YASKAWA

MACHINE CONTROL PRODUCTS

RETHINK WHAT’S POSSIBLE
Today’s machine builders and equipment users face unique challenges, with limited resources and tight deadlines. Your success depends on suppliers with the right products, the expertise in applying them and a commitment to supporting them in the field.

SOLVING PROBLEMS IS IN OUR DNA
We embrace the toughest challenges to solve the biggest problems. Dedication to engineering and innovation is what makes us different.

Since 1915, Yaskawa has produced...

- > 40,000 ROBOTS
- > 825,000 SERVOPACKS
- > 1.12 MILLION SERVO MOTORS
- > 2.1 MILLION AC DRIVES

Countries with Yaskawa sales, service and manufacturing locations

14,800+ EMPLOYEES WORLD WIDE

GLOBAL SALES: $4.5B

100+ YEARS MANUFACTURING EXCELLENCE

Based on 2021 reported sales. For reference only.
GLOBAL OVERVIEW
World leader in automation, drive technology and robotics

YASKAWA GLOBAL LOCATIONS

NORTH/SOUTH AMERICA
- United States
- Canada
- Brazil
- Mexico

EUROPE/AFRICA/MIDDLE EAST
- Germany
- Sweden
- U.K.
- Italy
- France
- Spain
- Norway
- Finland

ASIA/PACIFIC/OCEANA
- Japan
- China
- Korea
- Taiwan
- Singapore
- Thailand
- Indonesia
- Vietnam
- Malaysia
- India
- Australia

You no longer need to settle for “good enough”.

PRODUCTS THAT PERFORM

MOTIONWORKS® IEC
IEC 61131-3 programming environment that enables programmers to take advantage of Ladder Logic, Structured Text and Function Block Diagrams

YASKAWA COMPASS™
Graphical user software package applicable to multiple applications in additive manufacturing, shape cutting, machine tool and robotics.

MP3300IEC CONTROLLER
Integrate Yaskawa’s powerful motion engine with MotionWorks IEC to achieve Singular Control, the ability to program 1 to 62 axes of servos, VFDs and/or robots from one programming environment.

SIGMA SERIES SERVO SYSTEMS
Rotary, Linear and Direct Drive servos from 3 W to 55 kW offer advanced features, including Tuning-less Mode, vibration suppression, ripple and friction compensation and advanced functional safety

VARIABLE FREQUENCY DRIVES
Yaskawa drives offer simple motor setup with highly flexible network communications, embedded functional safety, no-power programming and mobile device connectivity with our DriveWizard mobile app

YASKAWA SLIO
The most effective, modern decentralized I/O systems available, providing exceptional usability in an extremely compact and functional design.

HMI PRODUCTS
Yaskawa smartPanel and Panel PC solutions monitor and interact with your machine easily and reliably.

ROBOTICS
Yaskawa offers articulated, delta, SCARA and collaborative packaging robot models compatible with simple-to-integrate robot controllers, as well as our MotionWorks IEC programming environment.
MP3300IEC / MOTIONWORKS IEC
Easy for you. Consistent for everyone.

Multi-Axis Machine Controller
A single MP3300iec machine controller can operate gantries, robots, servo and stepper axes, VFDs, G-code machining equipment - any motion device necessary to implement the latest advances in hybrid manufacturing.

Multi-axis synchronization
Up to 62 axes of motion
5-axis simultaneous control
Built-in web server for diagnostics and status check
Networking options: Modbus TCP, EtherNet/IP, MECHATROLINK III and OPC
Easy interface with HMI and I/O solutions

STDANDARDED PROGRAMMING
5 language options increase program predictability and re-usability: Ladder, Function Block, Structure Text, Sequential Function Chart, Instruction List

ROBOT SUPPORT
Plug-and-play configuration and control of articulated, SCARA and delta robots, as well as custom robot mechanisms

CUSTOM KINEMATICS
Allow users to create and configure their own custom robotic mechanisms, significantly simplifying the process of specifying everyday motion

TANGENT AXIS FOLLOWING
Enhances the ability of automated shape cutting equipment to smoothly follow complex contours

MotionWorks IEC was built on the conventional tools that automation professionals already know and trust.

REUSABLE MOTION LIBRARIES
Draw from an extensive collection of automation logic developed by Yaskawa experts to accomplish common tasks, or import your own previously developed logic

CAMMING TOOLS
Includes a built-in cam tool to convert cam profiles and a variety of camming function blocks for customization

G-CODE EXECUTION
RS-274 G-code available with all Yaskawa kinematic libraries, allowing you to stream large G-code files from a host PC without excessive buffering

HMI TAGGING
Supports easy tagging of Yaskawa HMI products, as well as several other major HMI vendors
SIMPLE INTERFACE FOR NEW USERS, EMPOWERMENT FOR EXPERTS

Yaskawa Compass is a software solution for G-code applications that allows you to easily create and deploy a customized CNC front-end, while providing an interface to create advanced features to set your machine apart from the competition.

This integrated development and runtime software features a wide variety of pre-developed and ready-to-use plug-ins for CNC applications. View, edit and run G-code programs, monitor servo positions, edit tool offsets and view and clear alarms. Operate your machine, adjust the screen layout, change colors or add controls, all from within the same software environment.

Wherever your machine development process is headed, Compass will be a valuable tool for the journey.

SAVETIMEWITHBUILT-IN CONFIGURATIONS

Choose from a variety of pre-developed, ready-to-use plug-ins for 3D printers, routers and other popular machine types. Each configuration draws on Yaskawa's extensive experience in a broad range of applications.

SCREEN LAYOUT STAYS NEAT AND ORGANIZED

Compass is built around a dynamic fit-to-panel format, keeping screen elements always in good order, regardless of screen size, resolution, or aspect ratio.

PRE-MADE STYLE LIBRARY

Built-in library of images and colors establish a pleasing, professional look right from the start.

SIMPLE, QUICK COMMISSIONING

Easily customize the style to match your company's custom colors and logos, enhancing brand identity.

UNLIMITED FLEXIBILITY

Create and import your own proprietary C# plug-ins, limited only by your imagination. The plugin interface allows you to protect your company's valuable software assets and algorithms, without exposing them in PLC code.

PARTNER WITH YASKAWA

Partner up with the most capable team in machine automation. Yaskawa’s automation experts are available as a resource, ready to help you create your ideal CNC solution.

POWERFUL, YET EASY TO USE

G-CODE FROM A TO Z

Coupled with Yaskawa’s MPiec Controllers, Compass is a powerful and flexible user interface for any machine that utilizes G-code. Features like axis readouts and streaming G-code displays are already built in. Customization is equally easy. OEMs can customize on screen features as well as adding custom G and M-codes specific to their process.
**SMARTPANEL**
The smartest choice for usability, performance and connectivity to MPiec controllers

**FEATURES**
- ARM Cortex Processor
- Robust and durable - IP66 protection rating (front)
- Rugged resistive touchscreen
- Familiar Windows system environment
- Slim space saving profile
- PLCI communication with MP3300iec, MP2600iec, and Sigma-7Siec using native data types

The slim design and rugged resistive touch screen of the smartPanel is perfect for the everyday industrial applications.

