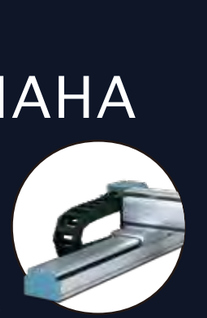
YAMAHA
Revs Your Heart

ENGLISH

YAMAHA

ROBOT



LINEUP CATALOG

YAMAHA
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202004-IE

YAMAHA ROBOT

Who we are and what we do

Over four decades of proven reliability

At Yamaha, development in the field of robotics began with the implementation of robotic technologies on our motorcycle production line over thirty years ago.
Since then, our industrial robot technologies have served as a backbone for manufacturing equipment in a wide variety of industries, including in the assembly of electronic products, the transport of in-vehicle components, and the manufacture of large LCD panels.
Over the years, we at Yamaha have done our utmost to always continue improving upon what we've put to market. Those efforts serve as a testament to our reliability when it comes to producing what businesses need.

A legacy of unique technologies and a keen sense for market

Motor Control Technology is absolutely necessary for precise, high speed operation. Controller Development Technology is based on the highest standards of evaluation. And Signal Processing Technology allows for stable operation even under extreme environmental conditions. Our products are characterized by highly-praised rigidity, durability and operability, and our Core Technologies* allow us to provide just what the market needs.

*Core Technologies refers to control boards, linear motors, linear scales (position detectors) and other such technologies.

Testing environments that guarantee greater reliability

At Yamaha, we continue evaluating our technologies to ensure that our products are reliable. During product development, we conduct assessments and tests in our own anechoic chambers* to ensure the kind of reliability and quality that businesses count on.

*Our anechoic chambers have been set up to help us in the overall development of EMC (Electro-Magnetic Compatibility) technologies deployed in products produced by Yamaha Group companies. This allows us to ensure compliance with international regulations and conformity with international standards.

Yamaha quality means safety

We have a system in place which integrates the areas of manufacturing, sales and technology into one well-oiled machine. We leverage this system to the utmost to produce consistency when it comes to inspection, manufacturing, assembly, inspection and shipping processes. This allows us to provide high levels of quality, affordable prices, and quick deliveries.
Processing and machining for key components is all done in house. As a robot manufacturer, we provide the kind of quality that you will find nowhere else. And when it comes to quality control, our customers can expect only high-quality craftsmanship achieved by rigid adherence to strict standards.

Robonity Series

Motorless Single-Axis Actuator

See p. 20 for a quick selection table

Motor-less

Basic model

LBAS

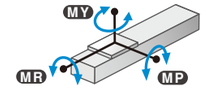
LBAS features a new, integrated guide rail and frame structure and a compact frame size with improved load capacity that is designed to accommodate motors produced by most of the major manufacturers.

- High rigidity
- Compact
- Low cost

Maximum payload	2 kg to 100 kg
Maximum speed	133 to 1,333 mm/sec
Stroke	50 to 1,100 mm

High rigidity

This model offers about three times the rigidity seen in our existing models.



	Existing product T6L	NEW LBAS05
MY	35	59
MP	40	63
MR	50	103

(N · m)

	Existing product T9H	NEW LBAS08
MY	86	221
MP	133	309
MR	117	343

(N · m)

Right angle attachment kit allows for motor orientation changes

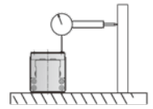
Straight Mount | Right Angle Mounts

Installation is simple

Mounting holes are accessible from both above and below. No disassembly of actuator units is required. The side features a standard surface and dowel pin holes are found on the bottom.

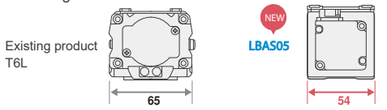
High precision

Straightness (running parallelism): +/-0.02/800 mm



Compact

The frame width is about 20% smaller when compared to our existing model.



Maintenance is easy

Moving parts can be lubricated from the outside with no opening of the actuator required.

A grease nipple is found on the side of the slider

Advanced model

LGXS

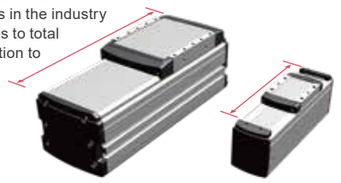
LGXS features ground ball screws to ensure greater efficiency, accuracy and reliability, making this product ideal for use as a the base axis in a multi-axis setup.

- High precision (accuracy class of C5)
- High Durability
- Cleanroom compatibility comes standard

Maximum payload	2 kg to 160 kg
Maximum speed	300 to 2,400 mm/sec
Stroke	50 to 1,450 mm

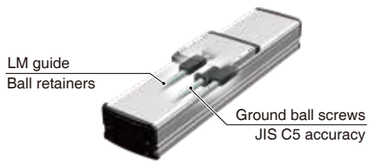
Shortest overall length

We have achieved the shortest class in the industry when it comes to total length in relation to the effective stroke.



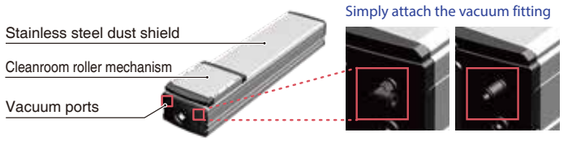
High precision

Features ground ball screws, a lead precision accuracy class of C5, and a repeated positioning accuracy of +/-5 µm.



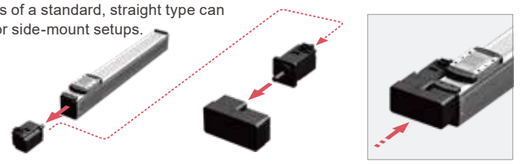
Ready for cleanroom use

Features a protective stainless steel dust shield along with ports that are ready for vacuum fittings.



Optional conversion unit allows for motor orientation changes

Motor units of a standard, straight type can be used for side-mount setups.



Standard + Conversion adapter ▶ Attachment with bend to the right

TRANSERVO Series

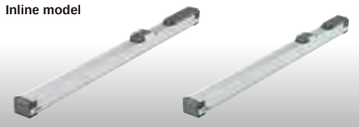
CLOSED LOOP STEPPER MOTOR SINGLE-AXIS ROBOTS

See p. 21 for a quick selection table

The TRANSERVO series brings to you compact and economical single-axis robots which feature a fusion of the low cost of a stepper motor and the functionality of a servo motor.

SS type Slide type

Inline model



SS05H-S

SS05-S

Foldback model (Slide type)

SS05H-R(L)

SS05-R(L)

SG type Slide type

SG07

STH type Slide table type

Inline model

STH04-S
STH06-S

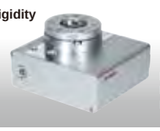
Foldback model

STH04-R(L)
STH06-R(L)

RF type Rotary type

Standard model

High rigidity model



RF02
RF03
RF04

SR type Rod type

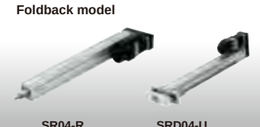
Standard model

SR05 SR04

Model with support guide

SRD05 SRD04

Foldback model



SR04-R SRD04-U

BD type Belt type

Inline model

BD04
BD05
BD07

The position detector is a resolver

The resolver used features a simple yet sturdy structure employing no electronic components or optical elements. This makes it extremely tough and great for use in harsh environments. Breakdown rates are also kept low and the structure of the resolver experiences none of the detection-related problems seen in other detectors, such as optical encoders that experience breakdowns of electronic components or which see moisture or oil sticking to the disk.

Closed-loop control for position feedback

While stepping motors can be deployed at a low cost, they experience drastic drops in torque at high speeds and offer no hunting oscillation (micro vibrations).
Our TRANSERVO series eliminates these problems with the deployment of an innovative vector control method, which means that the series delivers the same functionality of a servo motor with the lower cost of a stopping motor.

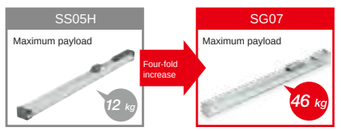
Stepping Motors	○ • Simple design & low cost • No vibration when stopped	× · High-pitched operating noise · Drop in torque at high speeds · Heavy power consumption when stopped
Servo Motors	○ • Smooth movement • Constant torque at all speeds • Saves energy	× · Micro vibrations occur when stopped · High cost

TRANSERVO brings together the best of both worlds

Features and benefits of the SG type (slider type)

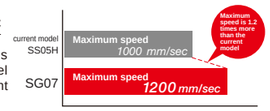
Dynamic payload—46 kg horizontally and 20 kg vertically

Payload capacities are increased a great deal thanks to the deployment of a rigid table slide and a 56 motor. The result is a maximum payload of 46 kg, with the limit being 20 kg when it comes to transport using vertical specifications.



Maximum speed of 1200 mm/sec

The maximum speed provided is 1.2 times faster than that offered by the current model SS05H, making it possible for your equipment to reduce cycle time.



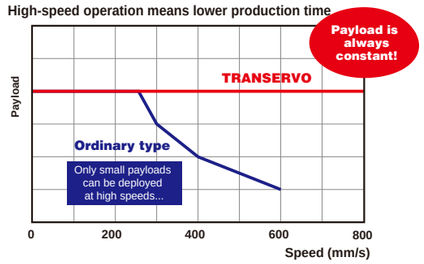
Features and benefits of the SS type (slide type)

High-speed operation means lower production time

TRANSERVO leverages the vector control method to the greatest extent possible to maintain a constant payload even under high speed conditions. This means a drastic reduction in cycle time. This combined with the high-load ball screws means that the TRANSERVO series provides a maximum speed of one meter per second,* which is as fast as single-axis servo motors found in the same category.

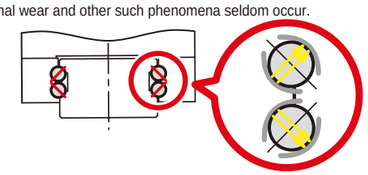
*SS05/SS05H/SSC05/SSC05H (lead: 20 mm)

High-speed operation means lower production time



Longer service life thanks to two-point contact guides featuring four rows of circular grooves

Guides maintain the rolling movement required with minimal differential ball slippage, even when a large-momentum load is applied or when accuracy (flatness) on the installation surface is sub-par. This rugged design means that breakdowns resulting from abnormal wear and other such phenomena seldom occur.



Features and benefits of the SR type (rod type)

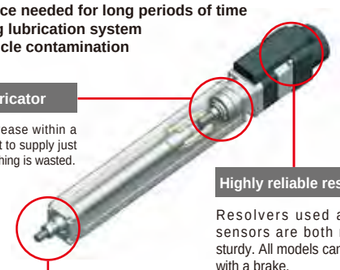
Maintenance required less frequently

A lubricator used in the ball screw along with a contact scraper provide the product with a long service life extended periods where maintenance is not required.

- **No maintenance needed for long periods of time**
- **Grease-saving lubrication system**
- **Prevents particle contamination**

Ball screw lubricator

Lubricators keep grease within a high-density fiber net to supply just the right amount. Nothing is wasted.



Highly reliable resolver used

Resolvers used as position sensors are both rugged and sturdy. All models can be equipped with a brake.

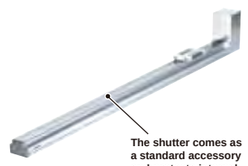
Layered contact scraper

A dual layer scraper prevents micro-contaminants on the rod from getting inside and also effectively curbs looseness or vibration in the rod.

Features and benefits of the BD type (belt type)

For long stroke applications

This product ensures high speed operation with its long maximum stroke of 2000 mm and a maximum transport speed of 1500 mm/sec. No exterior parts (such as the cover) need to be removed when installing. A shutter is also provided as a standard accessory, which securely covers the guide and belt to prevent grease from scattering about and serves to prevent contamination by foreign objects. This product is best suited for workpiece positioning or transport taking place over long distances.

