

# YASKAWA

Meeting Customer Needs with Technology and Products

## YASKAWA TOTAL SOLUTION



Empowering the next generation with  
YASKAWA i<sup>3</sup>-Mechatronics

# Components

Mechatronics products supporting production sites

MOTION CONTROL

## Controllers and AC Servo Drives



Controllers and AC servos are built into products, such as electronic parts and semiconductor products that must operate with a level of high precision. Yaskawa offers an extensive lineup of products that are compact, operate at high speeds and high performance, and are easy to use to meet the needs of high-performance machines and improve productivity.

MOTION CONTROL

## AC Drives



AC drives help conserve energy when used in social infrastructure, such as HVAC, escalators and elevators, metal processing machinery, packaging machinery, and conveyors. Yaskawa offers a variety of products from general-purpose models to dedicated models for specific applications to meet a wide range of customers' needs.

ROBOTICS

## Industrial Robots



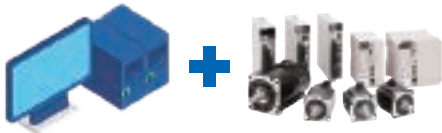
Robots are used mainly at automobile and food industry production sites for welding, painting, assembling, and handling. Yaskawa's broad lineup of robots support the various needs of automation, including vertically-articulated robots, parallel-link robots, and collaborative robots. Yaskawa also offers clean and vacuum robots for handling of semiconductors and LCDs.

# Applications

## Quality Predict causes of machine defects by analyzing equipment operational data

**YASKAWA Cockpit**

**Machine controller/ servo**



Traditionally, a substantial amount of time was required to identify and verify the causes of defects in products found during the inspection process. These factors can now be assessed with the performance of a correlation analysis using manufacturing data and product defect data to quickly identify the cause of defects and find solutions.

The data logging function of the MP series machine controllers has a time stamp feature that can identify the control data of equipment in  $\mu$ s units to track operational status and causes of abnormalities.

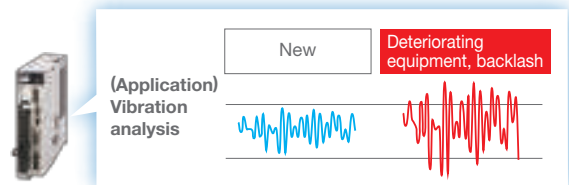
Logging data (image)

No.	Data/Time	Data/Time/Minimum(0.01 $\mu$ s)	MW0000	MW0001	GW0000
0	yyyy/mm/dd hh:mm:ss	yyyy/mm/dd hh:mm:ss.12345678	15544	1	49992
1	yyyy/mm/dd hh:mm:ss	yyyy/mm/dd hh:mm:ss.12345678	15545	2	49992
2	yyyy/mm/dd hh:mm:ss	yyyy/mm/dd hh:mm:ss.12345678	15546	3	49993
3	yyyy/mm/dd hh:mm:ss	yyyy/mm/dd hh:mm:ss.12345678	15547	4	49994

Improve precision analysis by accurately setting times for multiple logging data



$\Sigma$ -7 series AC drives can monitor sensing data, such as vibration, disturbance, positioning, quality of communications, and temperature. Data related to signs of potential breakdowns, such as changes in equipment by age and environment will be detected in real time.

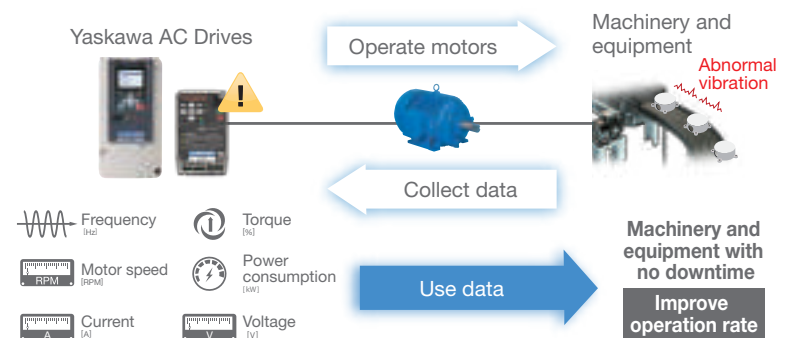


## Maintenance Predictive failure detection of machines using AC drives

**AC drive**



Yaskawa AC drives not only control motors, but also detect signs of potential problems by collecting and using operation data to create production systems without downtime.



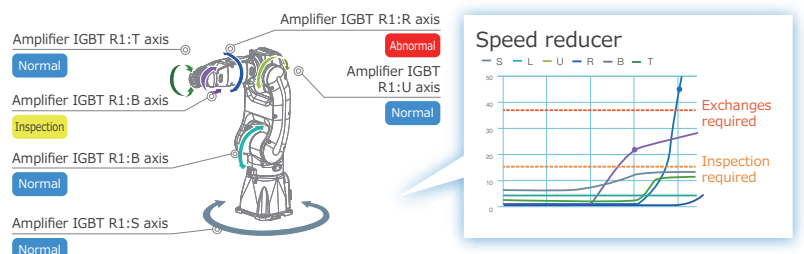
## Maintenance Failure prediction of robot speed reducers

**YASKAWA Cockpit**

**Vertically-articulated robot**



Predicts wear and tear on speed reducers using robot operation data. Unexpected shutdowns can be prevented by predicting the failure time for each speed reducer.














# AC Servo Drives

For Unsurpassed Performance and Ease-of-use to Best Satisfy Your Need

	Series	Servomotor					Rated Output/Rated Torque/Rated Force
		Type	Appearance	Model	Features		
AC Power Input	$\Sigma$ -X Series	Rotary Servomotor		SGMXJ	Medium inertia, high speed	50 W to 750 W	
				SGMXA	Low inertia, high speed	50 W to 7.0 kW	
				SGMXP	Medium inertia, at type	100 W to 1.5 kW	
				SGMXG	Medium inertia, large torque	1500-min <sup>-1</sup> specification: 300 W to 15 kW 1000-min <sup>-1</sup> specification: 300 W to 5.5 kW	
	$\Sigma$ -7 Series	Rotary Servomotor		SGM7M	Ultra small capacity, low inertia	11 W to 33 W	
				SGM7J	Medium inertia, high speed	50 W to 750 W	
				SGM7A	Low inertia, high speed	50 W to 7 kW	
				SGM7P	Medium inertia, flat type	100 W to 1.5 kW	
				SGM7G	Medium inertia, large torque	300 W to 15 kW	
	Common to $\Sigma$ -X and $\Sigma$ -7 Series	Direct Drive Servomotor		SGM7D	With core, outer rotor	1.30 N-m to 240 N-m	
				SGM7E	Small capacity, coreless, inner rotor	2.00 N-m to 35.0 N-m	
				SGM7F	Small capacity, with core, inner rotor Medium capacity, with core, inner rotor	2.00 N-m to 35.0 N-m 45.0 N-m to 200 N-m	
		Linear Servomotor		SGLGW	Coreless model	12.5 N to 750 N	
				SGLTW	Model with T-type iron core	130 N to 2,000 N	
				SGLFW2	Model with F-type iron core	45 N to 2,520 N	
DC Power Input	Large-capacity $\Sigma$ -V Series	Rotary Servomotor		SGMVV	Large capacity, low inertia	22 kW to 55 kW	
	$\Sigma$ -7 Series	Rotary Servomotor		SGM7M	Ultra small capacity, low inertia	3.3 W to 33 W	
$\Sigma$ -V-MD Series			SGMMV	Ultra small capacity, low inertia	3.3 W to 30 W		

