

**YASKAWA**

# **MACHINE CONTROL PRODUCTS**

RETHINK WHAT'S POSSIBLE



YASKAWA MACHINE CONTROL

# RETHINK WHAT'S POSSIBLE



## YASKAWA EXPERIENCE: BY THE NUMBERS

Since 1915,  
Yaskawa has produced...

18M  
SERVO  
AMPLIFIERS

30M  
VARIABLE  
FREQUENCY  
DRIVES

500K  
ROBOTS

Per year, that's...

> 40,000 ROBOTS

> 825,000 SERVOPACKS

> 1.12 MILLION SERVO MOTORS

> 2.1 MILLION AC DRIVES

30

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.

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.

# 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

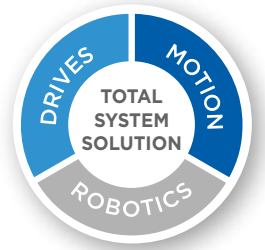
- Germany
- Sweden
- U.K.
- Italy
- France
- Spain
- Norway
- Finland
- Netherlands
- Slovenia
- Czech Republic
- Poland
- Turkey
- Israel
- South Africa

### ASIA/PACIFIC/OCEANIA

- Japan
- China
- Korea
- Taiwan
- Singapore
- Thailand
- Indonesia
- Vietnam
- Malaysia
- India
- Australia

# PRODUCTS THAT PERFORM

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



**MotionWorks<sup>®</sup> IEC**  
PROFESSIONAL



## SOFTWARE

### MOTIONWORKS<sup>®</sup> IEC

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

### YASKAWA COMPASS<sup>™</sup>

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

## CONTROL

### MP3300 IEC 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.

## SERVO

### 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

## VFD

### 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

## I/O

### YASKAWA SLIO

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

## HMI

### HMI PRODUCTS

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

## ROBOTICS

### 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

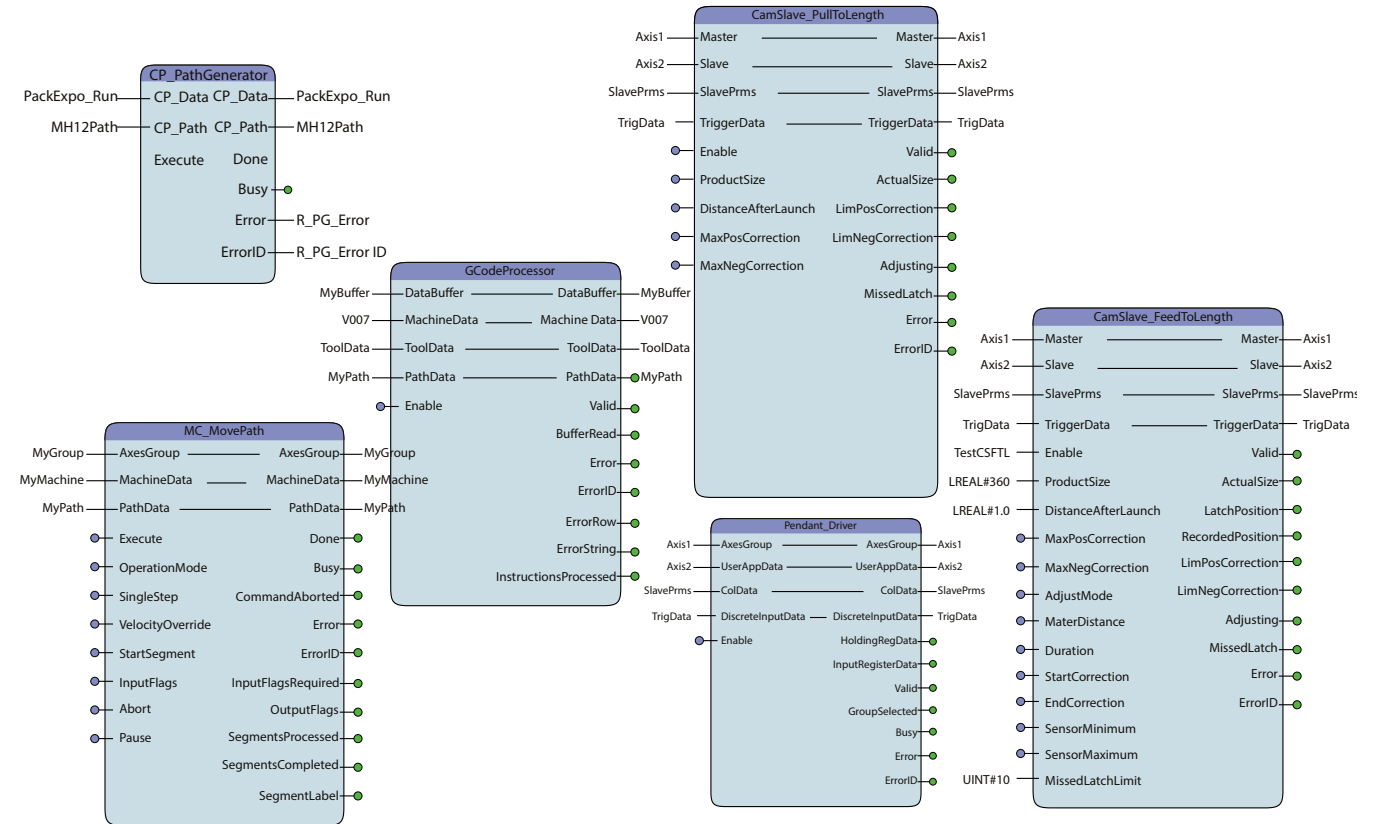
A single MP3300iec machine controller can operate gantries, robots, servo and stepper axes, VFDs, G-code machining equipment - any motion device necessary to implement the latest advances in hybrid manufacturing.



- Up to 62 axes of motion
- Multi-axis synchronization
- 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



## IEC 61131-3 Programming Environment



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

### STANDARDIZED 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

### 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

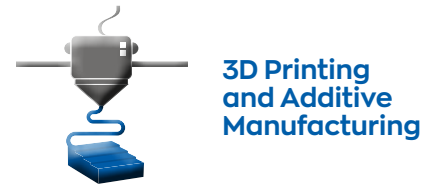
### HMI TAGGING

Supports easy tagging of Yaskawa HMI products, as well as several other major HMI vendors

SOFTWARE

# YASKAWA COMPASS

Your CNC Navigator



## 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.

## G-CODE FROM A TO Z

Coupled with Yaskawa's MPiC 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.



## Powerful, Yet Easy to Use

### SAVE TIME WITH BUILT-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.

# SMARTPANEL

The smartest choice for usability, performance and connectivity to MPiec controllers

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

## 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

## MODELS AND SPECIFICATIONS

Model Number	H41-71A41-O	H71-71A41-O	HA1-71A41-O
Display Size [In]	4.3	7	10
Resolution [Pixel]	480x272	800x480	1024x600
Touch Screen	Resistive		
Processor	ARM Cortex-A8 1GHz		
Interfaces	1x RS232/422/485; 1x USB-A; 1x Ethernet		
int. RFID Reader	-		
Work Memory [MB]	512		
Load Memory [GB]	4		
Card Slot	-		
Housing	Plastic		
Protection	Front: IP66 / Rear: IP20		
Operating System	Windows Embedded Compact 7		
Runtime	Movicon 11		



# PANEL PC

Intelligent control and monitoring with PC performance

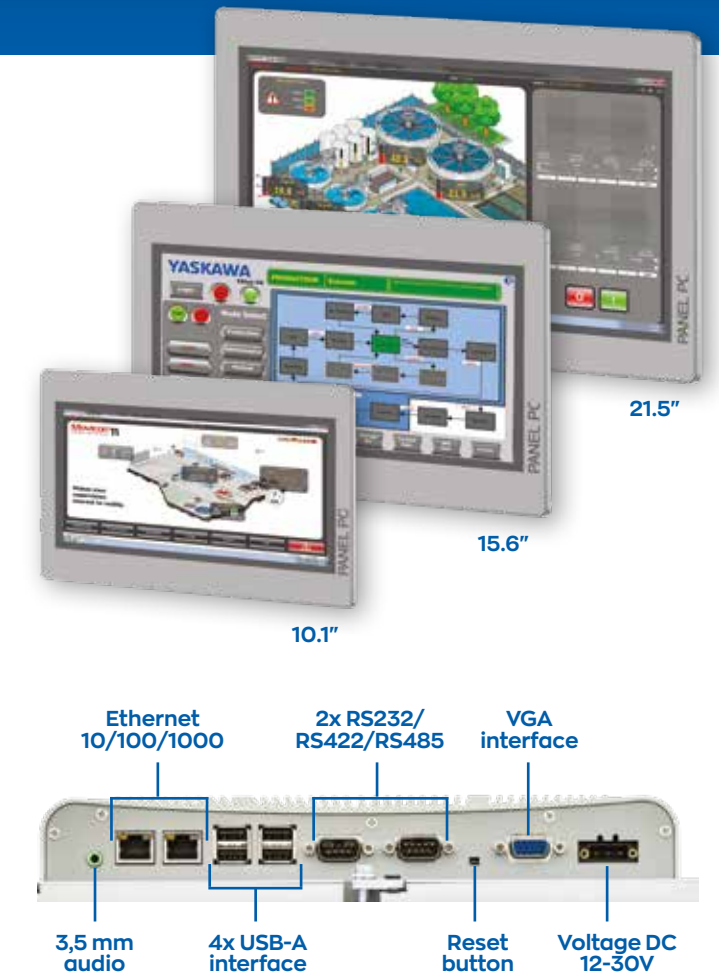
The latest performance features and a precise, responsive capacitive touchscreen combine in Panel PC to deliver outstanding usability in a small space.