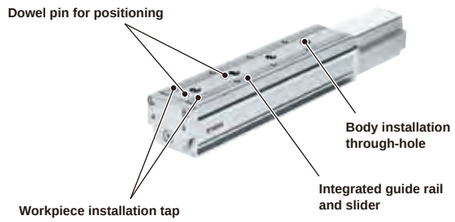


The shutter comes as a standard accessory and protects internal mechanisms

Features and benefits of the STH type (slide table type)

Circulation type linear guide for high rigidity and accuracy

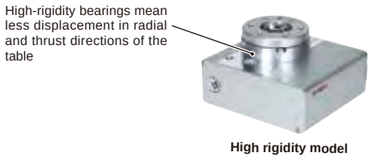
This product features a maximum pressing force of 180 N and a repeated positioning accuracy of +/-0.5 mm. Integrating a guide rail and slider ensures less bending and the circulation type linear guide provides high rigidity and accuracy. The allowable overhand provided by STH06 exceeds that seen in the T9 model of the FLIP-X series. The STH type is optimal for precise assembly.



RFeatures and benefits of RF type (rotary type)

The first rotation axis model in the TRANSERVO series

Featuring a maximum speed of 420 degrees per second and a repeated positioning accuracy of +/-0.05 degrees, the RF type is a thin, electric rotary type actuator. There are two models which can be selected in accordance with the application: the standard type and a high-rigidity type. The RF type is very easy to use and allows for simple installation of the workpiece on the table and on the base frame. The RF type can be used for rotational transport taking place after chucking and for vertical rotation when combined with a gripper.



FLIP-X Series

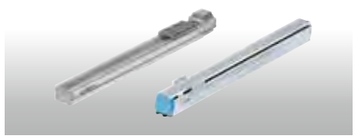
SINGLE-AXIS ROBOTS

See p. 22 for a quick selection table

Our single-axis robot series includes 6 types and 29 variations, meaning a broad range of options are available

T type — Compact model

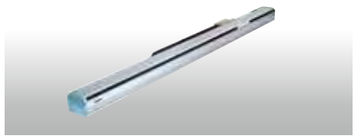
T4L/T4LH, T5L/T5LH, T6L, T9/T9H



This model provides a compact body at an affordable price and is ideal for installation director on a mount.

N type — Nut rotation model

N15/N15D, N18/N18D



This model allows for operation even under long stroke conditions, all while maintaining maximum speed and remaining unaffected by critical speed. Double carrier specifications also come standard.

F type / GF type — High rigidity model

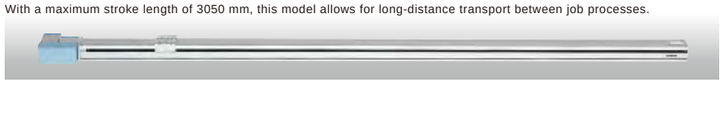
F8/F8L/F8LH, F10/F10H, F14/F14H, F17/F17L, F20/F20N, GF14XL/GF17XL

The model features a highly rigid aluminum frame, which provides high levels of load moment and offers strength against offset loads. The model is suitable for use in Cartesian robots requiring arm rigidity and for moving arms which move the overall axis.

B type — Timing belt drive model

B10, B14/B14H

With a maximum stroke length of 3050 mm, this model allows for long-distance transport between job processes.



R type — Rotary axis model

R5, R10, R20

This model provided a repeated positioning accuracy of +/-30 seconds (meaning 0.0083 degrees). The R type can be combined with other robots for use as the rotation axis or for a broad range of other applications, like index tables. The product's harmonic driver provides great strength and accuracy.

A resolver built for harsh environments

A highly reliable resolver is used for the detection of motor positions, which ensures the steady detection of positions even under harsh conditions where powder particles or oil mist is found. When it comes to resolution performance, the resolver provides an amazing 20480 pulses per revolution.

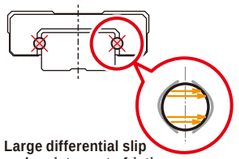
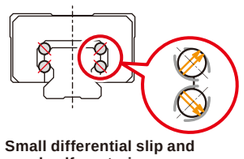
Optical encoder	Resolver
	
● Optical ● Complicated structure with electronic parts required ● Trouble with electronic parts, condescension of dew and the sticking of oil on the disc occur more frequently	● Magnetic type ● A simple structure comprised of an iron core and winding means less potential for failure ● Highly impact resistant and resilient against electronic noise
Risk of detection failure	**High reliability**

Customization for each model available

If you are looking to do special orders for any of our models (double sliders, wide sliders, etc.), please inquire with a sales representative.

Two-point contact guides featuring four rows of circular grooves help in dealing with large moment loads

Two-point contact guides featuring four rows of circular grooves allow for less differential slip. Differential slip experienced by the ball is low when compared to four-point contact guides with two rows of Gothic arch grooves. This means that excellent rolling motions are provided even when dealing with large moment loads or poor installation surface accuracy. Malfunctions, such as that resulting from unusual wear, are also much less frequent.

Conventional Four-point contact guides with two rows of Gothic arch grooves	Yamaha Two-point contact guides featuring four rows of circular grooves
	
Large differential slip and resistance to friction	**Small differential slip and good self-centering**
● Highly impacted by poor installation precision, friction and elastic deformation ● May break down even during the calculated service life	● Highly resistant to alignment fluctuations and moment loads ● Seldom breaks

A long service life means you save on maintenance and management

Our highly rigid ball screws and guides are a huge help in letting you save on maintenance and management costs. Visit our website to find out what you can expect in terms of the service life of a given product under certain conditions.

PHASER Series

LINEAR MOTOR SINGLE-AXIS ROBOTS

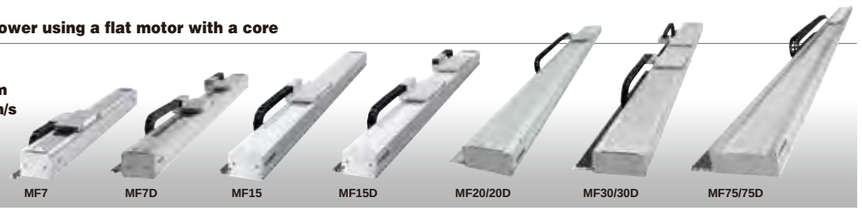
See p. 23 for a quick selection table

No critical speed restrictions required up to long strokes of 4 meters Excellent performance during long-distance transport

MF type — Long stroke and high power using a flat motor with a core

Double carrier comes standard

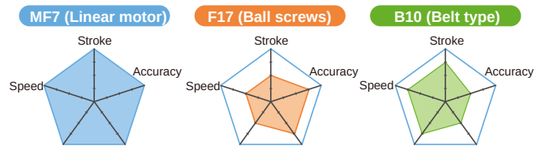
- Maximum stroke: 4050 mm
- Maximum speed: 2500 mm/s
- Repeated positioning accuracy: +/- 5 µm
- Maximum payload: 7kg to 160 kg



Yamaha in-house components means lower costs

Magnetic scales originally developed by Yamaha are still being produced by us today. We also manufacture other major components to ensure significant reductions in cost. Linear mechanisms are no longer something special as we are now in an era where they they can stand shoulder to shoulder with ball screws as the right tool for the job.

The linear motor type will particularly provide lower costs when it comes to transporting lightweight workpieces over long distances at high speeds.



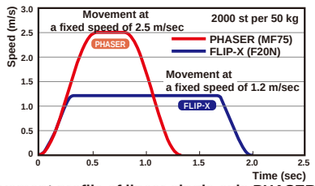
Comparison of single-axis robot models

Model	Unit cost*1	Maximum speed (mm/sec)	Payload (kg)	Repeated position accuracy (µm)	Maximum stroke (mm)	Frame dimension*2 (W × H) (mm)
MF7-1500		2500	10 (7)*3	+/-5	4000	85 × 80
F17-40-145		720*4	40	+/-10	1450	168 × 100
B10-1450		1850	10	+/-40	2550	100 × 81

1. Comparisons using the strokes noted above. 2. Cable carrier not included. 3. Becomes 7 kg when the maximum speed is 2500 mm/s (meaning 2100 mm/s when transferring 10kg).
4. Value determined in consideration of critical speed when the stroke is 1,450 mm.

High speed, long travel

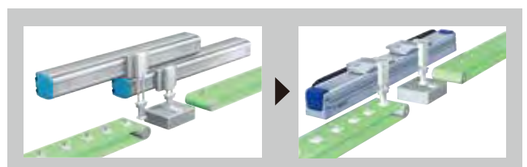
The ultimate appeal of linear motor single-axis robots is that there are critical speed limits like you would see when dealing with ball screws. Even long-distance travel means no reduction in maximum speeds. Standard maximum stroke goes up to 1050 mm with the MR type and up to 4000 mm with the MF type. Cycles times for long-distance transport have particularly seen drastic improvements.



Movement profile of linear single-axis PHASER and single-axis robot FLIP-X

Standard double carrier setup saves spaces and ensures great efficiency

This product allows you to lower the costs involved and decrease spaced used in comparison to the usage of two single-axis robots. No axis alignment is needed and tools can be shared, which shortens setup time. Lastly, an anti-collision control function is provided when making use of the RCX series controller.



Ball screw type single-axis robots (2 units) — **Space-saving double carriage**

Maximum payload capacity of the MF series: 160 kg

Flat magnets are deployed within the MF series, meaning that heavy objects can be transported at high speeds with a high level of accuracy.

Lower noise levels and longer service lives

When compared with ball screw type robots, there are fewer sliding and rotating sections, meaning that operation is exceedingly quiet. Coils and magnets do not make contact, meaning no wear is experienced, making the the robot usable for extended periods of time.

XY-X Series

CARTESIAN ROBOTS

See p. 23 for a quick selection table

From compact, economical and light-duty systems to large, heavy-duty systems, a variety of pre-configured multi-axis systems are available

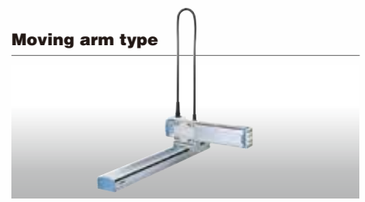
Custom orders

Custom multi-axis systems are also available. Please inquire with a Yamaha representative near you.

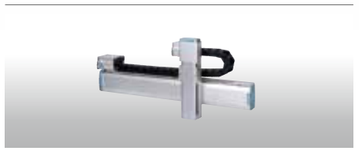
Arm type

Gantry type

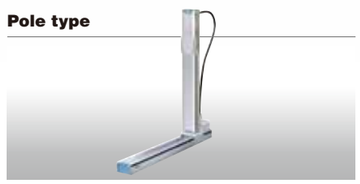
Moving arm type



XZ type

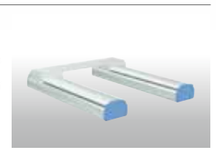


Pole type



Dual-synchronous drive

The dual-synchronous drive has two axes being controlled in synchronization with one another. This means that they are effective for the carrying of heavy items and for long stroke operation with a Cartesian robot.
Note: Custom orders are required for dual drive functionality.



Variations

For specifications involving 3 or more axes, please select from the following:
- Z-axis clamped base and moving table type
- Z-axis clamped table and moving base type

Resolver provides durability and reliable position detection

The position detector is a resolver featuring a simple yet robust structure which uses no electronic components or optical elements, making it extremely tough for usage in harsh conditions. It also seldom breaks down. The structure of the resolver presents non of the detection issues seen in other detectors, such as optical encoders with electronic components which experience breakdown or have moisture and oil sticking to the disc. The mechanical specifications when it comes absolute specifications and incremental specifications are shared by all controllers, meaning that you can switch to either absolute or incremental specifications with the mere setting of parameters.
Even if the absolute battery gets completely worn down, the XY-X can operate based on incremental specifications, meaning that the production lines never need to be halted if trouble occurs. Backup circuits have been completely overhauled as well, meaning a backup period of one year.

Save money

Cutting down on the number of parts while boosting performance has allowed us to lower our prices. The inclusion of a resolver within the structure means that that we have eliminated the idea that absolute units have to be expensive. What's more, mechanical components remain unchanged regardless of whether incremental unit specifications or absolute unit specifications are being used.

