OMRON

Machine Automation Controller

NX1P

SYSMAC

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 which previously would require a dedicated controller or special unit. Continuous operation by use of electronic cams improves productivity and meets diverse production needs.

1S AC Servo System

Sysmac Library
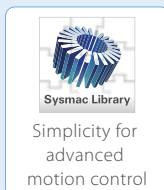
Simplicity for advanced motion control

for onsite IoT in a compact controller

Build a cost effective weighing/measurement system using load cells.

Temperature control made easy - build a temperature control system with heater burnout detection

Load Cell Input Unit
NX-RS

Temperature Input Unit
NX-TS

Heater Burnout Detection Unit
NX-HB

IO-Link Master Unit
NX-ILM400

Value Design for Panel

### Reduce wiring time with Push-In Plus terminals

Push-In Plus terminals deliver the advantage of our **"Value Design for Panel"** concept to reduce space, time and cost.

IO-Link connectivity for communication down to the sensor level

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

◈ IO-Link
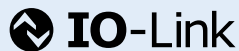
IO-Link sensor

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.
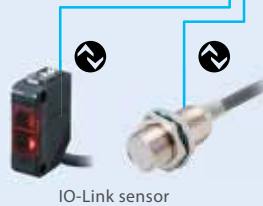
Advanced motion control

Built in EtherCAT 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. Increase machine speed and precision with electronic cams and interpolation.
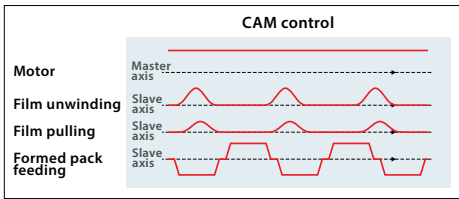
Interpolation

- Precise machining and high-speed handling with Linear and circular interpolation

Welding for secondary batteries and bonding

Electronic cam

- High-speed and continuous machine operation using electronic cams
- Meet diverse production needs by using electronic cams instead of mechanical cams

CAM control

Motor	Master axis
Film unwinding	Slave axis
Film pulling	Slave axis
Formed pack feeding	Slave axis

Packaging machines and filling machines

EtherCAT®

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

- Reduce wiring work by using one EtherCAT cable to connect the NX1P and servo drives.

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
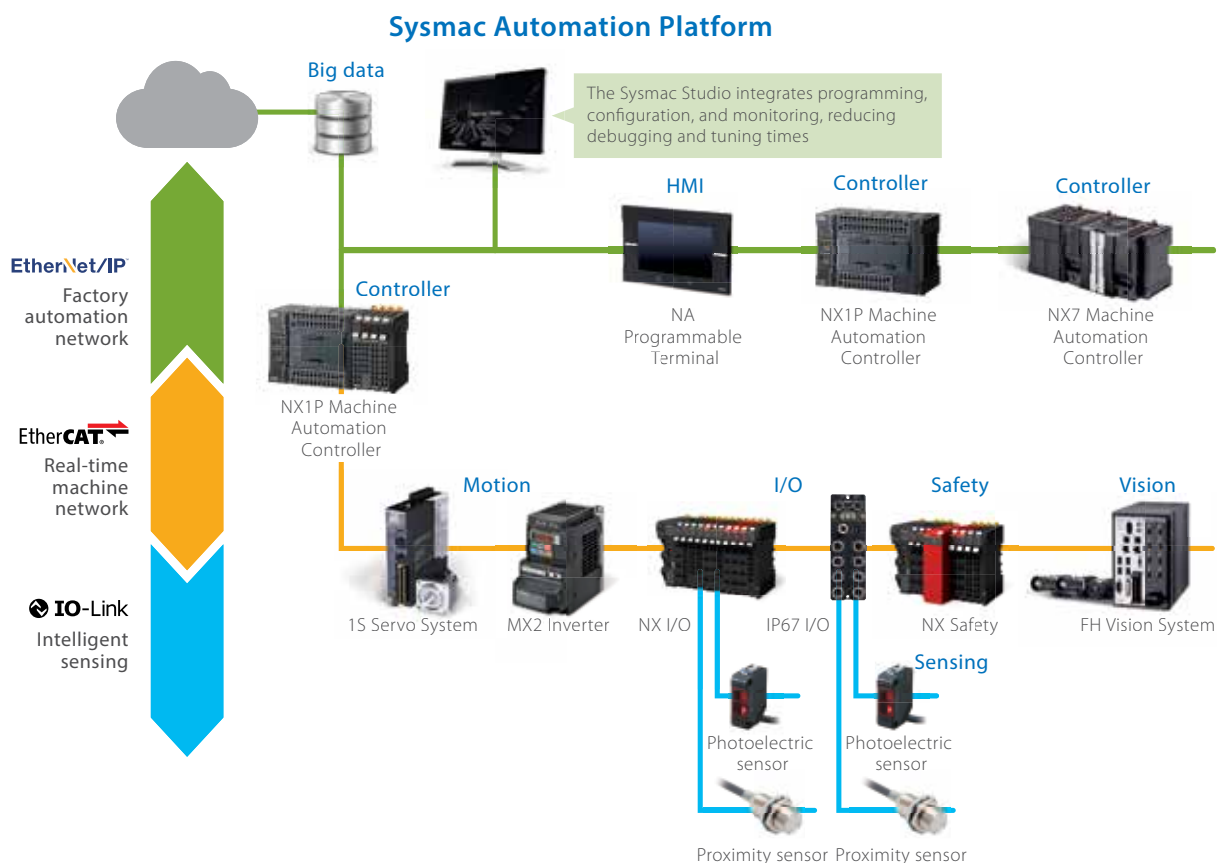- Safety function: STO

