

# Advanced Control for Compact Machines

## NX1P Machine Controller



Increase productivity and quality  
Reuse your engineering time by scalability  
Save time on wiring and programming

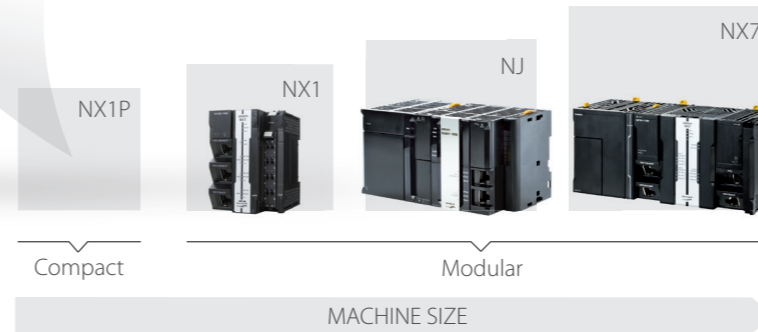
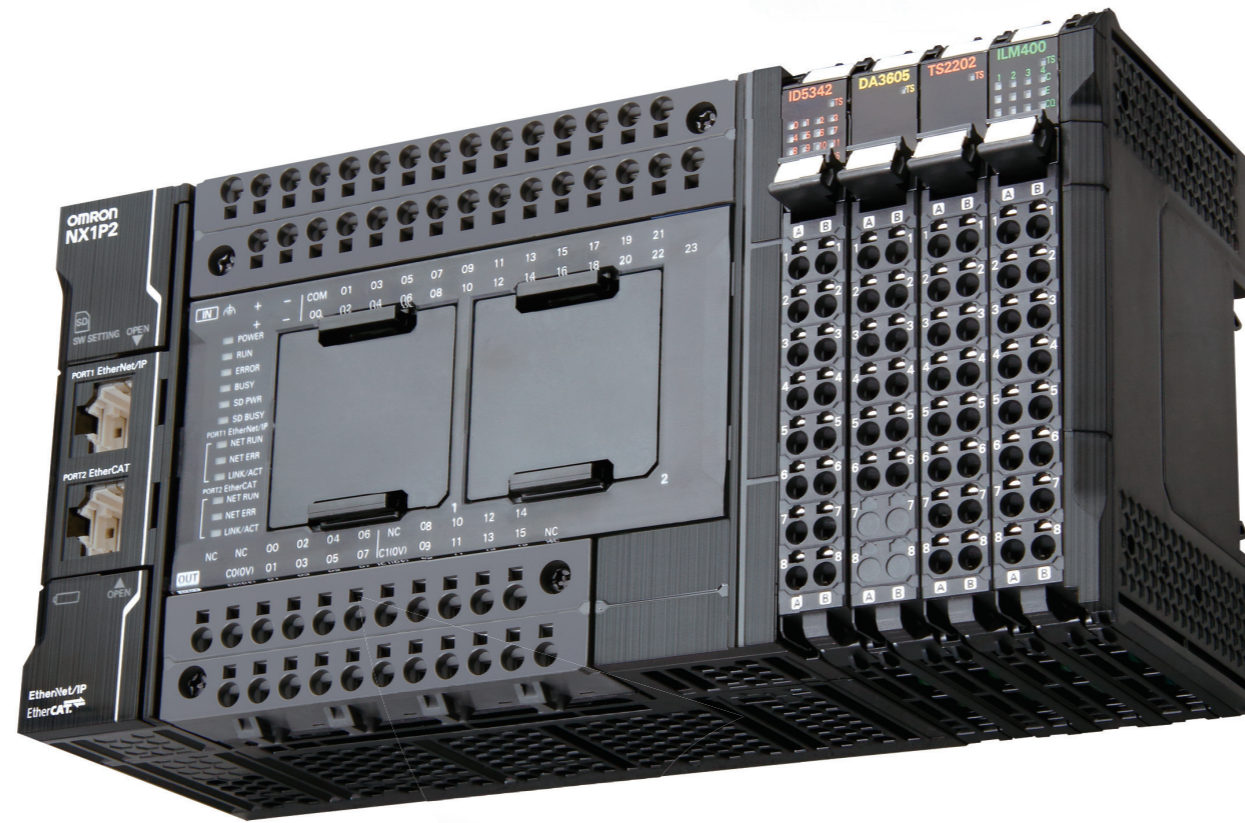
# NX1P brings advanced control to compact machines

The manufacturing industry is striving to boost productivity and to improve quality. Although the use of high-end multi-functional machines is one of its solutions, flexible systems that leverage production data are required to satisfy diverse consumer needs by optimizing manufacturing processes. Omron industrial automation enables faster adaptability of the small-middle size machines to a flexible production line as a key for the next manufacturing processes. With this principle in mind Omron has extended the Sysmac Machine Control portfolio with the NX1P Machine Controller.

