YASKAWA

iCube Control™

The new machine controller ecosystem

www.yaskawa.eu

iCube Control™

The automation technology that puts you in control

Built for you

Whether you want the flexibility of open system design, the scalability of modular system integration or the certainty of security and safety—you get it all with the iCube Control platform. With one controller, built to perform impeccably over the life of your system.

iCube Control is the open automation machine control solution, based on the PLCnext technology running on a realtime Linux system that gives engineers, application developers, machine builders and designers total control over their systems, delivering:

Flexibility

- Program in IEC61131-3, along with high-level languages
- Collaborate securely across teams and geographies
- Choose from a wide variety of Yaskawa servo technology matched to your application

Scalability

- One machine controller and one software engineering tool for Motion, Logic, Safety, HMI and Robotics
- Scale controller features to meet your specific application requirements
- Easily integrate additional components with open network communications

Certainty

- Engineered to ensure the highest quality and long-term product life cycle
- Integrated Safety over EtherCAT (FSoE) for a complete machine safety solution
- Secure controller communications and web-based management

Expert support

- Expert engineering resources, from design to development
- Quick, nimble and thorough response, from concept to implementation
- Delivered by Yaskawa, the world's largest manufacturer of robotics and automation systems

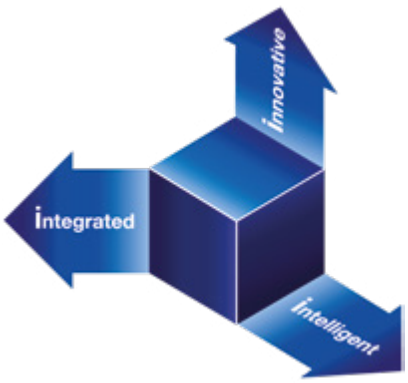
i^3-Mechatronics

Yaskawa is a pioneer in developing connected devices that enhance productivity and production flexibility. i^3-Mechatronics stands for:

Integrated
Smart products that enable the collection and analysis of real-time data

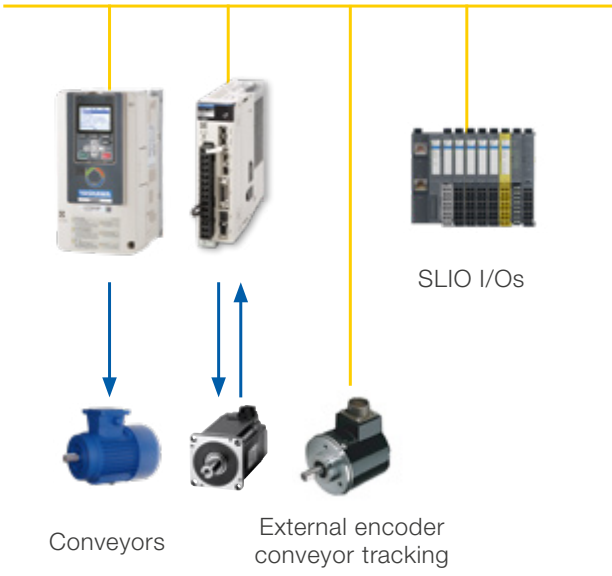
Intelligent
Big Data analysis and AI learning deliver new ways of optimizing the production process at every level

Innovative
Insights gained from the production process trigger improvements to production and quality



iCube Control architecture overview

Safety over EtherCAT®



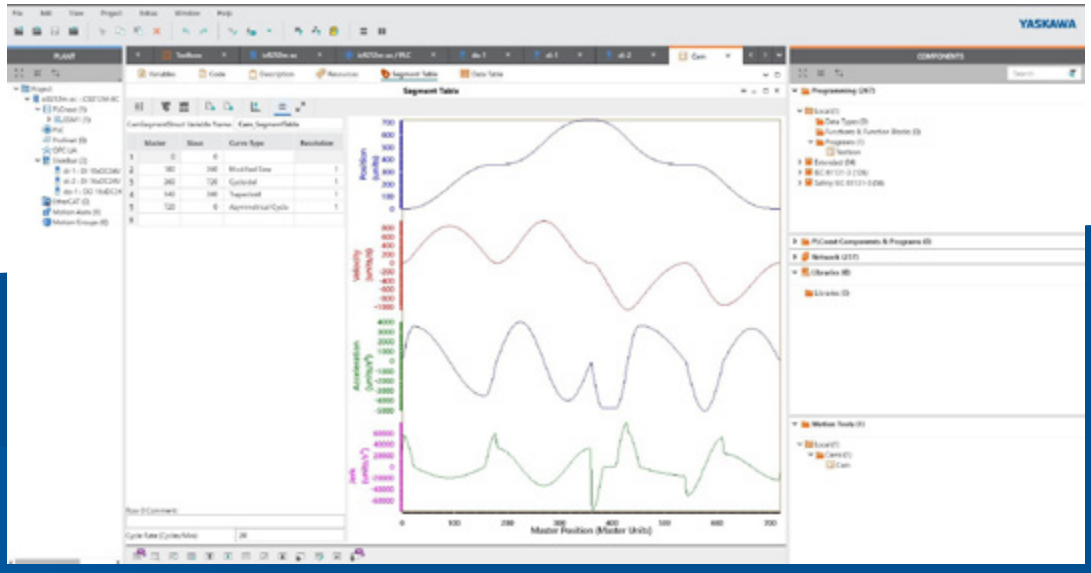
Your system for full control

- One machine controller and one software engineering tool for Motion, Logic, Safety, HMI and Robotics
- Integrated EtherCAT machine controller and Safety over EtherCAT (FSoE)
- Compatible with a broad range of Yaskawa mechatronics technology

iCube Engineer

Engineered for your opportunities

Open up your possibilities and develop more efficient solutions. Designed for collaborative working, iCube Engineer gives developers the freedom to program function modules in the language of their choice.



Integrated environment

- Motion, robotics, logic, variable frequency drives and HMI
- Fully integrated SIL3 safety programming
- Network configuration, diagnostics and security

Open programming

- IEC61131-3 graphical, structured text or SFC programming
- Create libraries with C#, C++ and other high-level languages

Control system security

- Device certificates and multi-user password protection

Collaborative

- Managed program access for multiple developers
- Online editing and version detection

The machine controller for all

A single machine controller for motion, logic, kinematics, safety, security and more. The iC9200 is ready for any challenge you face today and that you will face tomorrow.

PLCnext Technology
Designed by Phoenix Contact

Yaskawa TRITON processor

- 3 core ARM Cortex-A17 1.26 GHz processor for fast processing of synchronous motion tasks
- High-speed DDR4 memory and eMMC flash
- Integrated real-time Ethernet network support

Safety over EtherCAT (FSoE)

- Integrated EtherCAT machine controller and EtherCAT safety master
- FSoE network safety profile meeting SIL3 requirements

Control system security

- Secure web-based management with multi-level password protection
- Secure OPC UA communications
- Designed for network security certification per ISA/IEC 62443
- Already meets the requirements of the Cyber Resiliance Act (CRA)

Network communications

EtherCAT · PROFINET · EtherNet/IP · Modbus TCP · IO-Link · OPC UA

Flexible I/O

- Expandable local I/O using SLIO Slice I/O

Connectivity designed for You

Built to provide real-time data acquisition, processing, communication and feedback.

