AC Servo System

1S Series

EtherCAT®

- Optimized installation and setup
- Increased machine productivity
- Global availability and global conformance

sysmac

Our fresh approach to general purpose servos delivers maximum built-in value

Improved machine design and increased machine productivity

Designed to meet present and future machine requirements, the 1S servo system optimizes the full machine manufacturing cycle, from machine design to installation to commissioning. In operation they help maximize machine production and shorten maintenance time. The 1S servo offers a high resolution multi-turn encoder without battery backup, a new innovative control loop (TDF), and a built-in safety network. This provides high performance, allowing accurate and higher machine productivity.

Optimizes installation and commissioning tasks

Simplifies panel design:
- Compact servo drive with same height throughout the whole power range
- Uniform height improves cabinet ventilation
- Top and bottom located connections allow use of thinner cabinets

Servo features
- Power range from 100 W to 3 kW – 100/200/400 Volt
- 23 bit, high resolution encoder
- Battery-free absolute multi-turn encoder
- Improved loop control for low overshoot and faster settling time
- Safety function built-in:
  - Network Safe Torque Off, FSoE: PLd (EN ISO 13849-1), SIL2 (IEC 61508)
  - Hardwired Safe Torque Off: PLe (EN ISO 13849-1), SIL3 (IEC 61508

Save wiring time:
- Fast and secure screw-less push-in terminals for all connectors
- Pluggable connectors for easy pre-wiring and system maintenance
- Direct wiring of I/O signals. No need for terminal block units
- Programmable I/O (8 in and 4 out, including 2 high speed registration inputs)
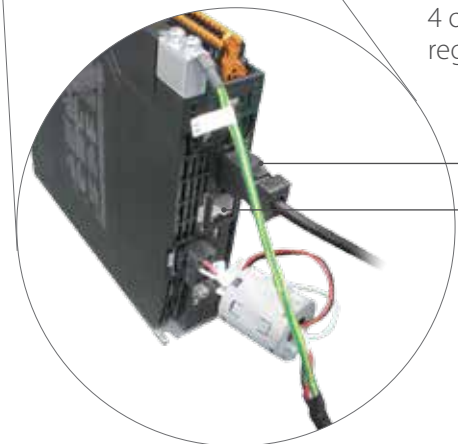
Pre-assembled motor cables

Embedded relay for direct motor brake control

Simplified machine design and maintenance

- Absolute multi-turn encoder design without mechanics: no battery, no maintenance
- 23 bit high resolution encoder as standard
- 16 bit, 65536 motor revolutions
- No need for homing sequence, improves machine uptime
- Small compact motor size

23/BIT

50% setup time reduction*

Servo sizing
- Servo sizing tool for the entire machine
- Graphical environment of the kinematic chain
- Electronic CAM import from Sysmac Studio

System configuration
- NJ project auto-builder from servo sizing file
- Quick setup wizard for key parameters
- Parameters transfer in less than 400 ms