		SERVOPACK					Catalog No.
		Appearance	Model	Features	Power Supply	Capacity	
Σ -X Series		SGDXS	<ul style="list-style-type: none"> <li>The best motion and digital data solutions.</li> <li>The world's highest level of basic performance and advanced servo adjustment functions</li> <li>Senser network Σ -LINK II support</li> <li>The first lineup of EtherCAT communication command type</li> <li>SGDXS is a single-axis SERVOPACK; SGD7W is a two-axis SERVOPACK; SGDXT is a three-axis SERVOPACK</li> </ul>	Three-phase 200 VAC	50 W to 15 kW	<ul style="list-style-type: none"> <li>● Σ -X Series KAEP C710812 03</li> <li>● Machine Controller and AC Servo Drive Solutions Catalog KAEP S800001 22</li> </ul>	
		SGD7W		Three-phase 200 VAC	0.2 kW to 1.0 kW		
		SGDXT		Three-phase 200 VAC	0.2 kW to 0.4 kW		
Σ -7 Series		SGD7S	<ul style="list-style-type: none"> <li>Ultimate solutions in seven key points</li> <li>Superlative performance and outstanding ease of use</li> <li>Provide the optimal solutions for equipment life cycle</li> <li>First line-up of two-axis SERVOPACK (SGD7W model)</li> </ul>	Single-phase 200 VAC	50 W to 400 W	<ul style="list-style-type: none"> <li>● Σ -7 Series KAEP S800001 23</li> <li>● Machine Controller and AC Servo Drive Solutions Catalog KAEP S800001 22</li> </ul>	
		SGD7W		Three-phase 200 VAC	11 W to 15 kW		
		SGD7C		<ul style="list-style-type: none"> <li>Two-axis SERVOPACKs with built-in controllers (200 W × 2 axes to 1 kW × 2 axes)</li> <li>Specifications and functions equivalent to those in the SGD7W model.</li> <li>Equipment modularization</li> <li>Distributed control systems</li> </ul>	Three-phase 200 VAC		200 W to 1 kW
		SGDV	<ul style="list-style-type: none"> <li>High performance</li> <li>Application optimization that require power and energy saving.</li> </ul>	Three-phase 200 VAC Three-phase 400 VAC	22 kW to 37 kW 22 kW to 55 kW	● Large-capacity Σ -V Series KAEP S800000 86	
		SGDV	<ul style="list-style-type: none"> <li>Contributes to machine downsizing</li> </ul>	24/48 VDC	3.3 W to 33 W	<ul style="list-style-type: none"> <li>● Σ -7 mini CHEP S800002 25</li> <li>● Σ -7 Series KAEP S800001 23</li> </ul>	
		SGDV	<ul style="list-style-type: none"> <li>Board-type SERVOPACK</li> <li>Selectable axes (4 axes, 8 axes, 12 axes)</li> <li>Less wiring</li> </ul>	24/48 VDC	3.3 W to 30 W	<ul style="list-style-type: none"> <li>● Σ -V-MD A01 CHEP S800001 52</li> <li>● Σ -V-MD A02 CHEP S800001 21</li> </ul>	

# AC Drives

Applications from Industrial-purpose Systems to Specialized Machinery

AC Drive		Max. Motor Output (kW)		Motor Type	Max. Output Frequency	Encoder		Harmonic Suppression	
		Single-phase	Three-phase			Without Encoder	With Encoder	DC Reactor	AC Reactor
Industrial Drives	 <p>Advanced Vector control &amp; IoT Drive GA700</p>		200 VAC 0.4 - 110 400 VAC 0.4 - 630	IM	590 Hz*2	⊙	⊙	⊙*4	○
				SPM	590 Hz	⊙	—		
				IPM	590 Hz	⊙	⊙		
				Synchronous reluctance motor	120 Hz	⊙	—		
	 <p>High performance vector control A1000</p>		200 VAC 0.4 - 110 400 VAC 0.4 - 560	IM	400 Hz	⊙	⊙	⊙*4	○
				SPM	400 Hz	⊙	—		
IPM				400 Hz	⊙	⊙			
 <p>3 Level control method drive Varispeed G7</p>		200 VAC 0.4 - 110 400 VAC 0.4 - 300	IM	400 Hz	⊙	⊙	⊙	○	
Machinery Drive	 <p>Compact Adv Vector Control Drives GA500</p>	200 VAC 0.1 - 4	200 VAC 0.1 - 22 400 VAC 0.37 - 30	IM	590 Hz	⊙	—	○	○
				SPM	590 Hz*3	⊙	—		
				IPM	590 Hz*3	⊙	—		
				Synchronous reluctance motor	120 Hz	⊙	—		
	 <p>Compact vector control V1000</p>	200 VAC 0.2 - 5.5	200 VAC 0.2 - 18.5 400 VAC 0.4 - 18.5	IM	400 Hz	⊙	—	○	○
				SPM	400 Hz	⊙	—		

◎: Standard ○: Available as an option

Braking		Communication Interface											Global Safety Standard	Outlines		
Power Regeneration	Resistance Discharge	RS-485/422	MECHATROLINK-III	MECHATROLINK-II	CC-Link	DeviceNet	PROFIBUS-DP	LONWORKS	CANopen	Modbus TCP/IP	Ethernet IP	Profinet,			Bacnet IP	
○	○	◎*5	○	○	○	○	○	○	○	○	○	○	○	○	CE UL/cUL ISO/EN13849-1 Cat.3 PLe, IEC/EN61508 SIL3	The world-class high-performance AC drive that improves the added value of our customers' machinery and equipment <ul style="list-style-type: none"> <li>• High-performance motor control for all motors</li> <li>• Reduce system costs by incorporating peripheral devices</li> <li>• Continuous operation of machinery and equipment with the predictive failure detection function in real-time</li> <li>• Improve efficiency of production management with sensing technology and IoT support</li> </ul>
○	○	◎	○	○	○	○	○	○	○	○	○	○	○	○	CE, UL/cUL Two Safe Disable inputs and 1EDM output according to ISO/EN13849-1 Cat. 3 PLd, IEC/EN61508 SIL2	High-quality AC drive that can drive any motor with high performance and safety
○	○	◎	-	-	-	-	○	-	-	-	-	-	-	-	CE, UL/cUL	Powerful AC drive that has adopted the world's first 3-level control method to solve micro surge issues with a single AC drive
○	○	◎*5	○	○	○	○	○	○	-	○	○	○	○	-	CE UL/cUL Two Safe Disable inputs and 1EDM output according to ISO/EN13849-1 Cat.3 PLe, IEC/EN61508 SIL3	The world's smallest class, top performance AC drive that improves the added value of our customers' machinery and equipment <ul style="list-style-type: none"> <li>• High-performance motor control for all motors</li> <li>• Reduce system costs by incorporating peripheral devices</li> <li>• Continuous operation of machinery and equipment with the predictive failure detection function in real-time</li> <li>• Improve efficiency of production management with sensing technology and IoT support</li> </ul>
○	○	◎	○	○	○	○	○	○	-	○	○	○	○	-	CE, UL/cUL ISO/EN13849-1 Cat.3 PLd, IEC/EN61508 SIL2	World's smallest class, highly-functional AC drive for the stable operation of Synchronous motors

AC Drive		Max. Motor Output (kW)		Motor Type	Max. Output Frequency	Encoder		Harmonic Suppression	
		Single-phase	Three-phase			Without Encoder	With Encoder	DC Reactor	AC Reactor
Application Specific Drive		For HVAC & R HV600	480 VAC 1.5 - 160	IM	400 Hz	☉	—	☉*	○
				IPM	400 Hz	☉	—		
				SPM	400 Hz	☉	—		
				Synchronous reluctance motor	120 Hz	☉	—		
		For Cranes CR700	200 VAC 0.4 - 110 400 VAC 0.4 - 315	IM	590 Hz*2	☉	☉	☉*4	○
						—	—	—	—
	For elevators L1000A	200 VAC 1.5 - 110 400 VAC 1.5 - 110	IM	120 Hz	—	☉	☉*3	—	
					IPM	120 Hz			—
Low Harmonics & Regenerative Drive		Ultra Low harmonics Drive U1000	200 VAC 3.7 - 55*1 400 VAC 2.2 - 500	IM	400 Hz	☉	☉	Built-in LCL	
				SPM	400 Hz	☉	—		
				IPM	400 Hz	☉	☉		
		Active Front End Module D1000	200 VAC 5.0 - 130*1 400 VAC 5.0 - 630*1	—	—	—	—	—	Supported by standard configuration devices
						—	—	—	
		Power regenerative unit R1000	200 VAC 3.5 - 105*1 400 VAC 3.5 - 300*1	—	—	—	—	—	—

\*1: Indicated in regeneration capacity.

\*2: 400 Hz when using Closed Loop Control.

\*3: When using Open Loop Vector Control for PM. 270 Hz when using Advanced Open Loop Vector Control for PM.

\*4: DC reactors are not built-in drives (for HD) with a motor capacity of 18.5 kW and below.

\*5: RS-485 only

\* HV600 Communication: Built-in - APOGEE FLN, RS-485, BACnet MS/TP, MEMOBUS/MODBUS, Metasys Optional Card - Profinet, Modbus TCP/IP, Ethernet/IP, LonWorks, BACnet IP

Peripheral devices must be installed and parameters changed to comply with ship classification standards.