Worldwide connectivity

- Easy web-based access from any internet-connected location
- Change settings from remote

Reduced maintenance costs

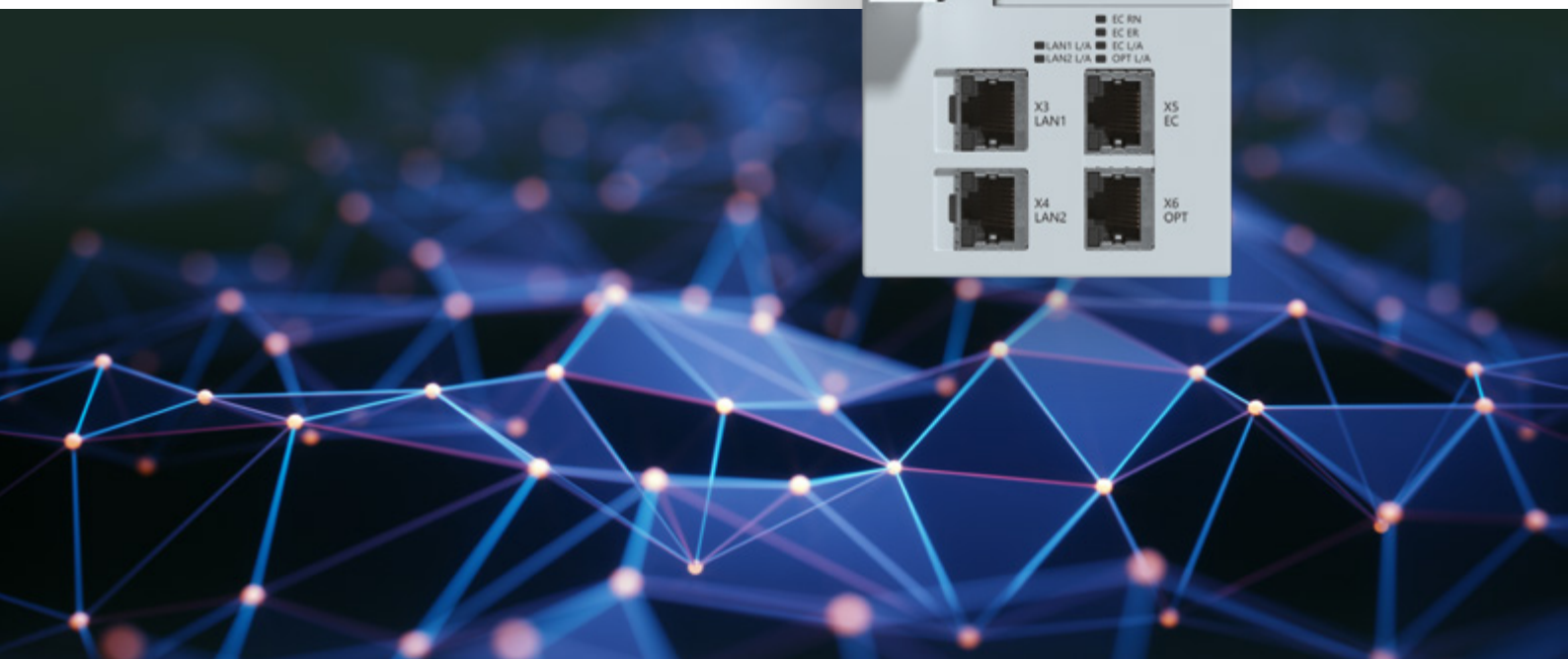
- Monitor variables, status, diagnostics, and alarms from any web browser
- Download new programs to the controller without any Yaskawa software
- Update controller firmware
- Monitor Servo axis position, velocity and torque
- Live display and setting of I/O values

Flexible access

- Connect via computer or mobile device

Secure access

- HTTPS and password-based user logins with multiple levels of access



The integration of motion and robotics

Singular Control™ delivers integrated control for Delta, SCARA, 6-axis, Gantry and customer-specific mechanisms.

A complete mechatronic continuum

- Motion axes, robots, and custom mechanisms running interchangeably under the same controller and application code

Familiar programming

- Program robots with PLCopen function blocks
- No proprietary robot programming language

Integrated control

- Control all types of mechanisms with one software engineering tool using the same function blocks

Machine flexibility

- Swap mechanism type with minimal changes to application code

Future enabled

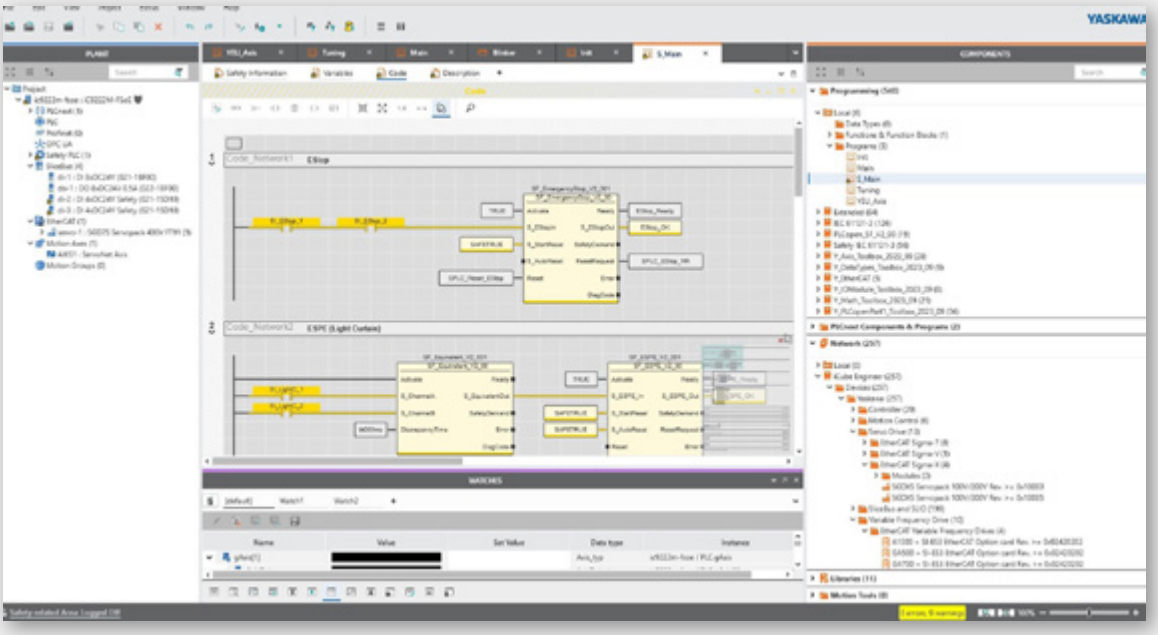
- Easily upgrade to new mechanisms

Get the certainty of safety, security and supply

iCube Control combines automation technology with the certainty of machine safety you need to operate successfully, all in one fully integrated platform.

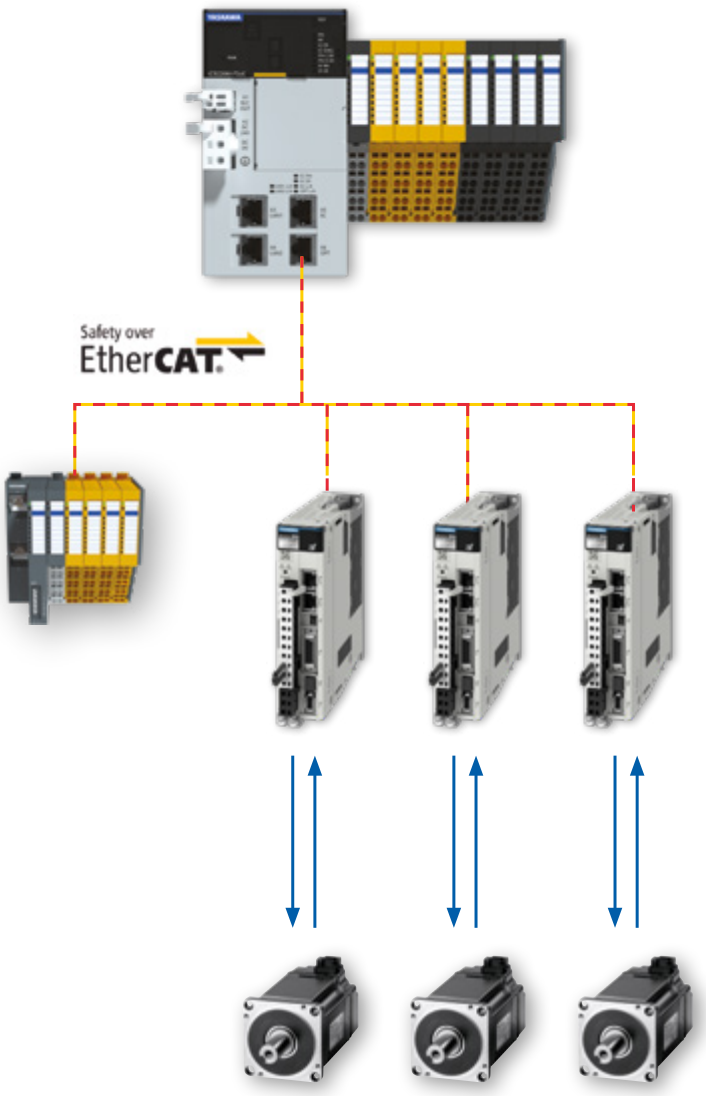
The iC9200 machine controllers are available with an integrated EtherCAT (FSoE) safety master, eliminating the need for an external safety PLC and allowing all safety and non-safety EtherCAT devices to be integrated onto a single network.

