

Machine Automation Controller

NX1P



Advanced motion control and networks

EtherNet/IP®

Open industrial Ethernet network

- Interface with HMI
- Peer-to-Peer controller communication
- Interface with Sysmac Studio
- Information network (host application)

MQTT

MQTT communication ideal for connecting to IoT systems

NX1P supports MQTT (S) communication using MQTT Communication Library. It can easily connect to the cloud without a gateway PC and securely collect manufacturing site data.



SD memory card

- Back up, restore, and verify data in the controller



Option board

Add serial communications or analog control without increasing the size

- RS-232, RS-422A/485 (Modbus-RTU: 32 nodes max.)
- Analog I/O



EtherCAT®

The fast machine network for a wide range of field and motion devices.

Machine Automation Controller
NX1P



Battery-free NX1P and 1S

The NX1P requires no battery to retain user program, set values, and variables during power interruption in the built-in memory. The 1S AC Servo System comes with a battery-free absolute encoder. They reduce machine maintenance.

Advanced motion control increases machine speed and precision

The NX1P provides advanced motion control previously done by a dedicated controller or special unit. Continuous operation by use of electronic cams improves productivity and meets diverse production needs.



1S AC Servo System



Simplicity for advanced motion control



for onsite IoT in a Sysmac entry model

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

• Load Cell Input Unit
NX-RS



The controller makes temperature control easy. Build a temperature control system with heater burnout detection

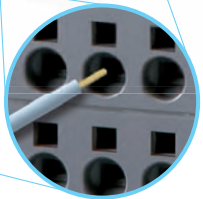
• Temperature Input Unit
NX-TS



• Heater Burnout Detection Unit
NX-HB



IO-Link Master Unit
NX-ILM400



Time saving wiring by Push-In Plus terminals

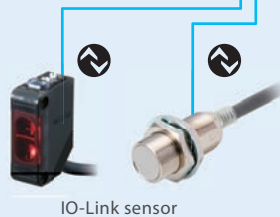
Corresponding to our shared Value Design for Panel concept for the specifications of products.

Start small-scale onsite IoT with IO-Link

Predictive maintenance minimizes downtime. Omron recommends to start from the point in your machine where failure often occurs.



IO-Link collects information held by sensors and actuators through the IO-Link master and via a fieldbus network into the host controller. It enables communication within the whole system and reduces time required for commissioning and maintenance.



IO-Link sensor



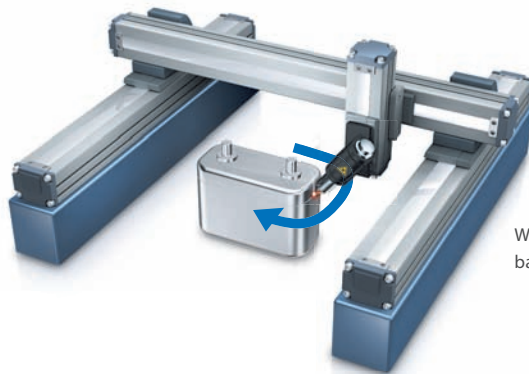
Advanced motion control

The built-in EtherCAT port and advanced motion control make machines faster and more precise

- EtherCAT simplifies the wiring to up to eight servo systems including for single-axis position control.
- Up to four axes of motion control. Electronic cams and interpolation increase machine speed and precision.

Interpolation

- Linear interpolation and circular interpolation for precise machining and high-speed handling



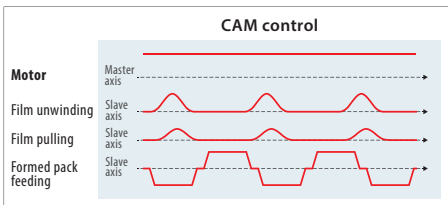
Welding for secondary batteries and bonding

Electronic cam

- Electronic cam enables continuous and high-speed machine operation
- Electronic cam makes it possible to easily change operation timing via a program through computerized cam operation to meet diverse production needs, which is difficult with mechanical cam



Packaging machines and filling machines



EtherCAT

Data transmission delay is compensated to synchronize servomotors. Synchronized axes provide high-precision positioning.