Note: IM: Induction motor, SPM: Surface Permanent Magnet synchronous motor, IPM: Interior Permanent Magnet synchronous motor



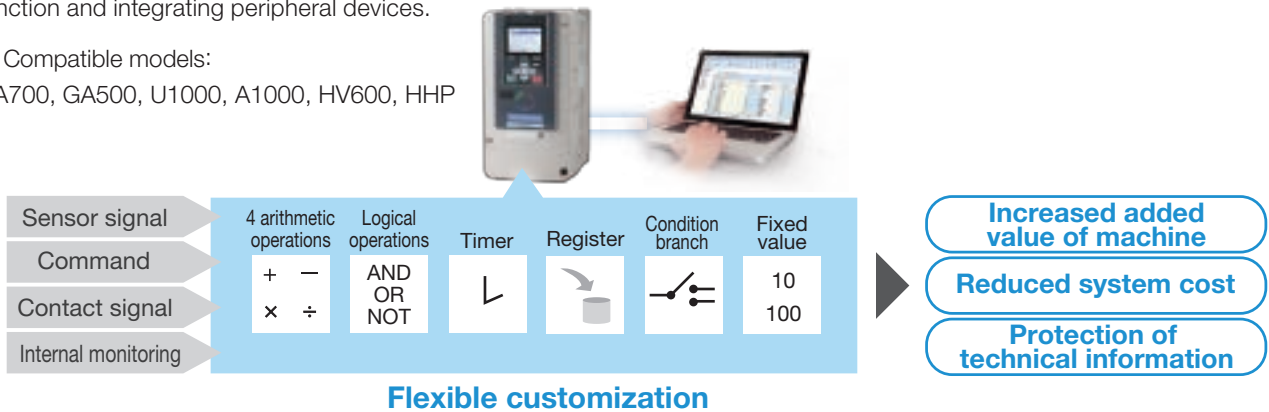
⊙: Standard ○: Available as an option

Braking		Communication Interface											Global Safety Standard	Outlines	
Power Regeneration	Resistance Discharge	RS-485/422	MECHATROLINK-III	MECHATROLINK-II	CC-Link	DeviceNet	PROFIBUS-DP	LONWORKS	CANopen	Modbus TCP/IP	Ethernet IP	Profinet			Bacnet IP
-	-	⊙	-	-	-	-	-	-	-	○	○	○	○	UL, cUL, CE, RoHS, WEEE, TUV SUD, SEMI F47	AC drives engineered for use in HVAC building automation applications requiring reliable motor control. Every HV600 comes with HVAC application-specific software that presets a Hand-Off-Auto LCD keypad, a high-visibility Status Ring for quick visual indication of drive status, and a real-time clock for system accuracy.
○	○	⊙*5	○	○	○	○	○	-	○	○	○	○	-	CE, UL/cUL ISO/EN 13849-1 Cat.3 PLc, IEC/EN 61508 SIL3	AC drive specialized for cranes with various functions, such as slope prevention function to improve productivity and workability, new cargo swing suppression function to improve reliability and productivity of cranes
○	○	⊙	-	-	-	-	-	-	○	-	-	-	-	CE, UL/cUL Two Safe Disable inputs and 1EDM output according to ISO/EN13849-1 Cat. 3 PLd, IEC/EN61508 SIL2	AC drive specialized for elevators that supports rescue operations using UPS. Can run a newly installed gearless synchronous motor and a refurbished geared induction motor.
⊙	-	⊙	○	○	○	○	○	○	○	○	○	○	○	CE UL/cUL Two Safe Disable inputs and 1EDM output according to ISO/EN13849-1 Cat.3 PLc, IEC/EN61508 SIL3 Ship classification (DNV, LR, ABS, BV, KR)	Next-generation motor drive features functions of AC drives, power regeneration, power factor improvement, and power supply harmonic suppression in one body
⊙	-	⊙	-	○	○	○	○	-	○	-	-	-	-	CE, UL/cUL	Sine-wave PWM converter that minimizes harmonic distortion and allows power regeneration in combination with AC drives.
⊙	-	⊙	-	○	○	○	○	-	○	-	-	-	-	CE, UL/cUL	Energy-saving unit that allows power regeneration in combination with an AC drive.

By combining the sensor signal, drive command and internal monitor input signal with the arithmetic functions (function block) of the drive, added value can be increased since costs are reduced as a result of adding a predictive failure diagnostic function and integrating peripheral devices.

Compatible models:

GA700, GA500, U1000, A1000, HV600, HHP



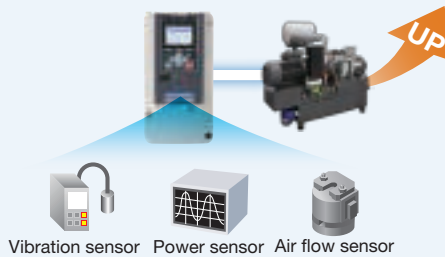
Application Examples

Detect machine failure or deterioration



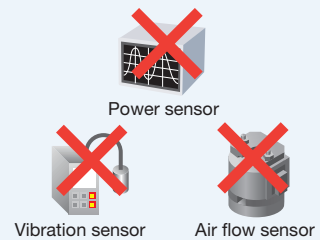
- Belt damage on conveyor
- Filter clogging of fan
- Liquid return in compressor
- Air entrainment in pump

Use the AC Drive's functions instead of sensor signals to enhance the functions of the machine



- Constant pressure control of pump
- Constant air flow control of fan
- Optimum temperature control
- Multiple pump control
- Dancer tension control

Significantly reduce the number of peripheral devices and sensors



- Impact stop function
- Repetitive starts and stops
- Forward/reverse run
- Simple positioning control
- Load unbalance detection

The DriveWizard supports setup and provisional operations of parameters by connecting the AC drive and computer. Adjustment and maintenance of AC drives and unified management of parameters can be easily performed using various monitors, the parameter editing function, pattern operation function, and oscilloscope function.

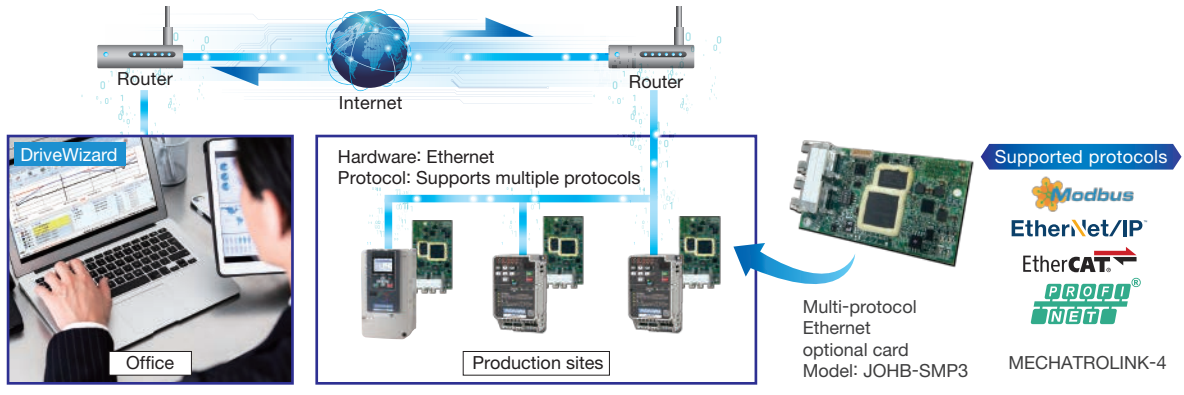
Compatible models: U1000, GA700, GA500, A1000, V1000, HV600, HHP, CR700, L1000A, D1000, R1000



## Enables real-time online remote monitoring

Monitor and check equipment status at production sites from an office via the Internet.\*  
 Using DriveWizard in remote monitoring makes it easy to adjust production volume and respond to problems.

\*: Requires a multi-protocol Ethernet option card. For GA500, a communication option case is also required.



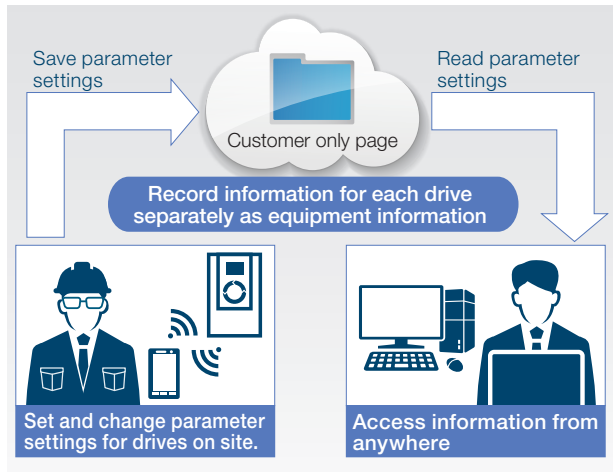
## Cloud service YASKAWA Drive Cloud

Note: Please register as a company or group (corporation) on Yaskawa's product and technology information website. Use of the cloud service is free of charge.

### Web product management service

Register your AC drive to your individual customer page. Facility information on each AC drive at production sites can be recorded for use in maintenance and management. Recovery in the event of a problem and product management can be easily performed by backing up parameter settings and maintenance information to the cloud.

Compatible models: GA700, GA500, HV600, CR700



### Smartphone application, DriveWizard Mobile

DriveWizard Mobile is an application for smartphones that lets you edit drive parameters, operate drives, and check monitoring information in real time by linking your smartphone to the drive.

Compatible models: GA700, GA500, HV600, CR700

Note: Download DriveWizard Mobile for free from the App Store or Google Play.



## Easy remote maintenance supported by IoT



# Industrial Robots MOTOMAN Series

Find smart solutions for your production site with YASKAWA's cutting-edge robot systems.

