

# 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)



### 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

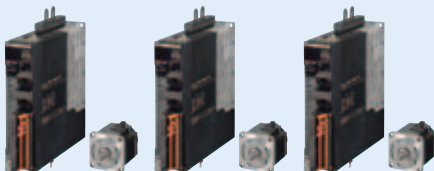


### Battery-free NX1P and 1S

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

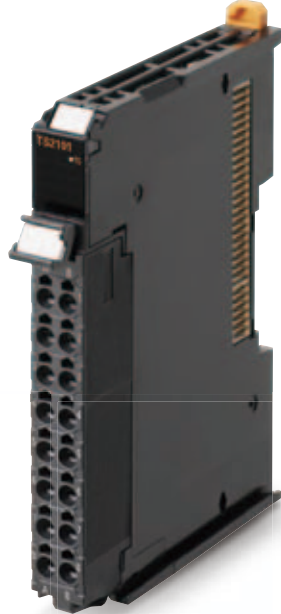
Build a cost saving weighing/measurement system by using load cells

• Load Cell Input Unit  
NX-RS



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

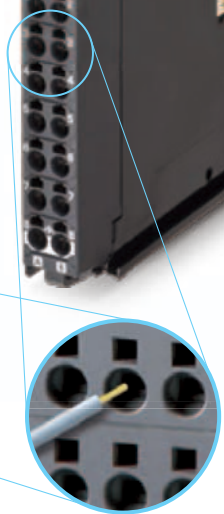
• Temperature Input Unit  
NX-TS



• Heater Burnout Detection Unit  
NX-HB



IO-Link Master Unit  
NX-ILM400

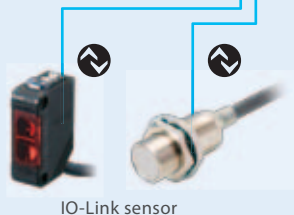


Time saving wiring by Push-In Plus terminals

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 sensor

## IO-Link

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.



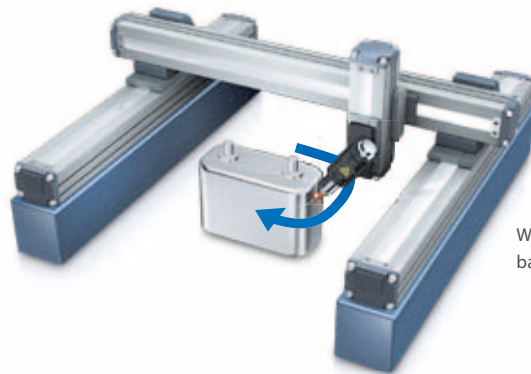
# Advanced motion control

## 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

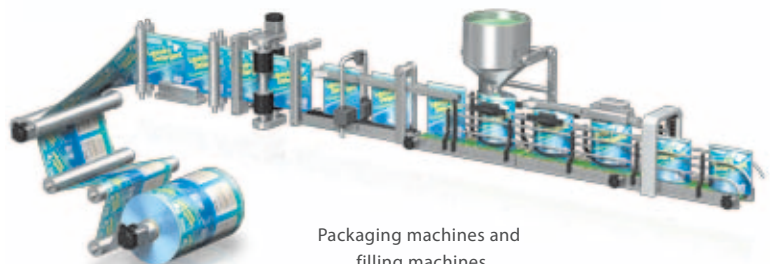
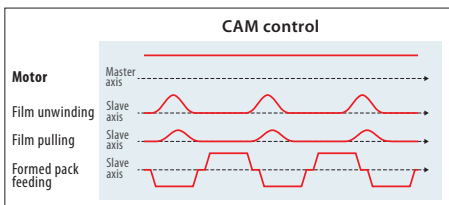
- Linear interpolation and circular interpolation for precise machining and high-speed handling



Welding for secondary batteries and bonding

### Electronic cam

- Electronic cam enables continuous and high-speed machine operation
- Electronic cam can meet diverse production needs, which is difficult with mechanical cam



Packaging machines and filling machines



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

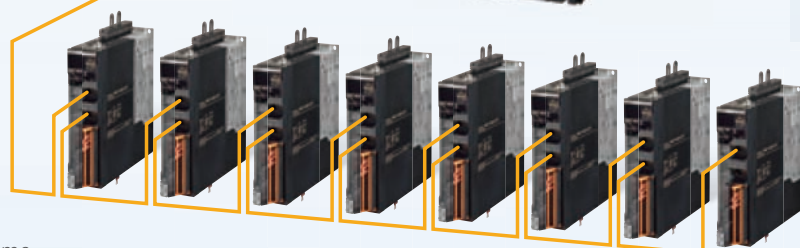
- EtherCAT enables one cable to connect the NX1P with servo drives, reducing wiring work.