Safety applications are programmed using certified safety function blocks in iCube Engineer, allowing you to use a single software engineering tool for programming safety and non-safety logic and motion.



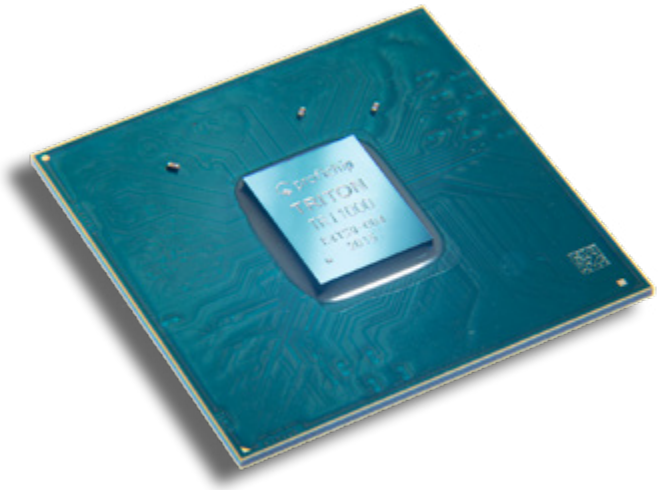
SLIO safety input and output modules can be mounted directly to the iC9200 controller or remotely on an EtherCAT fieldbus module.

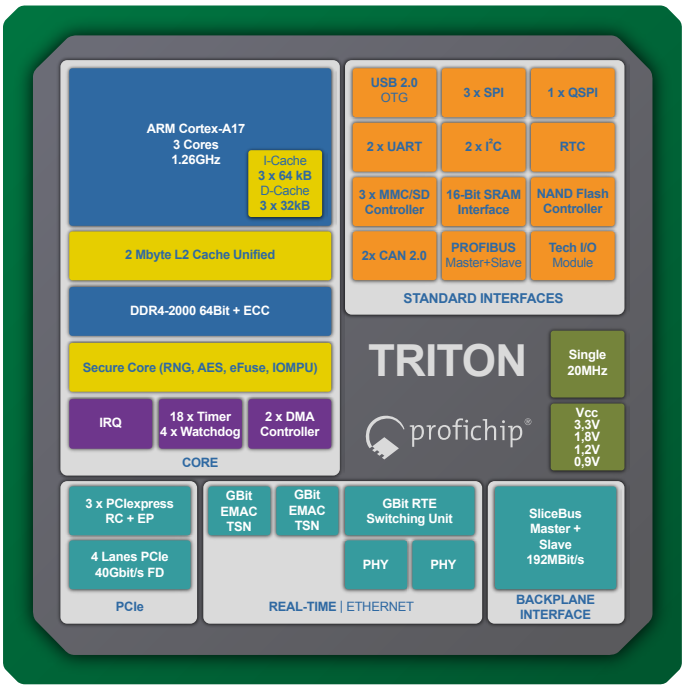
Yaskawa Servopacks featuring the Advanced Safety Module provide safe motion, meeting SIL3 requirements.



TRITON - the IIoT powerhouse

The iC9200 machine controllers are powered by the Triton processor. They are designed by Yaskawa specifically for demanding machine control applications, including multi-axis synchronized motion. The controller supports multiple modern field buses and provides a feature set that can be tailored to meet your specific requirements.





Technical Data	TRITON
Processor type	3 × ARM Cortex A17 cores up to 1.26 GHz
Floating point unit per core	64-bit
Cache	64/32 kB instruction/data cache 2 MB of L2 cache (with ECC)

Hardware model options

Model	iC9226M-EC	iC9226M-FSoE
Network Master	EtherCAT (CoE, FoE, EoE)	EtherCAT (CoE, EoE, FoE) EtherCAT Safety (FSoE)
Fieldbus Support	OPC UA Client, -Server, -Pub/Sub EtherNet/IP Scanner and Adapter PROFINET IO RT PROFINET I-Device Modbus TCP Client/Server	
Connections	2 × Gigabit Ethernet 2 × 100 Megabit Ethernet Network 24 VDC Power Supply (Input) SD Memory Card Slot Integrated Slice Bus for local SLIO Modules	
Processor	Triton ARM Cortex-A17 1.26 GHz, 3 Core Processor	
Memory	Flash Memory: 4 GB eMMC SDRAM: 2 GB DDR4 Program Memory: 12 MB Data Storage Memory: 32 MB Retained Data Storage: 3 MB MRAM	
Synchronized Axis Count	Up to 64 Real and 64 Virtual Axes	

System requirements for iCube Engineer

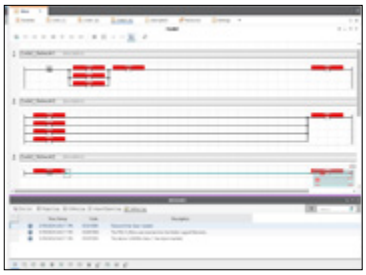
License type	Professional license	Free trial version
Duration	Unlimited	30-days
Operating System	Windows 10 (64-bit) > build 1709	
Languages Supported	English, German	
SW Platform	.NET Framework 4.8	
Harddisk	Min. 2 Gbyte	
RAM (DDR4)	Min. 8 Gbyte	
CPU	Min. Intel Core i5	
Graphic Card	Min. MS DirectX 9 WDDM	

Open programming

You can program the iCube controller using the language you know best: Choose from the standard IEC61131-3 languages: Sequential Function Chart (SFC), Function Block Diagram (FBD), Network Oriented Ladder Diagram (NOLD), Structured Text (ST) or Safety NOLD.

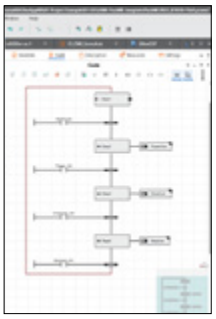
NOLD Editor

You can program in the classic, network-oriented ladder diagram (NOLD).



SFC Editor

Sequential Function Chart (SFC) is one of the standardized languages of IEC61131-3 and supported by iCube Engineer. SFC allows you to graphically create program organization in terms of steps, actions and transitions.



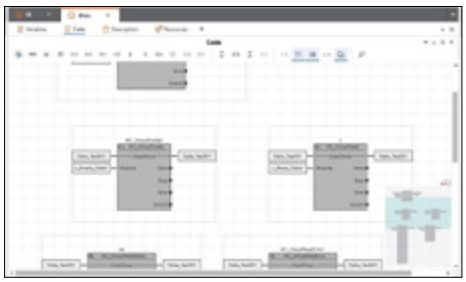
ST Editor

The ST editor is a text editor and is used to implement code in Structured Text (ST).

Safety in LD-Editor

Safety functions are programmed in the Safety NOLD (SNOLD).

Function Block Diagram (FBD) Editor



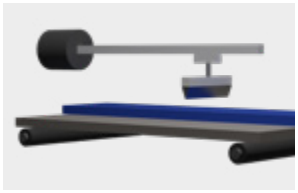
High Level Languages

Our new iCube Engineer development environment opens up countless new possibilities for the development of solutions. Designed for collaboration, it gives developers the freedom to develop function modules in the language of their choice.

Software solutions

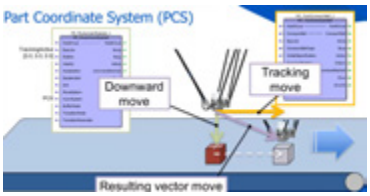
Flying Saw

The flying saw cuts a moving material web into specified lengths “on-the-fly” without stopping. The cutting tool must be precisely synchronized with the material path.



Conveyor Tracking

Conveyor tracking is needed for picking parts with a robot arm from a moving conveyor without stopping the conveyor.



MotoLogix

Via the MotoLogix library, you can control articulated arms (= Yaskawa Motoman Robots) with standard PLCopen FBs written in the iCube in IEC61131-3 language. So, you don’t need a proprietary robotic programming language any longer. We can control several robots with only 1 TeachPendant or HMI.