## 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

## MODELS AND SPECIFICATIONS

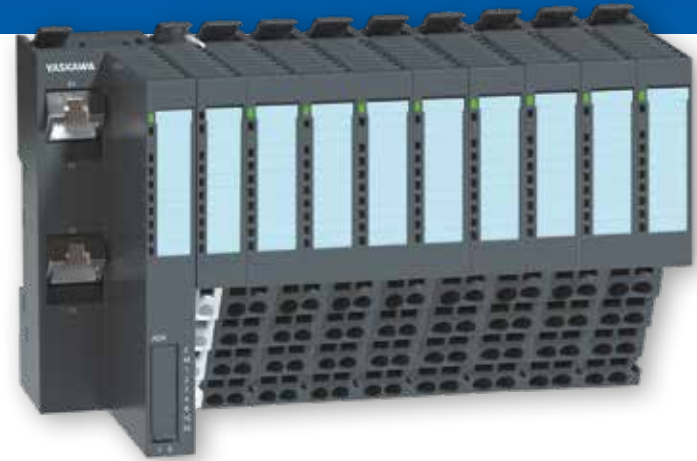
Model Number	67K-RRJO-EB	67P-RRJO-EB	67S-RRJO-EB
Display Size [in]	10.1	15.6	21.5
Resolution [Pixel]	1280x800	1366x768	1920x1080
Touch Screen	Capacitive		
Processor	Intel Celeron J1900 4 x 2.0 GHz		
Interfaces	2x Ethernet; 2x RS232/422/485 (SUB-D)	2x USB 2.0; 1x USB 3.0;	1x VGA; 1x Audio out
Work Memory [MB]	2,048-4,096		
User Memory [MB]	2,048-16,384		
Card Slot	CFast		
Casing	Aluminium		
Protection	Front: IP65 / Rear: IP20		
Operating System	Windows Embedded Compact 7		
Runtime	Movicon 11		



INPUT/OUTPUT PRODUCTS

# YASKAWA SLIO

Compact. Intelligent. Flexible.



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.

## 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.



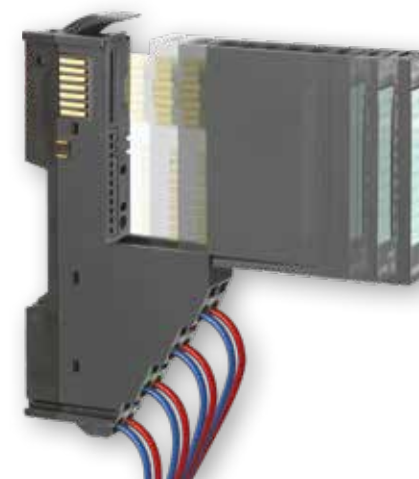
## HIGH SPEED BACKPLANE BUS

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.

# SIGMA SERIES SERVOPACKS

A smarter SERVOPACK to enhance productivity

## 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.



## 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.



Without Vibration Suppression



With Vibration Suppression

### RESONANCE

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

### FRICITION

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 cogging 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.



### 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.

### SETTLING TIME

**40 ms**  
RANGE

### 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..

### SETTLING TIME

**4 ms**  
RANGE

### 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

**0-4 ms**  
RANGE

# 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



OR



- 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.

### SCALABLE AS NEEDS CHANGE

- Easy transition from single axis to dual axis model

### SIMPLE 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.

## Variety of SERVOPACK products to fit your application

### SGD7S



#### Single-Axis SERVOPACK

- 100 V, 200 V and 400 V operation
- 50 W - 15 kW operating range
- Control interface options:
  - EtherCAT
  - MECHATROLINK
  - Analog

### SGD7W



#### Dual-Axis SERVOPACK

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

### SIGMA-7SIEC



#### Single-Axis Controller

- Controller and SERVOPACK in one device
- IEC 61131-3 compatibility for predictable behavior
- Ethernet/IP, Modbus TCP/IP and OPC server connectivity
- Built-in web server

### 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

### SIGNALOGIC7



#### 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

### ADVANCED NETWORK SAFETY



#### FSoE SERVOPACK

- Functional Safety over EtherCAT (FSoE)
- System certification to Safety Integrity Level 3 (PL<sub>E</sub>)
- Lower cost, component count, less cabinet space
- 16 supported safety functions

# SIGMALOGIC7

Improve machine performance for PLC-based control



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.

## 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

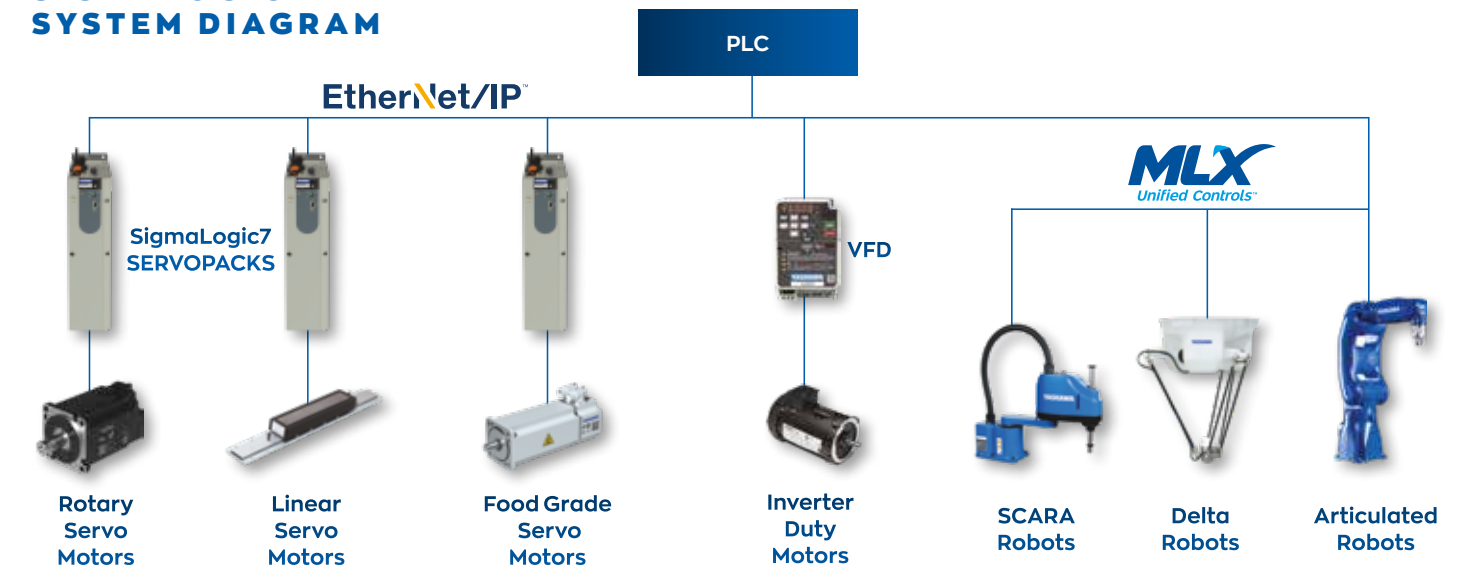
- Created for full compatibility with all CompactLogix and ControlLogix PLCs using RSLogix5000 software v17 and above
- Named to be familiar to Rockwell users
- Right-click instruction help available for all instructions in the PLC programming environment
- Sample program available in RSLogix5000



- 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

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.

## SIGMALOGIC7 SYSTEM DIAGRAM



Extend system performance and reliability with additional Yaskawa PLC tools

## ROBOTICS

Yaskawa's **MLX Unified Controls™** software option:

- Enables robot programming in a standard PLC environment
- Provides control without a separate piece of hardware

## 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

# BUILT-IN SINGLE AXIS CONTROL

Single and 1.5 axis controller options



**SIGMA-7SIEC SINGLE-AXIS CONTROL OPTION**

## I/O FEATURES

- 7 digital inputs
- 4 digital outputs



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.

