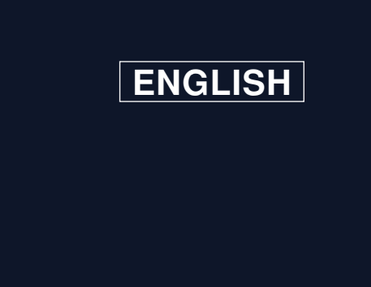
YAMAHA
Revs Your Heart

ENGLISH

YAMAHA

ROBOT



LINEUP CATALOG

YAMAHA
YAMAHA MOTOR CO., LTD.
Robotics Operations FA Section
127 Toyooka, Kita-ku, Hamamatsu, Shizuoka 433-8103, Japan
Tel. +81-53-525-8350 Fax. +81-53-525-8378
URL https://global.yamaha-motor.com/business/robot/
E-mail robotn@yamaha-motor.co.jp

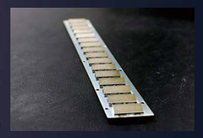
201912-HE

YAMAHA ROBOT
History and approach

30 years of proven reliability.

YAMAHA's robot development started as it was introduced in our motorcycle production line more than 30 years ago.
Since then, YAMAHA's industrial robots have supported production equipment in a wide variety of industries, such as assembly of electronic products, transfer of in-vehicle components, and manufacture of large-scale LCD panels.
Over the years YAMAHA has striven to develop and improve the market and this is a testament to YAMAHA's reliability.

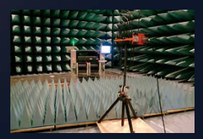
Technical development based on the originally developed technologies and focusing on the needs of the market



"Motor control technology" absolutely necessary for precise and high-speed operation "Controller development technology" is based on the highest evaluation standards and Signal processing technology allowing stable operation even under extreme environmental conditions.
Rigidity, durability, and operability are features of YAMAHA's products base on "Coretechnologies*" .

*Control boards, linear motors, and linear scales (position detectors), etc.

Evaluation system provides high reliability



YAMAHA continues to evaluate technology to assure product reliability.
In the product development phase, the evaluation test at "anechoic chamber"* (YAMAHA's equipment) was developed to ensure the high reliability and quality.

*Anechoic chamber: This equipment is intended to synthetically develop the EMC (Electro-Magnetic Compatibility) technologies for YAMAHA Group products and to share the developed technologies. This equipment can evaluate the compliance with each country's regulation in conformity with the international standards.

YAMAHA quality ensuring safety

Manufacturing, sales, and technology integrated system is utilized at its maximum level to establish a system that consistently performs a series of processes: inspection → manufacture → assembly → inspection → shipping. This can provide the customers with high quality, low price, and short delivery time.
Key components are manufactured through in-house processing and machining. YAMAHA as a robot manufacturer builds the components to the highest quality level.
Furthermore, the quality control based on the severe standards achieves the craftsmanship with high quality.

Robonity Series

Motor-less Single Axis Actuator

Quick selection table ▶▶ P20

Motor-less

Basic model

LBAS

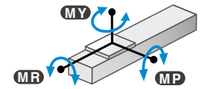
Newly designed integrated guide rail/frame structure.
Improved moment load capacity in compact frame size.
Designed to accommodate motors from most leading manufacturers.

- 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

Moment rigidity is increased approximately three times from current models.



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

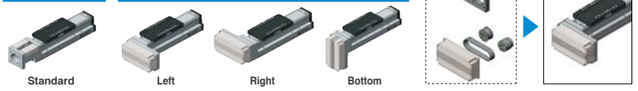
(N · m)

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

(N · m)

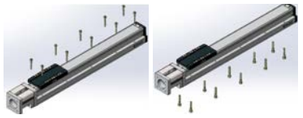
Motor orientation is changeable with Right Angle Attachment Kit.

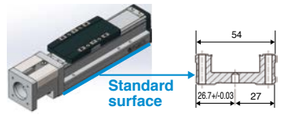
Straight Mount | Right Angle Mounts



Installation process is simple and easy

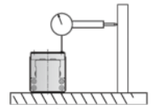
1. Mounting holes are accessible from top or bottom without disassembling actuator unit.
2. Standard surface on the side and dowel pin holes on the bottom.