Case Packing Toolbox

Path Generator Function block generates robot path based on case size, product dimensions, and pack patterns. Data-driven structure allows ease-of-use without sacrificing flexibility. Path Processor executes and coordinates motion sequencing and error recovery.

MotoPick Software

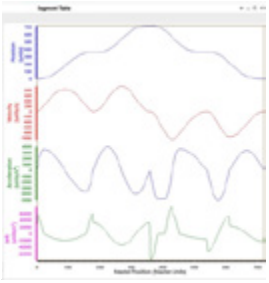
For picking, sorting, transfer, collation, singulation, tray fill. A software solution that combines everything necessary for successful picking operation.

PackML

PackML is the contraction of Packaging Machine Language. The primary objective of PackML is to bring a common “look and feel” and operational consistency to all machines that make up a Packing Line (Note: Can be used for other types of discrete process).

Camming

Cam applications are used to control non-uniform motion sequences. Positions of so-called slave axes are assigned to defined positions of the respective master axis.



Compass

With Yaskawa Compass™ we provide our customers with a simple and quickly customizable solution for processing G-code.

IO-Link

IO-Link is a fieldbus independent Point-to-Point interface for the connection of actuators and sensors. It is easy to integrate in every existing fieldbus system. The SLIO IO-Link module enables communication between the iCube Controller and IO-Link capable field devices such as sensors and actuators according to IEC 61131-9.

Palletsolver

This software is a PC-based pattern generation tool to optimize pallet efficiency. It includes 2D and 3D vision guidance for inspecting products, identifying shapes to define the picking strategy. Line tracking enables product handling while it is still moving on the conveyor to optimize your productivity.

Sigma series servopacks

More productivity with smart solutions

The Yaskawa tuning functions

Our Sigma series offers a whole range of innovations and the entire experience of many generations of servo drives. You will notice this right from the commissioning stage.

Yaskawa equips the servo packs with functionalities that reduce the time required for commissioning to a minimum.

The Sigma series delivers outstanding performance and masters the many challenges found in a modern automated machine: Shortest positioning times, highest synchronization quality, compensation of friction, suppression of various (resonance) frequencies and much more.

Tuning-Less Function

Ready for immediate use

The “Tuning-Less” function is enabled from the moment you pull the amp out of the box. For most applications areas, no further tuning is required. Inertia ratios of up to 100:1 can be handled with this function.

Settling time

40 ms
Range

Advanced Autotuning

Minimize settling time. Maximize smooth motion.

The “Advanced Autotuning” automatically adjusts gain and filter parameters to minimize settling time and tracking error. At the same time, interferences such as resonance frequencies or vibrations are detected and suppressed.

Settling time

4 ms
Range

One Parameter Tuning

Precise User-Driven Adjustment

Optimize the performance of your machine even further by making simple fine adjustments without compromising the stability of the system you have already achieved.

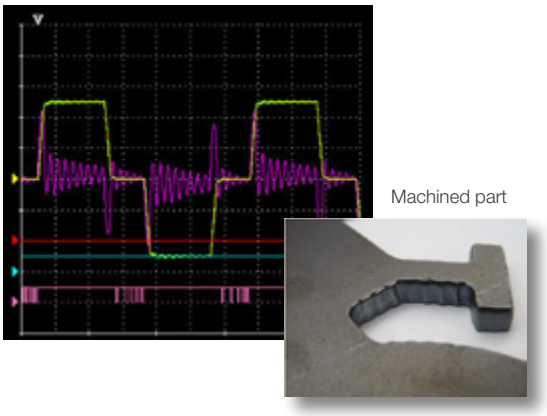
Settling time

0-4 ms
Range

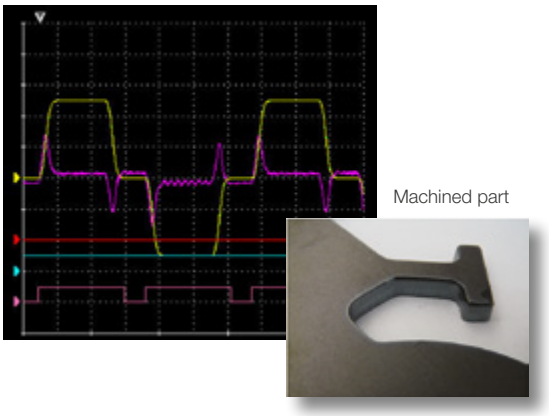
Unleash the full power

For a servo system to deliver the fastest, smoothest and most precise motion possible, unwanted mechanical effects that occur in every machine must be compensated for. The sophisticated suppression functions of Yaskawa servopacks reduce these negative influences to a minimum.

Without vibration suppression



With vibration suppression



Vibration suppression

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

Speed stability

Ripple compensation suppresses so-called cogging torque effects, which can occur at low motor speeds. This achieves outstanding speed stability.

Resonance suppression

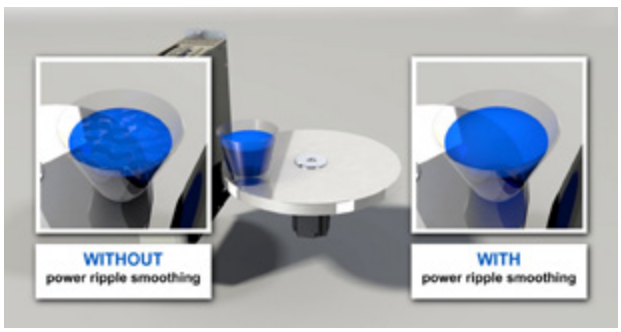
Our servo amplifiers offer several adjustable filters to effectively counteract resonances that occur in the machine mechanics.

Friction

The Friction Compensation function enables smooth starting at all times, even if there is high static friction.

Better noise protection

The servo amplifier offers the option of electronically defining up to nine frequencies (from a few Hz to several kHz) to counteract vibrations and resonances in the mechanics.



Sigma series servopacks

Feature-packed for your machine

Sigma-X Servopacks

With real-time data collection, speeds up to 7,000 RPM, frequency response of 3.5 kHz, and multi-axis amplifiers with expanded functions to improve precision, Sigma-X takes servo response to a higher level to maximize your machine performance.

Sigma-X Servopacks are EtherCAT-compatible to communicate seamlessly with our iCube Control platform.

They are available in power ranges from 50 W to 15 kW.

SGDXS
Single-Axis

SGDXW
Dual-Axis

SGDXT
Three-Axis

Integrated data collection and visualization

- The servomotor acts as a sensor for recording data that can be used for preventive maintenance
- A large number of operating monitors allow the system status to be monitored at all times and the machine to be driven to its optimum performance level
- Even unforeseen operating states can also be reliably detected by the new error detection function, providing additional protection for the machine parts

Expanded functions to improve precision and quality

- Ripple compensation
- Battery-less 26-bit multiturn absolute encoder
- Motors with safe encoder available. This safety functions according to SIL3/PLe can now be realized
- Each servo pack has STO (SIL3/PLe)
- Further safety functions and also Safety over EtherCAT (FSoE) optionally available

Shortens cycle times to improve performance

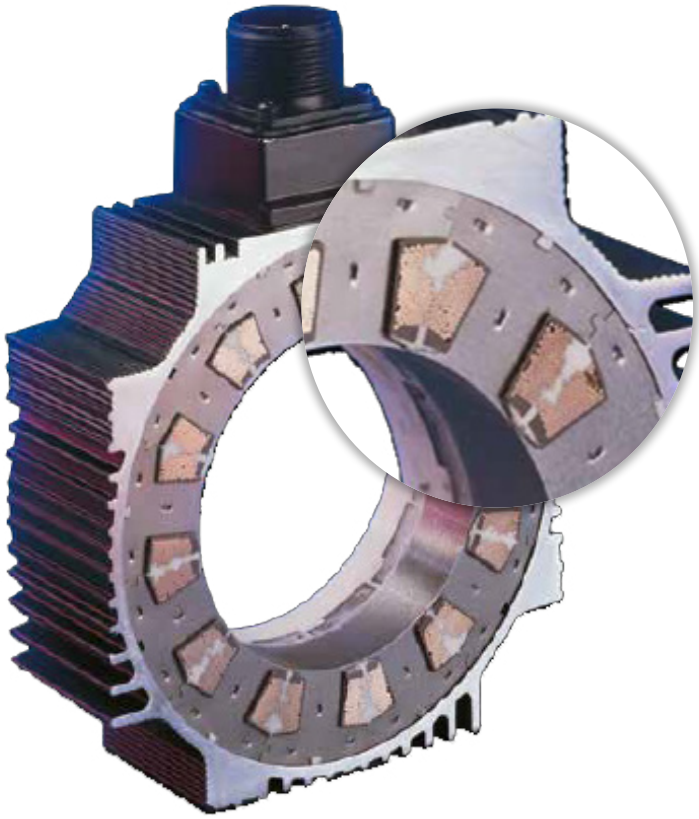
- Improved *Tuning-Less*-Function. This now allows safe handling of inertia ratios of up to 100:1
- *Advanced Autotuning* with improved vibration detection and algorithms for continuous determination of the inertia ratio
- *One-Parameter Tuning* for quick and easy optimization of the control loops