Arc Welding

Spot Welding



Name	MOTOMAN-AR1440	MOTOMAN-AR1730	MOTOMAN-SP100	MOTOMAN-SP210	
Features	<ul style="list-style-type: none"> <li>Fastest in the 12-kg payload class, the robot's high speed improves productivity.</li> <li>Hollow arm structure to store cables reduces operation restrictions resulting from cable interference</li> </ul>	<ul style="list-style-type: none"> <li>Productivity has been improved since the maximum speed of the individual axes has been increased by 30% compared to former models</li> <li>Hollow arm structure to store cables reduces operation restrictions resulting from cable interference</li> </ul>	<ul style="list-style-type: none"> <li>Expanded the number of types of applicable spot guns with its 100-kg payload</li> <li>Wider motion range for more flexible welding lines</li> <li>Can be used with the Automatic Tool Changer (ATC)</li> </ul>	<ul style="list-style-type: none"> <li>High-speed operations reduce cycle times and improve productivity</li> <li>Slim robot width enables high-density, optimal layouts</li> <li>Battery-less motor for the spot welding gun allows for easy maintenance.</li> </ul>	
Controlled Axis	6 (vertically articulated)	6 (vertically articulated)	6 (vertically articulated)	6 (vertically articulated)	
Payload	<b>12kg</b>	<b>25kg</b>	<b>100kg*4</b>	<b>210kg*4</b>	
Maximum Reach	1440mm	1730mm	2236mm	2702mm	
Repeatability*1	±0.06mm	±0.06mm	±0.07mm	±0.2mm	
Range of Motion	S-axis	-170° - +170°	-180° - +180°	-180° - +180°	-180° - +180°
	L-axis	-90° - +155°	-105° - +155°	-90° - +155°	-60° - +76°
	U-axis	-85° - +150° *2*3	-86° - +160° *2	-80° - +90° *2	-86° - +90° *2
	R-axis	-200° - +200° *3	-200° - +200° *3	-205° - +205° *4	-210° - +210° *4
	B-axis	-150° - +150° *3	-150° - +150° *3	-120° - +120° *4	-125° - +125°
	T-axis	-455° - +455° *3	-455° - +455° *3	-205° - +205° *4	-210° - +210° *4
Maximum Speed	S-axis	4.53rad/s (260°/s)	3.67rad/s (210°/s)	2.45rad/s (140°/s)	2.09rad/s (120°/s)
	L-axis	4.01rad/s (230°/s)	3.67rad/s (210°/s)	1.92rad/s (110°/s)	1.69rad/s (97°/s)
	U-axis	4.53rad/s (260°/s)	4.63rad/s (265°/s)	2.27rad/s (130°/s)	2.01rad/s (115°/s)
	R-axis	8.20rad/s (470°/s)	7.33rad/s (420°/s)	3.05rad/s (175°/s)	2.53rad/s (145°/s)
	B-axis	8.20rad/s (470°/s)	7.33rad/s (420°/s)	3.05rad/s (175°/s)	2.53rad/s (145°/s)
	T-axis	12.2rad/s (700°/s)	15.44rad/s (885°/s)	4.44rad/s (255°/s)	3.84rad/s (220°/s)
Approx. Mass	150kg	250kg	660kg	1080kg	
Controller	YRC1000	YRC1000	YRC1000	YRC1000	
Catalog No.	CHEP C941111 01		CHEP C941111 05		

\*1: Conforms to ISO 9283.

\*2: The range of motion of the U-axis itself. Not with respect to the ground.

\*3: The range of motion will be limited when the robot is used together with MOTOPAC.

\*4: When a standard flange for cabling by Yaskawa is equipped to the tip of the wrist.

\*5: When standard external cablings by Yaskawa is mounted to the manipulator.

\*6: For details on Hand-carry Type, Dust- and Drip-proof Specification, and Food Specification, refer to the individual catalog (no. CHEP C941111 02).

\*7: Maximum payload is 1kg when the T-axis faces downward.

Handling (Collaborative)

Handling (General purpose)



MOTOMAN-SP225H	MOTOMAN-HC10DT	MOTOMAN-HC20DT (Dust- and Drip-proof Specification)	MotoMINI
<ul style="list-style-type: none"> <li>Hollow arm model that stores cables for spot welding</li> <li>Easy off-line simulation and teaching with reduced interference from peripheral equipment</li> <li>Space for additional equipment behind the U-axis reduces protrusions from the robot (reduces interference).</li> </ul>	<ul style="list-style-type: none"> <li>Collaborative robot that works with humans in close proximity</li> <li>The safety operation stops the robot when it detects an external force, allowing humans and robots to work in collaboration.</li> <li>Hand-carry Type for easy transportation and setup, Dust- and Drip-proof Specification with an IP67 rating for all axes, and Food Specification with special surface treatment are available.*6</li> </ul>	<ul style="list-style-type: none"> <li>Collaborative robot that works with humans in close proximity</li> <li>Simultaneously transfers large or multiple workpieces with a 20-kg payload.</li> <li>Featuring a dust- and drip-proof structure with an IP67 rating for all axes, the robot can be used for applications that require it to be washed for sanitary reasons.</li> </ul>	<ul style="list-style-type: none"> <li>A 7-kg small robot with an installation space of 191×124mm</li> <li>With the highest acceleration in its class, the robot can achieve high-speed and highly accurate operation in a high-density layout.</li> </ul>
6 (vertically articulated)	6 (vertically articulated)	6 (vertically articulated)	6 (vertically articulated)
<b>225kg</b>	<b>10kg</b>	<b>20kg</b>	<b>0.5kg (Max. 1kg*7)</b>
2702mm	1200mm	1700mm	350mm
±0.2mm	±0.05mm	±0.05mm	±0.02mm
-180° - +180°	-180° - +180°	-180° - +180°	-170° - +170°
-60° - +76°	-180° - +180°	-180° - +180°	-85° - +90°
-86° - +90° *2	-5° - +355° *2	-67° - +247° *2	-50° - +90° *2
-210° - +210°	-180° - +180°	-210° - +210°	-140° - +140°
-130° - +130°	-180° - +180°	-180° - +180°	-30° - +210°
-210° - +210° *5	-180° - +180°	-210° - +210°	-360° - +360°
2.09rad/s (120°/s)	2.27rad/s (130°/s)	1.40rad/s (80°/s)	5.5rad/s (315°/s)
1.69rad/s (97°/s)	2.27rad/s (130°/s)	1.40rad/s (80°/s)	5.5rad/s (315°/s)
2.01rad/s (115°/s)	3.14rad/s (180°/s)	2.09rad/s (120°/s)	7.3rad/s (420°/s)
2.62rad/s (150°/s)	3.14rad/s (180°/s)	2.27rad/s (130°/s)	10.5rad/s (600°/s)
2.62rad/s (150°/s)	4.36rad/s (250°/s)	3.14rad/s (180°/s)	10.5rad/s (600°/s)
4.01rad/s (230°/s)	4.36rad/s (250°/s)	3.14rad/s (180°/s)	10.5rad/s (600°/s)
1090kg	48kg	140kg	7kg
YRC1000	YRC1000micro, YRC1000	YRC1000micro, YRC1000	YRC1000micro
CHEP C941111 05	CHEP C941111 02	CHEP C941111 02	CHEP C941111 03



