OMRON

Sysmac Catalog

EtherNet/IP

EtherCAT

IO-Link

sysmac
always in control

News

System Design Guide

System Configuration

Network Configuration

You can make networks in the following layers with an NJ/NX/NY-Series Controller.
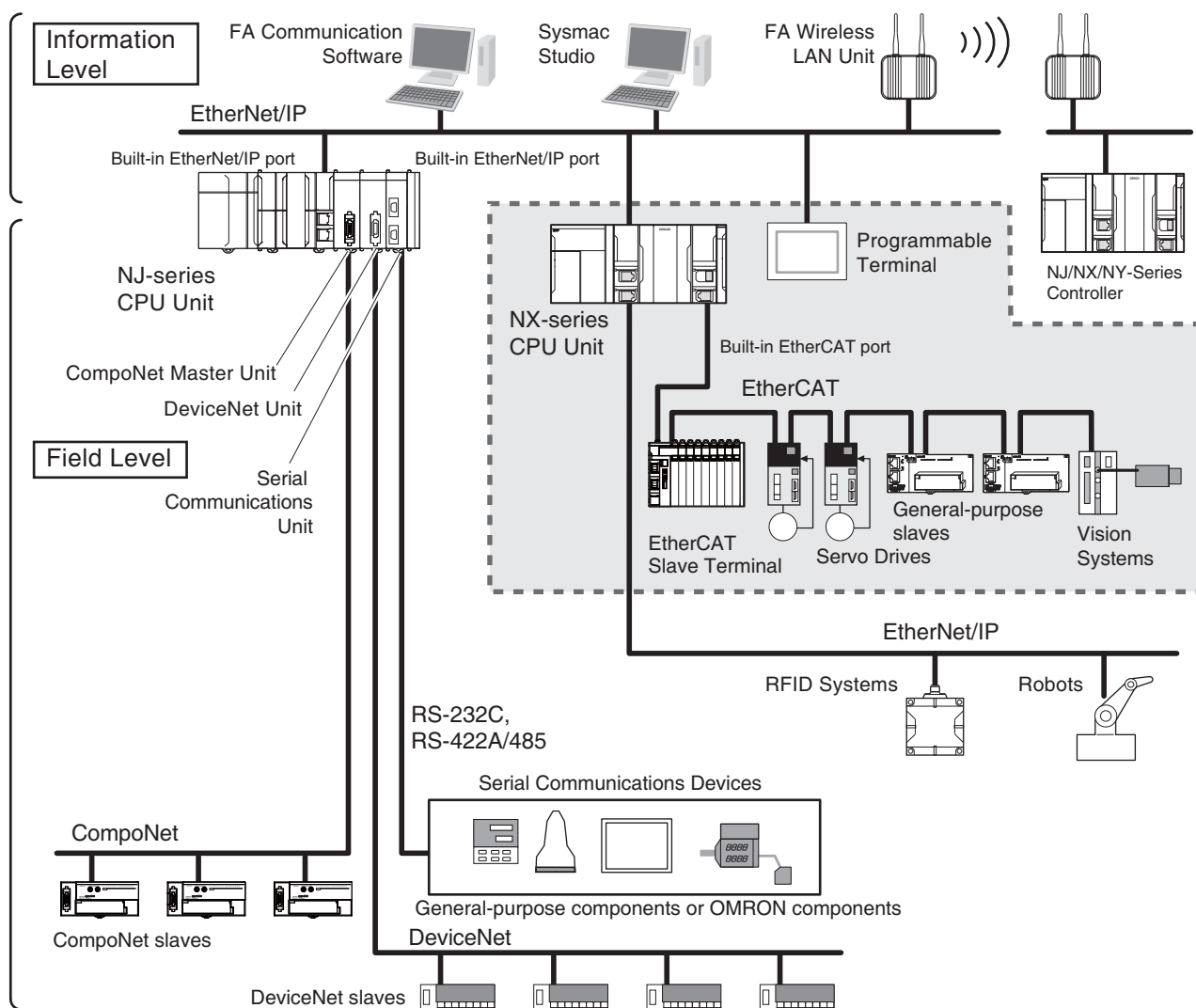
Connection		Connection method
Sysmac Studio		Use USB or the built-in EtherNet/IP port.
Between Controllers	NJ/NX/NY-series Controller or CJ-series PLC	Use the built-in EtherNet/IP port or a port on an EtherNet/IP Unit. *1
Devices	Servo Drives, general-purpose slaves and Vision Systems	Use the built-in 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.

OMRON

EtherCAT Network Configuration

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

Automation Software
Sysmac Studio

ESI Files

.xml

NJ/NX/NY-Series Controller
NX701-□□□□
NJ501-□□□□
NJ301-□□□□
NJ101-□□□□
NX1P2-□□□□
NY5□□-1

Programmable Terminals
NA5-□□□□□□

USB Cable *1
Commercially available USB cable

Built-in EtherCAT port

Ethernet cable *2
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
R88M-1□/R88D-1SN□-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-7000T
ZW-CE□□T

N-Smart Sensor Communications Unit
E3NW

N-Smart Fiber/Laser Photoelectric/ Contact Sensors
E3NX-FA0
E3NX-CA0
E3NC-LA0
E3NC-SA0
E9NC-TA0

Sensor Communications Unit
E3X-ECT

Fibers/Laser Photoelectric/ Proximity Sensor
E3X-HD0
E3X-MDA0
E3C-LDA0
E2C-EDA0

*1 The NX1P2 does not have a USB port. Connect to Sysmac Studio using the EtherNet/IP port.
*2 For 1000BASE-T, use an STP (double shielding with aluminum tape and braiding) cable of Ethernet category 5e or higher.
**Note:** With the NX1P2, a maximum of eight NX units can be connected to the CPU Unit. With the NX701, NJ501, NJ301 and NJ101, NX units cannot be connected to the CPU unit. Connect NX units to the slave terminal.

MEMO

OMRON

Machine Automation Controller
NJ/NX-Series

New controller that covers functions and high-speed processing required for machine control and safety, reliability and maintainability
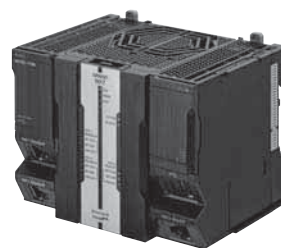
NX701-@@@@   **NJ501-@@@@**

Features

- 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-@@@@)
- Linear and circular interpolation.
- Electronic gear and cam synchronization.
- The Controller can be directly connected to a database. No special Unit, software, nor middleware is required. (NJ501-@@20/NJ101-@020)
- The NJ501 SECS/GEM CPU Unit has built-in the SECS/GEM communications functions which are the standards in the semiconductor industry. (NJ501-1340)
- Parallel link robot control function. (NJ501-4@@0)

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Features
Unit Configuration
Power Supply Units Current Consumption
Dimensions
General Specifications
Performance Specifications
Function Specifications
Version Information
Components and Functions

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

CPU Units
NJ501-□□□□ NJ301-□□□□

Ethernet Cable
100Base-TX twisted-pair cable

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

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.

Memory Card
HMC-SD291 (2GB) HMC-SD491 (4GB)

NX-Series EtherCAT Slave Terminals

EtherCAT Coupler Unit
NX-ECC□□□

Expansion Rack

NX Units	End Cover

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.)

NJ-Series
Power Supply Unit
NJ-P□□□□□

I/O Control Unit
CJ1W-IC101
(Required only when connecting to an Expansion Rack.)

CPU Rack

Configuration Units
· CJ1 Basic I/O Units
· CJ1 Special I/O Units
· CJ1 CPU Bus Units

Total: 10 Units max
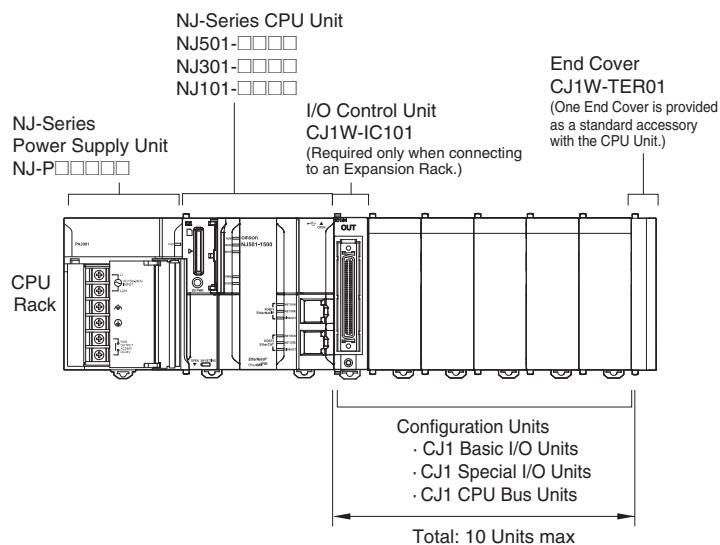
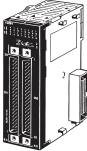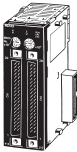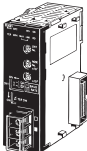Even though the NJ-Series Controllers do not have Backplanes, the term "slot" still used to refer to the location of Units. Slot numbers are assigned in order to Units from left to right on the CPU Rack (slot 0, slot 1, slot 2, etc.).

● **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.
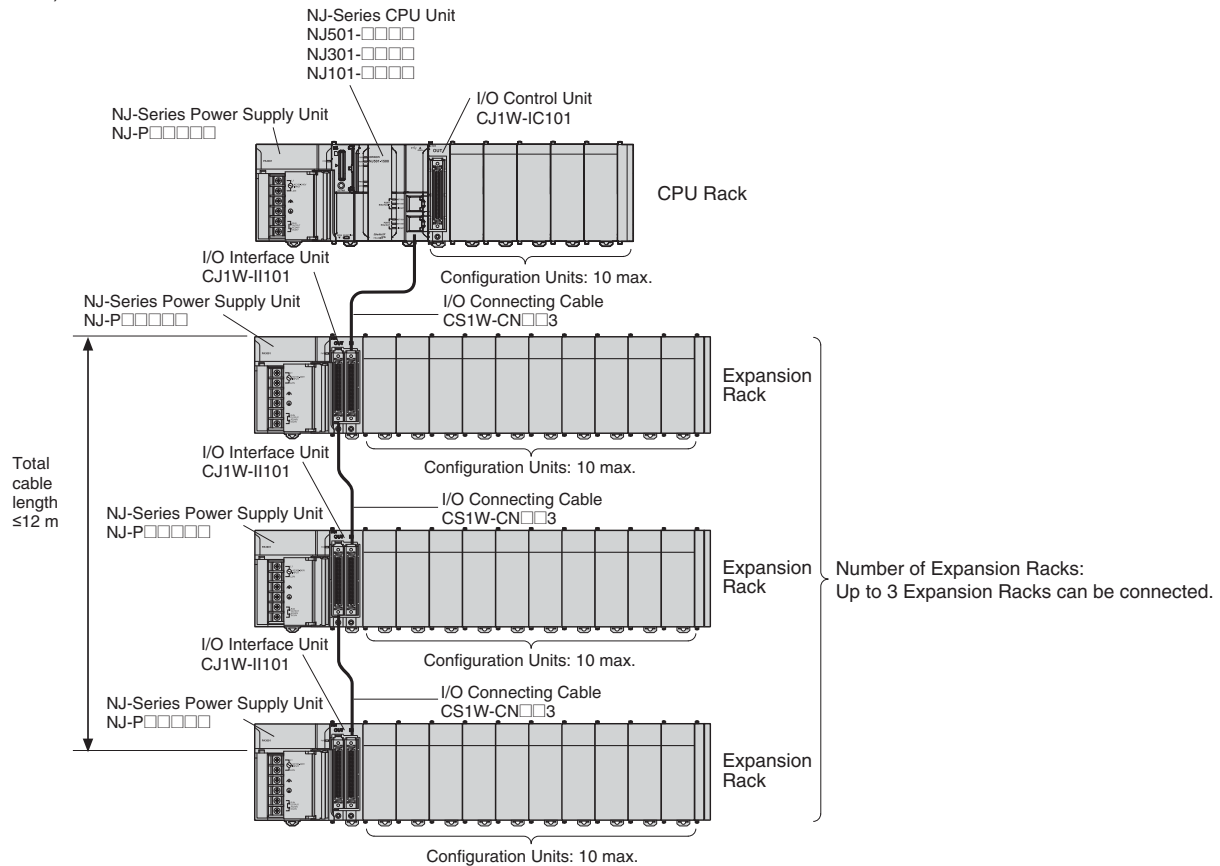
● Required Units

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	CJ1W-CRM21 *1							130 g max.
		Communications mode No. 0: 128 inputs/ 128 outputs for Word Slaves		0 to 94 (uses words for 2 unit numbers)	None	20 words	40 Units	0.40	---	
		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) 5 VDC	Current consumption (A) 24 VDC	Weight
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 (A) 5-VDC CPU Racks*	Max. current supplied (A)5-VDC Expansion Rack	Max. current supplied (B) 24 VDC	(C) Max. total power supplied
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
$(1) \times 5\ V + (2) \times 24\ V \leq$ (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	Voltage group 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

Product Dimensions

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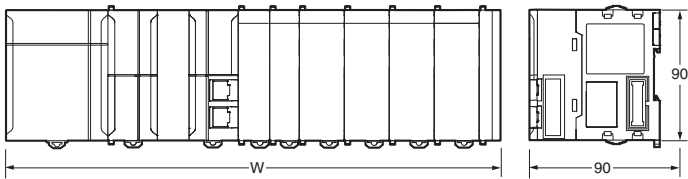
Example Rack Widths using NJ-PA3001 Power Supply Unit (AC)

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
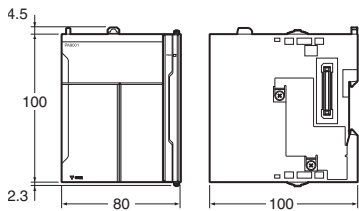
NX-PD7001
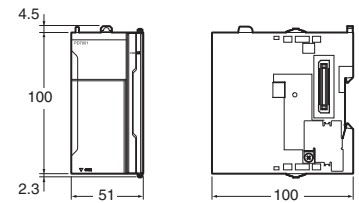
● CPU Units
NX701-@@@@

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

NJ-series

● Power Supply Units
NJ-PA3001
NJ-PD3001

W=70 :NJ-PA3001
　　　:NJ-PD3001

● CPU Units
NJ501-@@@@
NJ301-@@@@
NJ101-@@@@
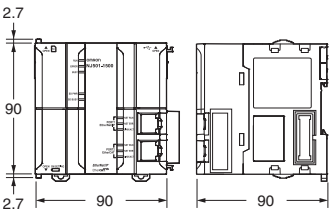
● End Cover
(included with CPU Units)
CJ1W-TER01
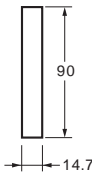
● **Units of Width 20 mm**

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

● I/O Control Unit
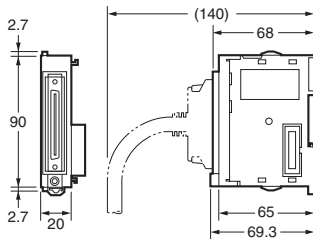
● 32-Point I/O Units (CJ1W-ID223@/OD23@)

Fujitsu connector

MIL connector
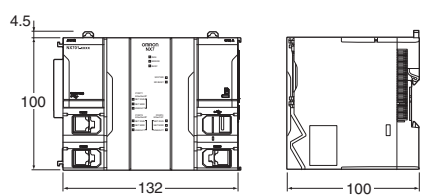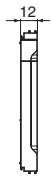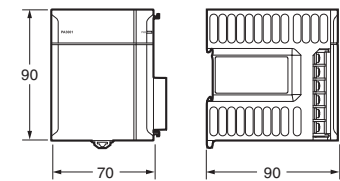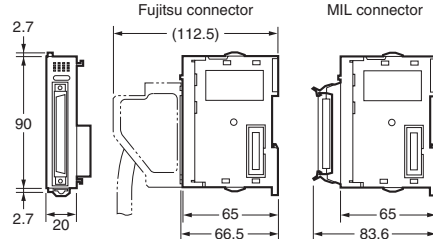
● **Units of Width 31 mm**

Unit	Model	Width
I/O Interface Unit	CJ1W-II101	
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	31
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
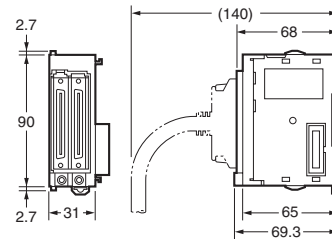
● 8/6-point Basic I/O Units, and High-speed Input Unit
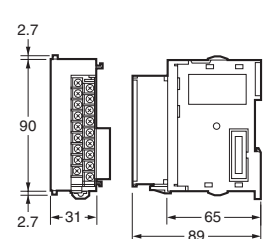
● 64-point Basic I/O Units and 32-point Basic I/O Units (CJ1W-MD23@)

Fujitsu connector

MIL connector
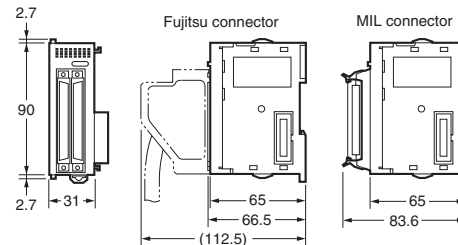
● Special I/O Units and CPU Bus Units

Mounting Dimensions

27.5
35
27.5

A

90

(Units:mm)
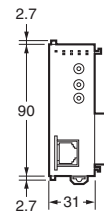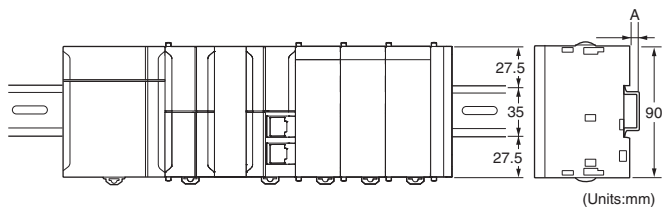
DIN Track model number	A
PFP-100N2	16 mm
PFP-100N	7.3 mm
FPP-50N	7.3 mm

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.

Approx. 100 to 150mm

to 90mm
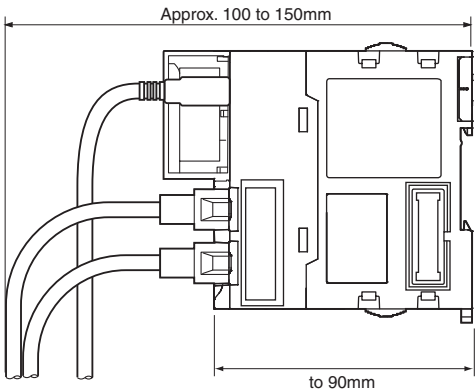
Note: Consider the following points when expanding the configuration:
The total length of I/O Connecting Cable must not exceed 12 m.
I/O Connecting Cables require the bending radius indicated below.

Expansion Cable

R ≥ 69 mm
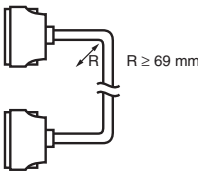
Note: Outer diameter of cable: 8.6 mm.

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 and fan unit)	-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, NK *1, EU Directives, RCM and KC Registration.	Conforms to cULus, NK, LR, EU Directives, RCM and KC Registration *2.		

*1. Supported only by the CPU Units manufactured in December 2016 or later.
*2. 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	1@@0	9@@0
Processing Time	Instruction Execution Times	LD instruction	0.37ns or more		1.1ns (1.7ns 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		24ns or more *1			42 ns or more		70 ns or more	
Programming	Program capacity *2	Size	80 MB (1600 KS)		20 MB (400 KS)			5 MB (100 KS)		3 MB (60 KS)	
		Number — POU definition	6,000		3,000			750		450	
		Number — 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 *3 — Size	256 MB		4 MB			2 MB			
		No Retain Attribute *3 — Number	360,000		90,000			22,500			
		Retain Attribute *4 — Size	4 MB		2 MB			0.5 MB			
		Retain Attribute *4 — 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		2,000			1,000			
	Memory for CJ-Series Units (Can be Specified with AT Specifications for Variables.)	CIO Area	---		6,144 words (CIO 0 to CIO 6143)						
		Work Area	---		512 words (W0 to W511)						
		Holding Area	---		1,536 words (H0 to H1535)						
		DM Area	---		32,768 words (D0 to D32767)						
		EM Area	---		32,768 words × 25 banks (E0_00000 to E18_32767) *5			32,768 words × 4 banks (E0_00000 to E3_32767) *5			
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	4,096 (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						
		Power OFF Detection Time — DC Power Supply	5 to 20ms		22 to 25 ms						

*1. When the hardware revision for the Unit is A.
*2. This is the capacity for the execution objects and variable tables (including variable names).
*3. Words for CJ-series Units in the Holding, DM, and EM Areas are not included.
*4. Words for CJ-series Units in the CIO and Work Areas are not included.
*5. When the Spool function of the NJ501-1@20 is enabled, the DB Connection Service uses E9_0 to E18_32767 (NJ501-1@20).
    When the Spool function of the NJ101-@@20 is enabled, the DB Connection Service uses E1_0 to E3_32767 (NJ101-@@20).

Item			NX701-		NJ501-			NJ301-		NJ101	
			1700	1600	@5@0	@4@0	@3@0	1200	1100	1@@0	9@@0
Motion Control	**Number of Controlled Axes**	**Maximum Number of Controlled Axes**	Maximum number of axes which can be defined. The number of controlled axes = The number of motion control axes + The number of single-axis position control axes							---	
			256 axes	128 axes	64 axes	32 axes	16 axes	15 axes *6	15 axes *6	6 axes	
		Motion control axes	Maximum number of motion control axes which can be defined. All motion control function is available.								
			256 axes	128 axes	64 axes	32 axes	16 axes	15 axes	15 axes	6 axes	
		Maximum number of used real axes	Maximum number of used real axes. The Number of used real axes includes following servo axes and encoder axes.								
			256 axes	128 axes	64 axes	32 axes	16 axes	8 axes	4 axes	2 axes	
		Used motion control servo axes	Maximum number of servo axes which all motion control function is available. The number of used motion control servo axes = The number of motion control axes whose axis type is set to servo axis and axis use is set to used axis.								
			256 axes	128 axes	64 axes	32 axes	16 axes	8 axes	4 axes	2 axes	
		Maximum number of axes for linear interpolation axis control	4 axes per axes group								
		Number of axes for circular interpolation axis control	2 axes per axes group								
	Maximum Number of Axes Groups		64 groups		32 groups						
	Motion Control Period		The same control period as that is used for the process data communications cycle for EtherCAT.								
	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.								

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

Item			NX701-		NJ501-			NJ301-		NJ101	
			1700	1600	@5@0	@4@0	@3@0	1200	1100	1@@0	9@@0
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 *7	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 *8 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 *9 including heartbeat		3,000 pps *9 *10 (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 (Total in 2 ports 739,328 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 *11	Supported.								
	Cip Message Service: Explicit Messages	Class 3 (number of connections)	128 / port total 256 (clients plus server)		32 (clients plus server)						
		UCMM (non-connec-tion type) — Maximum Number of Clients that Can Communicate at One Time	32 / port total 64		32						
		UCMM (non-connec-tion type) — Maximum Number of Servers that Can Communicate at One Time	32 / port total 64		32						
		Maximum number of TCP socket service	30		30 *12						30

*7. Data is updated on the line in the specified interval regardless of the number of nodes.
*8. The Packet interval of the CPU Unit version 1.02 or earlier is 10 to 10,000 ms in 1.0-ms increments.
*9. Means packets per second, i.e., the number of communications packets that can be sent or received in one second.
*10.The Permissible Communications Band of the CPU Unit version 1.02 or earlier is 1,000 pps.
*11.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.
*12.The Maximum number of TCP socket service of the CPU Unit version 1.02 or earlier is 16.
Note: For robot control by NJ501-4@@0, use the G5 series/1S series AC Servo Drive with built-in EtherCAT communications, absolute encoder, and brake.

Item		NX701-		NJ501-			NJ301-		NJ101	
		1700	1600	@5@0	@4@0	@3@0	1200	1100	1@@0	9@@0
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 (However, the maximum number of process data frames is 8.)		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 *13					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 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	
		Conditional-ly 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).		
Program-ming	POU (program organization units)	Programs		POUs that are assigned to tasks.			
		Function Blocks		POUs that are used to create objects with specific conditions.			
		Functions		POUs that are used to create an object that determine unique outputs for the inputs, such as for data processing.			
	Programming 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			
		Enumera-tions	Function	A derivative data type that uses text strings called enumerators to express variable values.			
	Data Type Attri-butes	Array Speci-fications	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 or 1S-Series Servomotor with an Absolute Encoder to eliminate the need to perform homing at startup.			
		Input signal logic inversion *6			You can inverse the logic of immediate stop input signal, positive limit input signal, negative limit input signal, or home proximity input signal.			
	External Interface Signals				The Servo Drive input signals listed on the right are used. Home signal, home proximity signal, positive limit signal, negative limit signal, immediate stop signal, and interrupt input signal			

*3. Supported only by the CPU Units with unit version 1.01 or later.
*6. Supported only by the CPU Units with unit version 1.05 or later.
*7. Supported only by the CPU Units with unit version 1.08 or later.

Item				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.			
	Built-in EtherNet/IP port Internal Port	Communications protocol		TCP/IP, UDP/IP			
		CIP Communications Service	Tag Data Links	Programless cyclic data exchange is performed with the devices on the EtherNet/IP network.			
			Message Communications	CIP commands are sent to or received from the devices on the EtherNet/IP network.			
		TCP/IP functions	CIDR	The function which performs IP address allocations without using a class (class A to C) of IP address.			
			IP Forwarding *5	The function which forward IP packets between interfaces.	---		
		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, no-protocol communications instructions *9, FTP client instructions, and Modbus RTU protcol instructions *9	The following instructions are supported. CIP communications instructions, socket communications instructions, SDO message instructions, no-protocol communications instructions, protocol macro instructions, and FTP client instructions *7, and Modbus RTU protcol instructions *9		
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	

*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.
*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.
*9. Supported only by the CPU Units with unit version 1.11 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 *10			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 *11	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 *12		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.			
		Transfer program from SD Memory Card *9		The user program on an SD Memory Card is loaded when the user changes system-defined variable to TRUE.			
		SD Memory Card Operation Instructions		You can access SD Memory Cards from instructions in the user program.			
		File Operations from the Sysmac Studio		You can perform file operations for Controller files in the SD Memory Card and read/write standard document files on the computer.			
		SD Memory Card Life Expiration Detection		Notification of the expiration of the life of the SD Memory Card is provided in a 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. Supported only by the CPU Units with unit version 1.11 or later.
*10.Cannot be used with the NJ101-9000.
*11.Maximum Number of Simultaneous Data Trace of the NJ501-1@20 CPU Unit with unit version 1.08 or later is 2.
*12.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-@@@@ or NJ101-@@@@, functions supported by the NJ501-@@20 or NJ101-@020 are as follows.

Item		Description	
		NJ501-1@20	NJ101-@020
Supported port		Built-in EtherNet/IP port	
Supported DB		Microsoft Corporation: SQL Server 2008/2008 R2/2012/2014 *1 Oracle Corporation: Oracle Database 10g /11g /12c *1 MySQL Community Edition 5.1/5.5/5.6 *2 International Business Machines Corporation (IBM): DB2 for Linux, UNIX and Windows 9.5/9.7/10.1/10.5 Firebird Foundation Incorporated: Firebird 2.1/2.5 The PostgreSQL Global Development Group: PostgreSQL 9.2/9.3/9.4 *1	
Number of DB Connections (Number of databases that can be connected at the same time)		3 connections max. *3	
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 *4	192 KB *4
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. SQL Server 2014, Oracle Database 12c and PostgreSQL 9.2/9.3/9.4 are supported by DBCon version 1.02 or higher.
*2. The supported storage engines of the DB are InnoDB and MyISAM.
*3. When two or more DB Connections are established, the operation cannot be guaranteed if you set different database types for the connections.
*4. Refer to "NJ-series Database Connection CPU Units User's Manual(W527)" for the information.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Motion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Features
Unit Configuration
Power Supply Units Current Consumption
Dimensions
General Specifications
Performance Specifications
Function Specifications
Version Information
Components and Functions

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 *2	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.
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	
Equipment Processing State	
Host-initiated S1, F13/F14 Scenario	
Event Notification	Yes
On-Line Identification	
Error Message	
Control (Operator Initiated)	
Documentation	

Additional capabilities	GEM-compliant
Establish Communications	
Dynamic Event Report Configuration	
Variable Data Collection	
Trace Data Collection	Yes
Status Data Collection	
Alarm Management	
Remote Control	
Equipment Constant	
Process Recipe Management	Process program: Yes E42 recipes: No E139 recipes: No
Material Movement	
Equipment Terminal Service	
Clock	
Limit Monitoring	Yes
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	4320
Robot control functions	Axes groups	Multi-axes coordinated control — Conveyer tracking	The robot is moved in synchronization with the conveyor during the conveyor tracking operation.				
		Auxiliary functions for multi-axes coordinated control — Kinematics Setting	Set parameters for robot operation, such as arm length of Delta3 robot.				
	Auxiliary functions	Monitoring functions — Work space function	Set the coordinate values for workspace check and check the workspace during operation.				

Version Information

Unit Versions

Units	Models	Unit Version
NX701 CPU Units	NX701-@@@@	From unit version 1.10 to 1.13
NJ501 CPU Units	NJ501-@@@@	From unit version 1.00 to 1.13
NJ301 CPU Units	NJ301-@@@@	From unit version 1.01 to 1.13
NJ101 CPU Units	NJ101-@@@@	From unit version 1.11 to 1.13
NJ-series Database Connection CPU Units	NJ501-@@20	Unit version 1.05 From unit version 1.07 to 1.13
	NJ101-@020	From unit version 1.11 to 1.13
NJ-series SECS/GEM CPU Unit	NJ501-1340	From unit version 1.09 to 1.13
NJ-series NJ Robotics CPU Units	NJ501-4@@0	From unit version 1.02 to 1.13

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
1.13	1.17
1.12	1.16
1.11	1.15
1.10 *1*2	1.14 1.13 1.12
1.09 *3	1.11 1.10
1.08	1.09
1.07	1.08
1.06	1.07
1.05 *4	1.06
1.04	1.05
1.03	1.04
1.02	1.03
1.01	1.02
1.00 *5	1.01 1.00

*1. The NJ101-1020 or NJ101-9020 can be used with Sysmac Studio version 1.14 or higher.
*2. The NX701-@@@@/NJ101-@@@@ CPU Unit can be used with Sysmac Studio version 1.13 or higher.
*3. The NJ501-1340 CPU Unit can be used with Sysmac Studio version 1.11 or higher.
*4. The NJ501-1@20 CPU Unit can be used with Sysmac Studio version 1.07 or higher.
*5. 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. About the "Unit Versions, DBCon Versions and Programming Devices", refer to the NJ-series Database Connection CPU Units Catalog (Cat. No. P088).
About the "Unit Versions, Robot Versions and Programming Devices", refer to the NJ-series Database Connection CPU Units Catalog (Cat. No. P085).
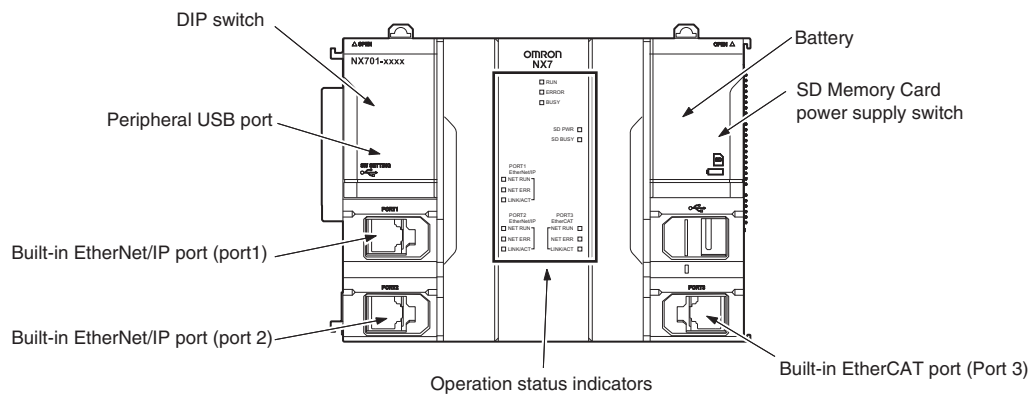
Relationship between Hardware Revisions of CPU Units and Sysmac Studio Versions

The following table shows how the hardware revisions of the NJ-series CPU Units correspond to Sysmac Studio versions. Use the corresponding version of Sysmac Studio or higher if you execute the Simulator in Execution Time Estimation Mode. You cannot select the relevant hardware revision if you use a lower version of the Sysmac Studio.
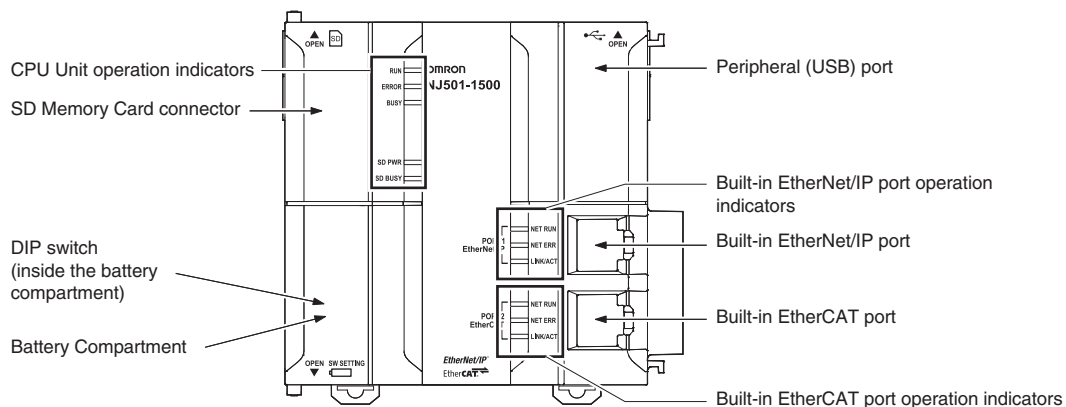
Model number	Hardware revision of CPU Unit	Corresponding version of Sysmac Studio
NJ501-@@@@	A	Ver.1.14 or higher

Components and Functions

NX-series CPU Unit
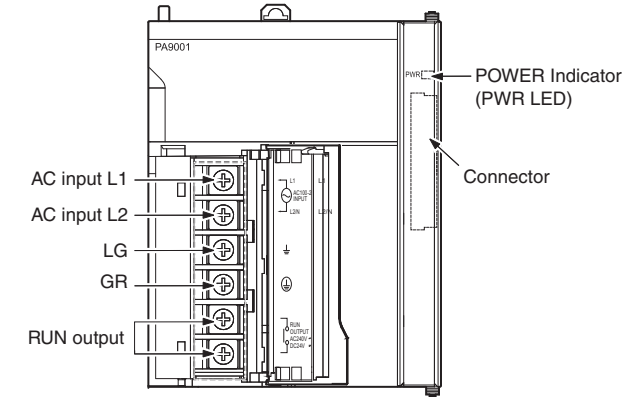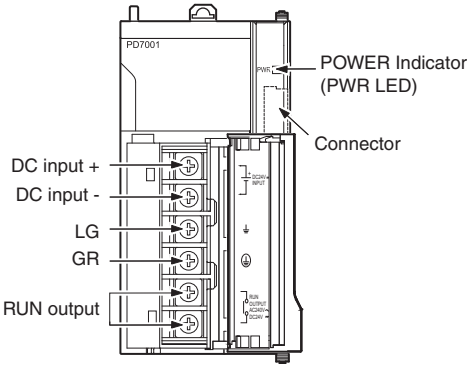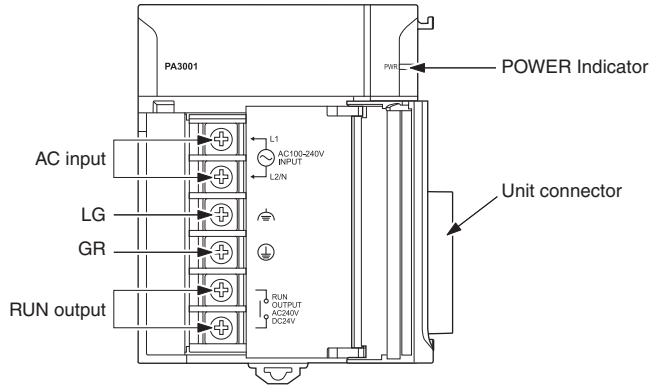
DIP switch

Peripheral USB port

Built-in EtherNet/IP port (port1)

Built-in EtherNet/IP port (port 2)

Battery

SD Memory Card power supply switch

Built-in EtherCAT port (Port 3)

Operation status indicators

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

Power Supply Unit
NX-PA9001

POWER Indicator
(PWR LED)

Connector

AC input L1

AC input L2

LG

GR

RUN output

NX-PD7001

POWER Indicator
(PWR LED)

Connector

DC input +

DC input -

LG

GR

RUN output

NJ-PA3001

POWER Indicator

AC input

LG

GR

RUN output

Unit connector

NJ-PD3001

POWER Indicator

+ (DC input)

– (DC input)

LG

GR

RUN output

Unit connector
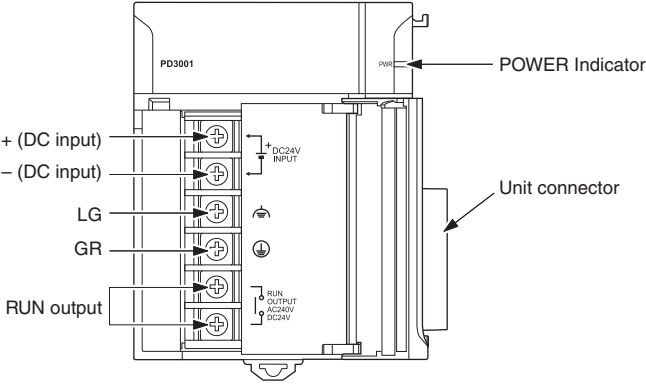
Compact package-type machine automation controller
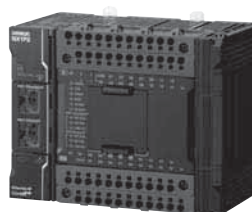
NX1P2-9024DT
NX1P2-9024DT1
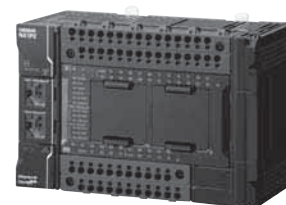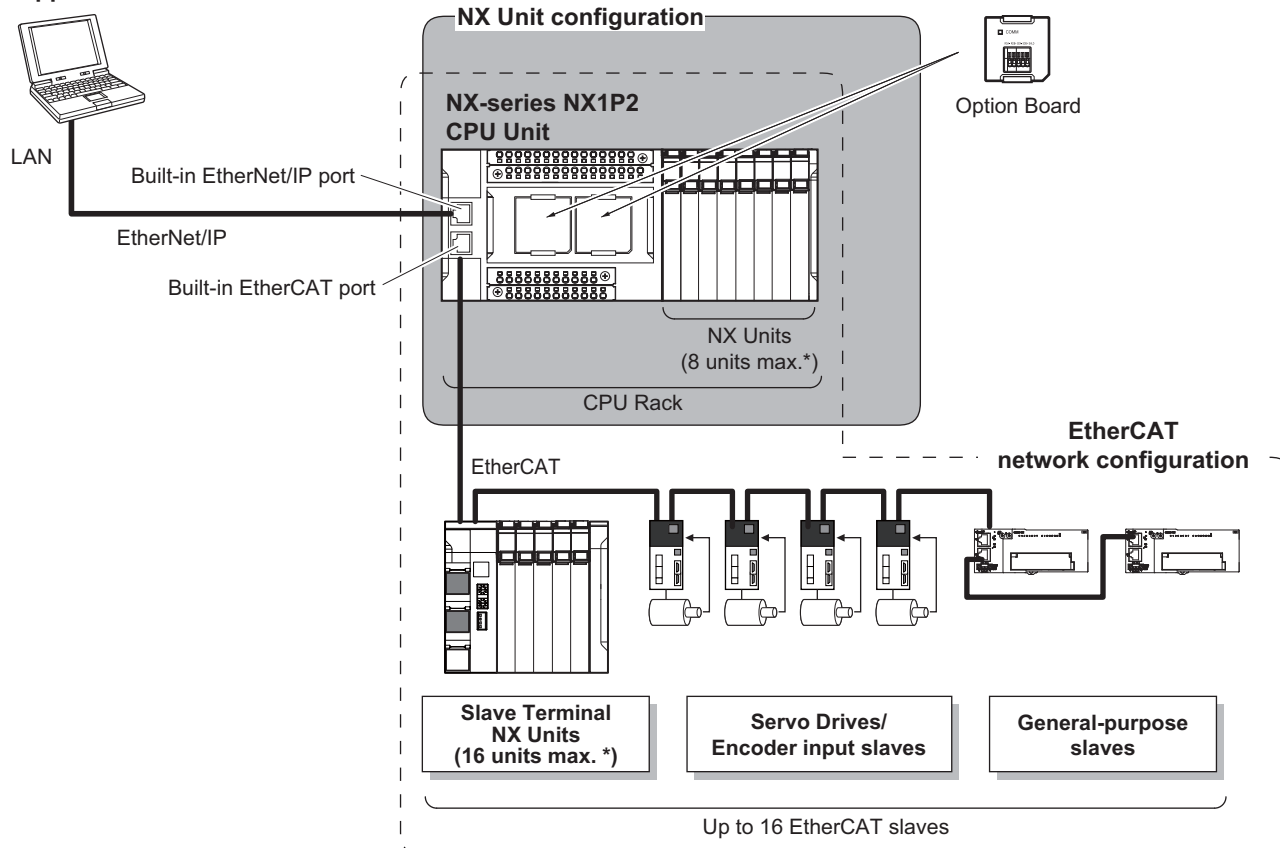
NX1P2-1□40DT
NX1P2-1□40DT1

Features

- Integrated sequence control and motion control
- Up to eight axes of control via EtherCAT
- Up to four synchronized axes - electronic gear/cam and linear/circular interpolation
- Standard-feature EtherCAT control network support
- Safety subsystem on EtherCAT
- Standard-feature EtherNet/IP port
- Built-in I/O
- Up to eight NX I/O Units connectable
- Up to sixteen remote NX I/O Units connectable via EtherCAT coupler
- Up to two option boards connectable to add serial communications or analog I/O functionality
- Battery-free operation
- Fully conforms with IEC 61131-3 standard programming

System Configuration

Basic System Configuration

Support Software

NX Unit configuration

Option Board

NX-series NX1P2 CPU Unit

LAN

Built-in EtherNet/IP port

EtherNet/IP

Built-in EtherCAT port

NX Units
(8 units max.*)

CPU Rack

EtherCAT

EtherCAT network configuration

Slave Terminal
NX Units
(16 units max. *)

Servo Drives/
Encoder input slaves

General-purpose
slaves

Up to 16 EtherCAT slaves

* Includes System Units such as Additional I/O Power Supply Unit.

Electrical and Mechanical Specifications

Item		Specification	
Model		NX1P2-1□40DT□	NX1P2-9024DT□
Enclosure		Mounted in a panel	
Dimensions (mm) *1		154 × 100 × 71 mm (W×H×D)	130 × 100 × 71 mm (W×H×D)
Weight *2		NX1P2-1□40DT: 650 g NX1P2-1□40DT1: 660 g	NX1P2-9024DT: 590 g NX1P2-9024DT1: 590 g
Unit power supply	**Power supply voltage**	24 VDC (20.4 to 28.8 VDC)	
	Unit power consumption *3	NX1P2-1□40DT: 7.05 W NX1P2-1□40DT1: 6.85 W	NX1P2-9024DT: 6.70 W NX1P2-9024DT1: 6.40 W
	Inrush current *4	For cold start at room temperature: 10 A max./0.1 ms max. and 2.5 A max./150 ms max.	
	Current capacity of power supply terminal *5	4 A max.	
	Isolation method	No isolation: between the Unit power supply terminal and internal circuit	
Power supply to the NX Unit power supply	**NX Unit power supply capacity**	10 W max.	
	NX Unit power supply efficiency	80 %	
	Isolation method	No isolation: between the Unit power supply terminal and NX Unit power supply	
I/O Power Supply to NX Units		Not provided *6	
External connection terminals	**Communication connector**	RJ45 for EtherNet/IP Communications × 1 RJ45 for EtherCAT Communications × 1	
	Screwless clamping terminal block	For Unit power supply input, grounding, and input signal: 1 (Removable) For output signal: 1 (Removable)	
	Output terminal (service supply)	Not provided	
	RUN output terminal	Not provided	
	NX bus connector	8 NX Units can be connected	
	Option board slot	2	1

*1. Includes the End Cover, and does not include projecting parts.
*2. Includes the End Cover. The weight of the End Cover is 82 g.
*3. Includes the SD Memory Card and Option Board. The NX Unit power consumption to NX Units is not included.
*4. The inrush current may vary depending on the operating condition and other conditions. Therefore, select fuses, breakers, and external power supply devices that have enough margin in characteristic and capacity, considering the condition under which the devices are used.
*5. The amount of current that can be passed constantly through the terminal. Do no exceed this current value when you use a through-wiring for the Unit power supply.
*6. When the type of the I/O power supply to NX Units you use is the supply from NX bus, an Additional I/O Power Supply Unit is required. The maximum I/O power supply current from an Additional I/O Power Supply Unit is 4 A. Refer to the *NX-series NX1P2 CPU Unit Hardware User's Manual* (Cat. No. W578) for details.

General Specifications

Item		Specification
Enclosure		Mounted in a panel
Grounding method		Ground to less than 100 Ω.
Operating environment	**Ambient operating temperature**	0 to 55°C
	Ambient operating humidity	10% to 95% (with no condensation)
	Atmosphere	Must be free from corrosive gases.
	Ambient storage temperature	-25 to 70°C (excluding battery)
	Altitude	2,000 m max.
	Pollution degree	2 or less: Conforms to JIS B 3502 and IEC 61131-2.
	Noise immunity	2 kV on power supply line (Conforms to IEC 61000-4-4.)
	Overvoltage category	Category II: Conforms to JIS B 3502 and IEC 61131-2.
	EMC immunity level	Zone B
	Vibration resistance	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 m/s² 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/s², 3 times in X, Y, and Z directions
Battery	**Life**	5 years (Power ON time rate 0% (power OFF))
	Model	CJ1W-BAT01 (sold separately)
Applicable standards *	**EU Directives**	EN 61131-2
	cULus	Listed UL 61010-2-201 and ANSI/ISA 12.12.01
	Shipbuilding Standards	---
	Other than the above.	KC

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

Performance Specifications

Item			NX1P2-		
			11□□□□/ 11□□□□1	10□□□□/ 10□□□□1	90□□□□/ 90□□□□1
Processing time	Instruction execution times	LD instruction	3.3 ns		
		Math instructions (for long real data)	70 ns or more		
Programming	Program capacity *1	Size	1.5 MB		
		Quantity — Number of POU definitions	450		
		Quantity — Number of POU Instances	1,800		
	Memory capacity for variables *2	Retain attributes — Size	32 kB		
		Retain attributes — Number of variables	5,000		
		No Retain attributes — Size	2 MB		
		No Retain attributes — Number of variables	90,000		
	Data types	Number of data types	1,000		
	Memory for CJ-series Units (Can be specified with AT specifications for variables.)	CIO Area	0 to 6,144 channel (0 to 6,143) *3		
		Work Area	0 to 512 channel (W0 to W511) *3		
		Holding Area	0 to 1,536 channel (H0 to H1,535) *4		
		DM Area	0 to 16,000 channel (D0 to F15,999) *4		
		EM Area	---		
Motion control	Number of controlled axes *5	Maximum number of controlled axes	12 axes	10 axes	4 axes
		Motion control axes	8 axes	6 axes	---
		Single-axis position control axes	4 axes	4 axes	4 axes
		Maximum number of used real axes	8 axes	6 axes	4 axes
		Used motion control servo axes	4 axes	2 axes	---
		Used single-axis position control servo axes	4 axes	4 axes	4 axes
		Maximum number of axes for linear interpolation axis control	4 axes per axes group		---
		Number of axes for circular interpolation axis control	2 axes per axes group		---
	Maximum number of axes groups		8 axes groups		---
	Motion control period		Same as the period for primary periodic task		
	Cams	Number of cam data points — Maximum points per cam table	65,535 points		---
		Number of cam data points — Maximum points for all cam tables	262,140 points		---
		Maximum number of cam tables	80 tables		---
	Position units		Pulse, mm, μm, nm, degree, and inch		
	Override factors		0.00% or 0.01% to 500.00%		
Built-in EtherNet/IP port	Number of ports		1		
	Physical layer		10BASE-T, 100BASE-TX		
	Frame length		1,514 bytes max.		
	Media access method		CSMA/CD		
	Modulation		Baseband		
	Topology		Star		
	Baud rate		100 Mbps/s (100BASE-TX)		
	Transmission media		STP (shielded, twisted-pair) cable of Ethernet category 5, 5e or higher		
	Maximum transmission distance between Ethernet switch and node		100 m		
	Maximum number of cascade connections		There are no restrictions if an Ethernet switch is used.		
	CIP service: Tag data links (cyclic communications)	Maximum number of connections	32		
		Packet interval *6	Can be set for each connection. 2 to 10,000 ms in 1-ms increments		
		Permissible communications band	3,000 pps *7 (including heartbeat)		
		Maximum number of tag sets	32		
		Tag types	Network variables CIO/WR/HR/DM		
		Number of tags per connection (i.e., per tag set)	8 (7 tags if Controller status is included in the tag set.)		
		Maximum number of tags	256		
		Maximum link data size per node (total size for all tags)	19,200 bytes		
		Maximum data size per connection	600 bytes		
		Maximum number of registrable tag sets	32 (1 connection = 1 tag set)		
		Maximum tag set size	600 bytes (Two bytes are used if Controller status is included in the tag set.)		
		Multi-cast packet filter *8	Supported.		

Item				NX1P2-		
				11□□□□/ 11□□□□1	10□□□□/ 10□□□□1	90□□□□/ 90□□□□1
Built-in EtherNet/IP port	**CIP message service: Explicit messages**	**Class 3 (number of connections)**		32 (clients plus server)		
		UCMM (non-connection type)	**Maximum number of clients that can communicate at one time**	32		
			Maximum number of servers that can communicate at one time	32		
	Number of TCP sockets			30		
Built-in EtherCAT port	**Communications standard**			IEC 61158 Type12		
	EtherCAT master specifications			Class B (Feature Pack Motion Control compliant)		
	Physical layer			100BASE-TX		
	Modulation			Baseband		
	Baud rate			100 Mbps (100BASE-TX)		
	Duplex mode			Auto		
	Topology			Line, daisy chain, and branching		
	Transmission media			Twisted-pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding)		
	Maximum transmission distance between nodes			100 m		
	Maximum number of slaves			16		
	Range of node addresses that can be set			1 to 192		
	Maximum process data size			Input: 1,434 bytes Output: 1,434 bytes However, the maximum number of process data frames is 1.		
	Maximum process data size per slave			Input: 1,434 bytes Output: 1,434 bytes		
	Communications cycle			2,000 μs to 8,000 μs in 250-μs increments		
	Sync jitter			1 μs max.		
Serial Communications (Serial Communications Option Board)	**Communications method**			half duplex		
	Synchronization			Start-stop		
	Baud rate			1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2 kbps		
	Transmission distance			Depends on Option Board.		
	Supported protocol			Host link, Modbus-RTU master, and no-protocol		
Unit configuration	**Maximum number of connectable Units**	**Maximum number of NX Units that can be mounted to the CPU Unit**		8		
		Maximum number of NX Units for entire controller		24 On CPU Rack: 8 On EtherCAT Slave Terminals: 16		
	Power supply	**Model**		A non-isolated power supply for DC input is built into the CPU Unit.		
		Power OFF detection time		2 to 8 ms		
Option Board	**Number of slots**			2	2	1
Built-in I/O	**Input**	**Number of points**		24	24	14
	Output	**Number of points**		16	16	10
		Load short-circuit protection		11□□DT/10□□DT/9024DT: Not provided (NPN) 11□□DT1/10□□DT1/9024DT1: Provided (PNP)		
Internal clock	**Accuracy**			At ambient temperature of 55°C: -3.5 to 0.5 min error per month At ambient temperature of 25°C: -1.5 to 1.5 min error per month At ambient temperature of 0°C: -3 to 1 min error per month		
	Retention time of built-in capacitor			At ambient temperature of 40°C: 10 days		

*1. Execution objects and variable tables (including variable names)
*2. Memory used for CJ-series Units is included.
*3. The value can be set in 1 ch increments. The value is included in the total size of variables without a Retain attribute.
*4. The value can be set in 1 ch increments. The value is included in the total size of variables with a Retain attribute.
*5. Refer to the *NJ/NX-series CPU Unit Motion Control User's Manual* (Cat. No. W507) for the description of this term.
*6. Data will be refreshed at the set interval, regardless of the number of nodes.
*7. "pps" means packets per second, i.e., the number of communications packets that can be sent or received in one second.
*8. As the EtherNet/IP port implements the IGMP client, unnecessary multi-cast packets can be filtered by using an Ethernet switch that supports IGMP Snooping.

Side tabs: System Configuration · Controllers · Softwares · Programmable Terminals · Slave Terminals · Safety · Mortion/Drives · Inverters · Robotics · Sensors · Remote I/O Terminals · Ordering Information

Sub tabs: Features · System Configuration · Specifications · Input/Output Terminal Block · Part Names and Functions · Option Board · NX Unit Configuration · Battery · Sysmac Studio · Version Information · Dimensions

Function Specifications

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

Item				NX1P2
Motion Control	Single Axes	Single-Axis Position Control	Absolute Positioning	Positioning is performed for a target position that is specified with an absolute value.
			Relative Positioning	Positioning is performed for a specified travel distance from the command current position.
			Interrupt Feeding	Positioning is performed for a specified travel distance from the position where an interrupt input was received from an external input.
			Cyclic Synchronous Absolute Positioning	A positioning command is output each control period in Position Control Mode.
		Single-axis Velocity Control	Velocity Control	Velocity control is performed in Position Control Mode.
			Cyclic Synchronous Velocity Control	A velocity command is output each control period in Velocity Control Mode.
		Single-axis Torque Control	Torque Control	The torque of the motor is controlled.
		Single-axis Synchronized Control	Starting Cam Operation	A cam motion is performed using the specified cam table.
			Ending Cam Operation	The cam motion for the axis that is specified with the input parameter is ended.
			Starting Gear Operation	A gear motion with the specified gear ratio is performed between a master axis and slave axis.
			Positioning Gear Operation	A gear motion with the specified gear ratio and sync position is performed between a master axis and slave axis.
			Ending Gear Operation	The specified gear motion or positioning gear motion is ended.
			Synchronous Positioning	Positioning is performed in sync with a specified master axis.
			Master Axis Phase Shift	The phase of a master axis in synchronized control is shifted.
			Combining Axes	The command positions of two axes are added or subtracted and the result is output as the command position.
		Single-axis Manual Operation	Powering the Servo	The Servo in the Servo Drive is turned ON to enable axis motion.
			Jogging	An axis is jogged at a specified target velocity.
		Auxiliary Functions for Single-axis Control	Resetting Axis Errors	Axes errors are cleared.
			Homing	A motor is operated and the limit signals, home proximity signal, and home signal are used to define home.
			Homing with specified parameters	The parameters are specified, the motor is operated, and the limit signals, home proximity signal, and home signal are used to define home.
			High-speed Homing	Positioning is performed for an absolute target position of 0 to return to home.
			Stopping	An axis is decelerated to a stop.
			Immediately Stopping	An axis is stopped immediately.
			Setting Override Factors	The target velocity of an axis can be changed.
			Changing the Current Position	The command current position or actual current position of an axis can be changed to any position.
			Enabling External Latches	The position of an axis is recorded when a trigger occurs.
			Disabling External Latches	The current latch is disabled.
			Zone Monitoring	You can monitor the command position or actual position of an axis to see when it is within a specified range (zone).
			Enabling Digital Cam Switches	You can turn a digital output ON and OFF according to the position of an axis
			Monitoring Axis Following Error	You can monitor whether the difference between the command positions or actual positions of two specified axes exceeds a threshold value.
			Resetting the Following Error	The error between the command current position and actual current position is set to 0.
			Torque Limit	The torque control function of the Servo Drive can be enabled or disabled and the torque limits can be set to control the output torque.
			Command Position Compensation	The function which compensate the position for the axis in operation.
			Start Velocity	You can set the initial velocity when axis motion starts.

Item				NX1P2
Motion Control	**Axes Groups**	**Multi-axes Coordinated Control**	**Absolute Linear Interpolation**	Linear interpolation is performed to a specified absolute position.
			Relative Linear Interpolation	Linear interpolation is performed to a specified relative position.
			Circular 2D Interpolation	Circular interpolation is performed for two axes.
			Axes Group Cyclic Synchronous Absolute Positioning	A positioning command is output each control period in Position Control Mode.
		Auxiliary Functions for Multi-axes Coordinated Control	**Resetting Axes Group Errors**	Axes group errors and axis errors are cleared.
			Enabling Axes Groups	Motion of an axes group is enabled.
			Disabling Axes Groups	Motion of an axes group is disabled.
			Stopping Axes Groups	All axes in interpolated motion are decelerated to a stop.
			Immediately Stopping Axes Groups	All axes in interpolated motion are stopped immediately.
			Setting Axes Group Override Factors	The blended target velocity is changed during interpolated motion.
			Reading Axes Group Positions	The command current positions and actual current positions of an axes group can be read.
			Changing the Axes in an Axes Group	The Composition Axes parameter in the axes group parameters can be overwritten temporarily.
	Common Items	**Cams**	**Setting Cam Table Properties**	The end point index of the cam table that is specified in the input parameter is changed.
			Saving Cam Tables	The cam table that is specified with the input parameter is saved in non-volatile memory in the CPU Unit.
			Generating Cam Tables	The cam table is generated from the cam property and cam node that is specified in input parameters.
		Parameters	**Writing MC Settings**	Some of the axis parameters or axes group parameters are overwritten temporarily.
			Changing Axis Parameters	You can access and change the axis parameters from the user program.
	Auxiliary Functions	**Count Modes**		You can select either Linear Mode (finite length) or Rotary Mode (infinite length).
		Unit Conversions		You can set the display unit for each axis according to the machine.
		Acceleration/ Deceleration Control	**Automatic Acceleration/ Deceleration Control**	Jerk is set for the acceleration/deceleration curve for an axis motion or axes group motion.
			Changing the Acceleration and Deceleration Rates	You can change the acceleration or deceleration rate even during acceleration or deceleration.
		In-Position Check		You can set an in-position range and in-position check time to confirm when positioning is completed.
		Stop Method		You can set the stop method to the immediate stop input signal or limit input signal.
		Re-execution of Motion Control Instructions		You can change the input variables for a motion control instruction during execution and execute the instruction again to change the target values during operation.
		Multi-execution of Motion Control Instructions (Buffer Mode)		You can specify when to start execution and how to connect the velocities between operations when another motion control instruction is executed during operation.
		Continuous Axes Group Motions (Transition Mode)		You can specify the Transition Mode for multi-execution of instructions for axes group operation.
		Monitoring Functions	**Software limits**	The movement range of an axis is monitored.
			Following Error	The error between the command current value and the actual current value is monitored for each axis.
			Velocity, Acceleration Rate, Deceleration Rate, Torque, Interpolation Velocity, Interpolation Acceleration Rate, and Interpolation Dceleration Rate	You can set and monitor warning values for each axis and each axes group.
		Absolute Encoder Support		You can use an OMRON 1S-series Servomotor or G5-series Servomotor with an Absolute Encoder to eliminate the need to perform homing at startup.
		Input Signal Logic Inversion		You can inverse the logic of immediate stop input signal, positive limit input signal, negative limit input signal, or home proximity input signal.

Item			NX1P2
Motion Control	**External Interface Signals**		The Servo Drive input signals listed on the right are used. Home signal, home proximity signal, positive limit signal, negative limit signal, immediate stop signal, and interrupt input signal
Unit (I/O) Management	**EtherCAT slaves**	**Maximum Number of Slaves**	16
	CJ-Series Units	**Maximum Number of Units**	Not supported
Communications	**Peripheral USB Port**		Not supported
	Built-in EtherNet/IP Port	**Communications Protocol**	TCP/IP and UDP/IP
		CIP Communications Service — **Tag Dta Links**	Programless cyclic data exchange is performed with the devices on the EtherNet/IP network.
		CIP Communications Service — **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.
		TCP/IP Applications — **FTP Client**	Files are transferred via FTP from the CPU Unit to computers or Controllers at other Ethernet nodes. FTP client communications instructions are used.
		TCP/IP Applications — **FTP Server**	Files can be read from or written to the SD Memory Card in the CPU Unit from computers at other Ethernet nodes.
		TCP/IP Applications — **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.
		TCP/IP Applications — **SNMP Agent**	Built-in EtherNet/IP port internal status information is provided to network management software that uses an SNMP manager.
	EtherCAT Port	**Supported Services** — **Process Data Communications**	A communications method to exchange control information in cyclic communications between the EtherCAT master and slaves. This communications method is defined by CoE.
		Supported Services — **SDO Communications**	A communications method to exchange control information in noncyclic event communications between EtherCAT master and slaves. This communications method is defined by CoE.
		Network Scanning	Information is read from connected slave devices and the slave configuration is automatically generated.
		DC (Distributed Clock)	Time is synchronized by sharing the EtherCAT system time among all EtherCAT devices (including the master).
		Packet Monitoring	The frames that are sent by the master and the frames that are received by the master can be saved. The data that is saved can be viewed with WireShark or other applications.
		Enable/Disable Settings for Slaves	The slaves can be enabled or disabled as communications targets.
		Disconnecting/Connecting Slaves	Temporarily disconnects a slave from the EtherCAT network for maintenance, such as for replacement of the slave, and then connects the slave again.
		Supported Application Protocol — **CoE**	SDO messages of the CAN application can be sent to slaves via EtherCAT
	Serial Communication	**Protocol**	Host link (FINS), no-protocol, and Modbus-RTU master (when connected to the Serial Communications Option Board)
	Communications Instructions		FTP client instructions, CIP communications instructions, socket communications instructions, SDO message instructions, noprotocol communications instructions, and Modbus RTU protocol instructions
Operation Management	**RUN Output Contacts**		Not supported
System Management	**Event Logs**	**Function**	Events are recorded in the logs
	Maximum Number of Events	**System Event Log**	576 *2
		Access Event Log	528 *3
		User-defined Event Log	512
Debugging	**Online Editing**	**Single**	Programs, function blocks, functions, and global variables can be changed online. More than one operators can change POUs individually via network.
	Forced Refreshing		The user can force specific variables to TRUE or FALSE.
		Maximum Number of Forced Variables — **Device Variables for EtherCAT Slaves**	64
		Maximum Number of Forced Variables — **Device Variables for CJ-series Units and Variables with AT Specifications**	Not supported
	MC Test Run		Motor operation and wiring can be checked from the Sysmac Studio.
	Synchronizing		The project file in the Sysmac Studio and the data in the CPU Unit can be made the same when online.
	Differentiation Monitoring		You can monitor when a variable changes to TRUE or changes to FALSE.
		Maximum Number of Contacts	8

System Configuration

Controllers

Softwares

Features | System Configuration | Specifications | Input/Output Terminal Block | Part Names and Functions | Option Board | NX Unit Configuration | Battery | Sysmac Studio | Version Information | Dimensions

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

		Item			NX1P2
Debugging	Data Tracing	Types	Single Triggered Trace		When the trigger condition is met, the specified number of samples are taken and then tracing stops automatically.
			Continuous Trace		Data tracing is executed continuously and the trace data is collected by the Sysmac Studio.
		Maximum Number of Simultaneous Data Traces			2
		Maximum Number of Records			10000
		Maximum Number of Sampled Variables			48 variables
		Timing of Sampling			Sampling is performed for the specified task period, at the specified time, or when a sampling instruction is executed.
		Triggered Traces			Trigger conditions are set to record data before and after an event.
			Trigger Conditions		When BOOL variable changes to TRUE or FALSE Comparison of non-BOOL variable with a constant Comparison Method: Equals (=), Greater than (>), Greater than or equals ($\geq$), Less Than (<), Less than or equals ($\leq$), Not equal ($\neq$)
			Delay		Trigger position setting: A slider is used to set the percentage of sampling before and after the trigger condition is met.
	Simulation				The operation of the CPU Unit is emulated in the Sysmac Studio.
Reliability functions	Self-Diagnosis	Controller Errors	Levels		Major faults, partial faults, minor faults, observation, and information
			Maximum number of message languages		9 (Sysmac Studio) 2 (NS-series PT)
		User-defined Errors	Function		User-defined errors are registered in advance and then records are created by executing instructions.
			Levels		8
			Maximum number of message languages		9
Security	Protecting Software Assets and Preventing Operating Mistakes	CPU Unit Names and Serial IDs			When going online to a CPU Unit from the Sysmac Studio, the CPU Unit name in the project is compared to the name of the CPU Unit being connected to.
		Protection	User Program Transfer with no Restoration Information		You can prevent reading data in the CPU Unit from the Sysmac Studio.
			CPU Unit Write Protection		You can prevent writing data to the CPU Unit from the Sysmac Studio or SD Memory Card.
			Overall Project File Protection		You can use passwords to protect .smc files from unauthorized opening on the Sysmac Studio.
			Data Protection		You can use passwords to protect POUs on the Sysmac Studio.
		Verification of Operation Authority			Online operations can be restricted by operation rights to prevent damage to equipment or injuries that may be caused by operating mistakes.
			Number of Groups		5
		Verification of User Program Execution ID			The user program cannot be executed without entering a user program execution ID from the Sysmac Studio for the specific hardware (CPU Unit).
SD Memory Card functions	Storage Type				SD Memory Card, SDHC Memory Card
	Application	Automatic Transfer from SD Memory Card			When the power supply to the Controller is turned ON, the data that is stored in the autoload directory of the SD Memory Card is transferred to the Controller.
		Program transfer from SD Memory Card			With the specification of the system-defined variable, you can transfer a program that is stored in the SD Memory Card to the Controller.
		SD Memory Card Operation Instructions			You can access SD Memory Cards from instructions in the user program.
		File Operations from the Sysmac Studio			You can perform file operations for Controller files in the SD Memory Card and read/write general-purpose document files on the computer.
		SD Memory Card Life Expiration Detection			Notification of the expiration of the life of the SD Memory Card is provided in a system-defined variable and event log.
Backing up data	SD Memory Card backups	Operating methods	CPU Unit front panel DIP switch		Backup, verification, and restoration operations are performed by manipulating the front-panel DIP switch on the CPU Unit.
			Specification with system-defined variables		Backup and verification operations are performed by manipulating system-defined variables.
			SD Memory Card Window in Sysmac Studio		Backup and verification operations are performed from the SD Memory Card Window of the Sysmac Studio.
			Special instruction		The special instruction is used to backup data.
		Protection	Disabling backups to SD Memory Cards		Backing up data to a SD Memory Card is prohibited.
	Sysmac Studio Controller backups				The Sysmac Studio is used to backup, restore, or verify Controller data.

*1. Inline ST is supported. (Inline ST is ST that is written as an element in a ladder diagram.)
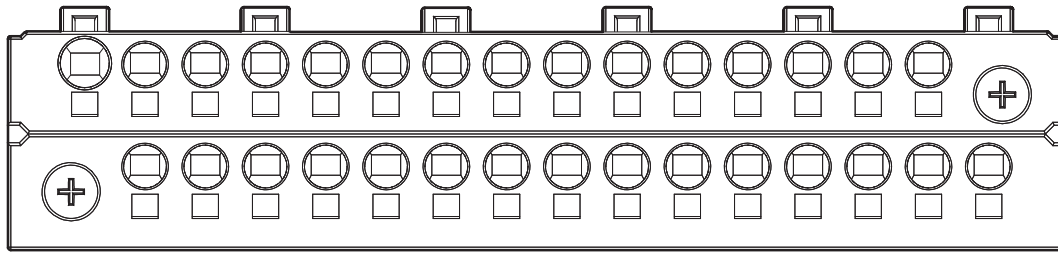*2. This is the total of 512 events for the CPU Unit and 64 events for the NX Unit.
*3. This is the total of 512 events for the CPU Unit and 16 events for the NX Unit.

Input Terminal Block

Terminal Arrangement
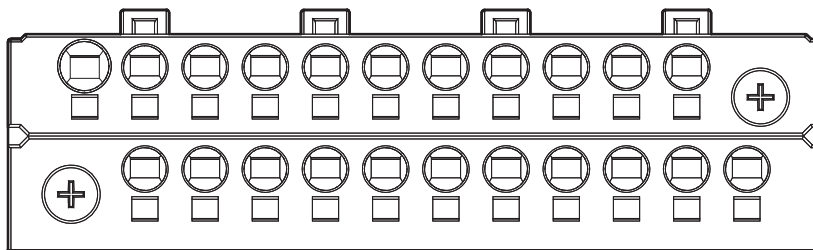
The description is given for each CPU Unit model.

NX1P2-1□40DT□

⏚	+	-	COM	01	03	05	07	09	11	13	15	17	19	21	
	+	-	00	02	04	06	08	10	12	14	16	18	20	22	23

Symbol	Terminal name	Description	Reference
⏚	Functional ground terminal	The functional ground terminal. Connect the ground wire to the terminal.	Refer to the *NX-series NX1P2 CPU Unit Hardware User's Manual* (Cat. No. W578) for details.
+/-	Unit power supply terminals	These terminals are connected to the Unit power supply. The + terminals and - terminals are internally connected to each other.	
COM	Common terminal	Common terminal for the input circuits	Refer to the *Input Specifications* page.
00 to 15	Input terminals	General-purpose input A	
16 to 23	Input terminals	General-purpose input B	

NX1P2-9024DT□
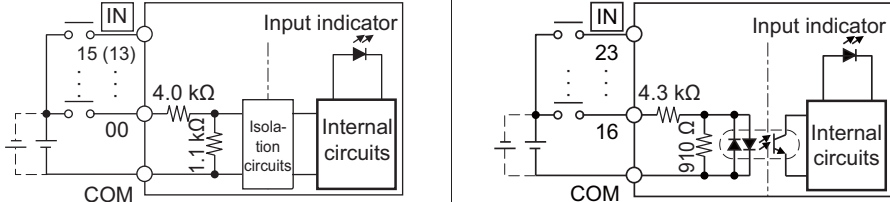
⏚	+	-	COM	01	03	05	07	09	11	13		
	+	-	00	02	04	06	08	10	12	NC	NC

Symbol	Terminal name	Description	Reference
⏚	Functional ground terminal	The functional ground terminal. Connect the ground wire to the terminal.	Refer to the *NX-series NX1P2 CPU Unit Hardware User's Manual* (Cat. No. W578) for details.
+/-	Unit power supply terminals	These terminals are connected to the Unit power supply. The + terminals and - terminals are internally connected to each other.	
COM	Common terminal	Common terminal for the input circuits	Refer to the *Input Specifications* page.
00 to 13	Input terminals	General-purpose input A	
NC	NC	Do not connect anything.	---

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Motion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Features
System Configuration
Specifications
Input/Output Terminal Block
Part Names and Functions
Option Board
NX Unit Configuration
Battery
Sysmac Studio
Version Information
Dimensions
Safety

Input Specifications

The specifications depends on the input terminal numbers of the model.

Item	Specification	
	General-purpose input A	**General-purpose input B**
Input type	General-purpose input A	General-purpose input B
Input terminal number	NX1P2-1☐40DT☐: 00 to 15 NX1P2-9024DT☐: 00 to 13	NX1P2-1☐40DT☐: 16 to 23 NX1P2-9024DT☐: None
Internal I/O common	For both NPN/PNP	
Input voltage	24 VDC (15 to 28.8 VDC)	
Connected sensor	Two-wire or three-wire sensors	
Input impedance	4.0 kΩ	4.3 kΩ
Input current	5.8 mA typical	5.3 mA typical
ON voltage	15 VDC min.	
OFF voltage/current	5 VDC max./1 mA max.	
ON response time *1	2.5 μs max.	1 ms max.
OFF response time *1	2.5 μs max.	1 ms max.
ON/OFF filter time *2	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms	
Circuit configuration		

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

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

Output Terminal Block

Terminal Arrangement

The description is given for each CPU Unit model.

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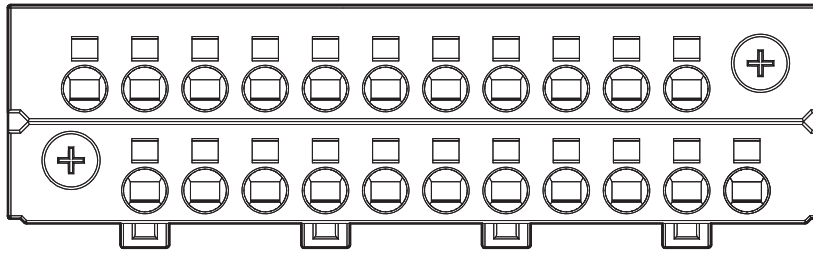
| NC | NC | 00 | 02 | 04 | 06 | NC | 08 | 10 | 12 | 14 | |
| C0 (0V) | 01 | 03 | 05 | 07 | C1 (0V) | 09 | 11 | 13 | 15 | NC |

Symbol	Terminal name	Description	Reference
C0 (0V), C1 (0V)	Common terminal	Connected to the 0-V side of the I/O power supply. C0 (0V) and C1 (0V) are independent from each other inside the CPU Unit.	Refer to the *Output Specifications* page.
00 to 15	Output terminals	NPN (sinking) type output	
NC	NC	Do not connect anything.	---

NX1P2-1□40DT1

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

| NC | C0 (+V) | 00 | 02 | 04 | 06 | C1 (+V) | 08 | 10 | 12 | 14 | |
| 0V0 | 01 | 03 | 05 | 07 | 0V1 | 09 | 11 | 13 | 15 | NC |

Symbol	Terminal name	Description	Reference
C0 (+V), C1 (+V)	Common terminal	Connected to the 24-V side of the I/O power supply. C0 (+V) and C1 (+V) are independent from each other inside the CPU Unit.	Refer to the *Output Specifications* page.
0V0, 0V1	0 V terminal	Supplies 0 V for the internal circuits for driving. 0V0 and 0V1 are independent from each other inside the CPU Unit.	
00 to 15	Output terminals	PNP (sourcing) type output with the load short-circuit protection function	
NC	NC	Do not connect anything.	---

NX1P2-9024DT

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

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

Symbol	Terminal name	Description	Reference
C0 (0V)	Common terminal	Connected to the 0-V side of the I/O power supply.	Refer to the *Output Specifications* page.
00 to 09	Output terminals	NPN (sinking) type output	
NC	NC	Do not connect anything.	---

NX1P2-9024DT1

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

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

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

Output Specifications

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

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

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

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

Part Names and Functions

CPU Unit

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

NX1P2-1□40□□□

NX1P2-9024□□□

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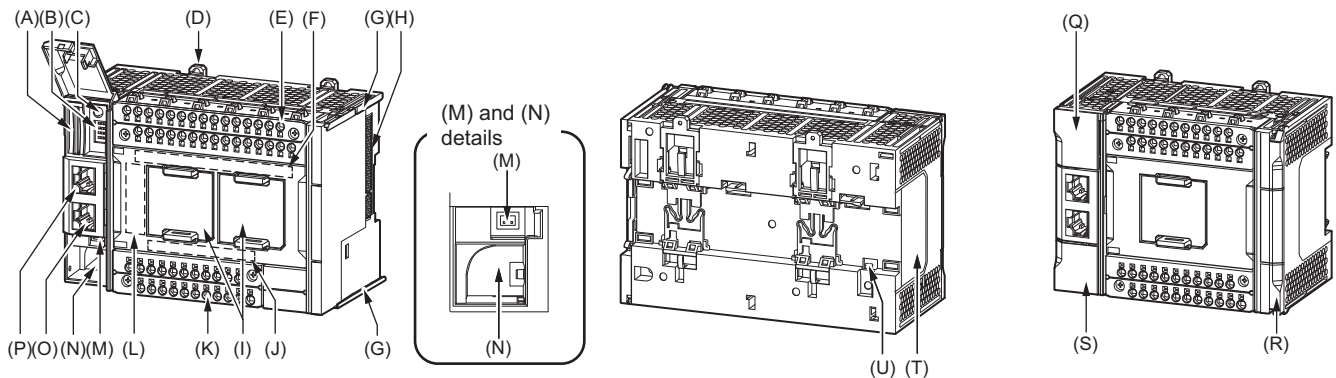
Letter	Name	Function
A	SD Memory Card connector	Connects the SD Memory Card to the CPU Unit.
B	DIP switch	Used in Safe Mode *1 or when backing up data *2. Normally, turn OFF all of the pins.
C	SD Memory Card power supply switch	Turns OFF the power supply so that you can remove the SD Memory Card.
D	DIN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

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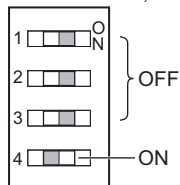
If the power supply to the Controller is turned ON with the CPU Unit in Safe Mode, the CPU Unit will start in PROGRAM mode. Use the Safe Mode if you do not want to execute the user program when the power supply is turned ON or if it is difficult to connect the Sysmac Studio. For information on Safe Mode,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

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

System Configuration
Controllers
Softwares
Features
Programmable Terminals
System Configuration
Slave Terminals
Specifications
Input/Output Terminal Block
Safety
Part Names and Functions
Mortion/Drives
Option Board
Inverters
NX Unit Configuration
Robotics
Battery
Sensors
Sysmac Studio
Remote I/O Terminals
Version Information
Dimensions
Ordering Information

Option Board

NX-series NX1P2 CPU Unit

Option Board
(NX1W-CIF01)
RS-232C

Option Board
(NX1W-CIF11/12)
RS-422A/485

Analog Input
Option Board
(NX1W-ADB21)

Analog Output
Option Board
(NX1W-DAB21V)

Analog I/O
Option Board
(NX1W-MAB221)

Specifications of Serial Communications Option Board

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

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

RS-232C Option Board (NX1W-CIF01)

Communications status indicator
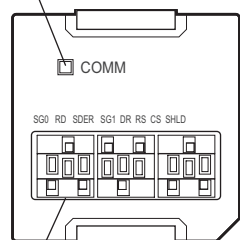
RS232C terminal block

RS-232C Terminal Block

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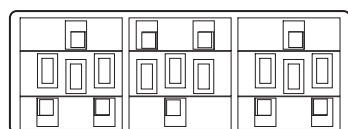
Abbreviation	Signal name	I/O
SG0	Signal grounding	---
RD	Receive data	Input
SD	Send data	Output
ER	Data terminal ready	Output
SG1	Signal grounding	---
DR	Data set ready	Input
RS	Send request	Output
CS	Data can be sent	Input
SHLD	Shield	---

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

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

Front   Back (CIF11)   Back (CIF12)

Communications
status indicator

CPU Unit connector

COMM

RDA- RDB+ SDA- SDB+ SHLD

SW 1

SW 1   SW 2

Operation setting DIP
switch (SW2)

RS-422A/485 terminal
block

Operation setting DIP
switch (SW1)

Operation setting DIP
switch (SW1)

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

RS-422A/485 Terminal Block

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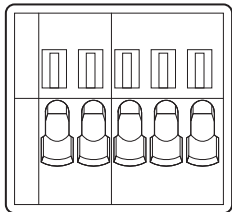
Abbreviation	Four-wire type selected		Two-wire type selected	
	Signal name	I/O	Signal name	I/O
RDA-	Reception data -	Input	Communication data -	I/O *
RDB+	Reception data +		Communication data +	
SDA-	Transmission data -	Output	Communication data -	I/O *
SDB+	Transmission data +		Communication data +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

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

System Configuration
Controllers
Softwares
Features
Programmable Terminals
System Configuration
Slave Terminals
Specifications
Safety
Input /Output Terminal Block
Mortion/Drives
Part Names and Functions
Inverters
Option Board
NX Unit Configuration
Robotics
Battery
Sensors
Sysmac Studio
Remote I/O Terminals
Version Information
Dimensions
Ordering Information

Specifications of Analog I/O Option Board

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

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

Analog Input Option Board (NX1W-ADB21)

Status indicator
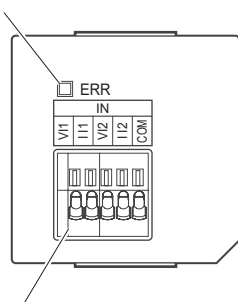
Analog input terminal block

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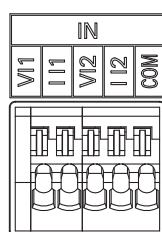
Abbreviation	Signal name
V I1	Voltage input 1
I I1	Current input 1
V I2	Voltage input 2
I I2	Current input 2
COM	Input common

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

Analog Input Specifications

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

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

Analog Output Option Board (NX1W-DAB21V)

Status indicator

ERR
OUT
VO1 VO2 COM
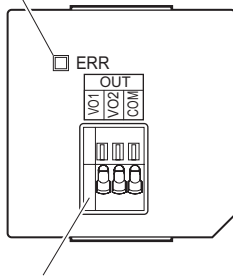
Analog output terminal block

Analog Output Terminal Array

OUT
VO1 VO2 COM

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

Analog Output Specifications

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

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

Analog I/O Option Board (NX1W-MAB221)

Status indicator

ERR
IN
VI1 II1 VI2 II2 COM
OUT
VO1 VO2 COM
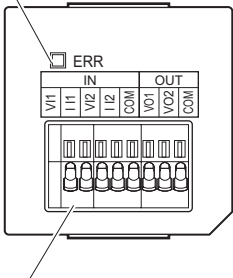
Analog output terminal block

Analog I/O Terminal Array

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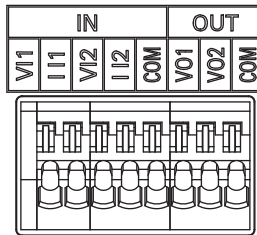
	Abbreviation	Signal name
IN	VI1	Voltage output 1
	II1	Current input 1
	VI2	Voltage input 2
	II2	Current input 2
	COM	Input common
OUT	VO1	Voltage output 1
	VO2	Voltage output 2
	COM	Output common

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

Analog I/O Specifications

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

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

NX Unit Configuration

CPU Rack

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

Option Board
(1 or 2)

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

NX Unit Power Supply System

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

Battery

The battery is not mounted when the product is shipped.
To turn OFF the power supply to the equipment for a certain period of time by using the clock data for programming, event logs, etc., you need a separately-sold battery to retain the clock data.
The following describes the purpose of the battery mounting, the battery model, and the battery-related error detection and clock data settings.

Purpose of the Battery Mounting

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

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

* This is equivalent to the time to charge a built-in capacitor in which no electric charge is accumulated.
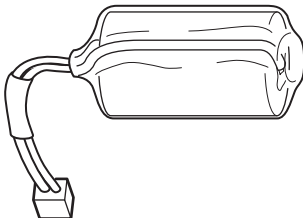
When you use the clock data for programming, use a battery if you cannot ensure the continuous power-ON time shown above or the power-OFF time is longer than the above power-ON time.

The following data (other than the clock data) is retained in the built-in non-volatile memory, so they are not lost even if the battery and built-in capacitor are fully discharged.
• User program
• Set values
• Variables retained during power interruption
• Event logs

Battery Model

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

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

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Features

System Configuration

Specifications

Input /Output Terminal Block

Part Names and Functions

Option Board

NX Unit Configuration

Battery

Sysmac Studio

Version Information

Dimensions

Sysmac Studio

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

Configuration

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

Connection with EtherNet/IP

- 1:1 Connection

Sysmac Studio

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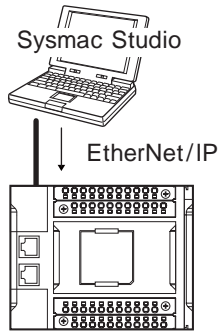
- A direct connection is made from the Sysmac Studio. The IP address and connection device do not need to be specified.
- You can make the connection whether or not a switching hub is used.
- Support for Auto-MDI enables the use of cross cables or straight cables if a direct connection is made.

- 1:N Connection

Sysmac Studio

EtherNet/IP
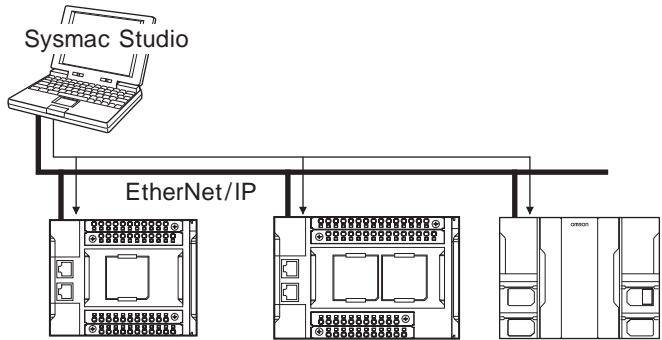
- Directly specify the IP address of the remote device.

Version Information

Unit Versions and Corresponding Sysmac Studio Versions

This following table gives the relationship between the unit versions of NX-series NX1P2 CPU Units and Option Boards and the corresponding Sysmac Studio versions.

Unit version of CPU Unit	Unit version of Option Board	Corresponding version of Sysmac Studio
Ver.1.13 *	Ver.1.00	Ver.1.17

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

Dimensions

(Unit: mm)

NX-series NX1P2 CPU Units

NX1P2-1□40□□□
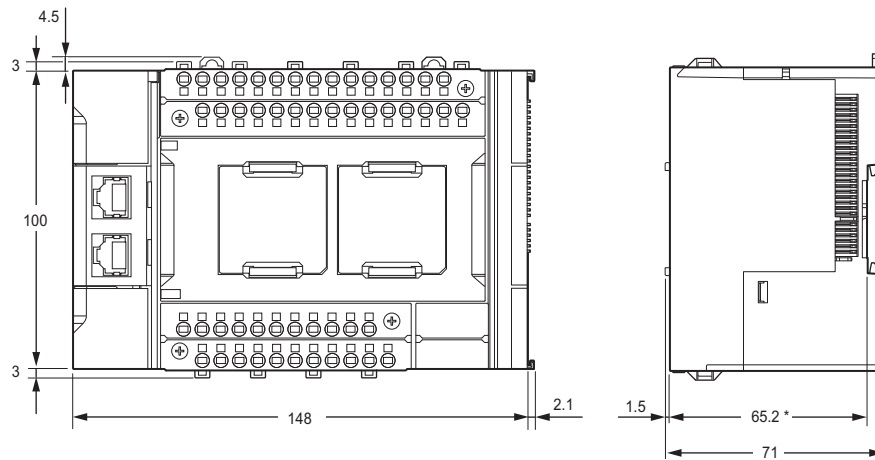
* The dimension from the attachment surface of the DIN Track to the front surface of the CPU Unit.

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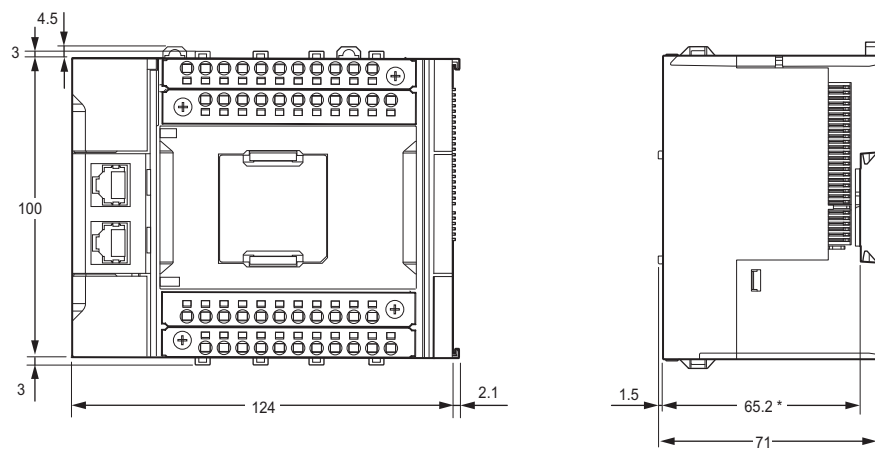
* The dimension from the attachment surface of the DIN Track to the front surface of the CPU Unit.

End cover

NX-END02
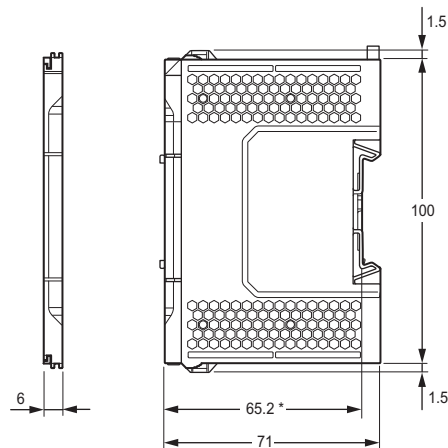
* The dimension from the attachment surface of the DIN Track to the front surface of the CPU Unit.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

System Configuration

Slave Terminals

Specifications

Safety

Input /Output Terminal Block

Part Names and Functions

Mortion/Drives

Option Board

Inverters

NX Unit Configuration

Robotics

Battery

Sysmac Studio

Sensors

Version Information

Remote I/O Terminals

Dimensions

Ordering Information

NY5@@-1

The future will be IT driven, we make you part of it

Our IPC Machine Controller combines proven machine automation with the freedom to use PC technology: working together but independently. So you can leverage Big Data, NUI and IoT to explore manufacturing innovation with no compromise on traditional PLC reliability and robustness. It makes engineers unstoppable and machines innovative yet reliable.

NY512-1   **NY532-1**

Features

- OS independency allows controller to continue to control if a Windows OS crashes
- Primary task period 500 μs/24 axes
- Retain/non-retain variables 4 MB/64 MB
- 16 to 64 axes
- 192 EtherCAT slaves
- Secure boot and recovery methods
- Powerful 4th-generation CPU technology for optimum performance
- No internal cables in the PC part eliminates faults, maximizes uptime
- Unique simplified thermal design to cut downtime
- Two Gbps Ethernet, one EtherCAT, one DVI, one UPS I/O connector
- Two USB2.0 and two USB3.0 for fast data-transmission

Industrial PC Platform NY-series

Microsoft Visual Studio

Sysmac Studio

IPC Machine Controller

Logic
Machine automation control software

Information
Windows

Hypervisor

| Core#1 | Core#2 | Core#3 | Core#4 |

Intel processor
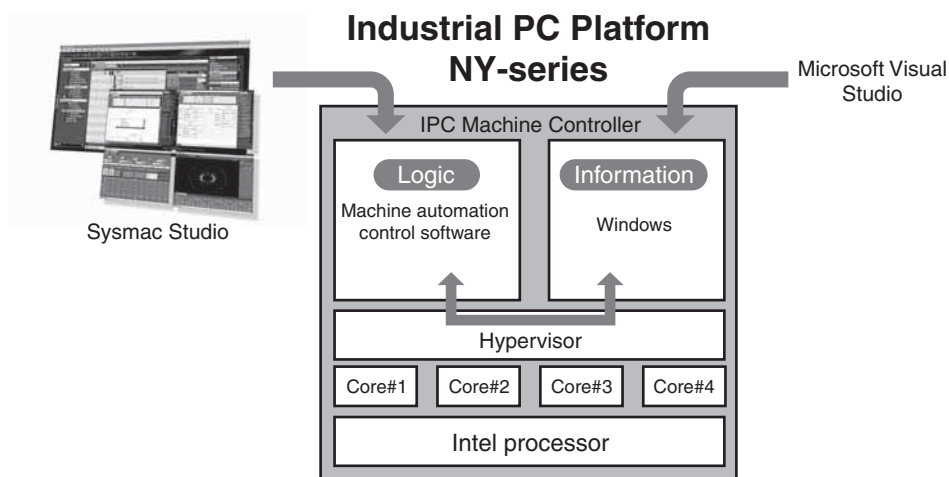
Sysmac is a trademark or registered trademark of OMRON Corporation in Japan and other countries for OMRON factory automation products.
Microsoft, Visual Studio and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
EtherCAT® is a registered trademark of Beckhoff Automation GmbH for their patented technology.
EtherNet/IP™, DeviceNet™ are trademarks of the ODVA.
The SD and SDHC logos are trademarks of SD-3C, LLC.
Intel, Celeron and Intel Core are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.
The product photographs and figures that are used in this document may vary somewhat from the actual products.

System Configuration
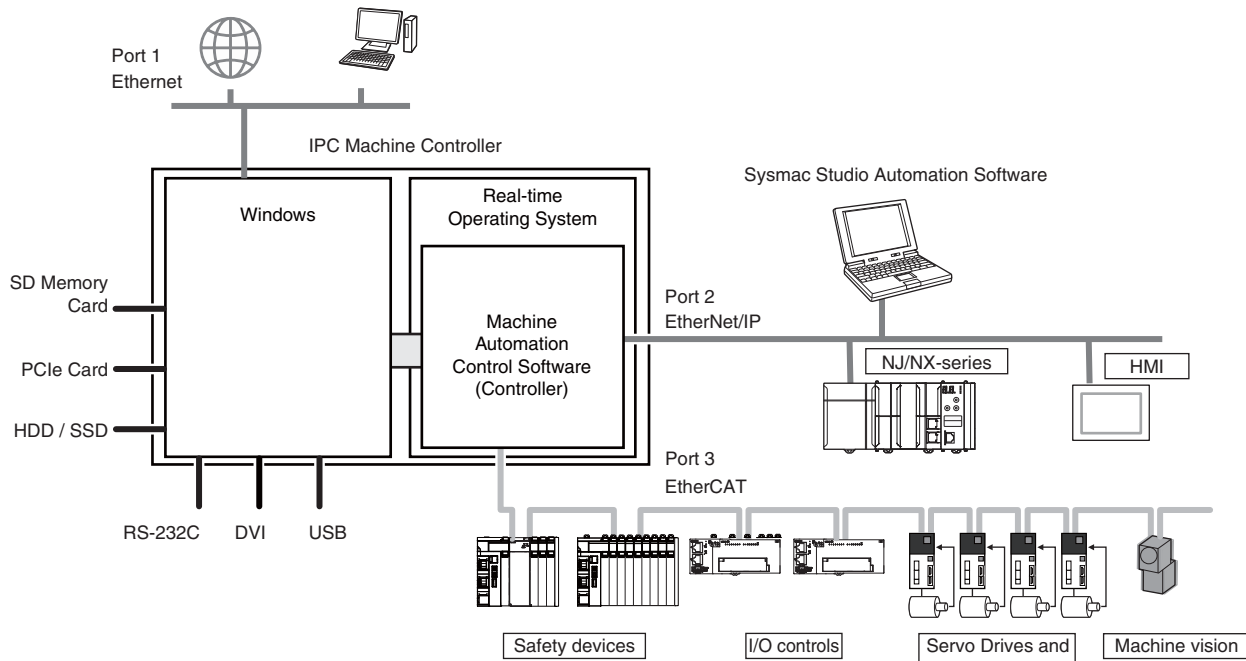
Model Number Structure

The purpose of this model number structure is to provide understanding of the meaning of specifications from the model number.
Models are not available for all combinations of code numbers.

NY 5 □ □ - □ □ 0 0 - □ □ □ □ □ □ □ □ □
1 2 3 4   5 6 7 8   9 10 11 12 13 14 15 16 17

Item	Description	Option
1	Series name	NY: NY-series Industrial PC Platform
2	Controller specifications	5: Large scale, high speed and high precision control application for up to 64 axes.
3	Model type	1: Industrial Box PC 3: Industrial Panel PC
4	Sequential number	2 or more
5	Function module	1: Standard
6	Number of axes for motion control	3: 16 axes 4: 32 axes 5: 64 axes
7	Additional function software module	0: ---
8	Reserved	0: ---
9	Expansion slots	1: 1 PCIe slots
10	Frame type	1: Aluminum frame, black, and projected capacitive touch type X: No display (Industrial Box PC)
11	Display size	1: 12.1 inch model 2: 15.4 inch model X: No display (Industrial Box PC)
12	OS	1: Windows Embedded Standard 7 - 32 bit *1 2: Windows Embedded Standard 7 - 64 bit
13	Processor	1: Intel® Core™ i7-4700EQ Processor 4th generation CPU with Fan Unit for active cooling
14	Main memory	3: 8 GB, non-ECC
15	Storage	8: 32 GB, SSD SLC 9: 64 GB, SSD SLC C: 320 GB, HDD K: 128 GB, SSD MLC
16	Optional interface	1: RS-232C 2: DVI-D
17	Logo	0: OMRON 2: Customization *2 X: No display (Industrial Box PC)

*1. For the 32 bit version, consult your OMRON sales representative.
*2. Customization only available in Europe.

Specifications

Performance Specifications Supported by NY5@@-1@00

Item			NY5□□-		
			15□□	14□□	13□□
Processing time	Instruction execution times	LD instruction	0.33 ns		
		Math instructions (for Long Real Data)	1.2 ns or more		
Programming	Program capacity *1	Size	40 MB		
		Number — POU definition	3,000		
		POU instance	24,000		
	Variables capacity	No retain attribute — Size	64 MB		
		Number	180,000		
		Retain attribute — Size	4 MB		
		Number	40,000		
	Data type	Number	4,000		
Unit configuration	Maximum number of connectable units	Maximum number of NX unit on the system	4,096 (on NX series EtherCAT slave terminal)		
Motion control	Number of controlled axes	Maximum number of controlled axes	Maximum number of axes which can be defined. The number of controlled axes = The number of motion control axes + The number of single-axis position control axes.		
			64 axes	32 axes	16 axes
		Motion control axes	Maximum number of motion control axes which can be defined. All motion control function is available.		
			64 axes	32 axes	16 axes
		Maximum number of used real axes	Maximum number of used real axes. The Number of used real axes includes following servo axes and encoder axes.		
		Used motion control servo axes	Maximum number of servo axes which all motion control function is available. The number of used motion control servo axes = The number of motion control axes whose axis type is set to servo axis and axis use is set to used axis.		
			64 axes	32 axes	16 axes
		Maximum number of axes for linear interpolation axis control	4 axes per axes group		
		Number of axes for circular interpolation axis control	2 axes per axes group		
	Maximum number of axes groups		32 axes groups		
	Motion control period		The same control period as that is used for the process data communications cycle for EtherCAT.		
	Cams	Number of cam data points — Maximum points per cam table	65,535 points		
		Maximum points for all cam tables	1,048,560 points		
		Maximum number of cam tables	640 tables		
	Position units		Pulses, millimeters, micrometers, nanometers, degrees and inches		
	Override factors		0.00% or 0.01% to 500.00%		

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

Item			NY5☐☐-		
			15☐☐	**14☐☐**	**13☐☐**
Built-in EtherNet/IP Port		Number of port	1		
		Physical layer	10BASE-T/100BASE-TX/1000BASE-T		
		Frame length	1,514 max.		
		Media access method	CSMA/CD		
		Modulation	Baseband		
		Topology	Star		
		Baud rate	1Gbps (1000BASE-T)		
		Transmission media	STP (shielded, twisted-pair) cable of Ethernet category 5, 5e or higher		
		Maximum transmission distance between Ethernet switch and node	100 m		
		Maximum number of cascade connections	There are no restrictions if Ethernet switch is used.		
	CIP service: Tag data links (Cyclic communications)	Maximum number of connections	128		
		Packet interval *2	1 to 10,000 ms in 1.0-ms increments Can be set for each connection.		
		Permissible communications band *3	20,000 pps including heartbeat		
		Maximum number of tag sets	128		
		Tag types	Network variables		
		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)	184,832 byte		
		Maximum number of tag	256		
		Maximum data size per connection	1,444 bytes		
		Maximum number of registrable tag sets	128 (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.)		
		Multi-cast packet filter *4	Supported.		
	Cip Message Service: explicit messages	Class 3 (number of connections)	64 (clients plus server)		
		UCMM (non-connection type) — Maximum number of clients that can communicate at one time	32		
		UCMM (non-connection type) — Maximum number of servers that can communicate at one time	32		
		Maximum number of TCP socket service	30		
Built-in EtherCAT port		Number of port	1		
		Communications standard	IEC 61158 Type12		
		EtherCAT master specifications	Class B (Feature Pack Motion Control compliant)		
		Physical layer	100BASE-TX		
		Modulation	Baseband		
		Baud rate	100 Mbps (100Base-TX)		
		Duplex mode	Auto		
		Topology	Line, daisy chain, and branching		
		Transmission media	Twisted-pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding)		
		Maximum transmission distance between nodes	100 m		
		Maximum number of slaves	192		
		Range of node address	1-512		
		Maximum process data size	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	500 μs to 8 ms (in 250-μs increments)		
		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		

*2. Data will be refreshed at the set interval, regardless of the number of nodes.
*3. "pps" means packets per second, i.e., the number of communications packets that can be sent or received in one second.
*4. As the EtherNet/IP port implements the IGMP client, unnecessary multi-cast packets can be filtered by using a switching hub that supports IGMP Snooping.

Some function specifications are common with the NJ/NX-series Machine Automation Controller.
"CPU Unit" described in the *Function Specifications Supported by NY5@@-1@00 means "Controller" in the NY Series*.

Function Specifications Supported by NY5@@-1@00

Item				NY5@@-1@@@
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		3
	Conditionally executed tasks	Maximum number of event tasks		32
		Execution conditions		When Activate Event Task instruction is executed or when condition expression for variable is met.
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 *1 and structured text (ST)
	Namespaces			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	Basic 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.
		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
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	A positioning command is output each control period in Position Control Mode.
		Single-axis velocity control	Velocity control	Velocity control is performed in Position Control Mode.
			Cyclic synchronous velocity control	A velocity command is output each control period in Velocity Control Mode.
		Single-axis torque control	Torque control	The torque of the motor is controlled.

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

Item				NY5@@-1@@@
Motion control	Single-axis	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	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	You can turn a digital output ON and OFF according to the position of an axis.
			Monitoring axis following error	You can monitor whether the difference between the command positions or actual positions of two specified axes exceeds a threshold value.
			Resetting the following error	The error between the command current position and actual current position is set to 0.
			Torque limit	The torque control function of the Servo Drive can be enabled or disabled and the torque limits can be set to control the output torque.
			Command position compensation	The function which compensate the position for the axis in operation.
			Start velocity	You can set the initial velocity when axis motion starts.
	Axes groups	Multi-axes coordinated control	Absolute linear interpolation	Linear interpolation is performed to a specified absolute position.
			Relative linear interpolation	Linear interpolation is performed to a specified relative position.
			Circular 2D interpolation	Circular interpolation is performed for two axes.
			Axes group cyclic synchronous absolute positioning	A positioning command is output each control period in Position Control Mode.
		Auxiliary functions for multi-axes coordinated control	Resetting axes group errors	Axes group errors and axis errors are cleared.
			Enabling axes groups	Motion of an axes group is enabled.
			Disabling axes groups	Motion of an axes group is disabled.
			Stopping axes groups	All axes in interpolated motion are decelerated to a stop.
			Immediately stopping axes groups	All axes in interpolated motion are stopped immediately.
			Setting axes group override factors	The blended target velocity is changed during interpolated motion.
			Reading axes group positions	The command current positions and actual current positions of an axes group can be read.
			Changing the axes in an axes group	The Composition Axes parameter in the axes group parameters can be overwritten temporarily.
	Common items	Cams	Setting cam table properties	The end point index of the cam table that is specified in the input parameter is changed.
			Saving cam tables	The cam table that is specified with the input parameter is saved in non-volatile memory in the CPU Unit.
			Generating cam tables	The cam table 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	You can access and change the axis parameters from the user program.

Item				NY5@@-1@@@
Motion control	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 1S-series Servomotor or G5-Series Servomotor with an Absolute Encoder to eliminate the need to perform homing at startup.
		Input signal logic inversion		You can inverse the logic of immediate stop input signal, positive limit input signal, negative limit input signal, or home proximity input signal.
	External interface signals	The Servo Drive input signals listed on the right are used.		Home signal, home proximity signal, positive limit signal, negative limit signal, immediate stop signal, and interrupt input signal.
Unit (I/O) management	EtherCAT slaves	Maximum number of slaves		192
Communications	Built-in EtherNet/IP port Internal Port	Communications protocol		TCP/IP, UDP/IP
		TCP/IP functions	CIDR	The function which performs IP address allocations without using a class (class A to C) of IP address.
			IP Forwarding	The function which forward IP packets between interfaces.
			Packet Filter *2	Check the IP packet, the function to determine whether to receive the source IP address and TCP port number.
			NAT	Function for transfer by converting the two IP address.
		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	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.
			SNMP agent	Built-in EtherNet/IP port internal status information is provided to network management software that uses an SNMP manager.
	EtherCAT port	Supported services	Process data communications	A communications method to exchange control information in cyclic communications between the EtherCAT master and slaves. This communications method is defined by CoE.
			SDO communications	A communications method to exchange control information in noncyclic event communications between EtherCAT master and slaves. This communications method is defined by CoE.
		Network scanning		Information is read from connected slave devices and the slave configuration is automatically generated.
		DC (distributed clock)		Time is synchronized by sharing the EtherCAT system time among all EtherCAT devices (including the master).
		Packet monitoring		The frames that are sent by the master and the frames that are received by the master can be saved. The data that is saved can be viewed with WireShark or other applications.
		Enable/disable settings for slaves		The slaves can be enabled or disabled as communications targets.
		Disconnecting/connecting slaves		Temporarily disconnects a slave from the EtherCAT network for maintenance, such as for replacement of the slave, and then connects the slave again.
		Supported application protocol	CoE	SDO messages of the CAN application can be sent to slaves via EtherCAT.
	Communications instructions			The following instructions are supported. CIP communications instructions, socket communications instructions, SDO message instructions, FTP client instructions, and Modbus RTU protcol instructions.

*2. Internal Port only.

Item			NY5@@-1@@@
System management	Event logs	Function	Events are recorded in the logs.
		Maximum number of events — System event log	2,048
		Access event log	1,024
		User-defined event log	1,024
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
	MC test run		Motor operation and wiring can be checked from the Sysmac Studio.
	Synchronizing		The project file in the Sysmac Studio and the data in the CPU Unit can be made the same when online.
	Differentiation monitoring		Rising/falling edge of contacts can be monitored.
		Maximum number of contacts	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
		Maximum number of records	10,000
		Sampling — Maximum number of sampled variables	192 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.
		Verification of operation authority	Online operations can be restricted by operation rights to prevent damage to equipment or injuries that may be caused by operating mistakes.
		Number of groups	5
		Verification of user program execution ID	The user program cannot be executed without entering a user program execution ID from the Sysmac Studio for the specific hardware (CPU Unit).
Memory card functions	Location to store		Shared folder: The folder that exist on the HDD / SDD that Windows is running.
	Application	Memory card operation instructions	You can access Memory Cards from instructions in the user program.
		File operations from the Sysmac Studio	You can perform file operations for Controller files in the Memory Card and read/write general-purpose document files on the computer.
		File operations from FTP Client/Server	You can store and read files by the FTP client function and FTP server function.
Backup functions	SD memory card backup functions	Operation — 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	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.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Motion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Features
System Configuration
Model Number Structure
Specifications
Dimensions
Version Information
Safety

Performance Specifications

Item			NY5@@-1@00
Main system	CPU	CPU type	Intel® Core™ i7-4700EQ
		Cores / Threads	4 / 8
		CPU base frequency	2.4 GHz
		Maximum turbo frequency	3.4 GHz
		Cache	6 MB
		Cooling details	Requires active cooling (fan)
	Memory	Memory size	8 GB
		Memory type	DDR3L (non ECC)
	Trusted platform module (TPM)		• Ensure the integrity of the platform • Disk encryption • Password protection and other uses of encryption
	Graphics controller		Intel® HD Graphics. Up to two independent screens.
			Intel® HD Graphics 4600
	Watchdog		Yes
Operating system	Windows OS		Windows Embedded Standard 7 - 32 bit *1 Windows Embedded Standard 7 - 64 bit
Storage devices	Drives	Hard disk drive	• 320 GB • Serial ATA 3.0
		Solid state drive — SLC type	• 32 GB and 64 GB • Serial ATA 3.1
		Solid state drive — MLC type	• 128 GB • Serial ATA 3.1
	Drive bay (HDD/SSD) *2		2
Connectors	Power connector		• 24 VDC
	I/O connector		2 inputs (Power ON/OFF Input and UPS Mode Input) and 1 output (Power Status Output)
	USB 2.0 Type-A	Number of ports	2
		Maximum current	500 mA
		Maximum cable length	5 m
	USB 3.0 Type-A	Number of ports	2
		Maximum current	900 mA
		Maximum cable length	3 m
	Ethernet connectors	Number of available ports	3
		Physical layer	10BASE-T, 100BASE-TX or 1000BASE-T
	DVI-I connector	Video interface	Digital or analog
		Resolution	Up to 1,920 x 1,200 pixels at 60 Hz
		Maximum DVI cable length	Dependent upon connected monitor type and resolution
Optional connector (select one per system)	RS-232C		Standard SUBD9 connector (Non-Isolated)
	DVI-D	Video interface	Digital only
		Resolution	Up to 1,920 x 1,200 pixels at 60 Hz
		Maximum DVI cable length	Dependent upon connected monitor type and resolution
PCIe Card Slot	Configuration		X4 (4 lanes) up to Gen 3
	Card height		Standard height cards, 4.20 inches (106.7 mm) *3
	Card length		Half length cards, 6.6 inches (167.65 mm)
Battery	Model		CJ1W-BAT01
	Service life		5 years at 25°C
Fan unit	Model		NY000-AF00
	Service life		70,000 hours of continuous operation at 40°C with 15% to 65% relative humidity
LED			PWR, ERR, HDD, RUN

*1. For the 32 bit version, consult your OMRON sales representative.
*2. Depending on the model one or two drives are supported.
*3. Low profile cards, 2.536 inches (64.4 mm) are not supported.

Display Specifications

Item			Specifications	
			12.1 Inch models	15.4 Inch models
Display	Display panel *1	Display device	TFT LCD	
		Screen size	12.1 inches	15.4 inches
		Surface treatment	Anti glare treatment	
		Surface hardness	Mohs scale: 5 - 6	
		Resolution	1,280 × 800 pixels at 60 Hz (horizontal × vertical)	
		Colors	16,770,000 colors	
		Effective display area	261 × 163 mm (horizontal × vertical)	331 × 207 mm (horizontal × vertical)
		View angles	Left: 60°, Right: 60°, Top: 60°, Bottom: 60°	
		Life	50,000 hours min. *2	
		Brightness adjustment	200 levels *3	
	Touch	Technology	Projected capacitive	
		Touch resolution	Touch accuracy 1.5% (4-5 mm)	
		Multitouch	Up to 5 simultaneous touches	
		Features	Water detection *4, hand palm rejection *5, gloves *6	
		Life	50,000,000 operations min.	
		EMC	Correct touchscreen operation is possible within allowable EMC immunity conditions	

Note: Industrial Panel PC type only.
*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 range: light and dark pixels 10 or less. (There must not be 3 consecutive light/dark pixels.)
*2. This is the estimated time before brightness is reduced by half at room temperature and humidity.
   The life expectancy is drastically shortened if used at high temperatures.
*3. If the brightness is set to very dark, it causes flickering or the screen will be too dark to use.
*4. If water is detected the touch functionality will not be available.
*5. If a palm is detected that specific area is neglected.
*6. The touchscreen can be operated when wearing gloves. Check correct usage of the gloves before using them.

Electrical Specifications

Item			NY51@ Industrial Box PC type	NY53@ Industrial Panel PC type
Rated power supply voltage			24 VDC, non-isolated	
Allowable power supply voltage range			20.4 to 28.8 VDC	
Grounding method			Ground to less than 100 Ω	
Inrush current			At 24 VDC: 12 A / 6 ms max. for cold start at room temperature	
Overvoltage category			JIS B3502 and IEC 61131-2: Category II	
EMC immunity level			IEC 61132-2: Zone B	
RTC accuracy			At ambient temperature of 55°C: -3.5 to +0.5 min error per month At ambient temperature of 25°C: -1.5 to +1.5 min error per month At ambient temperature of 0°C: -3 to +1 min error per month	
Power button life			100,000 operations	
Battery life			5 years at 25°C (for battery CJ1W-BAT01)	
Fan life			8 years of continuous operation at 40°C	
Power consumption *	Maximum power consumption including drives and expansions		114 W	132 W
	Maximum power consumption excluding drives and expansions		81 W	99 W
	Drives	HDD 320 GB	2 W	
		SSD SLC 32 GB	2 W	
		SSD SLC 64 GB	2 W	
		SSD MLC 128 GB	2 W	
	Expansions	USB	14 W max. ((2 x 500 mA at 5 V) + (2 x 900 mA at 5 V))	
		PCIe	15 W max.	5 W max.

Note: Refer to the *NY-series IPC Machine Controller Industrial Panel PC Hardware User's Manual* (W557) or the *NY-series IPC Machine Controller Industrial Box PC Hardware User's Manual* (W556) for detail.
* The total power consumption is the sum of the power consumption of all items that are installed in your Industrial PC.
   To guarantee S8BA UPS operation in combination with our IPC, the specified combination of UPS and power-supply must be used.
   The required supply specifications for an Industrial PC with an Intel® Core™ i7-4700EQ CPU.

Item	Minimum power requirements
Power supply	240 W
UPS	120 W

Environmental Specifications

Item		Specifications	
		Industrial Box PC	Industrial Panel PC
Operation environment	Ambient operating temperature *1	0 to 55°C	
	Ambient storage temperature *1	-20 to 70°C	
	Ambient operating humidity *1	10% to 90% with no condensation	
	Ambient storage humidity *1	10% to 90% with no condensation	
	Operating atmosphere	No corrosive gases	
	Altitude	2,000 m max.	
	Noise resistance (during operation)	Conforms to IEC61000-4-4, 2kV (power lines)	
	Vibration resistance (during operation)	Conforms to IEC 60068-2-6. • For a Box PC with an SSD: 5 to 8.4 Hz with 3.5 mm single amplitude and 8.4 to 150 Hz with 9.8 m/s^2 for 10 times each in X, Y and Z directions. • For a Box PC with a HDD the vibration resistance depends on the mounting orientation *2.	The vibration resistance depends on the storage device(s): • For a Panel PC with only SSD storage devices: 5 to 8.4Hz with 3.5 mm single amplitude and 8.4 to 150 Hz with 9.8 m/s^2 for 10 times each in X, Y and Z directions. Conforms to IEC 60068-2-6. • For a Panel PC with one or more HDD storage devices the Panel PC must be installed in a vibration free environment. *3
	Shock resistance (during operation)	Conforms to IEC 60028-2-27. 147 m/s^2, 3 times in each X, Y and Z directions	
	Installation method	Book mount, Wall mount	Mount on panel
	Degree of protection *4	–	Front of Monitor: IP65
	Pollution degree	2 or less: Conforms to JIS B3502 and IEC 61131-2.	
Applicable standards *5		EU Directives: EMC Directive 2014/30/EU (EN 61131-2), KC, RCM, cULus, RoHS Directive (2002/95/EC)	

*1. The allowed ambient operating temperature and ambient humidity depend on product type, CPU type, mounting orientation, and storage device type.
*2. Vibration resistance depends on the Box PC's mounting orientation and storage device type.

Mounting Orientation	SSD	HDD
Book	9.8 m/s^2	2.5 m/s^2
Wall		4.9 m/s^2

*3. A Panel PC with one or more HDD storage devices should not be used in applications subject to vibration.
   Examples of applications subject to vibration:
   • AGV (Automated Guided Vehicles)
   • Rail vehicle
   • Stacker crane
   • Elevator
   • Tableting machine
   • Connector pin assembling machine
   • Bending machine
   Ensure your Panel PC with HDD does not vibrate. When in doubt use a Panel PC with SSD storage devices.
*4. The Panel PC may not operate properly in locations subjected to oil splashes for extended periods of time. (Industrial Panel PC type only)
*5. Refer to the OMRON website (www.ia.omron.com) or contact your OMRON representative for the most recent applicable standards for each model.

Storage Device Specifications

Item	Specifications			
Model	NY000-AS00	NY000-AS01	NY000-AS02	NY000-AH00 *1
Capacity	32 GB	64 GB	128 GB	320 GB
Type	SSD (SLC)		SSD (MLC)	HDD
S.M.A.R.T. support	Yes			
Rotation speed	–			5,400 r/min
Interface	Serial ATA 3.1			Serial ATA 3.0
Sustained standard read speed	Up to 160 MB/s		Up to 430 MB/s	–
Sustained standard write speed	Up to 150 MB/s		Up to 190 MB/s	–
Operating temperature	0 to 70°C			5 to 55°C
Operating humidity	10% to 95% (with no condensation)			• 10% to 95% (with no condensation) • 29°C wet-bulb temperature max.
Storage temperature	-40 to 100°C			-40 to 65°C
Storage humidity	10% to 95% (with no condensation)			• 8% to 90% (with no condensation) • 40°C wet-bulb temperature max.
Life	1,500 TB written / 11 years at a daily workload of 350 GB	3,000 TB written / 23 years at a daily workload of 350 GB	114 TB written / 3 years at a daily workload of 100 GB	Approximately 5 years or 20,000 powered-ON hours (whichever comes first) under the following conditions: • 25°C at 101.3 kPa • Less than 333 powered-ON hours/ month *2 • Less than 20% operation while powered-ON *3 • Less than 1.30 x 10^6 seeks/month

*1. For a Panel PC with an HDD: this device can only be installed in a vibration free environment only.
*2. Powered-ON hours include sleep and standby modes.
*3. Operation includes seeking, writing, and reading functions.

Dimensions

Industrial Box PC type
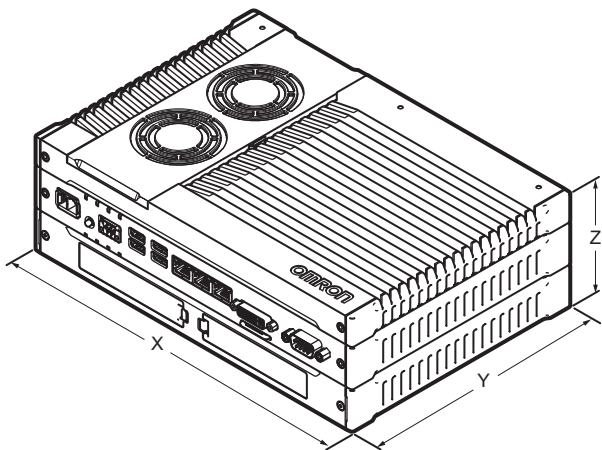
Item	Specifications
Dimensions	Width X = 282 mm Depth Y = 195 mm. Y = 200 mm including the DVI connectors. Height Z = 88.75 mm
Weight	3.8 kg

Bracket Specifications

The metal mounting brackets mount your Industrial Box PC and they are the connection for the functional ground.
Use metal screws with a diameter of 4 mm or 5 mm to mount the brackets.
Mounting screw locations for book mount and wall mount orientation:

(Unit: mm)

System Configuration

Controllers

Softwares

Features | Programmable Terminals

System Configuration | Slave Terminals

Model Number Structure

Specifications | Safety

Dimensions | Mortion/Drives

Version Information | Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information
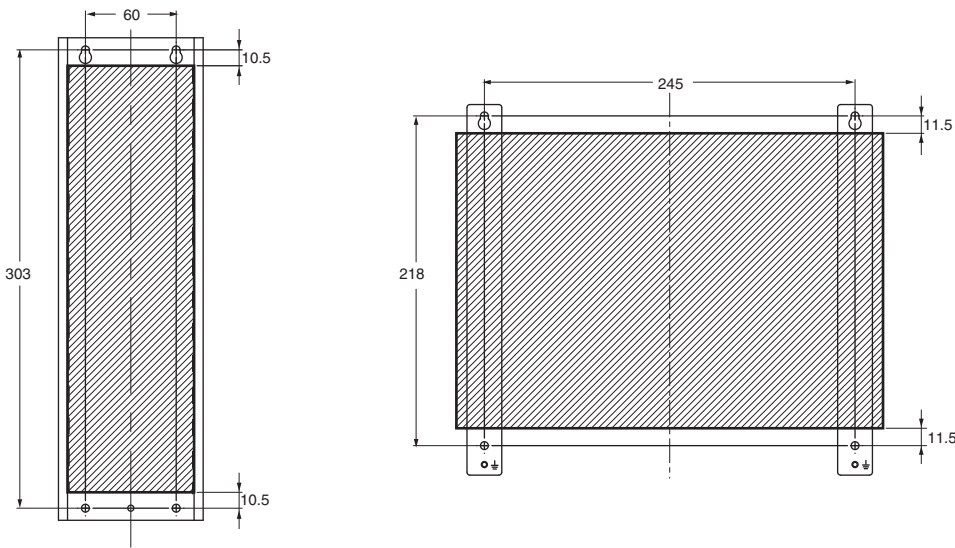
Industrial Panel PC type
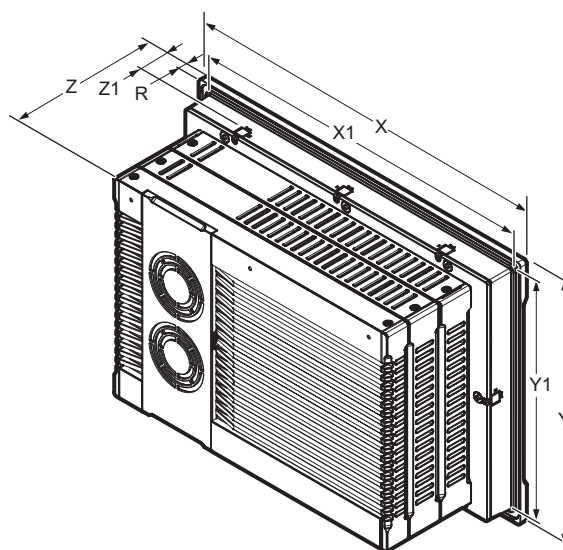
Item	Specifications	
	12.1 Inch	**15.4 Inch**
Panel cutout dimensions	Cutout Width X1 = $314^{-0\ +1}$ mm Cutout Height Y1 = $216^{-0\ +1}$ mm	Cutout Width X1 = $383^{-0\ +1}$ mm Cutout Height Y1 = $259^{-0\ +1}$ mm
Panel thickness range *	Panel thickness range Z1 = 1.6 to 6.0 mm	Panel thickness range Z1 = 1.6 to 6.0 mm
Dimensions	Width X = 332 mm Height Y = 234 mm Depth Z = 121 mm	Width X = 401 mm Height Y = 277 mm Depth Z = 121 mm
Monitor thickness in front of panel	Rim thickness R = 8.0 mm	
Weight	6.1 kg	7.2 kg

* The minimum panel thickness depends on the panel material.

Version Information

Unit Versions

Units	Models	Unit Version
IPC Machine Controller	**NY5@2-1**	Unit version 1.14
		Unit version 1.12

Unit Versions and Programming Devices Supported by NY5@@-1@00

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

Unit Versions and Programming Devices

Unit Version *	Corresponding version of Sysmac Studio
1.14	1.18
1.12	1.17

* There is no NY5@@-1 with unit version 1.11 or earlier.
Note: If you use a lower version of the Sysmac Studio, you can use only the functions of the unit version of the unit that corresponds to the Sysmac Studio version.
　　If you use a unit with an earlier version, select the unit version of the connected 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 unit.

MEMO

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Features

System Configuration

Model Number Structure

Specifications

Dimensions

Version Information

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 CPU Units, NY-series Industrial PC, and other Machine Automation Controllers, as well as EtherCAT slaves.

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

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 7 (32-bit/64-bit version) /Windows 8 (32-bit/64-bit version) / Windows 8.1 (32-bit/64-bit version) *4/ Windows 10 (32-bit/64-bit version)
CPU *3	Windows computers with Intel® Celeron™ processor 540 (1.8 GHz) or faster CPU. Intel® Core™ i5 M520 processor (2.4 GHz) or equivalent or faster recommended.
Main memory *3 *5	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	Minimum 4.6 GB of Hard disk space is required to install.
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 *6
Supported languages *7	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 to some application operations when Sysmac Studio is used with Microsoft Windows 7, Windows 8 / Windows 8.1 or Windows10.

Application	Restriction
CX-Designer	If a new Windows 7, Windows 8/Windows 8.1 or Windows 10 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 7, Windows 8/Windows 8.1 or Windows 10 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.
CX-ConfiguratorFDT	.NET Framework 3.5.1 is required to install when CX-ConfiguratorFDT is used with Windows 8/ Windows 8.1, or Windows 10.

*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 RAM.
  If the user program size is large, we recommend that you use the 64-bit edition of the operating system, an Intel® Core™ i7 processor or the equivalent, and 8 GB or more of RAM.
  If you use Vision&Robot integrated simulation with Robot Additional Option, use the 64-bit edition of the operating system, an Intel® Core™ i5 processor or the equivalent, and 8 GB or more of RAM.
*4. Windows 8.1 Update (KB2919355) must be applied.
*5. 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
*6. Refer to the hardware manual for your CPU unit for hardware connection methods and cables to connect the computer and CPU unit.
*7. 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 or NY-series Industrial PC, 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 or NY-series Industrial PC 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 NY-series Industrial PC. Or, the EtherCAT network configuration information in the CPU Unit or PC 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 or NY-series Industrial PC using the synchronize function.	
	CPU/Expansion Rack Configuration and Setup		You create the configuration in the Sysmac Studio of the Units mounted in the CPU Rack and Expansion Racks of NJ-series and NX1P2 CPU Units and set 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	For NJ-series CPU Units, model numbers, unit numbers, and slot numbers are displayed. For NX1P2 CPU Units, model numbers and unit numbers are displayed. *1	
		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	For NJ-series CPU Units, rack width, current consumption, and power consumption are displayed based on the Unit configuration information. For NX1P2 CPU Units, rack width is displayed based on the Unit configuration information. *1	
		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 using the synchronization function.	
		Printing the Unit configuration information	The Unit configuration information is printed.	

*1. Version 1.17 or higher.

Item			Function	Applicable versions
Setting Parameters	**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 *2, and other settings are made.	
		Transferring Operation Settings	The synchronization function is used to transfer the operation settings to the NJ/NX-series CPU Unit or NY-series Industrial PC.	
		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 or NY-series Industrial PC.	
		Transferring Built-in EtherNet/IP Port Settings	The synchronization function is used to transfer the Built-in EtherNet/IP Port Settings to the NJ/NX-series CPU Unit or NY-series Industrial PC.	
		Built-in I/O Settings	You make the settings related to built-in I/O of the NX1P2 CPU Unit.	Ver. 1.17 or higher
		Transferring Built-in I/O Settings	The synchronization function is used to transfer the built-in I/O settings to the NX1P2 CPU Unit.	
		Option Board Settings	You make the settings related to the option boards mounted on the NX1P2 CPU Unit.	
		Transferring Option Board Settings	The synchronization function is used to transfer the option board settings to the NX1P2 CPU Unit.	
		Memory Settings	You make the settings related to the memory area for CJ-series Units in the NX1P2 CPU Unit.	
		Transferring Memory Settings	The synchronization function is used to transfer the memory settings to the NX1P2 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.	
		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.	
	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.	
		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.	
		Editing cam definitions	You set cam definitions.	Ver.1.09 or higher
		Transferring cam definitions	You transfer cam definitions to the Controller.	
		Exporting cam tables	You can export a cam table to a CSV file.	
		Transferring cam tables from the Controller to files	You can save a cam table in the NJ/NX-series CPU Unit or NY-series Industrial PC 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/NX-series CPU Unit or NY-series Industrial PC.	
		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 Settings		Programs are executed in tasks in the NJ/NX-series CPU Unit or NY-series Industrial PC. 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.	
		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.	

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

OMRON | **71**

Item			Function	Applicable versions
Setting Parameters	**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 HMI**".	Ver. 1.11 or higher
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 *3	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. *4	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.	

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

	Item		Function	Applicable versions
Programming	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 or NY-series Industrial PC.	
		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 HMI**".	Ver.1.11 or higher
Reuse Functions	Library		You can create functions, function block definitions, programs *5, 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 *6. You can also export a project to a previous project file format, i.e., .smc or .csm.*7.	All versions
		Importing a project file	You can import a project from an .smc2 *6, .csm2 *6, .smc, or .csm *7 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 *6 or .smc project file. Or, you can merge detailed comparison results. *8	Ver.1.02 or higher
		Importing motor sizing tool results	You can import the EtherCAT configuration and motion control settings created by the motor sizing tool.	Ver.1.16 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 or NY-series Industrial PC 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 or NY-series Industrial PC 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 or the virtual SD Memory Card of the NY-series Industrial PC (hereinafter called SD Memory Card), and to copy files between the SD Memory Card and computer.	
		Formatting the SD Memory Card	The SD Memory Card is formatted.	All versions
		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.	

*5. Creating programs in a library file is supported by version 1.06 or higher.
*6. Supported only by the Sysmac Studio version 1.08 or higher.
*7. 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.
*8. Merging detailed comparison results is supported by version 1.03 or higher.

System Configuration

Controllers

Softwares

Features

System Requirements

Function Specifications

Version Information

Web Support Services

Applicable Models

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Item			Function	Applicable versions
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 or NY-series Industrial PC. 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 *9		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.	
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 or NY-series Industrial PC 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. *10 You can consecutively read and display continuous trace results from more than one file. *11	
		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

*9. Changing present values in the Ladder Editor or ST Editor is supported by version 1.03 or higher.
*10.Changing the colors of graph lines is supported by version 1.01 or higher.
*11.Consecutively reading and displaying continuous trace results from more than one file is supported by version 1.05 or higher.

Item			Function	Applicable versions
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. *12	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 *13	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 or NY-series Industrial PC, 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 an NJ/NX-series CPU Unit, NY-series Industrial PC, or in the Simulator. When the Simulator is connected, you can also monitor the real processing time of tasks. This allows you to perform a Controller performance test.	
	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 user program that you are editing in the Sysmac Studio is displayed in relation to the size of memory for the NJ/NX-series CPU Unit or NY-series Industrial PC.	All versions
	Setting clock information		You can read and set the clock of NJ/NX-series CPU Unit or NY-series Industrial PC. 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
Communications	**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. *6	All versions
	Checking for forced refreshing		When you go offline, any forced refreshing is cleared.	

*6. Supported only by the Sysmac Studio version 1.08 or higher.
*12. MATLAB®/Simulink R2013a or higher is required.
*13. CX-Designer version 3.41 or higher is required.

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

Item			Function	Applicable versions
Maintenance	Changing the operating mode of the Controller		There are two operating modes for NJ/NX-series CPU Unit or NY-series Industrial PC, 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 data of the NJ/NX-series CPU Unit or NY-series Industrial PC 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. *14	
		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 Controller data to an SD Memory Card mounted in the NJ/NX-series CPU Unit or to the Virtual SD Memory Card of the NY-series Industrial PC, or compare the Controller data to the data in these SD Memory Cards.	
		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 CPU Unit names and serial IDs	If the name or the serial ID is different between the project and the 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 or NY-series Industrial PC 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/NX-series CPU Unit or NY-series Industrial PC.	
	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.	

*14.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.
The DB connection service can be used if the NJ101-@@20 is selected with Sysmac Studio version 1.14 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.

System Configuration

Controllers

Softwares

Features

System Requirements

Function Specifications

Version Information

Web Support Services

Applicable Models

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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 and NY-series Industrial PCs.
		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.
	User-defined 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		POUs can be exported and imported.
		Programs *3	You can export/import POUs.
		User-defined Function Blocks *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 *4		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.
		Initial Value Settings *5	You can set the initial values of variables when you start execution of simulation.
		Feedback Settings *5	You can set input status that is linked to changes in output status when simulator is running.
		Simple Automatic Test *6	You can check that expected values of the outputs to the inputs of the program are designed as intended using the Simulator functions of the Safety CPU Unit.
	User Memory Usage Monitor *5		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 Theft of Assets	**Data Protection (Programs) *3**	You can set passwords for individual programs to prohibit displaying or changing them.
		Data Protection (User-defined Function Blocks) *4	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 1.17 or higher.
*4. Supported only by the Sysmac Studio version 1.08 or higher.
*5. Supported only by the Sysmac Studio version 1.10 or higher.
*6. Supported only by the Sysmac Studio version 1.15 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 settings	Settings to communicate with FTP clients using the Ethernet port are made.
		NTP settings	Settings to communicate with an NTP server using the Ethernet port are made.
		FINS settings	Settings to communicate with devices that support FINS are made.
		VNC settings	Settings to communicate with VNC clients using the Ethernet port are made.
		Print settings *1	Print settings 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.
	Troubleshooter *2		Troubleshooter settings are made.
	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.
		Changing the display status of each object *1	You can check display status changes for lamp and other objects on the Page Editor.
		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. Also, labels can be edited *1.
		Setting object entry order *1	Entry order of Data Edit 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.
		Duplicating objects *3	You can duplicate a specified number of objects. Offsets are set to the element numbers of the array set for the object.
		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. *4
		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.

Note: These specifications are supported by Sysmac Studio version 1.11 or higher.
*1. Supported only by the Sysmac Studio version 1.14 or higher.
*2. Supported only by the Sysmac Studio version 1.13 or higher.
*3. Supported only by the Sysmac Studio version 1.16 or higher.
*4. There are restrictions on the functions that can be used.

Item			Function
Creating data and programming	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.
	Controller events *1	User-defined event settings	Settings for pages that can be changed from user-defined events' display in Troubleshooter.
	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.
	Broken-line graph *1		Settings for the data that is displayed in a broken-line graph.
		Adding and deleting data groups	Data groups for which a broken-line graph is drawn are added and deleted.
		Log condition setting	Conditions to display a broken-line graph and target global variables are set for data groups.
	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.
	Keypad customization *1		Keypads can be customized.
	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. Also, registered resources can be indirectly accessed.
		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.
	Scaling *1		Values of variables and objects are converted by a specified a scaling factor set for them.
	Searching and replacing		You can search all strings in a project to find and replace a specified string.
	Cross reference *1		Where a specified program element (variable, data type, page, or resource) is used in a project can be checked with a list. You can access the use locations of the element from the list.
	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.
		Creating user-defined events *1	You can create user-defined events that can be used in an IAG.
		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.

Note: These specifications are supported by Sysmac Studio version 1.11 or higher.
*1. Supported only by the Sysmac Studio version 1.14 or higher.

Item			Function
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.
Print *1	Printing		Settings of each project can be printed out.
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.
*1. Supported only by the Sysmac Studio version 1.14 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 CPU Unit or NY-series Industrial PC 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.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Features

System Requirements

Function Specifications

Version Information

Web Support Services

Applicable Models

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.
		Conveyor Calibration Wizard Tool *2	Calibrates cameras, conveyors, and robots in a conveyor tracking application.
		Calibration Plate Print Tool *2	Prints out calibration patterns that are used in the Conveyor Calibration Wizard.
		Conveyor Panorama Display Tool *2	Displays a panoramic image in a conveyor tracking application.
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 *3	Simulates the linked operation of the sequence controls in the NJ/NX-series CPU Unit or NY-series Industrial PC 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 *4	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 1.14 or higher.
*3. Supported only by the Sysmac Studio version 1.08 or higher.
*4. 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.
Monitoring		Senor monitoring	Monitors the light-detection status and the measurement results of the sensor.
		Trend monitoring	Logs and monitors the measurement results that meet the specific conditions of the sensor.
Debugging		Offline Debugging of Sensor Control Programs and Sensor Operation	Performs a linked simulation between the sequence control of an NJ/NX-series CPU Unit or NY-series Industrial PC 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: The ZW-series can be used with the Sysmac Studio version 1.05 or higher.
The ZW-7000-series can be used with the Sysmac Studio version 1.15 or higher.

Function Specifications of Robot Additional Option

Item		Function
3D machine models		–
Conveyor for picking	Setting	This conveyor is for picking workpieces in a pick-and-place 3D equipment model that uses a Vision Sensor and delta robots. A workpiece is displayed at the specified coordinates in the field of vision of the Vision Sensor and the workpiece is moved on a conveyor at the set speed.
Pick-and-place 3D Equipment Model Creation Wizard	Setup with a wizard	You can easily build a pick-and-place 3D equipment model that uses a Vision Sensor and delta robots. You can select from configuration elements (such as one conveyor for picking, one conveyor for placing, and two robots) and enter the required parameters in a wizard to complete the 3D equipment model.
Calibration parameter output	Text output	The calibration parameters required in programming to operate a pick-and-place 3D equipment model are output in ST program format.

Note: This option can be used by applying the Robot Additional Option to Sysmac Studio version 1.14 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
Machine Automation Controllers	NX-series	---	NX1P2-@@@@	Ver.1.17 or higher
			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@00/NJ501-4@10	Ver.1.04 or higher
			NJ501-4320	Ver.1.10 or higher
			NJ301-@@@@	Ver.1.02 or higher
			NJ101-@000	Ver.1.13 or higher
			NJ101-@020	Ver.1.14 or higher
Industrial PC Platform	NY-series	---	NY5@@-1@@@	Ver.1.17 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
	1S-series	---	R88D-1SN@-ECT	Ver.1.16 or higher
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
			ZW-7000 ZW-7000T	Ver.1.15 or higher
Fiber Sensors, Laser Sensors *4	N-Smart E3NX E3NC	---	E3NX-FA0/CA0 *5 E3NC-LA0/SA0	Ver.1.05 or higher
Fiber Sensors, Laser Photoelectric Sensors, Proximity Sensors *6	E3X E3C E2C	---	E3X-HD0/MDA0 E3C-LDA0 E2C-EDA0	Ver.1.02 or higher
Modular Temperature Controller	EJ1	---	EJ1N-HFUC-ECT	Ver.1.15 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 *7	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@@@ NX-PG01@@	Ver.1.06 or higher
			NX-CIF@@@	Ver.1.15 or higher *8
			NX-HB@@@@ NX-RS@@@@ NX-ILM@@@	Ver.1.16 or higher
Safety Control Units *9	NX-series	---	NX-SL3500 *10 NX-SL3300 *11 NX-SIH400 *11 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
			GX-ILM@@@	Ver.1.16 or higher

Series		Unit version	Model	Applicable versions
HMIs	**NS-series**	To connect to NJ501-@@@@: NS system version 8.5 or later CX-Designer version 3.3 or higher To connect to NJ301-@@@@/NJ101-@@@@: NS system version 8.61 or later CX-Designer version 3.4 or higher To connect to NX701-@@@@: NS system version 8.9 or later CX-Designer version 3.64 or higher To connect to NX1P2-@@@@: NS system version 8.93 or later CX-Designer version 3.64 or higher	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 to NX701-@@@@/NJ101-@@@@: NA system version 1.02 or later Sysmac Studio version 1.13 or higher To connect to NY512-@@@@/NY532-@@@@: NA system version 1.06 or later Sysmac Studio version 1.17 or higher To connect to NX1P2-@@@@: NA system version 1.07 or later Sysmac Studio version 1.17 or higher	NA5-15W@@@@ NA5-12W@@@@ NA5-9W@@@@ NA5-7W@@@@	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. The E3NX-CA0 can be used with the Sysmac Studio version 1.16 or higher.

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

*7. 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".

*8. The serial communications instructions for the CIF Units are supported by the CPU Units with unit version 1.11 or later and the Sysmac Studio version 1.15 or higher. If the serial communications instructions are not used, CIF Units can be used with the combination of CPU Units with unit version 1.10 or later and the Sysmac Studio version 1.12 or higher. Refer to the *NJ/NX-series Instructions Reference Manual* (Cat. No. W502-E1-15 or later) for the serial communications instructions for the CIF Units.

*9. 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.

*10. 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.

*11. 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/NY Controller and the Automation Software Sysmac Studio, allows you to simply and flexibly create sophisticated user interfaces to suit your machines.

15.4 inch wide

9 inch wide

12.1 inch wide

7 inch wide
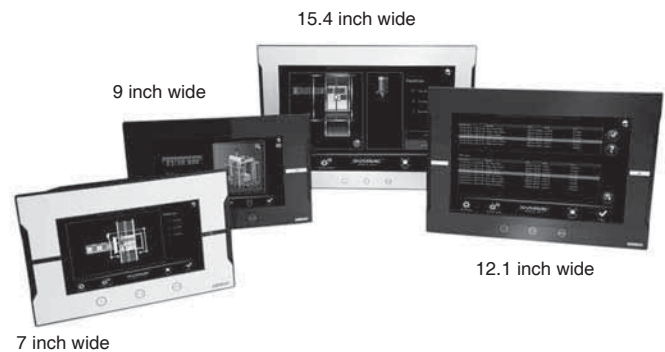
Features

- 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/NY variables sharing in the NA project and NA application testing with the NJ/NX/NY 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

Ethernet — NJ/NX/NY series

Ethernet (CIP/FINS) — CJ series

Connect to the Ethernet port 2 on the NA — Sysmac Studio

Mouse

USB Memory

Keyboard

Sysmac Studio
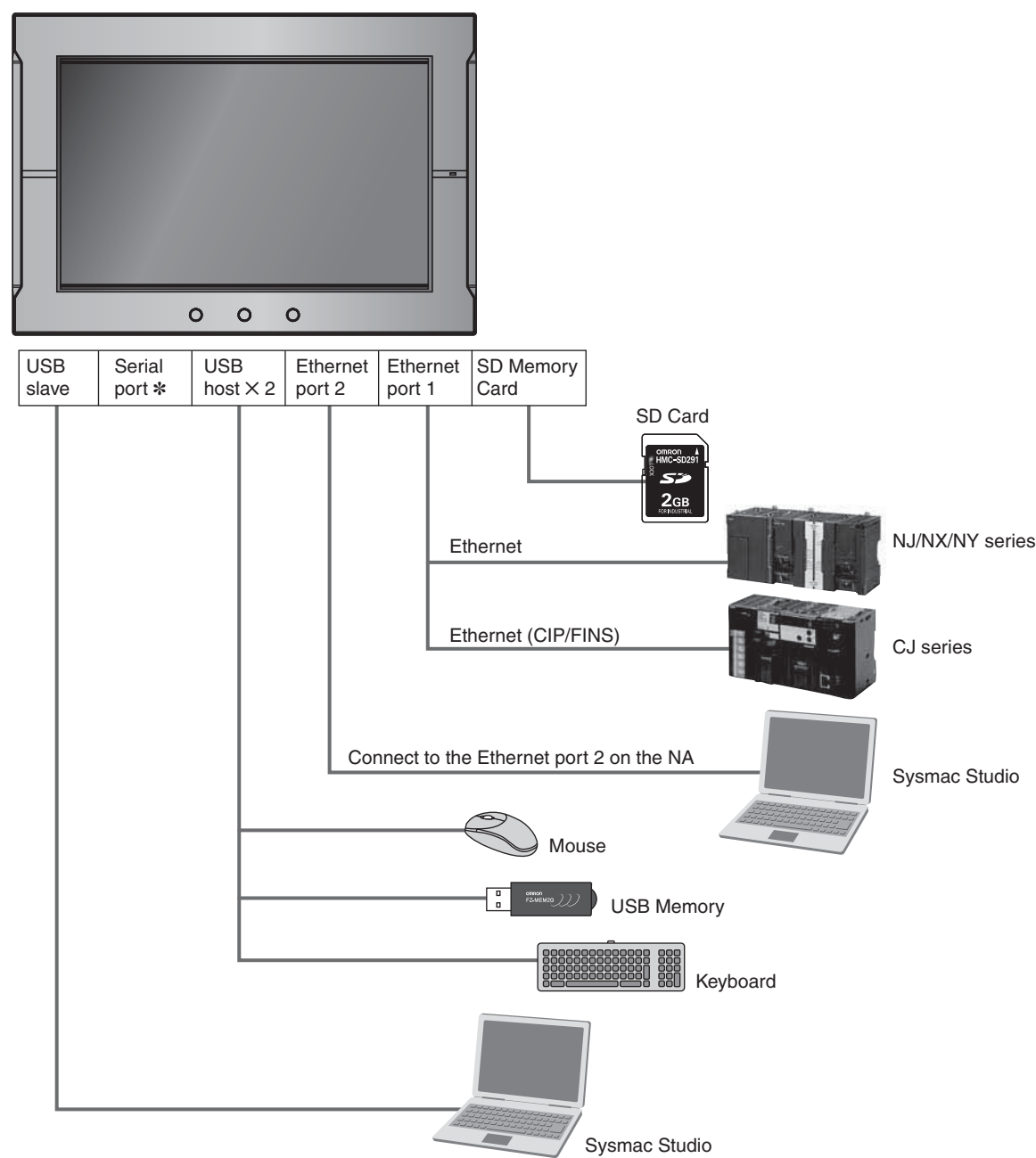
* The serial port is for future expansion.

Performance Specifications

NA5-@W and NA5-@U have the same specifications and performance characteristics of hardware and software.

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	$392_0^{+1} \times 268_0^{+1}$ mm (horizontal × vertical) Panel thickness: 1.6 to 6.0 mm *4	$310_0^{+1} \times 221_0^{+1}$ mm (horizontal × vertical) Panel thickness: 1.6 to 6.0 mm *4	$261_0^{+1} \times 166_0^{+1}$ mm (horizontal × vertical) Panel thickness: 1.6 to 6.0 mm *4	$197_0^{+0.5} \times 141_0^{+0.5}$ mm (horizontal × vertical) Panel thickness: 1.6 to 6.0 mm *4
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, UL Type 4X (at initial state) To reinstall the NA Unit in a panel, contact your OMRON representative for replacement of the rubber packing.			
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 *5	UL 508/CSA standard C22.2 No.142 *6 EMC Directive (2004/108/EC) EN 61131-2:2007 Shipbuilding standards LR, DNV, and NK IP65 oil-proof, UL Type 4X *7 (front panel only) ANSI 12.12.01 Class 1 Division 2/CSA standard C22.2 No. 213-M1987 (R2013) RoHS Directive (2002/95/EC) KC Standards KN 61000-6-2:2012-06 for EMS and KN 61000-6-4:2012-06 for EMI RCM			

*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.
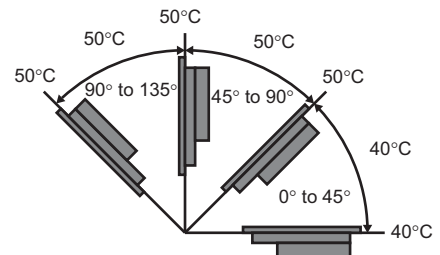
*2. Use the Programmable Terminal within the following temperature and humidity ranges.
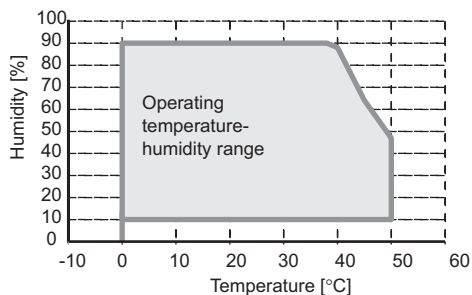
*3. Store the Programmable Terminal within the following temperature and humidity ranges.
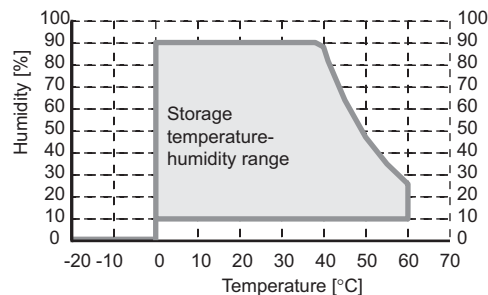
*4 When the NA-@WATW01 High-pressure Waterproof Attachment is used, the panel thickness is between 1.6 to 4.5 mm.
*5 Check with your OMRON representative or refer to the following OMRON website for the latest information on the applicable standards for each model: www.ia.omron.com.
*6 Use power supply Class 2 to conform to UL Standards.
*7 Use the NA-@WATW01 High-pressure Waterproof Attachment (sold separately) to conform to UL Type 4X.