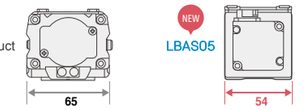
High Precision

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



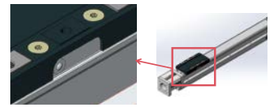
Compact

Frame width is reduced by approximately 20% from current models



Easy Maintenance

Moving parts can be lubricated from outside without opening actuator



Grease nipple on the slider side surface

Advanced model

LGXS

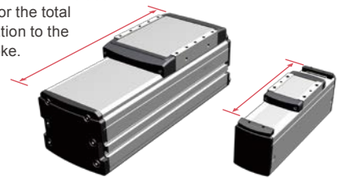
Higher efficiency, accuracy, and reliability from ground ball screw.
Ideal for base axis of multi-axis configuration.

- High Precision Accuracy Class C5
- High Durability
- Clean specification as a standard feature

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

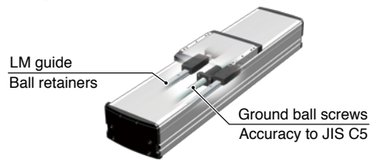
Shortest Overall Length

The industry's shortest class is achieved for the total length in relation to the effective stroke.



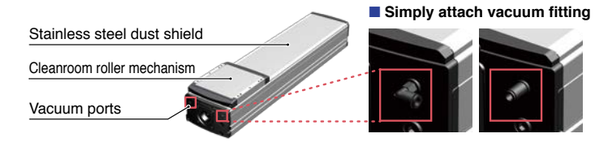
High Precision

- Adopted ground ball screws
  Ball screw Remove Accuracy: Accuracy class C5
- Positioning Remove Accuracy repeatability: +/-5 µm



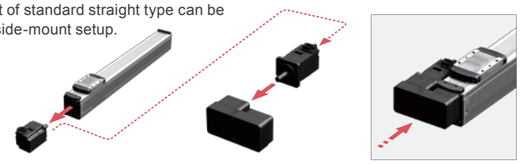
Cleanroom Ready Design

- Protective stainless dust shield
- Ports are ready for vacuum fittings



Motor orientation is changeable with optional conversion unit

Motor unit of standard straight type can be used for side-mount setup.



Standard + Conversion adapter ▶ Right attachment of bending

TRANSERVO Series

CLOSED LOOP STEPPING MOTOR SINGLE-AXIS ROBOTS

Quick selection table ▶▶ P21

Compact & economical single-axis robot, TRANSERVO series, with cost of the stepping motor and function of 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

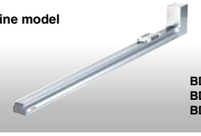
SRD05 SRD04

Foldback model

SR04-R SRD04-U

BD type Belt type

Inline model



BD04 BD05 BD07

The position detector is a resolver

The position detector is a resolver. The resolver has a simple yet strong structure using not electronic components or elements and so has great features such as being extremely tough in harsh environments as well as a low breakdown rate. The resolver structure has none of the detection problems that occur in other detectors such as optical encoders whose electronic components breakdown or suffer from moisture or oil that sticks to the disk.

Closed-loop control for position feedback

Stepping motors provide great features such as low cost , yet they have a drastic drop in torque at high speeds and heavy current consumption when stopped.
The TRANSERVO by YAMAHA eliminates all these problems by adopting an innovative vector control method. In effect, the TRANSERVO delivers the same functions of a servo motor while using a lower cost stepping motor.

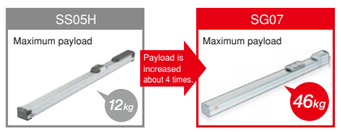
Stepping Motors	○ • Simple design & low cost • No vibration when it stops	× · High-pitched operating noise · Drop in torque at high-speed · Heavy current consumption when stopped.
Servo Motors	○ • Smooth movement • Constant torque at all speed range • Energy saver	× · Dithering · Cost is high

TRANSERVO is combines the best features of both types

SG type (Slider type) Features & Benefits

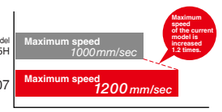
Dynamic payload capacity of 46 kg (horizontal) and 20 kg (vertical)

As rigid table slide and 56 motor are adopted, the payload is increased greatly. A maximum payload of 46 kg is achieved. Up to 20 kg can be transferred even with the vertical specifications.