## Handling (General purpose)



Name	MOTOMAN-SG400/-SG650	MOTOMAN-GP8	MOTOMAN-GP12	MOTOMAN-GP50	
Features	<ul style="list-style-type: none"> <li>With the top-level speed in its class, the robot reduces cycle times and improves productivity.</li> <li>Compact body saves space.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates precise transfer capabilities with the highest payload (8kg), speed, and wrist allowable moment in its class</li> <li>Slim manipulator body and arm structure reduce installation space</li> </ul>	<ul style="list-style-type: none"> <li>Fastest in the 12-kg payload class, the robot's high speed improves productivity.</li> <li>Slim hollow arm design reduces interference with peripheral equipment.</li> </ul>	<ul style="list-style-type: none"> <li>High speed and wide range of motion for various applications</li> <li>Can handle various workpieces due to its improved wrist allowable moment and allowable inertia</li> </ul>	
Controlled Axis	4 (horizontally articulated)	6 (vertically articulated)	6 (vertically articulated)	6 (vertically articulated)	
Payload	<b>3kg / 6kg</b>	<b>8kg</b>	<b>12kg</b>	<b>50kg</b>	
Maximum Reach	400mm / 650mm	727mm	1440mm	2061mm	
Repeatability*1	S-axis + L-axis: ±0.01mm, U-axis: ±0.01mm, R-axis: ±0.004°	±0.02mm	±0.06mm	±0.07mm	
Range of Motion	Rotation	—	—	—	
	S-axis	-142° - +142° / -137° - +137°	-170° - +170°	-170° - +170°	-180° - +180°
	L-axis	-147° - +147° / -150° - +150°	-65° - +145°	-90° - +155°	-90° - +135°
	E-axis	—	—	—	—
	U-axis	200mm / 210mm	-70° - +190° *2	-85° - +150° *2	-80° - +206° *2
	R-axis	-360° - +360°	-190° - +190°	-200° - +200°	-360° - +360°
	B-axis	—	-135° - +135°	-150° - +150°	-125° - +125°
	T-axis	—	-360° - +360°	-455° - +455°	-360° - +360°
Maximum Speed	Rotation	—	—	—	
	S-axis	740° /s / 450° /s	7.94rad/s (455° /s)	4.53rad/s (260° /s)	3.14rad/s (180° /s)
	L-axis	800° /s / 730° /s	6.72rad/s (385° /s)	4.01rad/s (230° /s)	3.11rad/s (178° /s)
	E-axis	—	—	—	—
	U-axis	1200mm/s / 1300mm/s	9.07rad/s (520° /s)	4.53rad/s (260° /s)	3.11rad/s (178° /s)
	R-axis	3000° /s / 2500° /s	9.59rad/s (550° /s)	8.20rad/s (470° /s)	4.36rad/s (250° /s)
	B-axis	—	9.59rad/s (550° /s)	8.20rad/s (470° /s)	4.36rad/s (250° /s)
	T-axis	—	17.45rad/s (1000° /s)	12.2rad/s (700° /s)	6.28rad/s (360° /s)
Approx. Mass	14kg / 19kg	32kg	150kg	570kg	
Controller	YRC1000micro	YRC1000, YRC1000micro	YRC1000, YRC1000micro	YRC1000	
Catalog No.	—	CHEP C941111 00	CHEP C941111 00	CHEP C941111 04	

\*1: Conforms to ISO 9283.

\*2: The range of motion of the U-axis itself. Not with respect to the ground.

Picking, Packing



Note: Photograph shows robot installed on the ceiling.

	MOTOMAN-GP225	MOTOMAN-SDA10D*3/F	MOTOMAN-MPP3H	MOTOMAN-MPK2F
	<ul style="list-style-type: none"> <li>High-speed operations reduce cycle times and improve productivity</li> <li>Supports various workpieces and jigs with one of the largest wrist allowable moments and allowable inertia in its class</li> </ul>	<ul style="list-style-type: none"> <li>Dual arm robot with seven axes in each arm</li> <li>The dual-arm, seven-axis structure allows the robot to work on multiple workpieces and on finely-detailed work similar to humans.</li> <li>Can be installed in existing layouts with humans because of the robot's human-like size</li> </ul>	<ul style="list-style-type: none"> <li>High-speed picking robot with parallel-link arms</li> <li>Large handling capacity reduces cycle times and improves productivity.</li> <li>Hollow-arm structure simplifies wiring and piping.</li> <li>Clean class*4: ISO Class 5</li> </ul>	<ul style="list-style-type: none"> <li>Picking robot optimized for high-speed, continuous aligning operation</li> <li>Large handling capacity reduces cycle times and improves productivity</li> <li>Manipulator's high level of cleanliness guarantees the safety and sanitation of the transferred products.</li> <li>Can be washed with disinfectants (conforms to IP67 specifications)</li> </ul>
	6 (vertically articulated)	15 (articulated)	4 (parallel link)	5 (vertically articulated)
	<b>225kg</b>	<b>10kg/Arm</b>	<b>3kg</b>	<b>2kg</b>
	2702mm	1003mm	1300mm (dia.)	900mm
	±0.2mm	±0.1mm	±0.1mm	±0.5mm
	—	−170° − +170°	1300mm (dia.)×300mm (H)  Recommended range of motion: 1040mm (dia.)×300mm (H)	—
	−180° − +180°	−180° − +180°		−170° − +170°
	−60° − +76°	−110° − +110°		−120° − +120°
	—	−170° − +170°		—
	−86° − +90° *2	−135° − +135°		−102° − +282°
	−360° − +360°	−180° − +180°		—
	−125° − +125°	−110° − +110°		−150° − +150°
	−360° − +360°	−180° − +180°		−270° − +270°
	—	2.27rad/s (130° /s)	Cycle time (25-305-25) 1kg: 230cpm*5 3kg: 150cpm	—
	2.09rad/s (120° /s)	2.97rad/s (170° /s)		5.59rad/s (320° /s)
	1.69rad/s (97° /s)	2.97rad/s (170° /s)		5.76rad/s (330° /s)
	—	2.97rad/s (170° /s)		—
	2.01rad/s (115° /s)	2.97rad/s (170° /s)		5.76rad/s (330° /s)
	2.53rad/s (145° /s)	3.49rad/s (200° /s)		—
	2.53rad/s (145° /s)	3.49rad/s (200° /s)		6.63rad/s (380° /s)
	3.84rad/s (220° /s)	6.98rad/s (400° /s)		34.9rad/s (2000° /s)
	1080kg	220kg	115kg	72kg
	YRC1000	DX100 / FS100	FS100	FS100
	CHEP C941111 04	KAEP C940440 18	KAEP C940440 24	

\*3: Models with built-in crystal sensors are also available. For details, refer to the individual catalog (no. KAEP C940440 26).

\*4: Conforms to ISO 14644-1.

\*5: With a limit in continuous operations. (No continuous operation limit: 185cpm or less)

Palletizing

Laser Applications

Painting



Name	MOTOMAN-MPL160II	MOTOMAN-MC2000II	MOTOMAN-MPX1150	MOTOMAN-MPX2600	
Features	<ul style="list-style-type: none"> <li>· Palletizing robot with a 160-kg payload, optimized for medium and large workpieces</li> <li>· Improves productivity with faster speeds and a wider range of motion</li> <li>· Hollow wrist structure to store cables and tubes reduces operation restrictions resulting from cable interference</li> </ul>	<ul style="list-style-type: none"> <li>· Improved accuracy for linear and circular paths in high-speed operations</li> <li>· Powerful performance in 3D laser cutting with six controlled axes</li> <li>· With a 50-kg payload, the robot can easily be used with a variety of laser heads.</li> <li>· With a maximum reach of 2038mm, the robot can cut and weld various automobile parts.</li> </ul>	<ul style="list-style-type: none"> <li>· Small painting robot optimized for painting small workpieces, such as home appliances and cell phones.</li> <li>· Multiple guns and small bells can be mounted with the robot's 5-kg wrist payload.</li> <li>· Minimized dimensions and interference radius enable high-density layout</li> <li>· The S/L axis is designed with no offset to enable closer installation to a workpiece</li> </ul>	<ul style="list-style-type: none"> <li>· Medium-sized painting robot optimized for painting medium size workpieces, such as automobile resin parts.</li> <li>· With a 15-kg payload of the wrist, multiple guns and large bells can be mounted on this medium-sized robot, just like on a large robot.</li> <li>· The S/L axis is designed with no offset to enable closer installation to a workpiece</li> </ul>	
Controlled Axis	4 (vertically articulated)	6 (vertically articulated)	6 (vertically articulated)	6 (vertically articulated)	
Payload	<b>160kg</b>	<b>50kg*2</b>	<b>5kg</b>	<b>15kg</b>	
Maximum Reach	3159mm	2038mm	727mm	2000mm	
Repeatability*1	±0.5mm	±0.07mm	±0.02mm	±0.2mm	
Range of Motion	S-axis	-180° - +180°	-180° - +180°	-170° - +170° (Wall mounted: -90° - +90°)	-150° - +150° (Wall mounted: -90° ~ +90°)
	L-axis	-45° - +90°	-90° - +135°	-80° - +120°	-65° - +130°
	U-axis	-120° - +15.5°	-158° - +235°	-70° - +90°	-65° - +150°
	R-axis	-	-360° - +360°	-190° - +190°	-720° - +720°
	B-axis	-	-125° - +125°	-135° - +135°	-720° - +720°
	T-axis	-360° - +360°	-360° - +360°	-360° - +360°	-720° - +720°
Maximum Speed	S-axis	2.44rad/s (140° /s)	2.62rad/s (150° /s)	6.10rad/s (350° /s)	2.09rad/s (120° /s)
	L-axis	2.44rad/s (140° /s)	2.62rad/s (150° /s)	6.10rad/s (350° /s)	2.09rad/s (120° /s)
	U-axis	2.44rad/s (140° /s)	2.62rad/s (150° /s)	6.98rad/s (400° /s)	2.18rad/s (125° /s)
	R-axis	-	4.36rad/s (250° /s)	7.85rad/s (450° /s)	6.28rad/s (360° /s)
	B-axis	-	4.36rad/s (250° /s)	7.85rad/s (450° /s)	6.28rad/s (360° /s)
	T-axis	5.32rad/s (305° /s)	4.36rad/s (250° /s)	12.56rad/s (720° /s)	6.28rad/s (360° /s)
Approx. Mass	1700kg	845kg	57kg	485kg	
Controller	DX200	DX200	DX200 (for painting robots)	DX200 (for painting robots)	
Catalog No.	KAEP C940560 01	CHEP C940321 27	CHEP C940321 50		

\*1: Conforms to ISO 9283. \*2: 30kg or less is recommended when using the robot for applications that require high accuracy.