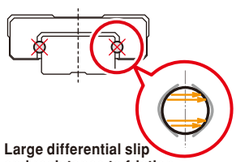
Maintenance is easy

Though a built-in structure is employed, maintenance is made simple thanks to the ability to replace components like motors and ball screws on an individual basis.

Two-point contact guides featuring four rows of circular grooves

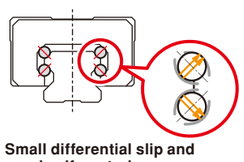
Two-point contact guides featuring four rows of circular grooves allow for less differential slip. Differential slip experienced by the ball is low when compared to four-point contact guides with two rows of Gothic arch grooves. This means that excellent rolling motions are provided even when dealing with large moment loads or poor installation surface accuracy. Malfunctions, such as that resulting from unusual wear, are also much less frequent.

Four-point contact guides with two rows of Gothic arch grooves



Large differential slip and resistance to friction
- Highly impacted by poor installation precision, friction and elastic deformation
- May break down even during the calculated service life

Two-point contact guides featuring four rows of circular grooves



Small differential slip and good self-centering
- Highly resistant to alignment fluctuations and moment loads
- Seldom breaks

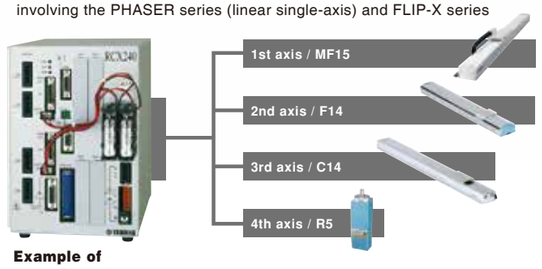
MULTI-FLIP/ MULTI-PHASER

MULTI-AXIS ROBOT

One controller for multiple single-axis robots

Advantages of multi-axis controller operation

- Sequence control is simple and system upgrades are inexpensive
- More compact and saves more space than situations where multiple single-axis controllers are being operated
- Allows for a greater level of control
- RC221 and RCX240 (multi-axis controllers) provided mixed control involving the PHASER series (linear single-axis) and FLIP-X series



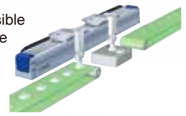
Example of a 4-axis controller

Robot setup

2-unit robot configuration
A multi-task program used with this configuration allows for asynchronous, independent operation.
Using this alongside an auxiliary axis configuration means even more freedom when it comes to assigning an axis to a task.

Synchronized double configuration
This configuration allows for the addition of two motors to one axis on types of robots where motor units run separately, such as the linear motor single-axis PHASER series or the N type (nut rotation type) FLIP X series.

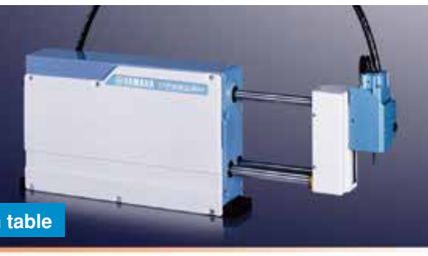
Main auxiliary axis configuration
Use this auxiliary axis configuration when it's impossible to have simultaneous movement take place using the MOVE command. Axes configured as main auxiliary axes move only with the DRIVE command (meaning a separate movement command issued to a particular axis) and cannot be operate via the MOVE command. That means this configuration is recommended for operation on an axis not synchronized with the main robot.



Synchronized dual configuration
Set things up like this when conducting dual-drive operation (meaning simultaneous control of two axes). Use this dual-drive configuration on gantry-type Catesian robots characterized by a long Y-axis stroke when going about stabilization during high levels of acceleration or deceleration, or in situations involving heavy loads and high levels of thrust.

YP-X Series

PICK & PLACE ROBOTS

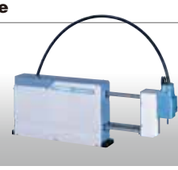


See p. 23 for a quick selection table

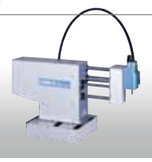
Ideal for picking and placing small parts at high speeds
Positioning via servo control means no mechanical adjustments required

2-axis type
YP220BX
YP320X

3-axis type
YP220BXR
YP320XR
YP330X

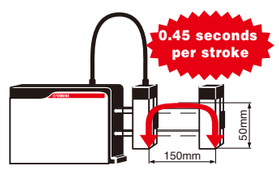


2-axis type
YP340X



High speed

Ultra high-speed picking and placing means greater productivity. The YP22BX, when used under operating conditions involving 50 mm in the vertical direction, 50 mm in the longitudinal direction, 50 in terms of arch volume and a 1 kg load, provides a total cycle time of 0.45 seconds.



High precision

The YP320X, YP320XR, YP330X and the YP340X provide both excellent high-speed performance and high repeated positioning accuracy (+/-0.02 mm).

Compact size

The YP220BX unit has a compact size with an overall length of 109 mm. The moving arm mechanism allows for the building of a compact production line that interferes less with its surroundings.

YK-X Series

SCARA ROBOTS

YK-XG	Direct drive beltless model
YK-XE	Low cost high performance model
YK-XGS	Wall mount/inverse model
YK-XGP	Dust-proof & drip-proof model

See p. 24 for a quick selection table

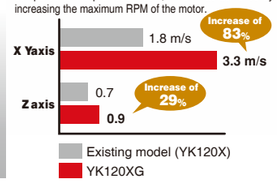
An outstanding, diverse lineup featuring arm lengths ranging from 120 to 1200 mm. Delivers high-speed and high-precision operations for increased productivity.

Extra small type SCARA model

YK120XG, YK150XG
YK180XG, YK180X
YK220X

■Arm length: 120 mm to 220 mm
■Maximum payload: 1 kg

This model provides the only completely beltless structure found in this class and you can look forward to high levels of rigidity and accuracy even with the extra small type. Maxim speeds have also been improved dramatically when compared to the previous model, which was achieved by increasing the maximum RPM of the motor.



Low cost high performance model

YK400XE-4
YK610XE-10
YK710XE-10

■Arm length: 400 mm to 710 mm
■Maximum payload: 4 kg to 10 kg

Small type

YK250XG
YK350XG
YK400XG

■Arm length: 250 mm to 400 mm
■Maximum payload: 5 kg

Medium type

YK500XGL / XG
YK600XGL / XG/XGH

■Arm length: 500 mm to 600 mm
■Maximum payload: 5 kg to 20 kg

Large type

YK700XGL
YK700XG
YK800XG
YK900XG
YK1000XG
YK1200X

■Arm length: 700 mm to 1,200 mm
■Maximum payload: 10 kg to 20 kg

Note: YK700XGL is available for custom orders.
Please inquire with a Yamaha representative for more details.

Wall mount/inverse type

YK300XGS, YK400XGS
YK500XGS, YK600XGS
YK700XGS, YK800XGS
YK900XGS,
YK1000XGS

■Arm length: 300 mm to 1,000 mm
■Maximum payload: 20 kg

Wall-mount type
This type is used when the robot body is installed on a wall.

Inverse type
This type is used in cases where the wall-mount type is mounted upside down.

Dust-proof & drip-proof model

YK250XGP, YK350XGP
YK400XGP, YK500XGP
YK500XGLP, YK600XGP
YK600XGLP, YK700XGP
YK800XGP, YK900XGP
YK1000XGP,

■Arm length: 250 mm to 1,000 mm
■Maximum payload: 20 kg

This model is designed for work environments involving frequent water splashing and dust (with the protection class being equivalent to IP65).
• If you need protection from moisture generated by anything other than water, please contact us.
Note: YK700GP/YK800XGP/YK1000XGP are custom order models.
Please inquire with a Yamaha representative for more details.

40 years of history

SCARA was our first robot. Since producing our first SCARA robot called CAME, we have spent some thirty years bringing SCARA robot innovations to market. SCARA robots have undergone countless modifications in an ever-changing marketplace. The extensive track record we have built with SCARA robots have made them an essential part of the Yamaha robot lineup.

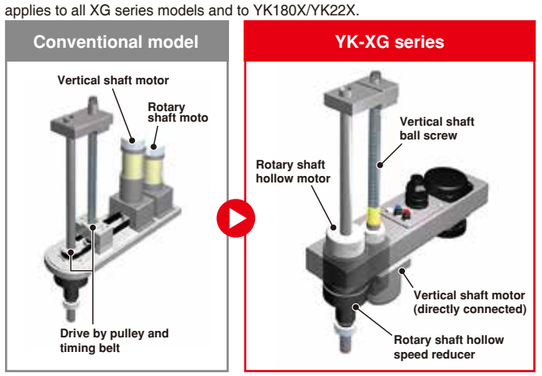
1979
<YK7000>

Internal structure designed for optimal operation

Note: The example shown is YK500XG

Completely beltless structure

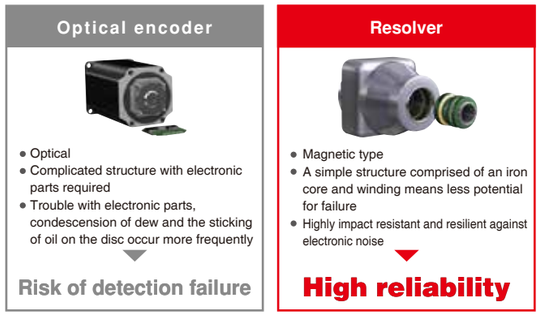
A ZR-axis direct coupling structure allows for a totally beltless structure. This direct drive structure means a dramatic reduction in wasted motion. It also serves to maintain high levels of accuracy over long periods of time and ensure maintenance-free usage over extended periods of time, meaning there is no need to worry about breakage, stretching or deterioration of the belt with age. This feature applies to all XG series models and to YK180X/YK22X.



Environmentally rugged resolver used for position detection

The position detector is a resolver featuring a simple yet robust structure which uses no electronic components or elements, making it extremely tough for usage in harsh conditions. It also seldom breaks down. The structure of the resolver presents non of the detection issues seen in other detectors, such as optical encoders with electronic components which experience breakdown or have moisture and oil sticking to the disc. The mechanical specifications when it comes absolute specifications and incremental specifications are shared by all controllers, meaning that you can switch to either absolute or incremental specifications with the mere setting of parameters.
Even if the absolute battery gets completely worn down, the SCARA can operate based on incremental specifications, meaning that the production lines never need to be halted if trouble occurs. Backup circuits have been completely overhauled as well, meaning a backup period of one year.

Note: The resolver is comprised of a simple structure which forgoes the usage of any electronic components. It is highly resistant to both high and low temperatures, impacts, electronic noise, dust particles, oil and other elements. The resolver is used in automobiles, trains and airplanes.

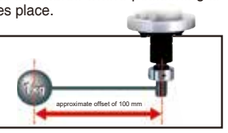


Superior rotary axis inertia moment capacity

SCARA robot performance is demonstrable by the standard cycle time alone. The robot allows for a diverse range of heavy workpieces to be dealt with as well as large offsets. Having a low axis inertia moment when it comes to the R axis helps drastically in reducing cycle times. All SCARA robots produced we produce come with speed reducers directly attached to the tip of the rotating axis, meaning the R axis produces an extremely high allowable inertia moment which provides higher speeds in terms of operation when compared to structures where positioning is usually dealt with by a belt after deceleration takes place.

YK120XG
(Allowable moment inertia of the R axis: 0.1 kgfcms²)

If the weight load at the tip is 1 kg, operation will be possible with an offset of about 100 mm.