Maximum speed of 1200 mm/sec.

The maximum speed is made 1.2 times faster than that of the current model SS05H.
The tact-up of the equipment can be achieved.

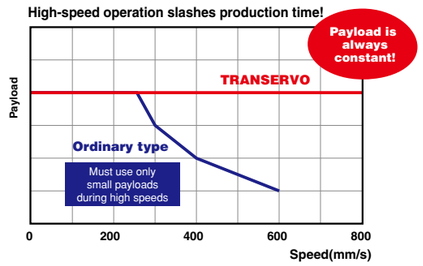


SS type (Slide type) Features & Benefits

High-speed operation slashes production time

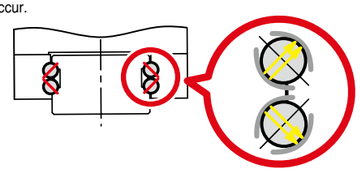
Optimizing vector control method, the TRANSERVO maintains a constant payload even in the high-speed range. This helps to drastically cut down on the tact time. By combining this feature with high-lead ball screws, the TRANSRERVO has achieved a maximum speed of 1 meter per second[Note] which is as fast as single-axis servo motors in the same categoly.

Note : SS05/SS05H/SSC05/SSC05H (Lead20mm)



Ideal 4-row circular-groove 2-point contact guide provides longer service life

The guide maintains a satisfactory rolling movement with minimal ball differential slip, even if a large momentum load is applied or the installation surface accuracy (flatness) is bad. The rugged design ensures that breakdowns from problems like abnormal wear will seldom occur.

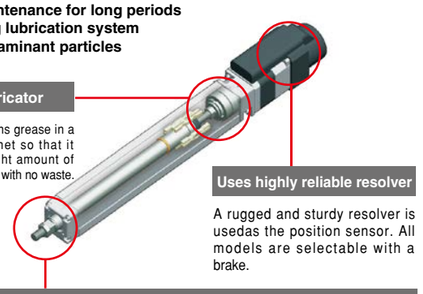


SR type (Rod type) Features & Benefits

Long-term maintenance free

A lubricator used in the ball screw and a contact scraper provides long-life and maintenance-free operation.maintenance free operation.

- Needs no maintenance for long periods
- Grease-saving lubrication system
- Prevents contaminant particles

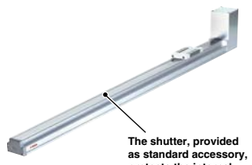


The dual-layer scraper prevents micro-contaminants adhering to the rod from penetrating to the inside. This is also effective in suppressing looseness or vibration in the rod.

BD type (Belt type) Features & Benefits

For long stroke applications

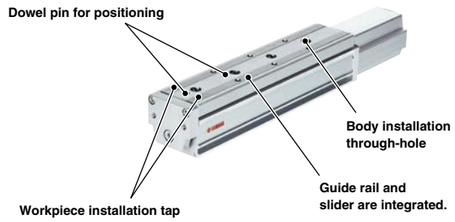
Maximum stroke 2000mm, Maximum speed 1500mm/sec.This type is applicable to a long stroke of up to 2000 mm. The maximum transfer speed is 1500 mm/sec., ensuring high-speed operation. The main body can be conviniently installed without removing exterior parts, such as the cover. Additionally, the shutter is provided as standard accessory. It cover the guide and belt securely to prevent grease from scattering and to block entry to external foreign objects. This type is optimal for workpiece positioning or long-distance transfer.