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
- Scalability with the multi-axis MP3300iec controller via common MotionWorks IEC programming environment
- Web server that allows for maintenance diagnostics and troubleshooting



**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

## SERVOPACKS

# 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

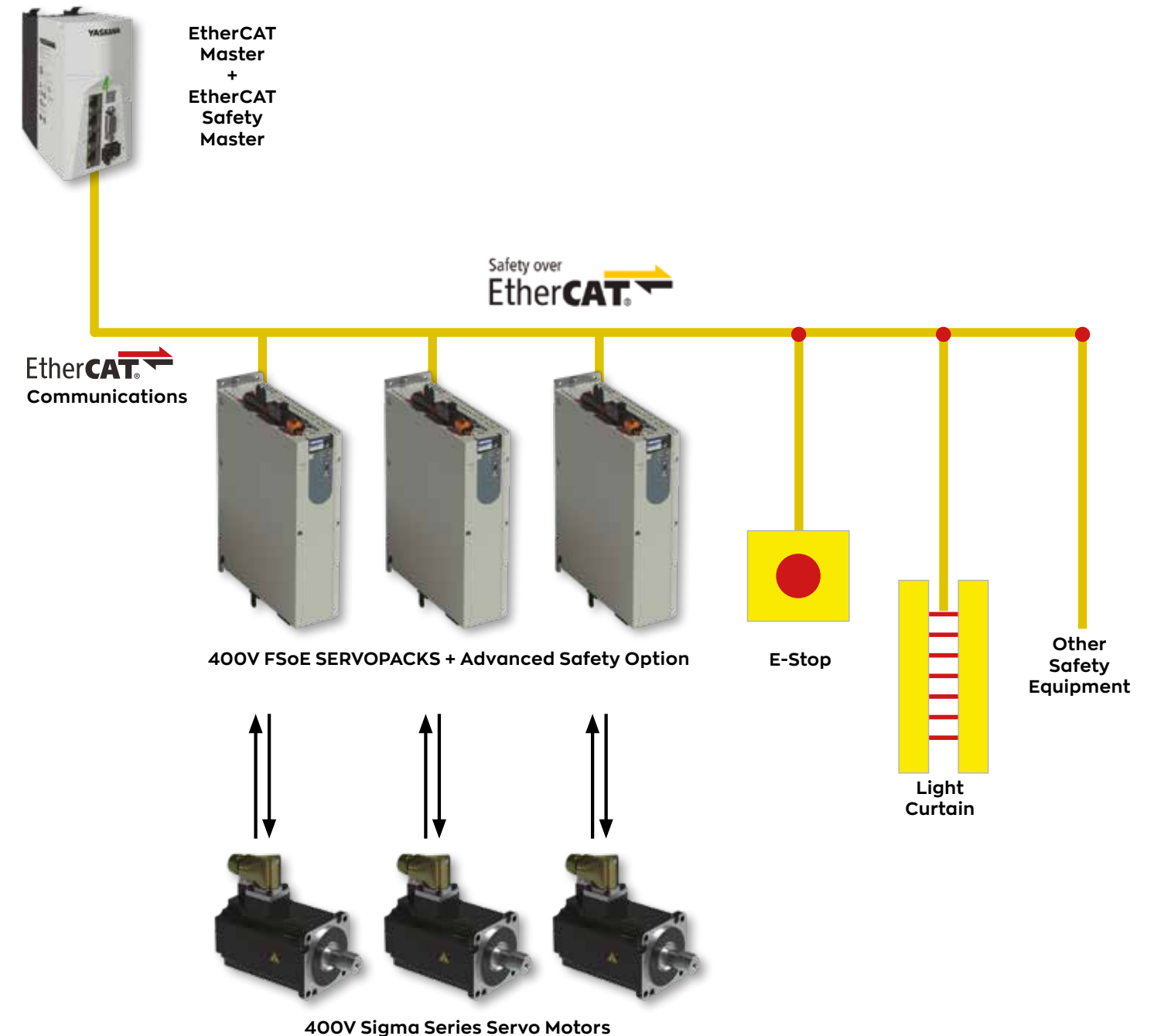
- Cut down your engineering hours with simplified electrical designs
- Slash your commissioning time with fewer cables to wire and test during your assembly process
- Shorten your BOM and reduce machine cost by eliminating safety relays and using fewer cables
- Condense your electrical cabinet footprint 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)

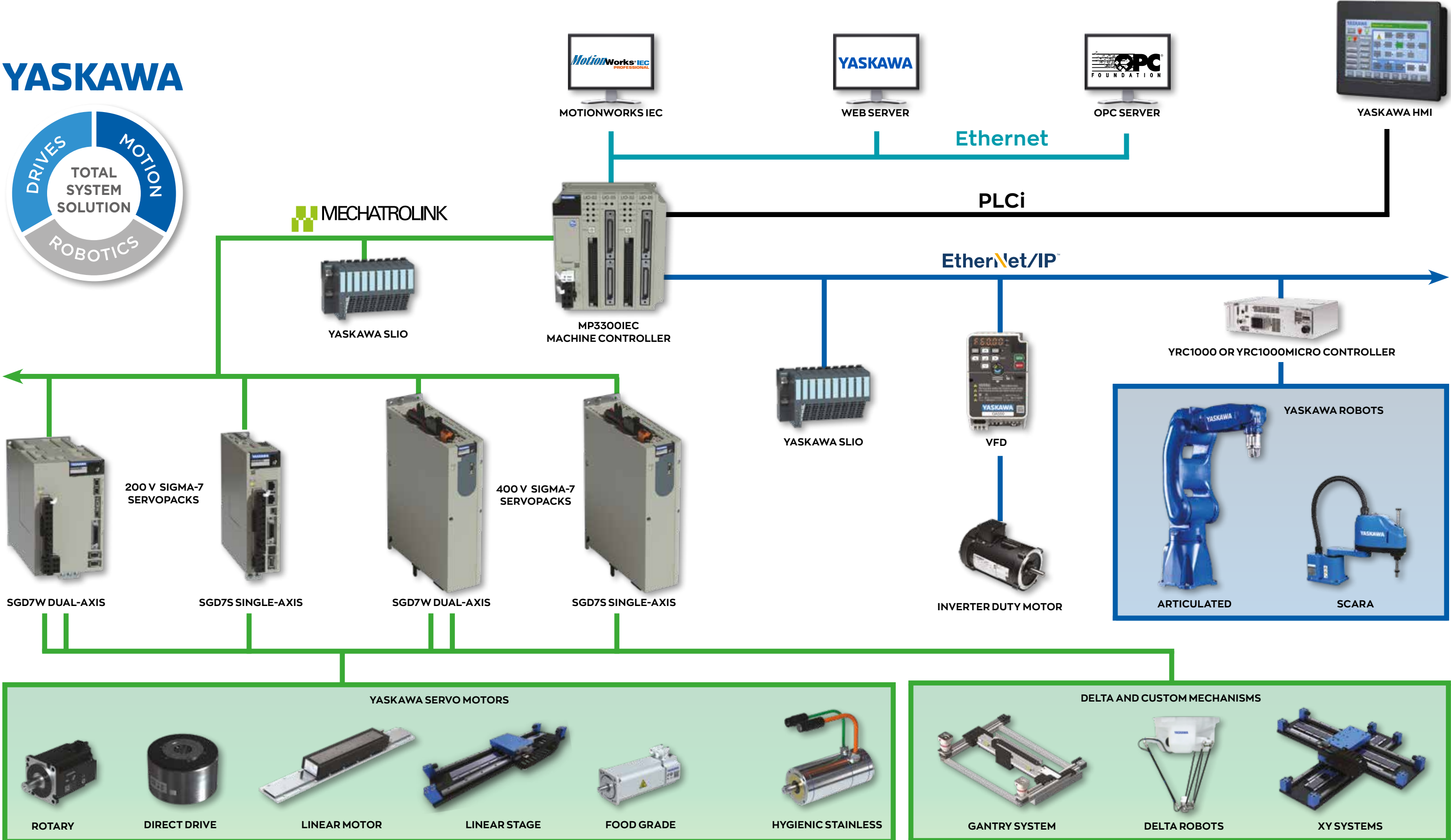
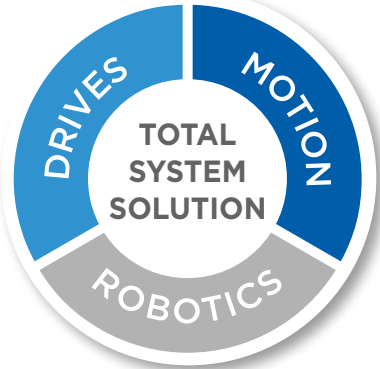
Up to 10 Safety Functions per SERVOPACK can be configured simultaneously