Gain tuning & test run
- "Best effort" feature for quick stabilization time
- Easy tuning with intelligent gain search in less than 2 minutes
- Wizard for tuning, test run & monitoring
- Advanced tuning simulation to reduce testing effort and prevent machine damage
- Software restart of the drive , eliminates power cycles
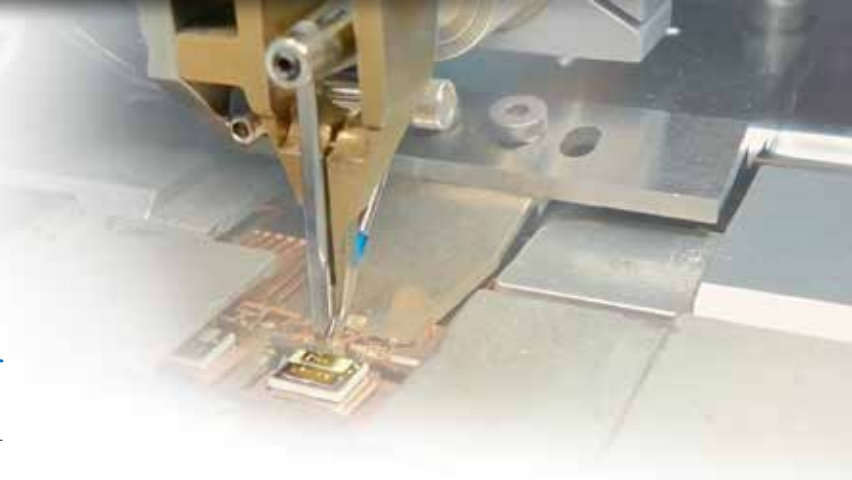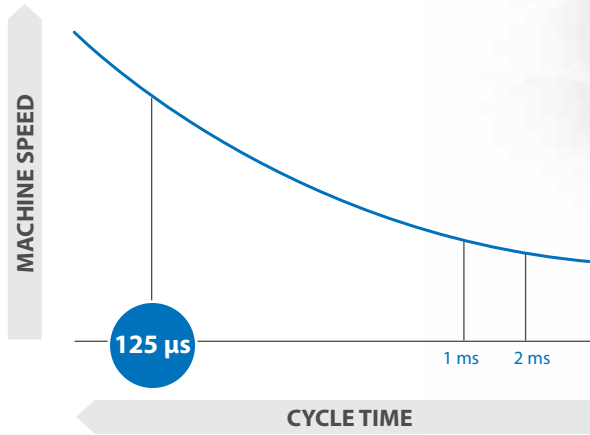
PATENT PENDING

Save **40%** *   Save **60%** *   Save **50%** *

*Performance comparison with previous Omron products based on Omron investigation in March 2016.

Totally integrated, totally in control

125 µs

1 ms   2 ms

MACHINE SPEED

CYCLE TIME

EtherNet/IP™

NJ/NX series Machine Controller

EtherCAT®

NX Safety

HIGHER PRODUCTIVITY

125 µs system cycle
- Faster machine speed keeping same accuracy
- Accurate profile generation in the controller
- Advanced real-time scheduler manages motion, network, and the user application updates in a single cycle scan to ensure perfect synchronization
- The 23 bit high resolution encoder in combination with the improved loop control provides an accurate following profile
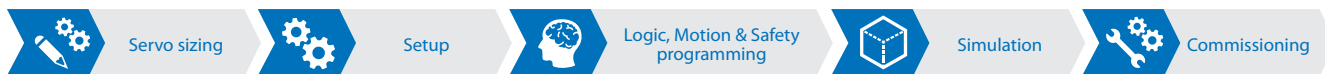
INTEGRATED SAFETY

Safety control via EtherCAT
- Simplified safety installation
- Reduction of safety devices
- Safety function built-in: Fail Safe over EtherCAT (FSoE) Safe Torque Off
- Safety approval: EN ISO 13849-1(Cat.3 PLd), EN61508(SIL2), EN62061(SIL2), EN61800-5-2(STO)
- Troubleshooter integrated with Sysmac Studio

| Servo sizing | Setup | Logic, Motion & Safety programming | Simulation | Commissioning |

TOTALLY IN CONTROL

Sysmac Studio

· Simplified servo setup: Direct use of servo sizing calculation

· Open standard IEC 61131-3 programming

· Single Integrated Development Environment (EDI) for motion, robotics, vision, safety, HMI visualization and sequential control

· Standard PLCopen Function Blocks for Motion and Safety

No. 0043
ST
05.06.2015
Datatypes supported: 17 of 26

· Sysmac Library for fast engineering and optimized machine availability
    · Application libraries
    · Optimized productivity
    · Predictive maintenance
    · Reduced downtime

Sysmac Library

Safety over
EtherCAT

1S Servo

Sysmac Automation Platform

Seamlessly integrate all your automation

Sysmac is an integrated automation platform dedicated to providing complete control and management of your plant automation. At the core of this platform, the Machine Controller series offers synchronous control of all machine devices and advanced functionality such as motion, robotics and database connectivity. This multidisciplinary concept allows you to simplify solution architecture, reduce programming and optimize productivity.