**MODELS AND SPECIFICATIONS**

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<tbody>
<tr>
<td>H41-71A41-0</td>
<td>4.3</td>
<td>480x272</td>
<td>Resistive</td>
<td>ARM Cortex-A8 1GHz</td>
<td>1x RS232/422/485, 1x USB-A, 1x Ethernet</td>
<td>512</td>
<td>2,048-4,096</td>
<td>CFast</td>
<td>Aluminium</td>
<td>Front: IP66 / Rear: IP20</td>
<td>Windows Embedded Compact 7</td>
<td>Movicon 11</td>
</tr>
<tr>
<td>H71-71A41-0</td>
<td>7</td>
<td>800x480</td>
<td>Resistive</td>
<td>Intel Celeron J1900 4 x 2.0 GHz</td>
<td>2x RS232/422/485 (SUB-D), 2x USB 2.0, 1x USB 3.0, 1x VGA, 1x Audio out</td>
<td>2,048-16,384</td>
<td>2,048-4,096</td>
<td>CFast</td>
<td>Aluminium</td>
<td>Front: IP66 / Rear: IP20</td>
<td>Windows Embedded Compact 7</td>
<td>Movicon 11</td>
</tr>
<tr>
<td>HA1-71A41-0</td>
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<td>1024x600</td>
<td>Resistive</td>
<td>Intel Celeron J1900 4 x 2.0 GHz</td>
<td>2x RS232/422/485 (SUB-D), 2x USB 2.0, 1x USB 3.0, 1x VGA, 1x Audio out</td>
<td>2,048-16,384</td>
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**PANEL PC**
Intelligent control and monitoring with PC performance

The latest performance features and a precise, responsive capacitive touchscreen combine in Panel PC to deliver outstanding usability in a small space.

**FEATURES**
- Intel Celeron Processor
- Large integrated work memory
- High resolution responsive capacitive touchscreen
- Familiar Windows system environment
- Numerous interfaces for every application need
- Fanless construction
- High-quality metal housing
- PLCI communication with MP3300iec, MP2600iec, and Sigma-7Siec using native data types

The latest performance features and a precise, responsive capacitive touchscreen combine in Panel PC to deliver outstanding usability in a small space.
Compact. Intelligent. Flexible.

**EASY WEB INTERFACE**
SLIO diagnostic and status information is accessible through a web interface, linking a standard browser to any EtherNet/IP or Mechatrolink-III fieldbus module.

**ONE-TOUCH HARDWARE CONFIGURATOR**
SLIO puts an end to hours of tedious manual I/O configuration. The MotionWorks IEC SLIO Hardware Configurator sets up a complete I/O system with the touch of a single button.

**High Speed Backplane Bus**
Achieve reaction times as fast as 20 microseconds with SLIO’s high speed backplane bus. Connect as many as 64 modules at a time, while maintaining speeds up to 48 Mbit/s.

**INSTALLER-FRIENDLY DESIGN**
Engineered for error-free installation, SLIO can be installed by an average technician without consulting a machine designer or installation engineer.
- Easy, safe assembly with no tools required
- Staircase-shaped wiring level saves space, eases connection
- Clamp terminal assignment is clearly printed on each module
- Labeling strips clearly indicate module function, replace easily after a reconfiguration

**RECONFIGURE WITHOUT WIRING**
Updating or amending a SLIO system is as easy as removing an existing module and snapping in a new one. System functions can be changed without removing the wiring from the contact block.

The SLIO system is designed to help you modularize and standardize, yet retain a sense of flexibility. SLIO can help reduce setup time and minimize user errors.
The Yaskawa Servo Tuning Suite

We’ve packed 25 years of innovation and five generations of servo expertise into our Sigma Series tuning features.

Yaskawa equips each SERVOPACK with a suite of software commissioning and tuning tools, designed to achieve full functioning right out of the box.

This superior performance continues in spite of the vibration, resonance, friction and noise that a modern automated machine can dish out.

**TUNING-LESS FUNCTION**

Get Up and Running Immediately

The tuning-less function is automatically enabled from the moment you pull the amp out of the box. No tuning is required.

From Day One, this function automatically compensates for mismatches in load to rotor inertia up to 30:1.

**ADVANCED AUTOTUNING**

Minimize Settling Time. Maximize Smooth Motion

Advanced auto tuning automatically adjusts nearly 20 gain and filter parameters to cancel vibration, rippling, friction and resonance.

**ONE PARAMETER TUNING**

Precise User-Driven Adjustment

Improve your machine’s performance even further with easy fine tuning adjustments that won’t throw off your existing operating parameters.

**SETTLING TIME**

- **40 ms** Range
- **4 ms** Range
- **0-4 ms** Range

**Eliminate effects that steal away performance**

Unwanted mechanical effects rob a servo system of the quick, smooth and precise movement you need. Yaskawa SERVOPACKs are equipped with suppression features that automatically eliminate harmful artifacts.

**VIBRATION**

Machine vibrations are eliminated by Yaskawa Vibration Suppression, which samples your equipment’s natural oscillations and uses compensating frequencies to cancel them out.

**RESONANCE**

Sigma-7 SERVOPACKS have twice as many anti-resonance filters to more effectively repress a servo system’s natural medium-frequency resonances.

**FRICTION**

Coulomb friction and viscosity-related variables are effectively addressed by Friction Model Compensation, which effectively elicits smooth start-up action in low speed or high rigidity machines.

**COGGING**

Motor c ogging effects are removed by Ripple Compensation, an especially important effect for systems that require minimum settling time and exceptionally precise positioning.

**ELECTROMAGNETIC INTERFERENCE**

The number of interference filters has been increased by 225% to counteract losses caused by data dropouts, EMI interference and artifacts from long cable runs.
SIGMA SERIES SERVOPACKS

Feature-packed for your machine

Choice of high-speed deterministic networks

- Used with our full line of IEC 61131-3 machine controllers
- Superior noise immunity in challenging industrial environments
- Retry function minimizes data drop-outs

Variety of SERVOPACK products to fit your application

- SIGMA-75IEC
  - Single-Axis Controller
  - Controller and SERVOPACK in one device
  - IEC 61131-3 compatibility for predictable behavior
  - EtherCAT, MECHATROLINK, Analog
  - Perform functions without learning new software
  - Basic point to point moves, blended speed moves, homing, jogging, electronic gearing

- SGD7S
  - Single-Axis SERVOPACK
  - Adheres to CoE device profile (CiA402)
  - Distributed clock for synchronized operation
  - Variety of system architectures (cascade, line, star, ring)

- SGD7W
  - Dual-Axis SERVOPACK
  - Control two servo axes with one SERVOPACK
  - Lower cost, component count, less cabinet space
  - 100 V, 200 V and 400 V operation
  - Regenerative power feature conserves energy

- MP2600IEC
  - 1.5-Axis Controller
  - Controller and SERVOPACK in one device
  - IEC 61131-3 compatibility for predictable behavior
  - Scalability between single and multi-axis control
  - EtherNet/IP, Modbus TCP connectivity
  - Built-in web server

- SIGMALOGIC7
  - PLC-Ready SERVOPACK
  - Add On Instructions (AOIs) for use with Rockwell PLCs
  - Dual EtherNet/IP ports onboard
  - Perform functions without learning new software
  - Basic point to point moves, blended speed moves, homing, jogging, electronic gearing

- FSoe SERVOPACK
  - Functional Safety over EtherCAT (FSoe)
  - System certification to Safety Integrity Level 3 (SIL3)
  - Lower cost, component count, less cabinet space
  - 16 supported safety functions

WIDE RANGE
- 10 W to 55 kW
- 100-480 VAC operation.

SCALABLE AS NEEDS CHANGE
- Easy transition from single axis to dual axis model

SIMPL E COMMISSIONING
- Automatic motor recognition simplifies configuration

ABSOLUTE FEEDBACK
- 20-Bit serial absolute encoder
- Motor data stored in the encoder
- Battery-less encoder
- Simplified cable design.