The NX1P Machine Controller enables efficient manufacturing by providing functionalities to

- ✓ Increase machine performance without compromising on quality
- ✓ Faster adaptability to a flexible production
- ✓ Get results quickly by the use of an intuitive Integrated Development Environment

✓ The NX1P completes the Sysmac machine controller family offering the same functionality in a compact design



### Produce faster with same level of product quality

The NX1P integrates advanced motion control and sequence control. Synchronized motion improves productivity enabling continuous operation and meets diverse production needs.



### Maximizing machine uptime

Vertical integration delivers production data from manufacturing process to IT systems. Device data collected via EtherCAT or IO-Link networks can be used to increase productivity and improve predictive maintenance or faster troubleshooting.



### Integrated architecture from sensor level to factory network

The use of EtherCAT network enables safety controller, vision sensors, inverters and servomotors as well as I/O to be connected and synchronized within same system cycle time. One cable connection reduces design and installation works. The Integrated Development Environment Sysmac Studio makes designing and debugging easier. Remote maintenance can be performed by monitoring devices connected via EtherCAT through the NX1P.

# Enabling efficient production

Efficient manufacturing, produces faster with higher quality and maximizes machine uptime. The NX1P controller not only controls machine sequence but also provides the required functionality to allow for efficient production.



## ✓ Improve machine efficiency

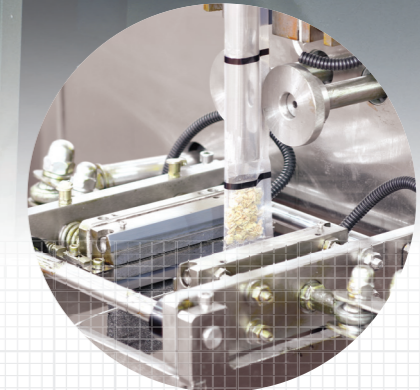
- IO-Link provides the controller with production data at sensor level
- The FTP and MQTT protocols enable standard Cloud connectivity to measure machine efficiency

## ✓ Reduce change-over time

- Dynamic configuration thanks to the sensors with IO-Link connectivity
- Remote I/Os with push-in plus connection reduces wiring time

## ✓ Predictive Maintenance

- Data collection of IO-Link sensor status, such as dust accumulated, enables predictive maintenance and reduced machine downtime
- Set of Function Blocks available for condition monitoring the actuators to prevent product failures



## Ready for Eco/Green Packaging

**Controlling real sealing temperature guarantees less defects during the sealing process even with thin and eco films**

- "Perfect Sealing" application library is ideal for thinner packaging materials, more sensitive to temperature changes. Reduce production cost and be ready to use green materials in production.

## Managing operations efficiently in flexible production

**Integrating the NX1P controller into OMRON's LD mobile robot provides efficient management of the custom payloads and machine handshaking**

- Control of customized top mechanics in the mobile robot such as belt conveyor, roller, lift...etc.
- Communication capabilities with MES, machines and robot fleet



NX1P controller



LD Mobile Robot

# Compact in size, powerful in functionality

The NX1P completes the NX/NJ machine controller family offering the same functionality in a compact design. A controller that integrates the architecture from the Sysmac platform: built-in EtherCAT port for real-time control and built-in Ethernet port for standard factory network. The NX1P provides synchronized control of all machine devices such as motion, I/O, safety and vision under one Integrated Development Environment.

## Sysmac Studio

- Single tool for logic sequence, motion, safety, vision and HMI
- Open standard IEC 61131-3 programming
- Ladder, ST and in-Line ST programming with a rich instruction set



## Sysmac Library

- The Sysmac Library for fast engineering and optimized machine availability is packed with Omron's rich technical know-how on control programs. Omron offers Function Blocks for a wide range of applications: temperature control, motion control, and connection to servo drives or sensors.