Version Information

NA-Series and Programming Devices

NA-Series		Corresponding unit versions/version	
Model	**NA system version**	**NJ/NX/NY-series Controller** **NX1P2-@@@@** **NY512-@@@@** **NY532-@@@@** **NX701-@@@@** **NJ501-@@@@** **NJ301-@@@@** **NJ101-@@@@**	**Sysmac studio**
NA5-15 NA5-12 NA5-9 NA5-7	1.07 or later	NX1P2: 1.13 or later	1.17 or higher
	1.06 or later	NY512: 1.12 or later NY532: 1.12 or later	1.17 or higher
	1.02 or later	NX701: 1.10 or later NJ101: 1.10 or later	1.13 or higher
	1.01 or later	NJ501 : 1.01 or later NJ501 Database Connection : 1.05 or later NJ301 : 1.01 or later	1.11 or higher

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
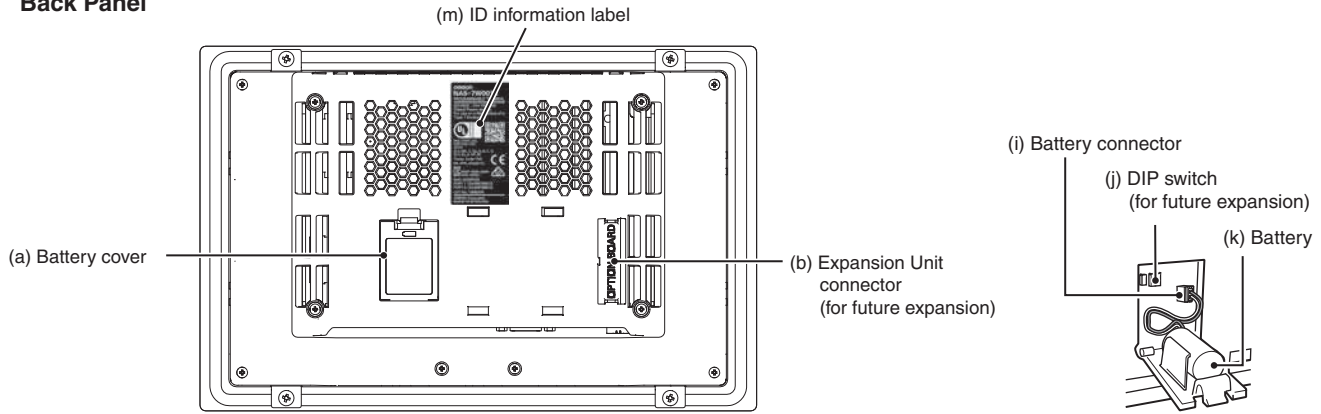
Bottm Panel
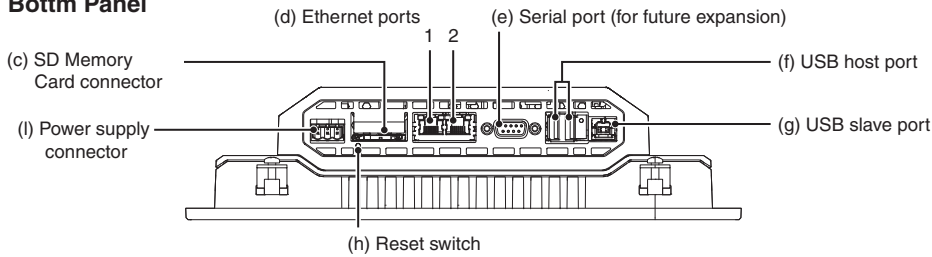
No.	Name	Description
(a)	Battery cover	Open this cover to replace the Battery.
(b)	Expansion Unit connector *	For future expansion.
(c)	SD Memory Card connector	Insert an SD Memory Card here.
(d)	Ethernet port 1	Connect a device other than the Sysmac Studio.
	Ethernet port 2	Connect mainly the Sysmac 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	NX1P2-@@@@ NY512-@@@@ NY532-@@@@ 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

NA5-15

Cable Connection Dimensions

NA5-12

Cable Connection Dimensions

NA5-9

Cable Connection Dimensions

NA5-7

Cable Connection Dimensions

System Configuration

Controllers

Softwares

Features | Programmable Terminals

System Configuration | Slave Terminals

Configuration Units | Safety

Power Supply Systems | Mortion/Drives

Power Supply System and Design Concepts | Inverters

Components and Functions | Robotics

Dimensions /Mounting Dimensions | Sensors

General Spesifications | Remote I/O Terminals

Ordering Information

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
- Heater Burnout Detection Unit
- Load Cell Input Unit
- Position Interface Unit 1, 2CH
- Communications Interface Units RS-232C, RS-422A/485
- IO-Link Master Unit
- 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

System Configuration

System Configuration in the Case of a CPU Unit

The following figure shows a system configuration when a group of NX Units is connected to an NX-series CPU Unit.
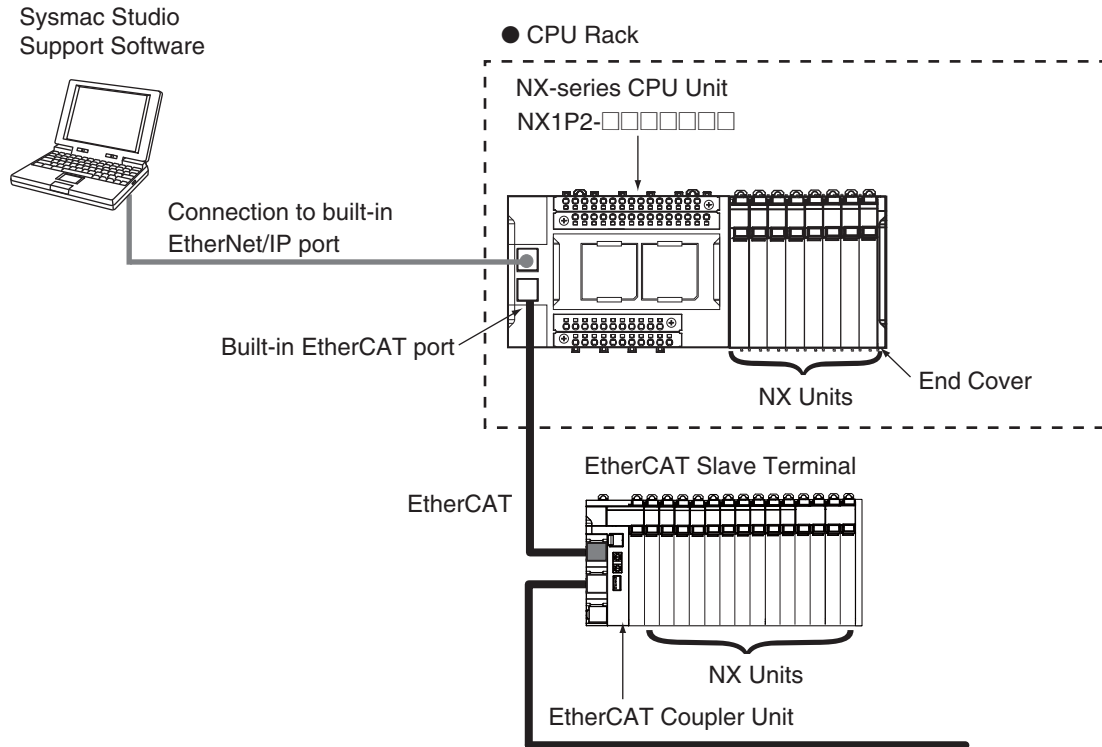
Sysmac Studio Support Software

● CPU Rack

NX-series CPU Unit NX1P2-□□□□□□

Connection to built-in EtherNet/IP port

Built-in EtherCAT port

NX Units

End Cover

EtherCAT

EtherCAT Slave Terminal

NX Units

EtherCAT Coupler Unit

System Configuration of Slave Terminals

The following figure shows an example of the system configuration when an EtherCAT Coupler Unit is used as a Communications Coupler Unit.

Sysmac Studio Support Software

Connection to peripheral USB port or built-in EtherNet/IP™ port on CPU Unit or Industrial PC *1

.xml

ESI files

EtherCAT master *2
NJ/NX-series CPU Unit, NY-series Industrial PC, or master from another manufacturer

Built-in EtherCAT port

Sysmac Studio Support Software

Communications cable Ethernet cables

Peripheral USB port.

Connection to peripheral USB port on EtherCAT Coupler Unit

.xml

ESI files

●EtherCAT Slave Terminal

NX Series EtherCAT Coupler Unit NX-ECC□□□

NX Units

End Cover

*1. The connection method for the Sysmac Studio depends on the model of the CPU Unit or Industrial PC.
*2. An EtherCAT Slave Terminal cannot be connected to any of the OMRON CJ1W-NC@81/@82 Position Control Units even though they can operate as EtherCAT masters.

Note: For whether NX Units can be connected to the CPU Unit or Communications Coupler Unit to be used, refer to the user's manual for the CPU Unit or Communications Coupler Unit to be used.

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-OC4633	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	–	–	–
Heater Burnout Detection Unit	–	NX-HB3101 NX-HB3201	–	–	–

Load Cell Input Unit

Unit	Model
Load Cell Input Unit	NX-RS1201

Position Interface Units

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	–

Communications Interface Units

Unit	Model
Communications Interface Units	NX-CIF101, NX-CIF105, NX-CIF201

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

Note: Connect the Safety CPU Unit, the Safety Input Unit and the Safety Output Unit to the NX1P2 CPU Unit via the EtherCAT Coupler Unit.

Power Supply Systems

Wiring the Power Supply to the CPU Unit

There are the following two types of power supplies that supply power to the CPU Rack of the NX1P2 CPU Units.
I/O power supply is also required to drive the built-in I/O output circuit. However, only the supply to the NX Unit is described in this section.
For the I/O power supply to the built-in I/O, refer to the hardware user's manual for the CPU Unit to which NX Units are connected.

Power supply name	Description
Unit power supply	This is the power supply for generating the internal power supply required for the CPU Rack to operate. This power supply is connected to the Unit power supply terminals on the CPU Unit. From the Unit power supply, the internal power supply circuit in the CPU Unit generates the internal circuit power supply, Option Board power supply and NX Unit power supply. The internal circuits of the NX Unit operates on the NX Unit power supply. The NX Unit power supply is supplied to the NX Units in the CPU Rack through the NX bus connectors.
I/O power supply	This power supply is used for driving the I/O circuits of the NX Units and for the connected external devices. There are the following two I/O power supply methods. Either supply method used depends on each model of NX Unit. • Supply from the NX bus • Supply from external source Refer to the *Installation and Wiring* in the *NX-series System Units User's Manual* (Cat. No. W523) for the details on the power supply methods.

The following are wiring diagrams (examples) for each power supply.

Note: Supply the Unit power and the I/O power from different power supplies. If you supply power from the same power supply the galvanic separation between the bus system and the I/O circuits is no longer effective. Noise generated in the I/O circuits may cause malfunctions in the internal circuits of the units.

System Configuration

Controllers

Softwares

Features | Programmable Terminals

System Configuration | Slave Terminals

Configuration Units

Power Supply Systems

Power Supply System and Design Concepts | Safety

Components and Functions | Mortion/Drives

Dimensions /Mounting Dimensions | Inverters

General Spesifications | Robotics

Sensors

Remote I/O Terminals

Ordering Information
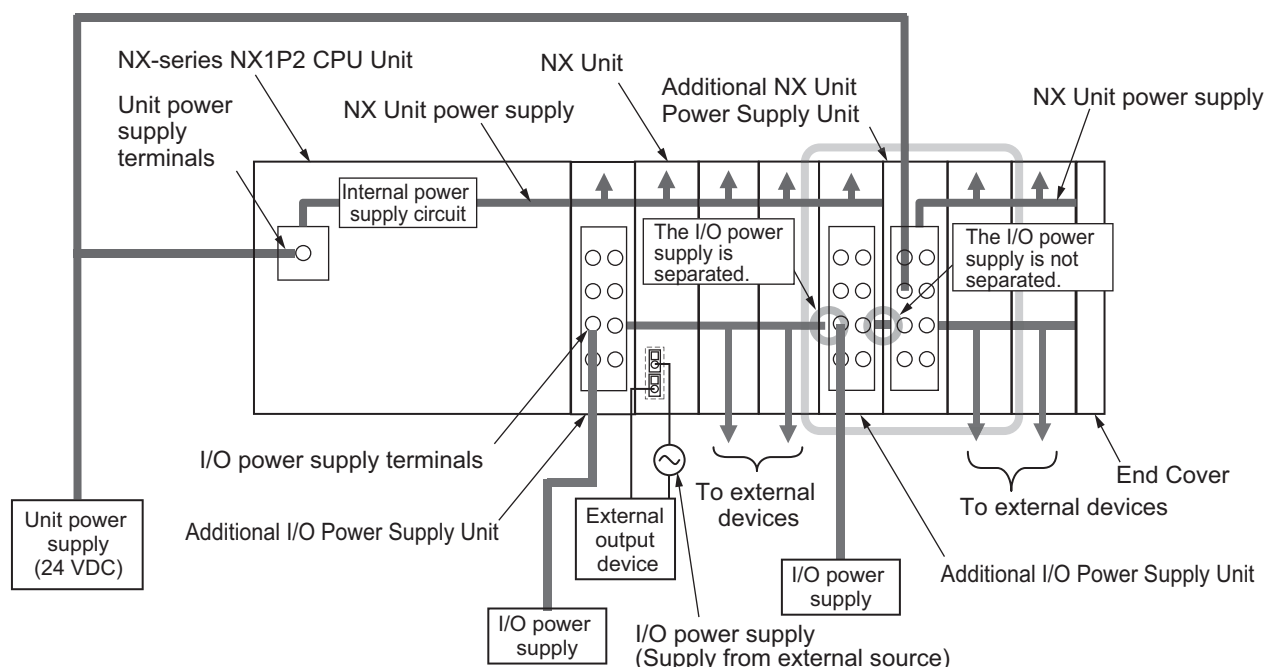
Wiring the Power Supply to the Slave Terminal

There are the following two types of power supplies that supply power to the Slave Terminal.

Power supply name	Description
Unit power supply	This is the power supply for generating the NX Unit power supply required for the Slave Terminal to operate. This is connected to the Unit power supply terminal on the Communications Coupler Unit or on the Additional NX Unit Power Supply Unit. The internal power supply circuit in the Communications Coupler Unit or the Additional NX Unit Power Supply Unit generates the NX Unit power supply from the Unit power supply. The internal circuits of the Communications Coupler Unit and NX Units operate by the NX Unit power supply. The NX Unit power supply is supplied to the NX Units in the Slave Terminal through the NX bus connectors.
I/O power supply	This power supply provides power to drive the I/O circuits of the Position Interface Units and it provides power to external devices such as external encoders and sensors. There are the following two I/O power supply methods. Either supply method used depends on each model of NX Unit. • Supply from the NX bus • Supply from external source Refer to the *Installation and Wiring* in the *NX-series System Units User's Manual* (Cat. No. W523) for the details on the power supply methods.

The following are wiring diagrams (examples) for each power supply.
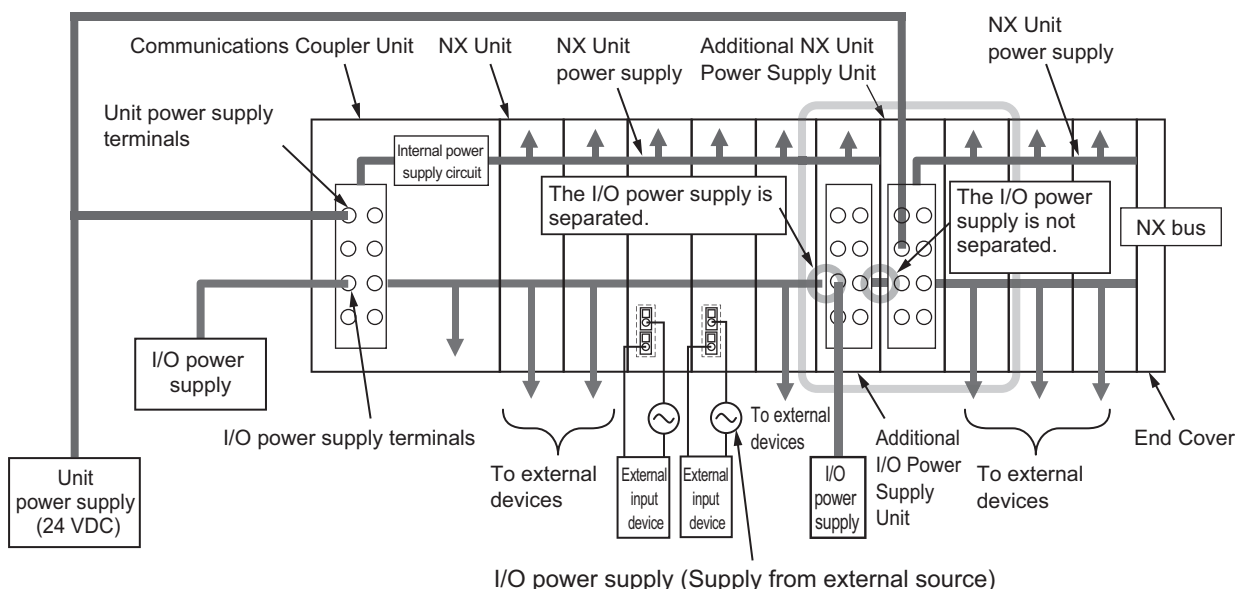
Note: Supply the Unit power and the I/O power from different power supplies. If you supply power from the same power supply the galvanic separation between the bus system and the I/O circuits is no longer effective. Noise generated in the I/O circuits may cause malfunctions in the internal circuits of the units.

Power Supply System and Design Concepts

Designing the NX Unit Power Supply System

For designing the NX Unit power supply of the 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 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
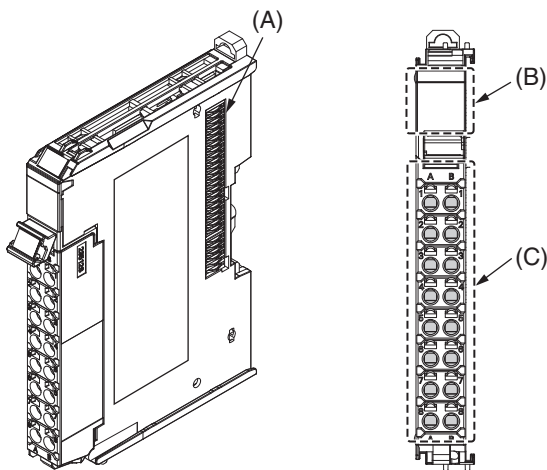
24mm Width
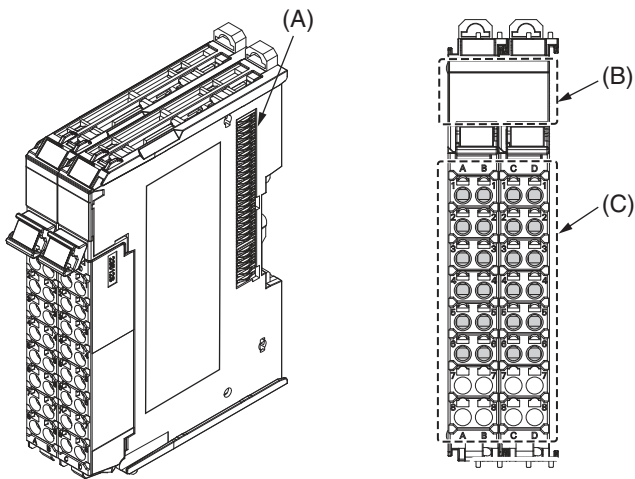
Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Terminal block	The terminal block is used to connect external devices. The number of terminals depends on the type of Unit.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Slave Terminals

System Configuration

Configuration Units

Safety

Power Supply Systems

Motion/Drives

Power Supply System and Design Concepts

Inverters

Components and Functions

Dimensions /Mounting Dimensions

Robotics

General Spesifications

Sensors

Remote I/O Terminals

Ordering Information

Terminal Blocks

| 12 mm width 8-terminal type | 12 mm width 12-terminal type | 12 mm width 16-terminal type | 24 mm width 8-terminal type x 2 | 24 mm width 12-terminal type x 2 | 24 mm width 16-terminal type x 2 |
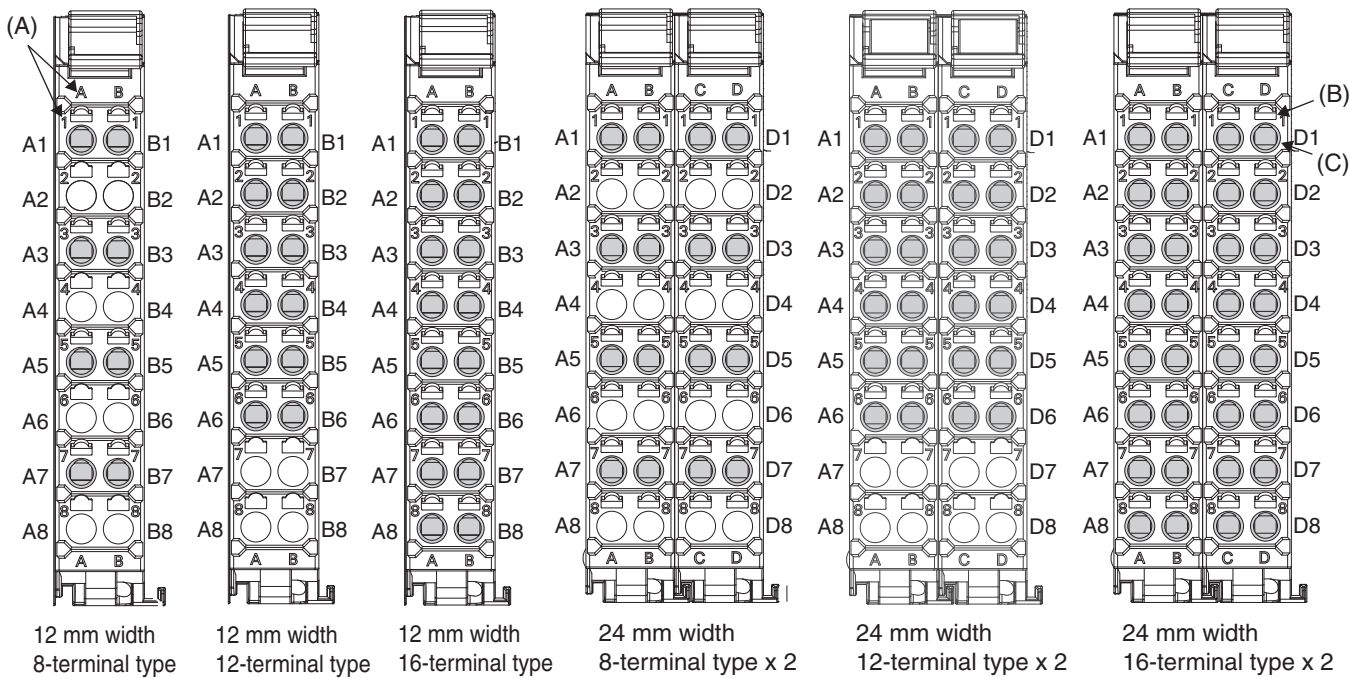
Symbol	Name	Function
(A)	Terminal number indications	Terminal numbers for which A and B indicate the column, and 1 to 8 indicate the line are displayed. The terminal number is a combination of column and line, i.e. A1 to A8 and B1 to B8. The terminal number indications are the same regardless of the 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 (mm² (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 mm², 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 mm², 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 mm² 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
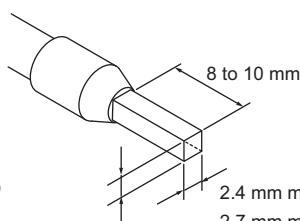
1.6 mm max. (except ground terminals)
2.0 mm max. (ground terminals)

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 mm² 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 mm²	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.
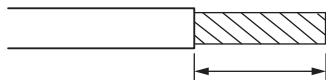
Conductor length (stripping length)

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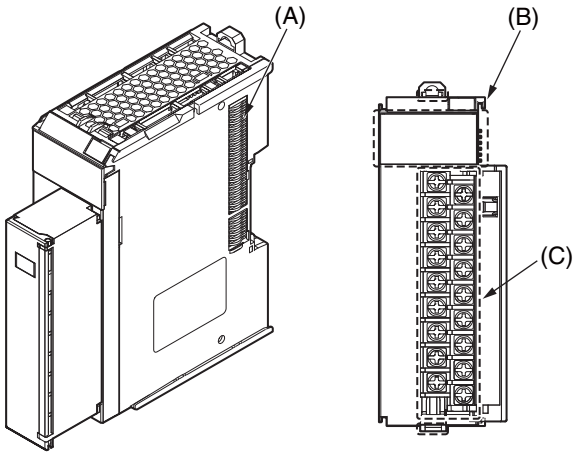
Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Screw terminals	These screw terminals are used to connect the wires.

Connector Types
30 mm Width
Units with MIL Connectors
(1 Connector with 20 Terminals)
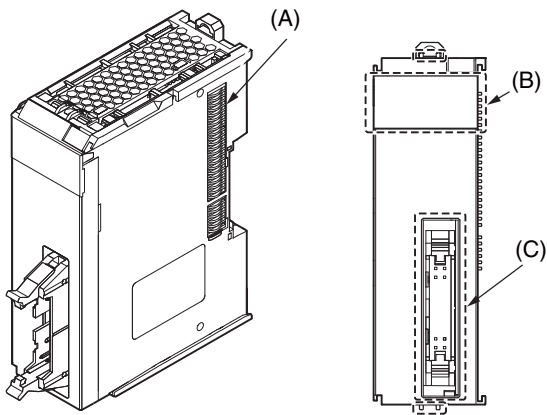
Units with MIL Connectors
(1 Connector with 40 Terminals)
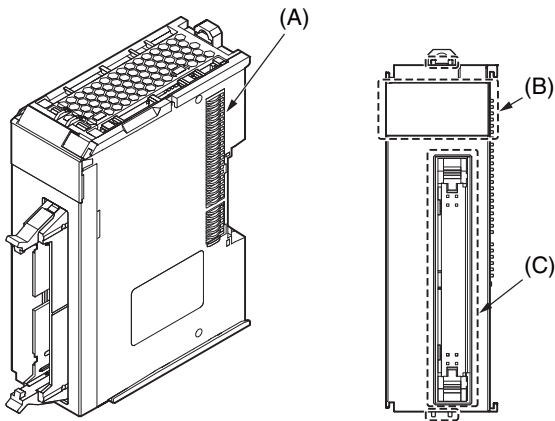
Units with MIL Connectors

(2 Connectors with 20 Terminals)
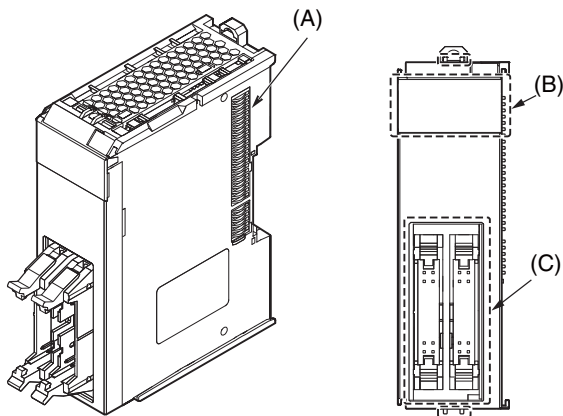
Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Connector	The connector is used to connect external devices. The number of terminals depends on the type of Unit.

Units with Fujitsu Connectors (1 Connector with 40 Terminals)
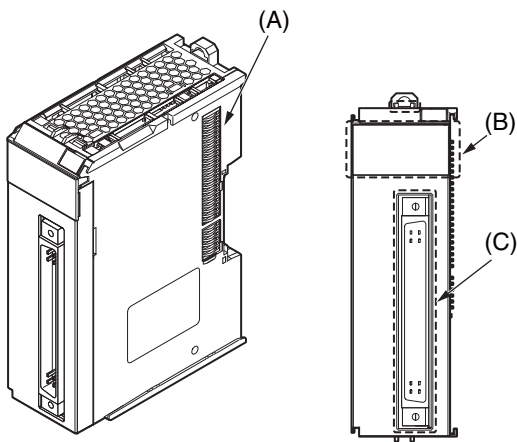
Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Connector	The connectors are used to connect to external devices.

Units with Fujitsu Connectors (2 Connectors with 24 Terminals)
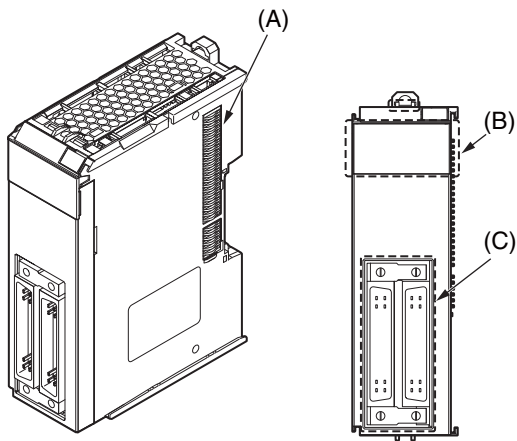
Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Connector	The connectors are used to connect to external devices.

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**
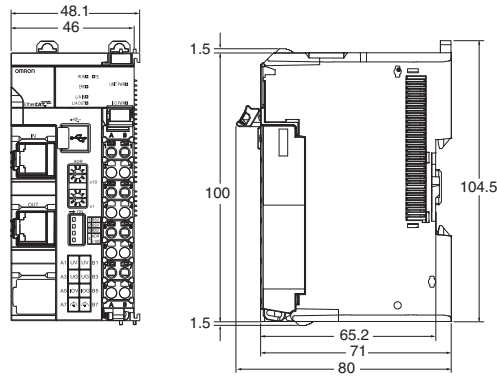
● **End Cover**
  (Included with EtherCAT Coupler Unit .)
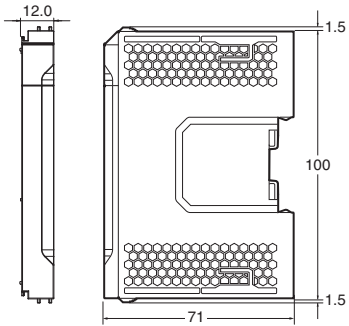
D-Sub connector Type

Unit	Model	Width
Communications Interface Units	NX-CIF210	30

● **Communications Interface Units**
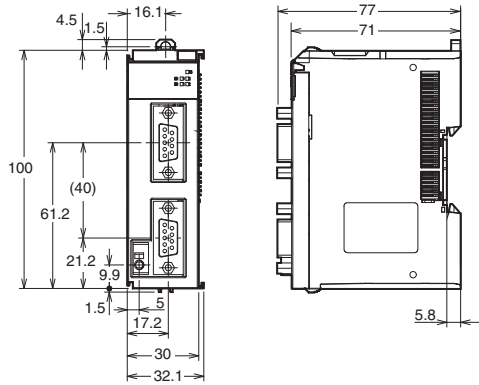
Screwless clamp terminal block 12mm

Unit	Model	Width
Digital Input Unit	NX-ID@@@@/IA@@@	
Digital Output Unit	NX-OD@@@@/OC@@@@	
Analog Input Unit	NX-AD@@@@	
Analog Output Unit	NX-DA@@@@	
Temperature Input Unit	NX-TS2@@@	
Heater Burnout Detection Unit	NX-HB@@@	
Load Cell Input Unit	NX-RS1201	
Incremental Encoder Input Unit	NX-EC0112/122/212/222	
SSI Input Unit	NX-ECS@@@	12
Pulse Output Unit	NX-PG0112/122	
Communications Interface Units	NX-CIF101/105	
IO-Link Master Unit	NX-ILM400	
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	
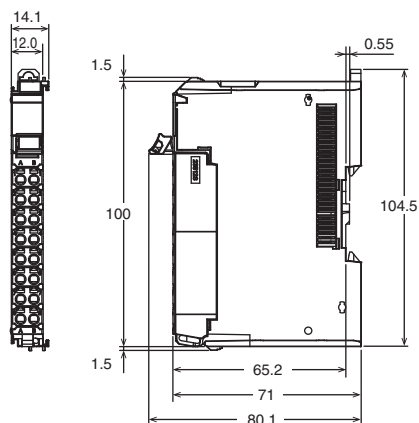
Screwless clamp terminal block 24mm

Unit	Model	Width
Relay Output Unit	NX-OC4633	
Temperature Input Unit	NX-TS3@@@	24
Incremental Encoder Input Unit	NX-EC0132/0142	
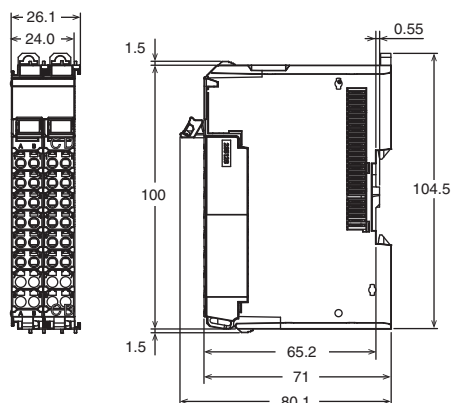
M3 Screw Terminal Block Type
30 mm Width

Unit	Model	Width
Digital Input Unit	NX-ID5142-1	
Digital Output Unit	NX-OD5121-1 NX-OD5256-1	30
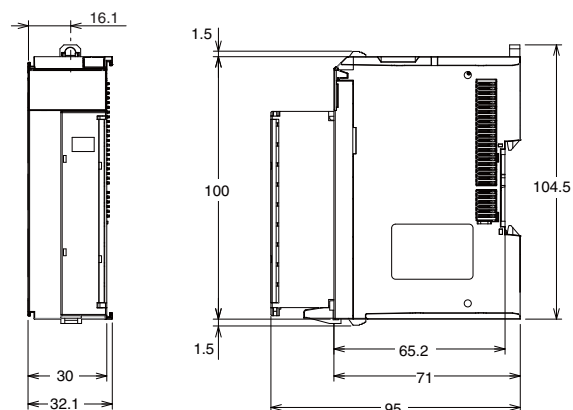
MIL connectors
1 Connector with 20 Terminals

Unit	Model	Width
Digital Input Unit	NX-ID5142-5	
Digital Output Unit	NX-OD5121-5 NX-OD5256-5	30
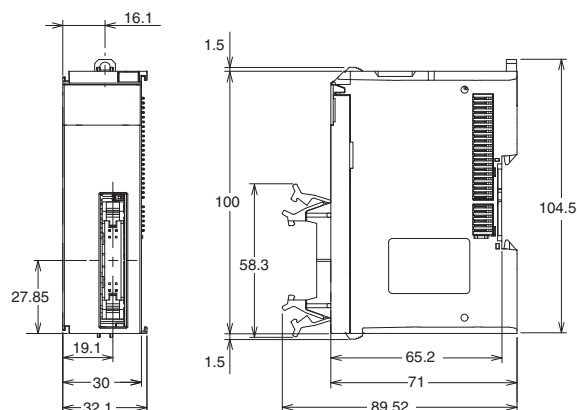
2 Connectors with 20 Terminals

Unit	Model	Width
Digital Mixed I/O Unit	NX-MD6121-5 NX-MD6256-5	30
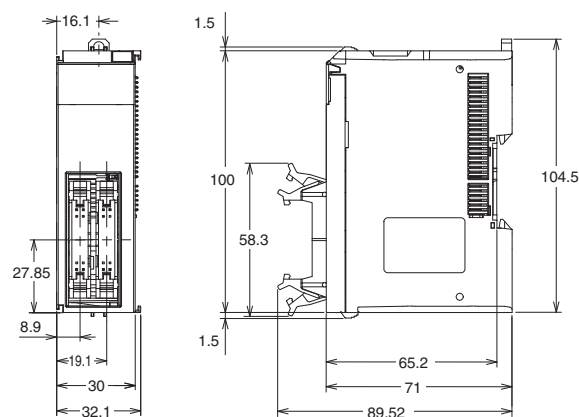
1 Connector with 40 Terminals

Unit	Model	Width
Digital Input Unit	NX-ID6142-5	
Digital Output Unit	NX-OD6121-5 NX-OD6256-5	30
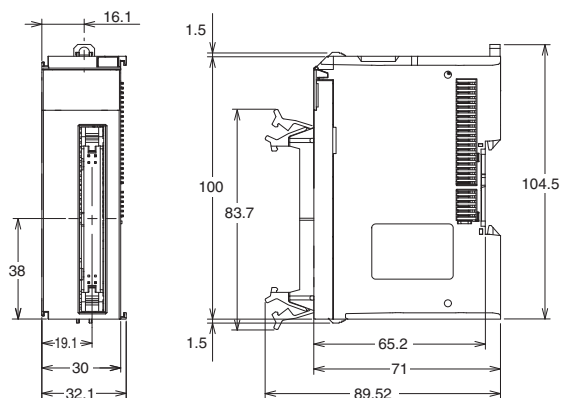
Units with Fujitsu Connectors
1 Connector with 40 Terminals

Unit	Model	Width
Digital Input Unit	NX-ID6142-6	30
Digital Output Unit	NX-OD6121-6	
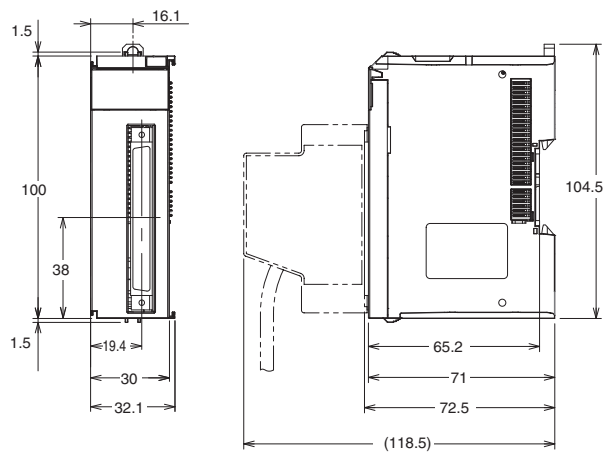
2 Connectors with 24 Terminals

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

System Configuration

Controllers

Softwares

Programmable Terminals

Features

System Configuration

Configuration Units

Power Supply Systems

Power Supply System and Design Concepts

Components and Functions

Dimensions /Mounting Dimensions

General Spesifications

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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
80
(B)

(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
5.8
71

USB cable

Communication cable
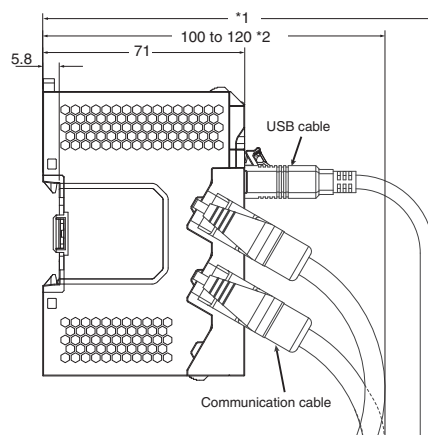
*1 This dimension depends on the specifications of the commercially available USB cable. Check the specifications of the USB cable that is used.
*2 Dimension from Back of Unit to Communications Cables
  - 100 mm: When an MPS588-C Connector is used.
  - 120 mm: When an XS6G-T421-1 Connector is used.

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

1.5
100
58.3
1.5
(A)
104.5
65.2
71
89.52
(B)

(Units:mm)
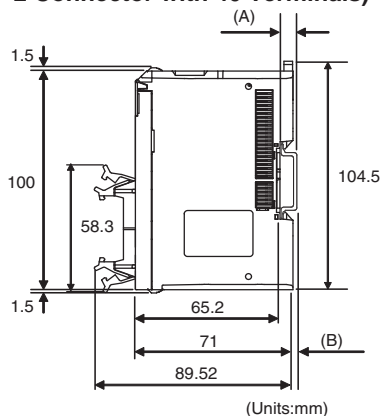
MIL connector
(40-pin connector x 1)
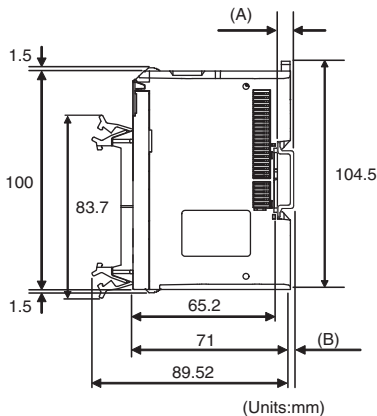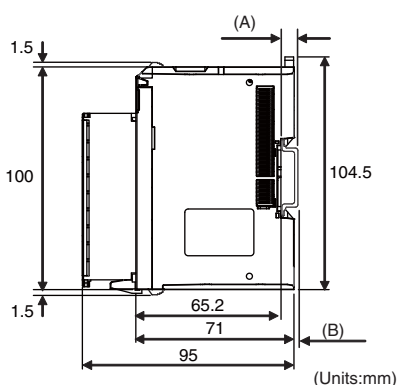
1.5
100
83.7
1.5
(A)
104.5
65.2
71
89.52
(B)

(Units:mm)

M3 Screw Terminal Block Type

1.5
100
1.5
(A)
104.5
65.2
71
95
(B)

(Units:mm)

Fujitsu Connectors
(1 Connector with 40 Terminals)

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

Fujitsu Connectors
(2 Connectors with 24 Terminals)

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

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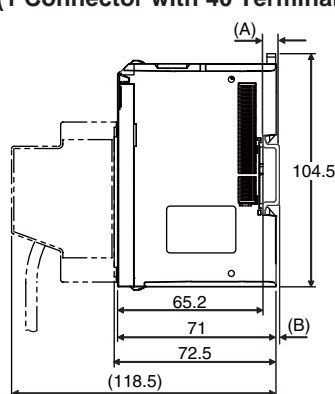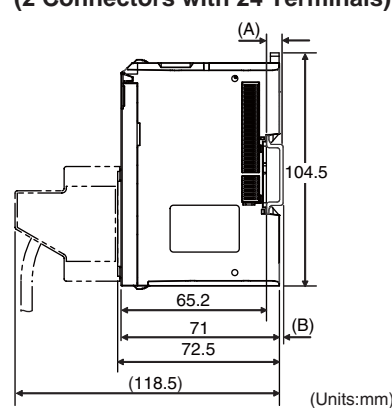
W: Width of Slave Terminal
W+(C)+(C): Width of Slave Terminal including End Plates

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 Slave Terminal**
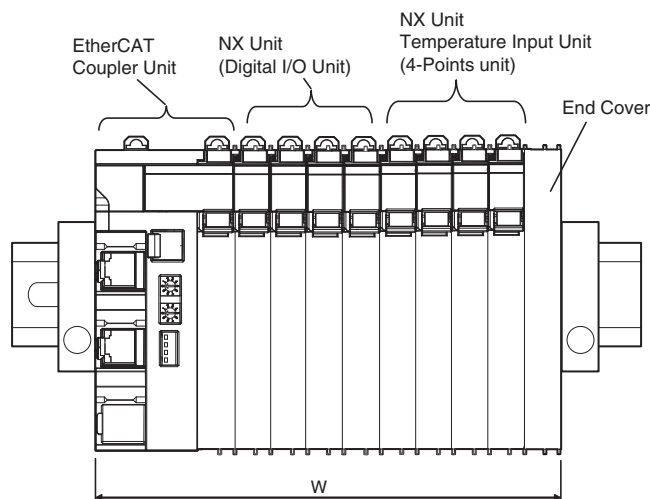
● Widths of Units in the Slave Terminal:

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, ANSI/ISA 12.12.01 EC: EN 61131-2, C-Tick or RCM, 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.
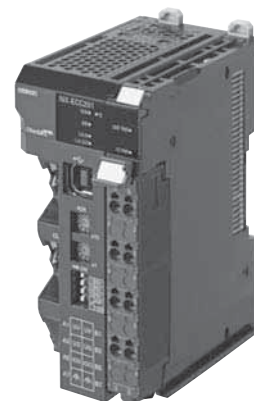
Features

• 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 the settable node address range for the built-in EtherCAT port is 1 to 512[*3] • Set on switches: 1 to 199 • Set with the Sysmac Studio: 1 to 512 When the settable node address range for the built-in EtherCAT port is 1 to 192[*3] • 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[*4][*5]		125 to 10,000 μs[*4][*5][*6]
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) [*7]		
	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 the *NX-series EtherCAT Coupler Unit User's Manual* (Cat. No. W519) for information on version upgrades.
*3. The range of node addresses that can be set depends on the model of the built-in EtherCAT port. For the node address ranges that can be set for a built-in EtherCAT port, refer to the user's manual for the built-in EtherCAT port on the connected CPU Unit or Industrial PC.
*4. 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. For the specifications of the built-in EtherCAT port, refer to the user's manual for the built-in EtherCAT port on the connected CPU Unit or the Industrial PC.
*5. This depends on the Unit configuration.
*6. There are restrictions in the communications cycles that you can set for some of the NX Units. If you use any of those NX Units, set a communications cycle that will satisfy the specifications for the refresh cycles that can be executed by the NX Unit. Refer to the appendix of the *NX-series Data Reference Manual* (Cat. No. W525-E1-07 or later) to see if there are restrictions on any specific NX Units. For information on the communications cycles that you can set, refer to the user's manuals for the NX Units.
*7. Use a 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. Output power [W] 10 W output, 40ºC 8.5 W output, 55ºC Ambient temperature [ºC] Used in another orientation other than the upright installation orientation. Output power [W] 10 W output, 40ºC 6.0 W output, 55ºC Ambient temperature [ºC]		
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		

Item	Specification		
	NX-ECC201	**NX-ECC202**	**NX-ECC203**
Terminal arrangement			
Accessory	End Cover (NX-END01): 1		

Terminal diagram labels: 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

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 versions [1]					
		Using an NX-series CPU Unit		Using an NJ-series CPU Unit		Using an NY-series Industrial PC	
		Unit version of CPU Unit	Sysmac Studio version	Unit version of CPU Unit	Sysmac Studio version	Unit version of Industrial PC	Sysmac Studio version
NX-ECC201	Ver. 1.2	Ver. 1.10 or later	Ver. 1.13 or higher	Ver. 1.07 or later	Ver. 1.08 or higher	Ver. 1.12 or later	Ver. 1.17 or higher
	Ver. 1.1			Ver. 1.06 or later	Ver. 1.07 or higher		
	Ver. 1.0			Ver. 1.05 or later	Ver. 1.06 or higher		
NX-ECC202	Ver. 1.2 [2]				Ver. 1.08 or higher		
NX-ECC203	Ver. 1.4		Ver. 1.16 or higher	Ver. 1.07 or later	Ver. 1.16 or higher		
	Ver. 1.3 [3]		Ver. 1.13 or higher		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.

System Configuration

Controllers

Softwares

Features

Programmable Terminals

Specifications

Slave Terminals

EtherCAT Communications Specifications

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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.
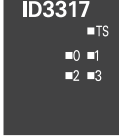
Features

- High-speed I/O refreshing is possible by connecting with the 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.
- Connection to the CJ-series is possible by connecting with the EtherNet/IP™ Coupler.

Digital Input Unit Specifications

● DC Input Unit (Screwless Clamping Terminal Block 12 mm, Width)
NX-ID3317

Unit name	DC Input Unit	Model	NX-ID3317
Number of points	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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.50 W max.	Current consumption from I/O power supply	No consumption
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

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

NX-ID3343

Unit name	DC Input Unit	Model	NX-ID3343
Number of points	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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.55 W max.	Current consumption from I/O power supply	30 mA max.
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

NX-ID3344

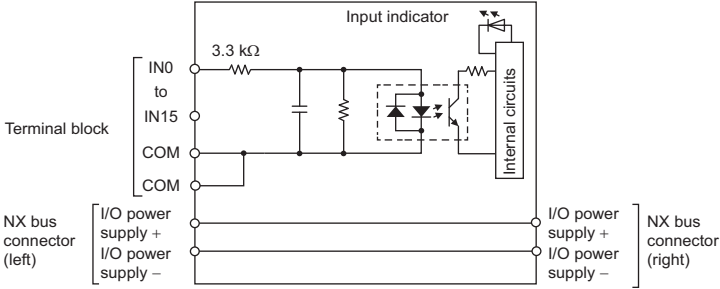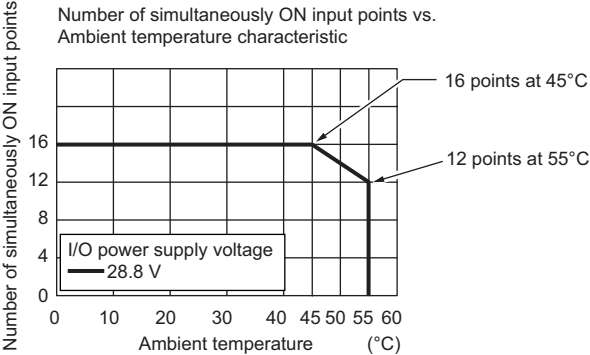| Unit name	DC Input Unit	Model	NX-ID3344
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Input refreshing with input changed time		
Indicators	TS indicator, input indicators ID3344 ■TS ■0 ■1 ■2 ■3	Internal I/O common	NPN
		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	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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.50 W max.	Current consumption from I/O power supply	30 mA max.
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/Short-circuit detection	Not supported.	Protective function	Not supported.

NX-ID3417

Unit name	DC Input Unit	**Model**	NX-ID3417
Number of points	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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.50 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

NX-ID3443

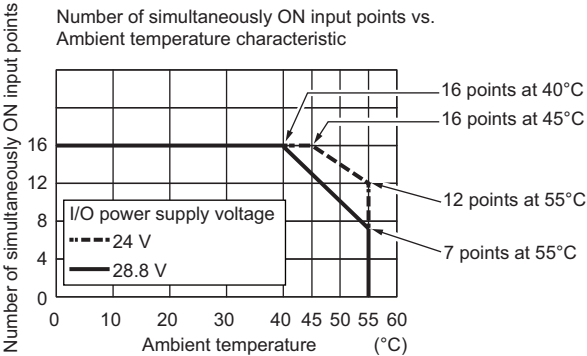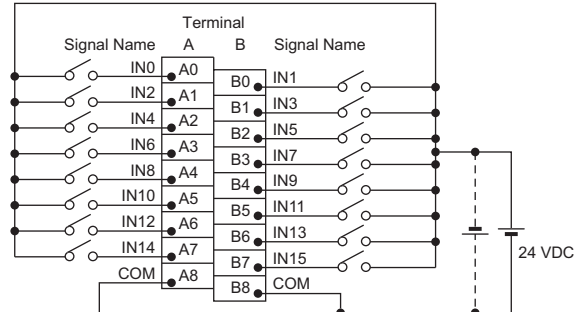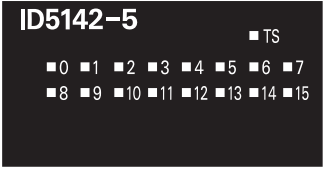|			
Unit name	DC Input Unit	**Model**	NX-ID3443
Number of points	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator **ID3443** ■TS ■0 ■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	• Connected to a CPU Unit
	  0.90 W max.
	• Connected to a Communications Coupler Unit
	  0.55 W max.
		Current consumption from I/O power supply	30 mA max.

Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

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

NX-ID3444

Unit name	DC Input Unit	**Model**	NX-ID3444
Number of points	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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.50 W max.	**Current consumption from I/O power supply**	30 mA max.
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

NX-ID4342

Unit name	DC Input Unit	**Model**	NX-ID4342
Number of points	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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.50 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

NX-ID4442

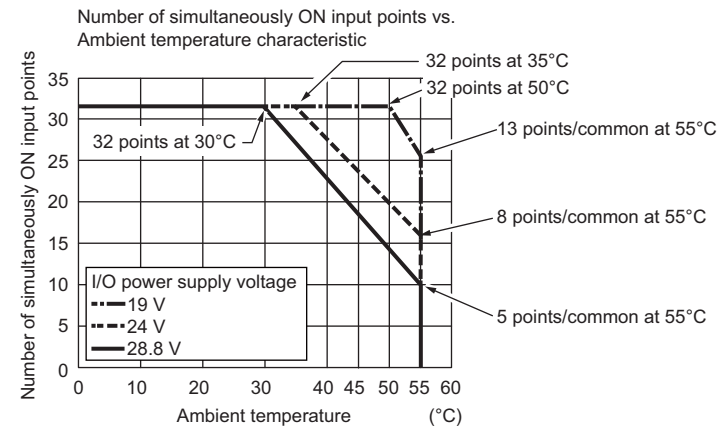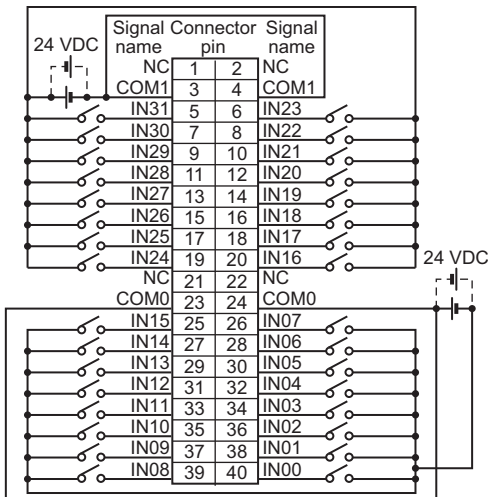| Unit name	DC Input Unit	Model	NX-ID4442
Number of points	8 points	External connection terminals	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator ID4442 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.50 W max.	Current consumption from I/O power supply	No consumption
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

NX-ID5342

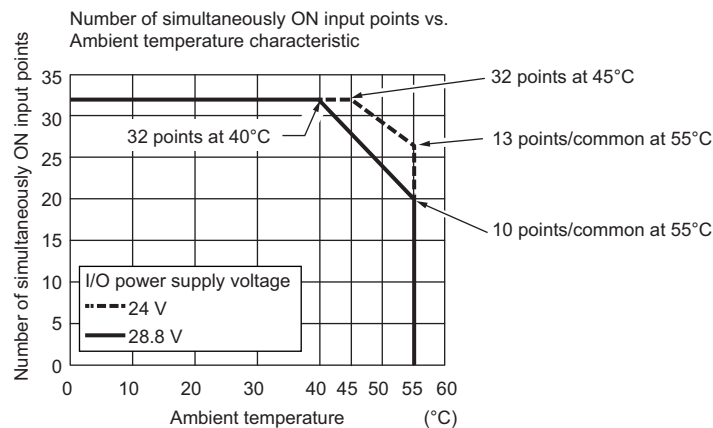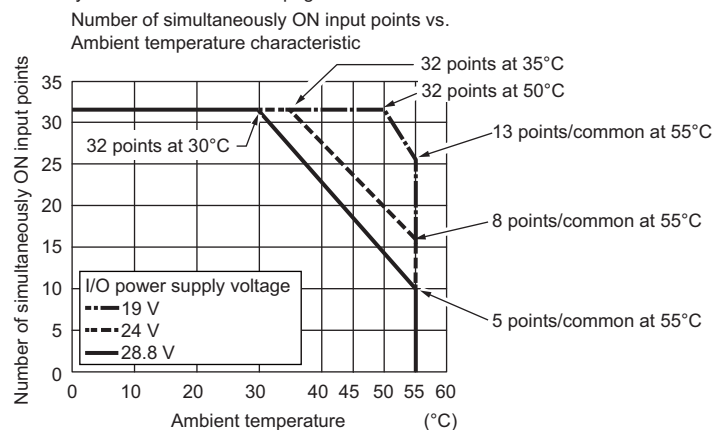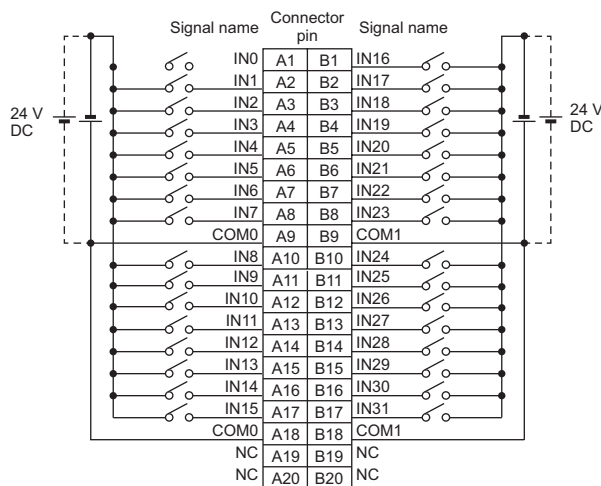|			
Unit name	DC Input Unit	**Model**	NX-ID5342
Number of points	16 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator ID5342 ■TS ■0 ■1 ■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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.55 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

NX-ID5442

Unit name	DC Input Unit	**Model**	NX-ID5442
Number of points	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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.55 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
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	• Connected to a CPU Unit
	  0.85 W max.
	• Connected to a Communications Coupler Unit
	  0.55 W max.
		Current consumption from I/O power supply	No consumption

Weight	125 g max.		
Circuit layout			

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

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: As shown in the following. • For upright installation Number of simultaneously ON input points vs. Ambient temperature characteristic 16 points at 45°C 12 points at 55°C I/O power supply voltage 28.8 V • For any installation other than upright Number of simultaneously ON input points vs. Ambient temperature characteristic 16 points at 40°C 16 points at 45°C 12 points at 55°C 7 points at 55°C I/O power supply voltage 24 V 28.8 V
Terminal connection diagram	 • 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 ID5142-5 ■ 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	• Connected to a CPU Unit 0.85 W max. • Connected to a Communications Coupler Unit 0.55 W max.	Current consumption from I/O power supply	No consumption
Weight	85 g max.		
Circuit layout			

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: As shown in the following. • For upright installation Number of simultaneously ON input points vs. Ambient temperature characteristic 16 points at 45°C 12 points at 55°C I/O power supply voltage 28.8 V Number of simultaneously ON input points / Ambient temperature (°C) • For any installation other than upright Number of simultaneously ON input points vs. Ambient temperature characteristic 16 points at 40°C 16 points at 45°C 12 points at 45°C 7 points at 55°C I/O power supply voltage 24 V 28.8 V Number of simultaneously ON input points / Ambient temperature (°C)
Terminal connection diagram	24 VDC | Signal name	Connector pin		Signal name
NC	1	2	NC
COM	3	4	COM
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 can be connected in either direction. • Be sure to wire both pins 3 and 4 (COM), and set the same polarity for both pins.

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

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 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	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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.60 W max.	Current consumption from I/O power supply	No consumption
Weight	90 g max.		
Circuit layout			

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Digital Input Unit Specifications

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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	 • 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.
Disconnection/ Short-circuit detection	Not supported.

Protective function	Not supported.

● 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	• Connected to a CPU Unit 0.95 W max. • Connected to a Communications Coupler Unit 0.55 W max.	Current consumption from I/O power supply	No consumption
Weight	90 g max.		
Circuit layout			

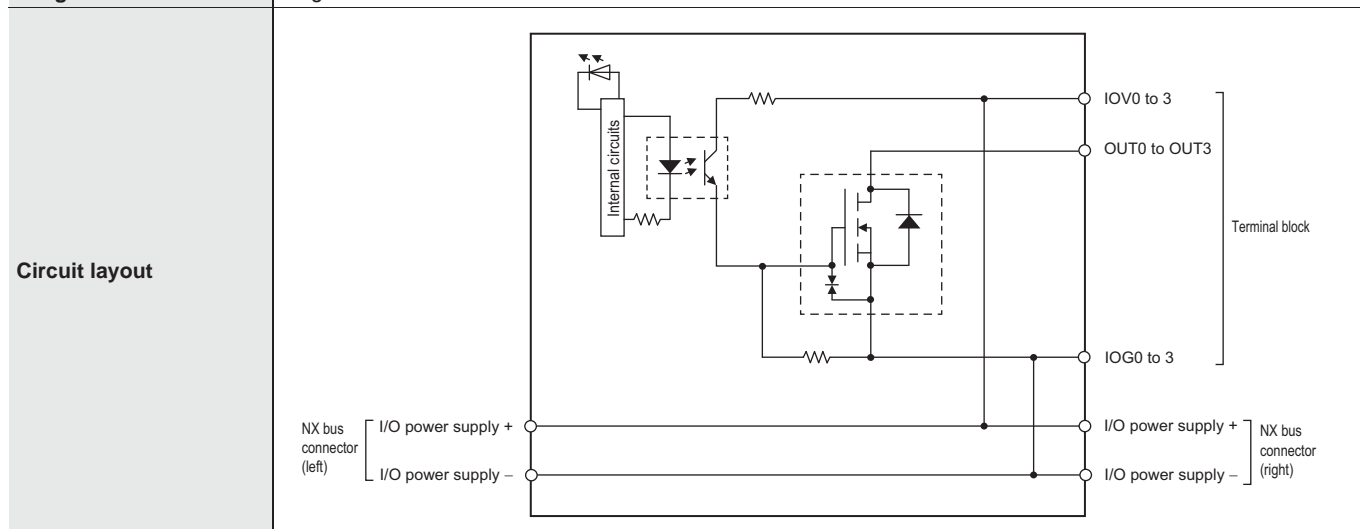|	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: As shown in the following. • For upright installation Number of simultaneously ON input points vs. Ambient temperature characteristic 32 points at 45°C 32 points at 40°C 13 points/common at 55°C 10 points/common at 55°C I/O power supply voltage 24 V 28.8 V • For any installation other than upright Number of simultaneously ON input points vs. Ambient temperature characteristic 32 points at 35°C 32 points at 50°C 32 points at 30°C 13 points/common at 55°C 8 points/common at 55°C I/O power supply voltage 19 V 24 V 28.8 V 5 points/common at 55°C
Terminal connection diagram	

Signal name	Connector pin		Signal name
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.
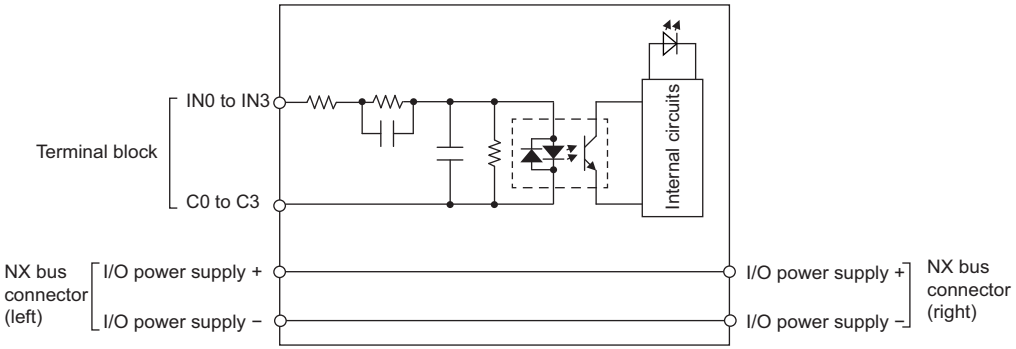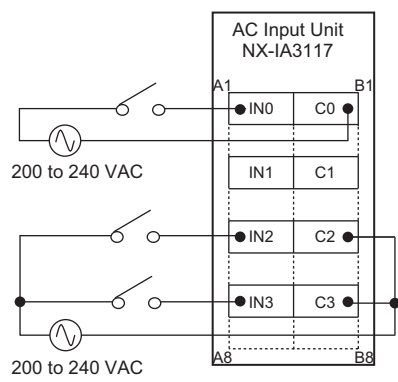
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

● AC Input Units (Screwless Clamping Terminal Block, 12 mm Width)
NX-IA3117

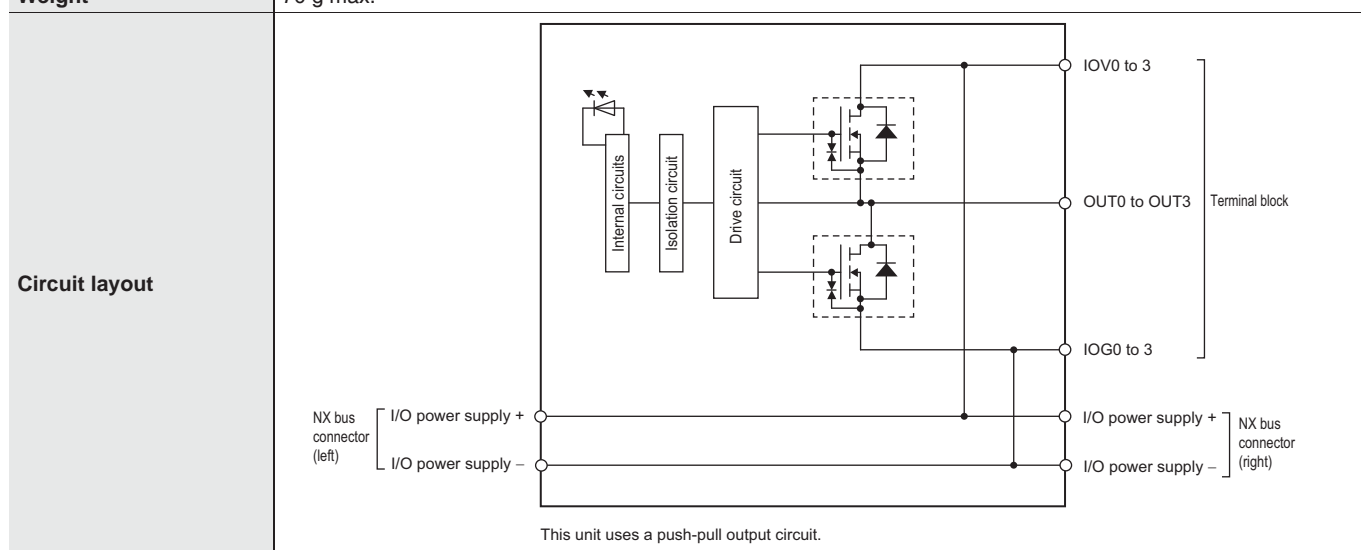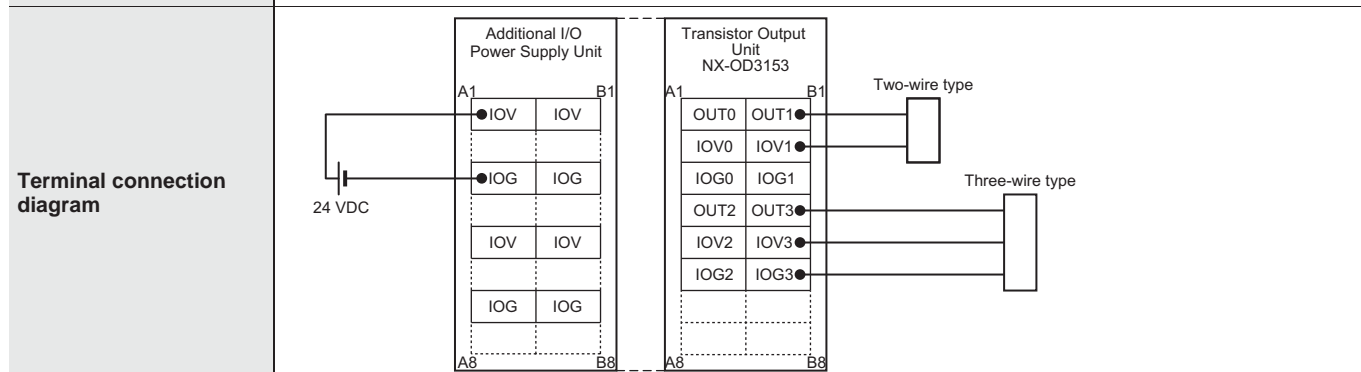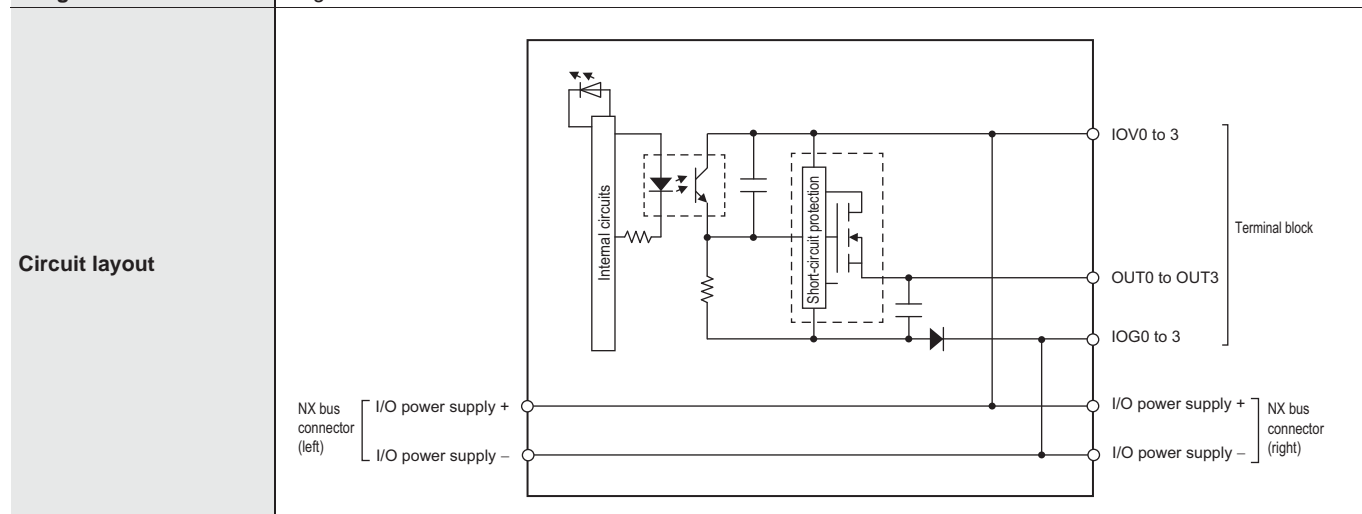| Unit name	AC Input Unit	Model	NX-IA3117
Number of points	4 points, independent contacts	External connection terminals	Screwless clamping terminal block (8 terminals)
Capacity	Free-Run refreshing		
Indicators	TS indicator, input indicator IA3117 ■TS ■0 ■1 ■2 ■3	Internal I/O common	No polarity
		Rated 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	• Connected to a CPU Unit 0.80 W max. • Connected to a Communications Coupler Unit 0.50 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 NX bus connector (left) — I/O power supply + / I/O power supply − Internal circuits I/O power supply + / I/O power supply − — NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	AC Input Unit NX-IA3117 A1 / B1 IN0 / C0 200 to 240 VAC IN1 / C1 IN2 / C2 IN3 / C3 A8 / B8 200 to 240 VAC		
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding versions *	
Model	Unit version	CPU Unit	Sysmac Studio
NX-ID3317	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher
NX-ID3343			
NX-ID3344			
NX-ID3417			
NX-ID3443			
NX-ID3444			
NX-ID4342			
NX-ID4442			
NX-ID5142-1			
NX-ID5142-5			
NX-ID5342			
NX-ID5442			
NX-ID6142-5			
NX-ID6142-6			
NX-IA3117			

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *1		
		EtherCAT		
Model	Unit version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	Sysmac Studio
NX-ID3317	Ver.1.0	Ver.1.0 or later	Ver.1.05 or later	Ver.1.06 or higher
NX-ID3343				
NX-ID3344		Ver.1.1 or later	Ver.1.06 or later *2	Ver.1.07 or higher
NX-ID3417		Ver.1.0 or later	Ver.1.05 or later	Ver.1.06 or higher
NX-ID3443				
NX-ID3444		Ver.1.1 or later	Ver.1.06 or later *2	Ver.1.07 or higher
NX-ID4342		Ver.1.0 or later	Ver.1.05 or later	Ver.1.06 or higher
NX-ID4442				
NX-ID5142-1				Ver.1.13 or higher
NX-ID5142-5				Ver.1.10 or higher
NX-ID5342				Ver.1.06 or higher
NX-ID5442				
NX-ID6142-5				Ver.1.10 or higher
NX-ID6142-6				Ver.1.13 or higher
NX-IA3117				Ver.1.08 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.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.
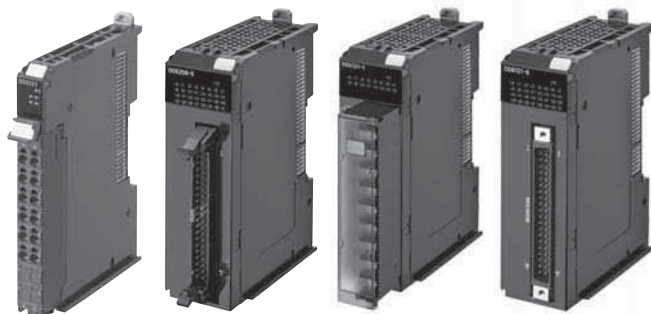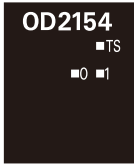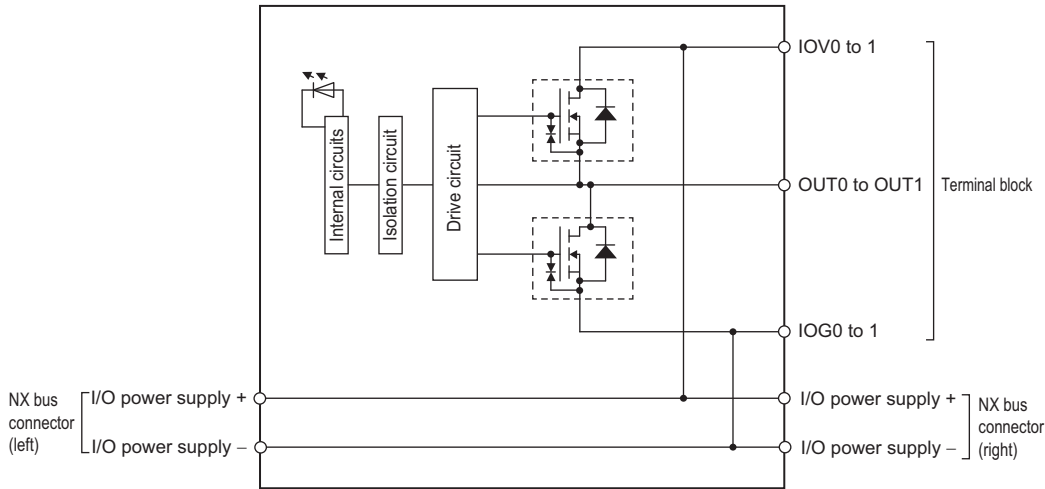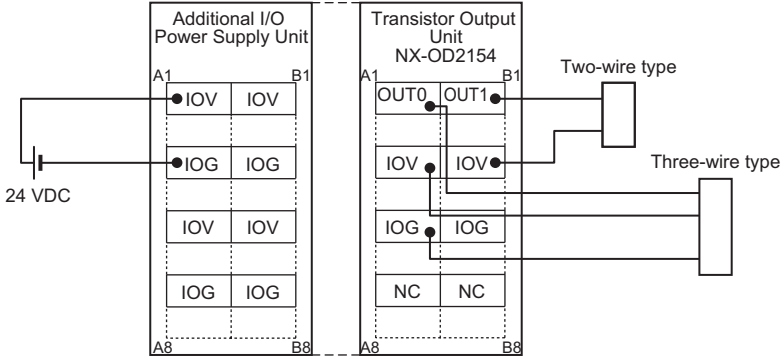
Features

- 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.
- Connection to the CJ-series is possible by connecting with the EtherNet/IP[TM] Coupler.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Digital Output Unit Specifications

Version Information

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Digital Output Unit Specifications

● Transistor Output Unit (Screwless Clamping Terminal Block 12 mm, Width)
NX-OD2154

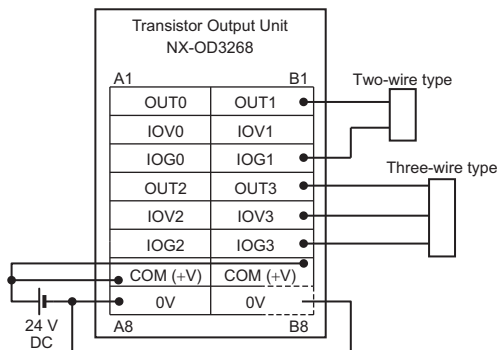| Unit name	Transistor Output Unit	Model	NX-OD2154
Number of points	2 points	External connection terminals	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Output refreshing with specified time stamp		
Indicators	TS indicator, output indicator OD2154 ■TS ■0 ■1	Internal I/O common	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	• Connected to a CPU Unit 0.85 W max. • Connected to a Communications Coupler Unit 0.45 W max.	I/O current consumption	30 mA max.
Weight	70 g max.		
Circuit layout	 This unit uses a push-pull output circuit.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Digital Output Unit Specifications

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NX-OD2258

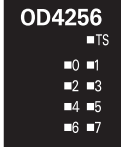| Unit name	Transistor Output Unit	Model	NX-OD2258
Number of points	2 points	External connection terminals	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Output refreshing with specified time stamp		
Indicators	TS indicator, output indicator	Internal I/O common	PNP
	OD2258 ■TS ■0 ■1	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	• Connected to a CPU Unit 0.85 W max. • Connected to a Communications Coupler Unit 0.50 W max.	I/O current consumption	40 mA max.
Weight	70 g max.		
Circuit layout	This unit uses a push-pull output circuit.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	With load short-circuit protection.

NX-OD3121

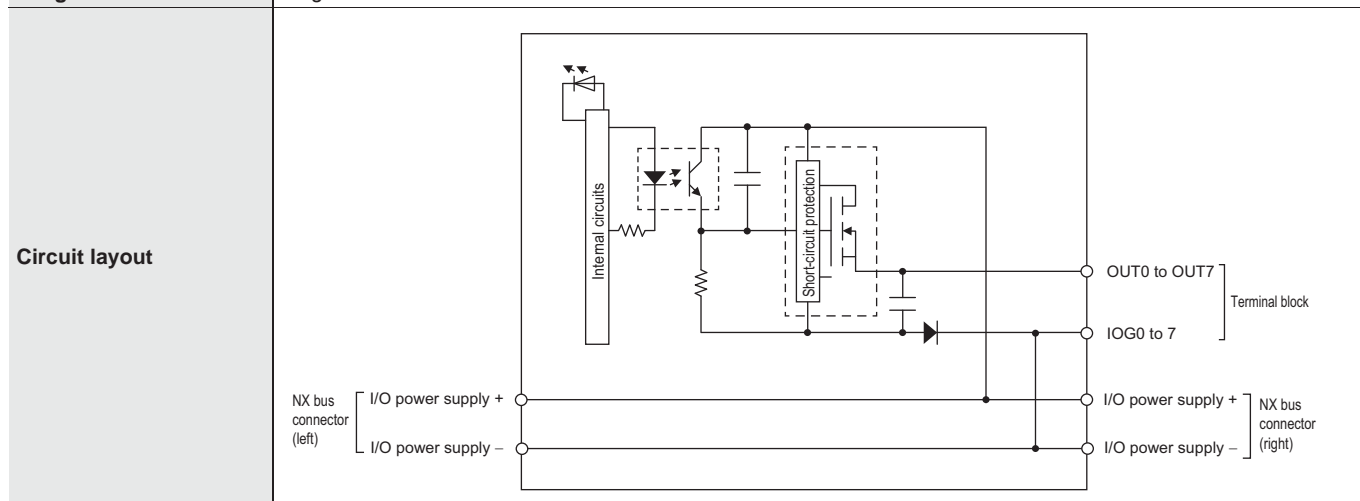| Unit name	Transistor Output Unit	Model	NX-OD3121
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator OD3121 ■TS ■0 ■1 ■2 ■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	• Connected to a CPU Unit
	  0.90 W max.
	• Connected to a Communications Coupler Unit
	  0.55 W max.
		I/O current consumption	10 mA max.

Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

NX-OD3153

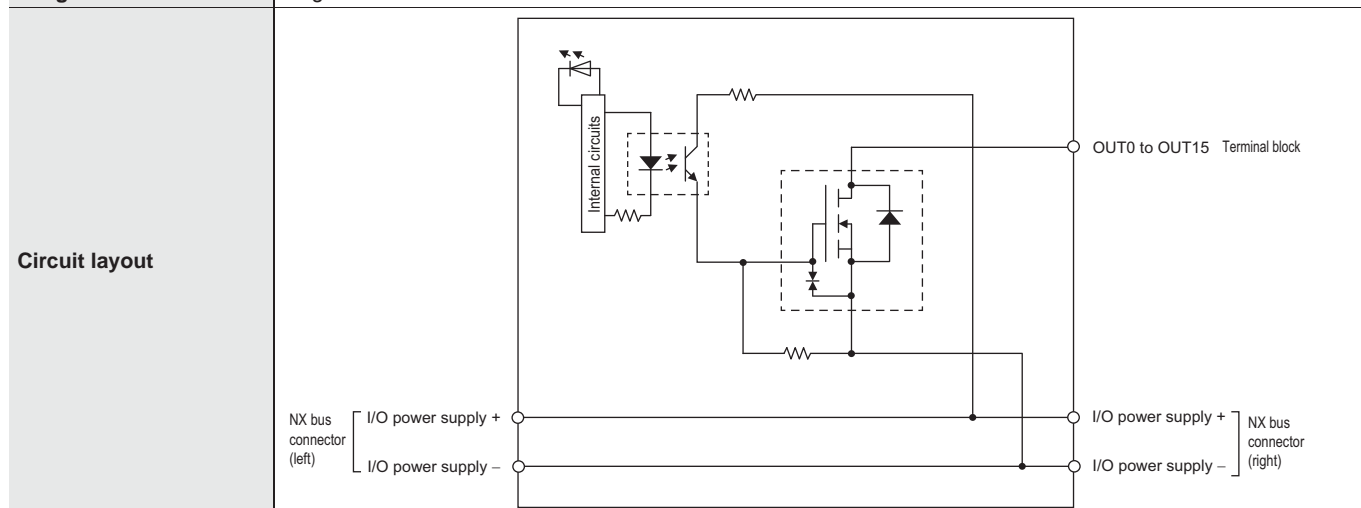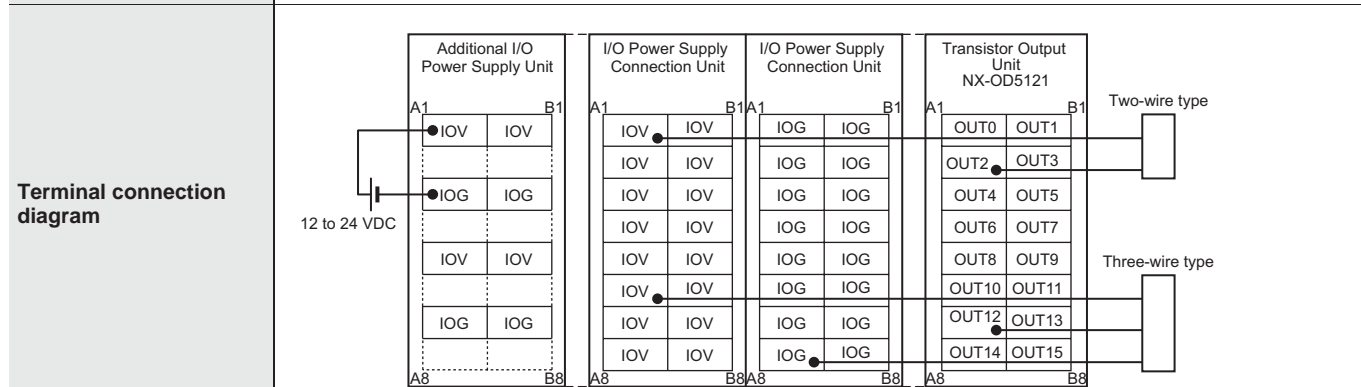| Unit name	Transistor Output Unit	Model	NX-OD3153
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator **OD3153** ■TS ■0 ■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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.50 W max.	I/O current consumption	30 mA max.
Weight	70 g max.		
Circuit layout	 This unit uses a push-pull output circuit.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Digital Output Unit Specifications

Version Information

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NX-OD3256

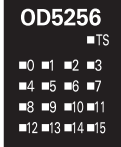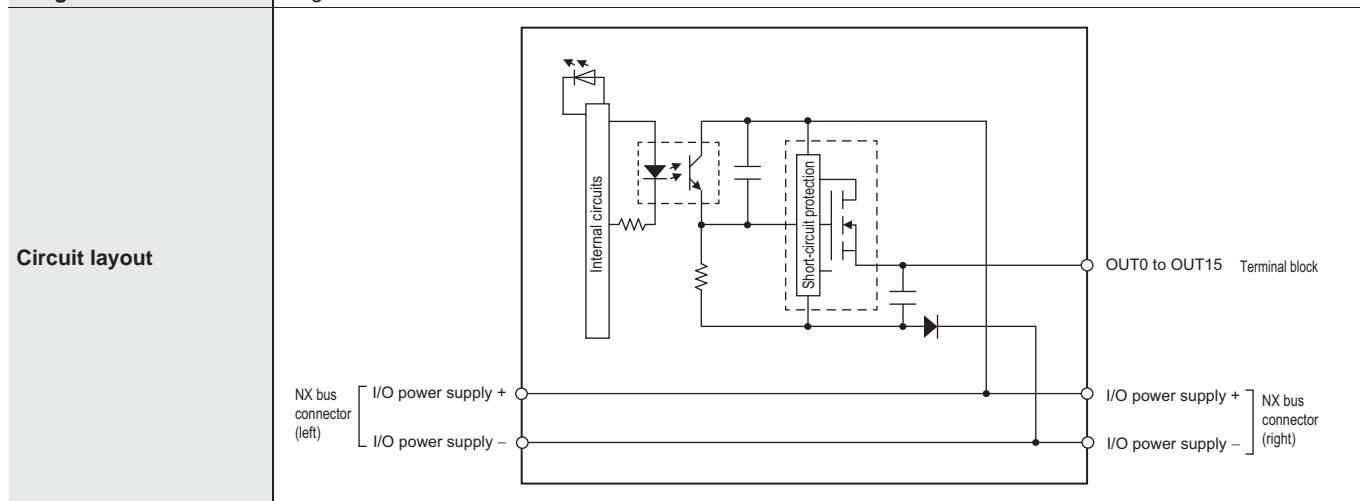| Unit name	Transistor Output Unit	Model	NX-OD3256
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator OD3256 ■TS ■0 ■1 ■2 ■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	• Connected to a CPU Unit
	  0.90 W max.
	• Connected to a Communications Coupler Unit
	  0.55 W max.
		I/O current consumption	20 mA max.

Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	With load short-circuit protection.

NX-OD3257

Unit name	Transistor Output Unit	**Model**	NX-OD3257
Number of points	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	• Connected to a CPU Unit 0.85 W max. • Connected to a Communications Coupler Unit 0.50 W max.	**I/O current consumption**	40 mA max.
Weight	70 g max.		
Circuit layout	 This unit uses a push-pull output circuit.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Digital Output Unit Specifications

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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	• Connected to a CPU Unit 0.85 W max. • Connected to a Communications Coupler Unit 0.50 W max.	Current consumption from I/O power supply	20 mA max.
Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 • 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.

System Configuration

Controllers

Softwares

Features

Programmable Terminals

Digital Output Unit Specifications

Version Information

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NX-OD4121

Unit name	Transistor Output Unit	Model	NX-OD4121
Number of points	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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.55 W max.	I/O current consumption	10 mA max.
Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

NX-OD4256

Unit name	Transistor Output Unit	Model	NX-OD4256
Number of points	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	• Connected to a CPU Unit 1.00 W max. • Connected to a Communications Coupler Unit 0.65 W max.	I/O current consumption	30 mA max.
Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	With load short-circuit protection.

NX-OD5121

Unit name	Transistor Output Unit	Model	NX-OD5121
Number of points	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	Internal I/O common	NPN
	OD5121 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15	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	• Connected to a CPU Unit 1.00 W max. • Connected to a Communications Coupler Unit 0.65 W max.	I/O current consumption	20 mA max.
Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	Not supported.

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

NX-OD5256

Unit name	Transistor Output Unit	Model	NX-OD5256
Number of points	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	• Connected to a CPU Unit 1.10 W max. • Connected to a Communications Coupler Unit 0.70 W max.	I/O current consumption	40 mA max.
Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	With load short-circuit protection.
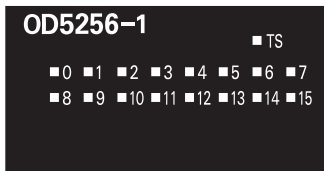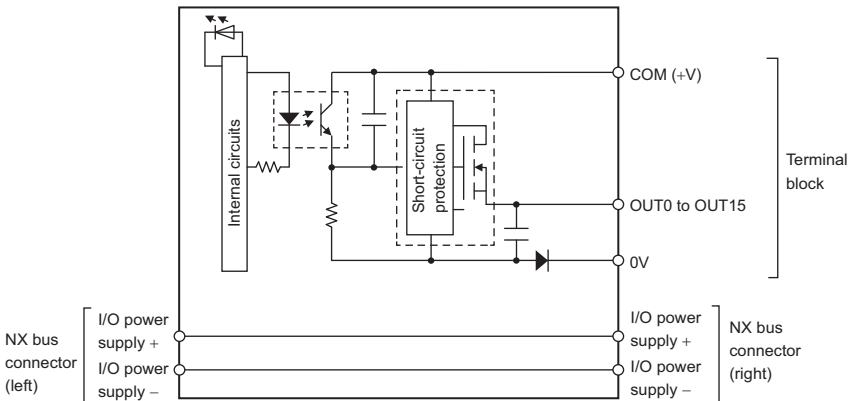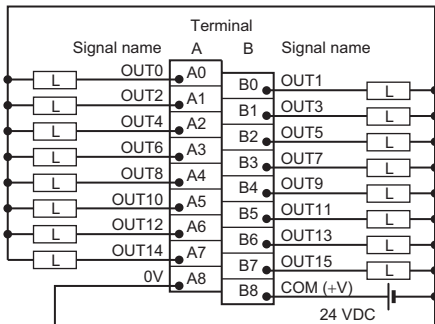
● Transistor Output Units (M3 Screw Terminal Block, 30 mm Width)
NX-OD5121-1

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	• Connected to a CPU Unit
	  0.90 W max.
	• Connected to a Communications Coupler Unit
	  0.60 W max.
		Current consumption from I/O power supply	30 mA max.

Weight	125 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/Short-circuit detection	Not supported.	Protective function	Not supported.

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

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	• Connected to a CPU Unit 0.95 W max. • Connected to a Communications Coupler Unit 0.65 W max.	Current consumption from I/O power supply	30 mA max.
Weight	125 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/ Short-circuit detection	Not supported.	Protective function	With load short-circuit protection.

Slave Terminals NX-series
Digital Output Units NX-OD/OC

System Configuration

Controllers

Softwares

Features

Programmable Terminals

Digital Output Unit Specifications

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

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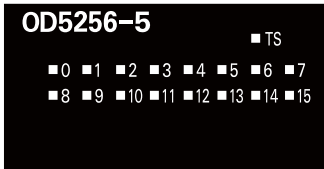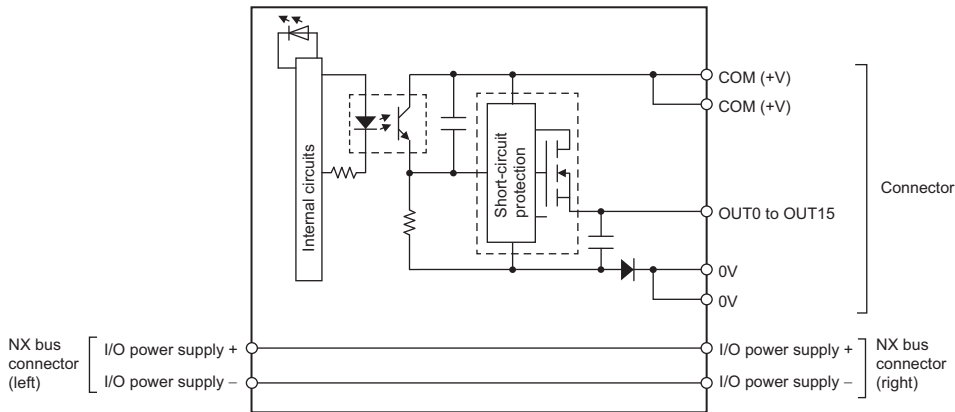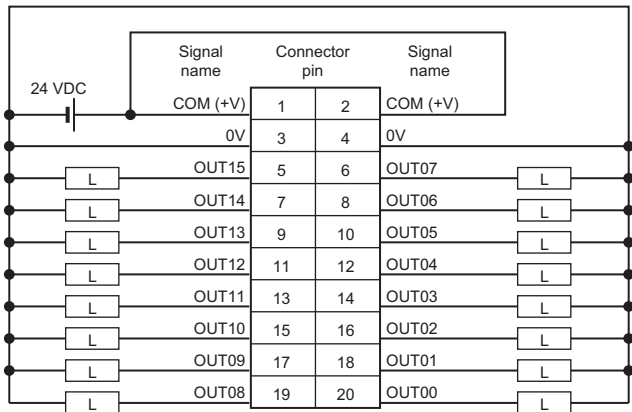
● Transistor Output Units (MIL Connector, 30 mm Width)
NX-OD5121-5

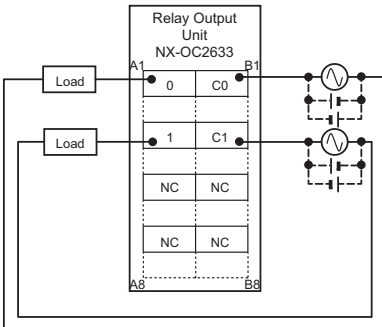| Unit name	Transistor Output Unit	Model	NX-OD5121-5
Number of points	16 points	External connection terminals	MIL connector (20 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, output indicator OD5121-5 ■ TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■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	• Connected to a CPU Unit 0.95 W max. • Connected to a Communications Coupler Unit 0.60 W max.	Current consumption from I/O power supply	30 mA max.
Weight	80 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 • 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.
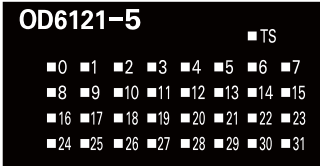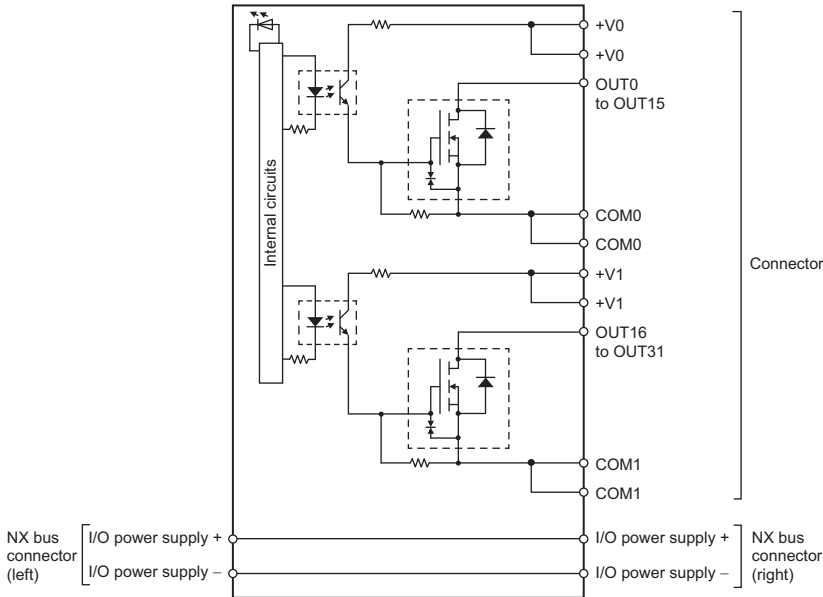
NX-OD5256-5

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	• Connected to a CPU Unit
	  1.00 W max.
	• Connected to a Communications Coupler Unit
	  0.70 W max.
		Current consumption from I/O power supply	40 mA max.

Weight	85 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 • 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	• Connected to a CPU Unit 1.00 W max. • Connected to a Communications Coupler Unit 0.80 W max.	Current consumption from I/O power supply	50 mA max.
Weight	90 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		

Terminal connection diagram	

Signal name / Connector pin / Signal name:

12 to 24 VDC	Signal name	Connector pin		Signal name	
	+V1	1	2	+V1	
	COM1	3	4	COM1	
	OUT31	5	6	OUT23	L
	OUT30	7	8	OUT22	L
	OUT29	9	10	OUT21	L
	OUT28	11	12	OUT20	L
	OUT27	13	14	OUT19	L
	OUT26	15	16	OUT18	L
	OUT25	17	18	OUT17	L
	OUT24	19	20	OUT16	L
	+V0	21	22	+V0	
	COM0	23	24	COM0	
	OUT15	25	26	OUT07	L
	OUT14	27	28	OUT06	L
	OUT13	29	30	OUT05	L
	OUT12	31	32	OUT04	L
	OUT11	33	34	OUT03	L
	OUT10	35	36	OUT02	L
	OUT09	37	38	OUT01	L
12 to 24 VDC	OUT08	39	40	OUT00	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).
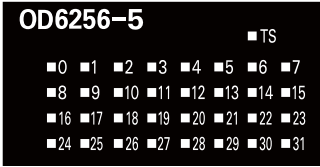
Disconnection/Short-circuit detection	Not supported.	Protective function	Not supported.

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	• Connected to a CPU Unit
	  1.30 W max.
	• Connected to a Communications Coupler Unit
	  1.00 W max.
		Current consumption from I/O power supply	80 mA max.

Weight	95 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Digital Output Unit Specifications

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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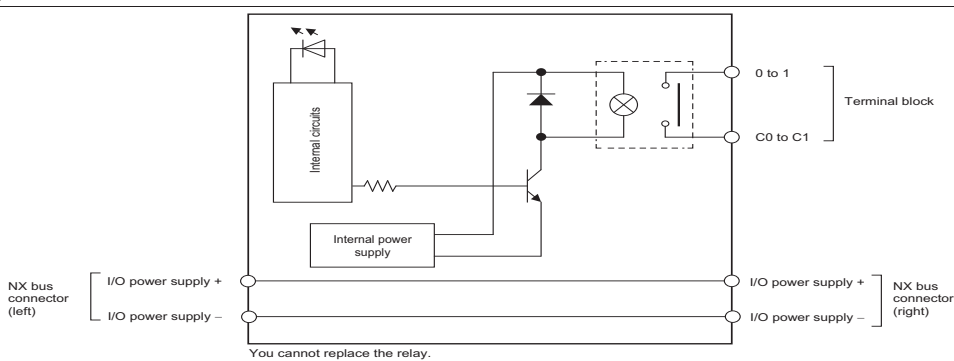
Slave Terminals NX-series
Digital Output Units NX-OD/OC

System Configuration | Controllers | Softwares | Features | Programmable Terminals | Digital Output Unit Specifications | Slave Terminals | Safety | Mortion/Drives | Inverters | Robotics | Sensors | Remote I/O Terminals | Ordering Information

Version Information

● Transistor Output Units (Fujitsu Connector, 30 mm Width)
NX-OD6121-6
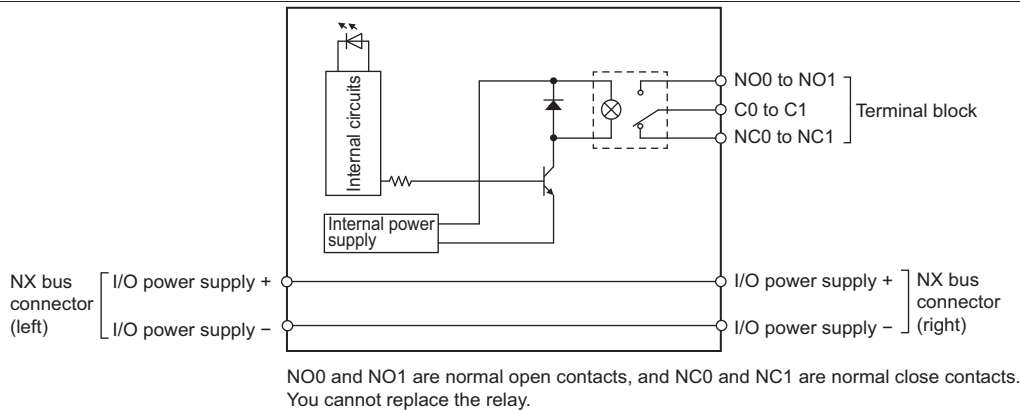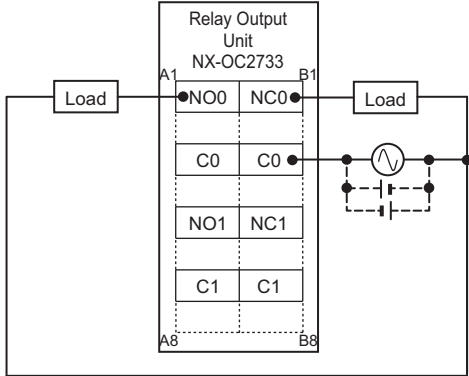
Unit name	Transistor Output Unit	Model	NX-OD6121-6
Number of points	32 points	External connection terminals	Fujitsu connector (40 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		

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	• Connected to a CPU Unit
	  1.10 W max.
	 • Connected to a Communications Coupler Unit
	  0.80 W max.
		Current consumption from I/O power supply	50 mA max.

Weight	90 g max.		

Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	 • 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
Number of points	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/s² 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)	Shock resistance	100 m/s², 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	• Connected to a CPU Unit 1.20 W max. • Connected to a Communications Coupler Unit 0.80 W max.	I/O current consumption	No consumption
Weight	65 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
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)
I/O refreshing method	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	• Connected to a CPU Unit
	  1.30 W max.
	• Connected to a Communications Coupler Unit
	  0.95 W max.
		Current consumption from I/O power supply	No consumption

Weight	70 g max.		
Circuit layout	 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: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
Disconnection/Short-circuit detection	Not supported.	Protective function	Not supported.

● Relay Output Units (Screwless Clamping Terminal Block, 24 mm Width)
NX-OC4633

Unit name	Relay Output Unit	Model	NX-OC4633
Number of points	8 points, independent contacts	External connection terminals	Screwless clamping terminal block (8 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator, output indicator OC4633 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7	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, 8 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	24 (W) x 100 (H) x 71 (D)	Isolation method	Relay isolation
Insulation resistance	Between output bits: 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 output bits: 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.
Vibration resistance	Conforms to IEC 60068-2-6. 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	• Connected to a CPU Unit 2.00 W max. • Connected to a Communications Coupler Unit 1.65 W max.	Current consumption from I/O power supply	No consumption
Weight	140 g max.		
Circuit layout	You cannot replace the relay.		

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: As shown in the following. Output current/Unit - Ambient temperature characteristics (8A, 45°C) (4A, 55°C) Output current/Unit (A) Ambient temperature (°C)
Terminal connection diagram	Relay Output Unit NX-OC4633

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

Side tabs:
System Configuration
Controllers
Softwares
Programmable Terminals
Features
Digital Output Unit Specifications
Slave Terminals
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding versions *		
Model	Unit version	CPU Unit	Sysmac Studio
NX-OD2154	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher
NX-OD2258			
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-OD6121-6			
NX-OD6256-5			
NX-OC2633			
NX-OC2733			
NX-OC4633			

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *1		
		EtherCAT		
Model	Unit version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	Sysmac Studio
NX-OD2154	Ver.1.0	Ver.1.1 or later	Ver.1.06 or later *2	Ver.1.07 or higher
NX-OD2258				
NX-OD3121		Ver.1.0 or later	Ver.1.05 or later	Ver.1.06 or higher
NX-OD3153				
NX-OD3256				
NX-OD3257				
NX-OD3268				Ver.1.13 or higher
NX-OD4121				Ver.1.06 or higher
NX-OD4256				
NX-OD5121				
NX-OD5121-1				Ver.1.13 or higher
NX-OD5121-5				Ver.1.10 or higher
NX-OD5256				Ver.1.06 or higher
NX-OD5256-1				Ver.1.13 or higher
NX-OD5256-5				Ver.1.10 or higher
NX-OD6121-5				
NX-OD6121-6				Ver.1.13 or higher
NX-OD6256-5				Ver.1.10 or higher
NX-OC2633				Ver.1.06 or higher
NX-OC2733				Ver.1.08 or higher
NX-OC4633				Ver.1.17 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. If you use a CPU Unit, 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 instructions reference manual for the connected CPU Unit or Industrial PC 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.
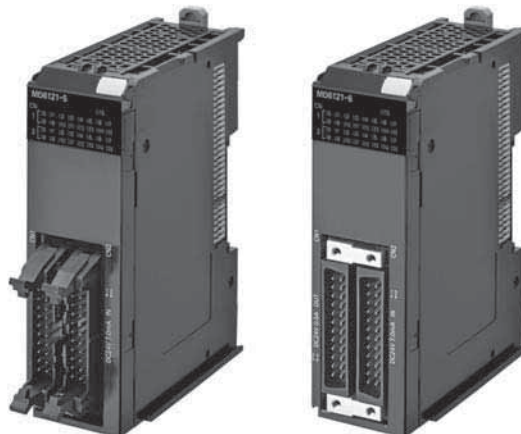
Features

- 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.
- Connection to the CJ-series is possible by connecting with the EtherNet/IP™ Coupler.

System Configuration
Controllers
Softwares
Features
Programmable Terminals
Digital Mixed I/O Units Specifications
Version Information
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

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	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	• Connected to a CPU Unit 1.00 W max. • Connected to a Communications Coupler Unit 0.70 W max.	
		Current consumption from I/O power supply	30 mA max.	
		Weight	105 g max.	

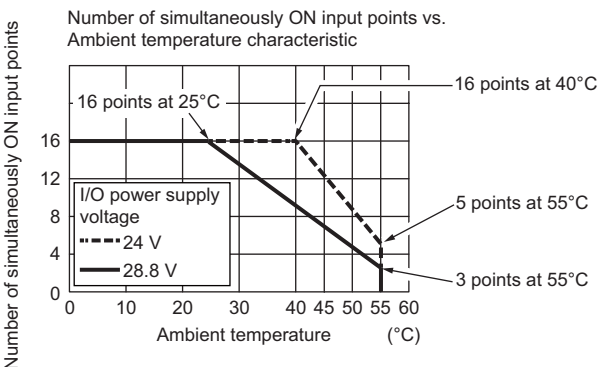|	
Circuit layout	CN1 (left) output circuit CN2 (right) input circuit

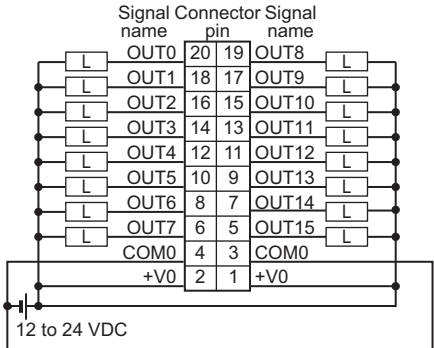|	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: As shown in the following. • For upright installation Number of simultaneously ON input points vs. Ambient temperature characteristic 16 points at 35°C — 16 points at 45°C 13 points at 55°C 9 points at 55°C I/O power supply voltage ---- 24 V —— 28.8 V Number of simultaneously ON input points / Ambient temperature (°C) • For any installation other than upright Number of simultaneously ON input points vs. Ambient temperature characteristic 16 points at 25°C — 16 points at 40°C 5 points at 55°C 3 points at 55°C I/O power supply voltage ---- 24 V —— 28.8 V Number of simultaneously ON input points / Ambient temperature (°C)
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 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.

System Configuration
Controllers
Softwares
Programmable Terminals
Features
Digital Mixed I/O Units Specifications
Slave Terminals
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

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	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	• Connected to a CPU Unit 1.10 W max. • Connected to a Communications Coupler Unit 0.75 W max.
		Current consumption from I/O power supply	40 mA max.
		Weight	110 g max.

Circuit layout	CN1 (left) output circuit
	CN2 (right) input circuit

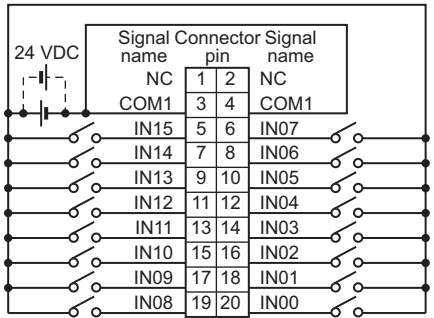| Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: As shown in the following. • For upright installation Number of simultaneously ON 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 • 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 • 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.
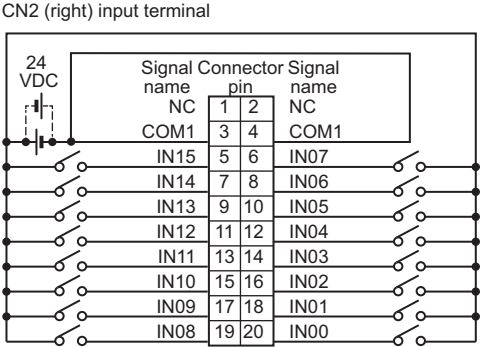
Disconnection/Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

● 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	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	• Connected to a CPU Unit 1.00 W max. • Connected to a Communications Coupler Unit 0.70 W max.	
		Current consumption from I/O power supply	30 mA max.	
		Weight	95 g max.	

Circuit layout	CN1 (left) output circuit CN2 (right) input circuit

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Digital Mixed I/O Units Specifications

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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 CN2 (right) input terminal

CN1 (left) output terminal

Signal name	B	A	Signal name
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

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.
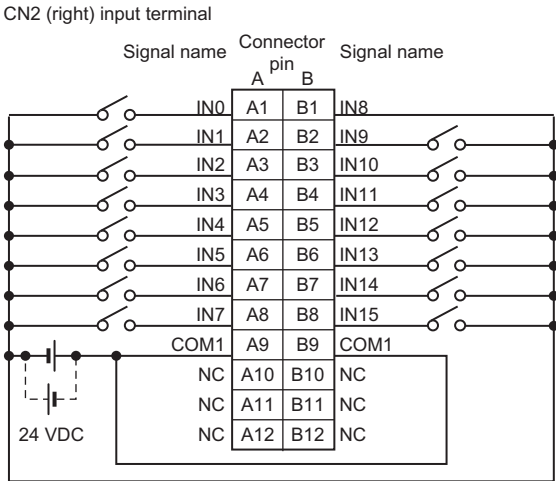
CN2 (right) input terminal

Signal name	A	B	Signal name
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

Connecting with CPU Units

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

NX Unit		Corresponding versions *	
Model	Unit version	CPU Unit	Sysmac Studio
NX-MD6121-5	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher
NX-MD6121-6			
NX-MD6256-5			

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *		
		EtherCAT		
Model	Unit version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	Sysmac Studio
NX-MD6121-5	Ver.1.0	Ver.1.0 or later	Ver.1.05 or later	Ver.1.10 or higher
NX-MD6121-6				Ver.1.13 or higher
NX-MD6256-5				Ver.1.10 or higher

* 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.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Digital Mixed I/O Units Specifications

Version Information

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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.
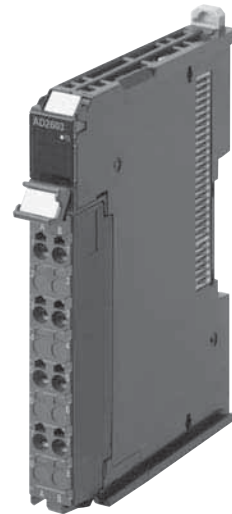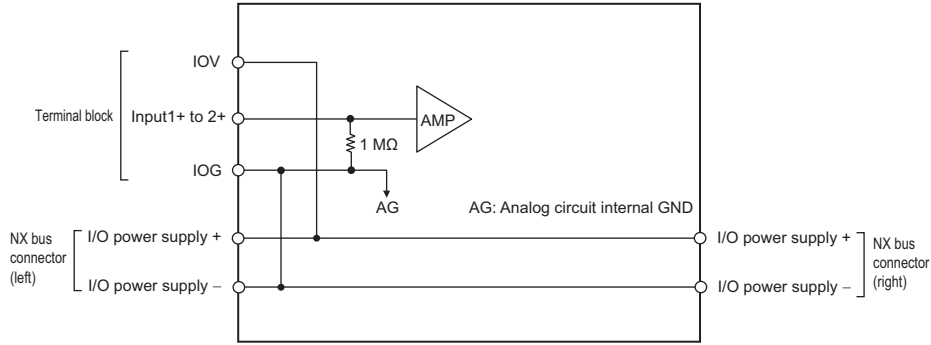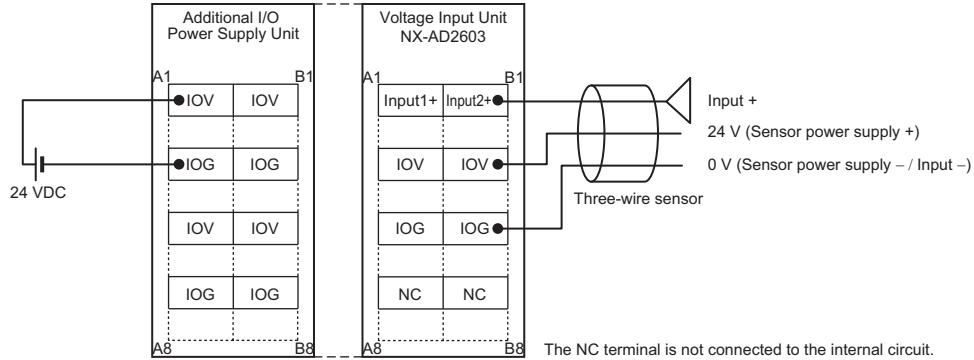
Features

- Up to eight analog inputs per unit.
- Free-Run refreshing or Synchronous I/O refreshing can be selected for refreshing with the NX-series NX1P2 CPU Unit or 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.
- Connection to the CJ-series is possible by connecting with the EtherNet/IP™ Coupler.

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
Number of points	2 points	External connection terminals	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator **AD2603** ■TS	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)
		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., IOG: 0.1 A/terminal max.
NX Unit power consumption	• Connected to a CPU Unit 1.35 W max. • Connected to a Communications Coupler Unit 1.05 W max.	I/O current consumption	No consumption
Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
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
Number of points	2 points	External connection terminals	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator **AD2604** ■TS	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	• Connected to a CPU Unit 1.35 W max. • Connected to a Communications Coupler Unit 1.05 W max.	I/O current consumption	No consumption
Weight	70 g max.		

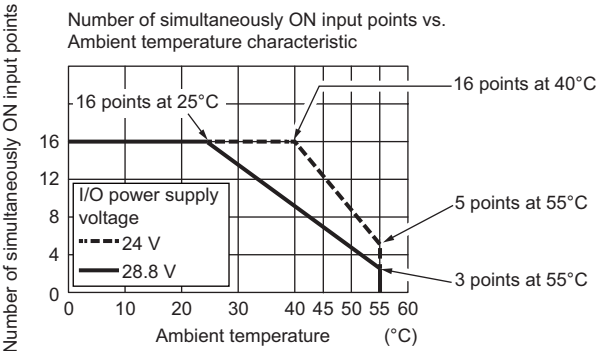| Circuit layout	

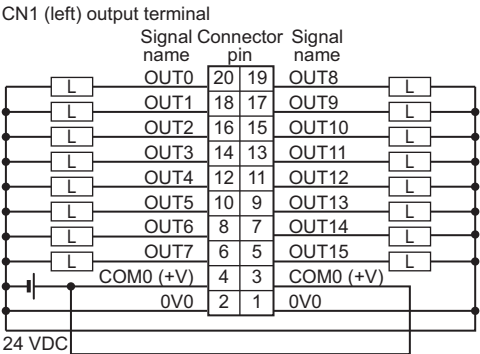| Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions

Terminal connection diagram	 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
Number of points	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 AD2608 ■TS	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	• Connected to a CPU Unit 1.35 W max. • Connected to a Communications Coupler Unit 1.05 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions

Terminal connection diagram	 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.

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

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

Unit name	Analog Input Unit (voltage input type)	Model	NX-AD3603
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		

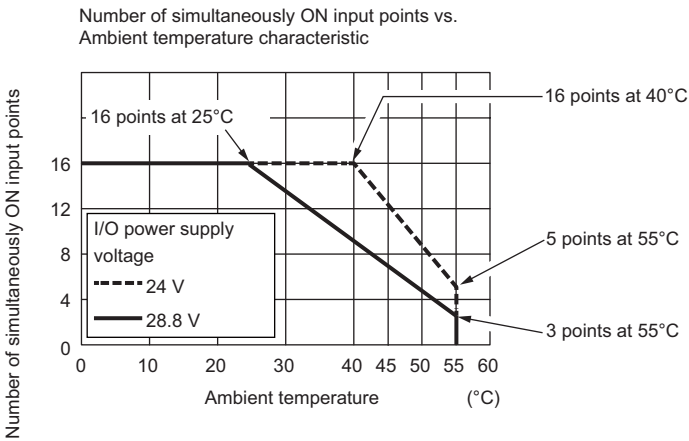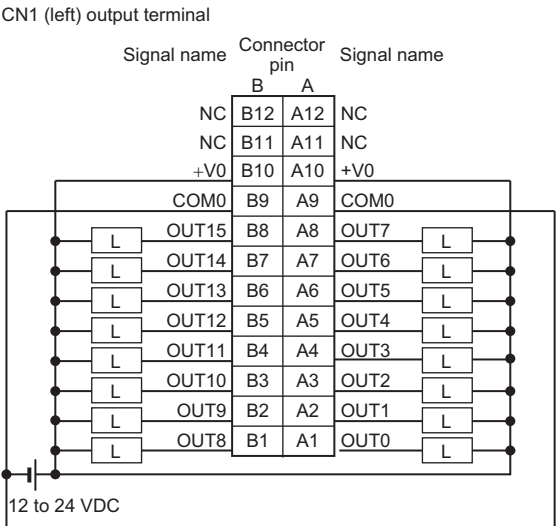|			
Indicator	TS indicator AD3603 ■TS	Input method	Single-ended input
		Input range	-10 to +10 V
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±15 V
		Input impedance	1 MΩ min.
		Resolution	1/8000 (full scale)
		Overall accuracy / 25°C	±0.2% (full scale)
		0 to 55°C	±0.4% (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	• Connected to a CPU Unit
	  1.35 W max.
	• Connected to a Communications Coupler Unit
	  1.10 W max.
		I/O current consumption	No consumption

Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			
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
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator AD3604 ■TS	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	• Connected to a CPU Unit 1.35 W max. • Connected to a Communications Coupler Unit 1.10 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	 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
Number of points	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
	AD3608	Input range	-10 to +10 V
	■TS	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	• Connected to a CPU Unit 1.45 W max. • Connected to a Communications Coupler Unit 1.10 W max.	I/O current consumption	No consumption
Weight	70 g max.		

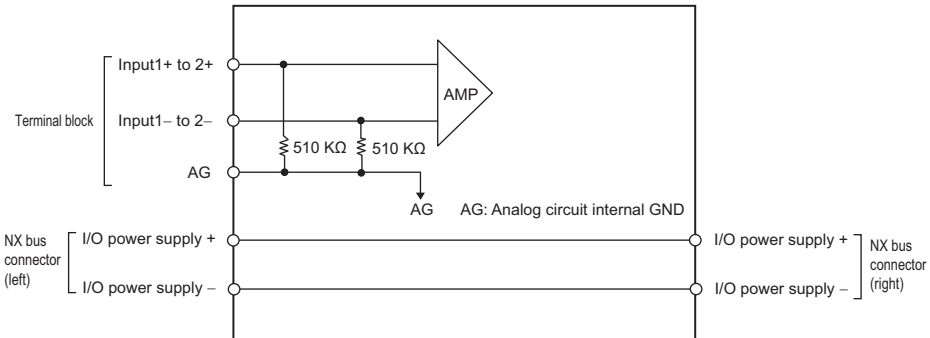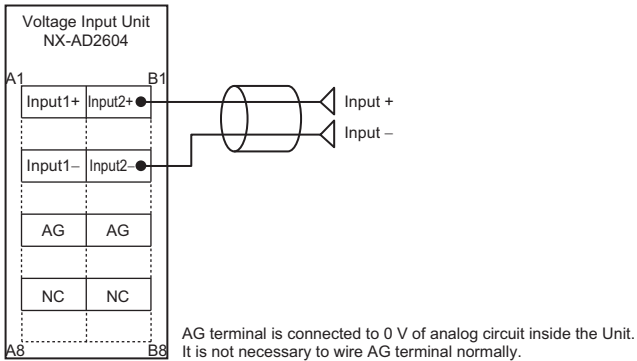| Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	
Input disconnection detection	Not supported.

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

Unit name	Analog Input Unit (voltage input type)	Model	NX-AD4603
Number of points	8 points	External connection terminals	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator **AD4603** ■TS	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)
		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	IOG: 0.1 A/terminal max.
NX Unit power consumption	• Connected to a CPU Unit 1.45 W max. • Connected to a Communications Coupler Unit 1.15 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	
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
Number of points	8 points	External connection terminals	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator AD4604 ▪TS	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	• Connected to a CPU Unit 1.45 W max. • Connected to a Communications Coupler Unit 1.15 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	
Input disconnection detection	Not supported.

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

Unit name	Analog Input Unit (voltage input type)	Model	NX-AD4608
Number of points	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 **AD4608** ■TS	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)
		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	• Connected to a CPU Unit 1.45 W max. • Connected to a Communications Coupler Unit 1.15 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	
Input disconnection detection	Not supported.

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

Unit name	Analog Input Unit (current input type)	Model	NX-AD2203
Number of points	2 points	External connection terminals	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator **DA2203** ■TS	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)
		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., IOG: 0.1 A/terminal max.
NX Unit power consumption	• Connected to a CPU Unit 1.25 W max. • Connected to a Communications Coupler Unit 0.90 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions

Terminal connection diagram	

Input disconnection detection	Supported.

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

Unit name	Analog Input Unit (current input type)	Model	NX-AD2204
Number of points	2 points	External connection terminals	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator **AD2204** ■TS	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	• Connected to a CPU Unit 1.25 W max. • Connected to a Communications Coupler Unit 0.90 W max.	I/O current consumption	No consumption
Weight	70 g max.		

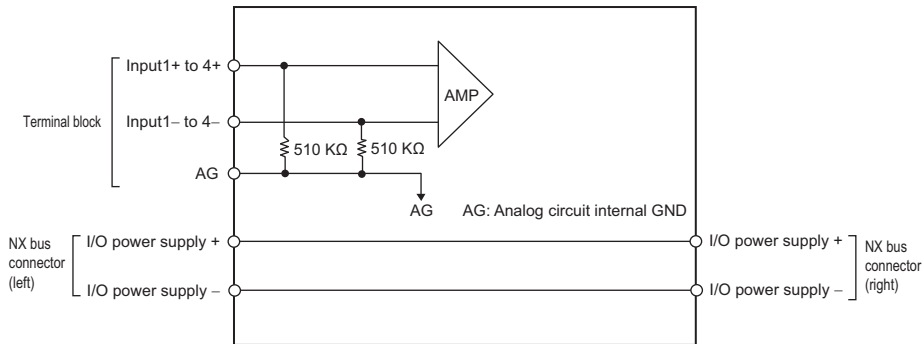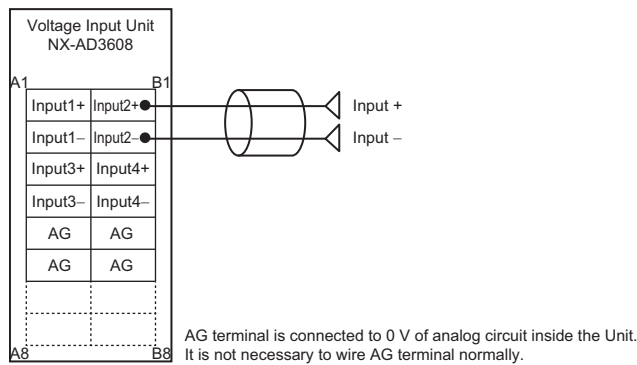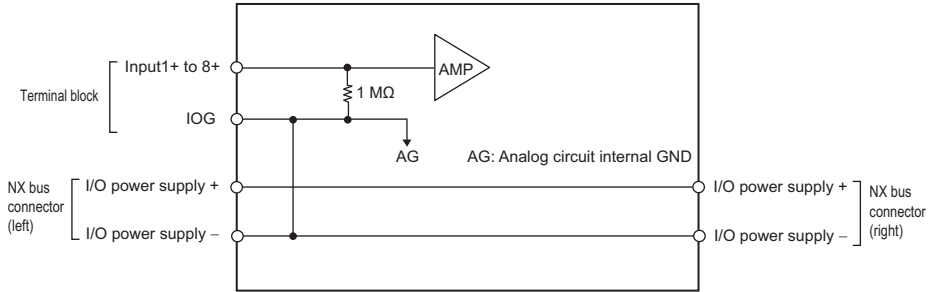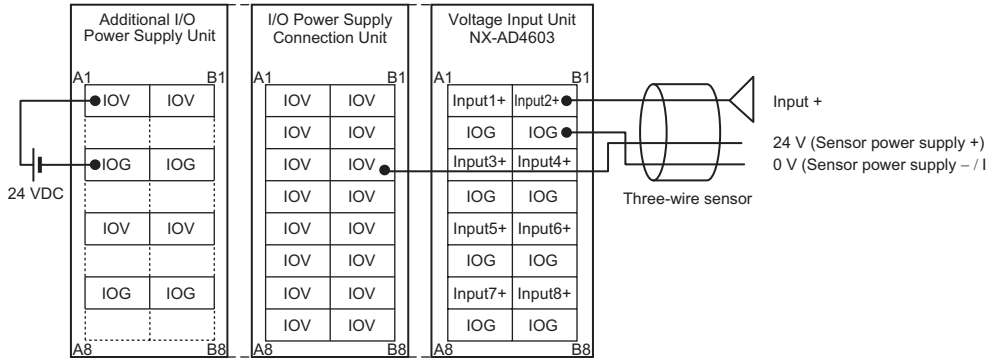| Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	
Input disconnection detection	Supported.

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

Unit name	Analog Input Unit (current input type)	Model	NX-AD2208
Number of points	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
	AD2208 ■TS	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)
		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	• Connected to a CPU Unit 1.25 W max. • Connected to a Communications Coupler Unit 0.90 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions

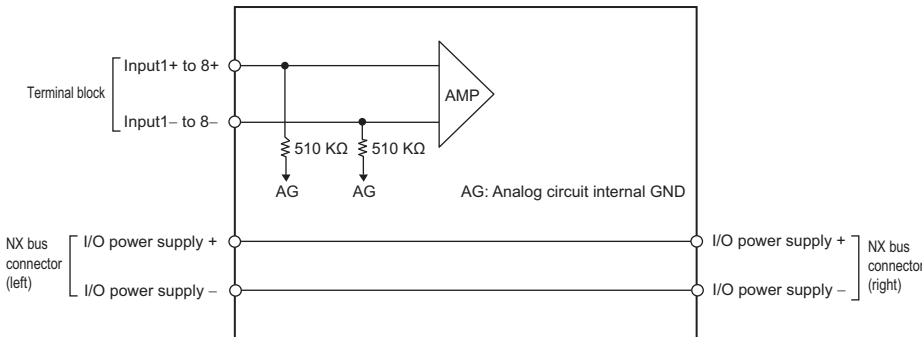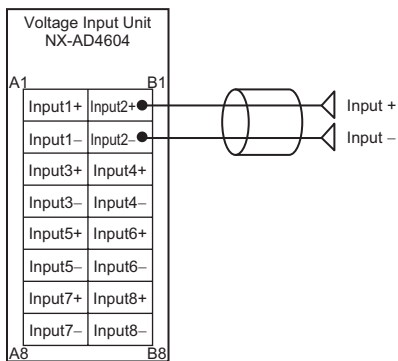| Terminal connection diagram	AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.

Input disconnection detection	Supported.

Slave Terminals **NX-series**
Analog Input Unit NX-AD

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Analog Input Unit Specifications

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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

Unit name	Analog Input Unit (current input type)	Model	NX-AD3203
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator **AD3203** ■TS	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	• Connected to a CPU Unit 1.25 W max. • Connected to a Communications Coupler Unit 0.90 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	
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
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator AD3204 ■TS	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	• Connected to a CPU Unit 1.25 W max. • Connected to a Communications Coupler Unit 0.90 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions

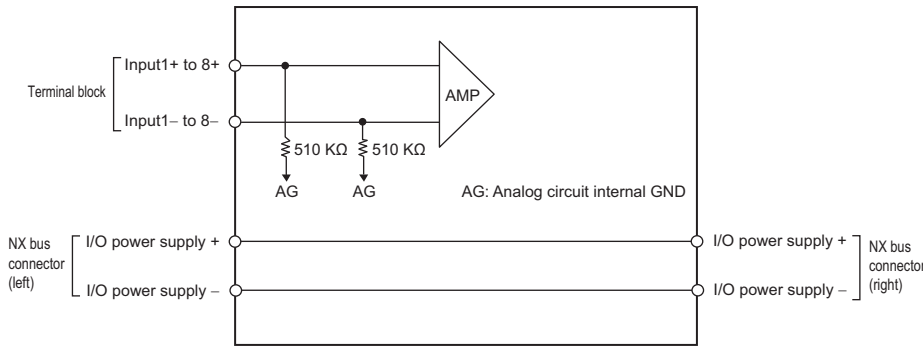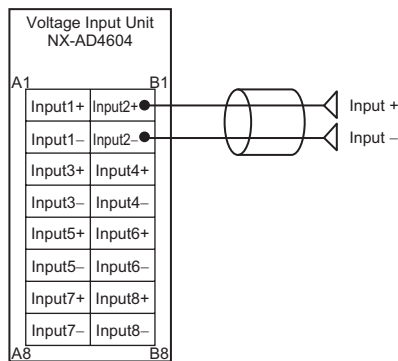| Terminal connection diagram	 AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.

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
Number of points	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 **AD3208** ■TS	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)
		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	• Connected to a CPU Unit
	  1.30 W max.
	• Connected to a Communications Coupler Unit
	  0.95 W max.
		I/O current consumption	No consumption

Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions

Terminal connection diagram	 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
Number of points	8 points	External connection terminals	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator AD4203 ■TS	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	• Connected to a CPU Unit 1.40 W max. • Connected to a Communications Coupler Unit 1.05 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions

Terminal connection diagram	

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
Number of points	8 points	External connection terminals	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator AD4203 ■TS	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	• Connected to a CPU Unit 1.40 W max. • Connected to a Communications Coupler Unit 1.05 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions

Terminal connection diagram	

Input disconnection detection	Supported.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Analog Input Unit Specifications

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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

Unit name	Analog Input Unit (current input type)	Model	NX-AD4208
Number of points	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 AD4208 ■TS	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	• Connected to a CPU Unit 1.45 W max. • Connected to a Communications Coupler Unit 1.10 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions

Terminal connection diagram	

Input disconnection detection	Supported.

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding versions *	
Model	**Unit version**	**CPU Unit**	**Sysmac Studio**
NX-AD@@@@	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *		
		EtherCAT		
Model	**Unit version**	**Communications Coupler Unit**	**NJ/NX-series CPU Units or NY-series Industrial PCs**	**Sysmac Studio**
NX-AD@@@@	Ver.1.0	Ver.1.0 or later	Ver.1.05 or later	Ver.1.06 or higher

* 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 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 for refreshing with the NX-series NX1P2 CPU Unit or 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.
- Connection to the CJ-series is possible by connecting with the EtherNet/IP™ Coupler.

Analog Output Unit Specifications

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

Unit name	Analog Output Unit (voltage output type)	Model	NX-DA2603
Number of points	2 points	External connection terminals	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator **DA2603** ■TS	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	• Connected to a CPU Unit 1.40 W max. • Connected to a Communications Coupler Unit 1.10 W max.	I/O current consumption	No consumption
Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			

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

Unit name	Analog Output Unit (voltage output type)	Model	NX-DA2605
Number of points	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 DA2605 ■TS	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	• Connected to a CPU Unit 1.40 W max. • Connected to a Communications Coupler Unit 1.10 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

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

Unit name	Analog Output Unit (voltage output type)	Model	NX-DA3603
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator AD3603 ■TS	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)
		Overall accuracy — 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	• Connected to a CPU Unit 1.35 W max. • Connected to a Communications Coupler Unit 1.25 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

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

Unit name	Analog Output Unit (voltage output type)	Model	NX-DA3605
Number of points	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 DA3605 ■TS	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	• Connected to a CPU Unit
	  1.60 W max.
	• Connected to a Communications Coupler Unit
	  1.25 W max.
		I/O current consumption	No consumption

Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			

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

Unit name	Analog Output Unit (current output type)	Model	NX-DA2203
Number of points	2 points	External connection terminals	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator DA2203 ■TS	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	• Connected to a CPU Unit 2.10 W max. • Connected to a Communications Coupler Unit 1.75 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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-DA2203 A1 — IOV / IOV — B1 A1 — I1+ / I2+ — B1 IOG / IOG IOV / IOV 24 VDC IOV / IOV IOG / IOG IOG / IOG NC / NC A8 — B8 — A8 — B8 Current output + Current output −

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

Unit name	Analog Output Unit (current output type)	Model	NX-DA2205
Number of points	2 points	External connection terminals	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		

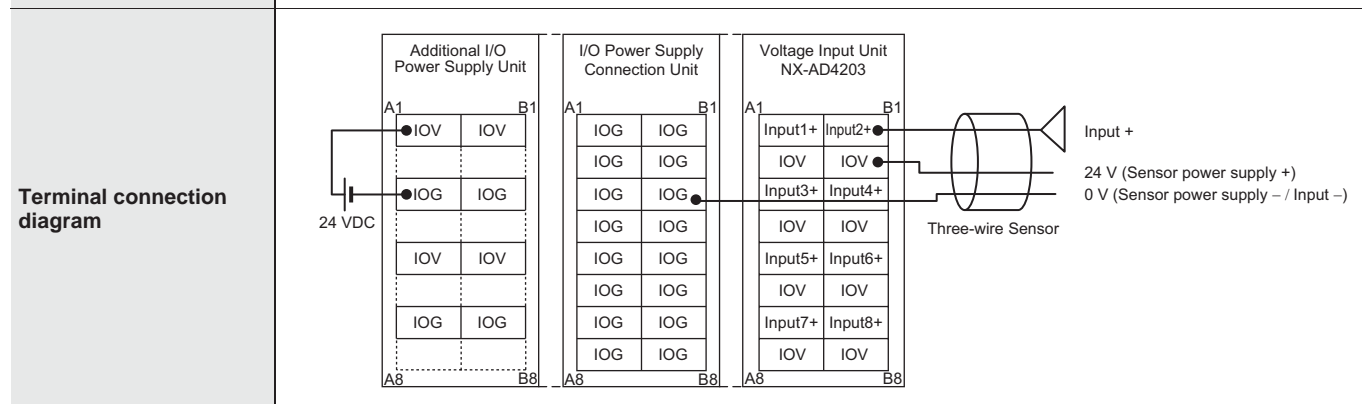| Indicator	TS indicator **DA2205** ■TS	Output range	4 to 20 mA
		Output conversion range	-5 to 105% (full scale)
		Allowable load resistance	600 Ω min.
		Resolution	1/30000 (full scale)
		Overall accuracy — 25°C	±0.1% (full scale)
		Overall accuracy — 0 to 55°C	±0.3% (full scale)
		Conversion time	10 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	• Connected to a CPU Unit 2.10 W max. • Connected to a Communications Coupler Unit 1.75 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

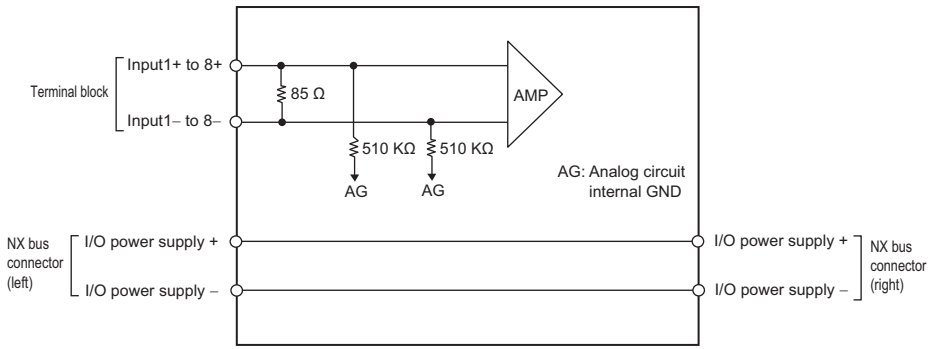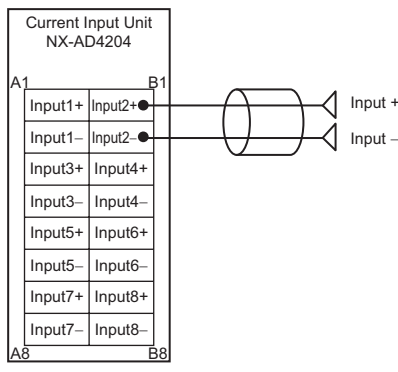| Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: For upright installation: No restrictions For any installation other than upright: Restricted as shown in the graph below.

System Configuration
Controllers
Softwares
Features
Programmable Terminals
Analog Output Unit Specifications
Version Information
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Terminal connection diagram	Additional I/O Power Supply Unit / Current Output Unit NX-DA2205 diagram: A1 ●IOV / IOV B1 — A1 I1+ / I2+ ● B1 → Current output + ●IOG / IOG — IOV / IOV 24 VDC — IOG / IOG ● → Current output − IOV / IOV — NC / NC IOG / IOG A8 B8 — A8 B8

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

Unit name	Analog Output Unit (current output type)	Model	NX-DA3203
Number of points	4 points	External connection terminals	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator **DA3203** ■TS	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	• Connected to a CPU Unit 2.10 W max. • Connected to a Communications Coupler Unit 1.80 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout	

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: For upright installation: No restrictions For any installation other than upright: Restricted as shown in the graph below.

System Configuration
Controllers
Softwares
Programmable Terminals
Features
Analog Output Unit Specifications
Slave Terminals
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Terminal connection diagram	Additional I/O Power Supply Unit Current Output Unit NX-DA3203

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) 4 points NX-DA3205

Unit name	Analog Output Unit (current output type)	Model	NX-DA3205
Number of points	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 **DA3205** ■TS	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	• Connected to a CPU Unit 2.10 W max. • Connected to a Communications Coupler Unit 1.80 W max.	I/O current consumption	No consumption
Weight	70 g max.		

Circuit layout

Installation orientation and restrictions

Installation orientation:
• Connected to a CPU Unit: Possible in upright installation.
• Connected to a Communications Coupler Unit: 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 — IOV / IOV — B1 IOG / IOG 24 VDC IOV / IOV IOG / IOG A8 — B8 A1 — I1+ / I2+ — B1 IOV / IOV IOG / IOG I3+ / I4+ IOV / IOV IOG / IOG A8 — B8 Current output + Current output –

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding versions *	
Model	**Unit version**	**CPU Unit**	**Sysmac Studio**
NX-DA@@@@	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *		
		EtherCAT		
Model	**Unit version**	**Communications Coupler Unit**	**NJ/NX-series CPU Units or NY-series Industrial PCs**	**Sysmac Studio**
NX-DA@@@@	Ver.1.0	Ver.1.0 or later	Ver.1.05 or later	Ver.1.06 or higher

* 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 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.
- Connection to the CJ-series is possible by connecting with the EtherNet/IP™ Coupler.

Temperature Input Unit Specifications

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

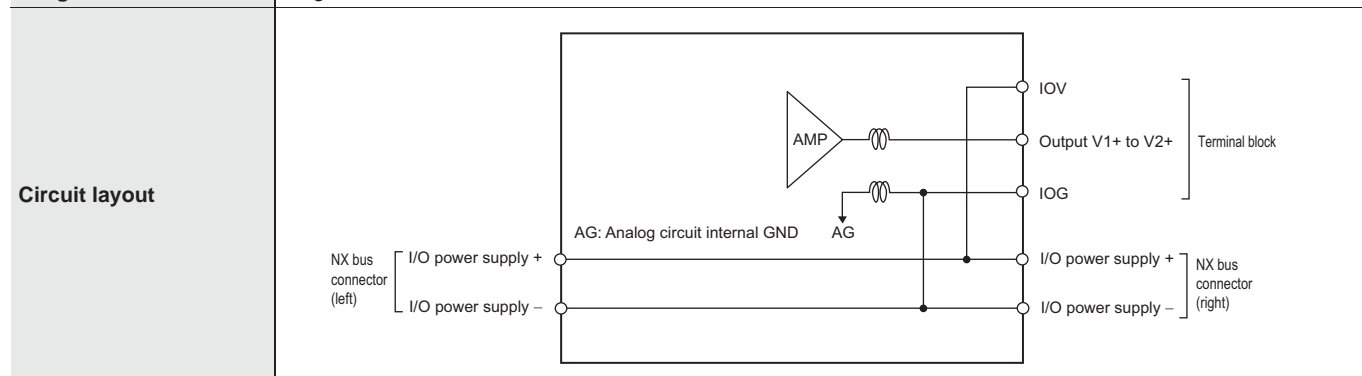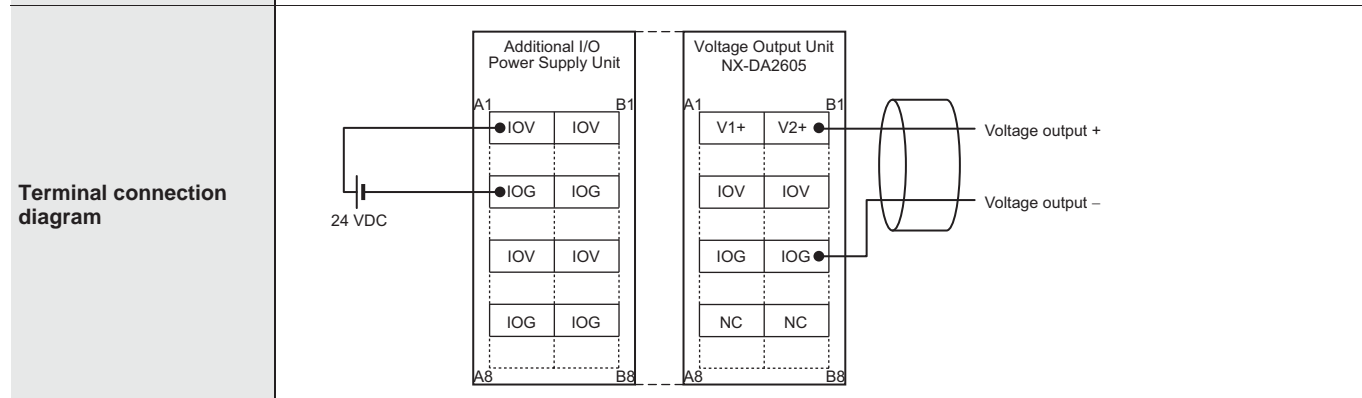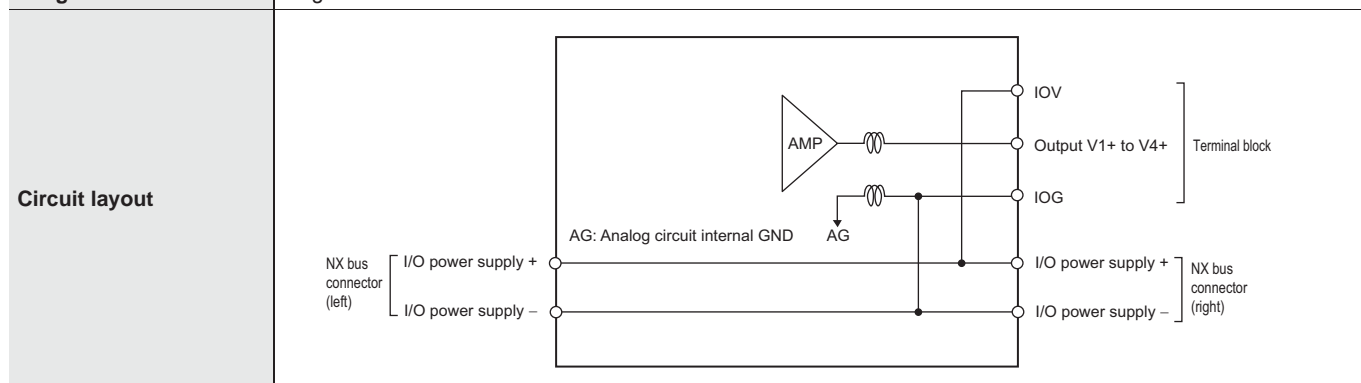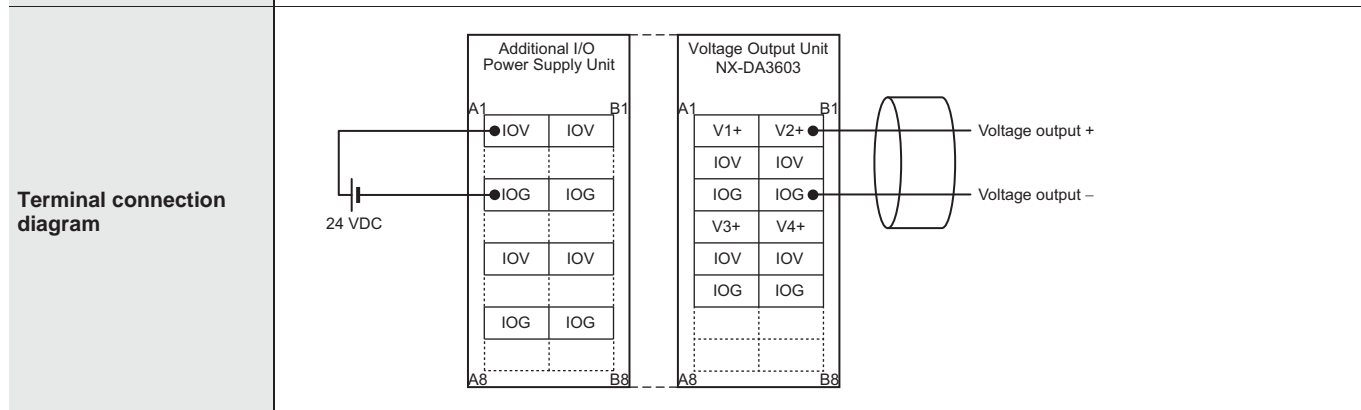|			
Unit name	Temperature Input Unit (thermocouple input type)	**Model**	NX-TS2101
Number of points	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator TS2101 ∎TS	**Temperature sensor**	K, J, 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	• Connected to a CPU Unit 1.25 W max. • Connected to a Communications Coupler Unit 0.90 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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			

*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

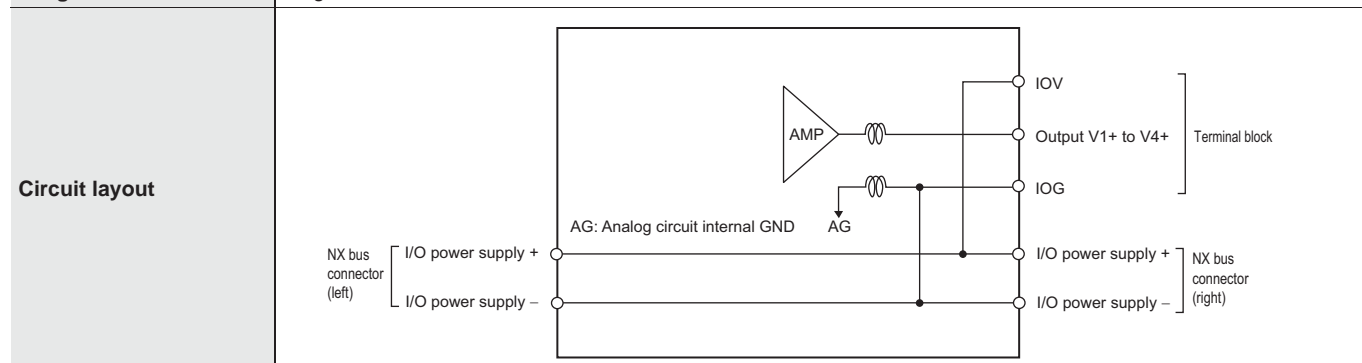| Unit name	Temperature Input Unit (thermocouple input type)	Model	NX-TS2102
Number of points	2 points	External connection terminals	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator TS2102 ■TS	Temperature sensor	K, J, T, E, L, U, N, 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	• Connected to a CPU Unit 1.15 W max. • Connected to a Communications Coupler Unit 0.80 W max.	Current consumption from I/O power supply	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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		

*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

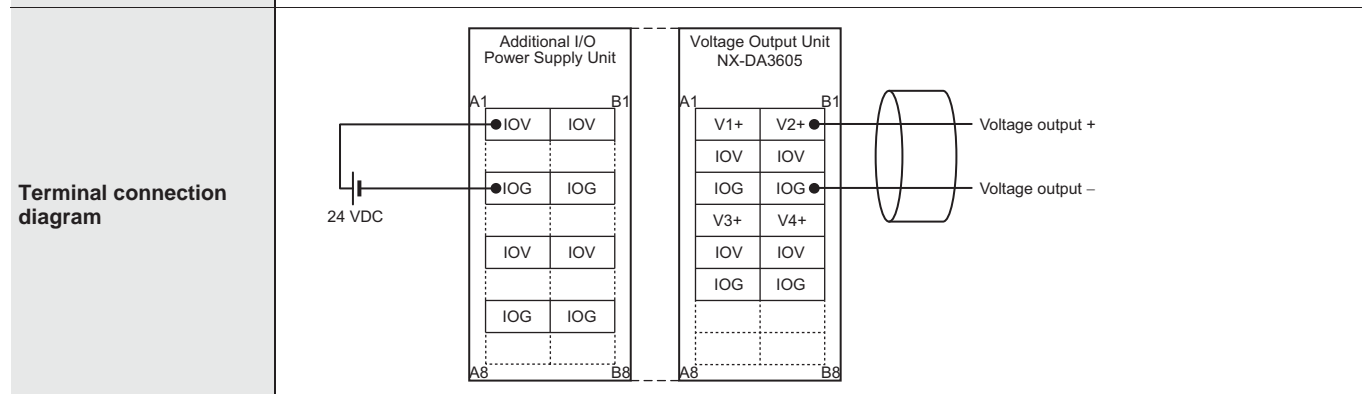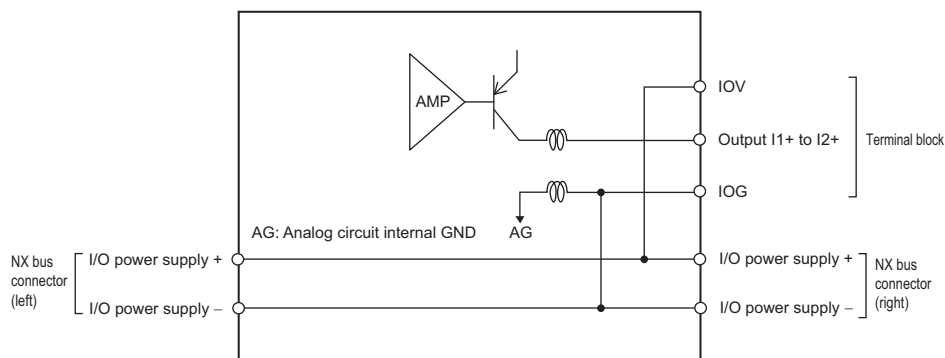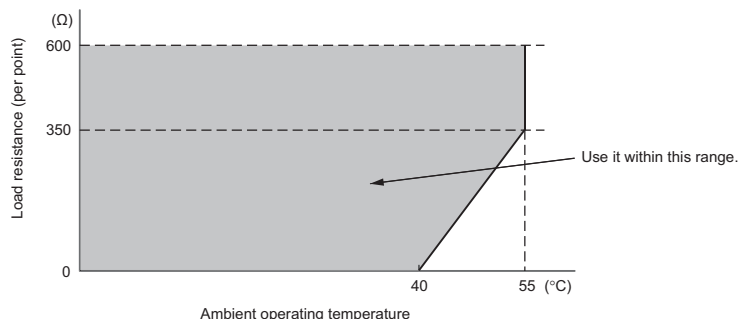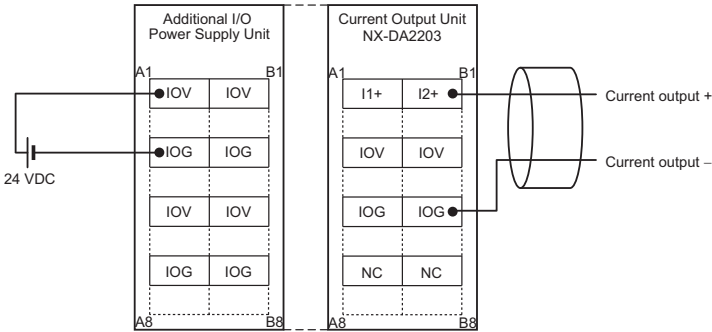| Unit name	Temperature Input Unit (thermocouple input type)	Model	NX-TS2104
Number of points	2 points	External connection terminals	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator **TS2104** ■TS	Temperature sensor	K, J, T, E, L, U, 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	• Connected to a CPU Unit
	  0.95 W max.
	• Connected to a Communications Coupler Unit
	  0.80 W max.
		Current consumption from I/O power supply	No consumption

Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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 <table><tr><td>NC</td><td>NC</td></tr><tr><td>NC</td><td>NC</td></tr><tr><td>NC</td><td>NC</td></tr><tr><td>NC</td><td>NC</td></tr><tr><td>TC2+</td><td>TC2−</td></tr><tr><td>CJ1+</td><td>CJ1−</td></tr><tr><td>TC1+</td><td>TC1−</td></tr><tr><td>NC</td><td>NC</td></tr></table>A8 ... B8 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 (Resistance Thermometer Input type) 2 points NX-TS2201

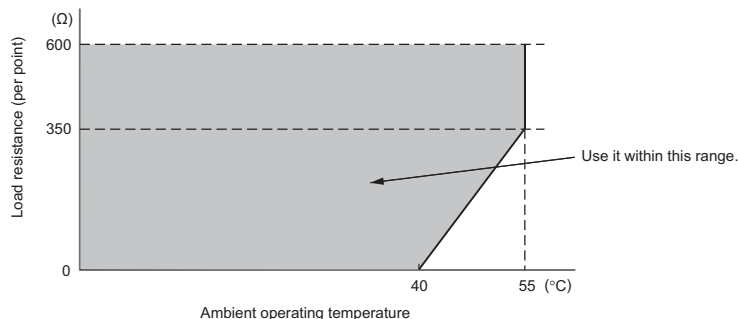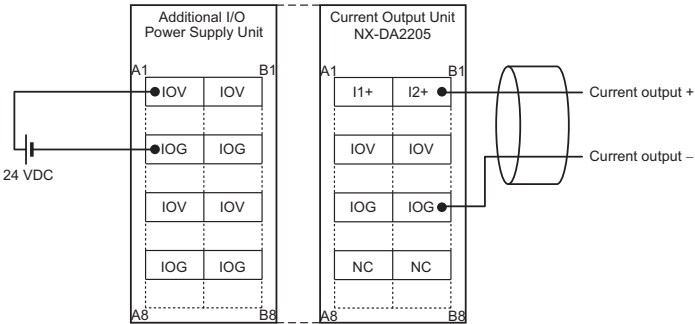| Unit name	Temperature Input Unit (resistance thermometer input type)	Model	NX-TS2201
Number of points	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator **TS2201** ■TS	**Temperature sensor**	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	• Connected to a CPU Unit 1.25 W max. • Connected to a Communications Coupler Unit 0.90 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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-TS2202

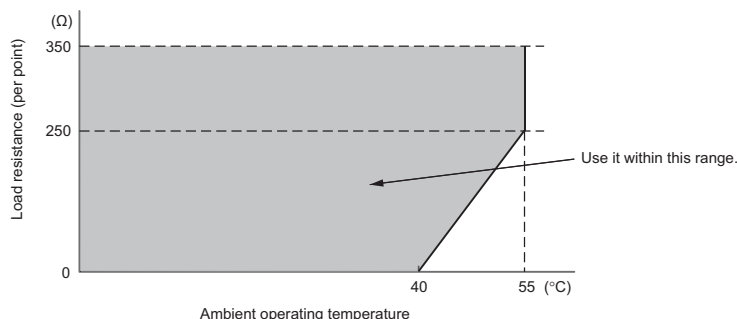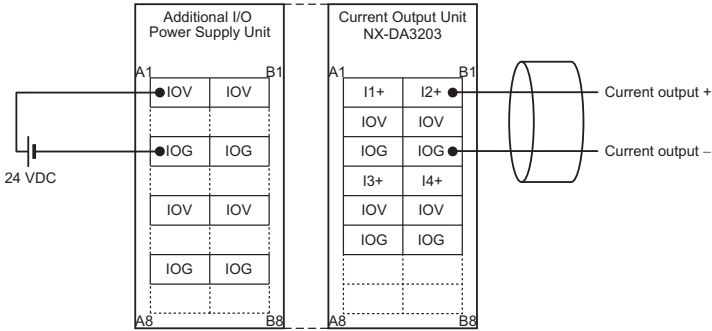|			
Unit name	Temperature Input Unit (resistance thermometer input type)	**Model**	NX-TS2202
Number of points	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator TS2202 ■TS	**Temperature sensor**	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	• Connected to a CPU Unit 1.15 W max. • Connected to a Communications Coupler Unit 0.75 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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
Number of points	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator **TS2204** ▪TS	**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	• Connected to a CPU Unit 0.90 W max. • Connected to a Communications Coupler Unit 0.75 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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.