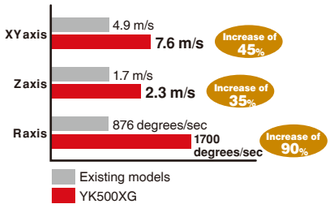
● **Allowable inertia moment of the R axis Comparison of YK120XG and a competitor's model**

Figures when using a 1 kg load		○ Operation OK × Operation deviates from allowable range of catalog values	
Offset (mm)	Inertia (kgfcms²)	Operation	
		YK120XG	Company A
0	0.0039	○	○
45	0.025	○	×
97	0.1	○	×

◆ **Allowable inertia moment of the R axis YK120XG: 0.1 kgfcms²**
Company A: 0.0039 0.1 kgfcms²

High speed

While standard cycle times are no doubt fast, our designs also put a focus on cycle times in the regions where usage is taking place. Drastic improvements in maximum speeds were achieved through changes made to gear ratios and maximum motor RPM, resulting in better cycle times during long-distance movement.



Hollow shaft and tool flange options available

Useful additions include a hollow shaft to facilitate easy wiring leading to the tip of the tool and a tool flange used for clamping tools.

Note: YK250XG/YK350XG/YK400XG/YK500XGL/YK600XGL

A hollow shaft makes for easy touring of air tubes and harness wires

A tool flange makes it easy to mount a tool to the tip

Improved maintenance features

Covers used in the Yamaha SCARA robot YK-XG series can be removed from the front or in an upwards motion. Maintenance is easy since covers are completely unattached to the cable.
When it comes to replacing grease on a harmonic gear, ordinary robots require a great deal of time and effort since gears must be disassembled and because position deviations may occur. Yamaha SCARA robots, however, feature grease-sealed harmonic gears, meaning that no grease replacement is required (YK-500XG to YK1000XG).

Affordable, superior performance

YK-XE

The model provides improved efficiency and reliability when deployed in production at an affordable price.

Features of the wall mount/inverse type

YK-XGS

A completely beltless structures ensures high rigidity

Flexibility in terms of system designed improved as a result of having the conventional ceiling mount type model changed to a wall mount type. This makes possible the downsizing of production equipment. With the addition of the inverse type to the lineup (which allows for upward operation), flexibility was also increased in terms of work directions. What's more, a completely beltless structure means that there is a maximum payload of 20 kg and an allowable inertia moment of the R axis of 1 kgm2*. This is the highest level available in the same class. Large hands can also be installed, making this robot suitable for work entailing heavy loads.

*YK700XGS to YK1000XGS

Dust-proof and drip-proof type

YK-XGP

Bellows provide improved dust/drip-proofing

Previous robot models were completely overhauled to create a model type* that is dust proof, drip proof and features an entirely beltless structure deployable in working environments were water droplets or dust particles are found scattering about.
This model type eliminates the issue of belt deterioration and is perfect for usage in harsh environments. The use of an up/down bellows-based structure also allows for improvements in terms of dust proofing and drip proofing capabilities.

*YK250XGP to YK600XGLP

- **Equivalent to a protection grade of IP65 (IEC60529)**
- **Dust-proof and drip-proof connector for user wiring comes standard**

YK-TW Series

ORBIT TYPE SCARA ROBOT

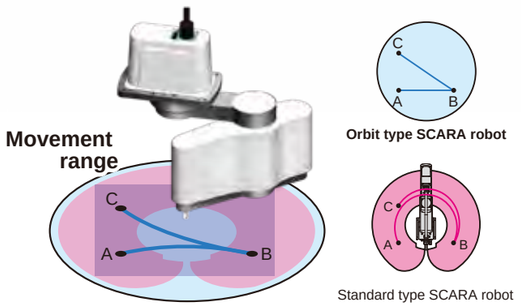
YK350TW
YK500TW

See p. 24 for a quick selection table

Equipped with high positioning accuracy and high speed. Defeats the limitations of other SCARA and parallel-link robots, leaving smaller equipment footprint and no dead space at the center of the work envelope.

Covers bases within a 1,000-millimeter*2 reach

The YK-TW series features SCARA robots with wide rotation angles and a ceiling-mount configuration, with the YK500TW model capable of a reach of up to 1,000 mm under the arm. This greatly reduces footprint and lets them be free of movement restrictions during palletizing and convey- or belt assembly operations.

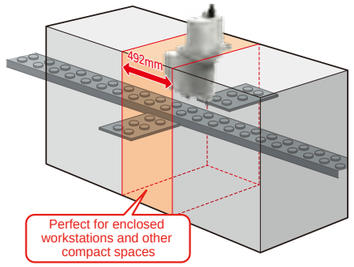


Orbit type SCARA robot

Standard type SCARA robot

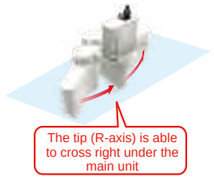
Ideal for work in narrow spaces

Minimum installation width 492 mm



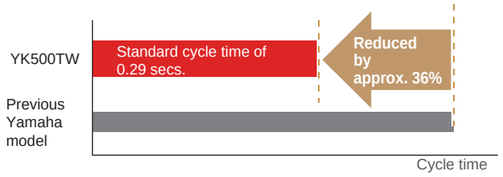
Freedom of movement

Full use of workspace underneath the unit



Standard cycle time down to 0.29 seconds*2

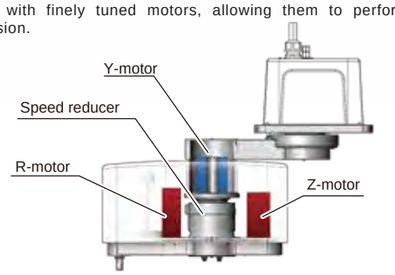
TK-TW robots are able to move with more flexibility in a horizontal plane. They are built with a second arm (Y-axis) that moves under the first (X-axis). Due to their multiple-joint structure, TK-TW robots can move more efficiently from point-to-point. Furthermore, with the weight balance of the internal components optimized, TK-TW robots have their cycle time reduced by 36% as compared to previous models.



The standard cycle time for moving a 1-kg load 300 mm horizontally and 25 mm vertically has been reduced by approximately 36% compared to older Yamaha models.

Repeated positioning accuracy: ±0.01 mm*1 (XY axes)

YK-TW robots boast higher repeated positioning accuracy than that of parallel-link robots. This was achieved by striving optimal weight balance and re-designing the robots' internal construction. Furthermore, the robots are equipped with highly rigid but lightweight robotic arms that are fitted with finely tuned motors, allowing them to perform with high precision.



Hollow construction

Coupled Y-axis motor and speed reducer unit with hollow construction enables wire harness to be inside of moving arm housing.

Enabling 360-degree rotation

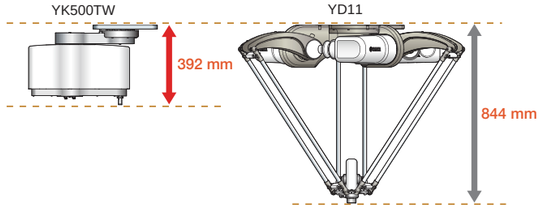
Optimized gravitational moment for rotation

Obtained weight balance by placing R-motor and Z-motor on the left and right.

High speed, reduced inertia

Lower profile, small footprint

The YK500TW is only 392 mm in height. Not only does it require little space, it also gives greater freedom when adjusting its layout.



Only 392 mm and 27 kg. Lower inertia, no bulky frame.

The YK-TW series comes with an optional installation frame.
For more details, please contact a Yamaha sales representative.

*1. Applies to the YK350TW *2. Applies to the YK500TW

CLEAN ROOM Type

CLEAN ROBOTS

See pp. 24-25 for a quick selection table

Designed for the electronics, food, and medical industries, and engineered for great suction and low particle emission. Delivers high cleanliness and excellent performance.

YK-XGC/XC type — **Clean room SCARA robots**

- Arm length: 180 mm to 1,000 mm
- Suction rate: 30 to 60 Nl/min
- Cleanliness class: ISO 3 (ISO14644-1)
  Class 10 (FED-STD-209D)
- Maximum payload: 20 kg

YK250XGC YK400XGC

The Z-axis spline shaft is protected with bellows made of low dust emitting material and other sliding mechanisms are sealed completely. The entire harness assembly is incorporated inside the housing, and dust emission is prevented by the air suction ports located on the back of the base housing.

Vertical bellows improve cleanliness reliability

FLIP-XC type — **Single-axis clean room robots**

- Stroke: 50 mm to 2,050 mm
- Suction rate: 15 to 90 Nl/min
- Cleanliness class: Class 10*
- Maximum payload: 120 kg (horizontal installation)

* C4L/C4LH, C5L/C5LH, and C6L conform to class ISO 3 (ISO14644-1).

C6L C5L C4L

Specifications of the FLIP-X series. Whether is it a lightweight, compact model, or one with a maximum payload of 120 kg, chose one that suits your needs from the 14 available. To achieve high cleanliness, these robots have suction joints installed as standard features and use grease with low dust emission. Their slide tables are also mounted with stainless steel sheets of excellent durability.

Fully beltless for higher rigidity

SSC type — **Single-axis clean room robots (TRANSERVO)**

- Stroke: 50 mm to 800 mm
- Suction rate: 15 to 80 Nl/min
- Cleanliness class: Class 10
- Maximum payload: 12 kg (horizontal installation)

SSC04 SSC05 SSC05H

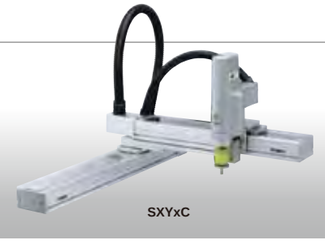
Specifications of the TRANSERVO series. TRANSERVO robots use stepper motors and a newly developed vector control system to keep performance costs low and achieve functionality similar to servomotors'. To achieve high cleanliness, these robots have suction joints installed as standard features and use grease with low dust emission. Their slide tables are also mounted with stainless steel sheets of excellent durability.

Easy to maintain

XY-XC type — **Clean room cartesian robots**

- Suction rate: 60 to 90 Nl/min
- Cleanliness class: Class 10
- Maximum payload: 20 kg
- Maximum speed: 1000 mm/sec

User wiring: D-Sub 25-pin connector (#1-#24 terminated, #25 grounded)
User piping: Three 6-mm diameter air tubes



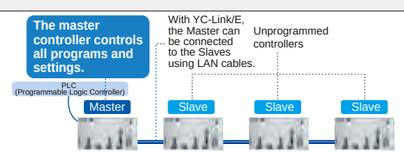
SXYxC

Cartesian robots for clean rooms. Using stainless steel sheets of high durability allows openings to be designed to the smallest possible, and the robots are capable of supporting Class 10 environments with minimal suction. Furthermore, with SCARA robots' high-speed units used for SXYxC robots' ZR-axis, cycle time is reduced significantly.

CONTROLLERS

Choose what fits your needs from a wide range of control systems. Controllers come pre-programmed with servo parameters and acceleration patterns so you can operate the robot straightaway.

	TRANSERVO	FLIP-X		PHASER
	Stepper motors	[T4L/T5L] Small servos (24V, 30W)	General purpose servos (30–600W)	Linear motors
1 axis	●I/O point trace ●Remote command	TS-S2, TS-SH (P)	TS-X (P)	TS-P (P)
	●Pulse train	TS-SD (D)	ERCD (C)	RDV-X (D)	RDV-P (D)
	●Program (Yamaha SRC language) ●I/O point trace ●Remote command ●Online command		SR1-X (C)	SR1-P (C)
2 axes	●Program (Yamaha BASIC language) ●I/O point trace ●Remote command ●Online command		RCX320 (C) RCX222 (C)	RCX221 (C)
3, 4 axes	●Program (Yamaha BASIC language) ●I/O point trace ●Remote command ●Online command			RCX340 (C)
5 to 8 axes	YC-Link **YC-LINK connects single-axis controllers to a 4-axis controller** Note: Up to four SR1 series controllers can be connected to the RCX series controller.			
up to 16 axes	YC-Link/E **RCX340 is capable of controlling up to four robots (or 16 axes)**			



P Robot positioners

Simply specify a point number to operate

TS series robot positioners can be operated simply by assigning point numbers and inputting the start command. They can also perform point moves and push moves without the need for writing a program. Velocity can also be changed during motion.