SECONDARY FEEDBACK OPTION (FULL CLOSED LOOP CONTROL)
- Close the position loop around a secondary feedback device near the load
- Helps eliminate the effects of mechanical compliance and thermal variances
- Delivers more precise control and improved machine performance

FUNCTIONAL SAFETY
- Safe Torque Off (STO) circuit standard in every SERVOPACK
- Safety functions SS1 (Safe Stop 1), SS2 (Safe Stop 2) and SLS (Safe Limited Speed) with selection of optional safety module.

ADVANCED NETWORK SAFETY

OR

MECHATROLINK
- EtherCAT
- Adheres to CoE device profile (CiA402)
- Distributed clock for synchronized operation
- Variety of system architectures (cascade, line, star, ring)

WIDE RANGE
- 10 W to 55 kW
- 100-480 VAC operation.

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- 20-Bit serial absolute encoder
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- Battery-less encoder
- Simplified cable design.
SigmaLogic7 SERVOPACKS add the superior performance and reliability of a Yaskawa servo system to your PLC-based machine without leaving the familiar programming environment of your existing PLC.

Utilize Yaskawa-written, Yaskawa-tested add-on instructions (AOIs) in RSLogix5000 software, with a ControlLogix or CompactLogix PLC.

We've done the heavy lifting to make Integration of Yaskawa servo, robotic and variable frequency drive components simple and effortless for your PLC programming environment.

**MOTION SEQUENCING WITH AOIs**
- Perform functions including point-to-point and blended moves, jogging and homing
  - Use direct commands or 200-point configurable sequence table
  - Utilize extra 7 inputs and 3 outputs on SigmaLogic7 SERVOPACK
  - Use LogicWorks software to download sequence and configuration data

**YASKAWA AOIs**
- Created for full compatibility with all CompactLogix and ControlLogix PLCs using RSLogix5000 software v17 and above
  - Named to be familiar to Rockwell users
  - Right-click instruction help available for all instructions in the PLC programming environment
  - Sample program available in RSLogix5000

**ROBOTICS**
- Software utility to create individual move profiles and sequencing for the application
- Upload/download sequence table and configuration data to/from LogicWorks™
- Embedded monitoring and test functions

**VARIABLE FREQUENCY DRIVES**
- **Tag Generator:** Easily create a tag file that can be imported into Logix Designer/RSLogix 5000
- **Faceplates:** Import faceplates to access commonly used parameters and monitors
- **AOIs:** Import our library of AOI using Yaskawa EtherNet/IP option

Extend system performance and reliability with additional Yaskawa PLC tools

**SIGMALOGIC7 SYSTEM DIAGRAM**
- PLC
- EtherNet/IP
- SigmaLogic7 SERVOPACKS
- Rotary Servo Motors
- Linear Servo Motors
- Food Grade Servo Motors
- Inverter Duty Motors
- SCARA Robots
- Delta Robots
- Articulated Robots
SERVOPACKS

BUILT-IN SINGLE AXIS CONTROL

Single and 1.5 axis controller options

Both of these SERVOPACKs provide a compact, all-in-one servo/controller package with the following features:

- IEC 61131-3 standard programming environment with PLCopen function blocks for motion control
- Self-tuning, anti-vibration and other high performance, easy-to-implement servo control features
- Ethernet/IP, Modbus TCP/IP and OPC server provide connectivity to PLCs, HMIs, SCADA, MES and ERP
- Scaleability with the multi-axis MP3300iec controller via common MotionWorks IEC programming environment
- Web server that allows for maintenance diagnostics and troubleshooting

You wouldn’t guess from their trim size that Yaskawa has packed a single-axis motion controller and a world class SERVOPACK into a space slimmer than most normal servo amps occupy.

That means less crowding in control cabinets, plus the easy familiarity of IEC 61131-3 programming.

SIGMA-7SIEC SINGLE-AXIS CONTROL OPTION

I/O FEATURES

- 7 digital inputs
- 4 digital outputs

MP2600IEC 1.5-AXIS CONTROL OPTION

I/O FEATURES

- 15 digital inputs
- 11 digital outputs
- 1 analog input
- 1 analog output
- 1 external encoder input
- 1 external encoder latch
INTEGRATED NETWORK SAFETY

400V EtherCAT SERVOPACK with Advanced Safety Option Module for Functional Safety over EtherCAT (FSoE)

Yaskawa’s FSoE SERVOPACKS are capable of achieving PLe (equivalent to SIL3), which is suited for:

- Machines where serious injuries are possible,
- Frequency to exposure is long and/or frequent,
- Possibility of avoiding injury is scarcely possible

**BENEFITS**

- Cut down your engineering hours with simplified electrical designs
- Slash your commissioning time with fewer cables to wire and test during your assembly process
- Shorten your BOM and reduce machine cost by eliminating safety relays and using fewer cables
- Condense your electrical cabinet footprint with fewer components to install
- Simplify your safety logic with user-friendly software
- System certification to Safety Integrity Level 3 (PLe)

**SAFETY FUNCTIONS SUPPORTED**

- Safe Torque Off (STO)
- Safe Stop 1-r (SS1-r)
- Safe Stop 2-r (SS2-r)
- Safely Limited Speed (SLS)
- Safe Speed Range (SLR)
- Safely Limited Position (SLP)
- Safely Limited Torque (SLT)
- Safe CAM (SCA)

- Safe Operating Stop (SOS)
- Safe Stop 1-t (SS1-t)
- Safe Stop 2-t (SS2-t)
- Safely Limited Acceleration (SLA)
- Safe Direction (SDA)
- Safely Limited Increment (SLI)
- Safe Motor Temperature (SMT)
- Safe Speed Monitor (SSM)

Up to 10 Safety Functions per SERVOPACK can be configured simultaneously

**THE NEW SOLUTION: NETWORKED SAFETY**

**400V FSoE SERVOPACKS + Advanced Safety Option**

**400V Sigma Series Servo Motors**

**Communications**

**EtherCAT Master**

**Other Safety Equipment**

**E-Stop**

**Light Curtain**
SYSTEM CONFIGURATION

YASKAWA

DRIVES
TOTAL SYSTEM SOLUTION
MOTION
ROBOTICS

MECHATROLINK

YASKAWA SLIO

MP3300IEC MACHINE CONTROLLER

OPC SERVER
WEB SERVER

Ethernet

PLCi

EtherNet/IP

YASKAWA HMI

YRC1000 OR YRC1000MICRO CONTROLLER

200 V SIGMA-7 SERVOPACKS
400 V SIGMA-7 SERVOPACKS

SGD7W DUAL-AXIS
SGD7W DUAL-AXIS
SGD7S SINGLE-AXIS
SGD7S SINGLE-AXIS

INVERTER DUTY MOTOR

VFD

YASKAWA SERVO MOTORS

ROBOTICS

YASKAWA ROBOTS

ARTICULATED

SCARA

DELTA AND CUSTOM MECHANISMS

GANTRY SYSTEM
DELTA ROBOTS
XY SYSTEMS

24
SIGMA SERIES SERVO MOTORS
Packed with performance

MORE TORQUE IN LESS SPACE
- Yaskawa’s segmented stator core design and automated winding techniques pack nearly twice the copper into the stator gap, for much more torque output from every square millimeter of space
- Encapsulated windings prevent shorts between windings, improving heat dissipation
- Precise machining is used to minimize the air gap between rotor magnets and stator windings, for higher running torque and reduced cogging torque
- By reducing the space taken up by the end turns of the winding, overall motor length is significantly reduced
- Neodymium-Iron-Boron rotor magnets optimize flux density in the motor

ELIMINATE MECHANICAL BREAKDOWNS
Simplify your machine’s design, decrease part counts and cut assembly time by replacing mechanical linkages with reliable, flexible servo control.
- Designed to accommodate up to a 30:1 inertia mismatch
- Reduce gearbox size, or eliminate gearboxes altogether
- Eliminate maintenance points in machinery and improve safety

7 SIGMA ADVANTAGES
The latest generation of Sigma Series servo motors offer power, precision and reliability unmatched by anything in the automation industry.
Better still, the newest Sigma-7 motors are completely compatible with Yaskawa’s industry-leading Sigma-5 products. An easy replacement can lead to an instant boost in machine productivity.