Slave Terminals NX-series
Temperature Input Unit NX-TS

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

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 TS3101 ■TS	**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	• Connected to a CPU Unit 1.75 W max. • Connected to a Communications Coupler Unit 1.30 W max.	**Current consumption from I/O power supply**	No consumption
Weight	140 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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			

*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

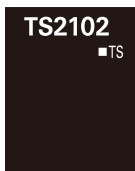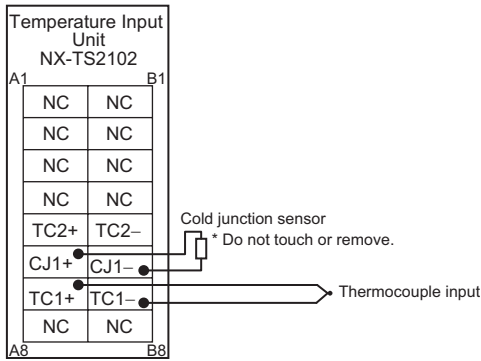| Unit name	Temperature Input Unit (thermocouple input type)	Model	NX-TS3102
Number of points	4 points	External connection terminals	Screwless clamping terminal block (16 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator **TS3102** ■TS	Temperature sensor	K, J, T, E, L, 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	• Connected to a CPU Unit 1.55 W max. • Connected to a Communications Coupler Unit 1.10 W max.	Current consumption from I/O power supply	No consumption
Weight	140 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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			

*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
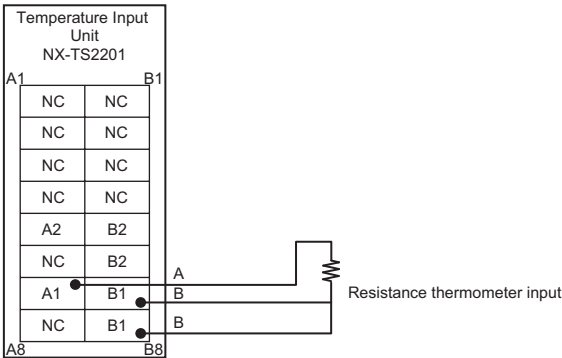
Unit name	Temperature Input Unit (thermocouple input type)	Model	NX-TS3104
Number of points	4 points	External connection terminals	Screwless clamping terminal block (16 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator **TS3104** ■TS	Temperature sensor	K, J, T, E, L, 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	• Connected to a CPU Unit 1.45 W max. • Connected to a Communications Coupler Unit 1.10 W max.	Current consumption from I/O power supply	No consumption
Weight	140 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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			

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−│    Cold junction sensor
    ├─────┼─────┼─────┼─────┤    * Do not touch or remove.
    │ CJ1+│ CJ1−│ CJ2+│ CJ2−│
    ├─────┼─────┼─────┼─────┤
    │ TC1+│ TC1−│ TC3+│ TC3−│      Thermocouple input
    ├─────┼─────┼─────┼─────┤
    │ NC  │ NC  │ NC  │ NC  │
    └─────┴─────┴─────┴─────┘
    A8              B8  C8              D8
```

*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.

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

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

Unit name	Temperature Input Unit (resistance thermometer input type)	Model	NX-TS3201
Number of points	4 points	External connection terminals	Screwless clamping terminal block (16 Terminals x 2)
I/O refreshing method	Free-Run refreshing		

Indicator	TS indicator **TS3201** ∎TS	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	• Connected to a CPU Unit 1.75 W max. • Connected to a Communications Coupler Unit 1.30 W max.	Current consumption from I/O power supply	No consumption
Weight	140 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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) 4 points NX-TS3202

Unit name	Temperature Input Unit (resistance thermometer input type)	**Model**	NX-TS3202
Number of points	4 points	**External connection terminals**	Screwless clamping terminal block (16 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator **TS3202** ■TS	**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	• Connected to a CPU Unit 1.50 W max. • Connected to a Communications Coupler Unit 1.05 W max.	**Current consumption from I/O power supply**	No consumption
Weight	130 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Temperature Input Unit Specifications

Version Information

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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

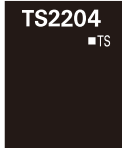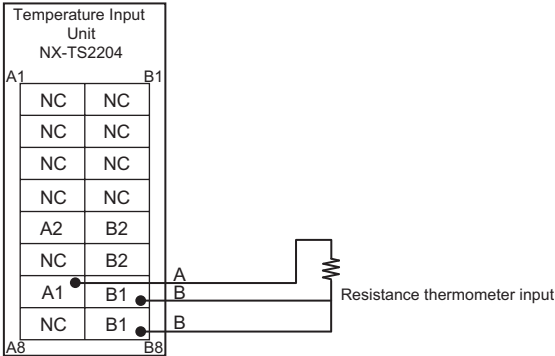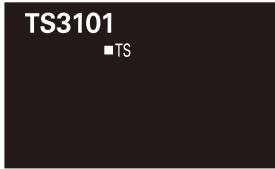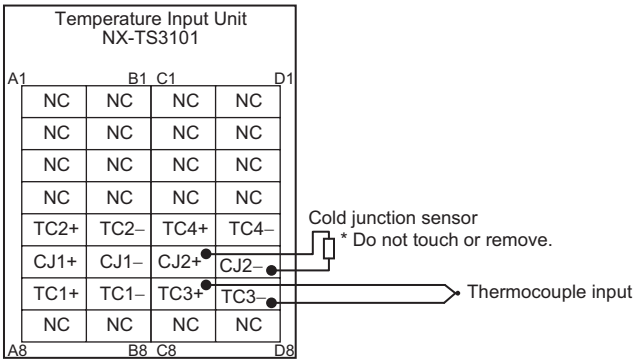| Unit name	Temperature Input Unit (resistance thermometer input type)	Model	NX-TS3204
Number of points	4 points	External connection terminals	Screwless clamping terminal block (16 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator **TS3204** ■TS	Temperature sensor	Pt100 (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	• Connected to a CPU Unit 1.45 W max. • Connected to a Communications Coupler Unit 1.05 W max.	Current consumption from I/O power supply	No consumption
Weight	130 g max.		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: 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.

• **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)

*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.

Calibration control number label

OMRON
NX-TS2101
Lot No. DDMYYX####

Calibration control number

DDMYYX####

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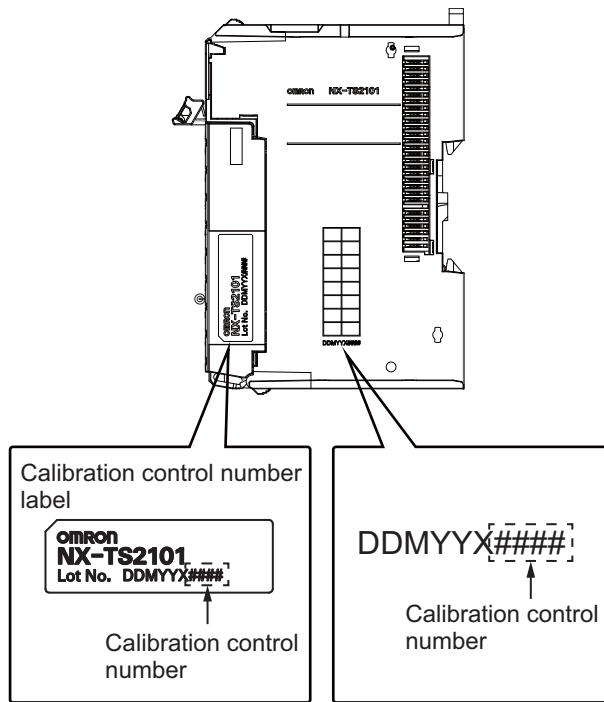
*4. An error for a measured value when the ambient temperature changes by 1°C.
The following formula is used to calculate the error of the measured value.
Overall accuracy = Reference accuracy + Temperature characteristic x Change in the ambient temperature + Cold junction compensation error
(Calculation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

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

• 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

Connecting with CPU Units

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

NX Unit		Corresponding version *	
Model	Unit Version	CPU Unit	Sysmac Studio
NX-TS2101	Ver.1.0		
	Ver.1.1		
NX-TS2102	Ver.1.1		
NX-TS2104	Ver.1.1		
NX-TS2201	Ver.1.0		
	Ver.1.1		
NX-TS2202	Ver.1.1		
NX-TS2204	Ver.1.1	Ver.1.13 or later	Ver.1.17 or higher
NX-TS3101	Ver.1.0		
	Ver.1.1		
NX-TS3102	Ver.1.1		
NX-TS3104	Ver.1.1		
NX-TS3201	Ver.1.0		
	Ver.1.1		
NX-TS3202	Ver.1.1		
NX-TS3204	Ver.1.1		

* 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.

Connecting with Coupler Units

NX Unit		Corresponding version *		
		EtherCAT		
Model	Unit Version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	Sysmac Studio
NX-TS2101	Ver.1.0			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.1.0 or later	Ver.1.05 or later	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

* 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 Heater Burnout Detection Unit
NX-HB

Build a temperature control system with heater burnout detection in conjunction with a temperature input unit and PID instructions

- Reduce the costs for communications programming and other development
- Achieve flexible temperature control

Features

- Up to four CT inputs per unit
- Omron's proven heater burnout detection function
- Monitoring of CT currents to detect heater burnouts and SSR failures
- Time-proportional control outputs to drive SSRs
- Control outputs not affected by controller cycle time
- Four control outputs to drive SSRs (100 mA max.)
- Heater burnout detection for a single-phase or three-phase heater
- Detachable terminal block for easy maintenance
- Screwless clamping terminal block speeds up installation

System Configuration

System Configuration of Slave Terminals

The following figure shows an example of the system configuration when an EtherCAT Coupler Unit is used as a Communications Coupler Unit.

Sysmac Studio
Support Software

Connection to peripheral USB port or
built-in EtherNet/IP port on NJ/NX-series
CPU Unit or NY-series Industrial PC *1

ESI files

EtherCAT master *2
(NJ/NX-series CPU Unit or NY-series Industrial PC)

EtherCAT Coupler Unit
NX-ECC□□□□

Heater Burnout Detection Unit
NX-HB□□□□

Temperature Input Units
NX-TS□□□□

EtherCAT communications cable

Temperature
sensor

Unit power supply
and I/O power supply

Heater power supply

SSR *3

Heater

CT (E54-CT or E54-CT3)
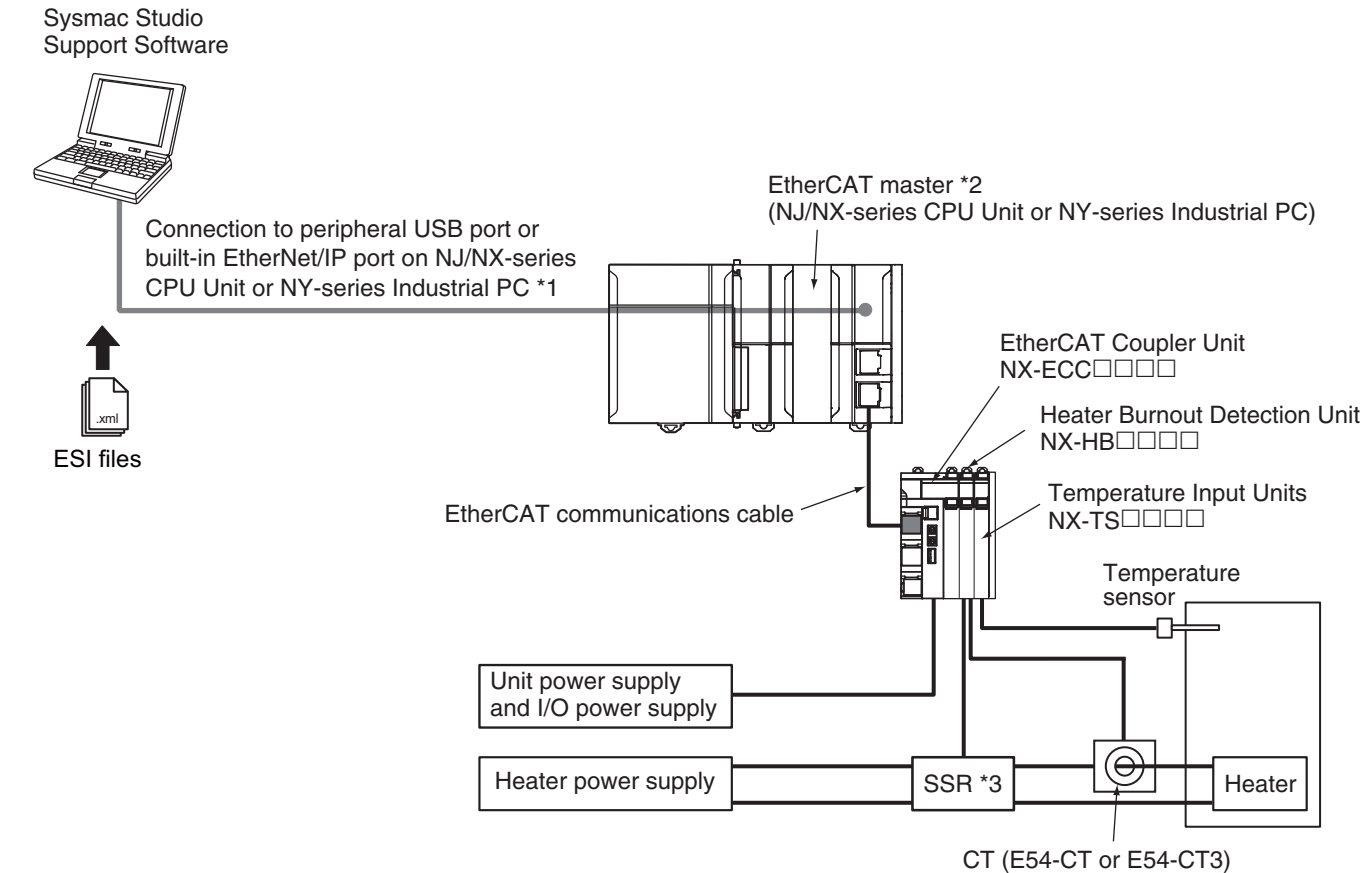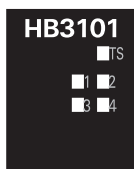
*1. The connection method for the Sysmac Studio depends on the model of the CPU Unit or Industrial PC.
*2. An EtherCAT Slave Terminal cannot be connected to any of the OMRON CJ1W-NC@81/@82 Position Control Units even though they can operate as EtherCAT masters.
*3. The SSR is used to turn the heater ON and OFF.

Individual Specifications

Heater Burnout Detection Unit (NPN) NX-HB3101

Unit name	Heater Burnout Detection Unit		**Model**	NX-HB3101	
Number of points	4 CT inputs and 4 control outputs		**External connection terminals**	Screwless Clamping Terminal Block (16 terminals)	
I/O refreshing method	Free-Run refreshing				
Indicators	TS indicator and output indicators				
CT input section	**CT current input range**	0 to 0.125 A	**Control output section**	**Internal I/O common**	NPN
	Input resistance	Approx. 2.7 Ω		**Control period**	50 to 100,000 ms
	Connectable CTs	E54-CT1 and E54-CT3		**Manipulated variable**	0% to 100%
				Resolution	1 ms
				Rated voltage	12 to 24 V DC
	Maximum heater current	50 A AC		**Operating load voltage range**	10.2 to 28.8 VDC
	Resolution	0.1 A		**Maximum load current**	0.1 A/point, 0.4 A/Unit
	Overall accuracy (25°C)	±5% (full scale) ±1 digit		**Maximum inrush current**	1.0 A/point max., 10 ms
				Leakage current	0.1 mA max.
				Residual voltage	1.5 V max.
	Influence of temperature (0 to 55°C)	±2% (full scale) ±1 digit		**Disconnection/ short-circuit detection**	None
	Conversion time	10 ms		**Protective functions**	None
Dimensions (mm)	12 × 100 × 71 mm (W×H×D)		**Isolation method**	Between control outputs and Internal circuits: Photocoupler isolation No isolation between Internal circuits and CT inputs	
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)		**Dielectric strength**	510 VAC between isolated circuits for 1 minute with a leakage current of 5 mA max.	
I/O power supply method	Supplied from the NX bus.		**Current capacity of I/O power supply terminals**	IOV: 0.1 A max. per terminal	
NX Unit power consumption	• Connected to a CPU Unit 1.05 W max. • Connected to a Communications Coupler Unit 0.75 W max.		**Current consumption from I/O power supply**	20 mA max.	
Weight	70 g max.				

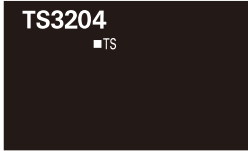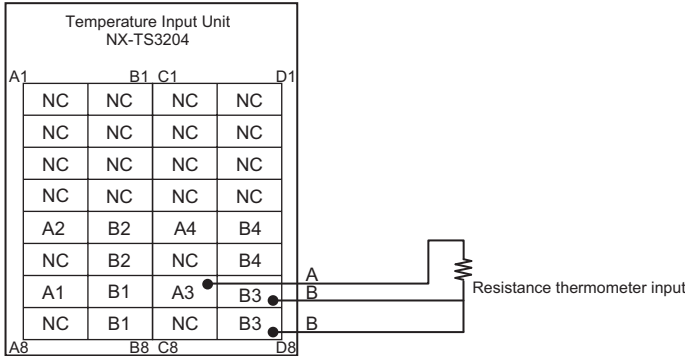|	
Circuit configuration	
Installation method and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

Heater Burnout Detection Unit (PNP) NX-HB3201

Unit name	Heater Burnout Detection Unit	Model	NX-HB3201
Number of points	4 CT inputs and 4 control outputs	External connection terminals	Screwless Clamping Terminal Block (16 terminals)
I/O refreshing method	Free-Run refreshing		

Indicators	TS indicator and output indicators
	HB3201 ■TS ■1 ■2 ■3 ■4

CT input section	CT current input range	0 to 0.125 A	Control output section	Internal I/O common	PNP
	Input resistance	Approx. 2.7 Ω		Control period	50 to 100,000 ms
	Connectable CTs	E54-CT1 and E54-CT3		Manipulated variable	0% to 100%
				Resolution	1 ms
				Rated voltage	24 VDC
	Maximum heater current	50 A AC		Operating load voltage range	15 to 28.8 VDC
	Resolution	0.1 A		Maximum load current	0.1 A/point, 0.4 A/Unit
	Overall accuracy (25°C)	±5% (full scale) ±1 digit		Maximum inrush current	1.0 A/point max., 10 ms
				Leakage current	0.1 mA max.
	Influence of temperature (0 to 55°C)	±2% (full scale) ±1 digit		Residual voltage	1.5 V max.
				Disconnection/short-circuit detection	None
	Conversion time	10 ms		Protective functions	Provided.

Dimensions (mm)	12 × 100 × 71 mm (W×H×D)	Isolation method	Between control outputs and Internal circuits: Photocoupler isolation No isolation between Internal circuits and CT inputs
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	Dielectric strength	510 VAC between isolated circuits for 1 minute with a leakage current of 5 mA max.
I/O power supply method	Supplied from the NX bus.	Current capacity of I/O power supply terminals	IOV: 0.1 A max. per terminal
NX Unit power consumption	• Connected to a CPU Unit 1.05 W max. • Connected to a Communications Coupler Unit 0.75 W max.	Current consumption from I/O power supply	20 mA max.
Weight	70 g max.		

Circuit configuration	
Installation method and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding version *	
Model	Unit version	CPU Unit	Sysmac Studio
NX-HB3101	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher
NX-HB3201			

* 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.

Connecting with Coupler Units

NX Unit		Corresponding version *		
		EtherCAT		
Model	Unit version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	Sysmac Studio
NX-HB3101	Ver.1.0	Ver.1.0 or later	Ver.1.05 or later	Ver.1.16 or higher
NX-HB3201				

* 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.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Features

System Configuration

Function Specification

Individual Specifications

Version Information

NX-series Load Cell Input Unit
NX-RS@@@

Build a cost saving weighing/measurement system by using load cells

- Converts the output signals from load cells into physical units such as weight or force and outputs them to the communications master

Features

- Sampling as fast as 125 μs
- Accuracy applicable to high-precision load cells (nonlinearity: ±0.01% (full scale), zero drift: ±0.1 μV/°C RTI, gain drift: ±10 ppm/°C)
- Screwless clamping terminal block for easy wiring. Push-in connections speed up installation
- Stable measurements with digital filtering (digital low-pass filter, moving average filter 1, and moving average filter 2)
- Optimum digital filter design using data tracing
- Cable disconnection check using sensor disconnection test
- Connection to the CJ-series is possible by connecting with the EtherNet/IP™ Coupler.

System Configuration

Weighing system configuration using Load Cell Input Unit

EtherCAT master
NJ/NX-series CPU Unit

Gross weight value = 10.0

Measured material

10.0 kg

Scale

Load cell

Load cell

Summing box
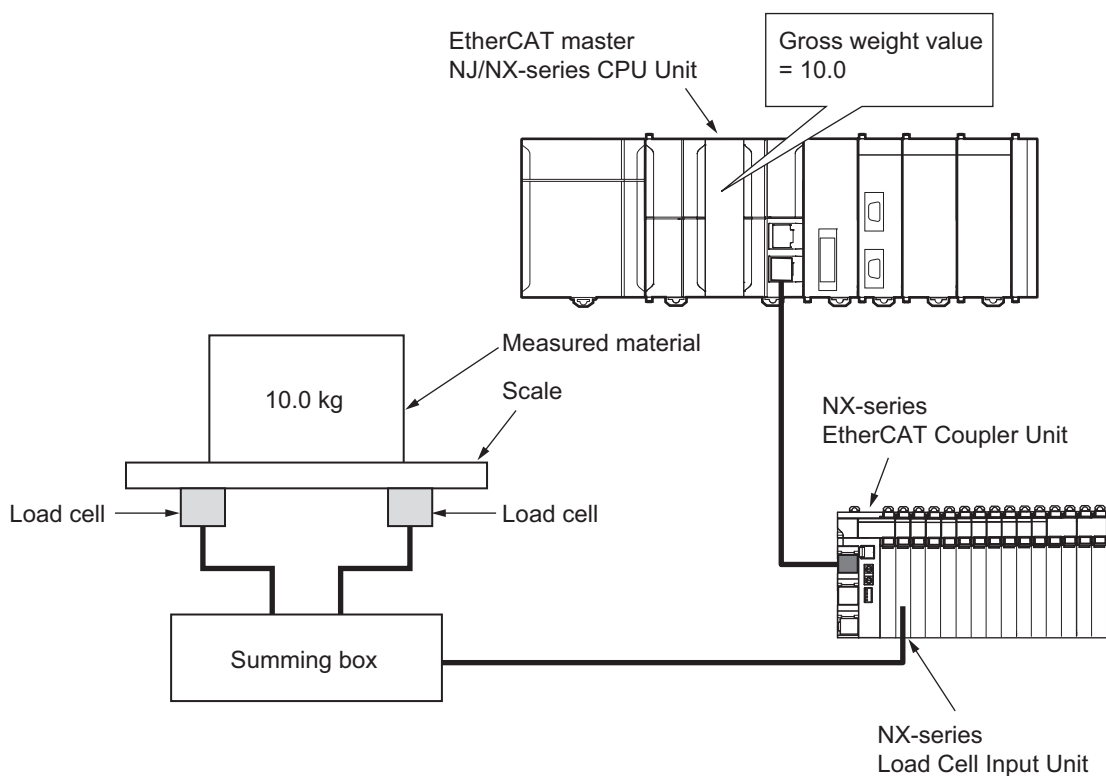
NX-series
EtherCAT Coupler Unit

NX-series
Load Cell Input Unit

Function Specification

Supported: Functions that are used in target applications
-: Functions that are not used in target applications

Function	Application		Description
	Weight measurement *1	Force measurement *2	
I/O refreshing method setting *3	Supported.	Supported.	Sets Free-Run refreshing, synchronous I/O refreshing,*4 or task period prioritized refreshing*5 for the I/O refreshing*6 method.
Actual load calibration	Supported.	Supported.	This is a user calibration function that is performed by placing an actual load on the load cell.
Equivalent input calibration	Supported.	Supported.	This is a user calibration function that is performed by inputting the rated output, rated capacity, and zero balance values of the load cell.
Gravity acceleration correction	Supported.	---	This function corrects errors in the gross weight values that occur due to the difference of gravity acceleration at each site when the site where the actual load calibration of the device is executed and the installation site are different.
Digital filtering	Supported.	Supported.	This function uses the digital filter to remove noise components that are contained in input signals to suppress fluctuations of measurement values. You can use the digital low-pass filter and moving average filter.
Zero set/zero reset	Supported.	Supported.	The zero set function corrects the gross weight value/force measurement value to be the zero point within the set range at a desired time. The zero reset function resets the zero point correction that is performed with the zero set function.
Zero tracking	Supported.	---	This function automatically corrects the zero point within the set range.
Zero point range over detection	Supported.	Supported.	This function detects when the gross weight value/force measurement value exceeds the set zero point range.
Tare subtraction	Supported.	---	This function subtracts the tare weight value from the gross weight value to acquire the net weight value. There are two types of this function: one-touch tare subtraction and digital tare subtraction.
One-touch tare subtraction	Supported.	---	This function stores the gross weight value at the specified timing as the tare value and subtracts it from a given gross weight value to acquire the net weight value.
Digital tare subtraction	Supported.	---	This function subtracts the preset digital tare value from the gross weight value to acquire the net weight value.
Stable detection	Supported.	---	This function detects whether the gross weight value is stable.
Over range/under range detection	Supported.	Supported.	This function detects when the input signal exceeds the input conversion range.
Sensor disconnection test	Supported.	Supported.	This function tests if the cable that connects the Load Cell Input Unit and load cell is disconnected. During the sensor disconnection test, you cannot measure the weight or force.
Input value refreshing stop	Supported.	Supported.	This function stops refreshing the input value in a specified period.
Peak hold/bottom hold	---	Supported.	This function continues holding the peak value or the bottom value of the force measurement value in a specified period.
Data tracing	Supported.	Supported.	This function records the values in REAL data in the buffer of the Load Cell Input Unit and exports the data to a CSV file. These values indicate the gross weight values/force measurement values before and after the digital filtering in a specified period.
Decimal point position setting	Supported.	Supported.	This function sets the number of digits which is displayed after the decimal point for each DINT data.

*1. It is used to measure the weight in the unit of kg or t.
*2. It is used to measure the force in the unit of N or kN.
*3. Select with the Communications Coupler Unit setting. Refer to the NX-series Load Cell Input Unit User's Manual (W565) for details on the setting method.
*4. You can select this option only when the Unit is used with an EtherCAT Coupler Unit with EtherCAT communications in DC Mode.
*5. You can select this option only when the Unit is used with an EtherCAT Coupler Unit NX-ECC203 with EtherCAT communications in DC Mode.
*6. This is the data exchange with the Controller.
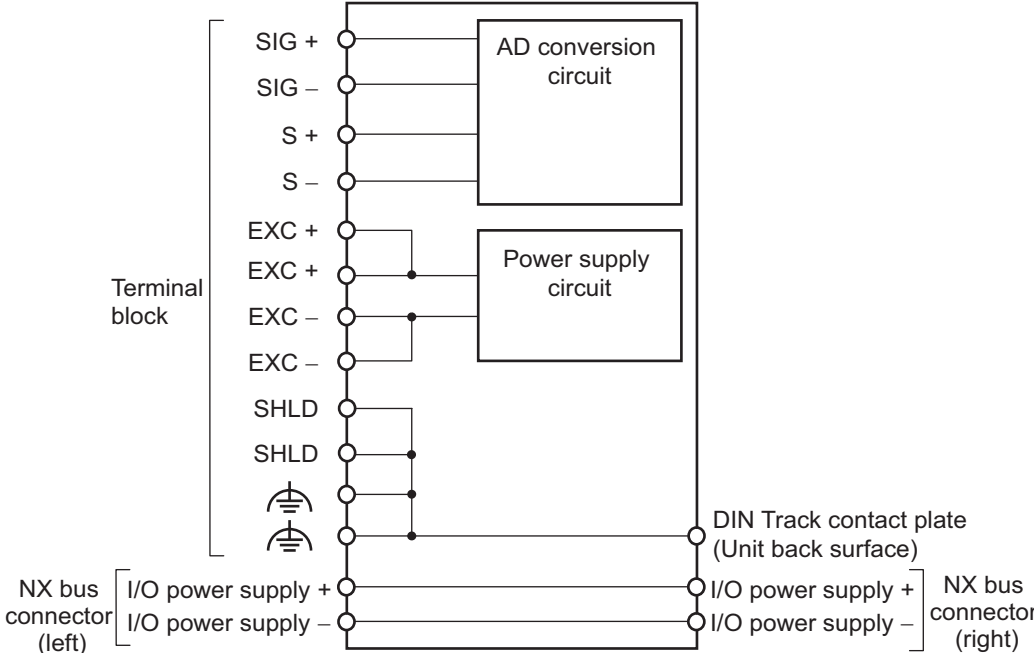
Individual Specifications

Load Cell Input Unit
NX-RS1201

Unit name	Load Cell Input Unit	Model	NX-RS1201
Number of points	1 point	External connection terminals	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing, synchronous I/O refreshing, or task period prioritized refreshing		

Indicators	TS indicator	Input range		−5.0 to 5.0 mV/V
		Input conversion range		−5.5 to 5.5 mV/V
	RS1201 ■TS	Load cell excitation voltage		5 VDC ± 10%, Output current: 60 mA max.
		Zero point adjustment range		−5.0 to 5.0 mV/V
		Gain point adjustment range		−5.0 to 5.0 mV/V
		Accuracy *1	Nonlinearity	±0.01% (full scale) *2
			Zero drift	±0.1 µV/°C RTI
			Gain drift	±10 ppm/°C
		A/D converter resolution		24 bits

Warm-up period	30 minutes	Conversion cycle	125 µs
Dimensions	12 (W) × 100 (H) × 71 (D)	Isolation method	Between the input and the NX bus: 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	• Connected to a CPU Unit 2.05 W max. • Connected to a Communications Coupler Unit 1.70 W max.	Current consumption from I/O power supply	No consumption
Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions		

*1. Accuracy for when the load cell and the Load Cell Input Unit are connected with the 6-wire connection.
*2. The value for when the Load Cell Unit is used under the following conditions.
    Full scale: 0.0 to 5.0 mV/V or -5.0 to 0.0 mV/V
    Ambient temperature: 25°C
    Setting of digital filtering: Default

System Configuration
Controllers
Softwares
Programmable Terminals
Features
System Configuration
Slave Terminals
Function Specification
Safety
Individual Specifications
Version Information
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Terminal connection diagram	Diagram of the 6-wire connection between the Unit and a load cell.
	Ground of 100 Ω or less
	Diagram of the 4-wire connection between the Unit and a load cell.
	Ground of 100 Ω or less
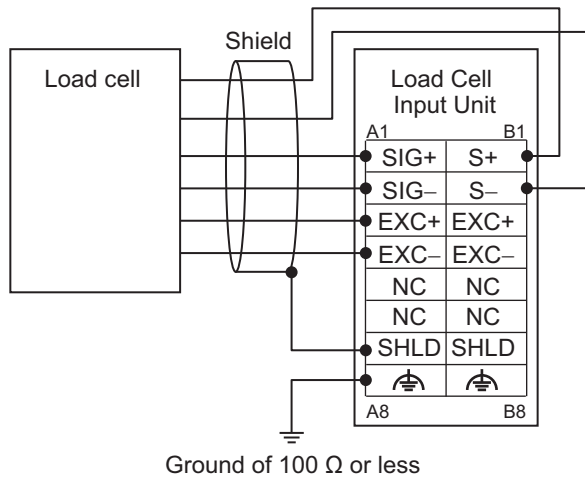
Version Information

Connecting with CPU Units

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

NX Unit		Corresponding versions *	
Model	Unit version	CPU Unit	Sysmac Studio
NX-RS1201	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *		
		EtherCAT		
Model	Unit version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	Sysmac Studio
NX-RS1201	Ver.1.0	Ver.1.0 or later	Ver.1.05 or later	Ver.1.16 or higher

* 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 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/NY5-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.
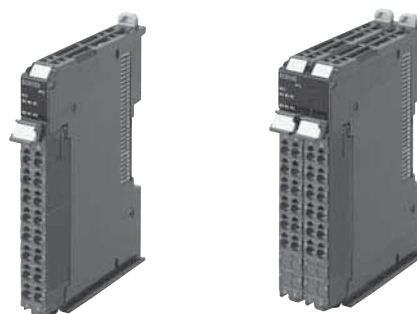
Features

- 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 NX1P2 CPU Unit or EtherCAT Coupler.
- When the MC Function Modules of the NJ/NX/NY5-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.
- Connection to the CJ-series is possible by connecting with the EtherNet/IP™ Coupler.

*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.

System Configuration

An example for the system configuration of an Incremental Encoder Input Unit

The following is an example when an EtherCAT Coupler Unit with an Incremental Encoder Input Unit connected is connected to the built-in EtherCAT port of an NJ/NX-series CPU Unit.

Support Software (Sysmac Studio)

EtherCAT master (NJ/NX-series CPU Unit)

Connection to the peripheral USB port or built-in EtherNet/IP™ port on an NJ/NX-series CPU Unit

EtherCAT communications cable

Incremental Encoder Input Unit

EtherCAT Coupler Unit

I/O power supply

External input[1] (latch input 1, latch input 2, gate input, or reset input)

Incremental encoder
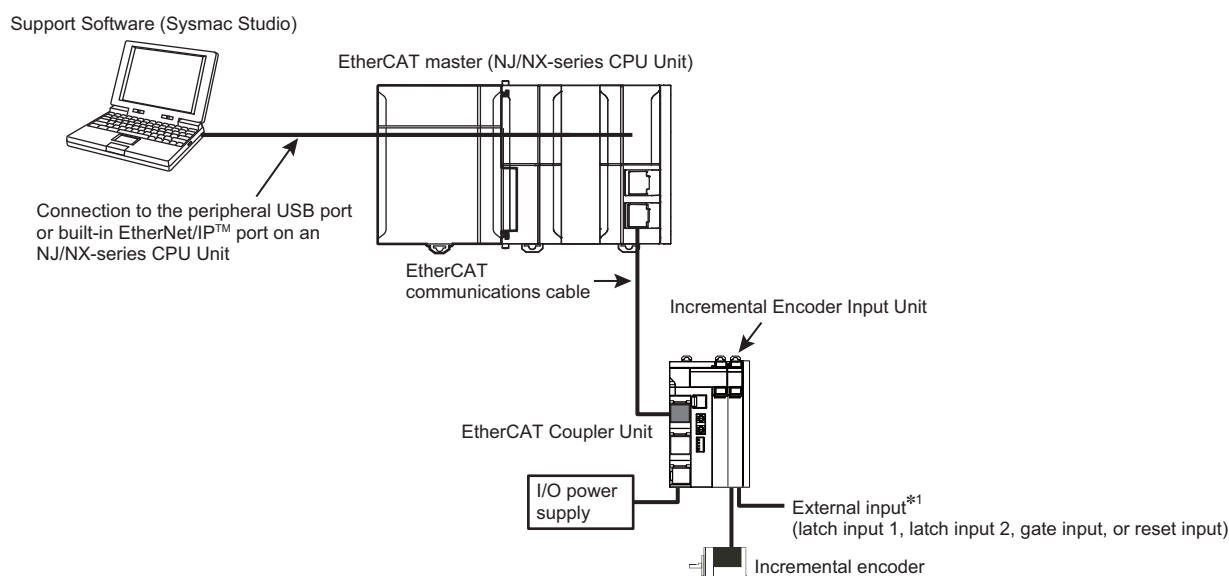
*1. You can specify functions for up to two external inputs to a One-input Incremental Encoder Input Unit. You cannot use external inputs for a Two-input Unit.

Specification

● Incremental Encoder Input Units
NX-EC0112

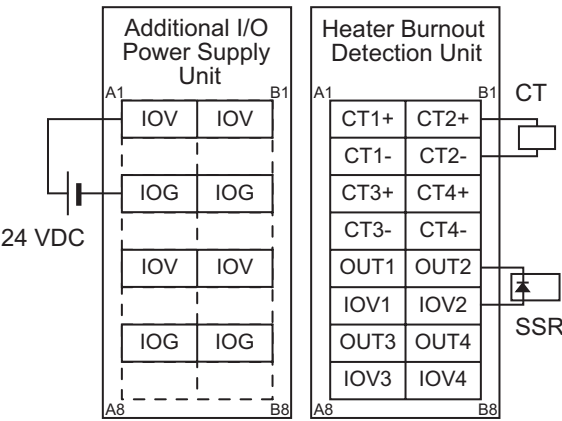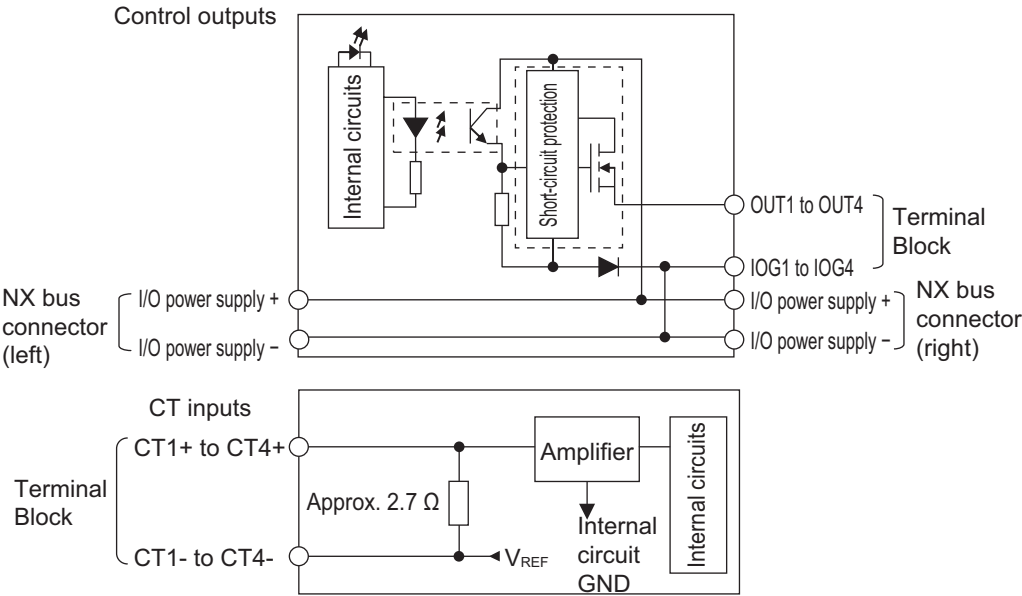| Unit name	Incremental Encoder Input Units	Model	NX-EC0112
Number of channels	1 channel	Type of external connections	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing, synchronous I/O refreshing or task period prioritized refreshing *		
Indicators	EC0112 ■TS ■CH ■A ■B ■Z ■I0 ■I1 ■I2	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	• Connected to a CPU Unit 1.15 W max. • Connected to a Communications Coupler Unit 0.85 W max.	Current consumption from I/O power supply	None
Weight	70 g max.		
Circuit layout	Encoder Input and External Inputs		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 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

Slave Terminals NX-series
Incremental Encoder Input Unit NC-EC0@@@

System Configuration

Controllers

Softwares

Features | Programmable Terminals

System Configuration

Slave Terminals

Specification

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NX-EC0122

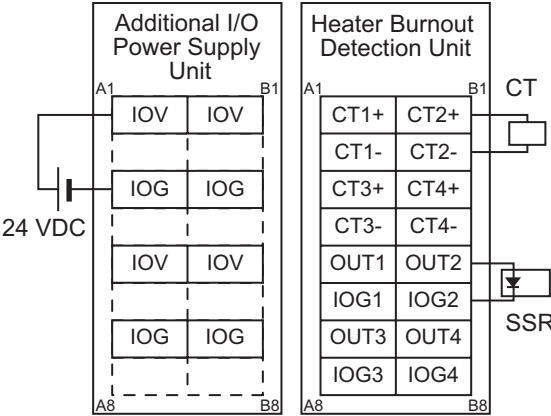| Unit name	Incremental Encoder Input Units	Model	NX-EC0122
Number of channels	1 channel	**Type of external connections**	Screwless push-in terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing, synchronous I/O refreshing or task period prioritized refreshing *		
Indicators	EC0122 ■TS ■CH ■A ■B ■Z ■I0 ■I1 ■I2	**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	• Connected to a CPU Unit 1.30 W max. • Connected to a Communications Coupler Unit 0.95 W max.	**Current consumption from I/O power supply**	None
Weight	70 g max.		
Circuit layout	Encoder Input and External Inputs		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 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

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, synchronous I/O refreshing or task period prioritized refreshing *		
Indicators	EC0132 ■TS ■CH ■A ■B ■Z ■I0 ■I1 ■I2	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	• Connected to a CPU Unit 1.25 W max. • Connected to a Communications Coupler Unit 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 External Inputs
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: There are no restrictions.
Terminal connection diagram	
Failure detection	None

Encoder Input

Terminal block — A-, B-, Z-
A+, B+, Z+

120 Ω

No isolation: 5 V

No isolation: 5 V GND

Isolation circuit — Internal circuits

Encoder power supply output, 5 V — Terminal block
Encoder power supply output, 0 V

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 −

Right-side NX bus connector — I/O power supply +
I/O power supply −

External Inputs

Terminal block — IOV
A, B, Z
I0 to I2
IOG

Power supply

Current limiter

Isolation circuit — Internal circuits

Left-side NX bus connector — I/O power supply +
I/O power supply −

Right-side NX bus connector — I/O power supply +
I/O power supply −

Terminal connection diagram:

I0	I1	A+	B+	Encoder
IOV	IOV	A-	B-	
IOG	IOG	Z+	5V	
I2	NC	Z-	0V	
IOV	NC	NC	NC	
IOG	NC	NC	NC	

Sensor 1, Sensor 2, Sensor 3

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, synchronous I/O refreshing or task period prioritized refreshing *		
Indicators	EC0142 ■TS ■CH ■A ■B ■Z ■I0 ■I1 ■I2	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	• Connected to a CPU Unit
	  1.50 W max.
	• Connected to a Communications Coupler Unit
	  1.05 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 External Inputs
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: There are no restrictions.
Terminal connection diagram	

Failure detection	None	**Protection**	None

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, synchronous I/O refreshing or task period prioritized refreshing *		
Indicators	EC0212 ■TS ■CH1 ■A1■B1■Z1 ■CH2 ■A2■B2■Z2	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	• Connected to a CPU Unit
	  1.15 W max.
	• Connected to a Communications Coupler Unit
	  0.85 W max.
		Current consumption from I/O power supply	None

Weight	70 g max.		
Circuit layout	Encoder Input 		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 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			
	A1	B1	Encoder 1
	Z1	NC	
	IOV	IOV	
	IOG	IOG	
Encoder 2	A2	B2	
	Z2	NC	
Failure detection	None	**Protection**	None

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, synchronous I/O refreshing or task period prioritized refreshing *		
Indicators	EC0222 ■TS ■CH1 ■A1■B1■Z1 ■CH2 ■A2■B2■Z2	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	• Connected to a CPU Unit 1.30 W max. • Connected to a Communications Coupler Unit 0.95 W max.	Current consumption from I/O power supply	None
Weight	70 g max.		
Circuit layout	Encoder Input		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 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

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding versions *	
Model	**Unit version**	**CPU Unit**	**Sysmac Studio**
NX-EC0112	Ver.1.1 or later		
	Ver.1.2 or later		
NX-EC0122	Ver.1.0 or later		
	Ver.1.1 or later		
	Ver.1.2 or later		
NX-EC0132	Ver.1.1 or later		
	Ver.1.2 or later		
NX-EC0142	Ver.1.0 or later	Ver.1.13 or later	Ver.1.17 or higher
	Ver.1.1 or later		
	Ver.1.2 or later		
NX-EC0212	Ver.1.1 or later		
	Ver.1.2 or later		
NX-EC0222	Ver.1.0 or later		
	Ver.1.1 or later		
	Ver.1.2 or later		

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *1		
		EtherCAT		
Model	**Unit version**	**Communications Coupler Unit**	**NJ/NX-series CPU Units or NY-series Industrial PCs**	**Sysmac Studio**
NX-EC0112	Ver.1.1	Ver.1.1 or later *2		Ver.1.10 or higher
	Ver.1.2	Ver.1.3 or later *3*4		Ver.1.13 or higher
NX-EC0122	Ver.1.0	Ver.1.1 or later *2		Ver.1.07 or higher
	Ver.1.1			Ver.1.08 or higher
	Ver.1.2	Ver.1.3 or later *3*4		Ver.1.13 or higher
NX-EC0132	Ver.1.1	Ver.1.1 or later *2		Ver.1.10 or higher
	Ver.1.2	Ver.1.3 or later *3*4		Ver.1.13 or higher
NX-EC0142	Ver.1.0	Ver.1.1 or later *2	Ver.1.06 or later *2	Ver.1.07 or higher
	Ver.1.1			Ver.1.08 or higher
	Ver.1.2	Ver.1.3 or later *3*4		Ver.1.13 or higher
NX-EC0212	Ver.1.1	Ver.1.1 or later *2		Ver.1.10 or higher
	Ver.1.2	Ver.1.3 or later *3*4		Ver.1.13 or higher
NX-EC0222	Ver.1.0	Ver.1.1 or later *2		Ver.1.07 or higher
	Ver.1.1			Ver.1.08 or higher
	Ver.1.2	Ver.1.3 or later *3*4		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. 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
*3. To use task period prioritized refreshing, you must use the NX-ECC203.
*4. If you do not use task period prioritized refreshing, you can use EtherCAT Coupler Units which support Position Interface Units with unit version 1.1 or earlier.

System Configuration
Controllers
Softwares
Programmable Terminals
Features
System Configuration
Slave Terminals
Specification
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

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/NY5-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 NX1P2 CPU Unit or EtherCAT Coupler.
- When the MC Function Modules of the NJ/NX/NY5-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: 400 m
- Connection to the CJ-series is possible by connecting with the EtherNet/IP™ Coupler.

[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.

System Configuration

An example for the system configuration of an SSI Input Unit.
The following is an example when an EtherCAT Coupler Unit with an SSI Input Unit connected is connected to the built-in EtherCAT port of an NJ/NX-series CPU Unit.
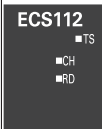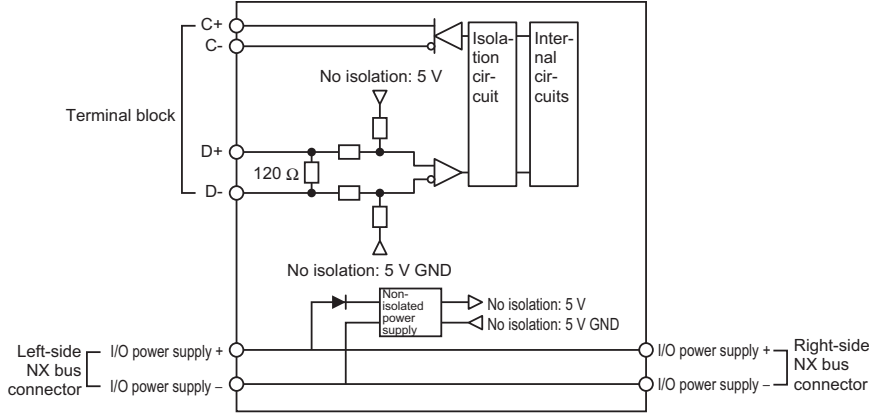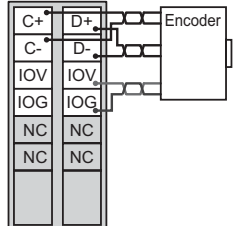
Support Software (Sysmac Studio)

EtherCAT master (NJ/NX-series CPU Unit)

Connection to the peripheral USB port or built-in EtherNet/IP™ port on an NJ/NX-series CPU Unit

EtherCAT communications cable

SSI Input Unit

EtherCAT Coupler Unit

I/O power supply
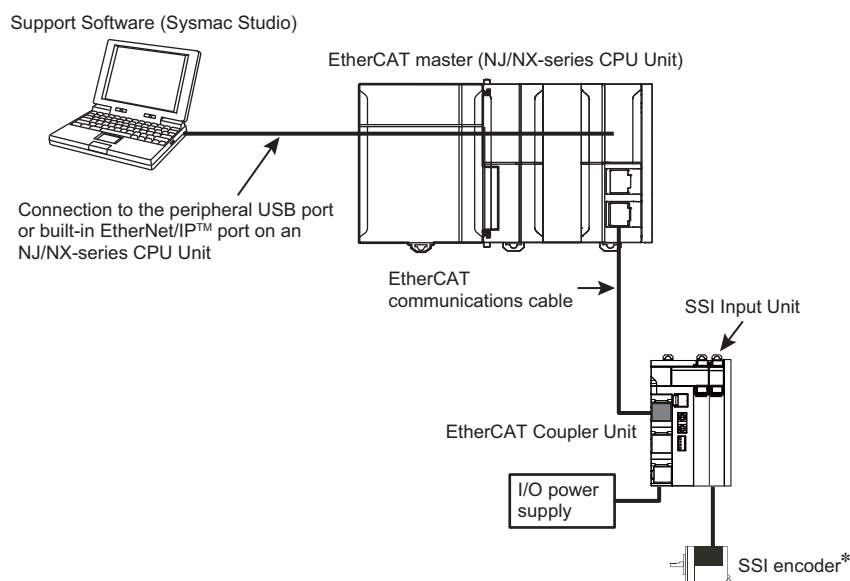
SSI encoder*

* The SSI encoder is supplied with 24-VDC power from the SSI Input Unit.

Specification

SSI Input Units 1 channel NX-ECS112
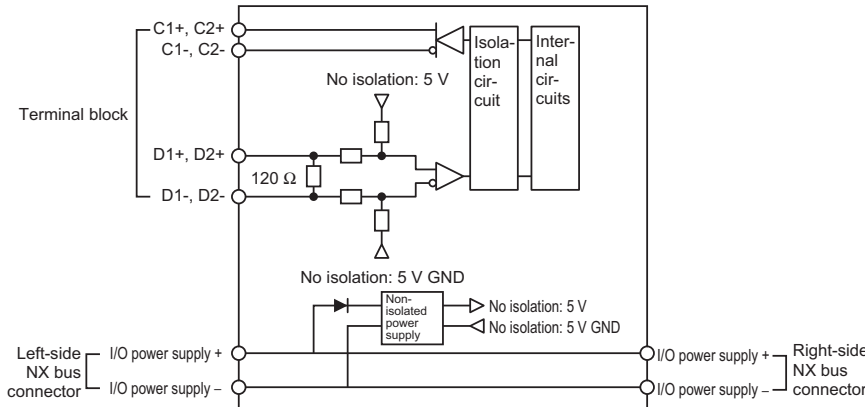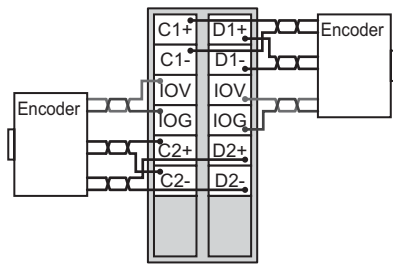
Unit name	SSI Input Units	Model	NX-ECS112
Number of channels	1 channel	Type of external connections	Screwless push-in terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing, synchronous I/O refreshing or task period prioritized refreshing [*1]		
Indicators	ECS112 ■TS ■CH ■RD	Input signals	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	• Connected to a CPU Unit 1.20 W max. • Connected to a Communications Coupler Unit 0.85 W max.	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
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

Failure detection	None	Protection	None

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.
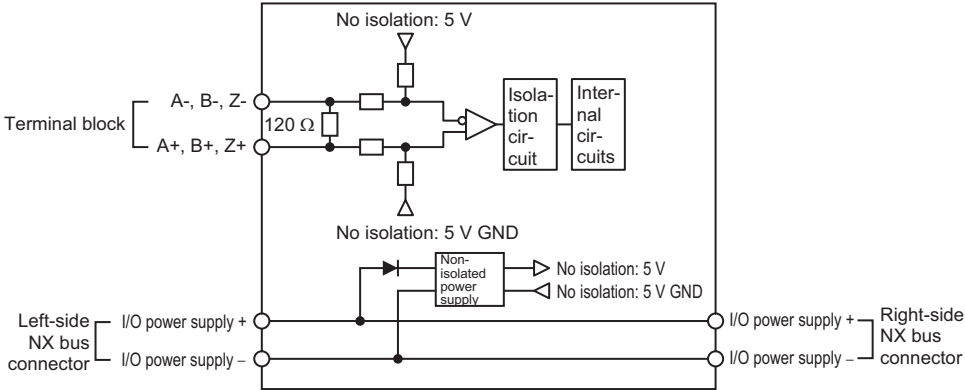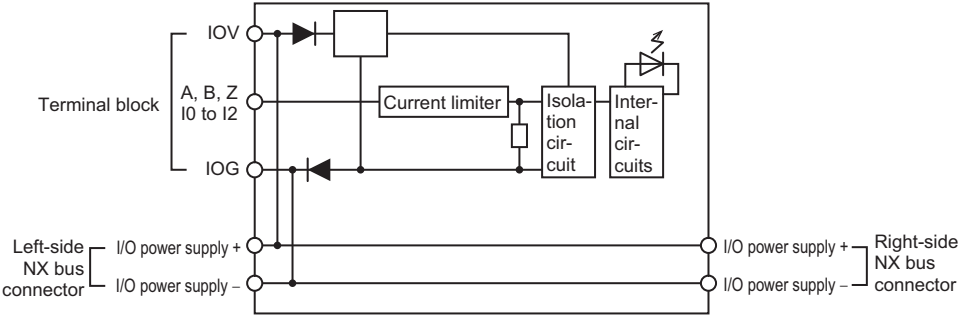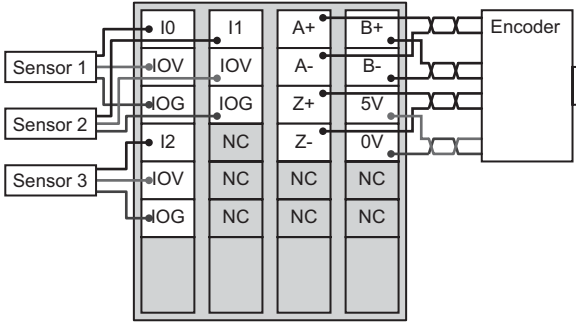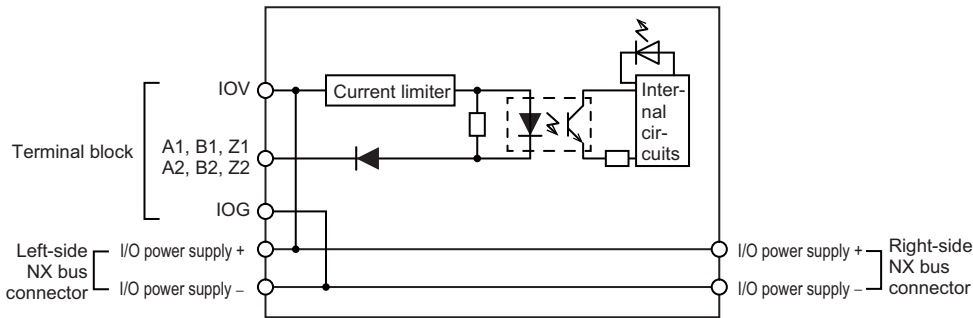   Refer to information on the I/O refreshing methods in the W524 manual for the communications cycles for each model.
*2. The maximum transmission distance for an SSI Input Unit depends on the baud rate due to the delay that can result from the responsiveness of the connected encoder and cable impedance. 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.

System Configuration
Controllers
Softwares
Features
Programmable Terminals
System Configuration
Slave Terminals
Specification
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

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, synchronous I/O refreshing or 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	• Connected to a CPU Unit 1.25 W max. • Connected to a Communications Coupler Unit 0.9 W max.	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
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

Failure detection	None	Protection	None

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.
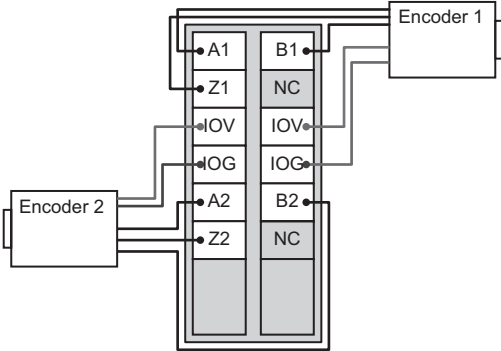 Refer to information on the I/O refreshing methods in the W524 manual for the communications cycles for each model.
*2. The maximum transmission distance for an SSI Input Unit depends on the baud rate due to the delay that can result from the responsiveness of the connected encoder and cable impedance. 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

Connecting with CPU Units

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

NX Unit		Corresponding versions *	
Model	Unit version	CPU Unit	Sysmac Studio
NX-ECS112	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher
	Ver.1.1		
	Ver.1.2		
NX-ECS212	Ver.1.0		
	Ver.1.1		
	Ver.1.2		

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *1		
		EtherCAT		
Model	Unit version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	Sysmac Studio
NX-ECS112	Ver.1.0	Ver.1.1 or later *2	Ver.1.06 or later *2	Ver.1.07 or higher
	Ver.1.1			Ver.1.08 or higher
	Ver.1.2	Ver.1.3 or later *3 *4		Ver.1.13 or higher
NX-ECS212	Ver.1.0	Ver.1.1 or later *2		Ver.1.07 or higher
	Ver.1.1			Ver.1.08 or higher
	Ver.1.2	Ver.1.3 or later *3 *4		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. 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
*3. To use task period prioritized refreshing, you must use the NX-ECC203.
*4. If you do not use task period prioritized refreshing, you can use EtherCAT Coupler Units which support Position Interface Units with unit version 1.1 or earlier.

System Configuration
Controllers
Softwares
Programmable Terminals
Features
System Configuration
Slave Terminals
Specification
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

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/NY5-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.
- Non-networked motors, such as DD motors, stepper motors, and DC motors, can be connected.
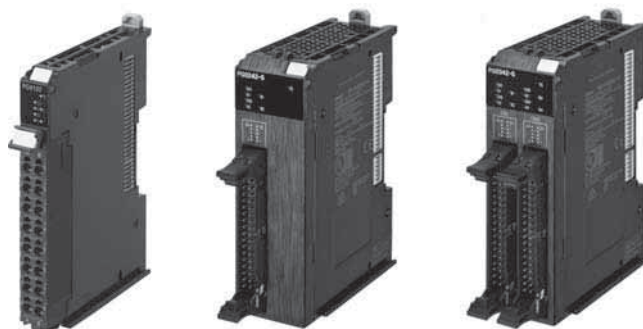
Features

- When the motion control instructions of the MC Function Modules of the NJ/NX/NY5-series Machine Automation Controller are used, number of usable units is the same as the maximum number of axes controlled by the NJ/NX/NY5-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], can be selected for refreshing with the NX-series EtherCAT Coupler.
- Latch function (2 external latch inputs)
- Open collector pulse outputs up to 500 kHz or line driver pulse outputs up to 4 MHz.
- Line driver output models with two or four channels.
- Connection to the CJ-series is possible by connecting with the EtherNet/IP™ Coupler.

*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.

System Configuration

Examples for the system configuration of an Pulse Output Unit

NX-PG0112/-PG0122
The following figure shows the system configuration of NX-PG0112 and NX-PG0122.

Support Software (Sysmac Studio)

EtherCAT master
(NJ/NX-series CPU Unit)

Connection to the peripheral USB port
or built-in EtherNet/IP™ port on an
NJ/NX-series CPU Unit

EtherCAT
communications cable

Pulse Output Unit
NX-PG0112/-PG0122

Digital Input Unit

EtherCAT Coupler Unit

I/O power
supply

External inputs*1
(forward limit input, reverse limit input, home
proximity input, and immediate stop input)

Latch inputs
(Latch input 1 and latch input 2)

Current-limiting resistor*2

Drive with pulse train input

Motor

*1. When the Unit is connected to an NJ-series CPU, you can use these inputs by adding a Digital Input Unit and assigning MC Function Module functions.
*2. The pulse output from a Pulse Output Unit is a 24-VDC PNP open collector output. Connect an external current-limiting resistor according to the input specifications of the connected motor drive.
Example: For a G5-series Servo Drive, connect a 2-kΩ (1/2-W) resistor in series.

System Configuration
Controllers
Softwares
Features
Programmable Terminals
System Configuration
Slave Terminals
Specification
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

NX-PG0232-5/-PG0242-5/-PG0332-5/-PG0342-5
The following figure shows the system configuration of NX-PG0232-5, NX-PG0242-5, NX-PG0332-5, and NX-PG0342-5.

Support Software (Sysmac Studio)

EtherCAT master
(NJ/NX-series CPU Unit)

Connection to the peripheral USB port
or built-in EtherNet/IP™ port on an
NJ/NX-series CPU Unit

Pulse Output Unit
NX-PG0232-5/-PG0242-5/-PG0332-5/-PG0342-5

EtherCAT
communications cable

Digital Input Unit

EtherCAT Coupler Unit

I/O power
supply

External inputs *1
(forward limit input, reverse limit input, home
proximity input, and immediate stop input)

Pulse output
power supply

Latch inputs
(Latch input 1 and latch input 2)

Connector-Terminal Block Conversion
Unit or relay terminal block

Current-limiting resistor *2

Drive with pulse train input

Motor

*1. When the Unit is connected to an NJ/NX-series CPU, you can use these inputs by assigning MC Function Module functions to external inputs inside a Pulse Output Unit or to inputs of a Digital Input Unit that is added. For information on Digital Input Units, refer to the *NX-series Digital I/O Units User's Manual* (Cat. No. W521). For NX-PG0232-5, NX-PG0242-5, NX-PG0332-5, and NX-PG0342-5 Pulse Output Units, the number of available external inputs that can be used in always ON status is restricted by ambient operating temperature and installation orientation.

*2. The pulse output from a Pulse Output Unit is a 24-VDC open collector output. When it is used as a control output for a motor drive such as an error counter reset output, connect an external current-limiting resistor according to the input specifications of the connected motor drive. A line drive output does not need a current limiting resistor.

Specification

Pulse Output Units (Open collector output, NPN type) NX-PG0112
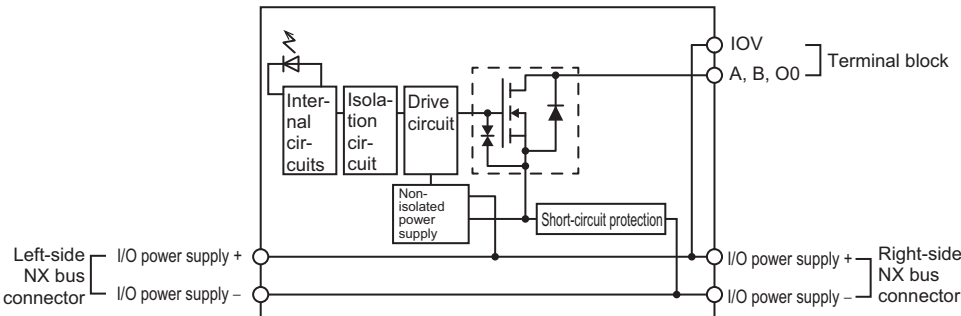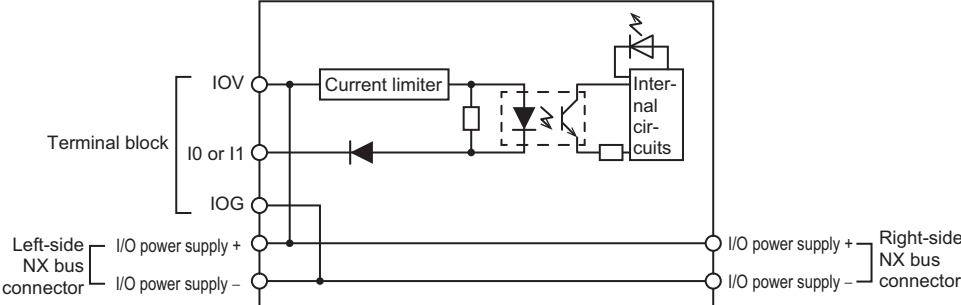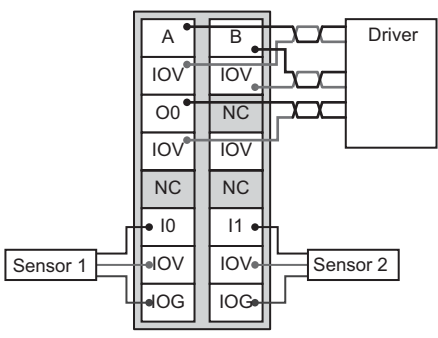
Unit name	Pulse Output Units	Model	NX-PG0112
Number of axes	1	Type of external connections	Screwless clamping terminal block (16 terminals)
I/O refreshing method [*1]	Synchronous I/O refreshing or task period prioritized refreshing		
Indicators	PG0112 ■TS ■CH1 ■A ■B ■O0 ■I0 ■I1	I/O signals	Inputs: 2, 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	• Connected to a CPU Unit 1.15 W max. • Connected to a Communications Coupler Unit 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/NX-series CPU Unit or the NY-series Industrial PC. For details, refer to the motion control user's manual for the connected CPU Unit or Industrial PC.
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.

System Configuration
Controllers
Softwares
Features
Programmable Terminals
System Configuration
Specification
Version Information
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Circuit layout	Pulse Output and External Output External Inputs
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: There are no restrictions.
Terminal connection diagram	

Failure detection	None	**Protection**	None

Pulse Output Units (Open collector output, NPN type) 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 [*1]	Synchronous I/O refreshing or task period prioritized refreshing		
Indicators	PG0122 ■TS ■CH1 ■A ■B ■O0 ■I0 ■I1	**I/O signals**	Inputs: 2, External inputs [*2] Outputs: 3, The outputs are the forward direction pulse output, reverse direction pulse output, and external output [*3] (one of each 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 [*4]			
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

*1. The I/O refreshing method is automatically set according to the connected CPU Unit or Communications Coupler Unit.
*2. You can use the external inputs as latch inputs.
*3. You can use the external output as error counter reset outputs.
*4. These functions are supported when you also use the MC Function Module in the NJ/NX-series CPU Unit or the NY-series Industrial PC.
   For details, refer to the motion control user's manual for the connected CPU Unit or Industrial PC.
   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.

System Configuration

Controllers

Softwares

Features | Programmable Terminals

System Configuration | Slave Terminals

Specification | Safety

Version Information | Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NX Unit power consumption	• Connected to a CPU Unit 1.30 W max. • Connected to a Communications Coupler Unit 0.90 W max.	Current consumption from I/O power supply	20 mA max.
Weight	70 g max.	Cable length	3 m max.
Circuit layout	Pulse Output and External Output External Inputs 		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: There are no restrictions.		
Terminal connection diagram			
Failure detection	None	Protection	None

Pulse Output Units (Line driver output, NPN type) 2 channels   NX-PG0232-5

Unit name	Pulse Output Units	Model	NX-PG0232-5
Number of channels	2 channels	**Type of external connections**	MIL connector (34 terminals ×1)
I/O refreshing method [*1]	Synchronous I/O refreshing or task period prioritized refreshing		
Indicators	PG0232-5 ■TS ■CH1 ■A1 ■B1 ■CH2 ■A2 ■B2	**I/O signals**	Inputs: 5 per channel. External inputs [*2] Outputs: 5 per channel. 1 forward direction pulse output, 1 reverse direction pulse output, and 3 external outputs (per channel) [*3]
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	Line driver output		
Unit of control	Pulses		
Maximum pulse output speed	4 Mpps		
Pulse output method	Forward/reverse direction pulse outputs, Pulse + direction outputs, or Phase differential pulse output multiplication x1/2/4		
Position control range	–2,147,483,648 to 2,147,483,647 pulses		
Velocity control range	1 to 4,000,000 pps		

Positioning [*4]			
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 (except for line receiver inputs)			
Input voltage	21.6 to 26.4 VDC (24 VDC +10%, −10%)	**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	External inputs 0 and 1: 1 µs max./2 µs max. External inputs 2 to 4: 20 µs max./400 µs max.		
Internal I/O common processing	NPN		

External input specifications (line receiver inputs)			
Input voltage	EIA standard RS–422–A line driver levels	**High level input voltage**	VIT+: 0.1 V min.
Input impedance	120 Ω ± 5%	**Low level input voltage**	VIT−: –0.1 V max.
Hysteresis voltage	Vhys (VIT+ – VIT−): 60 mV		

Line driver output specifications			
Output voltage	RS-422-A line driver level (equivalent to AM26C31)		
Maximum load current	20 mA		
Maximum output frequency	4 Mpps		

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	External output 0: 5 µs max./5 µs max. External outputs 1 and 2: 0.5 ms max./1 ms max.		
Internal I/O common processing	NPN		

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.
*2. You can use the external input 0 as a latch input.
*3. You can use the external output 0 as an error counter reset output.
*4. These functions are supported when you also use the MC Function Module in the NJ/NX-series CPU Unit or the NY-series Industrial PC.
    For details, refer to the motion control user's manual for the connected CPU Unit or Industrial PC.
    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.

Dimensions	30 × 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 at a leakage current of 5 mA max.
I/O power supply method	Supply from external source 20.4 to 28.8 VDC (24 VDC +20%, -15%)	Current capacity of I/O power supply terminals	Without I/O power supply terminals
NX Unit power consumption	• Connected to a CPU Unit 1.55 W max. • Connected to a Communications Coupler Unit 1.20 W max.	Current consumption from I/O power supply	50 mA max.
Weight	110 g max.	Cable length	Line driver outputs: 10 m max. Other I/O: 3 m max.
Circuit layout	Pulse Output External Output External Inputs (Line Receiver) External Inputs (Other than Line Receiver)		

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: The number of external inputs that can be always ON is restricted as shown below. • For upright installation For any installation other than upright
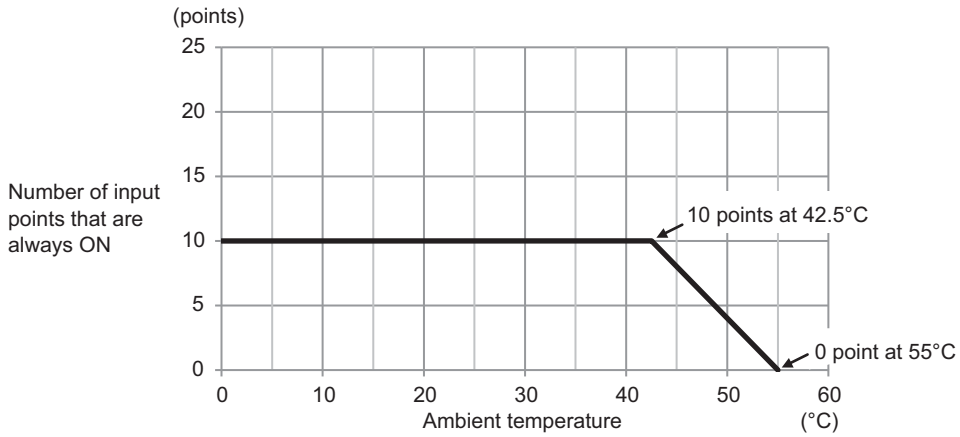
• For upright installation

(points)

Number of input points that are always ON

10 points at 49.375°C

4 points at 55°C

Ambient temperature (°C)

• For any installation other than upright

(points)

Number of input points that are always ON

10 points at 42.5°C

0 point at 55°C

Ambient temperature (°C)

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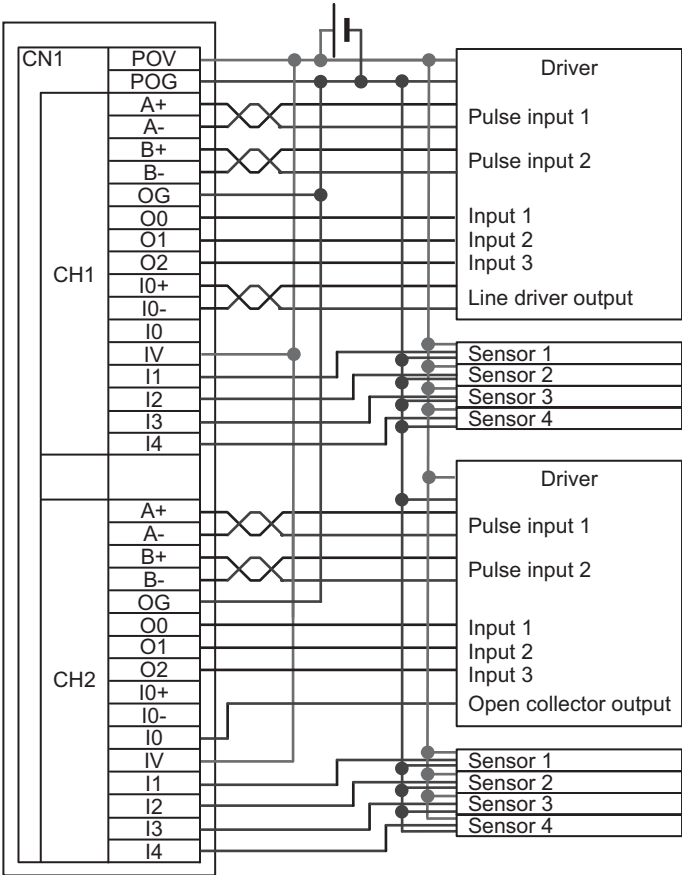
Failure detection	None	**Protection**	None

Pulse Output Units (Line driver output, PNP type) 2 channels   NX-PG0242-5

Unit name	Pulse Output Units	Model	NX-PG0242-5
Number of channels	2 channels	Type of external connections	MIL connector (34 terminals ×1)
I/O refreshing method [*1]	Synchronous I/O refreshing or task period prioritized refreshing		
Indicators	PG0242-5 ■TS ■CH1 ■A1 ■B1 ■CH2 ■A2 ■B2	I/O signals	Inputs: 5 per channel. External inputs [*2] Outputs: 5 per channel. 1 forward direction pulse output, 1 reverse direction pulse output, and 3 external outputs (per channel) [*3]
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	Line driver output		
Unit of control	Pulses		
Maximum pulse output speed	4 Mpps		
Pulse output method	Forward/reverse direction pulse outputs, Phase + direction outputs, or Phase differential pulse output multiplication x1/2/4		
Position control range	−2,147,483,648 to 2,147,483,647 pulses		
Velocity control range	1 to 4,000,000 pps		

Positioning[*4]		
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 (except for line receiver inputs)			
Input voltage	21.6 to 26.4 VDC (24 VDC +10%, −10%)	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	External inputs 0 and 1: 1 μs max./2 μs max. External inputs 2 to 4: 20 μs max./400 μs max.		
Internal I/O common processing	PNP		

External input specifications (line receiver inputs)			
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 max.
Hysteresis voltage	Vhys (V$_{IT+}$ − V$_{IT-}$): 60 mV		

Line driver output specifications	
Output voltage	RS-422-A line driver level (equivalent to AM26C31)
Maximum load current	20 mA
Maximum output frequency	4 Mpps

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	External output 0: 5 μs max./200 μs max. External outputs 1 and 2: 0.5 ms max./1 ms max.		
Internal I/O common processing	PNP		

*1. The I/O refreshing method is set according to the connected Communications Coupler Unit and CPU Unit.
*2. You can use the external input 0 as a latch input.
*3. You can use the external output 0 as an error counter reset output.
*4. These functions are supported when you also use the MC Function Module in the NJ/NX-series CPU Unit or the NY-series Industrial PC.
  For details, refer to the motion control user's manual for the connected CPU Unit or Industrial PC.
  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.

System Configuration
Controllers
Softwares
Features
Programmable Terminals
System Configuration
Slave Terminals
Specification
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Dimensions	30 × 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 at a leakage current of 5 mA max.
I/O power supply method	Supply from external source 20.4 to 28.8 VDC (24 VDC +20%, -15%)	Current capacity of I/O power supply terminals	Without I/O power supply terminals
NX Unit power consumption	• Connected to a CPU Unit 1.55 W max. • Connected to a Communications Coupler Unit 1.20 W max.	Current consumption from I/O power supply	50 mA max.
Weight	110 g max.	Cable length	Line driver outputs: 10 m max. Other I/O: 3 m max.
Circuit layout	Pulse Output External Output External Inputs (Line Receiver) External Inputs (Other than Line Receiver)		

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: The number of external inputs that can be always ON is restricted as shown below. • For upright installation (points) Number of input points that are always ON 10 points at 49.375°C 4 points at 55°C Ambient temperature (°C) • For any installation other than upright (points) Number of input points that are always ON 10 points at 42.5°C 0 point at 55°C Ambient temperature (°C)

Terminal connection diagram	

Failure detection	None	Protection	None

Pulse Output Units (Line driver output, NPN type) 4 channels   NX-PG0332-5

Unit name	Pulse Output Units	Model	NX-PG0332-5
Number of channels	4 channels	**Type of external connections**	MIL connector (34 terminals ×2)
I/O refreshing method [1]	Synchronous I/O refreshing or task period prioritized refreshing		

Indicators	PG0332-5 TS CH1 CH3 A1 B1 A3 B3 CH2 CH4 A2 B2 A4 B4	**I/O signals**	Inputs: 5 per channel. External inputs[2] Outputs: 5 per channel. 1 forward direction pulse output, 1 reverse direction pulse output, and 3 external outputs (per channel)[3]

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	Line driver output
Unit of control	Pulses
Maximum pulse output speed	4 Mpps
Pulse output method	Forward/reverse direction pulse outputs, Pulse + direction outputs, or Phase differential pulse output multiplication x1/2/4
Position control range	–2,147,483,648 to 2,147,483,647 pulses
Velocity control range	1 to 4,000,000 pps

Positioning [4]		
	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 (except for line receiver inputs)			
	Input voltage	21.6 to 26.4 VDC (24 VDC +10%, –10%)	**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	External inputs 0 and 1: 1 μs max./2 μs max. External inputs 2 to 4: 20 μs max./400 μs max.		
	Internal I/O common processing	NPN		

External input specifications (line receiver inputs)			
	Input voltage	EIA standard RS–422–A line driver levels	**High level input voltage**	VIT+: 0.1 V min.
	Input impedance	120 Ω ± 5%	**Low level input voltage**	VIT−: –0.1 V max.
	Hysteresis voltage	Vhys (VIT+ – VIT−): 60 mV		

Line driver output specifications		
	Output voltage	RS-422-A line driver level (equivalent to AM26C31)
	Maximum load current	20 mA
	Maximum output frequency	4 Mpps

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	External output 0: 5 μs max./5 μs max. External outputs 1 and 2: 0.5 ms max./1 ms max.		
	Internal I/O common processing	NPN		

*1. The I/O refreshing method is set according to the connected Communications Coupler Unit and CPU Unit.
*2. You can use the external input 0 as a latch input.
*3. You can use the external output 0 as an error counter reset output.
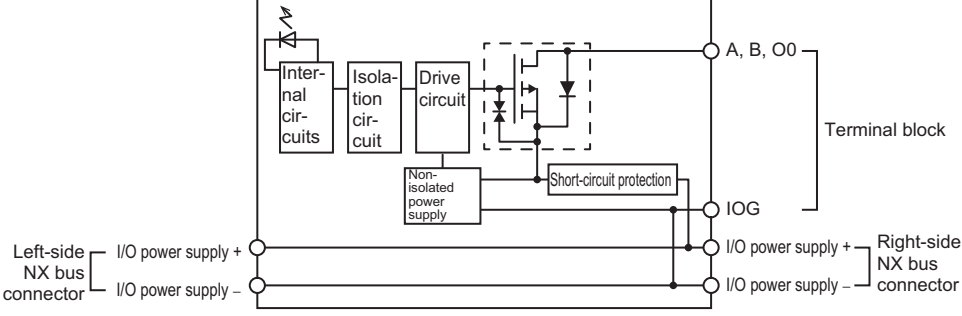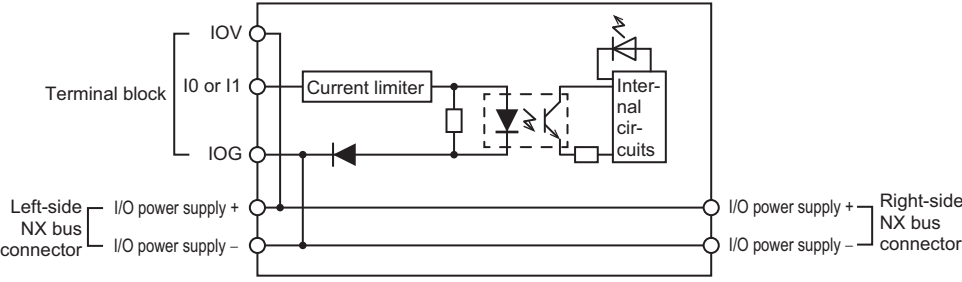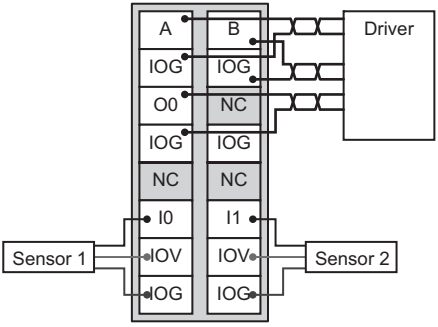*4. These functions are supported when you also use the MC Function Module in the NJ/NX-series CPU Unit or the NY-series Industrial PC.
   For details, refer to the motion control user's manual for the connected CPU Unit or Industrial PC.
   A Pulse Output Unit only outputs pulses during the control 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.

Dimensions	30 × 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 at a leakage current of 5 mA max.
I/O power supply method	Supply from external source 20.4 to 28.8 VDC (24 VDC +20%, -15%)	**Current capacity of I/O power supply terminals**	Without I/O power supply terminals

NX Unit power consumption	• Connected to a CPU Unit
	  1.65 W max.
	• Connected to a Communications Coupler Unit
	  1.30 W max.
		Current consumption from I/O power supply	50 mA/CN max.

Weight	150 g max.	**Cable length**	Line driver outputs: 10 m max. Other I/O: 3 m max.
Circuit layout	Pulse Output External Output External Inputs (Line Receiver) External Inputs (Other than Line Receiver)		

Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: The number of external inputs that can be always ON is restricted as shown below. • For upright installation (points) Number of input points that are always ON 20 points at 40°C 4 points at 55°C Ambient temperature (°C) • For any installation other than upright (points) Number of input points that are always ON 20 points at 30°C 0 point at 55°C Ambient temperature (°C)

Terminal connection diagram	 • The connection diagram for CN2 is the same as the one for CN1.

Failure detection	None	**Protection**	None

Pulse Output Units (Line driver output, PNP type) 4 channels   NX-PG0342-5

Unit name	Pulse Output Units	Model	NX-PG0342-5
Number of channels	4 channels	**External connection terminals**	MIL connector (34 terminals ×2)
I/O refreshing method [1]	Synchronous I/O refreshing or task period prioritized refreshing		
Indicators	PG0342-5　TS　CH1　CH3　A1　B1　A3　B3　CH2　CH4　A2　B2　A4　B4	**I/O signals**	Inputs: 5 per channel. External inputs [2] Outputs: 5 per channel. 1 forward direction pulse output, 1 reverse direction pulse output, and 3 external outputs (per channel) [3]
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	Line driver output		
Unit of control	Pulses		
Maximum pulse output speed	4 Mpps		
Pulse output method	Forward/reverse direction pulse outputs, Pulse + direction outputs, or Phase differential pulse output multiplication x1/2/4		
Position control range	–2,147,483,648 to 2,147,483,647 pulses		
Velocity control range	1 to 4,000,000 pps		

Positioning [4]			
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 (except for line receiver inputs)			
Input voltage	21.6 to 26.4 VDC (24 VDC +10%, −10%)	**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	External inputs 0 and 1: 1 μs max./2 μs max. External inputs 2 to 4: 20 μs max./400 μs max.		
Internal I/O common processing	PNP		

External input specifications (line receiver inputs)			
Input voltage	EIA standard RS–422–A line driver levels	**High level input voltage**	VIT+: 0.1 V min.
Input impedance	120 Ω ± 5%	**Low level input voltage**	VIT−: −0.1 V max.
Hysteresis voltage	Vhys (VIT+ − VIT−): 60 mV		

Line driver output specifications			
Output voltage	RS-422-A line driver level (equivalent to AM26C31)		
Maximum load current	20 mA		
Maximum output frequency	4 Mpps		

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	External output 0: 5 μs max./200 μs max. External outputs 1 and 2: 0.5 ms max./1 ms max.		
Internal I/O common processing	PNP		

*1. The I/O refreshing method is set according to the connected Communications Coupler Unit and CPU Unit.
*2. You can use the external input 0 as a latch input.
*3. You can use the external output 0 as an error counter reset output.
*4. These functions are supported when you also use the MC Function Module in the NJ/NX-series CPU Unit or the NY-series Industrial PC.
 For details, refer to the motion control user's manual for the connected CPU Unit or Industrial PC.
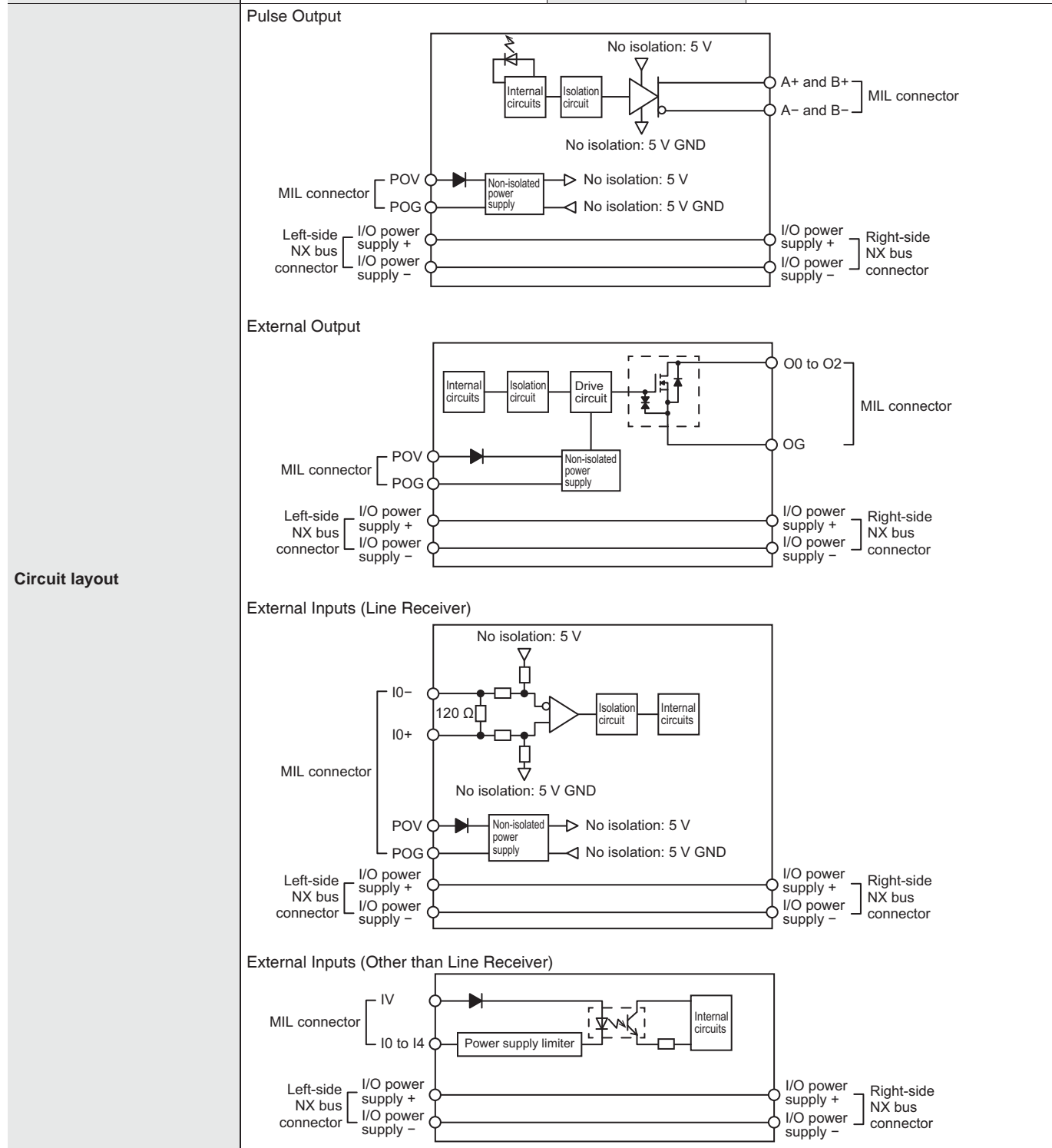 A Pulse Output Unit only outputs pulses during the control period based on commands received at a fixed period.
 Target position calculations (distribution calculations) for acceleration/deceleration control or for each control period must be performed on the Controller.
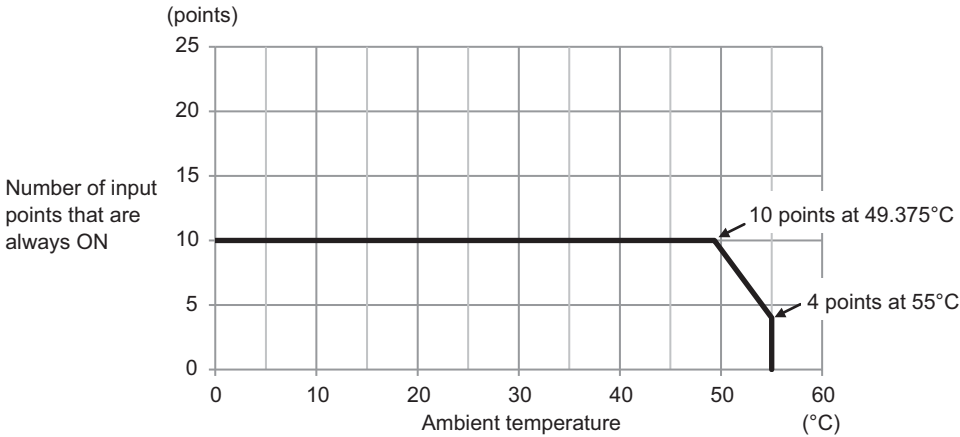
System Configuration
Controllers
Softwares
Programmable Terminals
Features
System Configuration
Slave Terminals
Specification
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Dimensions	30 × 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 at a leakage current of 5 mA max.
I/O power supply method	Supply from external source 20.4 to 28.8 VDC (24 VDC +20%, -15%)	Current capacity of I/O power supply terminals	Without I/O power supply terminals
NX Unit power consumption	• Connected to a CPU Unit 1.65 W max. • Connected to a Communications Coupler Unit 1.30 W max.	Current consumption from I/O power supply	50 mA/CN max.
Weight	150 g max.	Cable length	Line driver outputs: 10 m max. Other I/O: 3 m max.
Circuit layout	Pulse Output External Output External Inputs (Line Receiver) External Inputs (Other than Line Receiver)		

	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: The number of external inputs that can be always ON is restricted as shown below. • For upright installation
Installation orientation and restrictions	

• For upright installation

(points)

Number of input points that are always ON

20 points at 40°C

4 points at 55°C

Ambient temperature (°C)

• For any installation other than upright

(points)

Number of input points that are always ON

20 points at 30°C

0 point at 55°C

Ambient temperature (°C)

Terminal connection diagram	
	• The connection diagram for CN2 is the same as the one for CN1.

Failure detection	None	Protection	None

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding versions *	
Model	Unit Version	CPU Unit	Sysmac Studio
NX-PG0112	Ver.1.1	Ver.1.13 or later	Ver.1.17 or higher
	Ver.1.2		
NX-PG0122	Ver.1.0		
	Ver.1.1		
	Ver.1.2		
NX-PG0232-5	Ver.1.2		
NX-PG0242-5			
NX-PG0332-5			
NX-PG0342-5			

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *1		
		EtherCAT		
Model	Unit Version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	Sysmac Studio
NX-PG0112	Ver.1.1	Ver.1.0 or later	Ver.1.05 or later	Ver.1.10 or higher
	Ver.1.2	Ver.1.3 or later *2 *3		Ver.1.13 or higher
NX-PG0122	Ver.1.0	Ver.1.0 or later		Ver.1.06 or higher
	Ver.1.1			Ver.1.08 or higher
	Ver.1.2			Ver.1.13 or higher
NX-PG0232-5	Ver.1.2	Ver.1.3 or later *2 *3		Ver.1.15 or higher
NX-PG0242-5				
NX-PG0332-5				
NX-PG0342-5				

*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. To use task period prioritized refreshing, you must use the NX-ECC203.
*3. If you do not use task period prioritized refreshing, you can use EtherCAT Coupler Units with unit version 1.0.

System Configuration
Controllers
Softwares
Programmable Terminals
Features
System Configuration
Slave Terminals
Specification
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

NX-series   Communications Interface Units
NX-CIF

Provides simplicity and flexibility in connecting serial devices to EtherCAT

- Mount to the NX-series EtherCAT Coupler Unit and connect various types of serial devices.
- The serial line monitor on the Sysmac Studio helps easily and reliably connect serial devices.

Features

- Just 12 mm wide, saving space in your cabinet.
- Three models are available with a choice of one RS-422A/485, one RS-232C, or two RS-232C ports.
- Screwless push-in terminal block (1-port model) and D-Sub connector (2-port model) significantly reduce wiring work.
- No-protocol communications are supported as the communications protocol.
- The maximum baud rate is 230.4 kbps. The baud rate can be selected to match the connected serial devices.
- The settings are backed up and saved in the EtherCAT Coupler Unit. This facilitates commissioning and maintenance.
- The serial line monitor enables you to check the communications status with serial devices on the Sysmac Studio for easy and reliable startup of the devices.

Serial Line Monitor

On the Sysmac Studio, the monitor data is displayed in the CIF Serial Line Monitor tab page. The configuration of the CIF Serial Line Monitor tab page is shown below. The data values are shown from left to right along a time scale. The left edge is the starting point of the monitor.

System Configuration

System Configuration of Slave Terminals

The following figure shows an example of the system configuration when an EtherCAT Coupler Unit is used as a Communications Coupler Unit.

Sysmac Studio
Support Software

Connection to peripheral USB port
or built-in EtherNet/IP™ port on
CPU Unit or Industrial PC *1

ESI files

EtherCAT master *2
NJ/NX-series CPU Unit, NY-series Industrial PC, or
master from another manufacturer

Built-in EtherCAT port

Sysmac Studio
Support Software

Communications cable
Ethernet cables

Peripheral USB port.

Connection to peripheral USB
port on EtherCAT Coupler Unit

ESI files

●EtherCAT Slave Terminal

NX Series
EtherCAT Coupler Unit
NX-ECC□□□

End Cover

NX Units

Communications
Interface Units

Serial line

Serial Communications Device

*1. The connection method for the Sysmac Studio depends on the model of the CPU Unit or Industrial PC.
*2. An EtherCAT Slave Terminal cannot be connected to any of the OMRON CJ1W-NC@81/@82 Position Control Units even though they can operate as EtherCAT masters.

Note: For whether NX Units can be connected to the CPU Unit or Communications Coupler Unit to be used, refer to the user's manual for the CPU Unit or Communications Coupler Unit to be used.

Specifications of Individual Units

NX-CIF101

Item		Specification
Number of ports		1
Communications ports		RS-232C
Communications protocol		No-protocol
Communications specifications	**Communications method**	Full duplex
	Signal lines *1	---
	Baud rate [bps] *1	1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200, or 230,400
	Data length [bits] *1	7 or 8
	Parity *1	Even, odd, or none
	Start bits [bits]	Always 1.
	Stop bits [bits] *1	1 or 2
	Flow control *1	None, RS/CS flow control, or Xon/Xoff control
	Flow control target *1	Send/receive, send only, or receive only
	Initial RS signal value *1 *2	ON or OFF
	Number of characters to determine the end *1 *3	0 to 10,000 (in increments of 0.1 character)) 0: The end is not detected.
	Maximum communications distance [m]	15 *4
	Connection configuration	1:1
I/O refreshing method		Free-Run refreshing only
PDO data size [bytes] *1		Inputs or outputs: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, or 80
Transmission buffering enable/disable setting *1		Enabled or disabled
Functions to back up data		Provided. *5
Terminating resistance setting		---
Isolation method		No isolation
Power consumption		• Connected to a CPU Unit 1.10 W max. • Connected to a Communications Coupler Unit 0.90 W max.
Weight		66 g max.
Installation orientation and restrictions		Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: There are no restrictions.

*1. Setting is possible in the Unit operation settings of the Sysmac Studio.
*2. This is the value of the RS signal when the port enters the Operational state or immediately after the port is restarted. The initial value is disabled when RS/CS flow control is set.
*3. This setting is provided for communications protocols that assume the end of the data if data is not received for a specific period of time. For example, if the number of characters to determine the end is set to 35, the end of the data will be assumed if data is not received for the time required to receive 3.5 characters.
*4. If the baud rate is set to higher than 19,200 bps, refer to the manual for the remote communications device.
*5. The settings that are backed up are saved in memory in the Communications Coupler Unit. The settings that are backed up are not saved in the Communications Interface Units.

NX-CIF105

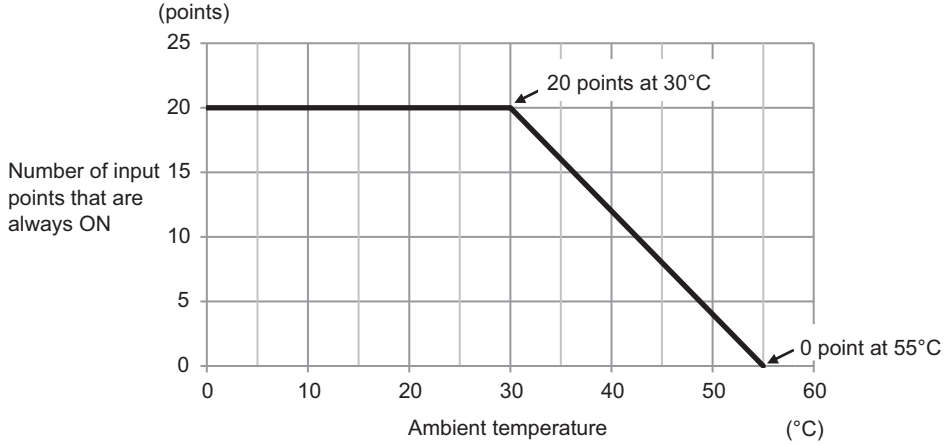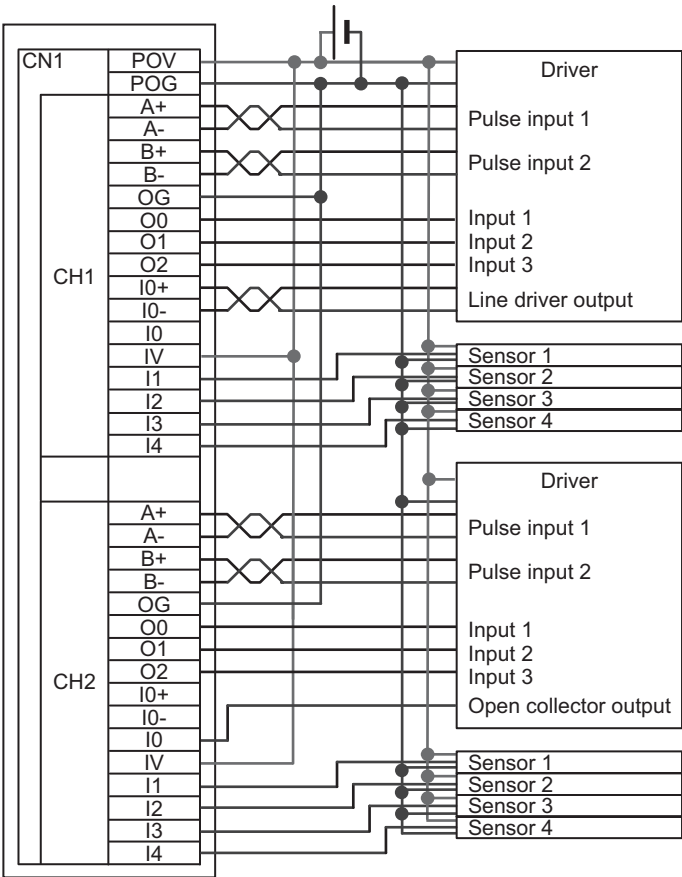| Item		Specification
Number of ports		1
Communications ports		RS-422A/485
Communications protocol		No-protocol
Communications specifications	**Communications method**	Half duplex for two-wire connection, Full duplex for four-wire connection
	Signal lines *1	Two lines or four lines
	Baud rate [bps] *1	1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200, or 230,400
	Data length [bits] *1	7 or 8
	Parity *1	Even, odd, or none
	Start bits [bits]	Always 1.
	Stop bits [bits] *1	1 or 2
	Flow control *1	None or Xon/Xoff control
	Flow control target *1	Send/receive, send only, or receive only
	Initial RS signal value *1 *2	ON or OFF
	Number of characters to determine the end *1 *3	0 to 10,000 (in increments of 0.1 character)) 0: The end is not detected.
	Maximum communications distance [m]	1,200 *4
	Connection configuration	1:N Maximum value of N is 32. You can change between two-wire and four-wire connections.
I/O refreshing method		Free-Run refreshing only
PDO data size [bytes] *1		Inputs or outputs: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, or 80
Transmission buffering enable/disable setting *1		Enabled or disabled
Functions to back up data		Provided. *5
Terminating resistance setting		Possible
Isolation method		Power supply: transformer and photocoupler Signals: Digital isolators
Power consumption		• Connected to a CPU Unit 1.65 W max. • Connected to a Communications Coupler Unit 1.45 W max.
Weight		69 g max.
Installation orientation and restrictions		Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: There are no restrictions.

*1. Setting is possible in the Unit operation settings of the Sysmac Studio.
*2. This is the value of the RS signal when the port enters the Operational state or immediately after the port is restarted. The initial value is disabled when RS/CS flow control is set. It is also disabled for the NX-CIF105.
*3. This setting is provided for communications protocols that assume the end of the data if data is not received for a specific period of time. For example, if the number of characters to determine the end is set to 35, the end of the data will be assumed if data is not received for the time required to receive 3.5 characters.
*4. The maximum total cable length for multidrop connections is 1,200 m.
*5. The settings that are backed up are saved in memory in the Communications Coupler Unit. The settings that are backed up are not saved in the Communications Interface Units.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Serial Line Monitor

Slave Terminals

System Configuration

Specifications of Individual Units

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NX-CIF210

Item		Specification
Number of ports		2
Communications ports		RS-232C
Communications protocol		No-protocol
Communications specifications	**Communications method**	Full duplex
	Signal lines *1	---
	Baud rate [bps] *1	1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 115,200, or 230,400
	Data length [bits] *1	7 or 8
	Parity *1	Even, odd, or none
	Start bits [bits]	Always 1.
	Stop bits [bits] *1	1 or 2
	Flow control *1	None, RS/CS flow control, or Xon/Xoff control
	Flow control target *1	Send/receive, send only, or receive only
	Initial RS signal value *1 *2	ON or OFF
	Number of characters to determine the end *1 *3	0 to 10,000 (in increments of 0.1 character)) 0: The end is not detected.
	Maximum communications distance [m]	15 *4
	Connection configuration	1:1
I/O refreshing method		Free-Run refreshing only
PDO data size [bytes] *1		Inputs or outputs: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, or 80
Transmission buffering enable/disable setting *1		Enabled or disabled
Functions to back up data		Provided. *5
Terminating resistance setting		---
Isolation method		No isolation
Power consumption		• Connected to a CPU Unit 1.15 W max. • Connected to a Communications Coupler Unit 0.95 W max.
Weight		91 g max.
Installation orientation and restrictions		Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: There are no restrictions.

*1. Setting is possible in the Unit operation settings of the Sysmac Studio.
*2. This is the value of the RS signal when the port enters the Operational state or immediately after the port is restarted. The initial value is disabled when RS/CS flow control is set.
*3. This setting is provided for communications protocols that assume the end of the data if data is not received for a specific period of time. For example, if the number of characters to determine the end is set to 35, the end of the data will be assumed if data is not received for the time required to receive 3.5 characters.
*4. If the baud rate is set to higher than 19,200 bps, refer to the manual for the remote communications device.
*5. The settings that are backed up are saved in memory in the Communications Coupler Unit. The settings that are backed up are not saved in the Communications Interface Units.

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding version *		
Model	Unit version	CPU Unit	Sysmac Studio	
NX-CIF101	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher	
NX-CIF105				
NX-CIF210				

* Some Units do not have all of the versions given in the 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.

Connecting with Communications Coupler Unit

NX Unit		Corresponding version *1		
		EtherCAT		
Model	Unit version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs *2	Sysmac Studio
NX-CIF101	Ver.1.0	Ver.1.0 or later	Ver.1.11 or later	Ver.1.15 or higher
NX-CIF105				
NX-CIF210				

*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 serial communications instructions for the CIF Units are supported by CPU Units with unit version 1.11 or later. If it is not used, it is available for a CPU Unit with unit version 1.10. Refer to the Instructions Reference Manual for the CPU Unit or Industrial PC for the serial communications instructions for the CIF Units.

NX-series IO-Link Master Unit
NX-ILM400

IO-Link makes sensor level information visible and solves the three major issues at manufacturing sites!
The screwless clamping terminal block reduces wiring work.

- Downtime can be reduced.
  Notifies you of faulty parts and such phenomena in the Sensor in real time.
- The frequency of sudden failure can be decreased.
  Condition monitoring of sensors and equipment to prevent troubles.
- The efficiency of changeover can be improved.
  The batch check for individual sensor IDs significantly decreases commissioning time.

Corresponding to our shared **Value Design for Panel** concept for the specifications of products

Features

- The host controller can cyclically read control signals, status*1, wiring, and power supply status of IO-Link sensors. Because an IO-Link System can cyclically read analog data such as the amount of incident light in addition to ON/OFF information, it can be used for predictive maintenance based on detection of such things as decreases in the amount of light.
- User-specified data in IO-Link devices can be read and written from the host controller when necessary.
- Digital signals can be input rapidly from IO-Link sensors*2 during IO-Link communications.
- IO-Link sensors can be combined with non-IO-Link sensors.
- Incorrect connections of IO-Link sensors can be checked when IO-Link communications start.
- Backup and restoration of IO-Link device parameters*3 make replacement of IO-Link sensors easier.
- Sensors can report their errors to the master, which facilitates locating errors from the host.
- The total number of retries in cyclic communications can be recorded. You can use this value to check for the influences of noise and other problems.
  (When EtherCAT is used as the host communication interface) *3
- Up to four sensors can be connected.
- *1. Examples for Photoelectric Sensors: Instability detection and sensor errors
- *2. IO-Link sensors that support digital inputs that use pin 2 of IO-Link Master Unit ports
- *3. When the Omron IO-Link master unit is used

System Configuration

Controller Communications with NX Bus

NX bus communications can be used only when the controller is an NX1P2 CPU Unit.

Support Software:
• IO-Link Master Unit settings: Use the Sysmac Studio.
• IO-Link device settings: Use CX-ConfiguratorFDT.
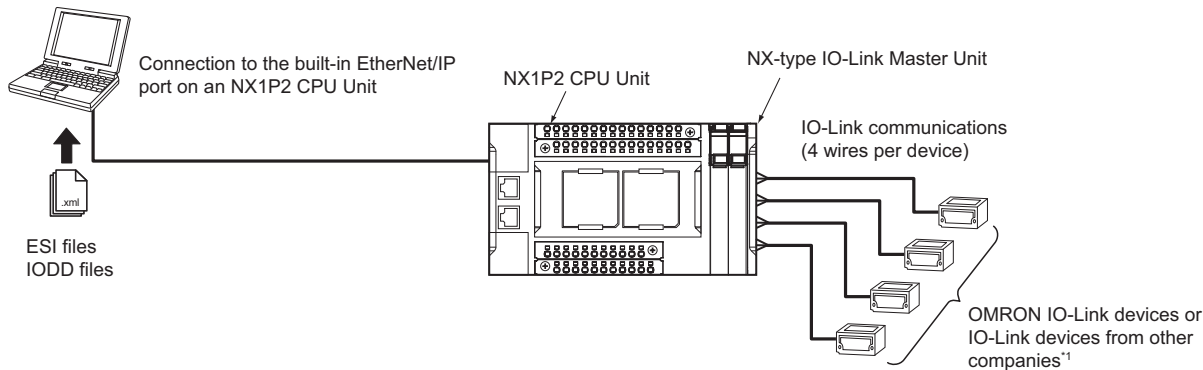
*1.You can also connect a combination of general-purpose sensors and other devices.

Applicable Support Software

Function	IO-Link Master Unit type	Applicable Support Software		
		NX Unit settings	IO-Link Master Unit settings	Setting and monitoring the connected IO-Link devices
Applicable Support Software	NX	Sysmac Studio *1	Sysmac Studio *1	CX-ConfiguratorFDT *2
	GX	Sysmac Studio *1	Sysmac Studio *1	CX-ConfiguratorFDT *2

*1. Sysmac Studio version 1.17 or higher is required.
*2. CX-ConfiguratorFDT version 2.2 or higher is required.

Controller Communications with EtherCAT

Support Software:
- IO-Link Master Unit settings: Use the Sysmac Studio.*1
- IO-Link device settings: Use CX-ConfiguratorFDT.*2

Connection to the peripheral USB port or built-in EtherNet/IP port on an NJ/NX-series CPU Unit or NY-series Industrial PC

ESI files
IODD files

EtherCAT Master Unit
NJ/NX-series CPU Unit or NY-series Industrial PC

RJ45

Built-in EtherCAT port

Support Software:
- IO-Link Master Unit settings:
Use the Sysmac Studio for the NX-type IO-Link Master Unit.
Connection is not possible to a GX-type IO-Link Master Unit.

- IO-Link device settings:
Use the CX-ConfiguratorFDT for the NX-type IO-Link Master Unit.
Connection is not possible to a GX-type IO-Link Master Unit.

Connect the computer to the peripheral USB port on the EtherCAT Coupler Unit.

ESI files
IODD files

EtherCAT Coupler Unit

EtherCAT

RJ45

NX-type IO-Link Master Unit

M12

GX-type IO-Link Master Unit

IO-Link

IO-Link

IO-Link communications (4 wires per device)

IO-Link devices (from OMRON or another company)*3

IO-Link devices (from OMRON or another company)*3

*1. When a host controller from another company is used with EtherCAT host communications, use the EtherCAT software application from the other company for a GX-type IO-Link Master Unit.
   Note. For an NX-type IO-Link Master Unit, connect the Sysmac Studio to the EtherCAT Coupler Unit, as shown above.
*2. When a host controller from another company is used with EtherCAT host communications, for a GX-type IO-Link Master Unit, make the IO-Link device settings with message communications from the host controller from the other company.
   Note. For an NX-type IO-Link Master Unit, connect CX-ConfiguratorFDT to the EtherCAT Coupler Unit, as shown above.
 *3. You can also connect a combination of general-purpose sensors and other devices.

Applicable Support Software

IO-Link Master Unit type	Applicable Support Software		
	PDO allocation settings (GX) I/O allocation settings (NX)	**IO-Link Master Unit settings (IO-Link device connection configuration settings) *1**	**Setting and monitoring the IO-Link devices**
NX	Sysmac Studio *1	Sysmac Studio *1	CX-ConfiguratorFDT *2
GX	Sysmac Studio *1	Sysmac Studio *1	CX-ConfiguratorFDT *2

*1. The device configuration settings are included in the IO-Link Master Unit settings.
*2. CX-ConfiguratorFDT version 2.2 or higher is required.

Function Specification

Item		Specification
Unit name		IO-Link Master Unit
Model		NX-ILM400
Number of ports		4
Communications specifications	Communications protocol	IO-Link protocol
	Baud rate	COM1: 4.8kbps COM2: 38.4kbps COM3: 230.4kbps
	Topology	1:1
	Compliant standards	• IO-Link Interface and System Specification Version1.1.2 • IO-Link Test Specification Version1.1.2
Power supply to devices* in IO-Link Mode or SIO (DI) Mode	Rated voltage	24 VDC (20.4 to 28.8 VDC)
	Maximum load current	0.2 A/port
	Short-circuit protection	Provided.
Digital inputs (in SIO (DI) Mode)	Internal I/O common	PNP
	Rated voltage	24 VDC (20.4 to 28.8 VDC)
	Input current	5 mA typical (24 VDC)
	ON voltage/ON current	15 VDC min., 2 mA min.
	OFF voltage	5 VDC 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
Digital outputs (in SIO (DO) Mode)	Internal I/O common	PNP
	Output type	Push-pull
	Rated voltage	24 VDC (20.4 to 28.8 VDC)
	Maximum load current	0.1 A/port
	Short-circuit protection	Provided.
	Leakage current	0.1 mA max.
	Residual voltage	1.5 V max.
Digital inputs for pin 2 (in IO-Link Mode)	Internal I/O common	PNP
	Rated voltage	24 VDC (20.4 to 28.8 VDC)
	Input current	2 mA typical (24 VDC)
	ON voltage/ON current	15 VDC min., 2 mA min.
	OFF voltage	5 VDC 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
Cable specifications	Cable type	Unshielded
	Length	20 m max.
	Electrostatic capacity between lines	3 nF max.
	Loop resistance	6 Ω max.
External connection terminals		Screwless Clamping Terminal Block (16 terminals)
I/O refreshing method		Free-Run refreshing
Dimensions		12 × 100 × 71 mm (W×H×D)
Isolation method		Photocoupler isolation
Insulation resistance		20 MΩ min. at 100 VDC (between isolated circuits)
Dielectric strength		510 VAC for 1 min, leakage current: 5 mA max. (between isolated circuits)
I/O power supply method		Supply from the NX bus

NX Unit power consumption		• Connected to a CPU Unit
		  1.05 W max.
		• Connected to a Communications Coupler Unit
		  0.80 W max.

Current consumption from I/O power supply		50 mA
Weight		67 g

System Configuration

Controllers

Softwares

Programmable Terminals

Features

System Configuration

Slave Terminals

Function Specification

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Item	Specification
Circuit configuration	
Terminal connection diagram	
Installation orientation and restrictions	• Connected to a CPU Unit The Unit can be in the upright installation orientation. Upright Installation • Connected to a Communications Coupler Unit The Unit can be installed in any of six possible orientations. There are restrictions on mounting orientations other than upright. Upright Installation Any Installation Other Than Upright
Protective functions	Load short-circuit protection

Function		Description
Communications	Cyclic communications	I/O data (process data) in the IO-Link devices is cyclically shared with the IO-Link Master Unit as the IO-Link communications master. At the same time, this data and the status of the IO-Link Master Unit is cyclically shared with the host communications master, with the IO-Link Master Unit operating as a slave of the controller. Cyclic communications can be used to check the amount of detection performance deterioration in devices, and to check changes in usage conditions, such as the amount of incident light for photoelectric sensors, stability detection margins, and excessive proximity for proximity sensors.
	Message communications	The controller can send messages (commands) to the IO-Link Master Unit and receive the response from the IO-Link Master Unit. The IO-Link Master Unit can also function as a gateway to send messages (commands and responses) between the controller and the IO-Link devices. During operation, you can change and adjust device parameters, such as threshold settings, tuning execution, and ON-delay time changes, from a program. Or, during operation, you can check the internal status, such as the operating times of devices.
Communications mode settings		You can select any of the following modes for each port: IO-Link Mode, SIO (DI) Mode, SIO (DO) Mode, or Disable Port This allows you to combine IO-Link communications and digital I/O in a single terminal or unit.
Digital inputs for pin 2		In IO-Link Mode, you can perform digital input with pin 2 while performing IO-Link communications.
Automatic baud rate setting for IO-Link communications		The IO-Link Master Unit automatically matches the specific baud rates (COM1, COM2, or COM3) of the IO-Link devices to communicate with the IO-Link devices. Therefore, it is not necessary to set the baud rate of the connected device for each port.
Connected device verification		This function is used to verify the configuration of IO-Link devices that are connected to the IO-Link Master Unit against the registered IO-Link device configuration settings when the power supply is turned ON. The user can enable or disable connected device verification.
IO-Link communications error detection		This function detects IO-Link cable breaks, disconnections from IO-Link device ports, error-level device events, device configuration verification errors, and IO-Link device malfunctions.
Detection of short-circuits in I/O cables		This function detects short-circuits in I/O cables
Notification of input data validity		The controller can use the Input Data Enabled Flags to determine whether input data * is valid.
Load rejection for controller communications error		This function turns OFF outputs from the IO-Link Master Unit when an error occurs in communications with the controller in IO-Link Mode or in an SIO mode. This prevents output operations with incorrect values from host communications.
Reading IO-Link total communications retries		The IO-Link total communications retries can be read from the CX-ConfiguratorFDT. You can use this function to determine communications status as affected by I/O communications noise or other factors.
Digital input filter		You can set a filter processing time interval for digital inputs in SIO (DI) Mode or for digital inputs for pin 2 in IO-Link Mode. This lets you eliminate data corruption that can result from noise or switch chattering. This function can also be used to implement an ON delay and an OFF delay.
Backup and restoration of parameter settings in IO-Link devices		This function is used to back up parameter settings in IO-Link devices in the IO-Link Master Unit or restore them to IO-Link devices. This eliminates the need to set parameters again after replacing an IO-Link device.
Event log		The event log records events (including errors) that occur in the IO-Link Master Unit and the IO-Link devices. This enables partial troubleshooting for NJ/NX-series Controllers and NY-series Industrial PCs.

* The input data includes IO-Link input data in IO-Link communications, the digital input data that is input with pin 2, and digital input data in SIO (DI) Mode.

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding versions *		
Model	Unit version	CPU Unit	Sysmac Studio	CX-Configurator FDT
NX-ILM400	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher	Ver.2.3 or higher

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *			
		EtherCAT			
Model	Unit version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	Sysmac Studio	CX-Configurator FDT
NX-ILM400	Ver.1.0	Ver.1.0 or later	Ver.1.12 or later	Ver.1.16 or higher	Ver.2.2 or higher

* 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.

System Configuration
Controllers
Softwares
Programmable Terminals
Features
System Configuration
Slave Terminals
Function Specification
Version Information
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

NX-series System Unit
NX-PD/PF/PC/TBX

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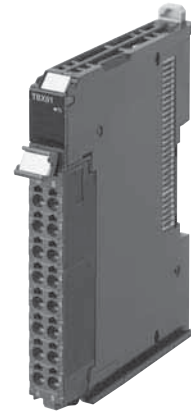
Features

- 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	• Connected to a CPU Unit
	  0.85 W max.
	• Connected to a Communications Coupler Unit
	  0.45 W max.

I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	

System Configuration

Controllers

Softwares

Features · Programmable Terminals

Specification

Version Information · Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

| Installation orientation and restrictions | Installation orientation:
• Connected to a CPU Unit: Possible in upright installation.
• Connected to a Communications Coupler Unit: Possible in 6 orientations.
Restrictions:
• For upright installation

For 10 W output, 40ºC
For 8.5 W output, 55ºC

• For any installation other than upright

For 10 W output, 40ºC
For 6.0 W output, 55ºC |
| **Terminal connection diagram** | Additional NX Unit Power Supply Unit NX-PD1000
A1 / B1: UV / UV
UG / UG
NC*2 / NC*2
A8 / B8
24 VDC Unit power supply
Through-wiring for surplus teaminals*1
Ground of 100 Ω or less |

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	• Connected to a CPU Unit
	  0.85 W max.
	• Connected to a Communications Coupler Unit
	  0.45 W max.	

I/O current consumption	10 mA max.	
Weight	65 g max.	
Circuit layout		
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions	
Terminal connection diagram		
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.

System Configuration

Controllers

Softwares

Features

Programmable Terminals

Specification

Version Information

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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 terminal 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	• Connected to a CPU Unit
	  0.85 W max.
	• Connected to a Communications Coupler Unit
	  0.45 W max.

I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

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	• Connected to a CPU Unit
	  0.85 W max.
	• Connected to a Communications Coupler Unit
	  0.45 W max.

I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

I/O Power Supply Connection Unit IOV/IOG terminal type NX-PC00300

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	• Connected to a CPU Unit 　0.85 W max. • Connected to a Communications Coupler Unit 　0.45 W max.
I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

Slave Terminals **NX-series**
System Unit NX-PD/PF/PC/TBX

System Configuration

Controllers

Softwares

Features

Programmable Terminals

Specification

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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	• Connected to a CPU Unit
	  0.85 W max.
	• Connected to a Communications Coupler Unit
	  0.45 W max.

I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	
Installation orientation and restrictions	Installation orientation: • Connected to a CPU Unit: Possible in upright installation. • Connected to a Communications Coupler Unit: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

OMRON **297**

Version Information

Connecting with CPU Units

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

NX Unit		Corresponding versions *	
Model	Unit Version	CPU Unit	Sysmac Studio
NX-PD1000	Ver.1.0	Ver.1.13 or later	Ver.1.17 or higher
NX-PF0630			
NX-PF0730			
NX-PC0020			
NX-PC0010			
NX-PC0030			
NX-TBX01			

* 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.

Connecting with Coupler Units

NX Unit		Corresponding versions *		
		EtherCAT		
Model	Unit Version	Communications Coupler Unit	NJ/NX-series CPU Units or NY-series Industrial PCs	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				

* 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.

MEMO

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Specification

Slave Terminals

Version Information

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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)
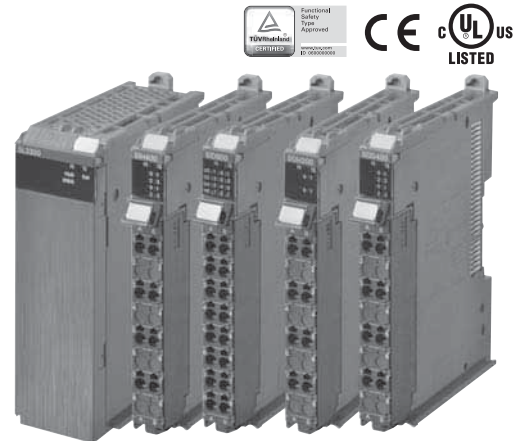
* Safety over EtherCAT (FSoE): The open protocol Safety over EtherCAT (abbreviated with FSoE "FailSafe over EtherCAT") defines a safety related communication layer for EtherCAT. Safety over EtherCAT meets the requirements of IEC 61508 SIL 3 and enables the transfer of safe and standard information on 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
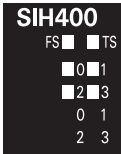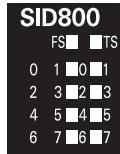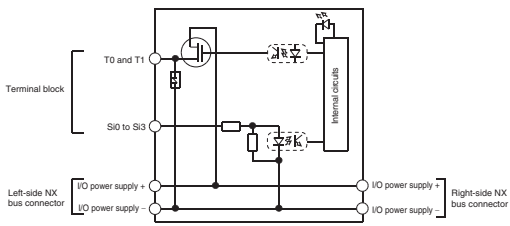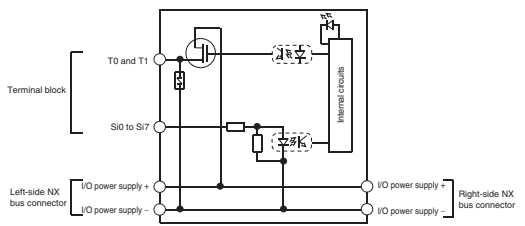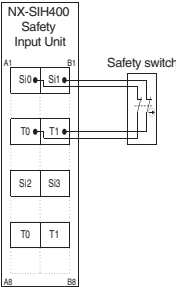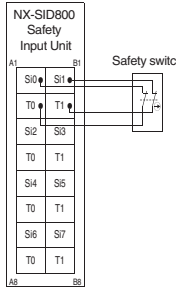
Item		Specification
Enclosure		Mounted in a panel (open)
Grounding method		Ground to 100 Ω or less.
Operating environment	Ambient operating temperature	0 to 55°C (The upper limit of the ambient operating temperature is restricted by the installation orientation.)
	Ambient operating humidity	10% to 95% (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

System Configuration

Controllers

Softwares

Programmable Terminals | Features

Slave Terminals | Specifications

Safety | Specifications of Individual Units

Mortion/Drives | Version Information

Inverters | External Interface

Robotics | Dimensions

Sensors

Remote I/O Terminals

Ordering Information

Specifications of Individual Units

Safety CPU Unit NX-SL3300/SL3500
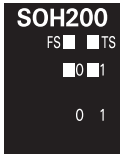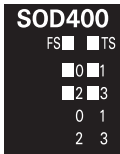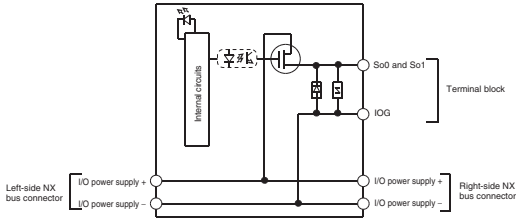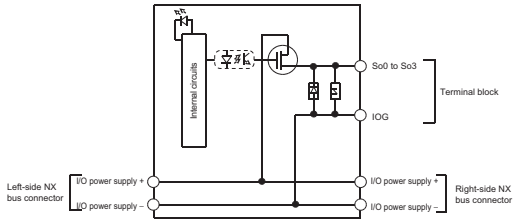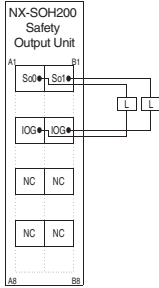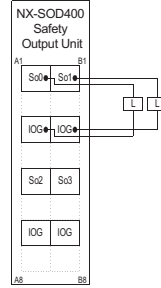
Unit name	Safety CPU Unit	
Model	NX-SL3300	NX-SL3500
Maximum number of safety I/O points	256 points	1024 points
Program capacity	512 KB	2048 KB
Number of safety master connections	32	128
I/O refreshing method	Free-Run refreshing	Free-Run refreshing
External connection terminals	None	None
Indicators	FS indicator, VALID indicator, DEBUG indicator, TS indicator, and RUN indicator SL3300 FS☐ ☐TS VALID☐ ☐RUN DEBUG☐	FS indicator, VALID indicator, DEBUG indicator, TS indicator, and RUN indicator SL3500 FS☐ ☐TS VALID☐ ☐RUN DEBUG☐
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 Control Units NX-series
NX-SL/SI/SO

System Configuration · Controllers · Softwares · Programmable Terminals · Slave Terminals · Safety · Motion/Drives · Inverters · Robotics · Sensors · Remote I/O Terminals · Ordering Information

Features · Specifications · Specifications of Individual Units · Version Information · External Interface · Dimensions
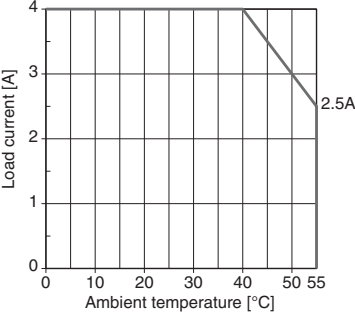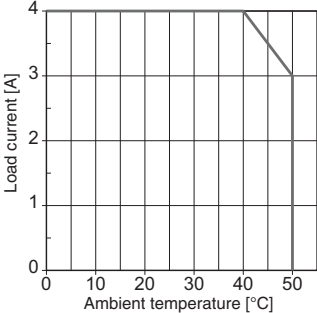
Safety Input Units NX-SIH400/SID800

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)	TS indicator, FS indicator, input indicators (yellow), and input error indicators (red)
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 connection diagram	Si0 to Si3: Safety input terminals T0 and T1: Test output terminals Refer to User's manual (Z930-E1) for details.	Si0 to Si7: Safety input terminals T0 and T1: Test output terminals Refer to User's manual (Z930-E1) for details.
Installation orientation and restrictions	Installation orientation: 6 possible orientations. Restrictions: Maximum ambient temperature is 50ºC 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		
Terminal connection diagram	So0 and So1: Safety output terminals IOG: I/O power supply 0 V Refer to User's manual (Z930-E1) for details.	So0 to So3: Safety output terminals IOG: I/O power supply 0 V Refer to User's manual (Z930-E1) for details.

Unit name	Safety Output Unit	
Model	NX- SOH200	NX-SOD400
Installation orientation and restrictions	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.	Installation orientation: 6 possible orientations Restrictions: None
Protective functions	Overvoltage protection circuit and short detection	

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 *1		
Model number	Unit version	EtherCAT Coupler Unit NX-ECC20@	NJ/NX-series CPU Units *2 NY-series Industrial PC	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				

*1 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.
*2 Connect the Safety CPU Unit to the NX1P2 CPU Unit via the EtherCAT Coupler Unit.

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.

System Configuration

Controllers

Softwares

Features   Programmable Terminals

Specifications   Slave Terminals

Specifications of Individual Units

Version Information   Safety

External Interface   Mortion/Drives

Dimensions   Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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
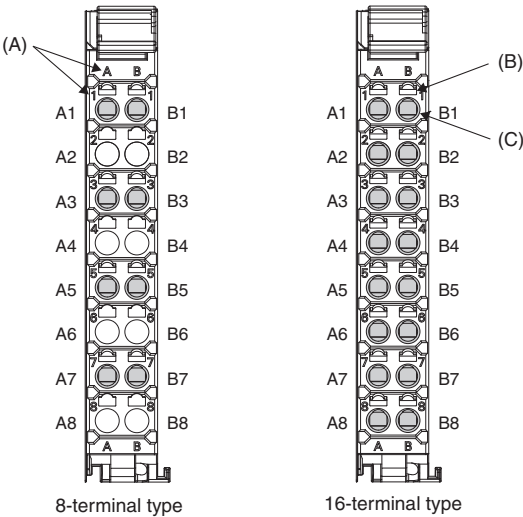
Letter	Item	Specification
(A)	Terminal number indications	The terminal numbers are given by column letters A and B, and row numbers 1 to 8. The combination of the column and row gives the terminal numbers from A1 to A8 and B1 to B8. The terminal number indicators are the same regardless of the number 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.

Safety Control Units NX-series
NX-SL/SI/SO

System Configuration

Controllers

Softwares

Programmable Terminals

Features

Specifications

Specifications of
Individual Units

Version Information

External Interface

Dimensions

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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

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.

Servo Drive

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

USB Communications

EtherCAT Communications

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

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

Peripheral Devices

External scale

- 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

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.

System Configuration

Controllers

Softwares

Programmable Terminals

System Configuration

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Servo Drive

I/O signals

Connector-Terminal Block Conversion Units and Cable

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

- **Cable XW2Z-□□□J-B34**

EtherCAT Communications

Motor power signals

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-□

Power Cables

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

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

Feedback Signals

External encoder

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

External encoder Cables

- **Serial Communications Cable R88A-CRKE010SR**

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

Peripheral Devices

- Reactors
  3G3AX-DL
  3G3AX-AL

- External Regeneration Resistors
  R88A-RR

OMRON **313**

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, 85% max. (with no condensation)
Storage ambient temperature and humidity			−20 to 65°C, 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 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		CSA C22.2 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.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

General Specifications
Performance Specifications
EtherCAT Communications Specifications
Version Information
Components and Functions
Dimensions

● 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	–	–
		ABS	–	–	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

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information
General Specifications
Performance Specifications
EtherCAT Communications Specifications
Version Information
Components and Functions
Dimensions

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
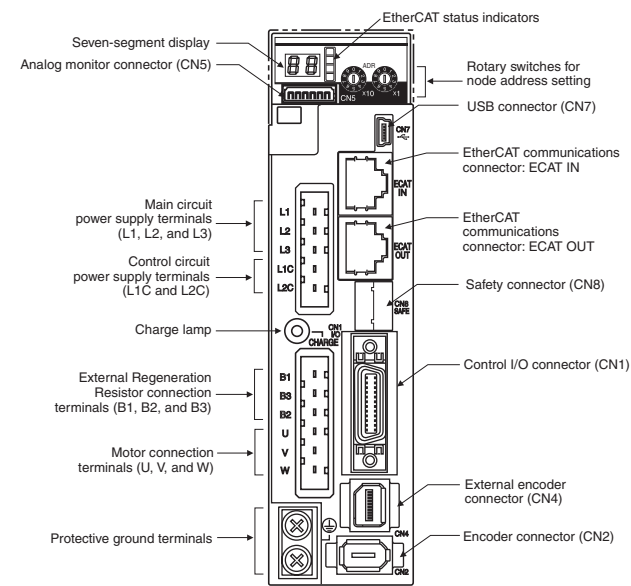
Name	Function
Display	A 2-digit 7-segment display shows the node address, error codes, and other Servo Drive status.
Charge Lamp	Lights when the main circuit power supply is turned ON.
EtherCAT Status Indicators	These indicators show the status of EtherCAT communications. For details, refer to G5 Series 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.

* 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]
90º phase difference output type[2][3]	–	90° phase difference output type	0 to 4 Mpps (Multiplication × 4)	–	–
Serial communications type (Incremental type) [3]	Magnescale Co., Ltd	SL700+PL101RP/RHP SL710+PL101RP/RHP	0 to 400 Mpps	0.1	10
		SR75/SR85		0.01 to 1	3.3
		BF1		0.001/0.01	0.4/1.8
		SQ10+PQ11 SQ10+PQ10+MQ10		0.05/0.1/0.5/1	3
	NIDEC SANKYO CORPORATION	PSLH041+PSLG		0.1	6
Serial communications type (Absolute type) [3]	HEIDENHAIN CORPORATION	LIC2197P/LIC2199P	0 to 400 Mpps	0.05/0.1	10
		LIC4193P/LIC4195P LIC4197P/LIC4199P		0.001/0.005/0.01	0.4/2/4
		LC195P/LC495P		0.001/0.01	3
	FAGOR AUTOMATION	SAP/SVAP/GAP		0.05	2.5
		S2AP/SV2AP/G2AP		0.01/0.05	3
		LAP		0.05/0.1	2
	Magnescale Co., Ltd	SR77/SR87		0.01 to 1	3.3
	Mitutoyo Corporation	AT573@		0.05	2.5
		ST77@@		0.1	5
		ST137@@		0.001/0.01	8
	Renishaw Co.	RESOLUTE		0.001	0.4
				0.05	20
				0.1	40

*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.

Count-down direction

EXA

EXB

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

Count-up direction

EXA

EXB

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.

System Configuration
Controllers
Softwares
Programmable Terminals
General Specifications
Performance Specifications
EtherCAT Communications Specifications
Version Information
Safety
Slave Terminals
Mortion/Drives
Components and Functions
Dimensions
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

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
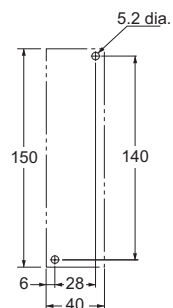
Single-phase 100 VAC R88D-KN02L-ECT (200W)
R88D-KN02L-ECT-L (200W)
Single-phase/Three-phase 200 VAC R88D-KN04H-ECT (400W)
R88D-KN04H-ECT-L (400W)
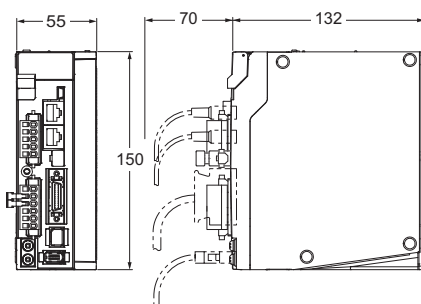
Mounting dimensions
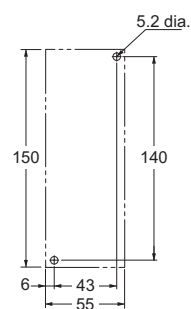
Single-phase 100 VAC R88D-KN04L-ECT (400W)
R88D-KN04L-ECT-L (400W)
Single-phase/Three-phase 200 VAC R88D-KN08H-ECT (750W)
R88D-KN08H-ECT-L (750W)
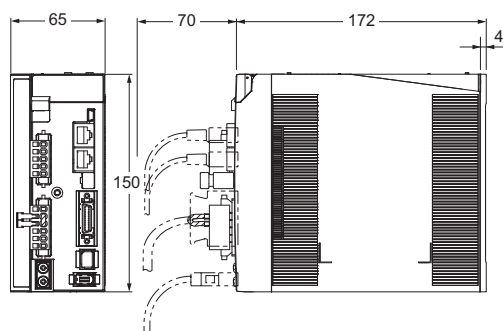
Mounting dimensions
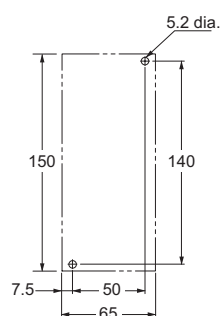
Single-phase/Three-phase 200 VAC R88D-KN10H-ECT/-KN15H-ECT (900W to 1.5kW)
R88D-KN10H-ECT-L/-KN15H-ECT-L (1 to 1.5kW)

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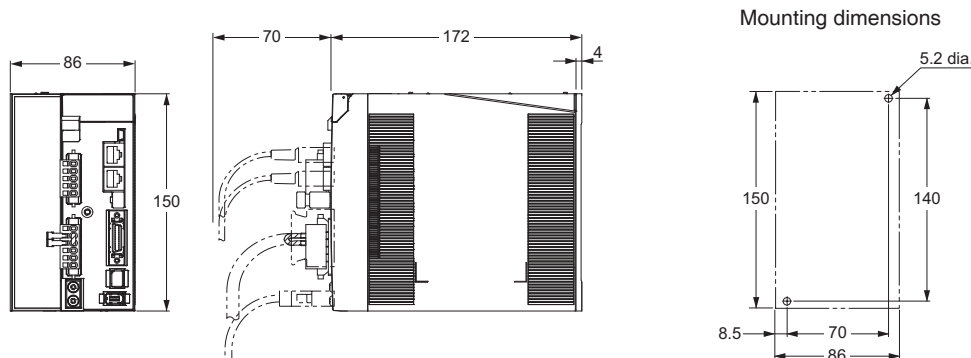
Three-phase 200 VAC R88D-KN20H-ECT (2kW)

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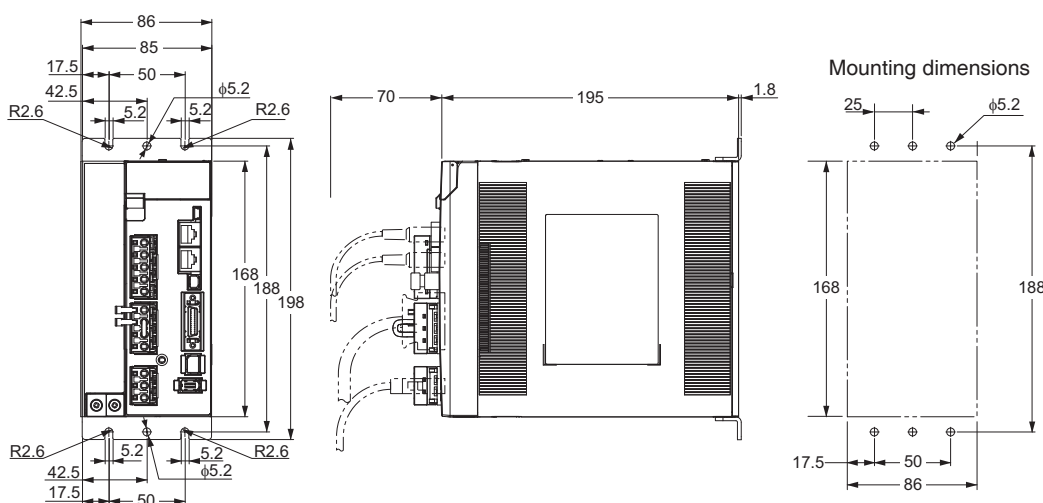
Three-phase 200 VAC R88D-KN30H-ECT/-KN50H-ECT (3 to 5kW)

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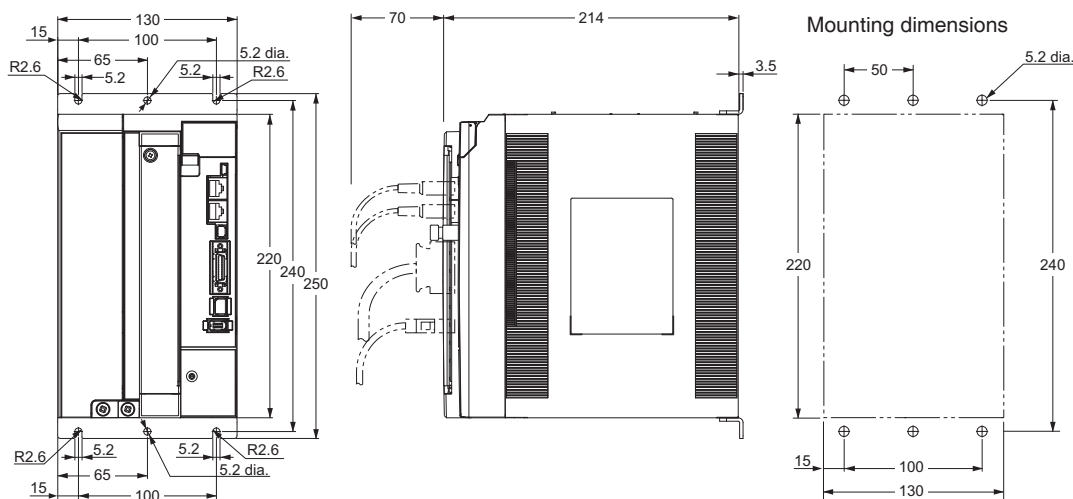
Three-phase 200 VAC R88D-KN75H-ECT (7.5kW)

Mounting dimensions

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

Mounting dimensions

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)

Mounting dimensions

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

Mounting dimensions

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

Mounting dimensions

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

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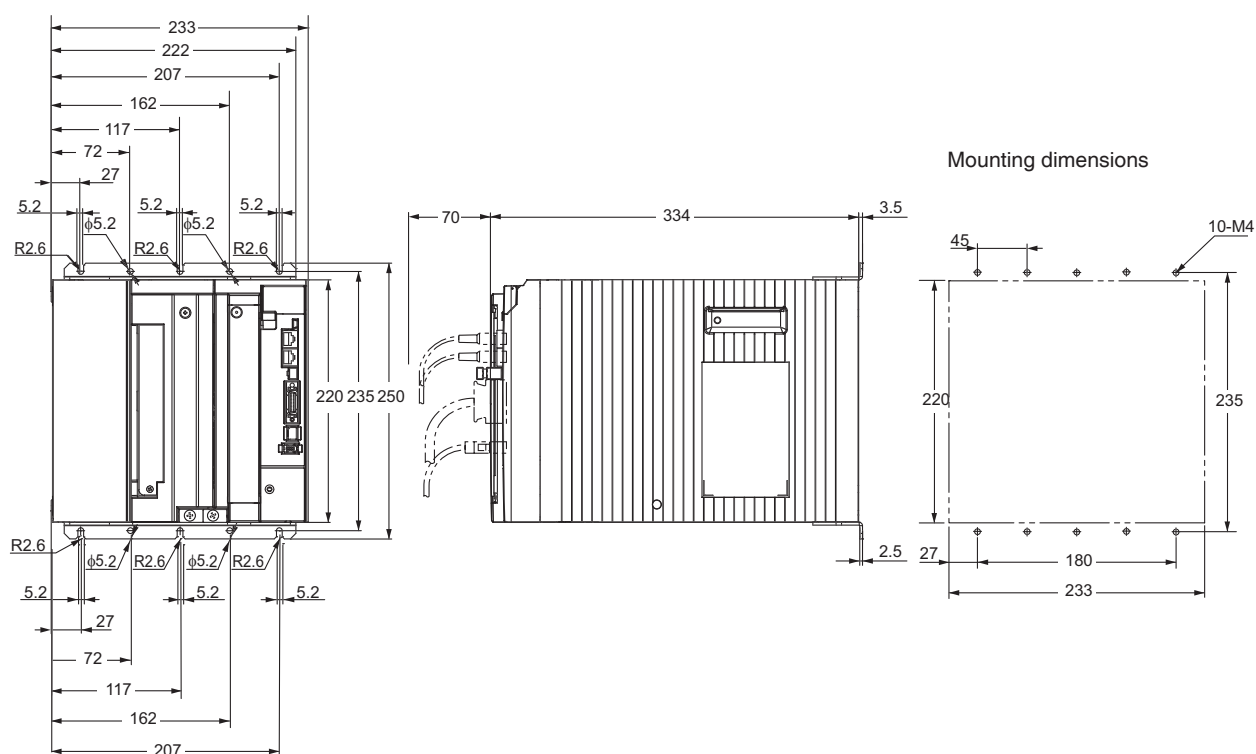
Three-phase 400 VAC R88D-KN150F-ECT (15kW)

Mounting dimensions

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

General Specifications

Performance Specifications

EtherCAT Communications Specifications

Version Information

Components and Functions

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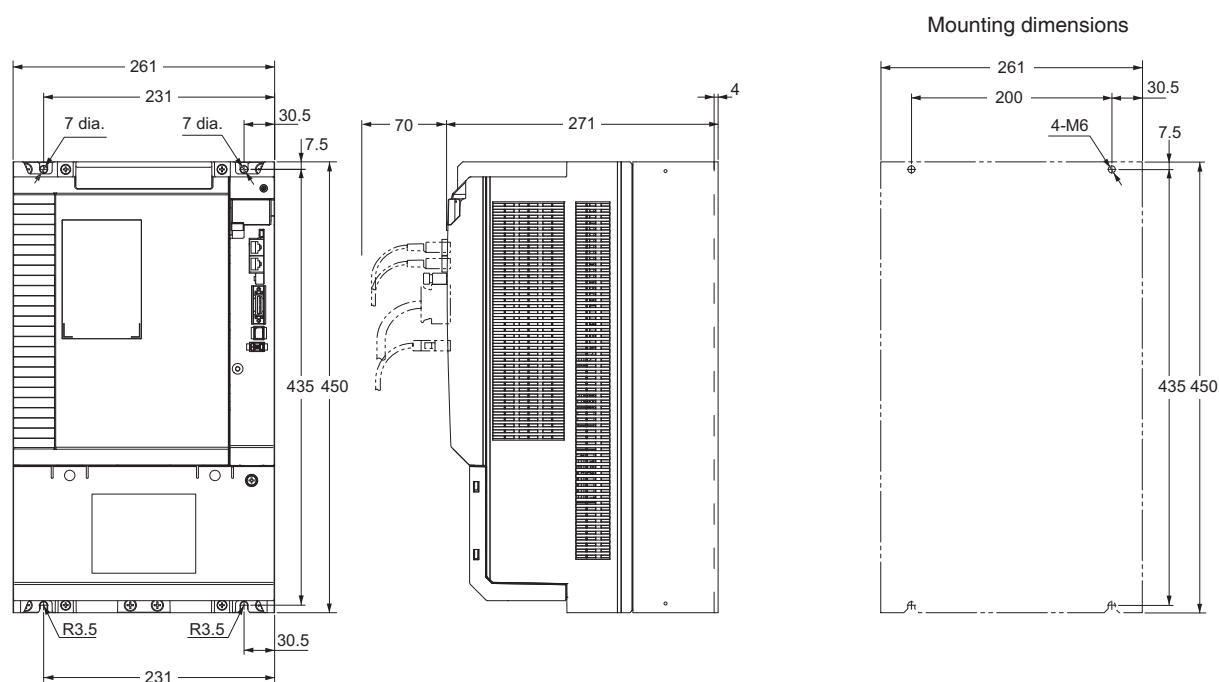
G5-series AC Servo Drives with Built-in EtherCAT Communications Linear Motor Type

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		CSA C22.2 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
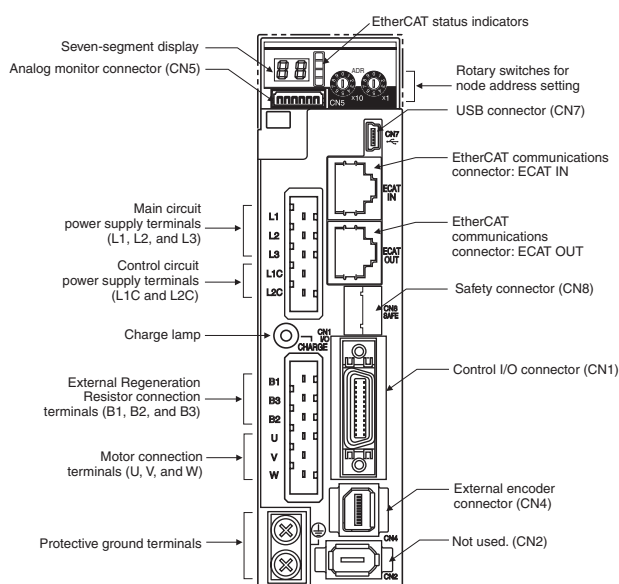
Display
A 2-digit 7-segment display shows the node address, error codes, and other Servo Drive status.

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.

Diagram labels: Seven-segment display, Analog monitor connector (CN5), EtherCAT status indicators, Rotary switches for node address setting, USB connector (CN7), EtherCAT communications connector: ECAT IN, EtherCAT communications connector: ECAT OUT, Main circuit power supply terminals (L1, L2, and L3), 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), Protective ground terminals, External encoder connector (CN4), Not used. (CN2)
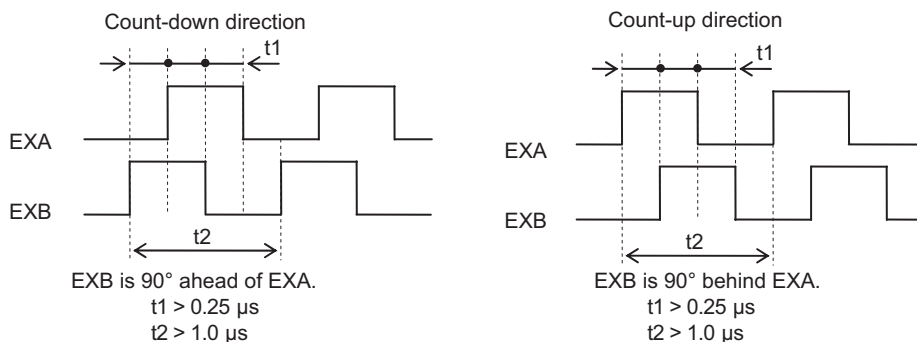
＊External Encoder

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]
90º phase difference output type[2][3]	–	90° phase difference output type	0 to 4 Mpps (Multiplication × 4)	–	–
Serial communications type (Incremental type) [3]	Magnescale Co., Ltd	SL700+PL101RP/RHP SL710+PL101RP/RHP	0 to 400 Mpps	0.1	10
		SR75/SR85		0.01 to 1	3.3
		BF1		0.001/0.01	0.4/1.8
		SQ10+PQ11 SQ10+PQ10+MQ10		0.05/0.1/0.5/1	3
	NIDEC SANKYO CORPORATION	PSLH041+PSLG		0.1	6
Serial communications type (Absolute type) [3]	HEIDENHAIN CORPORATION	LIC2197P/LIC2199P	0 to 400 Mpps	0.05/0.1	10
		LIC4193P/LIC4195P LIC4197P/LIC4199P		0.001/0.005/0.01	0.4/2/4
		LC195P/LC495P		0.001/0.01	3
	FAGOR AUTOMATION	SAP/SVAP/GAP		0.05	2.5
		S2AP/SV2AP/G2AP		0.01/0.05	3
		LAP		0.05/0.1	2
	Magnescale Co., Ltd	SR77/SR87		0.01 to 1	3.3
	Mitutoyo Corporation	AT573@		0.05	2.5
		ST77@@		0.1	5
		ST137@@		0.001/0.01	8
	Renishaw Co.	RESOLUTE		0.001	0.4
				0.05	20
				0.1	40

＊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.

Count-down direction — EXB is 90° ahead of EXA. t1 > 0.25 μs, t2 > 1.0 μs
Count-up direction — 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 Coil Unit moves in the direction of the connected cable, and count-down occurs when the Motor Coil Unit moves in the opposite direction. 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.
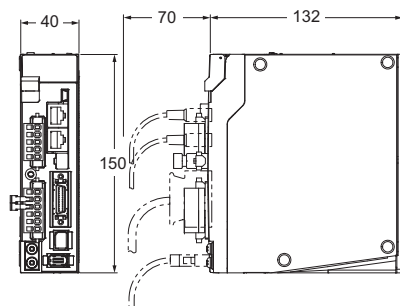
Dimensions

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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

Ro
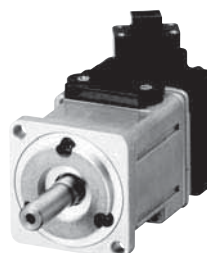
General Specifications

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 [*3] 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)		
International standard	EC directive	Low voltage directive	EN60034-1/-5		
	UL standards	UL1004-1		UL1004-1,UL1004-6 [*2]
	CSA standards	CSA C22.2 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.
*3 24.5m/s^2 is specified for 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 / K05030T	K10030L / K10030S	K20030L / K20030S	K40030L / 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±5%			
	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	ms	35 max.	35 max.	50 max.	50 max.
	Release time	ms	20 max. *5	20 max. *5	15 max. *5	15 max. *5
	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 Direct current switching with a varistor (TNR15G271K by Nippon Chemi-Con Corporation or Z15D271 by Ishizuka Electronics Co.).

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)
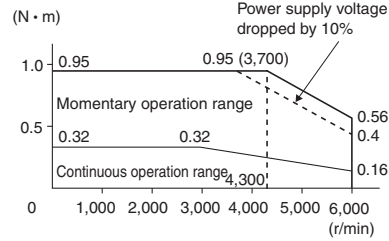
• R88M-K20030L/S (200W)
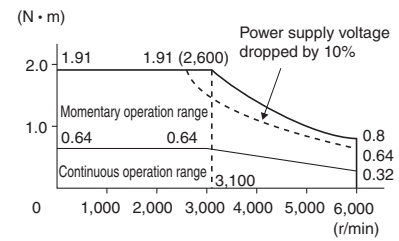
• R88M-K40030L/S (400W)

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.

System Configuration

Controllers

Softwares

Programmable Terminals

General Specifications

Performance Specifications/ Torque and Rotation Speed Characteristics

Encoder Specifications

Dimensions

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Performance Specifications

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

Item	Unit	K05030H / K05030T	K10030H / K10030T	K20030H / K20030T	K40030H / K40030T	K75030H / K75030T	K1K030H / K1K030T	K1K530H / K1K530T	K2K030H / K2K030T	K3K030H / K3K030T	K4K030H / K4K030T	K5K030H / K5K030T
Model (R88M-)												
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	$0.025{\times}10^{-4}$	$0.051{\times}10^{-4}$	$0.14{\times}10^{-4}$	$0.26{\times}10^{-4}$	$0.87{\times}10^{-4}$	$2.03{\times}10^{-4}$	$2.84{\times}10^{-4}$	$3.68{\times}10^{-4}$	$6.50{\times}10^{-4}$	$12.9{\times}10^{-4}$	$17.4{\times}10^{-4}$
Rotor inertia — With brake	kg•m²	$0.027{\times}10^{-4}$	$0.054{\times}10^{-4}$	$0.16{\times}10^{-4}$	$0.28{\times}10^{-4}$	$0.97{\times}10^{-4}$	$2.35{\times}10^{-4}$	$3.17{\times}10^{-4}$	$4.01{\times}10^{-4}$	$6.85{\times}10^{-4}$	$14.2{\times}10^{-4}$	$18.6{\times}10^{-4}$
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
Power rate *1 — 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
Mechanical time constant — 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
Weight — 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

Item	Unit	K05030H / K05030T	K10030H / K10030T	K20030H / K20030T	K40030H / K40030T	K75030H / K75030T	K1K030H / K1K030T	K1K530H / K1K530T	K2K030H / K2K030T	K3K030H / K3K030T	K4K030H / K4K030T	K5K030H / K5K030T
Brake inertia	kg•m²	$2{\times}10^{-7}$	$2{\times}10^{-7}$	$1.8{\times}10^{-6}$	$1.8{\times}10^{-6}$	$0.75{\times}10^{-5}$	$0.33{\times}10^{-4}$	$0.33{\times}10^{-4}$	$0.33{\times}10^{-4}$	$0.33{\times}10^{-4}$	$1.35{\times}10^{-4}$	$1.35{\times}10^{-4}$
Excitation voltage *4	V	24 VDC±5%					24 VDC±10%					
Power consumption (at 20°C)	W	7	7	9	9	10	19	19	19	19	22	22
Current consumption (at 20°C)	A	0.3	0.3	0.36	0.36	0.42	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.	2.45 min.	7.8 min.	7.8 min.	7.8 min.	11.8 min.	16.1 min.	16.1 min.
Attraction time	ms	35 max.	35 max.	50 max.	50 max.	70 max.	50 max.	50 max.	50 max.	80 max.	110 max.	110 max.
Release time	ms	20 max. *5	20 max. *5	15 max. *5	15 max. *5	20 max. *5	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	196	392	392	392	392	1470	1470
Allowable total work	J	$4.9{\times}10^{3}$	$4.9{\times}10^{3}$	$44.1{\times}10^{3}$	$44.1{\times}10^{3}$	$1.47{\times}10^{5}$	$4.9{\times}10^{5}$	$4.9{\times}10^{5}$	$4.9{\times}10^{5}$	$4.9{\times}10^{5}$	$2.2{\times}10^{6}$	$2.2{\times}10^{6}$
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 Direct current switching with a varistor (TNR15G271K by Nippon Chemi-Con Corporation or Z15D271 by Ishizuka Electronics Co.).
*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)
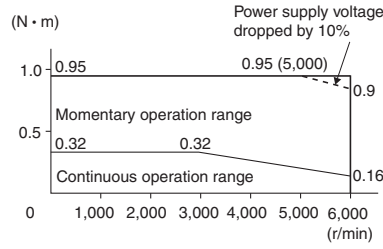
• R88M-K20030H/T (200W)

• R88M-K40030H/T (400W)

• R88M-K75030H/T (750W)

• R88M-K1K030H/T (1kW)

• R88M-K1K530H/T (1.5kW)
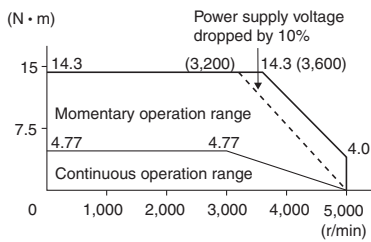
• R88M-K2K030H/T (2kW)
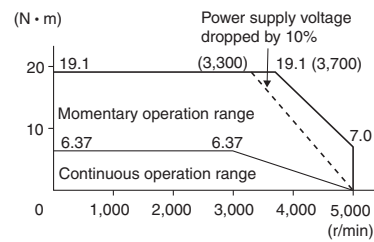
• R88M-K3K030H/T (3kW)
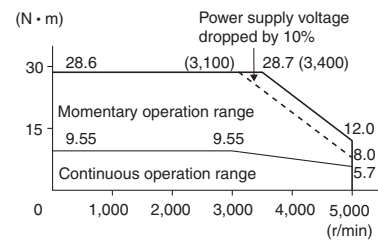
• R88M-K4K030H/T (4kW)
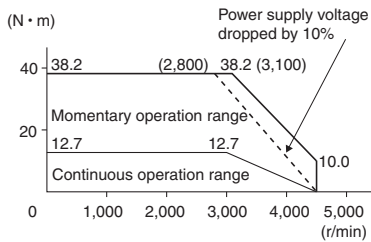
• R88M-K5K030H/T (5kW)
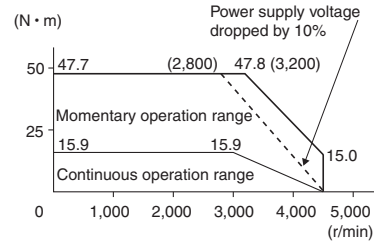
Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However, doing so will reduce the output torque.
2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

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

Model (R88M-)		Unit	K75030F K75030C	K1K030F K1K030C	K1K530F K1K530C	K2K030F K2K030C	K3K030F K3K030C	K4K030F K4K030C	K5K030F 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•m^2	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•m^2	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•m^2	0.33×10^{-4}	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	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	ms	50 max.	50 max.	50 max.	50 max.	80 max.	110 max.	110 max.
	Release time	ms	15 max. [5]	15 max. [5]	15 max. [5]	15 max. [5]	15 max. [5]	50 max. [6]	50 max. [6]
	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/s^2	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.

Radial load
Thrust load
Center of shaft (LR/2)

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

[5] Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

[6] 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.
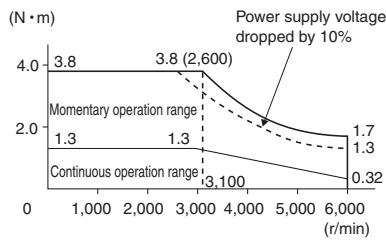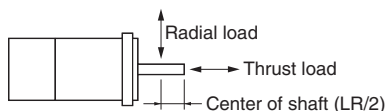
• R88M-K75030F/C (750W)