## THE NEW SOLUTION: NETWORKED SAFETY



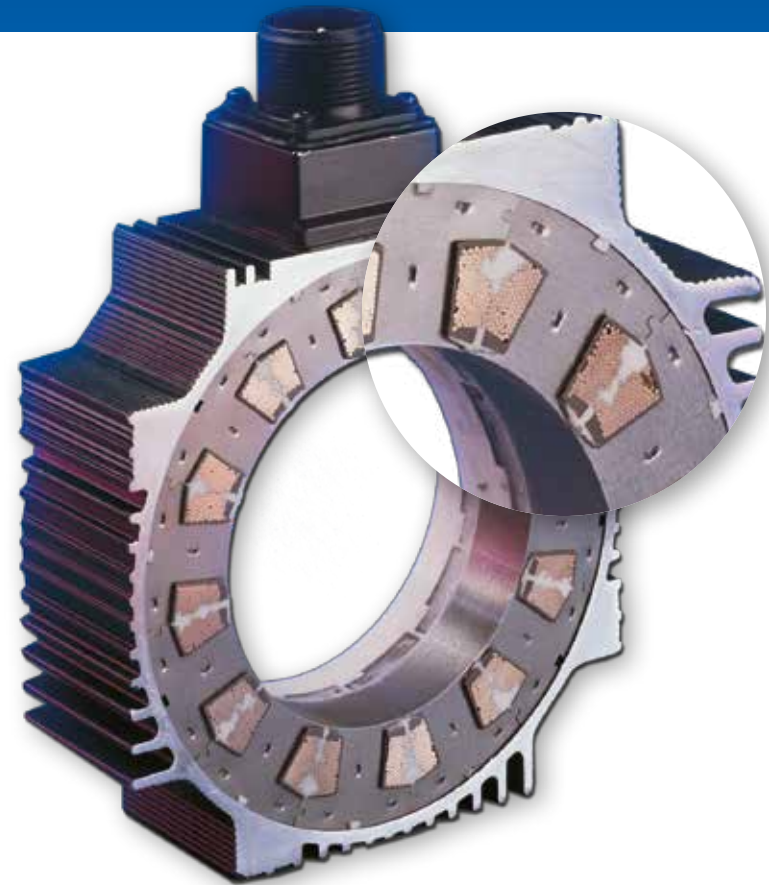
# SYSTEM CONFIGURATION

**YASKAWA**



# 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

## BATTERYLESS ABSOLUTE ENCODER

- Simplifies wiring in control panels
- No concerns about losing rotational data if battery runs out.
- No need to stock batteries



## 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

# 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



**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.

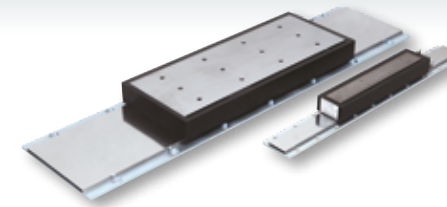
- Built-in 24-bit encoder
- High allowable load moment of inertia ratio for large loads
- Large center aperture provides more space for wiring
- High rigidity



**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



**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

## REDUCE DOWNTIME

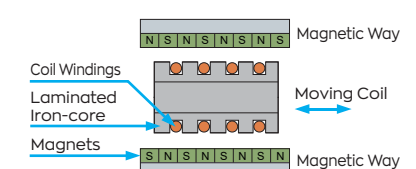
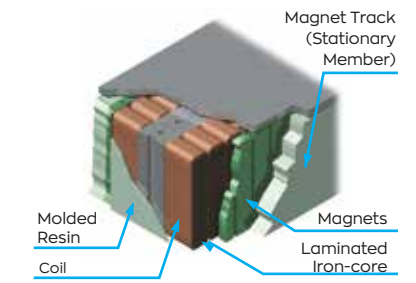
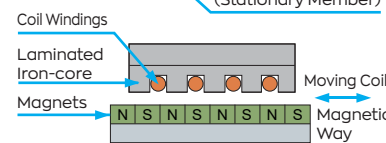
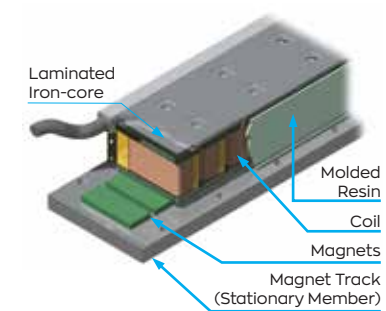
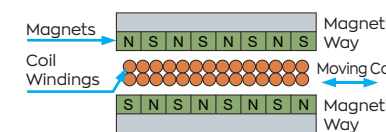
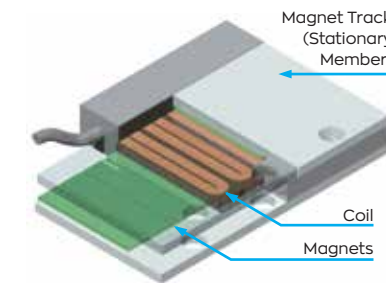
By eliminating gear reduction and creating a direct coupling to the machine load, direct drive motors simplify your machine's design. Eliminating transmission components leads to fewer breakdowns and long-term reliability you can trust.

## 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.



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.

# SIGMA TRAC II

Ready to run, turnkey linear stages

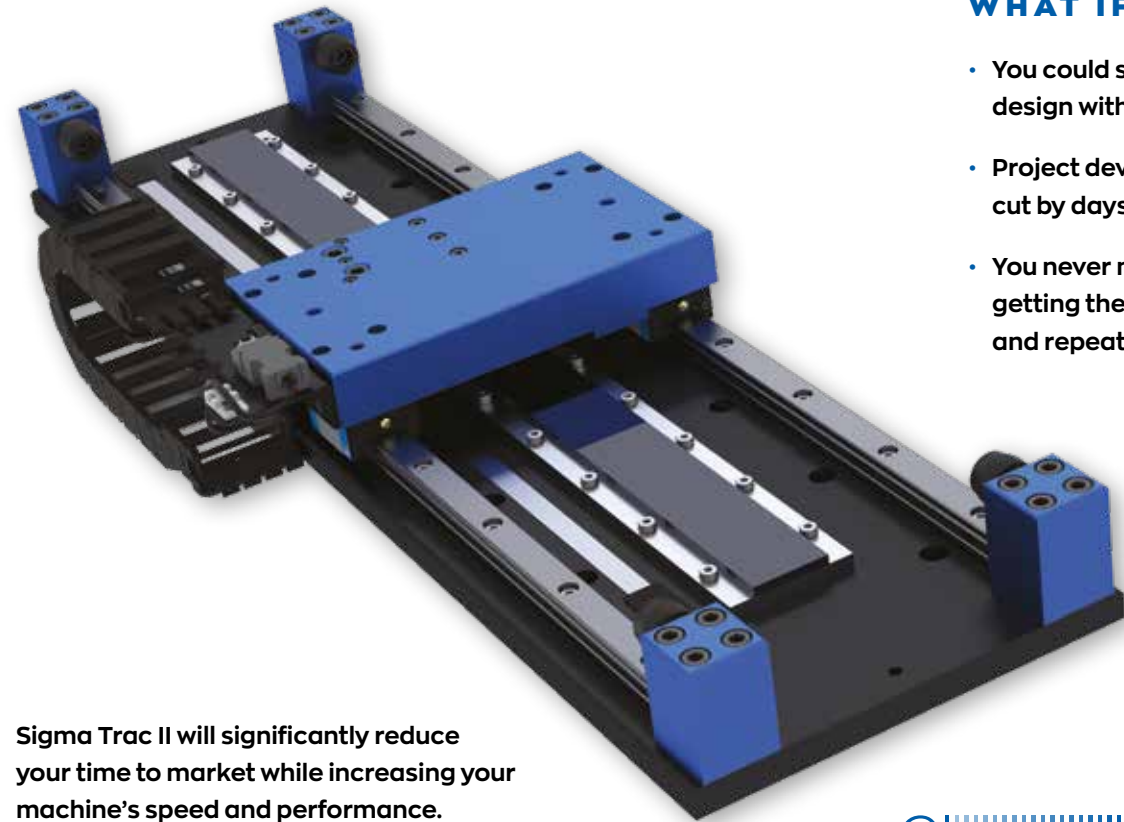
Built-to-order and fully tested. Bolt it down, connect it up and enjoy world class linear motion immediately.

## 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.



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



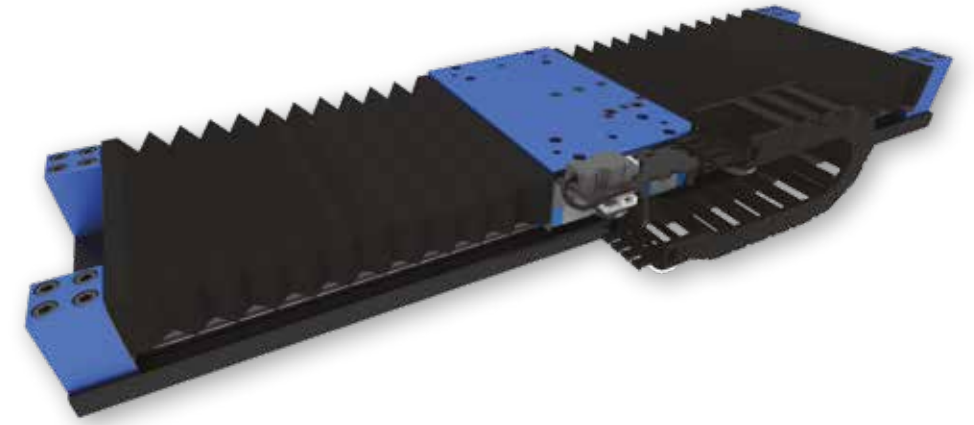
## WHAT IF...

- 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?