1. 20% more compact in size, for an easier fit in more applications
2. 16 times better resolution radically improves positional accuracy
3. Nearly double the bandwidth yields faster speed, more throughput
4. New thermal sensors detect application problems before they affect motor life
5. Withstands ambient temperatures to 60 °C for reliable performance in extreme environments
6. High-altitude friendly with full function assured at elevations of 2000 m and above
7. IP67 rated for total protection against dust and the effects of water immersion to a depth of 1 m

BATTERYLESS ABSOLUTE ENCODER
- Simplifies wiring in control panels
- No concerns about losing rotational data if battery runs out
- No need to stock batteries
DIRECT DRIVE MOTORS
Boost the quality of your design

Direct drive motor technology provides a host of improvements in the quality of a machine’s design.

- Less audible noise
- Reduced maintenance of mechanical transmissions
- Overall efficiency and performance increased, leading to lower long-term cost

REDUCE DOWNTIME
By eliminating gear reduction and creating a direct coupling to the machine load, direct drive motors simplify your machine’s design. Eliminating transmission components leads to fewer breakdowns and long-term reliability you can trust.

REDUCE SIZE AND COST
Directly coupling a compact direct drive servo motor to your machine load will save physical space, which can lead to a more compact machine. When precision gearheads and other transmission components are gone, the cost of your machine will go down as well.

INCREASE PERFORMANCE
Direct drive motors get rid of the inefficiencies caused by mechanical transmission components that wear over time. Say goodbye to mechanical backlash as well. As compliance is reduced, the responsiveness of the servo system can be dramatically improved.

LINEAR MOTORS
Eliminate the effects of mechanical linkages

Yaskawa offers a full range of linear servo motors designed to handle the most demanding applications.

Yaskawa linear servo motors replace the backlash, friction, inertia and wear of mechanical linkages with smooth, precise, high performance linear motion in a compact footprint.

All Yaskawa linear motors offer plug-and-play connection with Sigma-7 and Sigma-5 series SERVOPACK amplifiers, using automatic motor recognition and serial encoder technology to make implementation trouble free.

SGMCS
(Coreless, Inner Rotor)
Ideal for smooth movement without speed fluctuations.
- Built-in 24- & 20-bit encoder
- Low cogging with a coreless system provides smooth operation free from speed variations.

SGM7F
(With Core, Inner Rotor)
Ideal for applications that require downsizing and shorter cycle time.
- Built-in 24-22- & 20-bit encoder
- Compact design with small rotor diameter
- High-speed, high frequency positioning
- Low inertia / low heat generation

SGM7D
(With Core, Outer Rotor)
Ideal for high torque, high precision and high rigidity.
- Built-in 24-bit encoder
- High allowable load moment of inertia ratio for large loads
- Large center aperture provides more space for wiring
- High rigidity

SGLG
(Coreless)
Smooth linear motion with an ironless design that eliminates motor cogging.
- 200 V windings
- 40 to 3000 N of peak force
- Standard and high force magnetic ways
- Zero cogging reduces force ripple

SGLF2
(Iron-Core)
Second generation iron core design that delivers high force and speed in a compact form.
- 200 V or 400 V windings
- 135 to 7560 N of peak force
- 5 m/s peak speed
- Very little cogging

SGLT
(Dual Magnet Iron-Core)
An iron core design featuring dual magnets, producing high output in a compact footprint.
- 200 V or 400 V windings
- 380 to 7500 N of peak force
- 5 m/s peak speed
- Very little cogging

SGM7CS (Coreless, Inner Rotor)
Ideal for smooth movement without speed fluctuations.
- Built-in 24- & 20-bit encoder
- Low cogging with a coreless system provides smooth operation free from speed variations.

SGM7F (With Core, Inner Rotor)
Ideal for applications that require downsizing and shorter cycle time.
- Built-in 24-22- & 20-bit encoder
- Compact design with small rotor diameter
- High-speed, high frequency positioning
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- 380 to 7500 N of peak force
- 5 m/s peak speed
- Very little cogging

Yaskawa linear servo motors replace the backlash, friction, inertia and wear of mechanical linkages with smooth, precise, high performance linear motion in a compact footprint.

All Yaskawa linear motors offer plug-and-play connection with Sigma-7 and Sigma-5 series SERVOPACK amplifiers, using automatic motor recognition and serial encoder technology to make implementation trouble free.

By eliminating gear reduction and creating a direct coupling to the machine load, direct drive motors simplify your machine’s design. Eliminating transmission components leads to fewer breakdowns and long-term reliability you can trust.

Directly coupling a compact direct drive servo motor to your machine load will save physical space, which can lead to a more compact machine. When precision gearheads and other transmission components are gone, the cost of your machine will go down as well.

As compliance is reduced, the responsiveness of the servo system can be dramatically improved.
SIGMA TRAC II
Ready to run, turnkey linear stages

Built-to-order and fully tested. Bolt it down, connect it up and enjoy world class linear motion immediately.

FASTER MOTION, FASTER TIME TO MARKET

Need precise, high speed and repeatable linear motion, without the time-consuming process of designing your own linear stages?

Use Yaskawa’s motion engineering expertise to spare your overworked engineers the effort of specifying, designing and sourcing components, assembly jigs and test equipment.

Our expertly designed, manufactured and tested mechatronic solutions give your machine a faster time to market and your engineering team more time to innovate.

WHAT IF...

• You could simplify your machine’s design with a bolt-in linear solution?
• Project development time could be cut by days or weeks?
• You never needed to worry about getting the best in speed, reliability and repeatability?

Sigma Trac II will significantly reduce your time to market while increasing your machine’s speed and performance.

COMPLETE LINEAR MOTION SOLUTION

Each component in Sigma Trac II is fully assembled and tested:
• Coil and magnets
• Bearings
• Encoder
• Cables
• Cable management
• Optional bellows
• Optional X-Y mounting kit

Simply provide a flat mounting surface and bolt on your payload!

IMPROVE MACHINE PERFORMANCE
Minimize cycle times and maximize productivity with speeds up to 5 m/s and peak force output up to 5040 N.

REPEATABILITY
Coupling the load directly to the motor and encoder yields positioning repeatability of ±2 µm.

WIDE RANGE OF SIZES
With six motor sizes and 24 base lengths, there is a linear stage for nearly any application. Stages are available for use with 100 V, 200 V, or 400 V power.

RELIABILITY
We’ve eliminate gears, belts and screws, resulting in a 10 million double-stroke design life.

ABSOLUTE ENCODER FEEDBACK
Simplifies wiring and requires no homing routines, even after removing power from the equipment.

ZERO MAINTENANCE
Integrated bearing lubrication technology for long-term maintenance-free operation.

CABLE MANAGEMENT
Carefully controlling cable flex maximizes cable life. Use additional space in the cable carrier for cables and hoses to your payload.

BELLOWS
Optional bellows protect magnets and encoder scale from dust, loose debris and the occasional dropped tool.
SERVO MOTOR PORTFOLIO

STANDARD ROTARY
The world’s largest manufacturer of servo motors brings 25 years of design innovation into each Sigma-7 rotary servo. Choose from a wide range of sizes, speeds and torque ratings, then add an amplifier and an MPiec controller to create a complete motion automation system.