```
(N·m)
            Power supply voltage
            dropped by 10%
8 - 7.16      (3,500)    7.16 (3,800)
   Momentary operation range
                                    2.6
4  2.39       2.39
                                    1.6
   Continuous operation range
0    1,000  2,000  3,000  4,000  5,000
                                  (r/min)
```

• R88M-K1K030F/C (1kW)

```
(N·m)
            Power supply voltage
            dropped by 10%
10 - 9.55    (3,800)   9.55 (4,200)
   Momentary operation range
                                    6.0
5  3.18       3.18                  4.0
                                    1.9
   Continuous operation range
0    1,000  2,000  3,000  4,000  5,000
                                  (r/min)
```

• R88M-K1K530F/C (1.5kW)

```
(N·m)
            Power supply voltage
            dropped by 10%
15 - 14.3    (3,200)   14.3 (3,600)
   Momentary operation range
7.5 4.77      4.77
                                    4.0
   Continuous operation range
0    1,000  2,000  3,000  4,000  5,000
                                  (r/min)
```

• R88M-K2K030F/C (2kW)

```
(N·m)
            Power supply voltage
            dropped by 10%
20 - 19.1    (3,300)   19.1 (3,700)
   Momentary operation range
10  6.37      6.37                  7.0
                                    2.0
   Continuous operation range
0    1,000  2,000  3,000  4,000  5,000
                                  (r/min)
```

• R88M-K3K030F/C (3kW)

```
(N·m)
            Power supply voltage
            dropped by 10%
30 - 28.6    (3,100)   28.7 (3,400)
   Momentary operation range
                                   12.0
15  9.55      9.55                  8.0
                                    5.7
   Continuous operation range
0    1,000  2000   3,000  4,000  5,000
                                  (r/min)
```

• R88M-K4K030F/C (4kW)

```
(N·m)
            Power supply voltage
            dropped by 10%
40 - 38.2    (2,800)   38.2 (3,100)
   Momentary operation range
20  12.7      12.7
                                    10
   Continuous operation range
0    1,000  2,000  3,000  4,000  5,000
                                  (r/min)
```

• R88M-K5K030F/C (5kW)