Information technologies

Factory   IT devices

Offices HQ   Sales force

Big Data

EtherNet/IP

HMI

Software

EtherCAT

Controller

Motion

I/O

Safety

Robotics

Vision

Sensing

Software

Sysmac Studio, the integrated software
- One single tool for logic sequence, motion, safety, robotics, vision and HMI
- Fully compliant with open standard IEC 61131-3
- PLCopen Function Blocks for Motion and Safety
- Supports Ladder, Structured Text and In-Line ST programming with a rich instruction set
- CAM editor for easy programming of complex motion profiles
- Database Connectivity Function Block library

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.
Please download it from following URL and install to Sysmac Studio.
https://industrial.omron.us/en/products/sysmac-studio#sysmac_library

- EtherCAT 1S Series Library: The EtherCAT 1S Series Library is used to initialize the absolute encoder, back up and restore the parameters for a 1S-series Servo Drive with built-in EtherCAT communications. You can use this library to reduce the amount of time needed for programming when implementing the Servo Drive.
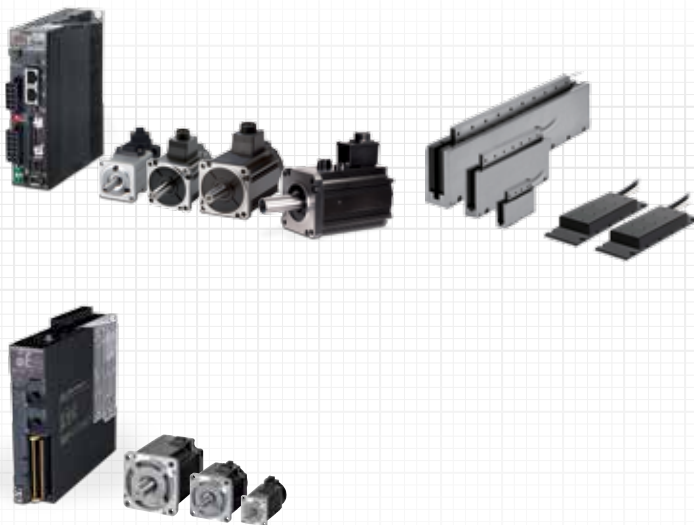
Sysmac servo family

Machine Controller

NJ/NX series
· Logic sequence, Motion, Safety, Robotics
  and Database connection functionality
· Scalable motion control: CPUs from 2 up
  to 256 axes
· IEC 61131-3 controller
· PLCopen Function Blocks for Motion
  Control
  and Safety
· Advanced motion with Robotics
  functionality
· Built-in EtherCAT and EtherNet/IP ports

Motion

G5 Servo System - Wide functionality and scalability
· Servo drive for rotary or linear motors
· Rotary motor: Up to 15 kW
· Iron-core and Ironless linear motor models:
  Up to 2100 N peak force
· Safety function: STO
· Full closed loop control

1S Servo System - General purpose servo
· Servo drive for rotary motors
· Up to 3 kW
· Safety function: STO

OMRON

Authorized Distributor:

Controllers & I/O
• Machine Automation Controllers (MAC) • Motion Controllers
• Programmable Logic Controllers (PLC) • Temperature Controllers • Remote I/O

Robotics
• Industrial Robots • Mobile Robots

Operator Interfaces
• Human Machine Interface (HMI)

Motion & Drives
• Machine Automation Controllers (MAC) • Motion Controllers • Servo Systems
• Frequency Inverters

Vision, Measurement & Identification
• Vision Sensors & Systems • Measurement Sensors • Auto Identification Systems

Sensing
• Photoelectric Sensors • Fiber-Optic Sensors • Proximity Sensors
• Rotary Encoders • Ultrasonic Sensors

Safety
• Safety Light Curtains • Safety Laser Scanners • Programmable Safety Systems
• Safety Mats and Edges • Safety Door Switches • Emergency Stop Devices
• Safety Switches & Operator Controls • Safety Monitoring/Force-guided Relays

Control Components
• Power Supplies • Timers • Counters • Programmable Relays
• Digital Panel Meters • Monitoring Products

Switches & Relays
• Limit Switches • Pushbutton Switches • Electromechanical Relays
• Solid State Relays

Software
• Programming & Configuration • Runtime