<table>
<thead>
<tr>
<th>100/200 V Servo Motors</th>
<th>400 V Servo Motors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low Inertia</strong></td>
<td><strong>Medium Inertia</strong></td>
</tr>
<tr>
<td>5W - 30W</td>
<td>50W - 7 kW</td>
</tr>
<tr>
<td>SGMF</td>
<td>SGM7A</td>
</tr>
<tr>
<td>200W - 15kW</td>
<td>200W - 7 kW</td>
</tr>
<tr>
<td>SGM7A</td>
<td>SGM7J</td>
</tr>
<tr>
<td>50W - 750W</td>
<td>200W - 15kW</td>
</tr>
<tr>
<td>SGM7G</td>
<td>400W - 15kW</td>
</tr>
<tr>
<td>500W - 15kW</td>
<td>SGMVV</td>
</tr>
</tbody>
</table>

* SGMVV large capacity servo motors are compatible only with large capacity Sigma-5 SERVOPACKs.

DIRECT DRIVE ROTARY
Direct drive products save space, eliminate backlash and cut component costs, adding extra mechanical strength to stiffen dynamic applications.

<table>
<thead>
<tr>
<th>200 V</th>
<th>400 V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>200 V and 400 V</strong></td>
<td></td>
</tr>
<tr>
<td>SGMF</td>
<td>SGMVF</td>
</tr>
<tr>
<td>(Iron Core) 4-25Nm rated torque, 600rpm max speed</td>
<td>(Iron Core) 40-300Nm, 600rpm max speed</td>
</tr>
<tr>
<td>SGMCS</td>
<td>SGLT</td>
</tr>
<tr>
<td>(Coreless) 2-200Nm rated torque, 500rpm max speed</td>
<td>(Double Trac) 380-7500N, 5m/s max speed</td>
</tr>
<tr>
<td>SGM7D</td>
<td>SGLF2</td>
</tr>
<tr>
<td>(Iron Core) 130-340Nm rated torque, 30-240rpm</td>
<td>(Iron Core) 135-7560N, 5m/s max speed</td>
</tr>
</tbody>
</table>

DIRECT DRIVE LINEAR
Maximum speed and acceleration for linear motion. Choose from four designs to reduce compliance, replace mechanical linkages and create a better fit for your application.

<table>
<thead>
<tr>
<th>200 V and 400 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGLG</td>
</tr>
<tr>
<td>(Coreless) 40-3000Npeak force, 5m/s max speed</td>
</tr>
<tr>
<td>SGLF2</td>
</tr>
<tr>
<td>(Iron Core) 135-7560N, 5m/s max speed</td>
</tr>
<tr>
<td>SGLT</td>
</tr>
<tr>
<td>(Double Trac) 380-7500N, 5m/s max speed</td>
</tr>
<tr>
<td>Sigma Trac II</td>
</tr>
<tr>
<td>(Complete Linear Stage) 5040N, 5m/s max speed</td>
</tr>
</tbody>
</table>

SERVOPACKs
1 Axis | 2 Axis
SGD7S | SGD7W | SGD7S | SGD7W
50W - 15kW | 200W-144W per axis | 50W - 15kW | 200W-144W per axis

Control Interface Options: EtherCAT, MECHATROLINK, Analog (Analog 100 V SERVOPACKs available from 50-400W)
FOOD GRADE MOTORS
High-performance FDA approved motors

Yaskawa now offers food grade servo motors that integrate seamlessly with the Sigma-7 line of SERVOPACKs.

These FDA approved white epoxy painted high performance motors are ideal for food packaging equipment. They are capable of withstandng repeated high pressure wash down and they have a smooth housing to minimize entrapment areas.

FEATURES
- FDA approved white epoxy coating
- Finless extruded aluminum housing
- IP66 sealing (high pressure wash down)
- UL (cURus), CE, RoHS
- Stainless steel shaft

HYGIENIC STAINLESS MOTORS
For demanding washdown environments

Yaskawa now offers a wide range of hygienic stainless servo motors for use with the Sigma-7 line of SERVOPACKs.

These stainless steel motors are designed for demanding wash down environments and are ideal for applications in food and beverage processing equipment. They adhere to the EHEDG hygienic standard.

FEATURES
- 316/316L stainless steel housing, max corrosion resistance
- Smooth finish with no sharp inside corners
- IP66 for continuous flood while in operation and complete protection from dust
- IP69/IP69k for high pressure, high temperature while not in operation
- EHEDG, UL (cURus), CE, RoHS
- Stainless steel shaft
- Two frame sizes
- 200 V / 400 V windings
- 24 V holding brake option
- 2.4 to 3.2 Nm of continuous torque
- Hiperface multi-turn absolute encoder
FAST. FLEXIBLE. RELIABLE.

Our full suite of material handling robots make it easy to integrate the ideal solution for your most challenging applications.

HIGH SPEED PICKING

Perfect your primary operations with our extremely accurate and nimble picking robots.

- **MotoMini**
  - 0.5 kg payload
  - 350 mm horizontal reach
  - 495 mm vertical reach

- **MPP3 Series (Delta)**
  - 3 kg payload, 150 cpm
  - 800 - 1,300 mm horizontal reach
  - 300 mm - 601 mm z-stroke
  - IP67-rated body, NSF-H1 certified food-grade lubricants

- **SG Series (SCARA)**
  - 3 - 6 kg payload
  - 400 - 650 mm radial reach
  - 200 - 210 mm z-stroke

Designed to optimize material handling operations from beginning to end, Yaskawa robots deliver exceptional speed and precision.

Whether your focus is food/beverage, pharmaceutical, consumer products or specialty items, our full suite of products and technologies make it easy to configure, program and integrate an ideal solution to meet your production goals.

PART HANDLING AND TRANSFER

Automate your secondary operations with our versatile, high-speed handling robots.

- **GP Series**
  - 4.0 - 600 kg payloads
  - 550 - 3518 mm horizontal reach
  - 1008 - 5622 mm vertical reach

- **MH Series**
  - 2.0 - 900 kg payloads
  - 532 - 4683 mm horizontal reach
  - 804 - 6209 mm vertical reach

- **HC10XP / HC20XP**
  - 10 kg / 20 kg payload
  - 1,200 mm / 1,700 mm max. reach
  - IP67-rated body, NSF-H1 certified food-grade lubricants

PALLETIZING

Move boxes and load pallets with greater consistency and ease using our efficient palletizing robots.

- **MPK/MPL Series**
  - 2.0 - 800 kg payloads
  - 900 - 3159 mm horizontal reach
  - 1551 - 3291 mm vertical reach
  - IP67-rated body, NSF-H1 certified food-grade lubricants

- **PL Series**
  - 80 - 500 kg payloads
  - 2061 - 3159 mm horizontal reach
  - 3024 - 3291 mm vertical reach

COLLABORATIVE

Highly versatile and portable, HC-series cobots are ideal for a variety of tasks including machine tending, material handling, packaging and light assembly.

POWER FOR THE REST OF US

If you’re familiar with standard ladder logic and function block programming, welcome to Singular Control.

Now you can program every component in a complete automation system: servo systems, variable frequency drives, and robots.

- Manage every system component with one software package, running on one MP330iec machine controller.
- Migrate a motion application from servos to robots and back again, without changing application code.
- Do it all with the IEC 61131-3 programming your team already knows and is comfortable using.

A Better Way to Control Automated Motion

Tired of hiring expensive programming experts to implement a robot, or of rewriting machine code every time you integrate a new mechanism?

Then you’re ready for Singular Control™, one hardware platform, one software tool, one programming standard and one vendor for everything in motion automation. Yaskawa understands.

That’s why we created Singular Control, and why we’re putting it to work to make your job easier.

SINGULAR CONTROL™

Simplify engineering design, maintenance and training, while reducing your development and machine commissioning time.