```
(N·m)
            Power supply voltage
            dropped by 10%
50 - 47.7    (2,800)   47.7 (3,200)
   Momentary operation range
25  15.9      15.9
                                    15
   Continuous operation range
0    1,000  2,000  3,000  4,000  5,000
                                  (r/min)
```

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	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 • m^2	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}
Rotor inertia — With brake	kg • m^2	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
Power rate [1] — 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
Mechanical time constant — 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
Weight — 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×t30 (Al)	470×440×t30 (Al)		550×520×t30 (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 • m^2	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}
Brake specifications — Excitation voltage [4]	V	24 VDC±10%								
Brake specifications — Power consumption (at 20°C)	W	14	19	19	22	31	31	34	26	26
Brake specifications — 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%
Brake specifications — 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.
Brake specifications — Attraction time	ms	80 max.	100 max.	100 max.	110 max.	80 max.	80 max.	150 max.	300 max.	300 max.
Brake specifications — Release time	ms	70 max. [5]	50 max. [5]	50 max. [5]	50 max. [5]	25 max. [6]	25 max. [6]	50 max. [6]	140 max. [7]	140 max. [7]
Brake specifications — Backlash		±1°								
Brake specifications — Allowable work per braking	J	588	1,176	1,176	1,470	1,372	1,372	1,372	2,000	2,000
Brake specifications — 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
Brake specifications — Allowable angular acceleration	rad/s^2	10,000						5,000	3,000	
Brake specifications — Brake limit	–	10 million times min.								
Brake specifications — Rating	–	Continuous								
Brake specifications — 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 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

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

*7 Direct current switching with a varistor (NVD07SCD082 by KOA SPEER ELECTRONICS, INC.).

# 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)
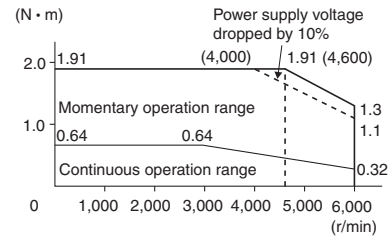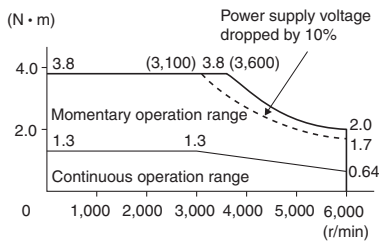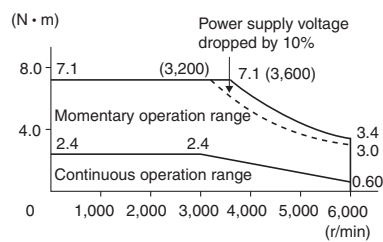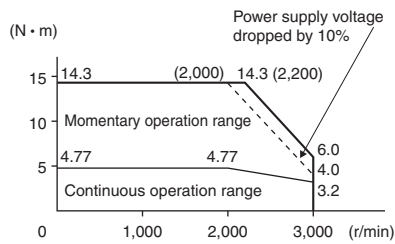

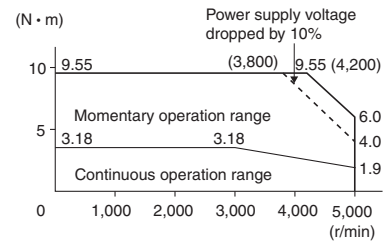• R88M-K1K520H/T (1.5kW)
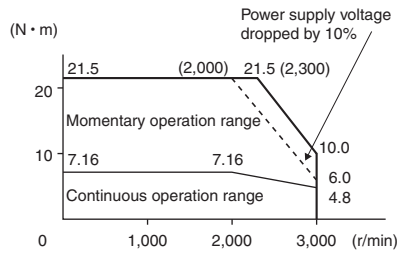
• R88M-K2K020H/T (2kW)
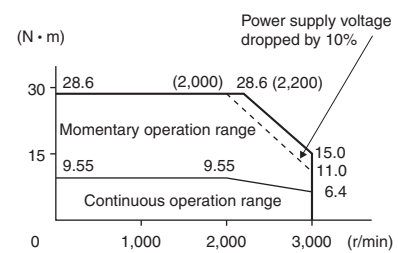
• R88M-K3K020H/T (3kW)
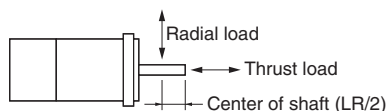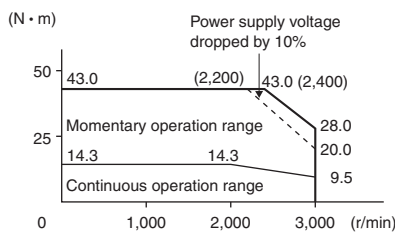

• R88M-K4K020H/T (4kW)
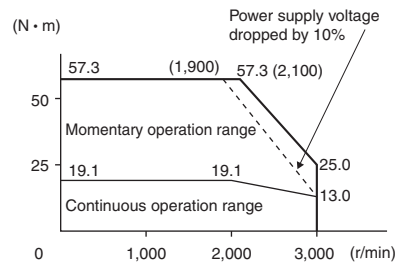
• R88M-K5K020H/T (5kW)
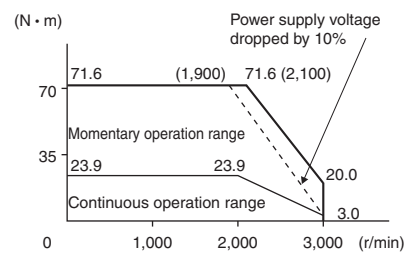
• R88M-K7K515T (7.5kW)
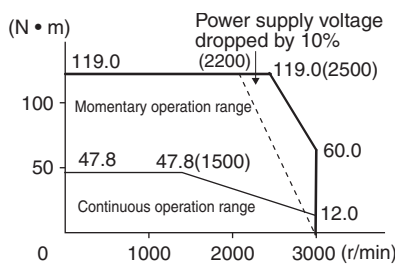
• R88M-K11K015T (11kW)
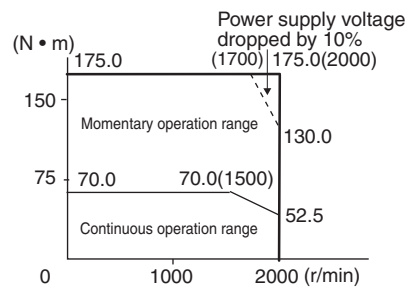
• R88M-K15K015T (15kW)

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)

Item	Model (R88M-)	Unit	K40020F / K40020C	K60020F / K60020C	K1K020F / K1K020C	K1K520F / K1K520C	K2K020F / K2K020C	K3K020F / K3K020C	K4K020F / K4K020C	K5K020F / 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·m²	$1.61×10^{-4}$	$2.03×10^{-4}$	$4.60×10^{-4}$	$6.70×10^{-4}$	$8.72×10^{-4}$	$12.9×10^{-4}$	$37.6×10^{-4}$	$48.0×10^{-4}$	$101×10^{-4}$	$212×10^{-4}$	$302×10^{-4}$
	With brake	kg·m²	$1.90×10^{-4}$	$2.35×10^{-4}$	$5.90×10^{-4}$	$7.99×10^{-4}$	$10.0×10^{-4}$	$14.2×10^{-4}$	$38.6×10^{-4}$	$48.8×10^{-4}$	$107×10^{-4}$	$220×10^{-4}$	$311×10^{-4}$
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·m²	$1.35×10^{-4}$	$1.35×10^{-4}$	$1.35×10^{-4}$	$1.35×10^{-4}$	$1.35×10^{-4}$	$1.35×10^{-4}$	$4.7×10^{-4}$	$4.7×10^{-4}$	$4.7×10^{-4}$	$7.1×10^{-4}$	$7.1×10^{-4}$
	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	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	ms	15 max. [5]	15 max. [5]	70 max. [6]	50 max. [6]	50 max. [6]	50 max. [6]	25 max. [5]	25 max. [5]	50 max. [5]	140 max. [7]	140 max. [7]
	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/s²	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] Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).
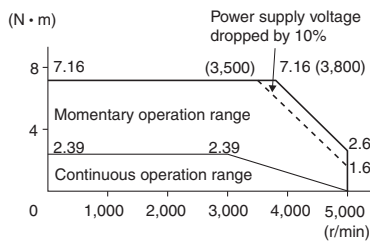[6] Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).
[7] Direct current switching with a varistor (NVD07SCD082 by KOA SPEER ELECTRONICS, INC.).

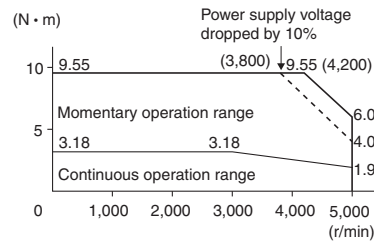# Torque and Rotation Speed Characteristics

• 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.

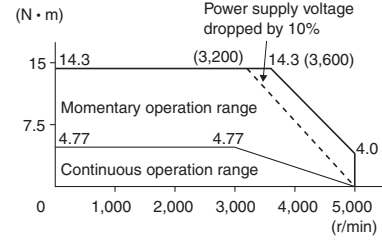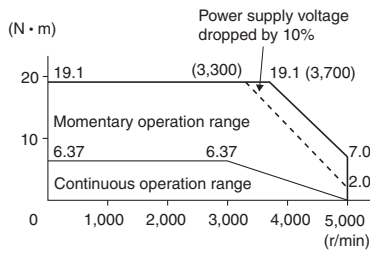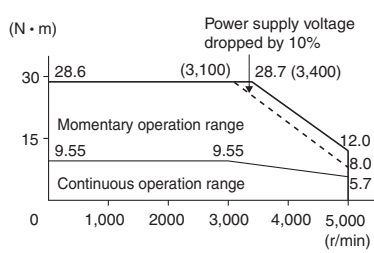• R88M-K40020F/C (400W)
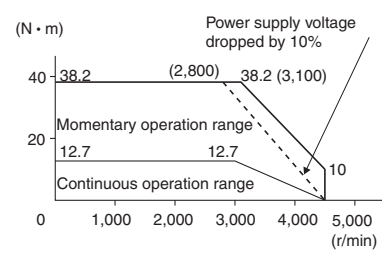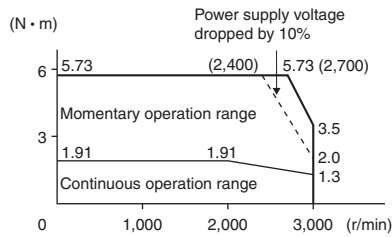

• R88M-K60020F/C (600W)

• R88M-K1K020F/C (1kW)
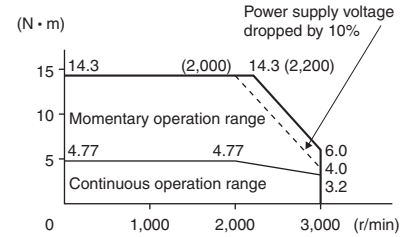
• R88M-K1K520F/C (1.5kW)
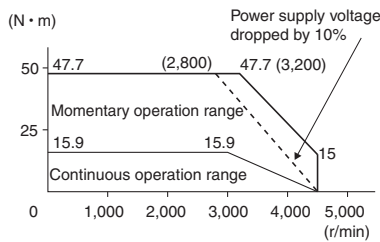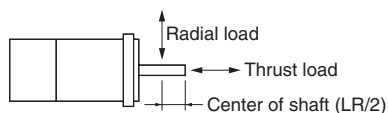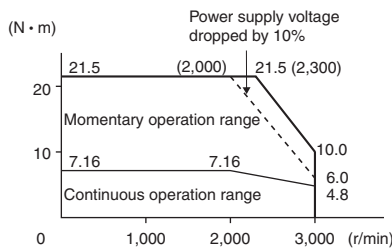

• R88M-K2K020F/C (2kW)
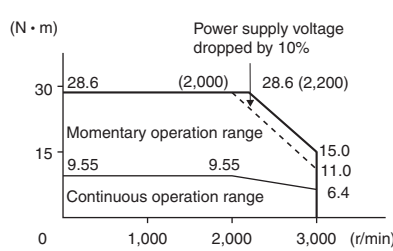
• R88M-K3K020F/C (3kW)
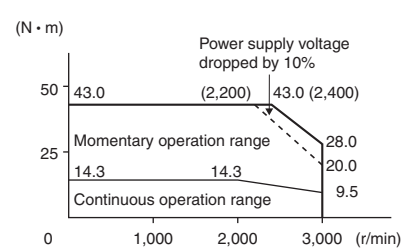
• R88M-K4K020F/C (4kW)
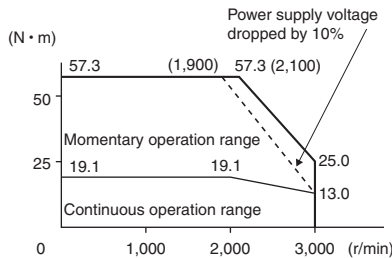
• R88M-K5K020F/C (5kW)
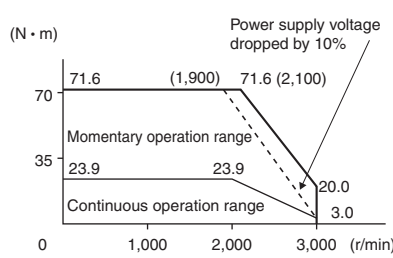
• R88M-K7K515C (7.5kW)
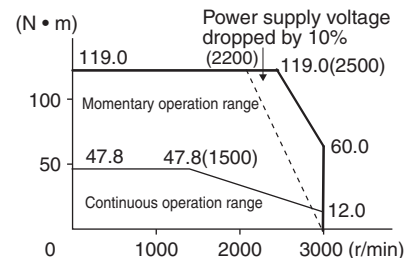
• R88M-K11K015C (11kW)
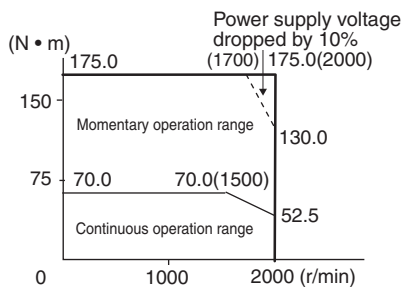
• R88M-K15K015C (15kW)
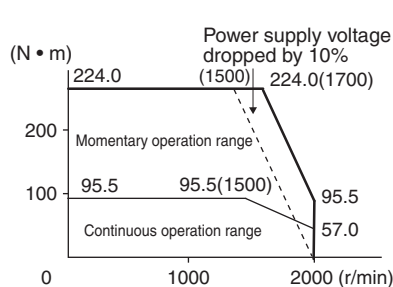
Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However, doing so will reduce the output torque.

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}
Rotor inertia — 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
Power rate [1] — 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
Mechanical time constant — 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
Weight — 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·m²	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}
Brake specifications — Excitation voltage [4]	V	24 VDC±10%									
Brake specifications — Power consumption (at 20°C)	W	19	31	34	34	34	19	31	34	34	34
Brake specifications — 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%
Brake specifications — 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.
Brake specifications — Attraction time	ms	100 max.	80 max.	150 max.	150 max.	150 max.	100 max.	80 max.	150 max.	150 max.	150 max.
Brake specifications — Release time	ms	50 max. [5]	25 max. [6]	50 max. [6]	50 max. [6]	50 max. [6]	50 max. [5]	25 max. [6]	50 max. [6]	50 max. [6]	50 max. [6]
Brake specifications — Backlash		±1°									
Brake specifications — 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
Brake specifications — 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
Brake specifications — Allowable angular acceleration	rad/s²	10,000		5,000			10,000		5,000		
Brake specifications — Brake limit	–	10 million times min.									
Brake specifications — Rating	–	Continuous									
Brake specifications — 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 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).
*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

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)

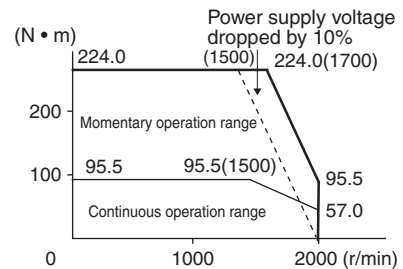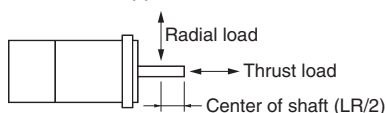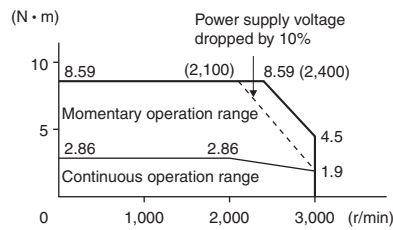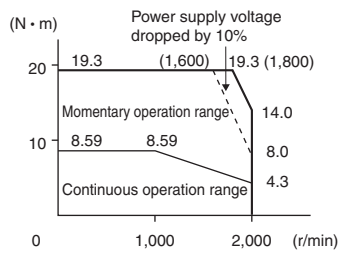

• R88M-K2K010H/T/F/C (2kW)
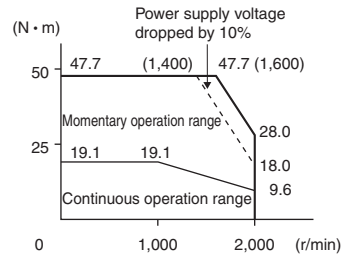
• R88M-K3K010H/T/F/C (3kW)
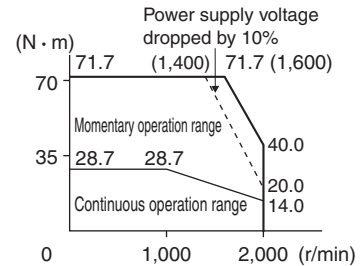
• R88M-K4K510T/C (4.5kW)
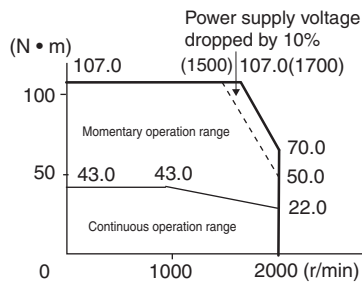
• R88M-K6K010T/C (6kW)
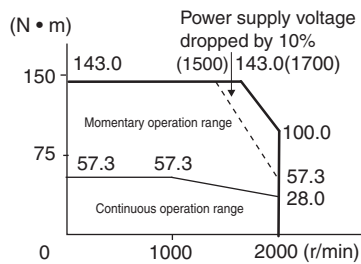
Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However, doing so will reduce the output torque.
2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation 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.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

General Specifications

Performance Specifications/ Torque and Rotation Speed Characteristics

Encoder Specifications

Dimensions

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
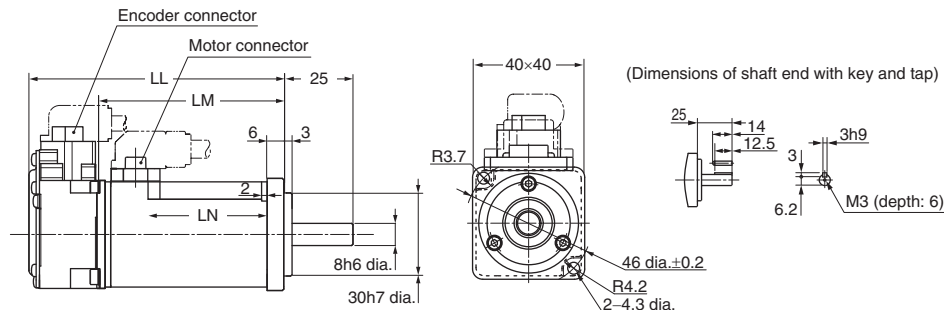
• With brake
- R88M-K05030H-B (S2)/-K10030@-B (S2) `INC`
- R88M-K05030T-B (S2)/-K10030@-B (S2) `ABS`

Model	Dimensions (mm)		
	LL	LM	LN
R88M-K05030@-B@	102	78	23
R88M-K10030@-B@	122	98	43
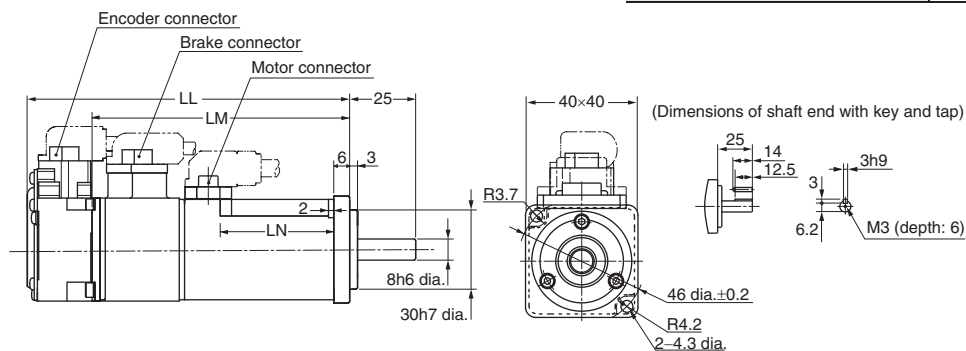
200W/400W
• Without brake
- R88M-K20030@ (-S2)/-K40030@ (-S2) `INC`
- R88M-K20030@ (-S2)/-K40030@ (-S2) `ABS`

Model	Dimensions (mm)		
	LL	LM	LN
R88M-K20030@	79.5	56.5	11
R88M-K40030@	99	76	14

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.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

General Specifications

Performance Specifications/ Torque and Rotation Speed Characteristics

Encoder Specifications

Dimensions

• 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
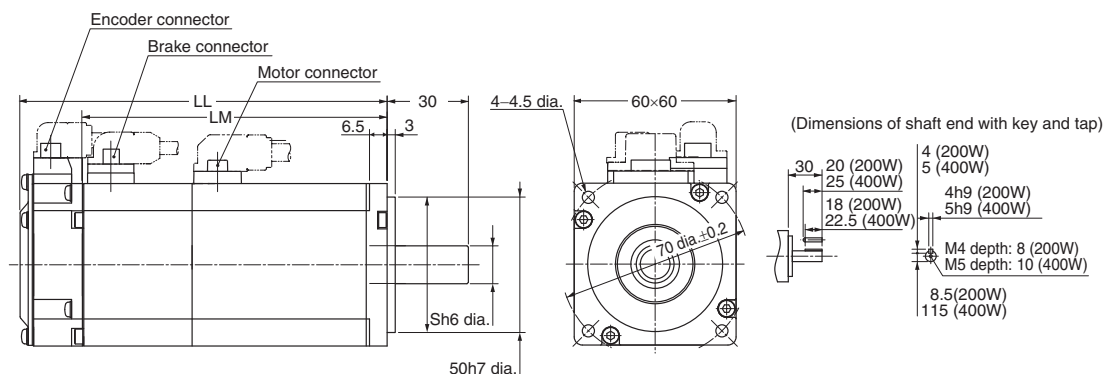
750W
• Without brake
- R88M-K75030H (-S2) **INC**
- R88M-K75030T (-S2) **ABS**
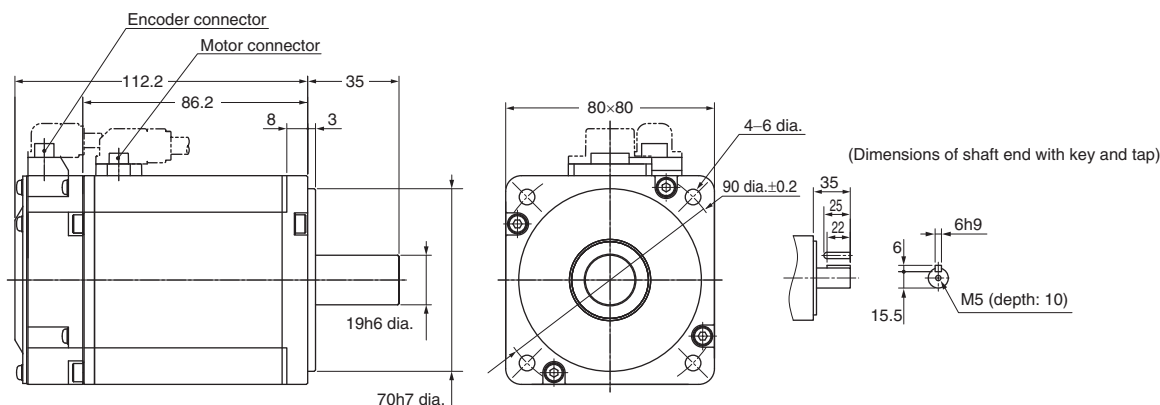
With brake
- R88M-K75030H-B (S2) **INC**
- R88M-K75030T-B (S2) **ABS**
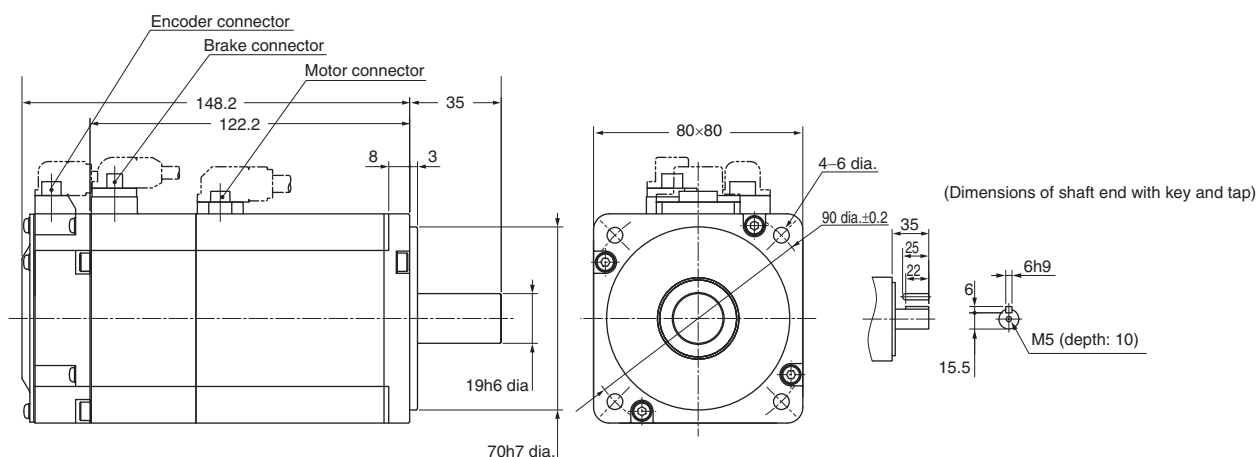
Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

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

3kW
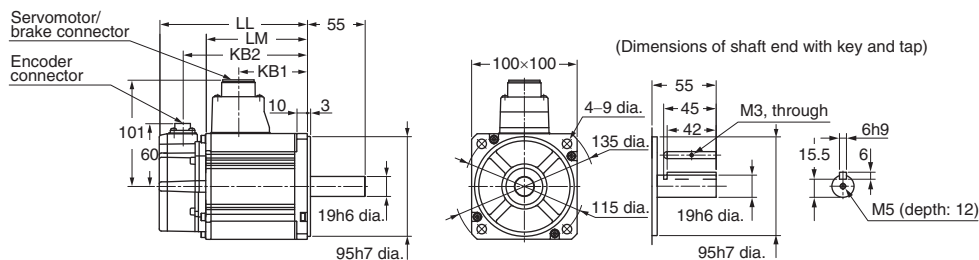
• Without brake

- 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
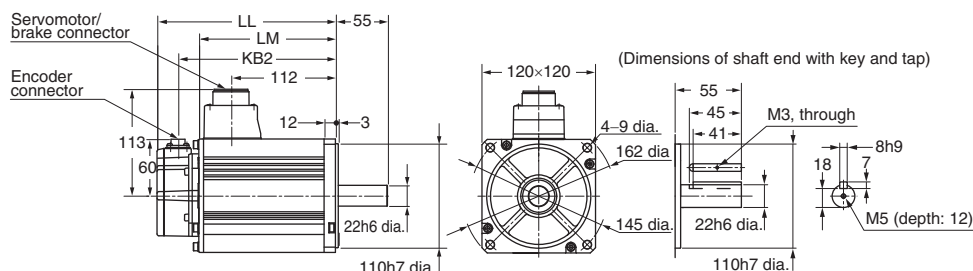
Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

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
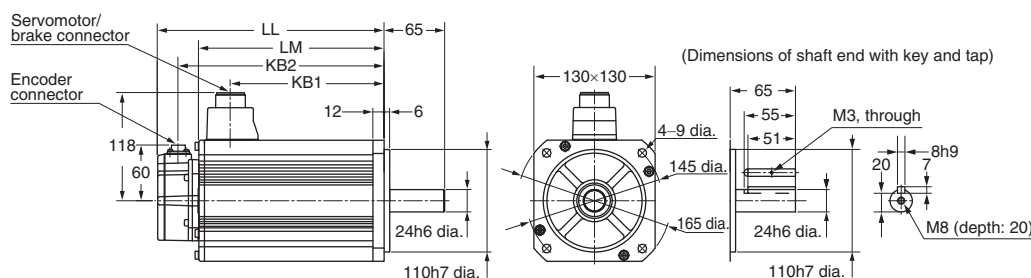
Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 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`
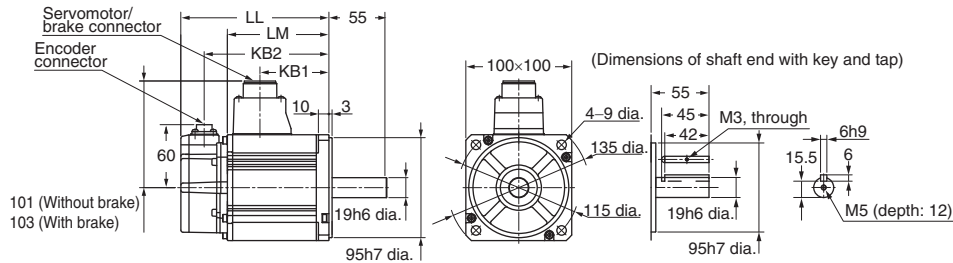
Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K75030@	131.5	87.5	56.5	109.5
R88M-K1K030@	141	97	66	119
R88M-K1K530@	159.5	115.5	84.5	137.5
R88M-K2K030@	178.5	134.5	103.5	156.5
R88M-K75030@-B@	158.5	114.5	53.5	136.5
R88M-K1K030@-B@	168	124	63	146
R88M-K1K530@-B@	186.5	142.5	81.5	164.5
R88M-K2K030@-B@	205.5	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
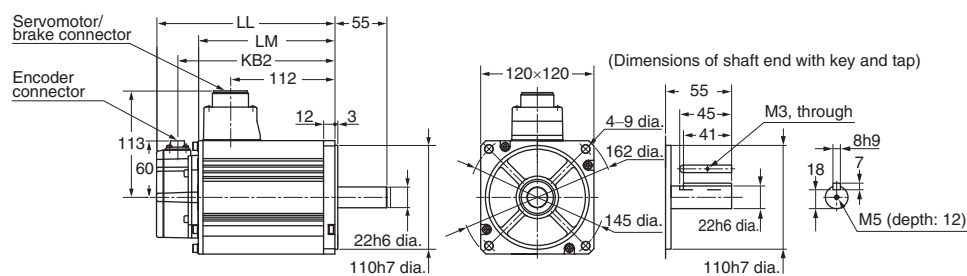
Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

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
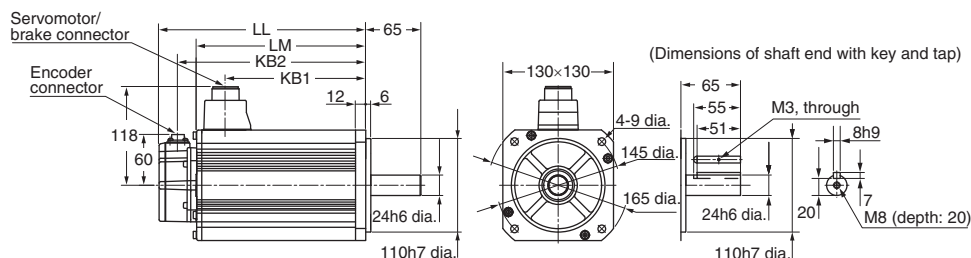
Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

System Configuration

Controllers

Softwares

Programmable Terminals

General Specifications

Performance Specifications/ Torque and Rotation Speed Characteristics

Encoder Specifications

Slave Terminals

Safety

Dimensions

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

• 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`
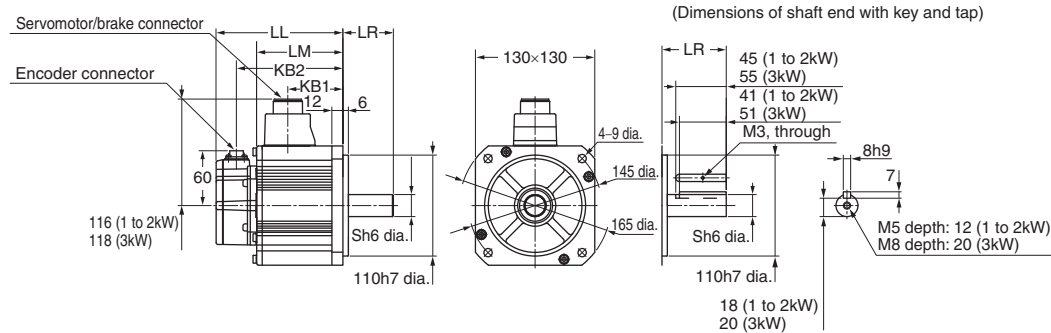
Model	Dimensions (mm)					
	LL	LR	LM	S	KB1	KB2
R88M-K1K020@	138	55	94	22	60	116
R88M-K1K520@	155.5	55	111.5	22	77.5	133.5
R88M-K2K020@	173	55	129	22	95	151
R88M-K3K020@	208	65	164	24	127	186
R88M-K1K020@-B@	166	55	122	22	60	144
R88M-K1K520@-B@	183.5	55	139.5	22	77.5	161.5
R88M-K2K020@-B@	201	55	157	22	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

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
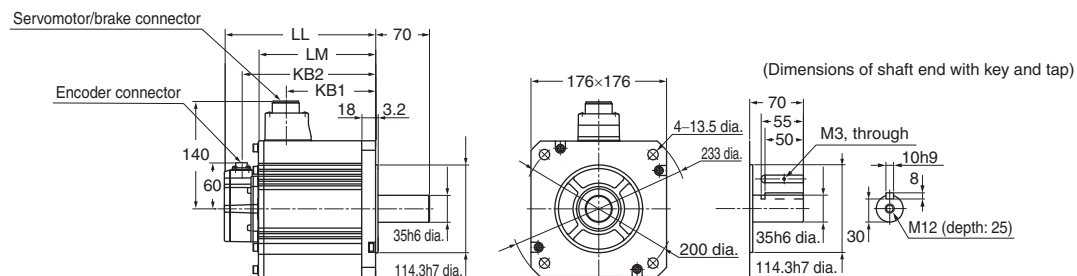
• Without brake
• R88M-K7K515T (-S2) **ABS**

• 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
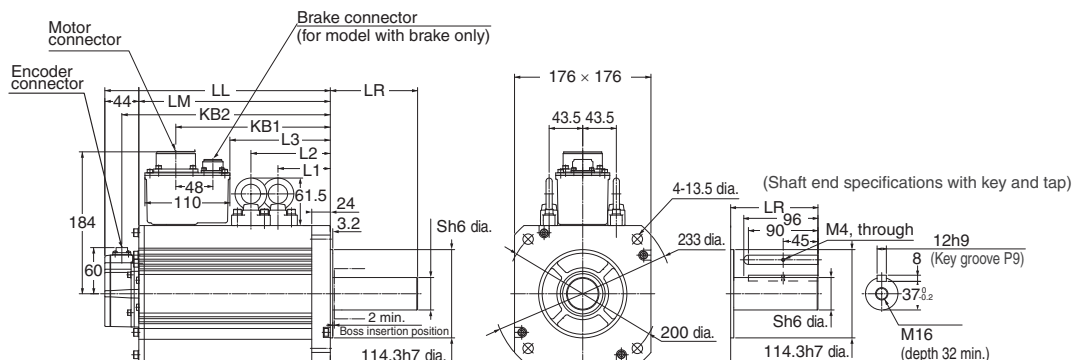
11kW/15kW

• Without brake
• R88M-K11K015T (-S2)/-K15K015T (-S2) **ABS**

• With brake
• R88M-K11K015T-B (S2)/R88M-K15K015T-B (S2) **ABS**
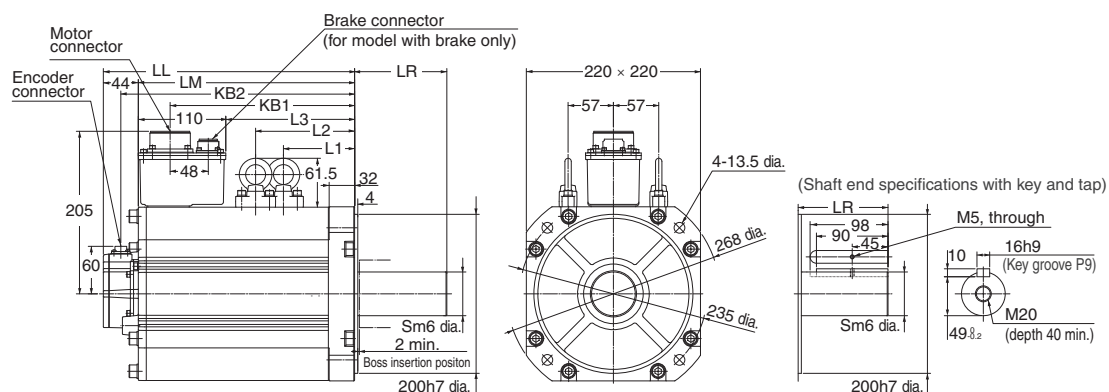
Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K11K015T@	316	116	272	55	232	294	124.5	124.5	162
R88M-K15K015T@	384	116	340	55	300	362	158.5	158.5	230
R88M-K11K015T-B@	364	116	320	55	266	342	124.5	159.5	196
R88M-K15K015T-B@	432	116	388	55	334	410	158.5	193.5	264

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**

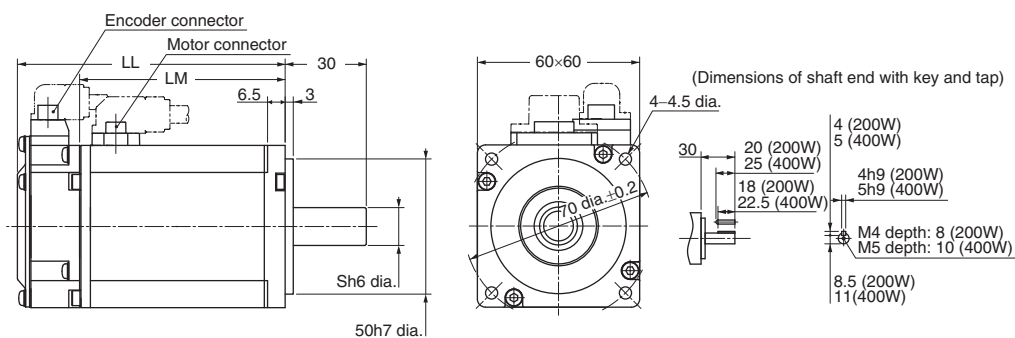| Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K40020@	131.5	87.5	56.5	109.5
R88M-K60020@	141	97	66	119
R88M-K40020@-B@	158.5	114.5	53.5	136.5
R88M-K60020@-B@	168	124	63	146

(Dimensions of shaft end with key and tap)
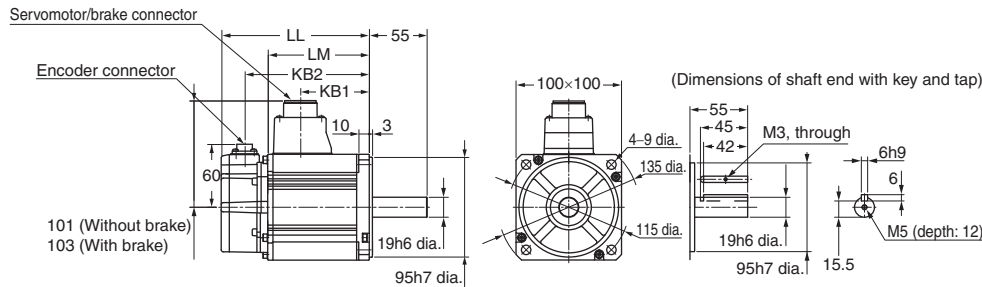
1kW/1.5kW/2kW/3kW

• 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**
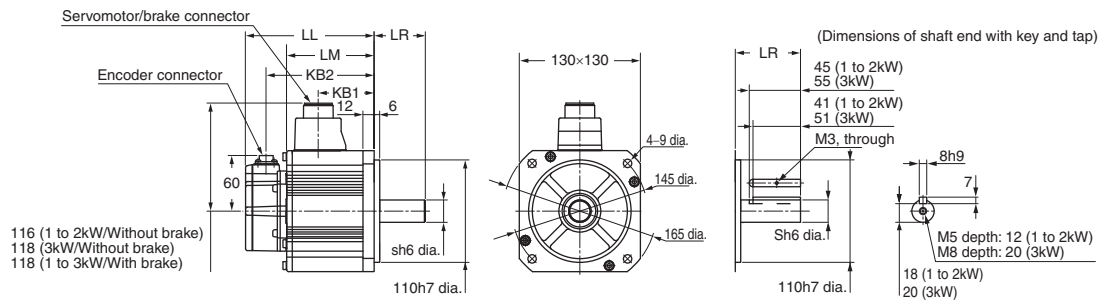
(Dimensions of shaft end with key and tap)

| 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
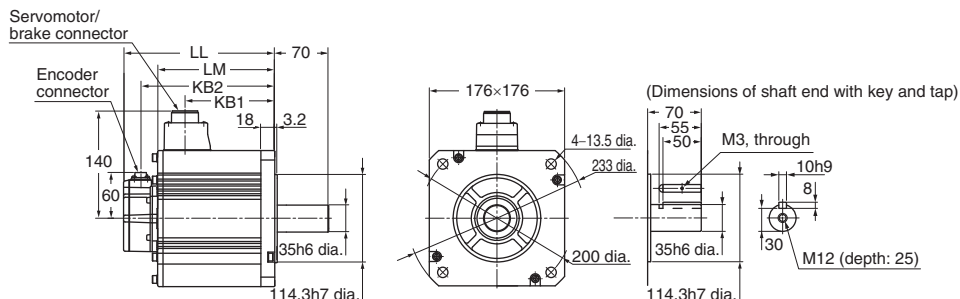
7.5kW

• 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
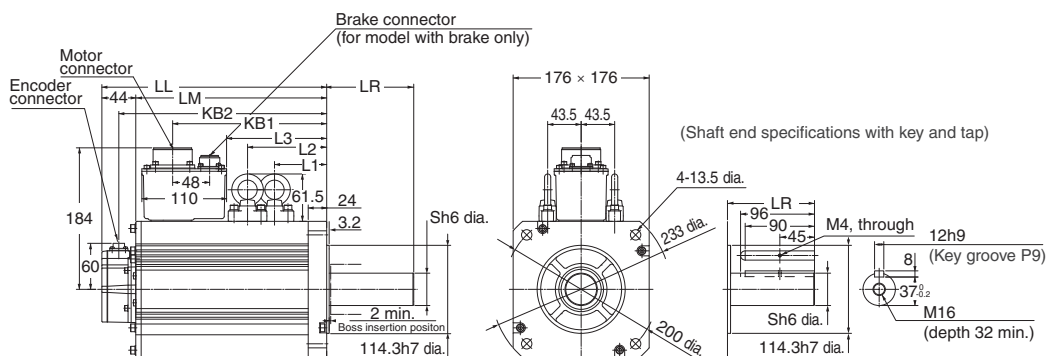
Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

11kW/15kW

• Without brake

• R88M-K11K015C (-S2)/-K15K015C (-S2) `ABS`

• With brake

• R88M-K11K015C-B (S2)/R88M-K15K015C-B (S2) `ABS`
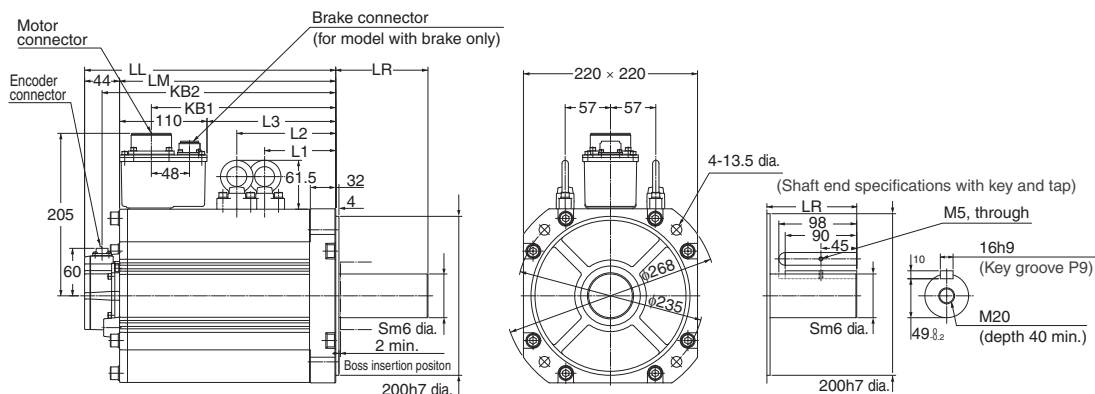
Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K11K015C@	316	116	272	55	232	294	124.5	124.5	162
R88M-K15K015C@	384	116	340	55	300	362	158.5	158.5	230
R88M-K11K015C-B@	364	116	320	55	266	342	124.5	159.5	196
R88M-K15K015C-B@	432	116	388	55	334	410	158.5	193.5	264

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.

System Configuration

Controllers

Softwares

Programmable Terminals

General Specifications

Performance Specifications/ Torque and Rotation Speed Characteristics

Encoder Specifications

Slave Terminals

Dimensions

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Infomation

• 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
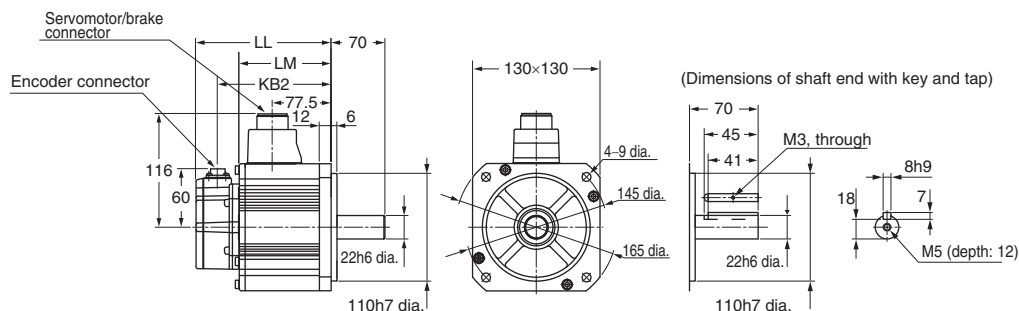
2kW/3kW
- **Without brake**
  - R88M-K2K010H (-S2)/-K3K010H (-S2) `INC`
  - R88M-K2K010T (-S2)/-K3K010T (-S2) `ABS`

- **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
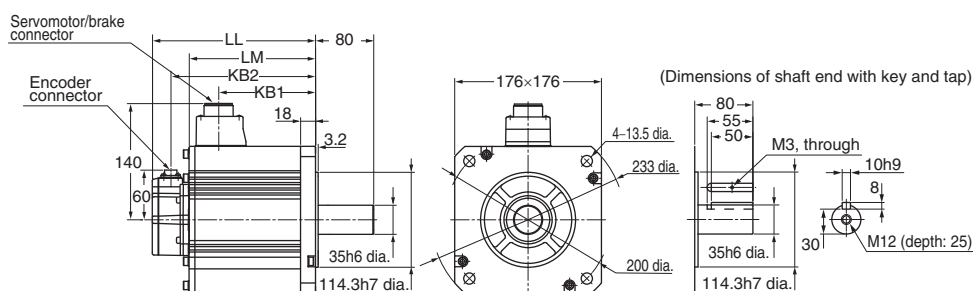
4.5kW
- **Without brake**
  - R88M-K4K510T (-S2) `ABS`

- **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

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
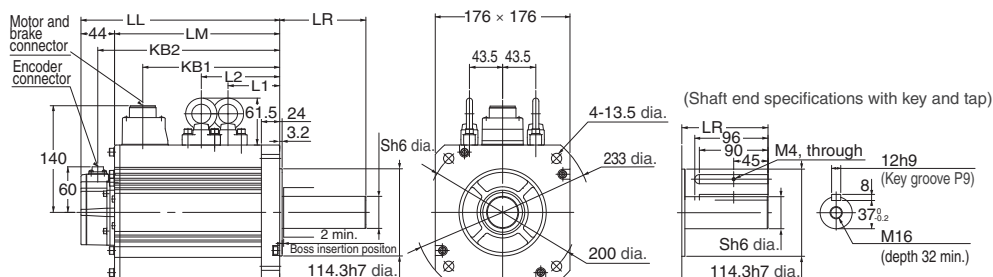
- **Without brake**
  - R88M-K6K010T (-S2) **ABS**

- **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
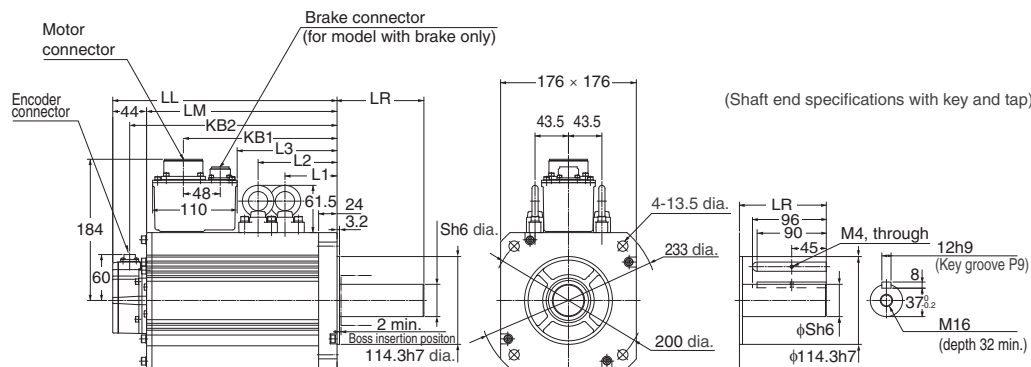
(Shaft end specifications with key and tap)

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

(Dimensions of shaft end with key and tap)
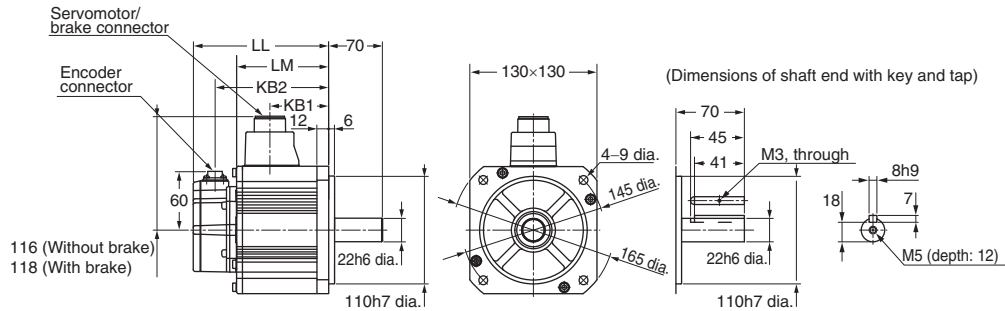
2kW/3kW

• 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

(Dimensions of shaft end with key and tap)
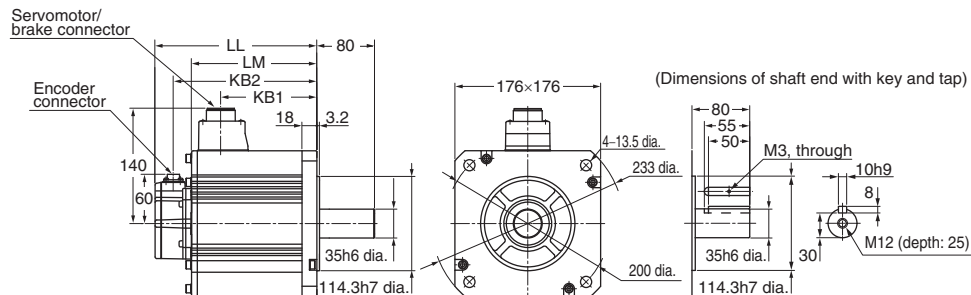
4.5kW

• 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

(Shaft end specifications with key and tap)

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
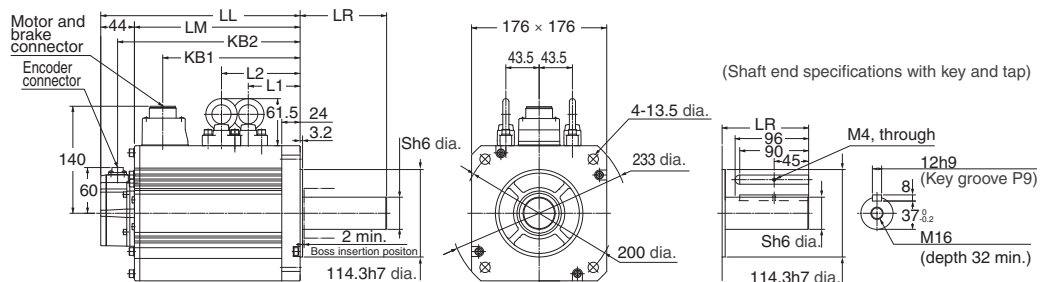
• Without brake
  • R88M-K6K010C (-S2) `ABS`

• 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
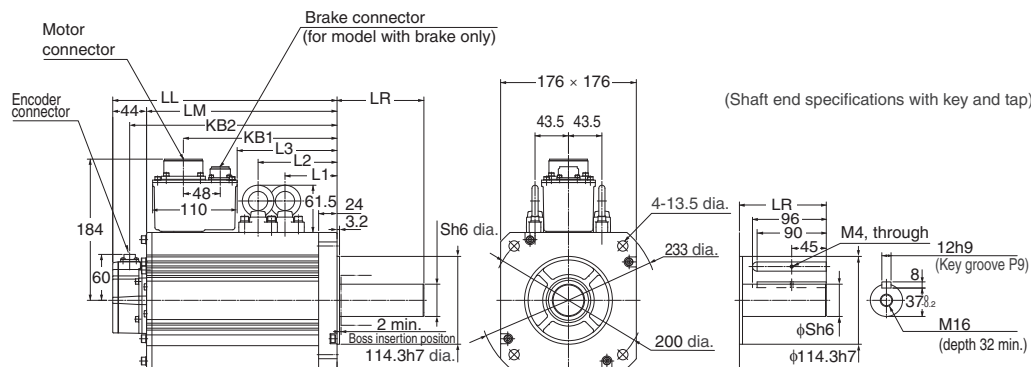
Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

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.

CE

Ro
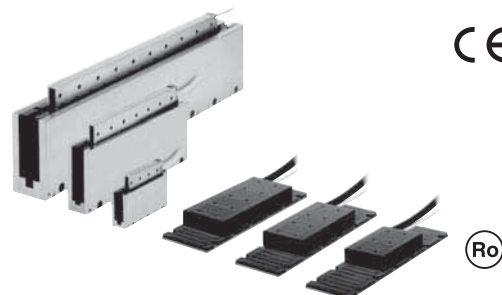
General Specifications

● Iron-core Linear Motors

Item	Description
Operating ambient temperature humidity	0 to 40°C, 20% to 80% (with no condensation)
Storage ambient temperature and humidity	−20 to +65°C, 85% max. (with no condensation)
Operating and storage atmosphere	No corrosive gases
Vibration resistance*	Acceleration of 49 m/s^2 max. in X, Y, and Z directions
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: 10 MΩ min. (at 500 VDC)
Dielectric strength	Between power terminal and FG terminal: 2,750 VDC for 1 s Between power terminal and sensor: 2,750 VDC for 1 s
Protective structure	IP00
Maximum coil temperature (Motor Coil Unit)	130°C
Maximum magnet temperature (Magnet Track)	70°C
Insulation class	Class B
Cooling method	Self-cooling
International standard	**EC directive**	**Low voltage directive**	EN60034-1

● Ironless Linear Motors

Item	Description
Operating ambient temperature humidity	0 to 40°C, 20% to 80% (with no condensation)
Storage ambient temperature and humidity	−20 to +65°C, 85% max. (with no condensation)
Operating and storage atmosphere	No corrosive gases
Vibration resistance*	Acceleration of 49 m/s^2 max. in X, Y, and Z directions
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: 10 MΩ min. (at 500 VDC)
Dielectric strength	Between power terminal and FG terminal: 2,250 VDC for 1 s Between power terminal and sensor: 2,250 VDC for 1 s
Protective structure	IP00
Maximum coil temperature (Motor Coil Unit)	110°C
Maximum magnet temperature (Magnet Track)	70°C
Insulation class	Class B
Cooling method	Self-cooling
International standard	**EC directive**	**Low voltage directive**	EN60034-1

* 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
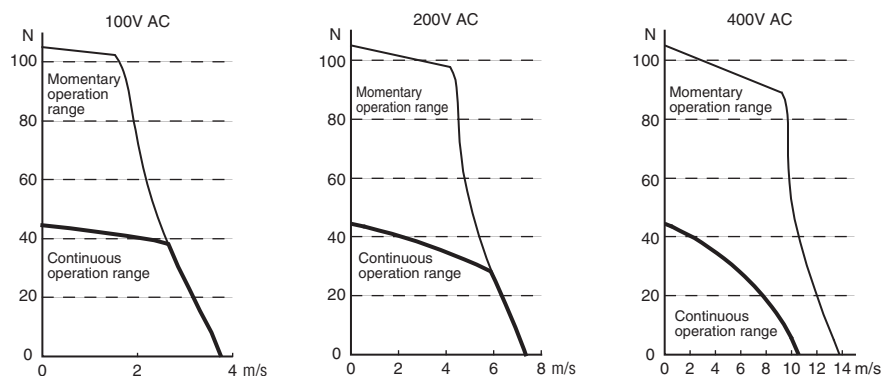
R88L-EC-FW-0306
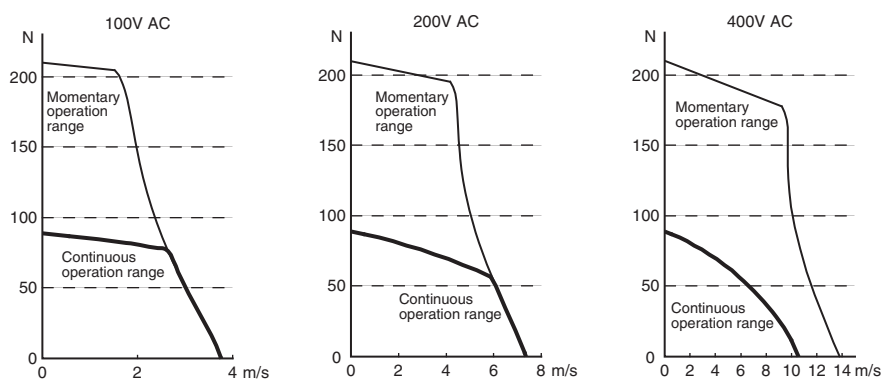
R88L-EC-FW-0606
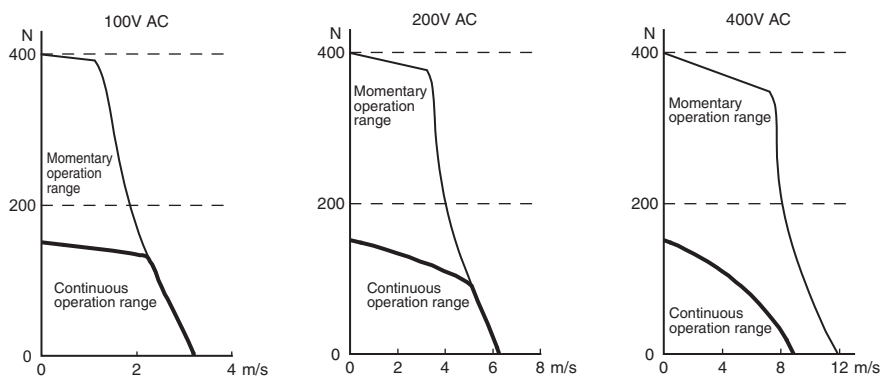
R88L-EC-FW-0609

R88L-EC-FW-0612

100V AC

200V AC

400V AC

R88L-EC-FW-1112

100V AC

200V AC

400V AC

R88L-EC-FW-1115

100V AC

200V AC

400V AC

● 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
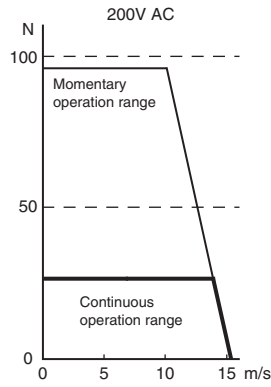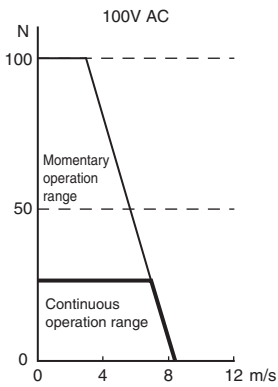
R88L-EC-GW-0306
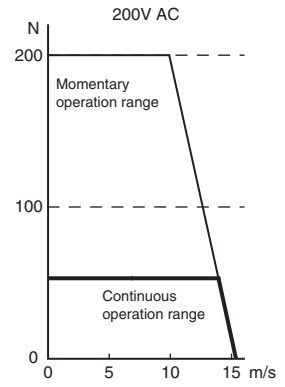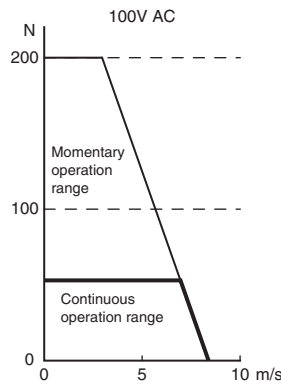
R88L-EC-GW-0309
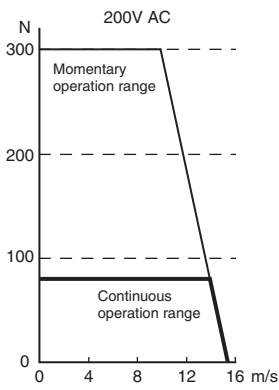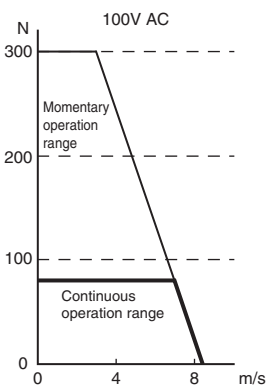
R88L-EC-GW-0503
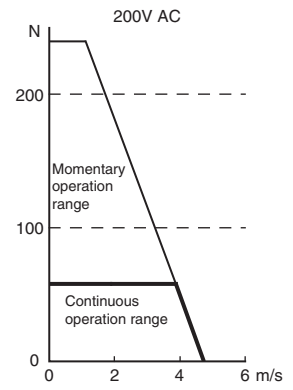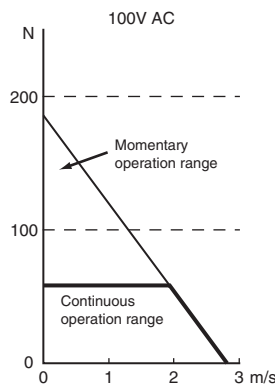
R88L-EC-GW-0506

R88L-EC-GW-0509

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

General Specifications

Characteristics/ Speed - Force Characteristics

Encoder Specifications

Dimensions

Combination table
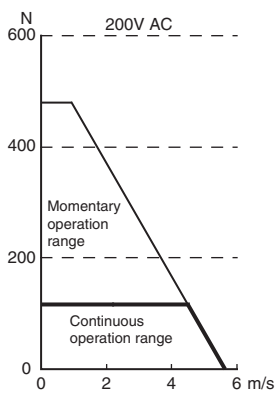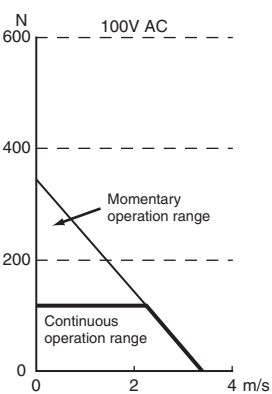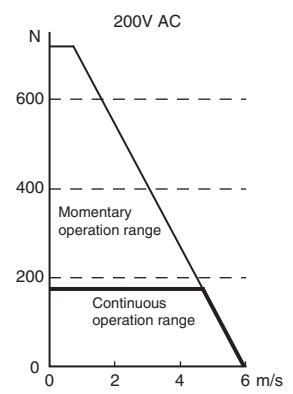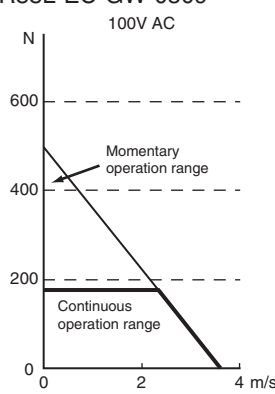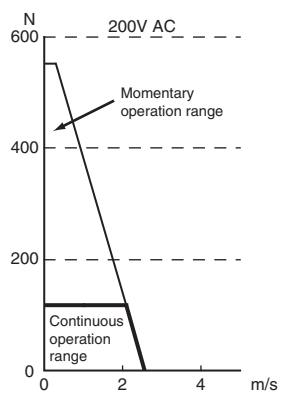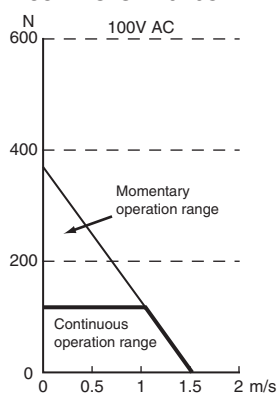
R88L-EC-GW-0703

R88L-EC-GW-0706
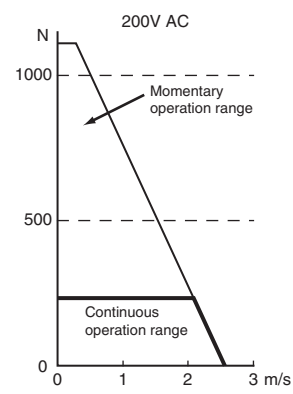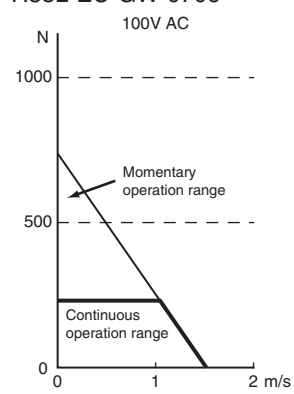
R88L-EC-GW-0709
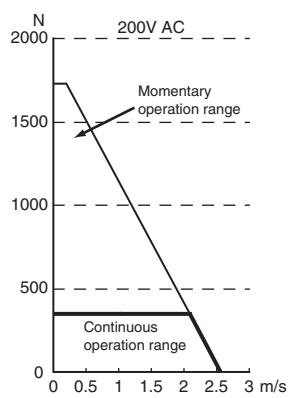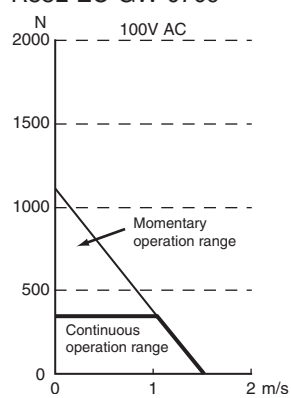
Dimensions

● **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
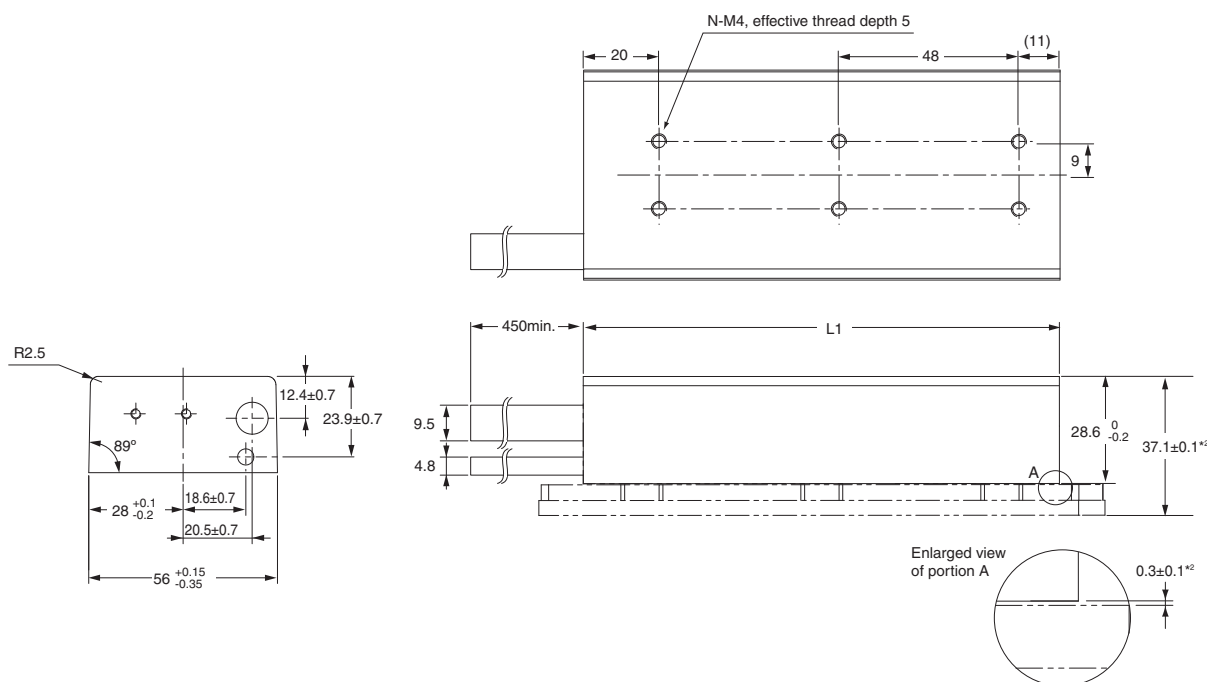
N-M4, effective thread depth 5

20   48   (11)

9

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

450min.   L1

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
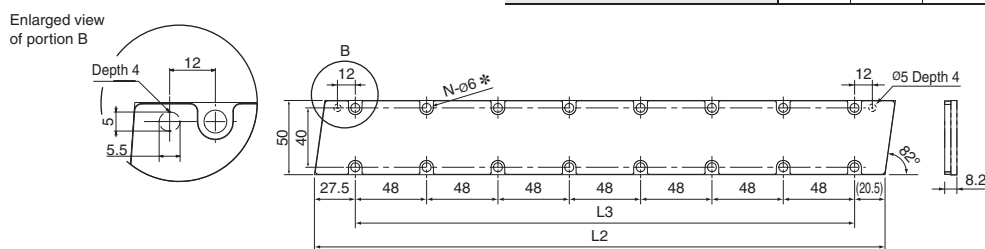
Enlarged view
of portion B

Depth 4   12

5

5.5

B

12

50   40

N-ø6 *

12   ø5 Depth 4

82°

8.2

27.5   48   48   48   48   48   48   48   (20.5)

L3

L2

* Use M5 low head allen head bolts.

System Configuration

Controllers

Softwares

Programmable Terminals

General Specifications

Characteristics/ Speed - Force Characteristics

Slave Terminals

Dimensions

Safety

Combination table

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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
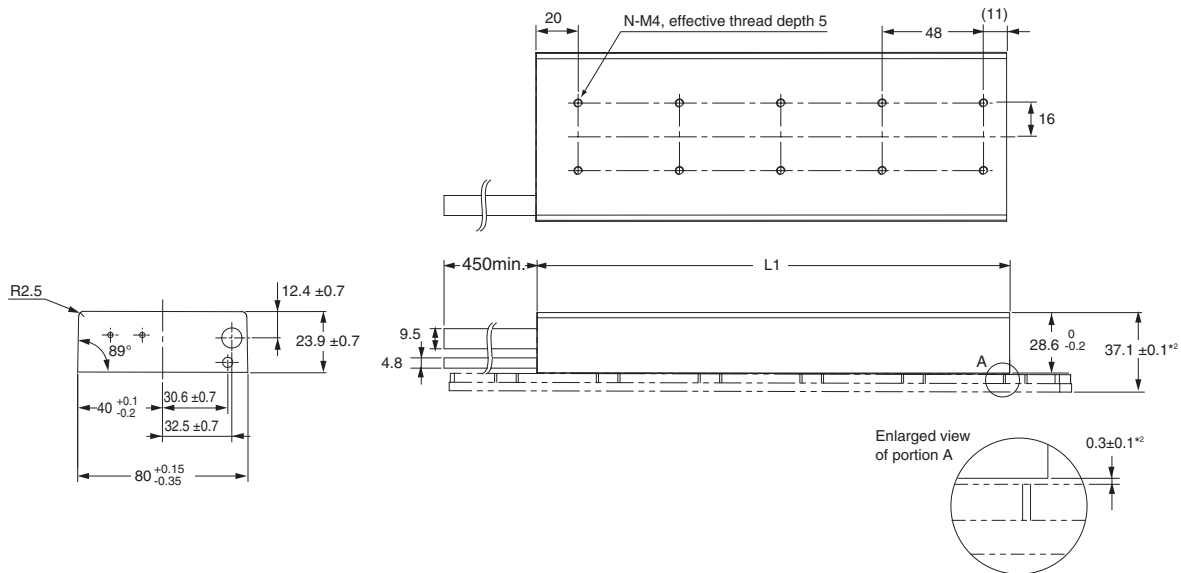
*1 The weight of 450-mm cables are included.
*2 These values indicate mounting dimensions.

• 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
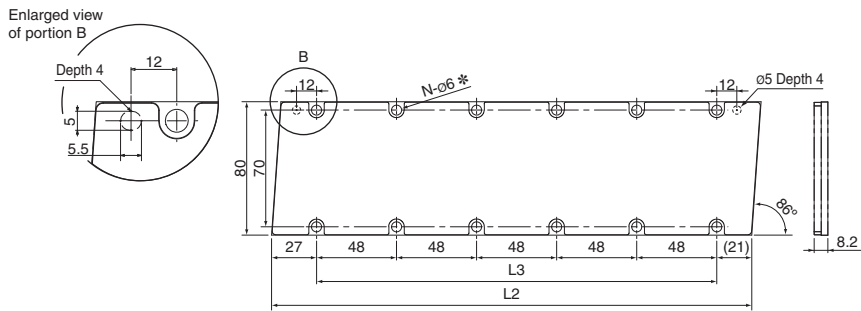
* Use M5 low head allen head bolts.

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
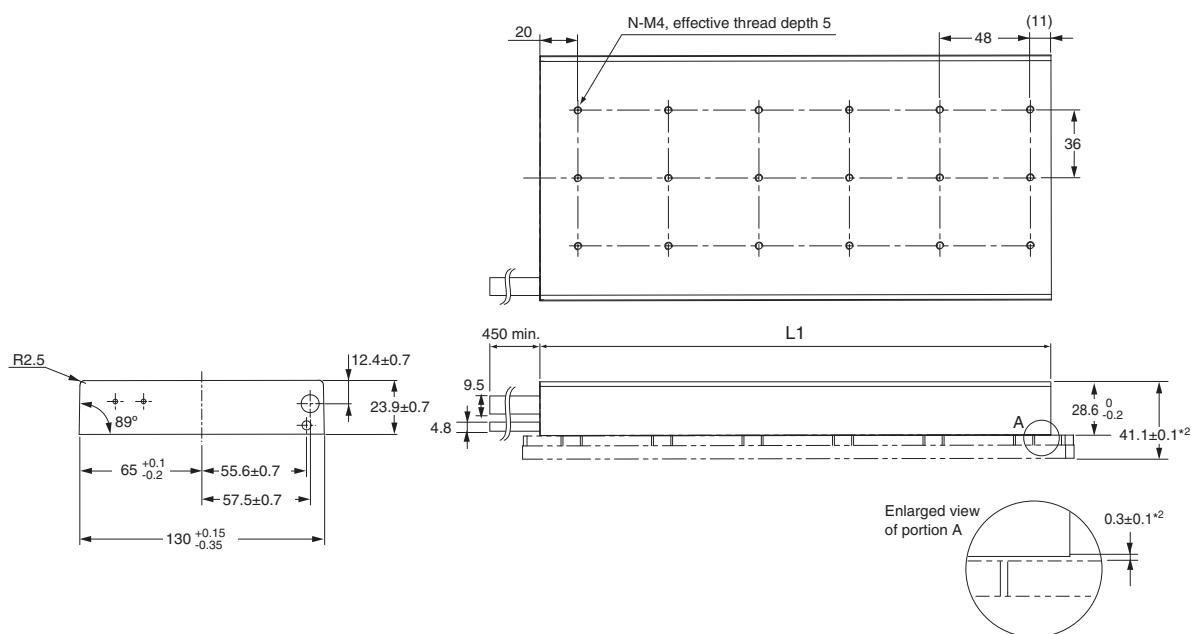
*1 The weight of 450-mm cables are included.
*2 These values indicate mounting dimensions.

• 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

* Use M5 low head allen head bolts.

System Configuration
Controllers
Softwares
Programmable Terminals
General Specifications
Characteristics/ Speed - Force Characteristics
Dimensions
Combination table
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information
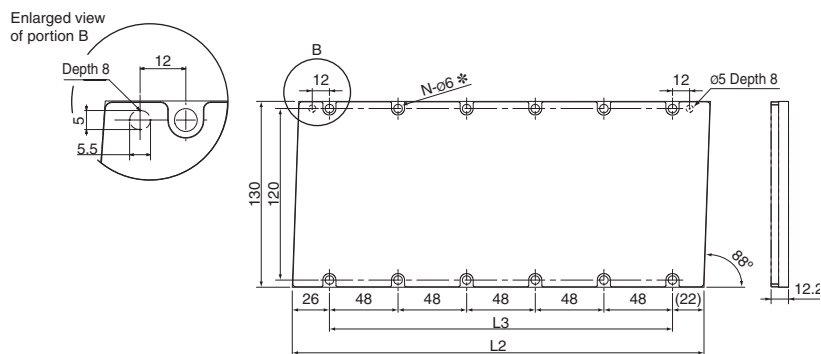
● Ironless Linear Motors
R88L-EC-GW-0303/-0306/-0309
• Motor Coil Unit

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
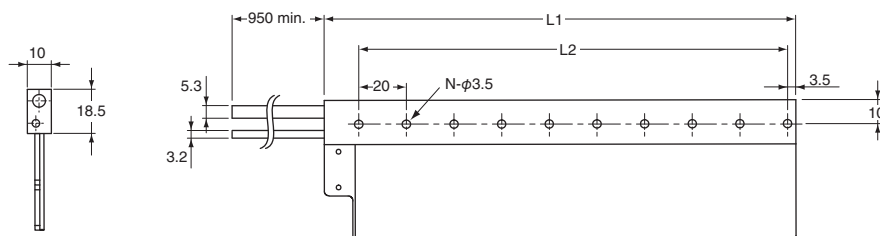
* The weight of 950 mm cables are included.

• 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

• Combination diagram

Motor Coil Unit mounting surface   Magnet Track mounting surface
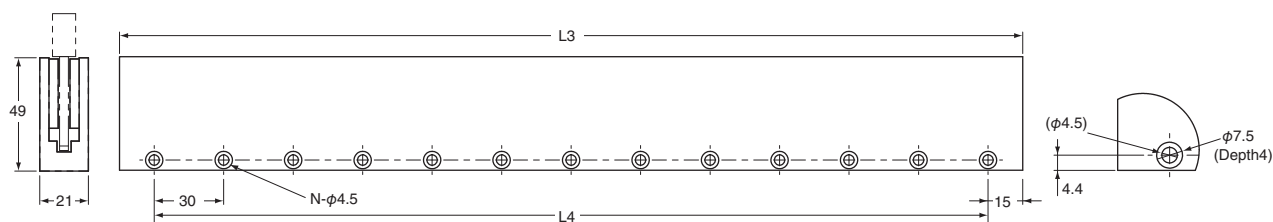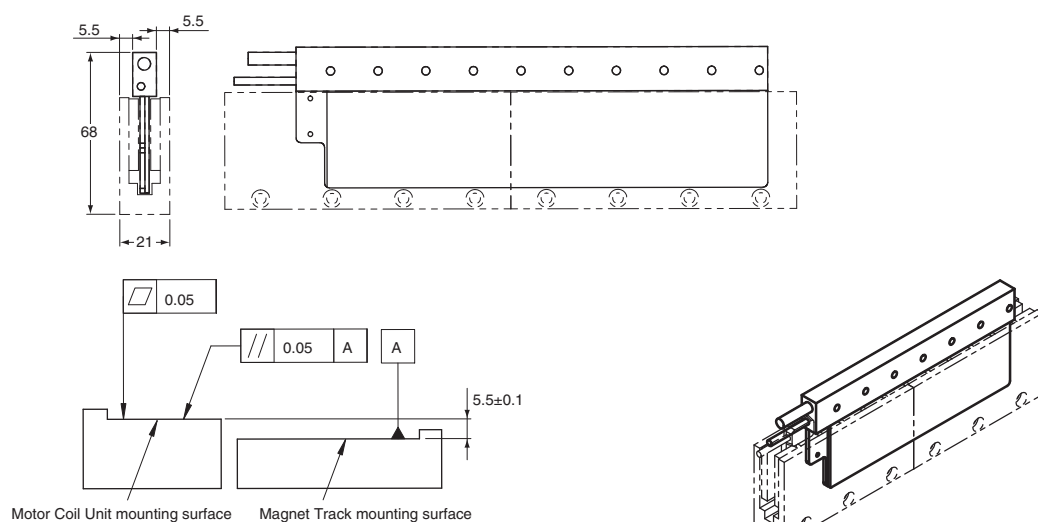
R88L-EC-GW-0503/-0506/-0509

• 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
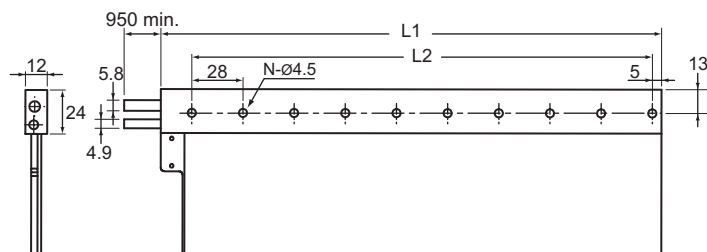
* The weight of 950 mm cables are included.

• 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
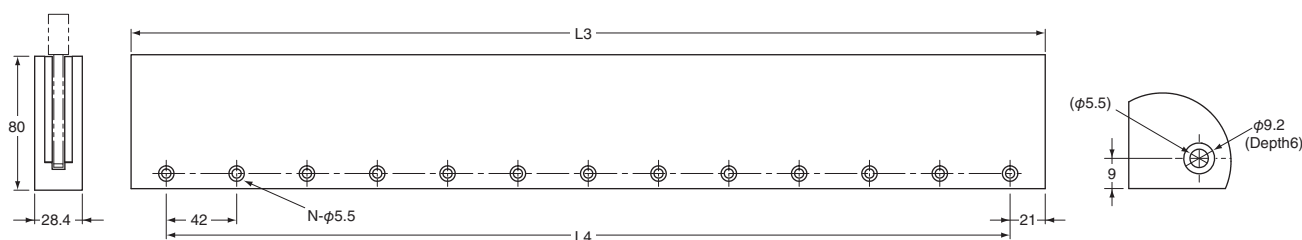
• Combination diagram

Motor Coil Unit mounting surface   Magnet Track mounting surface
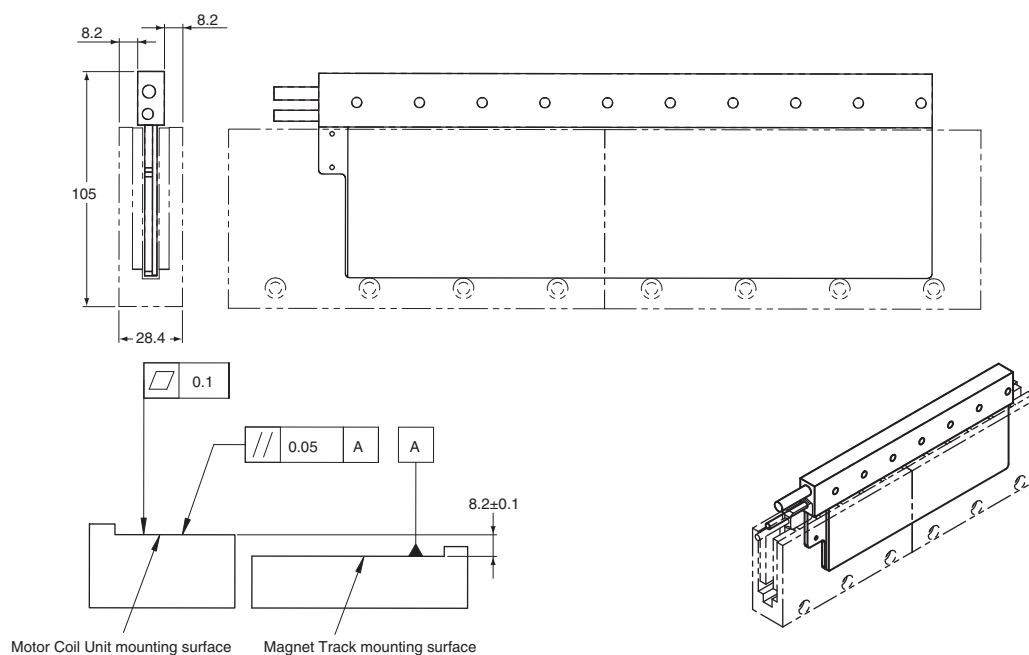
R88L-EC-GW-0703/-0706/-0709

• 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
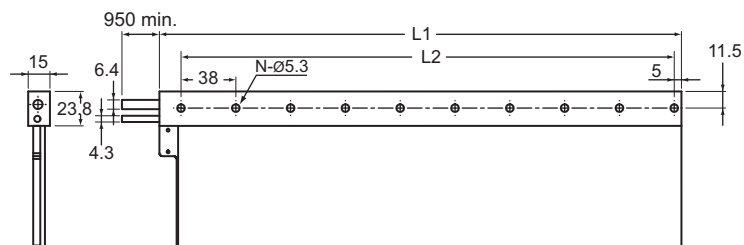
* The weight of 950 mm cables are included.

• 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
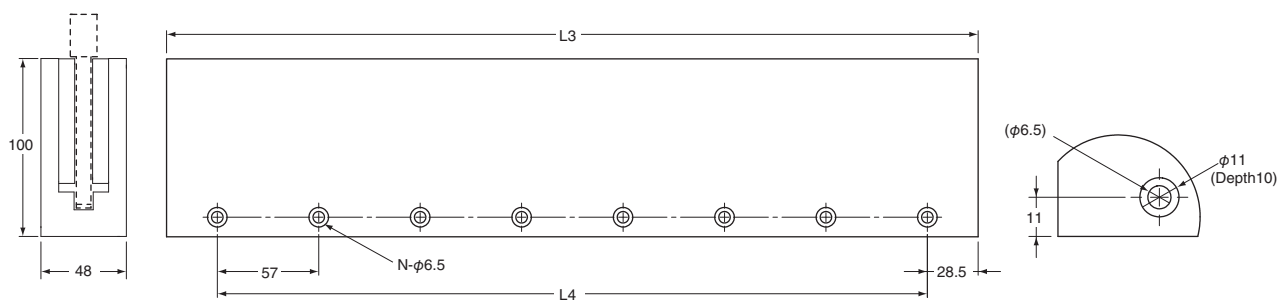
• Combination diagram
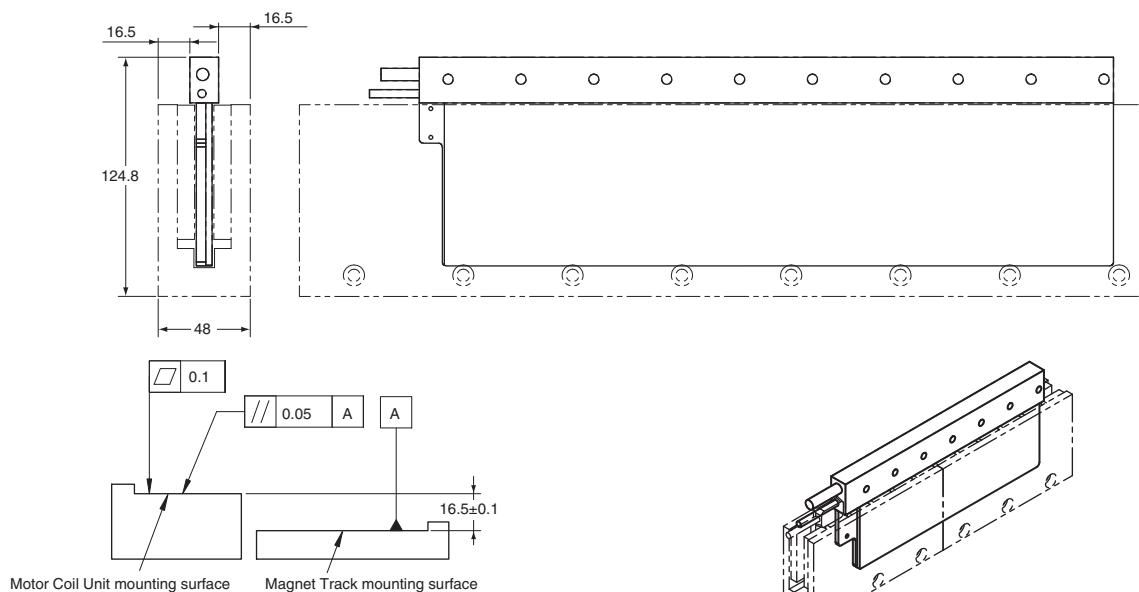
Motor Coil Unit mounting surface   Magnet Track mounting surface

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@)

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

General Specifications
Characteristics/Speed - Force Characteristics
Dimensions
Combination table

Linear Motor and AC Servo Drive Linear Motor Type Combinations

● Iron-core Linear Motor type
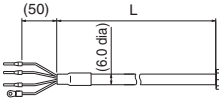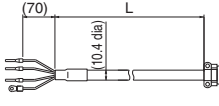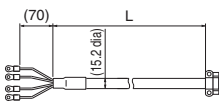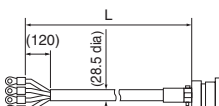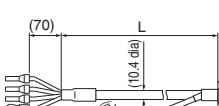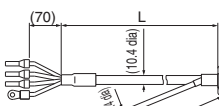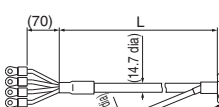
Linear Motor Model Numbers	Power Supply Voltage (V)	Servo Drive Model Numbers	Maximum speed (m/s)
R88L-EC-FW-0303-ANPC	100	R88D-KN01L-ECT-L	2.5
	200	R88D-KN02H-ECT-L	5
	400	R88D-KN06F-ECT-L	10
R88L-EC-FW-0306-ANPC	100	R88D-KN02L-ECT-L	2.5
	200	R88D-KN04H-ECT-L	5
	400	R88D-KN10F-ECT-L	10
R88L-EC-FW-0606-ANPC	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
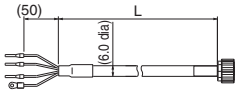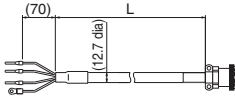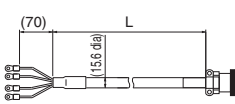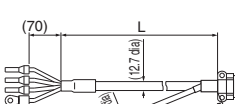
Linear Motor Model Numbers	Power Supply Voltage (V)	Servo Drive Model Numbers	Maximum speed (m/s)
R88L-EC-GW-0303-ANPS	100	R88D-KN01L-ECT-L	8
	200	R88D-KN02H-ECT-L	16
R88L-EC-GW-0306-ANPS	100	R88D-KN04L-ECT-L	8
	200	R88D-KN08H-ECT-L	16
R88L-EC-GW-0309-ANPS	200	R88D-KN10H-ECT-L	16
R88L-EC-GW-0503-ANPS	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

Machine Automation Controller

Connector-Terminal Block
Conversion Units

Control I/O Connector
R88A-CNW01C

● EtherCAT Communications Linear Motor Type

External encoder

Machine Automation
Controller

Connector-Terminal Block
Conversion Units

Control I/O Connector
R88A-CNW01C

Servomotor Power Cables (For CNB)
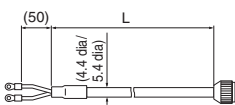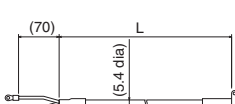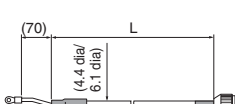
Symbol			Name	Connected to	Model	Description
(1)	Standard Cables	Without Brakes	Standard Servomotor Power Cables for Servomotors without Brakes	[100 V] [200 V] Cylindrical Servomotors, 3,000 r/min, 50 to 750 W	R88A-CAKA@@@S The empty boxes in the model number are for the cable length. The cable can be 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.	[Servomotor Connector] Straight plug: N/MS3106B24-11S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-16A (Japan Aviation Electronics Industry, Ltd.)
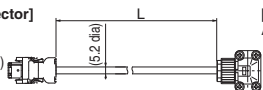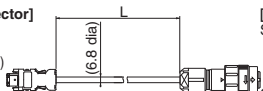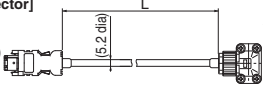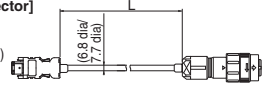
Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

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.)
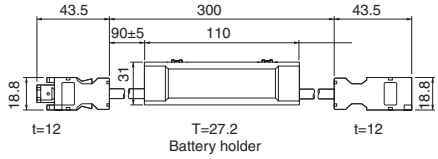
Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

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)
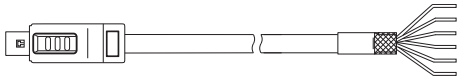
Monitor Connector (for CN5)

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

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

General Specifications
Characteristics/ Speed - Force Characteristics
Dimensions
Combination table

AC Servo System
1S-Series

Best Machine Architecture

- Simple installation and wiring contributes to board design efficiency
- EtherCAT Communications Cycle of 125 μs
- Achievement of Safety on EtherCAT Network
- Supports two-degree-of-freedom control
- Battery-free system reduces maintenance and space
- Comes equipped with a 23-bit ABS encoder
- 350% momentary maximum torque (200 V, 750 W max.)

System Configuration

Controller	Support Software
NJ/NX-series CPU Unit (with EtherCAT port) Machine Automation Controller NJ/NX-series	● Automation Software Sysmac Studio
CJ-series CPU Unit + Position Control Unit (with EtherCAT Interface) Programmable Controller CJ□□-CPU□□ + Position Control Unit (NC) CJ1W-NC□8□	● FA Integrated Tool Package CX-One ✱ (CX-Programmer included)
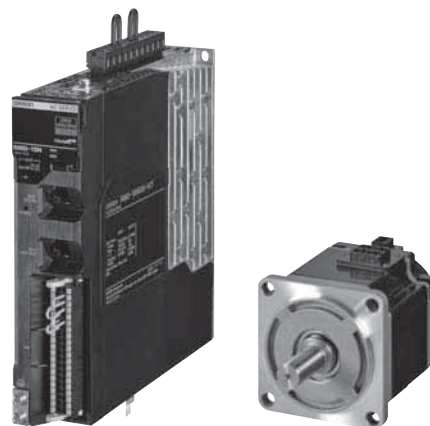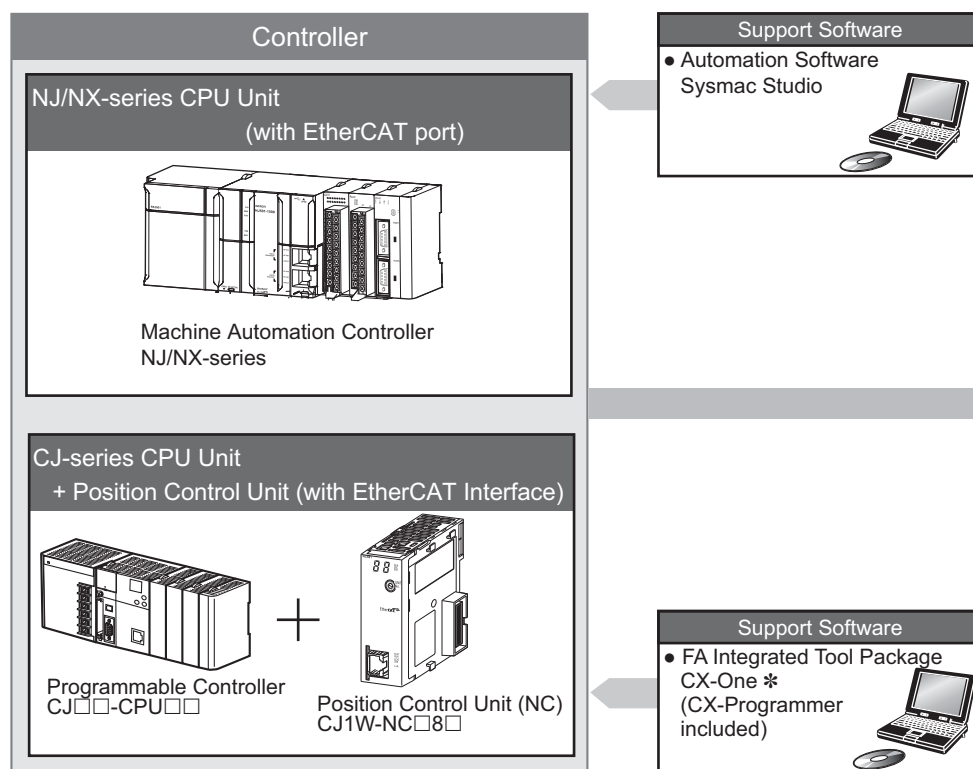
* You cannot use the CX-One to make the settings of 1S-series Servo Drives. Obtain the Sysmac Studio.

USB
communications

EtherCAT
communications

Servo Drive

Power signal

Power cable

● Standard cable
· Without brake wire
R88A-CA1□□□□S
· With brake wire
R88A-CA1□□□□B
● Flexible cable
· Without brake wire
R88A-CA1□□□□SF
· With brake wire
R88A-CA1□□□□BF

Brake cable for 750 W max.

● Standard cable
R88A-CA1A□□□B
● Flexible cable
R88A-CA1A□□□BF

Feedback signal

Encoder cable

● Standard cable
R88A-CR1A□□□C
R88A-CR1B□□□N
● Flexible cable
R88A-CR1A□□□CF
R88A-CR1B□□□NF

● 1S-series Servo Drive
R88D-1SN□-ECT
100 VAC
200 VAC
400 VAC

Servomotor

● 1S-series Servomotor
R88M-1L□/-1M□
3,000 r/min
2,000 r/min
1,000 r/min

ABS

Decelerator

● Backlash: 3 Arcminutes max.
R88G-HPG□

AC Servo Drives with Built-in EtherCAT Communications [1S-series]
R88D-1SN@-ECT

Contents

- Ordering Information
- Specifications
- EtherCAT Communication Specifications
- Version Information
- Names and Functions
- Dimensions
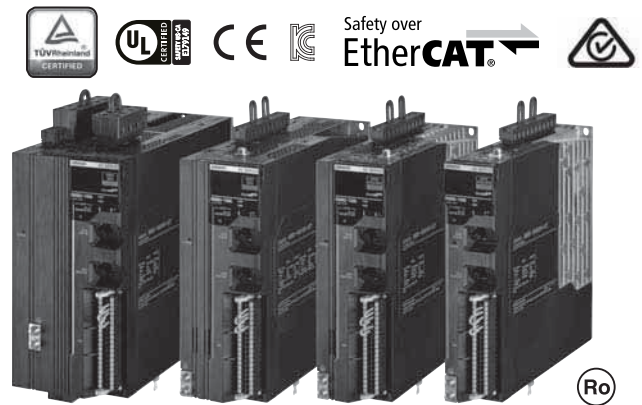
Specifications

General Specifications

Item			Specifications
Operating ambient temperature and humidity			0 to 55°C, 90% max. (with no condensation)
Storage ambient temperature and humidity			-20 to 65°C, 90% max. (with no condensation)
Operating and storage atmosphere			No corrosive gases
Operating altitude			1,000 m max.
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 frequency)
Insulation resistance			Between power supply terminals/power terminals and PE terminals: 0.5 MΩ min. (at 500 VDC)
Dielectric strength			Between power supply terminals/power terminals and PE terminals: 1,500 VAC for 1 min (at 50/60 Hz)
Protective structure			IP20 (Built into IP54 panel)
International standard	EU Directives	EMC Directive	EN 61800-3 second environment, C3 category (EN61326-3-1; Functional Safety)
		Low Voltage Directive	EN 61800-5-1
		Machinery Directive	EN ISO 13849-1 (Cat.3), EN 61508, EN 62061, EN 61800-5-2
	UL standards		UL 61800-5-1
	CSA standards		CSA C22.2 No. 274
	Korean Radio Regulations (KC)		Compliant
	Australian EMC Labelling Requirements (RCM)		Compliant

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

The detail of Machinery Directive is as follows:
The STO function via safety input signals: EN ISO 13849-1 (Cat3 PLe), EN 61508 (SIL3), EN 62061 (SIL3), EN 61800-5-2 (STO)
The STO function via EtherCAT communications: EN ISO 13849-1 (Cat.3 PLd), EN 61508 (SIL2), EN 62061 (SIL2), EN 61800-5-2 (STO)

Precautions for Correct Use
Disconnect all connections to the Servo Drive before attempting a megger test (insulation resistance measurement) on a Servo Drive. Not doing so may result in the Servo Drive failure.
Do not perform a dielectric strength test on the Servo Drive. Internal elements may be damaged.

Characteristics

100-VAC Input Models

Servo Drive model (R88D-)			1SN01L-ECT	1SN02L-ECT	1SN04L-ECT
Item			100 W	200 W	400 W
Input	Main circuit	Power supply voltage	Single-phase 100 to 120 VAC (85 to 132 V) *1		
		Frequency	50/60 Hz (47.5 to 63 Hz) *1		
	Control circuit	Power supply voltage	24 VDC (21.6 to 26.4 V)		
	Rated input current [A (rms)] (Main circuit power supply voltage: 120 VAC)	Single-phase	2.9	4.9	8.4
		3-phase	---	---	---
Output	Rated current [A (rms)]		1.5	2.5	4.8
	Maximum current [A (rms)]		4.7	8.4	14.7
Maximum power loss at power conversion			10% (Load condition: rated output)		
Applicable Servomotor rated output [W]			100	200	400
3,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		1M10030S	1M20030S	1M40030S
Hold time at momentary power interruption (Main circuit power supply voltage: 100 VAC)			10 ms (Load condition: rated output) *2		
Weight [kg]			1.2	1.5	1.9

*1. The values outside parentheses indicate the rated value, and the values inside parentheses indicate the range of acceptable variation.
*2. The control power supply is not specified here as long as a DC power supply that meets the following conditions is used.
    Reinforced insulation or double insulation, and the output hold time of 10 ms or more.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Motion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Specifications

EtherCAT Communications Specifications

Version Information

Part Names

Dimensions

200-VAC Input Models

Servo Drive model (R88D-)			1SN01H-ECT	1SN02H-ECT	1SN04H-ECT	1SN08H-ECT
Item			100 W	200 W	400 W	750 W
Input	Main circuit	Power supply voltage	Single-phase and 3-phase 200 to 240 VAC (170 to 252 V) *1			
		Frequency	50/60 Hz (47.5 to 63 Hz) *1			
	Control circuit	Power supply voltage	24 VDC (21.6 to 26.4 V)			
	Rated current [A (rms)] (Main circuit power supply voltage: 240 VAC)	Single-phase	1.8	2.7	4.6	7.3
		3-phase	1.0	1.5	2.7	4.0
Output	Rated current [A (rms)]		0.8	1.5	2.5	4.6
	Maximum current [A (rms)]		3.1	5.6	9.1	16.9
Maximum power loss at power conversion			10% (Load condition: rated output)			
Applicable Servomotor rated output [W]			100	200	400	750
3,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		1M10030T	1M20030T	1M40030T	1M75030T
2,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		---	---	---	---
1,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		---	---	---	---
Hold time at momentary power interruption (Main circuit power supply voltage: 200 VAC)			10 ms (Load condition: rated output) *2			
Weight [kg]			1.2	1.2	1.5	2.0

Servo Drive model (R88D-)			1SN10H-ECT	1SN15H-ECT	1SN20H-ECT	1SN30H-ECT
Item			1 kW	1.5 kW	2 kW	3 kW
Input	Main circuit	Power supply voltage	3-phase 200 to 240 VAC (170 to 252 V) *1	Single-phase and 3-phase 200 to 240 VAC (170 to 252 V) *1	3-phase 200 to 240 VAC (170 to 252 V) *1	
		Frequency	50/60 Hz (47.5 to 63 Hz) *1			
	Control circuit	Power supply voltage	24 VDC (21.6 to 26.4 V)			
	Rated current [A (rms)] (Main circuit power supply voltage: 240 VAC)	Single-phase	---	15.7	---	---
		3-phase	5.8	9.0	13.0	15.9
Output	Rated current [A (rms)]		7.7	9.7	16.2	22.3
	Maximum current [A (rms)]		16.9	28.4	41.0	54.7
Maximum power loss at power conversion			10% (Load condition: rated output)			
Applicable Servomotor rated output [W]			1,000	1,500	2,000	3,000
3,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		1L1K030T	1L1K530T	1L2K030T	1L3K030T
2,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		1M1K020T	1M1K520T	1M2K020T	1M3K020T
1,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		1M90010T	---	1M2K010T	1M3K010T
Hold time at momentary power interruption (Main circuit power supply voltage: 200 VAC)			10 ms (Load condition: rated output) *2			
Weight [kg]			2.0	3.4	3.4	3.4

*1. The values outside parentheses indicate the rated value, and the values inside parentheses indicate the range of acceptable variation.
*2. The control power supply is not specified here as long as a DC power supply that meets the following conditions is used.
  Reinforced insulation or double insulation, and the output hold time of 10 ms or more.

400-VAC Input Models

Use a neutral grounded 400 VAC 3-phase power supply for the 400 VAC input models in order to satisfy the conditions to obtain the standards.

Servo Drive model (R88D-)			1SN06F-ECT	1SN10F-ECT	1SN15F-ECT	1SN20F-ECT	1SN30F-ECT
Item			600 W	1 kW	1.5 kW	2 kW	3 kW
Input	Main circuit	Power supply voltage	3-phase 380 to 480 VAC (323 to 504 V) *1				
		Frequency	50/60 Hz (47.5 to 63 Hz) *1				
	Control circuit	Power supply voltage	24 VDC (21.6 to 26.4 V)				
	Rated current [A (rms)] (Main circuit power supply voltage: 480 VAC)	3-phase	2.4	3.1	4.3	6.5	8.4
Output	Rated current [A (rms)]		1.8	4.1	4.7	7.8	11.3
	Maximum current [A (rms)]		5.5	9.6	14.1	19.8	28.3
Maximum power loss at power conversion			10% (Load condition: rated output)				
Applicable Servomotor rated output [W]			600	1,000	1,500	2,000	3,000
3,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		---	1L75030C 1L1K030C	1L1K530C	1L2K030C	1L3K030C
2,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		1M40020C 1M60020C	1M1K020C	1M1K520C	1M2K020C	1M3K020C
1,000-r/min Servomotor (R88M-)	Batteryless 23-bit ABS		---	1M90010C	---	1M2K010C	1M3K010C
Hold time at momentary power interruption (Main circuit power supply voltage: 400 VAC)			10 ms (Load condition: rated output) *2				
Weight [kg]			3.4	3.4	3.4	3.4	3.4

*1. The values outside parentheses indicate the rated value, and the values inside parentheses indicate the range of acceptable variation.
*2. The control power supply is not specified here as long as a DC power supply that meets the following conditions is used.
Reinforced insulation or double insulation, and the output hold time of 10 ms or more.

System Configuration

Controllers

Softwares

Specifications

Programmable Terminals

EtherCAT Communications Specifications

Slave Terminals

Version Information

Safety

Part Names

Mortion/Drives

Dimensions

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

EtherCAT Communications Specifications

Item	Specifications
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	Recommended media: Twisted-pair cable, which is doubly shielded by the aluminum tape and braid, with Ethernet Category 5 (100BASE-TX) or higher
Communications distance	Distance between nodes: 100 m max.
Process data	Fixed PDO mapping Variable PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Synchronization mode and communications cycle	DC Mode (Synchronous with Sync0 Event) Communications cycle: 125 µs, 250 µs, 500 µs, 750 µs, 1 to 10 ms (in 0.25 ms increments) Free Run Mode
Indicators	ECAT-L/A IN (Link/Activity IN) × 1 ECAT-L/A OUT (Link/Activity OUT) × 1 ECAT-RUN × 1 ECAT-ERR × 1
CiA 402 Drive Profile	• Cyclic synchronous position mode • Cyclic synchronous velocity mode • Cyclic synchronous torque mode • Profile position mode • Profile velocity mode • Homing mode • Touch probe function • Torque limit function

Version Information

1S-series Servo Drive		Corresponding version	
Model	**Unit version**	**NJ/NX-series CPU Unit**	**Sysmac Studio**
R88D-1SN@-ECT	Version 1.0	NJ: Version 1.11 or later NX: Version 1.11 or later	Version 1.16 or higher

Part Names

Servo Drive Part Names

R88D-1SN01L-ECT/-1SN02L-ECT/-1SN04L-ECT/-1SN01H-ECT/
-1SN02H-ECT/-1SN04H-ECT/-1SN08H-ECT/-1SN10H-ECT

Main circuit connector (CNA)
⏚terminal
7-segment LED display
ID switches
Status indicators
Charge lamp
Control I/O connector (CN1)
⏚terminal

Status indicators
USB connector (CN7)
EtherCAT communications connector (ECAT IN CN10)
EtherCAT communications connector (ECAT OUT CN11)

Brake interlock connector (CN12)
Motor connector (CNC)

Encoder connector (CN2)
⏚terminal

R88D-1SN15H-ECT/-1SN20H-ECT/-1SN30H-ECT/-1SN06F-ECT/
-1SN10F-ECT/-1SN15F-ECT/-1SN20F-ECT/-1SN30F-ECT

Main circuit connector A (CNA)
Control power supply connector (CND)
Main circuit connector B (CNB)
7-segment LED display
ID switches
Status indicators
Charge lamp
Control I/O connector (CN1)
⏚terminal

Status indicators
USB connector (CN7)
EtherCAT communications connector (ECAT IN CN10)
EtherCAT communications connector (ECAT OUT CN11)
Motor connector (CNC)

Encoder connector (CN2)
Brake interlock connector (CN12)
⏚ terminal

⏚ terminal

Top view

Servo Drive Functions

Status Indicators

The following seven indicators are mounted.

Name	Color	Description
PWR	Green	Displays the status of control power supply.
ERR	Red	Gives the Servo Drive error status.
ECAT-RUN	Green	Displays the EtherCAT communications status.
ECAT-ERR	Red	
ECAT-L/A IN, ECAT-L/A OUT	Green	Lights or flashes according to the status of a link in the EtherCAT physical layer.
FS	Red/green	Displays the safety communications status.

7-segment LED Display

A 2-digit 7-segment LED display shows error numbers, the Servo Drive status, and other information.

ID Switches

Two rotary switches (0 to F hex) are used to set the EtherCAT node address.

Charge Lamp

Lights when the main circuit power supply carries electric charge.

Control I/O Connector (CN1)

Used for command input signals, I/O signals, and as the safety device connector. The short-circuit wire is installed on the safety signals before shipment.

Encoder Connector (CN2)

Connector for the encoder installed in the Servomotor.

EtherCAT Communications Connectors (ECAT IN CN10, ECAT OUT CN11)

These connectors are for EtherCAT communications.

USB Connector (CN7)

USB-Micro B Communications connector for the computer. This connector enables USB 2.0 Full Speed (12 Mbps) communications.

Brake Interlock Connector (CN12)

Used for brake interlock signals.

Main Circuit Connector (CNA)

Connector for the main circuit power supply input, control power supply input, external regeneration resistor, and DC reactor.
Applicable models: R88D-1SN01L-ECT/-1SN02L-ECT/-1SN04L-ECT/-1SN01H-ECT/-1SN02H-ECT/-1SN04H-ECT/-1SN08H-ECT/-1SN10H-ECT

Main Circuit Connector A (CNA)

Connector for the main circuit power supply input and external regeneration resistor.
Applicable models: R88D-1SN15H-ECT/-1SN20H-ECT/-1SN30H-ECT/-1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT/-1SN20F-ECT/-1SN30F-ECT

Main Circuit Connector B (CNB)

Connector for a DC reactor.
Applicable models: R88D-1SN15H-ECT/-1SN20H-ECT/-1SN30H-ECT/-1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT/-1SN20F-ECT/-1SN30F-ECT

Control Power Supply Connector (CND)

Connector for control power supply input.
Applicable models: R88D-1SN15H-ECT/-1SN20H-ECT/-1SN30H-ECT/-1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT/-1SN20F-ECT/-1SN30F-ECT

Motor Connector (CNC)

Connector for the power line to the phase U, V, and W of the Servomotor. The connector differs depending on the model.

⏚Terminal

The number of ⏚ terminals of the Servo Drives and their connection targets are as follows.

Model	Number of ⏚ terminals	Connection to
R88D-1SN01L-ECT/-1SN02L-ECT/-1SN04L-ECT/ -1SN01H-ECT/-1SN02H-ECT/-1SN04H-ECT/ -1SN08H-ECT/-1SN10H-ECT	1 on top	PE wire of the main circuit power supply cable. FG wire inside the control panel, and FG wire for the motor cable and shielded wire.
	2 on front	
	1 on bottom	
R88D-1SN15H-ECT/-1SN20H-ECT/-1SN30H-ECT/ -1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT/ -1SN20F-ECT/-1SN30F-ECT	1 on top	PE wire of the main circuit power supply cable. FG wire inside the control panel and the motor cable shielded wire.
	2 on front	
	1 on bottom	

Dimensions

(Unit: mm)

Single-phase 100 VAC: R88D-1SN01L-ECT (100 W)
Single-phase/3-phase 200 VAC: R88D-1SN01H-ECT/-1SN02H-ECT (100 to 200 W)

External dimensions

Mounting dimensions
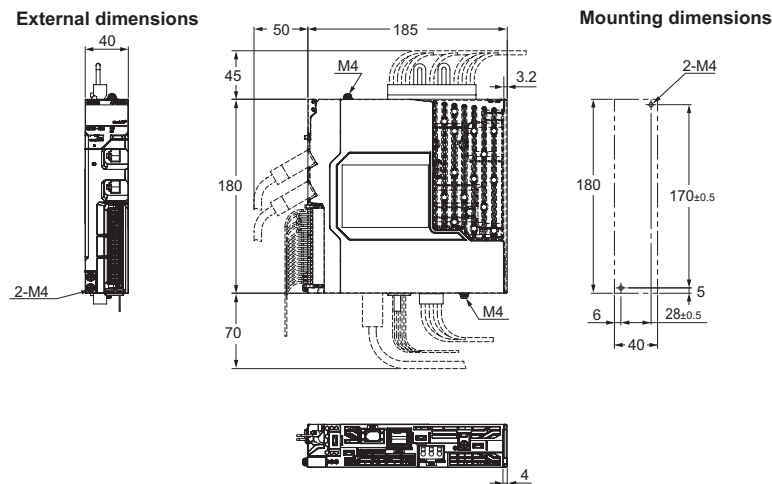
Single-phase 100 VAC: R88D-1SN02L-ECT (200 W)
Single-phase/3-phase 200 VAC: R88D-1SN04H-ECT (400 W)

External dimensions

Mounting dimensions
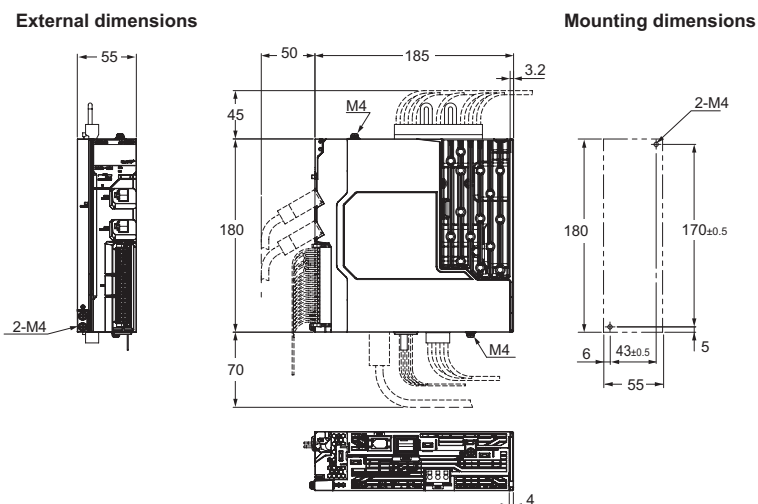
Single-phase 100 VAC: R88D-1SN04L-ECT (400 W)
Single-phase/3-phase 200 VAC: R88D-1SN08H-ECT (750 W)
3-phase 200 VAC: R88D-1SN10H-ECT (1 kW)
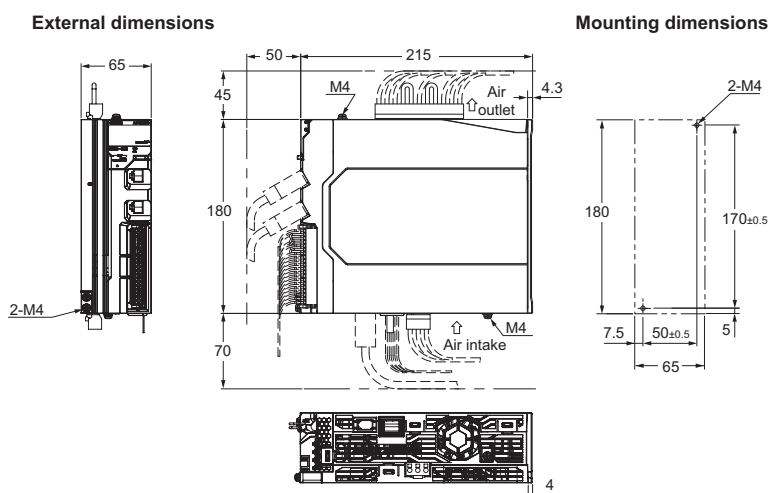
External dimensions

Mounting dimensions

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Specifications
EtherCAT Communications Specifications
Version Information
Part Names
Dimensions

Single-phase/3-phase 200 VAC: R88D-1SN15H-ECT (1.5 kW)
3-phase 200 VAC: R88D-1SN20H-ECT/-1SN30H-ECT (2 to 3 kW)
3-phase 400 VAC: R88D-1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT/-1SN20F-ECT/-1SN30F-ECT (600 W to 3 kW)

External dimensions   **Mounting dimensions**

AC Servomotors [1S-series]
R88M-1L@/-1M@

System Configuration

Controllers

Softwares

Specifications

Part Names

External Dimensions

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information
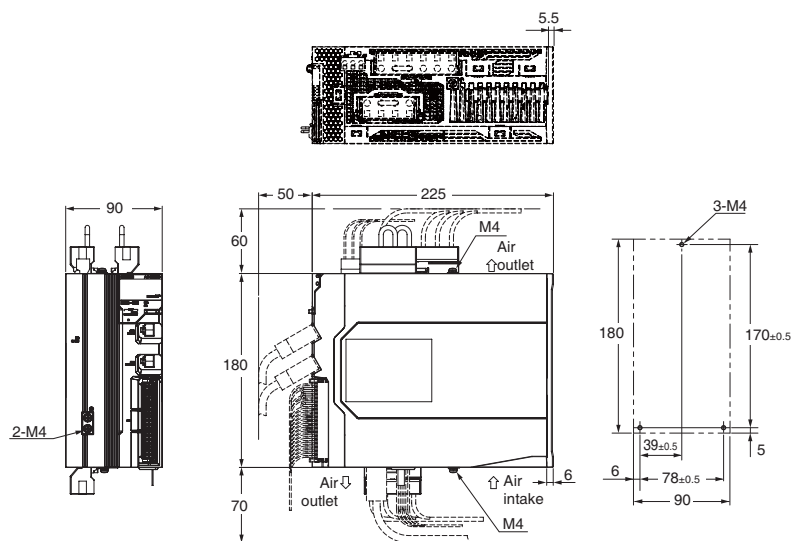
Contents

• Ordering Information
• Specifications
• Names and Functions
• External Dimensions

Specifications

General Specifications

Item	Specifications
Operating ambient temperature and humidity	0 to 40°C 20% to 90% (with no condensation)
Storage ambient temperature and humidity	-20 to 65°C 20% to 90% (with no condensation)
Operating and storage atmosphere	No corrosive gases
Vibration resistance *	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 terminals and FG terminals: 10 MΩ min. (at 500 VDC Megger)
Dielectric strength	Between power terminals and FG terminals: 1,500 VAC for 1 min (voltage 100 V, 200 V) Between power terminals and FG terminals: 1,800 VAC for 1 min (voltage 400 V) Between brake terminal and FG terminals: 1,000 VAC for 1 min
Insulation class	Class F
Protective structure	IP67 (except for the through-shaft part and connector pins) IP20 if you use a 30-meter or longer encoder cable.
International standard	EU Directives	Low Voltage Directive	EN 60034-1/-5
	UL standards	UL 1004-1/-6
	CSA standards	CSA C22.2 No.100 (with cUR mark)

* The amplitude may be increased by machine resonance. As a guideline, 80% of the specified value must not be exceeded.
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 its own weight.

Encoder Specifications

Item	Specifications
Encoder system	Optical batteryless absolute encoder
Resolution per rotation	23 bits
Multi-rotation data hold	16 bits
Power supply voltage	5 VDC±10%
Current consumption	230 mA max.
Output signal	Serial communications
Output interface	RS485 compliant

Note: It is possible to use an absolute encoder as an incremental encoder.
  Refer to the *AC Servomotors/Servo Drives 1S-series with Built-in EtherCAT® Communications User's Manual* (Cat.No.I586) for details.

Characteristics

3,000-r/min Servomotors

Model (R88M-)		100 VAC		
Item	Unit	1M10030S	1M20030S	1M40030S
Rated output *1 *2	W	100	200	400
Rated torque *1 *2	N·m	0.318	0.637	1.27
Rated rotation speed *1 *2	r/min	3,000		
Maximum rotation speed	r/min	6,000		
Momentary maximum torque *1	N·m	0.95	1.91	3.8
Rated current *1 *2	A (rms)	1.50	2.50	4.8
Momentary maximum current *1	A (rms)	4.70	8.40	14.7
Rotor inertia — Without brake	× 10⁻⁴ kg·m²	0.0890	0.2232	0.4452
Rotor inertia — With brake	× 10⁻⁴ kg·m²	0.0968	0.2832	0.5052
Applicable load inertia	× 10⁻⁴ kg·m²	1.62	4.80	8.40
Torque constant *1	N·m/ A (rms)	0.24	0.28	0.30
Power rate *1 *3	kW/s	11.9	18.5	36.6
Mechanical time constant *3	ms	1.1	0.76	0.61
Electrical time constant	ms	0.84	2.4	2.4
Allowable radial load *4	N	68	245	245
Allowable thrust load *4	N	58	88	88
Weight — Without brake	kg	0.52	1.0	1.4
Weight — With brake	kg	0.77	1.3	1.9
Radiator plate dimensions (material)	mm	250 × 250 × t6 (aluminum)		
Brake specifications — Excitation voltage *5	V	24 VDC±10%		
Brake specifications — Current consumption (at 20°C)	A	0.27	0.32	0.32
Brake specifications — Static friction torque	N·m	0.32 min.	1.37 min.	1.37 min.
Brake specifications — Attraction time	ms	25 max.	30 max.	30 max.
Brake specifications — Release time *6	ms	15 max.	20 max.	20 max.
Brake specifications — Backlash	°	1.2 max.	1.2 max.	1.2 max.
Brake specifications — Allowable braking work	J	9	60	60
Brake specifications — Allowable total work	J	9,000	60,000	60,000
Brake specifications — Allowable angular acceleration	rad/s²	10,000 max.		
Brake specifications — Brake lifetime (acceleration/deceleration)	---	10 million times min.		
Brake specifications — Insulation class	---	Class F		

For models with an oil seal, the following derating is used due to increase in friction torque.

Model (R88M-)	1M10030S-O/ -OS2/ -BO/ -BOS2	1M20030S-O/ -OS2/ -BO/ -BOS2	1M40030S-O/ -OS2/ -BO/ -BOS2
Item — Unit			
Derating rate — %	95	95	80
Rated output — W	95	190	320
Rated current — A (rms)	1.50	2.50	4.0

Model (R88M-)		200 VAC			
Item	Unit	1M10030T	1M20030T	1M40030T	1M75030T
Rated output *1 *2	W	100	200	400	750
Rated torque *1 *2	N·m	0.318	0.637	1.27	2.39
Rated rotation speed *1 *2	r/min	3,000			
Maximum rotation speed	r/min	6,000			
Momentary maximum torque *1	N·m	1.11	2.2	4.5	8.4
Rated current *1 *2	A (rms)	0.84	1.5	2.5	4.6
Momentary maximum current *1	A (rms)	3.10	5.6	9.1	16.9
Rotor inertia — Without brake	× 10⁻⁴ kg·m²	0.0890	0.2232	0.4452	1.8242
Rotor inertia — With brake	× 10⁻⁴ kg·m²	0.0968	0.2832	0.5052	2.0742
Applicable load inertia	× 10⁻⁴ kg·m²	1.62	4.80	8.40	19.4
Torque constant *1	N·m/ A (rms)	0.42	0.48	0.56	0.59
Power rate *1 *3	kW/s	11.9	18.5	36.6	31.4
Mechanical time constant *3	ms	1.2	0.78	0.56	0.66
Electrical time constant	ms	0.83	2.4	2.6	3.3
Allowable radial load *4	N	68	245	245	490
Allowable thrust load *4	N	58	88	88	196
Weight — Without brake	kg	0.52	1.0	1.4	2.9
Weight — With brake	kg	0.77	1.3	1.9	3.9
Radiator plate dimensions (material)	mm	250 × 250 × t6 (aluminum)			
Brake specifications — Excitation voltage *5	V	24 VDC±10%			
Current consumption (at 20°C)	A	0.27	0.32	0.32	0.37
Static friction torque	N·m	0.32 min.	1.37 min.	1.37 min.	2.55 min.
Attraction time	ms	25 max.	30 max.	30 max.	40 max.
Release time *6	ms	15 max.	20 max.	20 max.	35 max.
Backlash	°	1.2 max.	1.2 max.	1.2 max.	1.0 max.
Allowable braking work	J	9	60	60	250
Allowable total work	J	9,000	60,000	60,000	250,000
Allowable angular acceleration	rad/s²	10,000 max.			
Brake lifetime (acceleration/deceleration)	---	10 million times min.			
Insulation class	---	Class F			

For models with an oil seal, the following derating is used due to increase in friction torque.

Model (R88M-) Item	Unit	1M10030T-O/ -OS2/ -BO/ -BOS2	1M20030T-O/ -OS2/ -BO/ -BOS2	1M40030T-O/ -OS2/ -BO/ -BOS2	1M75030T-O/ -OS2/ -BO/ -BOS2
Derating rate	%	95	95	80	90
Rated output	W	95	190	320	675
Rated current	A (rms)	0.84	1.5	2.1	4.2

Model (R88M-)			200 VAC			
Item	Unit	1L1K030T	1L1K530T	1L2K030T	1L3K030T	
Rated output *1 *2	W	1,000	1,500	2,000	3,000	
Rated torque *1 *2	N·m	3.18	4.77	6.37	9.55	
Rated rotation speed *1 *2	r/min	3,000				
Maximum rotation speed	r/min	5,000				
Momentary maximum torque *1	N·m	9.55	14.3	19.1	28.7	
Rated current *1 *2	A (rms)	5.2	8.8	12.5	17.1	
Momentary maximum current *1	A (rms)	16.9	28.4	41.0	54.7	
Rotor inertia	Without brake	$\times 10^{-4}$ kg·m^2	2.1042	2.1042	2.4042	6.8122
	With brake	$\times 10^{-4}$ kg·m^2	2.5542	2.5542	2.8542	7.3122
Applicable load inertia	$\times 10^{-4}$ kg·m^2	35.3	47.6	60.2	118	
Torque constant *1	N·m/ A (rms)	0.67	0.58	0.56	0.64	
Power rate *1 *3	kW/s	48	108	169	134	
Mechanical time constant *3	ms	0.58	0.58	0.50	0.47	
Electrical time constant	ms	5.9	6.1	6.4	11	
Allowable radial load *4	N	490				
Allowable thrust load *4	N	196				
Weight	Without brake	kg	5.7	5.7	6.4	11.5
	With brake	kg	7.4	7.4	8.1	12.5
Radiator plate dimensions (material)	mm	400 × 400 × t20 (aluminum)		470 × 470 × t20 (aluminum)		
Brake specifications	Excitation voltage *5	V	24 VDC±10%			
	Current consumption (at 20°C)	A	0.70	0.70	0.70	0.66
	Static friction torque	N·m	9.3 min.	9.3 min.	9.3 min.	12.0 min.
	Attraction time	ms	100 max.	100 max.	100 max.	100 max.
	Release time *6	ms	30 max.	30 max.	30 max.	30 max.
	Backlash	°	1.0 max.	1.0 max.	1.0 max.	0.8 max.
	Allowable braking work	J	500	500	500	1,000
	Allowable total work	J	900,000	900,000	900,000	3,000,000
	Allowable angular acceleration	rad/s^2	10,000 max.			
	Brake lifetime (acceleration/ deceleration)	---	10 million times min.			
	Insulation class	---	Class F			

Model (R88M-)			400 VAC		
Item		Unit	1L75030C	1L1K030C	1L1K530C
Rated output *1 *2		W	750	1,000	1,500
Rated torque *1 *2		N·m	2.39	3.18	4.77
Rated rotation speed *1 *2		r/min	3,000		
Maximum rotation speed		r/min	5,000		
Momentary maximum torque *1		N·m	7.16	9.55	14.3
Rated current *1 *2		A (rms)	3.0	3.0	4.5
Momentary maximum current *1		A (rms)	9.6	9.6	14.1
Rotor inertia	Without brake	× 10^{-4} kg·m²	1.3042	2.1042	2.1042
	With brake	× 10^{-4} kg·m²	1.7542	2.5542	2.5542
Applicable load inertia		× 10^{-4} kg·m²	38.6	35.3	47.6
Torque constant *1		N·m/ A (rms)	0.91	1.17	1.17
Power rate *1 *3		kW/s	44	48	108
Mechanical time constant *3		ms	1.09	0.6	0.58
Electrical time constant		ms	4.3	5.9	5.9
Allowable radial load *4		N	490		
Allowable thrust load *4		N	196		
Weight	Without brake	kg	4.1	5.7	5.7
	With brake	kg	5.8	7.4	7.4
Radiator plate dimensions (material)		mm	305 × 305 × t20 (aluminum)	400 × 400 × t20 (aluminum)	
Brake specifications	Excitation voltage *5	V	24 VDC±10%		
	Current consumption (at 20°C)	A	0.70	0.70	0.70
	Static friction torque	N·m	9.3 min.	9.3 min.	9.3 min.
	Attraction time	ms	100 max.	100 max.	100 max.
	Release time *6	ms	30 max.	30 max.	30 max.
	Backlash	°	1.0 max.	1.0 max.	1.0 max.
	Allowable braking work	J	500	500	500
	Allowable total work	J	900,000	900,000	900,000
	Allowable angular acceleration	rad/s²	10,000 max.		
	Brake lifetime (acceleration/deceleration)	---	10 million times min.		
	Insulation class	---	Class F		

System Configuration

Controllers

Softwares

Specifications — Programmable Terminals

Part Names — Slave Terminals

External Dimensions

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Item		Model (R88M-) Unit	400 VAC	
			1L2K030C	1L3K030C
Rated output *1 *2		W	2,000	3,000
Rated torque *1 *2		N·m	6.37	9.55
Rated rotation speed *1 *2		r/min	3,000	
Maximum rotation speed		r/min	5,000	
Momentary maximum torque *1		N·m	19.1	28.7
Rated current *1 *2		A (rms)	6.3	8.7
Momentary maximum current *1		A (rms)	19.8	27.7
Rotor inertia	Without brake	× 10⁻⁴ kg·m²	2.4042	6.8122
	With brake	× 10⁻⁴ kg·m²	2.8542	7.3122
Applicable load inertia		× 10⁻⁴ kg·m²	60.2	118
Torque constant *1		N·m/ A (rms)	1.15	1.23
Power rate *1 *3		kW/s	169	134
Mechanical time constant *3		ms	0.52	0.49
Electrical time constant		ms	6.3	11
Allowable radial load *4		N	490	
Allowable thrust load *4		N	196	
Weight	Without brake	kg	6.4	11.5
	With brake	kg	8.1	12.5
Radiator plate dimensions (material)		mm	470 × 470 × t20 (aluminum)	
Brake specifications	Excitation voltage *5	V	24 VDC±10%	
	Current consumption (at 20°C)	A	0.70	0.66
	Static friction torque	N·m	9.3 min.	12 min.
	Attraction time	ms	100 max.	100 max.
	Release time *6	ms	30 max.	30 max.
	Backlash	°	1.0 max.	0.8 max.
	Allowable braking work	J	500	1,000
	Allowable total work	J	900,000	3,000,000
	Allowable angular acceleration	rad/s²	10,000 max.	
	Brake lifetime (acceleration/ deceleration)	---	10 million times min.	
	Insulation class	---	Class F	

*1. This is a typical value for when the Servomotor is used at a normal temperature (20°C, 65%) in combination with a Servo Drive.
*2. The rated values are the values with which continuous operation is possible at an ambient temperature of 40°C when the Servomotor is horizontally installed on a specified radiator plate.
*3. This value is for models without options.
*4. 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.

*5. This is a non-excitation brake. It is released when excitation voltage is applied.
*6. This value is a reference value.

Torque-Rotation Speed Characteristics for 3,000-r/min Servomotors (100 VAC)

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

• R88M-1M10030S

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

• R88M-1M20030S

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

• R88M-1M40030S

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

Note: The continuous operation range is the range in which continuous operation is possible at an ambient temperature of 40°C when the Servomotor is horizontally installed on a specified radiator plate.
Continuous operation at the maximum speed is also possible. However, doing so will reduce the output torque.

Torque-Rotation Speed Characteristics for 3,000-r/min Servomotors (200 VAC)

The following graphs show the characteristics with a 3-m standard cable and a 3-phase 200-VAC or single-phase 220-VAC input.

• R88M-1M10030T

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

• R88M-1M20030T

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

• R88M-1M40030T

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

• R88M-1M75030T

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

• R88M-1L1K030T

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

• R88M-1L1K530T

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

• R88M-1L2K030T

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

• R88M-1L3K030T

Torque[N·m] / Rotation[r/min]
Momentary operation range
Continuous operation range

Note: The continuous operation range is the range in which continuous operation is possible at an ambient temperature of 40°C when the Servomotor is horizontally installed on a specified radiator plate.
Continuous operation at the maximum speed is also possible. However, doing so will reduce the output torque.

System Configuration
Controllers
Softwares
Specifications
Part Names
External Dimensions
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Torque-Rotation Speed Characteristics for 3,000-r/min Servomotors (400 VAC)

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

• R88M-1L75030C

Momentary operation range
Continuous operation range

Torque[N·m] — 0, 1, 2, 3, 4, 5, 6, 7, 8
Rotation[r/min] — 0, 1000, 2000, 3000, 4000, 5000

• R88M-1L1K030C

Momentary operation range
Continuous operation range

Torque[N·m] — 0, 2, 4, 6, 8, 10, 12
Rotation[r/min] — 0, 1000, 2000, 3000, 4000, 5000

• R88M-1L1K530C

Momentary operation range
Continuous operation range

Torque[N·m] — 0, 2, 4, 6, 8, 10, 12, 14, 16
Rotation[r/min] — 0, 1000, 2000, 3000, 4000, 5000

• R88M-1L2K030C

Momentary operation range
Continuous operation range

Torque[N·m] — 0, 5, 10, 15, 20, 25
Rotation[r/min] — 0, 1000, 2000, 3000, 4000, 5000

• R88M-1L3K030C

Momentary operation range
Continuous operation range

Torque[N·m] — 0, 5, 10, 15, 20, 25, 30, 35
Rotation[r/min] — 0, 1000, 2000, 3000, 4000, 5000

Note: The continuous operation range is the range in which continuous operation is possible at an ambient temperature of 40°C when the Servomotor is horizontally installed on a specified radiator plate.
Continuous operation at the maximum speed is also possible. However, doing so will reduce the output torque.

2,000-r/min Servomotors

Model (R88M-)		Unit	200 VAC			
Item			1M1K020T	1M1K520T	1M2K020T	1M3K020T
Rated output *1 *2		**W**	1,000	1,500	2,000	3,000
Rated torque *1 *2		**N·m**	4.77	7.16	9.55	14.3
Rated rotation speed *1 *2		**r/min**	2,000			
Maximum rotation speed		**r/min**	3,000			
Momentary maximum torque *1		**N·m**	14.3	21.5	28.7	43.0
Rated current *1 *2		**A (rms)**	5.2	8.6	11.3	15.7
Momentary maximum current *1		**A (rms)**	16.9	28.4	40.6	54.7
Rotor inertia	Without brake	**× 10⁻⁴ kg·m²**	6.0042	9.0042	12.2042	15.3122
	With brake	**× 10⁻⁴ kg·m²**	6.5042	9.5042	12.7042	17.4122
Applicable load inertia		**× 10⁻⁴ kg·m²**	59.0	79.9	100	142
Torque constant *1		**N·m/ A (rms)**	0.93	0.83	0.85	0.93
Power rate *1 *3		**kW/s**	38	57	75	134
Mechanical time constant *3		**ms**	0.94	0.78	0.81	0.80
Electrical time constant		**ms**	13	15	14	19
Allowable radial load *4		**N**	490			784
Allowable thrust load *4		**N**	196			343
Weight	Without brake	**kg**	6.6	8.5	10	12
	With brake	**kg**	8.6	10.5	12	15
Radiator plate dimensions (material)		**mm**	400 × 400 × t20 (aluminum)	470 × 470 × t20 (aluminum)		
Brake specifications	**Excitation voltage** *5	**V**	24 VDC±10%			
	Current consumption (at 20°C)	**A**	0.51	0.51	0.66	0.60
	Static friction torque	**N·m**	9.0 min.	9.0 min.	12 min.	16 min.
	Attraction time	**ms**	100 max.	100 max.	100 max.	150 max.
	Release time *6	**ms**	30 max.	30 max.	30 max.	50 max.
	Backlash	**°**	0.6 max.	0.6 max.	0.6 max.	0.6 max.
	Allowable braking work	**J**	1,000	1,000	1,000	350
	Allowable total work	**J**	3,000,000	3,000,000	3,000,000	1,000,000
	Allowable angular acceleration	**rad/s²**	10,000 max.			
	Brake lifetime (acceleration/ deceleration)	**---**	10 million times min.			
	Insulation class	**---**	Class F			

Model (R88M-)			400 VAC		
Item	Unit		1M40020C	1M60020C	1M1K020C
Rated output *1 *2	W		400	600	1,000
Rated torque *1 *2	N·m		1.91	2.86	4.77
Rated rotation speed *1 *2	r/min		2,000		
Maximum rotation speed	r/min		3,000		
Momentary maximum torque *1	N·m		5.73	8.59	14.3
Rated current *1 *2	A (rms)		1.1	1.6	2.9
Momentary maximum current *1	A (rms)		3.9	5.5	9.4
Rotor inertia	Without brake	$\times 10^{-4}$ kg·m^2	2.5042	3.9042	6.0042
	With brake	$\times 10^{-4}$ kg·m^2	2.8472	4.2472	6.5042
Applicable load inertia	$\times 10^{-4}$ kg·m^2		19.0	23.5	59.0
Torque constant *1	N·m/ A (rms)		1.75	1.84	1.69
Power rate *1 *3	kW/s		14.6	21.0	38
Mechanical time constant *3	ms		1.57	1.21	0.94
Electrical time constant	ms		6.8	7.8	13
Allowable radial load *4	N		490		
Allowable thrust load *4	N		196		
Weight	Without brake	kg	3.9	4.7	6.6
	With brake	kg	4.8	5.8	8.6
Radiator plate dimensions (material)	mm		$305 \times 305 \times$ t12 (aluminum)		$400 \times 400 \times$ t20 (aluminum)
Brake specifications	Excitation voltage *5	V	24 VDC±10%		
	Current consumption (at 20°C)	A	0.30	0.30	0.51
	Static friction torque	N·m	3.92 min.	3.92 min.	9.0 min.
	Attraction time	ms	40 max.	40 max.	100 max.
	Release time *6	ms	25 max.	25 max.	30 max.
	Backlash	°	1.0 max.	1.0 max.	0.6 max.
	Allowable braking work	J	330	330	1,000
	Allowable total work	J	330,000	330,000	3,000,000
	Allowable angular acceleration	rad/s^2	10,000 max.		
	Brake lifetime (acceleration/ deceleration)	---	10 million times min.		
	Insulation class	---	Class F		

Model (R88M-)			400 VAC		
Item		**Unit**	**1M1K520C**	**1M2K020C**	**1M3K020C**
Rated output *1 *2		W	1,500	2,000	3,000
Rated torque *1 *2		N·m	7.16	9.55	14.3
Rated rotation speed *1 *2		r/min	2,000		
Maximum rotation speed		r/min	3,000		
Momentary maximum torque *1		N·m	21.5	28.7	43.0
Rated current *1 *2		A (rms)	4.1	5.7	8.6
Momentary maximum current *1		A (rms)	13.5	19.8	28.3
Rotor inertia	Without brake	× 10⁻⁴ kg·m²	9.0042	12.2042	15.3122
	With brake	× 10⁻⁴ kg·m²	9.5042	12.7042	17.4122
Applicable load inertia		× 10⁻⁴ kg·m²	79.9	100	142
Torque constant *1		N·m/ A (rms)	1.75	1.75	1.74
Power rate *1 *3		kW/s	57	75	134
Mechanical time constant *3		ms	0.85	0.80	0.76
Electrical time constant		ms	13	14	20
Allowable radial load *4		N	490		784
Allowable thrust load *4		N	196		343
Weight	Without brake	kg	8.5	10	12
	With brake	kg	10.5	12	15
Radiator plate dimensions (material)		mm	470 × 470 × t20 (aluminum)		
Brake specifications	Excitation voltage *5	V	24 VDC±10%		
	Current consumption (at 20°C)	A	0.51	0.66	0.60
	Static friction torque	N·m	9.0 min.	12 min.	16 min.
	Attraction time	ms	100 max.	100 max.	150 max.
	Release time *6	ms	30 max.	30 max.	50 max.
	Backlash	°	0.6 max.	0.6 max.	0.6 max.
	Allowable braking work	J	1,000	1,000	350
	Allowable total work	J	3,000,000	3,000,000	1,000,000
	Allowable angular acceleration	rad/s²	10,000 max.		
	Brake lifetime (acceleration/ deceleration)	---	10 million times min.		
	Insulation class	---	Class F		

*1. This is a typical value for when the Servomotor is used at a normal temperature (20°C, 65%) in combination with a Servo Drive.
*2. The rated values are the values with which continuous operation is possible at an ambient temperature of 40°C when the Servomotor is horizontally installed on a specified radiator plate.
*3. This value is for models without options.
*4. 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.

*5. This is a non-excitation brake. It is released when excitation voltage is applied.
*6. This value is a reference value.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information
Specifications
Part Names
External Dimensions

Torque-Rotation Speed Characteristics for 2,000-r/min Servomotors (200 VAC)

The following graphs show the characteristics with a 3-m standard cable and a 3-phase 200-VAC or single-phase 220-VAC input.

• R88M-1M1K020T

• R88M-1M1K520T
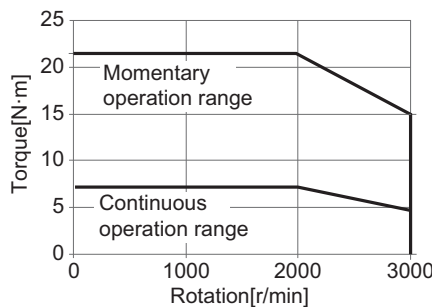
• R88M-1M2K020T
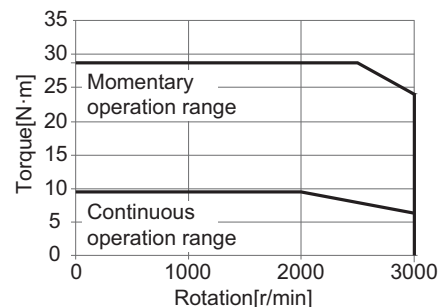
• R88M-1M3K020T
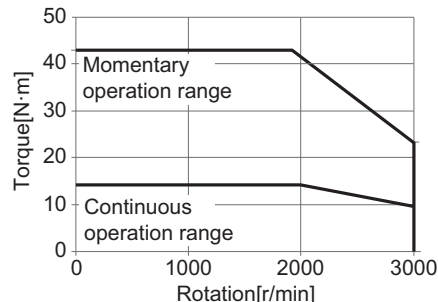
Note: The continuous operation range is the range in which continuous operation is possible at an ambient temperature of 40°C when the Servomotor is horizontally installed on a specified radiator plate.
Continuous operation at the maximum speed is also possible. However, doing so will reduce the output torque.

Torque-Rotation Speed Characteristics for 2,000-r/min Servomotors (400 VAC)

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

• R88M-1M40020C
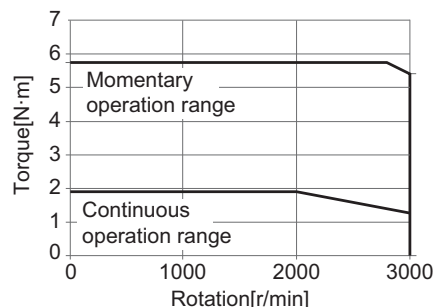
• R88M-1M60020C
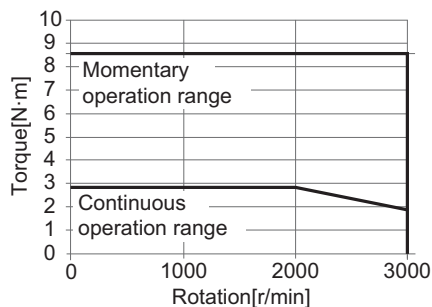
• R88M-1M1K020C
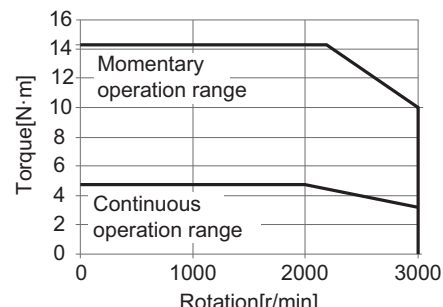
• R88M-1M1K520C
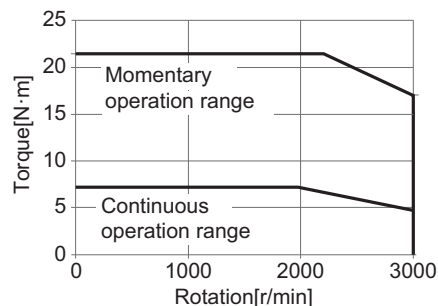
• R88M-1M2K020C
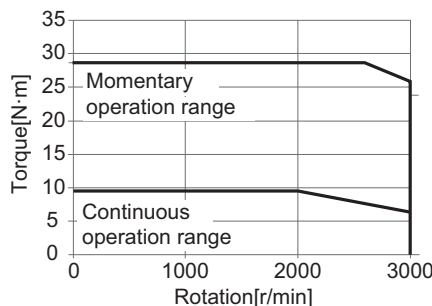
• R88M-1M3K020C
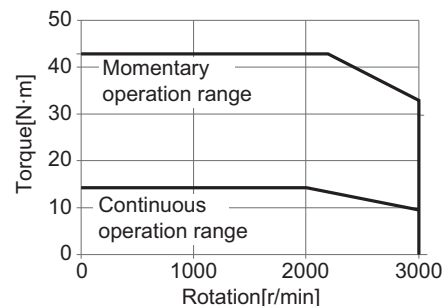
Note: The continuous operation range is the range in which continuous operation is possible at an ambient temperature of 40°C when the Servomotor is horizontally installed on a specified radiator plate.
Continuous operation at the maximum speed is also possible. However, doing so will reduce the output torque.

1,000-r/min Servomotors

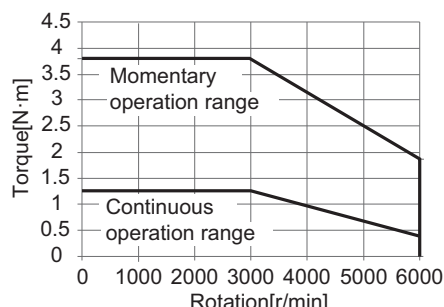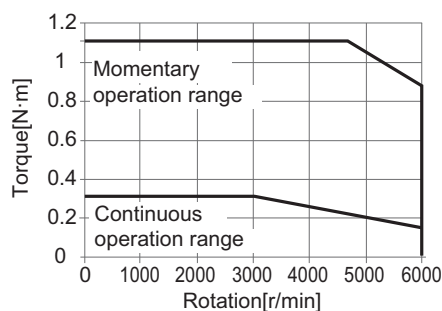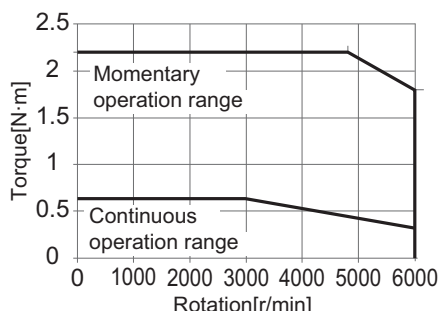| Model (R88M-)		Unit	200 VAC		
Item		Unit	1M90010T	1M2K010T	1M3K010T
Rated output *1 *2		W	900	2,000	3,000
Rated torque *1 *2		N·m	8.59	19.1	28.7
Rated rotation speed *1 *2		r/min	1,000		
Maximum rotation speed		r/min	2,000		
Momentary maximum torque *1		N·m	19.3	47.7	71.7
Rated current *1 *2		A (rms)	6.7	14.4	21.2
Momentary maximum current *1		A (rms)	16.9	40.6	54.7
Rotor inertia	Without brake	× 10⁻⁴ kg·m²	9.0042	40.0122	68.0122
	With brake	× 10⁻⁴ kg·m²	9.5042	45.1122	73.1122
Applicable load inertia		× 10⁻⁴ kg·m²	79.9	314	492
Torque constant *1		N·m/ A (rms)	1.28	1.45	1.51
Power rate *1 *3		kW/s	82	91	121
Mechanical time constant *3		ms	0.77	1.0	0.83
Electrical time constant		ms	15	18	22
Allowable radial load *4		N	686	1,176	1,470
Allowable thrust load *4		N	196	490	
Weight	Without brake	kg	8.5	18	28
	With brake	kg	10.5	22	33
Radiator plate dimensions (material)		mm	470 × 470 × t20 (aluminum)		540 × 540 × t20 (aluminum)
Brake specifications	Excitation voltage *5	V	24 VDC±10%		
	Current consumption (at 20°C)	A	0.51	1.2	1.0
	Static friction torque	N·m	9.0 min.	22 min.	42 min.
	Attraction time	ms	100 max.	120 max.	150 max.
	Release time *6	ms	30 max.	50 max.	60 max.
	Backlash	°	0.6 max.	0.8 max.	0.8 max.
	Allowable braking work	J	1,000	1,400	1,400
	Allowable total work	J	3,000,000	4,600,000	4,600,000
	Allowable angular acceleration	rad/s²	10,000 max.		
	Brake lifetime (acceleration/ deceleration)	---	10 million times min.		
	Insulation class	---	Class F		

Model (R88M-)			400 VAC		
Item		Unit	1M90010C	1M2K010C	1M3K010C
Rated output *1 *2		W	900	2,000	3,000
Rated torque *1 *2		N·m	8.59	19.1	28.7
Rated rotation speed *1 *2		r/min	1,000		
Maximum rotation speed		r/min	2,000		
Momentary maximum torque *1		N·m	19.3	47.7	71.7
Rated current *1 *2		A (rms)	3.6	7.1	10.6
Momentary maximum current *1		A (rms)	9.0	19.5	27.7
Rotor inertia	Without brake	× 10⁻⁴ kg·m²	9.0042	40.0122	68.0122
	With brake	× 10⁻⁴ kg·m²	9.5042	45.1122	73.1122
Applicable load inertia		× 10⁻⁴ kg·m²	79.9	314	492
Torque constant *1		N·m/ A (rms)	2.41	3.00	2.97
Power rate *1 *3		kW/s	82	91	121
Mechanical time constant *3		ms	0.88	1.2	0.92
Electrical time constant		ms	13	16	19
Allowable radial load *4		N	686	1,176	1,470
Allowable thrust load *4		N	196	490	
Weight	Without brake	kg	8.5	18	28
	With brake	kg	10.5	22	33
Radiator plate dimensions (material)		mm	470 × 470 × t20 (aluminum)		540 × 540 × t20 (aluminum)
Brake specifications	Excitation voltage *5	V	24 VDC±10%		
	Current consumption (at 20°C)	A	0.51	1.2	1.0
	Static friction torque	N·m	9.0 min.	22 min.	42 min.
	Attraction time	ms	100 max.	120 max.	150 max.
	Release time *6	ms	30 max.	50 max.	60 max.
	Backlash	°	0.6 max.	0.8 max.	0.8 max.
	Allowable braking work	J	1,000	1,400	1,400
	Allowable total work	J	3,000,000	4,600,000	4,600,000
	Allowable angular acceleration	rad/s²	10,000 max.		
	Brake lifetime (acceleration/deceleration)	---	10 million times min.		
	Insulation class	---	Class F		

*1. This is a typical value for when the Servomotor is used at a normal temperature (20°C, 65%) in combination with a Servo Drive.
*2. The rated values are the values with which continuous operation is possible at an ambient temperature of 40°C when the Servomotor is horizontally installed on a specified radiator plate.
*3. This value is for models without options.
*4. 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.

Radial load
Thrust load
Center of shaft (LR/2)
LR

*5. This is a non-excitation brake. It is released when excitation voltage is applied.
*6. This value is a reference value.

Torque-Rotation Speed Characteristics for 1,000-r/min Servomotors (200 V/400 VAC)

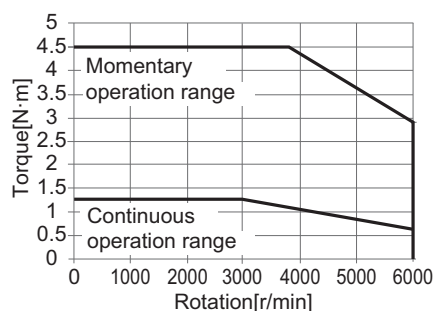The following graphs show the characteristics with a 3-m standard cable and a 3-phase 200-VAC or single-phase 220/400-VAC input.
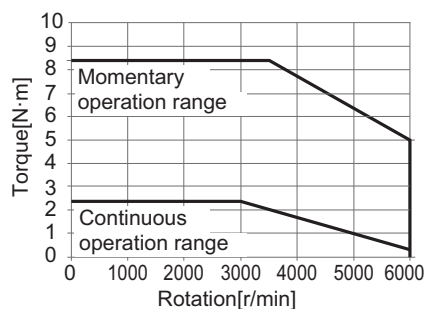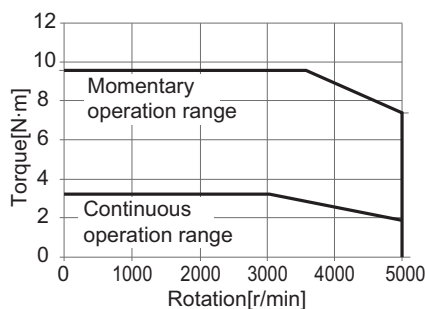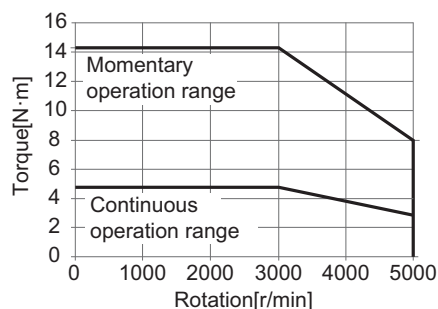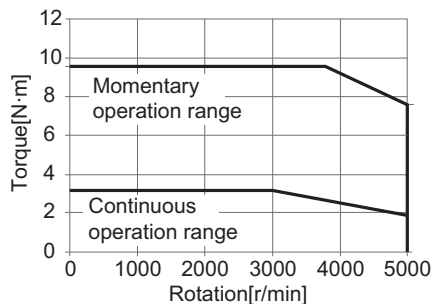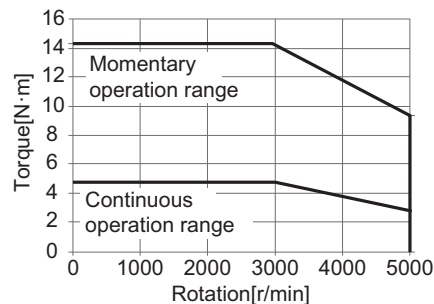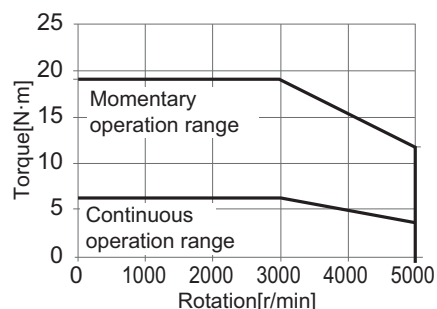
- R88M-1M90010T
- R88M-1M2K010T
- R88M-1M3K010T

AC Servo System **1S-series**
AC Servomotors

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Specifications

Part Names

External Dimensions

Momentary operation range

Continuous operation range

Torque[N·m]

Rotation[r/min]

Momentary operation range

Continuous operation range

Torque[N·m]

Rotation[r/min]

Momentary operation range

Continuous operation range

Torque[N·m]

Rotation[r/min]

• R88M-1M90010C

• R88M-1M2K010C

• R88M-1M3K010C
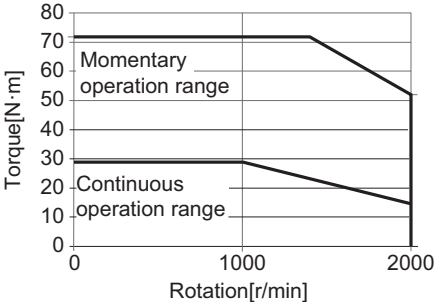
Momentary operation range

Continuous operation range

Torque[N·m]

Rotation[r/min]

Momentary operation range

Continuous operation range

Torque[N·m]

Rotation[r/min]

Momentary operation range

Continuous operation range

Torque[N·m]

Rotation[r/min]

Note: The continuous operation range is the range in which continuous operation is possible at an ambient temperature of 40°C when the Servomotor is horizontally installed on a specified radiator plate.
Continuous operation at the maximum speed is also possible. However, doing so will reduce the output torque.

Part Names

Servomotor Part Names

Flange Size of 80 × 80 or less

Encoder Connector

Power
Connector

Shaft

Flange

Mating part
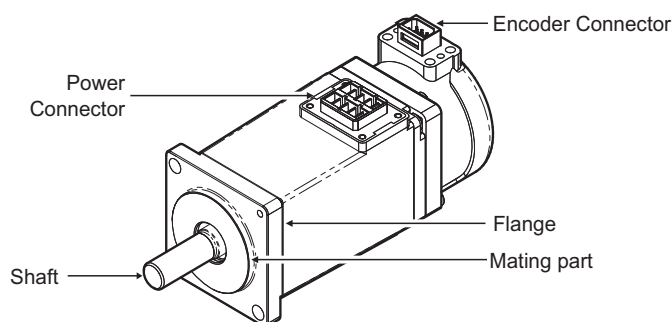
100 VAC 100 W Servomotors (without Brake)

Brake Connector

Encoder Connector

Power
Connector

Shaft

Flange

Mating part
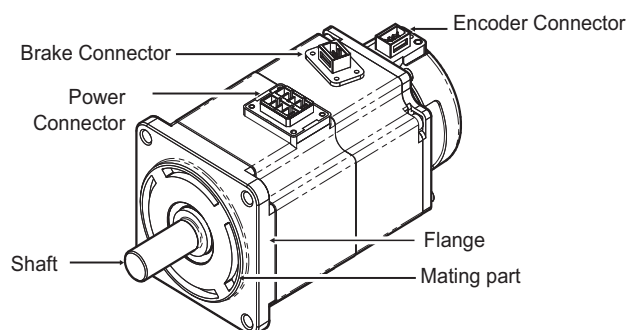
200 VAC 200 W Servomotors (with Brake)

Flange Size of 100 × 100 or more

Power/brake connector

Encoder
connector

Shaft

Flange
Mating part
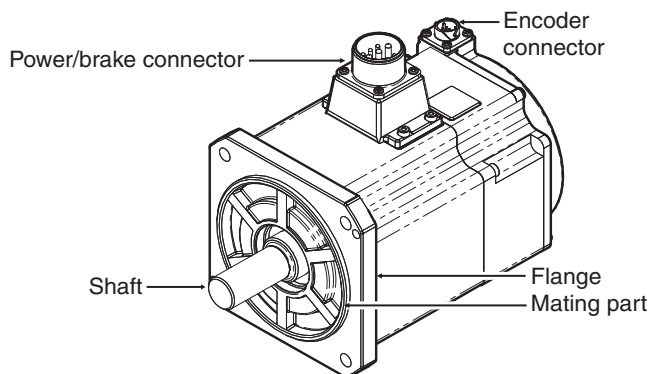
200 VAC 1.5 kW Servomotors (with Brake)

Servomotor Functions

Shaft

The load is mounted on this shaft.
The direction which is in parallel with the shaft is called the thrust direction, and the direction which is perpendicular to the shaft is called the radial direction.

Flange

Used for mounting the Servomotor on the equipment.
Fit the mating part into the equipment and use the mounting holes to screw the Servomotor.

Power Connector

Used for supplying power to the phase U, V, and W of the Servomotor.
For Servomotors with a brake and flange size of 100 × 100 or more, the pins for power and brake are set on the same connector.

Encoder Connector

Used for supplying power to the encoder of the Servomotor and communicating with the Servo Drive.

Brake Connector

Used for supplying power to the brake coil of the Servomotor.
This part is attached only to the Servomotors with a brake and flange size of 80 × 80 or less.

External Dimensions

(Unit: mm)

3,000-r/min Servomotors (100 V and 200 V)
100 W (without Brake)

R88M-1M10030S(-O/-S2/-OS2)
R88M-1M10030T(-O/-S2/-OS2)

Shaft-end with key and tap

QE (tap)
LT (tap depth)
Key and tap cross section
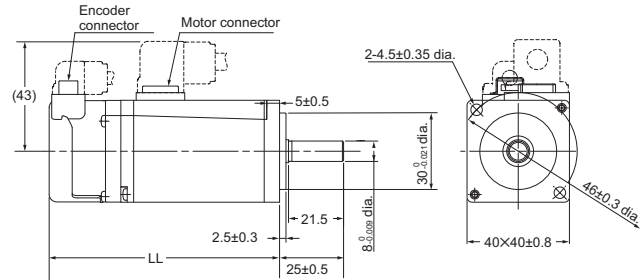
Model	Dimensions [mm]
	LL
R88M-1M10030S(-S2) R88M-1M10030T(-S2)	90±1
R88M-1M10030S(-O/-OS2) R88M-1M10030T(-O/-OS2)	95±1
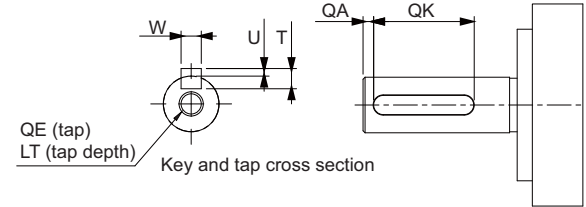
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M10030S(-S2/-OS2)	2	12	$3_{-0.025}^{0}$	3	$1.2_{-0.2}^{0}$	M3	8
R88M-1M10030T(-S2/-OS2)	2	12	$3_{-0.025}^{0}$	3	$1.2_{-0.2}^{0}$	M3	8

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

100 W (with Brake)

R88M-1M10030S-B(O/S2/OS2)
R88M-1M10030T-B(O/S2/OS2)

Shaft-end with key and tap

QE (tap)
LT (tap depth)
Key and tap cross section

Model	Dimensions [mm]
	LL
R88M-1M10030S-B(S2) R88M-1M10030T-BS2)	126±1
R88M-1M10030S-B(O/OS2) R88M-1M10030T-B(O/OS2)	131±1
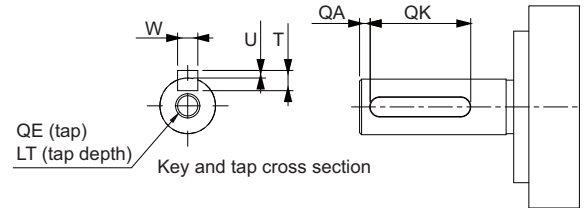
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M10030S-B(S2/OS2)	2	12	$3_{-0.025}^{0}$	3	$1.2_{-0.2}^{0}$	M3	8
R88M-1M10030T-B(S2/OS2)	2	12	$3_{-0.025}^{0}$	3	$1.2_{-0.2}^{0}$	M3	8

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

200 W/400 W (without Brake)

R88M-1M20030S(-O/-S2/-OS2)/R88M-1M20030T(-O/-S2/-OS2)
R88M-1M40030S(-O/-S2/-OS2)/R88M-1M40030T(-O/-S2/-OS2)

Shaft-end with key and tap

Key and tap cross section
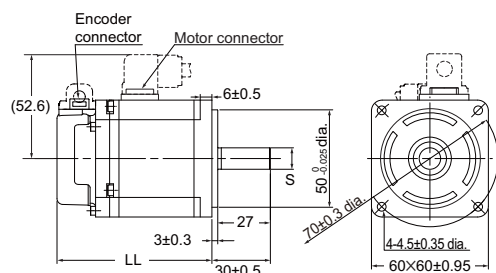
Model	Dimensions [mm]	
	S	LL
R88M-1M20030S(-S2) R88M-1M20030T(-S2)	$11_{-0.011}^{0}$ dia.	79.5±1
R88M-1M40030S(-S2) R88M-1M40030T(-S2)	$14_{-0.011}^{0}$ dia.	105.5±1
R88M-1M20030S(-O/-OS2) R88M-1M20030T(-O/-OS2)	$11_{-0.011}^{0}$ dia.	86.5±1
R88M-1M40030S(-O/-OS2) R88M-1M40030T(-O/-OS2)	$14_{-0.011}^{0}$ dia.	112.5±1
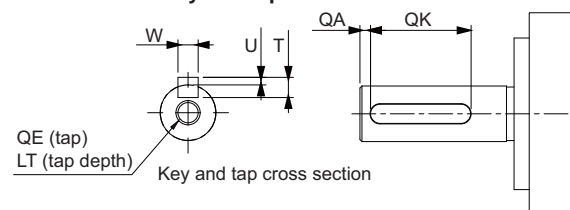
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M20030S(-S2/-OS2)	2	20	$4_{-0.03}^{0}$	4	$1.5_{-0.2}^{0}$	M4	10
R88M-1M20030T(-S2/-OS2)	2	20	$4_{-0.03}^{0}$	4	$1.5_{-0.2}^{0}$	M4	10
R88M-1M40030S(-S2/-OS2)	2	20	$5_{-0.03}^{0}$	5	$2_{-0.2}^{0}$	M5	12
R88M-1M40030T(-S2/-OS2)	2	20	$5_{-0.03}^{0}$	5	$2_{-0.2}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and
tap are indicated with "S2" at the end of the model number.
Models with an oil seal are indicated with "O" at the end of the
model number.

200 W/400 W (with Brake)

R88M-1M20030S-B(O/S2/OS2)/R88M-1M20030T-B(O/S2/OS2)
R88M-1M40030S-B(O/S2/OS2)/R88M-1M40030T-B(O/S2/OS2)

Shaft-end with key and tap

Key and tap cross section

Model	Dimensions [mm]	
	S	LL
R88M-1M20030S-B(S2) R88M-1M20030T-B(S2)	$11_{-0.011}^{0}$ dia.	107.5±1
R88M-1M40030S-B(S2) R88M-1M40030T-B(S2)	$14_{-0.011}^{0}$ dia.	133.5±1
R88M-1M20030S-B(O/OS2) R88M-1M20030T-B(O/OS2)	$11_{-0.011}^{0}$ dia.	114.5±1
R88M-1M40030S-B(O/OS2) R88M-1M40030T-B(O/OS2)	$14_{-0.011}^{0}$ dia.	140.5±1
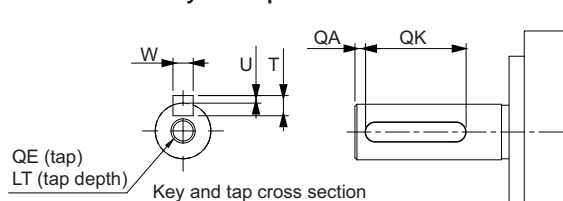
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M20030S-B(S2/OS2)	2	20	$4_{-0.03}^{0}$	4	$1.5_{-0.2}^{0}$	M4	10
R88M-1M20030T-B(S2/OS2)	2	20	$4_{-0.03}^{0}$	4	$1.5_{-0.2}^{0}$	M4	10
R88M-1M40030S-B(S2/OS2)	2	20	$5_{-0.03}^{0}$	5	$2_{-0.2}^{0}$	M5	12
R88M-1M40030T-B(S2/OS2)	2	20	$5_{-0.03}^{0}$	5	$2_{-0.2}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and
tap are indicated with "S2" at the end of the model number.
Models with an oil seal are indicated with "O" at the end of the
model number.

750 W (without Brake)
R88M-1M75030T(-O/-S2/-OS2)

Shaft-end with key and tap

QE (tap)
LT (tap depth)

Key and tap cross section

Model	Dimensions [mm]
	LL
R88M-1M75030T(-S2)	117.3±1
R88M-1M75030T(-O/-OS2)	124.3±1
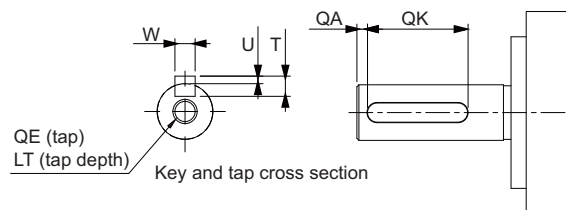
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M75030T(-S2/-OS2)	3	24	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

750 W (with Brake)
R88M-1M75030T-B(O/S2/OS2)

Shaft-end with key and tap

QE (tap)
LT (tap depth)

Key and tap cross section
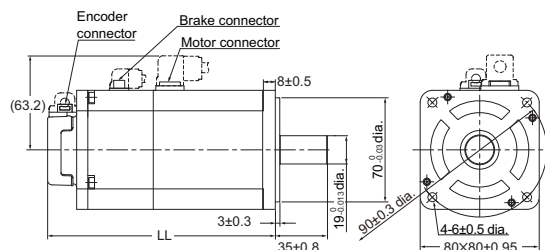
Model	Dimensions [mm]
	LL
R88M-1M75030T-B(S2)	153±1
R88M-1M75030T-B(O/OS2)	160±1
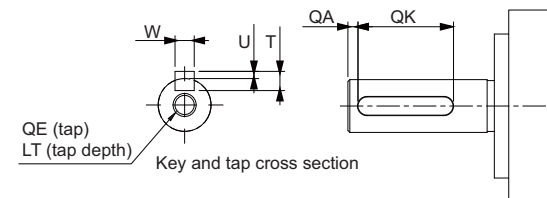
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M75030T-B(S2/OS2)	3	24	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

1 kW/1.5 kW/2 kW (without Brake)
R88M-1L1K030T(-O/-S2/-OS2)/R88M-1L1K530T(-O/-S2/-OS2)/ R88M-1L2K030T(-O/-S2/-OS2)

Shaft-end with key and tap

QE (tap)
LT (tap depth)

Key and tap cross section
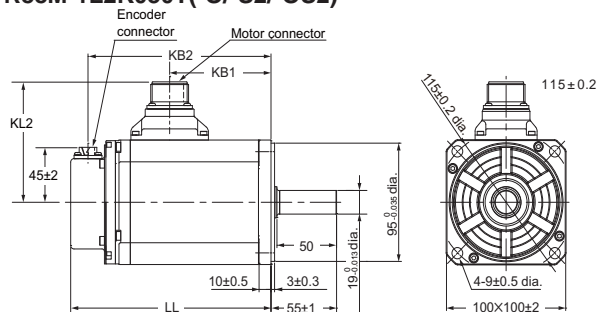
Model	Dimensions [mm]			
	LL	KB1	KB2	KL2
R88M-1L1K030T(-O/-S2/-OS2)	168±2	85±1	153±2	97±2
R88M-1L1K530T(-O/-S2/-OS2)	168±2	85±1	153±2	97±2
R88M-1L2K030T(-O/-S2/-OS2)	179±2	96±1	164±2	102±2
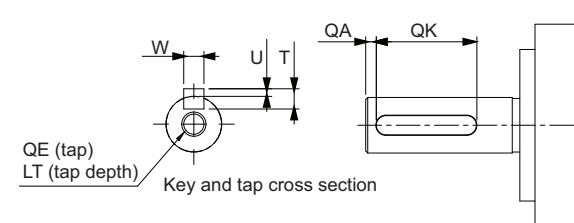
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1L1K030T(-S2/-OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L1K530T(-S2/-OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L2K030T(-S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Specifications

Part Names

External Dimensions

1 kW/1.5 kW/2 kW (with Brake)

R88M-1L1K030T-B(O/S2/OS2)/R88M-1L1K530T-B(O/S2/OS2)/
R88M-1L2K030T-B(O/S2/OS2)

Shaft-end with key and tap

Key and tap cross section
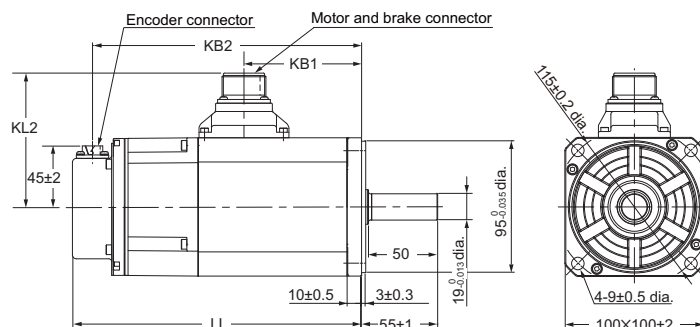
Model	Dimensions [mm]			
	LL	KB1	KB2	KL2
R88M-1L1K030T-B(O/S2/OS2)	209±3	85±1	194±2	97±2
R88M-1L1K530T-B(O/S2/OS2)	209±3	85±1	194±2	97±2
R88M-1L2K030T-B(O/S2/OS)	220±3	96±1	205±2	104±2

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
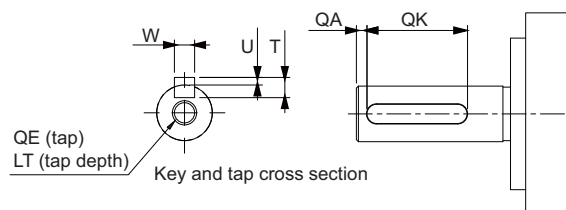
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1L1K030T-B(S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L1K530T-B(S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L2K030T-B(S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12

3 kW (without Brake)

R88M-1L3K030T(-O/-S2/-OS2)
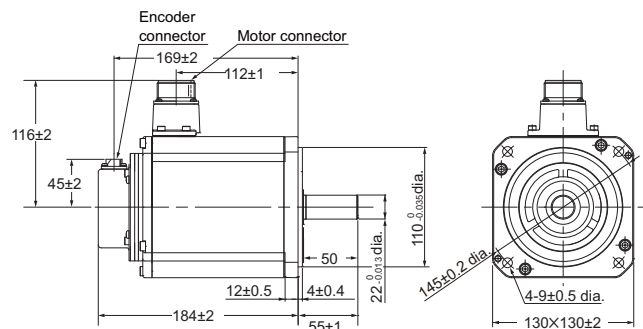
Shaft-end with key and tap

Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
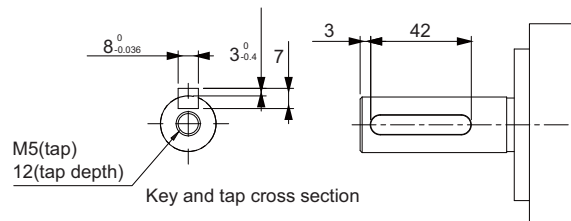
3 kW (with Brake)

R88M-1L3K030T-B(O/S2/OS2)

Shaft-end with key and tap

Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

3,000-r/min Servomotors (400 V)
750 W/1 kW/1.5 kW/2 kW (without Brake)
R88M-1L75030C(-O/-S2/-OS2)/R88M-1L1K030C(-O/-S2/-OS2)
R88M-1L1K530C(-O/-S2/-OS2)/R88M-1L2K030C(-O/-S2/-OS2)

Shaft-end with key and tap
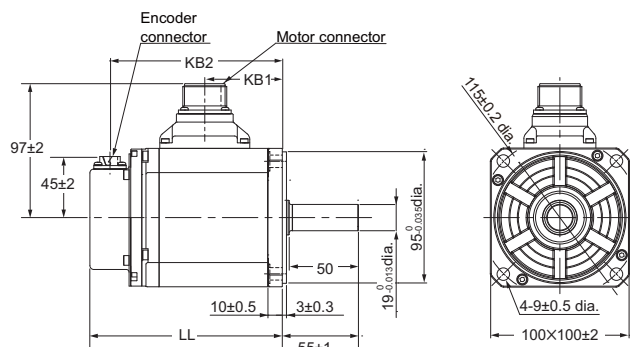
Model	Dimensions [mm]		
	LL	KB1	KB
R88M-1L75030C(-O/-S2/-OS2)	139±2	56±1	124±2
R88M-1L1K030C(-O/-S2/-OS2)	168±2	85±1	153±2
R88M-1L1K530C(-O/-S2/-OS2)	168±2	85±1	153±2
R88M-1L2K030C(-O/-S2/-OS2)	179±2	96±1	164±2
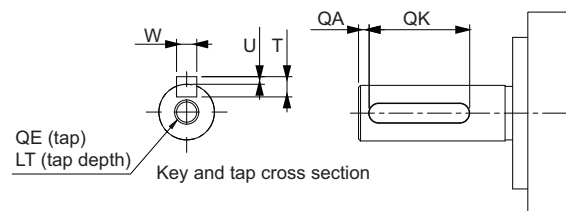
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1L75030C(-S2/-OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L1K030C(-S2/-OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L1K530C(-S2/-OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L2K030C(-S2/-OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number.
Models with an oil seal are indicated with "O" at the end of the model number.

750 W/1 kW/1.5 kW/2 kW (with Brake)
R88M-1L75030C-B(O/S2/OS2)/R88M-1L1K030C-B(O/S2/OS2)
R88M-1L1K530C-B(O/S2/OS2)/R88M-1L2K030C-B(O/S2/OS2)

Shaft-end with key and tap
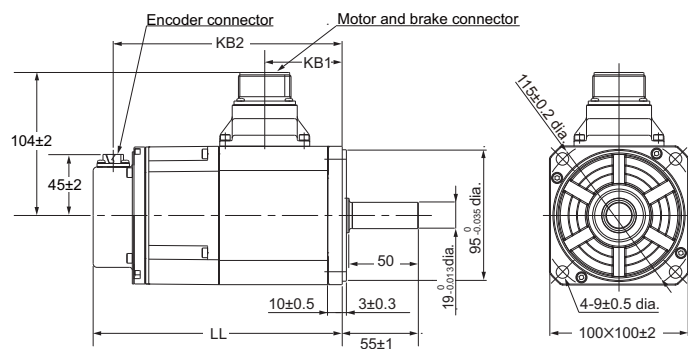
Model	Dimensions [mm]		
	LL	KB1	KB
R88M-1L75030C-B(O/S2/OS2)	180±2	56±1	165±2
R88M-1L1K030C-B(O/S2/OS2)	209±3	85±1	194±2
R88M-1L1K530C-B(O/S2/OS2)	209±3	85±1	194±2
R88M-1L2K030C-B(O/S2/OS2)	220±3	96±1	205±2
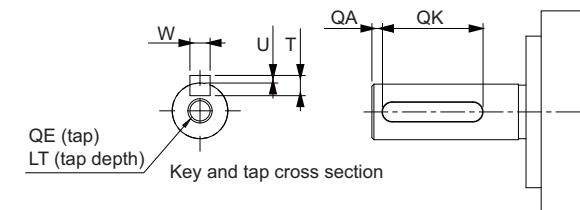
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1L75030C-B(S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L1K030C-B(S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L1K530C-B(S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1L2K030C-B(S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number.
Models with an oil seal are indicated with "O" at the end of the model number.

3 kW (without Brake)
R88M-1L3K030C(-O/-S2/-OS2)

Encoder connector
Motor connector
169±2
112±1
116±2
45±2
110 -0.035 dia.
50
22 -0.013 dia.
12±0.5   4±0.4
184±2
55±1
145±0.2 dia.
4-9±0.5 dia.
130×130±2

Shaft-end with key and tap

8 -0.036
3 -0.4
7
3
42
M5(tap)
12(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
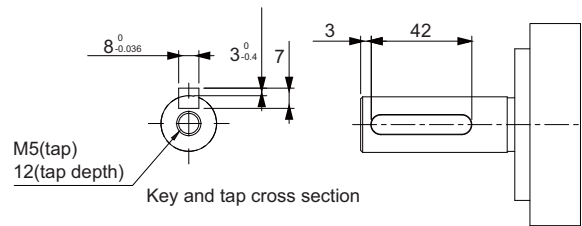
3 kW (with Brake)
R88M-1L3K030C-B(O/S2/OS2)

Encoder connector
Motor and brake connector
215±2
112±1
119±2
45±2
110 -0.035 dia.
50
22 -0.013 dia.
12±0.5   4±0.4
230±3
55±1
145±0.2 dia.
4-9±0.5 dia.
130×130±2

Shaft-end with key and tap

8 -0.036
3 -0.4
7
3
42
M5(tap)
12(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
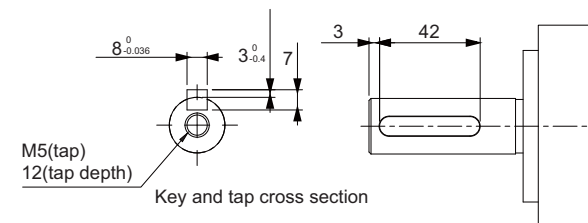
2,000-r/min Servomotors (200 V)

1 kW/1.5 kW/2 kW (without Brake)

R88M-1M1K020T(-O/-S2/-OS2)
R88M-1M1K520T(-O/-S2/-OS2)
R88M-1M2K020T(-O/-S2/-OS2)

Shaft-end with key and tap

Model	Dimensions [mm]			
	LL	KB1	KB2	KL2
R88M-1M1K020T(-O/-S2/-OS2)	120.5±2	63±1	109±2	118±2
R88M-1M1K520T(-O/-S2/-OS2)	138±2	79±1	125±2	118±2
R88M-1M2K020T(-O/-S2/-OS2)	160±2	99±1	147±2	116±2
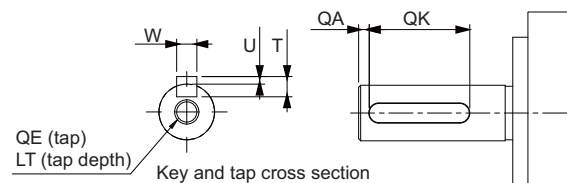
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M1K020T(-S2/-OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12
R88M-1M1K520T(-S2/-OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12
R88M-1M2K020T(-S2/-OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

1 kW/1.5 kW/2 kW (with Brake)

R88M-1M1K020T-B (O/S2/OS2)
R88M-1M1K520T-B(O/S2/OS2)
R88M-1M2K020T-B(O/S2/OS2)

Shaft-end with key and tap
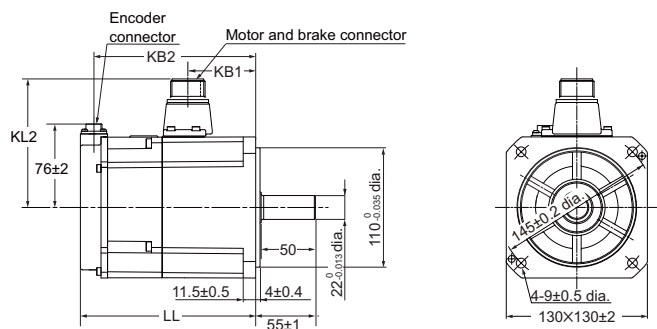
Model	Dimensions [mm]			
	LL	KB1	KB2	KL2
R88M-1M1K020T-B(O/S2/OS2)	162±2	63±1	149±2	118±2
R88M-1M1K520T-B(O/S2/OS2)	179±2	79±1	166±2	118±2
R88M-1M2K020T-B(O/S2/OS2)	201±3	99±1	189±2	119±2
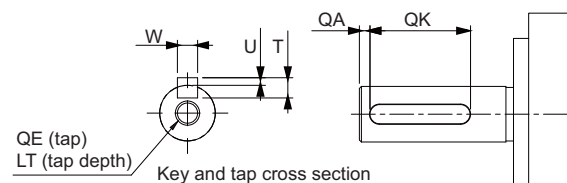
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M1K020T-B(S2/OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12
R88M-1M1K520T-B(S2/OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12
R88M-1M2K020T-B(S2/OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

3 kW (without Brake)

R88M-1M3K020T(-O/-S2/-OS2)

Encoder connector   Motor connector

176±2
119±1
116±2
45±2
110-0.035 dia.
60
24-0.013 dia.
11.5±0.5   4±0.4
191±2   65±1

145±0.2 dia.
4-9±0.5 dia.
130×130±2

Shaft-end with key and tap

8 0 -0.036   3 0 -0.4   7
3   52

M8 (tap)
20 (tap depth)

Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
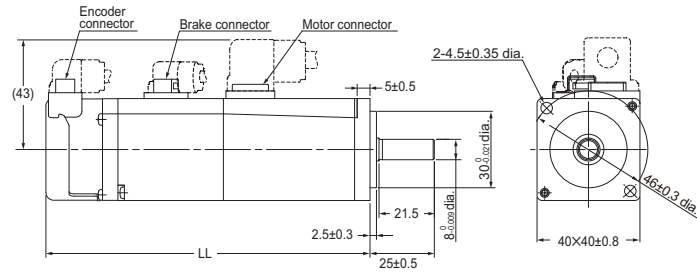
3 kW (with Brake)

R88M-1M3K020T-B(O/S2/OS2)
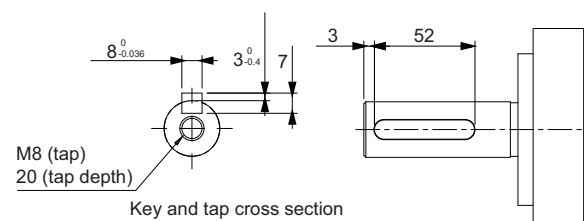
Encoder connector   Motor and brake connector

219±2
118±1
119±2
45±2
110-0.035 dia.
60
24-0.013 dia.
11.5±0.5   4±0.4
234±3   65±1

145±0.2 dia.
4-9±0.5 dia.
130×130±2

Shaft-end with key and tap

8 0 -0.036   3 0 -0.4   7
3   52

M8 (tap)
20 (tap depth)

Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

2,000-r/min Servomotors (400 V)
400 W/600 W (without Brake)
R88M-1M40020C(-O/-S2/-OS2)/R88M-1M60020C(-O/-S2/-OS2)

Shaft-end with key and tap

Key and tap cross section
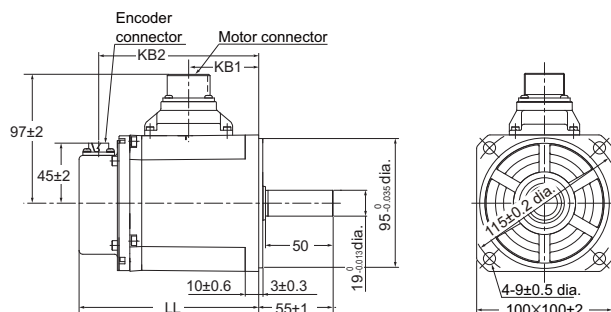
Model	Dimensions [mm]		
	LL	KB1	KB2
R88M-1M40020C(-O/-S2/-OS2)	134.8±1	52±1	120.5±2
R88M-1M60020C(-O/-S2/-OS2)	151.8±1	69±1	137.5±2

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
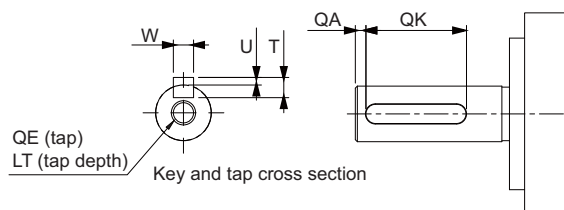
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M40020C(-S2/-OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1M60020C(-S2/-OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12

400 W/600 W (with Brake)
R88M-1M40020C-B(O/S2/OS2)/R88M-1M60020C-B(O/S2/OS2)

Shaft-end with key and tap

Key and tap cross section
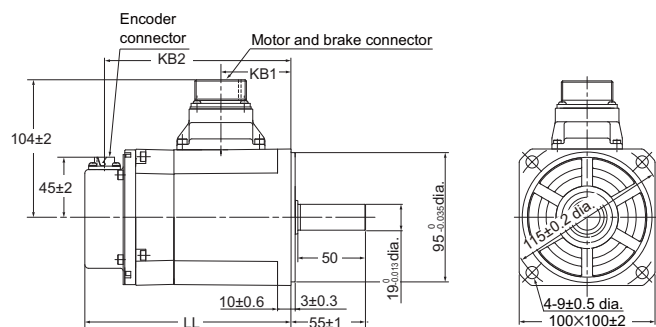
Model	Dimensions [mm]		
	LL	KB1	KB2
R88M-1M40020C-B(O/S2/OS2)	152.3±1	52±1	138±2
R88M-1M60020C-B(O/S2/OS2)	169.3±1	69±1	155±2

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
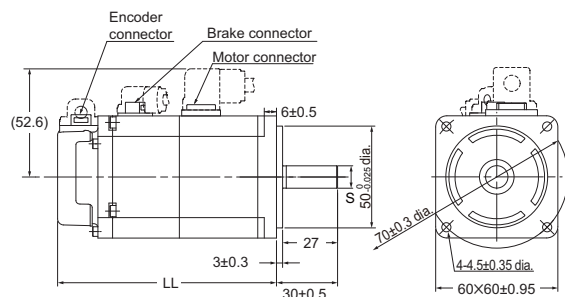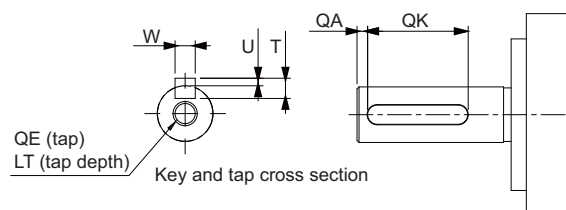
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M40020C-B(S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12
R88M-1M60020C-B(S2/OS2)	3	42	$6_{-0.03}^{0}$	6	$2.5_{-0.2}^{0}$	M5	12

1 kW/1.5 kW/2 kW (without Brake)

R88M-1M1K020C(-O/-S2/-OS2)
R88M-1M1K520C(-O/-S2/-OS2)
R88M-1M2K020C(-O/-S2/-OS2)

Shaft-end with key and tap

Key and tap cross section
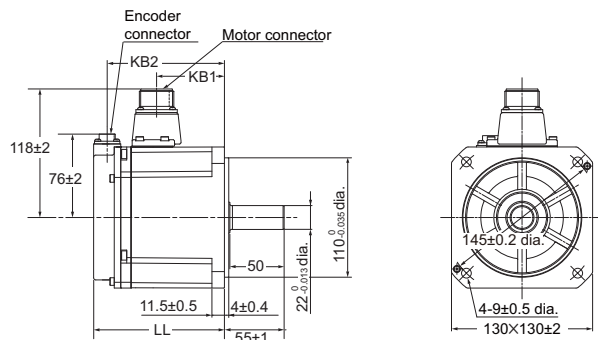
Model	Dimensions [mm]		
	LL	KB1	KB2
R88M-1M1K020C(-O/-S2/-OS2)	120.5±2	63±1	109±2
R88M-1M1K520C(-O/-S2/-OS2)	138±2	79±1	125±2
R88M-1M2K020C(-O/-S2/-OS2)	160±2	98±1	148±2
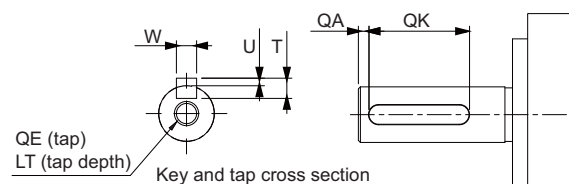
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M1K020C(-S2/-OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12
R88M-1M1K520C(-S2/-OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12
R88M-1M2K020C(-S2/-OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number.
Models with an oil seal are indicated with "O" at the end of the model number.
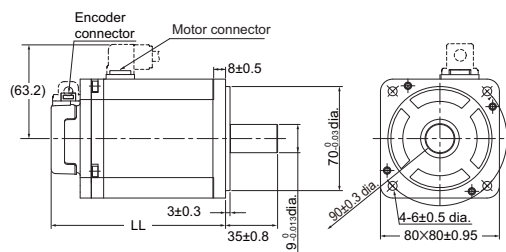
1 kW/1.5 kW/2 kW (with Brake)

R88M-1M1K020C-B(O/S2/OS2)
R88M-1M1K520C-B(O/S2/OS2)
R88M-1M2K020C-B(O/S2/OS2)

Shaft-end with key and tap

Key and tap cross section
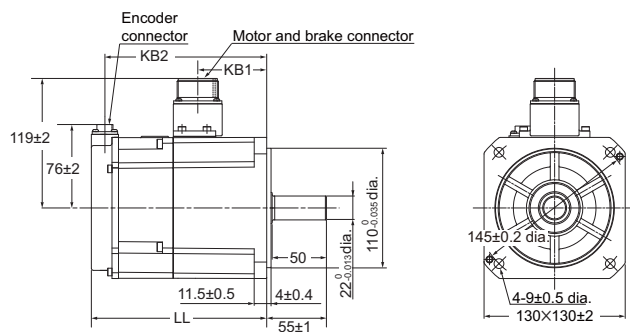
Model	Dimensions [mm]		
	LL	KB1	KB2
R88M-1M1K020C-B(O/S2/OS2)	162±2	64±1	150±2
R88M-1M1K520C-B(O/S2/OS2)	179±2	81±1	167±2
R88M-1M2K020C-B(O/S2/OS2)	201±3	99±1	189±2
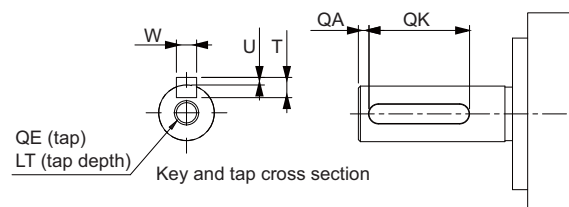
Model	Dimensions [mm]						
	QA	QK	W	T	U	QE	LT
R88M-1M1K020C-B(S2/OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12
R88M-1M1K520C-B(S2/OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12
R88M-1M2K020C-B(S2/OS2)	3	42	$8_{-0.036}^{0}$	7	$3_{-0.4}^{0}$	M5	12

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number.
Models with an oil seal are indicated with "O" at the end of the model number.

AC Servo System **1S-series**
AC Servomotors

System Configuration
Controllers
Softwares
Specifications
Part Names
External Dimensions
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Programmable Terminals

3 kW (without Brake)

R88M-1M3K020C(-O/-S2/-OS2)
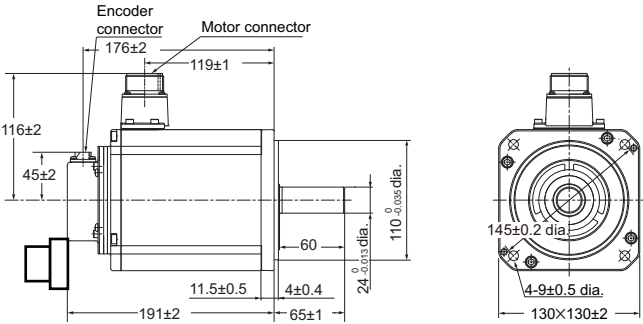
Shaft-end with key and tap
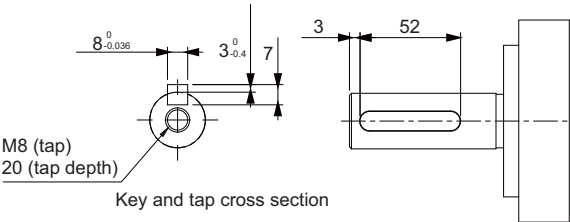
$8_{-0.036}^{0}$ $3_{-0.4}^{0}$ 7   3   52

M8 (tap)
20 (tap depth)

Key and tap cross section

116±2
45±2
176±2
119±1
60
11.5±0.5
4±0.4
191±2
65±1
$110_{-0.035}^{0}$ dia.
$24_{-0.013}^{0}$ dia.
145±0.2 dia.
4-9±0.5 dia.
130×130±2

Encoder connector   Motor connector

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

3 kW (with Brake)

R88M-1M3K020C-B(O/S2/OS2)
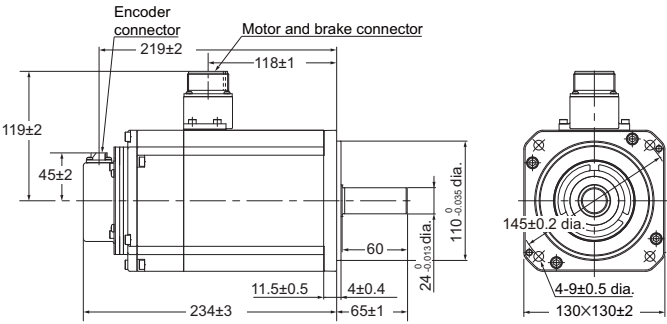
Shaft-end with key and tap
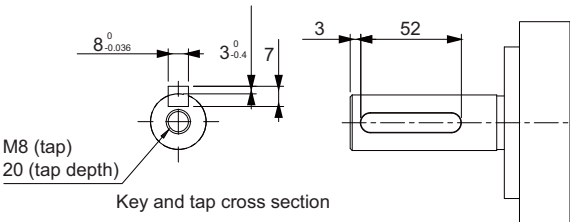
$8_{-0.036}^{0}$ $3_{-0.4}^{0}$ 7   3   52

M8 (tap)
20 (tap depth)

Key and tap cross section

119±2
45±2
219±2
118±1
60
11.5±0.5
4±0.4
234±3
65±1
$110_{-0.035}^{0}$ dia.
$24_{-0.013}^{0}$ dia.
145±0.2 dia.
4-9±0.5 dia.
130×130±2

Encoder connector   Motor and brake connector

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

1,000-r/min Servomotors (200 V)
900 W (without Brake)
R88M-1M90010T(-O/-S2/-OS2)
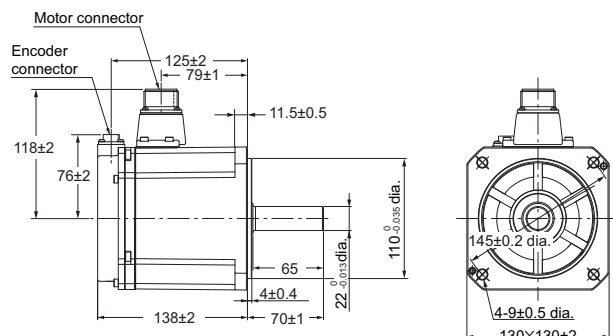
Motor connector
Encoder connector
125±2
79±1
11.5±0.5
118±2
76±2
65
4±0.4
138±2
70±1
110$_{-0.035}^{0}$ dia.
22$_{-0.013}^{0}$ dia.
145±0.2 dia.
4-9±0.5 dia.
130×130±2

Shaft-end with key and tap

8$_{-0.036}^{0}$
3$_{-0.4}^{0}$
7
3
42
M5(tap)
12(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
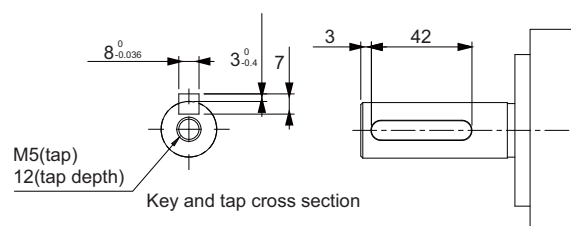
900 W (with Brake)
R88M-1M90010T-B(O/S2/OS2)
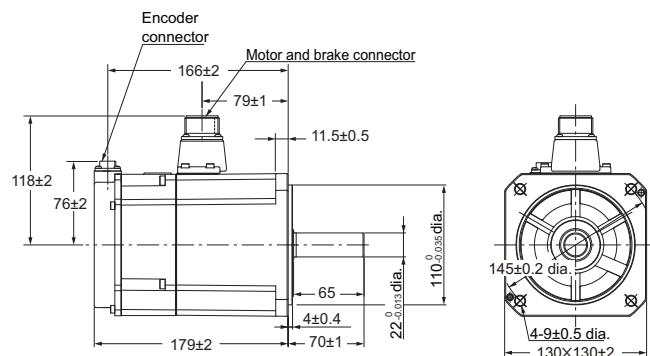
Encoder connector
Motor and brake connector
166±2
79±1
11.5±0.5
118±2
76±2
65
4±0.4
179±2
70±1
110$_{-0.035}^{0}$ dia.
22$_{-0.013}^{0}$ dia.
145±0.2 dia.
4-9±0.5 dia.
130×130±2

Shaft-end with key and tap

8$_{-0.036}^{0}$
3$_{-0.4}^{0}$
7
3
42
M5(tap)
12(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
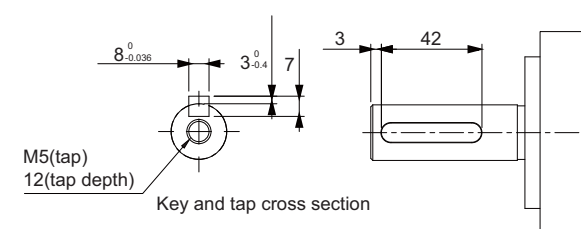
2 kW (without Brake)
R88M-1M2K010T(-O/-S2/-OS2)
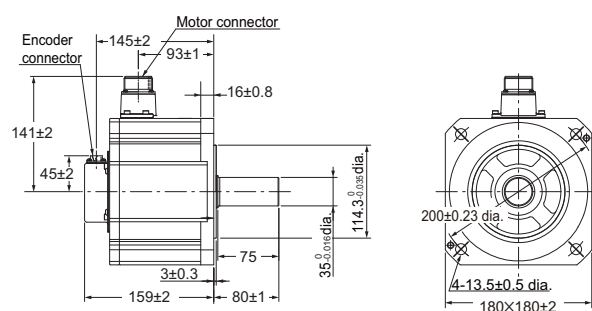
Motor connector
Encoder connector
145±2
93±1
16±0.8
141±2
45±2
75
3±0.3
159±2
80±1
114.3$_{-0.035}^{0}$ dia.
35.0$_{-0.016}^{0}$ dia.
200±0.23 dia.
4-13.5±0.5 dia.
180×180±2

Shaft-end with key and tap

10$_{-0.036}^{0}$
3$_{-0.4}^{0}$
8
3
62
M12(tap)
25(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.

System Configuration

Controllers

Softwares

Specifications

Part Names

Programmable Terminals

Slave Terminals

External Dimensions

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information
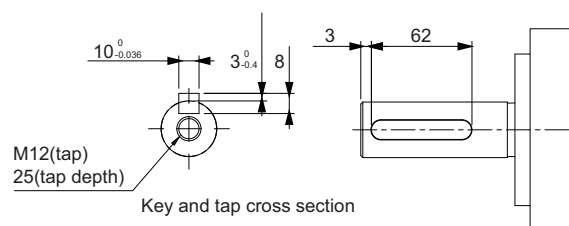
2 kW (with Brake)

R88M-1M2K010T-B(O/S2/OS2)
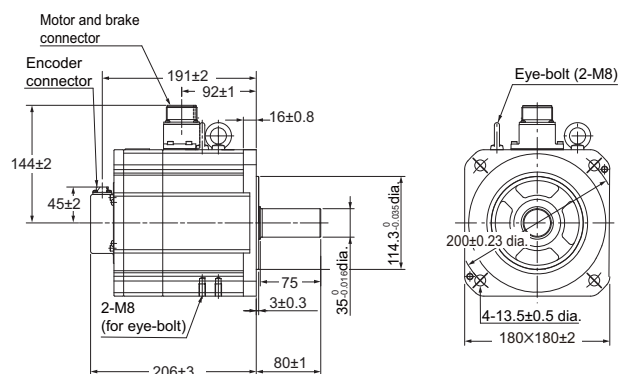
Shaft-end with key and tap

Key and tap cross section

M12(tap)
25(tap depth)

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
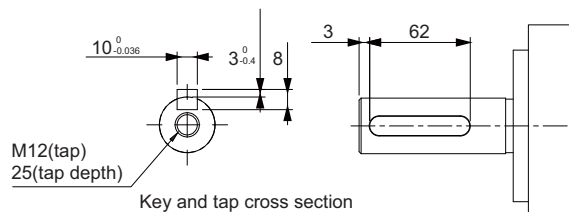
3 kW (without Brake)

R88M-1M3K010T(-O/-S2/-OS2)
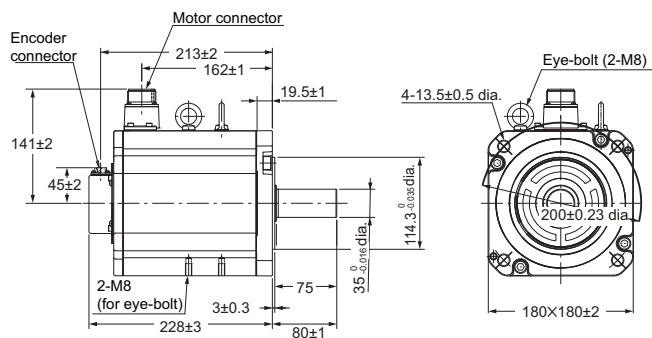
Shaft-end with key and tap

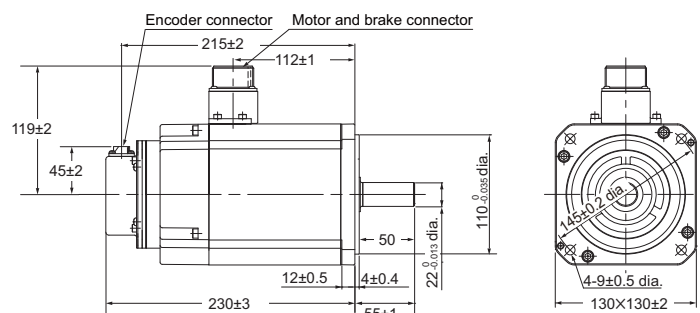Key and tap cross section

M12(tap)
25(tap depth)

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
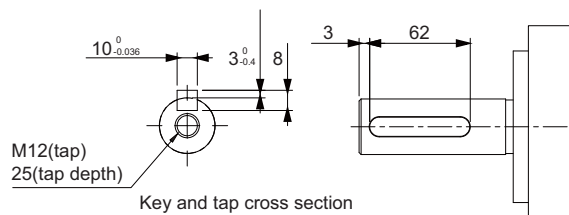
3 kW (with Brake)

R88M-1M3K010T-B(O/S2/OS2)
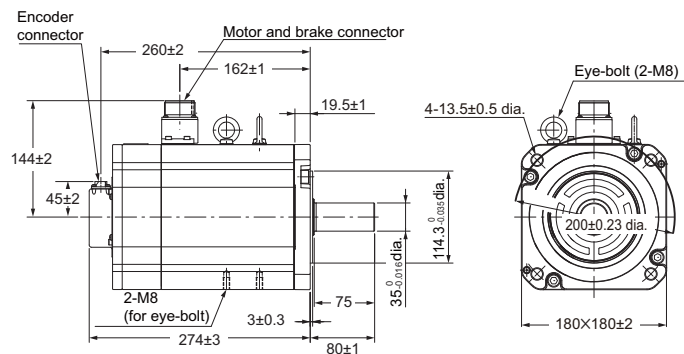
Shaft-end with key and tap

Key and tap cross section

M12(tap)
25(tap depth)

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
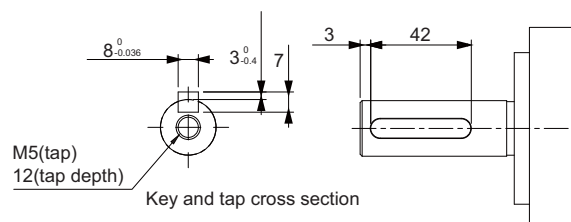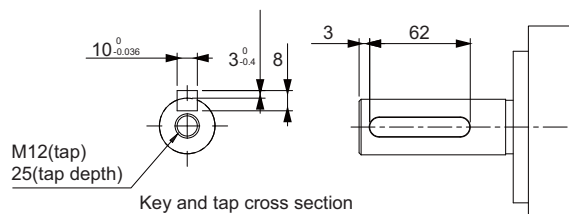
1,000-r/min Servomotors (400 V)
900 W (without Brake)
R88M-1M90010C(-O/-S2/-OS2)
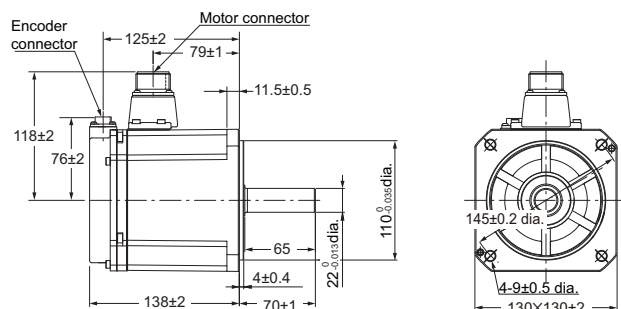
Encoder connector
Motor connector
125±2
79±1
11.5±0.5
118±2
76±2
110 0/-0.035 dia.
65
22 0/-0.013 dia.
4±0.4
138±2
70±1
145±0.2 dia.
4-9±0.5 dia.
130×130±2

Shaft-end with key and tap

$8_{-0.036}^{0}$
$3_{-0.4}^{0}$ 7
3
42
M5(tap)
12(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
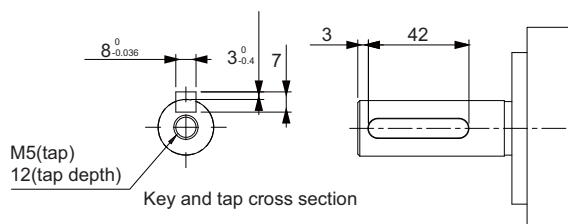
900 W (with Brake)
R88M-1M90010C-B(O/S2/OS2)
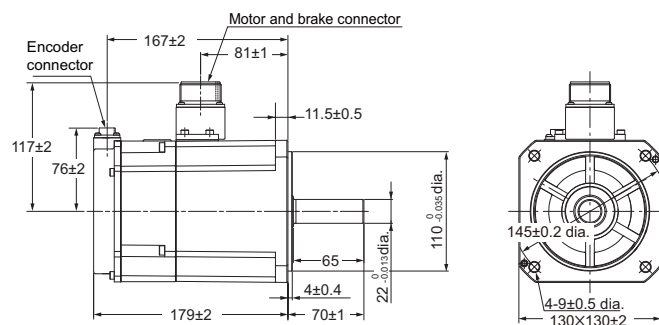
Encoder connector
Motor and brake connector
167±2
81±1
11.5±0.5
117±2
76±2
110 0/-0.035 dia.
65
22 0/-0.013 dia.
4±0.4
179±2
70±1
145±0.2 dia.
4-9±0.5 dia.
130×130±2

Shaft-end with key and tap

$8_{-0.036}^{0}$
$3_{-0.4}^{0}$ 7
3
42
M5(tap)
12(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
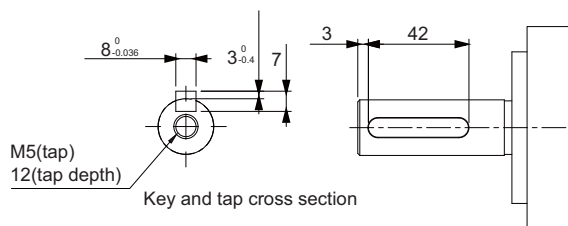
2 kW (without Brake)
R88M-1M2K010C(-O/-S2/-OS2)
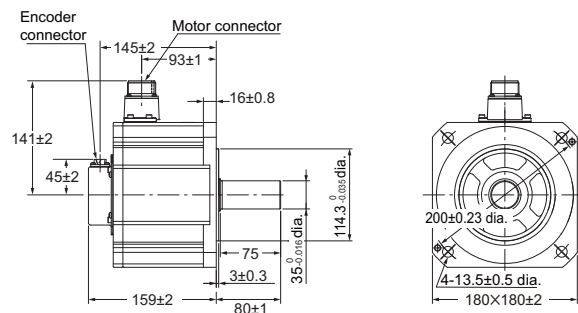
Encoder connector
Motor connector
145±2
93±1
16±0.8
141±2
45±2
114.3 0/-0.035 dia.
75
35 0/-0.016 dia.
3±0.3
159±2
80±1
200±0.23 dia.
4-13.5±0.5 dia.
180×180±2

Shaft-end with key and tap

$10_{-0.036}^{0}$
$3_{-0.4}^{0}$ 8
3
62
M12(tap)
25(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
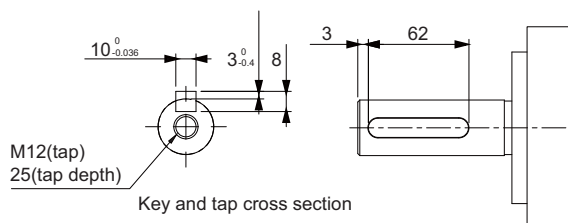
2 kW (with Brake)
R88M-1M2K010C-B(O/S2/OS2)
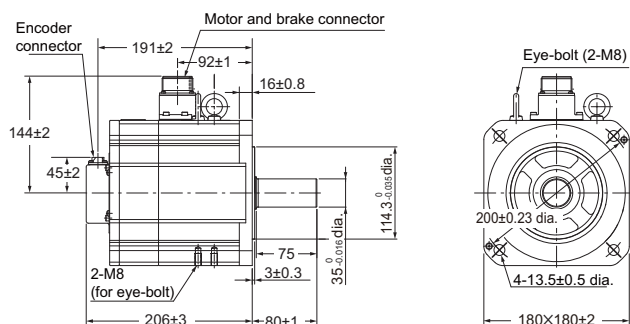
Shaft-end with key and tap

Encoder connector
Motor and brake connector
191±2
92±1
16±0.8
144±2
45±2
Eye-bolt (2-M8)
114.3 $^{0}_{-0.035}$ dia.
35 $^{0}_{-0.016}$ dia.
200±0.23 dia.
75
3±0.3
2-M8 (for eye-bolt)
206±3
80±1
4-13.5±0.5 dia.
180×180±2

10 $^{0}_{-0.036}$
3 $^{0}_{-0.4}$ 8
3   62
M12(tap) 25(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
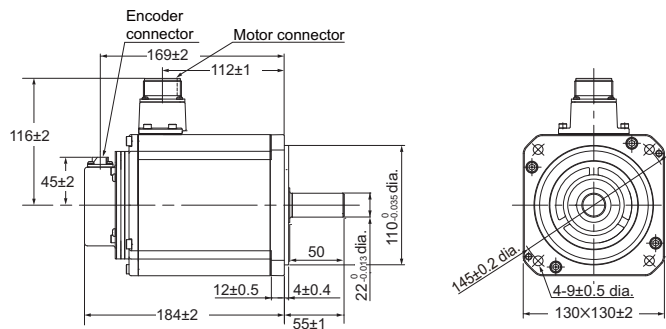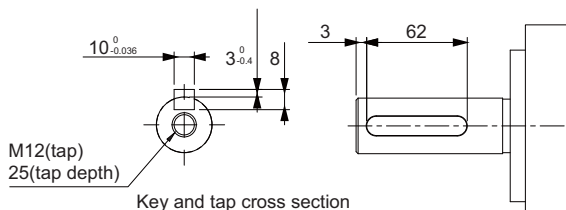
3 kW (without Brake)
R88M-1M3K010C(-O/-S2/-OS2)
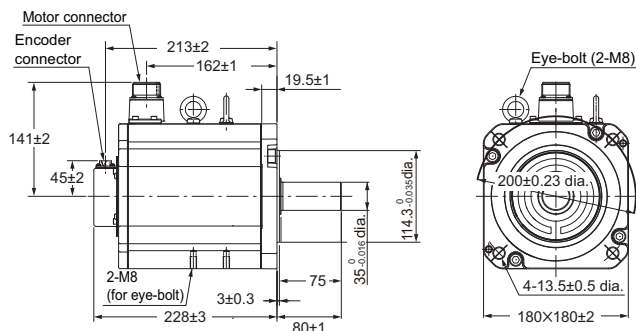
Shaft-end with key and tap

Motor connector
Encoder connector
213±2
162±1
19.5±1
141±2
45±2
Eye-bolt (2-M8)
114.3 $^{0}_{-0.035}$ dia.
35 $^{0}_{-0.016}$ dia.
200±0.23 dia.
2-M8 (for eye-bolt)
75
3±0.3
228±3
80±1
4-13.5±0.5 dia.
180×180±2

10 $^{0}_{-0.036}$
3 $^{0}_{-0.4}$ 8
3   62
M12(tap) 25(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
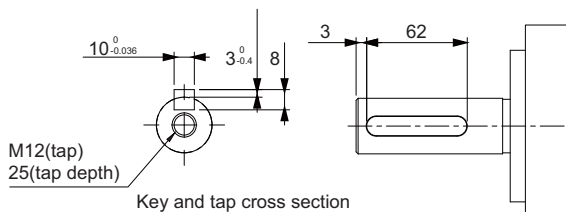
3 kW (with Brake)
R88M-1M3K010C-B(O/S2/OS2)
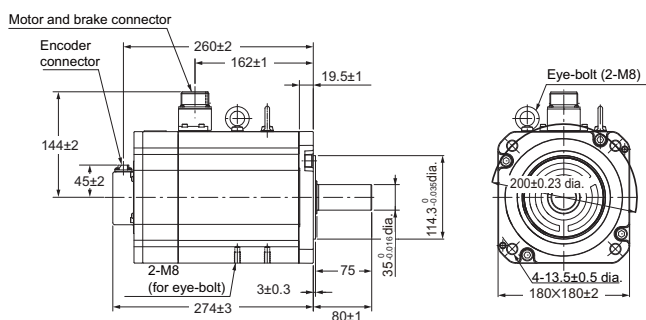
Shaft-end with key and tap

Motor and brake connector
Encoder connector
260±2
162±1
19.5±1
144±2
45±2
Eye-bolt (2-M8)
114.3 $^{0}_{-0.035}$ dia.
35 $^{0}_{-0.016}$ dia.
200±0.23 dia.
2-M8 (for eye-bolt)
75
3±0.3
274±3
80±1
4-13.5±0.5 dia.
180×180±2

10 $^{0}_{-0.036}$
3 $^{0}_{-0.4}$ 8
3   62
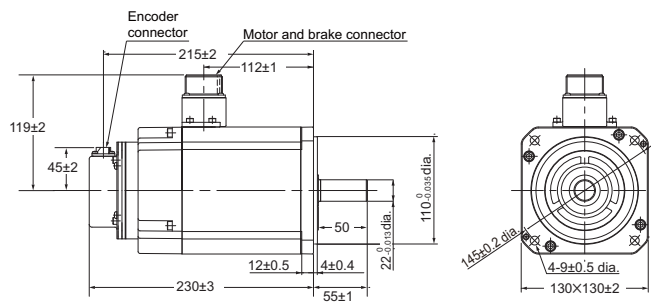M12(tap) 25(tap depth)
Key and tap cross section

Note: The standard shaft type is a straight shaft. Models with a key and tap are indicated with "S2" at the end of the model number. Models with an oil seal are indicated with "O" at the end of the model number.
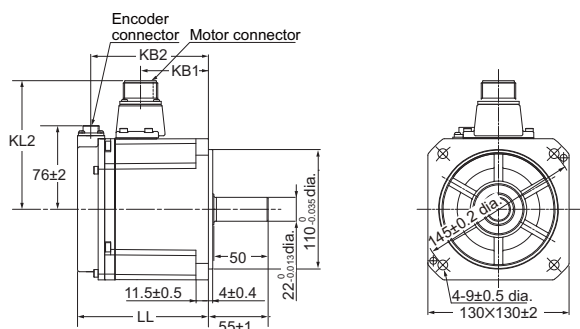
Note:
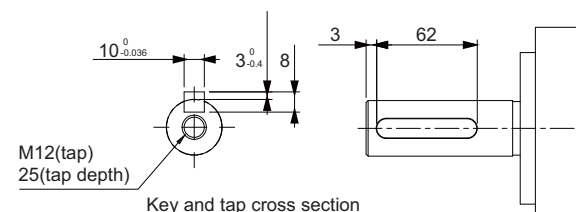
Decelerator AC Servo System [1S-series]
R88G-HPG

Contents

- Ordering Information
- Specifications
- External Dimensions

Specifications

Backlash: 3 Arcminutes Max.
For 3,000-r/min Servomotors

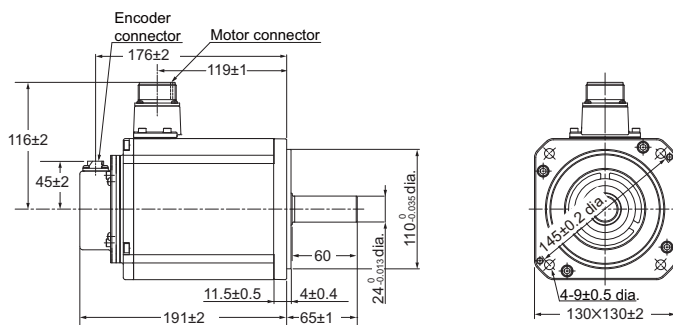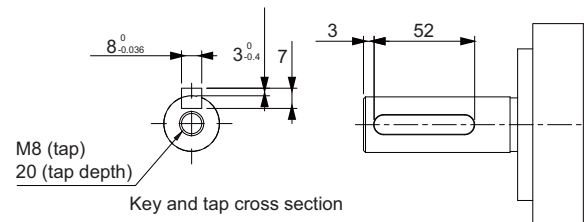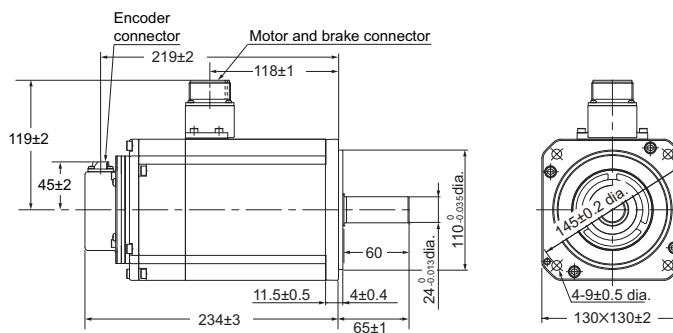| Servomotor rated output	Reduction ratio	Model	Rated rotation speed	Rated torque	Efficiency	Momentary maximum rotation speed	Momentary maximum torque	Decelerator inertia	Allowable radial load	Allowable thrust load	Weight
			r/min	N·m	%	r/min	N·m	× 10⁻⁴ kg·m²	N	N	kg
100 W (100 V)	1/5	R88G-HPG11B05100B□	600	1.2	77.0	1200	4.2	0.005	135	538	0.3
	1/11	R88G-HPG14A11100B□	272	2.5	72.1	545	9.0	0.06	280	1119	1.0
	1/21	R88G-HPG14A21100B□	142	5.2	77.8	285	17.5	0.05	340	1358	1.0
	1/33	R88G-HPG20A33100B□	90	6.8	65.2	181	26.9	0.065	916	3226	2.4
	1/45	R88G-HPG20A45100B□	66	9.8	68.2	133	37.1	0.063	1006	3541	2.4
100 W (200 V)	1/5	R88G-HPG11B05100B□	600	1.2	77.0	1200	4.9	0.005	135	538	0.3
	1/11	R88G-HPG14A11100B□	272	2.5	72.1	545	10.6	0.06	280	1119	1.0
	1/21	R88G-HPG14A21100B□	142	5.2	77.8	285	20.7	0.05	340	1358	1.0
	1/33	R88G-HPG20A33100B□	90	6.8	65.2	181	31.9	0.065	916	3226	2.4
	1/45	R88G-HPG20A45100B□	66	9.8	68.2	133	44.0	0.063	1006	3541	2.4
200 W (100 V)	1/5	R88G-HPG14A05200B□	600	2.4	75.4	1200	8.3	0.207	221	883	1.0
	1/11	R88G-HPG14A11200B□	272	5.8	82.6	545	18.8	0.197	280	1119	1.1
	1/21	R88G-HPG20A21200B□	142	10.2	76.2	285	35.9	0.49	800	2817	2.9
	1/33	R88G-HPG20A33200B□	90	17.0	80.6	181	57.3	0.45	916	3226	2.9
	1/45	R88G-HPG20A45200B□	66	23.5	82.1	133	78.5	0.45	1006	3541	2.9
200 W (200 V)	1/5	R88G-HPG14A05200B□	600	2.4	75.4	1200	9.7	0.207	221	883	1.0
	1/11	R88G-HPG14A11200B□	272	5.8	82.6	545	21.8	0.197	280	1119	1.1
	1/21	R88G-HPG20A21200B□	142	10.2	76.2	285	41.7	0.49	800	2817	2.9
	1/33	R88G-HPG20A33200B□	90	17.0	80.6	181	66.5	0.45	916	3226	2.9
	1/45	R88G-HPG20A45200B□	66	23.5	82.1	133	91.1	0.45	1006	3541	2.9
400 W (100 V)	1/5	R88G-HPG14A05400B□	600	5.3	84.2	1200	17.1	0.207	221	883	1.1
	1/11	R88G-HPG20A11400B□	272	11.4	81.6	545	38.1	0.57	659	2320	2.9
	1/21	R88G-HPG20A21400B□	142	23.0	86.1	285	74.0	0.49	800	2817	2.9
	1/33	R88G-HPG32A33400B□	90	33.8	80.7	181	114.0	0.62	1565	6240	7.5
	1/45	R88G-HPG32A45400B□	66	46.6	81.5	133	155.9	0.61	1718	6848	7.5
400 W (200 V)	1/5	R88G-HPG14A05400B□	600	5.3	84.2	1200	20.4	0.207	221	883	1.1
	1/11	R88G-HPG20A11400B□	272	11.4	81.6	545	45.5	0.57	659	2320	2.9
	1/21	R88G-HPG20A21400B□	142	23.0	86.1	285	88.1	0.49	800	2817	2.9
	1/33	R88G-HPG32A33400B□	90	33.8	80.7	181	136.2	0.62	1565	6240	7.5
	1/45	R88G-HPG32A45400B□	66	46.6	81.5	133	186.1	0.61	1718	6848	7.5

Servomotor rated output	Reduction ratio	Model	Rated rotation speed	Rated torque	Efficiency	Momentary maximum rotation speed	Momentary maximum torque	Decelerator inertia	Allowable radial load	Allowable thrust load	Weight
			r/min	N·m	%	r/min	N·m	× 10⁻⁴ kg·m²	N	N	kg
750 W (200 V)	1/5	R88G-HPG20A05750B□	600	9.9	82.9	1200	38.7	0.68	520	1832	2.9
	1/11	R88G-HPG20A11750B□	272	20.0 *1	87.2	545	86.7	0.6	659	2320	3.1
	1/21	R88G-HPG32A21750B□	142	42.1	84.0	285	163.3	3.0	1367	5448	7.8
	1/33	R88G-HPG32A33750B□	90	69.3	87.9	181	259.7	2.7	1565	6240	7.8
	1/45	R88G-HPG32A45750B□	66	94.9	88.3	133	299.0 *2	2.7	1718	6848	7.8
750 W (400 V)	1/5	R88G-HPG32A052K0B□	600	7.7	64.3	1000	30.6	3.8	889	3542	7.4
	1/11	R88G-HPG32A112K0B□	272	20.5	78.0	454	70.9	3.4	1126	4488	7.9
	1/21	R88G-HPG32A211K5B□	142	42.1	84.0	238	138.3	3.0	1367	5448	7.9
	1/33	R88G-HPG32A33600SB□	90	69.3	87.9	151	220.4	2.7	1565	6240	7.9
	1/45	R88G-HPG50A451K5B□	66	92.0	85.5	111	298.0	4.7	4538	15694	19.0
1 kW	1/5	R88G-HPG32A052K0B□	600	11.5	72.2	1000	42.0	3.8	889	3542	7.4
	1/11	R88G-HPG32A112K0B□	272	28.9	82.5	454	96.1	3.4	1126	4488	7.9
	1/21	R88G-HPG32A211K5B□	142	58.1	86.9	238	186.5	3.0	1367	5448	7.9
	1/33	R88G-HPG50A332K0B□	90	90.9	86.7	151	292.7	4.8	4135	14300	19.0
	1/45	R88G-HPG50A451K5B□	66	126.1	88.1	111	401.3	4.7	4538	15694	19.0
1.5 kW	1/5	R88G-HPG32A052K0B□	600	19.1	80.1	1000	64.8	3.8	889	3542	7.4
	1/11	R88G-HPG32A112K0B□	272	45.7	87.0	454	146.3	3.4	1126	4488	7.9
	1/21	R88G-HPG32A211K5B□	142	90.1	90.0	238	282.2	3.0	1367	5448	7.9
	1/33	R88G-HPG50A332K0B□	90	141.3	89.8	151	443.2	4.8	4135	14300	19.0
	1/45	R88G-HPG50A451K5B□	66	194.8	90.8	111	606.5	4.7	4538	15694	19.0
2 kW	1/5	R88G-HPG32A052K0B□	600	26.8	84.1	1000	87.9	3.8	889	3542	7.4
	1/11	R88G-HPG32A112K0B□	272	62.5	89.3	454	197.0	3.4	1126	4488	7.9
	1/21	R88G-HPG50A212K0B□	142	119.0	89.0	238	375.7	5.8	3611	12486	19.0
	1/33	R88G-HPG50A332K0B□	90	192.0	91.3	151	595.3	4.8	4135	14300	19.0
3 kW	1/5	R88G-HPG32A053K0B□	600	42.0	88.1	1000	134.0	3.8	889	3542	7.3
	1/11	R88G-HPG50A113K0B□	272	93.9	89.3	454	296.1	7.7	2974	10285	19.0
	1/21	R88G-HPG50A213K0B□	142	183.1	91.3	238	569.2	5.8	3611	12486	19.0

*1. The value is the allowable continuous output torque of the Decelerator. Take care so that this value is not exceeded.
*2. The value is the maximum allowable torque of the Decelerator. Take care so that this value is not exceeded.
Note: 1. The Decelerator inertia is the Servomotor shaft conversion value.
    2. The protective structure rating of the Servomotor with the Decelerator is IP44.
    3. The Allowable radial load column shows the values obtained at the center of the shaft (T/2).

    4. The standard shaft type is a straight shaft. A model with a key and tap is indicated with "J" at □ of the model number.
    5. Take care so that the surface temperature of the Decelerator does not exceed 70°C.

For 2,000-r/min Servomotors

Servomotor rated output	Reduction ratio	Model	Rated rotation speed	Rated torque	Efficiency	Momentary maximum rotation speed	Momentary maximum torque	Decelerator inertia	Allowable radial load	Allowable thrust load	Weight
			r/min	N·m	%	r/min	N·m	× 10⁻⁴ kg·m²	N	N	kg
			r/min	N·m	%	r/min	N·m	$\times 10^{-4}$ kg·m²	N	N	kg
400 W	1/5	R88G-HPG32A052K0B□	400	6.5	68.4	600	24.9	3.8	889	3542	7.4
	1/11	R88G-HPG32A112K0B□	181	16.8	79.9	272	57.1	3.4	1126	4488	7.9
	1/21	R88G-HPG32A211K5B□	95	34.0	84.9	142	111.1	3.0	1367	5448	7.9
	1/33	R88G-HPG32A33600SB□	60	55.6	88.2	90	176.6	2.7	1565	6240	7.9
	1/45	R88G-HPG32A45400SB□	44	76.0	88.5	66	241.1	2.7	1718	6848	7.9
600 W	1/5	R88G-HPG32A052K0B□	400	11.1	77.6	600	38.6	3.8	889	3542	7.4
	1/11	R88G-HPG32A112K0B□	181	26.8	85.3	272	87.3	3.4	1126	4488	7.9
	1/21	R88G-HPG32A211K5B□	95	53.2	88.6	142	168.7	3.0	1367	5448	7.9
	1/33	R88G-HPG32A33600SB□	60	85.7	90.8	90	267.2	2.7	1565	6240	7.9
	1/45	R88G-HPG50A451K5B□	44	115.1	89.4	66	362.6	4.7	4538	15694	19.0
1 kW	1/5	R88G-HPG32A053K0B□	400	20.3	85.0	600	66.0	3.8	889	3542	7.3
	1/11	R88G-HPG32A112K0SB□	181	47.0	89.6	272	147.6	3.4	1126	4488	7.8
	1/21	R88G-HPG32A211K0SB□	95	91.7	91.5	142	283.8	2.9	1367	5448	7.8
	1/33	R88G-HPG50A332K0SB□	60	143.9	91.4	90	445.8	4.7	4135	14300	19.0
	1/45	R88G-HPG50A451K0SB□	44	197.6	92.1	66	609.3	4.7	4538	15694	19.0
1.5 kW	1/5	R88G-HPG32A053K0B□	400	31.7	88.7	600	100.6	3.8	889	3542	7.3
	1/11	R88G-HPG32A112K0SB□	181	72.2	91.7	272	223.7	3.4	1126	4488	7.8
	1/21	R88G-HPG50A213K0B□	95	137.6	91.5	142	426.7	5.8	3611	12486	19.0
	1/33	R88G-HPG50A332K0SB□	60	219.6	92.9	90	673.9	4.7	4135	14300	19.0
2 kW	1/5	R88G-HPG32A053K0B□	400	43.2	90.5	600	135.1	3.8	889	3542	7.3
	1/11	R88G-HPG32A112K0SB□	181	97.5	92.8	272	299.7	3.4	1126	4488	7.8
	1/21	R88G-HPG50A213K0B□	95	185.8	92.7	142	571.9	5.8	3611	12486	19.0
	1/33	R88G-HPG50A332K0SB□	60	270.0 *1	93.5	90	849.0 *2	4.7	4135	14300	19.0
3 kW	1/5	R88G-HPG32A054K0B□	400	66.0	92.3	600	203.8	3.8	889	3542	7.9
	1/11	R88G-HPG50A115K0B□	181	146.1	92.9	272	449.2	8.8	2974	10285	19.1
	1/21	R88G-HPG50A213K0SB□	95	260.0 *1	93.6	142	849.0 *2	6.9	3611	12486	19.1
	1/25	R88G-HPG65A253K0SB□	80	322.9	90.3	120	1011.7	14	7846	28654	52.0

*1. The value is the allowable continuous output torque of the Decelerator. Take care so that this value is not exceeded.
*2. The value is the maximum allowable torque of the Decelerator. Take care so that this value is not exceeded.
Note: 1. The Decelerator inertia is the Servomotor shaft conversion value.
    2. The protective structure rating of the Servomotor with the Decelerator is IP44.
    3. The Allowable radial load column shows the values obtained at the center of the shaft (T/2).

    4. The standard shaft type is a straight shaft. A model with a key and tap is indicated with "J" at □ of the model number.
    5. Take care so that the surface temperature of the Decelerator does not exceed 70°C.

For 1,000-r/min Servomotors

Servomotor rated output	Reduction ratio	Model	Rated rotation speed	Rated torque	Efficiency	Momentary maximum rotation speed	Momentary maximum torque	Decelerator inertia	Allowable radial load	Allowable thrust load	Weight
			r/min	N·m	%	r/min	N·m	× 10⁻⁴ kg·m²	N	N	kg
900 W	1/5	R88G-HPG32A05900TB☐	200	39.8	92.6	400	91.2	3.8	889	3542	7.9
	1/11	R88G-HPG32A11900TB☐	90	88.7	93.9	181	201.8	3.4	1126	4488	8.4
	1/21	R88G-HPG50A21900TB☐	47	169.2	93.8	95	385.1	7.0	3611	12486	19.1