Multi-axis servo ampflifiers

- Reduced control panel size
- Reduced wiring time
- Two- and three-axis servo amplifiers available

Sigma series servo motors

Packed with performance



More power per engine volume

- Thanks to a segmented stator core design and highly automated winding layout, a significantly higher packing density is achieved than with other manufacturers. This results in a significantly higher power density per unit volume.
- Encapsulated windings prevent shorts between windings, improving heat dissipation
- Increased precision during production minimizes the air gap between the rotor and stator. The improved magnetic flux density achieves a higher torque with reduced cogging at the same time.
- 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

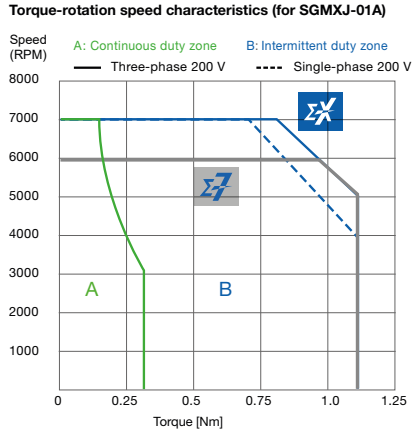
- Simplifies wiring in control panels
- Rotation data are retained
- No need to stock batteries

More power and greater precision with Sigma-X

With Sigma-X, Yaskawa presents the latest generation of Sigma servo drives. Performance characteristics and precision have been further improved while maintaining the same high quality and reliability.

Increased speeds

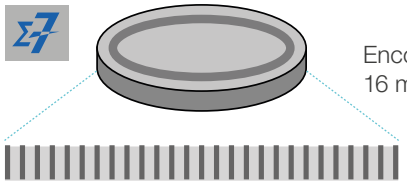
The maximum rotation speed of the motor has increased from the earlier value of 6,000 RPM to 7,000 RPM.



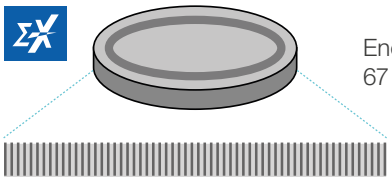
Improving maximum servo motor rotation speed can reduce positioning time, which can contribute to higher productivity.

High resolution 26-bit encoder

The resolution of the encoder has been increased to 26 bits, four times that of Sigma-7.



Encoder resolution 24 bits: 16 mio. pulses/rev



Encoder resolution 26 bits: 67 mio. pulses/rev

- Increased positioning resolution/stop precision = Precise stops
- Decrease in speed ripples = Smooth movement and improved machining precision

Servo motor portfolio

Quality. Precision. Dynamics.

Rotary motors

Each and every one of our servo motors incorporates more than 30 years of experience and technological know-how. As a leading manufacturer of servo drives, we offer a wide range of motors in various sizes, speeds and torque values. In combination with an amplifier and machine controller, they form a complete motion automation system.

200 V Servo Motors

Low Inertia		Medium Inertia	
			
SGMXA	50 W - 7 kW	SGMXJ	50 W - 750 W
			
		SGMXG	300 W - 15 kW

400 V Servo Motors

Low Inertia		Medium Inertia	
			
SGM7A	200 W - 7 kW	SGM7J	200 W - 1.5 kW
			
		SGM7G	450 W - 15 kW

Servopacks

1 Axis		2 Axis		3 Axis	
					
SGDXS	50 W - 15 kW	SGDXW	50 W - 1 kW per axis	SGDXT	50 W - 400 W per axis

EtherCAT®

Servopacks

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

EtherCAT®

MECHATROLINK

Direct drives (torque motors)

Direct drives save space, eliminate mechanical backlash and reduce component costs by adding mechanical rigidity to dynamic applications.

200 V Rotary Direct Drives

SGM7F

Iron Core

Rated: 2 Nm - 200 Nm
Peak: 6 Nm - 600 Nm

SGM7E

Coreless

Rated: 2 Nm - 35 Nm
Peak: 6 Nm - 105 Nm

SGM7D

Iron Core

Rated: 1.3 Nm - 240 Nm
Peak: 4 Nm - 400 Nm

Servopacks

1 Axis		2 Axis		3 Axis	
					
SGDXS	50 W - 15 kW	SGDXW	50 W - 1 kW per axis	SGDXT	50 W - 400 W per axis

EtherCAT®

Linear motors

They offer maximum speed and high dynamics and are characterized by low cogging torque. They replace mechanical connections and allow an optimum design for your application.

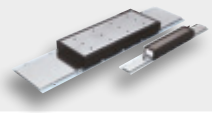
200 V & 400 V Linear Direct Drives

SGLG

Coreless

Rated: 12.5 N - 750 N
Peak: 40 N - 3000 N

SGLFW2



F-Type Iron Core

Rated: 25 N - 2520 N
Peak: 86 N - 7560 N

SGLT

T-Type Iron Core

Rated: 130 N - 2000 N
Peak: 380 N - 7500 N

Servopacks

1 Axis		2 Axis		3 Axis	
					
SGDXS SGD7S	50 W - 15 kW	SGDXW SGD7W	50 W - 1 kW per axis	SGDXT	50 W - 400 W per axis

EtherCAT®

Robot overview

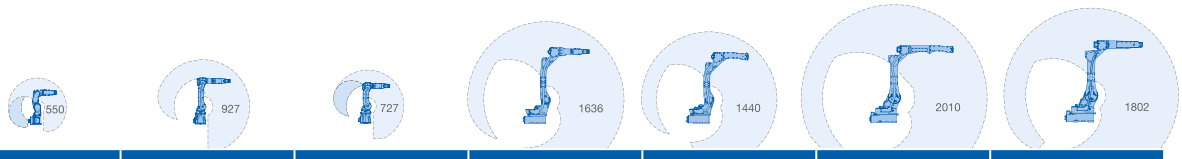
Robots for Handling and Assembly

The 6-axis robots in the MOTOMAN GP series are versatile and powerful and are suitable for a wide range of applications. They offer a high payload of up to 600 kg and a large movement range of up to 2,942 mm, which enables the handling of large and heavy workpieces in particular.