D Robot drivers

Pulse train input drivers

These drivers have done away with operations that use robot languages and use the pulse train input method instead. Their compact design allows them to be built easily into control consoles.

C Robot controllers

Diverse command methods

There are different methods to choose from: programs, point trace, remote command, online command, and more. Programs use a BASIC-like Yamaha language capable of executing various operations, be it simple tasks, or I/O output and conditional branching.

Comprehensive software

The applications for the controllers are designed to let users operate the robots, teach points, create and edit programs, and perform other tasks simply and easily on the screen.

TS-Manager

VIP+

RCX-Studio Pro*

*Web download only.

iVY2 System

ROBOT VISION FOR THE RCX340

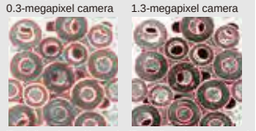
A robot-integrated vision system for simplicity, high functionality, and reliability. An upgrade to the original iVY with improved specifications but still as easy to use.

Supports 5-megapixel cameras

(Choose from either 0.3 MP, 1.3 MP, 2 MP or 5 MP)

Performs fine edge detection even if workpieces are extremely close or have complex shapes.

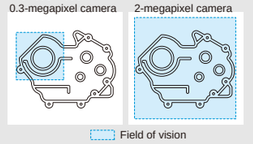
Previous model: 0.3-megapixel camera / New model: 1.3-megapixel camera



(Partially enlarged image) (Partially enlarged image)

Even for large workpieces, just a single search is enough for detection. Thus, improving takt time.

Previous model: 0.3-megapixel camera / New model: 2-megapixel camera



Field of vision

Close to double the search speed

(compared to previous model)

iVY2's search speed is close to double than that of the previous model. At high speed, it is capable of detecting a large number of workpieces. iVY2 can be used in a wide variety of applications, including the manufacture of molded plastic parts and food items.

Sample workpiece: Connector-shaped workpiece

RCX240 + iVY: 158.7 ms

RCX240 + iVY2: 83.8 ms

Capacity to register up to 254 parts

Simply changing the part numbers completes a changeover.

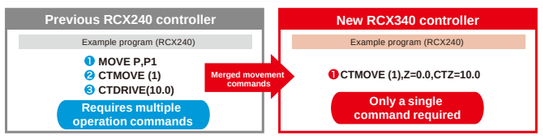
254 types (0 to 253) can be registered

Visually track search status

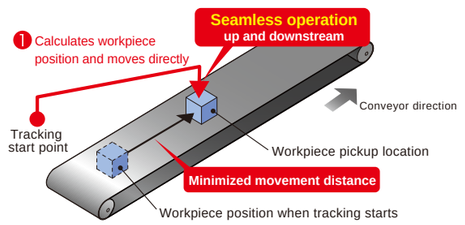
You can monitor the search status on a monitor during calibration configuration or automatic operations.

Conveyor tracking capability reaches 100 CPM

The vision cameras detect the position and orientation of parts on the moving conveyors during pick & place applications.

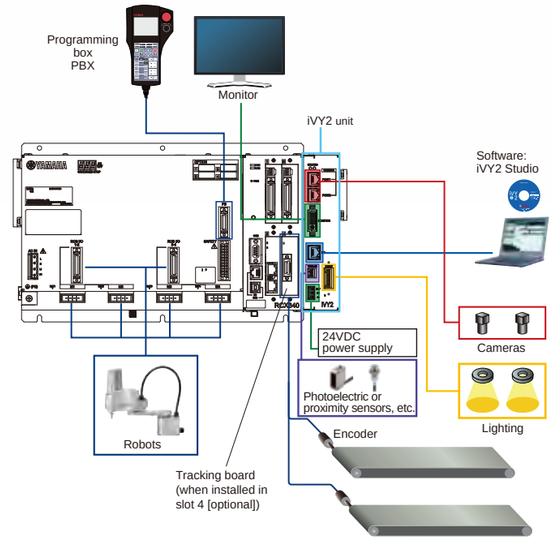


Up-down and workpiece tracking commands, all in one.



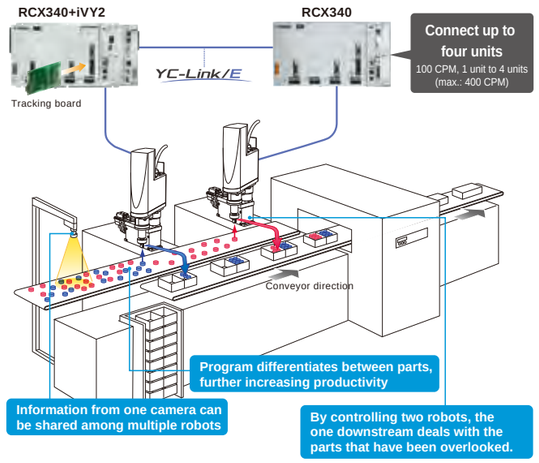
Operating conditions: YK500XG/Payload: 1 kg (tool and workpiece)
Horizontal movement: 250 mm/Vertical movement: 1 mm/Conveyor speed: 100 mm/sec

iVY2 system configuration



Note: The illustration above shows an example of a system of an iVY2 unit that uses a tracking board (with optional lighting control board selected). Connections to the STD.DIO, ACIN, and SAFETY connectors have been excluded.

Boost to productivity with control over multiple robots



YRG Series

ELECTRIC GRIPPERS

See p. 23 for a quick selection table

Easy operation enabled by Yamaha's robot language.

Gripping force control	Measuring	Speed control	Multi-point control	Workpiece check function
Can be set in increments of 1% in the range of 30 to 100%	Measures a workpiece by detecting its position	Speed can be set in increments of 1% in the range of 30 to 100%, and the range of 1 to 100% for acceleration	Up to 10,000 positioning points possible	The HOLD signal determines if workpieces have been picked up or dropped, even without the use of a sensor

S type Single cam type

Fast, compact, lightweight

YRG-2005SS YRG-2010S YRG-2815S YRG-4225S

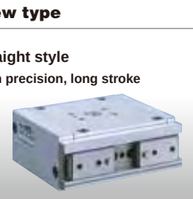
W type Double cam type

High gripping force

YRG-2005W YRG-2810W YRG-4220W

Screw type

Straight style
High precision, long stroke



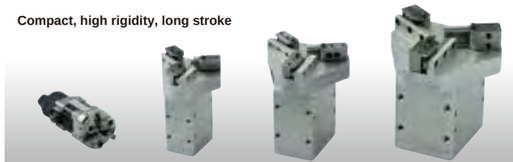
YRG-2020FS/YRG-2840FS

"T" style

YRG-2020FT/YRG-2840FT

3-finger type

Compact, high rigidity, long stroke



YRG-2004T YRG-2013T YRG-2820T YRG-4230T

Electric grippers for positioning, speed control, and high-precision gripping performance

YRG grippers deliver what was challenging for the air-driven ones—gripping force control, speed and acceleration control, multi-point positioning, and the ability to measure workpieces, making them suitable for catering to a wide range of applications.

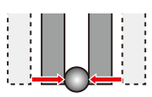
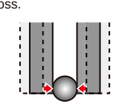
Gripping force control

YRG grippers' gripping force can be set in 1% increments. They are capable of gripping glass, spring, and other workpieces that are fragile or easily deformed. The gripper force remains constant even with finger position changes.

Pneumatic control	Electric control
Difficult to make fine adjustments to the regulator.	Gripping force can be set in a range of 30% to 100% in 1% increments.
	

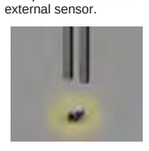
Multi-point control

Gripper fingers can be configured to desired positions that correspond to workpiece sizes. This feature improves the efficiency of assembly lines, where changeovers are frequent and different workpiece sizes and materials are found.

Pneumatic control	Electric control
Results in stroke loss.	High positioning accuracy prevents stroke loss.
	 Achieves improvements to takt time

Workpiece check function

The electric grippers output the HOLD signal, which checks for workpieces that were not gripped or dropped during transfer. No external sensor is needed.

Pneumatic control	Electric control
Image processor or sensor detects workpieces that were dropped or missed out.	Detects fallen workpieces without an external sensor.
	

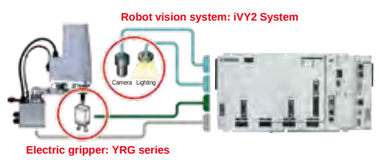
Only a single controller needed for control

The grippers require just a single controller. Setup and startup are significantly simpler as there is no need for communication with PLCs or other host devices.

Supports a variety of applications by being combined with vision system

With YRG grippers integrated into the robot vision system iVY2, RCX340 can be used to control the camera for positioning and workpiece handling. An advanced system, but easily constructed.

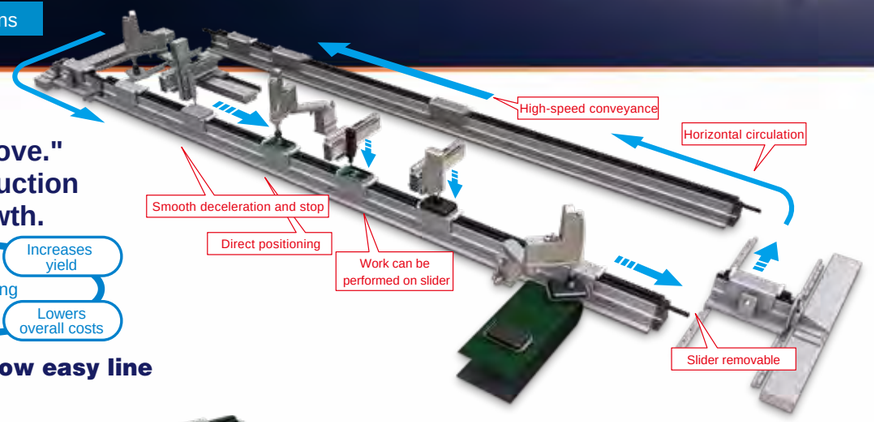
*The RCX240 controller can be used too.



LCM100

LINEAR CONVEYOR MODULES

See p. 26 for basic specifications

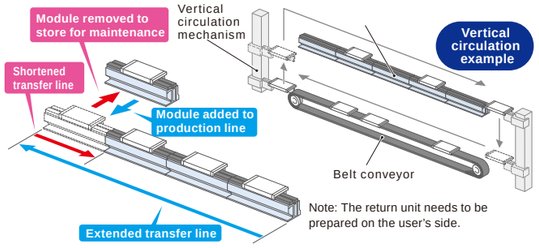


Go from "flow" to "move." Accelerate your production line and revenue growth.

Removable modules allow easy line layout change

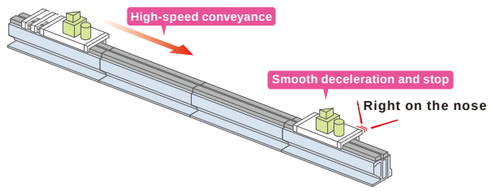
Create transfer lines whenever needed by connecting just only the modules you need. New line configurations and changes can start up quickly too. In addition, extra modules from shortened lines can be reused for others or stored for maintenance.

Linear conveyor



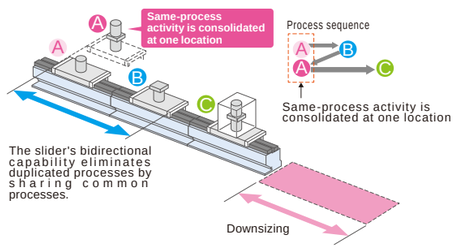
Servo control enables smooth and fast, collision-free stop-and-go.

The LCM100 module system utilizes servo control, which allows workpieces to slow down gently and avoid collisions with stoppers that would cause them to go out of line or become damaged. In this way, servos also ensure that workpiece movements are able to continue at high speed.