	1/33	R88G-HPG50A33900TB☐	30	267.5	94.4	60	606.8	5.9	4135	14300	19.1
2 kW	1/5	R88G-HPG32A052K0TB☐	200	90.2	94.5	400	227.5	5.2	889	3542	8.90
	1/11	R88G-HPG50A112K0TB☐	90	198.9	94.7	181	500.9	8.4	2974	10285	20.1
	1/21	R88G-HPG50A212K0TB☐	47	320.1 *1	94.8	95	849.0 *2	6.5	3611	12486	20.1
	1/25	R88G-HPG65A255K0SB☐	40	446.7	93.6	80	1133.1	14	7846	28654	55.4
3 kW	1/5	R88G-HPG50A055K0SB☐	200	135.4	94.4	400	341.8	11	2347	8118	22.0
	1/11	R88G-HPG50A115K0SB☐	90	246.2 *1	94.9	181	754.4	8.4	2974	10285	23.5
	1/20	R88G-HPG65A205K0SB☐	50	540.4	94.2	100	1366.0	14	7338	26799	55.4
	1/25	R88G-HPG65A255K0SB☐	40	677.1	94.4	80	1709.1	14	7846	28654	55.4

*1. The value is the allowable continuous output torque of the Decelerator. Take care so that this value is not exceeded.
*2. The value is the maximum allowable torque of the Decelerator. Take care so that this value is not exceeded.
Note: 1. The Decelerator inertia is the Servomotor shaft conversion value.
　　　2. The protective structure rating of the Servomotor with the Decelerator is IP44.
　　　3. The Allowable radial load column shows the values obtained at the center of the shaft (T/2).

Radial load
Thrust load
Center of shaft (T/2)
T

　　　4. The standard shaft type is a straight shaft. A model with a key and tap is indicated with "J" at ☐ of the model number.
　　　5. Take care so that the surface temperature of the Decelerator does not exceed 70°C.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information
Specifications
External Dimensions

External Dimensions

Backlash: 3 Arcminutes Max.
For 3,000-r/min Servomotors (100 to 200 W)

Servomotor rated output	Reduction ratio	Model	Outline drawing	Dimensions [mm]												
				LM	LR	C1	C2	D1	D2	D3	D4	D5	D6 *2	E	F1	F2
100 W	1/5	R88G-HPG11B05100B□	1 *1	39.5	42	40	40 × 40	46	46	40	39.5	29	---	27	2.2	15
	1/11	R88G-HPG14A11100B□	1	64.0	58	60	60 × 60	70	46	56	55.5	40	---	37	2.5	21
	1/21	R88G-HPG14A21100B□	1	64.0	58	60	60 × 60	70	46	56	55.5	40	---	37	2.5	21
	1/33	R88G-HPG20A33100B□	2	66.5	80	90	55 dia.	105	46	85	84	59	89	53	7.5	27
	1/45	R88G-HPG20A45100B□	2	66.5	80	90	55 dia.	105	46	85	84	59	89	53	7.5	27
200 W	1/5	R88G-HPG14A05200B□	1	64.0	58	60	60 × 60	70	70	56	55.5	40	---	37	2.5	21
	1/11	R88G-HPG14A11200B□	1	64.0	58	60	60 × 60	70	70	56	55.5	40	---	37	2.5	21
	1/21	R88G-HPG20A21200B□	2	71.0	80	90	89 dia.	105	70	85	84	59	---	53	7.5	27
	1/33	R88G-HPG20A33200B□	2	71.0	80	90	89 dia.	105	70	85	84	59	---	53	7.5	27
	1/45	R88G-HPG20A45200B□	2	71.0	80	90	89 dia.	105	70	85	84	59	---	53	7.5	27

Servomotor rated output	Reduction ratio	Model	Dimensions [mm]						Key				Tap	
			G	S	T	Z1	Z2	AT *3	QK	b	h	t1	M	L
100 W	1/5	R88G-HPG11B05100B□	5	8	20	3.4	M4 × 9	M3	15	3	3	1.8	M3	6
	1/11	R88G-HPG14A11100B□	8	16	28	5.5	M4 × 10	M3	25	5	5	3	M4	8
	1/21	R88G-HPG14A21100B□	8	16	28	5.5	M4 × 10	M3	25	5	5	3	M4	8
	1/33	R88G-HPG20A33100B□	10	25	42	9	M4 × 10	M4	36	8	7	4	M6	12
	1/45	R88G-HPG20A45100B□	10	25	42	9	M4 × 10	M4	36	8	7	4	M6	12
200 W	1/5	R88G-HPG14A05200B□	8	16	28	5.5	M4 × 10	M4	25	5	5	3	M4	8
	1/11	R88G-HPG14A11200B□	8	16	28	5.5	M4 × 10	M4	25	5	5	3	M4	8
	1/21	R88G-HPG20A21200B□	10	25	42	9	M4 × 10	M4	36	8	7	4	M6	12
	1/33	R88G-HPG20A33200B□	10	25	42	9	M4 × 10	M4	36	8	7	4	M6	12
	1/45	R88G-HPG20A45200B□	10	25	42	9	M4 × 10	M4	36	8	7	4	M6	12

*1. Two set bolts are positioned at 90° from each other.
*2. D6 is the maximum diameter of the decelerator body between the flange side and Servomotor side. (See Outline Drawing) The value is given only when the diameter is larger than the diameters of these two sides. Take heed of this when you mount the decelerator to the machine.
*3. Indicates set bolt.
Note: 1. The standard shaft type is a straight shaft.
    2. A model with a key and tap is indicated with "J" at □ of the model number.
    (Example: R88G-HPG11B05100BJ)
    3. The diameter of the motor shaft insertion hole is the same as the shaft diameter of the corresponding Servomotor.
    4. The dimensional drawings in this document are for showing main dimensions only, and they do not give the details of the product shape.
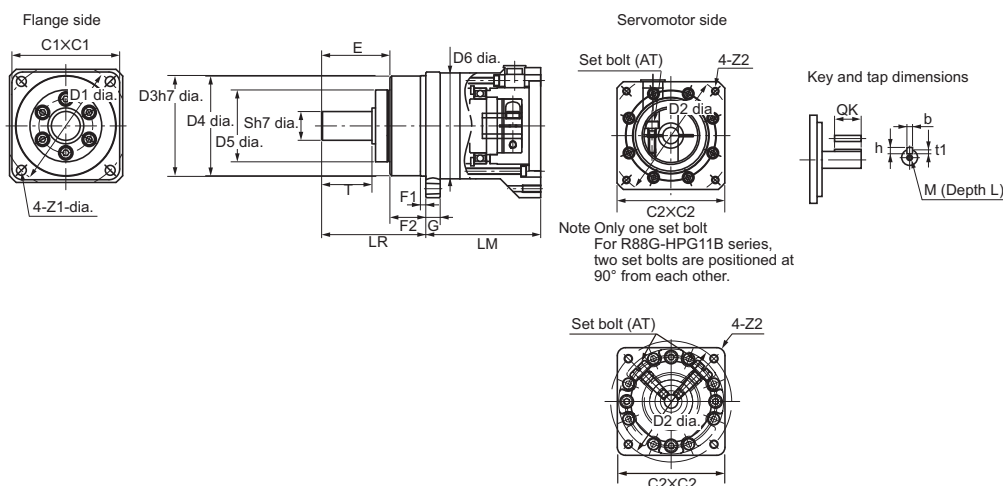
Outline Drawing 1
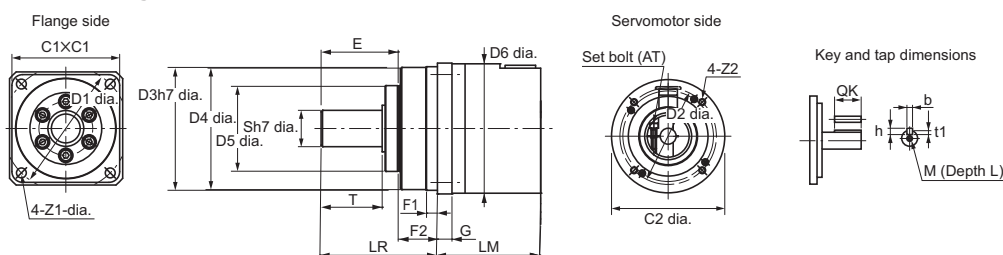
Outline Drawing 2

For 3,000-r/min Servomotors (400 to 750 W)

Servomotor rated output	Reduction ratio	Model	Outline drawing	Dimensions [mm]												
				LM	LR	C1	C2	D1	D2	D3	D4	D5	D6 *1	E	F1	F2
400 W	1/5	R88G-HPG14A05400B☐	1	64	58	60	60 × 60	70	70	56	55.5	40	---	37	2.5	21
	1/11	R88G-HPG20A11400B☐	2	71	80	90	89 dia.	105	70	85	84	59	---	53	7.5	27
	1/21	R88G-HPG20A21400B☐	2	71	80	90	89 dia.	105	70	85	84	59	---	53	7.5	27
	1/33	R88G-HPG32A33400B☐	2	104	133	120	122 dia.	135	70	115	114	84	---	98	12.5	35
	1/45	R88G-HPG32A45400B☐	2	104	133	120	122 dia.	135	70	115	114	84	---	98	12.5	35
750 W (200 V)	1/5	R88G-HPG20A05750B☐	1	78	80	90	80 × 80	105	90	85	84	59	89	53	7.5	27
	1/11	R88G-HPG20A11750B☐	1	78	80	90	80 × 80	105	90	85	84	59	89	53	7.5	27
	1/21	R88G-HPG32A21750B☐	2	104	133	120	122 dia.	135	90	115	114	84	---	98	12.5	35
	1/33	R88G-HPG32A33750B☐	2	104	133	120	122 dia.	135	90	115	114	84	---	98	12.5	35
	1/45	R88G-HPG32A45750B☐	2	104	133	120	122 dia.	135	90	115	114	84	---	98	12.5	35
750 W (400 V)	1/5	R88G-HPG32A052K0B☐	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A112K0B☐	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/21	R88G-HPG32A211K5B☐	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/33	R88G-HPG32A33600SB☐	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/45	R88G-HPG50A451K5B☐	2	123	156	170	170 dia.	190	115	165	163	122	---	103	12	53

Servomotor rated output	Reduction ratio	Model	Dimensions [mm]						Key				Tap	
			G	S	T	Z1	Z2	AT *2	QK	b	h	t1	M	L
400 W	1/5	R88G-HPG14A05400B☐	8	16	28	5.5	M4 × 10	M4	25	5	5	3	M4	8
	1/11	R88G-HPG20A11400B☐	10	25	42	9	M4 × 10	M4	36	8	7	4	M6	12
	1/21	R88G-HPG20A21400B☐	10	25	42	9	M4 × 10	M4	36	8	7	4	M6	12
	1/33	R88G-HPG32A33400B☐	13	40	82	11	M4 × 10	M4	70	12	8	5	M10	20
	1/45	R88G-HPG32A45400B☐	13	40	82	11	M4 × 10	M4	70	12	8	5	M10	20
750 W (200 V)	1/5	R88G-HPG20A05750B☐	10	25	42	9	M5 × 12	M4	36	8	7	4	M6	12
	1/11	R88G-HPG20A11750B☐	10	25	42	9	M5 × 12	M4	36	8	7	4	M6	12
	1/21	R88G-HPG32A21750B☐	13	40	82	11	M5 × 12	M6	70	12	8	5	M10	20
	1/33	R88G-HPG32A33750B☐	13	40	82	11	M5 × 12	M6	70	12	8	5	M10	20
	1/45	R88G-HPG32A45750B☐	13	40	82	11	M5 × 12	M6	70	12	8	5	M10	20
750 W (400 V)	1/5	R88G-HPG32A052K0B☐	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A112K0B☐	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/21	R88G-HPG32A211K5B☐	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/33	R88G-HPG32A33600SB☐	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/45	R88G-HPG50A451K5B☐	16	50	82	14	M8 × 10	M6	70	14	9	5.5	M10	20

*1. D6 is the maximum diameter of the decelerator body between the flange side and Servomotor side. (See Outline Drawing) The value is given only when the diameter is larger than the diameters of these two sides. Take heed of this when you mount the decelerator to the machine.
*2. Indicates set bolt.
Note: 1. The standard shaft type is a straight shaft.
2. A model with a key and tap is indicated with "J" at ☐ of the model number.
(Example: R88G-HPG11B05100BJ)
3. The diameter of the motor shaft insertion hole is the same as the shaft diameter of the corresponding Servomotor.
4. The dimensional drawings in this document are for showing main dimensions only, and they do not give the details of the product shape.

Outline Drawing 1

Outline Drawing 2

*3. The tolerance is "h8" for R88G-HPG50☐.

System Configuration
Controllers
Softwares
Programmable Terminals
Specifications
External Dimensions
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

For 3,000-r/min Servomotors (1 to 3 kW)

Servomotor rated output	Reduction ratio	Model	Outline drawing	Dimensions [mm]												
				LM	LR	C1	C2	D1	D2	D3	D4	D5	D6 *1	E	F1	F2
1 kW	1/5	R88G-HPG32A052K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A112K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/21	R88G-HPG32A211K5B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/33	R88G-HPG50A332K0B□	2	123	156	170	170 dia.	190	115	165	163	122	---	103	12	53
	1/45	R88G-HPG50A451K5B□	2	123	156	170	170 dia.	190	115	165	163	122	---	103	12	53
1.5 kW	1/5	R88G-HPG32A052K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A112K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/21	R88G-HPG32A211K5B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/33	R88G-HPG50A332K0B□	2	123	156	170	170 dia.	190	115	165	163	122	---	103	12	53
	1/45	R88G-HPG50A451K5B□	2	123	156	170	170 dia.	190	115	165	163	122	---	103	12	53
2 kW	1/5	R88G-HPG32A052K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A112K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/21	R88G-HPG50A212K0B□	2	123	156	170	170 dia.	190	115	165	163	122	---	103	12	53
	1/33	R88G-HPG50A332K0B□	2	123	156	170	170 dia.	190	115	165	163	122	---	103	12	53
3 kW	1/5	R88G-HPG32A053K0B□	1	107	133	120	130 x 130	135	145	115	114	84	---	98	12.5	35
	1/11	R88G-HPG50A113K0B□	2	123	156	170	170 dia.	190	145	165	163	122	---	103	12	53
	1/21	R88G-HPG50A213K0B□	2	123	156	170	170 dia.	190	145	165	163	122	---	103	12	53

Servomotor rated output	Reduction ratio	Model	Dimensions [mm]						Key				Tap	
			G	S	T	Z1	Z2	AT *2	QK	b	h	t1	M	L
1 kW	1/5	R88G-HPG32A052K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A112K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/21	R88G-HPG32A211K5B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/33	R88G-HPG50A332K0B□	16	50	82	14	M8 × 10	M6	70	14	9	5.5	M10	20
	1/45	R88G-HPG50A451K5B□	16	50	82	14	M8 × 10	M6	70	14	9	5.5	M10	20
1.5 kW	1/5	R88G-HPG32A052K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A112K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/21	R88G-HPG32A211K5B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/33	R88G-HPG50A332K0B□	16	50	82	14	M8 × 10	M6	70	14	9	5.5	M10	20
	1/45	R88G-HPG50A451K5B□	16	50	82	14	M8 × 10	M6	70	14	9	5.5	M10	20
2 kW	1/5	R88G-HPG32A052K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A112K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/21	R88G-HPG50A212K0B□	16	50	82	14	M8 × 10	M6	70	14	9	5.5	M10	20
	1/33	R88G-HPG50A332K0B□	16	50	82	14	M8 × 10	M6	70	14	9	5.5	M10	20
3 kW	1/5	R88G-HPG32A053K0B□	13	40	82	11	M8 × 18	M6	70	12	8	5	M10	20
	1/11	R88G-HPG50A113K0B□	16	50	82	14	M8 × 16	M6	70	14	9	5.5	M10	20
	1/21	R88G-HPG50A213K0B□	16	50	82	14	M8 × 16	M6	70	14	9	5.5	M10	20

*1. D6 is the maximum diameter of the decelerator body between the flange side and Servomotor side. (See Outline Drawing) The value is given only when the diameter is larger than the diameters of these two sides. Take heed of this when you mount the decelerator to the machine.
*2. Indicates set bolt.
Note: 1. The standard shaft type is a straight shaft.
2. A model with a key and tap is indicated with "J" at □ of the model number.
(Example: R88G-HPG11B05100BJ)
3. The diameter of the motor shaft insertion hole is the same as the shaft diameter of the corresponding Servomotor.
4. The dimensional drawings in this document are for showing main dimensions only, and they do not give the details of the product shape.

Outline Drawing 1

Outline Drawing 2

*3. The tolerance is "h8" for R88G-HPG50□.

For 2,000-r/min Servomotors (400 W to 1 kW)

Servomotor rated output	Reduction ratio	Model	Outline drawing	Dimensions [mm]												
				LM	LR	C1	C2	D1	D2	D3	D4	D5	D6 *1	E	F1	F2
400 W (400 V)	1/5	R88G-HPG32A052K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A112K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/21	R88G-HPG32A211K5B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/33	R88G-HPG32A33600SB□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/45	R88G-HPG32A45400SB□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
600 W (400 V)	1/5	R88G-HPG32A052K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A112K0B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/21	R88G-HPG32A211K5B□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/33	R88G-HPG32A33600SB□	2	110	133	120	135 dia.	135	115	115	114	84	---	98	12.5	35
	1/45	R88G-HPG50A451K5B□	2	123	156	170	170 dia.	190	115	165	163	122	---	103	12	53
1 kW	1/5	R88G-HPG32A053K0B□	1	107	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A112K0SB□	1	107	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/21	R88G-HPG32A211K0SB□	1	107	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/33	R88G-HPG50A332K0SB□	2	123	156	170	170 dia.	190	145	165	163	122	---	103	12	53
	1/45	R88G-HPG50A451K0SB□	2	123	156	170	170 dia.	190	145	165	163	122	---	103	12	53

Servomotor rated output	Reduction ratio	Model	Dimensions [mm]						Key				Tap	
			G	S	T	Z1	Z2	AT *2	QK	b	h	t1	M	L
400 W (400 V)	1/5	R88G-HPG32A052K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A112K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/21	R88G-HPG32A211K5B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/33	R88G-HPG32A33600SB□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/45	R88G-HPG32A45400SB□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
600 W (400 V)	1/5	R88G-HPG32A052K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A112K0B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/21	R88G-HPG32A211K5B□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/33	R88G-HPG32A33600SB□	13	40	82	11	M8 × 10	M6	70	12	8	5	M10	20
	1/45	R88G-HPG50A451K5B□	16	50	82	14	M8 × 10	M6	70	14	9	5.5	M10	20
1 kW	1/5	R88G-HPG32A053K0B□	13	40	82	11	M8 × 18	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A112K0SB□	13	40	82	11	M8 × 18	M6	70	12	8	5	M10	20
	1/21	R88G-HPG32A211K0SB□	13	40	82	11	M8 × 18	M6	70	12	8	5	M10	20
	1/33	R88G-HPG50A332K0SB□	16	50	82	14	M8 × 16	M6	70	14	9	5.5	M10	20
	1/45	R88G-HPG50A451K0SB□	16	50	82	14	M8 × 16	M6	70	14	9	5.5	M10	20

*1. D6 is the maximum diameter of the decelerator body between the flange side and Servomotor side. (See Outline Drawing) The value is given only when the diameter is larger than the diameters of these two sides. Take heed of this when you mount the decelerator to the machine.

*2. Indicates set bolt.

Note: 1. The standard shaft type is a straight shaft.

2. A model with a key and tap is indicated with "J" at □ of the model number.
   (Example: R88G-HPG11B05100BJ)

3. The diameter of the motor shaft insertion hole is the same as the shaft diameter of the corresponding Servomotor.

4. The dimensional drawings in this document are for showing main dimensions only, and they do not give the details of the product shape.

Outline Drawing 1

Outline Drawing 2

*3. The tolerance is "h8" for R88G-HPG50□.

For 2,000-r/min Servomotors (1.5 to 3 kW)

Servomotor rated output	Reduction ratio	Model	Outline drawing	Dimensions [mm]												
				LM	LR	C1	C2	D1	D2	D3	D4	D5	D6 *1	E	F1	F2
1.5 kW	1/5	R88G-HPG32A053K0B□	1	107	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A112K0SB□	1	107	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/21	R88G-HPG50A213K0B□	2	123	156	170	170 dia.	190	145	165	163	122	---	103	12	53
	1/33	R88G-HPG50A332K0SB□	2	123	156	170	170 dia.	190	145	165	163	122	---	103	12	53
2 kW	1/5	R88G-HPG32A053K0B□	1	107	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A112K0SB□	1	107	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/21	R88G-HPG50A213K0B□	2	123	156	170	170 dia.	190	145	165	163	122	---	103	12	53
	1/33	R88G-HPG50A332K0SB□	2	123	156	170	170 dia.	190	145	165	163	122	---	103	12	53
3 kW	1/5	R88G-HPG32A054K0B□	1	129	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/11	R88G-HPG50A115K0B□	1	149	156	170	130 × 130	190	145	165	163	122	170	103	12	53
	1/21	R88G-HPG50A213K0SB□	1	149	156	170	130 × 130	190	145	165	163	122	170	103	12	53
	1/25	R88G-HPG65A253K0SB□	1	231	222	230	130 × 130	260	145	220	214	168	220	165	12	57

Servomotor rated output	Reduction ratio	Model	Dimensions [mm]						Key				Tap	
			G	S	T	Z1	Z2	AT *2	QK	b	h	t1	M	L
1.5 kW	1/5	R88G-HPG32A053K0B□	13	40	82	11	M8 × 18	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A112K0SB□	13	40	82	11	M8 × 18	M6	70	12	8	5	M10	20
	1/21	R88G-HPG50A213K0B□	16	50	82	14	M8 × 16	M6	70	14	9	5.5	M10	20
	1/33	R88G-HPG50A332K0SB□	16	50	82	14	M8 × 16	M6	70	14	9	5.5	M10	20
2 kW	1/5	R88G-HPG32A053K0B□	13	40	82	11	M8 × 18	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A112K0SB□	13	40	82	11	M8 × 18	M6	70	12	8	5	M10	20
	1/21	R88G-HPG50A213K0B□	16	50	82	14	M8 × 16	M6	70	14	9	5.5	M10	20
	1/33	R88G-HPG50A332K0SB□	16	50	82	14	M8 × 16	M6	70	14	9	5.5	M10	20
3 kW	1/5	R88G-HPG32A054K0B□	13	40	82	11	M8 × 25	M6	70	12	8	5	M10	20
	1/11	R88G-HPG50A115K0B□	16	50	82	14	M8 × 25	M6	70	14	9	5.5	M10	20
	1/21	R88G-HPG50A213K0SB□	16	50	82	14	M8 × 25	M6	70	14	9	5.5	M10	20
	1/25	R88G-HPG65A253K0SB□	25	80	130	18	M8 × 25	M8	110	22	14	9	M16	35

*1. D6 is the maximum diameter of the decelerator body between the flange side and Servomotor side. (See Outline Drawing) The value is given only when the diameter is larger than the diameters of these two sides. Take heed of this when you mount the decelerator to the machine.
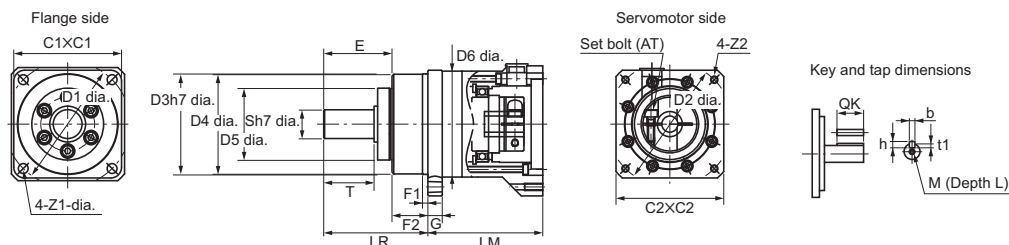*2. Indicates set bolt.
Note: 1. The standard shaft type is a straight shaft.
    2. A model with a key and tap is indicated with "J" at □ of the model number.
    (Example: R88G-HPG11B05100BJ)
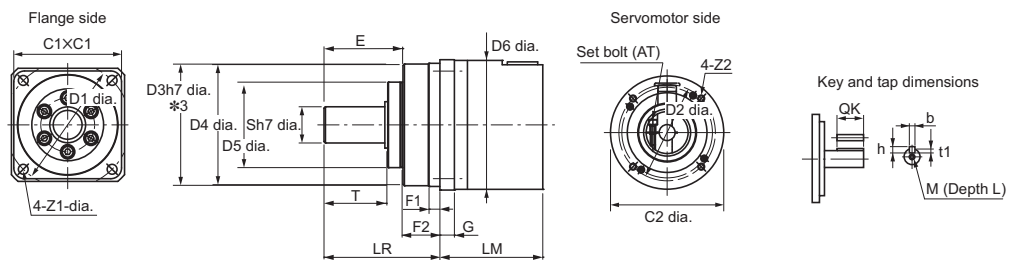   **3.** The diameter of the motor shaft insertion hole is the same as the shaft diameter of the corresponding Servomotor.
    4. The dimensional drawings in this document are for showing main dimensions only, and they do not give the details of the product shape.

Outline Drawing 1

*3. The tolerance is "h8" for R88G-HPG50@ and R88G-HPG65@.
*4. The model R88G-HPG65@ has the taps for eye bolts.

Outline Drawing 2
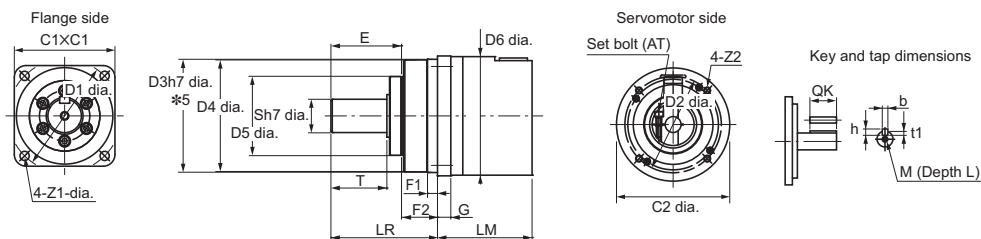
*5. The tolerance is "h8" for R88G-HPG50@.

For 1,000-r/min Servomotors (900 W to 3 kW)

Servomotor rated output	Reduction ratio	Model	Outline drawing	Dimensions [mm]												
				LM	LR	C1	C2	D1	D2	D3	D4	D5	D6 *1	E	F1	F2
900 W	1/5	R88G-HPG32A05900TB□	1	129	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/11	R88G-HPG32A11900TB□	1	129	133	120	130 × 130	135	145	115	114	84	---	98	12.5	35
	1/21	R88G-HPG50A21900TB□	1	149	156	170	130 × 130	190	145	165	163	122	170	103	12	53
	1/33	R88G-HPG50A33900TB□	1	149	156	170	130 × 130	190	145	165	163	122	170	103	12	53
2 kW	1/5	R88G-HPG32A052K0TB□	1	129	133	120	180 × 180	135	200	115	114	84	---	98	12.5	35
	1/11	R88G-HPG50A112K0TB□	1	149	156	170	180 × 180	190	200	165	163	122	---	103	12	53
	1/21	R88G-HPG50A212K0TB□	1	149	156	170	180 × 180	190	200	165	163	122	---	103	12	53
	1/25	R88G-HPG65A255K0SB□	1	231	222	230	180 × 180	260	200	220	214	168	220	165	12	57
3 kW	1/5	R88G-HPG50A055K0SB□	1	149	156	170	180 × 180	190	200	165	163	122	---	103	12	53
	1/11	R88G-HPG50A115K0SB□	1	149	156	170	180 × 180	190	200	165	163	122	---	103	12	53
	1/20	R88G-HPG65A205K0SB□	1	231	222	230	180 × 180	260	200	220	214	168	220	165	12	57
	1/25	R88G-HPG65A255K0SB□	1	231	222	230	180 × 180	260	200	220	214	168	220	165	12	57

Servomotor rated output	Reduction ratio	Model	Dimensions [mm]						Key				Tap	
			G	S	T	Z1	Z2	AT *2	QK	b	h	t1	M	L
900 W	1/5	R88G-HPG32A05900TB□	13	40	82	11	M8 × 25	M6	70	12	8	5	M10	20
	1/11	R88G-HPG32A11900TB□	13	40	82	11	M8 × 25	M6	70	12	8	5	M10	20
	1/21	R88G-HPG50A21900TB□	16	50	82	14	M8 × 25	M6	70	14	9	5.5	M10	20
	1/33	R88G-HPG50A33900TB□	16	50	82	14	M8 × 25	M6	70	14	9	5.5	M10	20
2 kW	1/5	R88G-HPG32A052K0TB□	13	40	82	11	M12 × 25	M6	70	12	8	5	M10	20
	1/11	R88G-HPG50A112K0TB□	16	50	82	14	M12 × 25	M6	70	14	9	5.5	M10	20
	1/21	R88G-HPG50A212K0TB□	16	50	82	14	M12 × 25	M6	70	14	9	5.5	M10	20
	1/25	R88G-HPG65A255K0SB□	25	80	130	18	M12 × 25	M8	110	22	14	9	M16	35
3 kW	1/5	R88G-HPG50A055K0SB□	16	50	82	14	M12 × 25	M6	70	14	9	5.5	M10	20
	1/11	R88G-HPG50A115K0SB□	16	50	82	14	M12 × 25	M6	70	14	9	5.5	M10	20
	1/20	R88G-HPG65A205K0SB□	25	80	130	18	M12 × 25	M8	110	22	14	9	M16	35
	1/25	R88G-HPG65A255K0SB□	25	80	130	18	M12 × 25	M8	110	22	14	9	M16	35

*1. D6 is the maximum diameter of the decelerator body between the flange side and Servomotor side. (See Outline Drawing) The value is given only when the diameter is larger than the diameters of these two sides. Take heed of this when you mount the decelerator to the machine.
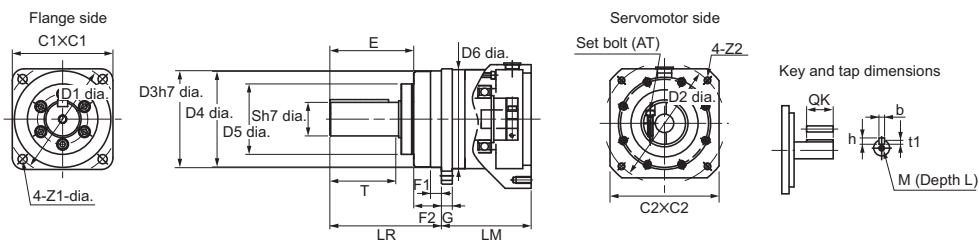*2. Indicates set bolt.
Note: 1. The standard shaft type is a straight shaft.
   2. A model with a key and tap is indicated with "J" at □ of the model number.
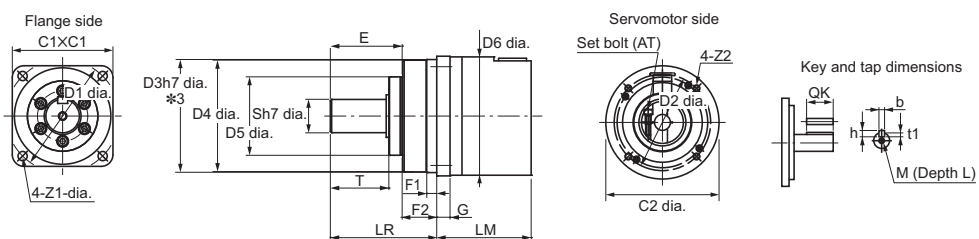   (Example: R88G-HPG11B05100BJ)
   3. The diameter of the motor shaft insertion hole is the same as the shaft diameter of the corresponding Servomotor.
   4. The dimensional drawings in this document are for showing main dimensions only, and they do not give the details of the product shape.

Outline Drawing 1

*3. The tolerance is "h8" for R88G-HPG50@ and R88G-HPG65@.
*4. The model R88G-HPG65@ has the taps for eye bolts.

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

*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).

System Configuration · Controllers · Softwares · Programmable Terminals · EtherCAT Slave Terminals · Safety · Mortion/Drives · Inverters · Robotics · Sensors · Remote I/O Terminals · Ordering Information

Performance Specifications · Function Specifications · Version Information · Components and Functions · Connection Diagram · Dimensions · Related Options

Function name	Specifications
Other option	DC reactor, AC reactor, radio noise filter, input noise filter, output noise filter, regenerative braking unit, Braking Resistor, 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 Item Unit version	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
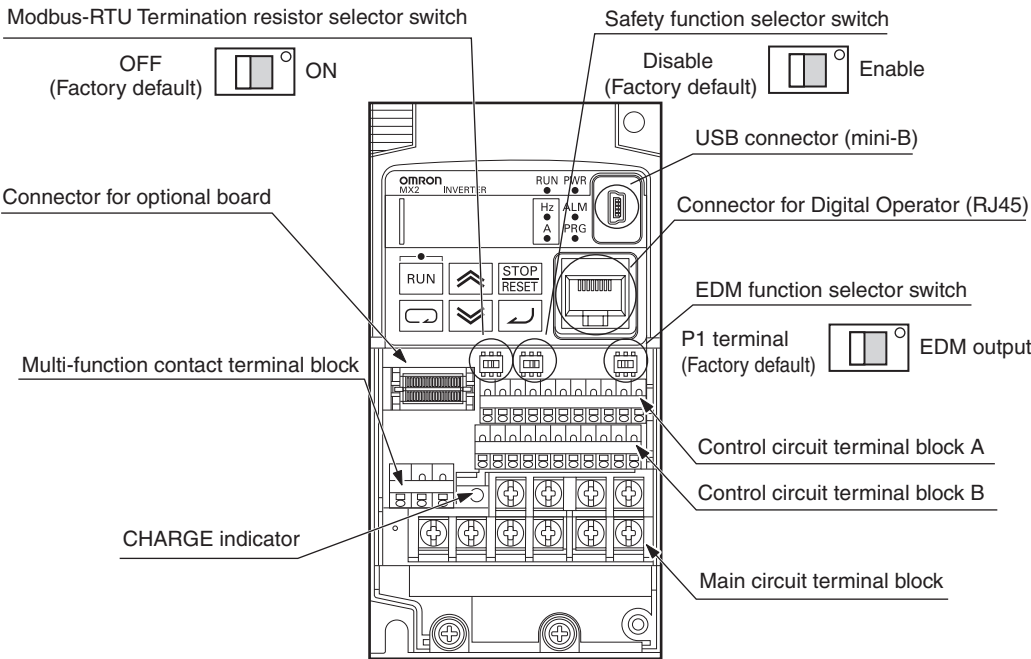
Name	Function
Modbus-RTU Termination resistor selector switch	Use this Terminal Resistor selector switch for RS-485 terminals on the control circuit terminal block. When this switch is turned ON, the internal 200 Ω Resistor is connected.
Safety function selector switch	Turn this switch ON when using 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
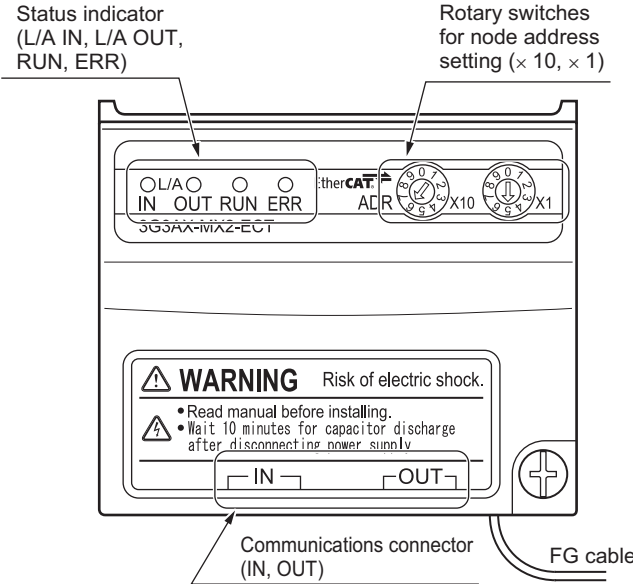
Connection Diagram
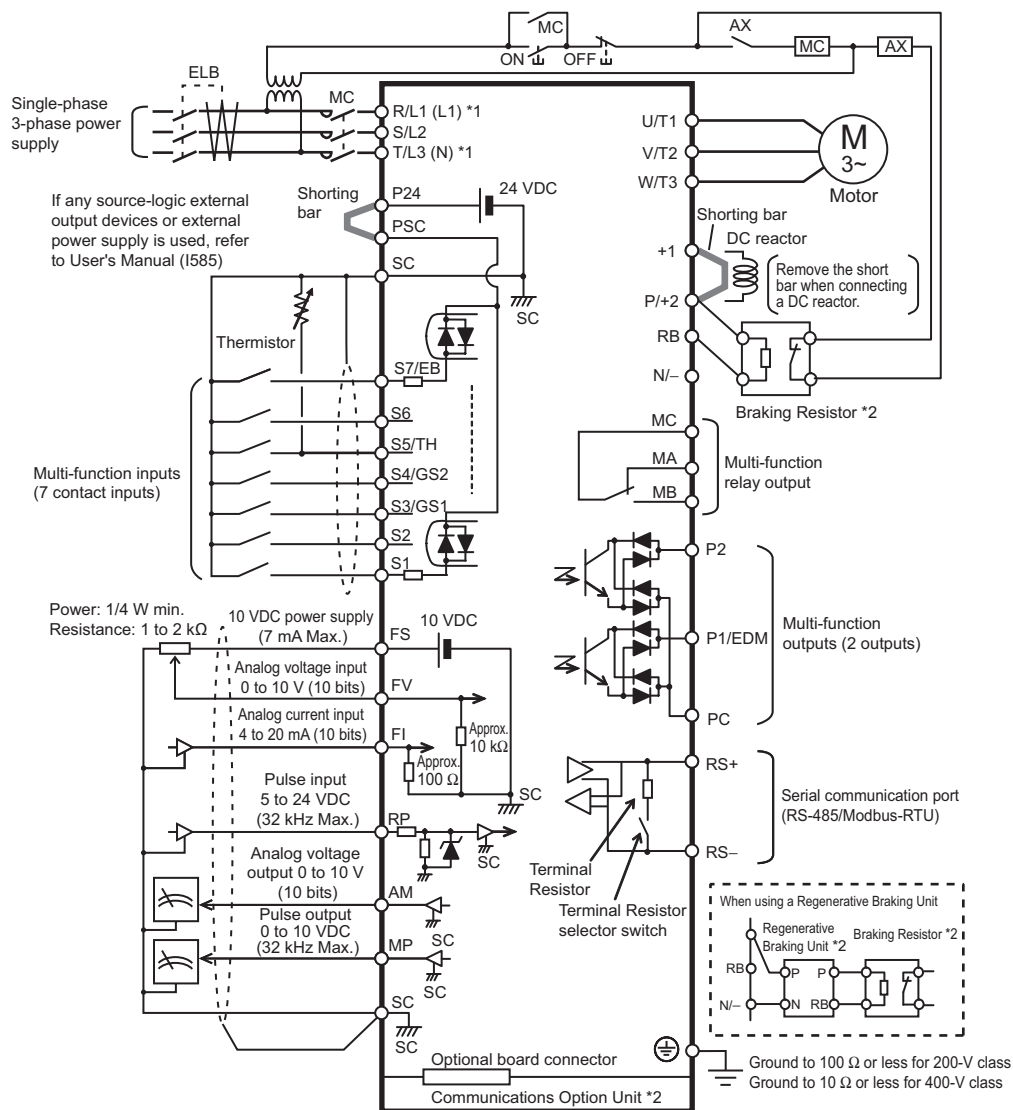
*1 Connect to terminals L1 and N on a single-phase, 200-V Inverter (3G3MX2-AB□□□-V1).
*2 Optional.

Dimensions

(Unit: mm)

3G3MX2-AB001-V1
3G3MX2-AB002-V1
3G3MX2-AB004-V1
3G3MX2-A2001-V1
3G3MX2-A2002-V1
3G3MX2-A2004-V1
3G3MX2-A2007-V1
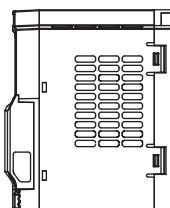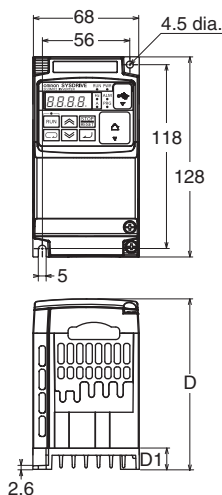
Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
1-phase 200 V	3G3MX2-AB001-V1 3G3MX2-AB002-V1	68	128	109	13.5
	3G3MX2-AB004-V1			122.5	27
3-phase 200 V	3G3MX2-A2001-V1 3G3MX2-A2002-V1			109	13.5
	3G3MX2-A2004-V1			122.5	27
	3G3MX2-A2007-V1			145.5	50

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
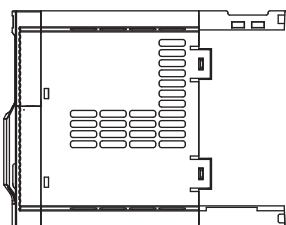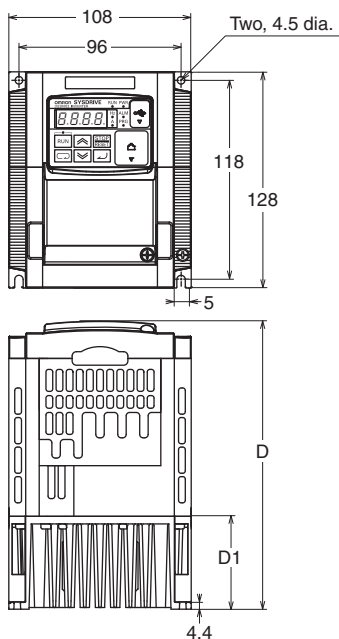
Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
1-phase 200 V	3G3MX2-AB007-V1 3G3MX2-AB015-V1 3G3MX2-AB022-V1	108	128	170.5	55
3-phase 200 V	3G3MX2-A2015-V1 3G3MX2-A2022-V1				
3-phase 400 V	3G3MX2-A4004-V1			143.5	28
	3G3MX2-A4007-V1 3G3MX2-A4015-V1 3G3MX2-A4022-V1 3G3MX2-A4030-V1			170.5	55

3G3MX2-A2037-V1
3G3MX2-A4040-V1
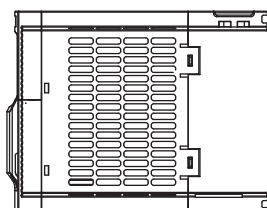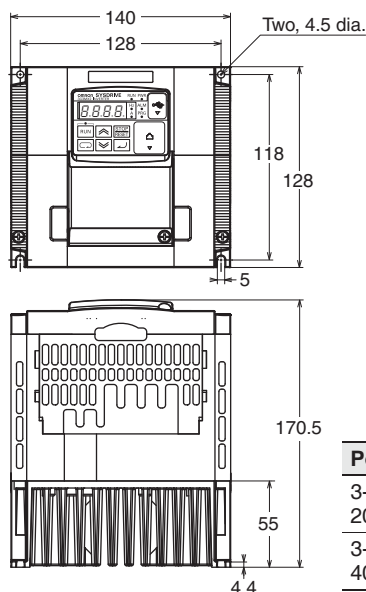
Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2037-V1	140	128	170.5	55
3-phase 400 V	3G3MX2-A4040-V1				

OMRON **437**

3G3MX2-A2055-V1
3G3MX2-A2075-V1
3G3MX2-A4055-V1
3G3MX2-A4075-V1
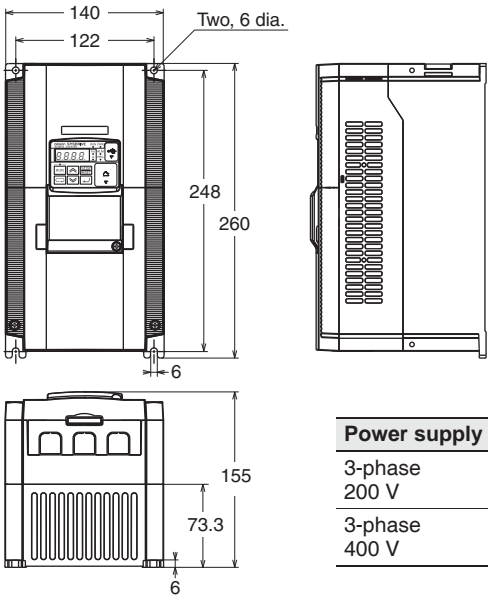
Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2055-V1 3G3MX2-A2075-V1	140	260	155	73.3
3-phase 400 V	3G3MX2-A4055-V1 3G3MX2-A4075-V1				

3G3MX2-A2110-V1
3G3MX2-A4110-V1
3G3MX2-A4150-V1
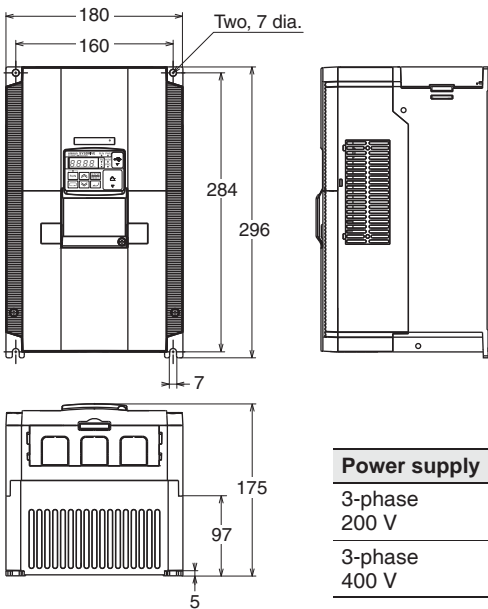
Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2110-V1	180	296	175	97
3-phase 400 V	3G3MX2-A4110-V1 3G3MX2-A4150-V1				

3G3MX2-A2150-V1
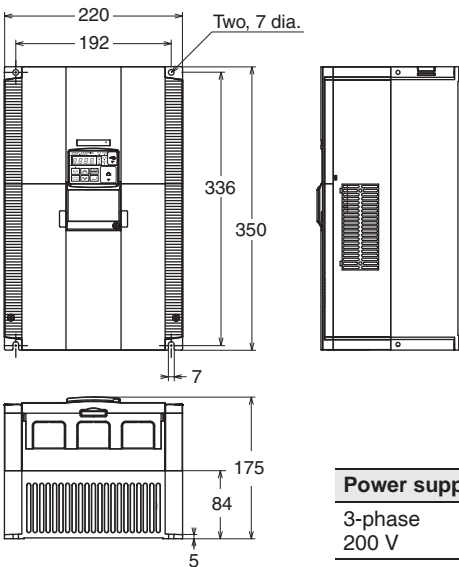
Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2150-V1	220	350	175	84

EtherCAT Communication Unit
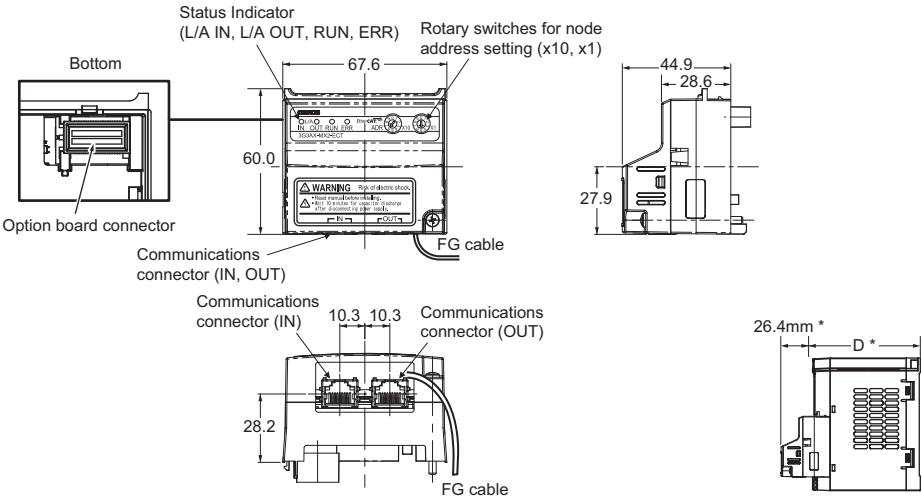
3G3AX-MX2-ECT

Status Indicator (L/A IN, L/A OUT, RUN, ERR)

Rotary switches for node address setting (x10, x1)

Bottom

67.6

60.0

Option board connector

Communications connector (IN, OUT)

FG cable

44.9

28.6

27.9

Communications connector (IN)

Communications connector (OUT)

10.3 10.3

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.

System Configuration

Controllers

Softwares

Performance Specifications — Programmable Terminals

Function Specifications — EtherCAT Slave Terminals

Version Information — Safety

Components and Functions

Connection Diagram — Mortion/Drives

Dimensions

Related Options — Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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 EMC filter

Performance Specifications

Inverter 3G3RX-V1

3-phase 200-V Class CT: Heavy load rating   VT: Light load rating

Item Model name (3G3RX-)			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-)		A4004-V1	A4007-V1	A4015-V1	A4022-V1	A4037-V1	A4055-V1	A4075-V1	A4110-V1	A4150-V1	A4185-V1	A4220-V1
							3-phase 400-V class						
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-)		A4300-V1	A4370-V1	A4450-V1	A4550-V1	B4750-V1	B4900-V1	B411K-V1	B413K-V1
						3-phase 400-V class				
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							

OMRON **441**

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
Operat-ing envi-ronment	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/s² (0.6G), 10 to 55Hz / 0.4 to 22kW 2.94m/s² (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™ Communication Unit	3G3AX-RX-CRT-E
	DeviceNet™ Communication Unit	3G3AX-RX-DRT-E
Other options		Braking Resistor, AC reactor, DC reactor, Digital Operator, Digital Operator cables, Noise filter, Regenerative brak-ing unit, etc.
Interna-tional standard	EC Directive — EMC Directive	EN61800-3: 2004
	EC Directive — 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.

OMRON 443

Connection Diagram

* 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
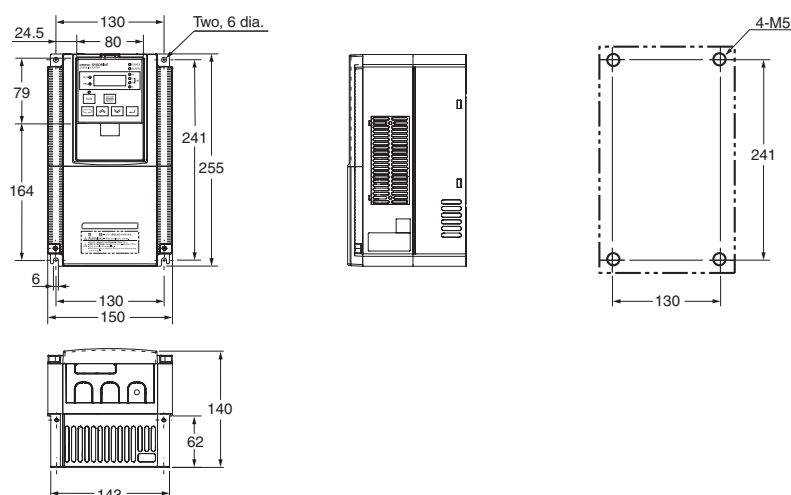
3G3RX-A2055-V1
3G3RX-A2075-V1
3G3RX-A2110-V1
3G3RX-A4055-V1
3G3RX-A4075-V1
3G3RX-A4110-V1
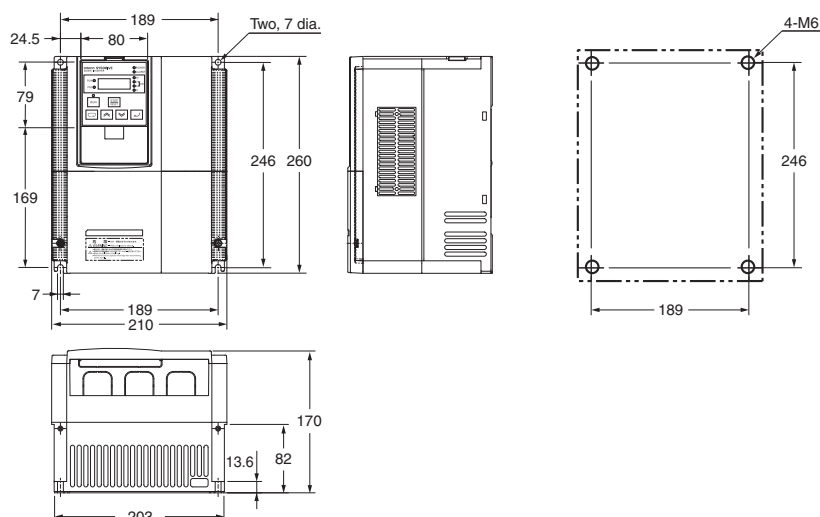
3G3RX-A2150-V1
3G3RX-A2185-V1
3G3RX-A2220-V1
3G3RX-A4150-V1
3G3RX-A4185-V1
3G3RX-A4220-V1

System Configuration
Controllers
Softwares
Performance Specifications
Programmable Terminals
Function Specifications
EtherCAT Slave Terminals
Components and Functions
Connection Diagram
Safety
Dimensions
Mortion/Drives
Communication Unit
Inverters
Optional application table
Robotics
Sensors
Remote I/O Terminals
Ordering Information
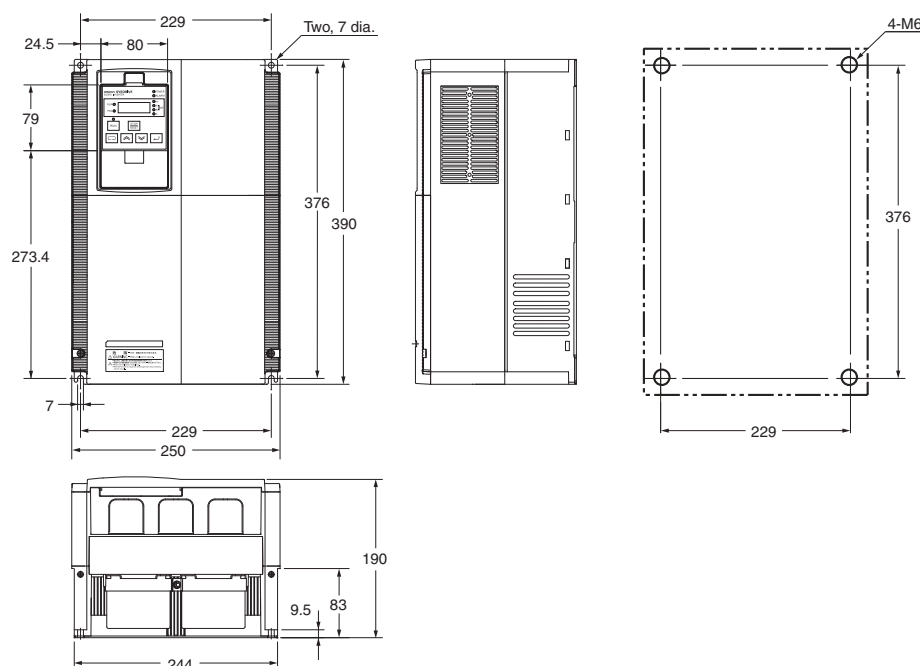
3G3RX-A2300-V1
3G3RX-A4300-V1
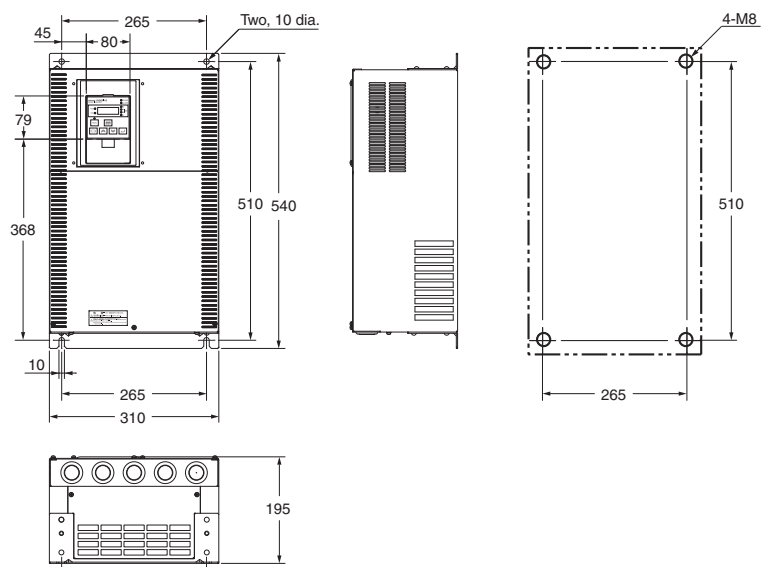
3G3RX-A2370-V1
3G3RX-A2450-V1
3G3RX-A4370-V1
3G3RX-A4450-V1
3G3RX-A4550-V1

3G3RX-A2550-V1

System Configuration

Controllers

Softwares

Programmable Terminals | Performance Specifications

EtherCAT Slave Terminals | Function Specifications

Safety | Components and Functions

Mortion/Drives | Connection Diagram

Inverters | Dimensions

Robotics | Communication Unit

Sensors | Optional application table

Remote I/O Terminals

Ordering Information
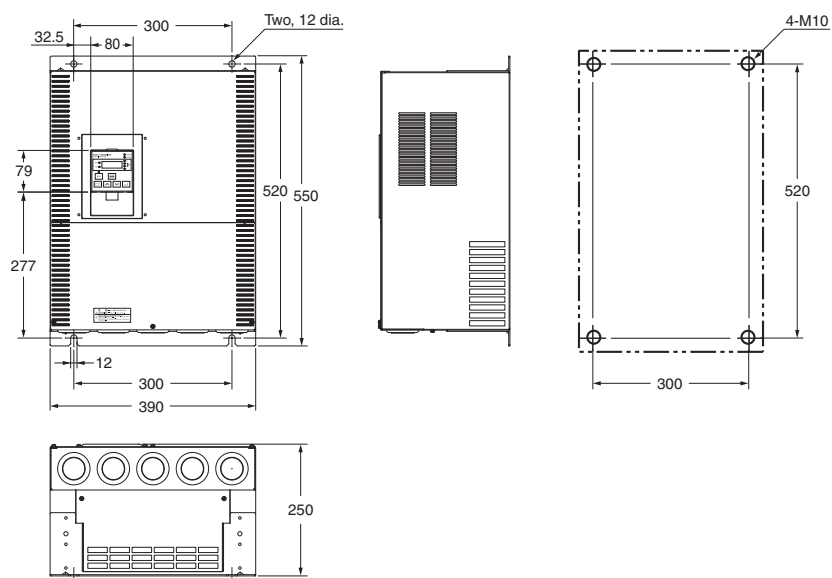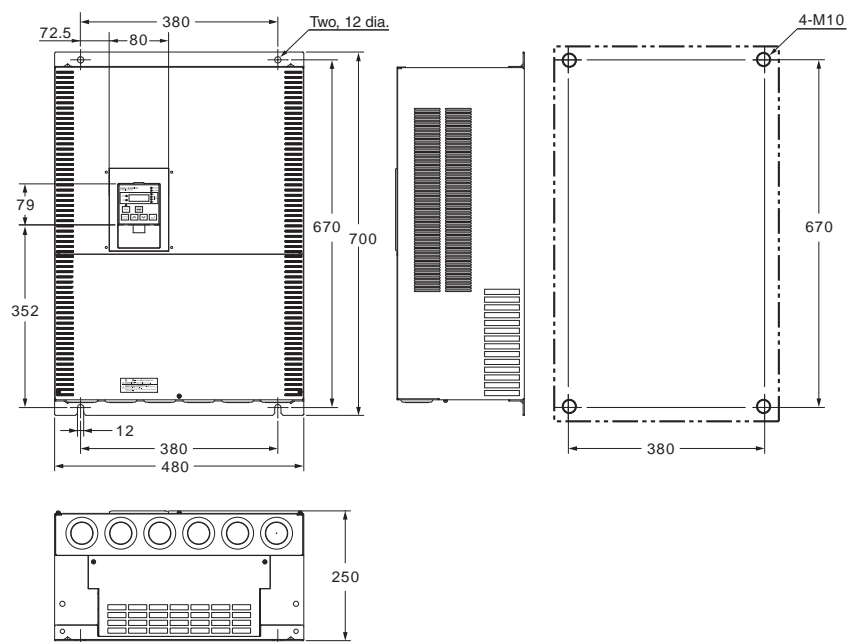
3G3RX-B4750-V1
3G3RX-B4900-V1
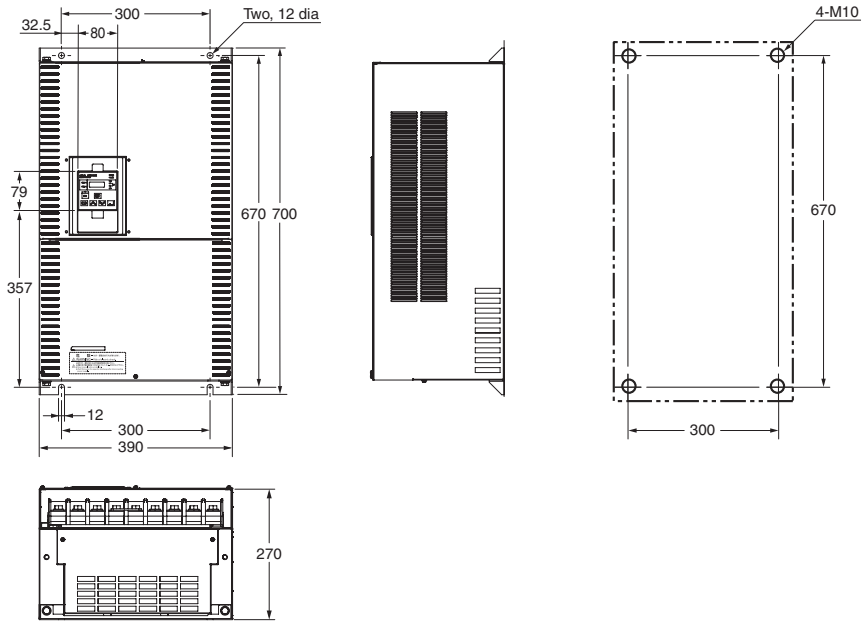
3G3RX-B411K-V1
3G3RX-B413K-V1

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)
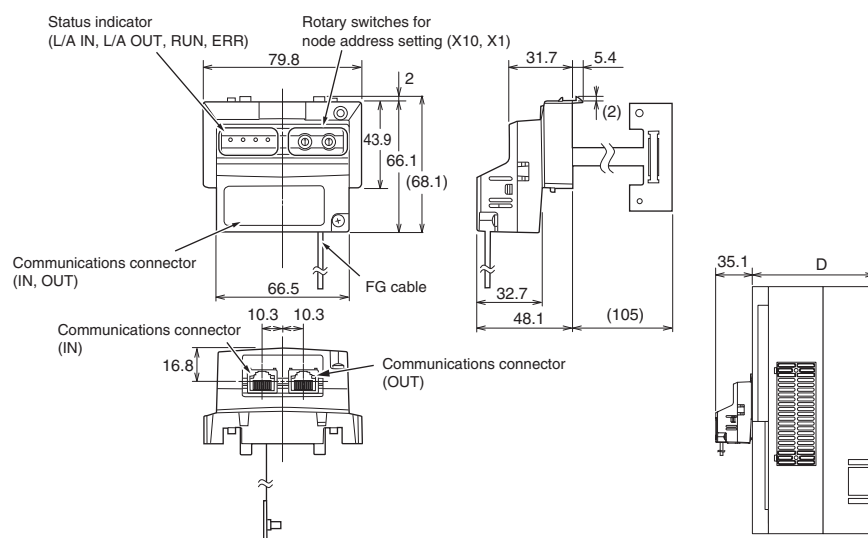
Note: After the EtherCAT Communication Unit is installed, dimension D of the inverter increases by 35.1 mm.
(Dimension D of the inverter varies depending on the capacity. Refer to the RX-series V1 type USER'S MANUAL (Cat.No.I578))

Related Options

Refer to Ordering Information of RX-Series V1 type Inverters for the related Options.

MEMO

Parallel Robots
Hornet 565

Parallel robot ideal for use in the food and beverage, pharmaceutical, and healthcare industries

- Ethernet capability to control the robot through the familiar programming language (IEC 61131-3) of Machine Automation controller NJ/NX series
- The amplifier and controller built into the robot reduces the number of cables
- Tracks up to a conveyor speed of 1.4 m/s
- Designed with a high payload to support multi-hand (multi-picking)
- Supports fast Pick & Place on a fast conveyor
- Helps reduce mounting cost and robot vibration
- Maximum working diameter 1,130 mm
- Working height 425 mm
- Maximum payload 8 kg
- Weight 52 kg
- Protection IP65 *2

Specifications

Product name		Hornet	
	Size	565	
	Type	3 axes	4 axes
Model		1720@-45600	1720@-45604
Number of axes		3	4
Mounting		inverted	
Working volume	X,Y axis (stroke)	1130 mm	
	Z axis (stroke)	425 mm	
	theta axis (rotation angle)	-	±360°
Maximum Payload		8 kg	3 kg
Repeatability		±0.10 mm	
Cycle times, sustained (at 20°C ambient)	Payload 0.1 kg	0.32 s *1	0.35 s *1
	Payload 1.0 kg	0.34 s *1	0.37 s *1
	Payload 3.0 kg	0.38 s *1	0.42 s *1
Power Requirements		24 VDC: 6 A 200 to 240 VAC: 10 A, single-phase	
Protection	Base	IP65 *2	
	Platform	IP67	
Environment Requirements	Ambient Temperature	1 to 40°C	
	Humidity Range	5 to 90% (non-condensing)	
Weight		52 kg	
Basic configuration	Controller	eAIB	
	On-board I/O (Input/Output)	12/8	
	Conveyor tracking input	2	
	RS-232C serial communications port	1	
	Programming environment	ACE, PackXpert, PLC	
	ACE Sight	Yes	
	ePLC Connect	Yes	
	ePLC I/O	Yes	
Connectable controller *3		SmartController EX, NJ/NX Series *4	

*1. Adept cycle, in mm (25/305/25)
*2. IP67: arms and platform, IP65:underside of robot, IP20: topside of robot, IP65:topside of robot (with option cover)
*3. Choose a controller to suit your application.
*4. The robot version 2.3.C is required to connect with the NX/NJ Series.

Dimensions

Hornet 565

722 (3axis)
747 (4axis)

Radius 565

275

100
50

Radius 375
Radius 205

Front panel

130

56

89

152

E-STOP

OMRON

Flange

6.02
6.01 dia. ▽ 8.00

45°

50.00 dia. B.C.

4×90°

4×M6×1.0 ▽ 11.00

38 dia. through hole

Footprint

(886 dia.)

B.C. 740 dia.

JOINT 2

JOINT 3

3× 120°

(3×43 dia.)

M12×1.75 ▽ 24

3×24 dia. +0.03 / 0.00

⊕ ⌀ .2

5±0.1

JOINT 1

36°

SECTION A-A
SCALE 1 : 2

Robot Parts Code and Bundled Accessories

Type	Hornet	Hornet Add-On
Hornet 565 3Axis	17201-45600	17203-45600
Hornet 565 4Axis	17201-45604	17203-45604
Overview	Robot + eAIB with fully integrated controller	Robot + eAIB required connection cables
Purpose	Typical for use in single robot system	Typically added to systems with an existing SmartController EX to create multi-robot systems
Bundled Accessories	• XSYS cable with jumpers, 2m/6ft (13323-000) • Front panel kit (90356-10358)	• XSYS cable with jumpers, 2m/6ft (13323-000) • XSYS cable, 5m/15 ft (11585-000) • DB9 splitter (00411-000) • 1394 latch cable, 5m/15 ft, 13632-045) • eV+ license to connect to controller (14529-103)

Note: OMRON also provides other types of model. Ask your OMRON sales representative for details.

System Configuration

Controllers

Softwares

Specifications · Programmable Terminals

Dimensions · Slave Terminals

Robot Parts Code and Bundled Accessories

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Parallel Robots
Quattro 650H/HS

Four-axis parallel robot achieves high speed and high precision

- Ethernet capability to control the robot through the familiar programming language (IEC 61131-3) of Machine Automation controller NJ/NX series
- Four-axis arm evenly distributes the load on the robot
- Fast and high-precision conveyance and assembly
- Designed with a high payload to support multi-hand (multi-picking)
- Supports fast Pick & Place on a fast conveyor
- Meets the sanitary standards of the United States Department of Agriculture for prevention of product contamination
- Maximum working diameter 1,300 mm
- Working height 500 mm
- Maximum payload 15 kg
- Weight 117 kg
- Protection IP66 (HS type)

Specifications

Product name		Quattro	
	Size	650	
	Type	H	HS
Model		1721@-2600@	1721@-2601@
Number of axes		4	4
Mounting		inverted	
Working volume	X,Y axis (stroke)	1300 mm	
	Z axis (stroke)	500 mm	
	theta axis (rotation angle)	0° (fixed) (P30)	
		±46.25° (P31)	
		±92.5° (P32)	
		±185° (P34)	
Maximum Payload		6 kg (P30: 15kg)	
Repeatability		±0.10mm	
Cycle times, sustained (at 20°C ambient)	Payload 0.1 kg	0.30s *1, 0.46 s *2	
	Payload 1.0 kg	0.36s *1, 0.47 s *2	
	Payload 2.0 kg	0.37s *1, 0.52 s *2	
	Payload 4.0 kg	0.41s *1, 0.58 s *2	
	Payload 6.0 kg	0.43s *1, 0.61 s *2	
Power Requirements		24 VDC: 11 A (eAIB, SmartController) 200 to 240 VAC: 10 A, single-phase	
Protection	Base	IP65 (with optional cable sealing kit)	IP66
	Tooling	IP67	IP67
Environment Requirements	Ambient Temperature	1 to 40°C	
	Humidity Range	5 to 90% (non-condensing)	
Weight		117 kg	
USDA-Accepted for meat and poultry processing		---	Yes
Basic configuration	Controller	SmartController EX	
	On-board I/O (Input/Output)	12/8	
	Conveyor tracking input	4	
	RS-232C serial communications port	1	
	Programming environment	ACE, PackXpert, PLC	
	ACE Sight	Yes	
	ePLC Connect	Yes	
	ePLC I/O	Yes	
Connectable controller *3		SmartController EX, NJ/NX Series *4	

*1. Adept cycle, in mm (25/305/25)
*2. Extended cycle, in mm (25/700/25)
*3. Choose a controller to suit your application.
*4. The robot version 2.3.C is required to connect with the NX/NJ Series.

OMRON

Dimensions

(Unit: mm)

Quattro 650H/HS

Note: The figure shows the HS type.

208.2 (H type)
211.8 (HS type)

700 -732
(depending
on platform)

650

Workspace
Radius

650

350

215

285

Front panel

130

56

89

152

SmartController EX

86

187

329

Four choices of platform offer different ranges of rotation.

Appearance				
Type	P30	P31	P32	P34
Rotation angle	No rotation	±46.25°	± 92.5°	±185°
Maximum Payload	H: 15 Kg, HS: 12 Kg	H: 6 Kg, HS: 3 Kg	H: 6 Kg, HS: 3 Kg	H: 6 Kg, HS: 3 Kg

Note: The platform appearances of the H type are shown above. The platform of the HS type is made of stainless steel.

Robot Parts Code and Bundled Accessories

Type	Quattro with EX Controller	Quattro Add-On
Quattro 650H P30	17214-26000	17213-26000
Quattro 650H P31	17214-26001	17213-26001
Quattro 650H P32	17214-26002	17213-26002
Quattro 650H P34	17214-26004	17213-26004
Quattro 650HS P30	17214-26010	17213-26010
Quattro 650HS P31	17214-26011	17213-26011
Quattro 650HS P32	17214-26012	17213-26012
Quattro 650HS P34	17214-26014	17213-26014
Overview	Robot + eAIB+ SmartController EX + required connection cables	Robot + eAIB + required connection cables
Purpose	Typical for use in single robot system and multi-robot systems.	Typically added to systems with an existing SmartController EX to create multi-robot systems
Bundled Accessories	• XSYS cable with jumpers, 2m/6ft (13323-000) • SmartController EX (09200-000) • XSYS cable, 5m/15 ft (11585-000) • 1394 latch cable, 5m/15 ft, 13632-045) • Front panel kit (90356-10358) • eV+ license to connect to controller (14529-103)	• XSYS cable with jumpers, 2m/6ft (13323-000) • XSYS cable, 5m/15 ft (11585-000) • DB9 splitter (00411-000) • 1394 latch cable, 5m/15 ft, 13632-045) • eV+ license to connect to controller (14529-103)

Note: OMRON also provides other types of model. Ask your OMRON sales representative for details.

System Configuration

Controllers

Softwares

Specifications | Programmable Terminals

Dimensions | Slave Terminals

Robot Parts Code and Bundled Accessories | Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Parallel Robots
Quattro 800H

Four-axis parallel robot achieves high speed and high precision

- Ethernet capability to control the robot through the familiar programming language (IEC 61131-3) of Machine Automation controller NJ/NX series
- Four-axis arm evenly distributes the load on the robot
- Fast and high-precision conveyance and assembly
- Designed with a high payload to support multi-hand (multi-picking)
- Supports fast Pick & Place on a fast conveyor
- Maximum working diameter 1,600 mm
- Working height 500 mm
- Maximum payload 10 kg
- Weight 117 kg
- Protection IP65 (with optional cable sealing kit)

Specifications

Product name		Quattro		
	Size	800		
	Type	H		
Model		1721@-2630@		
Number of axes		4		
Mounting		inverted		
Working volume	X,Y axis (stroke)	1600 mm		
	Z axis (stroke)	500 mm		
	theta axis (rotation angle)	0° (fixed) (P30)		
		±46.25° (P31)		
		±92.5° (P32)		
		±185° (P34)		
Maximum Payload		4 kg (P30:10 kg)		
Repeatability		±0.10 mm		
Cycle times, sustained (at 20°C ambient)	Payload 0.1 kg	0.33 s *1, 0.48 s *2		
	Payload 1.0 kg	0.38 s *1, 0.50 s *2		
	Payload 2.0 kg	0.40 s *1, 0.55 s *2		
	Payload 4.0 kg	0.45 s *1, 0.62 s *2		
Power Requirements		24 VDC: 11 A (eAIB, SmartController) 200 to 240 VAC: 10 A, single-phase		
Protection	Base	IP65 (with optional cable sealing kit)		
	Tooling	IP67		
Environment Requirements	Ambient Temperature	1 to 40°C		
	Humidity Range	5 to 90% (non-condensing)		
Weight		117 kg		
Basic configuration	Controller	SmartController EX		
	On-board I/O (Input/Output)	12/8		
	Conveyor tracking input	4		
	RS-232C serial communications port	3		
	Programming environment	ACE, PackXpert, PLC		
	ACE Sight	Yes		
	ePLC Connect	Yes		
	ePLC I/O	Yes		
Connectable controller *3		SmartController EX, NJ/NX Series *4		

*1. Adept cycle, in mm (25/305/25)
*2. Extended cycle, in mm (25/700/25)
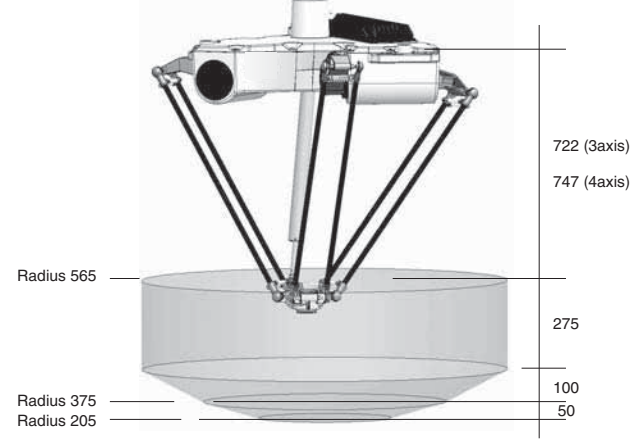*3. Choose a controller to suit your application.
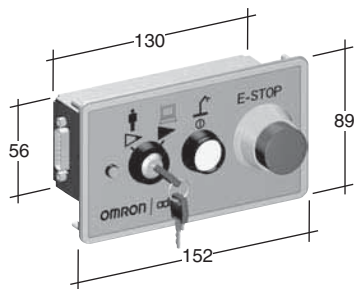*4. The robot version 2.3.C is required to connect with the NX/NJ Series.
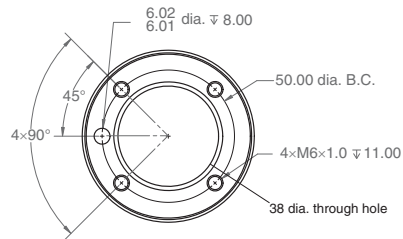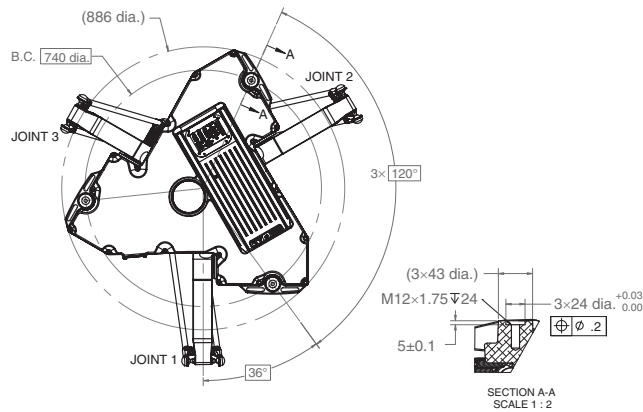
Dimensions

(Unit: mm)

Quattro 800H

90

1005 – 1033
(depending on platform)

800
800
430

Workspace Radius

215

285

Front panel

130
56
89
152

SmartController EX

86
187
329

Four choices of platform offer different ranges of rotation.

Appearance				
Type	P30	P31	P32	P34
Rotation angle	No rotation	±46.25°	± 92.5°	±185°
Maximum Payload	10 Kg	4 Kg	4 Kg	4 Kg

Robot Parts Code and Bundled Accessories

Type	Quattro with EX Controller	Quattro Add-On
Quattro 800H P30	17214-26300	17213-26300
Quattro 800H P31	17214-26301	17213-26301
Quattro 800H P32	17214-26302	17213-26302
Quattro 800H P34	17214-26304	17213-26304
Overview	Robot + eAIB+ SmartController EX + required connection cables	Robot + eAIB + required connection cables
Purpose	Typical for use in single robot system and multi-robot systems.	Typically added to systems with an existing SmartController EX to create multi-robot systems
Bundled Accessories	• XSYS cable with jumpers, 2m/6ft (13323-000) • SmartController EX (09200-000) • XSYS cable, 5m/15 ft (11585-000) • 1394 latch cable, 5m/15 ft, 13632-045) • Front panel kit (90356-10358) • eV+ license to connect to controller (14529-103)	• XSYS cable with jumpers, 2m/6ft (13323-000) • XSYS cable, 5m/15 ft (11585-000) • DB9 splitter (00411-000) • 1394 latch cable, 5m/15 ft, 13632-045) • eV+ license to connect to controller (14529-103)

Note: OMRON also provides other types of model. Ask your OMRON sales representative for details.

SCARA Robots
Cobra 350

Small SCARA robot for precision machining, assembly, and material handling

- Ethernet capability to control the robot through the familiar programming language (IEC 61131-3) of Machine Automation controller NJ/NX series
- High repeatability suitable for precision assembly
- High payload for screw-driving tools
- The separate amplifier with a built-in controller minimizes the robot footprint
- Reach 350 mm
- Maximum payload 5 kg
- Weight 20 kg
- Protection IP20
- Cleanroom class 10 option

Specifications

Product name		Cobra
	Size	350
Model		1720@-13000
Number of axes		4
Mounting		table/floor
Reach		350 mm
Maximum Payload		5 kg
Repeatability	XY	±0.015 mm
	Z	±0.01 mm
	Theta	±0.005°
Joint Range	Joint 1	±155°
	Joint 2	±145°
	Joint 3	200 mm
	Joint 4	±360°
Joint Speeds	Joint 1	720°/s
	Joint 2	720°/s
	Joint 3	2000 mm/s
	Joint 4	2400°/s
Power Requirements		24 VDC: 6 A 200 to 240 VAC: 10 A, single-phase
Protection		IP20
Environment Requirements	Ambient Temperature	5 to 40°C
	Humidity Range	5 to 90% (non-condensing)
Weight		20 kg
Basic configuration	Controller	eAIB
	On-board I/O (Input/Output)	12/8
	Conveyor tracking input	2
	RS-232C serial communications port	1
	Programming environment	ACE, PackXpert, PLC
	ACE Sight	Yes
	ePLC Connect	Yes
	ePLC I/O	Yes
Connectable controller *1		eMotionBlox-40R, SmartController EX, NJ/NX Series *2

*1. Choose a controller to suit your application.
*2. The robot version 2.3.C is required to connect with the NX/NJ Series.

Dimensions

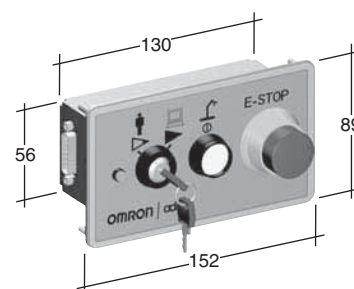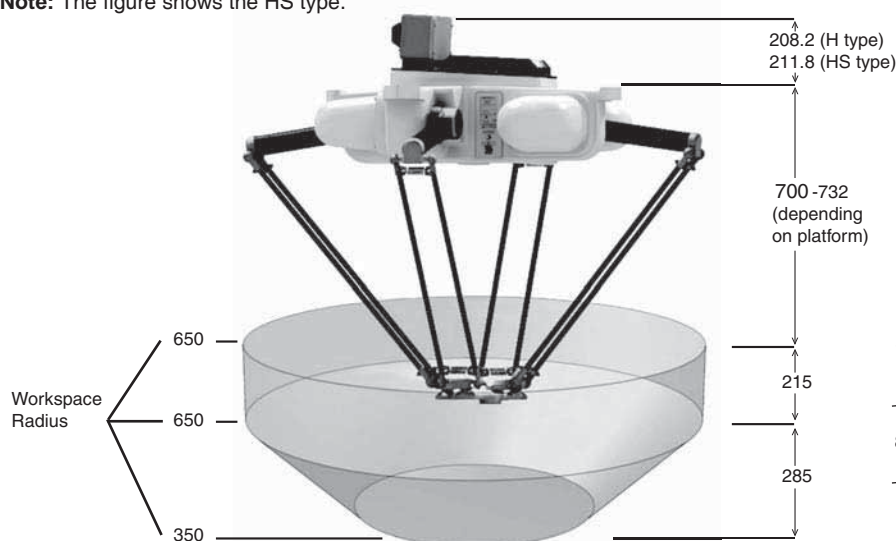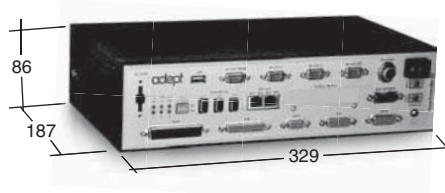(Unit: mm)

Cobra 350
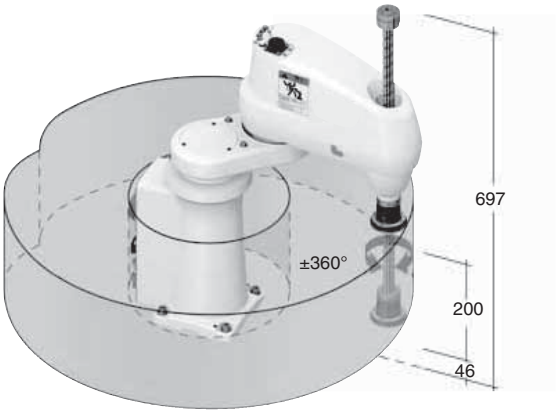
eMotion Blox-40R

Front panel

Flange

Footprint

Robot Parts Code and Bundled Accessories

Type	Cobra 350	Cobra 350 Add-On
Cobra 350	17201-13000	17203-13000
Overview	Robot + eMotionBlox amplifier with fully integrated controls	Robot + eMotionBlox + required connection cables
Purpose	Typical for use in single robot system	Typically added to systems with an existing SmartController EX to create multi-robot systems
Bundled Accessories	• XSYS cable with jumpers, 2m/6ft (13323-000) • Front panel kit (90356-10358)	• XSYS cable with jumpers, 2m/6ft (13323-000) • XSYS cable, 5m/15 ft (11585-000) • DB9 splitter (00411-000) • 1394 latch cable, 5m/15 ft, 13632-045) • eV+ license to connect to controller (14529-103)

Note: OMRON also provides other types of model. Ask your OMRON sales representative for details.

System Configuration

Controllers

Softwares

Specifications

Programmable Terminals

Dimensions

Slave Terminals

Robot Parts Code and Bundled Accessories

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

SCARA Robots
eCobra 600 Lite/Standard/Pro

Mid-size SCARA robot for precision machining, assembly, and material handling

- Ethernet capability to control the robot through the familiar programming language (IEC 61131-3) of Machine Automation controller NJ/NX series
- High repeatability suitable for material handling and precision assembly
- High payload for screw-driving tools
- The amplifier and controller built into the robot reduces the number of cables
- Choose the right robot for you application from three different types
- Reach 600 mm
- Maximum payload 5.5 kg
- Weight 41 kg
- Protection IP20
- Cleanroom class 10 option

Pro

Standard

Lite

Specifications

Product name		eCobra		
	Size	600		
	Type	600 Lite	600 Standard	600 Pro
Model		17010-16000	1711@-16000	1721@-16000
Number of axes		4	4	4
Mounting		table/floor		
Reach		600 mm		
Maximum Payload		5.5 kg		
Repeatability	XY	±0.017 mm		
	Z	±0.003 mm		
	Theta	±0.019°		
Joint Range	Joint 1	±105°		
	Joint 2	±157.5°		
	Joint 3	210 mm		
	Joint 4	±360°		
Inetia Moment (Max.)	Joint 4	450 kg-cm^2		
Joint Speeds	Joint 1	386°/s		
	Joint 2	720°/s		
	Joint 3	1100mm/s		
	Joint 4	1200°/s		
Cycle times (Payload 2.0 kg)	Burst	0.66 s *1	0.55 s *1	0.39 s *1
	Sustained	0.66 s *1	0.55 s *1	0.45 s *1
Power Requirements		24 VDC: 6 A 200 to 240 VAC: 10 A, single-phase		
Protection		IP20		
Environment Requirements	Ambient Temperature	5 to 40°C		
	Humidity Range	5 to 90% (non-condensing)		
Weight		41 kg		
Basic configuration	Controller	eAIB		
	On-board I/O (Input/Output)	12/8, 4 Solenoid Output		
	Conveyor tracking input	No		2
	RS-232C serial communications port	No	1	
	Programming environment	ACE	ACE, PackXpert, PLC	
	ACE Sight	No *2	Yes	
	ePLC Connect	No	Yes	
	ePLC I/O	No	Yes	
Connectable controller *3		No	SmartController EX, NJ/NX Series *4	

*1. Adept cycle, in mm 25/305/25 (seconds, at 20°C ambient)
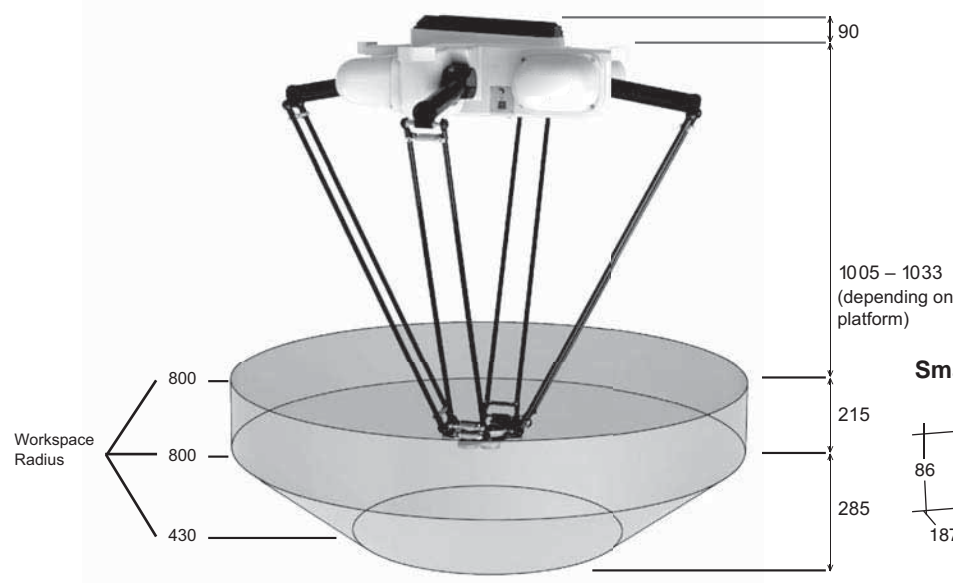*2. The SmartVision MX cannot be used with the Lite type.
*3. Choose a controller to suit your application.
*4. The robot version 2.3.C is required to connect with the NX/NJ Series.

Dimensions

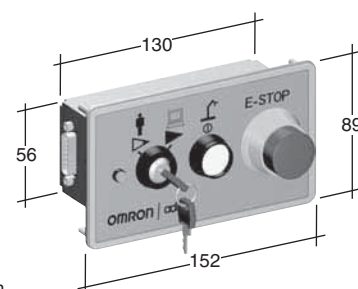**(Unit: mm)**

System Configuration

Controllers

Softwares

Specifications

Dimensions

Robot Parts Code and Bundled Accessories

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

eCobra 600

Work Envelope: Radius 600 mm
Inner Limit: Radius 163 mm
Height: 210 mm

Required clearance to open eAIB Chassis

Flange

Drilling for register pin
6 dia. $^{+0.01}_{0}$
45°
41.15 dia.
63 dia.
50 dia.
30°
4×M6×1 - 6H
Grounding
M3×0.5 - 6H

Front panel

E-STOP
OMRON
130
89
56
152

Footprint

338
160
160
200

Robot Parts Code and Bundled Accessories

Type	eCobra	eCobra Add-On
eCobra 600 Lite	17010-16000	---
eCobra 600 Standard	17111-16000	17113-16000
eCobra 600 Pro	17211-16000	17213-16000
Overview	Robot + eAIB with fully integrated controls	Robot + eAIB with required connection cables
Purpose	Typical for use in single robot system	Typically added to systems with an existing SmartController EX to create multi-robot systems
Bundled Accessories	• XSYS cable with jumpers, 2m/6ft (13323-000) • Front panel kit (90356-10358)	• XSYS cable with jumpers, 2m/6ft (13323-000) • XSYS cable, 5m/15 ft (11585-000) • DB9 splitter (00411-000) • 1394 latch cable, 5m/15 ft, 13632-045) • eV+ license to connect to controller (14529-103)

Note: OMRON also provides other types of model. Ask your OMRON sales representative for details.

SCARA Robots
eCobra 800 Lite/Standard/Pro

Large SCARA robot for precision machining, assembly, and material handling
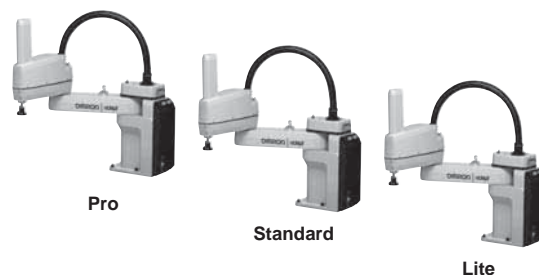
Pro

Standard

Lite

- Ethernet capability to control the robot through the familiar programming language (IEC 61131-3) of Machine Automation controller NJ/NX series
- Reach is extended to 800 mm without compromising repeatability
- High payload for screw-driving tools
- The amplifier and controller built into the robot reduces the number of cables
- Choose the right robot for you application from three different types
- Reach 800 mm
- Maximum payload 5.5 kg
- Weight 43 kg
- Protection IP20 (IP65 option)
- Cleanroom class 10 option

Specifications

Product name		eCobra		
	Size	800		
	Type	**800 Lite**	**800 Standard**	**800 Pro**
Model		17010-18000	1711@-18000	1721@-18000
Number of axes		4	4	4
Mounting		table/floor		
Reach		800 mm		
Maximum Payload		5.5 kg		
Repeatability	XY	±0.017 mm		
	Z	±0.003 mm		
	Theta	±0.019°		
Joint Range	Joint 1	±105°		
	Joint 2	±157.5°		
	Joint 3	210 mm		
	Joint 4	±360°		
Inetia Moment (Max.)	Joint 4	450 kg-cm^2		
Joint Speeds	Joint 1	386°/s		
	Joint 2	720°/s		
	Joint 3	1100 mm/s		
	Joint 4	1200°/s		
Cycle times (Payload 2.0 kg)	Burst	0.73 s *1	0.62 s *1	0.44 s *1
	Sustained	0.73 s *1	0.62 s *1	0.54 s *1
Power Requirements		24 VDC: 6 A 200 to 240 VAC: 10 A, single-phase		
Protection		IP20 (IP65 option)		
Environment Requirements	Ambient Temperature	5 to 40°C		
	Humidity Range	5 to 90% (non-condensing)		
Weight		43 kg		
Basic configuration	Controller	eAIB		
	On-board I/O (Input/Output)	12/8, 4 Solenoid Output		
	Conveyor tracking input	No		2
	RS-232C serial communications port	No	1	
	Programming environment	ACE	ACE, PackXpert, PLC	
	ACE Sight	No *2	Yes	
	ePLC Connect	No	Yes	
	ePLC I/O	No	Yes	
Connectable controller *3		No	SmartController EX, NJ/NX Series *4	

*1. Adept cycle, in mm 25/305/25 (seconds, at 20°C ambient)
*2. The SmartVision MX cannot be used with the Lite type.
*3. Choose a controller to suit your application.
*4. The robot version 2.3.C is required to connect with the NX/NJ Series.
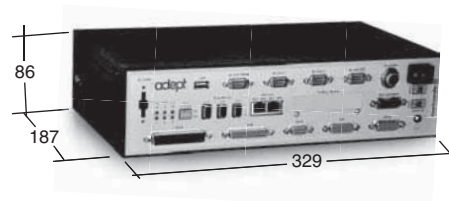
Dimensions

(Unit: mm)

System Configuration

Controllers

Softwares

Specifications

Dimensions

Robot Parts Code and Bundled Accessories

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

eCobra 800

918
894
+/- 360°
210
184
183

Flange

Drilling for register pin
6 dia. $^{+0.01}_{0}$
45°
41.15 dia.
63 dia.
50 dia.
30°
4×M6×1 - 6H
Grounding
M3×0.5 - 6H

Footprint

338
160
160
200

Work Envelope: Radius 800 mm
Inner Limit: Radius 164 mm
Height: 210 mm

Required clearance to open eAIB Chassis

Front panel

130
56
89
152
E-STOP
OMRON

Robot Parts Code and Bundled Accessories

Type	eCobra	eCobra Add-On
eCobra 800 Lite	17010-18000	---
eCobra 800 Standard	17111-18000	17113-18000
eCobra 800 Pro	17211-18000	17213-18000
Overview	Robot + eAIB with fully integrated controls	Robot + eAIB with required connection cables
Purpose	Typical for use in single robot system	Typically added to systems with an existing SmartController EX to create multi-robot systems
Bundled Accessories	• XSYS cable with jumpers, 2m/6ft (13323-000) • Front panel kit (90356-10358)	• XSYS cable with jumpers, 2m/6ft (13323-000) • XSYS cable, 5m/15 ft (11585-000) • DB9 splitter (00411-000) • 1394 latch cable, 5m/15 ft, 13632-045) • eV+ license to connect to controller (14529-103)

Note: OMRON also provides other types of model. Ask your OMRON sales representative for details.

SCARA Robots
eCobra 800 Inverted Lite/Standard/Pro

Overhead-mount large SCARA robot for precision machining, assembly, and material handling
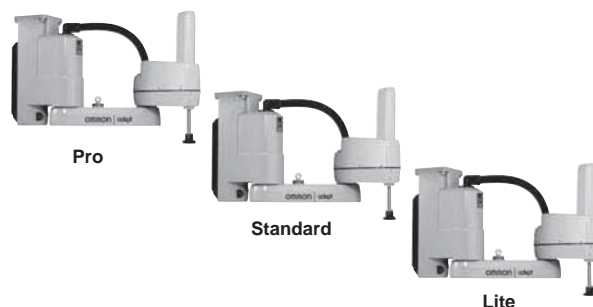
Pro

Standard

Lite

- Ethernet capability to control the robot through the familiar programming language (IEC 61131-3) of Machine Automation controller NJ/NX series
- Overhead-mounting configuration for efficient use of space
- High payload for screw-driving tools
- The amplifier and controller built into the robot reduces the number of cables
- Choose the right robot for you application from three different types
- Reach 800 mm
- Maximum payload 5.5 kg
- Weight 51 kg
- Protection IP20 (IP65 option)
- Cleanroom class 10 option

Specifications

Product name		eCobra Inverted		
	Size	800		
	Type	800 Lite	800 Standard	800 Pro
Model		17010-18400	1711@-18400	1721@-18400
Number of axes		4	4	4
Mounting		inverted		
Reach		800 mm		
Maximum Payload		5.5 kg		
Repeatability	XY	±0.017 mm		
	Z	±0.003 mm		
	Theta	±0.019°		
Joint Range	Joint 1	±23.5°		
	Joint 2	±156.5°		
	Joint 3	210 mm		
	Joint 4	±360°		
Inetia Moment (Max.)	Joint 4	450 kg-cm^2		
Joint Speeds	Joint 1	386°/s		
	Joint 2	720°/s		
	Joint 3	1100 mm/s		
	Joint 4	1200°/s		
Power Requirements		24 VDC: 6 A 230 VAC: 10 A		
Protection		IP20 (IP65 option)		
Environment Requirements	Ambient Temperature	5 to 40°C		
	Humidity Range	5 to 90% (non-condensing)		
Weight		51 kg		
Basic configuration	Controller	eAIB		
	On-board I/O (Input/Output)	12/8, 4 Solenoid Output		
	Conveyor tracking input	No		2
	RS-232C serial communications port	No	1	
	Programming environment	ACE	ACE, PackXpert, PLC	
	ACE Sight	No *1	Yes	
	ePLC Connect	No	Yes	
	ePLC I/O	No	Yes	
Connectable controller *2		No	SmartController EX, NJ/NX Series *3	

*1. The SmartVision MX cannot be used with the Lite type.
*2. Choose a controller to suit your application.
*3. The robot version 2.3.C is required to connect with the NX/NJ Series.
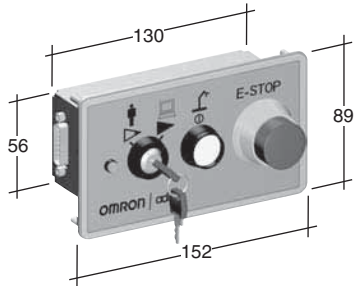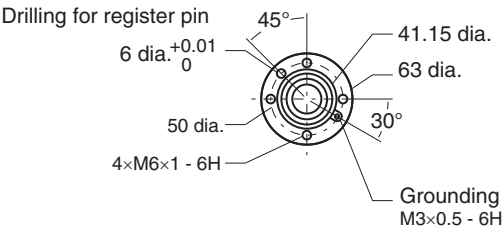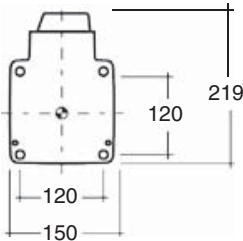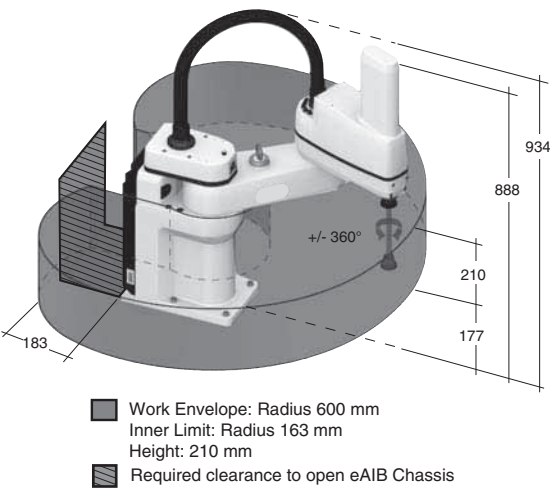
Dimensions

(Unit: mm)

eCobra Inverted 800

110
571
+/- 360°
729
210
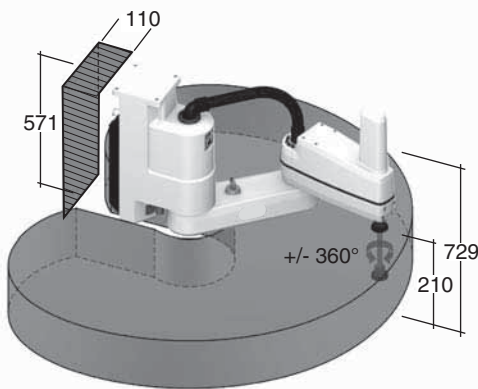
Work Envelope: Radius 800 mm
Inner Limit: Radius 167 mm
Height: 210 mm

Required clearance to open eAIB Chassis

Flange

Drilling for register pin
6 dia. $^{+0.01}_{0}$
45°
41.15 dia.
63 dia.
50 dia.
30°
4×M6×1 - 6H
Grounding
M3×0.5 - 6H

Footprint

160
205
160
189

Front panel

130
E-STOP
89
56
OMRON
152

Robot Parts Code and Bundled Accessories

Type	eCobra	eCobra Add-On
eCobra 800 Inverted Lite	17010-18400	---
eCobra 800 Inverted Standard	17111-18400	17113-18400
eCobra 800 Inverted Pro	17211-18400	17213-18400
Overview	Robot + eAIB with fully integrated controls	Robot + eAIB with required connection cables
Purpose	Typical for use in single robot system	Typically added to systems with an existing SmartController EX to create multi-robot systems
Bundled Accessories	• XSYS cable with jumpers, 2m/6ft (13323-000) • Front panel kit (90356-10358)	• XSYS cable with jumpers, 2m/6ft (13323-000) • XSYS cable, 5m/15 ft (11585-000) • DB9 splitter (00411-000) • 1394 latch cable, 5m/15 ft, 13632-045) • eV+ license to connect to controller (14529-103)

Note: OMRON also provides other types of model. Ask your OMRON sales representative for details.

Articulated Robots
Viper 650

Articulated robot for machining, assembly, and material handling

- Ethernet capability to control the robot through the familiar programming language (IEC 61131-3) of Machine Automation controller NJ/NX series
- Diagnostics display enables faster trouble shooting
- High-resolution, absolute encoders to provide high accuracy, superior slow-speed following, and easy calibration
- High-efficiency, low-inertia Harmonic Drives and a lightweight arm to deliver maximum acceleration
- Reach 653 mm
- Maximum payload 5 kg
- Weight 28 kg
- Protection IP40 *1
- Cleanroom class 10 option
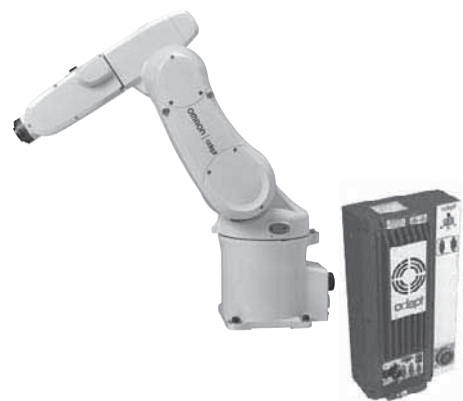
Specifications

Product name		Viper
	Size	650
Model		1720@-36000
Mounting		Table/Floor/Inverted
Number of axes		6
Reach		653 mm
Maximum Payload		5 kg
Repeatability	XYZ	±0.02 mm
Joint Range	Joint 1	±170°
	Joint 2	-190°, +45°
	Joint 3	-29°, +256°
	Joint 4	±190°
	Joint 5	±120°
	Joint 6	±360°
Inetia Moment (Max.)	Joint 4	0.295 kgm^2
	Joint 5	0.295 kgm^2
	Joint 6	0.045 kgm^2
Joint Speeds	Joint 1	328°/s
	Joint 2	300°/s
	Joint 3	375°/s
	Joint 4	375°/s
	Joint 5	375°/s
	Joint 6	600°/s

Product name		Viper
	Size	650
Power Requirements		24VDC: 6A 200 to 240VAC: 10A, single-phase
Protection		IP40 *1
Environment Requirements	Ambient Temperature	5 to 40°C
	Humidity Range	5 to 90% (non-condensing)
Weight		28 kg
cULus Compliant		(Yes) *2
Basic configuration	Controller	eMotionBlox-60R
	On-board I/O (Input/Output)	12/8
	Conveyor tracking input	2
	RS-232C serial communications port	1
	Programming environment	ACE, PackXpert, PLC
	ACE Sight	Yes
	ePLC Connect	Yes
	ePLC I/O	Yes
Connectable controller *3		eMotionBlox-60R, SmartController EX, NJ/NX Series *4

*1. IP54: main body, IP65: robot joints (J4, J5, J6)
*2. cULus option
*3. Choose a controller to suit your application.
*4. The robot version 2.3.C is required to connect with the NX/NJ Series.

Dimensions

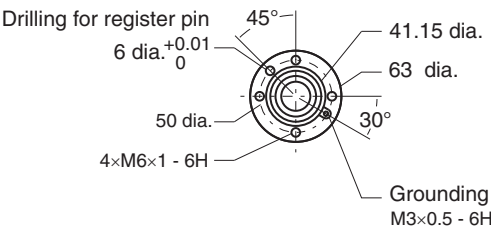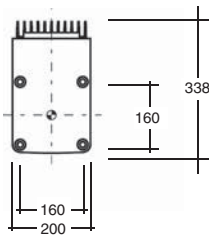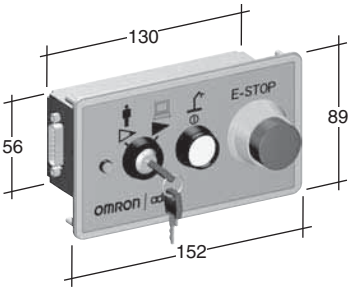**(Unit: mm)**

Viper 650

Workable space defined by point P

eMotion Blox -60R

Front panel

Flange

40 dia. H8 $^{0}_{-0.039}$

20 dia. H7 $^{+0.021}_{0}$
6 Deep

4×M5×0.08
8 Deep
(31.5 B.C)

Hole for Register-pin
5 dia. H7 $\left(^{+0.012}_{0}\right)$
7 Deep

Footprint

(with room for power cables : 200 x 430)

Robot Parts Code and Bundled Accessories

Type	Viper	Viper Add-On
Viper 650	17201-36000	17203-36000
Overview	Robot + eMotionBlox60N amplifier with fully integrated controls	Robot + eMotionBlox60N + required connection cables
Purpose	Typical for use in single robot system	Typically added to systems with an existing SmartController EX to create multi-robot systems
Bundled Accessories	• XSYS cable with jumpers, 2m/6ft (13323-000) • Front panel kit (90356-10358)	• XSYS cable with jumpers, 2m/6ft (13323-000) • XSYS cable, 5m/15 ft (11585-000) • DB9 splitter (00411-000) • 1394 latch cable, 5m/15 ft, 13632-045) • eV+ license to connect to controller (14529-103)

Note: OMRON also provides other types of model. Ask your OMRON sales representative for details.

System Configuration

Controllers

Softwares

Specifications · Programmable Terminals

Dimensions · Slave Terminals

Robot Parts Code and Bundled Accessories

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Articulated Robots
Viper 850

Articulated robot for machining, assembly, and material handling

- Ethernet capability to control the robot through the familiar programming language (IEC 61131-3) of Machine Automation controller NJ/NX series
- Diagnostics display enables faster trouble shooting
- High-resolution, absolute encoders to provide high accuracy, superior slow-speed following, and easy calibration
- High-efficiency, low-inertia Harmonic Drives and a lightweight arm to deliver maximum acceleration
- Reach 855 mm
- Maximum payload 5 kg
- Weight 29 kg
- Protection IP40 ＊1
- Cleanroom class 10 option

Specifications

Product name		Viper
	Size	850
Model		1720@-38000
Mounting		Table/Floor/Inverted
Number of axes		6
Reach		855 mm
Maximum Payload		5 kg
Repeatability	XYZ	±0.03 mm
Joint Range	Joint 1	±170°
	Joint 2	-190°, +45°
	Joint 3	-29°, +256°
	Joint 4	±190°
	Joint 5	±120°
	Joint 6	±360°
Inetia Moment (Max.)	Joint 4	0.295 kgm^2
	Joint 5	0.295 kgm^2
	Joint 6	0.045 kgm^2
Joint Speeds	Joint 1	250°/s
	Joint 2	250°/s
	Joint 3	250°/s
	Joint 4	375°/s
	Joint 5	375°/s
	Joint 6	600°/s

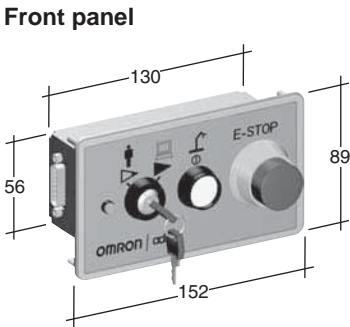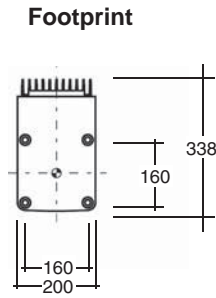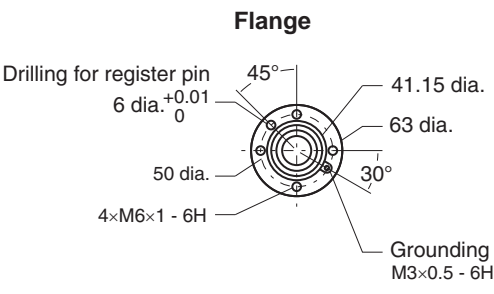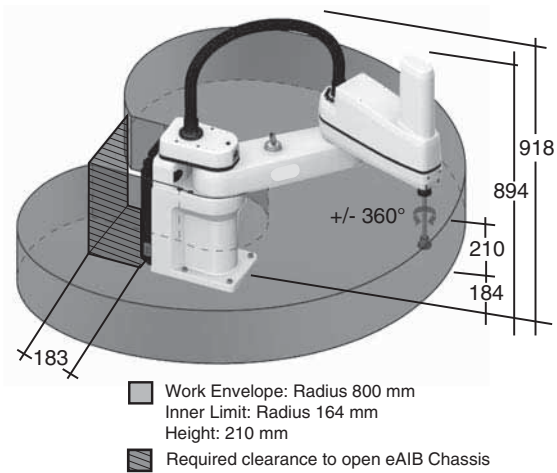| Product name		Viper
	Size	850
Power Requirements		24VDC: 6A 200 to 240VAC: 10A, single-phase
Protection		IP40 ＊1
Environment Requirements	Ambient Temperature	5 to 40°C
	Humidity Range	5 to 90% (non-condensing)
Weight		29 kg
cULus Compliant		---
Basic configuration	Controller	eMotionBlox-60R
	On-board I/O (Input/Output)	12/8
	Conveyor tracking input	2
	RS-232C serial communications port	1
	Programming environment	ACE, PackXpert, PLC
	ACE Sight	Yes
	ePLC Connect	Yes
	ePLC I/O	Yes
Connectable controller ＊2		eMotionBlox-60R, SmartController EX, NJ/NX Series ＊3

＊1. IP54: main body, IP65: robot joints (J4, J5, J6)
＊2. Choose a controller to suit your application.
＊3. The robot version 2.3.C is required to connect with the NX/NJ Series.

Dimensions

Viper 850

eMotion Blox -60R

Front panel

Flange

40 dia. H8 $^{0}_{-0.039}$

20 dia. H7 $^{+0.021}_{0}$
6 Deep

4×M5×0.08
8 Deep
(31.5 B.C)

Hole for Register-pin
5 dia. H7 $\left(^{+0.012}_{0}\right)$
7 Deep

Footprint

(with room for power
cables : 200 x 430)

Robot Parts Code and Bundled Accessories

Type	Viper	Viper Add-On
Viper 850	17201-38000	17203-38000
Overview	Robot + eMotionBlox60N amplifier with fully integrated controls	Robot + eMotionBlox60N + required connection cables
Purpose	Typical for use in single robot system	Typically added to systems with an existing SmartController EX to create multi-robot systems
Bundled Accessories	• XSYS cable with jumpers, 2m/6ft (13323-000) • Front panel kit (90356-10358)	• XSYS cable with jumpers, 2m/6ft (13323-000) • XSYS cable, 5m/15 ft (11585-000) • DB9 splitter (00411-000) • 1394 latch cable, 5m/15 ft, 13632-045) • eV+ license to connect to controller (14529-103)

Note: OMRON also provides other types of model. Ask your OMRON sales representative for details.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Specifications

Dimensions

Robot Parts Code and Bundled Accessories

Automation Control Environment (ACE)

ACE provides a host of innovative features that allow you to increase productivity while streamlining configuration setup

**The ACE is a PC-based software package that helps you quickly and easily set up your robot system.
The software makes it easy to configure single and multi-robot systems.**

- ACE PackXpert is the intelligent software choice designed to manage packaging systems from integration to deployment
- ACE PackXpert provides the underlying robot programming based on the system configuration
- Built-in customization allows for any line configuration and advanced load balancing
- Wizard-based user-friendly interface to calibrate and teach the robots
- Tightly-integrated vision option (ACE Sight) enables visionguided conveyor-tracking
- Display and share process statistics
- Built-in UI Builder to create a custom operator interface
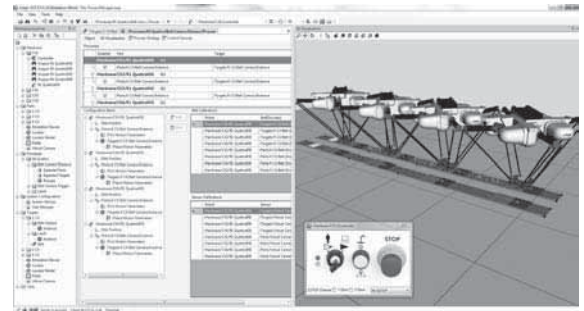
ACE PackXpert

The ACE PackXpert is intelligent software designed to manage a packaging line from integration and deployment through operation.
The software walks you through the configuration of packaging applications by setting up process-specific items, such as controllers, robots, and conveyor belts.

Scalable
Manage robots on packaging lines

Fast
Deploy your application faster through a user-friendly GUI

Reusable
Use across a variety of applications

Complete
Adjust control settings through V+ and C#
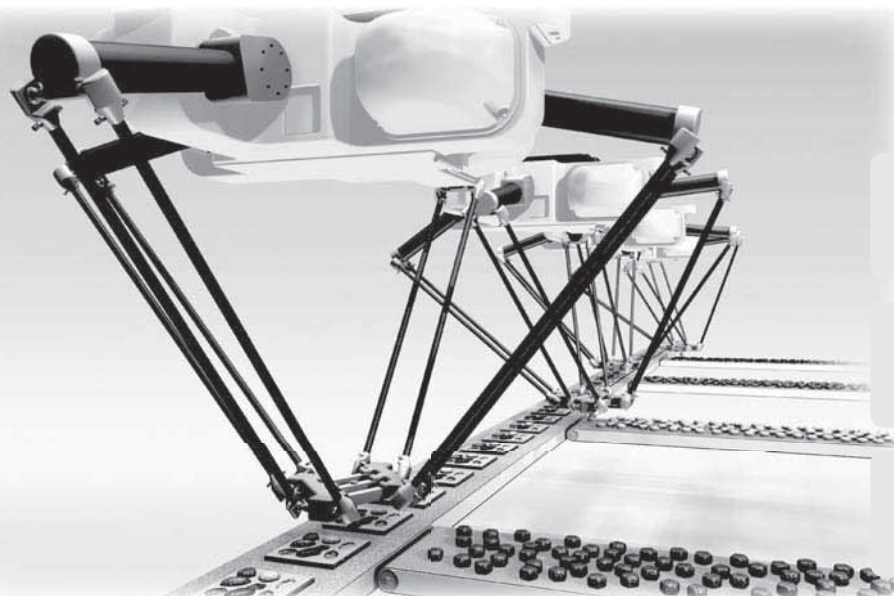
Versatile
No lengthy programming required

Adaptable
Create your own operator interface with the built-in UI Builder

Visual
Get a 3D view of your packaging line

ACE License Configuration

license	Explanation
ACE PackXpert	Enables full functionality of the ACE PackXpert software and includes one Controller license that would allow you to connect one controller. You will need to add the appropriate controller, vision, camera, and OPC server/client licenses required for your application.
ACE Sight Vision Software	Enables the ACE Sight software functionality. This license includes 1 Controller licence that would allow you to connect (and communicate with) 1 controller and 2 Camera licenses that would allow you to use up to 2 cameras.
Controller	Provides support for the controllers in the ACE PackXpert and ACE Sight. You must have one controller license for each controller you wish to use with the ACE PackXpert or ACE Sight. For example, 4 Controller licenses would allow you to connect (and communicate with) up to 4 controllers in your application.
Additional Camera Option	Provides support for physical cameras. You must have one Camera license for each physical camera you wish to use in your application. For example, 3 Camera licenses would allow you to use up to 3 physical cameras in your application.
Color Camera Option	Provides support for color vision.
OPC Server	Enables OPC data communications.
OPC Client	Provides OPC client capability for each controller (client). You must have one OPC Client license for each OPC client you wish to communicate with in your application. For example, 2 OPC Client licenses would allow you to use OPC data communications with 2 controllers in your application.

Note: When you create robot programs without using wizards, the ACE license is not required.

System Requirements

Item	Requirement
Operating system (OS)	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) / Windows 10 (32-bit/64-bit version)
CPU	Intel® Core™ i7 or equivalent or faster recommended.
Main memory	2 GB min. (8 GB min. recommended.)
Video memory	512 MB min.
Hard disk	At least 1 GB of available space
Display	XGA 1,024 × 768, 16 million colors. WXGA 1,280 × 800 min. recommended
Communications ports	USB port (for hardware key), Ethernet port
Supported languages	Japanese, English, German, simplified Chinese

Automation Control Environment (ACE)

The ACE is a PC-based software package that helps you quickly and easily set up your robot system. The ACE is available to download from Omron Adept Technologies Inc. website.
http://www.adept.com/Robots-Tool

Robot Controllers
SmartController EX

High-performance robot motion controller capable of high-speed processing

- Controls up to four robots
- Gigabit Ethernet
- 12 inputs/8 outputs
- Ultra-compact form factor for high footprint efficiency
- Integration with configuration software ACE to control complex mechanisms through user-friendly interface

Specifications

Item		Specifications
Model		19300-000
Grounding Method		Ground to less than 100 Ω
Dimensions (Height × Depth × Width)		86 × 187 × 329 mm
Weight		2.6 kg
Power Supply		24 VDC±10%
Current Consumption		5 A
Power Consumption		120 W
Operation Environment	Ambient Temperature	5 to 40°C
	Humidity Range	5 to 90% (non-condensing)
Mounting		Panel mount, rack mount, stack mount, desktop
Communications Port		RS-232 (115 kbps), RS422/485, Gigabit Ethernet, DeviceNet
On-board I/O (Input/Output)		12/8
Conveyor tracking input		4

Dimensions

(Unit: mm)

SmartController EX

Front panel
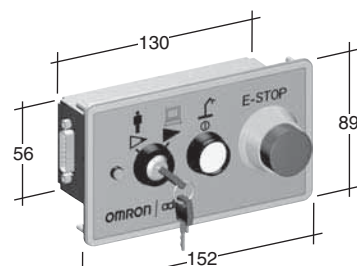
Note: Front Panel is provided with the SmartController EX.

Vision System
SmartVision MX

System Configuration

Controllers

Softwares

Specifications

Programmable Terminals

Dimensions

Slave Terminals

Camera Variations

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Dependable vision system optimized for robot applications

- Fanless construction
- Supports up to eight cameras simultaneously
- Capable of processing high resolution and high frame rate images
- Dedicated software ACE Sight provides easy-to-use object location and inspection tools
- GigE PoE and USB 3.0 ports for a wide variety of cameras
- A wide operating temperature range and SSD ensure high reliability

Specifications

Item		Specifications
Model		14189-901
Grounding Method		Ground to less than 100 Ω
Dimensions (Height × Depth × Width)		68 × 150 × 260 mm
Weight		2.16 kg
CPU		Intel® Core™ i7
Main Memory		8 GB DDR3 RAM
Power Supply		10 to 32 VDC
Current Consumption		4.2 A (24 VDC), 7.0 A max. (when using 4 cameras)
Power Consumption		9 to 36 VDC
Operation Environment	Ambient Temperature	0 to 50°C
	Humidity Range	5 to 90% (non-condensing)
Communications Port	Ethernet	Gigabit Ethernet × 2, Gigabit Ethernet with PoE × 4 15.7 W per channel
	USB	USB 3.0 × 4, USB 2.0 × 2
	Display	DVI-D × 1 (up to 1,920 × 1,200 @60 Hz), DVI-I × 1 (up to 2,048 × 1,536 @75 Hz)
I/O		8 inputs, 8 outputs

Dimensions

(Unit: mm)

SmartVision MX

68 mm
2.68 in

260 mm
10.24 in

150 mm
5.90 in
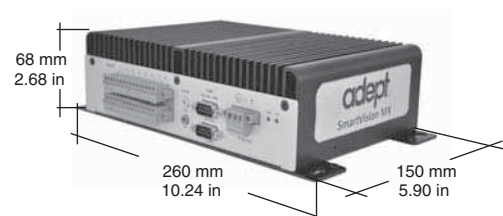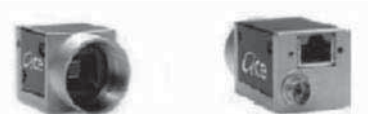
Dongle

Note: The dongle is bundled with the ACE License. Insert the dongle into the USB port of the SmartVision MX.

Industrial Robots

Camera Variations

	GigE type					
Model	24114-100	24114-101	24114-200	24114-201	24114-250	24114-300
Image elements	1/4-inch CCD	1/4-inch CCD	1/3-inch CCD	1/3-inch CCD	1/1.8-inch CMOS	1-inch CMOS
Effective pixels	640(H) x 480(V)	640(H) x 480(V)	1296(H) x 996(V)	1296(H) x 996(V)	1600(H) x 1200(V)	2048(H) x 2048(V)
Color/Monochrome	Monochrome	Color	Monochrome	Color	Monochrome	Monochrome
Frame rate	120 fps	120 fps	30 fps	30 fps	60 fps	25 fps
Trigger input	• Software trigger • External trigger				• Software trigger	• Software trigger • External trigger
I/F	Gigabit Ethernet (1 Gbit/s)					
Lens mounting	• C mount • CS mount				• C mount	
Power supply voltage	PoE or 12 VDC					
Power consumption (PoE/AUX)	2.3 W/2.0 W		2.5 W/2.2 W		3.0 W	2.8 W/2.5 W
Weight	Approx. 90 g					

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Dimensions

Connection to SmartController

Wall Bracket Dimensions - Optional

Panel and Front panel Installation

Pendant
T20 Pendant

Excellent operability and ergonomic design

- Tested for a 1.5 meter drop onto industrial flooring
- Displays custom messages
- Emergency stop switch (dual channel circuit)
- Enable switches on back
- Lightweight for fatigue-free operation
- Bright display with backlight and contrast adjustment

Dimensions (Unit: mm)

T20 Pendant

Wall Bracket Dimensions - Optional
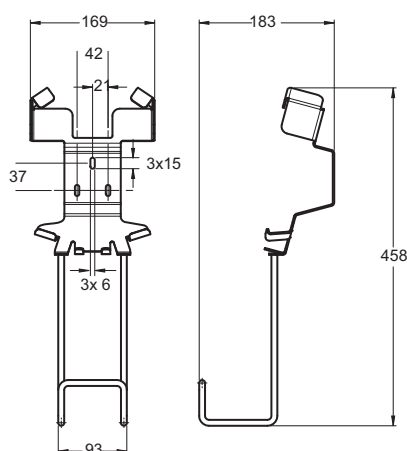
Connection to SmartController
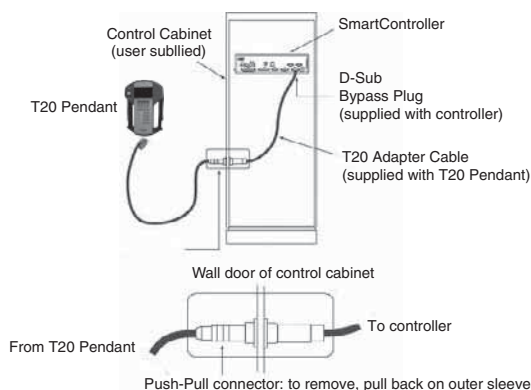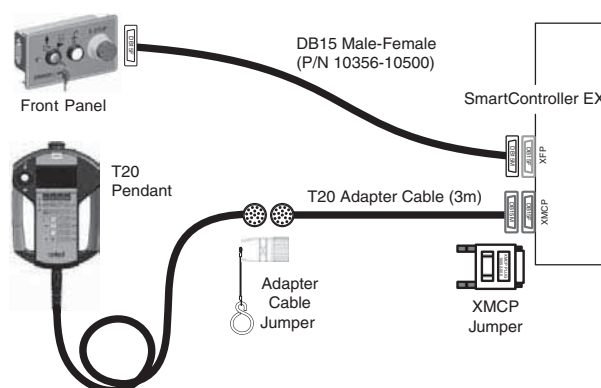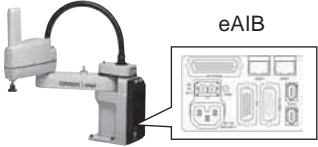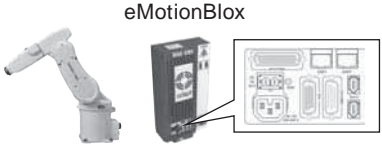
Name	Details	Model
Pendant	T20 Pendant, 10m Cable	10046-010
	T20 Pendant-Jumper Plug	10048-000
	T20 Pendant Wall Bracket	10079-000

Panel and Front panel Installation

OMRON **473**

System Configuration

Amplifiers with Built-in Controller

Robot	Description
Hornet 565, eCobra	Embedded into the robot. (eAIB)
Cobra 350, Viper	A separate amplifier (eMotionBlox). Bundled with the robot.
Quattro	A separate amplifier (SmartController EX). Bundled with the robot. (The SmartController EX can be sold separately.)

Basic configuration

Control by eAIB/eMotionBlox
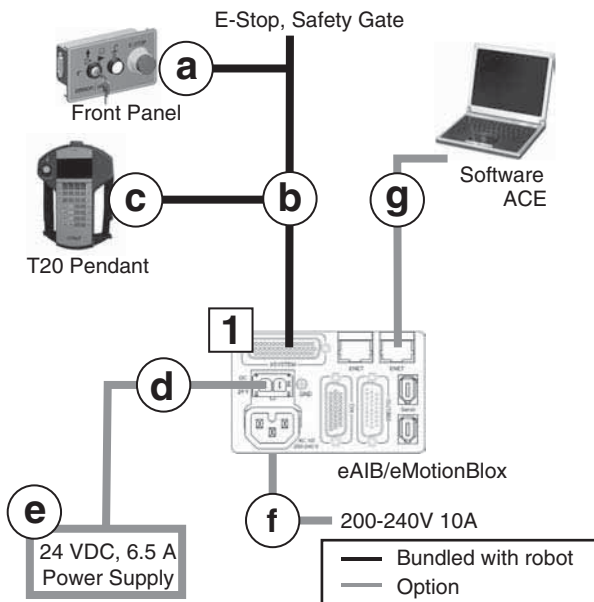
Control by SmartController EX

Cobra 350, eCobra, Viper, Hornet

Part	Name	Model	Note	Qty
1	Robot	17@@@-@@@@@		1
a	Front Panel with Cable	90356-10358	Bundled with Robot	(1)
b	eAIB XSYSTEM Cable	13323-000	Bundled with Robot	(1)
c	T20 Pendant with Cable	10046-010		1
d	24 VDC Power Cable	04120-000		1
e	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		1
f	AC Power Cable	04118-000		1
g	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		1
---	ACE PackXpert License	09187-000	When you create robot programs without using wizards, the ACE license is not required.	1

Quattro

Part	Name	Model	Note	Qty
2	Robot	17214-2@@@@		1
1	SmartController EX	09200-000	Bundled with Robot	(1)
a	Front Panel with Cable	90356-10358	Bundled with Robot	(1)
b	IEEE 1394 cable	13632-045	Bundled with Robot	(1)
c	eAIB XSYS Cable	11585-000	Bundled with Robot	(1)
d	T20 Pendant with Cable	10046-010		1
e	24 VDC Power Cable	04120-000		1
f	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		2
g	AC Power Cable	04118-000		1
h	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		1
---	ACE PackXpert License	09187-000	When you create robot programs without using wizards, the ACE license is not required.	1

* User-supplied shielded power cable.

Vision tracking robot system

Control by eAIB/eMotionBlox with SVMX (When using a vision system)
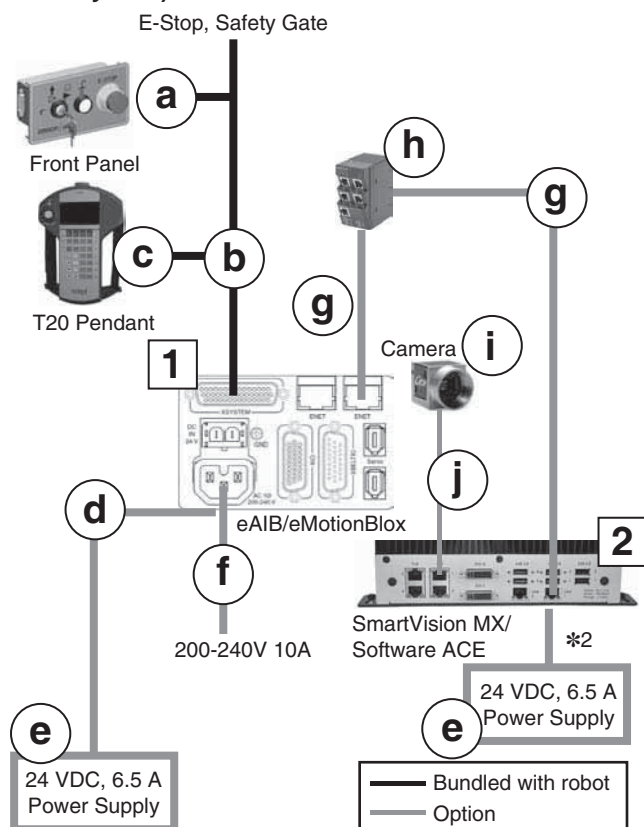
Control by SmartController EX (When using a vision system)

Cobra 350, eCobra, Viper, Hornet

Part	Name	Model	Note	Qty
1	Robot	17@@@-@@@@@		1
a	Front Panel with Cable	90356-10358	Bundled with Robot	(1)
b	eAIB XSYSTEM Cable	13323-000	Bundled with Robot	(1)
c	T20 Pendant with Cable	10046-010		1
d	24 VDC Power Cable	04120-000		1
e	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		2
f	AC Power Cable	04118-000		1
g	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		2
h	Industrial Switching Hubs	W4S1-05C		1
2	SmartVision MX	14189-901	Bundling a 24 VDC connector	1
i	Camera	241@@-@@@		1 *1
j	Camera cable	---	Bundled with Camera	1 *1
---	ACE PackXpert with ACE Sight Vision License	09187-010	Including 2 monochrome camera licenses *3	1

*1. Qty depends on a system.
*2. User-supplied shielded power cable.
*3. When using color cameras, purchase the ACE License Color Camera Option (09287-040).
   When using 3 or more cameras, purchase the ACE License Additional Camera Option (09287-000) for more than 2 cameras.

Quattro

Part	Name	Model	Note	Qty
2	Robot	17214-2@@@@		1
1	SmartController EX	09200-000	Bundled with Robot	(1)
a	Front Panel with Cable	90356-10358	Bundled with Robot	(1)
b	IEEE 1394 cable	13632-045	Bundled with Robot	(1)
c	eAIB XSYS Cable	11585-000	Bundled with Robot	(1)
d	T20 Pendant with Cable	10046-010		1
3	SmartVision MX	14189-901		1
e	Camera	241@@-@@@		1 *1
f	Camera cable	---	Bundled with Camera	1 *1
g	24 VDC Power Cable	04120-000		1
h	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		3
i	AC Power Cable	04118-000		1
j	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		2
k	Industrial Switching Hubs	W4S1-05C		1
---	ACE PackXpert with ACE Sight Vision License	09187-010	Including 2 monochrome camera licenses *3	1

*1. Qty depends on a system.
*2. User-supplied shielded power cable.
*3. When using color cameras, purchase the ACE License Color Camera Option (09287-040).
   When using 3 or more cameras, purchase the ACE License Additional Camera Option (09287-000) for more than 2 cameras.

Industrial Robots

Conveyor tracking robot system
Control by eAIB/eMotionBlox with SVMX (When using a vision system)

Cobra 350, eCobra, Viper, Hornet

Part	Name	Model	Note	Qty
1	Robot	17@@@-@@@@@		1
a	Front Panel with Cable	90356-10358	Bundled with Robot	(1)
b	eAIB XSYSTEM Cable	13323-000	Bundled with Robot	(1)
c	T20 Pendant with Cable	10046-010		1
d	24 VDC Power Cable	04120-000		2
e	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		1
f	AC Power Cable	04118-000		1
g	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		2
h	Industrial Switching Hubs	W4S1-05C		1
2	SmartVision MX	14189-901	Bundling a 24 VDC connector	1
i	Camera	241@@-@@@		1 *1
j	Camera cable	---	Bundled with Camera	1 *1
k	XBELTIO Cable	13463-000		1
---	ACE PackXpert with ACE Sight Vision License	09187-010	Including 2 monochrome camera licenses *3	1

*1. Qty depends on a system.
*2. User-supplied shielded power cable.
*3. When using color cameras, purchase the ACE License Color Camera Option (09287-040).
    When using 3 or more cameras, purchase the ACE License Additional Camera Option (09287-000) for more than 2 cameras.

Conveyor tracking robot system by SCEX
Control by SCEX with SVMX (When using a vision system)

Bundled with robot
Option

Cobra 350, eCobra, Viper, Hornet

Part	Name	Model	Note	Qty
1	SmartController EX	19300-000		1
a	Front Panel with Cable	90356-10358	Bundled with SmartController EX	(1)
b	T20 Pendant with Cable	10046-010		1
c	SCEX-BELT, Y-Adapter Cable	09550-000		1
2	Robot Add on	17@@3-@@@@@		1
d	IEEE 1394 cable	13632-045	Bundled with Robot Add on	(1)
e	eAIB XSYS Cable	11585-000	Bundled with Robot Add on	(1)
f	DB9 splitter	00411-000	Bundled with Robot Add on (Not used in this configuration)	(1)
3	SmartVision MX	14189-901	Bundling a 24 VDC connector	1
g	Camera	241@@-@@@		1 *1
h	Camera cable	---	Bundled with Camera	1 *1
i	24 VDC Power Cable	04120-000		1
j	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		3
k	AC Power Cable	04118-000		1
l	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		2
m	Industrial Switching Hubs	W4S1-05C		1
---	ACE PackXpert with ACE Sight Vision License	09187-010	Including 2 monochrome camera licenses *3	1

*1. Qty depends on a system.
*2. User-supplied shielded power cable.
*3. When using color cameras, purchase the ACE License Color Camera Option (09287-040).
When using 3 or more cameras, purchase the ACE License Additional Camera Option (09287-000) for more than 2 cameras.

Quattro

Part	Name	Model	Note	Qty
2	Robot	17214-2@@@@		1
1	SmartController EX	09200-000	Bundled with Robot	(1)
a	Front Panel with Cable	90356-10358	Bundled with Robot	(1)
d	IEEE 1394 cable	13632-045	Bundled with Robot	(1)
e	eAIB XSYS Cable	11585-000	Bundled with Robot	(1)
b	T20 Pendant with Cable	10046-010		1
c	SCEX-BELT, Y-Adapter Cable	09550-000		1
3	SmartVision MX	14189-901	Bundling a 24 VDC connector	1
g	Camera	241@@-@@@		1 *1
h	Camera cable	---	Bundled with Camera	1 *1
i	24 VDC Power Cable	04120-000		1
j	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		3
k	AC Power Cable	04118-000		1
l	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		2
m	Industrial Switching Hubs	W4S1-05C		1
---	ACE PackXpert with ACE Sight Vision License	09187-010	Including 2 monochrome camera licenses *3	1

*1. Qty depends on a system.
*2. User-supplied shielded power cable.
*3. When using color cameras, purchase the ACE License Color Camera Option (09287-040).
When using 3 or more cameras, purchase the ACE License Additional Camera Option (09287-000) for more than 2 cameras.

Conveyor tracking dual-robotics system
2 robots control by SCEX with SVMX (When using a vision system)

Cobra 350, eCobra, Viper, Hornet

Part	Name	Model	Note	Qty
1	SmartController EX	19300-000		1
a	Front Panel with Cable	90356-10358	Bundled with SmartController EX	(1)
b	T20 Pendant with Cable	10046-010		1
c	SCEX-BELT, Y-Adapter Cable	09550-000		1
2, 3	Robot Add on	17@@3-@@@@@		2
d	IEEE 1394 cable	13632-045	Bundled with Robot Add on	(2)
e	eAIB XSYS Cable	11585-000	Bundled with Robot Add on	(2)
f	DB9 splitter	00411-000	Bundled with Robot Add on	(2)
4	SmartVision MX	14189-901	Bundling a 24 VDC connector	1
g	Camera	241@@-@@@		1 *1
h	Camera cable	---	Bundled with Camera	1 *1
i	24 VDC Power Cable	04120-000		2
j	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		4
k	AC Power Cable	04118-000		2
l	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		2
m	Industrial Switching Hubs	W4S1-05C		1
---	ACE PackXpert with ACE Sight Vision License	09187-010	Including 2 monochrome camera licenses *3	1

*1. Qty depends on a system.
*2. User-supplied shielded power cable.
*3. When using color cameras, purchase the ACE License Color Camera Option (09287-040).
When using 3 or more cameras, purchase the ACE License Additional Camera Option (09287-000) for more than 2 cameras.

Quattro

Part	Name	Model	Note	Qty
2	Robot	17214-2@@@@		1
1	SmartController EX	09200-000	Bundled with Robot	(1)
a	Front Panel with Cable	90356-10358	Bundled with Robot	(1)
d	IEEE 1394 cable	13632-045	Bundled with Robot	(1)
e	eAIB XSYS Cable	11585-000	Bundled with Robot	(1)
b	T20 Pendant with Cable	10046-010		1
c	SCEX-BELT, Y-Adapter Cable	09550-000		1
3	Robot Add on	17203-2@@@@		1
d	IEEE 1394 cable	13632-045	Bundled with Robot Add on	(1)
e	eAIB XSYS Cable	11585-000	Bundled with Robot Add on	(1)
f	DB9 splitter	00411-000	Bundled with Robot Add on	(1)
4	SmartVision MX	14189-901	Bundling a 24 VDC connector	1
g	Camera	241@@-@@@		1 *1
h	Camera cable	---	Bundled with Camera	1 *1
i	24 VDC Power Cable	04120-000		2
j	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		4
k	AC Power Cable	04118-000		2
l	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		2
m	Industrial Switching Hubs	W4S1-05C		1
---	ACE PackXpert with ACE Sight Vision License	09187-010	Including 2 monochrome camera licenses *3	1

*1. Qty depends on a system.
*2. User-supplied shielded power cable.
*3. When using color cameras, purchase the ACE License Color Camera Option (09287-040).
When using 3 or more cameras, purchase the ACE License Additional Camera Option (09287-000) for more than 2 cameras.

Vision tracking robot system
Control by eAIB/eMotionBlox (Status monitoring by NJ/NX Series)
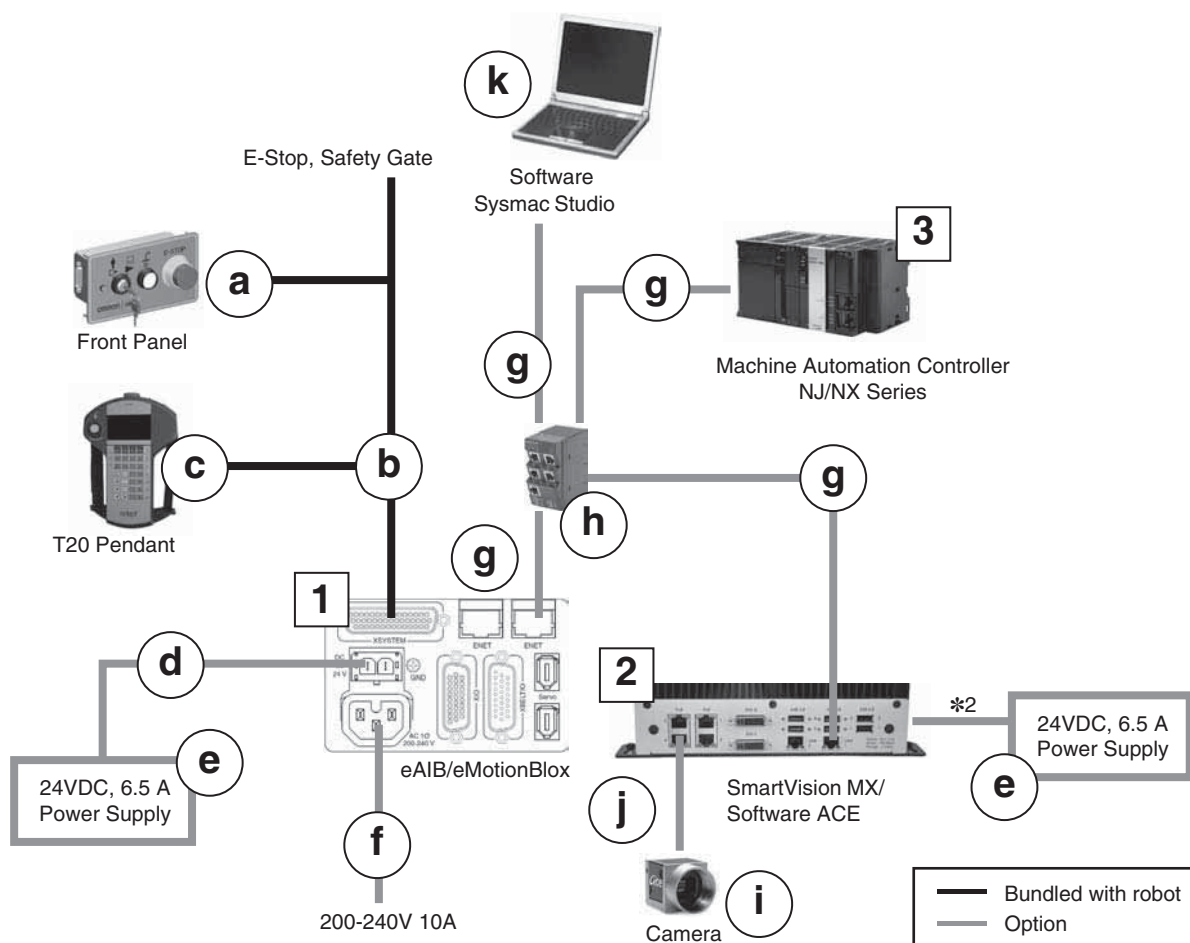
Cobra 350, eCobra, Viper, Hornet

Part	Name	Model	Note	Qty
1	Robot	17@@1-@@@@@		1
a	Front Panel with Cable	90356-10358	Bundled with Robot	(1)
b	eAIB XSYSTEM Cable	13323-000	Bundled with Robot	(1)
c	T20 Pendant with Cable	10046-010		1
d	24 VDC Power Cable	04120-000		1
e	24 VDC, 6.5 A Power Supply	S8JX-G15024C or S8JX-G15024CD		2
f	AC Power Cable	04118-000		1
g	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y		4
h	Industrial Switching Hubs	W4S1-05C		1
2	SmartVision MX	14189-901	Bundling a 24 VDC connector	1
i	Camera	241@@-@@@		1 *1
j	Camera cable	---	Bundled with Camera	1 *1
3	Machine Automation Controller NJ/NX Series	NJ/NX		1
k	Automation software Sysmac Studio	SYSMAC-SE2@@@		1
---	ACE PackXpert with ACE Sight Vision License	09187-010	Including 2 monochrome camera licenses *3	1

*1. Qty depends on a system.
*2. User-supplied shielded power cable.
*3. When using color cameras, purchase the ACE License Color Camera Option (09287-040).
When using 3 or more cameras, purchase the ACE License Additional Camera Option (09287-000) for more than 2 cameras.

Industrial Robots

Connected with encoders

SmartController EX

SmartController EX

D-Sub 26 pin m

Belt Encoder connector D-Sub 26 pin f

SCEX-BELT, Y-Adapter Cable (09550-000)

DB15 f

DB15 m

DB15 f

Y-Adapter Cable (09443-000)

M12 f

M12 f

M12 f

Encoder Kit IP65 (09742-001)

M12 - M12
f   m

Encoder IP65

Encoder Extension Cable (09446-050)

Encoder Bracket

M12 - M12
f   m

f   m

M12

eAIB/eMotionBlox

eAIB/eMotionBlox

XBELTIO D-Sub 26pin m

D-Sub 26 pin f

RS-232C

Force/EXPIO

XBELTIO Cable (13463-000)

DB15 m

DB15 f

DB15 f

Y-Adapter Cable (09443-000)

M12 f

M12 f

M12 f

Encoder Kit IP65 (09742-001)

M12 - M12
f   m

Encoder IP65

Encoder Extension Cable (09446-050)

Encoder Bracket

M12 - M12
f   m

f   m

M12

Protection and Cleanroom Classes

Type	Name	Specifications	Option	Remarks
Parallel Robots	**Hornet 565**	IP67: arms and platform IP65: underside of robot IP20: topside of robot Class 1000	IP65: topside of robot	The addition of the cable sealing kit raises the IP rating of the topside of the robot to IP65.
	Quattro 650H **Quattro 800H**	IP67: arms and platform Class 1000	IP65: robot base	The addition of the cable sealing kit raises the IP rating of the topside of the robot to IP65.
	Quattro 650HS	IP67: arms and platform IP66: robot base Class 1000	---	Mount the Cable Inlet Box (09564-000) on the topside of the robot.
SCARA Robots	**Cobra 350**	IP20	Class10 Cleanroom model	The version with the option has a different model number.
	eCobra 600	IP20	Class10 Cleanroom model	The version with the option has a different model number.
	eCobra 800 **eCobra 800 Inverted**	IP20	IP65, Class10 Cleanroom model	The version with the option has a different model number.
Articulated Robots	**Viper 650** **Viper 850**	IP40	IP54: robot main body IP65: robot joints (J4, J5, J6) Class10 Cleanroom model	The version with the option has a different model number.

Vision System
FH-Series

Like or even more than the human eye

- A complete line-up of cameras for various applications
- Powerful controllers for fast and precise inspection and measurement
- Software for easy setting of various measurements

System configuration

EtherCAT connections for FH series

Example of the FH Sensor Controllers (4-camera type)

Sysmac Studio
Standard Edition
Vision Edition

NJ/NX/NY Controllers

EtherCAT junction slaves

EtherCAT Cables *1

Vision System **FH** Sensor Controllers

Lighting Controllers External Lightings

special cable for cameras

Cameras

Ethernet Cables *2

Incremental rotary encoder

special cable

cable tor Touch Panel interface

special cable for Touch Panel Monitor

Another slave
(With built-in EtherCAT slave function)

Touch Panel Monitor
FH-MT12

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 (FH Sensor Controllers)

High-speed Controllers/Standard Controllers

Sensor Controller Series			FH-3000 series			FH-1000 series		
Type			High-speed Controller (4 cores)			Standard Controller (2 cores)		
Sensor Controller Model			FH-3050	FH-3050-10	FH-3050-20	FH-1050	FH-1050-10	FH-1050-20
Controller Type			BOX type					
Parallel IO			NPN/PNP (common)					
Main Functions	Operation Mode	Standard	Yes					
		Double Speed Multi-input	Yes					
		Non-stop adjustment mode	Yes					
		Multi-line random-trigger mode	Yes (Maximum 8 lines)					
	Parallel Processing		Yes					
	Number of Connectable Camera		2	4	8	2	4	8
	Supported Camera	FH-S series camera	All of the FH-S series cameras are connectable.		All of the FH-S series cameras are connectable. *1	All of the FH-S series cameras are connectable.		All of the FH-S series cameras are connectable. *1
		FZ-S series camera	All of the FZ-S series cameras are connectable.					
	Camera I/F		OMRON I/F					
	Possible Number of Captured Images		Refer to page 484.					
	Possible Number of Logging Images to Sensor Controller							
	Possible Number of Scenes		128					
	Operating on UI	USB Mouse	Yes (wired USB and driver is unnecessary type)					
		Touch Panel	Yes (RS-232C/USB connection: FH-MT12)					
	Setup		Create the processing flow using Flow editing.					
	Language		Japanese, English, Simplified Chinese, Traditional Chinese, Korean, German, French, Spanish, Italian					
External Interface	Serial Communication		RS-232C × 1					
	Ethernet Communication	Protocol	Non-procedure (TCP/UDP)					
		I/F	1000BASE-T × 1	1000BASE-T × 2		1000BASE-T × 1	1000BASE-T × 2	
	EtherNet/IP Communication		Ethernet port (transmission rate: 1Gbps)					
	EtherCAT Communication		Yes (slave)					
	Parallel I/O		• 12 inputs/31 outputs: • Use 1 Line. • Operation mode: Except Multi-line random-trigger mode. • 17 inputs/37 outputs: • Use 2 Lines. • Operation mode: Multi-line random-trigger mode. • 14 inputs/29 outputs: • Use 3 to 4 Lines. • Operation mode: Multi-line random-trigger mode. • 19 inputs/34 outputs: • Use 5 to 8 Lines. • Operation mode: Multi-line random-trigger mode.					
	Encoder Interface		Input voltage: 5 V ± 5% Signal: RS-422A LineDriver Level Phase A/B/Z: 1 MHz					
	Monitor Interface		DVI-I output (Analog RGB & DVI-D single link) × 1					
	USB I/F		USB2.0 host × 4 (BUS Power: Port5 V/0.5 A)					
	SD Card I/F		SDHC × 1					
Indicator Lamps	Main		POWER: Green ERROR: Red RUN: Green ACCESS: Yellow					
	Ethernet		NET RUN: Green NET LINK ACT: Yellow	NET RUN1: Green NET LINK ACK1: Yellow NET RUN2: Green NET LINK ACK2: Yellow		NET RUN: Green NET LINK ACT: Yellow	NET RUN1: Green NET LINK ACK1: Yellow NET RUN2: Green NET LINK ACK2: Yellow	
	SD Card		SD POWER: Green SD BUSY: Yellow					
	EtherCAT		EtherCAT RUN LED: Green EtherCAT LINK/ACT IN LED: Green EtherCAT LINK/ACT OUT LED: Green EtherCAT ERR LED: Red					
Power-supply voltage			20.4 VDC to 26.4 VDC					
Current consumption	When connected to a Controller	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 not connected to Controller	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.
Built-in FAN			Yes					
Usage Environment	Ambient temperature range		Operating: 0°C to 50°C Storage: -20 to +65°C (with no icing or condensation)					
	Ambient humidity range		Operating: 35 to 85%RH Storage: 35 to 85%RH (with no condensation)					
	Ambient atmosphere		No corrosive gases					
	Vibration tolerance		Oscillation frequency: 10 to 150 Hz Half amplitude: 0.1 mm Acceleration: 15 m/s² Sweep time: 8 minute/count Sweep count: 10 Vibration direction: up and down/front and behind/left and right					
	Shock resistance		Impact force: 150 m/s² Test direction: up and down/front and behind/left and right					
	Noise immunity	Fast Transient Burst	• DC power Direct infusion: 2kV, Pulse rising: 5ns, Pulse width: 50ns, Burst continuation time: 15ms/0.75ms, Period: 300ms, Application time: 1 min • I/O line Direct infusion: 1kV, Pulse rising: 5ns, Pulse width: 50ns, Burst continuation time: 15ms/0.75ms, Period: 300ms, Application time: 1 min					
	Grounding		Type D grounding (100 Ω or less grounding resistance) *2					
External Features	Dimensions		190 mm × 115 mm × 182.5 mm Note Height: Including the rubber feet at the base.					
	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
	Degree of protection		IEC60529 IP20					
	Case material		Cover: zinc-plated steel plate Side plate: aluminum (A6063)					
Accessories			Instruction Sheet (Japanese and English): 1, Instruction Installation Manual for FH series:1, General Compliance Information and Instructions for EU:1, Power source(FH-XCN): 1 (male), Ferrite core for camera cable: 2(FH-3050, FH-1050), 4(FH-3050-10, FH-1050-10), 8(FH-3050-20, FH-1050-20)					

*1 When the 12 megapixels camera: Max. 4 cameras are connectable. When use except 12 megapixels cameras: Max. 8 cameras are connectable.
*2 Existing third class grounding

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information
System Configuration
Ratings and Specifications
Cameras / Cables Connection Table
EtherCAT Communications Specifications
Version Information
Components and Functions
Processing Items
Dimensions
Optical Chart

Number of logged images/Max. Number of Loading Images during Multi-input

Cameras	Color/ Monochrome	Model	Number of logged images *1								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 Digital CMOS Cameras *3	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
5 million pixels Digital CMOS Cameras	Color/ Monochrome	FH-SC05R/-SM05R	16	8	5	4	3	2	2	2	25
12 million pixels CMOS Cameras	Color/Mono-chrome	FH-SC12/-SM12	6	3	2	2	---	---	---	---	10

*1 Number of logging images is the maximum number of logging images that can be saved in the memory of the Sensor Controller itself and it depends on the settings of the system and the scene. Refer to Vision System FH/FZ5 Series User's Manual (Z340).
*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.
*3 The multi-input function cannot be used when the built-in lighting of an intelligent compact Digital camera is used.
Refer to the Vision System FH/FZ5 Series User's Manual (Cat. No. Z340) for details.

Ratings and Specifications (Cameras)

High-speed Digital 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 (6.0 mm)		11.26 × 5.98 (12.76 mm)		11.26 × 11.26 (15.93 mm)		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 Acquisition 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 CMOS Cameras

Model	FH-SM05R	FH-SC05R
Image Elements	CMOS image elements (1/2.5-inch equivalent)	
Color/Monochrome	Monochrome	Color
Effective Pixels	2592 (H) × 1944 (V)	
Imaging area H × V (opposing corner)	5.70 × 4.28 (7.13 mm)	
Pixel Size	2.2 (μm) × 2.2 (μm)	
Scan Type	Progressive	
Shutter Method	Rolling shutter	
Shutter Function	Electronic shutter; Shutter speeds can be set from 500 to 10000 ms in multiples of 50 μs	
Frame Rate (Image Acquisition Time)	14 fps (71.7 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 +40°C Storage: -30 to 65°C (with no icing or condensation)	
Ambient humidity range	Operating: 35 to 85%RH Storage: 35 to 85%RH (with no condensation)	
Weight	Approx. 52 g	
Accessories	Instruction Sheet	

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 Acquisition 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
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 Acquisition 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	

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

System Configuration
Ratings and Specifications
Cameras / Cables Connection Table
EtherCAT Communications Specifications
Version Information
Components and Functions
Processing Items
Dimensions
Optical Chart

High-speed Digital 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 Acquisition 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 Digital CMOS Cameras

Model	FZ-SQ010F	FZ-SQ050F	FZ-SQ100F	FZ-SQ100N
Image elements	CMOS color 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 Acquisition Time)	60 fps (16.7 ms)			
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
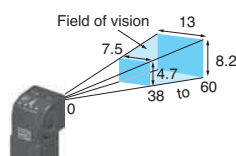
- **Standard**
  FZ-SQ050F
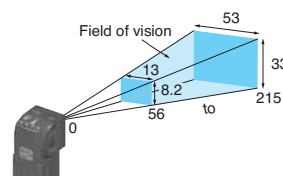
- **Wide View (Long-distance)**
  FZ-SQ100F
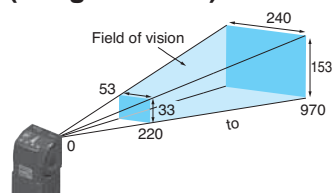
- **Wide View (Short-distance)**
  FZ-SQ100N
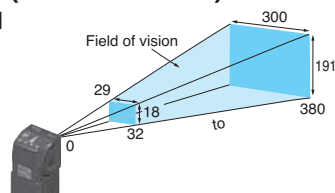
Ratings and Specifications (Cable, Monitor)

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	0.5A
	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

LCD 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 5.71	Supported by version 1.18 or higher.
	Version 5.60	Supported by version 1.15 or higher.
	Version 5.50	Supported by version 1.14.89 or higher.
	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

Sensor Controllers
High-speed Controllers/
Standard Controllers
BOX type
(4-camera type)
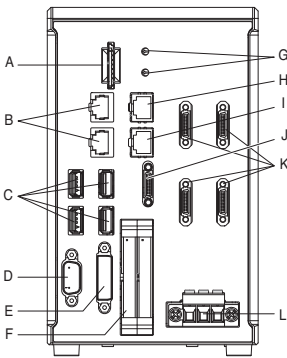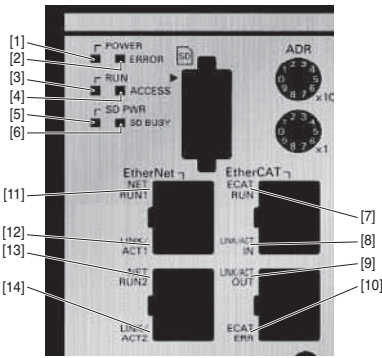
	Name	Description
[1]	POWER LED	Lit while power is ON.
[2]	ERROR LED	Lit when an error has occurred.
[3]	RUN LED	Lit while the layout turned on output setting is displayed.
[4]	ACCESS LED	Blinks while the internal nonvolatile memory is accessed.
[5]	SD POWER LED	Blinks while power is supplied to the SD memory 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 while 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 memory card during measurement operation. Otherwise measurement time may be affected or data may be destroyed.		
B	EtherNet connector	Connect an EtherNet device.		
			Camera 2ch type	**Camera 4ch/8ch type**
			Ethernet port and EtherNet/IP port are sharing use.	Upper port : Ethernet port Lower port : Ethernet port and EtherNet/IP port are sharing use.
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.		

* Use the attachment power terminal connector (male) of FH-XCN series.
  For details, refer to 5-3 Sensor Controller Installation on Vision System FH/FZ5 series Hardware Setup Manual (Z366).

**Lite Controllers
BOX type
(40camera type)**
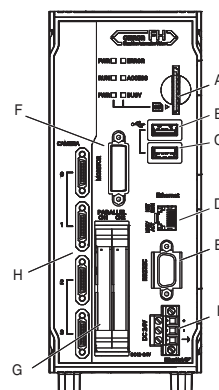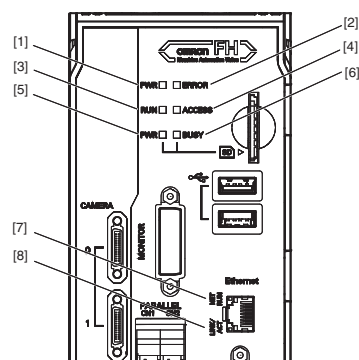
	LED name	Description
[1]	PWR LED	Lit while power is ON.
[2]	ERROR LED	Lit when an error has occurred.
[3]	RUN LED	Lit while the layout turned on output setting is displayed.
[4]	ACCESS LED	Blinks while the internal nonvolatile memory is accessed.
[5]	SD PWR LED	Lit while power is supplied to the SD memory card and the card is usable.
[6]	SD BUSY LED	Lit when access to the SD memory card.
[7]	Ethernet NET RUN LED	Lit while Ethernet communications are usable.
[8]	Ethernet NET LINK/ACT LED	Blinks when connected with an Ethernet device, and blinks while performing communications.

	Connector name	Description
A	SD memory card installation connector	Install the SD memory card. Do not plug or unplug the SD memory card during measurement operation. Otherwise measurement time may be affected or data may be destroyed.
B	USB 2.0 connector	Connects to USB 2.0. Do not insert or remove during loading or writing of measurement or data. The measurement time can be longer or data can be damaged.
C	USB 3.0 connector	Connects to USB 3.0. Do not insert or remove during loading or writing of measurement or data. The measurement time can be longer or data can be damaged. USB 3.0 has a high ability to supply the bus power. Use the Sensor Controller by combining USB 3.0, faster transport can be realized.
D	Ethernet connector	Connect an Ethernet device. Shared Ethernet port and EtherNet/IP port.
E	RS-232C connector	Connect an external device such as a programmable controller
F	Monitor connector	Connect a monitor.
G	Parallel connector (control lines, data lines)	Connect the controller to external devices such as a sync sensor.
H	Camera connector	Connect a camera.
I	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 FH Sensor Controller alone.

* Use the attachment power terminal connector (male) of FH-XCN-L series.
  For details, refer to 5-3 Sensor Controller Installation on Vision System FH/FZ5 series Hardware Setup Manual(Z366).

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.
		Character Inspect	Recognize character according correlation search with model image registered in [Model Dictionary].
		Date Verification	Reading character string is verified with internal date.
		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	Recognize and read characters in images as character information.
		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 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	
Input Image		Multi-trigger Imaging	The Multi-trigger Imaging processing item captures multiple images at user-defined timings and executes parallel measurement for each image. Insert the Multi-trigger Imaging to the top of the flow.
		Multi-trigger Imaging Task	The Multi-trigger Imaging processing item captures multiple images at user-defined timings and executes parallel measurement for each image. Insert this processing item to the top of the processing which requires imaging for multiple times.
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.
		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.
		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.
		Precise Calibration	Used for calibration corresponding to trapezoidal distortion and lens distortion.
		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.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

System Configuration
Ratings and Specifications
Cameras / Cables Connection Table
EtherCAT Communications Specifications
Version Information
Components and Functions
Processing Items
Dimensions
Optical Chart

Group	Icon	Processing Item	
Support measurement		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.
		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.
		Conveyor Calibration	Conveyor Calibration is used to calibrate camera, conveyor, and robots for conveyor tracking application.

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.
		Selective Branch	Easily branch to multiple destinations.
Output results		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.
Output result		Result Display	Used for displaying the texts or the figures in the camera image.
		Display Image File	Display selected image file.
		Display Last NG Image	Display the last NG images.
		Conveyor Panorama Display	Display images of the tracking area as a panoramic image.

*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)

Sensor Controllers

High-speed Controllers/Standard Controllers
Box-type
FH-3050/-3050-10/-3050-20
FH-1050/-1050-10/-1050-20

The 2-camera type has only two camera connectors, and the 8-camera type has eight camera connectores.

The 2-camera type has only one Ethernet connectors.

Four, M4 mounting holes with a depth of 4.5 mm

Four, M4 mounting holes with a depth of 4.5 mm

Four, M3 mounting holes with a depth of 4.5 mm
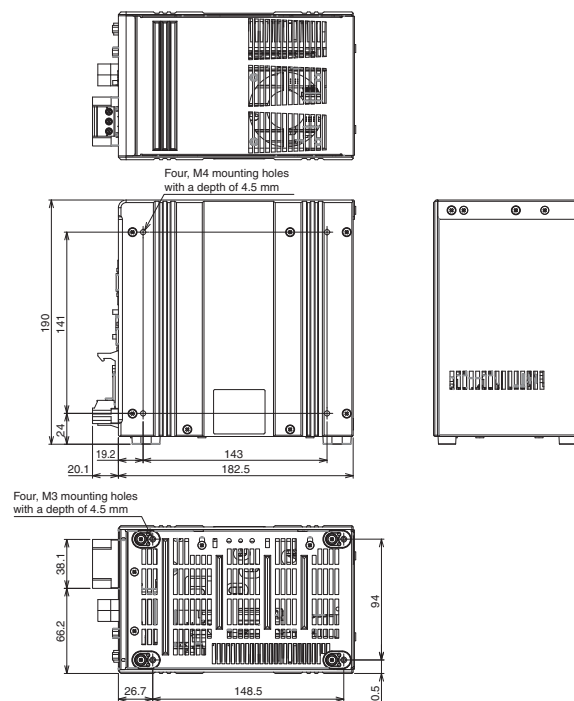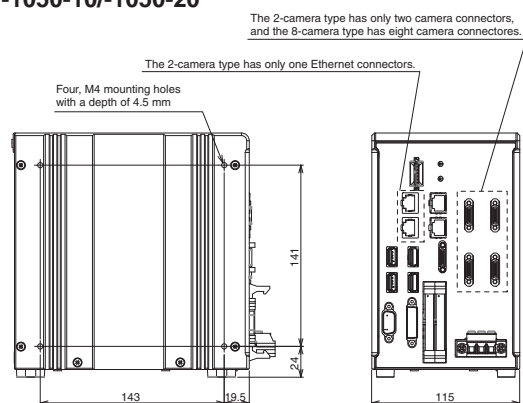
Cameras

High-speed Digital CMOS Camera

300,000-pixel camera

FH-SC
FH-SM
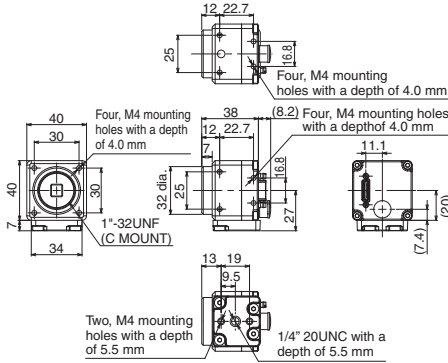
2 million-pixel camera

FH-SC02
FH-SM02
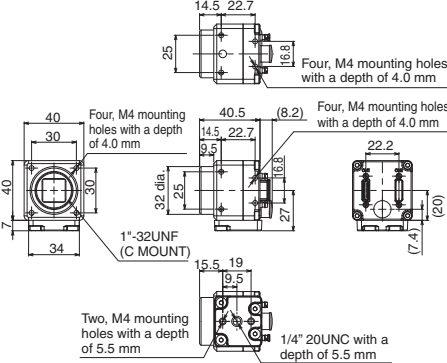
4 million-pixel camera

FH-SC04
FH-SM04
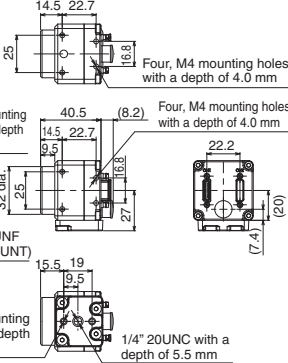
12 million-pixel camera

FH-SC12
FH-SM12
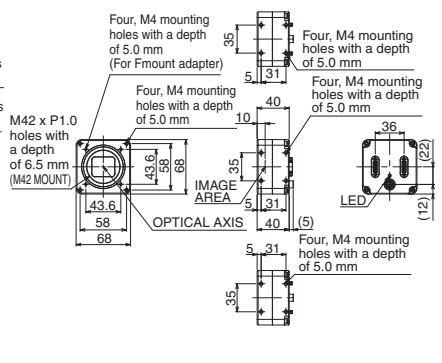
Digital CMOS Cameras

FH-SM05R
FH-SC05R
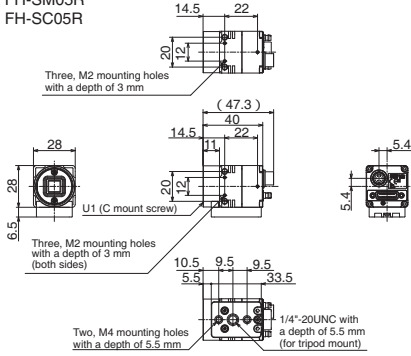
Digital CCD Cameras

300,000-pixel camera

FZ-S
FZ-SC
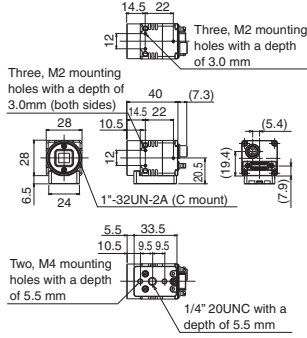
2 million-pixel camera

FZ-S2M
FZ-SC2M
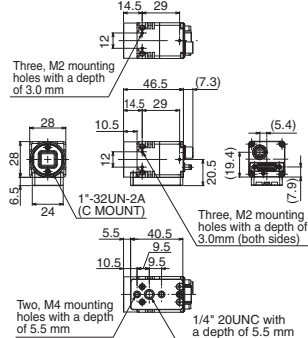
5 million-pixel camera

FZ-S5M2
FZ-SC5M2
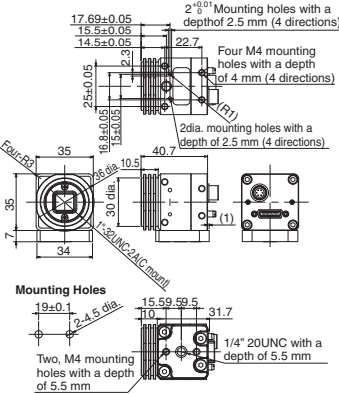
High-speed CCD Camera

FZ-SH
FZ-SHC
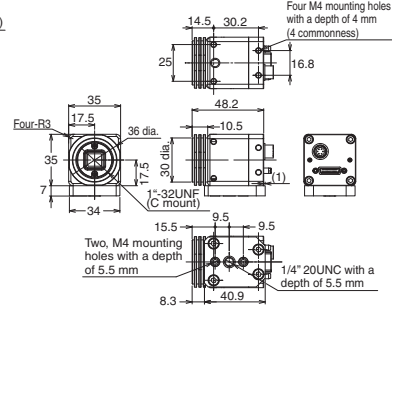
Small digital CCD cameras

Camera head

Flat camera
FZ-SF
FZ-SFC
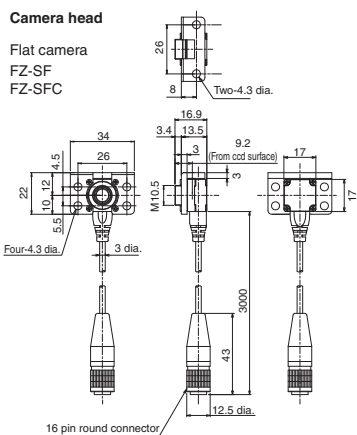
Pen-shaped camera
FZ-SP
FZ-SPC

Four, M1.7 mounting holes
with a depth of 1.5 mm

3000

Eight, M1.7 mounting holes
with a depth of 1.5 mm

16 pin round
connector

(From ccd surface)

Two, M3 mounting holes
with a depth of 4 mm

Two-4.3 dia.

Four-4.3 dia.

16 pin round connector
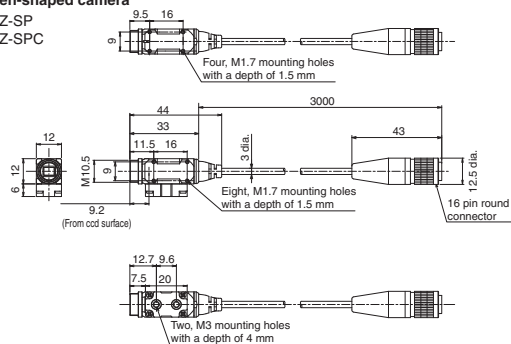
Camera amplifier

Can be used for both flat cameras and pen-shaped cameras

Three, M2 mounting holes
with a depth of 3.0 mm

Three, M2 mounting holes
with a depth of 3.0 mm