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

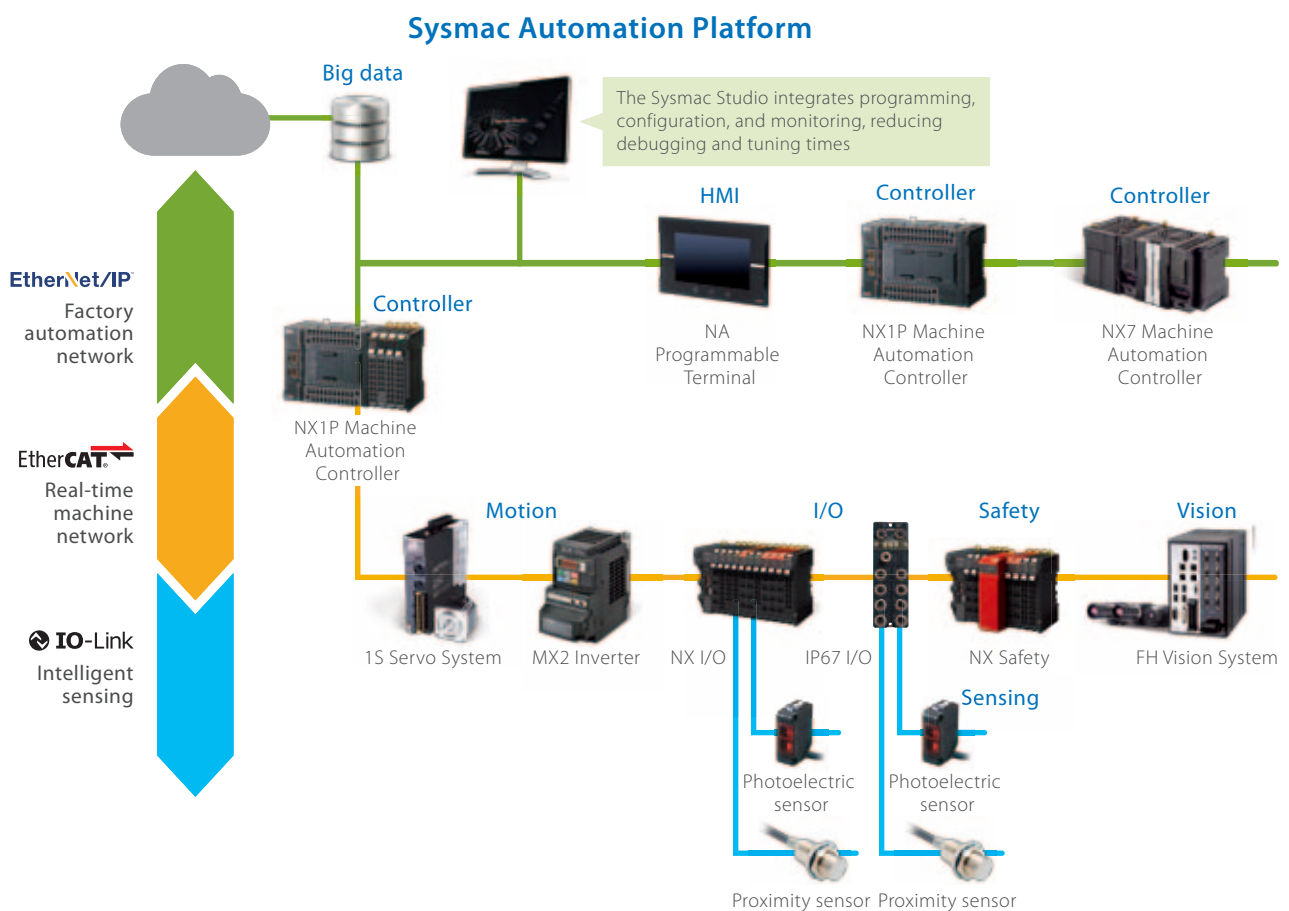


1S AC Servo System

# Networks for onsite IoT

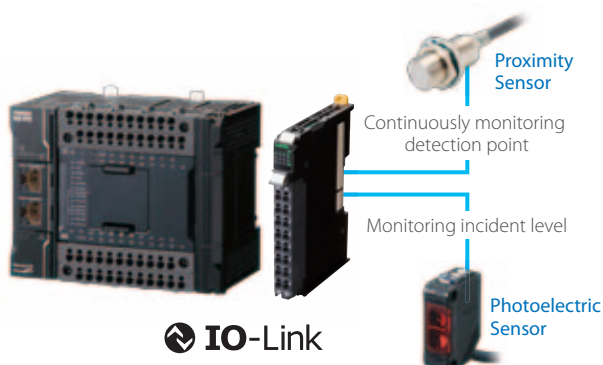
## IO-Link brings IoT to the sensor level

- 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.



## 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.



Wear and vibration of mechanical parts may cause problems

Monitoring excessive remoteness or proximity using the IO-Link proximity sensor greatly reduces the occurrence of sudden defects

The incident level drops due to dirt

Monitoring the incident level using the IO-Link photoelectric sensor prevents false detection

# Product line up

## Machine Automation Controller NX-series NX1P2 CPU Units



EtherNet/IP  
EtherCAT

**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



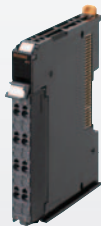
Analog I/O  
NX1W-ADB21/  
DAB21V/MAB221

## 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

SYSMAC-SE2 □ □ □

Significantly reduced  
startup time  
(Ver. 1.17 or higher)



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	
								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	
	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

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	Specification	Number of licenses	Media	Model
 Sysmac Studio Standard Edition Ver.1.00	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) 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 (CXDesigner). For details, refer to the Sysmac Integrated Catalog (Cat. No. P072).	— (Media only)	DVD	SYSMAC-SE200D
		1 license *	—	SYSMAC-SE201L

\* Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).

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

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