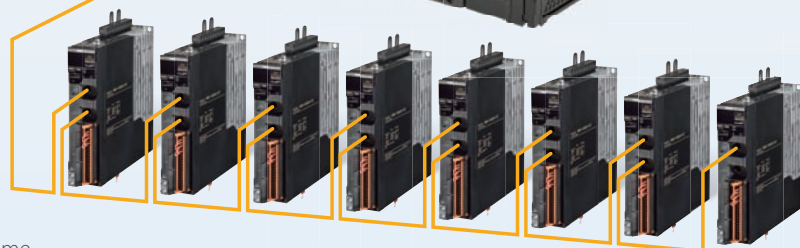
- EtherCAT enables one cable to connect the NX1P with servo drives, reducing wiring work.



Machine Automation Controller NX1P

1S AC Servo System

- No battery, no maintenance. No need for homing sequence improving machine uptime
- 23 bit high resolution encoder as standard
- Improved loop control for low overshoot and quick settling time
- Safety function: STO

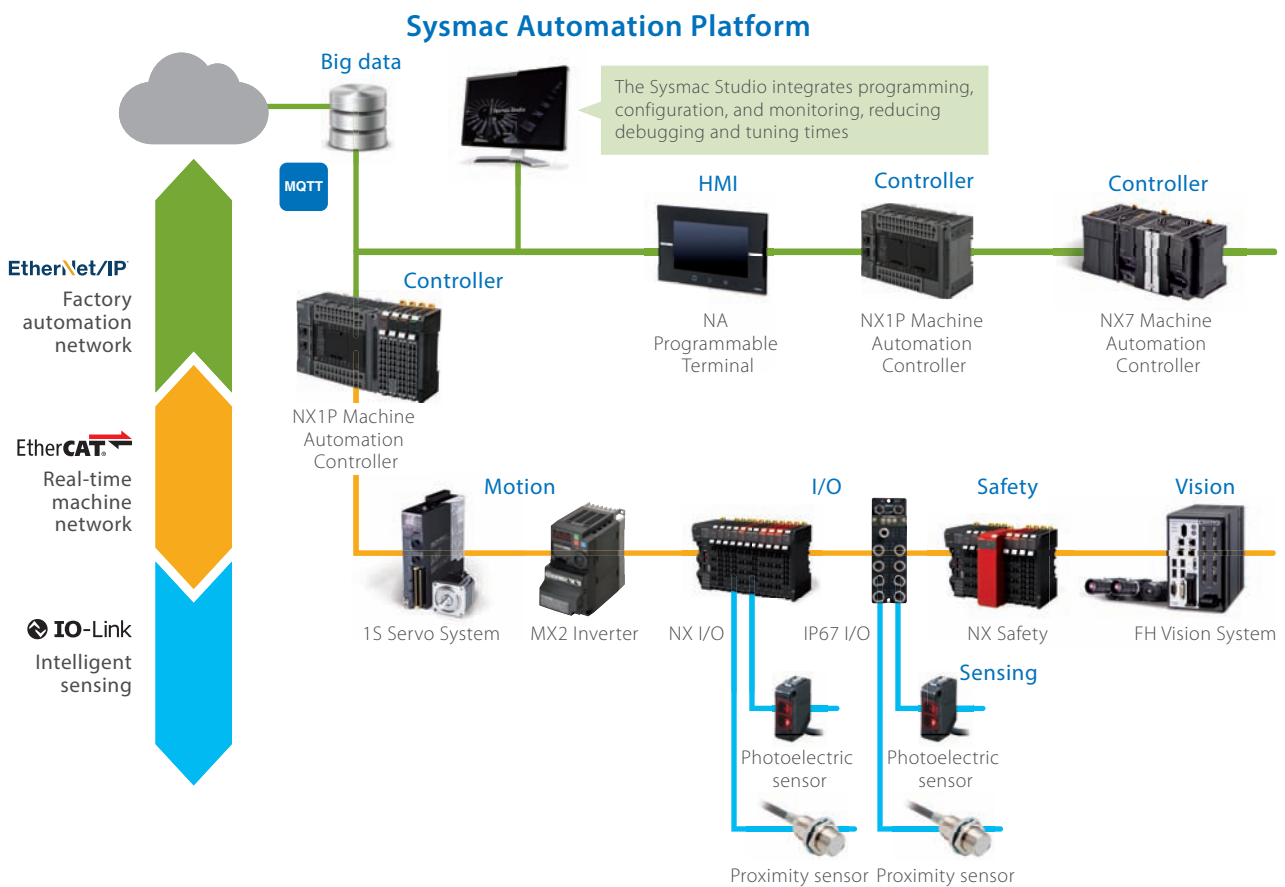


1S AC Servo System

Networks for onsite IoT

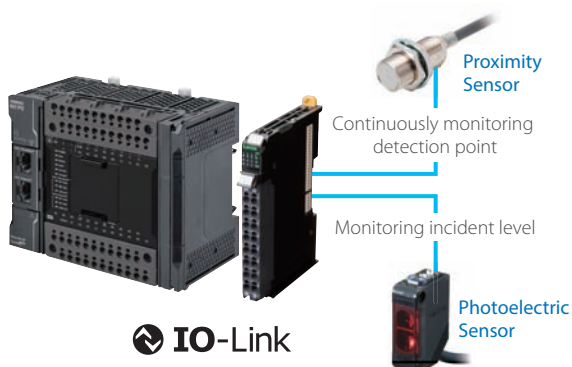
IO-Link brings IoT to the sensor level

- EtherCAT connects I/O devices, motion devices, safety controllers, and vision systems with a single cable. You can check machine information by monitoring the status of the connected components.
- EtherNet/IP enables communications with a host PC and data links between NJ/NX Controllers and CJ PLCs.
- The NX1P can easily connect to the cloud using the MQTT Communication Library, and data on the manufacturing site can be collected securely.



Predictive maintenance using IO-Link

You can start predictive maintenance with visualization of the status of a small-sized machine. IO-Link functionality can be added to existing machines.



Product line up

Machine Automation Controller NX-series NX1P2 CPU Units

EtherNet/IP
EtherCAT

24-point type



40-point type



Dimensions
(Unit: mm)

24-point type
130(W)×100(H)×71(D)

40-point type
154(W)×100(H)×71(D)

Option Boards



Serial Communications
NX1W-CIF01/
CIF11/CIF12



Analog I/O
NX1W-ADB21/
DAB21V/MAB221

NX Series Up to eight NX Units can be connected to an NX1P2 CPU Unit.

Digital I/O Units
NX-ID/IA/
OD/OC/MD



Analog I/O Units
NX-AD/DA



Temperature Input/
Heater Burnout
Detection Units
NX-TS/HB



Load Cell Input
Unit
NX-RS



Position Interface
Units
NX-ECO/
ECS/PGO



Communications
Interface
Unit
NX-CIF



IO-Link

IO-Link
Master Unit
NX-ILM400



System Units
NX-PD/PF/
PC/TBX



NX-series I/O system
Cat. No. R183

Automation Software Sysmac Studio



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