Two, M4 mounting holes
with a depth of 5.5 mm

1/4" 20UNC with a depth of 5.5 mm
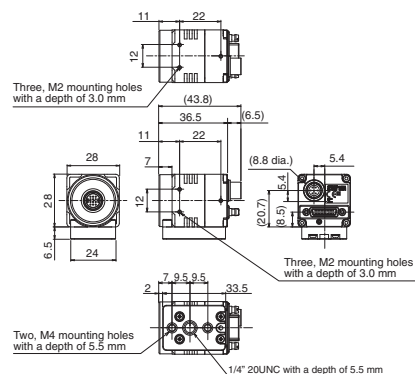
Intelligent Compact Digital CMOS Cameras

Narrow view / Standard
FZ-SQ010F
FZ-SQ050F

Optical
axis

Polarizing
Filter Attachment

Mounting Bracket *1

1/4-20UNC Depth: 6

Four, M4 Depth: 6

Mounting Hole Dimensions

Two, 4.5 dia.

20±0.1

Tightening torque: 1.2 N·m
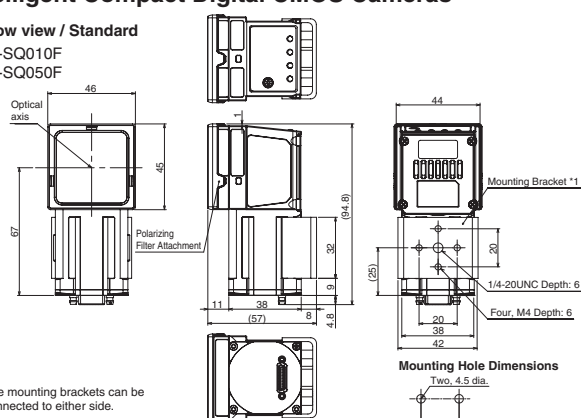
*1. The mounting brackets can be
connected to either side.

Wide View
FZ-SQ100F (long-distance)
FZ-SQ100N (short-distance)

Optical
axis

Polarizing
Filter Attachment

Mounting Bracket *1

1/4-20UNC Depth: 6

Four, M4 Depth: 6

Mounting Hole Dimensions

Two, 4.5 dia.

20±0.1

Tightening torque: 1.2 N·m
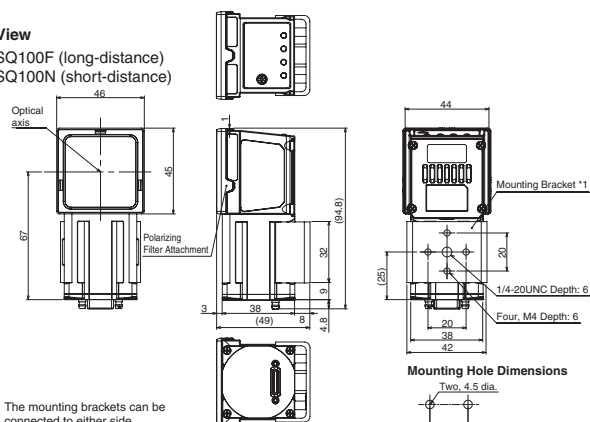
*1. The mounting brackets can be
connected to either side.

Cables

Camera Cable

Camera Cable

FZ-VS3
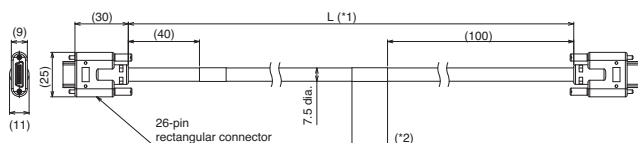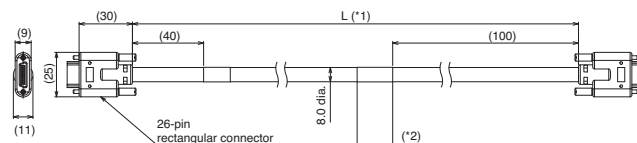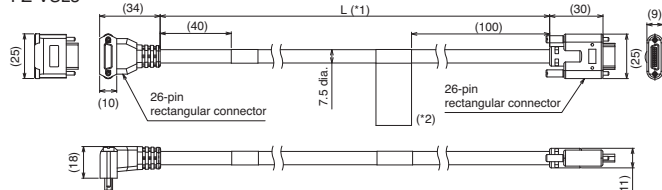
26-pin rectangular connector

L (*1)
(30) (40) (100)
(9) (25) (11)
7.5 dia.
(*2)

Bend resistant Camera Cable

FZ-VSB3

26-pin rectangular connector

L (*1)
(30) (40) (100)
(9) (25) (11)
8.0 dia.
(*2)

Right-angle Camera Cable

FZ-VSL3

26-pin rectangular connector

L (*1)
(34) (40) (100) (30)
(25) (10) (9) (25)
7.5 dia.
(*2)
26-pin rectangular connector
(18) (11)

Bend resistant Right-angle Camera Cable

FZ-VSLB3

26-pin rectangular connector

L (*1)
(34) (40) (100) (30)
(25) (10) (9) (25)
8.0 dia.
(*2)
26-pin rectangular connector
(18) (11)

Long-distance Camera Cable

FZ-VS4

26-pin rectangular connector

L (*3)
(12) (42) (40) (100)
(24)
7.8 dia.
(*2)

Long-distance Right-angle Camera Cable

FZ-VSL4

26-pin rectangular connector

L (*3)
(34) (40) (100) (42)
(25) (10) (24)
7.8 dia.
(*2)
26-pin rectangular connector
(18) (12)
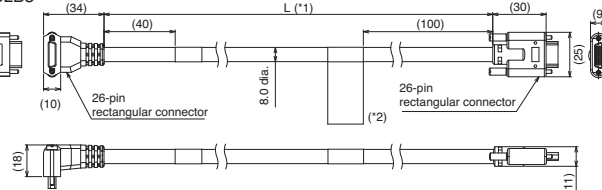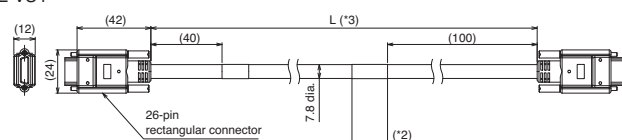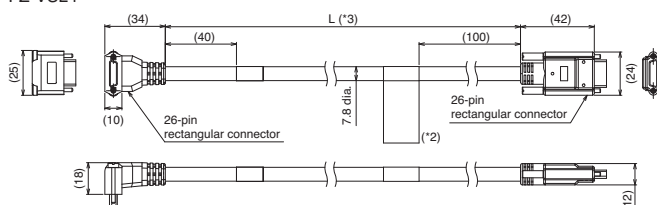
*1. Cable is available in 2m/3m/5m/10m.
*2. Each camera cables has polarity.
Please ensure that the name plate side of the cable is connected to the controller.
*3. Cable is available in 15m.

Camera Cable Extension Unit

FZ-VSJ

Camera Cable Connector (Camera side)
POWER LED Indicator

9 15
9.1
14.9
75
65
54
4-3.4
60
83
3.2
3.2
4.85
4.85
93.8

Camera Cable Connector (Controller side)
9 14
Power terminal
2.8
9.1
4
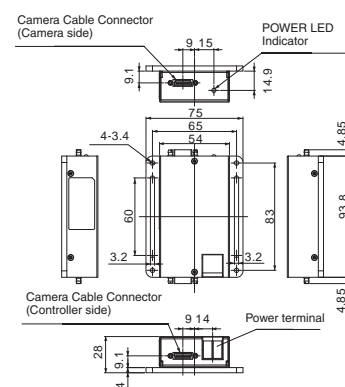
Extension Tubes for Small Camera

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
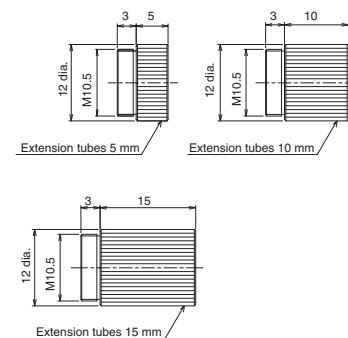
Lens for Small Camera

FZ-LES Series

L *
Diaphragm adjustment knob
4
12 dia.
Diaphragm look screw (M1.4)
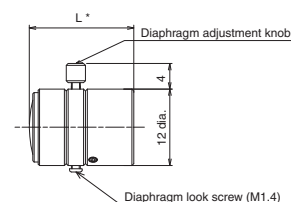
*   Overall length is available in 16.4mm/19.7mm/23.1mm/25.5mm.

Encoder Cable

FH-VR

11.7
L1 (*1)
100
20
26
2.2 37.2
90±5
3
20
10±2
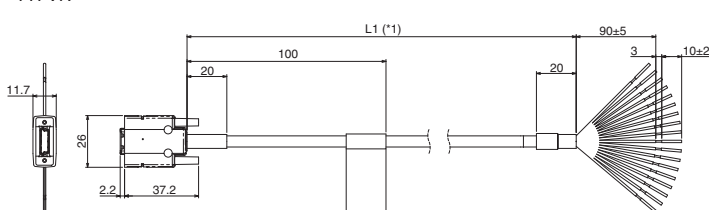
*1. Cable is available in 1.5 m.

Parallel I/O Cable

XW2Z-S013-□

UNFUSED PART
FUSED PART
1 2
33 34
70 30 70 15
L(*1)
CABLE MARK

*1. Cable is available in 2m/5m.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

System Configuration
Ratings and Specifications
Cameras / Cables Connection Table
EtherCAT Communications Specifications
Version Information
Components and Functions
Processing Items
Dimensions
Optical Chart

Touch Panel Monitor
FH-MT12

Panel cutout dimensions

Note:1. Panel thickness   1.6 to 4.8 mm
2. No burr allowed

8-M4 EFFECTIVE SCREW LENGTH6

(19) MOUNTING PLATE THICKNESS 1.6-4.8

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)

12± 0.25
45± 5
10± 2

45± 5
12± 0.25

11.5 max.

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

Mountable plate thickness:
1.6 to 5.0 mm

Four, M4

LCD Monitor Cable
FZ-VM

(15)
(39)
L(*1)
(32.5)
(32.5)
(14 dia.)
(33.5)
4.5 dia.

Two, 15-pin rectangular connector

*1. cable is available in 2m/5m.

DVI-I -RGB Conversion Connector
FH-VMRGB

15.7
63.8
54
4.9
40

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).

X
Y
Lens
Field of vision (mm)
WD (mm)
Camera distance (mm)
Extension Tube thickness: t □ (mm)
Camera

*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.

Normal Lenses

High-speed Digital CMOS Camera
FH-S@,
High-speed Digital CCD Camera
FZ-SH@,
Digital CCD Camera
FZ-S@,
300,000-pixel
(Using 3Z4S-LE SV-V Series)
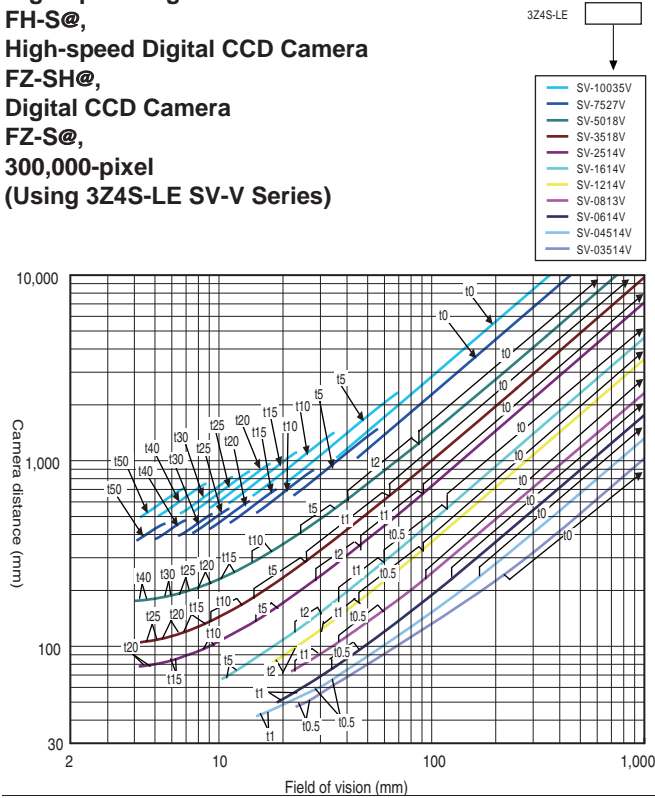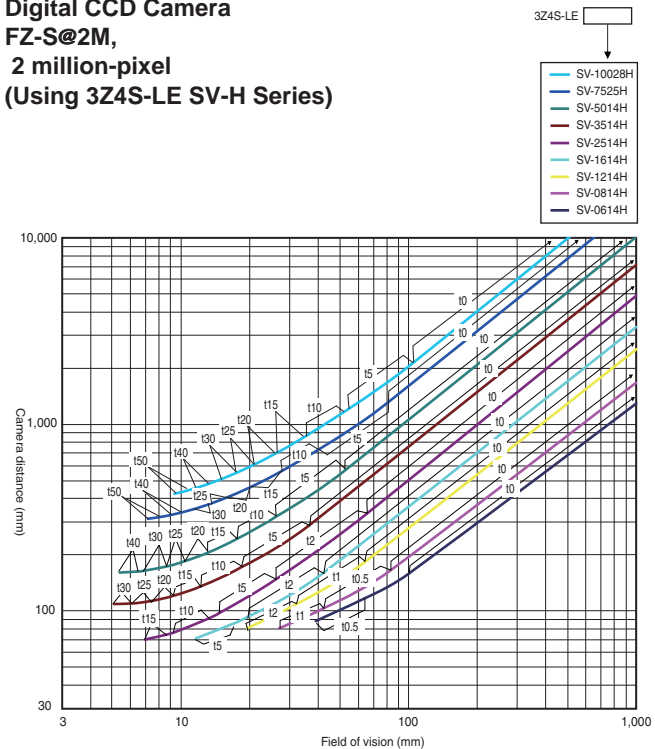
3Z4S-LE

SV-10035V
SV-7527V
SV-5018V
SV-3518V
SV-2514V
SV-1614V
SV-1214V
SV-0813V
SV-0614V
SV-04514V
SV-03514V

Digital CCD Camera
FZ-S@5M2,
5 million-pixel
(Using 3Z4S-LE SV-H Series)

3Z4S-LE

SV-10028H
SV-7525H
SV-5014H
SV-3514H
SV-2514H
SV-1614H
SV-1214H
SV-0814H
SV-0614H

Digital CCD Camera
FZ-S@2M,
2 million-pixel
(Using 3Z4S-LE SV-H Series)

3Z4S-LE

SV-10028H
SV-7525H
SV-5014H
SV-3514H
SV-2514H
SV-1614H
SV-1214H
SV-0814H
SV-0614H

Digital CMOS Camera (Standalone):
FH-S@05R
5 million-pixel
(Using 3Z4S-LE SV-H Series)

3Z4S-LE

SV-10028H
SV-7525H
SV-5014H
SV-3514H
SV-2514H
SV-1614H
SV-1214H
SV-0814H
SV-0614H
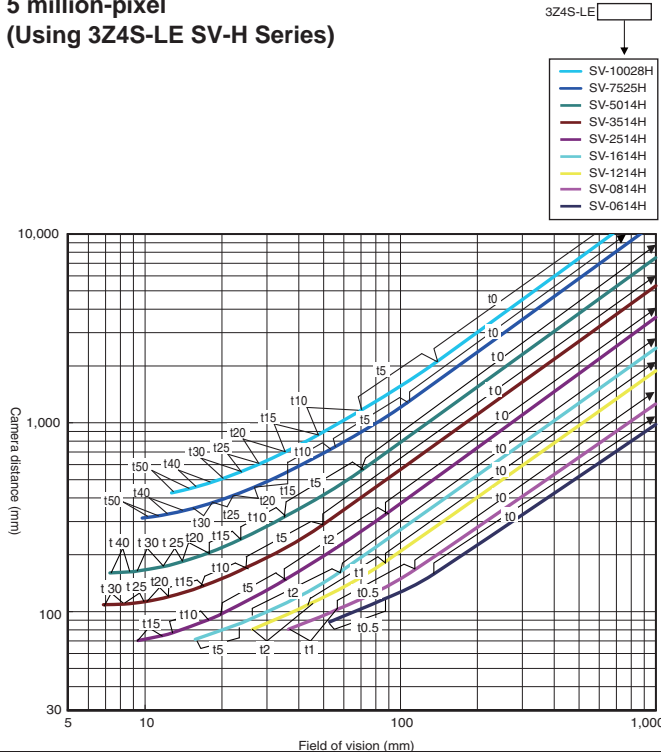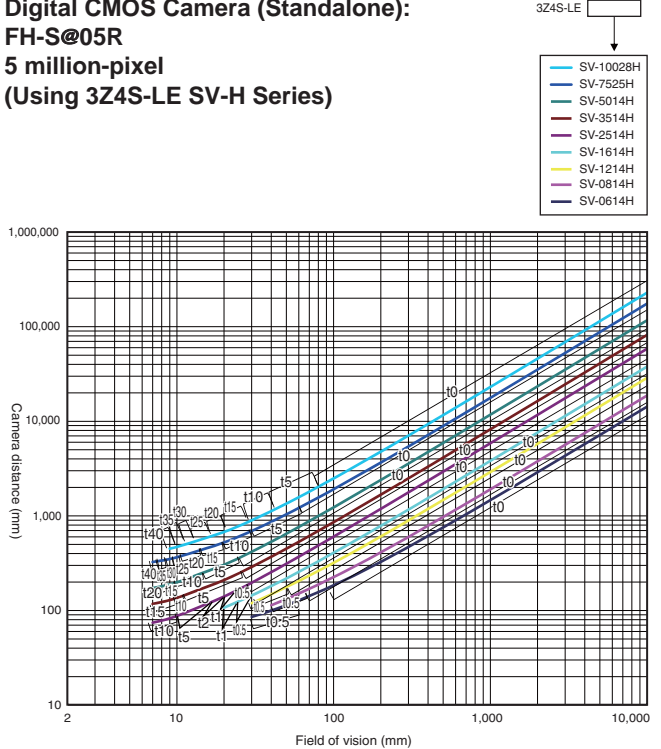
**Small Digital CCD Cameras
FZ-SF@,
FZ-SP@,
300,000-pixel
(Using FZ-LES Series)**

Legend:
- FZ-LES30
- FZ-LES16
- FZ-LES6
- FZ-LES3
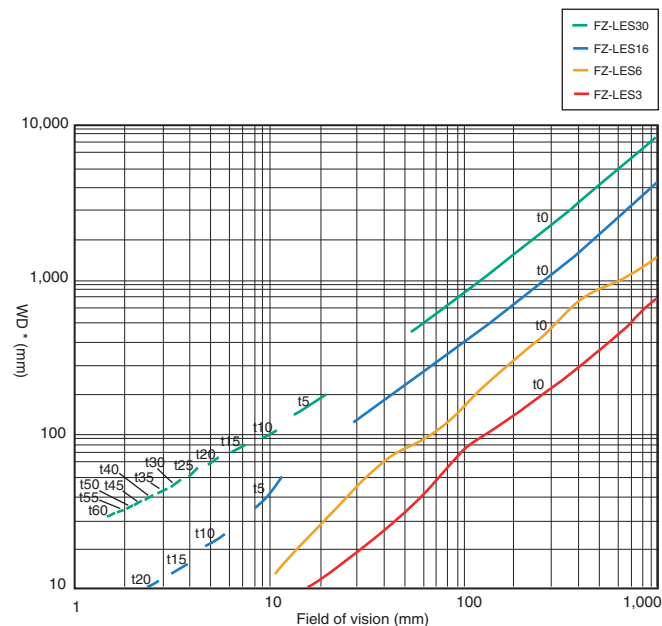
* The vertical axis represents WD, not installation distance.

**High-speed Digital CMOS Camera
FH-S@04,
4 million-pixel
(Using 3Z4S-LE VS-H1 Series)**

3Z4S-LE

Legend:
- SV-10028H
- SV-7525H
- VS-5018H1
- VS-3514H1
- VS-2514H1
- VS-1614H1N
- VS-1214H1
- VS-0814H1
- VS-0618H1
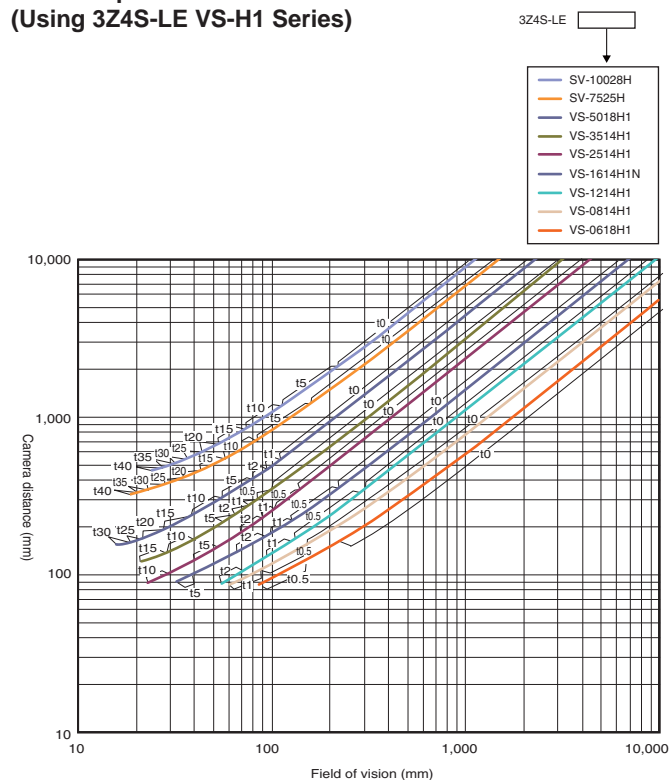
**High-speed Digital CMOS Camera
FH-S@02,
2million-pixel
(Using 3Z4S-LE VS-H1 Series)**

3Z4S-LE

Legend:
- SV-10028H
- SV-7525H
- VS-5018H1
- VS-3514H1
- VS-2514H1
- VS-1614H1N
- VS-1214H1
- VS-0814H1
- VS-0618H1
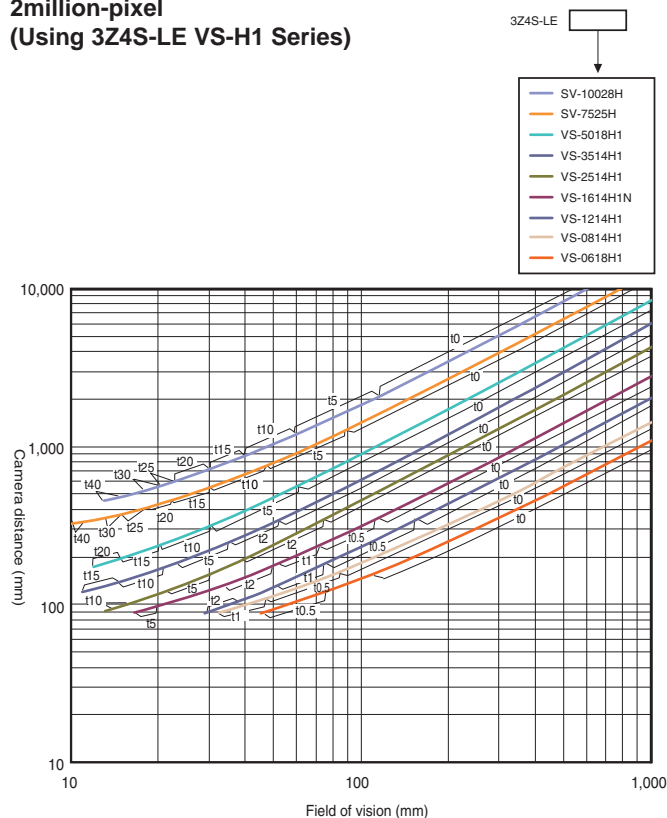
**High-speed Digital CMOS Camera
FH-S@12,
12 million-pixel
(Using 3Z4S-LE VS-L/M42 Series)**

3Z4S-LE

Legend:
- VS-L10028/M42-10
- VS-L8540/M42-10
- VS-L5028/M42-10
- VS-L3528/M42-10
- VS-L2526/M42-10
- VS-L1828/M42-10

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information
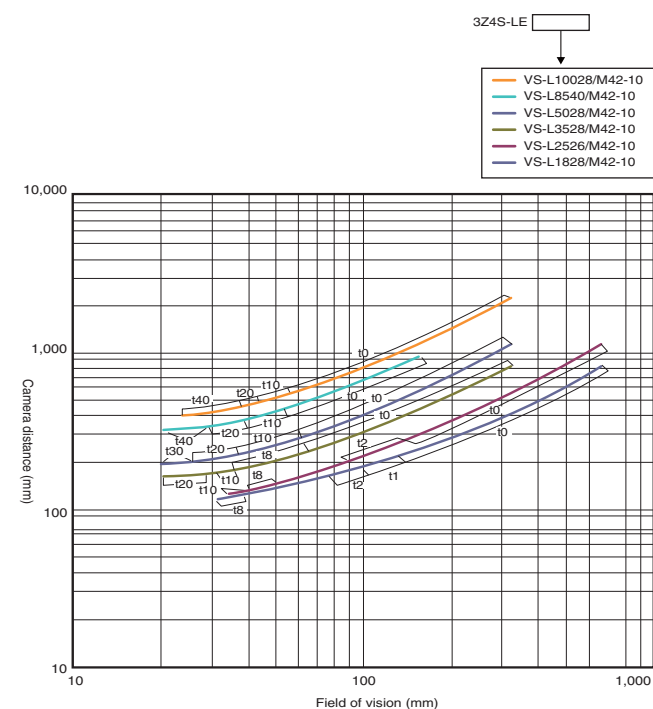
Vibration/Shock-resistance Lens

**High-speed Digital CMOS Camera
FH-S@,
High-speed Digital CCD Camera
FZ-SH@,
Digital CCD Camera
FZ-S@,
300,000-pixel
(Using 3Z4S-LE VS-MC Series)**

3Z4S-LE ☐

—	VS-MC75
—	VS-MC50
—	VS-MC35
—	VS-MC30
—	VS-MC25N
—	VS-MC20
—	VS-MC15

**Digital CCD Camera
FZ-S@5M2,
5 million-pixel
(Using 3Z4S-LE VS-MC Series)**

3Z4S-LE ☐

—	VS-MC75
—	VS-MC50
—	VS-MC35
—	VS-MC30
—	VS-MC25N
—	VS-MC20
—	VS-MC15

**Digital CCD Camera
FZ-S@2M,
 2 million-pixel
(Using 3Z4S-LE VS-MC Series)**

3Z4S-LE ☐

—	VS-MC75
—	VS-MC50
—	VS-MC35
—	VS-MC30
—	VS-MC25N
—	VS-MC20
—	VS-MC15

**Digital CMOS Camera (Standalone)
FH-S@05R,
5 million-pixel
(Using 3Z4S-LE VS-MC Series)**

3Z4S-LE ☐

—	VS-MC75
—	VS-MC50
—	VS-MC35
—	VS-MC30
—	VS-MC25N
—	VS-MC20
—	VS-MC15
—	VS-MC10
—	VS-MC6.5
—	VS-MC4

System
Configuration

Ratings and
Specifications

Cameras / Cables
Connection Table

EtherCAT
Communications
Specifications

Version Information

Components
and Functions

Processing Items

Dimensions

Optical Chart
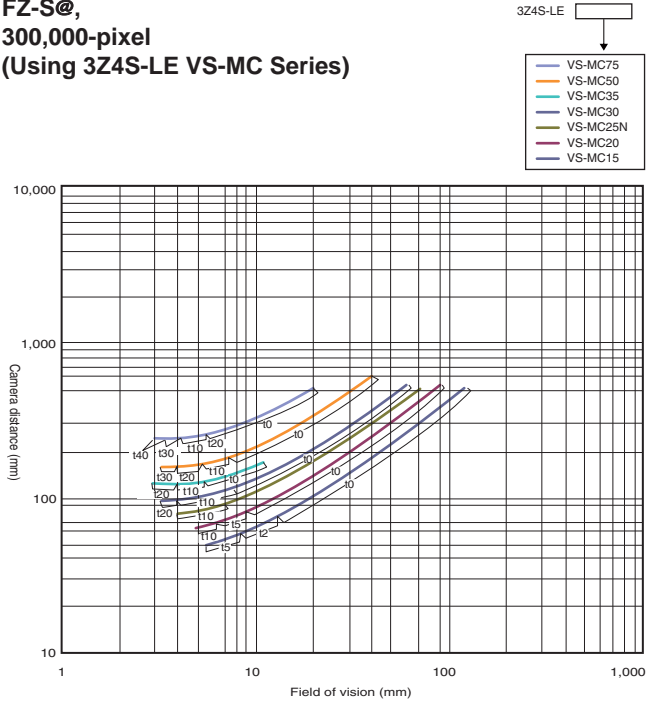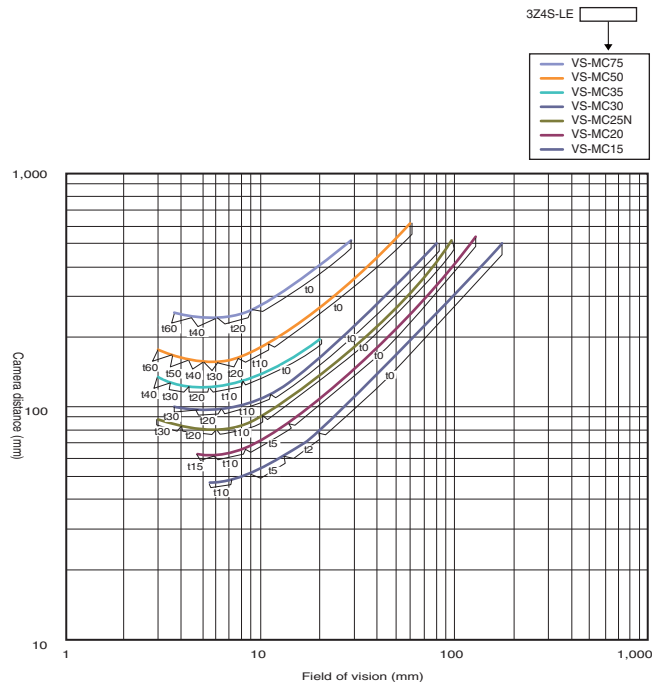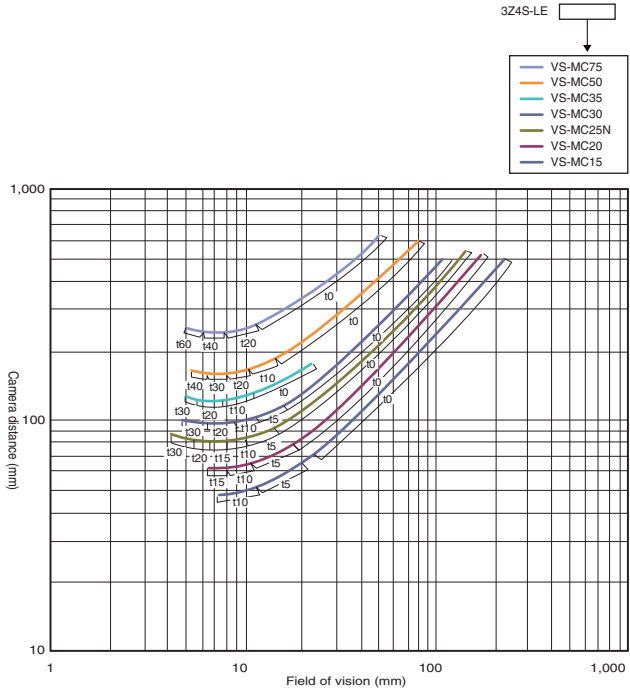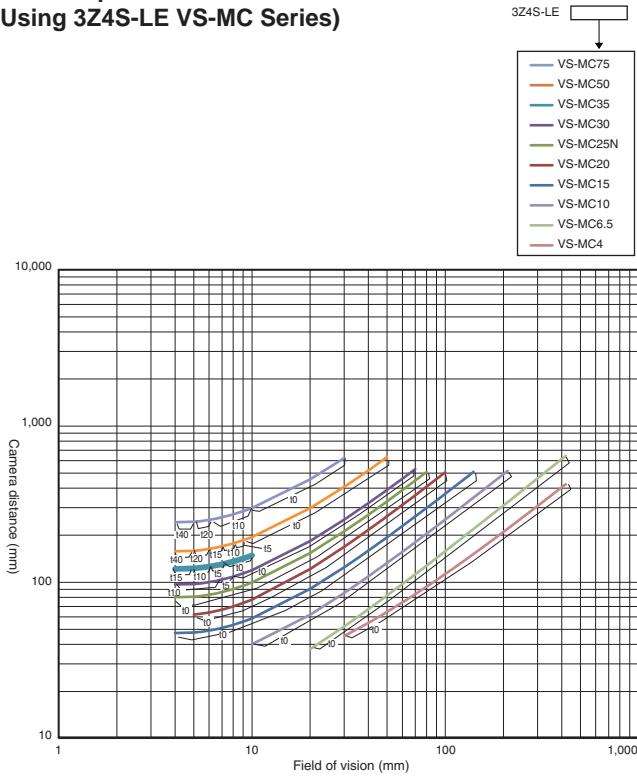
High-speed Digital CMOS Camera (Standalone)
FH-S@02
2 million-pixel
(Using 3Z4S-LE VS-MCH Series)
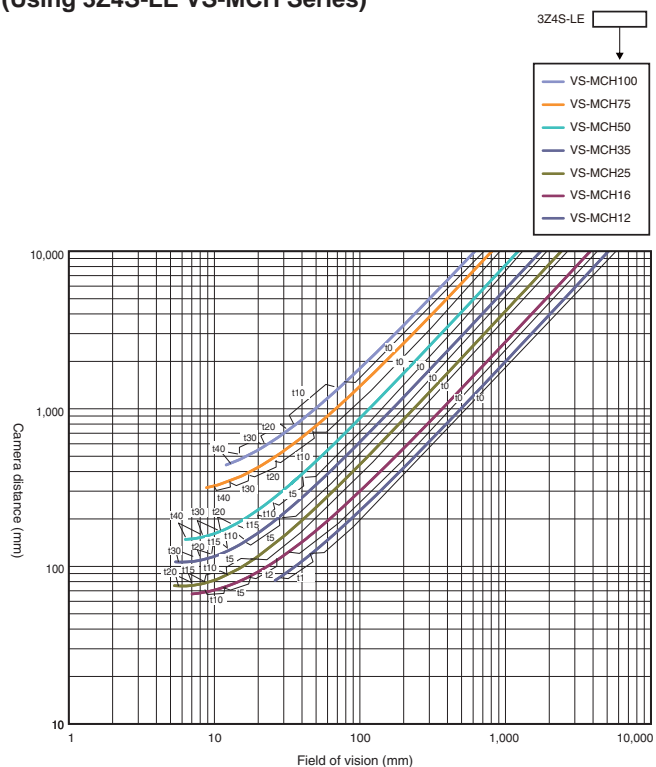
High-speed Digital CMOS Camera (Standalone)
FH-S@04
4 million-pixel
(Using 3Z4S-LE VS-MCH Series)
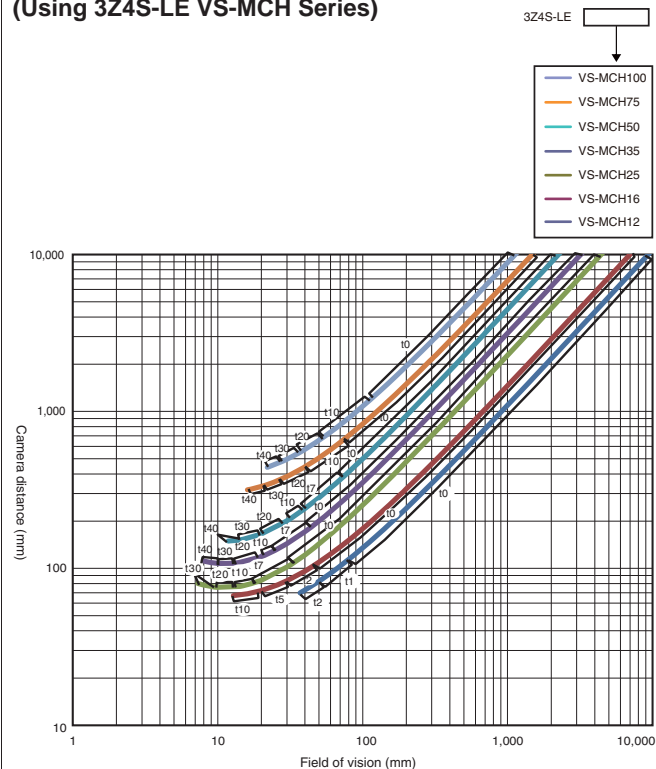
High-speed Digital CMOS Camera (Standalone)
FH-S@12
12 million-pixel
(Using 3Z4S-LE VS-MCL/M42 Series)

Smart Camera
FQ-M-Series

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

System Configuration

Specifications

EtherCAT Communications Specifications

Version Information

Components and Functions

Dimensions

Optical Chart
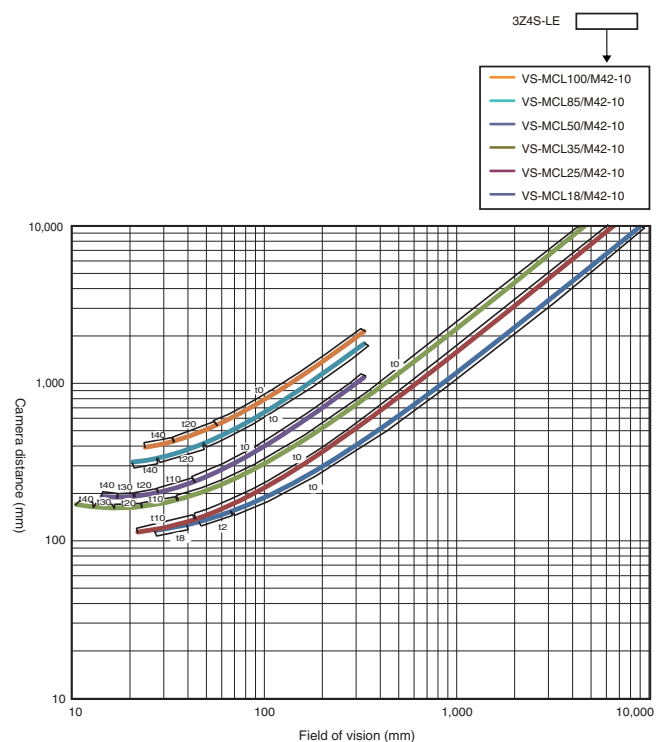
Designed for motion tracking

- 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 *

NJ/NX/NY Controllers

Standard Ethernet Cables

Industrial Switching Hubs for EtherNet/IP and Ethernet

FQ-M Ethernet Cables (RJ45/M12)

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)

FQ-M EtherCAT Cables FQ-MWNEL/-WMNE (M12/M12)

FQ-M EtherCAT Cables FQ-MWNL/-WN (M12/RJ45)

External Lightings (FL Series)

Lighting Controllers FL-TCC1

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 NJ/NX/NY controller settings with the Sysmac Studio Standard Edition, connect a computer and the controller 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/NY 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

Type Item		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) $\times$ 480 (V)	
	Pixel size	6.0 (μm) $\times$ 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) $\times$ 1 • L/A OUT (Link/Activity OUT) $\times$ 1 • RUN $\times$ 1 • ERR $\times$ 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)	

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

System Configuration

Specifications

EtherCAT Communications Specifications

Version Information

Components and Functions

Dimensions

Optical Chart

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
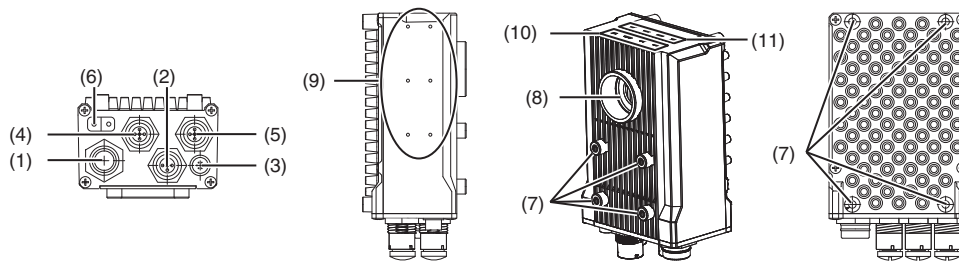
Sensor

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)	Measurement 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
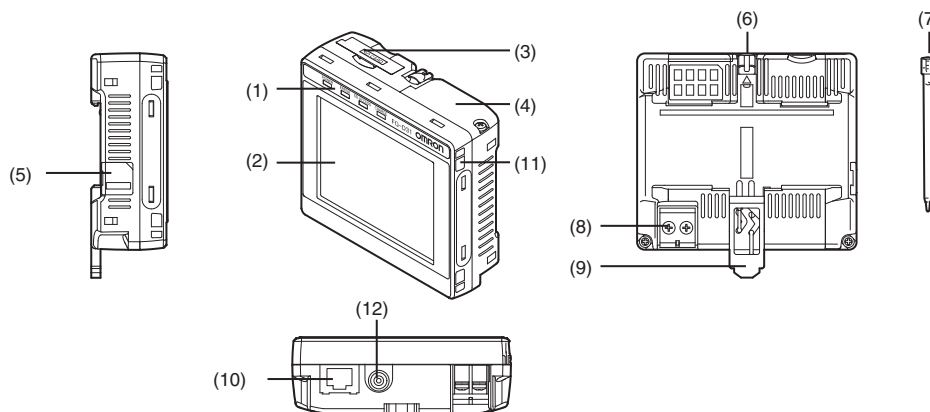
No.	Name		Description
(1)	Operation indicators	POWER	Lights green when the Touch Finder is turned ON.
		ERROR	Lights red when an error occurs.
		SD ACCESS	Lights yellow when an SD card is inserted. Flashes yellow when the SD card is being accessed.
		CHARGE *	Lights orange when the Battery is charging.
(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.

50.5

5

6-M2 DEPTH 4.5 max.

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
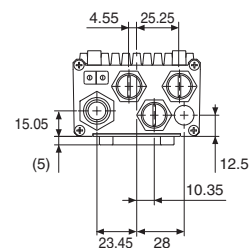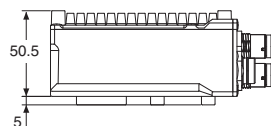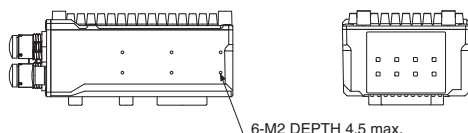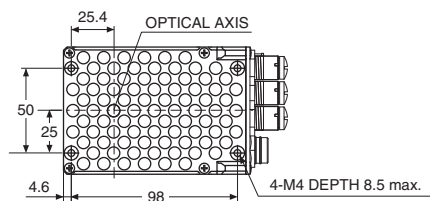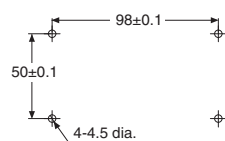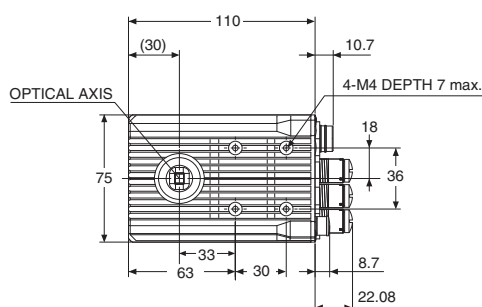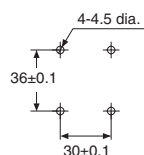
Touch Finder

FQ-MD30/MD31

Panel Mounting Adapter *2

20

44.5

33

95

70

*1

35.5

14

27.9

23.8

85

52.9

12.1

13.5   15

27

10

17.3

19.2

*1

(36.9)

(2)   31.6

3.5

116

95

116

85

(133.4)

(8.1)
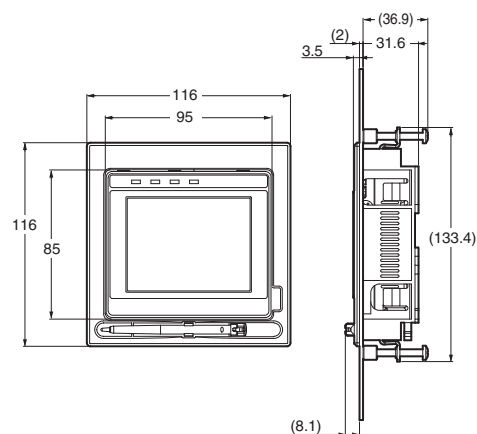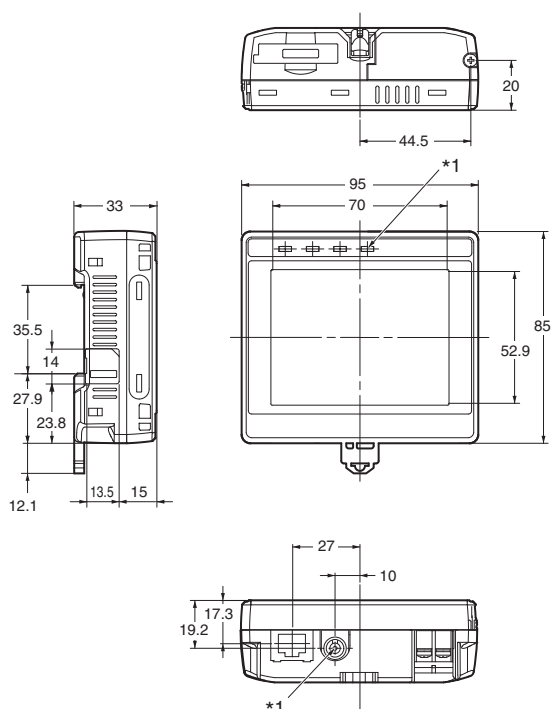
Panel Cutout Dimensions

111±1

111±1
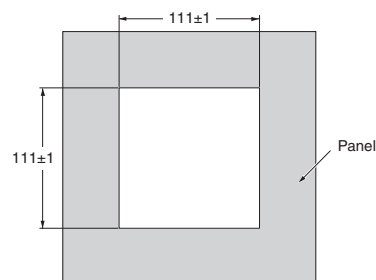
Panel

*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
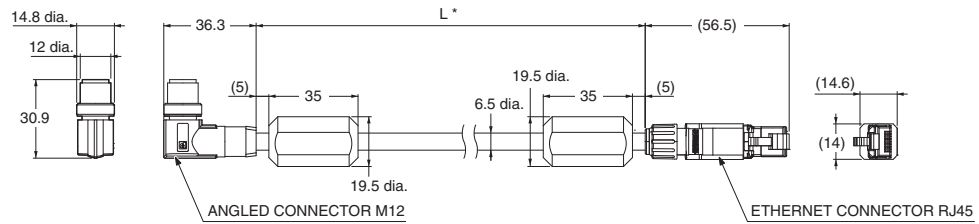
* Cable is available in 5 m/10 m.

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.)
19.5 dia.
(19.9)
CIRCULAR CONNECTOR M12
ETHERNET CONNECTOR RJ45
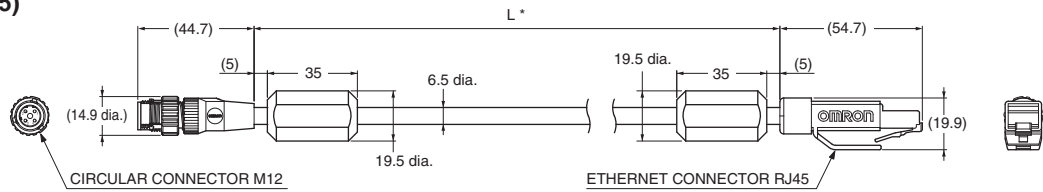
* Cable is available in 5 m/10 m.

● **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)
(5)
35
(19.5 dia.)
(19.5 dia.)
35
(5)
(14.9 dia.)
(14.9 dia.)
CIRCULAR CONNECTOR M12
CIRCULAR CONNECTOR M12
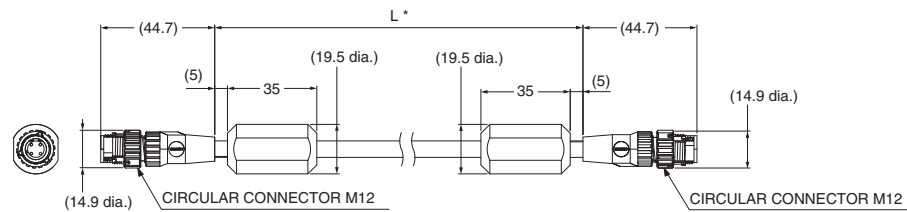
* Cable is available in 5 m/10 m.

● **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
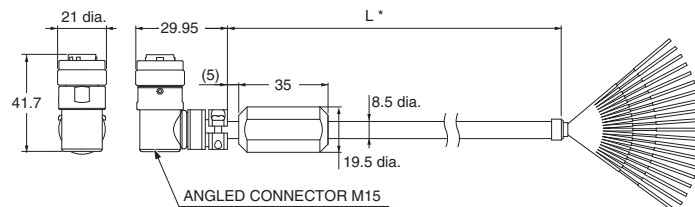
* Cable is available in 5 m/10 m.

Straight type
FQ-MWD005/010
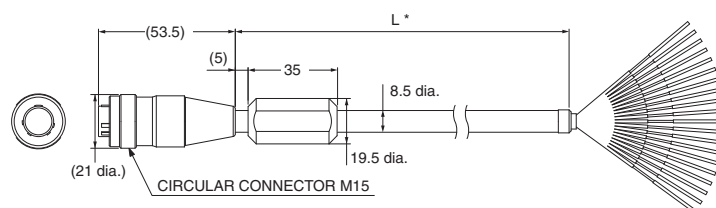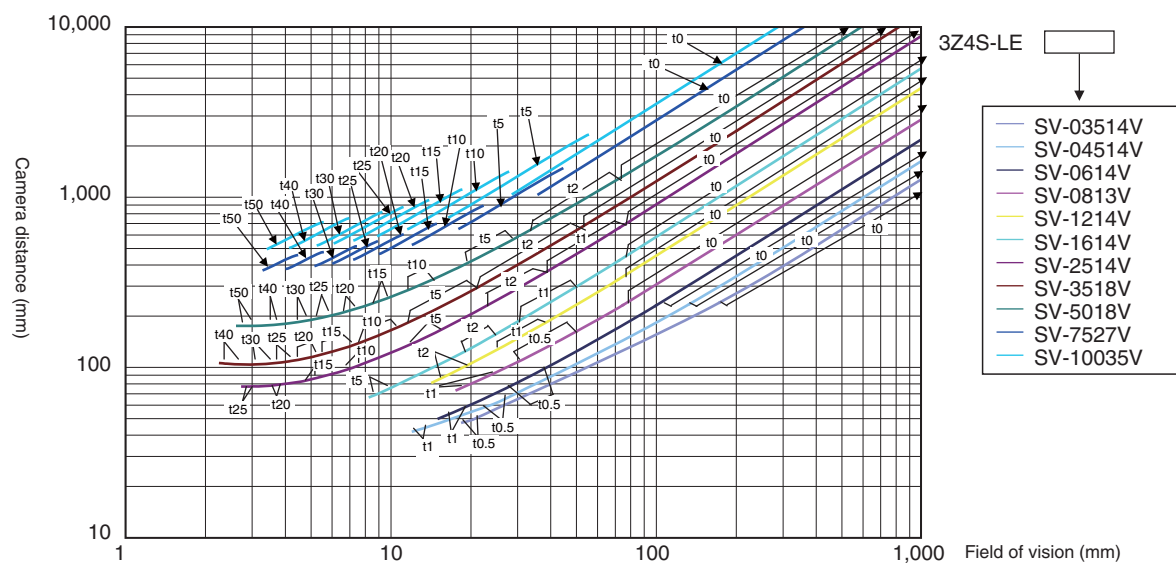
(53.5)
L *
(5)
35
8.5 dia.
19.5 dia.
(21 dia.)
CIRCULAR CONNECTOR M15

* Cable is available in 5 m/10 m.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

System Configuration
Specifications
EtherCAT Communications Specifications
Version Information
Components and Functions
Dimensions
Optical Chart

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
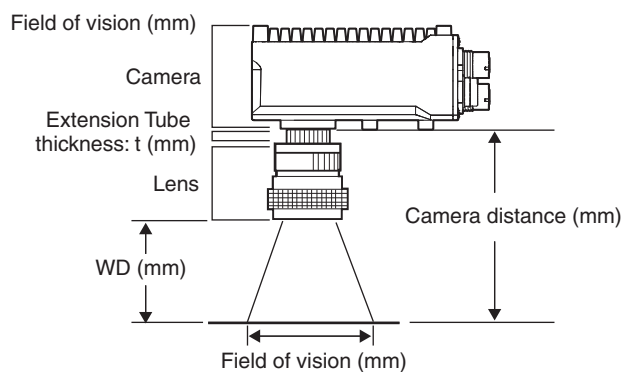
*1. The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.
*2. The vertical axis represents WD for small cameras.

Confocal Fiber Displacement Sensor
ZW-7000 Series

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

System Configuration

Specifications

Dimensions

Reliable measurements for any material and surface types

- Measuring shiny objects with an inclination of ±25° *
- ±0.5 μm or less linearity for various materials *
- Sampling rate as fast as 20 μs

* Typical value of the ZW-S7010 Sensor Head

CE

System Configuration

EtherCAT connections

Basic Configuration

Controller ZW-7000T

Sensor Head ZW-S70□0

Calibration ROM (included with Sensor Head)

EtherCAT Cable (RJ45/RJ45)

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

NJ/NX/NY Controllers

Ethernet *2 /USB

Setting Software

Sysmac Studio Standard Edition SYSMAC-SE20□□

Analog, EtherNet/IP, Ethernet, RS-232C and Parallel connections

Basic Configuration

Controller ZW-7000T

Sensor Head ZW-S70□0

Calibration ROM (included with Sensor Head)

Switching Hubs

- - - - - Analog, RS-232C and Parallel

————— EtherNet/IP™, Ethernet

Control PLC

Setting Software

Sysmac Studio Measurement Sensor Edition SYSMAC-ME00□L
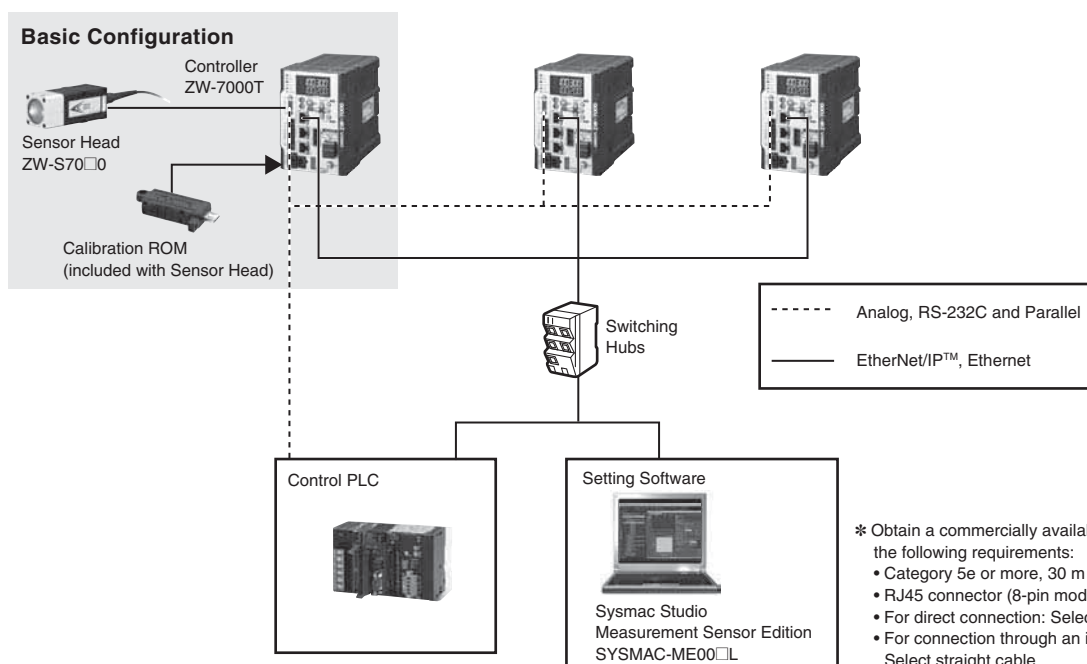
＊Obtain a commercially available Ethernet cable satisfying the following requirements:
- Category 5e or more, 30 m or less
- RJ45 connector (8-pin modular jack)
- For direct connection: Select cross cable.
- For connection through an industrial switching hub: Select straight cable.

OMRON

●**Recommended EtherCAT Communications Cables**
Refer to Connecting cable with NJ-series Controller for the recommended cables.

Specifications

●**Sensor Head**

Item	Specifications		
	ZW-S7010	**ZW-S7020**	**ZW-S7030**
Sensor controller	ZW-7000T		
Measurement center distance	10 mm	20 mm	30 mm
Measuring range *1	±0.5 mm	±1 mm	±2 mm
Static resolution *2	0.25 μm		
Linearity *3	±0.45 μm	±0.9 μm	±2.0 μm
Spot diameter (Total measurent range) *4	50 μm dia.	70 μm dia.	100 μm dia.
Measurement cycle	20 μs to 400 μs		
Operating ambient illumination	Illumination on object surface max.30000: (incandescent light)		
Ambient temperature range	Operation: 0 to +50°C, Storage: -15 to +60°C (No freezing and condensation)		
Ambient humidity range	Operation/storage: 35 or 85% (No condensation)		
Degree of protection	IP40 (IEC60529)		
Vibration resistance (destructive)	10 to 150 Hz (half amplitude 0.35 mm), 80 mins in each of X/Y/Z directions		
Shock resistance (destructive)	150 m/s^2, 6 direction, 3 times each (up/down, left/right, forward/backward)		
Temperature characteristic *5	0.6 μm/°C	1.1 μm/°C	1.8 μm/°C
LED Safety	Risk Group 3 (IEC62471)		
Material	Chassis: aluminum die cast Fiber cable sheath: PVC Calibration ROM: PC		
Fiber cable length	0.3 m, 2 m (flex-resistant cable)		
Fiber cable minimum bend 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: 1000 VAC, 50/60 Hz, 1 min		
Weight	Fiber cable length 0.3m Approx. 170g Fiber cable length 2m Approx. 180g		
Accessories	Instruction Manual, 2 straps, Calibration ROM fixing screws (M2), Note on Use		

*1. The measurement range is based on 28 μs, or higher, measurement cycle.
*2. Capacity value when OMRON standard mirror surface target is measured at the measurement center distance as the average of 16,384 times
   The value when the controller ZW-7000T is connected
*3. Material setting for the OMRON standard mirror surface target: Error from an ideal straight line when measuring on mirror surface.
*4. Capacity value defined by 1/e^2 (13.5%) of the peak optical intensity of the measurement wavelength.
*5. 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 Sensor Controller are set in the same temperature environment.

●Controller

Item		Specifications
		ZW-7000T
Input/output type		NPN/PNP dual type
Number of connected sensor heads		1
Sensor head compatibility		ZW-S70@@
Light source for measurement		White LED
LED Safety		Risk Group 3 (IEC62471)
Segment Display	Main display	11-segment white 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 indicator	ECAT RUN (green), L/A IN (Link/Activity IN) (green), L/A OUT (Link/Activity OUT) (green), ECAT ERR (red)
External I/F	Ethernet	100BASE-TX/10BASE-T
	EtherCAT	EtherCAT exclusive protocol 100BASE-TX
	RS-232C	Max. 115,200 bps
	Analog output terminal block	Analog voltage output (OUT V)	-10 V to +10 V, output impedance: 100 Ω
		Analog current output (OUT A)	4 mA to 20 mA, max. load resistance: 300 Ω
	32-pole expansion connector	Judgment output (HIGH/PASS/LOW)	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
		Busy output (BUSY)	
		Alarm output (ALARM)	
		Enable output (ENABLE 1)	
		Sync flag output (SYNFLG)	
		Trigger busy output (TRIGBUSY)	
		Logging state output (LOGSTAT)	
		Logging error output (LOGERR)	
		Stability output (STABILITY)	
		Task state output (TASKSTAT)	
		LIGHT OFF input (LIGHT OFF 1)	DC input system Input voltage: 24 VDC ± 10% (21.6 to 26.4 VDC) Input current: 7 mA Type. (24 VDC) ON voltage/ON current: 19 V/3 mA or less ON voltage/ON current: 5 V/1 mA or less
		Zero reset input (ZERO 1)	
		Timing input (TIMING 1)	
		Reset input (RESET 1)	
		Sync input (SYNC)	
		Trigger input (TRIG)	
		Logging input (LOGGING)	
		Bank	Currently 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: 2 V or less Leakage voltage when turning OFF: 0.1 mA or less
			Bank Selection input (BANK_SEL 1 to 3)	DC input system Input voltage: 24 VDC ± 10% (21.6 to 26.4 VDC) Input current: 7 mA Type. (24 VDC) ON voltage/ON current: 19 V/3 mA or more OFF voltage/OFF current: 5 V/1 mA or less
Main functions	Exposure time	Automatic/Fixed
	Measuring cycle	20 µs to 10 ms
	Material setting	Standard/Mirror/Rough surfaces
	MEASUREMENT ITEM	Height/Thickness of transparent object/Calculation
	Filtering	Median/Average/Differentiation/High pass/Low pass/Band pass
	Output	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/Internal logging condition/Peak amount of received light
	Number of configurable banks	Max. 8 banks
	Task process	Multi-task (up to 4 tasks per bank)
	System	Save/Initialization/Display measured information/Communication settings/Sensor head calibration/Key-lock/Zero reset memory/Timing input
Rating	Power supply voltage	21.6 to 26.4 VDC (including ripple)
	Current consumption	800 mA max.
	Insulation resistance	Across all lead wires and FG terminal: 20 MΩ (by 250 V megger)
	Dielectric strength	Between all lead wires and FG terminal: 500 VAC, 50/60 Hz, 1 minute
Environmental resistance	Degree of protection	IP20 (IEC60529)
	Vibration resistance (destructive)	10 to 55 Hz (half amplitude 0.35 mm), 50 mins in each of X/Y/Z directions
	Shock resistance (destructive)	150 m/s^2, 6 direction, 3 times each (up/down, left/right, forward/backward)
	Ambient temperature range	Operation: 0 to +40°C, Storage: -15 to +60°C (No freezing and condensation)
	Ambient humidity range	Operation/storage: 35 to 85% (No condensation)
Grounding		D-type grounding (grounding resistance of 100 Ω or less) Note: For conventional Class D grounding
Material		Chassis: PC
Weight		Approx. 900g (main unit only), Approx. 150 g (Parallel cable)
Accessories		Instruction Manual Member registration sheet Parallel cable (ZW-XCP2E) 10 Fiber cleaners (ZW-XCL)

Note: 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 are other than the above are as in the table below.

●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

●Version Information

ZW-7000 Series and Sysmac Studio
Use the latest version of Sysmac Studio Standard Edition/Measurement Sensor Edition.

ZW Series	Version of ZW Series	Corresponding version of Sysmac Studio Standard Edition/Measurement Sensor Edition
ZW-7000T	Ver.2.01 or later	Supported by version 1.15 or higher.

External Dimensions

(Unit: mm)

Sensor Head
ZW-S7010 @M/-S7020 @M/-S7030 @M

MOUNTING SCREW HOLES
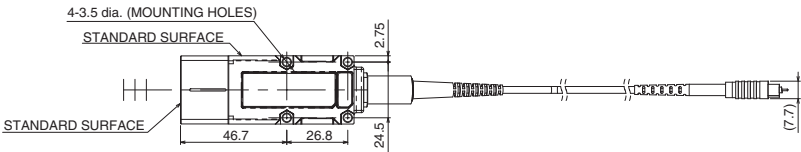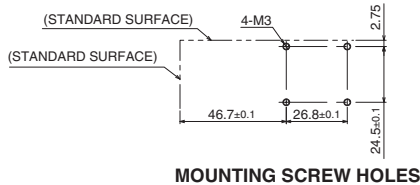
*1. Each dimension is as follows.

Type	W.D.	M
ZW-S7010	10	0.5
ZW-S7020	20	1
ZW-S7030	30	2

*2. Each dimension is as follows.

Length	L
0.3 m	(300)
2 m	(2000)

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Controller

ZW-7000T

SCREW HOLE FOR CONNECTING ROM M2 DEPTH 2.0 MAX.

SCREW FOR CONNECTING FRAME GROUND TERMINAL M4 LENGTH6

SCREW HOLE FOR CONNECTING FRAME GROUND TERMINAL M4 DEPTH 7.0 MAX.

140

124

85

6

34.9

40.8

139.5

SLIDER FOR MOUNTING DIN-RAIL

Four, 4.5 dia.

40

70

15   55

55±0.1

70±0.1

MOUNTING SCREW HOLES
4-M4 DEPTH6.0MAX.

MOUNTING SCREW HOLES

Extension Fiber Cable

ZW-XF7002R/-XF7005R

FIBER CORD (DIA.3.0)

Fiber connector (Sensor head side)

Nameplate

Fiber connector (Controller side)

2-0.7 dia.

4.6

12-0.125 dia.

(12.6)

(25)   (40)

(30)   (40)   (25)

2-0.7 dia.

4.6

12-0.125 dia.

(12.6)

L *

(7.7)

(7.7)
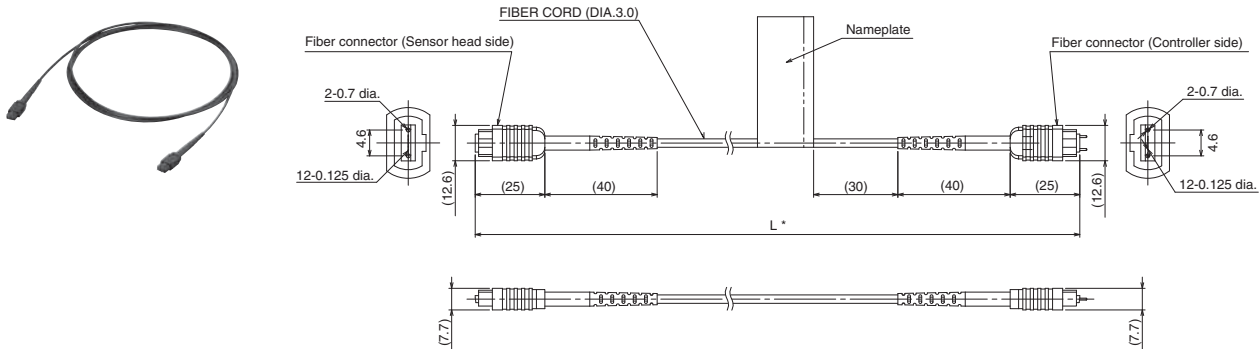
* The following table lists cable lengths per models.

Type	Specification	L
ZW-XF7002R	2 m	2000+40/0
ZW-XF7005R	5 m	5000+100/0

OMRON | **513**

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)

Other
EtherCAT
Slaves

EtherCAT Cable
(RJ45/RJ45)

EtherCAT Cable
(RJ45/RJ45)

EtherCAT Cable
(Select the cable that matches
the Slave's connector.)

EtherCAT Cable
(RJ45/RJ45)

EtherCAT Master

NJ/NX/NY Controllers

Ethernet *
/USB

Setting Software

Sysmac Studio
Standard Edition
SYSMAC-SE20□□
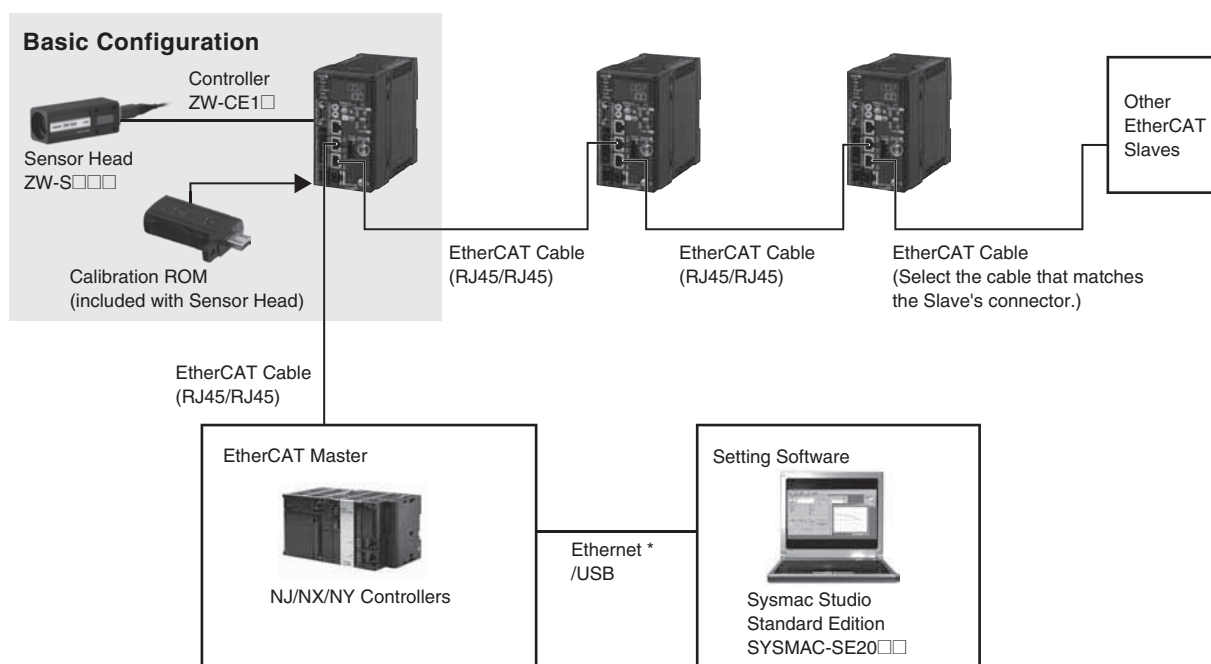
* Prepare commercially available Ethernet cable satisfying the following requirements:
- Category 5e or more, 30 m or less
- RJ45 connector (8-pin modular jack)
- For direct connection: Select cross cable.
- For connection through an industrial switching hub: Select straight cable.

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						
Applicable sensor controller		ZW-C1@@@/-CE1@@						
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/s^2 3 times each in six directions (up/down, left/right, forward/backward)						
Temperature characteristic *4		0.6 μm/ °C	1.5 μm/ °C	2.8 μm/ °C	4.8 μm/ °C	0.6 μm/ °C	1.5 μm/ °C	4.8 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.

Controller

Item			ZW-CE10T	ZW-CE15T
Input/Output type			NPN	PNP
Number of connected Sensor Heads			1 per Controller	
Applicable sensor head			ZW-S@@/-SR@@	
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	

System Configuration

Controllers

Softwares

Programmable Terminals

System Configuration

Specifications

Dimensions

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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

Dimensions

(Unit: mm)

Sensor Head
Straight type
ZW-S07/-S20/-S30/-S40

Mounting hole dimensions

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
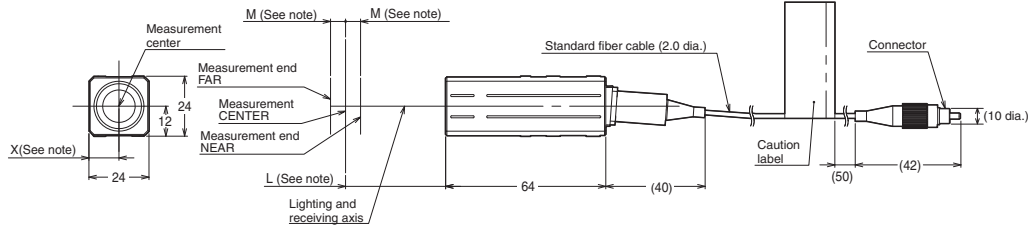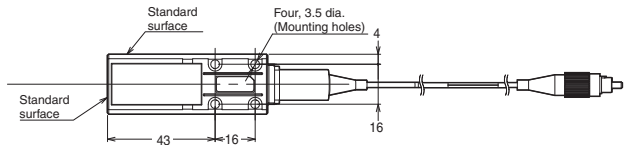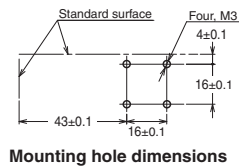
Right-angle type
ZW-SR07/-SR20/-SR40

Mounting hole dimensions

Note:

Model	L	M
ZW-SR07	7	0.3
ZW-SR20	20	1
ZW-SR40	40	6

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

System Configuration
Specifications
Dimensions
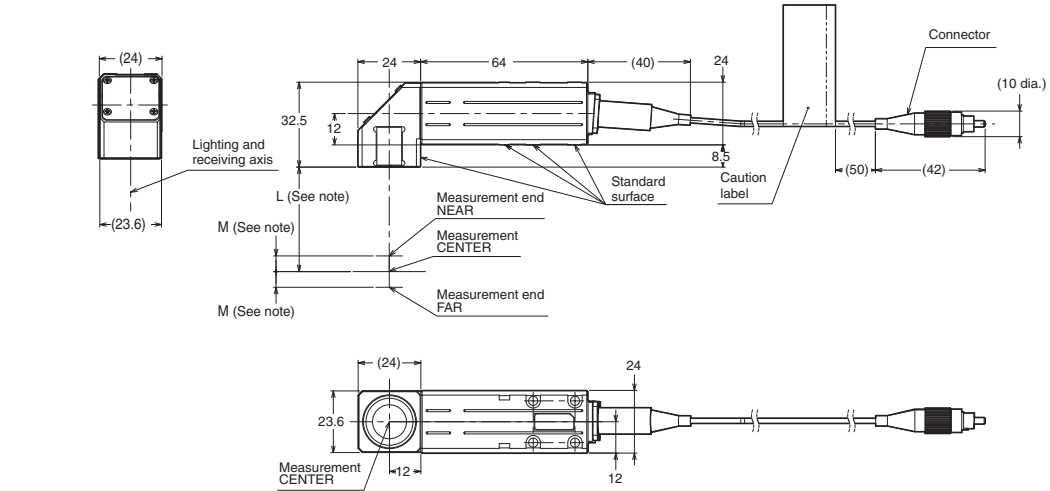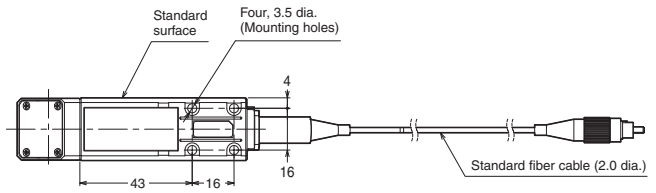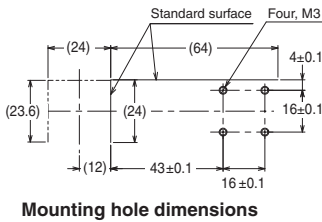
Controller
ZW-CE10T/-CE15T

DIN track attachment hook

Four, 4.5 dia.

70±0.1

43±0.1

Mounting hole dimensions

Installation holes
Four, M4 depth 6.0 MAX
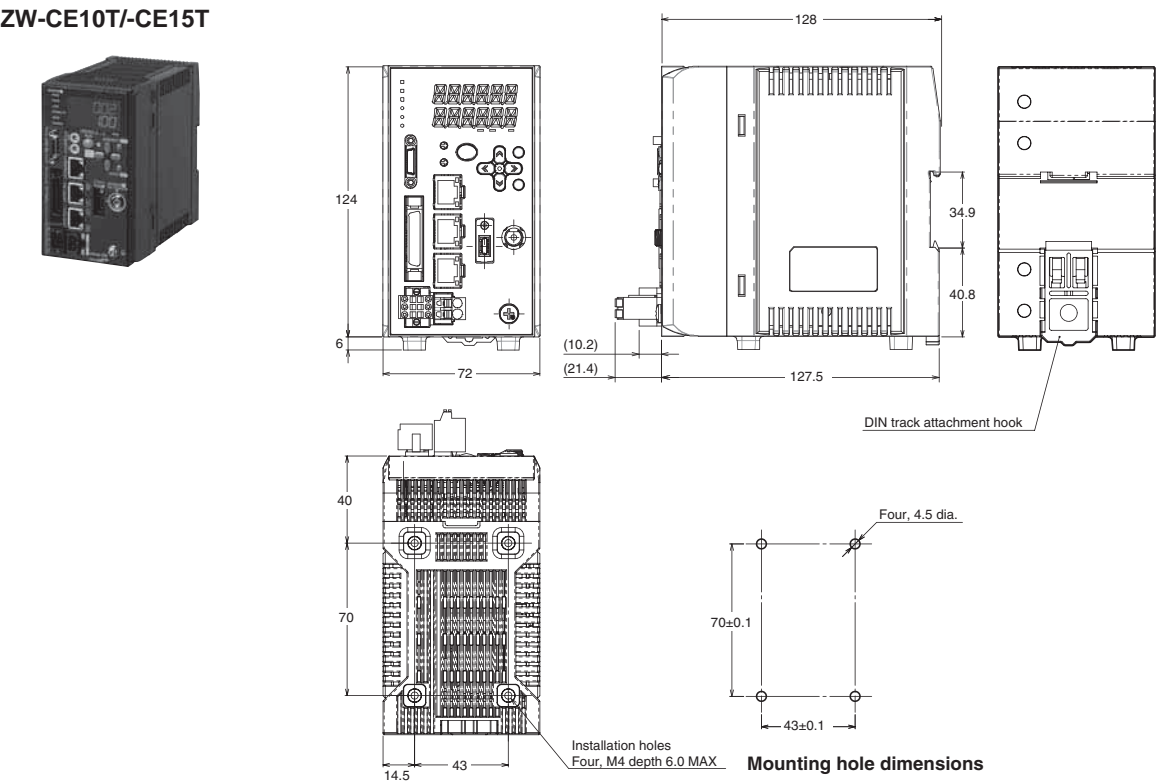
Extension Fiber Cable
ZW-XF02R/-XF05R/-XF10R/-XF20R/-XF30R

FC connector

Fiber Cable (2.0 dia.)

FC connector

(10 dia.)

(42)

(50)

(42)

L (See note)
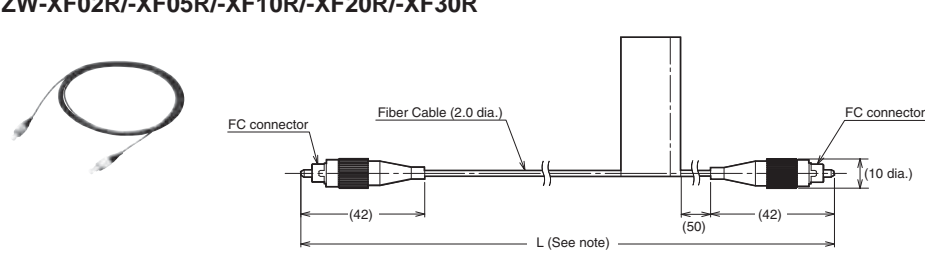
Note: The following table lists cable lengths per models.

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

System Configuration

Controllers

Softwares

Programmable Terminals

EtherCAT Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Fiber Sensor/Laser Photoelectric Sensors/Contact Sensor

E3NX-FA/E3NX-CA/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

EtherCAT

Sensor Communications Unit

E3NW-ECT

P.520

Inter-Unit Network
DS-Bus
*1 PAT.P

Distributed Sensor Unit

E3NW-DS

P.520

You can connect up to eight Distributed Sensor Units to a Sensor Communications Unit.*2

Sensor Amplifier Units	Sensor Heads	
Smart Fiber Amplifier Unit	Fiber Units	For details on the Sensors that you can connect, refer to product information on your OMRON website.
E3NX-FA0 **P.522**	E32 Series	
Color Fiber Amplifier Unit	Fiber Units	
E3NX-CA0 **P.524**	E32 Series	
Smart Laser Amplifier Unit	Compact Smart Laser Sensor Heads	
E3NC-LA0 **P.528**	E3NC-LH Series	
Smart Laser Amplifier Unit (CMOS type)	Ultra-compact CMOS Smart Laser Sensor Heads	
E3NC-SA0 **P.530**	E3NC-SH Series	
Smart Contact Amplifier Unit	Compact Sensor Heads	
E9NC-TA0 **P.532**	E9NC-TH Series	

You can connect up to 30 Amplifier Units to a Sensor Communications Unit.*2

Sensor Amplifier Units	Sensor Heads
Smart Fiber Amplifier Unit	Fiber Units
E3NX-FA0	E32 Series
Color Fiber Amplifier Unit	Fiber Units
E3NX-CA0	E32 Series
Smart Laser Amplifier Unit	Compact Smart Laser Sensor Heads
E3NC-LA0	E3NC-LH Series
Smart Laser Amplifier Unit (CMOS type)	Ultra-compact CMOS Smart Laser Sensor Heads
E3NC-SA0	E3NC-SH Series
Smart Contact Amplifier Unit	Compact Sensor Heads
E9NC-TA0	E9NC-TH Series

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.

E3NW

The Next-generation Sensor Networking Units That Revolutionizes the Workplace from Introduction and Startup though Operation

- 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)
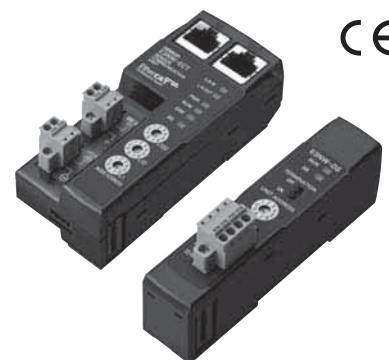
For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

General Spesifications

Type / Item	Sensor Communications Unit	Distributed Sensor Unit
Model	E3NW-ECT	E3NW-DS
Connectable Sensor Amplifier Units	N-Smart Smart Fiber Amplifier Unit: E3NX-FA0 Color Fiber Amplifier Unit: E3NX-CA0*1 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 E3NX-CA0 is supported for firmware version 1.06 or higher (Sensor Communications Units manufactured in June 2016 or later).
 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
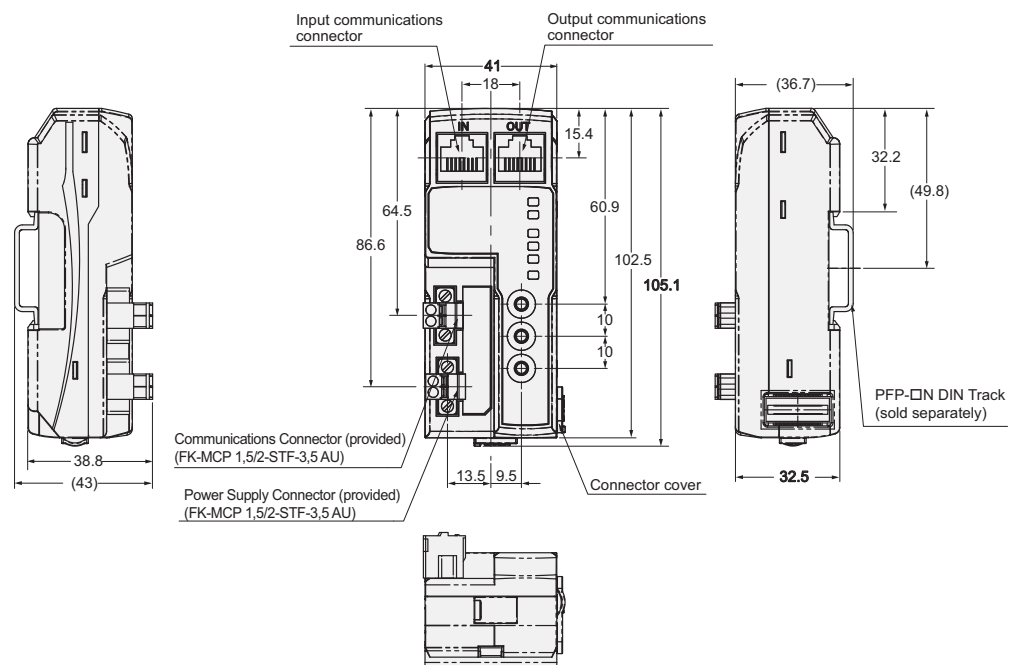
Distributed Sensor Unit
E3NW-DS
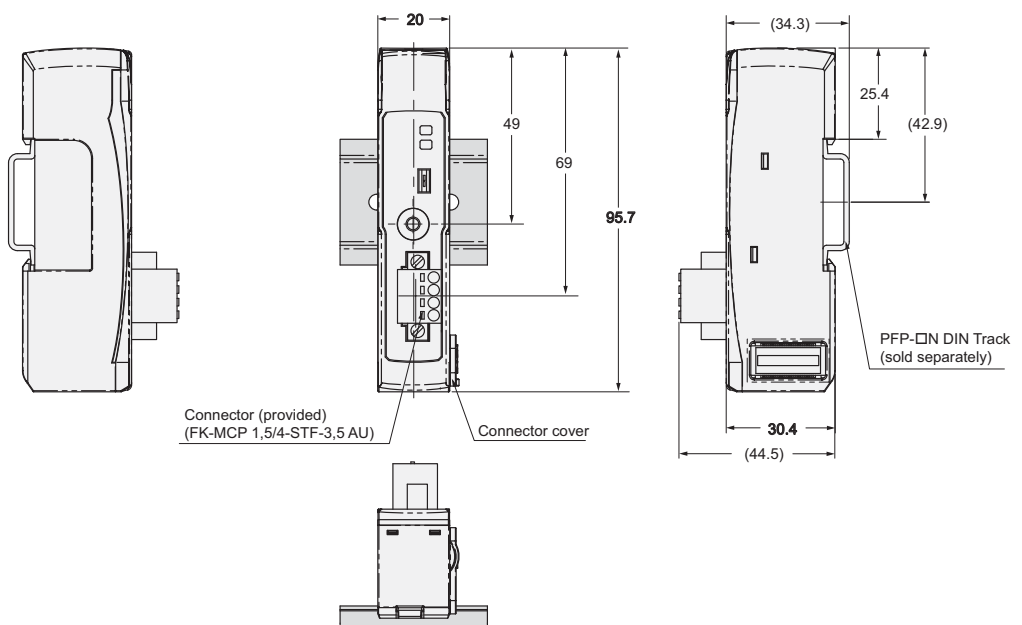
Smart Fiber Amplifier Unit
E3NX-FA0

A Smart Fiber Amplifier Unit with Ultra-stable Detection and Ultra-easy Setup

$C\epsilon$

- 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 allows you to see display values even for fast workpieces.
* 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		At Power Supply Voltage of 24 VDC
		  Normal mode: 920 mW max. (Current consumption: 38 mA max.),
		  Eco ON: 680 mW max. (Current consumption: 28 mA max.)
		  Eco LO: 800 mW max. (Current consumption: 33 mA max.)

Protection circuits		Power supply reverse polarity protection and output short-circuit protection
Response time	Super-high-speed mode (SHS) *1	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) *1	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 *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.
	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.

System Configuration

Controllers

Softwares

Programmable Terminals

General Specifications

Dimensions

EtherCAT Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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) within the surrounding air temperature range shown above
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   The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.
*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 July 2014 or later.
*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
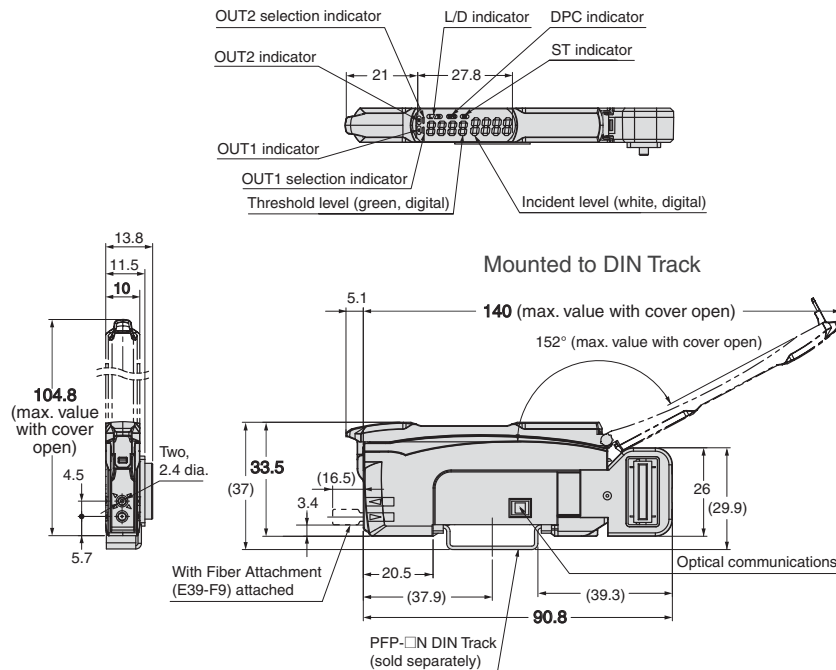
Color Fiber Amplifier Unit
E3NX-CA0

Smart Fiber Amplifier Units with White LEDs.
High Color Discrimination Capability with the Same Easy Operation as Previous Fiber Amplifier Units. Existing General-purpose Fiber Units Can Be Connected.
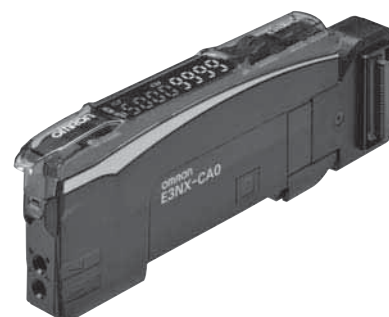
- Detects subtle color differences.
  The new white LED optic system increases the light intensity and the low-noise circuit in the Smart Fiber Amplifier Unit provides a surprising detection capability.
- Handles glossy workpieces.
  Smart Tuning lets you set the optimum sensitivity for detection with one simple operation.
- IoT compatible.
  The detected RGB data can be displayed on the Amplifier Unit, and the Amplifier Unit for communications can transfer this data to the host in realtime.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

For details on the Fiber Units that you can connect, refer to product information on your OMRON website.

General Specifications

Item	Specifications
Model	E3NX-CA0
Connecting method	Connector for Sensor Communications Unit
Light source (wavelength)	White LED (420 to 700 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 function ON: 720 mW max. (Current consumption: 30 mA max.)
	    Eco function LO: 800 mW max. (Current consumption: 33 mA max.)

Protection circuits	Power supply reverse polarity protection
Sensing method	Contrast Mode: Light intensity discrimination for RGB (initial state/after 2-point tuning) (R+G+B light intensity discrimination for 1-point tuning) Color Mode: RGB ratio discrimination

Item		Specifications
Response time	**Super-high-speed mode (SHS) *2**	Operate or reset: 50 μs (only in Contrast Mode)
	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 Units
No. of Units for mutual interference prevention *3	**Super-high-speed mode (SHS) *2**	---
	High-speed mode (HS)	10 Units
	Standard mode (Stnd)	10 Units
	Giga-power mode (GIGA)	10 Units

Item		Specifications
Functions	**Operation mode**	Contrast Mode: NO (Light-ON) or NC (Dark-ON) Color Mode: NO (ON for match: ON for same color as registered color) or 　　　　　　　 NC (ON for mismatch: ON for different color from registered color)
	Timer	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer (Counted by 0.1 s in a range of 0.1 to 0.5 ms, by 0.5 ms for 0.5 to 5 ms, and by 1 ms for 5 to 9999 ms. Default: 10 ms, Error: 0.1 ms)
	Zero reset	Contrast Mode only Negative values can be displayed. (Threshold level is shifted.)
	Resetting settings *4	Select from initial reset (factory defaults), user reset (saved settings), or bank reset.
	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 8.
	Power tuning level	Set from 100 to 9,999. (The RGB maximum incident level at Smart Tuning is adjusted to the power tuning level.)
	Changing the displays	Threshold level and incident level, channel number and incident level, RGB display and incident level, or bank display and incident level
Ambient illumination (Receiver side)		Incandescent lamp: 20,000 lx max., Sunlight: 30,000 lx max.
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) within the surrounding air temperature range shown above
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　Power consumption
　　At Power Supply Voltage of 10 to 30 VDC
　　Normal mode: 1,080 mW max. (Current consumption: 36 mA max. at 30 VDC, 74 mA max. at 10 VDC)
　　Eco function ON: 840 mW max. (Current consumption: 28 mA max. at 30 VDC, 50mA max. at 10 VDC)
　　Eco function LO: 930 mW max. (Current consumption: 31 mA max. at 30 VDC, 55 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 tuning will not change the number of units.
　　The least unit count among the mutual interference prevention units of E3NX and E3NC.
　　Check the mutual interference prevention unit count and response speed of each model.
*4　The bank is not reset by the user reset function or saved by the user save function.

System Configuration

Controllers

Softwares

General Specifications

Programmable Terminals

Dimensions

EtherCAT Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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-CA0

OUT2 selection indicator
NO/NC indicator
OUT2 indicator
ST indicator
21
27.8
5.2
10
6.9
4.2
OUT1 indicator
Incident level (white, digital)
OUT1 selection indicator
Threshold level (green, digital)

Mounted to DIN Track

13.8
11.5
10

104.8
(max. value with cover open)

Two, 2.4 dia. fiber unit holes

4.5

5.7
4.8

5.1
140 (max. value with cover open)
152° (max. value with cover open)
Connector (E3NX-CN30)

(37) 33.5
(5.7)
3.4
(16.5)
26 (29.9)

Fiber Attachment (E39-F9) attached

20.5
(37.9)
(39.3)

PPE-☐N DIN Track (Sold separately.)

90.8

Optical communications

MEMO

System Configuration

Controllers

Softwares

Programmable Terminals

General Specifications

EtherCAT Slave Terminals

Dimensions

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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.

For details on the Sensor Heads that you can connect, refer to product information on your OMRON website.

CE FDA

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 *4	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 *5		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 Eco LO is supported for Amplifier Units manufactured in July 2014 or later.
*5 When the number of connected units is 11 or more, the ambient temperature is less than 50°C.

Dimensions

Amplifier Unit with Connector for Sensor Communications Unit
E3NC-LA0

System Configuration

Controllers

Softwares

General Specifications

Dimensions

Programmable Terminals

EtherCAT Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information
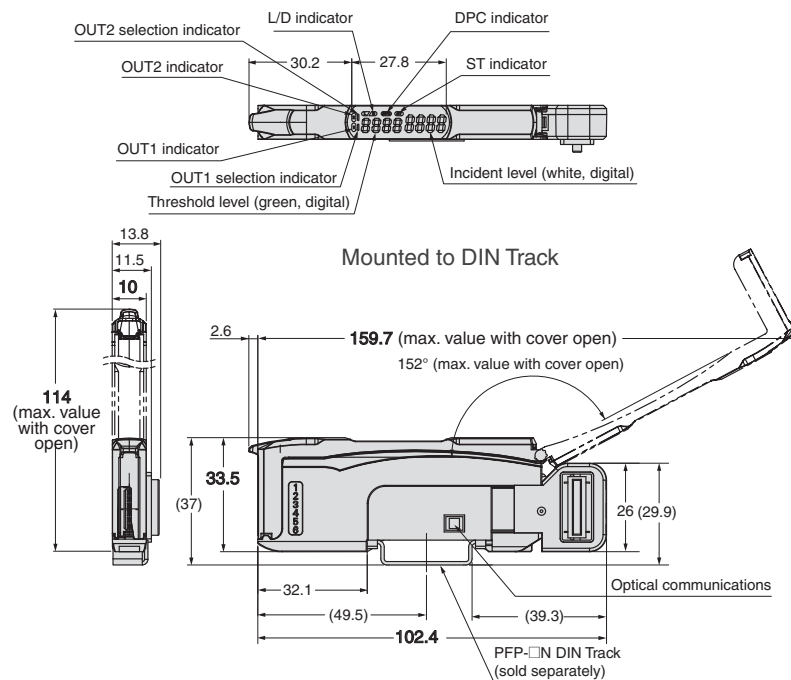
Smart Laser Amplifier Unit (CMOS type)
E3NC-SA0

A Ultra-compact CMOS Laser Sensor for Stable Detection without the Influence of Workpiece Color, Material, or Surface Conditions

- 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.

CE FDA

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-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 *4	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 *5	Select from ON or OFF.
	Background suppression *6	Select from ON or OFF.
	Hysteresis width	Select from standard setting or user setting.

Item		Specifications
Ambient temperature range [7]		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/s² 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 Eco LO is supported for Amplifier Units manufactured in August 2014 or later.
*5 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.
*6 Only the sensing object is detected when tuning.
*7 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
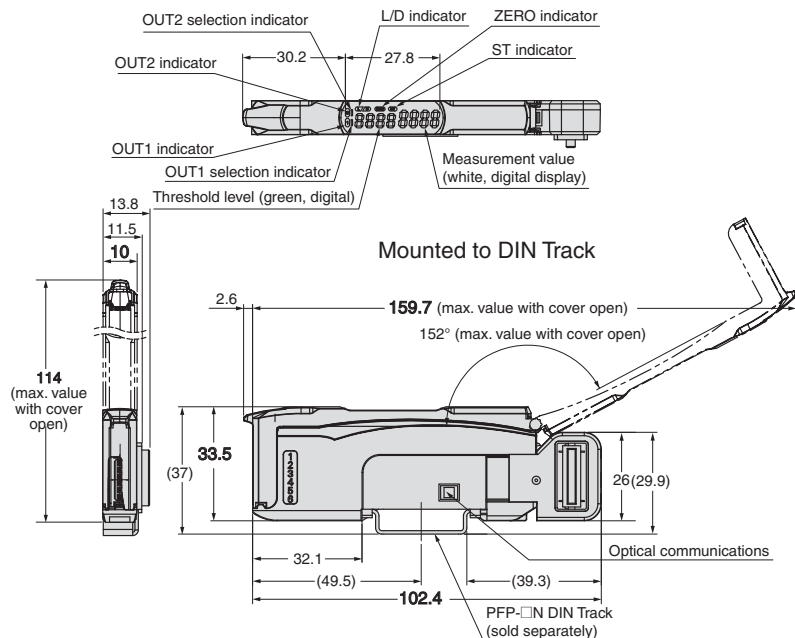
Smart Contact Amplifier Unit
E9NC-TA0

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.

C €

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.
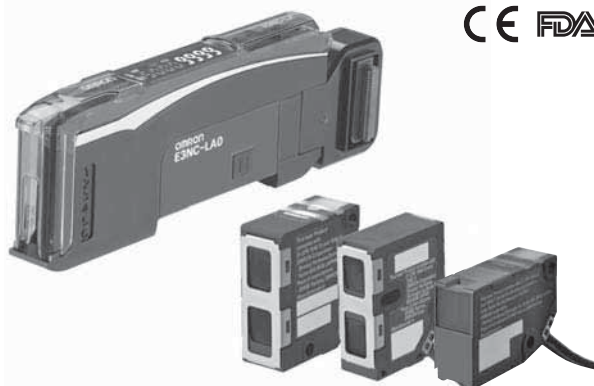*4. When the Sensors are connected to an OMRON NJ/NX-series Controller.

Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Model with Communications
E9NC-TA0

NO/NC indicator
HIGH indicator
GO indicator
PRST indicator
ST indicator
30.2
27.8
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)

32.1
Optical communications
(49.5)
(39.3)
102.4
PFP-□N DIN Track
(sold separately)
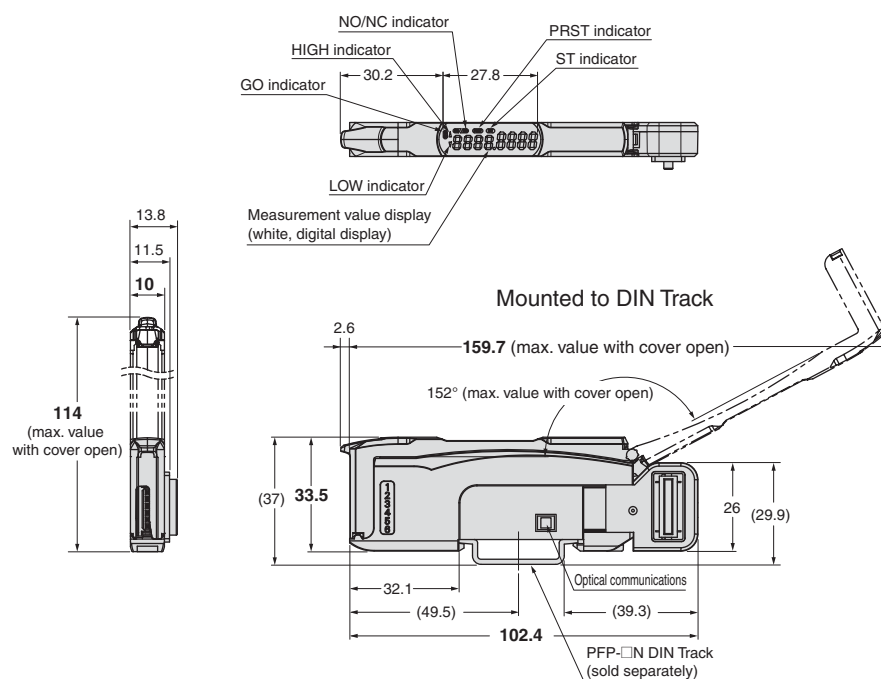
Fiber Sensors/Laser Photoelectric Sensor/Proximity Sensor

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

Controller

EtherCAT

| Sensor Amplifier Units | Sensor Heads |

Sensor Communications Unit

E3X-ECT

P.535

Standard Fiber Amplifier Unit

E3X-HD0

P.538

Two-channel Fiber Amplifier Unit

E3X-MDA0

P.540

Fiber Units

E32 Series

For details on the Sensors that you can connect, refer to product information on your OMRON website.

Laser Photoelectric Sensor Amplifier Unit

E3C-LDA0

P.542

Laser Photoelectric Sensor Heads

E3C-LD Series

For details, visit the OMRON website at www.ia.omron.com.

Proximity Sensor Amplifier Unit

E2C-EDA0

P.544

Proximity Sensor Heads

E2C-ED Series

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
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 * The temperature is limited by the number of connected Sensor Amplifier Units.
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, connector cover, End Plates for DIN track, and Instruction Manual
Weight (packed state/Amplifier only)	Approx. 220g/Approx. 95g

* Temperature Limitations Based on Number of Connected Sensor Amplifier Units:
  - 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

System Configuration
Controllers
Softwares
Programmable Terminals
Connectable sensor amplifier types, features
General Specifications
EtherCAT Communications Specifications
Dimensions
Version Information
EtherCAT Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

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
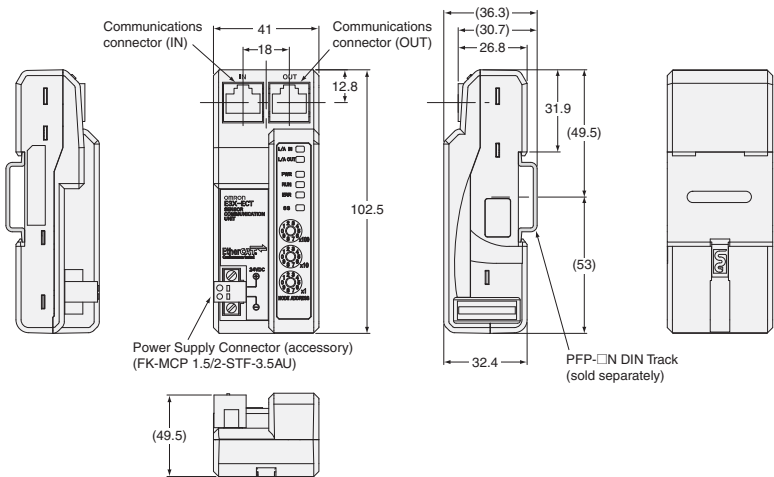
Communications connector (IN)
Communications connector (OUT)
41
18
12.8
(36.3)
(30.7)
26.8
31.9
(49.5)
102.5
(53)
omron
E3X-ECT
SENSOR
COMMUNICATION
UNIT

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.

System Configuration

Controllers

Softwares

Programmable Terminals

EtherCAT Slave Terminals

Safety

Motion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Connectable sensor amplifier types, features

General Specifications

EtherCAT Communications Specifications

Dimensions

Version Information

Standard Fiber Amplifier Unit
E3X-HD0

High Functionality Fiber Amplifier
Long-term Stable Detection
with Your Finger Tip

$C \in$

- 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

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

100° (max. value with cover open)

103.5

104.8
(max. value
with cover open)

5.1
71.8

Two,
2.4 dia.

33.5
3.4

(16.5)

9.9

4.5

5.65

20.5
(37.9)
(39.3)
3.4
90.8

Optical communications
PFP-□N DIN Track
(sold separately)

Fiber Attachment Mounted (E39-F9)

System Configuration
Controllers
Softwares
Programmable Terminals
General Specifications
Dimensions
EtherCAT Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Two-channel Fiber Amplifier Unit
E3X-MDA0

Two-channel fiber amplifier on one unit

- 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.

$C \epsilon$

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
Response time — Standard mode	Operate or reset: 1 ms
Response time — 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 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: 200 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)
Materials — 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

System Configuration

Controllers

Softwares

Programmable Terminals | General Specifications

EtherCAT Slave Terminals | Dimensions

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

OMRON | **541**
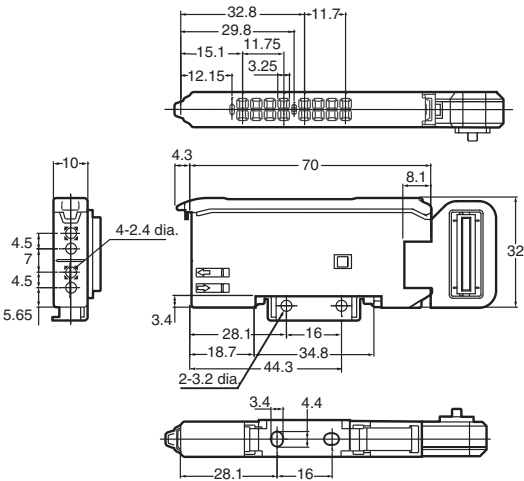
Laser Photoelectric Sensor Amplifier Unit
E3C-LDA0

Three beams are selectable to match the work: spot, line, and area

CE FDA

- 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

Proximity Sensor Amplifier Unit
E2C-EDA0

CE

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.
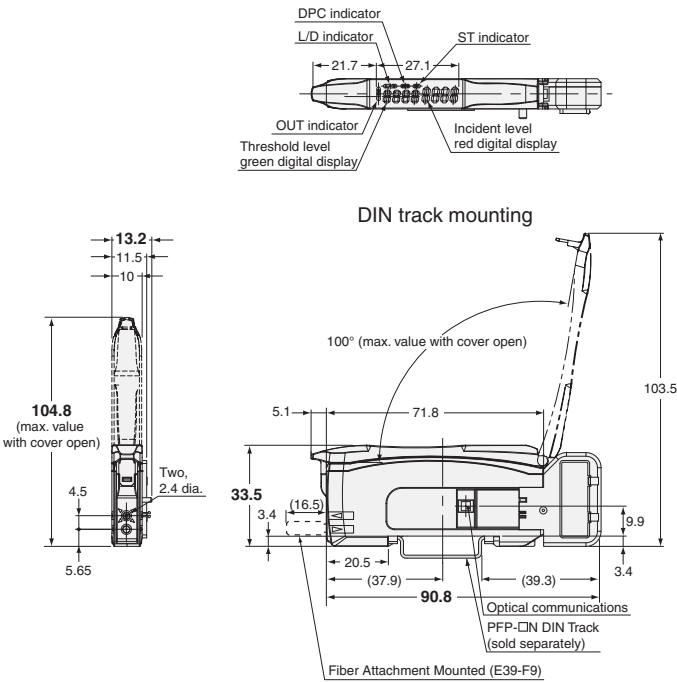
General Specifications

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
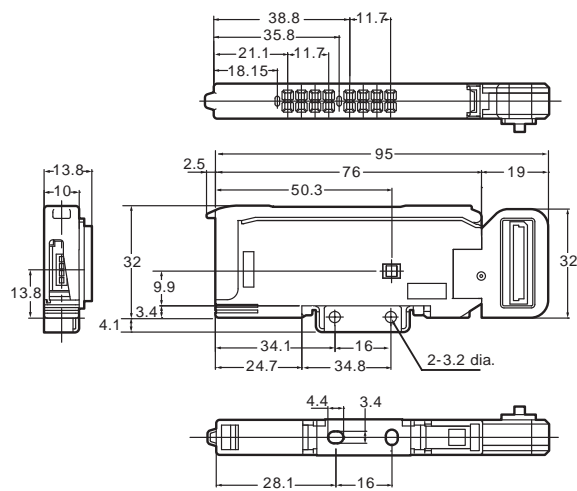
EtherCAT Remote I/O Terminals
GX-Series

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.
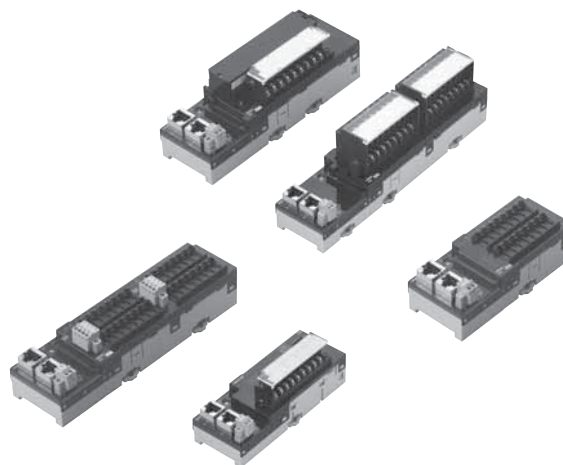
General Specifications

It is common specifications of Digital I/O Terminal, Analog I/O Terminal and Encoder Input Terminal GX-Series. Refer to the pages of specifications for individual I/O terminals for details.
For General Specification of IO-Link Master Unit, refer to page page 578.

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 in X, Y, and Z directions for 80 min each
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-@@@@@@	
Item〈Unit version〉	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

System Configuration

Controllers

Softwares

General Specifications

Programmable Terminals

EtherCAT Communications Specifications

Version Information

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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.
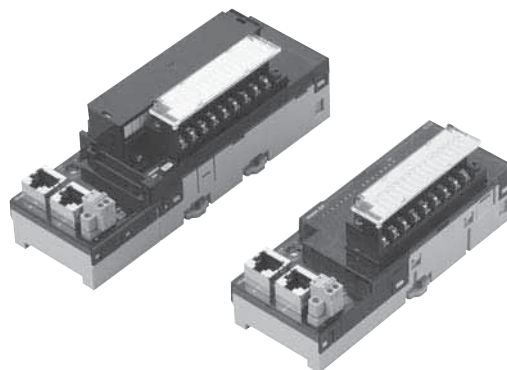
Expansion Units

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 546.

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	8 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.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information
Expansion Units
General Specifications
Components and Functions
Wiring
Dimensions

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	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.
		    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	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 (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	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 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.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Expansion Units

General Specifications

Components and Functions

Wiring

Dimensions

Wiring

GX-ID1611 (NPN)

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.)

GX-ID1621 (PNP)

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.)

GX-OD1611 (NPN)

I/O power supply
(24 VDC)

Solenoid valve, etc.   Solenoid valve, etc.

GX-OD1621 (PNP)

I/O power supply
(24 VDC)

Solenoid valve, etc.   Solenoid valve, etc.

GX-OC1601

Load

AC power supply
(DC power supply
is also allowed)

GX-MD1611 (NPN)

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.)

I/O power supply
(24 VDC)

Solenoid valve, etc.   Solenoid valve, etc.

GX-MD1621 (PNP)

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.)

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 · 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.
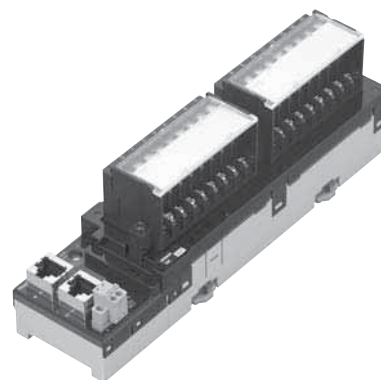
General Specifications

For Common Specifications of I/O terminals, refer to page 546.

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

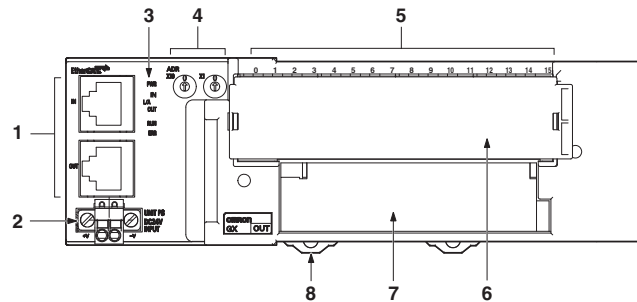| Item	Specification	
	GX-OD1612	GX-OD1622
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
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).
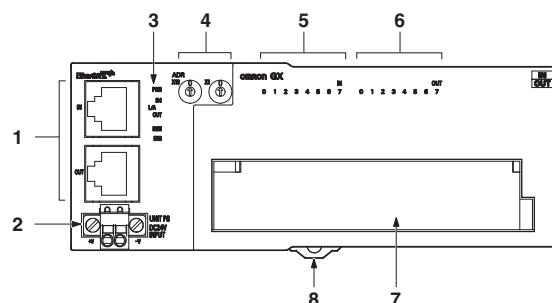
Input and Output Section Specifications

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).

System Configuration
Controllers
Softwares
General Specifications
Components and Functions
Wiring
Dimensions
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

Components and Functions

16 Inputs Terminal   **GX-ID1612/ID1622**
16 Outputs Terminal   **GX-OD1612/OD1622**

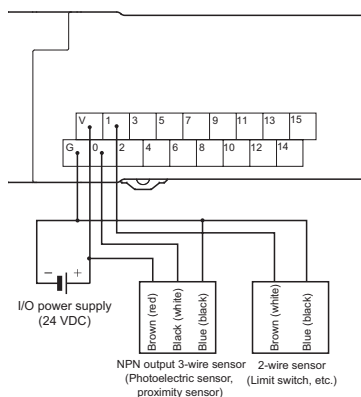| No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the 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)

I/O power supply (24 VDC)

2-wire sensor (Limit switch, etc.)
Brown (white) / Blue (black)

NPN output 3-wire sensor (Photoelectric sensor, proximity sensor)
Blue (black) / Brown (red) / Black (white)

GX-ID1622 (PNP)

I/O power supply (24 VDC)

2-wire sensor (Limit switch, etc.)
Brown (white) / Blue (black)

PNP output 3-wire sensor (Photoelectric sensor, proximity sensor)
Blue (black) / Brown (red) / Black (white)

GX-OD1612 (NPN)

I/O power supply (24 VDC)

Solenoid valve, etc.

NPN input 3-wire external device (Alley light of photoelectric sensor)
Blue (black) / Brown (red) / Pink (white)

GX-OD1622 (PNP)

I/O power supply (24 VDC)

Solenoid valve, etc.

PNP input 3-wire external device (Alley light of photoelectric sensor)
Blue (black) / Brown (red) / Pink (white)

GX-MD1612 (NPN)

I/O power supply (24 VDC)

2-wire sensor (Limit switch, etc.)
Brown (white) / Blue (black)

NPN output 3-wire sensor (Photoelectric sensor, proximity sensor)
Blue (black) / Brown (red) / Black (white)

I/O power supply (24 VDC)

Solenoid valve, etc.

NPN input 3-wire external device (Alley light of photoelectric sensor)
Blue (black) / Brown (red) / Pink (white)

GX-MD1622 (PNP)

I/O power supply (24 VDC)

2-wire sensor (Limit switch, etc.)
Brown (white) / Blue (black)

PNP output 3-wire sensor (Photoelectric sensor, proximity sensor)
Blue (black) / Brown (red) / Black (white)

I/O power supply (24 VDC)

Solenoid valve, etc.

PNP input 3-wire external device (Alley light of photoelectric sensor)
Blue (black) / Brown (red) / Pink (white)
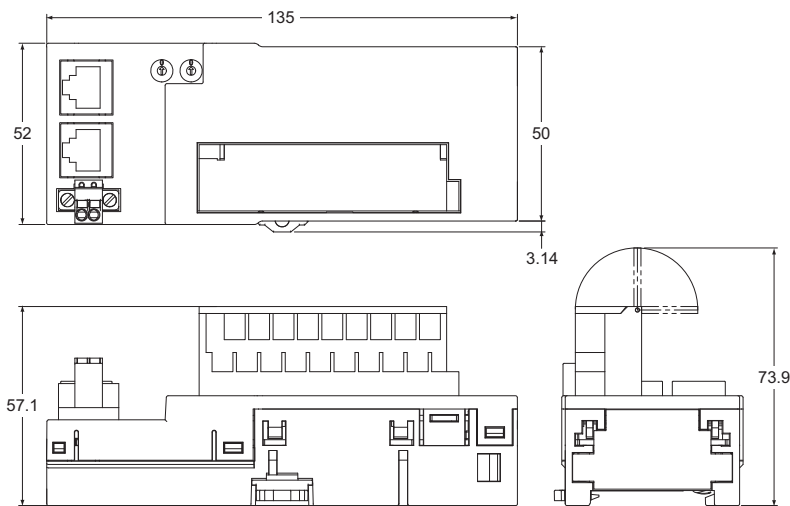
Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.
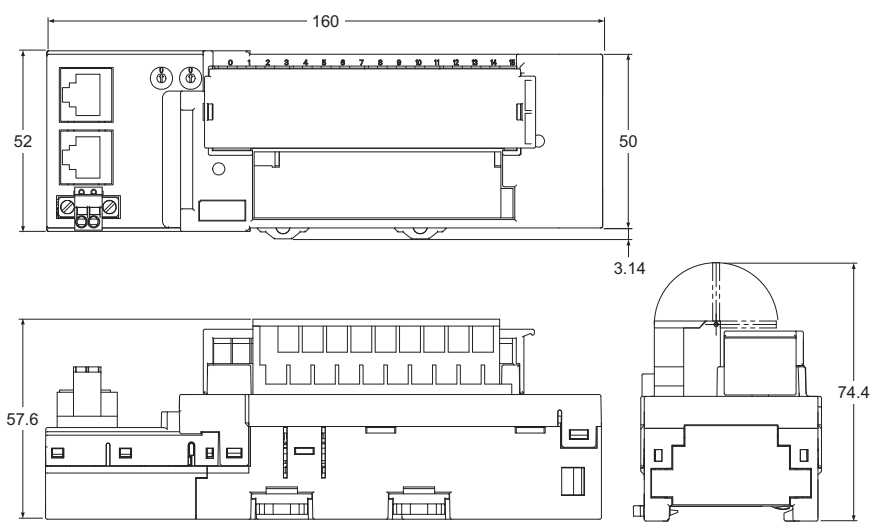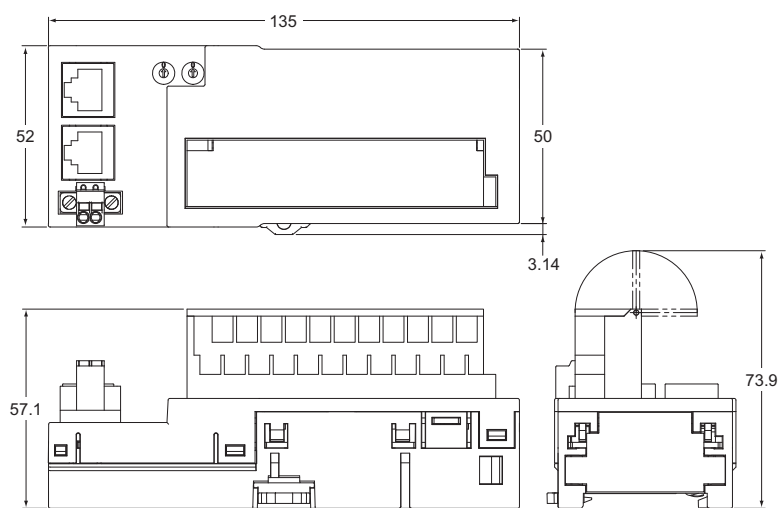
Dimensions

(Unit: mm)

GX-ID1612/ID1622
GX-OD1612/OD1622
GX-MD1612/MD1622

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

General Specifications
Components and Functions
Wiring
Dimensions

OMRON | **557**

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.
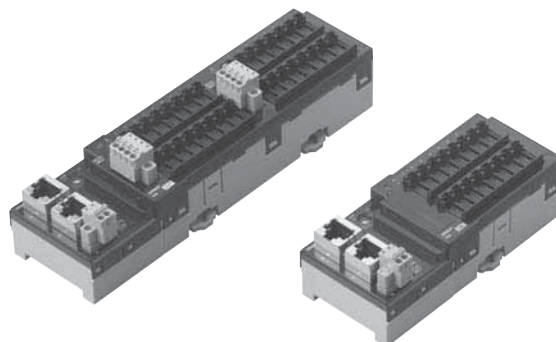
General Specifications

For Common Specifications of I/O terminals, refer to page 546.

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	

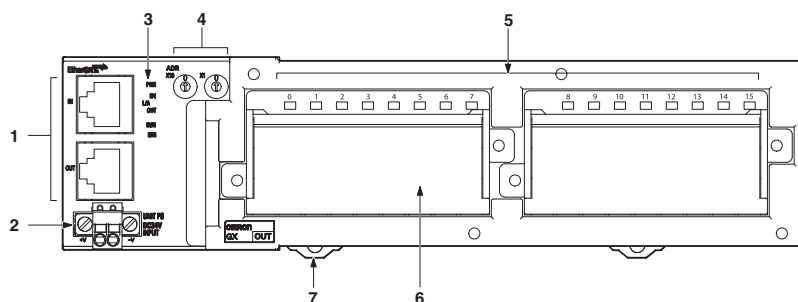**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

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.)	

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 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

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

No.	Name	Function
1	Communications con-nector	(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 Con-nector	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 con-nector	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

No.	Name	Function
1	Communications con-nector	(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 Con-nector	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 con-nector	Supplies the I/O power. (For output device)
9	DIN track mounting hook	Fixes a slave to a DIN track.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

General Specifications

Components and Functions

Wiring

Dimensions

32 Inputs Terminal GX-ID3218/ID3228

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

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

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)

2-wire sensor
(Limit switch, etc.)

NPN output 3-wire sensor
(Photoelectric sensor, proximity sensor)

GX-ID1628 (PNP)

2-wire sensor
(Limit switch, etc.)

PNP output 3-wire sensor
(Photoelectric sensor, proximity sensor)

GX-OD1618 (NPN)

I/O power supply
(24 VDC)

Solenoid valve, etc.

NPN input 3-wire external device
(Alley light of photoelectric sensor)

GX-OD1628 (PNP)

I/O power supply
(24 VDC)

Solenoid valve, etc.

PNP input 3-wire external device
(Alley light of photoelectric sensor)

GX-ID3218 (NPN)

2-wire sensor
(Limit switch, etc.)

NPN output 3-wire sensor
(Photoelectric sensor, proximity sensor)

GX-ID3228 (PNP)

2-wire sensor
(Limit switch, etc.)

PNP output 3-wire sensor
(Photoelectric sensor, proximity sensor)

GX-OD3218 (NPN)

I/O power supply
(24 VDC)

Solenoid valve, etc.

NPN input 3-wire external device
(Alley light of photoelectric sensor)

GX-OD3228 (PNP)

I/O power supply
(24 VDC)

Solenoid valve, etc.

PNP input 3-wire external device
(Alley light of photoelectric sensor)

GX-MD1618 (NPN)

GX-MD1628 (PNP)

GX-MD3218 (NPN)
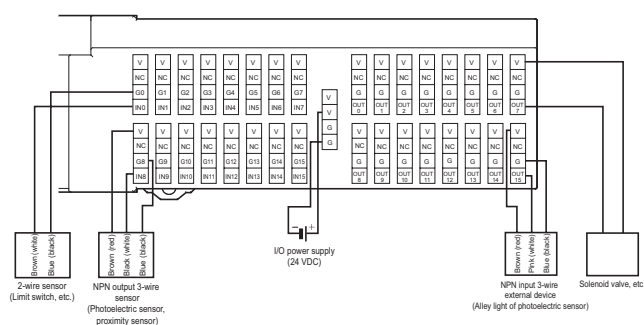
GX-MD3228 (PNP)
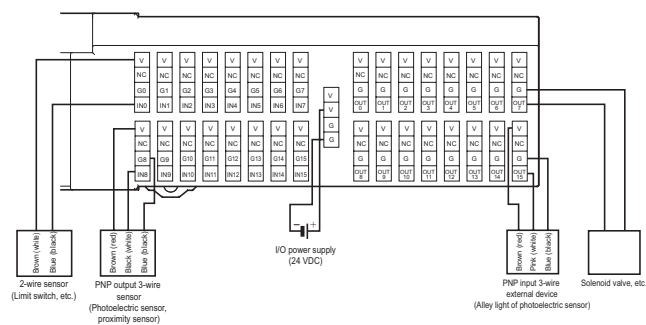
Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors.
The colors in parentheses are the wire colors prior to the revisions.

Dimensions

(Unit: mm)

GX-ID1618/ID1628

115

52   50

3.14

43.85   39.4
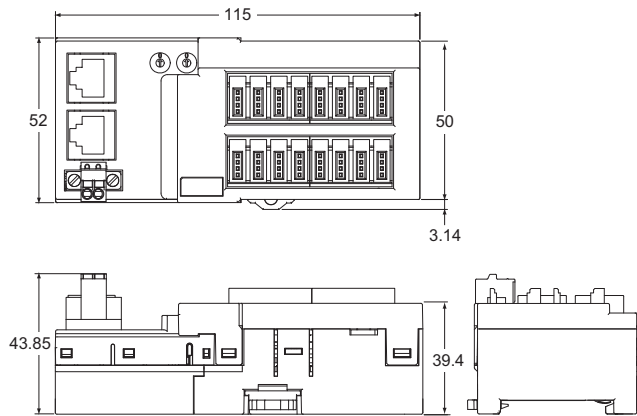
GX-OD1618/OD1628
GX-MD1618/MD1628
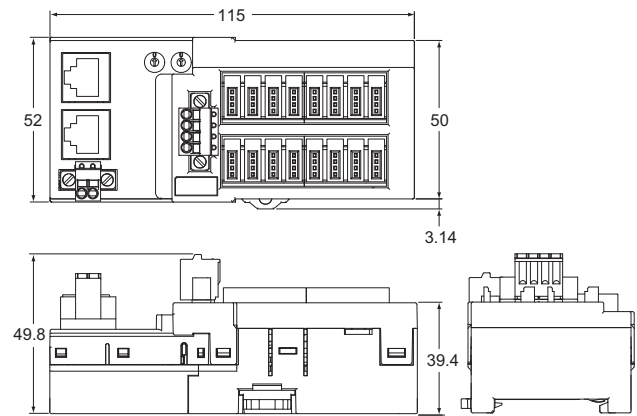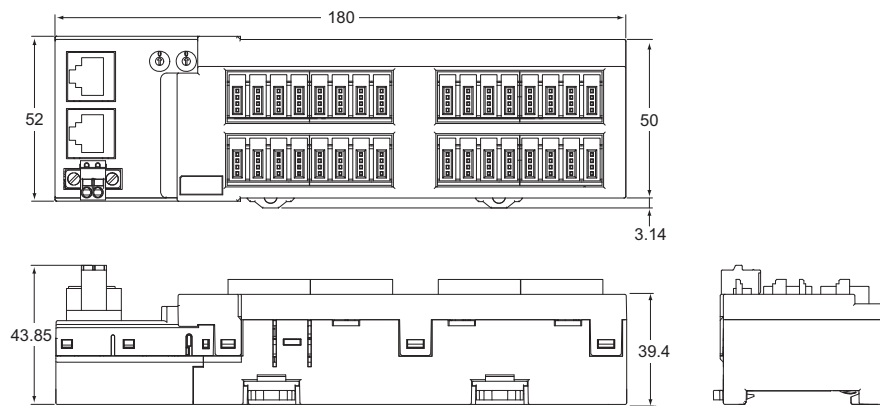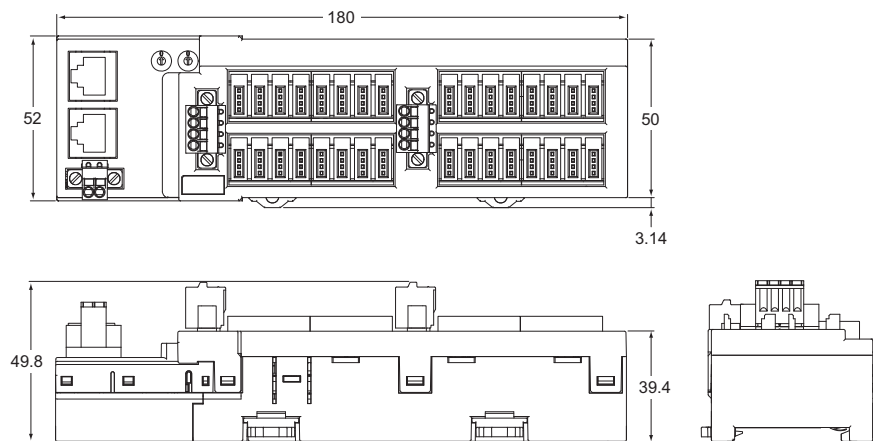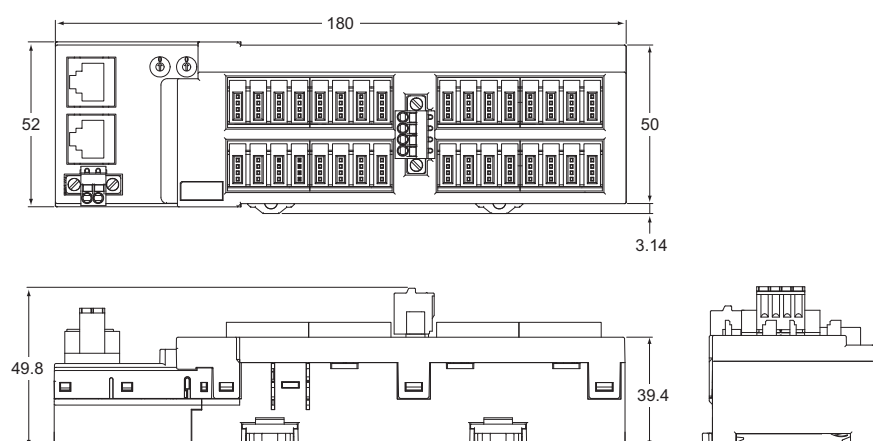
115

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

System Configuration
Controllers
Softwares
Programmable Terminals
General Specifications
Components and Functions
Slave Terminals
Wiring
Dimensions
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

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.
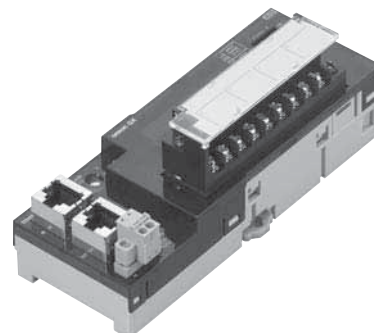
General Specifications

For Common Specifications of I/O terminals, refer to page 546.

Input Section Specifications
4-point Input Terminals

Item		Specification	
		Voltage input	Current input
Input capacity		4 points (possible to set number of en-abled 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 en-abled 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 communica-tions: Possible to set outputs CH1 and CH2 sep-arately.	
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

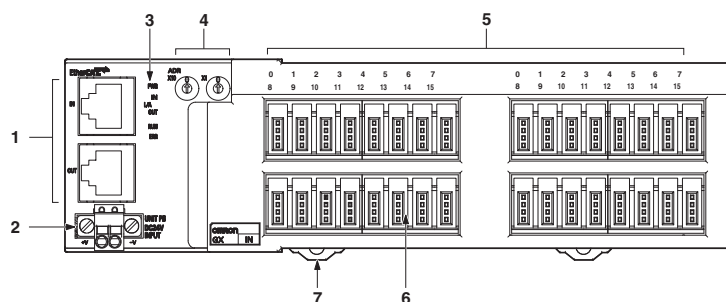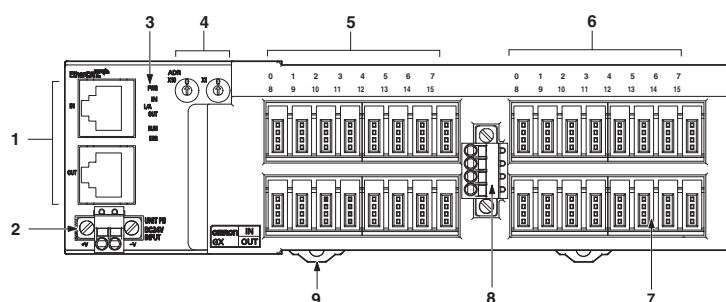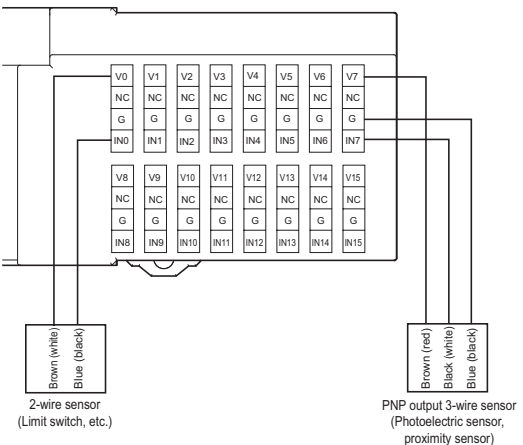| No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the 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

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

Voltage input

0 V

0 V
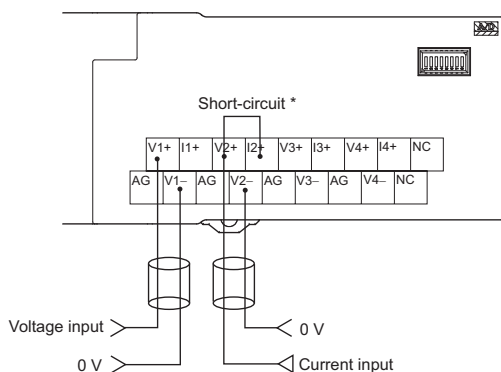
Current input

* 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
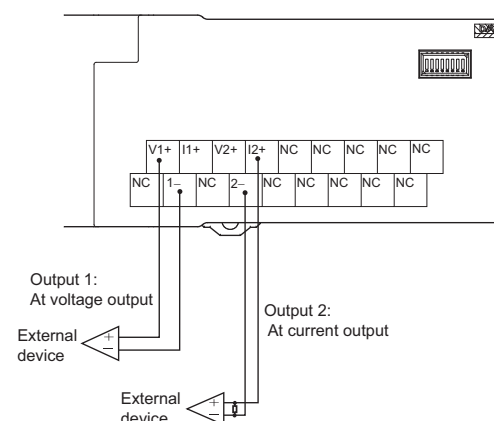
Output 1:
At voltage output

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

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

General Specifications

Components and Functions

Wiring

Dimensions
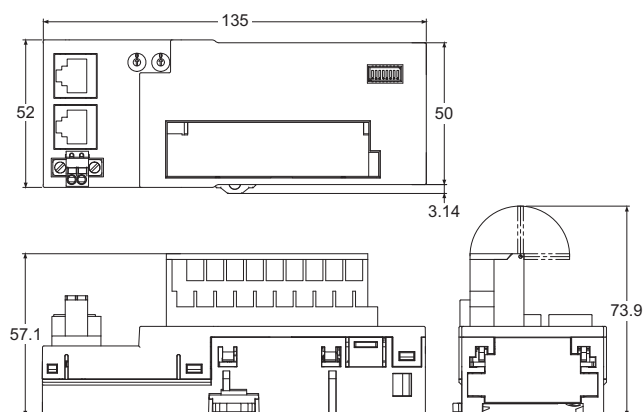
Encoder Input Terminal 3-tier Terminal Block Type
GX-EC0211/EC0241

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.
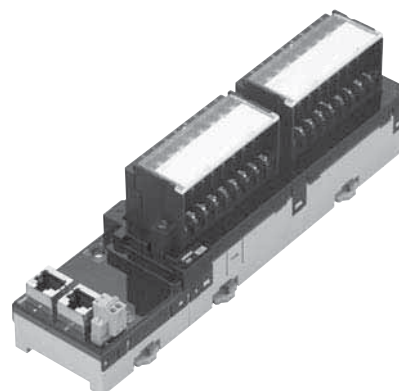
General Specifications

For Common Specifications of I/O terminals, refer to page 546.

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
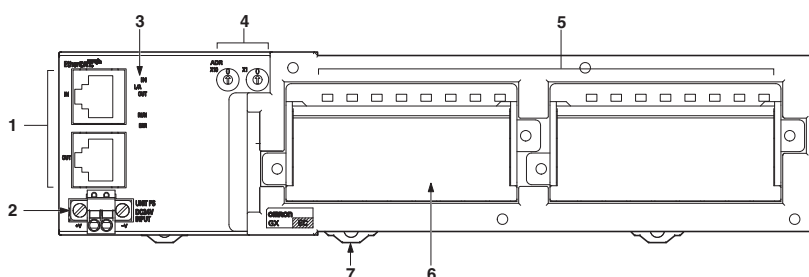
No.	Name	Function
1	Communications Connectors	(CN IN)　　Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status Indicators	It indicates the 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
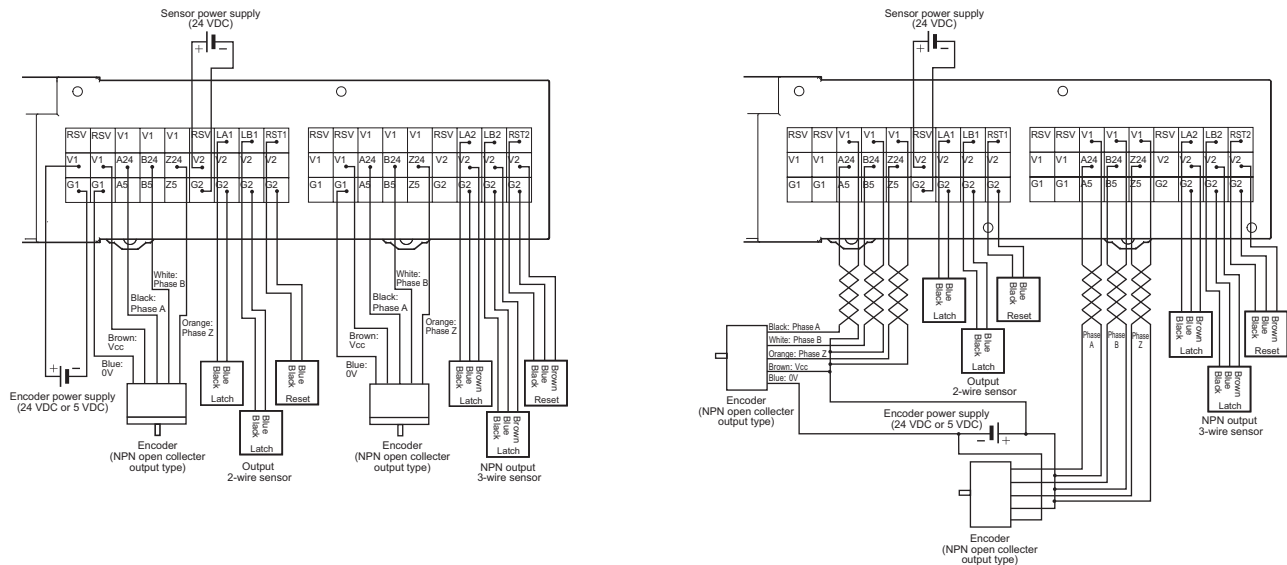
Line driver inputs Type GX-EC0241
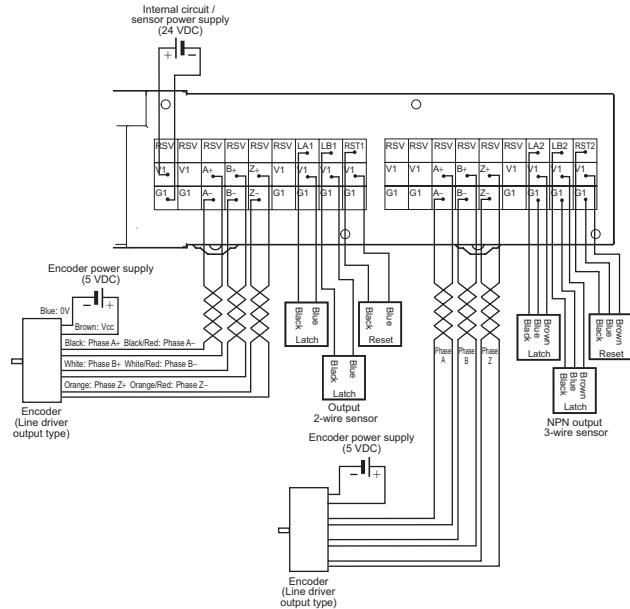
Note: Wire to V1, G1, V2, and G2 as shown in the wiring diagram.

Dimensions

(Unit: mm)

GX-EC0211/EC0241

System Configuration

Controllers

Softwares

Programmable Terminals

General Specifications

Components and Functions

Slave Terminals

Wiring

Dimensions

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information
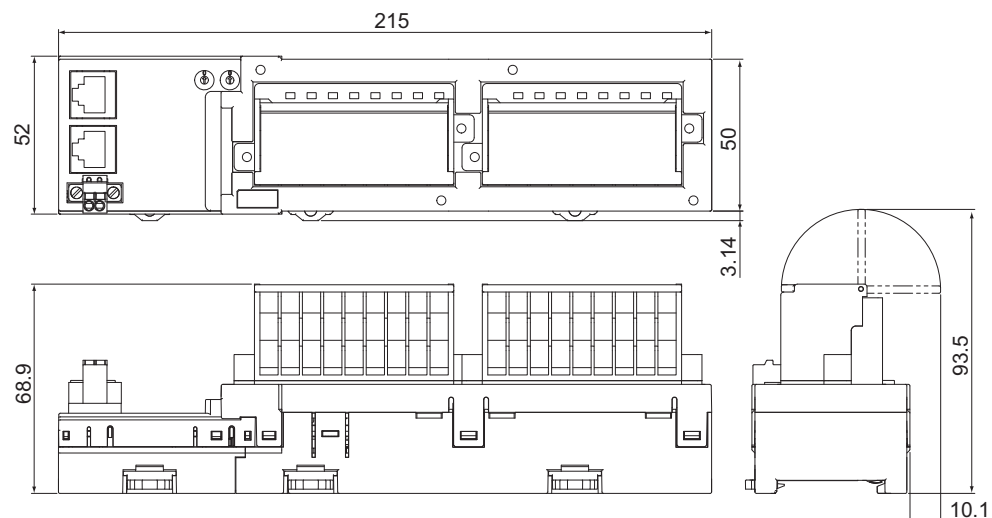
Expansion Unit
XWT-@D08(-1)/@D16(-16)

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).
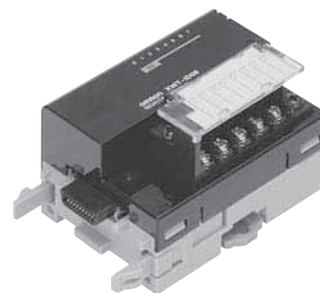
General Specifications

For Common Specifications of I/O terminals, refer to page 546.

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

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

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

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

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.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

General Specifications

Components and Functions

Wiring

Dimensions

Wiring

XWT-ID08 (NPN)

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)

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)

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)

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)

I/O power supply
(24 VDC)

Solenoid valve, etc.   Solenoid valve, etc.

XWT-OD08-1 (PNP)

I/O power supply
(24 VDC)

Solenoid valve, etc.   Solenoid valve, etc.

XWT-OD16 (NPN)

I/O power supply
(24 VDC)

Solenoid valve, etc.   Solenoid valve, etc.

XWT-OD016-1 (PNP)

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
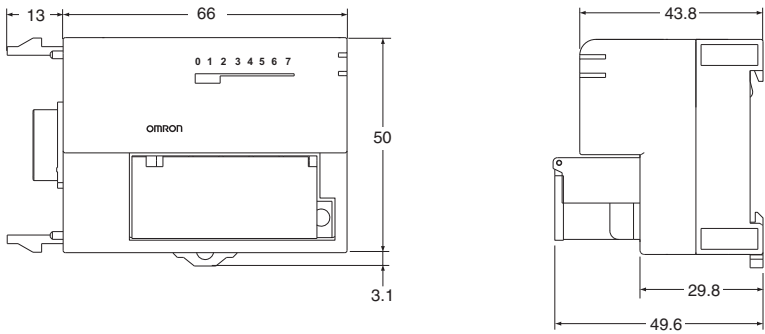
XWT-ID16/ID16-1
XWT-OD16/OD16-1
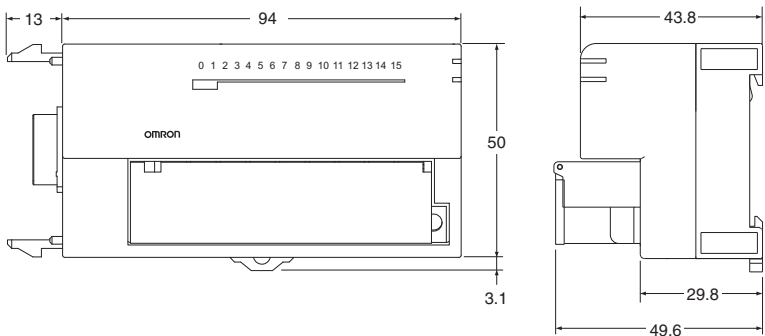
System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

General Specifications

Components and Functions

Wiring

Dimensions

IO-Link Master Unit
GX-ILM08C

IO-Link makes sensor level information visible and solves the three major issues at manufacturing sites!
The unit for M12 Smartclick connector can be used in watery, and dusty environments.

- Downtime can be reduced.
  Notifies you of faulty parts and such phenomena
  in the Sensor in real time.
- The frequency of sudden failure can be decreased.
  Condition monitoring of sensors and equipment to prevent troubles.
- The efficiency of changeover can be improved.
  The batch check for individual sensor IDs significantly decreases commissioning time.

Features

- The host controller can cyclically read control signals, status*1, wiring, and power supply status of IO-Link sensors. Because an IO-Link System can cyclically read analog data such as the amount of incident light in addition to ON/OFF information, it can be used for predictive maintenance based on detection of such things as decreases in the amount of light.
- User-specified data in IO-Link devices can be read and written from the host controller when necessary.
- Digital signals can be input rapidly from IO-Link sensors*2 during IO-Link communications.
- IO-Link sensors can be combined with non-IO-Link sensors.
- Incorrect connections of IO-Link sensors can be checked when IO-Link communications start.
- Backup and restoration of IO-Link device parameters*3 make replacement of IO-Link sensors easier.
- Sensors can report their errors to the master, which facilitates locating errors from the host.
- The total number of retries in cyclic communications can be recorded. You can use this value to check for the influences of noise and other problems.
  (When EtherCAT is used as the host communication interface) *3
- Up to eight sensors can be connected. IP67 protection.
*1. Examples for Photoelectric Sensors: Instability detection and sensor errors
*2. IO-Link sensors that support digital inputs that use pin 2 of IO-Link Master Unit ports
*3. When the Omron IO-Link master unit is used

System Configuration

Support Software:
• IO-Link Master Unit settings: Use the Sysmac Studio.*1
• IO-Link device settings: Use CX-ConfiguratorFDT.*2

NJ/NX-series CPU Unit or
NY-series Industrial PC
with an EtherCAT Master

Connection to the
peripheral USB port or
built-in EtherNet/IP port on
an NJ/NX-series CPU Unit

RJ45

ESI files
IODD files

Built-in EtherCAT port

EtherCAT

Support Software:
• IO-Link Master Unit settings:
Use the Sysmac Studio for
the NX-type IO-Link Master
Unit.
Connection is not possible to
a GX-type IO-Link Master
Unit.

• IO-Link device settings:
Use the CX-ConfiguratorFDT
for the NX-type IO-Link
Master Unit.
Connection is not possible to
a GX-type IO-Link Master
Unit.

RJ45

NX-type IO-Link
Master Unit

M12

GX-type IO-Link
Master Unit

IO-Link

Connect the computer to the
peripheral USB port on the
EtherCAT Coupler Unit.

IO-Link

ESI files
IODD files

EtherCAT Coupler Unit

IO-Link communications
(4 wires per device)

IO-Link devices
(from OMRON or another
company)*3

IO-Link devices
(from OMRON or another
company)*3

*1. When a host controller from another company is used with EtherCAT host communications, use the EtherCAT software application from the other company for a GX-type IO-Link Master Unit.
   Note. For an NX-type IO-Link Master Unit, connect the Sysmac Studio to the EtherCAT Coupler Unit, as shown above.
*2. When a host controller from another company is used with EtherCAT host communications, for a GX-type IO-Link Master Unit, make the IO-Link device settings with message communications from the host controller from the other company.
   Note. For an NX-type IO-Link Master Unit, connect CX-ConfiguratorFDT to the EtherCAT Coupler Unit, as shown above.
*3. You can also connect a combination of general-purpose sensors and other devices.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

System Configuration

Slave Terminals

General Specifications

Function Specifications

Safety

EtherCAT Communications Specifications

Motion/Drives

Version Information

Inverters

Component Names and Functions

Robotics

Wiring

Dimensions

Sensors

Remote I/O Terminals

Ordering Information

General Specification

Item	Specification
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC −15%/+10%)
I/O power supply	20.4 to 26.4 VDC (24 VDC −15%/+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 150 Hz and 50 m/s^2 for 80 minutes each in X, Y, and Z directions
Shock resistance	150 m/s^2 with amplitude of 0.7 mm
Dielectric strength	600 VAC (between isolated circuits)
Insulation resistance	20 MΩ min. (between isolated circuits)
Ambient operating temperature	−10 to 55°C
Ambient operating humidity	25% to 85% (with no condensation)
Ambient operating atmosphere	No corrosive gases
Altitude	2,000 m max.
Storage temperature	−25 to 65°C
Storage humidity	25% to 85% (with no condensation)
Degree of protection	IP67
Mounting	M5 screw mounting
Mounting strength	100 N
Communications connector strength	30 N
Connector types	Connectors for EtherCAT communications: M12 (D-coding, female) × 2 Power supply connector: M12 (A-coding, male) × 1 I/O connectors: M12 (A-coding, female)*1 × 8
Screw tightening torque *2	Round connectors (communications connector, power supply, and I/O): 0.39 to 0.49 N·m M5 (Unit mounted from the front):1.47 to 1.96 N·m Cover for node address setting switches: 0.4 to 0.6 N·m
Applicable standards *3	EU: EN 61131-2, RCM, KC, IO-Link conformance, and EtherCAT conformance

*1 Confirms to Class A when used as an IO-Link connector.
*2 For SmartClick Connectors, insert the Connector all the way and turn it approx. 1/8 of a turn. Torque management is not required.
*3 Refer to the OMRON website (www.ia.omron.com) or ask your OMRON representative for the most recent applicable standards for each model.

Function Specification

Item		Specification
Unit name		IO-Link Master Unit
Model		GX-ILM08C
Number of IO-Link ports		8
Communications specifications	Communications protocol	IO-Link protocol
	Baud rate	COM1: 4.8 kbps COM2: 38.4 kbps COM3: 230.4 kbps
	Topology	1:1
	Compliant standards	• IO-Link Interface and System Specification Version1.1.2 • IO-Link Test Specification Version1.1.2
Device power supply* in IO-Link Mode or SIO (DI) Mode	Rated voltage	24 VDC (20.4 to 26.4 VDC)
	Maximum load current	0.2 A/port
	Short-circuit protection	Yes
Digital inputs (in SIO (DI) Mode)	Internal I/O common	PNP
	Rated voltage	24 VDC (20.4 to 26.4 VDC)
	Input current	5 mA typical (at 24 VDC)
	ON voltage/ON current	15 VDC min., 5 mA min.
	OFF voltage	5 VDC 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, or 256 ms
Digital outputs (in SIO (DIO) Mode)	Internal I/O common	PNP
	Output type	Push-pull
	Rated voltage	24 VDC (20.4 to 26.4 VDC)
	Maximum load current	0.3 A/port
	Short-circuit protection	Provided.
	Leakage current	0.1 mA max.
	Residual voltage	1.5 V max.
Digital inputs for pin 2 (in IO-Link Mode)	Internal I/O common	PNP
	Rated voltage	24 VDC (20.4 to 26.4 VDC)
	Input current	2 mA (24 VDC)
	ON voltage/ON current	15 VDC min., 2 mA min.
	OFF voltage	5 VDC 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, or 256 ms
Cable specifications	Cable type	Unshielded
	Cable length	20 m max.
	Electrostatic capacity between lines	3 nF max.
	Loop resistance	6 Ω max.
Dimensions		175 × 33 × 60 mm (W×H×D) (The height is 49.1 mm when the connectors are included.)
Isolation method		Photocoupler isolation
I/O power supply method		Supplied from the power supply connector.
Unit power supply current consumption		60 mA
I/O power supply current consumption		100 mA
Weight		430 g
Circuit layout		
Installation orientation and restrictions		Installation orientation: 6 possible orientations Restrictions: No restrictions
Protective functions		Load short-circuit protection

Right margin tabs: System Configuration, Controllers, Softwares, Programmable Terminals, Slave Terminals, Motion/Drives, Inverters, Robotics, Sensors, Remote I/O Terminals, Ordering Information | Features, System Configuration, General Specifications, Function Specifications, EtherCAT Communications Specifications, Version Information, Component Names and Functions, Wiring, Dimensions

Function		Description
Communications	Cyclic communications	I/O data (process data) in the IO-Link devices is cyclically shared with the IO-Link Master Unit as the IO-Link communications master. At the same time, this data and the status of the IO-Link Master Unit is cyclically shared with the host communications master, with the IO-Link Master Unit operating as a slave of the controller. Cyclic communications can be used to check the amount of detection performance deterioration in devices, and to check changes in usage conditions, such as the amount of incident light for photoelectric sensors, stability detection margins, and excessive proximity for proximity sensors.
	Message communications	The controller can send messages (commands) to the IO-Link Master Unit and receive the response from the IO-Link Master Unit. The IO-Link Master Unit can also function as a gateway to send messages (commands and responses) between the controller and the IO-Link devices. During operation, you can change and adjust device parameters, such as threshold settings, tuning execution, and ON-delay time changes, from a program. Or, during operation, you can check the internal status, such as the operating times of devices.
Communications mode settings		You can select any of the following modes for each port: IO-Link Mode, SIO (DI) Mode, SIO (DO) Mode, or Disable Port This allows you to combine IO-Link communications and digital I/O in a single terminal or unit.
Digital inputs for pin 2		In IO-Link Mode, you can perform digital input with pin 2 while performing IO-Link communications.
Automatic baud rate setting for IO-Link communications		The IO-Link Master Unit automatically matches the specific baud rates (COM1, COM2, or COM3) of the IO-Link devices to communicate with the IO-Link devices. Therefore, it is not necessary to set the baud rate of the connected device for each port.
Connected device verification		This function is used to verify the configuration of IO-Link devices that are connected to the IO-Link Master Unit against the registered IO-Link device configuration settings when the power supply is turned ON. The user can enable or disable connected device verification.
IO-Link communications error detection		This function detects IO-Link cable breaks, disconnections from IO-Link device ports, error-level device events, device configuration verification errors, and IO-Link device malfunctions.
Detection of short-circuits in I/O cables		This function detects short-circuits in I/O cables
Notification of input data validity		The controller can use the Input Data Enabled Flags to determine whether input data * is valid.
Load rejection for controller communications error		This function turns OFF outputs from the IO-Link Master Unit when an error occurs in communications with the controller in IO-Link Mode or in an SIO mode. This prevents output operations with incorrect values from host communications.
Reading IO-Link total communications retries		The IO-Link total communications retries can be read from the CX-ConfiguratorFDT. You can use this function to determine communications status as affected by I/O communications noise or other factors.
Digital input filter		You can set a filter processing time interval for digital inputs in SIO (DI) Mode or for digital inputs for pin 2 in IO-Link Mode. This lets you eliminate data corruption that can result from noise or switch chattering. This function can also be used to implement an ON delay and an OFF delay.
Backup and restoration of parameter settings in IO-Link devices		This function is used to back up parameter settings in IO-Link devices in the IO-Link Master Unit or restore them to IO-Link devices. This eliminates the need to set parameters again after replacing an IO-Link device.
Event log		The event log records events (including errors) that occur in the IO-Link Master Unit and the IO-Link devices. This enables partial troubleshooting for NJ/NX-series Controllers and NY-series Industrial PCs.

* The input data includes IO-Link input data in IO-Link communications, the digital input data that is input with pin 2, and digital input data in SIO (DI) Mode.

EtherCAT Communications Specifications

Item	Specification
Communications protocol	EtherCAT protocol
Modulation	Baseband
Baud rate	100 Mbps
Physical layer	100BASE-TX (IEEE 802.3)
Connectors	M12 (D-coding, female) × 2 (shielded) 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 (Slave Units): 100 m max.
Noise resistance	Conforms to IEC 61000-4-4, 1 kV or higher.
Node address setting method	Set on hexadecimal node address switches or with a Configuration Tool.
Node address range	000 to FFF hex (0 to 4,095 decimal): Set on node address switches or with a Configuration Tool.
Indicators	UNIT PWR × 1 IO 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	2 to 270 bytes
Mailbox	Emergency messages, SDO requests, SDO responses, and SDO information
Synchronization mode	Free Run Mode (asynchronous)

Version Information

GX Unit		Corresponding versions *		
		EtherCAT		
Model	**Unit version**	**CPU Units**	**Sysmac Studio**	**CX-Configurator FDT**
GX-ILM08C	Ver.1.0	Ver.1.12 or later	Ver.1.16 or higher	Ver.2.2 or higher

* 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.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

Features

System Configuration

General Specifications

Function Specifications

EtherCAT Communications Specifications

Version Information

Component Names and Functions

Wiring

Dimensions

Component Names and Functions

GX-ILM08C
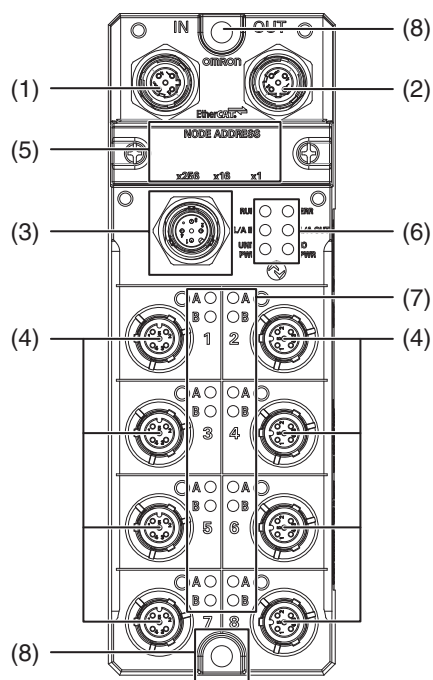
No.	Name	Function
(1)	EtherCAT communications connector, IN	EtherCAT cable connection: IN side M12 connector (D-coding, female)
(2)	EtherCAT communications connector, OUT	EtherCAT cable connection: OUT side M12 connector (D-coding, female)
(3)	Power supply connector	Connects to Unit power supply and I/O power supply cable. M12 connector (A-coding, male)
(4)	I/O connectors	Connect to IO-Link sensor cables (IO-Link connector type: Class A) M12 connectors (A-coding, female)
(5)	Node address setting switches	Used to set the EtherCAT node address.
(6)	Status indicators	Indicate the current status of the EtherCAT Slave Unit. (RUN, ERR, L/A IN, L/A OUT, UNIT PWR, and I/O PWR)
(7)	I/O indicators	Indicate the I/O status. (C/E and C/Q)
(8)	Mounting holes	Used to mount the Unit with M5 screws.

Wiring

IO-Link Mode
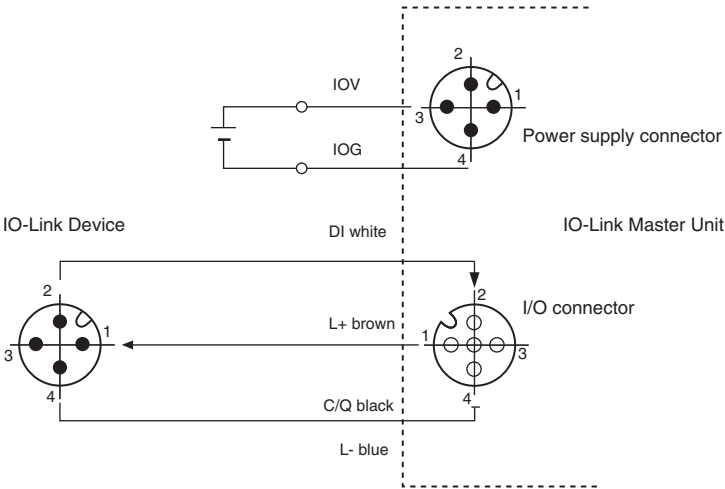
Note: Even if you connect to IO-Link devices without digital inputs for pin 2, connect pin 2 as shown in the above figure. This is because connectors on the IO-Link devices and the cable with connectors on both ends connect pin 2. However, because no data enters pin 2 of the IO-Link Master Unit, digital IO-Link input data is always OFF.

SIO (DI) Mode

Wiring Three-wire Sensors

The DI terminal cannot be used.

Wiring Two-wire Sensors

The DI terminal cannot be used.

System Configuration

Controllers

Softwares

Programmable Terminals

Features

System Configuration

Slave Terminals

General Specifications

Safety

Function Specifications

EtherCAT Communications Specifications

Mortion/Drives

Version Information

Inverters

Component Names and Functions

Robotics

Wiring

Sensors

Dimensions

Remote I/O Terminals

Ordering Information

SIO (DO) Mode
Wiring Output Devices

IOV

IOG

Power supply connector

IO-Link Master Unit

I/O connector

C/Q black

L- blue

L

The DI terminal cannot be used.

Dimensions

(Unit: mm)

GX-ILM08C

Mounting dimensions

Two, M5
or 5.3-dia. holes

44.9
22
15.1
18.3
57.5
86
111
136
161
175
13.5
46.5
60

49.1
40.7
24.8
32.8
35.15

165±0.2

Ordering Information

Ordering Information

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, L: Lloyd, CE: EU Directives, RCM: Regulatory Compliance Mark, C-Tick: C-Tick Registration, and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

● EU Directives
  The EU 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 EU Directives
  The NJ/NX/NY-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.
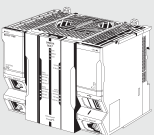
Ordering Information
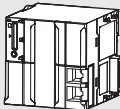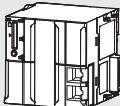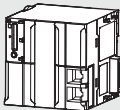
Basic Configuration Units
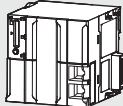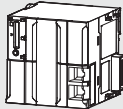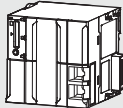
CPU Rack

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, N,CE, RCM,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	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	1.90	---	NJ501-1500	UC1, N, L, CE, RCM, KC
				32			NJ501-1400	
				16			NJ501-1300	
NJ301 CPU Units		5 MB	0.5 MB: Retained during power interruption 2 MB: Not retained during power interruption	8			NJ301-1200	
				4			NJ301-1100	
NJ101 CPU Units		3 MB		2			NJ101-1000	
				0			NJ101-9000	

Product name	Specifications							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		
NJ-series Database Connection CPU Units	2,560 points / 40 Units (3 Expansion Racks)	20 MB	2 MB: Retained during power interruption 4 MB: Not retained during power interruption	64	Yes	No	---	1.90	---	NJ501-1520	UC1, N, L, CE, RCM, KC
				32						NJ501-1420	
				16						NJ501-1320	
		3 MB	0.5 MB: Retained during power interruption 2 MB: Not retained during power interruption	2						NJ101-1020	
				0						NJ101-9020	
NJ-series SECS/GEM CPU Unit		20 MB	2 MB: Retained during power interruption 4 MB: Not retained during power interruption	16	No	Yes				NJ501-1340	
NJ-series NJ Robotics CPU Units				64	No	No	8 max.*			NJ501-4500	
				32						NJ501-4400	
				16		No	No			NJ501-4300	
							1			NJ501-4310	
					Yes		8 max.*			NJ501-4320	

* 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-@@20 or NJ101-@@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, N, 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
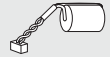
Note: Mounting the I/O Interface Unit in any other location may cause faulty operation.

■ I/O Connecting Cables
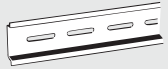
Product name	Specifications		Model	Standards
I/O Connecting Cable	• Connects an I/O Control Unit on NJ-Series CPU Rack to an I/O Interface Unit on a NJ-Series Expansion Rack. or • Connects an I/O Interface Unit on NJ-Series Expansion Rack to an I/O Interface Unit on another NJ-Series Expansion Rack.	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	

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals

NJ/NX/NY Series
Sysmac Studio
FA Communications Software
NA Series
NX Series
G5 Series
1S Series
MX2-V1 Series
RX-V1 Series
Industrial Robots
FH Series
FQ-M Series
ZW-7000 Series ZW Series
E3NX/E3NC E3X/E3C/E2C
GX Series
Related Manuals
Ordering Information

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.

Cable with Connectors

Item			Recommended manufacturer	Cable length (m)	Model
Products for EtherCAT	Wire Gauge and Number of Pairs: AWG26, 4-pair Cable Cable Sheath material: LSZH *2	Cable with Connectors on Both Ends (RJ45/RJ45) Standard RJ45 plug type *1 Cable color: Yellow *3	OMRON	0.3	XS6W-6LSZH8SS30CM-Y
				0.5	XS6W-6LSZH8SS50CM-Y
				1	XS6W-6LSZH8SS100CM-Y
				2	XS6W-6LSZH8SS200CM-Y
				3	XS6W-6LSZH8SS300CM-Y
				5	XS6W-6LSZH8SS500CM-Y
	Wire Gauge and Number of Pairs: AWG22, 2-pair Cable	Cable with Connectors on Both Ends (RJ45/RJ45) Rugged RJ45 plug type *1 Cable color: Light blue	OMRON	0.3	XS5W-T421-AMD-K
				0.5	XS5W-T421-BMD-K
				1	XS5W-T421-CMD-K
				2	XS5W-T421-DMD-K
				5	XS5W-T421-GMD-K
				10	XS5W-T421-JMD-K
		Cable with Connectors on Both Ends (M12 Straight/M12 Straight) Shield Strengthening Connector cable *4 M12/Smartclick Connectors Cable color: Black	OMRON	0.5	XS5W-T421-BM2-SS
				1	XS5W-T421-CM2-SS
				2	XS5W-T421-DM2-SS
				3	XS5W-T421-EM2-SS
				5	XS5W-T421-GM2-SS
				10	XS5W-T421-JM2-SS
		Cable with Connectors on Both Ends (M12 Straight/RJ45) Shield Strengthening Connector cable *4 M12/Smartclick Connectors Rugged RJ45 plug type Cable color: Black	OMRON	0.5	XS5W-T421-BMC-SS
				1	XS5W-T421-CMC-SS
				2	XS5W-T421-DMC-SS
				3	XS5W-T421-EMC-SS
				5	XS5W-T421-GMC-SS
				10	XS5W-T421-JMC-SS

*1. Standard type cables length 0.2, 0.3, 0.5, 1, 1.5, 2, 3, 5, 7.5, 10, 15 and 20 m are available.
   Rugged type cables length 0.3, 0.5, 1, 2, 3, 5, 10 and 15 m are available.
   For details, refer to Cat.No.G019.
*2. The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use. Although the LSZH cable is single shielded, its communications and noise characteristics meet the standards.
*3. Cables colors are available in blue, yellow, or Green.
*4. For details, contact your OMRON representative.

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 Cable, 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
			JMACS Japan 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 594), 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	
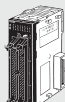
*1 The ON/OFF response time for the CJ1W-OD213/CJ1W-OD234 is shorter than for the CJ1W-OD211/CJ1WOD233, as shown below.
 ・ ON response time: 0.1 ms improved to 0.015 ms
 ・ OFF response time: 0.8 ms improved to 0.08 ms
*2 Connectors are not provided with these connector models. Either purchase one of 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.

System Configuration
NJ/NX/NY Series
Controllers
Sysmac Studio
Softwares
FA Communications Software
NA Series
Programmable Terminals
NX Series
G5 Series
Slave Terminals
1S Series
MX2-V1 Series
Safety
RX-V1 Series
Motion/Drives
Industrial Robots
FH Series
Inverters
FQ-M Series
Robotics
ZW-7000 Series ZW Series
E3NX/E3NC E3X/E3C/E2C
Sensors
GX Series
Remote I/O Terminals
Related Manuals
Ordering Information

■ 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	
			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	UC1, N, CE
			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

Connection to 32 pts unit
(Without branch)

XW2Z-□□□B
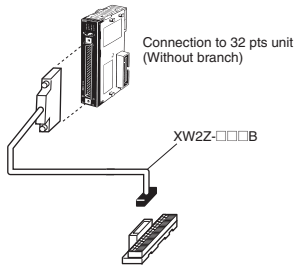
64-point Input Unit or Output Unit
CJ1W-ID261 64-point

Connection to 64 pts unit
(Without branch)

XW2Z-□□□B
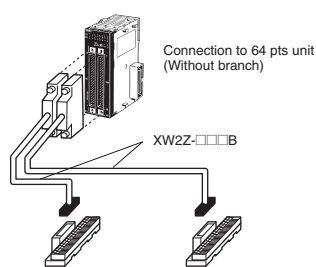
64-point Output Unit
CJ1W-MD563 IN 32 Points, OUT 32 Points

Connection to 64 pts unit
(Without branch)

XW2Z-□□□K

outputs   inputs
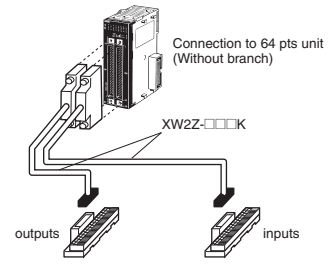
Choose the wiring method.
Choose @@ from a following combination table PLC type.

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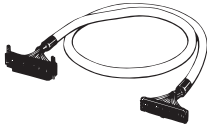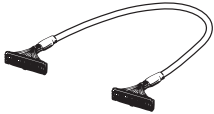
Note: 1. @@@ is replaced by the cable length.
2. There is one common for each 32 points.

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
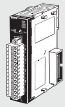
Connecting cables

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 clas-sification	Product name	Specifications				Number of bits allocated	Response time		Current con-sumption (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 clas-sification	Product name	Specifications		Number of bits allocated	Current con-sumption (A)		Model	Standards
		I/O points	External connection		5 V	24 V		
CJ1 Basic I/O Units	B7A Inter-face 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) 5 V	Current consumption (A) 24 V	Model	Standards
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 or −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) 5 V	Current consumption (A) 24 V	Model	Standards
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 clas-sification	Product name	Input points	Signal range selec-tion	Signal range	Resolution	Conversion speed	Accuracy (at ambient temperature of 25°C)	External connec-tion	No. of unit numbers allocated	Current consump-tion (A)		Model	Standards
										5 V	24 V		
CJ1 Special I/O Units	Analog Input Units High-speed type	4 inputs	Set sepa-rately 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.	Remov-able termi-nal 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 clas-sification	Product name	Output points	Signal range selec-tion	Signal range	Resolu-tion	Conver-sion speed	Accuracy (at ambient temperature of 25°C)	External connec-tion	External power supply	No. of unit num-bers allo-cated	Current con-sumption (A)		Model	Standards
											5 V	24 V		
CJ1 Special I/O Units	Analog Output Units High-speed type	4 outputs	Set sepa-rately 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.	Remov-able termi-nal 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 clas-sification	Product name	No. of points	Signal range selec-tion	Signal range	Resolu-tion (See note.)	Conversion speed (See note.)	Accuracy (at ambient temperature of 25°C)	External connec-tion	No. of unit numbers allocated	Current consump-tion (A) 5 V	24 V	Model	Standards
CJ1 Special I/O Units	**Analog I/O Units**	4 inputs / 2 outputs	Set sepa-rately 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. / Voltage output: ±0.3% of F.S. / Current output: ±0.3% of F.S.	Remov-able termi-nal block	1	0.58	---	CJ1W-MAD42	UC1, N, L, CE

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 clas-sification	Product name	Specifications			No. of unit numbers allocated	Current con-sumption (A) 5 V	24 V	Model	Standards
		No. of loops	Temperature sensor inputs	Control outputs					
CJ1 Special I/O Units	**Temper-ature 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 classifi-cation	Product name	Specifications			No. of unit numbers allo-cated	Current con-sumption (A) 5 V	24 V	Model	Standards
		Countable channels	Encoder A and B inputs, pulse input Z signals	Max. counting rate					
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 clas-sification	Product name	Specifications		No. of unit numbers allocated	Current con-sumption (A)		Model	Standards
		Communications Interface	Communications functions		5 V	24 V		
CJ1 CPU Bus Units	Serial Com-munications 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 classifi-cation	Product name	Specifications			No. of unit numbers allocated	Current con-sumption (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 classifi-cation	Product name	Specifications	Communications type	No. of unit numbers allocated	Current con-sumption (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) 5 V	Current consumption (A) 24 V	Model	Standards
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: Communications functions	Specifications: No. of I/O points per Master Unit	No. of unit numbers allocated	Current consumption (A) 5 V	Current consumption (A) 24 V	Model	Standards
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: Connected ID Systems	Specifications: No. of connected R/W heads	Specifications: External power supply	No. of unit numbers allocated	Current consumption (A) 5 V	Current consumption (A) 24 V	Model	Standards
CJ1 CPU Bus Units	**ID Sensor Units**	V680-Series RFID System	1	Not required.	1	0.26	0.13 *	CJ1W-V680C11	
			2		2	0.32	0.26	CJ1W-V680C12	UC, CE

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).

System Configuration

NJ/NX/NY Series

Sysmac Studio

FA Communications Software

NA Series

NX Series

G5 Series

1S Series

MX2-V1 Series

RX-V1 Series

Industrial Robots

FH Series

FQ-M Series

ZW-7000 Series ZW Series

E3NX/E3NC E3X/E3C/E2C

GX Series

Related Manuals

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

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	
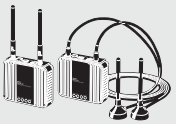
Note: 1. Please do not connect EtherCAT junction slaves with OMRON position control unit, Model CJ1W-NC@81/@82.
    2. EtherCAT junction slaves cannot be used for EtherNet/IP and Ethernet.

■ 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 *1	UC
		Client (Slave)	WE70-CL-US *1	
	Canada	Access Point (Master)	WE70-AP-CA *2	
		Client (Slave)	WE70-CL-CA *2	
	China	Access Point (Master)	WE70-AP-CN	---
		Client (Slave)	WE70-CL-CN	

Note: 1. A Pencil Antenna, mounting magnet, and screw mounting bracket are included as accessories.
    2. Always use a model that is applicable in your region. Refer to the WE70 Catalog (Cat. No. N154).
*1. From December 2015, the WE70-AP-US and WE70-CL-US can be used in Mexico.
    The Units will be sold in the USA until the end of May 2016.
*2. From January 2016, the WE70-AP-CA and WE70-CL-CA can be used in Singapore.

Ordering Information

NX-series NX1P2 CPU Units

Product Name	Program capacity	Memory capacity for variables	Maximum number of used real axes			Total number of built-in I/O points			Model	Standards
				Used motion control servo axes *1	Used single-axis position control servo axes *1		Number of input points	Number of output points		
NX1P2 CPU Unit	1.5 MB	32 KB (Retained during power interruptions) or 2 MB (Not retained during power interruptions)	8 axes	4 axes	4 axes	40 points	24 points	16 points, NPN transistor	**NX1P2-1140DT**	UC1, CE, RCM, KC
								16 points, PNP transistor *2	**NX1P2-1140DT1**	
			6 axes	2 axes	4 axes			16 points, NPN transistor	**NX1P2-1040DT**	
								16 points, PNP transistor *2	**NX1P2-1040DT1**	
			4 axes	0 axes	4 axes	24 points	14 points	10 points, NPN transistor	**NX1P2-9024DT**	
								10 points, PNP transistor *2	**NX1P2-9024DT1**	

Note: One NX-END02 End Cover is provided with the NX1P2 CPU Unit.
*1. The following table shows the enabled functions.

Motion control function	Motion control servo axes	Single-axis position control servo axes
Single-axis position control	Yes	Yes
Single-axis synchronized control	Yes	No
Single-axis velocity control	Yes	Yes *
Single-axis torque control	Yes	No
Multi-axes coordinated control	Yes	No

*You can use only the MC_MoveVelocity (Velocity Control) instruction.
*2. With the load short-circuit protection.

Option Boards (For CPU Units)

The Option Boards are mounted to the option board slot on the CPU Unit.

Product Name	Specification	Supported protocol	Model	Standards
Serial Communications Option Board	One RS-232C port. Transmission distance: 15 m. Connection type: Screwless clamping terminal block (9 terminals).	Host link, Modbus-RTU master, and no-protocol	**NX1W-CIF01**	UC1, CE, RCM, KC
	One RS-422A/485 port. Transmission distance: 50 m. Connection type: Screwless clamping terminal block (5 terminals)		**NX1W-CIF11**	
	One RS-422A/485 port (isolated). Transmission distance: 500 m. Connection type: Screwless clamping terminal block (5 terminals)		**NX1W-CIF12**	
Analog I/O Option Board	Analog input: 2 Voltage input: 0 to 10 V (Resolution: 1/4,000). Current input: 0 to 20 mA (1/2,000) Connection type: Screwless clamping terminal block (5 terminals)		**NX1W-ADB21**	
	Analog output: 2 Voltage output: 0 to 10 V (Resolution: 1/4,000) Connection type: Screwless clamping terminal block (3 terminals)		**NX1W-DAB21V**	
	Analog input: 2/Analog output: 2 Voltage input: 0 to 10 V (Resolution: 1/4,000). Current input: 0 to 20 mA (1/2,000) Voltage output: 0 to 10 V (Resolution: 1/4,000) Screwless clamping terminal block (8 terminals)		**NX1W-MAB221**	

NX Units

Up to eight NX Units can be connected to an NX1P2 CPU Unit.
Refer to the EtherCAT Slave Terminals NX Series for connectable NX Units.
Note: Connect the Safety Control Units to the NX1P2 CPU Unit via the EtherCAT Coupler Unit.

Recommended EtherCAT and EtherNet/IP Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

Optional Products/Maintenance Products/DIN Track Accessories

Product Name	Specification		Model	Standards
EtherCAT junction slaves *1	3 ports. Power supply voltage: 20.4 to 28.8 VDC (24 VDC -15 to +20%). Current consumption (A): 0.08		**GX-JC03**	CE, UC1
	6 ports. Power supply voltage: 20.4 to 28.8 VDC (24 VDC -15 to +20%). Current consumption (A): 0.17		**GX-JC06**	
Industrial Switching Hubs for EtherNet/IP and Ethernet *2	Quality of Service (QoS): EtherNet/IP control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-Negotiation	3 ports. Current consumption (A): 0.22 Power supply connector included.	**W4S1-03B**	UC, CE
		5 ports. Current consumption (A): 0.22 Power supply connector included.	**W4S1-05B**	
		5 ports. Current consumption (A): 0.22 Failure detection Power supply connector and Connector for informing error included.	**W4S1-05C**	CE
Memory Cards	SD memory card, 2 GB		**HMC-SD291**	N, L, CE
	SD memory card, 4 GB		**HMC-SD491**	CE
Battery	The battery is not mounted when the product is shipped. To turn OFF the power supply to the equipment for a certain period of time by using the clock data for programming, event logs, etc., you need a separately-sold battery to retain the clock data. Refer to the *Battery* page for details.		**CJ1W-BAT01**	---
End Cover (For NX1P2 CPU Unit) *3	Must be connected to the right end of the CPU Rack. One End Cover is provided with the CPU Unit.		**NX-END02**	---
DIN Tracks	Length: 0.5 m; Height: 7.3 mm		**PFP-50N**	---
	Length: 1 m; Height: 7.3 mm		**PFP-100N**	
End Plate	There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track.		**PFP-M**	---

*1. EtherCAT junction slaves cannot be used for EtherNet/IP and Ethernet.
*2. Industrial switching hubs cannot be used for EtherCAT.

Ordering Information

NY-series IPC Machine Controller

Recommended models

The industrial PC Platform has extended configuration possibilities to meet your requirements, below an overview of the most used and recommended models. Selecting one of the models below will bring the benefit of faster delivery times.
In case your preferred model is not listed below, please contact your Omron representative to discuss the possibilities.

Product Name	Specifications						Model
	Operating system	CPU type	Number of motion axes	RAM memory (non-ECC type)	Storage size	Interface option	
Industrial Box PC	Windows Embedded Standard 7 - 64bit	Intel® Core™ i7-4700EQ	64	8 GB	64 GB SSD type (SLC)	RS-232C	**NY512-1500-1XX21391X**
					320 GB HDD type		**NY512-1500-1XX213C1X**
			32		64 GB SSD type (SLC)		**NY512-1400-1XX21391X**
					320 GB HDD type		**NY512-1400-1XX213C1X**
			16		64 GB SSD type (SLC)		**NY512-1300-1XX21391X**
					320 GB HDD type		**NY512-1300-1XX213C1X**
Industrial Panel PC	Windows Embedded Standard 7 - 64bit	Intel® Core™ i7-4700EQ	64	8 GB	64 GB SSD type (SLC)	RS-232C	**NY532-1500-111213910**
					320 GB HDD type		**NY532-1500-111213C10**
			32		64 GB SSD type (SLC)		**NY532-1400-111213910**
					320 GB HDD type		**NY532-1400-111213C10**
			16		64 GB SSD type (SLC)		**NY532-1300-111213910**
					320 GB HDD type		**NY532-1300-111213C10**

Automation Software Sysmac Studio

Please purchase a DVD and required number of licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. Each model of licenses does not include any DVD.

Product name	Specifications	Number of licenses	Media	Model
Sysmac Studio Standard Edition Ver.1.@@	The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX-series CPU Units, NY-series Industrial PC, EtherCAT Slave, and the HMI. Sysmac Studio runs on the following OS. Windows 7 (32-bit/64-bit version)/Windows 8 (32-bit/64-bit version)/Windows 8.1 (32-bit/64-bit version)/Windows 10 (32-bit/64-bit version)	– (Media only)	DVD	**SYSMAC-SE200D**
	The Sysmac Studio Standard Edition DVD includes Support Software to set up EtherNet/IP Units, DeviceNet slaves, Serial Communications Units, and Support Software for creating screens on HMIs (CX-Designer). For details, refer to the Sysmac Integrated Catalogue (P072).	1 license *	–	**SYSMAC-SE201L**

* Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).

Accessories

Optional Hardware

Product name	Specifications	Model
Mounting Brackets *1	Book mount	NY000-AB00
	Wall mount	NY000-AB01
SD Memory Cards	Card type: SD Card Capacity: 2 GB Format: FAT16	HMC-SD291
	Card type: SDHC Card Capacity: 4 GB Format: FAT32	HMC-SD491
USB Flash Drives	Capacity: 2 GB	FZ-MEM2G
	Capacity: 8 GB	FZ-MEM8G
Storage Devices	Storage type: HDD Capacity: 320 GB	NY000-AH00
	Storage type: SSD SLC Capacity: 32 GB	NY000-AS00
	Storage type: SSD SLC Capacity: 64 GB	NY000-AS01
	Storage type: SSD MLC Capacity: 128 GB	NY000-AS02
USB Type-A to USB Type-B Cables	Cable length: 2 m USB 2.0 Minimum bend radius: 25 mm	FH-VUAB 2M
	Cable length: 5 m USB 2.0 Minimum bend radius: 25 mm	FH-VUAB 5M
DVI Cables	Cable length: 2 m Supports DVI-D Minimum bend radius: 36 mm	NY000-AC00 2M
	Cable length: 5 m Supports DVI-D Minimum bend radius: 36 mm	NY000-AC00 5M
Industrial Monitor	• LCD touchscreen • Multi-touch functionality • Supply voltage: 24 VDC • Up to 1,280 x 800 pixels at 60 Hz • 2 USB Type-A Connectors • Programmable brightness control	NYM1@W-C100@
Power Supply	• Output voltage: 24 VDC • Push-In Plus terminal blocks	S8VK-S@@@24
UPS *2	Output voltage during backup operation: 24 VDC ± 5%	S8BA
UPS Communication Cable	Cable length: 2 m Signals for • Signal output (BL, TR, BU, WB) • Remote ON/OFF input • UPS Stop Signal input (BS)	S8BW-C02

*1. Select the required type. Industrial Box PC type only.
*2. Revision number 04 or higher.

The revision number of the UPS can be retrieved from the serial number label on the product and the product packaging.

A3@ @@@@@@@@@ @@ @
 1   2   3   4

Item	Description
1	Product code
2	Product period and sequential number
3	Revision number
4	RoHS status

System Configuration

Controllers
NJ/NX/NY Series
Sysmac Studio
FA Communications Software

Softwares

Programmable Terminals
NA Series
NX Series
G5 Series
1S Series
MX2-V1 Series
RX-V1 Series

Slave Terminals

Safety

Mortion/Drives
Industrial Robots
FH Series

Inverters

Robotics
FQ-M Series
ZW-7000 Series ZW Series
E3NX/E3NC E3X/E3C/E2C

Sensors

Remote I/O Terminals
GX Series
Related Manuals

Ordering Information

Spare Parts

The following spare parts for the Industrial PC are available.

Product name	Specifications	Model
Battery	One battery is supplied with the Industrial PC. The battery supplies power to the real-time clock. The battery is located inside the Industrial PC. Service life: 5 years at 25°C	CJ1W-BAT01
Fan Unit	The Fan Unit is available for the Industrial PC that has active cooling. Service life: 70,000 hours of continuous operation at 40°C with 15% to 65% relative humidity. Shelf life: 6 months This is the storage limitation with no power supplied.	NY000-AF00
Accessory Kit	Replacement kit containing all accesories supplied with Industrial PC. • Power connector • I/O connector • Drive bracket for drive installation • 4 mounting screws for drive installation • PCIe Card support for PCIe Card installation • PCIe Card clip for PCIe Card installation	NY000-AK00

Installed Support Software

Item	Specifications
Industrial PC Support Utility	The Industrial PC Support Utility is a software utility to assist in diagnosing and resolving problems of the Industrial PC. It is pre-installed on the Industrial Box PC and the Industrial Panel PC.
Industrial PC Tray Utility	The Industrial PC Tray Utility is a software utility that provides information about the current state of the Industrial PC, its related devices, and associated software. It is pre-installed on the Industrial Box PC and the Industrial Panel PC.
Industrial PC System API	The Industrial PC System API allows programmers to create programs that can retrieve information or set an indicator status of the Industrial PC. The API makes use of the included IPC System Service to manage the hardware. It is pre-installed on the Industrial Box PC and the Industrial Panel PC.
Industrial Monitor Utility	The Industrial Monitor Utility provides a user interface to control settings and display details of connected Industrial Monitors. It is pre-installed on the Industrial Box PC and the Industrial Panel PC.
Industrial Monitor Brightness Utility	The Industrial Monitor Brightness Utility is a small software utility that allows you to control the brightness of the screen backlight of all connected Industrial Monitors. It is pre-installed on the Industrial Box PC and the Industrial Panel PC.
Industrial Monitor API	The Industrial Monitor API allows programmers to create applications that can control the hardware features and retrieve information from connected Industrial Monitors. It is pre-installed on the Industrial Box PC and the Industrial Panel PC.

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 CPU Units, NY-series Industrial PC, EtherCAT Slave, and the HMI. Sysmac Studio runs on the following OS. Windows 7 (32-bit/64-bit version) / Windows 8 (32-bit/64-bit version) / Windows 8.1(32-bit/64-bit version)/ Windows 10 (32-bit/64-bit version)	– (Media only)	DVD	**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.@@ *1 *2	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.@@ *2 *3	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.@@ *2 *4	Sysmac Studio NX-I/O Edition is a limited license that provides selected functions required for EtherNet/IP Coupler settings.	1 license	–	**SYSMAC-NE001L**	–
Sysmac Studio Drive Edition Ver.1.@@ *2 *5	Sysmac Studio Drive Edition is a limited license that provides selected functions required for drive settings.	1 license	–	**SYSMAC-DE001L**	–
Sysmac Studio Robot Additional Option *2	Sysmac Studio Robot Additional Option is a license to enable the Vision & Robot integrated simulation.	1 license	–	**SYSMAC-RA401L**	–

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/NE0@@L/RA4@@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.
Adept Robot IP Address Setting Tool	**Ver.1.@**	The Adept Robot IP Address Setting Tool is used for setting IP address of Adept Robot.

*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.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NJ/NX/NY Series

Sysmac Studio

FA Communications Software

NA Series

NX Series

G5 Series

1S Series

MX2-V1 Series

RX-V1 Series

Industrial Robots

FH Series

FQ-M Series

ZW-7000 Series ZW Series

E3NX/E3NC E3X/E3C/E2C

GX Series

Related Manuals

FA Communications Software CX-Compolet / SYSMAC Gateway

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 2005/2008/2010/2012/2013/2015 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 XP SP3 (32bit) Microsoft Windows Vista (32bit)	Microsoft Windows Server 2008 (32bit/64bit *) Microsoft Windows Server 2008 R2 (64bit *) Microsoft Windows Server 2012 (64bit*) Microsoft Windows Server 2012 R2 (64bit*) Microsoft Windows 7 (32bit/64bit *) Microsoft Windows 8 (32bit/64bit*) Microsoft Windows 8.1 (32bit/64bit*) Microsoft Windows 10 (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.
    3. The compatible functions of SYSMAC Compolet V2 are supported by Windows XP only.
* 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
NX7/NJ1 (unit version 1.10 or later)*1 NJ5/NJ3 (unit version 1.03 or later)*2	No	No	No	No	No	No	Yes*3	No

*1. To connect the NX7/NJ1 Controller, CX-Compolet / SYSMAC Gateway version 1.70 or higher is required.
*2. To connect the NJ3/5 Controller, CX-Compolet / SYSMAC Gateway version 1.31 or higher is required.
*3. 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.

Programmable Terminal **NA-Series**

Ordering Information

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
High-pressure Waterproof Attachment for NA5-@W	This metal frame is for high-pressure waterproofing. Install it to conform to UL Type 4X standards. UL Type 4X is the rating for high-pressure wash-down applications with a flow rate of 246 liter/min. This attachment can be used for the NA5-@W, but not for the NA5-@U.	NA-15WATW01
		NA-12WATW01
		NA-9WATW01
		NA-7WATW01

Note: The NA5-@U is also available. Contact your OMRON representative for details.

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

Communications Coupler Units

● EtherCAT Coupler Units

Unit type	Product name	Communications cycle in DC Mode	Current consumption	Maximum I/O power supply current	Model	Standards
NX-series Communications Coupler Unit *1	EtherCAT Coupler Unit	250 to 4000 µs *2	1.45 W or lower	4 A	**NX-ECC201**	UC1, N, L, CE, RCM, KC
		250 to 4000 µs *2		10 A	**NX-ECC202**	
		125 to 10000 µs *2	1.25 W or lower		**NX-ECC203**	UC1, N, CE, RCM, KC

*1. One End Cover NX-END01 is provided with the EtherCAT Coupler Unit.
*2. This depends on the specifications of the EtherCAT master. For example, the values are as follows when the EtherCAT Coupler Unit is connected to the built-in EtherCAT port on an NJ5-series CPU Unit: 500 µs, 1,000 µs, 2,000 µs, and 4,000 µs. For the specifications of the built-in EtherCAT port, refer to the user's manual for the built-in EtherCAT port on the connected CPU Unit or the Industrial PC. This depends on the Unit configuration.

Digital Input Units

● DC Input Units (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 Unit	DC Input Unit	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, RCM, 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	24 VDC	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, the NJ-series 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 Unit (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 Unit	DC Input Unit	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, N, CE, RCM, 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 Unit	DC Input Unit	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, N, CE, RCM, KC
		32 points					**NX-ID6142-5**	

● DC Input Unit (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 Unit	DC Input Unit	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, N, CE, RCM, KC

● AC 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 Digital Input Unit	AC Input Unit	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, RCM, KC

Digital Output Units
● Transistor Output Units (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 Unit	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, RCM, 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	
				2 A/point, 8 A/Unit			0.5ms max./ 1.0ms max.	NX-OD3268	UC1, N, CE, RCM, 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, RCM, 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, the NJ-series 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 Unit	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, N, CE, RCM, 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 Unit	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, N, CE, RCM, 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 Unit (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 Unit	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, N, CE, RCM, KC