## EtherNet/IP™

- Programming
- Auto connection (1:1) with Sysmac Studio
- Machine to machine
- HMI / Visualization
- Standard protocols and services: TCP/IP and UDP/IP, FTP client and server, NTP, SNMP
- CIP protocol

## EtherCAT™

- Synchronous control of Motion, I/O, Safety, Sensing and Vision
- System cycle time: Up to 2 ms
- Up to 16 EtherCAT slaves

## NX1P controller models

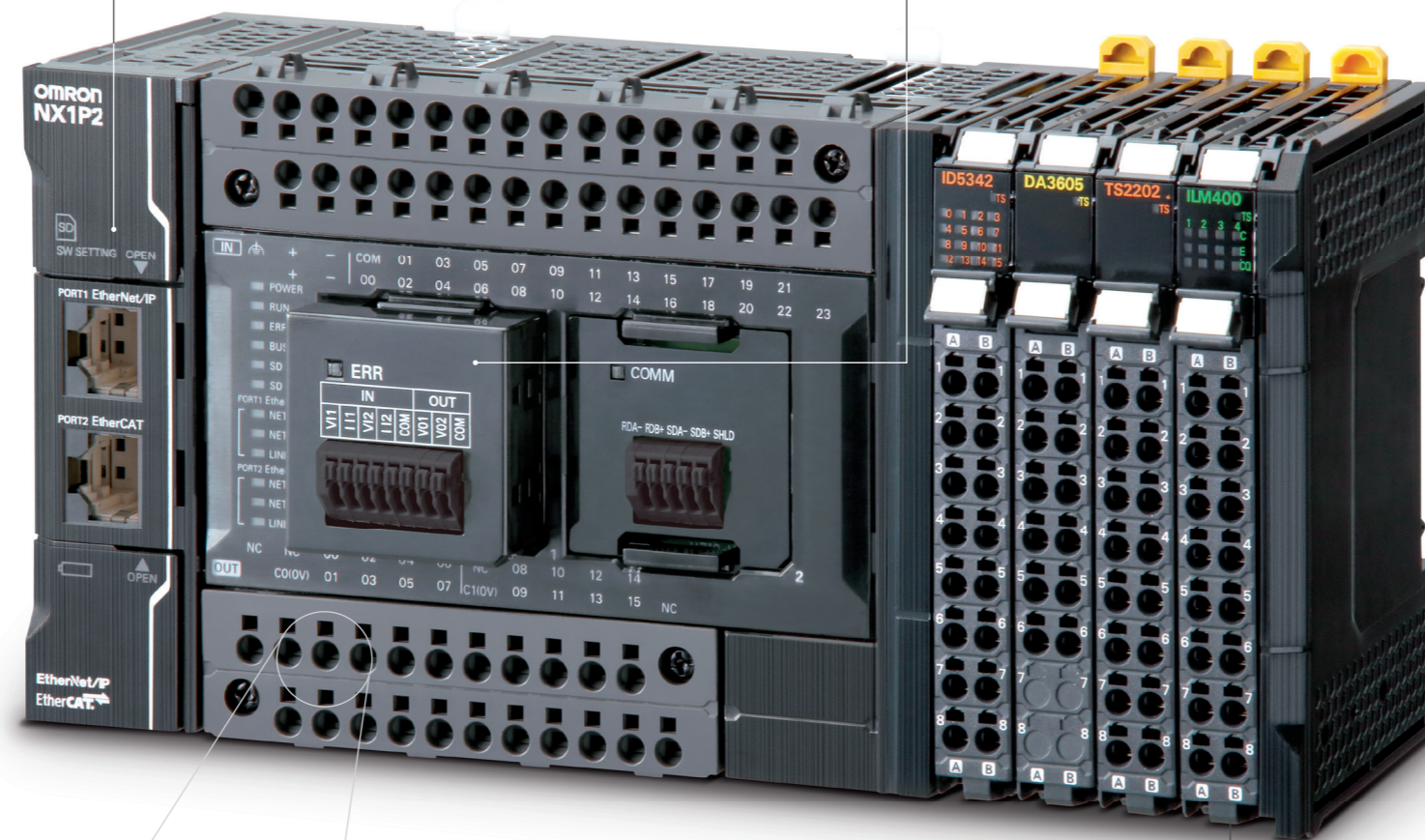
- 40 built-in I/O points / 4 synchronous axes / 4 PTP axes
- 40 built-in I/O points / 2 synchronous axes / 4 PTP axes
- 24 built-in I/O points / 4 PTP axes
- 40 built-in I/O points / 2 PTP axes
- 24 built-in I/O points / 2 PTP axes