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



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Ordering Information

International Standards







- The standards are abbreviated as follows: UC1: cULus (Class I Division 2 Products for Hazardous Locations), L: Lloyd, CE: EU Directives, RCM: Regulatory Compliance Mark, and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

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	Used single-axis position control servo axes		Number of input points	Number of output points			
40-point type 	1.5MB	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, L, CE, RCM, KC
								16 points, PNP transistor *	NX1P2-1140DT1	
			6 axes	2 axes	4 axes			16 points, NPN transistor	NX1P2-1040DT	
								16 points, PNP transistor *	NX1P2-1040DT1	
24-point type 			4 axes	0 axes	4 axes	24 points	14 points	10 points, NPN transistor	NX1P2-9024DT	
								10 points, PNP transistor *	NX1P2-9024DT1	

Note. One NX-END02 End Cover is provided with the NX1P2 CPU Unit.
 * With the load short-circuit protection.

Option Boards (For CPU Units)

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, L, CE, RCM, KC
Serial Communications Option Board 	One RS-422A/485 port. Transmission distance: 50 m. Connection type: Screwless clamping terminal block (5 terminals)		NX1W-CIF11	
Serial Communications Option Board 	One RS-422A/485 port (isolated). Transmission distance: 500 m. Connection type: Screwless clamping terminal block (5 terminals)		NX1W-CIF12	
Analog Input 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 Option Board 	Analog output: 2 Voltage output: 0 to 10 V (Resolution: 1/4,000) Connection type: Screwless clamping terminal block (3 terminals)	NX1W-DAB21V		
Analog I/O Option Board 	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		

Automation Software Sysmac Studio

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

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

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

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