● **Relay Output Units (Screwless Clamping Terminal Block, 12 mm Width)**

Unit type	Product name	Specification					Model	Standards
		Number of points	Relay type	Maximum switching capacity	I/O refreshing method	ON/OFF response time		
NX-series Digital Output Unit	Relay Output Unit	2 points	N.O.	250 VAC/2 A (cosφ = 1), 250 VAC/2 A (cosφ = 0.4), 24 VDC/2 A, 4 A/Unit	Free-Run refreshing	15 ms max./ 15 ms max.	NX-OC2633	UC1, N, L, CE, RCM, KC
			N.O.+N.C.				NX-OC2733	UC1, N, CE, RCM, KC

● **Relay Output Unit (Screwless Clamping Terminal Block, 24 mm Width)**

Unit type	Product name	Specification					Model	Standards
		Number of points	Relay type	Maximum switching capacity	I/O refreshing method	ON/OFF response time		
NX-series Digital Output Unit	Relay Output Unit	8 points	N.O.	250 VAC/2 A (cosφ=1) 250 VAC/2 A (cosφ=0.4) 24 VDC/2 A 8 A/Unit	Free-Run refreshing	15 ms max./ 15 ms max.	NX-OC4633	UC1, CE, RCM, KC

Note: For details of connection patterns for I/O relay terminals, refer to the *NX-series Digital I/O Units User's Manual* (Cat. No. W521).

Digital Mixed I/O Units
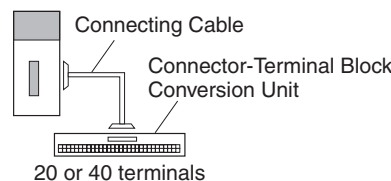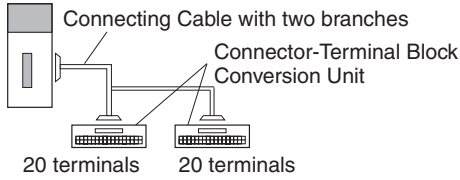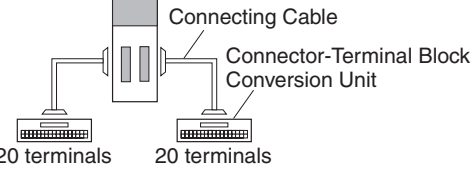
● DC Input/Transistor Output Units (MIL Connector, 30 mm Width)

Unit type	Product name	Specification					Model	Standards
		Number of points	Internal I/O common	Rated voltage	I/O refreshing method	ON/OFF response time		
NX-series Digital Mixed I/O Unit	DC Input/ Transistor Output Unit	Outputs: 16 points Inputs: 16 points	Outputs: NPN Inputs: For both NPN/PNP	Outputs: 12 to 24 VDC Inputs: 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	Outputs: 0.1 ms max./ 0.8 ms max. Inputs: 20 µs max./ 400 µs max.	NX-MD6121-5	UC1, N, CE, RCM, 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 Unit (Fujitsu Connector, 30 mm Width)

Unit type	Product name	Specification					Model	Standards
		Number of points	Internal I/O common	Rated voltage	I/O refreshing method	ON/OFF response time		
NX-series Digital Output Unit	DC Input/ Transistor Output Unit	Outputs: 16 points Inputs: 16 points	Outputs: NPN Inputs: For both NPN/PNP	Outputs: 12 to 24 VDC Inputs: 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	Outputs: 0.1 ms max./ 0.8 ms max. Inputs: 20 µs max./ 400 µs max.	NX-MD6121-6	UC1, N, CE, RCM, KC

Connection Patterns for Connector-Terminal Block Conversion Units

Pattern	Configuration	Number of connectors	Branching
A	Connecting Cable / Connector-Terminal Block Conversion Unit / 20 or 40 terminals	1	None
B	Connecting Cable with two branches / Connector-Terminal Block Conversion Unit / 20 terminals 20 terminals		2 branches
C	Connecting Cable / Connector-Terminal Block Conversion Unit / 20 terminals 20 terminals	2	None

System Configuration

NJ/NX/NY Series
Controllers

Sysmac Studio
FA Communications Software
Softwares

NA Series
Programmable Terminals

NX Series
Slave Terminals

G5 Series

1S Series
Safety

MX2-V1 Series

RX-V1 Series
Mortion/Drives

Industrial Robots

FH Series
Inverters

FQ-M Series
Robotics

ZW-7000 Series ZW Series

E3NX/E3NC E3X/E3C/E2C
Sensors

GX Series
Remote I/O Terminals

Related Manuals
Ordering Information

Connections to Connector-Terminal Block Conversion Units

Unit	I/O capacity	Number of connectors	Polarity	Connection pattern	Number of branches	Connecting Cable	Connector-Terminal Block Conversion Unit	Common terminal
NX-ID5142-5	16 inputs	1 MIL connector	NPN/PNP	A	None	XW2Z-□□□X	XW2B-20G4	None
				A	None	XW2Z-□□□X	XW2B-20G5	None
				A	None	XW2Z-□□□X	XW2D-20G6	None
				A	None	XW2Z-□□□X	XW2R-J20G-T	None
NX-ID6142-5	32 inputs	1 MIL connector	NPN/PNP	A	None	XW2Z-□□□K	XW2B-40G4	None
				A	None	XW2Z-□□□K	XW2B-40G5	None
				A	None	XW2Z-□□□K	XW2D-40G6	None
				A	None	XW2Z-□□□K	XW2D-40G6-RM *1	None
				A	None	XW2Z-□□□K	XW2R-J40G-T	None
				B	2	XW2Z-□□□N	XW2B-20G4 (2 Units)	None
				B	2	XW2Z-□□□N	XW2B-20G5 (2 Units)	None
				B	2	XW2Z-□□□N	XW2C-20G5-IN16 (2 Units) *2	Yes
				B	2	XW2Z-□□□N	XW2C-20G6-IO16 (2 Units)	Yes
				B	2	XW2Z-□□□N	XW2D-20G6 (2 Units)	None
				B	2	XW2Z-□□□N	XW2E-20G5-IN16 (2 Units) *2	Yes
				B	2	XW2Z-□□□N	XW2F-20G7-IN16 (2 Units) *2	Yes
				B	2	XW2Z-□□□N	XW2N-20G8-IN16 (2 Units) *2	Yes
				B	2	XW2Z-□□□N	XW2R-J20G-T (2 Units)	None
NX-ID6142-6	32 inputs	1 Fujitsu connector	NPN/PNP	A	None	XW2Z-□□□B	XW2B-40G4	None
				A	None	XW2Z-□□□B	XW2B-40G5	None
				A	None	XW2Z-□□□B	XW2D-40G6	None
				A	None	XW2Z-□□□B	XW2D-40G6-RF *1	None
				A	None	XW2Z-□□□B	XW2R-J40G-T	None
				A	None	XW2Z-□□□BU	XW2D-40C6	None
				B	2	XW2Z-□□□D	XW2B-20G4 (2 Units)	None
				B	2	XW2Z-□□□D	XW2B-20G5 (2 Units)	None
				B	2	XW2Z-□□□D	XW2C-20G5-IN16 (2 Units) *2	Yes
				B	2	XW2Z-□□□D	XW2C-20G6-IO16 (2 Units)	Yes
				B	2	XW2Z-□□□D	XW2D-20G6 (2 Units)	None
				B	2	XW2Z-□□□D	XW2E-20G5-IN16 (2 Units) *2	Yes
				B	2	XW2Z-□□□D	XW2F-20G7-IN16 (2 Units) *2	Yes
				B	2	XW2Z-□□□D	XW2N-20G8-IN16 (2 Units) *2	Yes
				B	2	XW2Z-□□□D	XW2R-J20G-T (2 Units)	None

*1. Bleeder resistor (5.6 kΩ) is built in.
*2. The inputs are NPN. For PNP inputs, reverse the polarity of the external power supply connections to the power supply terminals on the Connector-Terminal Block Conversion Unit.

Unit	I/O capacity	Number of connectors	Polarity	Connection pattern	Number of branches	Connecting Cable	Connector-Terminal Block Conversion Unit	Common terminal
NX-OD5121-5	16 outputs	1 MIL connector	NPN	A	None	XW2Z-□□□X	XW2B-20G4	None
				A	None	XW2Z-□□□X	XW2B-20G5	None
				A	None	XW2Z-□□□X	XW2D-20G6	None
				A	None	XW2Z-□□□X	XW2R-J20G-T	None
NX-OD5256-5	16 outputs	1 MIL connector	PNP	A	None	XW2Z-□□□X	XW2B-20G4	None
				A	None	XW2Z-□□□X	XW2B-20G5	None
				A	None	XW2Z-□□□X	XW2D-20G6	None
				A	None	XW2Z-□□□X	XW2R-J20G-T	None
NX-OD6121-5	32 outputs	1 MIL connector	NPN	A	None	XW2Z-□□□K	XW2B-40G4	None
				A	None	XW2Z-□□□K	XW2B-40G5	None
				A	None	XW2Z-□□□K	XW2D-40G6	None
				A	None	XW2Z-□□□K	XW2R-J40G-T	None
				B	2	XW2Z-□□□N	XW2B-20G4 (2 Units)	None
				B	2	XW2Z-□□□N	XW2B-20G5 (2 Units)	None
				B	2	XW2Z-□□□N	XW2C-20G6-IO16 (2 Units)	Yes
				B	2	XW2Z-□□□N	XW2D-20G6 (2 Units)	None
				B	2	XW2Z-□□□N	XW2F-20G7-OUT16 (2 Units)	Yes
				B	2	XW2Z-□□□N	XW2R-J20G-T (2 Units)	None

Unit	I/O capacity	Number of connectors	Polarity	Connection pattern	Number of branches	Connecting Cable	Connector-Terminal Block Conversion Unit	Common terminal
NX-OD6121-6	32 outputs	1 Fujitsu connector	NPN	A	None	XW2Z-□□□B	XW2B-40G4	None
				A	None	XW2Z-□□□B	XW2B-40G5	None
				A	None	XW2Z-□□□B	XW2D-40G6	None
				A	None	XW2Z-□□□B	XW2R-J40G-T	None
				A	None	XW2Z-□□□BU	XW2D-40C6	None
				B	2	XW2Z-□□□L	XW2B-20G4 (2 Units)	None
				B	2	XW2Z-□□□L	XW2B-20G5 (2 Units)	None
				B	2	XW2Z-□□□L	XW2C-20G6-IO16 (2 Units)	Yes
				B	2	XW2Z-□□□L	XW2D-20G6 (2 Units)	None
				B	2	XW2Z-□□□L	XW2F-20G7-OUT16 (2 Units)	Yes
				B	2	XW2Z-□□□L	XW2R-J20G-T (2 Units)	None
NX-OD6256-5	32 outputs	1 MIL connector	PNP	A	None	XW2Z-□□□K	XW2B-40G4	None
				A	None	XW2Z-□□□K	XW2B-40G5	None
				A	None	XW2Z-□□□K	XW2D-40G6	None
				A	None	XW2Z-□□□K	XW2R-J40G-T	None
				B	2	XW2Z-□□□N	XW2B-20G4 (2 Units)	None
				B	2	XW2Z-□□□N	XW2B-20G5 (2 Units)	None
				B	2	XW2Z-□□□N	XW2C-20G6-IO16 (2 Units)	Yes
				B	2	XW2Z-□□□N	XW2D-20G6 (2 Units)	None
				B	2	XW2Z-□□□N	XW2F-20G7-OUT16 (2 Units)	Yes
				B	2	XW2Z-□□□N	XW2R-J20G-T (2 Units)	None
NX-MD6121-5	16 inputs	1 MIL connector	NPN/PNP	C	None	XW2Z-□□□X	XW2B-20G4	None
				C	None	XW2Z-□□□X	XW2B-20G5	None
				C	None	XW2Z-□□□X	XW2D-20G6	None
				C	None	XW2Z-□□□X	XW2R-J20G-T	None
	16 outputs	1 MIL connector	NPN	C	None	XW2Z-□□□X	XW2B-20G4	None
				C	None	XW2Z-□□□X	XW2B-20G5	None
				C	None	XW2Z-□□□X	XW2D-20G6	None
				C	None	XW2Z-□□□X	XW2R-J20G-T	None
NX-MD6121-6	16 inputs	1 Fujitsu connector	NPN/PNP	C	None	XW2Z-□□□A	XW2B-20G4	None
				C	None	XW2Z-□□□A	XW2B-20G5	None
				C	None	XW2Z-□□□A	XW2C-20G5-IN16 *	Yes
				C	None	XW2Z-□□□A	XW2C-20G6-IO16	Yes
				C	None	XW2Z-□□□A	XW2D-20G6	None
				C	None	XW2Z-□□□A	XW2E-20G5-IN16 *	Yes
				C	None	XW2Z-□□□A	XW2F-20G7-IN16 *	Yes
				C	None	XW2Z-□□□A	XW2N-20G8-IN16 *	Yes
				C	None	XW2Z-□□□A	XW2R-J20G-T	None
	16 outputs	1 Fujitsu connector	NPN	C	None	XW2Z-□□□A	XW2B-20G4	None
				C	None	XW2Z-□□□A	XW2B-20G5	None
				C	None	XW2Z-□□□A	XW2C-20G6-IO16	Yes
				C	None	XW2Z-□□□A	XW2D-20G6	None
				C	None	XW2Z-□□□A	XW2F-20G7-OUT16	Yes
				C	None	XW2Z-□□□A	XW2R-J20G-T	None
NX-MD6256-5	16 inputs	1 MIL connector	NPN/PNP	C	None	XW2Z-□□□X	XW2B-20G4	None
				C	None	XW2Z-□□□X	XW2B-20G5	None
				C	None	XW2Z-□□□X	XW2D-20G6	None
				C	None	XW2Z-□□□X	XW2R-J20G-T	None
	16 outputs	1 MIL connector	PNP	C	None	XW2Z-□□□X	XW2B-20G4	None
				C	None	XW2Z-□□□X	XW2B-20G5	None
				C	None	XW2Z-□□□X	XW2D-20G6	None
				C	None	XW2Z-□□□X	XW2R-J20G-T	None

* The inputs are NPN. For PNP inputs, reverse the polarity of the external power supply connections to the power supply terminals on the Connector-Terminal Block Conversion Unit.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NJ/NX/NY Series
Sysmac Studio
FA Communications Software
NA Series
NX Series
G5 Series
1S Series
MX2-V1 Series
RX-V1 Series
Industrial Robots
FH Series
FQ-M Series
ZW-7000 Series
ZW Series
E3NX/E3NC
E3X/E3C/E2C
GX Series
Related Manuals

Analog Input Units

Unit type	Product name	Specification									Model	Standards
		Number of points	Input range	Resolution	Conversion value, decimal number (0 to 100%)	Over all accuracy (25°C)	Input method	Conversion time	Input impedance	I/O refreshing method		
NX-series Analog Input Unit	Voltage Input type	2 points	-10 to +10 V	1/8000	-4000 to 4000	±0.2% (full scale)	Single-ended input	250 µs/ point	1 MΩ min.	Free-Run refreshing	NX-AD2603	UC1, N, L, CE, RCM, KC
							Differential input				NX-AD2604	
				1/30000	-15000 to 15000	±0.1% (full scale)	Differential input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD2608	
		4 points		1/8000	-4000 to 4000	±0.2% (full scale)	Single-ended input	250 µs/ point		Free-Run refreshing	NX-AD3603	
							Differential input				NX-AD3604	
				1/30000	-15000 to 15000	±0.1% (full scale)	Differential input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD3608	
		8 points		1/8000	-4000 to 4000	±0.2% (full scale)	Single-ended input	250 µs/ point		Free-Run refreshing	NX-AD4603	
							Differential input				NX-AD4604	
				1/30000	-15000 to 15000	±0.1% (full scale)	Differential input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD4608	
	Current Input type	2 points	4 to 20 mA	1/8000	0 to 8000	±0.2% (full scale)	Single-ended input	250 µs/ point	250 Ω	Free-Run refreshing	NX-AD2203	
							Differential input				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	NX-AD2208	
		4 points		1/8000	0 to 8000	±0.2% (full scale)	Single-ended input	250 µs/ point		Free-Run refreshing	NX-AD3203	
							Differential input				NX-AD3204	
				1/30000	0 to 30000	±0.1% (full scale)	Differential input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD3208	
		8 points		1/8000	0 to 8000	±0.2% (full scale)	Single-ended input	250 µs/ point		Free-Run refreshing	NX-AD4203	
							Differential input				NX-AD4204	
				1/30000	0 to 30000	±0.1% (full scale)	Differential input	10 µs/ point	85 Ω	Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD4208	

Analog Output Units

Unit type	Product name	Specification							Model	Standards
		Number of points	Input range	Resolution	Output setting value, decimal number (0 to 100%)	Over all accuracy (25°C)	Conversion time	I/O refreshing method		
NX-series Analog Output Unit	Voltage Output type	2 points	-10 to +10 V	1/8000	-4000 to 4000	±0.3% (full scale)	250 μs/point	Free-Run refreshing	NX-DA2603	UC1,N, L, CE, RCM, KC
				1/30000	-15000 to 15000	±0.1% (full scale)	10 μs/point	Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-DA2605	
		4 points		1/8000	-4000 to 4000	±0.3% (full scale)	250 μs/point	Free-Run refreshing	NX-DA3603	
				1/30000	-15000 to 15000	±0.1% (full scale)	10 μs/point	Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-DA3605	
	Current Output type	2 points	4 to 20 mA	1/8000	0 to 8000	±0.3% (full scale)	250 μs/point	Free-Run refreshing	NX-DA2203	
				1/30000	0 to 30000	±0.1% (full scale)	10 μs/point	Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-DA2205	
		4 points		1/8000	0 to 8000	±0.3% (full scale)	250 μs/point	Free-Run refreshing	NX-DA3203	
				1/30000	0 to 30000	±0.1% (full scale)	10 μs/point	Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-DA3205	

Temperature Input Units

Unit type	Product name	Specification							Model	Standards
		Number of points	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 the *Reference accuracy and temperature coefficient according to the input type and measurement temperature of NX-series Temperature Input Unit.*	250 ms/Unit	Free-Run refreshing	16 Terminals	NX-TS2101	UC1, N, L, CE, RCM, KC
		4 points						16 Terminals x 2	NX-TS3101	
		2 points		0.01°C max.		10 ms/Unit		16 Terminals	NX-TS2102	
		4 points						16 Terminals x 2	NX-TS3102	
		2 points		0.001°C max.		60 ms/Unit		16 Terminals	NX-TS2104	
		4 points						16 Terminals x 2	NX-TS3104	
	Resistance Thermometer Input type	2 points	Resistance Thermometer (Pt100/Pt1000, three-wire) *2	0.1°C max.		250 ms/Unit		16 Terminals	NX-TS2201	
		4 points						16 Terminals x 2	NX-TS3201	
		2 points		0.01°C max.		10 ms/Unit		16 Terminals	NX-TS2202	
		4 points						16 Terminals x 2	NX-TS3202	
		2 points		0.001°C max.		60 ms/Unit		16 Terminals	NX-TS2204	
		4 points						16 Terminals x 2	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 support Pt100 three-wire sensor.

System Configuration
Controllers
NJ/NX/NY Series
Sysmac Studio
FA Communications Software
Softwares
NA Series
Programmable Terminals
NX Series
Slave Terminals
G5 Series
1S Series
MX2-V1 Series
Safety
RX-V1 Series
Mortion/Drives
Industrial Robots
Inverters
FH Series
FQ-M Series
Robotics
ZW-7000 Series ZW Series
E3NX/E3NC E3X/E3C/E2C
Sensors
GX Series
Remote I/O Terminals
Related Manuals
Ordering Information

Heater Burnout Detection Units

Unit type	Product name	Specification							Model	Standards
		CT input section		Control output section						
		Number of inputs	Maximum heater current	Number of outputs	Internal I/O common	Maximum load current	Rated voltage	I/O refreshing method		
NX-series Heater Burnout Detection Unit	Heater Burnout Detection Unit	4	50 A AC	4	NPN	0.1 A/point, 0.4 A/Unit	12 to 24 VDC	Free-Run refreshing	**NX-HB3101**	UC1, CE, RCM, KC
					PNP		24 VDC		**NX-HB3201**	

Optional Products

Product name	Specification	Model	Standards
Current Transformer (CT)	Hole diameter: 5.8 mm	**E54-CT1**	---
	Hole diameter: 12.0 mm	**E54-CT3**	---

Load Cell Input Unit

Unit type	Product name	Specification					Model	Standards
		Number of points	Conversion cycle	I/O refreshing method *	Load cell excitation voltage	Input range		
NX-series Load Cell Input Unit	Load Cell Input Unit	1	125 μs	• Free-Run refreshing • Synchronous I/O refreshing • Task period prioritized refreshing	5 VDC ± 10%	-5.0 to 5.0 mV/V	**NX-RS1201**	UC1, CE, RCM, KC

* Refer to the *I/O Refreshing* in the *NX-series Load Cell Input Unit User's Manual* (Cat. No. W565) for detailed information on I/O refresh cycle.
Note: The NX-RS1201-K Load Cell Input Unit with the test and calibration certificate is also available. Ask your OMRON representative for details.

Position Interface Units
● Incremental Encoder Input Units

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 Unit	1 (NPN)	3 (NPN)	500 kHz	• Free-Run refreshing • Synchronous I/O refreshing	1/1	24-V voltage input	**NX-EC0112**	UC1, CE, RCM, KC
		1 (PNP)	3 (PNP)					**NX-EC0122**	UC1, N, L, CE, RCM, KC
		1	3 (NPN)	4 MHz			Line receiver input	**NX-EC0132**	UC1, N, CE, RCM, KC
			3 (PNP)					**NX-EC0142**	UC1, N, L, CE, RCM, KC
		2 (NPN)	None	500 kHz		2/2	24-V voltage input	**NX-EC0212**	UC1, N, CE, RCM, KC
		2 (PNP)						**NX-EC0222**	UC1, N, L, CE, RCM, KC

● SSI Input Units

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 Unit	1	EIA standard RS-422-A	32 bits	24 VDC, 0.3 A/CH	Screwless push-in terminal block (12 terminals)	**NX-ECS112**	UC1, N, L, CE, RCM, KC
		2	EIA standard RS-422-A	32 bits	24 VDC, 0.3 A/CH	Screwless push-in terminal block (12 terminals)	**NX-ECS212**	UC1, N, L, CE, RCM, KC
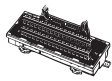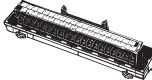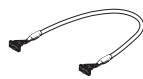
● Pulse Output Units

Unit type	Product name	Specification							Model	Standards
		Number of channels *1	External inputs	External outputs	Maximum pulse output speed	I/O refreshing method	Number of I/O entry mappings	Control output interface		
NX-series Position Interface Unit	**Pulse Output Unit**	1 (NPN)	2 (NPN)	1 (NPN)	500 kpps	• Synchronous I/O refreshing • Task period prioritized refreshing *2	1/1	Open collector output	**NX-PG0112**	UC1, N, CE, RCM, KC
		1 (PNP)	2 (PNP)	1 (PNP)			1/1	Open collector output	**NX-PG0122**	UC1, N, L, CE, RCM, KC
		2	5 inputs/CH (NPN)	3 outputs/ CH (NPN)	4 Mpps		2/2	Line driver output	**NX-PG0232-5**	UC1, CE, RCM, KC
		2	5 inputs/CH (PNP)	3 outputs/ CH (PNP)			2/2		**NX-PG0242-5**	
		4	5 inputs/CH (NPN)	3 outputs/ CH (NPN)			4/4		**NX-PG0332-5**	
		4	5 inputs/CH (PNP)	3 outputs/ CH (PNP)			4/4		**NX-PG0342-5**	

*1. This is the number of pulse output channels.
*2. Unit version 1.2 or later and an NX-ECC203 EtherCAT Coupler Unit are required.

Cables and Connectors for Line Driver Output Units with MIL Connectors

Product name	Specifications		Model	Standards
Connector-Terminal Block Conversion Unit	Flat Cable Connectors type (Terminal block with M3 screws) 34 terminals		**XW2B-34G4**	---
	Flat Cable Connectors type (Terminal block with M3.5 screws) 34 terminals		**XW2B-34G5**	---
	MIL Connectors type (Slim Connector) 34 terminals		**XW2D-34G6**	---
	MIL Connectors type (Phillips screw) 34 terminals		**XW2R-J34GD-T**	---
	MIL Connectors type (Slotted screw (rise up)) 34 terminals		**XW2R-E34GD-T**	---
	MIL Connectors type (Push-in spring) 34 terminals		**XW2R-P34GD-T**	---
Cable for Connector-Terminal Block Conversion Unit	34-terminal MIL Connector to 34-terminal MIL Connector	Cable length: 0.5 m	**XW2Z-050EE**	---
		Cable length: 1 m	**XW2Z-100EE**	
		Cable length: 1.5 m	**XW2Z-150EE**	
		Cable length: 2 m	**XW2Z-200EE**	
		Cable length: 3 m	**XW2Z-300EE**	
		Cable length: 5 m	**XW2Z-500EE**	

Note: Each of NX-PG0232-5 and NX-PG0242-5 has one MIL connector. Therefore, one Connector-Terminal Block Conversion Unit is required.
Each of NX-PG0332-5 and NX-PG0342-5 has two MIL connectors. Therefore, two Connector-Terminal Block Conversion Units are required.

Communications Interface Units

Unit type	Product name	Serial interface	External connection terminals	Number of serial ports	Communications function	Model	Standards
NX-series Communications Interface Unit	**Communications Interface Unit**	RS-232C	Screwless clamping terminal block	1 port	• No-protocol serial communications • Serial line monitor	**NX-CIF101**	UC1, N, CE, RCM, KC
		RS-422A/485				**NX-CIF105**	
		RS-232C	D-Sub connector	2 ports		**NX-CIF210**	

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NJ/NX/NY Series

Sysmac Studio

FA Communications Software

NA Series

NX Series

G5 Series

1S Series

MX2-V1 Series

RX-V1 Series

Industrial Robots

FH Series

FQ-M Series

ZW-7000 Series ZW Series

E3NX/E3NC E3X/E3C/E2C

GX Series

Related Manuals

IO-Link Master Unit

Unit type	Product name	Specification			Model	Standards
		Number of IO-Link ports	I/O refreshing method	I/O connection terminals		
NX-series IO-Link Master Unit	IO-Link Master Unit	4	Free-Run refreshing	Screwless clamping terminal block	**NX-ILM400**	UC1, CE, RCM, KC

Note: For details of IO-Link sensors and sensor I/O connectors, refer to the *IO-Link Series Catalog* (Cat. No. Y212).

System Units

● Additional NX Unit Power Supply Unit

Unit type	Product name	Power supply voltage	NX bus power supply capacity	Model	Standards
NX-series System Unit	Additional NX Unit Power Supply Unit	24 VDC (20.4 to 28.8 VDC)	10 W max.	**NX-PD1000**	UC1, N, L, CE, RCM, KC

● Additional I/O Power Supply Units

Unit type	Product name	Power supply voltage	I/O power feed maximum current	Model	Standards
NX-series System Unit	Additional I/O Power Supply Unit	5 to 24 VDC (4.5 to 28.8 VDC)	4 A	**NX-PF0630**	UC1, N, L, CE, RCM, KC
			10 A *	**NX-PF0730**	

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

● I/O Power Supply Connection Units

Unit type	Product name	Number of I/O power terminals	Current capacity of I/O power terminal	Model	Standards
NX-series System Unit	I/O Power Supply Connection Unit	IOG: 16 terminals	4 A/terminal max.	**NX-PC0010**	UC1, N, L, CE, RCM, KC
		IOV: 16 terminals	4 A/terminal max.	**NX-PC0020**	UC1, N, L, CE, RCM, KC
		IOV: 8 terminals IOG: 8 terminals	4 A/terminal max.	**NX-PC0030**	UC1, N, L, CE, RCM, KC

● Shield Connection Unit

Unit type	Product name	Number of shield terminals	Model	Standards
NX-series System Unit	Shield Connection Unit	14 terminals (The two lower terminals are functional ground terminals.)	**NX-TBX01**	UC1, N, L, CE, RCM, 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 the Communication Coupler Unit.	**NX-END01**	---
DIN Track Insulation Spacer	A Spacer to insulate the control panel from the DIN Track. To insulate the 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 Block	8	A/B	None	10 A	**NX-TBA082**	---
	12	A/B			**NX-TBA122**	
	16	A/B			**NX-TBA162**	
	12	C/D			**NX-TBB122**	
	16	C/D			**NX-TBB162**	
	8	A/B	Provided		**NX-TBC082**	
	16	A/B			**NX-TBC162**	

System Configuration

NJ/NX/NY Series

Controllers

Sysmac Studio

FA Communications Software

Softwares

NA Series

Programmable Terminals

NX Series

Slave Terminals

G5 Series

1S Series

Safety

MX2-V1 Series

RX-V1 Series

Mortion/Drives

Industrial Robots

Inverters

FH Series

FQ-M Series

Robotics

ZW-7000 Series ZW Series

E3NX/E3NC E3X/E3C/E2C

Sensors

GX Series

Remote I/O Terminals

Related Manuals

Ordering Information

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
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

Note: Connect the Safety CPU Unit to the NX1P2 CPU Unit via the EtherCAT Coupler Unit.

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**

System Configuration

NJ/NX/NY Series

Controllers

Sysmac Studio

Softwares

FA Communications Software

NA Series

Programmable Terminals

NX Series

G5 Series

Slave Terminals

1S Series

MX2-V1 Series

Safety

RX-V1 Series

Mortion/Drives

Industrial Robots

FH Series

Inverters

FQ-M Series

Robotics

ZW-7000 Series ZW Series

E3NX/E3NC E3X/E3C/E2C

Sensors

GX Series

Remote I/O Terminals

Related Manuals

Ordering Information

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	200 VAC (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)

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.)

Refer to the *Decelerators* in *Ordering Information* for motor capacity and decelerator combinations.

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
		11	1/11
		20	1/20
		21	1/21
		25	1/25
		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) Type	(4) Applicable Servomotor Capacity	(5) Rotation speed	Model	(6) Applied Voltage						(7) With brake / Without brake		(8) Models with oil seals		(9) Shaft type	
				INC 400	INC 200	INC 100	ABS 400	ABS 200	ABS 100	−	B	Blank	O	Blank	S2
				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.

System Configuration · Controllers · Softwares · Programmable Terminals · Slave Terminals · Safety · Mortion/Drives · Inverters · Robotics · Sensors · Remote I/O Terminals · Ordering Information

NJ/NX/NY Series · Sysmac Studio · FA Communications Software · NA Series · NX Series · G5 Series · 1S Series · MX2-V1 Series · RX-V1 Series · Industrial Robots · FH Series · FQ-M Series · ZW-7000 Series ZW Series · E3NX/E3NC E3X/E3C/E2C · GX Series · Related Manuals

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

Decelerators (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

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	Applicable Servomotor Capacity	Model
Servomotor Connector for Encoder Cable	[100 V/200 V] 3,000 r/min (50 to 750 W)	**R88A-CNK02R**
Servomotor Connector for Encoder Cable	[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**

AC Servo System 1S-Series

Interpreting Model Numbers

AC Servo Drives with Built-in EtherCAT Communications

R88D-1S N 01 H -ECT
          (1)   (2) (3) (4)   (5)

No	Item	Symbol	Specifications
(1)	1S-series Servo Drive		
(2)	Servo Drive Type	N	Communication type
(3)	Applicable Servomotor rated output	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)	Communications type	ECT	EtherCAT Communications

AC Servomotor

R88M-1 M 100 30 S -BOS2
        (1)   (2)   (3)   (4) (5)   (6)

No	Item	Symbol	Specifications
(1)	1S-series Servomotor		
(2)	Servomotor Type	L	Low inertia
		M	Middle inertia
(3)	Rated output	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
(4)	Rated rotation speed	10	1,000 r/min
		20	2,000 r/min
		30	3,000 r/min
(5)	Servo Drive main power supply voltage and encoder type	S	100 VAC absolute encoder
		T	200 VAC absolute encoder
		C	400 VAC absolute encoder
(6)	Options		
	Brake	None	Without brake
		B	With 24-VDC brake
	Oil seal	None	Without oil seal
		O	With oil seal
	Key and tap	None	Straight shaft
		S2	With key and tap

Decelerator

R88G-HPG 14A 05 100 S B J
　　　　　　(1)　　(2)　(3)　(4)　(5)(6)(7)

No	Item	Symbol	Specifications
(1)	Decelerator for Servomotor Backlash: 3 Arcminutes max.		
(2)	Flange size number	11B	40 × 40
		14A	60 × 60
		20A	90 × 90
		32A	120 × 120
		50A	170 × 170
		65A	230 × 230
(3)	Reduction ratio	05	1/5
		11	1/11
		20	1/20
		21	1/21
		25	1/25
		33	1/33
		45	1/45
(4)	Applicable Servomotor rated output *	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
		5K0	5 kW
(5)	Motor type	None	3,000-r/min Servomotors
		S	2,000-r/min Servomotors
		T	1,000-r/min Servomotors
(6)	Backlash	B	Backlash: 3 Arcminutes max.
(7)	Option	None	Straight shaft
		J	With key and tap

* This is based on the rated output of a typical applicable Servomotor.
For the selection, check the Servomotor and Decelerator
Combination Tables.

Table of AC Servomotor Variations

R88M-1@ @@@ @@ @ - @ @ @@
(2)   (3)   (4) (5)   (6) (7) (8)

(2)	(3)	(4)	Model	(5)			(6)		(7)		(8)	
				Power supply specifications			Brake		Oil seal		Shaft type	
Type	Rated output	Rotation speed		ABS 400	ABS 200	ABS 100						
				C	T	S	None	B	None	O	None	S2
M	100 W	3,000 r/min	R88M-1M10030		✓	✓	✓	✓	✓	✓	✓	✓
	200 W		R88M-1M20030		✓	✓	✓	✓	✓	✓	✓	✓
	400 W		R88M-1M40030		✓	✓	✓	✓	✓	✓	✓	✓
	750 W		R88M-1M75030		✓		✓	✓	✓	✓	✓	✓
L	750 W		R88M-1L75030	✓			✓	✓	✓	✓	✓	✓
	1 kW		R88M-1L1K030	✓	✓		✓	✓	✓	✓	✓	✓
	1.5 kW		R88M-1L1K530	✓	✓		✓	✓	✓	✓	✓	✓
	2 kW		R88M-1L2K030	✓	✓		✓	✓	✓	✓	✓	✓
	3 kW		R88M-1L3K030	✓	✓		✓	✓	✓	✓	✓	✓
M	400 W	2,000 r/min	R88M-1M40020	✓			✓	✓	✓	✓	✓	✓
	600 W		R88M-1M60020	✓			✓	✓	✓	✓	✓	✓
	1 kW		R88M-1M1K020	✓	✓		✓	✓	✓	✓	✓	✓
	1.5 kW		R88M-1M1K520	✓	✓		✓	✓	✓	✓	✓	✓
	2 kW		R88M-1M2K020	✓	✓		✓	✓	✓	✓	✓	✓
	3 kW		R88M-1M3K020	✓	✓		✓	✓	✓	✓	✓	✓
M	900 W	1,000 r/min	R88M-1M90010	✓	✓		✓	✓	✓	✓	✓	✓
	2 kW		R88M-1M2K010	✓	✓		✓	✓	✓	✓	✓	✓
	3 kW		R88M-1M3K010	✓	✓		✓	✓	✓	✓	✓	✓
M:Middle inertia L:Low inertia	100: 100 W 1K0: 1 kW 3K0: 3 kW	10: 1,000 r/min 20: 2,000 r/min 30: 3,000 r/min		C: 400 VAC (with absolute encoder) ABS/INC T: 200 VAC (with absolute encoder) ABS/INC S: 100 VAC (with absolute encoder) ABS/INC			None: Without brake B: With 24-VDC brake		None: Without oil seal O: With oil seal		None: Straight shaft S2: With key and tap	

Ordering Information

AC Servo Drives with Built-in EtherCAT Communications

Power supply voltage	Rated output	Model
Single-phase 100 VAC	100 W	R88D-1SN01L-ECT
	200 W	R88D-1SN02L-ECT
	400 W	R88D-1SN04L-ECT
Single-phase/3-phase 200 VAC	100 W	R88D-1SN01H-ECT
	200 W	R88D-1SN02H-ECT
	400 W	R88D-1SN04H-ECT
	750 W	R88D-1SN08H-ECT
	1.5 kW	R88D-1SN15H-ECT
3-phase 200 VAC	1 kW	R88D-1SN10H-ECT
	2 kW	R88D-1SN20H-ECT
	3 kW	R88D-1SN30H-ECT
3-phase 400 VAC	600 W	R88D-1SN06F-ECT
	1 kW	R88D-1SN10F-ECT
	1.5 kW	R88D-1SN15F-ECT
	2 kW	R88D-1SN20F-ECT
	3 kW	R88D-1SN30F-ECT

AC Servomotors
3,000-r/min Servomotors

Specifications			Model Without oil seal	
			Straight shaft	With key and tap
Without brake	100 VAC	100 W	R88M-1M10030S	R88M-1M10030S-S2
		200 W	R88M-1M20030S	R88M-1M20030S-S2
		400 W	R88M-1M40030S	R88M-1M40030S-S2
	200 VAC	100 W	R88M-1M10030T	R88M-1M10030T-S2
		200 W	R88M-1M20030T	R88M-1M20030T-S2
		400 W	R88M-1M40030T	R88M-1M40030T-S2
		750 W	R88M-1M75030T	R88M-1M75030T-S2
		1 kW	R88M-1L1K030T	R88M-1L1K030T-S2
		1.5 kW	R88M-1L1K530T	R88M-1L1K530T-S2
		2 kW	R88M-1L2K030T	R88M-1L2K030T-S2
		3 kW	R88M-1L3K030T	R88M-1L3K030T-S2
	400 VAC	750 W	R88M-1L75030C	R88M-1L75030C-S2
		1 kW	R88M-1L1K030C	R88M-1L1K030C-S2
		1.5 kW	R88M-1L1K530C	R88M-1L1K530C-S2
		2 kW	R88M-1L2K030C	R88M-1L2K030C-S2
		3 kW	R88M-1L3K030C	R88M-1L3K030C-S2
With brake	100 VAC	100 W	R88M-1M10030S-B	R88M-1M10030S-BS2
		200 W	R88M-1M20030S-B	R88M-1M20030S-BS2
		400 W	R88M-1M40030S-B	R88M-1M40030S-BS2
	200 VAC	100 W	R88M-1M10030T-B	R88M-1M10030T-BS2
		200 W	R88M-1M20030T-B	R88M-1M20030T-BS2
		400 W	R88M-1M40030T-B	R88M-1M40030T-BS2
		750 W	R88M-1M75030T-B	R88M-1M75030T-BS2
		1 kW	R88M-1L1K030T-B	R88M-1L1K030T-BS2
		1.5 kW	R88M-1L1K530T-B	R88M-1L1K530T-BS2
		2 kW	R88M-1L2K030T-B	R88M-1L2K030T-BS2
		3 kW	R88M-1L3K030T-B	R88M-1L3K030T-BS2
	400 VAC	750 W	R88M-1L75030C-B	R88M-1L75030C-BS2
		1 kW	R88M-1L1K030C-B	R88M-1L1K030C-BS2
		1.5 kW	R88M-1L1K530C-B	R88M-1L1K530C-BS2
		2 kW	R88M-1L2K030C-B	R88M-1L2K030C-BS2
		3 kW	R88M-1L3K030C-B	R88M-1L3K030C-BS2

Specifications			Model	
			With oil seal	
			Straight shaft	With key and tap
Without brake	100 VAC	100 W	R88M-1M10030S-O	R88M-1M10030S-OS2
		200 W	R88M-1M20030S-O	R88M-1M20030S-OS2
		400 W	R88M-1M40030S-O	R88M-1M40030S-OS2
	200 VAC	100 W	R88M-1M10030T-O	R88M-1M10030T-OS2
		200 W	R88M-1M20030T-O	R88M-1M20030T-OS2
		400 W	R88M-1M40030T-O	R88M-1M40030T-OS2
		750 W	R88M-1M75030T-O	R88M-1M75030T-OS2
		1 kW	R88M-1L1K030T-O	R88M-1L1K030T-OS2
		1.5 kW	R88M-1L1K530T-O	R88M-1L1K530T-OS2
		2 kW	R88M-1L2K030T-O	R88M-1L2K030T-OS2
		3 kW	R88M-1L3K030T-O	R88M-1L3K030T-OS2
	400 VAC	750 W	R88M-1L75030C-O	R88M-1L75030C-OS2
		1 kW	R88M-1L1K030C-O	R88M-1L1K030C-OS2
		1.5 kW	R88M-1L1K530C-O	R88M-1L1K530C-OS2
		2 kW	R88M-1L2K030C-O	R88M-1L2K030C-OS2
		3 kW	R88M-1L3K030C-O	R88M-1L3K030C-OS2
With brake	100 VAC	100 W	R88M-1M10030S-BO	R88M-1M10030S-BOS2
		200 W	R88M-1M20030S-BO	R88M-1M20030S-BOS2
		400 W	R88M-1M40030S-BO	R88M-1M40030S-BOS2
	200 VAC	100 W	R88M-1M10030T-BO	R88M-1M10030T-BOS2
		200W	R88M-1M20030T-BO	R88M-1M20030T-BOS2
		400 W	R88M-1M40030T-BO	R88M-1M40030T-BOS2
		750 W	R88M-1M75030T-BO	R88M-1M75030T-BOS2
		1 kW	R88M-1L1K030T-BO	R88M-1L1K030T-BOS2
		1.5 kW	R88M-1L1K530T-BO	R88M-1L1K530T-BOS2
		2 kW	R88M-1L2K030T-BO	R88M-1L2K030T-BOS2
		3 kW	R88M-1L3K030T-BO	R88M-1L3K030T-BOS2
	400 VAC	750 W	R88M-1L75030C-BO	R88M-1L75030C-BOS2
		1 kW	R88M-1L1K030C-BO	R88M-1L1K030C-BOS2
		1.5 kW	R88M-1L1K530C-BO	R88M-1L1K530C-BOS2
		2 kW	R88M-1L2K030C-BO	R88M-1L2K030C-BOS2
		3 kW	R88M-1L3K030C-BO	R88M-1L3K030C-BOS2

2,000-r/min Servomotors

Specifications			Model	
			Without oil seal	
			Straight shaft	With key and tap
Without brake	200 VAC	1 kW	R88M-1M1K020T	R88M-1M1K020T-S2
		1.5 kW	R88M-1M1K520T	R88M-1M1K520T-S2
		2 kW	R88M-1M2K020T	R88M-1M2K020T-S2
		3 kW	R88M-1M3K020T	R88M-1M3K020T-S2
	400 VAC	400 W	R88M-1M40020C	R88M-1M40020C-S2
		600 W	R88M-1M60020C	R88M-1M60020C-S2
		1 kW	R88M-1M1K020C	R88M-1M1K020C-S2
		1.5 kW	R88M-1M1K520C	R88M-1M1K520C-S2
		2 kW	R88M-1M2K020C	R88M-1M2K020C-S2
		3 kW	R88M-1M3K020C	R88M-1M3K020C-S2
Witht brake	200 VAC	1 kW	R88M-1M1K020T-B	R88M-1M1K020T-BS2
		1.5 kW	R88M-1M1K520T-B	R88M-1M1K520T-BS2
		2 kW	R88M-1M2K020T-B	R88M-1M2K020T-BS2
		3 kW	R88M-1M3K020T-B	R88M-1M3K020T-BS2
	400 VAC	400 W	R88M-1M40020C-B	R88M-1M40020C-BS2
		600 W	R88M-1M60020C-B	R88M-1M60020C-BS2
		1 kW	R88M-1M1K020C-B	R88M-1M1K020C-BS2
		1.5 kW	R88M-1M1K520C-B	R88M-1M1K520C-BS2
		2 kW	R88M-1M2K020C-B	R88M-1M2K020C-BS2
		3 kW	R88M-1M3K020C-B	R88M-1M3K020C-BS2

Specifications			Model	
			With oil seal	
			Straight shaft	With key and tap
Without brake	200 VAC	1 kW	R88M-1M1K020T-O	R88M-1M1K020T-OS2
		1.5 kW	R88M-1M1K520T-O	R88M-1M1K520T-OS2
		2 kW	R88M-1M2K020T-O	R88M-1M2K020T-OS2
		3 kW	R88M-1M3K020T-O	R88M-1M3K020T-OS2
	400 VAC	400 W	R88M-1M40020C-O	R88M-1M40020C-OS2
		600 W	R88M-1M60020C-O	R88M-1M60020C-OS2
		1 kW	R88M-1M1K020C-O	R88M-1M1K020C-OS2
		1.5 kW	R88M-1M1K520C-O	R88M-1M1K520C-OS2
		2 kW	R88M-1M2K020C-O	R88M-1M2K020C-OS2
		3 kW	R88M-1M3K020C-O	R88M-1M3K020C-OS2
Witht brake	200 VAC	1 kW	R88M-1M1K020T-BO	R88M-1M1K020T-BOS2
		1.5 kW	R88M-1M1K520T-BO	R88M-1M1K520T-BOS2
		2 kW	R88M-1M2K020T-BO	R88M-1M2K020T-BOS2
		3 kW	R88M-1M3K020T-BO	R88M-1M3K020T-BOS2
	400 VAC	400 W	R88M-1M40020C-BO	R88M-1M40020C-BOS2
		600 W	R88M-1M60020C-BO	R88M-1M60020C-BOS2
		1 kW	R88M-1M1K020C-BO	R88M-1M1K020C-BOS2
		1.5 kW	R88M-1M1K520C-BO	R88M-1M1K520C-BOS2
		2 kW	R88M-1M2K020C-BO	R88M-1M2K020C-BOS2
		3 kW	R88M-1M3K020C-BO	R88M-1M3K020C-BOS2

1,000-r/min Servomotors

Specifications			Model	
			Without oil seal	
			Straight shaft	With key and tap
Without brake	200 VAC	900 W	R88M-1M90010T	R88M-1M90010T-S2
		2 kW	R88M-1M2K010T	R88M-1M2K010T-S2
		3 kW	R88M-1M3K010T	R88M-1M3K010T-S2
	400 VAC	900 W	R88M-1M90010C	R88M-1M90010C-S2
		2 kW	R88M-1M2K010C	R88M-1M2K010C-S2
		3 kW	R88M-1M3K010C	R88M-1M3K010C-S2
With brake	200 VAC	900 W	R88M-1M90010T-B	R88M-1M90010T-BS2
		2 kW	R88M-1M2K010T-B	R88M-1M2K010T-BS2
		3 kW	R88M-1M3K010T-B	R88M-1M3K010T-BS2
	400 VAC	900 W	R88M-1M90010C-B	R88M-1M90010C-BS2
		2 kW	R88M-1M2K010C-B	R88M-1M2K010C-BS2
		3 kW	R88M-1M3K010C-B	R88M-1M3K010C-BS2

Specifications			Model	
			With oil seal	
			Straight shaft	With key and tap
Without brake	200 VAC	900 W	R88M-1M90010T-O	R88M-1M90010T-OS2
		2 kW	R88M-1M2K010T-O	R88M-1M2K010T-OS2
		3 kW	R88M-1M3K010T-O	R88M-1M3K010T-OS2
	400 VAC	900 W	R88M-1M90010C-O	R88M-1M90010C-OS2
		2 kW	R88M-1M2K010C-O	R88M-1M2K010C-OS2
		3 kW	R88M-1M3K010C-O	R88M-1M3K010C-OS2
With brake	200 VAC	900 W	R88M-1M90010T-BO	R88M-1M90010T-BOS2
		2 kW	R88M-1M2K010T-BO	R88M-1M2K010T-BOS2
		3 kW	R88M-1M3K010T-BO	R88M-1M3K010T-BOS2
	400 VAC	900 W	R88M-1M90010C-BO	R88M-1M90010C-BOS2
		2 kW	R88M-1M2K010C-BO	R88M-1M2K010C-BOS2
		3 kW	R88M-1M3K010C-BO	R88M-1M3K010C-BOS2

Decelerator (Backlash: 3 Arcminutes Max.)
For 3,000-r/min Servomotors

Servomotor rated output	Reduction ratio	Model (Straight shaft) *
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@
750 W (400 V)	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-HPG32A052K0B@
	1/11	R88G-HPG32A112K0B@
	1/21	R88G-HPG32A211K5B@
	1/33	R88G-HPG50A332K0B@
	1/45	R88G-HPG50A451K5B@
1.5 kW	1/5	R88G-HPG32A052K0B@
	1/11	R88G-HPG32A112K0B@
	1/21	R88G-HPG32A211K5B@
	1/33	R88G-HPG50A332K0B@
	1/45	R88G-HPG50A451K5B@
2 kW	1/5	R88G-HPG32A052K0B@
	1/11	R88G-HPG32A112K0B@
	1/21	R88G-HPG50A212K0B@
	1/33	R88G-HPG50A332K0B@
3 kW	1/5	R88G-HPG32A053K0B@
	1/11	R88G-HPG50A113K0B@
	1/21	R88G-HPG50A213K0B@

* The standard shaft type is a straight shaft. A model with a key and tap is indicated with "J" at @ of the Decelerator model number.
e.g. R88G-HPG11B05100BJ

For 2,000-r/min Servomotors

Servomotor rated output	Reduction 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@

* The standard shaft type is a straight shaft. A model with a key and tap is indicated with "J" at @ of the Decelerator model number.
e.g. R88G-HPG11B05100BJ

For 1,000-r/min Servomotors

Servomotor rated output	Reduction 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@

* The standard shaft type is a straight shaft. A model with a key and tap is indicated with "J" at @ of the Decelerator model number.
e.g. R88G-HPG11B05100BJ

System Configuration
Controllers
NJ/NX/NY Series
Sysmac Studio
FA Communications Software
Softwares
NA Series
Programmable Terminals
NX Series
Slave Terminals
G5 Series
1S Series
MX2-V1 Series
Safety
RX-V1 Series
Mortion/Drives
Industrial Robots
FH Series
Inverters
FQ-M Series
Robotics
ZW-7000 Series ZW Series
Sensors
E3NX/E3NC E3X/E3C/E2C
Remote I/O Terminals
GX Series
Related Manuals
Ordering Information

Cables and Peripheral Devices

Encoder Cables (Standard Cable)

Applicable Servomotor			Model
100 V 200 V	3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	3 m	R88A-CR1A003C
		5 m	R88A-CR1A005C
		10 m	R88A-CR1A010C
		15 m	R88A-CR1A015C
		20 m	R88A-CR1A020C
		30 m	R88A-CR1A030C
		40 m	R88A-CR1A040C
		50 m	R88A-CR1A050C
200 V 400 V	200 V: 3,000-r/min Servomotors of 1 kW or more 2,000-r/min Servomotors 1,000-r/min Servomotors 400 V: 3,000-r/min Servomotors 2,000-r/min Servomotors 1,000-r/min Servomotors	3 m	R88A-CR1B003N
		5 m	R88A-CR1B005N
		10 m	R88A-CR1B010N
		15 m	R88A-CR1B015N
		20 m	R88A-CR1B020N
		30 m	R88A-CR1B030N
		40 m	R88A-CR1B040N
		50 m	R88A-CR1B050N

Brake Cables (Standard Cable)

Applicable Servomotor			Model
100 V 200 V	3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	3 m	R88A-CA1A003B
		5 m	R88A-CA1A005B
		10 m	R88A-CA1A010B
		15 m	R88A-CA1A015B
		20 m	R88A-CA1A020B
		30 m	R88A-CA1A030B
		40 m	R88A-CA1A040B
		50 m	R88A-CA1A050B

Motor Power Cables (Standard Cable)

Applicable Servomotor			Without brake wire	With brake wire
			Model	Model
100 V 200 V	3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	3 m	R88A-CA1A003S	---
		5 m	R88A-CA1A005S	---
		10 m	R88A-CA1A010S	---
		15 m	R88A-CA1A015S	---
		20 m	R88A-CA1A020S	---
		30 m	R88A-CA1A030S	---
		40 m	R88A-CA1A040S	---
		50 m	R88A-CA1A050S	---
200 V	3,000-r/min Servomotors of 1 kW 2,000-r/min Servomotors of 1 kW 1,000-r/min Servomotors of 900 W	3 m	R88A-CA1B003S	R88A-CA1B003B
		5 m	R88A-CA1B005S	R88A-CA1B005B
		10 m	R88A-CA1B010S	R88A-CA1B010B
		15 m	R88A-CA1B015S	R88A-CA1B015B
		20 m	R88A-CA1B020S	R88A-CA1B020B
		30 m	R88A-CA1B030S	R88A-CA1B030B
		40 m	R88A-CA1B040S	R88A-CA1B040B
		50 m	R88A-CA1B050S	R88A-CA1B050B
200 V	3,000-r/min Servomotors of 1.5 kW 2,000-r/min Servomotors of 1.5 kW	3 m	R88A-CA1C003S	R88A-CA1C003B
		5 m	R88A-CA1C005S	R88A-CA1C005B
		10 m	R88A-CA1C010S	R88A-CA1C010B
		15 m	R88A-CA1C015S	R88A-CA1C015B
		20 m	R88A-CA1C020S	R88A-CA1C020B
		30 m	R88A-CA1C030S	R88A-CA1C030B
		40 m	R88A-CA1C040S	R88A-CA1C040B
		50 m	R88A-CA1C050S	R88A-CA1C050B
400 V	3,000-r/min Servomotors of 750 W, 1 kW, 1.5 kW, and 2 kW 2,000-r/min Servomotors of 400 W, 600 W, 1 kW, 1.5 kW, and 2 kW 1,000-r/min Servomotors of 900 W	3 m	R88A-CA1C003S	R88A-CA1D003B
		5 m	R88A-CA1C005S	R88A-CA1D005B
		10 m	R88A-CA1C010S	R88A-CA1D010B
		15 m	R88A-CA1C015S	R88A-CA1D015B
		20 m	R88A-CA1C020S	R88A-CA1D020B
		30 m	R88A-CA1C030S	R88A-CA1D030B
		40 m	R88A-CA1C040S	R88A-CA1D040B
		50 m	R88A-CA1C050S	R88A-CA1D050B

Applicable Servomotor			Without brake wire	With brake wire
			Model	Model
200 V 400 V	3,000-r/min Servomotors of 2 kW (200 V) and 3 kW (200 V/400 V) 2,000-r/min Servomotors of 2 kW (200 V) and 3 kW (200 V/400 V) 1,000-r/min Servomotors of 2 kW (200 V/400 V) and 3 kW (400 V)	3 m	R88A-CA1E003S	R88A-CA1E003B
		5 m	R88A-CA1E005S	R88A-CA1E005B
		10 m	R88A-CA1E010S	R88A-CA1E010B
		15 m	R88A-CA1E015S	R88A-CA1E015B
		20 m	R88A-CA1E020S	R88A-CA1E020B
		30 m	R88A-CA1E030S	R88A-CA1E030B
		40 m	R88A-CA1E040S	R88A-CA1E040B
		50 m	R88A-CA1E050S	R88A-CA1E050B
200 V	1,000-r/min Servomotors of 3 kW	3 m	R88A-CA1F003S	R88A-CA1F003B
		5 m	R88A-CA1F005S	R88A-CA1F005B
		10 m	R88A-CA1F010S	R88A-CA1F010B
		15 m	R88A-CA1F015S	R88A-CA1F015B
		20 m	R88A-CA1F020S	R88A-CA1F020B
		30 m	R88A-CA1F030S	R88A-CA1F030B
		40 m	R88A-CA1F040S	R88A-CA1F040B
		50 m	R88A-CA1F050S	R88A-CA1F050B

Encoder Cables (Flexible Cable)

Applicable Servomotor			Model
100 V 200 V	3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	3 m	R88A-CR1A003CF
		5 m	R88A-CR1A005CF
		10 m	R88A-CR1A010CF
		15 m	R88A-CR1A015CF
		20 m	R88A-CR1A020CF
		30 m	R88A-CR1A030CF
		40 m	R88A-CR1A040CF
		50 m	R88A-CR1A050CF
200 V 400 V	200 V: 3,000-r/min Servomotors of 1 kW or more For 2,000-r/min Servomotors For 1,000-r/min Servomotors 400 V: 3,000-r/min Servomotors 2,000-r/min Servomotors 1,000-r/min Servomotors	3 m	R88A-CR1B003NF
		5 m	R88A-CR1B005NF
		10 m	R88A-CR1B010NF
		15 m	R88A-CR1B015NF
		20 m	R88A-CR1B020NF
		30 m	R88A-CR1B030NF
		40 m	R88A-CR1B040NF
		50 m	R88A-CR1B050NF

Brake Cables (Flexible Cable)

Applicable Servomotor			Model
100 V 200 V	3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	3 m	R88A-CA1A003BF
		5 m	R88A-CA1A005BF
		10 m	R88A-CA1A010BF
		15 m	R88A-CA1A015BF
		20 m	R88A-CA1A020BF
		30 m	R88A-CA1A030BF
		40 m	R88A-CA1A040BF
		50 m	R88A-CA1A050BF

System Configuration
NJ/NX/NY Series · Controllers
Sysmac Studio
FA Communications Software · Softwares
NA Series
NX Series · Programmable Terminals
G5 Series · Slave Terminals
1S Series
MX2-V1 Series · Safety
RX-V1 Series · Mortion/Drives
Industrial Robots
FH Series · Inverters
FQ-M Series · Robotics
ZW-7000 Series ZW Series
E3NX/E3NC E3X/E3C/E2C · Sensors
GX Series · Remote I/O Terminals
Related Manuals
Ordering Information

Motor Power Cables (Flexible Cable)

Applicable Servomotor			Without brake wire	With brake wire
			Model	Model
100 V 200 V	3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	3 m	R88A-CA1A003SF	---
		5 m	R88A-CA1A005SF	---
		10 m	R88A-CA1A010SF	---
		15 m	R88A-CA1A015SF	---
		20 m	R88A-CA1A020SF	---
		30 m	R88A-CA1A030SF	---
		40 m	R88A-CA1A040SF	---
		50 m	R88A-CA1A050SF	---
200 V	3,000-r/min Servomotors of 1 kW 2,000-r/min Servomotors of 1 kW 1,000-r/min Servomotors of 900 W	3 m	R88A-CA1B003SF	R88A-CA1B003BF
		5 m	R88A-CA1B005SF	R88A-CA1B005BF
		10 m	R88A-CA1B010SF	R88A-CA1B010BF
		15 m	R88A-CA1B015SF	R88A-CA1B015BF
		20 m	R88A-CA1B020SF	R88A-CA1B020BF
		30 m	R88A-CA1B030SF	R88A-CA1B030BF
		40 m	R88A-CA1B040SF	R88A-CA1B040BF
		50 m	R88A-CA1B050SF	R88A-CA1B050BF
200 V	3,000-r/min Servomotors of 1.5 kW 2,000-r/min Servomotors of 1.5 kW	3 m	R88A-CA1C003SF	R88A-CA1C003BF
		5 m	R88A-CA1C005SF	R88A-CA1C005BF
		10 m	R88A-CA1C010SF	R88A-CA1C010BF
		15 m	R88A-CA1C015SF	R88A-CA1C015BF
		20 m	R88A-CA1C020SF	R88A-CA1C020BF
		30 m	R88A-CA1C030SF	R88A-CA1C030BF
		40 m	R88A-CA1C040SF	R88A-CA1C040BF
		50 m	R88A-CA1C050SF	R88A-CA1C050BF
400 V	3,000-r/min Servomotors of 750 W, 1 kW, 1.5 kW, and 2 kW 2,000-r/min Servomotors of 400 W, 600 W, 1 kW, 1.5 kW, and 2 kW 1,000-r/min Servomotors of 900 W	3 m	R88A-CA1C003SF	R88A-CA1D003BF
		5 m	R88A-CA1C005SF	R88A-CA1D005BF
		10 m	R88A-CA1C010SF	R88A-CA1D010BF
		15 m	R88A-CA1C015SF	R88A-CA1D015BF
		20 m	R88A-CA1C020SF	R88A-CA1D020BF
		30 m	R88A-CA1C030SF	R88A-CA1D030BF
		40 m	R88A-CA1C040SF	R88A-CA1D040BF
		50 m	R88A-CA1C050SF	R88A-CA1D050BF
200 V 400 V	3,000-r/min Servomotors of 2 kW (200 V) and 3 kW (200 V/400 V) 2,000-r/min Servomotors of 2 kW (200 V) and 3 kW (200 V/400 V) 1,000-r/min Servomotors of 2 kW (200 V/400 V) and 3 kW (400 V)	3 m	R88A-CA1E003SF	R88A-CA1E003BF
		5 m	R88A-CA1E005SF	R88A-CA1E005BF
		10 m	R88A-CA1E010SF	R88A-CA1E010BF
		15 m	R88A-CA1E015SF	R88A-CA1E015BF
		20 m	R88A-CA1E020SF	R88A-CA1E020BF
		30 m	R88A-CA1E030SF	R88A-CA1E030BF
		40 m	R88A-CA1E040SF	R88A-CA1E040BF
		50 m	R88A-CA1E050SF	R88A-CA1E050BF
200 V	1,000-r/min Servomotors of 3 kW	3 m	R88A-CA1F003SF	R88A-CA1F003BF
		5 m	R88A-CA1F005SF	R88A-CA1F005BF
		10 m	R88A-CA1F010SF	R88A-CA1F010BF
		15 m	R88A-CA1F015SF	R88A-CA1F015BF
		20 m	R88A-CA1F020SF	R88A-CA1F020BF
		30 m	R88A-CA1F030SF	R88A-CA1F030BF
		40 m	R88A-CA1F040SF	R88A-CA1F040BF
		50 m	R88A-CA1F050SF	R88A-CA1F050BF

Recommended EtherCAT Communications Cable

Refer to Connecting cable with NJ-series Controller for the recommended cables.

Peripheral Connector
Servo Drive Side Connectors

One of each of servo drive side connectors (except the encoder connector) are included with the R88D-1SN@-ECT AC Servo Drive.
All connecters are also available separately for maintenance.

Name and applications	Model
Main circuit connector (CNA) *1 For R88D-1SN01L-ECT/-1SN02L-ECT/-1SN04L-ECT/-1SN01H-ECT/-1SN02H-ECT/-1SN04H-ECT/-1SN08H-ECT/ -1SN10H-ECT	R88A-CN102P *4
Main circuit connector A (CNA) *2 For R88D-1SN15H-ECT/-1SN20H-ECT/-1SN30H-ECT/-1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT/-1SN20F-ECT/ -1SN30F-ECT	R88A-CN103P *4
Main circuit connector B (CNB) *2 For R88D-1SN15H-ECT/-1SN20H-ECT/-1SN30H-ECT/-1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT/-1SN20F-ECT/ -1SN30F-ECT	R88A-CN104P *4
Motor connector (CNC) For R88D-1SN01L-ECT/-1SN02L-ECT/-1SN04L-ECT/-1SN01H-ECT/-1SN02H-ECT/-1SN04H-ECT/-1SN08H-ECT/ -1SN10H-ECT	R88A-CN101A *4
Motor connector (CNC) For R88D-1SN15H-ECT/-1SN20H-ECT/-1SN30H-ECT/-1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT/-1SN20F-ECT/ -1SN30F-ECT	R88A-CN102A *4
Control power supply connector (CND) For R88D-1SN15H-ECT/-1SN20H-ECT/-1SN30H-ECT/-1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT/-1SN20F-ECT/ -1SN30F-ECT	R88A-CN101P *4
Control I/O connector (CN1) *3	R88A-CN101C
Encoder connector (CN2)	R88A-CN101R
Brake interlock connector (CN12)	R88A-CN101B

*1. Two short-circuit wires are connected to the connector.
*2. One short-circuit wire is connected to the connector.
*3. Four short-circuit wires are connected to the connector.
*4. One opener is included.

Servomotor Side Connector

Name and applications			Model
Encoder connector	100 V, 200 V	For 3,000 r/min (100 to 750 W)	R88A-CNK02R
	100 V, 200 V	For 3,000 r/min (1 to 3 kW), 2,000 r/min, 1,000 r/min	R88A-CN104R
	400 V	For 3,000 r/min, 2,000 r/min, 1,000 r/min	
Power connector (For 750 W max.)			R88A-CN111A
Brake connector (For 750 W max.)			R88A-CN111B

External Regeneration Resistors

Applicable Servo Drive	Specifications	Model
R88D-1SN01L-ECT/-1SN02L-ECT	Regeneration process capacity: 24 W, 15 Ω	R88A-RR12015
R88D-1SN01H-ECT/-1SN02H-ECT	Regeneration process capacity: 24 W, 25 Ω	R88A-RR12025
R88D-1SN20H-ECT/-1SN30H-ECT	Regeneration process capacity: 60 W, 10 Ω	R88A-RR30010
R88D-1SN04L-ECT	Regeneration process capacity: 60 W, 12 Ω	R88A-RR30012
R88D-1SN01L-ECT/-1SN02L-ECT	Regeneration process capacity: 60 W, 15 Ω	R88A-RR30015
R88D-1SN15H-ECT	Regeneration process capacity: 60 W, 17 Ω	R88A-RR30017
R88D-1SN08H-ECT/-1SN10H-ECT/-1SN20F-ECT */ -1SN30F-ECT *	Regeneration process capacity: 60 W, 20 Ω	R88A-RR30020
R88D-1SN01H-ECT/-1SN02H-ECT/-1SN04H-ECT	Regeneration process capacity: 60 W, 25 Ω	R88A-RR30025
R88D-1SN06F-ECT */-1SN10F-ECT */-1SN15F-ECT *	Regeneration process capacity: 60 W, 33 Ω	R88A-RR30033

* Use two series-connected External Regeneration Resistors for this model.

External Regeneration Resistance Unit

Applicable Servo Drive	Specifications	Model
R88D-1SN20H-ECT/-1SN30H-ECT	Regeneration process capacity: 640 W, 10 Ω	R88A-RR1K610
R88D-1SN15H-ECT	Regeneration process capacity: 640 W, 17 Ω	R88A-RR1K617
R88D-1SN08H-ECT/-1SN10H-ECT/-1SN20F-ECT */ -1SN30F-ECT *	Regeneration process capacity: 640 W, 20 Ω	R88A-RR1K620
R88D-1SN20F-ECT/-1SN30F-ECT	Regeneration process capacity: 640 W, 40 Ω	R88A-RR1K640
R88D-1SN06F-ECT/-1SN10F-ECT/-1SN15F-ECT	Regeneration process capacity: 640 W, 66 Ω	R88A-RR1K666

* Use two series-connected External Regeneration Resistance Units for this model.

Reactor

Applicable Servomotor	Model
R88D-1SN01L-ECT/-1SN01H-ECT/-1SN02H-ECT	R88A-PD2002
R88D-1SN02L-ECT/-1SN04H-ECT	R88A-PD2004
R88D-1SN04L-ECT/-1SN08H-ECT	R88A-PD2007
R88D-1SN10H-ECT/-1SN15H-ECT	R88A-PD2015
R88D-1SN20H-ECT	R88A-PD2022
R88D-1SN30H-ECT	R88A-PD2037
R88D-1SN06F-ECT	R88A-PD4007
R88D-1SN10F-ECT/-1SN15F-ECT	R88A-PD4015
R88D-1SN20F-ECT	R88A-PD4022
R88D-1SN30F-ECT	R88A-PD4037

Footprint-type Noise Filter

Applicable Servo Drive	Model
R88D-1SN01L-ECT/-1SN01H-ECT/-1SN02H-ECT (Single-phase input)	R88A-FI1S103
R88D-1SN02L-ECT/-1SN04H-ECT (Single-phase input)	R88A-FI1S105
R88D-1SN04L-ECT/-1SN08H-ECT (Single-phase input)	R88A-FI1S109
R88D-1SN15H-ECT (Single-phase input)	R88A-FI1S116
R88D-1SN01H-ECT/-1SN02H-ECT (3-phase input)	R88A-FI1S202
	R88A-FI1S203
R88D-1SN04H-ECT (3-phase input)	R88A-FI1S203
R88D-1SN08H-ECT (3-phase input)/-1SN10H-ECT	R88A-FI1S208
R88D-1SN15H-ECT (3-phase input)/-1SN20H-ECT/-1SN30H-ECT	R88A-FI1S216
R88D-1SN06F-ECT/-1SN10F-ECT-1SN15F-ECT/-1SN20F-ECT/-1SN30F-ECT	R88A-FI1S309

Combination table

Servo Drive and Servomotor Combinations

The following tables show the possible combinations of 1S-series Servo Drives and Servomotors.
The Servomotors and Servo Drives can only be used in the listed combinations. "□"at the end of the motor model number is for options, such as the shaft type and brake.

3,000-r/min Servomotors and Servo Drives

Main circuit power supply voltage	Servomotor rated output	Servomotor	Servo Drive
Single-phase 100 VAC	100 W	R88M-1M10030S-□	R88D-1SN01L-ECT
	200 W	R88M-1M20030S-□	R88D-1SN02L-ECT
	400 W	R88M-1M40030S-□	R88D-1SN04L-ECT
Single-phase/3-phase 200 VAC	100 W	R88M-1M10030T-□	R88D-1SN01H-ECT
	200 W	R88M-1M20030T-□	R88D-1SN02H-ECT
	400 W	R88M-1M40030T-□	R88D-1SN04H-ECT
	750 W	R88M-1M75030T-□	R88D-1SN08H-ECT
	1.5 kW	R88M-1L1K530T-□	R88D-1SN15H-ECT
3-phase 200 VAC	1 kW	R88M-1L1K030T-□	R88D-1SN10H-ECT
	2 kW	R88M-1L2K030T-□	R88D-1SN20H-ECT
	3 kW	R88M-1L3K030T-□	R88D-1SN30H-ECT
3-phase 400 VAC	750 W	R88M-1L75030C-□	R88D-1SN10F-ECT
	1 kW	R88M-1L1K030C-□	R88D-1SN10F-ECT
	1.5 kW	R88M-1L1K530C-□	R88D-1SN15F-ECT
	2 kW	R88M-1L2K030C-□	R88D-1SN20F-ECT
	3 kW	R88M-1L3K030C-□	R88D-1SN30F-ECT

2,000-r/min Servomotors and Servo Drives

Main circuit power supply voltage	Servomotor rated output	Servomotor	Servo Drive
Single-phase/3-phase 200 VAC	1.5 kW	R88M-1M1K520T-□	R88D-1SN15H-ECT
3-phase 200 VAC	1 kW	R88M-1M1K020T-□	R88D-1SN10H-ECT
	2 kW	R88M-1M2K020T-□	R88D-1SN20H-ECT
	3 kW	R88M-1M3K020T-□	R88D-1SN30H-ECT
3-phase 400 VAC	400 W	R88M-1M40020C-□	R88D-1SN06F-ECT
	600 W	R88M-1M60020C-□	R88D-1SN06F-ECT
	1 kW	R88M-1M1K020C-□	R88D-1SN10F-ECT
	1.5 kW	R88M-1M1K520C-□	R88D-1SN15F-ECT
	2 kW	R88M-1M2K020C-□	R88D-1SN20F-ECT
	3 kW	R88M-1M3K020C-□	R88D-1SN30F-ECT

1,000-r/min Servomotors and Servo Drives

Main circuit power supply voltage	Servomotor rated output	Servomotor	Servo Drive
3-phase 200 VAC	900 W	R88M-1M90010T-□	R88D-1SN10H-ECT
	2 kW	R88M-1M2K010T-□	R88D-1SN20H-ECT
	3 kW	R88M-1M3K010T-□	R88D-1SN30H-ECT
3-phase 400 VAC	900 W	R88M-1M90010C-□	R88D-1SN10F-ECT
	2 kW	R88M-1M2K010C-□	R88D-1SN20F-ECT
	3 kW	R88M-1M3K010C-□	R88D-1SN30F-ECT

System Configuration

Controllers

NJ/NX/NY Series

Sysmac Studio

Softwares

FA Communications Software

Programmable Terminals

NA Series

NX Series

Slave Terminals

G5 Series

1S Series

Safety

MX2-V1 Series

Motion/Drives

RX-V1 Series

Industrial Robots

Inverters

FH Series

FQ-M Series

Robotics

ZW-7000 Series ZW Series

Sensors

E3NX/E3NC E3X/E3C/E2C

Remote I/O Terminals

GX Series

Ordering Information

Related Manuals

Servomotor and Decelerator Combinations

3,000-r/min Servomotors and Decelerators (Backlash:3 Arcminutes Max.)

Servomotor models *	1/5	1/11	1/21	1/33	1/45
R88M-1M10030□	R88G-HPG 11B05100B□	R88G-HPG 14A11100B□	R88G-HPG 14A21100B□	R88G-HPG 20A33100B□	R88G-HPG 20A45100B□
R88M-1M20030□	R88G-HPG 14A05200B□	R88G-HPG 14A11200B□	R88G-HPG 20A21200B□	R88G-HPG 20A33200B□	R88G-HPG 20A45200B□
R88M-1M40030□	R88G-HPG 14A05400B□	R88G-HPG 20A11400B□	R88G-HPG 20A21400B□	R88G-HPG 32A33400B□	R88G-HPG 32A45400B□
R88M-1M75030□ (200 VAC)	R88G-HPG 20A05750B□	R88G-HPG 20A11750B□	R88G-HPG 32A21750B□	R88G-HPG 32A33750B□	R88G-HPG 32A45750B□
R88M-1L75030□ (400 VAC)	R88G-HPG 32A052K0B□	R88G-HPG 32A112K0B□	R88G-HPG 32A211K5B□	R88G-HPG 32A33600SB□	R88G-HPG 50A451K5B□
R88M-1L1K030□				R88G-HPG 50A332K0B□	
R88M-1L1K530□					
R88M-1L2K030□			R88G-HPG 50A212K0B□		---
R88M-1L3K030□	R88G-HPG 32A053K0B□	R88G-HPG 50A113K0B□	R88G-HPG 50A213K0B□	---	---

* You cannot use a Servomotor with a key and tap (model numbers with -S2 at the end) in combination with a Decelerator.

2,000-r/min Servomotors and Decelerators (Backlash:3 Arcminutes Max.)

Servomotor models *	1/5	1/11	1/21	1/25	1/33	1/45
R88M-1M40020□ (400VAC)	R88G-HPG 32A052K0B□	R88G-HPG 32A112K0B□	R88G-HPG 32A211K5B□	---	R88G-HPG 32A33600SB□	R88G-HPG 32A45400SB□
R88M-1M60020□ (400VAC)				---		R88G-HPG 50A451K5B□
R88M-1M1K020□	R88G-HPG 32A053K0B□	R88G-HPG 32A112K0SB□	R88G-HPG 32A211K0SB□	---	R88G-HPG 50A332K0SB□	R88G-HPG 50A451K0SB□
R88M-1M1K520□			R88G-HPG 50A213K0B□	---		---
R88M-1M2K020□				---		---
R88M-1M3K020□	R88G-HPG 32A054K0B□	R88G-HPG 50A115K0B□	R88G-HPG 50A213K0SB□	R88G-HPG 65A253K0SB□	---	---

* You cannot use a Servomotor with a key and tap (model numbers with -S2 at the end) in combination with a Decelerator.

1,000-r/min Servomotors and Decelerators (Backlash:3 Arcminutes Max.)

Servomotor models *	1/5	1/11	1/21	1/25	1/33	1/45
R88M-1M90010□	R88G-HPG 32A05900TB□	R88G-HPG 32A11900TB□	---	R88G-HPG 50A21900TB□	---	R88G-HPG 50A33900TB□
R88M-1M2K010□	R88G-HPG 32A052K0TB□	R88G-HPG 50A112K0TB□	---	R88G-HPG 50A212K0TB□	R88G-HPG 65A255K0SB□	---
R88M-1M3K020□	R88G-HPG 50A055K0SB□	R88G-HPG 50A115K0SB□	R88G-HPG 65A205K0SB□	---		---

* You cannot use a Servomotor with a key and tap (model numbers with -S2 at the end) in combination with a Decelerator.

Cable Connection Configuration

Encoder Cables
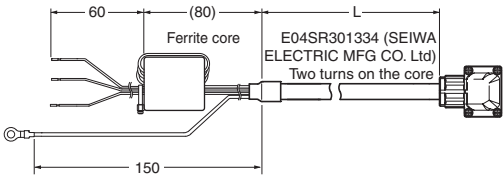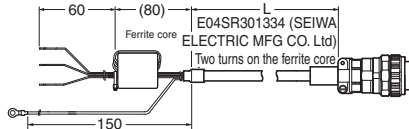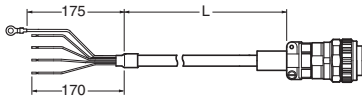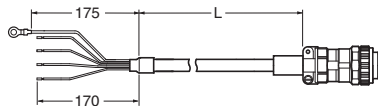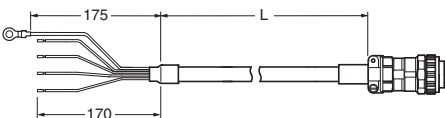
Connected to	Model	Connection configuration and external dimensions [mm]	
100 V and 200 V: 3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	Standard Cable R88A-CR1A□□□C The empty boxes in the model number are for the cable length. (3 to 20 m: 5.3 dia. 30 to 50 m: 6.0 dia.)	Servo Drive side connector Connector model Receptacle: 3E206-0100KV (3M) Shell kit: 3E306-3200-008 (3M)	Servomotor side connector Angle clamp model JN6FR07SM1 (Japan Aviation Electronics) Connector pin model LY10-C1-A1-10000 (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 1 kW, 2,000-r/min Servomotors, and 1,000-r/min Servomotors 400 V: 3,000-r/min Servomotors, 2,000-r/min Servomotors, and 1,000-r/min Servomotors	Standard Cable R88A-CR1B□□□N The empty boxes in the model number are for the cable length. (6.0 dia.)	Servo Drive side connector Connector model Receptacle: 3E206-0100KV (3M) Shell kit: 3E306-3200-008 (3M)	Servomotor side connector Straight plug model JN2DS10SL1-R (Japan Aviation Electronics) Contact model JN1-22-22S-10000 (Japan Aviation Electronics)
100 V and 200 V: 3,000-r/min Servomotors of 100 W, 200 W, 400 W and 750 W	Flexible Cable R88A-CR1A□□□CF The empty boxes in the model number are for the cable length. (3 to 20 m: 5.3 dia. 30 to 50 m: 6.0 dia.)	Servo Drive side connector Connector model Receptacle: 3E206-0100KV (3M) Shell kit: 3E306-3200-008 (3M)	Servomotor side connector Angle clamp model JN6FR07SM1 (Japan Aviation Electronics) Connector pin model LY10-C1-A1-10000 (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 1 kW, 2,000-r/min Servomotors, and 1,000-r/min Servomotors 400 V: 3,000-r/min Servomotors, 2,000-r/min Servomotors, and 1,000-r/min Servomotors	Flexible Cable R88A-CR1B□□□NF The empty boxes in the model number are for the cable length. (6.0 dia.)	Servo Drive side connector Connector model Receptacle: 3E206-0100KV (3M) Shell kit: 3E306-3200-008 (3M)	Servomotor side connector Straight plug model JN2DS10SL1-R (Japan Aviation Electronics) Contact model JN1-22-22S-10000 (Japan Aviation Electronics)

Note: Cable length: 3 m, 5 m, 10 m, 15 m, 20 m, 30 m, 40 m, 50 m
The empty boxes in the model number are put as follows: 3 m = 003, 5 m = 005, 10 m = 010.
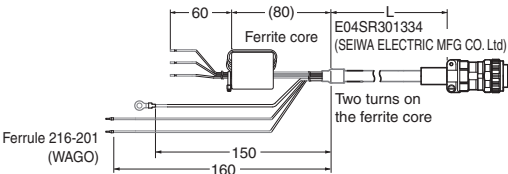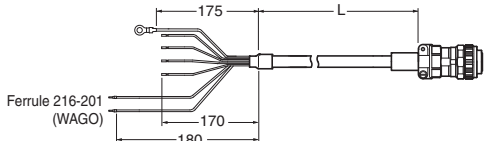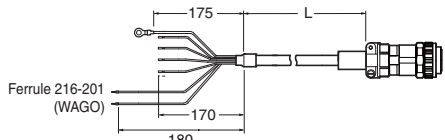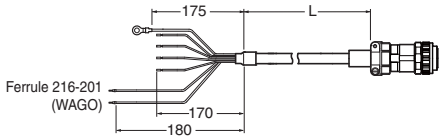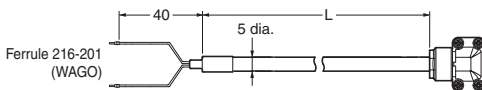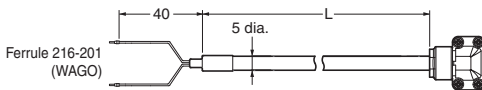
Power Cables without Brake Wire
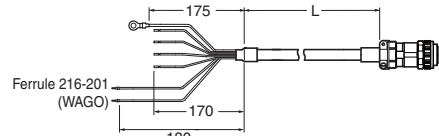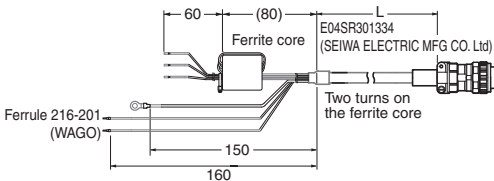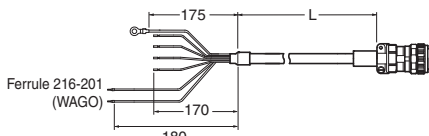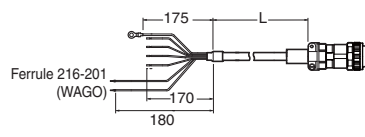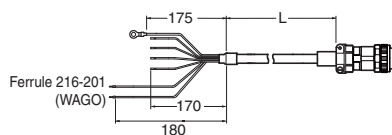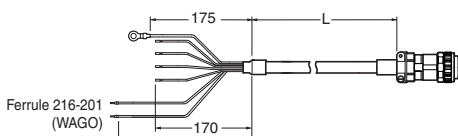
Connected to	Model	Connection configuration and external dimensions [mm]	
100 V and 200 V: 3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	Standard Cable R88A-CA1A□□□S The empty boxes in the model number are for the cable length. (6.8 dia.)	60 (80) L Ferrite core E04SR301334 (SEIWA ELECTRIC MFG CO. Ltd) Two turns on the core 150	Servomotor side connector Connector JN6FS05SJ2 (Japan Aviation Electronics) Socket contact ST-JN6-S-C1B-2500 (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 1 kW, 2,000-r/min Servomotors of 1 kW, and 1,000-r/min Servomotors of 900 W	Standard Cable R88A-CA1B□□□S The empty boxes in the model number are for the cable length. (10.8 dia.)	60 (80) L Ferrite core E04SR301334 (SEIWA ELECTRIC MFG CO. Ltd) Two turns on the core 150	Servomotor side connector Connector JL10-6A20-4SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(12)-R (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 1.5 kW and 2,000-r/min Servomotors of 1.5 kW 400 V: 3,000-r/min Servomotors of 750 W, 1 kW, 1.5 kW, and 2 kW 2,000-r/min Servomotors of 400 W, 600 W, 1 kW, 1.5 kW, and 2 kW 1,000-r/min Servomotors of 900 W	Standard Cable R88A-CA1C□□□S The empty boxes in the model number are for the cable length. (10.8 dia.)	175 L 170	Servomotor side connector Connector JL10-6A20-4SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(12)-R (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 2 kW and 3 kW 2,000-r/min Servomotors of 2 kW and 3 kW 1,000-r/min Servomotors of 2 kW 400 V: 3,000-r/min Servomotors of 3 kW 2,000-r/min Servomotors of 3 kW 1,000-r/min Servomotors of 2 kW and 3 kW	Standard Cable R88A-CA1E□□□S The empty boxes in the model number are for the cable length. (12.0 dia.)	175 L 170	Servomotor side connector Connector JL10-6A22-22SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(12)-R (Japan Aviation Electronics)
200 V: 1,000-r/min Servomotors of 3 kW	Standard Cable R88A-CA1F□□□S The empty boxes in the model number are for the cable length. (14.5 dia.)	175 L 170	Servomotor side connector Connector JL10-6A22-22SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(14)-R (Japan Aviation Electronics)

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Motion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

NJ/NX/NY Series
Sysmac Studio
FA Communications Software
NA Series
NX Series
G5 Series
1S Series
MX2-V1 Series
RX-V1 Series
Industrial Robots
FH Series
FQ-M Series
ZW-7000 Series ZW Series
E3NX/E3NC E3X/E3C/E2C
GX Series
Related Manuals

OMRON | **659**

Connected to	Model	Connection configuration and external dimensions [mm]	
100 V and 200 V: 3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	Flexible Cable R88A-CA1A□□□SF The empty boxes in the model number are for the cable length. (6.8 dia.)		Servomotor side connector Connector JN6FS05SJ2 (Japan Aviation Electronics) Socket contact ST-JN5-S-C1B-2500 (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 1 kW, 2,000-r/min Servomotors of 1 kW, and 1,000-r/min Servomotors of 900 W	Flexible Cable R88A-CA1B□□□SF The empty boxes in the model number are for the cable length. (10.8 dia.)		Servomotor side connector Connector JL10-6A20-4SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(12)-R (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 1.5 kW 2,000-r/min Servomotors of 1.5 kW 400 V: 3,000-r/min Servomotors of 750 W, 1 kW, 1.5 kW, and 2 kW 2,000-r/min Servomotors of 400 W, 600 W, 1 kW, 1.5 kW, and 2 kW 1,000-r/min Servomotors of 900 W	Flexible Cable R88A-CA1C□□□SF The empty boxes in the model number are for the cable length. (10.8 dia.)		Servomotor side connector Connector JJL10-6A20-4SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(12)-R (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 2 kW and 3 kW 2,000-r/min Servomotors of 2 kW and 3 kW 1,000-r/min Servomotors of 2 kW 400 V: 3,000-r/min Servomotors of 3 kW 2,000-r/min Servomotors of 3 kW 1,000-r/min Servomotors of 2 kW and 3 kW	Flexible Cable R88A-CA1E□□□SF The empty boxes in the model number are for the cable length. (12.0 dia.)		Servomotor side connector Connector JL10-6A22-22SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(12)-R (Japan Aviation Electronics)
200 V: 1,000-r/min Servomotors of 3 kW	Flexible Cable R88A-CA1F□□□SF The empty boxes in the model number are for the cable length. (14.5 dia.)		Servomotor side connector Connector JL10-6A22-22SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(14)-R (Japan Aviation Electronics)

Note: Cable length: 3 m, 5 m, 10 m, 15 m, 20 m, 30 m, 40 m, 50 m
The empty boxes in the model number are put as follows: 3 m = 003, 5 m = 005, 10 m = 010.

Power Cables with Brake Wire

Connected to	Model	Connection configuration and external dimensions [mm]	
200 V: 3,000-r/min Servomotors of 1 kW 2,000-r/min Servomotors of 1 kW 1,000-r/min Servomotors of 900 W	Standard Cable R88A-CA1B□□□B The empty boxes in the model number are for the cable length. (12.5 dia.)		Servomotor side connector Connector JL10-6A20-18SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(12)-R (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 1.5 kW 2,000-r/min Servomotors of 1.5 kW	Standard Cable R88A-CA1C□□□B The empty boxes in the model number are for the cable length. (12.5 dia.)		Servomotor side connector Connector JL10-6A20-18SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(12)-R (Japan Aviation Electronics)
400 V: 3,000-r/min Servomotors of 750 W, 1 kW, 1.5 kW, and 2 kW 2,000-r/min Servomotors of 400 W, 600 W, 1 kW, 1.5 kW, and 2 kW 1,000-r/min Servomotors of 900 W	Standard Cable R88A-CA1D□□□B The empty boxes in the model number are for the cable length. (12.5 dia.)		Servomotor side connector Connector JL10-6A24-11SE-EB (Japan Aviation Electronics) Clamp JL04-2428CK(14)-R (Japan Aviation Electronics)

Connected to	Model	Connection configuration and external dimensions [mm]	
200 V: 3,000-r/min Servomotors of 2 kW and 3 kW 2,000-r/min Servomotors of 2 kW and 3 kW 1,000-r/min Servomotors of 2 kW 400 V: 3,000-r/min Servomotors of 3 kW 2,000-r/min Servomotors of 3 kW 1,000-r/min Servomotors of 2 kW and 3 kW	Standard Cable R88A-CA1E□□□B The empty boxes in the model number are for the cable length. (14.0 dia.)		Servomotor side connector Connector JL10-6A24-11SE-EB (Japan Aviation Electronics) Clamp JL04-2428CK(14)-R (Japan Aviation Electronics)
200 V: 1,000-r/min Servomotors of 3 kW	Standard Cable R88A-CA1F□□□B The empty boxes in the model number are for the cable length. (17.0 dia.)		Servomotor side connector Connector JL10-6A24-11SE-EB (Japan Aviation Electronics) Clamp JL04-2428CK(17)-R (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 1 kW 2,000-r/min Servomotors of 1 kW 1,000-r/min Servomotors of 900 W	Flexible Cable R88A-CA1B□□□BF The empty boxes in the model number are for the cable length. (12.5 dia.)		Servomotor side connector Connector JL10-6A20-18SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(14)-R (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 1.5 kW 2,000-r/min Servomotors of 1.5 kW	Flexible Cable R88A-CA1C□□□BF The empty boxes in the model number are for the cable length. (12.5 dia.)		Servomotor side connector Connector JL10-6A20-18SE-EB (Japan Aviation Electronics) Clamp JL04-2022CK(12)-R (Japan Aviation Electronics)
400 V: 3,000-r/min Servomotors of 750 W, 1 kW, 1.5 kW, and 2 kW 2,000-r/min Servomotors of 400 W, 600 W, 1 kW, 1.5 kW, and 2 kW 1,000-r/min Servomotors of 900 W	Flexible Cable R88A-CA1D□□□BF The empty boxes in the model number are for the cable length. (12.5 dia.)		Servomotor side connector Connector JL10-6A24-11SE-EB (Japan Aviation Electronics) Clamp JL04-2428CK(14)-R (Japan Aviation Electronics)
200 V: 3,000-r/min Servomotors of 2 kW and 3 kW 2,000-r/min Servomotors of 2 kW and 3 kW 1,000-r/min Servomotors of 2 kW 400 V: 3,000-r/min Servomotors of 3 kW 2,000-r/min Servomotors of 3 kW 1,000-r/min Servomotors of 2 kW and 3 kW	Flexible Cable R88A-CA1E□□□BF The empty boxes in the model number are for the cable length. (14.2 dia.)		Servomotor side connector Connector JL10-6A24-11SE-EB (Japan Aviation Electronics) Clamp JL04-2428CK(14)-R (Japan Aviation Electronics)
200 V: 1,000-r/min Servomotors of 3 kW	Flexible Cable R88A-CA1F□□□BF The empty boxes in the model number are for the cable length. (17.0 dia.)		Servomotor side connector Connector JL10-6A24-11SE-EB (Japan Aviation Electronics) Clamp JL04-2428CK(17)-R (Japan Aviation Electronics)

Note: Cable length: 3 m, 5 m, 10 m, 15 m, 20 m, 30 m, 40 m, 50 m
The empty boxes in the model number are put as follows: 3 m = 003, 5 m = 005, 10 m = 010.

Brake Cables

Connected to	Model	Connection configuration and external dimensions [mm]	
100 V and 200 V: 3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	Standard Cable R88A-CA1A□□□B The empty boxes in the model number are for the cable length. (5.0 dia.)		Servomotor side connector Connector JN6FR02SM1 (Japan Aviation Electronics) Socket contact LY10-C1-A1-10000 (Japan Aviation Electronics)
100 V and 200 V: 3,000-r/min Servomotors of 100 W, 200 W, 400 W, and 750 W	Flexible Cable R88A-CA1A□□□BF The empty boxes in the model number are for the cable length. (5.0 dia.)		Servomotor side connector Connector JN6FR02SM1 (Japan Aviation Electronics) Socket contact LY10-C1-A1-10000 (Japan Aviation Electronics)

Note: Cable length: 3 m, 5 m, 10 m, 15 m, 20 m, 30 m, 40 m, 50 m
The empty boxes in the model number are put as follows: 3 m = 003, 5 m = 005, 10 m = 010.

Interpreting Model Numbers

$$3G3MX2-A\square\square\square\square-V1$$

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

-V1	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**	
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	

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NJ/NX/NY Series

Sysmac Studio

FA Communications Software

NA Series

NX Series

G5 Series

1S Series

MX2-V1 Series

RX-V1 Series

Industrial Robots

FH Series

FQ-M Series

ZW-7000 Series ZW Series

E3NX/E3NC E3X/E3C/E2C

GX Series

Related Manuals

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.

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**

System Configuration

NJ/NX/NY Series | Controllers
Sysmac Studio
FA Communications Software | Softwares
NA Series | Programmable Terminals
NX Series
G5 Series | Slave Terminals
1S Series
MX2-V1 Series | Safety
RX-V1 Series | Mortion/Drives
Industrial Robots
FH Series | Inverters
FQ-M Series | Robotics
ZW-7000 Series ZW Series
E3NX/E3NC E3X/E3C/E2C | Sensors
GX Series | Remote I/O Terminals
Related Manuals | Ordering Information

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.

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

Ordering Information

NJ/NX/NY Series

Sysmac Studio

FA Communications Software

NA Series

NX Series

G5 Series

1S Series

MX2-V1 Series

RX-V1 Series

Industrial Robots

FH Series

FQ-M Series

ZW-7000 Series ZW Series

E3NX/E3NC E3X/E3C/E2C

GX Series

Related Manuals

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**
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.

Industrial Robots

Ordering Information

Industrial Robots

Type	Name	Model
Parallel Robots	Hornet 565 4AXIS	17201-45604
	Hornet 565 3AXIS	17201-45600
	Hornet 565 4AXIS (Add on)	17203-45604
	Hornet 565 3AXIS (Add on)	17203-45600
	Quattro 650H P30	17214-26000
	Quattro 650H P31	17214-26001
	Quattro 650H P32	17214-26002
	Quattro 650H P34	17214-26004
	Quattro 650HS P30	17214-26010
	Quattro 650HS P31	17214-26011
	Quattro 650HS P32	17214-26012
	Quattro 650HS P34	17214-26014
	Quattro 800H P30	17214-26300
	Quattro 800H P31	17214-26301
	Quattro 800H P32	17214-26302
	Quattro 800H P34	17214-26304
	Quattro 650H P30 (Add on)	17213-26000
	Quattro 650H P31 (Add on)	17213-26001
	Quattro 650H P32 (Add on)	17213-26002
	Quattro 650H P34 (Add on)	17213-26004
	Quattro 650HS P30 (Add on)	17213-26010
	Quattro 650HS P31 (Add on)	17213-26011
	Quattro 650HS P32 (Add on)	17213-26012
	Quattro 650HS P34 (Add on)	17213-26014
	Quattro 800H P30 (Add on)	17213-26300
	Quattro 800H P31 (Add on)	17213-26301
	Quattro 800H P32 (Add on)	17213-26302
	Quattro 800H P34 (Add on)	17213-26304
SCARA Robots	Cobra 350	17201-13000
	eCobra 600 Lite	17010-16000
	eCobra 600 Standard	17111-16000
	eCobra 600 Pro	17211-16000
	eCobra 800 Lite	17010-18000
	eCobra 800 Standard	17111-18000
	eCobra 800 Pro	17211-18000
	eCobra 800 Inverted Lite	17010-18400
	eCobra 800 Inverted Standard	17111-18400
	eCobra 800 Inverted Pro	17211-18400
	Cobra 350 (Add on)	17203-13000
	eCobra 600 Standard (Add on)	17113-16000
	eCobra 600 Pro (Add on)	17213-16000
	eCobra 800 Standard (Add on)	17113-18000
	eCobra 800 Pro (Add on)	17213-18000
	eCobra 800 Inverted Standard (Add on)	17113-18400
	eCobra 800 Inverted Pro (Add on)	17213-18400
Articulated Robots	Viper 650	17201-36000
	Viper 850	17201-38000
	Viper 650 (Add on)	17203-36000
	Viper 850 (Add on)	17203-38000

System Configuration

Controllers

Softwares

Programmable Terminals

Slave Terminals

Safety

Mortion/Drives

Inverters

Robotics

Sensors

Remote I/O Terminals

NJ/NX/NY Series

Sysmac Studio

FA Communications Software

NA Series

NX Series

G5 Series

1S Series

MX2-V1 Series

RX-V1 Series

Industrial Robots

FH Series

FQ-M Series

ZW-7000 Series ZW Series

E3NX/E3NC E3X/E3C/E2C

GX Series

Related Manuals

Ordering Information

Industrial Robots

Options

Type	Name/Specifications	Model
Robot Controller	SmartController EX	19300-000
Pendant	T20 Pendant with 10m Cable	10046-010
	T20 Pendant-Jumper Plug	10048-000
	T20 Pendant Wall Bracket	10079-000
Sensor Controllers	SmartVision MX	14189-901
Camera	GigE PoE, 640 x 480 dots, 120 fps, Monochrome, CCD (1/4-inch equivalent), camera cables included (10 m)	24114-100
	GigE PoE, 640 x 480 dots, 120 fps, Color, CCD (1/4-inch equivalent), camera cables included (10 m)	24114-101
	GigE PoE, 1296 x 996 dots, 30 fps, Monochrome, CCD (1/3-inch equivalent), camera cables included (10 m)	24114-200
	GigE PoE, 1296 x 996 dots, 30 fps, Color, CCD (1/3-inch equivalent), camera cables included (10 m)	24114-201
	GigE PoE, 1600 x 1200 dots, 60 fps, Monochrome, CMOS (1/1.8-inch equivalent), camera cables included (10 m)	24114-250
	GigE PoE, 2048 x 2048 dots, 25 fps, Monochrome, CMOS (1-inch equivalent), camera cables included (10 m)	24114-300
Belt Encoder (Conveyor-Tracking)	Encoder Kit IP65	09742-001
	Y-Adapter Cable, 3 m	09443-000
	Encoder Extension Cable, 5 m	09446-050
	SCEX-BELT,Y-Adapter Cable	09550-000
	XBELTIO Cable	13463-000
Additional I/O Options	IO Blox 8 inputs/8 outputs (IO Blox - connects to robot)	90356-30200
	IO Blox 8 inputs/8 outputs (expansion - connects to previous IO Blox)	90356-30100
	IO Blox Extension Cable, 0.30m (connects IO Blox to IO Blox)	04679-003
	IO Blox Extension Cable, 3.0m (connects IO Blox to IO Blox)	04679-030
	IO Blox Extension Cable, 3.0m (connects IO Blox to robot)	04677-030
	Termination Block, 12inputs/8 outputs	90356-40100
Front panel	Front Panel	90356-10358
	Front Panel Cable	10356-10500
Power Supply/Cable	AC Power Cable	04118-000
	24 VDC Power Cable	04120-000
	24 VDC, 6.5 A, 150 W (Front Mounting), Power Supply	S8JX-G15024C *1
	24 VDC, 6.5 A, 150 W (DIN-Rail Mounting), Power Supply	S8JX-G15024CD *1
	1394 Cable, 4.5m	13632-045
	eAIB XSYSTEM Cable Assembly	13323-000
	DB9 Splitter	00411-000
	eAIB XSYS Cable	11585-000
	Ethernet Cable	XS6W-6LSZH8SS@@@CM-Y *2
	Industrial Switching Hubs	W4S1-05C *3
ACE License	Automation Control Environment (ACE)	Please download it from following URL: http://www.adept.com/Robots-Tool
	ACE PackXpert	09187-000
	ACE Sight Vision Software	01056-030
	Additional Camera Option	09287-000
	Color Camera Option	09287-040
	ACE PackXpert with ACE Sight Vision This license contains an ACE PackXpert license and an ACE Sight license.	09187-010

Type	Name/Specifications	Model
Related Products	Machine Automation Controller NJ/NX Series	NJ/NX *5
	Automation Software Sysmac Studio	SYSMAC-SE2@@@ *5
	Collection of software functional components Sysmac Library Adept Robot Control Library	SYSMAC-XR009 *6

Note: Contact your Omron representative for lenses, lights, and licenses.
*1. Refer to the Switch Mode Power Supply Catalog (Cat.No.T041) for details.
*2. Refer to the Industrial Ethernet Cables Catalog (Cat.No.G019) for details.
*3. Refer to the Industrial Switching Hubs Catalog (Cat.No.V227) for details.
*4. You must purchase all the required licenses at the time you purchase as the license cannot be added afterwards.
*5. Refer to the Sysmac Catalog (Cat.No.P072) for details.
*6. Refer to the Sysmac Library Catalog (Cat.No.P106) for details.

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 Acqui-sition Time *1	Model
	High-speed Digital CMOS Cameras (Lens required)	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 *2	**FH-SC12**
			Monochrome		**FH-SM12**
	High-speed Digital CMOS Cameras (Lens required)	4 million pixels	Color	8.5 ms *2	**FH-SC04**
			Monochrome		**FH-SM04**
		2 million pixels	Color	4.6 ms *2	**FH-SC02**
			Monochrome		**FH-SM02**
		300,000 pixels	Color	3.3 ms	**FH-SC**
			Monochrome		**FH-SM**
	Digital CMOS Cameras (Lens required)	5 million pixels	Color	71.7ms	**FH-SC05R**
			Monochrome		**FH-SM05R**
	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 Digital 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 Digital CMOS Camera (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**

*1 The image acquisition time does not include the image conversion processing time of the sensor controller.
 The camera image input time varies depending on the sensor controller model, number of cameras, and camera settings.
 Check before you use the camera.
*2 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.

Camera Cables

Item	Descriptions	Model *3
	Camera Cable Cable length: 2 m, 3 m, 5m, or 10 m *2	FZ-VS3 @M
	Bend resistant Camera Cable Cable length: 2 m, 3 m, 5m, or 10 m *2	FZ-VSB3 @M
	Right-angle Camera Cable *1 Cable length: 2 m, 3 m, 5m, or 10 m *2	FZ-VSL3 @M
	Bend resistant Right-angle Camera Cable *1 Cable length: 2 m, 3 m, 5 m, or 10 m *2	FZ-VSLB3 @M
	Long-distance Camera Cable Cable length: 15 m *2	FZ-VS4 15M
	Long-distance Right-angle Camera Cable *1 Cable length: 15 m *2	FZ-VSL4 15M
	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 Digital CMOS camera FH-S@02/-S@04/-S@12 is used in the high speed mode of transmission speed, two camera cables are required.
*3 Insert the cables length into @ in the model number as follows. 2 m = 2, 3 m = 3, 5 m = 5, 10 m = 10

Cameras / Cables Connection Table

Type of camera	Model	Cable length	High-speed Digital CMOS cameras							Digital CMOS Camera
			300,000-pixel	2 million-pixel		4 million-pixel		12 million-pixel		5 megapixel camera
			FH-SM/SC	FH-SM02/SC02		FH-SM04/SC04		FH-SM12/SC12		FH-SC05R/SM05R
			—	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	Yes
		3 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		5 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	No	Yes	No	Yes	No	Yes	Yes
Bend resistant camera cables Bend resistant Right-angle Camera Cable	FZ-VSB3 FZ-VSLB3	2 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		3 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		5 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	No	Yes	No	Yes	No	Yes	Yes
Long-distance camera cable Long-distance right-angle camera cable	FZ-VS4 FZ-VSL4	15 m	Yes	No	Yes	No	Yes	No	Yes	Yes

Type of camera	Model	Cable length	Digital CCD cameras			Small digital CCD cameras Pen type / flat type	High-speed Digital CCD cameras	Intelligent Compact Digital CMOS Camera
			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 Camera Cable	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
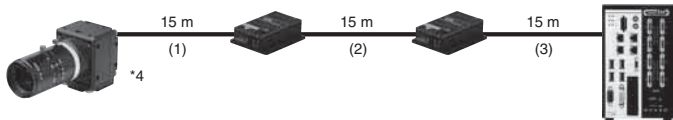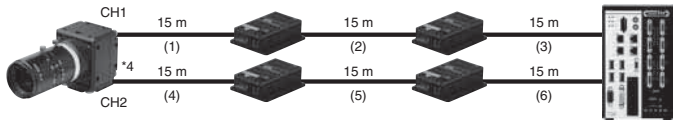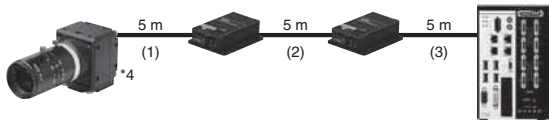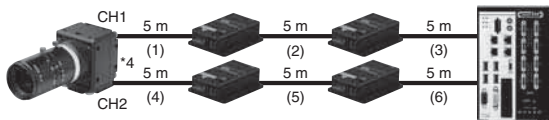
Item	Model	Transmission speed (*1)	No. of CH used for connection (*2)	Maximum cable length using 1 Camera Cable (*1)	Max. number of connectable Extension Units	Using Cable Extension Units FZ-VSJ	
						Max. cable length	Connection configuration
High-speed Digital CMOS Cameras	FH-SM/SC	---	---	15 m (Using 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 CMOS Cameras	FH-SC05R FH-SM05R	---	---	15m (Using FZ-VS4/VSL4)	2	45 m	[Configuration 1] Camera cable: 15 m × 3 Extension Unit: 2
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 Flat type/ Pen type	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 Digital 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 Digital CMOS Camera	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		
Configuration 3		
Configuration 4		

*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 @M** *1
	RS-232C Cable for Touch Panel Monitor Cable length: 2 m, 5 m or 10 m	**XW2Z-@@@PP-1** *2
	USB Cable for Touch Panel Monitor Cable length: 2 m or 5 m	**FH-VUAB @M** *1

*1 Insert the cables length into @ in the model number as follows. 2 m = 2, 5 m = 5, 10 m = 10
*2 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: 2m, 5m or 15m	**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-@34GD-T** *4
	Encoder Cable for line-driver Cable length: 1.5 m	**FH-VR 1.5M**

*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, 15 m = 15
*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.

Parallel Converter Cable

When you change to connect the F series, FZ5 series, or FZ5-L series to FH series Sensor Controller,
you can convert by using the appropriate parallel converter cable of FH-VPX series under the usable condition.

Item	Applicable Model		Usable Condition	Model
	FZ@ series		• Do not use RESET signal. * • Use with COMIN and COMUT are same power source.	**FH-VPX-FZ**
	FZ@-L35x series		• Do not use RESET signal. *	**FH-VPX-FZL**
	F160 series	F160-C10	• Do not use RESET signal. * • Use with COMIN and COMOUT are same power source. • Do not use DI5 and DI6.	**FH-VPX-F160**
	F210 series	F210-C10	• Do not use RESET signal. * • Use with COMIN and COMOUT are same power source. • Do not use DI8 and DI9.	**FH-VPX-F210**
		F210-C10-ETN		
	F500 series	F500-C10		

* Even if RESET signal cannot be use by conversion, conversion is possible to convert satisfying other usable condition.
Note: Cannot be used for the F160-C10CP/-C10CF.

Recommended EtherCAT and EtherNet/IP Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

NJ/NX/NY Series
Sysmac Studio
FA Communications Software
NA Series
NX Series
G5 Series
1S Series
MX2-V1 Series
RX-V1 Series
Industrial Robots
FH Series
FQ-M Series
ZW-7000 Series ZW Series
E3NX/E3NC E3X/E3C/E2C
GX Series
Related Manuals

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)
		— (Media only)	CD-ROM	FH-AP1

	• .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	1 license	—	FH-AP1L

Accessories

| Item	Descriptions			Model
	LCD Monitor 8.4 inches			FZ-M08
	LCD Monitor Cable 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.	2 m		FZ-VM 2M
		5 m		FZ-VM 5M
	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: 0.08 A	W4S1-03B
		5 port	Failure detection: None	Current consumption: 0.12 A	W4S1-05B
		5 port	Failure detection: Supported		W4S1-05C
–	Calibration Plate			FZD-CAL
–	External Lighting	—		FLV Series *
				FL Series *
	Lighting Controller (Required to control external lighting from a Controller)	For FLV-Series	Camera Mount Lighting Controller	FLV-TCC Series *
			Analog Lighting Controller	FLV-ATC Series *
		For FL-Series	Camera Mount Lighting Controller	FL-TCC Series *
	For Intelligent Compact Digital CMOS 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

* 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)	29.5 dia. 30.4	29.5 dia. 29.5	29 dia. 30.0	28 dia. 34.0	29 dia. 29.5	29 dia. 24.0	29 dia. 24.5	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/FH-S@05R)
(3Z4S-LE SV-7525H and 3Z4S-LE SV-10028H can also be used for FH-S@02 and 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)	42 dia. 57.5	39 dia. 52.5	30 dia. 51.0	30 dia. 47.5	30 dia. 36.0	44 dia. 45.5	44 dia. 57.5	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)	64.5 dia. 57.2	57 dia. 59	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	8 mm	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 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)	58.5 dia. 94	58.5 dia. 80	64.5 dia. 108	66 dia. 94.5	55.5 dia. 129.5	54 dia. 134.5
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					
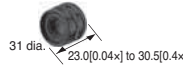
Lenses for small camera
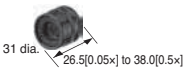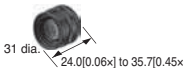
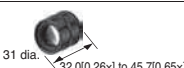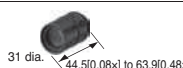| Model	FZ-LES3	FZ-LES6	FZ-LES16	FZ-LES30
Appearance/ Dimensions (mm)	12 dia. 16.4	12 dia. 19.7	12 dia. 23.1	12 dia. 25.5
Focal length	3 mm	6 mm	16 mm	30 mm
Aperture (F No.)	2.0 to 16	2.0 to 16	3.4 to 16	3.4 to 16

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@/FH-S@05R)
(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)	31 dia. 25.4[0.03×] to 29.5[0.3×]									31 dia. 23.0[0.04×] to 30.5[0.4×]								
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)	31 dia. 26.5[0.05×] to 38.0[0.5×]									31 dia. 24.0[0.06×] to 35.7[0.45×]								
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)	31 dia. 32.0[0.26×] to 45.7[0.65×]									31 dia. 44.5[0.08×] to 63.9[0.48×]								
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	1.9	5.6	8	1.9	5.6	8	1.9	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)	31 dia. 70.0[0.14×] to 105.5[0.62×]								
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 aperture 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.

High-resolution Telecentric Lens for C-mount Lens for 2/3-inch image sensor
(Recommend:FZ-S@/FZ-SH@/FZ-S@2M/FZ-S@5M2/FH-S@/FH-S@05R)

Model *1			3Z4S-LE VS-TCH05 -65@@@@	3Z4S-LE VS-TCH05 -110@@@@	3Z4S-LE VS-TCH1 -65@@@@	3Z4S-LE VS-TCH1 -110@@@@	3Z4S-LE VS-TCH1.5 -65@@@@	3Z4S-LE VS-TCH1.5 -110@@@@	3Z4S-LE VS-TCH2 -65@@@@	3Z4S-LE VS-TCH2 -110@@@@	3Z4S-LE VS-TCH4 -65@@@@	3Z4S-LE VS-TCH4 -110@@@@
Optical magnification (±5%)			0.5x		1.0x		1.5x		2.0x		4.0x	
Field of view (±5%) (VxH) (mm)	FH-SC/-SM	1/3 inch equivalent	9.6×7.2		4.8×3.6		3.2×2.4		2.4×1.8		1.2×0.9	
	FH-S@05R	1/2.5 inch equivalent	11.4×8.56		5.7×4.28		3.8×2.85		2.85×2.14		1.43×1.07	
	FZ-SC/-S	1/3 inch equivalent	9.6×7.2		4.8×3.6		3.2×2.4		2.4×1.8		1.2×0.9	
	FZ-SC2M /-S2M	1/1.8 inch equivalent	14.0×10.6		7.0×5.3		4.7×3.5		3.5×2.7		1.8×1.3	
	FZ-SC5M@ /-S5M@	2/3 inch equivalent	16.8×14.2		8.4×7.1		5.6×4.7		4.2×3.6		2.1×1.8	
WD(mm) *2			75.3	110.8	68.8	110.3	65	110.8	65	110.8	65	110.8
Effective FNO			9.42	9.49	9.94	10.49	11.8	11.97	13.6	13.5	17.91	22.2
Depth of field (mm) *3			3	3.04	0.8	0.84	0.4	0.43	0.3	0.27	0.09	0.11
Resolution *4			12.43	12.9	6.71	6.99	5.24	5.33	4.53	4.53	3	3.73
TV distortion			0.02%	0.02%	0.01%	0.02%	0.01%	0.02%	0.03%	0.03%	0.02%	0.03%
Maximum sensor size			2/3 inch		2/3 inch		2/3 inch		2/3 inch		2/3 inch	

*1 Insert the shape into @@@@ in the model number as follows.
　　Straight ： -O
　　Coaxial ： CO-O
*2 The working distance is the distance from the end of the lens to the sensor.
*3 The depth of field is calculated using a permissible circle of confusion diameter of 0.04 mm.
*4 The resolution is calculated using a wavelength of 550 nm.
Note: 1. Fixing the lens or other reinforcement may be required depending on the installation angle or operating environment (vibration/shock). When fixing the lens, insulate the lens from the fixture.
　　　2. The above specifications are values calculated from the optical design and can vary depending on installation conditions.

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.

System Configuration
Controllers
Softwares
Programmable Terminals
Slave Terminals
Safety
Mortion/Drives
Inverters
Robotics
Sensors
Remote I/O Terminals
Ordering Information

NJ/NX/NY Series
Sysmac Studio
FA Communications Software
NA Series
NX Series
G5 Series
1S Series
MX2-V1 Series
RX-V1 Series
Industrial Robots
FH Series
FQ-M Series
ZW-7000 Series ZW Series
E3NX/E3NC E3X/E3C/E2C
GX Series
Related Manuals

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.
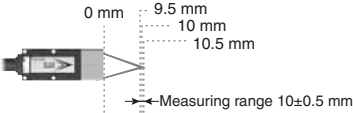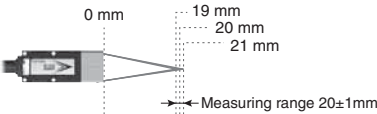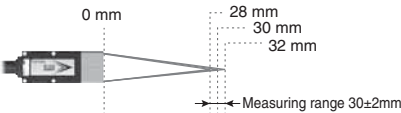
Cameras peripheral devices

Type	Model	Remarks
CCTV Lenses	3Z4S-LE Series	**Refer to Vision Accessory Catalog(Q198)**
External Lightings	FLV Series	
	FL Series	

Order Information

●Sensor Head

Appearance	Measuring range	Spot diameter	Static resolution *	Cable length	Model
	0 mm — 9.5 mm, 10 mm, 10.5 mm — Measuring range 10±0.5 mm	<50 µm dia.	0.25 µm	2 m	**ZW-S7010 2M**
				0.3 m	**ZW-S7010 0.3M**
	0 mm — 19 mm, 20 mm, 21 mm — Measuring range 20±1mm	<70 µm dia.	0.25 µm	2 m	**ZW-S7020 2M**
				0.3 m	**ZW-S7020 0.3M**
	0 mm — 28 mm, 30 mm, 32 mm — Measuring range 30±2mm	<100 µm dia.	0.25 µm	2 m	**ZW-S7030 2M**
				0.3 m	**ZW-S7030 0.3M**

* Values when the controller ZW-7000T is used.

●Controller with EtherCAT

Appearance	Power supply	Output type	Model
	24VDC	NPN/PNP	**ZW-7000T**

●Cable

Appearance	Item	Cable length	Model
	Extension Fiber Cable (from Sensor Head to Controller), (Fiber Adapter ZW-XFCM is included)	2m *	**ZW-XF7002R**
		5m *	**ZW-XF7005R**
	Fiber Adapter (used between Sensor Head pre-wired cable and Extension Fiber Cable)	—	**ZW-XFCM**
	Parallel cable for ZW-7000T 32-pole (included with Controller ZW-7000T)	2m	**ZW-XCP2E**
	RS-232C Cable for personal computer	2m	**ZW-XRS2**
	RS-232C Cable for PLC/programmable terminal	2m	**ZW-XPT2**

* Ask your Omron representative if you require a cable longer than 5 m.

●Accessories
Fiber Cleaner

Item	Recommended manufacturer	Model	Contacts	Remarks
Fiber Connector Cleaner	OMRON	ZW-XCL	OMRON	Place orders in units of boxes (contacting 10 units).
NEOCLEAN-M	NTT Advanced Technology Corporation	ATC-NE-M1	Japan NTT Advanced Technology Corporation TEL: 0422-47-7888 China GUANGZHOU LI CHENG OPTOELECTRONIC CO.,LTD. TEL: 020-8165 0508 Hong Kong ComStar Communications Ltd. TEL: +852 2536 9737 Taiwan Global Science Instruments Co., Ltd. TEL: +886-2-8913-2737 Ext. 33 India Aishwarya Telecom Ltd. TEL: +91 40 2753 1324 Singapore Masstron Pte Ltd TEL: (65) 6763 0309 Malaysia Masstron Communication Solutions Sdn Bhd TEL: (603) 8061 0309 Thailand Masstron (Thailand) Co.,Ltd TEL: (66-2) 319-9375/6 Vietnam Masstron Pte Ltd (Singapore) TEL: (65) 6763 0309 Germany AMS Technologies AG TEL: +49 (0)89 895 77 0 France AMS Technologies S.A.R.L. TEL: +33 (0)1 64 86 46 00 Italy AMS Technologies S.r.l. TEL: +39 0331 596 693 Spain AMS Technologies S.L. TEL: +34 93 380 84 20 Netherlands AMS Technologies AG (Germany) TEL: +49 (0)89 895 77 0 USA AFL Telecommunications TEL: +1 (800) 235-3423"	

Recommended EtherCAT Communications Cables
Refer to Connecting cable with NJ-series Controller for the recommended cables.

Displacement Sensor ZW-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 to start 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**
Color Fiber Amplifier Unit			**E3NX-CA0**
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**
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.

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.

EtherCAT Slave Terminals IO-Link Master Unit

Product Name	Specification			Model	Standards
	Environmental resistance	Number of IO-Link ports	I/O connection terminals		
GX-series IO-Link Master Unit	IP67	8	M12 connector (A-cording, female)	**GX-ILM08C**	CE, RCM, KC

Peripheral Devices

Recommended EtherCAT Communications Cables

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

Item	Appearance	Recommended manufacturer	Cable length (m)	Model
Cable with Connectors on Both Ends Shield Strengthening cable Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black	Smartclick (M12 Straight/M12 straight) NEW	OMRON	0.5	**XS5W-T421-BM2-SS**
			1	**XS5W-T421-CM2-SS**
			2	**XS5W-T421-DM2-SS**
			3	**XS5W-T421-EM2-SS**
			5	**XS5W-T421-GM2-SS**
			10	**XS5W-T421-JM2-SS**
Cable with Connectors on Both Ends Rugged type Shield Strengthening cable Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black	Smartclick (M12 Straight/RJ45 straight) NEW	OMRON	0.5	**XS5W-T421-BMC-SS**
			1	**XS5W-T421-CMC-SS**
			2	**XS5W-T421-DMC-SS**
			3	**XS5W-T421-EMC-SS**
			5	**XS5W-T421-GMC-SS**
			10	**XS5W-T421-JMC-SS**

Note: For details, Contact your OMRON representative.

Power Supply Cables

Item	Appearance	Recommended manufacturer	Cable length (m)	Model
Connector connected to cable, socket on one cable end Fire-retardant, Robot cable	Smartclick (M12 Straight)	OMRON	1	**XS5F-D421-C80-F**
			2	**XS5F-D421-D80-F**
			3	**XS5F-D421-E80-F**
			5	**XS5F-D421-G80-F**
			10	**XS5F-D421-J80-F**
Connectors connected to cable, socket and plug on cable ends Fire-retardant, Robot cable	Smartclick (M12 Straight/M12 straight)	OMRON	1	**XS5W-D421-C81-F**
			2	**XS5W-D421-D81-F**
			3	**XS5W-D421-E81-F**
			5	**XS5W-D421-G81-F**
			10	**XS5W-D421-J81-F**

Note: Refer to the *Round Water-resistant Connectors* in the category of *Sensor I/O Connector/Sensor Controller* on your local OMRON website for details.
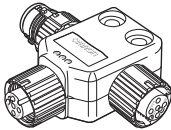
Sensor I/O Connectors

Order a cable with a connector on both ends to connect a sensor.

Item	Appearance	Recommended manufacturer	Cable length (m)	Model
Connectors connected to cable, M8 socket and M12 plug on cable ends Fire-retardant, Robot cable	M8 screw- M12 Smartclick (M8 Straight/M12 straight)	OMRON	0.2	**XS3W-M42C-4C2-A**
Connectors connected to cable, socket and plug on cable ends Fire-retardant, Robot cable	Smartclick (M12 Straight/M12 straight)	OMRON	1	**XS5W-D421-C81-F**
			2	**XS5W-D421-D81-F**
			3	**XS5W-D421-E81-F**
			5	**XS5W-D421-G81-F**
			10	**XS5W-D421-J81-F**

Note: Refer to the *Ordering Information* in the catalog of the sensor to connect or the *Sensor I/O Connectors/Sensor Controllers* on your local OMRON website for details.

Power Supply T-Joint Connector

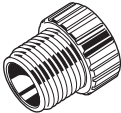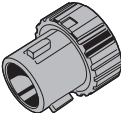This connector is used when branching a GX-type Unit power supply.

Item	Appearance	Specification	Connector type	Model
XS5R Plug/Socket T-Joint Connector		M12	Smartclick connector	**XS5R-D427-5**

Waterproof Cover for Connectors

This is a waterproof cover for unused M12 GX connectors (female).
When you use this waterproof cover, you can maintain the IP67 protective structure.
The following two types of covers are available. Either one can be mounted on an EtherCAT communications connector or I/O connector.
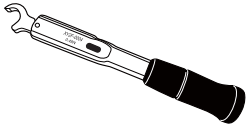
Item	Appearance	Specification	Connector type	Materials	Model
M12 Threaded Waterproof Cover *1		M12	Screw-type connector	Brass/nickel plated	**XS2Z-22**
Smartclick Waterproof Cover *2		M12	Smartclick connector	PBT	**XS5Z-11**

*1. When mounting the M12 Threaded Waterproof Cover on a connector, always tighten it to a torque of 0.39 to 0.49 N·m.
*2. When mounting a Smartclick Waterproof Cover on a connector, torque management is not required.

Tool for M12 Threaded Connectors

The tool for tightening M12 Threaded Connectors is used when tightening to a specified torque.

Item	Appearance	Model
Torque Wrench		**XY2F-0004**

Related Manuals

NJ/NX-Series · NX1P

Cat. No.	Model number	Manual
W513	NJ501/NJ301/NJ101-@@@@	NJ-Series Startup Guide (CPU Unit)
W514	NJ501/NJ301/NJ101-@@@@	NJ-Series Startup Guide (Motion Control)
W535	NX701-@@@@	NX-series CPU Unit Hardware User's Manual
W500	NJ501/NJ301/NJ101-@@@@	NJ-series CPU Unit Hardware User's Manual
W501	NX701/NX1P2/NJ501/NJ301/NJ101-@@@@	NJ/NX-series CPU Unit Software User's Manual
W507	NX701/NX1P2/NJ501/NJ301/NJ101-@@@@	NJ/NX-series CPU Unit Motion Control User's Manual
W539	NJ501-4@@@@	NJ-series Robotics CPU Units User's Manual
W527	NJ501/NJ101-@@20	NJ-series Database Connection CPU Units User's Manual
W528	NJ501-1340	NJ-series SECS/GEM CPU Units User's Manual
W505	NX701/NX1P2/NJ501/NJ301/NJ101-@@@@	NJ/NX-series CPU Unit Built-in EtherCAT Port User's Manual
W506	NX701/NX1P2/NJ501/NJ301/NJ101-@@@@	NJ/NX-series CPU Unit Built-in EtherNet/IP Port User's Manual
W502	NX701/NX1P2/NJ501/NJ301/NJ101-@@@@	NJ/NX-series Instructions Reference Manual
W508	NX701/NX1P2/NJ501/NJ301/NJ101-@@@@	NJ/NX-series Motion Control Instructions Reference Manual
W503	NX701/NX1P2/NJ501/NJ301/NJ101-@@@@	NJ/NX-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
W578	NX1P2-@@@@	NX-series NX1P2 CPU Unit Hardware User's Manual
W579	NX1P2-@@@@	NX-series NX1P2 CPU Unit Built-in I/O and Option Board User's Manual

NY-Series

Cat. No.	Model number	Manual
W557	NY532-@@@@	NY-series IPC Machine Controller Industrial Panel PC Hardware User's Manual
W556	NY512-@@@@	NY-series IPC Machine Controller Industrial Box PC Hardware User's Manual
W568	NY532-@@@@ NY512-@@@@	NY-series IPC Machine Controller Industrial Panel PC / Industrial Box PC Setup User's Manual
W558	NY532-@@@@ NY512-@@@@	NY-series IPC Machine Controller Industrial Panel PC / Industrial Box PC Software User's Manual
W560	NY532-@@@@ NY512-@@@@	NY-series Instructions Reference Manual
W559	NY532-@@@@ NY512-@@@@	NY-series IPC Machine Controller Industrial Panel PC / Industrial Box PC Motion Control User's Manual
W561	NY532-@@@@ NY512-@@@@	NY-series Motion Control Instructions Reference Manual
W562	NY532-@@@@ NY512-@@@@	NY-series IPC Machine Controller Industrial Panel PC / Industrial Box PC Built-in EtherCAT® Port User's Manual
W563	NY532-@@@@ NY512-@@@@	NY-series IPC Machine Controller Industrial Panel PC / Industrial Box PC Built-in EtherNet/IP™ Port User's Manual
W564	NY532-@@@@ NY512-@@@@	NY-series Troubleshooting Manual
W504	SYSMAC-SE2@@@	Sysmac Studio Version 1 Operation Manual
U702	S8BA	UPS S8BA User's Manual

OMRON

Sysmac Studio

Cat. No.	Model number	Manual
W504	SYSMAC-SE2@@@	Sysmac Studio version 1 OPERATION MANUAL
I589	SYSMAC-SE2@@@ SYSMAC-DE@@L	Sysmac Studio Drive Functions 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

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

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
W566	NX-TS NX-HB	NX-series Analog I/O Units User's Manual for Temperature Input Units and Heater Burnout Detection Units
W565	NX-RS@@@	NX-series Load Cell Input Unit User's Manual
W524	NX-EC0@@@ NX-ECS@@@ NX-PG0@@@	NX-series Position Interface Units User's Manual
W540	NX-CIF@@@	NX-series Communications Interface Units User's Manual
W567	NX-ILM400	NX-series IO-Link Master Unit User's Manual
W570	NX-ILM400 GX-ILM08C	IO-Link System 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

1S-Series

Cat. No.	Model number	Manual
I586	R88M-1□/R88D-1SN□-ECT	AC Servomotors/Servo Drives 1S-Series with EtherCAT Communications User's Manual

Industrial Robots

Cat. No.	Manual
I590	Robot Safety Guide
I591	Cobra 350 Robot User's Guide
I592	Cobra 350 Robot ePLC Quick Setup Guide
I593	eCobra 600, 800, and 800 Inverted Robots User's Guide
I594	eCobra 600, 800, and 800 Inverted Robots ePLC Quick Setup Guide
I595	Hornet 565 Robot Qucik Setup Guide
I596	Hornet 565 Robot User's Guide
I597	Quattro 650H/650HS/800H/800HS User's Guide
I598	Quattro 650H/650HS/800H/800HS ePLC Quick Setup Guide
I599	Viper 650/850 Robot with eMB-60R User's Guide
I600	Viper 650/850 ePLC Quick Setup Guide
I601	T20 Pendant User's Guide
I602	SmartController EX user's guide
I603	ACE User's Guide
I604	eV+ Language User's Guide
I605	eV+ Language Reference Guide
I606	eV+ Operating System User's Guide
I607	eV+ Operating System Reference Guide
I608	SmartVision MX User's Guide
I609	ACE Sight Reference Guide

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
Z365	FH/FZ5	Vision System FH/FZ5 Series User's Manual
Z341	FH/FZ5	Vision System FH/FZ5 series Processing 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
Z366	FH/FZ5	Vision System FH/FZ5 series Hardware Setup Manual
Z367	FH/FZ5	Vision System FH/FZ5 series Macro Customize Functions Programming Manual

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-7000-Series

Cat. No.	Model number	Manual
Z362	ZW-7000@	Displacement Sensor ZW-7000@ User's Manual
Z363	ZW-7000@	Displacement Sensor ZW-7000@ User's Manual for Communications Settings
W504	SYSMAC-SE2	Sysmac Studio Version 1 Operation 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
W570	NX-ILM400 GX-ILM08C	IO-Link System User's Manual

Terms and Conditions Agreement

Read and understand this catalog.

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranties.

(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

(b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

See http://www.omron.com/global/ or contact your Omron representative for published information.

Limitation on Liability; Etc.

OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

Suitability of Use.

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Programmable Products.

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Performance Data.

Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

Change in Specifications.

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

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

OMRON Corporation   Industrial Automation Company
   Kyoto, JAPAN

Contact: www.ia.omron.com

Regional Headquarters
OMRON EUROPE B.V.
Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands
Tel: (31)2356-81-300/Fax: (31)2356-81-388

OMRON ELECTRONICS LLC
2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

Authorized Distributor:

CSM_9_2_0317
Cat. No. P072-E1-21   1016(0711)