\*3: Conforms to ISO 14644 (with suction inside the robot in an environment with a down flow of 0.4m/s or more).

## Handling Glass Substrates



	MOTOMAN-MPX3500	MOTOMAN-MCL130	MOTOMAN-MFL1200D-2400	MOTOMAN-MFS2500D
	<ul style="list-style-type: none"> <li>· Large painting robot optimized for painting large workpieces, such as automobile bodies and bumpers.</li> <li>· Diversified installation methods can be used to meet the needs of a variety of production line layouts.</li> <li>· A set of symmetrically-installed manipulators on the wall saves space and enables high-density layout.</li> <li>· Hollow shaft structure eliminates tube interference (hollow dia.: 70mm)</li> </ul>	<ul style="list-style-type: none"> <li>· Six-axis vertically articulated clean robot that can transfer and easily change its posture to reverse or slant workpieces.</li> <li>· Flexible system layout is achieved with the high-speed transfer of large or heavy workpieces over a wide distance with an extensive range of motion.</li> <li>· Clean class*3: ISO Class 6</li> </ul>	<ul style="list-style-type: none"> <li>· Can transfer 5th generation large LCD glass substrates (1000mm x 1200mm class)</li> <li>· Three models with different up-and-down strokes (1200mm, 1600mm, 2400mm) are available to create optimal layouts for multi-level cassettes.</li> <li>· Easy maintenance without the need for fans or filters</li> <li>· Clean class*3: ISO Class 4</li> </ul>	<ul style="list-style-type: none"> <li>· Can transfer 8th generation extra-large LCD glass substrates (2200mm x 2500mm class)</li> <li>· Yaskawa's single link mechanism can be used to tilt glass substrates without a traverse axis.</li> <li>· Clean class*3: ISO Class 4</li> </ul>
	6 (vertically articulated)	6 (vertically articulated)	4 (horizontally articulated)	6 (horizontally articulated)
	<b>15kg</b>	<b>130kg</b>	<b>30kg / Arm</b>	<b>60kg / Arm</b>
	2700mm	Vertical reach: 3130mm (measured from the floor) Horizontal reach: minimum 729mm, maximum 2650mm	Back-and-forth stroke: ±1175mm Up-and-down axis range of motion: 2400mm	Back-and-forth stroke: ±2300mm Up-and-down axis range of motion: 4000mm
	±0.15mm	±0.2mm	±0.2mm	±0.2mm
	-150° - +150°	-150° - +150°	-215° - +125°	-180.5° - +180.5°
	-65° - +140°	-60° - +76°	-1175mm - +1175mm	-2300mm - +2300mm
	-65° - +90°	-130° - +240°	2400mm	4000mm
	-720° - +720°	-360° - +360°	-1175mm - +1175mm	-2300mm - +2300mm
	-720° - +720°	-130° - +130°	-	-
	-720° - +720°	-360° - +360°	-	-
	1.75rad/s (100° /s)	2.27rad/s (130° /s)	3.14rad/s (180° /s)	1.57rad/s (90° /s)
	1.75rad/s (100° /s)	2.27rad/s (130° /s)	Max.: 2100mm/s	Max.: 3800mm/s
	1.92rad/s (110° /s)	2.27rad/s (130° /s)	Max.: 1720mm/s	1150mm/s
	5.24rad/s (300° /s)	3.75rad/s (215° /s)	Max.: 2100mm/s	Max.: 3800mm/s
	6.28rad/s (360° /s)	3.14rad/s (180° /s)	-	-
	6.28rad/s (360° /s)	5.24rad/s (300° /s)	-	-
	590kg	1300kg	800kg	2500kg
	DX200 (for painting robots)	DX100 (for clean robots)	DX200 (for clean robots)	DX100 (for clean robots)
	CHEP C940321 50		KAEP C940580 02	

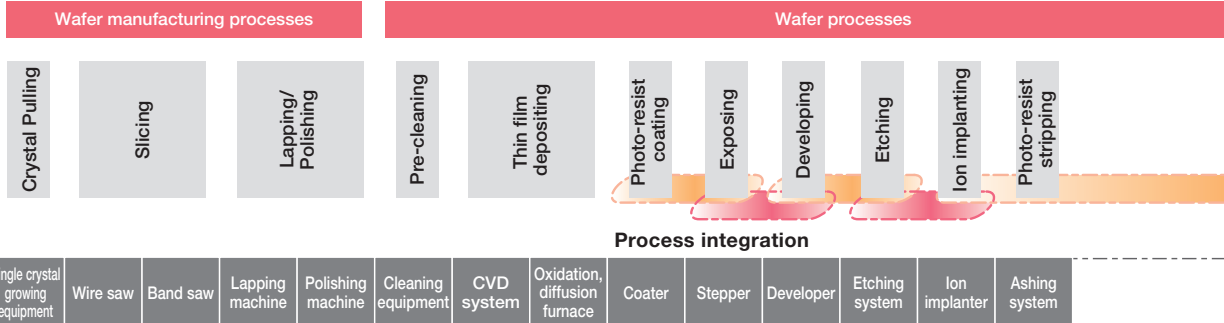
# ROBOTICS

Robots for Semiconductors

# Robots for Semiconductors SEMISTAR Series

High-precision transport and transfer of semiconductor wafers and glass substrates with minimum vibration.

## Semiconductor Manufacturing Process



## Handling robots for semiconductor transport

### Applications

Transport and transfer of wafers in super-clean rooms



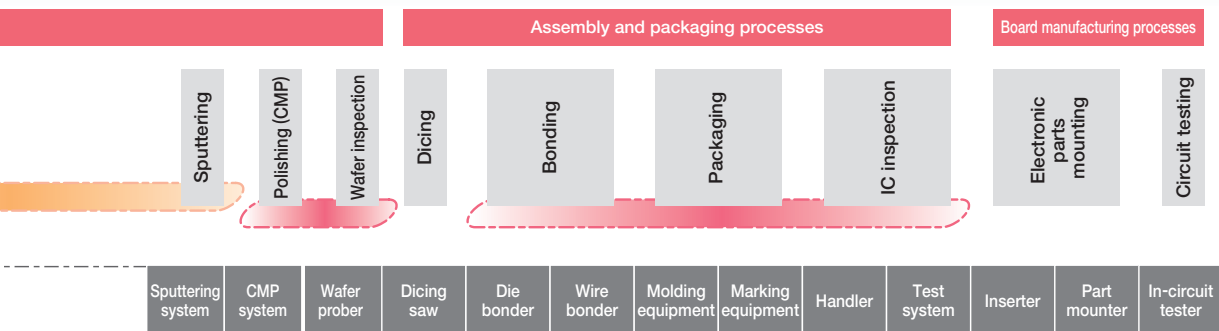
Name	SEMISTAR-GEKKO MD124D	Name	SEMISTAR-MU124D		
Features	· Precise and quick transfer with minimum stress to wafers using direct drive motors	Features	· Compatible with the SR200, Yaskawa's new robot controller · Transfer capability equivalent to the former model · Equipped with batteryless absolute encoders		
Applicable Wafer Size	<b>300mm (SEMI compliant)</b>	Applicable Wafer Size	<b>300mm (SEMI compliant)</b>		
Wafer Grip Method	Passive grip (Vacuum and edge grip are also available)	Wafer Grip Method	Vacuum/Edge grip		
Length of Standard End Effector	345mm	Length of Standard End Effector	345mm		
Controlled Axis	5 degrees of freedom	Controlled Axis	5 degrees of freedom		
Range of Motion	EX-axis (Extension)	1215mm*3	Range of Motion	R-axis (Extension)	1215mm*3
	TH-axis (Rotation)	330°		θ-axis (Rotation)	330°
	Z-axis (Elevation)	480mm		Z-axis (Elevation)	480mm
	H-axis (End Effector Rotation)	440°		B-axis (End Effector Rotation)	440°
Minimum Rotation Radius	510mm	Minimum Rotation Radius	510mm		
Repeatability*1	0.05mm (P-P)	Repeatability*1	0.1mm (P-P)		
Approx. Mass	86kg	Approx. Mass	82kg		
Clean Class*2	ISO class 1	Clean Class*2	ISO class 1		
Controller	SR200	Controller	SR200		
Catalog No.	CHEP CM20100 06	Catalog No.	-		

\*1: Conforms to ISO 9283 pose repeatability.