1S AC Servo System

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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.

Sysmac Automation Platform

Big data

The Sysmac Studio integrates programming, configuration, and monitoring, reducing debugging and tuning times

EtherNet/IP
Factory automation network

EtherCAT
Real-time machine network

IO-Link
Intelligent sensing

Controller
NX1P Machine Automation Controller

HMI
NA Programmable Terminal

Controller
NX1P Machine Automation Controller

Controller
NX7 Machine Automation Controller

Motion
1S Servo System   MX2 Inverter

I/O
NX I/O   IP67 I/O

Safety
NX Safety

Vision
FH Vision System

Sensing
Photoelectric sensor   Photoelectric sensor

Proximity sensor Proximity sensor

Predictive maintenance using IO-Link

With the controller's IO-Link connectivity, you can implement predictive maintenance that lets you visualize machine status at the sensor level.

Proximity Sensor
Continuous distance monitoring

Continuous level monitoring

Photoelectric Sensor

IO-Link

Wear and vibration of mechanical parts may cause problems

With an IO-Link Proximity Sensor you are notified if the target is too close or too far away, and the occurrence of sudden faults is greatly reduced.

The incident level drops due to dirt

With an IO-Link Photoelectric Sensor monitoring incident light level prevents false detection. The photoelectric sensor offers several instability settings, allowing you to communicate the incident light level and easily determine when maintenance must be performed.

Product line up

Machine Automation Controller NX-series
NX1P2 CPU Units

24-point type

40-point type

EtherNet/IP
EtherCAT

Dimensions (Unit: mm)		Option Boards	
24-point type 130(W)×100(H)×71(D)		Serial Communications **NX1W-CIF01/ CIF11/CIF12**	Analog I/O **NX1W-ADB21/ DAB21V/MAB221**
40-point type 154(W)×100(H)×71(D)			

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

IO-Link

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-EC0/ ECS/PG0**	Communications Interface Unit **NX-CIF**	IO-Link Master Unit **NX-ILM400**	System Units **NX-PD/PF/ PC/TBX**

Automation Software Sysmac Studio
SYSMAC-SE2☐☐☐

Sysmac Studio 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), CE: EU Directives, RCM: RCM 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†
			Motion control axes**	Single-axis position control***	Number of input points	Number of output points		
40-point	1.5MB	32 KB (Retained during power interruptions) and 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 *	NX1P2-1140DT1	
			6 axes / 2 axes	4 axes		16 points, NPN transistor	NX1P2-1040DT	
						16 points, PNP transistor *	NX1P2-1040DT1	
24-point			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.

**Motion control axes includes:
- Point to point positioning
- Synchronized motion (Gearing/Camming)
- Multi-Axes coordinated motion (Circular/Linear Interpolation)
- Axes grouping

***Single-axis position control includes:
- Only Point to point positioning
- No Synchronized motion (Gearing/Camming)
- No Multi-Axes coordinated motion (Circular/Linear Interpolation)
- No Axes grouping

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, 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) Connection type: 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 DVD.

Product name	Specification	Number of licenses	Media	Model
Sysmac Studio Standard Edition Ver.1.□□	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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