## 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 5m/s and peak force output up to 5040 N.

## REPEATABILITY

Coupling the load directly to the motor and encoder yields positioning repeatability of  $\pm 2 \mu\text{m}$ .

## 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.

100/200 V Servo Motors			
Low Inertia		Medium Inertia	
	SGMMV 3 W - 30 W		SGM7P 100 W - 1.5 kW
	SGM7A 50 W - 7 kW		SGM7J 50 W - 750 W
			SGM7G 300 W - 15 kW

400 V Servo Motors			
Low Inertia		Medium Inertia	
	SGM7A 200W - 7 kW		SGM7J 200 W - 1.5 kW
			SGM7G 450 W - 15 kW
			SGMVV* 22 kW - 55 kW

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

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

Control Interface Options: EtherCAT, MECHATROLINK, Analog (Analog 100 V SERVOPACKs available from 50-400W)

SERVOPACKs			
1 Axis		2 Axis	
	SGD7S 500 W - 15 kW		SGD7W 750 W - 1.5 kW per axis

Control Interface Options: EtherCAT, MECHATROLINK

## DIRECT DRIVE ROTARY

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


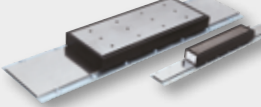


200 V	
	SGM7F (Iron Core) 4.0-25 Nm rated torque, 600 rpm max speed
	SGMCS (Coreless) 2.0-200 Nm rated torque, 500 rpm max speed
	SGM7D (Iron Core) 1.30-240 Nm rated torque, 30-240 rpm

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

Control Interface Options: EtherCAT, MECHATROLINK, Analog

## 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.

200 V and 400 V	
	SGLG (Coreless) 40-3000 N peak force, 5 m/s max speed
	SGLF2 (Iron Core) 135-7560 N peak force, 5 m/s max speed
	SGLT (Double Trac) 380-7500 N peak force, 5 m/s max speed
	Sigma Trac II (Complete Linear Stage) 5040 N peak force, 5 m/s max speed

SERVOPACKs			
1 Axis		2 Axis	
	SGD7S 500 W - 15 kW		SGD7W 200 W - 1.0 kW per axis

Control Interface Options: EtherCAT, MECHATROLINK, Analog

## SERVO MOTORS

# 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 withstanding 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 (cRUus), CE, RoHS
- Stainless steel shaft
- Four frame sizes
- 200 V / 400 V windings
- 24 V holding brake option
- 1.3 to 24 Nm of continuous torque
- 20-bit Yaskawa serial encoder



# 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 (cRUus), 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
- 20-bit Yaskawa serial encoder



# SINGULAR CONTROL™

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

## 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.



### 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 MP3300iec 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.

**ONE**  
CONTROLLER

+

**ONE**  
SOFTWARE

### FOR EVERYTHING IN MOTION

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

## ROBOTICS PORTFOLIO

# FAST. FLEXIBLE. RELIABLE.

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

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.

### 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

### COLLABORATIVE

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



#### HC10XP / HC20XP

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

### 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

### 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

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.



## 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.



## 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

## 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.



# SELECTION GUIDE

## Machine Controllers

### CONTROLLER HARDWARE

Description	Part Number	Notes
MP3300iec	CPU Module PMC-U-MP33□□□	☒: CPU Options 0: Standard IMI CPU 1: Standard RJ45 CPU 3: Medium IMI CPU 4: Medium RJ45 CPU 5: High IMI CPU 6: High RJ45 CPU □□: Maximum number of MECHATROLINK Axes: 04:4 08:8 20:20 32:32 62:62 (Note: Standard CPU up to 20 axes, Medium CPU in 20 and 32 axes, High CPU in 32 and 62)
	Power and Option Rack JEPMC-BU330□-E	□: Number of slots: 4: 1 slot DC 3: 3 slots DC 2: 8 slots DC 1: 8 slots AC

### CONTROLLER SOFTWARE AND NETWORK COMPONENTS

Description	Part Number	Notes
Software	MotionWorks IEC Professional PDE-U-IE3Px	Software Version: 3 x: License Type: E: Electronic • H: Floating License
	MotionWorks IEC OPC Server PDE-U-OP2Px	Software Version 2 x: Licenses: A:1 B:5 C:10 • D:20 E: Electronic
Option Cards (for MP3200iec, MP3300iec, MP2300Siec, MP2310iec)	JAPMC-AN2300	Analog Inputs (AI-01) (8) channels; +/- 10 V @ 16-bit resolution @ 20 kΩ or 4-20 mA @ 15-bit @ 250 Ω
	JAPMC-AN2310	Analog Outputs (AO-01) (4) channels; +/- 10 V @ 16-bit resolution; 5 mA max load current
	JAPMC-DO2300	Output Module (DO-01) (64) 24 VDC sinking outputs; 100 mA/output
	JAPMC-IO2300-E	I/O Module (LIO-01) (16) 24 VDC sinking or sourcing inputs; (16) 24 VDC sinking outputs; IOmA/output; (1) Encoder Counter; A/B/C channels; differential; latch response time varies based on input used; max frequency 4 MHz
	JAPMC-IO2301-E	I/O Module (LIO-02) (16) 24 VDC sinking or sourcing inputs; (16) 24 VDC sourcing outputs; IO mA/output; (1) Encoder Counter; A/B/C channels; differential; latch response time varies based on input used; max frequency 4 MHz
	JAPMC-IO2303	I/O Module (LIO-04) (32) 24 VDC sinking or sourcing inputs; (32) 24 VDC sinking outputs; 100 mA/output
	JAPMC-IO2304	I/O Module (LIO-05) (32) 24 VDC sinking or sourcing inputs; (32) 24 VDC sourcing outputs; 100 mA/output
Terminal Block Conversion Kits	JAPMC-IO2305-E	Multi-Function (LIO-06) I/O Option Module (8) 24VDC sinking or sourcing inputs; (8) 24 VDC sinking outputs; 100 mA/output; (1) Encoder Counter; A/B/C channels; differential; (1) Analog input -10 to +10 V 16 bits; (1) Analog Output -10 to +10 V 16 bits
	CBK-U-MP2A-□□	For LIO-01/02 □□: Cable Length:: A5: 0.5 m 01: 1.0 m 03: 3.0 m
	CBK-U-MP2B-□□	For LIO-04/05/06/ MP2600iec □□: Cable Length:: A5: 0.5 m 01: 1.0 m 03: 3.0 m
	SBK-U-VBA-□□	For SGD7 Servo Amp- CN1 □□: Cable Length:: • A5: 0.5 m 01: 1.0 m 03: 3.0 m

## SLIO Modules

### DIGITAL INPUT MODULES

Material Number	Description	E/IP Support	M-III Support
021-1BB00	2 inputs	Y	Y
021-1BB10	2 fast inputs; Input filter time delay parameterizable 2 μs - 4 ms	Y	Y
021-1BD00	4 inputs	Y	Y
021-1BD10	4 fast inputs; Input filter time delay parameterizable 2 μs - 4 ms	Y	Y
021-1BD40	4 inputs; Connect 2/3-wire	Y	Y
021-1BD50	4 inputs; Active low input	Y	Y
021-1BD70	4 inputs; Time stamp	N	N
021-1BF00	8 inputs	Y	Y
021-1BF01	8 inputs; 0.5 ms	Y	Y
021-1BF50	8 inputs; Active low input	Y	N
021-1DF00	8 inputs; Diagnosis of wiring errors	Y	Y
021-1SD00	4 inputs; Safety	N	N
021-1BH00	16 inputs	Y	Y

### DIGITAL OUTPUT MODULES

Material Number	Description	E/IP Support	M-III Support
022-1BB00	2 outputs; Output current 0.5 A	Y	Y
022-1BB90	2 outputs; PWM	Y	Y
022-1BD00	4 outputs; Output current 0.5 A	Y	Y
022-1BD20	4 outputs; Output current 2 A	Y	Y
022-1BD50	4 Low-Side outputs; Output current 0.5 A	Y	Y
022-1BD70	4 outputs; Time stamp, Output current 0.5 A	N	N
022-1BF00	8 outputs; Output current 0.5 A	Y	Y
022-1BF50	8 Low-Side outputs; Output current 0.5 A	Y	Y
022-1HB10	2 relay outputs; DC 30 V / AC 230 V; Output current 3 A	Y	Y
022-1HD10	4 relay outputs; DC 30 V / AC 230 V; Output current 1.8 A	Y	Y
022-1DF00	8 outputs; Output current: 0.5 A; Diagnosis of wiring errors	Y	Y
022-1SD00	4 outputs; Safety; Output current 0.5 A	N	N
022-1BH00	16 outputs, Output current 0.5 A	Y	Y