\*2: Based on Yaskawa's recommended installation conditions when used in a downflow environment of 0.3 m/s

\*3: Center of manipulator rotation to center of wafer when using Yaskawa's standard 300-mm end effector





### Prealigners



Name	PPS1130	PVS1230A
Applicable Wafer Size	300mm (SEMI compliant)	200mm / 300mm* <sup>3</sup> (SEMI compliant)
Wafer Grip Method	Passive grip	Vacuum grip
Detection Target	Notch	Notch or orientation flat* <sup>3</sup>
Material of Wafer	Silicon* <sup>1</sup>	Silicon* <sup>1</sup>
Alignment Accuracy	±0.1° * <sup>2</sup>	±0.03° * <sup>2</sup>
Alignment Time	5.0 s or less* <sup>2</sup>	1.7 s or less* <sup>2</sup>
Approx. Mass	8.5kg	7.0kg
Controller	SR200	SR200

- \*1: Contact your Yaskawa representative for quartz wafer use. Related parameters need to be adjusted and evaluated. (Yaskawa has experiences with quartz wafer.)
- \*2: Value for a SEMI compliant wafer (300-mm silicon wafer, notch)
- \*3: Must be changed by instructions. (Move sensor section + change parameters)(Standard setting: 300-mm silicon wafer)

### SR200 Robot Controller

The SR200 is a compact, lightweight robot controller with optimal functions and capabilities for wafer handling equipment. With an open architecture that surpasses those of previous models, the SR200 can be easily connected to external devices such as Yaskawa's SERVOPACKS (Σ-7 Series). This controller is designed to achieve functional safety and can be used with a compact teaching pendant.



Controller	Dimensions	425 (W) × 300 (D) × 133 (H) mm (Protrusions are not included)
	Approx. Mass	13 kg max.
	Power Supply	Three-phase 200 VAC to 240 VAC (+10% to -15%), 50/60 Hz Single-phase 200 VAC to 240 VAC (+10% to -15%), 50/60 Hz
	Communications (Connection to Host)	Ethernet (10BASE-T/100BASE-TX) 2 ports
	Optional Board Slot	2 slots
	Number of Control Axes	8 axes max.
	Applicable Standards	SEMI S2, S8, F47, UL61010-1 ISO 13849-1, Category 3 (PL=d), etc.

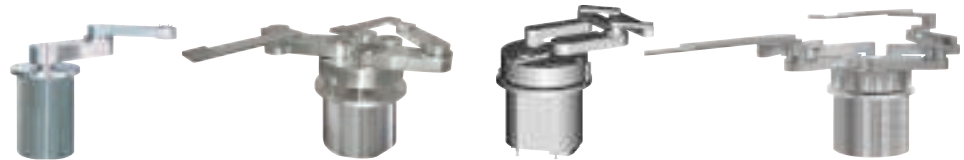
Teaching Pendant	Dimensions	191 (W) × 71 (D) × 169 (H) mm
	Approx. Mass	0.50 kg (1.30 kg (includes cable))
	Display	4.3-inch TFT color LCD
	IEC Protection Class	IP54
	Cable Length	8 m

## Vacuum robots for glass substrates transfer

## SEMISATAR-V Series

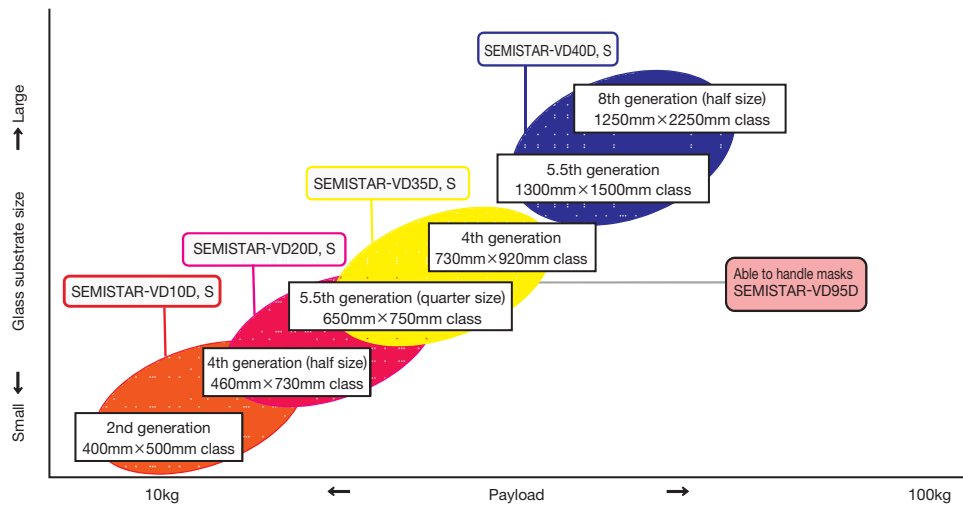
### Applications

- Transport and transfer of glass substrates from one to the other process room in vacuum environments
- Carry-out of OLEDs



Name	SEMISATAR-VD10S	SEMISATAR-VD10D	SEMISATAR-VD20S	SEMISATAR-VD20D		
Features	<ul style="list-style-type: none"> <li>· Capable of transferring glass substrates of 400mm×500mm in vacuum environments.</li> <li>· High-rigidity construction and Advanced Robot Motion (ARM) control to realize high-precision positioning with minimum vibration.</li> </ul>		<ul style="list-style-type: none"> <li>· Capable of transferring glass substrates of 460mm×730mm in vacuum environments.</li> <li>· High-rigidity construction and ARM control to realize high-precision positioning with minimum vibration.</li> <li>· Low gas emissions by eliminating use of belt drive in vacuum environments.</li> <li>· Sensors for substrate detection can be wired internally.</li> </ul>			
Substrate Size	400×500mm	400×500mm	460×730mm	460×730mm		
Payload	10kg	10kg/Arm	20kg	20kg/Arm		
Controlled Axis	3 degrees of freedom	4 degrees of freedom	3 degrees of freedom	4 degrees of freedom		
Range of Motion	L-axis (Extension)	1485mm	1485mm	1300mm	1300mm	
	R-axis (Extension)	—	1485mm	—	1300mm	
	S-axis (Rotation)	−170° – +170°	−170° – +170°	−165° – +165°	−165° – +165°	
	U-axis (Elevation)	65mm	100mm	100mm	100mm	
Operating Time (at max. speed)	L-axis (Extension)	2.5s or less	2.5s or less	2.5s or less	2.5s or less	
	R-axis (Extension)	—	2.5s or less	—	2.5s or less	
	S-axis (Rotation)	4.9s or less	3.7s or less	3.7s or less	3.7s or less	
	U-axis (Elevation)	4.9s or less	2.5s or less	2.5s or less	2.5s or less	
Repeatability	L-axis (Extension)	±0.2mm	±0.2mm	±0.3mm	±0.3mm	
	R-axis (Extension)	—	±0.2mm	—	±0.3mm	
	S-axis (Rotation)	±0.2mm	±0.2mm	±0.3mm	±0.3mm	
	U-axis (Elevation)	±0.2mm	±0.2mm	±0.3mm	±0.3mm	
Allowable Inertia (GD <sup>2</sup> /4)	2.5kg·m <sup>2</sup>	2.5kg·m <sup>2</sup>	14kg·m <sup>2</sup>	14kg·m <sup>2</sup>		
Approx. Mass	160kg	430kg	430kg	480kg		
Ultimate Pressure	1×10 <sup>-5</sup> Pa	1×10 <sup>-5</sup> Pa	1×10 <sup>-6</sup> Pa	1×10 <sup>-6</sup> Pa		
Controller	DX100	DX100	DX100	DX100		
Catalog No.	KAEP CM20100 02					