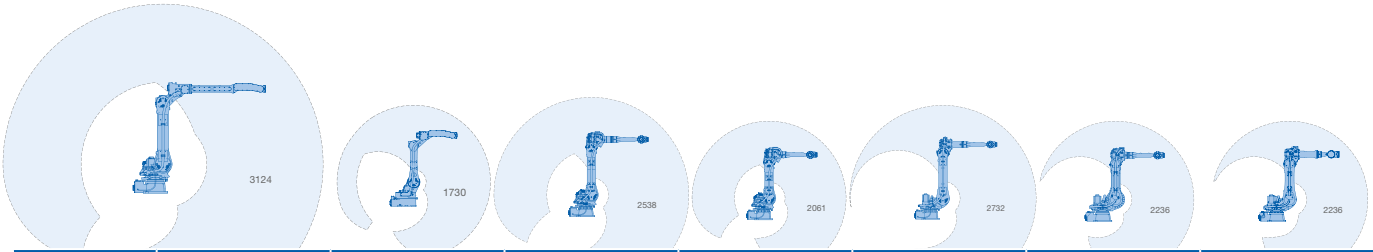
Tecnical data	GP-Series
Maximum working range	532 – 2,942 mm
Maximum payload	7 – 600 kg
Controlled axes	6

Features

- High speed
- Very wide product range
- Compact and powerful

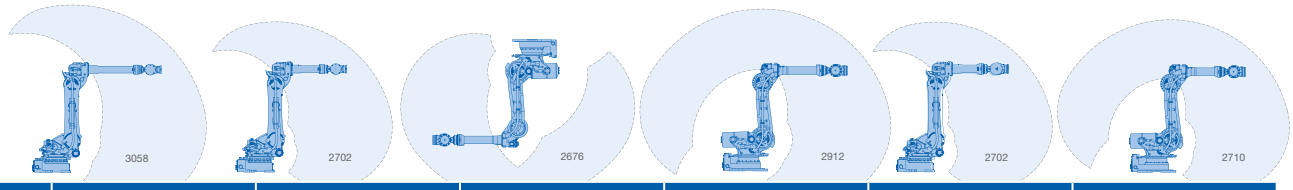


Model	GP4	GP7	GP8	GP8L	GP12	GP25-12	GP20
Payload [kg]	4	7	8	8	12	12	20
Max. working range [mm]	550	927	727	1636	1440	2010	1802

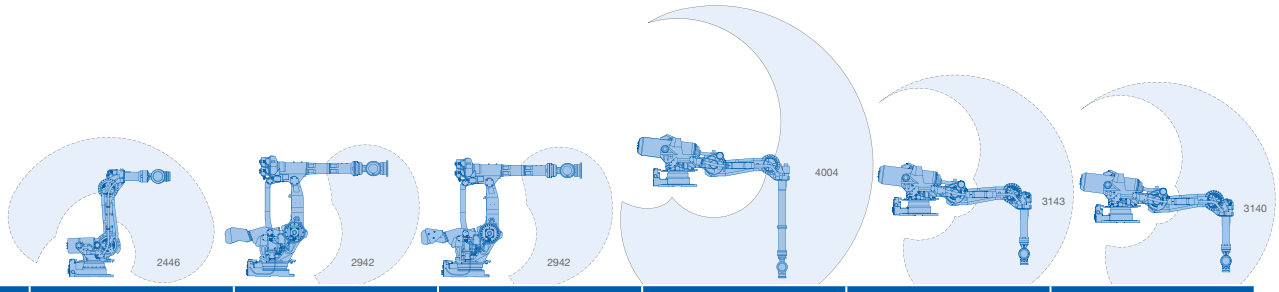


Model	GP20HL	GP25	GP35L	GP50	GP70L	GP88	GP110
Payload [kg]	20	25	35	50	70	88	110
Max. working range [mm]	3124	1730	2538	2061	2732	2236	2236

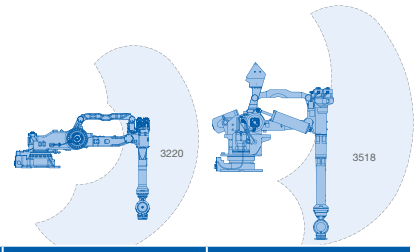
Equipped with the latest generation of Sigma servo drives, a powerful high-inertia wrist and smooth-running roller bearings, the robots in the GP series achieve the best cycle times when handling loads. They have been designed for easy installation, operation and minimal maintenance.



Model	GP180-120	GP180	GP215-200T	GP215	GP225	GP250
Payload [kg]	120	180	200	215	225	250
Max. working range [mm]	3058	2702	2676	2912	2702	2710



Model	GP280	GP400	GP600	GP120RL	GP165R	GP200R
Payload [kg]	280	400	600	120	165	200
Max. working range [mm]	2446	2942	2942	4004	3143	3140



Model	GP300R	GP400R
Payload [kg]	300	400
Max. working range [mm]	3220	3518

Handling & Picking

Handling, Picking, Packing, Human-robot collaboration

SG series scara robots

The robust SG series is particularly suitable for applications that require high speed and accuracy. Small interference contours allow the robots working together in confined spaces. Internal cabling enables a reliable workflow and saves extensive maintenance.
The SG400 is driven by the compact and lightweight YRC1000micro controller

MPP 3-Serie
Pick & place robots

The 4-axes high-speed robot MOTOMAN MPP3 with parallel kinematic system combines the speed of the delta design with a high payload capacity and a large working range.

HC-Series
6 integrated sensors

The MOTOMAN HC robots are 6-axes human-collaborative robots with a payload of up to 20 kg. Operator's safety is assured by a power and force limit technology that stops the robot in case of contact with an operator.

The HC robots can operate without additional protective measures like a safety fence, depending on the risk assessment. This saves space and costs.

Its installation area is very flexible and therefore it is able to operate at different workplaces

MotoPick for iCube

Software solution for serial picking stations

MotoPick for iCube makes it easy to control complex processes for pick & place applications. Complicated programming is not necessary. All settings are configured via the HMI. MotoPick makes it possible to set up customer-specific pick & place applications where fast cycle times are required.

Features

- Conveyor belt tracking
- Vision integration
- For multi-robot systems
- Load distribution
- Multiple grippers
- Configurable pick and place sequences and priorities

Technical data	MotoPick for iCube
Max. number of robots	16
Controller type	iC9226
Tools per robot	5
Signals per tool	Pick (out), Place (out), Feedback (in)
Recognisable product types	32
Sync. Multi-Pick combinations	One per each unused product type
Sync. Multi-Place combinations	One per each unused product type
Conveyors per robot	6
Robots per conveyor	16
Conveyor speed	1 m/s
Tables per robot*	16
Robots per table	1
Cameras per conveyor/table	1
Conveyors per camera	16
Products per image/tray	128
Natively supported cameras	Sick, Cognex

* each conveyor reduces this value by 1

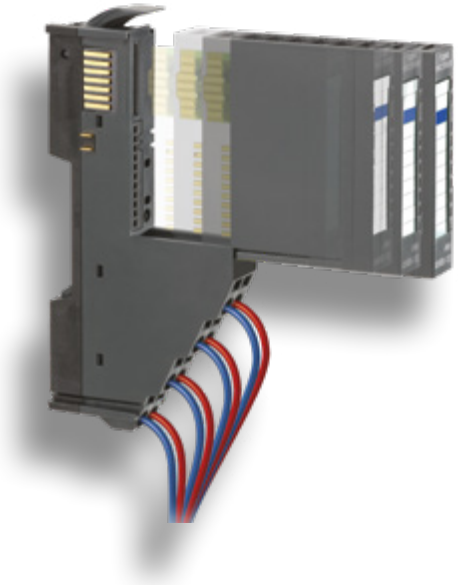
SLIO I/O modules

Compact. Intelligent. Flexible.

SLIO (= Sliced I/O) is a modular and compact, decentralized I/O system. It can be combined not only with our control systems, but also with control systems from other manufacturers. Regardless of which controller you use, the SLIO I/O system minimizes engineering effort and is quick to implement.

Side mounting

Mount SLIO I/O directly to an iC9200 series controller using the controller's integrated Slice Bus.



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.

High speed backplane bus

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

Interface modules

053-1PN01	PROFINET Coupler
053-1DP00	PROFIBUS Coupler
053-1EC01	EtherCAT Coupler
053-1IP01	EtherNet/IP Coupler
053-1MT01	Modbus TCP Coupler
053-1ML00	MECHATROLINK-III Coupler
053-1ML40	MECHATROLINK-IV Coupler
053-1CA00	CANopen Coupler

Clamp modules

001-1BA00	Potential distributor module 8x DC 24 V
001-1BA10	Potential distributor module 8x DC 0 V
001-1BA20	Potential distributor module 4x DC 24 V, 4x DC 0 V

Function modules

050-1BA00	1x 32 Bit(AB) DC 24 V, DO 1x DC 24 V 0.5 A
050-1BA10	1x 32 Bit(AB) DC 5 V 2 MHz
050-1BB00	2x 32 Bit(AB) DC 24 V
050-1BB30	2x 32 Bit(AB) DC 24 V ECO
050-1BB40	2x 24 Bit DC 24 V 600 kHz, Frequency measurement
050-1BS00	1x SSI, RS422, 8 ... 32 Bit, 1x DI, 1x CO, 1x CI
054-1BA00	1x Stepper 24 V 1.5 A, 1CH (2 DO), Feedback (2 DI)
054-2BA10	1x Stepper 24-48 V 5 A, 1CH (1 DO / 3 DI)
054-1CB00	1x DC Mot 24 V 1.5 A, 2 CH (2 DO), Feedback (2 DI)
054-1DA00	1x PulseTrain RS422, 0-1000 kHz, 24 V DC, Feedback (2 DI)
060-1AA00	Line extension module, Master 2 m
060-1AA01	Line extension module, Master 10 m
060-1BA00	Line extension module, Slave 2 m
061-1BA01	Line extension module, Slave 10 m