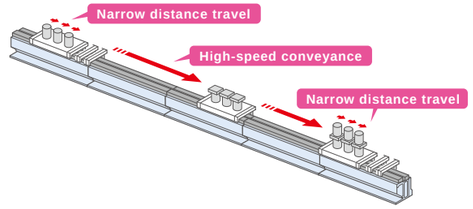
Configurable production lines that saves space

The LCM100 is bidirectional and can move freely back and forth at high speeds. This makes it possible to streamline operations that use the same processes, enabling cost savings and smaller transfer lines. Not only is it able to accelerate, decelerate, change speeds, and stop precisely at designated locations, it is also able to move specific sliders in the reverse direction, allowing for greater flexibility in designing line operations.



Efficient transfer between work stations in line operation

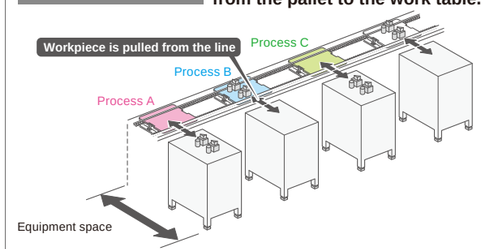
- Tasks can travel in incremental movements.
- Transportation time can be reduced by moving incrementally in repeating processes and moving at high speed between processes.



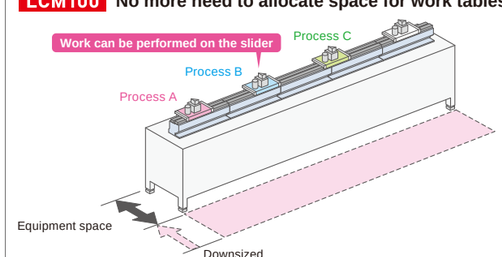
No more need for pulling workpieces from the line

- Reduced operation time and work space saves costs.

Conventional system Workpieces have to be removed from the pallet to the work table.



LCM100 No more need to allocate space for work tables



YA Series

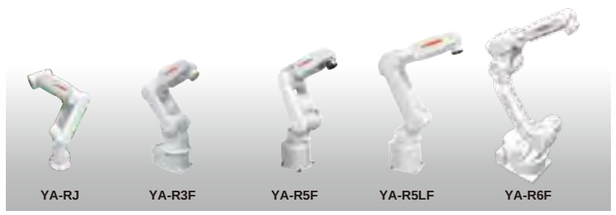
VERTICALLY ARTICULATED ROBOTS

6-axis | 7-axis

See p. 26 for a quick selection table

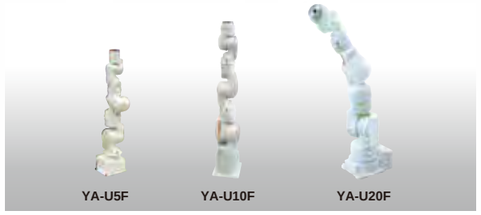
Increase productivity Ideal for constructing compact cells, moving and assembling small parts, or inspection processes.

6-axis robots



YA-RJ YA-R3F YA-R5F YA-R5LF YA-R6F

7-axis robots



YA-U5F YA-U10F YA-U20F

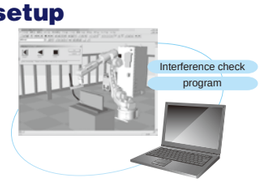
High-speed operation reduces cycle time

Thanks to high-speed, low-inertia AC servo motors, an arm designed to be lightweight, and the latest control technology, these robots achieve an operating speed that is best in their class. From supply, assembly, inspection, and packing to palletization, all applications can enjoy shorter cycle time and improved productivity.

High wrist load workpieces are also supported

With a wrist section that has the highest allowable moment of inertia in its class, these robots can support jobs involving a high wrist load, or simultaneous handling of multiple workpieces.

Dramatically reduce line setup time with a simulator



We provide software* that lets you use 3D CAD data to construct a production facility in virtual space on a computer, and easily perform engineering tasks such as creating programs and checking for robot interference. Teaching can be performed even before the actual production line is completed, dramatically reducing line startup time.
*Optional

7-axis

Reduced space allows sophisticated system layouts

Since these robots can be installed close to workpieces or other equipment, you can reduce the space required for your production facility. By locating multiple robots close to each other,processing can be integrated and shortened.

7-axis

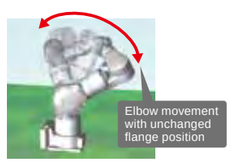
Able to reach workpieces from around or under

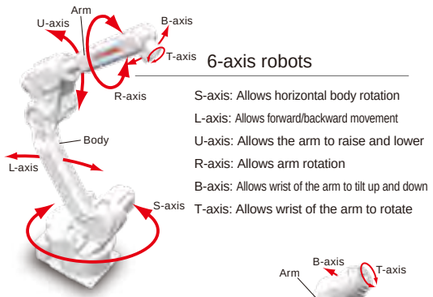
Rotation of the seventh axis enables flexible movements with the same freedom of movement as a human arm, allowing the workpiece to be accessed from around or from under. This allows the robot to enter narrow locations that a person cannot fit in, or to approach the workpiece in a way that avoids obstructions, giving you more freedom to design the layout for shorter cycle time and reduced space.

7-axis

"Elbow movement" unique to 7-axis models allows optimal posture to be maintained

The 7-axis U-type robots allow "elbow movement," changing only the elbow angle without affecting the position or posture of the tool. This permits operation to avoid nearby obstructions.

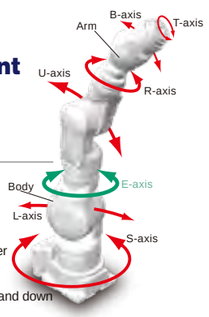




6-axis robots

S-axis: Allows horizontal body rotation
L-axis: Allows forward/backward movement
U-axis: Allows the arm to raise and lower
R-axis: Allows arm rotation
B-axis: Allows wrist of the arm to tilt up and down
T-axis: Allows wrist of the arm to rotate

Free arm movement further boosts productivity.



7-axis robots

S-axis: Allows horizontal body rotation
L-axis: Allows forward/backward movement
E-axis: Allows the arm to twist
U-axis: Allows the arm to raise and lower
R-axis: Allows arm rotation
B-axis: Allows wrist of the arm to tilt up and down
T-axis: Allows wrist of the arm to rotate

Controller Specifications **YAC100**

YAC100 Controller Specifications	
Configuration	Standard: IP20 (open structure), Option: IP54 (dustproof housing)
Dimensions (H x W x D)	200 x 470 × 420 mm (excludes protrusions)
Mass	20 kg
Cooling system	Direct cooling
Ambient temperature	During operation: 0°C to +40°C During storage: -10°C to +60°C
Relative humidity	90% max. (non-condensing)
Power supply*	Single-phase 200/230 VAC (+10%, -15%), 50/60 Hz Three-phase 200/220 VAC (+10%, -15%), 50/60 Hz
Grounding	Grounding resistance: 100 Ω or less
Digital I/Os	Specialized signals: 10 inputs and 1 output General signals: 28 inputs and 28 outputs Max. I/O (optional): 1,024 inputs and 1,024 outputs
Positioning system	By serial encoder
Programming capacity	JOB: 10,000 steps, 1,000 instructions CIO ladder: 1,500 steps
Expansion slots	MP2000 bus × 5 slots
LAN (connection to host)	1 (10BASE-T/100BASE-TX)
Interface	RS-232C: 1ch
Control method	Software servo control
Drive units	Six axes for robots, two more axes can be added as external axes (installable in the controller)
Paint color	Munsell notation 5Y7/1 (reference value)

*YA-R6F: Three-phase only

MEMO

Robonity MOTORLESS SINGLE-AXIS ACTUATORS

Basic model LBAS

Model		LBAS04		LBAS05				LBAS08		
Motor		50 W		100 W				200 W		
Repeated positioning accuracy*1		+/-0.01 mm		+/-0.01 mm				+/-0.01 mm		
Deceleration mechanism		Rolled ball screw, diameter 10mm (C7 class)		Rolled ball screw, diameter 12mm (C7 class)				Rolled ball screw, diameter 16mm (C7 class)		
Stroke (50-mm increments)		50 mm to 800 mm		50 mm to 800 mm				50 mm to 1100 mm		
Maximum speed*2 (or equivalent)		800 mm/sec	400 mm/sec	1333 mm/sec	666 mm/sec	333 mm/sec	133 mm/sec	1200 mm/sec	600 mm/sec	300 mm/sec
Ball screw lead		12 mm	6 mm	20 mm	10 mm	5 mm	2 mm	20 mm	10 mm	5 mm
Maximum payload*3 (or equivalent)	Horizontal	12 kg	20 kg	12 kg	24 kg	40 kg	45 kg	40 kg	80 kg	100 kg
	Vertical	2 kg	5 kg	3 kg	6 kg	12 kg	15 kg	8 kg	20 kg	30 kg
Rated thrust*3 (or equivalent)		71 N	141 N	84 N	169 N	339 N	854 N	174 N	341 N	683 N
Max. size of unit's cross-section (W x H)		44 mm × 52 mm		54 mm × 60 mm				82 mm × 78 mm		
Overall length		ST + 214 mm		ST + 220.5 mm				ST + 278 mm		
Ambient temperature range and humidity		0–40°C, 35–80%RH (non-condensing)								

1. Unidirectional repeatability.
2. Maximum speed may not be reached in the event of short travel distances or other operating conditions.
3. The values of the rated thrust and maximum payload are based on the assumption that the installed motors output the rated torque.

Advanced model LGXS

Model		LGXS05			LGXS05L			LGXS07			
Motor		50 W			100 W			100 W			
Repeated positioning accuracy*1		+/-0.005 mm			+/-0.005 mm			+/-0.005 mm			
Deceleration mechanism		Ground ball screw, diameter 12mm (C5 class)			Ground ball screw, diameter 12mm (C5 class)			Ground ball screw, diameter 15mm (C5 class)			
Stroke (50-mm increments)		50 mm to 800 mm			50 mm to 800 mm			50 mm to 1100 mm			
Maximum speed*2 (or equivalent)		1333 mm/sec	666 mm/sec	333 mm/sec	1333 mm/sec	666 mm/sec	333 mm/sec	1800 mm/sec	1200 mm/sec	600 mm/sec	300 mm/sec
Ball screw lead		20 mm	10 mm	5 mm	20 mm	10 mm	5 mm	30 mm	20 mm	10 mm	5 mm
Maximum payload*3 (or equivalent)	Horizontal	5 kg	8 kg	13 kg	12 kg	24 kg	32 kg	10 kg	25 kg	45 kg	85 kg
	Vertical	2 kg	4 kg	8 kg	3 kg	6 kg	12 kg	2 kg	4 kg	8 kg	16 kg
Rated thrust*3 (or equivalent)		41 N	69 N	138 N	84 N	169 N	339 N	56 N	84 N	169 N	339 N
Max. size of unit's cross-section (W x H)		48 mm × 65 mm			48 mm × 65 mm			70 mm × 76.5 mm			
Overall length		ST + 131.5 mm			ST + 161.5 mm			ST + 202 mm			
Cleanliness level*4		ISO Class 3 (ISO14644-1) or equivalent									
Suction rate*5		30 Nl/min to 100 Nl/min			30 Nl/min to 100 Nl/min			30 Nl/min to 115 Nl/min			
Ambient temperature range and humidity		0–40°C, 35–80%RH (non-condensing)									