## SD memory card

- System backup and restore to reduce maintenance time
- Complete system backup: Project, network configuration and slaves parameter
- Parameter restore of individual EtherCAT slave

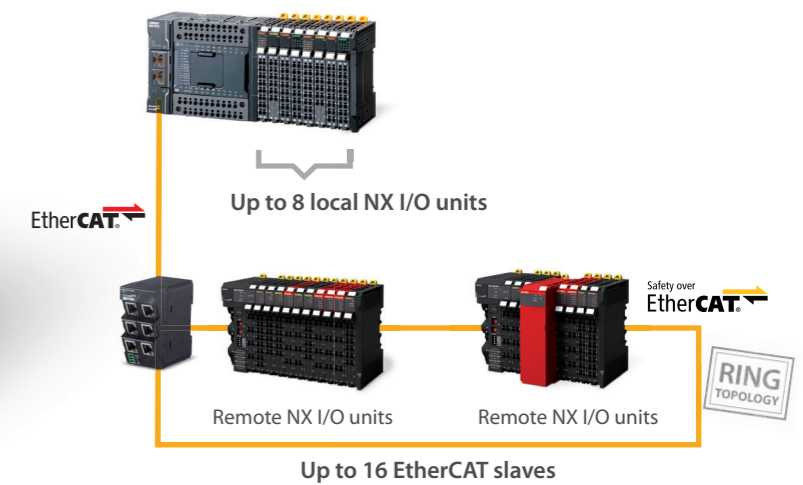
## Option boards

- Up to 2 option boards
- Serial communication: R232C or RS-422A/485. Host link and Modbus-RTU master protocols
- Analog I/O: +/-10V voltage and 0-20 mA current signals
- Screw-less clamping terminal block



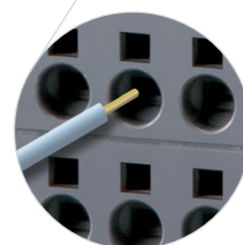
## NX I/O technology

- Local or remote I/O units configuration
- High-speed and time-stamp unit
- Complete I/O family: Analog/digital, temperature control, load cell input, pulse output, encoder input, integrated safety, IO-Link master, high-speed analog input and RFID units



- Battery free operation for no maintenance \*

- Push-in connection reduces I/O wiring time



- Corresponding to our shared value design of the panel concept for the product specifications

## IO-Link

- IO-Link master unit to communicate with sensors

## RING TOPOLOGY

- ✓ Mix between daisy-chain and ring topologies
- ✓ Ring topology maintain communications and control in case of a broken cable or device failure

\* A battery is necessary for RTC. The capacitor RTC backup 10 days/40 degree.

# Sysmac motion engine now in a compact solution

The NX1P is fully designed according the Sysmac architecture, supporting sequence and motion core to control your machine faster with high accuracy. The built-in EtherCAT real-time network simplifies the wiring and provides synchronized axes control, remote I/O and safety devices within 2 ms cycle time. A rich set of Function Blocks for Motion Control and application libraries reduce your engineering time.

- ✓ The NX1P offers the motion functionality you need for advanced machine control

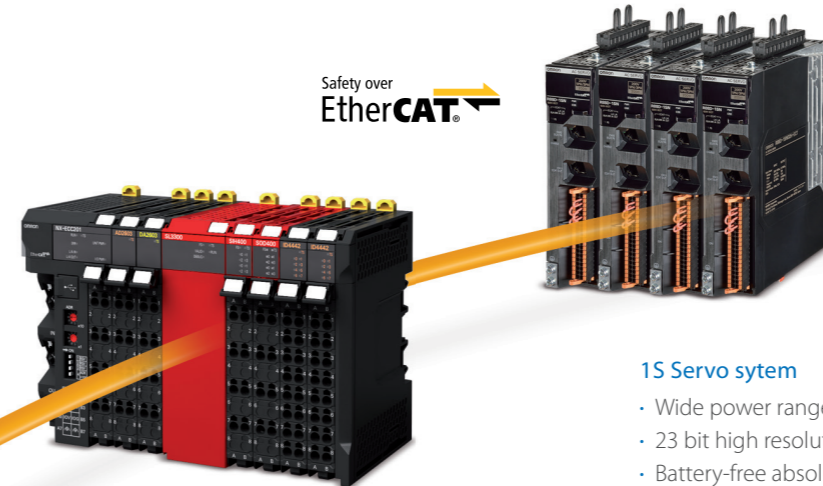
### Integrated logic sequence and motion control