Communication processors

040-1BA00	RS232C, ASCII, STX/ETX, 3964R, Modbus, PtP
040-1CA00	RS422/485, ASCII, STX/ETX, 3964R, Modbus, PtP
042-1IO00	IO-Link Master, 4 channels, Standard-I/O (SIO) or IO-Link Modus

Digital input modules

021-1BB00	DI 2x DC 24 V
021-1BB10	DI 2x DC 24 V 2 µs ... 4 ms
021-1BD00	DI 4x DC 24 V
021-1BD10	DI 4x DC 24 V 2 µs ... 4 ms
021-1BD40	DI 4x DC 24 V 3-wire
021-1BD50	DI 4x DC 24 V NPN
021-1BD70	DI 4x DC 24 V Time stamp
021-1BD80	DI 4x DC 24V Time stamp NPN
021-1BF00	DI 8x DC 24 V
021-1BF01	DI 8x DC 24 V 0.5 ms
021-1BF50	DI 8x DC 24 V NPN
021-1BF51	DI 8x DC 24V 0.5 ms NPN
021-1BH00	DI 16x DC 24 V
021-1DF00	DI 8x DC 24 V Diagnostic
021-1DF50	DI 8x DC 24V Diagnostic NPN

Digital Safety input modules

021-1SD00	DI 4x DC 24 V Safety / PROFIsafe
021-1SD10	DI 4x DC 24 V Safety / FSoE

Power supply

007-1AB00	DC 24 V 10 A
007-1AB10	DC 24 V 4 A I DC 24 V +5 V/ 2A
007-0AA00	DC 24 V Only electronic module

Digital output modules

022-1BB00	DO 2x DC 24 V 0.5 A
022-1BB90	DO 2x DC 24 V 0.5 A PWM
022-1BD00	DO 4x DC 24 V 0.5 A
022-1BD20	DO 4x DC 24 V 2 A
022-1BD50	DO 4x DC 24 V 0.5 A NPN
022-1BD70	DO 4x DC 24 V 0.5 A Time stamp
022-1BD80	DO 4x DC 24V 0.5A Time stamp NPN
022-1BF00	DO 8x DC 24 V 0.5 A
022-1BF50	DO 8x DC 24 V 0.5 A NPN
022-1BH00	DO 16x DC 24 V 0.5 A
022-1BH50	DO 16x DC 24V 0.5A NPN
022-1DF00	DO 8x DC 24 V 0.5 A Diagnostic
022-1HB10	DO 2x Relay DC 30 V / AC 230 V/3 A
022-1HD10	DO 4x Relay DC 30 V / AC 230 V/1.8 A

Digital Safety output modules

022-1SD00	DO 4x DC 24 V 0.5 A Safety / PROFIsafe
022-1SD10	DO 4x DC 24 V 0.5 A Safety / FSoE

Analog input modules

031-1BB10	AI 2x12Bit 0(4)...20mA ISO, 2-wire, potential separated per channel
031-1BB30	AI 2x 12 Bit 0 ...10 V
031-1BB40	AI 2x 12 Bit 0(4) ... 20 mA
031-1BB60	AI 2x 12 Bit 0(4) ... 20 mA 2-wire
031-1BB70	AI 2x 12 Bit -10 ...10 V
031-1BB90	AI 2x 16 Bit thermo coupler
031-1BD30	AI 4x 12 Bit 0 ...10 V
031-1BD40	AI 4x 12 Bit 0(4) ... 20 mA
031-1BD70	AI 4x 12 Bit -10 ...10 V
031-1BD80	AI 4x 16 Bit R RTD, 2x 3/4-wire
031-1BF60	AI 8x 12 Bit 0(4) ... 20 mA
031-1BF74	AI 8x 12 Bit -10 ...10 V
031-1CA20	AI 1x 16 Bit DMS, 1x 4/6-wire
031-1CB30	AI 2x 16 Bit 0 ...10 V
031-1CB40	AI 2x 16 Bit 0(4) ... 20 mA
031-1CB70	AI 2x 16 Bit -10 ...10 V
031-1CD30	AI 4x 16 Bit 0 ...10 V
031-1CD35	AI 4x 16 Bit 0 ...10 V, Reduced parameter bytes
031-1CD40	AI 4x 16 Bit 0(4) ... 20 mA
031-1CD45	AI 4x 16 Bit 0(4) ... 20 mA, Reduced parameter bytes
031-1CD70	AI 4x 16 Bit -10 ...10 V
031-1LB90	AI 2x 16 Bit thermo coupler
031-1LD90	AI 4x 16 Bit R RTD, 2x 3/4-wire
031-1PA00	AI 1x 3 Ph 230/400 V 1 A SLIO Energy measurement module
031-1PA10	AI 1x 3 Ph 230/400 V 1/5 A

Analog output modules

032-1BB30	AO 2x 12 Bit 0 ...10 V
032-1BB40	AO 2x 12 Bit 0(4) ... 20mA
032-1BB70	AO 2x 12 Bit -10 ...10 V
032-1BD30	AO 4x 12 Bit 0 ...10 V
032-1BD40	AO 4x 12 Bit 0(4) ... 20 mA
032-1BD70	AO 2x 12 Bit -10 ...10 V
032-1CB30	AO 2x 16 Bit 0 ...10 V
032-1CB40	AO 2x 16 Bit 0(4) ... 20 mA
032-1CB70	AO 2x 16 Bit -10 ...10 V
032-1CD30	AO 4x 16 Bit 0 ...10 V
032-1CD40	AO 4x 16 Bit 0(4) ... 20 mA
032-1CD70	AO 4x 16 Bit -10 ...10 V

HMI products

The smartest choice for usability, performance and connectivity.

smartPanel

The slim design and rugged resistive touch screen are ideal for everyday industrial applications.

Features

- ARM Cortex-A8 1GHz Processor
- Robust and durable-IP66 protection rating (front)
- Linux system environment

Model Number	Specifications
H41-A1A41-0	4.3", 480 × 272 px, Linux OS, HMI Designer
H71-A1A41-0	7", 800 × 480 px, Linux OS, HMI Designer
HA1-A1A41-0	10", 1024 × 600 px, Linux OS, HMI Designer

Panel PC

Equipped with the latest performance features and a precise, responsive capacitive touchscreen for outstanding usability in a small space.

Features

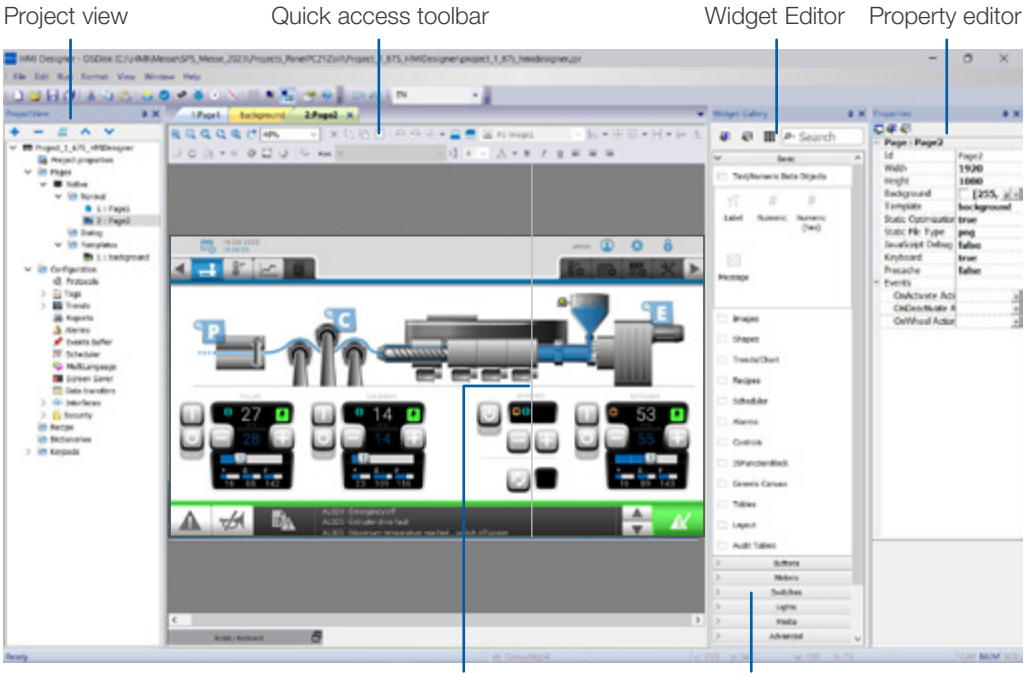
- Intel Celeron J1900 4 x 2.0 GHz processor
- 8 GB integrated work memory
- Familiar Windows system environment
- Numerous interfaces for every application need
- Fanless construction and high-quality metal housing