FOR EVERYTHING IN MOTION

- SERVO SYSTEMS
- ROBOTS
- VARIABLE FREQUENCY DRIVES
- LOGIC CONTROL

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POWER

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IF YOU'RE

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AND

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BLOCK
PROGRAMMING,
WELCOME TO
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NOW YOU CAN
PROGRAM EVERY
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AUTOMATION
SYSTEM: SERVO
SYSTEMS,
VARIABLE
FREQUENCY
DRIVES,
AND
ROBOTS.

- MANAGE EVERY
SYSTEM COMPONENT WITH ONE SOFTWARE PACKAGE,
RUNNING ON ONE MP330IEC MACHINE CONTROLLER.
- MIGRATE A MOTION APPLICATION FROM SERVOS TO
ROBOTS AND BACK AGAIN, WITHOUT CHANGING
APPLICATION CODE.
- DO IT ALL WITH THE IEC 61131-3 PROGRAMMING YOUR
TEAM ALREADY KNOWS AND IS COMFORTABLE USING.
CUSTOM SOLUTIONS FOR CUSTOMER NEEDS
ENGINEERED SERVICES GROUP

Our experts in automation and machine control are ready to design and build whatever is necessary to make new automation ideas possible.

Yaskawa is known for creating exceptional motion automation components. It is only natural to back up this reputation with an exceptional ability to help customers put them to use. Our capabilities range from custom enclosures, panels and cables to complete retrofits and electromechanical assemblies.

CUSTOM ENCLOSURES
AND PANELS

Custom without Complexity
Every aspect of control enclosure manufacturing is covered by Engineered Systems, from design and component selection to cabinet manufacturing, wiring and preparation for final installation.

Combine top quality Yaskawa control components, with hardware, cabinetry and connectors to match. Enjoy Yaskawa performance without the complexity of panel design.

CUSTOM CABLES

Plug and Play Cables for any Equipment!
Yaskawa Engineered Systems Group can provide everything from connectors and raw wire to complete wiring harness.

• Custom lengths
• Complete harnesses
• Connector installations
• Armored and special specification cables
• Conduit
• JIT / Stocking program

CONTROL SYSTEMS

Equipped to Handle Every Facet of Automated Systems
Our A-to-Z capability includes development of mechanical systems and control architecture, panel design, wiring, mechanical design and assembly...all the way to shipping, stocking and fulfillment.

Whether you are looking to outsource some or all of the control system manufacturing for a new machine design or seeking a turnkey retrofit of existing equipment, Yaskawa Engineered Systems Group is your one stop for integration of the best automation products in the industry.
## Machine Controllers

### CONTROLLER HARDWARE

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Module</td>
<td>PNC-U-MP350</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) CPU Options; (3) Standard IEC CPU; 4 Medium IEC CPU; 5 High IEC CPU; 6 High IEC CPU; (3) Maximum number of MECHATROLINK Axes; 04: 08, 52.52, 62.62 (Note: Standard CPU up to 20 axes, Medium CPU up to 32 axes, High CPU up to 32 and 62)</td>
</tr>
<tr>
<td>Power and Option Rack</td>
<td>JEPNC-BU350</td>
<td>-E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of slots; 4: 1 slot DC; 5: 3 slots DC; 6: 2 slots DC; 7: 1 slots AC</td>
</tr>
</tbody>
</table>

### SOFTWARE AND NETWORK COMPONENTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MotionWorks IEC Professional</td>
<td>PDE-U-IE3Px</td>
<td>Software Version: 3 x: License Type: E: Electronic • H: Floating License</td>
</tr>
<tr>
<td></td>
<td>PDE-U-OP2Px</td>
<td>Software Version 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>x: License; (x) License Type: E: Electronic • H: Floating License</td>
</tr>
</tbody>
</table>

### Option Cards

<table>
<thead>
<tr>
<th>Option Cards (for MP3200iec, MP3500iec, MP2500iec, MP2300iec)</th>
<th>Description</th>
<th>Part Number</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAPNC-AN2300</td>
<td>Analog Inputs (AI-01)</td>
<td>021-1BH00</td>
<td>(8) channels; +/- 10 V @ 16-bit resolution @ 20 kHz or 40 mA @ 15-bit @ 250 Ω</td>
</tr>
<tr>
<td>JAPNC-AN2310</td>
<td>Analog Outputs (AO-01)</td>
<td>021-1AH00</td>
<td>(6) channels; +/- 10 V/16-bit resolution, 5 mA max load current</td>
</tr>
<tr>
<td>JAPNC-DQ2300</td>
<td>Output Module (DO-01)</td>
<td>021-1BH00</td>
<td>(8) 24 VDC sinking outputs, 100 mA/output</td>
</tr>
<tr>
<td>JAPNC-ID2300-E</td>
<td>I/O Module (LD-01)</td>
<td>021-1BD00</td>
<td>(16) 24 VDC sinking or sourcing inputs; (16) 24 VDC sinking outputs; I/OmA/output; (1) Encoder Counter; A/B/C channels; differential; latch response time varies based on input used; max frequency 4 MHz</td>
</tr>
<tr>
<td>JAPNC-ID2301-E</td>
<td>I/O Module (LD-02)</td>
<td>021-1BD00</td>
<td>(16) 24 VDC sinking or sourcing inputs; (16) 24 VDC sourcing outputs; I/OmA/output; (1) Encoder Counter; A/B/C channels; differential; latch response time varies based on input used; max frequency 4 MHz</td>
</tr>
<tr>
<td>JAPNC-ID2303-E</td>
<td>I/O Module (LD-04)</td>
<td>021-1BD00</td>
<td>(32) 24 VDC sinking or sourcing inputs; (32) 24 VDC sourcing outputs; I/OmA/output</td>
</tr>
<tr>
<td>JAPNC-ID2304-E</td>
<td>I/O Module (LD-05)</td>
<td>021-1BD00</td>
<td>(32) 24 VDC sourcing or sourcing outputs; (32) 24 VDC sourcing outputs; I/OmA/output</td>
</tr>
<tr>
<td>JAPNC-ID2305-E</td>
<td>Multi-Function ( LD-06) (O Option Module)</td>
<td>021-1BD00</td>
<td>(8) 24 VDC sinking or sourcing inputs; (8) 24 VDC sourcing outputs; I/OmA/output; (1) Encoder Counter; A/B/C channels; differential; latch response time varies based on input used; max frequency 4 MHz</td>
</tr>
<tr>
<td>CBK-U-HP2A</td>
<td>For LD-01/02</td>
<td>021-1BD00</td>
<td>(1) Encoder Input; A/B/C channels; (1) Analog Input; 10 to +10 V bits; (1) Analog Output; -10 to +10 V bits</td>
</tr>
<tr>
<td>CBK-U-HP2B</td>
<td>For LD-04/05/06/</td>
<td>021-1BD00</td>
<td>MP2500iec/</td>
</tr>
<tr>
<td>SBK-U-VA2A</td>
<td>For SG27 Servo Amp-Chip</td>
<td>021-1BD00</td>
<td></td>
</tr>
</tbody>
</table>

### SLIO Modules

#### DIGITAL INPUT MODULES

<table>
<thead>
<tr>
<th>Material Number</th>
<th>Description</th>
<th>E/IP Support</th>
<th>M-08 Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>021-1BH00</td>
<td>2 inputs; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BH01</td>
<td>2 fast inputs, input filter time delay parameterizable 2 µs - 4 ms</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BH02</td>
<td>4 inputs</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BH03</td>
<td>4 fast inputs, input filter time delay parameterizable 2 µs - 4 ms</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BH04</td>
<td>4 inputs; Connect 2/5 wire</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BH05</td>
<td>4 inputs; Active low input</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BH07</td>
<td>4 inputs; Time stamp</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>021-1BF00</td>
<td>8 inputs</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BF01</td>
<td>8 inputs; 0.5 ms</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BF05</td>
<td>8 inputs; Active low input</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>021-1BD00</td>
<td>8 inputs; Diagnosis of wiring errors</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BH00</td>
<td>16 inputs</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