- System cycle time of 2 ms
- Up to 8 axes control via EtherCAT
- Up to 4 synchronized axes
- PTP motion control for single-axis positioning
- Electronic CAM for continuous operation at high speed



EtherCAT

Safety over EtherCAT

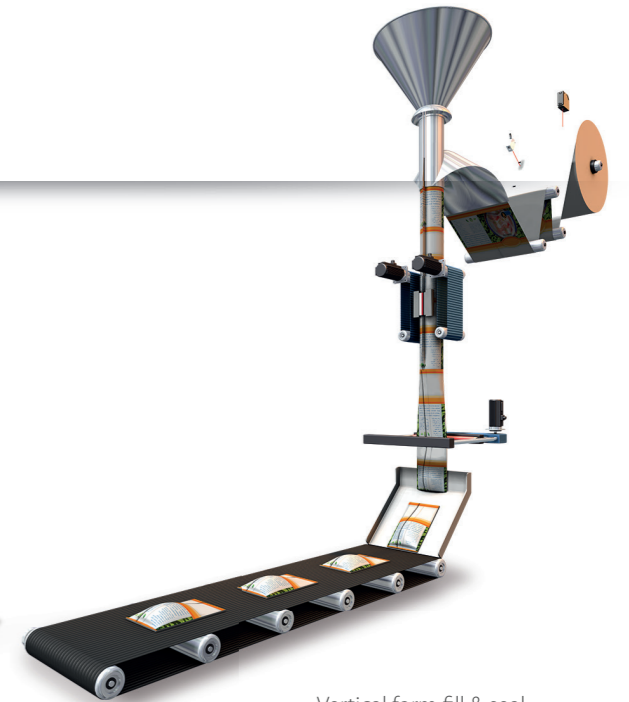


### NX I/O

- Freely mix Safety CPU and units with standard I/O
- The safety controller meets PLe (EN ISO 13849-1) and SIL3 (IEC 61508)
- Variables are part of the NX1P controller project

### 1S Servo system

- Wide power range up to 15 kW
- 23 bit high resolution encoder
- Battery-free absolute multi-turn encoder or incremental encoder
- Safety over EtherCAT



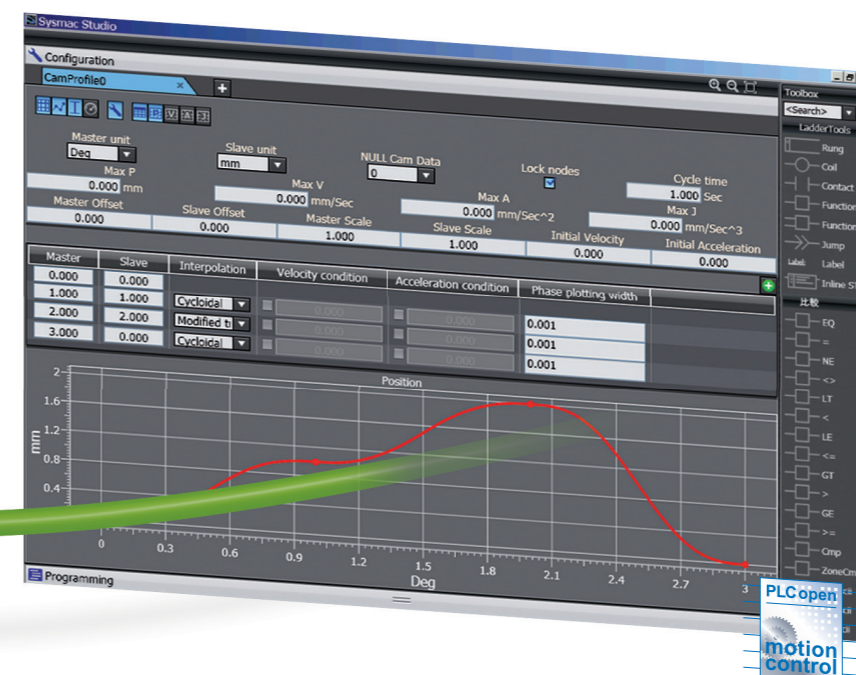
- Vertical form fill & seal machine with continuous feeding operation