Model		LGXS10				LGXS12				LGXS16			LGXS20		
Motor		200 W				400 W				750 W			750 W		
Repeated positioning accuracy*1		+/-0.005 mm				+/-0.005 mm				+/-0.005 mm			+/-0.005 mm		
Deceleration mechanism		Ground ball screw, diameter 15mm (C5 class)				Ground ball screw, diameter 15mm (C5 class)				Ground ball screw, diameter 20mm (C5 class)			Ground ball screw, diameter 20mm (C5 class)		
Stroke (50-mm increments)		100 mm to 1250 mm				100 mm to 1250 mm				100 mm to 1450 mm			100 mm to 1450 mm		
Maximum speed*2 (or equivalent)		1800 mm/sec	1200 mm/sec	600 mm/sec	300 mm/sec	1800 mm/sec	1200 mm/sec	600 mm/sec	300 mm/sec	2400 mm/sec	1200 mm/sec	600 mm/sec	2400 mm/sec	1200 mm/sec	600 mm/sec
Ball screw lead		30 mm	20 mm	10 mm	5 mm	30 mm	20 mm	10 mm	5 mm	40 mm	20 mm	10 mm	40 mm	20 mm	10 mm
Maximum payload*3 (or equivalent)	Horizontal	25 kg	40 kg	80 kg	100 kg	35 kg	50 kg	95 kg	115 kg	45 kg	95 kg	130 kg	65 kg	130 kg	160 kg
	Vertical	4 kg	8 kg	20 kg	30 kg	8 kg	15 kg	25 kg	45 kg	12 kg	28 kg	55 kg	15 kg	35 kg	65 kg
Rated thrust*3 (or equivalent)		113 N	170 N	341 N	683 N	225 N	339 N	678 N	1360 N	320 N	640 N	1280 N	320 N	640 N	1280 N
Max. size of unit's cross-section (W x H)		100 mm × 99.5 mm				125 mm × 101 mm				160 mm × 130 mm			200 mm × 140 mm		
Overall length		ST + 175.5 mm				ST + 211.5 mm				ST + 242.5 mm			ST + 288.5 mm		
Cleanliness level*4		ISO Class 3 (ISO14644-1) or equivalent													
Suction rate*5		30 Nl/min to 90 Nl/min													
Ambient temperature range and humidity		0–40°C, 35–80%RH (non-condensing)													

1. Unidirectional repeatability.
2. Maximum speed may not be reached in the event of short travel distances or other operating conditions.
3. The values of the rated thrust and maximum payload are based on the assumption that the installed motors output the rated torque.
4. Install air suction joints when using in a clean room environment. The cleanliness level is achieved at a usage of 1000 mm per second or less.
5. The suction amount required varies with the operating conditions and operating environment.

TRANSERVO CLOSED LOOP STEPPER MOTOR SINGLE-AXIS ROBOTS

Type	Size*1 (mm) (W × H)	Model	Lead (mm)	Maximum payload*2 (kg)		Maximum speed*3 (mm/sec)	Stroke (mm)
				Horizontal	Vertical		
					SR / SRD		
SS type (Slide type) Inline model / Foldback model	49 × 59	SS04-S SS04-R(L)	12	2	1	600	50 to 400
			6	4	2	300	
			2	6	4	100	
	55 × 56	SS05-S SS05-R(L)	20	4	-	1000	50 to 800
			12	6	1	600	
			6	10	2	300	
	55 × 56	SS05H-S SS05H-R(L)	20	6	-	1000	50 to 800
			12	8	2	600 (Horizontal) 500 (Vertical)	
			6	12	4	300 (Horizontal) 250 (Vertical)	
SG type (Slide type)	65 × 64	SG07	20	36	4	1200	50 to 800
			12	43	12	800	
			6	46	20	350	
SR type (Rod type standard) Inline model / Foldback model	48 × 56.5	SR03-S SR03-R(L) SR03-U	12	10	4	500	50 to 200
			6	20	8	250	
	48 × 58	SR04-S SRD04-R(L)	12	25	5	500	50 to 300
			6	40	12	250	
			2	45	25	80	
	56.4 × 71	SR05-S SRD05-R(L)	12	50	10	300	50 to 300
			6	55	20	150	
			2	60	30	50	
SR type (Rod type with support guide) Inline model / Foldback model	105 × 56.5	SRD03-S SRD03-U	12	10	3.5	500	50 to 200
			6	20	7.5	250	
	135 × 58	SRD04-S SRD04-U	12	25	4	500	50 to 300
			6	40	11	250	
			2	45	24	80	
	157 × 71	SRD05-S SRD05-U	12	50	8.5	300	50 to 300
			6	55	18.5	150	
			2	60	28.5	50	
STH type (Slide table type) Inline model/ Foldback model	45 × 46	STH04-S	5	6	2	200	50 to 100
	73 × 51	STH04-R(L)*4	10	4	1	400	
	61 × 65	STH06	8	9	2	150	50 to 150
	106 × 70	STH06-R(L)	16	6	4	400	

Type	Height (mm)	Model	Torque type	Rotational torque (N/m)	Maximum pushing torque (N/m)	Maximum speed*3 (mm/sec)	Rotation range (°)
STH type (Rotary type) Standard/High rigidity	42(Standard) 49(High rigidity)	RF02-N RF02-S	N: Standard	0.22	0.11	420	310(RF02-N) 360(RF02-S)
			H: High torque	0.32	0.16	280	
	53(Standard) 62(High rigidity)	RF03-N RF03-S	N: Standard	0.8	0.4	420	320(RF03-N) 360(RF03-S)
			H: High torque	1.2	0.6	280	
	68(Standard) 78(High rigidity)	RF04-N RF04-S	N: Standard	6.6	3.3	420	320(RF04-N) 360(RF04-S)
			H: High torque	10	5	280	

Type	Size*1 (mm) (W x H)	Model	Lead (mm)	Maximum payload*2 (kg)		Maximum speed*3 (mm/sec)	Stroke (mm)
				Horizontal	Vertical		
BD type (Belt type)	40 × 40	BD04	48	1	-	1100	300 to 1000
	58 × 48	BD05	48	5	-	1400	300 to 2000
	70 × 60	BD07	48	14	-	1500	300 to 2000

1. Approximate size of unit's cross section.
2. Payload varies with operation speed. For details, see the appropriate page of manufacturer's catalog.
3. Maximum speed varies with stroke length and payload. For details, see the appropriate page of manufacturer's catalog.
4. Brake option is not available for STH04-R(L)-**-50.

■ **Allowable ambient temperature for robot installation** SS/SR type: 0–40C, STH/RF/BD type: 5–40C

FLIP-X SINGLE-AXIS ROBOTS

Type	Size*1 (mm) (W × H)	Model	Lead (mm)	Maximum payload (kg)		Maximum speed (mm/sec)	Stroke (mm)
				Horizontal	Vertical		
T type Compact model	45 × 53	T4L/T4LH	12	4.5	1.2	720	50 to 400
			6	6	2.4	360	
			2	6	7.2	120	
	55 × 52	T5L/T5LH	20	3	-	1200	50 to 800
			12	5	1.2	800	
			6	9	2.4	400	
	65 × 56	T6L	20	10	-	1333	50 to 800
			12	12	4	800	
			6	30	8	400	
	94 × 98	T9 (Standard)	30	15	-	1800	150 to 1050
			20	30	4	1200	
			10	55	10	600	
			5	80	20	300	
		T9H (High thrust)	30	25	-	1800	150 to 1050
			20	40	8	1200	
			10	80	20	600	
			5	100	30	300	
F type High rigidity model	80 × 65	F8	20	12	-	1200	150 to 800
			12	20	4	720	
			6	40	8	360	
	80 × 65	F8L	30	7	-	1800	150 to 1050
			20	20	4	1200	
			10	40	8	600	
			5	50	16	300	
	80 × 65	F8LH	20	30	-	1200	150 to 1050
			10	60	-	600	
			5	80	-	300	
	110 × 71	F10	30	15	-	1800	150 to 1050
			20	20	4	1200	
			10	40	10	600	
			5	60	20	300	
		F10H (High thrust)	30	25	-	1800	150 to 1000
			20	40	8	1200	
			10	80	20	600	
			5	100	30	300	
	136 × 83	F14 (Standard)	30	15	-	1800	150 to 1050
			20	30	4	1200	
			10	55	10	600	
			5	80	20	300	
		F14H (High thrust)	30	25	-	1800	
			20	40	8	1200	
			10	80	20	600	
			5	100	30	300	
	168 × 100	F17L	50	50	10	2200	1100 to 2050
		F17	40	40	-	2400	200 to 1450
			20	80	15	1200	200 to 1250
			10	120	35	600	
	202 × 115	F20	40	60	-	2400	200 to 1450
			20	120	25	1200	200 to 1250
			10	-	45	600	
	202 × 120	F20N	20	80	-	1200	1150 to 2050
GF type High rigidity model	145 × 91.5	GF14XL	20	45	-	1200	750 to 2000
	168 × 105.5	GF17XL	20	90	-	1200	850 to 2500
N type Nut rotation model	145 × 120	N15 (Single carriage)	20	50	-	1200	500 to 2000
		N15D(Double carriage)					250 to 1750
	180 × 115	N18 (Single carriage)		80	-		500 to 2500
		N18D (Double carriage)					250 to 2250
B type Timing belt drive model	100 × 81	B10	Belt drive	10	-	1875	150 to 2550
	146 × 94	B14(Standard)	Belt drive	20	-	1875	150 to 3050
		B14H(High thrust)	Belt drive	30	-	1875	
R type Rotation axis model	-	R5	-	0.12kgm²	-	360°/sec	360°
		R10		0.36kgm²	-		
		R20		1.83kgm²	-		

1. Approximate size of unit's cross section.

PHASER LINEAR MOTOR SINGLE-AXIS ROBOTS

Type	Size*1 (mm) (W × H)	Model	Carriage	Maximum payload (kg)	Maximum speed (mm/sec)	Stroke (mm)
MF type Steel cored linear motor with falt magnet	85 × 80	MF7	Single	10 (7)*2	2500	100 to 4000(Horizontal) 100 to 2000(Wall mount)
		MF7D	Double			100 to 3800(Horizontal) 100 to 1800(Wall mount)
	100 × 80	MF15	Single	30 (15)*2		100 to 4000(Horizontal) 100 to 2000(Wall mount)
		MF15D	Double			100 to 3800(Horizontal) 100 to 1800(Wall mount)
	150 × 80	MF20	Single	40 (20)*2		150 to 4050
		MF20D	Double			150 to 3850
		MF30	Single	60 (30)*2		100 to 4000
		MF30D	Double			150 to 3750
	210 × 100	MF75	Single	160 (75)*2		1000 to 4000
		MF75D	Double			680 to 3680

1. Approximate size of unit's cross section.
2. Value in brackets refers to the highest payload when the robot is at maximum speed.

XY-X CARTESIAN ROBOTS

Model	Arm variations					Number of axes	Maximum payload (kg)	Maximum stroke (mm)	
	Arm	Gantry	Moving arm	Pole	XZ			X axis	Y axis
PXYx	√	-	-	-	-	2 axes	4.5	150 to 650	50 to 300
FXYx	√	-	-	-	-	2 axes / 3 axes	12	150 to 1050	150 to 550
FXYBx	√	-	-	-	-	2 axes	7	150 to 2450	150 to 550
SXYx	√	-	√	√	√	2 axes / 3 axes / 4 axes	20	150 to 1050	150 to 650
SXYBx	√	-	-	-	√	2 axes / 3 axes / 4 axes	14	150 to 3050	150 to 550
MXYx	√	√	√	√	√	2 axes / 3 axes / 4 axes	30	250 to 1250	150 to 650
NXY	√	-	-	-	-	2 axes / 3 axes	25	500 to 2000	150 to 650
NXY-W	√	-	-	-	-	4 axes / 6 axes	25	250 to 1750	150 to 650
HXYx	√	√	√	√	√	2 axes / 3 axes / 4 axes	40	250 to 1250	250 to 650
HXYLx	√	√	-	-	-	2 axes	40	1150 to 2050	250 to 650

Note: Maximum payload and maximum stroke length are based on cable carrier specifications or when using the arm type model.