#### DIGITAL OUTPUT MODULES

<table>
<thead>
<tr>
<th>Material Number</th>
<th>Description</th>
<th>E/IP Support</th>
<th>M-08 Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>021-1BB00</td>
<td>2 outputs; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB01</td>
<td>2 outputs; PMW</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB02</td>
<td>4 outputs; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB03</td>
<td>4 outputs; Output current 2 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB04</td>
<td>4 outputs; Low-side output; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB05</td>
<td>4 outputs; Low-side output; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB07</td>
<td>8 outputs; Time stamp; Output current 0.5 A</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>021-1BB08</td>
<td>8 outputs; Time stamp; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB09</td>
<td>8 outputs; Time stamp; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB09</td>
<td>2 relay outputs; DC 30 V / AC 250 V; Output current 2 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB10</td>
<td>2 relay outputs; DC 30 V / AC 250 V; Output current 1.8 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB11</td>
<td>8 outputs; Time stamp; Output current 0.5 A; Diagnosis of wiring errors</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB12</td>
<td>4 outputs; Safety; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB13</td>
<td>4 outputs; Safety; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

#### ANALOG INPUT MODULES

<table>
<thead>
<tr>
<th>Material Number</th>
<th>Description</th>
<th>E/IP Support</th>
<th>M-08 Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>021-1BB00</td>
<td>2 inputs; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB01</td>
<td>2 inputs; PMW</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB02</td>
<td>4 inputs; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB03</td>
<td>4 inputs; Output current 2 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB04</td>
<td>4 inputs; Low-side output; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB05</td>
<td>4 inputs; Low-side output; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB07</td>
<td>8 outputs; Time stamp; Output current 0.5 A</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>021-1BB08</td>
<td>8 outputs; Time stamp; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB09</td>
<td>8 outputs; Time stamp; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB10</td>
<td>2 relay outputs; DC 30 V / AC 250 V; Output current 2 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB11</td>
<td>2 relay outputs; DC 30 V / AC 250 V; Output current 1.8 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB12</td>
<td>8 outputs; Time stamp; Output current 0.5 A; Diagnosis of wiring errors</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB13</td>
<td>4 outputs; Safety; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>021-1BB14</td>
<td>4 outputs; Safety; Output current 0.5 A</td>
<td>Y</td>
<td>Y</td>
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</tbody>
</table>
**SLIO Modules**

<table>
<thead>
<tr>
<th>Material Number</th>
<th>Description</th>
<th>E/IP Support</th>
<th>M-III Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>032-1BB50</td>
<td>2 outputs 12-bit; Voltage 0-10 V</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>032-1BB40</td>
<td>2 outputs 12-bit; Voltage 0-10 V</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>032-1BB70</td>
<td>2 outputs 12-bit; Voltage -10 V to +10 V</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>032-1BD30</td>
<td>4 outputs 12-bit; Voltage 0-10 V</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>032-1BC850</td>
<td>2 outputs 12-bit; Voltage 0-10 V</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>032-1BC40</td>
<td>2 outputs 12-bit; Current 0.4-20 mA</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>032-1CB70</td>
<td>4 outputs 12-bit; Voltage -10 V to +10 V</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>032-1C850</td>
<td>2 outputs 12-bit; Voltage 0-10 V</td>
<td>Y</td>
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</tr>
</tbody>
</table>

* **POTENTIAL ANALOG OUTPUT MODULES**

<table>
<thead>
<tr>
<th>Material Number</th>
<th>Description</th>
<th>E/IP Support</th>
<th>M-III Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>035-1IP01</td>
<td>EtherNet/IP Slave; 2-port Switch 0-4-20 mA/100baseTX full duplex; 16 configuration via flexbus; Up to 64 peripheral modules</td>
<td>Y</td>
<td></td>
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<tr>
<td>035-4HL00</td>
<td>Transfer rate 100 Mbit/s; Up to 64 peripheral modules</td>
<td>Y</td>
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* **FUNCTION MODELS**

<table>
<thead>
<tr>
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<th>Description</th>
<th>E/IP Support</th>
<th>M-III Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>050-18A00</td>
<td>Counter Module; 1 Counter 32-bit (AB), DC 24 V</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>050-18A10</td>
<td>Counter Module; 1 Counter 32-bit (AB), DC 5V (difference signal)</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>050-18B00</td>
<td>Counter Module; 2 Counter 32-bit (AB), DC 24 V</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>050-18B30</td>
<td>Counter Module ECO; 2 Counter 32-bit (AB), DC 24 V</td>
<td>Y</td>
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<tr>
<td>050-18B40</td>
<td>Frequency Measurement; 2 Channels 24-bit, DC 24 V</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>054-18A00</td>
<td>Stepper Module; 1-channel with feedback; 4 inputs/outputs DC 24V</td>
<td>Y</td>
<td>N</td>
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<tr>
<td>054-18C00</td>
<td>DC Motor Module; 2-channel with feedback; 4 inputs/outputs DC 24V</td>
<td>Y</td>
<td>N</td>
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</tbody>
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* **INTERFACE MODULES**

<table>
<thead>
<tr>
<th>Material Number</th>
<th>Description</th>
<th>E/IP Support</th>
<th>M-III Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>039-1PA04</td>
<td>MECHATROLINK-II slave</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>039-360</td>
<td>8 x DC 24 V, 8 x DC 0 V clamps</td>
<td>Y</td>
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<tr>
<td>039-361</td>
<td>4 x DC 24 V, 4 x DC 0 V clamps</td>
<td>Y</td>
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</table>

* **POWER MODULES**

<table>
<thead>
<tr>
<th>Material Number</th>
<th>Description</th>
<th>E/IP Support</th>
<th>M-III Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>007-1A000</td>
<td>Power Supply DC 24 V, 10 A (only electronic modules as spare part of PLC and interface module)</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>007-1A100</td>
<td>Power Supply DC 24 V, 10 A; Reverse polarity protection; Overvoltage protection</td>
<td>Y</td>
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<tr>
<td>007-1A800</td>
<td>Power Supply DC 24 V, 4 A; Power Supply DC 24 V for bus supply 5 V, 2 A; Reverse polarity protection; Overvoltage protection</td>
<td>Y</td>
<td>Y</td>
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</table>

**Sigma Series Servo Products**

* **SIGMA-7 ROTARY SERVO MOTOR / SERVOPACK COMBINATIONS**

<table>
<thead>
<tr>
<th>Rotary Servo Motor Model</th>
<th>Rated Output</th>
<th>Rotated Torque</th>
<th>Pitch Torque</th>
<th>Rotated (Max.) Speed</th>
<th>Battery (min.)</th>
<th>Sigma-7 Servopack Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGMA-48A</td>
<td>15 W</td>
<td>0.392</td>
<td>0.029</td>
<td>3000 (5000)</td>
<td>0.0035</td>
<td>0977S, 0979W, 1057S, 1057W, 1187S, 1187W</td>
</tr>
<tr>
<td>SGMA-14A</td>
<td>20 W</td>
<td>0.505</td>
<td>0.039</td>
<td>3000 (5000)</td>
<td>0.007</td>
<td>0977S, 0979W, 1057S, 1057W, 1187S, 1187W</td>
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<tr>
<td>SGMA-22A</td>
<td>30 W</td>
<td>0.685</td>
<td>0.047</td>
<td>3000 (5000)</td>
<td>0.015</td>
<td>0977S, 0979W, 1057S, 1057W, 1187S, 1187W</td>
</tr>
<tr>
<td>SGMA-30A</td>
<td>40 W</td>
<td>0.995</td>
<td>0.057</td>
<td>3000 (5000)</td>
<td>0.035</td>
<td>0977S, 0979W, 1057S, 1057W, 1187S, 1187W</td>
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</tbody>
</table>