### MOTION CONTROL SCALABILITY

	AXES
PTP motion control	2 or 4
Synchronous control	2 or 4

EtherNet/IP



### Sysmac Studio Integrated Development Environment

- The Sysmac Studio integrates programming, configuration and monitoring of the complete system - logic sequence, motion and safety -. This Integrated Development Environment allows you to minimize servo setup, project debugging and commissioning time.
- A rich set of Function Blocks for Motion Control library are available to implement general purpose motion control. The Sysmac applications library such as rotary knife, winder, temperature control... provides fast engineering.



- The graphical CAM editor allows quick implementation of complex motion profiles.

# Family products

## Machine Controller



NX1P

Model	Built-in I/O	Real axes	
		Synchronous	PTP
NX1P2-1140DT[]	40	4	4
NX1P2-1040DT[]	40	2	4
NX1P2-9024DT[]	24	-	4
NX1P2-9B40DT[]	40	-	2
NX1P2-9B24DT[]	24	-	2

## Local NX I/O



- Up to 8 local I/O units
- Digital and Analog I/O, temperature control, load cell input, pulse output, encoder input, IO-Link master, high-speed analog input and RFID units
- Detachable front connector with push-in terminals

## Option board



- Serial communication: R232C or RS-422A/485
- Host link and Modbus-RTU master protocols
- Analog I/O: +/-10V voltage and 0-20 mA current signals
- Screw-less clamping terminal block

## Software



### Sysmac Studio Lite Edition

- Optimize your total cost of ownership by using the Sysmac Studio Lite Edition.
- Same functionality as Sysmac Studio Standard Edition supporting for the NX1P and NJ1 controllers
- Upgrading is possible from Lite Edition to Standard Edition
- Full functionality for logic sequence, motion, safety, vision and HMI
- IEC 61131-3 standard programming

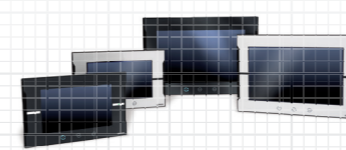
### Sysmac Library

- The Sysmac Library is a collection of software functional components that can be used in programs for the NJ/NX Machine Automation Controllers. Sample programs and HMI screen samples are also available.



Please download it from following URL and install to Sysmac Studio.  
[http://www.ia.omron.com/sysmac\\_library/](http://www.ia.omron.com/sysmac_library/)

## HMI



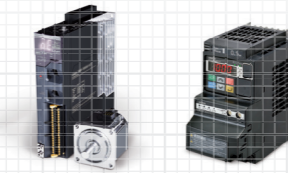
### NA advanced HMI

- Wide screen across 7", 9", 12" and 15" range
- NX1P controller variables (Tags) in the NA project
- Microsoft Visual Basic for versatile, flexible and advanced programming

### NB compact HMI

- Wide screen across 3.5", 5.6", 7" and 10" range
- Serial, USB or Ethernet communication

## Motion



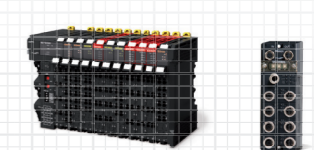
### 1S servo system

- Up to 15 kW
- 23 bit high resolution encoder
- Battery-free absolute multi-turn encoder or incremental encoder
- Safety built-in: Hardwired and Network STO

### MX2 inverter

- Power range up to 15 kW
- Torque control in open loop
- 200% starting torque
- Double rating VT 120%/1 min and CT 150%/1 min

## Remote I/O



### NX modular I/O

- Digital and Analog I/O, temperature control, load cell input, pulse output, encoder input, safety, IO-Link master, high-speed analog input and RFID units
- I/O units with high-speed and time-stamp
- Detachable front connector with push-in terminals