STH type (Slider table type) Features & Benefits

Circulation type linear guide for high rigidity and accuracy

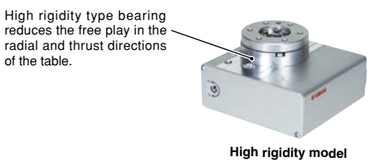
Maximum. pressing force 180N, Repeatability ±0.05mm.Integration of the guide rail and slider, this ensures less deflection. The circulation type linear guide makes it possible to provide high rigidity and accuracy. “STH06” provides an allowable overhang that exceeds “T9” of the FLIP-X series. Also, foldback models with the side mounted motor built into the body. The STH type is optimal for precise assembly.



RF type (Rotary type) Features & Benefits

First rotation axis model in TRANSERVO series

Maximum speed 420°/sec, Repeatability±0.05°.The RF type is a thin and electric rotary type actuator. The two model types, standard type and high rigidity type, can be selected as the optimal applications. The RF type has very easy-to-use specifications that allow easy installation of the workpiece on the table and installation on the base frame. This type can be used for the rotation transfer after chucking or the vertical rotation operation by combining it with the gripper.



FLIP-X Series

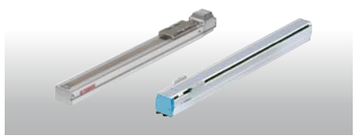
SINGLE-AXIS ROBOTS

Quick selection table ▶▶ P22

Single-axis robot series include 6 types and 29 variations for a wide range of selections.

T type — Compact model

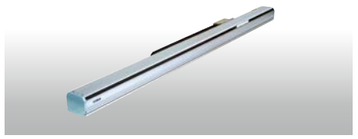
T4L/T4LH, T5L/T5LH, T6L, T9/T9H



Double appeal of a compact body and low price.
Ideal in applications as an actuator directly installed on a mount.

N type — Nut rotation model

N15/N15D, N18/N18D



The operation can be made even at a long stroke while keeping the maximum speed without being affected by the critical speed. Double carrier specifications are also available as a standard.

F type GF type — High rigidity model

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

Highly rigid aluminum frame is used, allowable load moment is large, and resistance to the offset load is provided. This model is suitable for the Cartesian robot that needs the rigidity for the arm and the moving arm that moves the overall axis.

B type — Timing belt drive model

B10, B14/B14H

Maximum stroke length of 3050mm. Allows long distance transport between job processes.

R type — Rotary axis model

R5, R10, R20

Position repeatability accuracy of +/-30seconds (0.0083°). The R type can be used as the rotation axis when combined with other robots, or utilized for a wide range of applications such as index tables.
Harmonic drive delivers high-strength and high-accuracy.

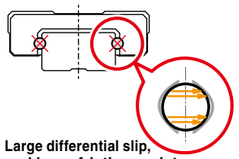
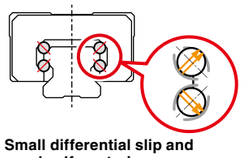
Resolver with excellent environmental resistance capability

Resolver with high reliability is adopted to detect the motor position. This enables stable position detection even in a harsh environment where powder particles or oil mists exist. Additionally, a high resolution of 20480 pulses per revolution is provided.

Optical encoder	Resolver
	
●Optical ●Electronics parts are required and structure is complicated. ●Electronics part trouble, disc dew condensation, or oil sticking occurs easily.	●Magnetic type ●Simple structure with only the iron core and winding ensures less potential failure. ●Highly resistant to impact and electric noise.
Risk of detection failure	**High reliability**

4-row circular-groove 2-point contact guide to support large moment load.

4-row circular-groove 2-point contact guide with less differential slip is adopted. According to its structure, the differential slip of the ball is small when compared to the 2-row gothic-arch-groove 4-point contact guide. This guide maintains excellent rolling motion even when a large moment load is applied or the installation surface accuracy is poor, and has characteristics that are difficult to produce a malfunction, such as unusual wear.

Conventional 2-row gothic arch groove 4-point contact guide	YAMAHA's 4-row circular arc groove 2-point contact guide
	
Large differential slip, and large friction resistance	**Small differential slip and good self-centering**
●Very susceptible to effects from poor installation precision, friction and elastic deformation ●Might break even within the calculated service life.	●Highly resistant to alignment fluctuations and moment loads ●Resistant to breakage

Custom order specifications for each model are available.