Model Number	Specifications
67K-RTP0-KJ	10.1", 1280 × 800 px, Windows 10 IoT EP, HMI Designer
67P-RTP0-KJ	15.6", 1366 × 768 px, Windows 10 IoT EP, HMI Designer
67S-RTP0-KJ	21.5", 1920 × 1080 px, Windows 10 IoT EP, HMI Designer

HMI Designer

Integrated HMI development environment

HMI Designer is an HMI development environment that is included with iCube Engineer. It is also available as a stand-alone version. Vizualization projects can run on smartPanels, PanelPCs, PCs, iC9200, or HTML5 web panels. iCube Engineer automatically synchronizes variables with the HMI Designer.



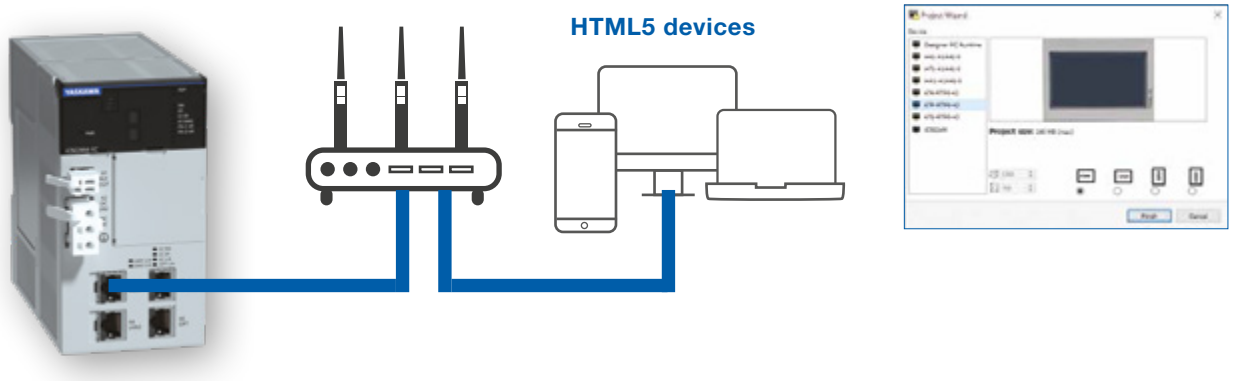
Features

- 200+ drivers (HMI can act as a protocol converter)
- Recipe Manager
- Alarm Handling
- JavaScript
- Trending
- Datalogging
- Project simulation
- OPC UA online browsing
- OPC UA tags synchronize with iCube Engineer projects
- Projects on Yaskawa panels
- Projects on PCs
- Project on iC9200
- Modbus/TCP tag import from Motionworks IEC project

HMI project on iC9200

- iC9200 hosts the HMI project (WebVisu)
- Uses iCube resources (3-core processor, memory)
- Generic HTML5 device used for viewing
- iC9200 is selected as the target
- If “unified” project is selected (default), same project can be sent to controller or HMI panel

visualization with HMI Designer



Variable frequency drives

AC drives for industrial applications

As one of the world's leading suppliers, Yaskawa provides technology and high-quality AC drives that help protect the environment, make our lives easier and improve the efficiency and productivity of industrial machinery around the world.

GA700 - Premium AC Drive

The GA700 precisely controls induction, permanent magnet, and synchronous reluctance motors providing versatility to run a variety of applications with just one drive. The times of complex motor set-up are over. With the new EZ vector mode, the GA700 can run all of these motor types without the need for comprehensive tuning.

Technical Data	GA700
Range	0.55 - 630 kW
Motor types	Induction, Permanent Magnet, Synchronous reluctance

GA500 - Standard AC Drive

Compact in size and flexible in terms of motor type and connectivity, the GA500 is designed to easily master nearly any application.

Technical Data	GA500
Range	0.1 - 30 kW
Motor types	Induction, Permanent Magnet, Synchronous reluctance

U1000 - Matrix converter

A highly efficient AC drive based on latest Matrix converter technology. Its full power regeneration capability offers great energy saving potential while sinusoidal input currents and a power factor close to one reduce stress on grid components, cables and wires.

Technical Data	U1000
Range	4.0 - 500 kW
Motor types	Induction, Permanent Magnet

D1000 - low harmonics Regenerative converter unit

D1000 is a regenerative unit for DC power supply of single drives or systems consisting of AC drives, servos or robots. In addition to the use of braking energy, the D1000 enables particularly efficient and networkfriendly system operation.

Technical Data	D1000
Range	5.0 - 630 kW
Motor types	Induction, Permanent Magnet

R1000 - Regenerative converter

The R1000 regenerative unit replaces conventional braking resistors in machines and systems and makes braking energy available to other consumers in the same system. This saves energy and reduces costs.

Technical Data	R1000
Range	3.5 - 300 kW
Drive types	GA700

Multi-Protocol-Ethernet-Option card

The multi-protocol Ethernet option card (JOHB-SMP3) for Yaskawa frequency inverters provides several Ethernet protocols on a single circuit board. Simply select the appropriate protocol for your application using the configuration switches on the board.

- BACnet/IP
- EtherCAT
- EtherNet/IP
- ProfiNet
- Modbus TCP/IP
- MECHATROLINK-4

Close to the customer

Ob verlängerte Garantiezeiten, speziell angepasste Produkte oder individuelle Wartungsverträge, mit Yaskawa haben Sie einen flexiblen Partner an Ihrer Seite, der auf Ihre Bedürfnisse und Anforderungen eingeht.

25 Mio

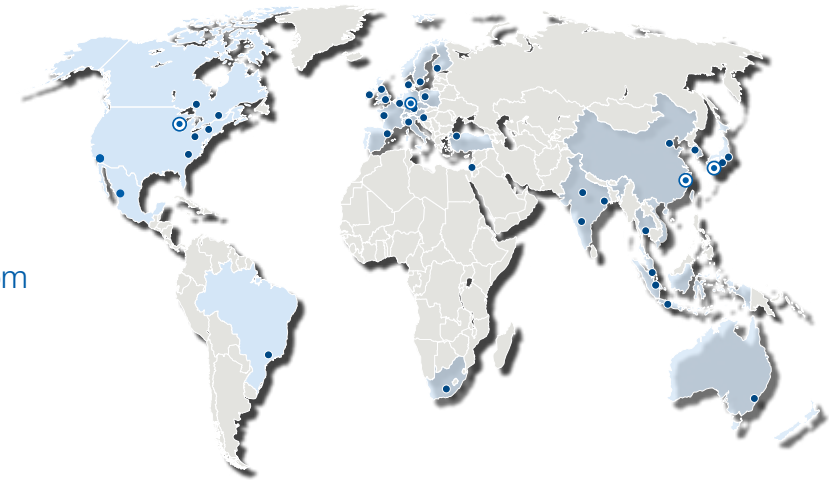
produced
Servo drives

33 Mio

produced
AC drives

European
production sites:

Finland
France
Germany
Norway
Slovenia
Sweden
United Kingdom



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Yaskawa
subsidiaries
in Europe

80%

of the products
sold in Europe
are locally pro-
duced

1,900+

Employees in
Europe

15,000+

Employees
worldwide

1,350+

Employees in
our worldwide
service

590,000

produced
Industrial robots

10 Mio

produced
PLC and I/O
modules

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03/2025
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