### ANALOG INPUT MODULES

Material Number	Description	E/IP Support	M-III Support
031-1BB10	2 inputs 12-Bit; Current 4-20 mA; 2 wire	Y	Y
031-1BB30	2 inputs 12-Bit; Voltage 0-10 V	Y	Y
031-1BB40	2 inputs 12-Bit; Current 0(4)-20 mA	Y	Y
031-1BB60	2 inputs 12-Bit; Current 4-20 mA; 2 wire	Y	Y
031-1BB70	2 inputs 12-Bit; Voltage -10 V to +10 V	Y	Y
031-1BB90	2 inputs 16-Bit; Thermocouple; Voltage -80 mV to +80 mV	Y	Y
031-1BD30	4 inputs 12-Bit; Voltage 0-10 V	Y	Y
031-1BD40	4 inputs 12-Bit; Current 0(4)-20 mA	Y	Y
031-1BD70	4 inputs 12-Bit; Voltage -10 V to +10 V	Y	Y
031-1BD80	4 inputs 16-Bit; 0-3000 Ω resistance; Resistance measurement with 2, 3, and 4-wires	Y	N
031-1BF60	8 inputs 12-Bit; Current 0(4)-20 mA	Y	N
031-1BF74	8 inputs 12-Bit; Voltage -10 V to +10 V	Y	N
031-1CB30	2 inputs 16-Bit; Voltage 0-10 V	Y	Y
031-1CB40	2 inputs 16-Bit; Current 0(4)-20 mA	Y	Y
031-1CB70	2 inputs 16-Bit; Voltage -10 V to +10 V	Y	Y
031-1CD30	4 inputs 16-Bit; Voltage 0-10 V	Y	Y
031-1CD35	4 inputs 16-Bit; Voltage 0-10 V	Y	Y
031-1CD40	4 inputs 16-Bit; Current 0(4)-20 mA	Y	Y
031-1CD45	4 inputs 16-Bit; Current 0(4)-20 mA	Y	Y
031-1CD70	4 inputs 16-Bit; Voltage -10 V to +10 V	Y	Y
031-1LB90	2 inputs 16-Bit; Thermocouple; Voltage -80 mV to +80 mV; Requires less parameter bytes than module 031-1BB90	Y	Y
031-1LD80	4 inputs 16-Bit; 0-3000 ohm resistance; Resistance measurement with 2, 3, and 4-wires; Requires less parameter bytes than module 031-1BD80	Y	N
031-1CA20	Load Cell 16 (24)-Bit; 4 or 6 wire	Y	Y
031-1PA00	Energy Measure Terminal; 3Ph 230/400V 1A	Y	Y
031-1PA10	Energy Measure Terminal; 3Ph 230/400V 1/5A	Y	Y

## SLIO Modules

### ANALOG OUTPUT MODULES

Material Number	Description	E/IP Support	M-III Support
032-1BB30	2 outputs 12-Bit; Voltage 0-10 V	Y	Y
032-1BB40	2 outputs 12-Bit; Current 0(4)-20 mA	Y	Y
032-1BB70	2 outputs 12-Bit; Voltage -10 V to +10 V	Y	Y
032-1BD30	4 outputs 12-Bit; Voltage 0-10 V	Y	Y
032-1BD40	4 outputs 12-Bit; Current 0(4)-20mA	Y	Y
032-1BD70	4 outputs 12-Bit; Voltage -10 V to +10 V	Y	Y
032-1CB30	2 outputs 12-Bit; Voltage 0-10 V	Y	Y
032-1CB40	2 outputs 16-Bit; Current 0(4)-20 mA	Y	Y
032-1CB70	2 outputs 16-Bit; Voltage -10 V to +10 V	Y	Y
032-1CD30	4 outputs 16-Bit; Voltage 0-10 V	Y	Y
032-1CD40	4 outputs 16-Bit; Current 0(4)-20mA	Y	Y
032-1CD70	4 outputs 16-Bit; Voltage -10 V to +10 V	Y	Y

### POTENTIAL DISTRIBUTOR MODULES

Material Number	Description	E/IP Support	M-III Support
001-1BA00	8 x DC 24 V clamps	Y	Y
001-1BA10	8 x DC 0 V clamps	Y	Y
001-1BA20	4 x DC 24 V; 4 x DC 0 V clamps	Y	Y

### POWER MODULES

Material Number	Description	E/IP Support	M-III Support
007-0AA00	Power supply DC 24 V, 10 A; (Only electronic modules as spare part of PLC and interface module)	Y	Y
007-1AB00	Power supply DC 24 V, 10 A; Reverse polarity protection; Overvoltage protection	Y	Y
007-1AB10	Power supply DC 24 V, 4 A; Power supply DC 24 V for bus supply 5 V, 2 A; Reverse polarity protection; Overvoltage protection	Y	Y

### INTERFACE MODULES

Material Number	Description	MWiec Support
053-1IP01	EtherNet/IP-Slave; 2-Port Switch RJ45 100BaseTX full duplex; IO configuration via fieldbus; Up to 64 peripheral modules	Y
053-1ML00	MECHATROLINK-III slave; Transfer rate 100 Mbit/s; Up to 64 peripheral modules	Y

### FUNCTION MODULES

Material Number	Description	E/IP Support	M-III Support
050-1BA00	Counter Module; 1 Counter 32-Bit (AB), DC 24V	Y	Y
050-1BA10	Counter Module; 1 Counter 32-Bit (AB); DC 5V (difference signal)	Y	Y
050-1BB00	Counter Module; 2 Counter 32-Bit (AB); DC 24V	Y	Y
050-1BB30	Counter Module Eco; 2 Counter 32-Bit (AB); DC 24V	Y	Y
050-1BB40	Frequency Measurement; 2 Channels 24-Bit; DC 24V	Y	Y
050-1BS00	SSI-Encoder; Master or Slave Mode; Encoder Frequency 125 kHz - 2 MHz; $\mu$ s time stamp for encoder value	N	Y
054-1BA00	Stepper Module; 1-channel with feedback; 4 inputs/ outputs DC 24V	Y	N
054-1CB00	DC Motor Module, 2-channel with feedback; 4 inputs/ outputs DC 24V	Y	N
054-1DA00	Pulse Train Output Module; 1-channel RS422 w/ feedback; 4 configurable inputs/ outputs	Y	N