YP-X PICK & PLACE ROBOTS

Model	Axes	Structure				Maximum payload (kg)	Cycle time (sec)
		X axis	Y axis	Y axis	R axis		
YP220BX	2 axes	Belt	-	Belt	-	3	0.45
YP320X		Ball screw	-	Belt	-	3	0.57
YP220BXR	3 axes	Belt	-	Belt	Rotation axis	1	0.62
YP320XR		Ball screw	-	Belt	Rotation axis	1	0.67
YP330X		Ball screw	Ball screw	Belt	-	3	0.57
YP340X	4 axes	Ball screw	Ball screw	Belt	Rotation axis	1	0.67

YRG ELECTRIC GRIPPER

Type	Model	Holding power (N)	Open/close stroke (mm)	Maximum speed (mm/sec)	Repeatability (mm)	Weight (g)
Compact single cam	YRG-2005SS	5	3.2	100	±0.02	90
Single cam	YRG-2010S	6	7.6	100	±0.02	160
	YRG-2815S	22	14.3	100	±0.02	300
	YRG-4225S	40	23.5	100	±0.02	580
Double cam	YRG-2005W	50	5	60	±0.03	200
	YRG-2810W	150	10	60	±0.03	350
	YRG-4220W	250	19.3	45	±0.03	800
Screw type Straight style	YRG-2020FS	50	19	50	±0.01	420
	YRG-2840FS	150	38	50	±0.01	880
Screw type "T" style	YRG-2020FT	50	19	50	±0.01	420
	YRG-2840FT	150	38	50	±0.01	890
3-finger	YRG-2004T	2.5	3.5	100	±0.03	90
	YRG-2013T	2	13	100	±0.03	190
	YRG-2820T	10	20	100	±0.03	340
	YRG-4230T	20	30	100	±0.03	640

- Gripping force control: 30–100% (in 1% increments)
- Multi-point control: 10,000 max.
- Speed control: 20–100% (in 1% increments)
- Workpiece size detection: 0.01 mm (by ZON signal)
- Acceleration control: 1–100% (in 1% increments)

YK-X/YK-XG/YK-XE/YK-TW/YK-XGS/YK-XGP SCARA ROBOTS

Model/Type		Model	Arm length (mm)	Maximum payload (kg)	Standard cycle time*1
Standard	Extra small type	YK120XG	120	1.0	0.33
		YK150XG	150		
		YK180XG	180		
		YK180X	180		0.39
		YK220X	220		0.42
	Small type	YK250XG	250	5.0 (4.0)*3	0.43
		YK350XG	350		0.44
		YK400XE-4	400	4.0 (3.0)*3	0.41
		YK400XG	400	5.0 (4.0)*3	0.45
	Medium type	YK500XGL	500	5.0 (4.0)*3	0.48
		YK500XG	500	10.0	0.42
		YK610XE-10	610	10.0 (9.0)*3	0.39
		YK600XGL	600	5.0 (4.0)*3	0.54
		YK600XG	600	10.0	0.43
		YK600XGH	600	20.0 (19.0)*3	0.47
	Large type	YK710XE-10	710	10.0 (9.0)*3	0.42
		YK700XGL	700	10.0 (9.0)*3	0.50
		YK700XG	700	20.0 (19.0)*3	0.42
		YK800XG	800		0.48
		YK900XG	900		0.49
		YK1000XG	1000		
		YK1200X	1200	50.0	0.91
Wall mount/inverse model		YK300XGS*2	300	5.0 (4.0)*3	0.49
		YK400XGS*2	400		
		YK500XGS	500	10.0	0.45
		YK600XGS	600		0.46
		YK700XGS	700	20.0	0.42
		YK800XGS	800		0.48
		YK900XGS	900		0.49
		YK1000XGS	1000		
Dust-proof & drip-proof model		YK250XGP	250	4.0	0.50
		YK350XGP	350		0.52
		YK400XGP	400		0.50
		YK500XGLP	500	4.0	0.66
		YK500XGP	500	10.0	0.55
		YK600XGLP	600	4.0	0.71
		YK600XGP	600	10.0	0.56
		YK600XGHP	600	18.0	0.57
		YK700XGP	700	20.0	0.52
		YK800XGP	800		0.58
		YK900XGP	900		0.59
		YK1000XGP	1000		
Orbit model		YK350TW	350	5.0	0.32
		YK500TW	500	5.0 (4.0)*3	0.29

1. **Extra small type** Maximum payload: 0.1kg (100 mm in the horizontal direction, 25 mm in the vertical direction [two-way], rough positioning)
   Orbit type Maximum payload: 1 kg (300 mm in the horizontal direction, 25 mm in the vertical direction [two-way], rough positioning)
   Other type Maximum payload: 2 kg (300 mm in the horizontal direction, 25 mm in the vertical direction [two-way], rough positioning)
2. Models YK300XGS and YK400XGS have to be custom-ordered. Please contact Yamaha for details regarding the delivery.
3. Value in brackets refers to the maximum payload when optional equipment are used (e.g. tool flanges, user wiring/tubing routed through spline shafts).

CLEAN ROOM SCARA ROBOTS

Type	Model	Arm length (mm)	Maximum payload (kg)	Standard cycle time* (sec)	Beltless structure
Extra small type	YK180XC	180	1.0	0.42	○
	YK220XC	220	1.0	0.45	○
Small type	YK250XGC	250	4.0	0.50	○
	YK350XGC	350	4.0	0.52	○
	YK400XGC	400	4.0	0.50	○
Medium type	YK500XC	500	10.0	0.53	-
	YK500XGLC	500	4.0	0.66	○
	YK600XC	600	10.0	0.56	-
	YK600XGLC	600	4.0	0.71	○
Large type	YK700XC	700	20.0	0.57	-
	YK800XC	800	20.0	0.57	-
	YK1000XC	1000	20.0	0.60	-

*Extra small type Maximum payload: 0.1kg (100 mm in the horizontal direction, 25 mm in the vertical direction [two-way], rough positioning)
Other type Maximum payload: 2 kg (300 mm in the horizontal direction, 25 mm in the vertical direction [two-way], rough positioning)

CLEAN ROOM SINGLE-AXIS ROBOTS

Type	Model	Size* (mm) (W × H)	Lead (mm)	Maximum payload (kg)		Maximum speed (mm/sec)	Stroke (mm)
				Horizontal	Vertical		
FLIP-XC type	C4L C4LH	45 x 55	12	4.5	1.2	720	50 to 400
			6	6	2.4	360	
			2	6	7.2	120	
	C5L C5LH	55 x 65	20	3	-	1000	50 to 800
			12	5	1.2	800	
			6	9	2.4	400	
	C6L	65 x 65	20	10	-	1000	50 to 800
			12	12	4	800	
			6	30	8	400	
	C8	80 x 75	20	12	-	1000	150 to 800
			12	20	4	720	
			6	40	8	360	
	C8L	80 x 75	20	20	4	1000	150 to 1050
			10	40	8	600	
			5	50	16	300	
	C8LH	80 x 75	20	30	-	1000	150 to 1050
			10	60	-	600	
			5	80	-	300	
	C10	104 x 85	20	20	4	1000	150 to 1050
			10	40	10	500	
			5	60	20	250	
	C14	136 x 96	20	30	4	1000	150 to 1050
			10	55	10	500	
			5	80	20	250	
	C14H	136 x 96	20	40	8	1000	150 to 1050
			10	80	20	500	
			5	100	30	250	
	C17	168 x 114	20	80	15	1000	250 to 1250
			10	120	35	600	
	C17L	168 x 114	50	50	10	1000	1150 to 2050
	C20	202 x 117	20	120	25	1000	250 to 1250
			10	-	45	500	
SSC type (TRANSERVO)	SSC04	49 x 59	12	2	1	600	50 to 400
			6	4	2	300	
			2	6	4	100	
	SSC05	55 x 56	20	4	-	1000	50 to 800
			12	6	1	600	
			6	10	2	300	
	SSC05H	55 x 56	20	6	-	1000	50 to 800
			12	8	2	600(Horizontal)/ 500(Vertical)	
			6	12	4	300(Horizontal)/ 250(Vertical)	

*Approximate size of unit's cross section.

CLEAN ROOM CARTESIAN ROBOTS

Type	Model	Axes	Moving range (mm)	Maximum speed (mm/sec)	Maximum payload (kg)
2 axes	SXYxC	X	150 to 1050	1000	20
		Y	150 to 650	1000	
3 axes	SXYxC (ZSC12)	X	150 to 1050	1000	3
		Y	150 to 650	1000	
		Z	150	1000	
	SXYxC (ZSC6)	X	150 to 1050	1000	5
		Y	150 to 650	1000	
		Z	150	500	
4 axes	SXYxC (ZRSC12)	X	150 to 1050	1000	3
		Y	150 to 650	1000	
		Z	150	1000	
		R	360°	1020°/sec	
	SXYxC (ZRSC6)	X	150 to 1050	1000	5
		Y	150 to 650	1000	
		Z	150	500	
		R	360°	1020°/sec	

LCM100 Linear conveyor module

Basic specifications	
Model	LCM100-4M/3M/2MT
Drive method	Moving magnet type, Linear motor with flat core
Repeated positioning accuracy	+/-0.015 mm (single slider)*1 0.1 mm (mutual width difference between sliders)
Scale	Electromagnetic type / resolution 5 µm
Max. speed	3000 mm/sec
Max. acceleration	2G
Max. payload	15 kg*3*4
Rated thrust	48 N
Total module length	640 mm (4M) / 480 mm (3M) / 400 mm (for 2MT circulation)
Max. number of combined modules	16 (total length: 10,240 mm)
Max. number of sliders	16 (when 16 modules are combined)
Min. dist. between sliders	420 mm
Mutual height difference between sliders	0.08 mm
Max. size of unit's cross-section (W × H)	136.5 mm × 155 mm (including slider)
Bearing	1 guide rail / 2 blocks (with retainer)
Module weight	12.5 kg (4M) / 9.4 kg (3M) / 7.6 kg (2MT)
Slider weight	2.4 kg / 3.4 kg (when belt module is used)
Cable length	3 m or 5 m
Controller	LCC140

1. The repeated positioning accuracy derived when a slider moving from the same direction (unidirectional) is used.
2. The unidirectional positioning accuracy derived when the position-correcting function through RFID was used.
3. Per slider.
4. The maximum payload is 14 kg when used together with belt module as parts required for use with the belt are attached to the slider.

LCC140 Controller

Basic specifications	
Controllable robots	Linear conveyor module LCM series
Outside dimensions (W × H × D)	402.5 × 229 × 106.5 mm
Main body weight	4.8 kg
Input power voltage	Single-phase AC200 to 230V +/-10% or less (50/60Hz)
Maximum power consumption	350VA (LCM100-4M, with one slider in operation)
External input/output	SAFETY
	RS-232C (dedicated to RFID)
	RS-232C (for HPB / doubles as POPCOM+)
Network option	CC-Link Ver. 1.10 compatible, Remote device station (2 stations)
	DeviceNet™ Slave: 1 node
	EtherNet/IP™ Adapter: 2 ports
Programming box	HPB, HPB-D (software version 24.01 or later)

LCM100 Belt module

Basic specifications	
Model	LCM100-4B/3B
Drive method	Belt back surface pressing force drive
Bearing method	1 guide rail / 2 blocks (with retainer)
Max. speed	560 mm/sec
Max. payload	14 kg
Module length	640 mm (4B) / 480 mm (3B)
Max. number of sliders	1 slider / 1 module
Max. size of unit's cross-section	173.8 mm× 155 mm (including slider)
Cable length	None
Controller	Dedicated driver (included)
Power supply	DC24V 5A
Communication I/F	Dedicated input/output, 16 points
Module weight	11.2 kg (4B) / 8.8 kg (3B)

YA Vertically articulated robots

Type	Model	Application	Number of axes	Payload (kg)	Vertical reach (mm)	Horizontal reach (mm)
6-axis	YA-RJ	Handling (general)	6-axis	1 kg (max. 2 kg*)	909	545
	YA-R3F			3	804	532
	YA-R5F			5	1193	706
	YA-R5LF			5	1560	895
	YA-R6F			6	2486	1422
7-axis	YA-U5F	Assembly / Placement	7-axis	5	1007	559
	YA-U10F			10	1203	720
	YA-U20F			20	1498	910

*Motion range is reduced when the load is more than 1 kg. Use the robot within the recommended motion range.