### GX block I/O

- IO-Link master
- IP67 protection class for wet and dusty environments
- Up to 8 sensors
- Photoelectric sensors, Proximity sensors, Flow/Pressure sensors and Safety Light Curtains available

## Sensing



### Photoelectric sensor

- Smart photoelectric sensor with IO-Link functionality
- Rugged compact housing
- Transmission rate COM2 & COM3

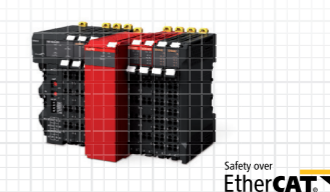
### Proximity sensor

- Smart inductive sensor with IO-Link functionality
- Excessive proximity signal
- Cylindrical rugged compact housing

### Flow/Pressure sensor

- Advanced process sensor with multi-sensing technology
- Digital, analog and IO-Link output
- White display & status indicator

## Safety



### NX Safety controller

- Freely mix with standard NX I/O
- The safety controller meets PLe (EN ISO 13849-1) and SIL3 (IEC 61508)
- Safety Function Blocks conforming with IEC 61131-3 standard programming
- Variables are part of the NX1P controller project
- High connectivity for direct connection to safety input devices

## Vision



### FH vision system

- High speed controller (4 core) and standard (2 core)
- Up to 8 cameras
- Over 100 processing items (1/2D code and OCR)
- Inspection of scratches and defects
- Built-in port: EtherCAT and Ethernet (EtherNet/IP protocol)

### FHV7 smart camera

- Module structure
- Customizable optical parts
- Single camera for inspecting various products: Multi-color light and Autofocus lens
- Rugged design with IP67 classification

Would you like to know more?

OMRON EUROPE

 +31 (0) 23 568 13 00

 [industrial.omron.eu](http://industrial.omron.eu)

 [omron.me/socialmedia\\_eu](https://www.omron.me/socialmedia_eu)

## Sales & Support Offices

### Austria

Tel: +43 (0) 2236 377 800  
[industrial.omron.at](http://industrial.omron.at)

### Belgium

Tel: +32 (0) 2 466 24 80  
[industrial.omron.be](http://industrial.omron.be)

### Czech Republic

Tel: +420 234 602 602  
[industrial.omron.cz](http://industrial.omron.cz)

### Denmark

Tel: +45 43 44 00 11  
[industrial.omron.dk](http://industrial.omron.dk)

### Finland

Tel: +358 (0) 207 464 200  
[industrial.omron.fi](http://industrial.omron.fi)

### France

Tel: +33 (0) 1 56 63 70 00  
[industrial.omron.fr](http://industrial.omron.fr)

### Germany

Tel: +49 (0) 2173 680 00  
[industrial.omron.de](http://industrial.omron.de)

### Hungary

Tel: +36 1 399 30 50  
[industrial.omron.hu](http://industrial.omron.hu)

### Italy

Tel: +39 02 326 81  
[industrial.omron.it](http://industrial.omron.it)

### Netherlands

Tel: +31 (0) 23 568 11 00  
[industrial.omron.nl](http://industrial.omron.nl)

### Norway

Tel: +47 22 65 75 00  
[industrial.omron.no](http://industrial.omron.no)

### Poland

Tel: +48 22 458 66 66  
[industrial.omron.pl](http://industrial.omron.pl)

### Portugal

Tel: +351 21 942 94 00  
[industrial.omron.pt](http://industrial.omron.pt)

### Russia

Tel: +7 495 648 94 50  
[industrial.omron.ru](http://industrial.omron.ru)

### South Africa

Tel: +27 (0)11 579 2600  
[industrial.omron.co.za](http://industrial.omron.co.za)

### Spain

Tel: +34 902 100 221  
[industrial.omron.es](http://industrial.omron.es)

### Sweden

Tel: +46 (0) 8 632 35 00  
[industrial.omron.se](http://industrial.omron.se)

### Switzerland

Tel: +41 (0) 41 748 13 13  
[industrial.omron.ch](http://industrial.omron.ch)

### Turkey

Tel: +90 (216) 556 51 30  
[industrial.omron.com.tr](http://industrial.omron.com.tr)

### United Kingdom

Tel: +44 (0) 1908 258 258  
[industrial.omron.co.uk](http://industrial.omron.co.uk)

### More Omron representatives

[industrial.omron.eu](http://industrial.omron.eu)