## Sigma Series Servo Products

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

Rotary Servomotor Model	Rated Output	Rated Torque	Peak Torque	Rated (Max) Speed	Rotary Inertia		Sigma-7 SERVOPACK Model					
					abs. enc. w/ battery	battery-less abs. enc.	100V/200V	200V	400V			
					x10 <sup>-4</sup> kg-cm <sup>2</sup>		SGD7S-□□□□	SGD7W-□□□□	SGD7S-□□□□	SGD7W-□□□□		
SGMMV (Low inertia, ultra-low capacity)	SGMMV-A1A	10 W	0.0318	0.0955	3000 (6000)	0.00272	-	R90A, R90F	1R6A, 2R8A	2R9E	-	
	SGMMV-A2A	20 W	0.0637	0.191		0.00466	-	1R6A, 2R1F	1R6A, 2R8A	-	-	
	SGMMV-A3A	30 W	0.0955	0.286		0.00668	-	R70A, R70F	1R6A, 2R8A	-	-	
SGM7J* (Medium inertia, high speed)	SGM7J-A5A	50 W	0.159	0.557	3000 (6000)	0.0395	0.0410	R90A, R90F	1R6A, 2R8A	-	-	
	SGM7J-01A*	100 W	0.318	1.11		0.0659	0.0674	1R6A, 2R1F	1R6A, 2R8A	-	-	
	SGM7J-C2A	150 W	0.477	1.67		0.0915	0.0930	2R8A, 2R8F	2R8A, 5R5A, 7R6A	1R9D	2R6D	
	SGM7J-02□*	200 W	0.637	2.23		0.263	0.264	5R5A	5R5A, 7R6A	3R5D	2R6D, 5R4D	
	SGM7J-04□*	400 W	1.27	4.46		0.486	0.487	N/A	N/A	5R4D	5R4D	
	SGM7J-06A	600 W	1.91	6.69		0.800	0.801	R70A, R70F	1R6A, 2R8A	-	-	
	SGM7J-08□*	750 W	2.39	8.36		1.59	1.59	R90A, R90R	1R6A, 2R8A	-	-	
	SGM7J-15□*	1.5 kW	4.77	14.3		4.02	4.02	1R6A, 2R1F	1R6A, 2R8A	-	-	
	SGM7A-A5A	50 W	0.159	0.557		3000 (6000)	0.0217	0.0232	2R8A, 2R8F	2R8A, 5R5A, 7R6A	1R9D	2R6D, 5R4D
	SGM7A-01A*	100 W	0.318	1.11			0.0337	0.0352	5R5A	5R5A, 7R6A	-	-
SGM7A-C2A	150 W	0.477	1.67	0.0458	0.0473		120A	120A	3R5D	2R6D, 5R4D		
SGM7A-02□*	200 W	0.637	2.23	0.139	0.140		180A	180A	5R4D	5R4D		
SGM7A-04□*	400 W	1.27	4.46	0.216	0.217		200A	200A	8R4D	-		
SGM7A-06A	600 W	1.91	6.69	0.315	0.316		330A	330A	120D	-		
SGM7A-08□*	750 W	2.39	8.36	0.775	0.776		550A	550A	170D	-		
SGM7A-10□*	1.0 kW	3.18	11.1	0.971	0.972		-	-	-	-		
SGM7A-15□*	1.5 kW	4.90	14.7	2.00	2.00		-	-	-	-		
SGM7A-20□*	2.0 kW	6.36	19.1	2.47	2.47		-	-	-	-		
SGM7A-25□*	2.5 kW	7.96	23.9	3.19	3.19	-	-	-	-			
SGM7A-30□*	3.0 kW	9.80	29.4	7.00	7.00	-	-	-	-			
SGM7A-40A*	4.0 kW	12.6	37.8	9.60	9.60	-	-	-	-			
SGM7A-50□*	5.0 kW	15.8	47.6	12.3	12.3	-	-	-	-			
SGM7A-70□*	7.0 kW	22.3	54.0	12.3	12.3	-	-	-	-			
SGM7P (Medium inertia, flat type)	SGM7P-01A	100 W	0.318	0.955	3000 (6000)	0.0592	-	R90A, R90F	1R6A, 2R8A	-	-	
	SGM7P-02A	200 W	0.637	1.91		0.263	-	2R8A, 2R8F	2R8A, 5R5A, 7R6A	-	-	
	SGM7P-04A	400 W	1.27	3.82		0.409	-	5R5A	5R5A, 7R6A	-	-	
	SGM7P-08A	750 W	2.39	7.16		2.10	-	120A	-	-	-	
	SGM7P-15A	1.5 kW	4.77	14.3		4.02	-	-	-	-	-	
SGM7G* (Medium inertia, large torque)	SGM7G-03A	300 W	1.96	5.88	1500 (3000)	2.48	2.48	3R8A	5R5A, 7R6A	-	-	
	SGM7G-05□*	450 W	2.86	8.92		3.33	3.33	7R6A	7R6A	1R9D	2R6D, 5R4D	
	SGM7G-09□*	850 W	5.39	14.2		13.9	13.9	120A	120A	3R5D	5R4D	
	SGM7G-13□*	1.3 kW	8.34	23.3		19.9	19.9	180A	180A	5R4D	5R4D	
	SGM7G-20□*	1.8 kW	11.5	28.7		26.0	26.0	330A	330A	8R4D	-	
	SGM7G-30□*	2.9 kW	18.6	45.1		46.0	46.0	470A	470A	120D	-	
	SGM7G-44□*	4.4 kW	28.4	71.6		67.5	67.5	550A	550A	170D	-	
	SGM7G-55□*	5.5 kW	35.0	87.6		89.0	89.0	780A	780A	210D	-	
	SGM7G-75□*	7.5 kW	48.0	119		125	125	-	-	260D	-	
	SGM7G-1A□	11 kW	70.0	175		242	242	-	-	280D	-	
SGM7G-1E□	15 kW	95.4	224	303	303	-	-	370D	-			
Food Grade	M431-NN0□	1.4 Nm	1.38	4.00	5500 (6000)	0.7	-	5R5A	-	3R5D	-	
	M433-MN0□	3.7 Nm	3.72	10.75		1.7	-	120A, 180A	-	5R4D, 8R4D	-	
	M443-KN0□	5.5 Nm	5.50	15.50		5.1	-	330A	-	170D	-	
	M465-GN0□	24.8 Nm	24.85	70.00		44.0	-	470A	-	210D	-	
Hygienic Stainless	M532-GK07□	2.4 Nm	2.4	7.2	5500 (6000)	1.16	-	5R5A	-	5R4D	-	
	M542-GK07□	3.2 Nm	3.2	8.8		2.62	-	7R6A	-	3R5D	-	

\* These motors also available as gear motors with gear ratios of 3:1, 5:1, 10:1, 25:1 or 50:1 gear ratios

# Sigma Series Servo Products

## SIGMA-5 ROTARY SERVO MOTOR / SERVOPACK COMBINATIONS

The following series motors include models that are only compatible with Sigma-5 SERVOPACKS.

Rotary Servomotor Model		Rated Output	Rated Torque	Peak Torque	Rated (Max) Speed	Rotary Inertia *	Sigma-5 SERVOPACK Model											
							24 VDC / 48 VDC	200V	400V									
							Nm	Nm	rpm									
SGMMV Sigma-Mini (Low inertia, ultra-low capacity)	SGMMV-B3E	3.3 W	0.0105	0.0263		0.000441	1R7E	-	-									
	SGMMV-B5E	5.5 W	0.0175	0.0438	3000 (6000)	0.000796												
	SGMMV-B9E	11 W	0.0350	0.0875		0.00221												
	SGMMV-A1□	10 W	0.0318	0.0955		0.00272	2R9E	R90F, R90A	-									
	SGMMV-A2□	20 W	0.0637	0.191	3000 (6000)	0.00466												
	SGMMV-A3□	30 W	0.0955	0.286		0.00668												
SGMVV (Large Capacity, Medium inertia)	SGMVV-22BA□B	22 kW	140	350	1500 (2000)	366 (451)	-	121H	-									
	SGMVV-22BD□B									-	750J							
	SGMVV-22BA□D											-	-					
	SGMVV-22BD□D																	
	SGMVV-3ZBA□B	30 kW	191	478	1500 (2000)	498 (583)	-	161H	-									
	SGMVV-3ZBD□B									-	750J							
	SGMVV-3ZBA□D											-	-					
	SGMVV-3ZBD□D																	
	SGMVV-3GBA□B	37 kW	358	752	800 (1300)	1290 (1448)	-	161H	-									
	SGMVV-3GBD□B									-	750J							
	SGMVV-3GBA□D											-	-					
	SGMVV-3GBD□D																	
	SGMVV-4EBD□B	45 kW	286	715	1500 (2000)	1071 (1229)	-	-	-									
	SGMVV-4EBD□D									-	131J							
SGMVV-5EBD□B	55 kW											350	875	1500 (2000)	1290 (1448)	-	-	-

\*: Rotary inertia values in parentheses indicate models with holding brakes.

## DIRECT DRIVE SERVO MOTOR / SERVOPACK COMBINATIONS

Direct Drive Servomotor Model		Outer Diameter	Rated Output	Rated Torque	Peak Torque	Rated (Max) Speed	Rotary Inertia	Sigma-7 SERVOPACK Model
		mm	W	Nm	Nm	rpm	$\times 10^{-4}$ kg-cm <sup>2</sup>	SGD7S-□□□□ *
SGM7D (With core, outer rotor)	SGM7D-30F	264	188	30.0	50.0	60 (72)	960	120A
	SGM7D-58F		364	58.0	100		1190	
	SGM7D-90F		565	90.0	150		1420	
	SGM7D-1AF		691	110	200		1670	
	SGM7D-01G	160	16	1.30	4.00	120 (150)	55.0	2R8A, 2R8F
	SGM7D-05G		63	5.00	6.00	75.0		
	SGM7D-08G		101	8.00	15.0	120		
	SGM7D-18G		226	18.0	30.0	120 (144)	150	
	SGM7D-24G		302	24.0	45.0	90 (144)	230	
	SGM7D-34G		320	34.0	60.0	120 (144)	270	
	SGM7D-45G	116	565	45.0	75.0	120 (144)	270	120A
	SGM7D-03H		38	3.00	4.00	120 (150)	25.0	

\*: Note: Use SGM7D servo motor in combination with FT-Specification SERVOPACK. The following SERVOPACK models can be used:

- SGD7S-□□□□□□A□□□F82□
- SGD7S-□□□□□□A□□□F83□

## DIRECT DRIVE SERVO MOTOR / SERVOPACK COMBINATIONS (CONT.)

Direct Drive Servomotor Model		Outer Diameter	Rated Output	Rated Torque	Peak Torque	Rated (Max) Speed	Rotary Inertia	Sigma-7 SERVOPACK Model		
		mm	W	Nm	Nm	rpm	$\times 10^{-4}$ kg-cm <sup>2</sup>	SGD7S-□□□□ *	SGD7W-□□□□	
SGM7D (With core, outer rotor)	SGM7D-28I	264	264	28.0	50.0	90 (108)	1800	120A	-	
	SGM7D-70I		440	70.0	100	2000				
	SGM7D-1ZI		628	100	150	60 (72)	2300			
	SGM7D-1CI		817	130	200	2850				
	SGM7D-2BI	150	691	220	300	30 (60)	3400	120A	-	
	SGM7D-2DI		754	240	400	30 (48)	4000			
	SGM7D-06J		75	6.00	8.00	150				
	SGM7D-09J		113	9.00	15.0	210				
	SGM7D-18J		226	18.0	30.0	240				
	SGM7D-20J		251	20.0	45.0	260				
	SGM7D-38J	107	358	38.0	60.0	90 (144)	330	2R8A, 2R8F	-	
	SGM7D-02K		52	2.06	5.00	60.0				
	SGM7D-06K		151	6.00	10.0	70.0				
	SGM7D-08K		201	8.00	15.0	80.0				
SGM7D-06L	224	113	6.00	10.0	220	220	2R8A, 2R8F	-		
SGM7D-12L		226	12.0	20.0	180 (216)	220				
SGM7D-30L		565	30.0	40.0	370	120A				
SGM7F (With core, inner rotor)	SGM7F-02A	100	63	2	6	300 (600)	8.04	2R8A, 2R1F	2R8A	
	SGM7F-05A		157	5	15	14.5				
	SGM7F-07A		220	7	21	19.3				
	SGM7F-04B	135	126	4	12	16.2	2R8A, 2R8F	2R8A		
	SGM7F-10B		314	10	30	25.2				
	SGM7F-14B		440	14	42	36.9				
	SGM7F-08C	175	251	8	24	300 (600)	56.5	2R8A, 2R8F	2R8A	
	SGM7F-17C		534	17	51	78.5				
	SGM7F-25C		785	25	75	111				
	SGM7F-16D		503	16	48	178				
	SGM7F-35D	230	1100 / 1000 <sup>†</sup>	35	105	300 / 270 <sup>†</sup> (400)	276	7R6A, 120A	7R6A	
	Small capacity, coreless (SGMCS)	SGMCS-02B	135	42	2	6	200 (500)	28.0	120A	-
		SGMCS-05B		105	5	15	51.0			
		SGMCS-07B		147	7	21	77.0			
SGMCS-04C		175	84	4	12	200 (500)	77.0	120A	-	
SGMCS-10C			209	10	30	140				
SGMCS-14C			293	14	42	220				
SGMCS-08D		230	168	8	24	200 (500)	285	120A	-	
SGMCS-17D			356	17	51	510				
SGMCS-25D	393		25	75	750					
SGMCS-16E	290	335	16	48	200 (500)	930	120A	-		
SGMCS-35E		550	35	105	1430					
Medium capacity, with core (SGMCS)	SGMCS-45M	280	707	45	135	150 (300)	388	2R8A, 2R8F	-	
	SGMCS-80M		1260	80	240	627				
	SGMCS-1AM		1730	110	330	865				
	SGMCS-80N	360	1260	80	240	150 (300)	1360	120A*	-	
	SGMCS-1EN		2360	150	450	2470				
	SGMCS-2ZN		3140	200	600	3060				

\*: Note: Use SGM7D servo motor in combination with FT-Specification SERVOPACK. The following SERVOPACK models can be used:

- SGD7S-□□□□□□A□□□F82□
- SGD7S-□□□□□□A□□□F83□

# Sigma Series Servo Products

## LINEAR SERVO MOTOR / SERVOPACK COMBINATIONS

Linear Servomotor Model		Rated Force	Peak Force	Rated (Max) Speed	Moving Coil Mass	Sigma-7 SERVOPACK Model			
		N	N	m/s	kg	SGD7S-□□□□	SGD7W-□□□□		
SGLG (Coreless, with standard magnetic way)	SGLGW-30A050C	12.5	40	1.5 (5.0)	0.10	R70A, R70F	1R6A		
	SGLGW-30A080C	25	80		0.15	R90A, R90F			
	SGLGW-40A140C	47	140	2.0 (5.0)	0.34			1R6A, 2R1F	
	SGLGW-40A253C	93	280		0.60				
	SGLGW-40A365C	140	420		0.87	2R8A, 2R8F			
	SGLGW-60A140C	70	220	2.3 (4.8)	0.42	1R6A, 2R1F		1R6A	
	SGLGW-60A253C	140	440		0.76	2R8A, 2R8F		2R8A	
	SGLGW-60A365C	210	660		1.1	5R5A			
	SGLGW-90A200C	325	1300	1.8 (4.0)	2.2	120A		-	
	SGLGW-90A370C	550	2200	1.5 (4.0)	3.6	180A			
	SGLGW-90A535C	750	3000		4.9	200A			
SGLG (Coreless, with high-force magnetic way)	SGLGW-40A140C	57	230	1.0 (4.2)	0.34	1R6A, 2R1F	1R6A		
	SGLGW-40A253C	114	460		0.60	2R8A, 2R8F	2R8A		
	SGLGW-40A365C	171	690		0.87	3R8A	5R5A		
	SGLGW-60A140C	85	360		0.42	1R6A, 2R1F	1R6A		
	SGLGW-60A253C	170	720		0.76	3R8A	5R5A		
	SGLGW-60A365C	255	1080		1.1	7R6A			
SGLF2 (with F-type iron core)	SGLFW2-30□070A	45	135	4.0 (5.0)	0.50	1R6A, 2R1F, 1R9D	1R6A, 2RD		
	SGLFW2-30□120A	90	270		0.90				
	SGLFW2-30□230A	180	540		1.7	3R8A, 1R9D	2R6D		
		170	500	2R8A, 2R8F		2R8A			
	SGLFW2-45□200A	280	840	4.0 (4.5)	2.9	5R5A, 3R5D	5R5A, 2R6D		
	SGLFW2-45□380A	560	1680		5.5	180A, 8R4D	-		
		1500	120A, 5R4D						
	SGLFW2-90□200A	560	1680	4.0 (4.0)	5.3	200A	-		
	SGLFW2-90□380A	1120	3360		10.1				
	SGLFW2-90□560A	1680	5040		14.9				
SGLFW2-1D□380A	1680	5040	2.0 (2.5)	14.6	200A	-			
	SGLFW2-1D□560A	2520		7560	21.5		330A		
SGLF* (with F-type iron core)	SGLFW-20A090A	25	86	5.0 (5.0)	0.70	1R6A, 2R1F	1R6A		
	SGLFW-20A120A	40	125	3.5 (5.0)	0.90				
	SGLFW-35A120A	80	220	2.5 (5.0)	1.3				
	SGLFW-35A230A	160	440	3.0 (5.0)	2.3			3R8A	5R5A
	SGLFW-50A200B	280	600	1.5 (5.0)	3.5			5R5A	
	SGLFW-50A380B	560	1200		6.9			120A	-
	SGLFW-1ZA200B	560	1200	6.4					
	SGLFW-1ZA380B	1120	2400	1.5 (4.9)	12			200A	-

\* The SGLFW model is an earlier product. Select the SGLFW2 model when newly installing a linear servomotor to a machine.

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

Linear Servomotor Model		Rated Force	Peak Force	Rated (Max) Speed	Moving Coil Mass	Sigma-7 SERVOPACK Model	
		N	N	m/s	kg	SGD7S-□□□□	SGD7W-□□□□
SGLT (with T-type iron core) Standard models	SGLTW-20A170A	130	380	3.0 (5.0)	2.5	3R8A	5R5A
	SGLTW-20A320A	250	760		4.6	7R6A	
	SGLTW-20A460A	380	1140		6.7	120A	-
	SGLTW-35A170A	220	660	2.5 (5.0)	3.7	5R5A	
	SGLTW-35A320A	440	1320		6.8	120A	-
	SGLTW-35A460A	670	2000		10	180A	
	SGLTW-40A400B	670	2600	1.5 (3.1)	15	330A	-
	SGLTW-40A600B	1000	4000	2.0 (3.1)	23		
	SGLTW-80A400B	1300	5000	2.0 (2.5)	24		
	SGLTW-80A600B	2000	7500		35	550A	
	SGLT (with T-type iron core) High-efficiency models	SGLTW-35A170H	300	600	2.5 (4.8)	4.9	5R5A
SGLTW-35A320H		600	1200	2.0 (4.8)	8.8	120A	-
SGLTW-50A170H		450	900	2.0 (3.2)	6.0	5R5A	
SGLTW-50A320H		900	1800	2.0 (3.1)	11	120A	-

## SIGMA TRAC II LINEAR STAGE / SERVOPACK COMBINATIONS

Linear Stage Model		Rated Force	Peak Force	Rated (Max) Speed	Maximum Payload		Moving Mass		SERVOPACK Model	
		N	N		w/o brake	with brake	w/o brake	with brake	SGD7S-□□□□	SGD7W-□□□□
				m/s	kg	kg	kg	kg		
ST2F Sigma Trac II Linear Stages	ST2F-A1A	45	135	4.0 (5.0)	3.3	2.5	2.3	3.1	1R6A, 2R1F	1R6A
	ST2F-A2A	90	270		5.8	5.0	3.6	4.4		
	ST2F-A3A	180	540		28.7	28.7	5.3	5.3	3R8A	
		170	500		4.7	4.7			2R8A, 2R8F	2R8A, 2R8F
	ST2F-A1D	45	135		3.3	2.5	2.3	3.1	1R9D	2R6D
	ST2F-A2D	90	270	5.8	5.0	3.6	4.4			
	ST2F-A3D	180	540	28.7	28.7	5.3	5.3			
	ST2F-C1A	560	1680	4.0 (4.0)	116.5	114.5	15.5	15.5	120A	-
	ST2F-C2A	1120	3360		137.2	135.7	22.8	24.3	200A	-
	ST2F-C3A	1680	5040		327.0	324.4	33.0	35.6	330A	-
	ST2F-C1D	560	1680		116.5	114.5	13.5	15.5	5R4D	5R4D
	ST2F-C2D	1120	3360		137.2	135.7	22.8	24.3	120D	-
	ST2F-C3D	1680	5040	327.0	324.4	33.0	35.6	170D	-	

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