* **Power Supply DC 24 V, 10 A (only electronic modules as spare part of PLC and interface module)**

* **Power Supply DC 24 V, 10 A; Reverse polarity protection; Overvoltage protection**

* **Power Supply DC 24 V, 4 A; Power Supply DC 24 V for bus supply 5 V, 2 A; Reverse polarity protection; Overvoltage protection**

---

* These motors also available as gear motors with gear ratios of 31:1, 91:1, 25:1 or 50:1 gear ratios.
### Sigma Series Servo Products

#### SIGMA-5 ROTARY SERVO MOTOR / SERVOPACK COMBINATIONS

The following servo models include combinations that are only compatible with SIGMA-5 SERVOPACKs.

<table>
<thead>
<tr>
<th>Sigma Series Servo Motor</th>
<th>Rated Output</th>
<th>Rated Torque (Nm)</th>
<th>Rated Speed (rpm)</th>
<th>Rotary Inertia (x10 kg·cm²)</th>
<th>Sigma-5 SERVOPACK Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGMV-01E</td>
<td>0.0105</td>
<td>0.0263</td>
<td>0.000441</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SGMV-05E</td>
<td>0.0175</td>
<td>0.0458</td>
<td>-</td>
<td>17E</td>
<td>-</td>
</tr>
<tr>
<td>SGMV-10E</td>
<td>0.0350</td>
<td>0.0875</td>
<td>-</td>
<td>383</td>
<td>-</td>
</tr>
<tr>
<td>SGMV-20E</td>
<td>0.1386</td>
<td>0.3395</td>
<td>-</td>
<td>2R9F, 9ROA</td>
<td>-</td>
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<tr>
<td>SGMV-30E</td>
<td>0.2676</td>
<td>0.6688</td>
<td>-</td>
<td>2R1F, 1R8A</td>
<td>-</td>
</tr>
</tbody>
</table>

### DIRECT DRIVE SERVO MOTOR / SERVOPACK COMBINATIONS

**Sigma Series Servo Motor | Rotary Inertia | Sigma-7 SERVOPACK Model**

<table>
<thead>
<tr>
<th>Sigma Series Servo Motor</th>
<th>Rated Output</th>
<th>Rated Torque (Nm)</th>
<th>Rated Speed (rpm)</th>
<th>Rotary Inertia</th>
<th>Sigma-7 SERVOPACK Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGMVY-0227/007</td>
<td>3.000</td>
<td>5.000</td>
<td>120 (210)</td>
<td>120</td>
<td>120A</td>
</tr>
<tr>
<td>SGMVY-0227/007</td>
<td>3.000</td>
<td>5.000</td>
<td>120 (210)</td>
<td>120</td>
<td>120A</td>
</tr>
<tr>
<td>SGMVY-0227/007</td>
<td>3.000</td>
<td>5.000</td>
<td>120 (210)</td>
<td>120</td>
<td>120A</td>
</tr>
<tr>
<td>SGMVY-0227/007</td>
<td>3.000</td>
<td>5.000</td>
<td>120 (210)</td>
<td>120</td>
<td>120A</td>
</tr>
<tr>
<td>SGMVY-0227/007</td>
<td>3.000</td>
<td>5.000</td>
<td>120 (210)</td>
<td>120</td>
<td>120A</td>
</tr>
<tr>
<td>SGMVY-0227/007</td>
<td>3.000</td>
<td>5.000</td>
<td>120 (210)</td>
<td>120</td>
<td>120A</td>
</tr>
</tbody>
</table>

**Note:** Use SIGMA-5 servo motor in combination with FT-Specification SERVOPACK. The following SERVOPACK models can be used:
- 120A
- 120A
- 120A
- 120A
- 120A
- 120A
- 120A
- 120A
- 120A
## Sigma Series Servo Products

### LINEAR SERVO MOTOR / SERVOPACK COMBINATIONS

<table>
<thead>
<tr>
<th>Linear Servomotor Model</th>
<th>Rated Force</th>
<th>Peak Force</th>
<th>Rated (Max) Speed</th>
<th>Moving Coil Mass</th>
<th>Sigma-7 SERVOPACK Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>m/s</td>
<td>kg</td>
<td></td>
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</tr>
<tr>
<td>SGLGW-30A0050C</td>
<td>12.5</td>
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<td></td>
<td>25</td>
<td>80</td>
<td>0.15</td>
<td>SGLGW-30A0050C</td>
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<td></td>
<td>47</td>
<td>140</td>
<td>0.54</td>
<td>SGLGW-30A0050C</td>
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</tr>
<tr>
<td></td>
<td>95</td>
<td>280</td>
<td>2.0 (5.0)</td>
<td>SGLGW-30A0050C</td>
<td></td>
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<tr>
<td></td>
<td>140</td>
<td>420</td>
<td>0.87</td>
<td>SGLGW-30A0050C</td>
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<td>70</td>
<td>220</td>
<td>0.62</td>
<td>SGLGW-30A0050C</td>
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</tr>
<tr>
<td></td>
<td>140</td>
<td>440</td>
<td>2.5 (4.8)</td>
<td>SGLGW-30A0050C</td>
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</tr>
<tr>
<td></td>
<td>210</td>
<td>660</td>
<td>1.1</td>
<td>SGLGW-30A0050C</td>
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</tr>
<tr>
<td></td>
<td>325</td>
<td>1300</td>
<td>1.8 (4.0)</td>
<td>SGLGW-30A0050C</td>
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<td></td>
<td>550</td>
<td>2200</td>
<td>1.5 (4.0)</td>
<td>SGLGW-30A0050C</td>
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<td>4.9</td>
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<td>230</td>
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<td>114</td>
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<td>0.60</td>
<td>SGLGW-30A0050C</td>
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<td>171</td>
<td>690</td>
<td>0.87</td>
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<td>85</td>
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<td>0.42</td>
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<td>SGLGW-30A0050C</td>
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<tr>
<td>SGLGW-60A2560C</td>
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<td>1.0</td>
<td>SGLGW-60A2560C</td>
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</tbody>
</table>

### LINEAR SERVO MOTOR / SERVOPACK COMBINATIONS (CONT.)

<table>
<thead>
<tr>
<th>Linear Servomotor Model</th>
<th>Rated Force</th>
<th>Peak Force</th>
<th>Rated (Max) Speed</th>
<th>Moving Coil Mass</th>
<th>Sigma-7 SERVOPACK Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>m/s</td>
<td>kg</td>
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<td>SGLTW-2DA170A</td>
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### SIGMA TRAC II LINEAR STAGE / SERVOPACK COMBINATIONS

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<th>Linear Stage Model</th>
<th>Rated Force</th>
<th>Peak Force</th>
<th>Rated (Max) Speed</th>
<th>Maximum Payload</th>
<th>Moving Mass</th>
<th>SERVOPACK Model</th>
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<td>N</td>
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<td>kg</td>
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* The SGLFW model is an earlier product. Select the SGLFW2 model when newly installing a linear servomotor to a machine.
Yaskawa is the leading global manufacturer of low and medium voltage variable frequency drives, servo systems, machine controllers and industrial robots. Our standard products, as well as tailor-made solutions, are well known and have a high reputation for outstanding quality and reliability.