### SEMISTAR-V Series



	SEMISTAR-VD35S-G4A	SEMISTAR-VD35D-G4A	SEMISTAR-VD40S	SEMISTAR-VD40D-G6A	SEMISTAR-VD95D
	<ul style="list-style-type: none"> <li>Capable of transferring glass substrates of 730mm x 920mm in vacuum environments.</li> <li>Realizes high rigidity through link mechanism on arm.</li> <li>Low gas emissions by eliminating use of belt drive in vacuum environments.</li> <li>Sensors for substrate detection can be wired internally.</li> </ul>		<ul style="list-style-type: none"> <li>Capable of transferring glass substrates of 1250mm x 2250mm in vacuum environments.</li> <li>Realizes high rigidity through link mechanism on arm.</li> <li>Low gas emissions by eliminating use of belt drive in vacuum environments.</li> <li>Sensors for substrate detection can be wired internally.</li> </ul>		<ul style="list-style-type: none"> <li>Capable of transferring glass substrates of 730mm x 920mm in vacuum environments.</li> <li>Realizes high rigidity through link mechanism on arm.</li> <li>Low gas emissions by eliminating use of belt drive in vacuum environments.</li> <li>Sensors for substrate detection can be wired internally.</li> </ul>
	<b>730×920mm</b>	<b>730×920mm</b>	<b>1250×2250mm</b>	<b>1250×2250mm</b>	<b>730×920mm</b>
	35kg	35kg/Arm	40kg	40kg/Arm	95kg/Arm
	3 degrees of freedom	4 degrees of freedom	3 degrees of freedom	4 degrees of freedom	4 degrees of freedom
	2050mm	2050mm	3800mm	3800mm	2300mm
	–	2050mm	–	3800mm	2300mm
	– 165° – +165°	– 165° – +165°	– 170° – +170°	– 170° – +170°	– 170° – +170°
	150mm	150mm	200mm	200mm	150mm
	3.0s or less	3.0s or less	3.4s or less	3.4s or less	3.2s or less
	–	3.0s or less	–	3.4s or less	3.2s or less
	3.6s or less	3.6s or less	4.5s or less	4.5s or less	3.8s or less
	3.2s or less	3.2s or less	3.0s or less	3.0s or less	2.5s or less
	±0.3mm	±0.3mm	±0.3mm	±0.3mm	±0.3mm
	–	±0.3mm	–	±0.3mm	±0.3mm
	±0.3mm	±0.3mm	±0.3mm	±0.3mm	±0.3mm
	±0.3mm	±0.3mm	±0.4mm	±0.4mm	±0.3mm
	14kg·m <sup>2</sup>	14kg·m <sup>2</sup>	65kg·m <sup>2</sup>	65kg·m <sup>2</sup>	118kg·m <sup>2</sup>
	520kg	700kg	1850kg	1900kg	1500kg
	1×10 <sup>-6</sup> Pa	1×10 <sup>-6</sup> Pa	1×10 <sup>-6</sup> Pa	1×10 <sup>-6</sup> Pa	1×10 <sup>-6</sup> Pa
	DX100	DX100	DX100	DX100	DX100
	KAEP CM20100 02				

Unraveling the business challenges of our customers

# Yaskawa Solutions *i<sup>3</sup>-Mechatronics*

## Smart Factory

(Use of robot/automation technologies and AI/big data )



Variable-type and variable-quantity production



Reduced stock parts and in-process products



Reduced production lead time



Prevention of equipment failure



Elimination of dependency on individual skills in inspection process



Quality improvement (identification of causes of defects)

Yaskawa has provided solutions, such as automation, using mechatronics technologies and products, including servos, AC drives, and robots, to respond to customers demands for higher quality manufacturing and improvements in productivity at production sites.

Yaskawa helps customers solve their business challenges with *i<sup>3</sup>-Mechatronics*, three-dimensional solutions for automating production systems by managing digital data.



FA Solution

Motion & Data

Data Solution



## Concept of *i<sup>3</sup>-Mechatronics*

The word "mechatronics" was first coined by an engineer at Yaskawa Electric in 1960s. This word consists of the term "mechanism", which is short for mechanical engineering, and "electronics", which encompasses the idea of electrical engineering.

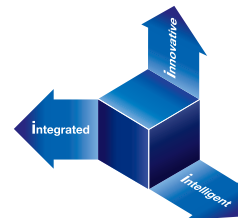
Our passion for automation is built into this word. Yaskawa added three "I"s (integrated, intelligent, and innovative) to the word, "mechatronics" to help identify solutions to business challenges right at the customers production sites by incorporating the use of data in mechatronics products.

### **I**ntegrated >>> **I**ntelligent >>> **I**nnovative

**System development**

**Smart development**

**Evolution through technological innovations**



## *i<sup>3</sup>-Mechatronics*

New value with "i cube", digital data solution



↓  
Create new values

# Smart Factories with i<sup>3</sup>-Mechatronics

Develop solutions to solve challenges along with customers

## Solutions to business issues at production sites

Identify solutions to business management challenges by collecting, analyzing, and utilizing data on site to innovate highly-adaptable factories.



### Integrated

Integration of components/digital data

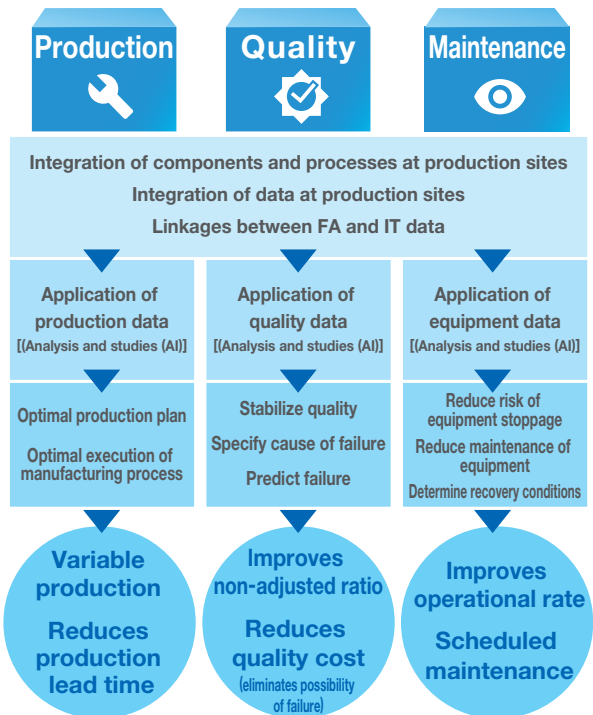
### Intelligent

In-depth analysis

### Innovative

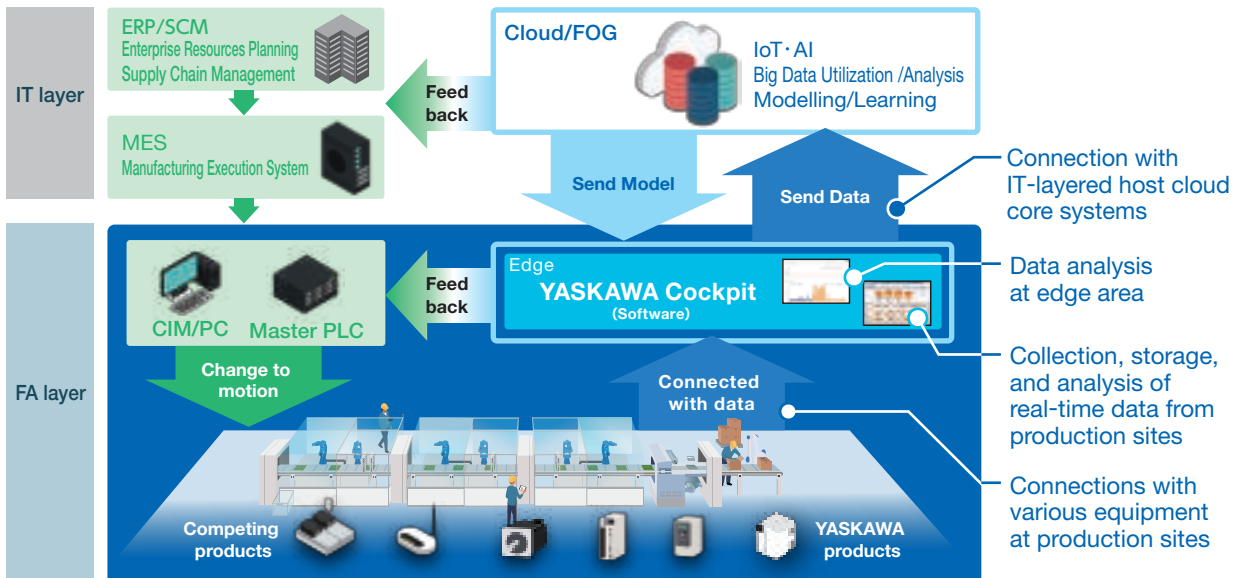
Transformation of production site

Solutions to business issues



## Complete automation of production sites, integrate and analyze equipment data

Data from production sites that are automated by integrating components and processes is collected and stored in real time using YASKAWA Cockpit. This data is used for AI learning and big data analysis in cooperation with host systems. Production operations can be transformed by learning models and analysis results that are fed back to production sites.



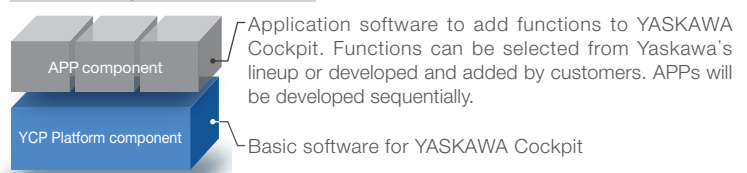
## YASKAWA Cockpit

### Features

- Collect, store, and analyze real-time data from production sites
- Establish connections with equipment other than YASKAWA products
- Freely customize and add optional functions depending on production sites

Note: Functions of YASKAWA Cockpit include those that are under development. Contact your Yaskawa representative for more details.

### Basic configuration (software)





# EVERY PRODUCT TELLS A STORY OF SUCCESS



## YASKAWA



### Drives, Motion & Control

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For Drives  
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