We gladly accept special orders for all models such as for double sliders or wide sliders. Please consult with our sales office for more information.

Long-service life greatly reduces the maintenance and control costs.

YAMAHA's highly rigid ball screw or guide greatly contributes to reduction of the customer's maintenance and control costs. The service life can be calculated based on the grounds at YAMAHA's website.

PHASER Series

LINEAR MOTOR SINGLE-AXIS ROBOTS

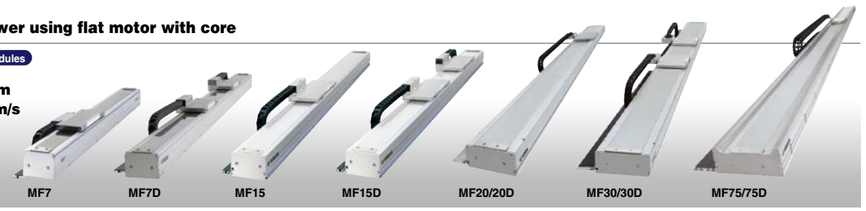
Quick selection table ▶▶ P23

No speed deration needed up to 4m long stroke. Delivers superb performance in long distance transport.

MF type — Long stroke & high-power using flat motor with core

Double Carriges Standard on all Modules

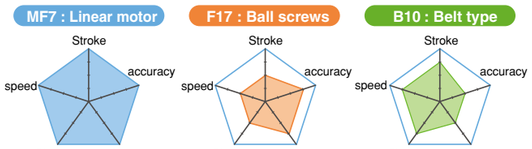
- **Maximum stroke : 4050mm**
- **Maximum speed : 2500mm/s**
- **Repeated positioning accuracy :±5μm**
- **Maximum payload : 7 to 160kg**



Low cost by YAMAHA's in-house design components.

YAMAHA originally developed the magnetic scale and still manufactures it. As YAMAHA also manufactures other major components, large cost reduction is achieved. Today is an era that the linear is not a special mechanism and can be appropriately selected in comparison to the ball screw.

Particularly, when transferring a lightweight workpiece a long distance at a high speed, selecting the linear motor type will reduce the cost.



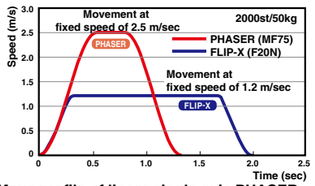
Comparison of single-axis robot models

Model	Unit Cost[Note1]	Maximum speed (mm/sec)	Payload (kg)	Repeatability (μm)	Maximum stroke (mm)	Frame dimension[Note2] (mm)
	Size / maintenance				Size / maintenance	Size / maintenance
MF7-1500		2500	10(7)[Note3]	±5	4000	W85×H80
F17-40-145		720[Note4]	40	±10	1450	W168×H100
B10-1450		1850	10	±40	2550	W100×H81

Note1 : Comparisons when using the strokes shown above Note2 : No flexible cable guide is included. Note3 : This value becomes 7kg when the maximum speed is 2500mm/s (2100mm/s when transferring 10kg).
Note4 : This value considers the critical speed when the stroke is 1450mm.

High speed , Long Travel

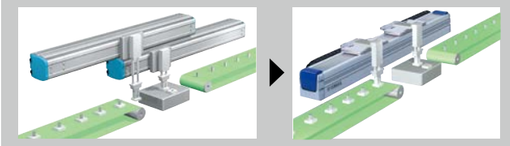
The ultimate appeal of linear motor single-axis robots is that there is no critical speed limits such as with ball screws. There is no reduction in the maximum speed even when traveling long distances. Moreover, the maximum stroke is a standard setting of up to 2m on the MR type and to 4m on the MF type. The cycle time in particular for long distance conveyance has been drastically improved.



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

Standard double carrier set-up for space saving and high efficiency.

Cost and space are reduced when compared to the use of two single-axis robots.
Additionally, the axis alignment is not needed and the tools can also be made common. This shortens the setup time. (When using the RCX series controller, the anti-collision control function can be used.)



Layout using 2 units of ball screw type single axis robots | **Space saving layout using a double carriage**

160 kg maximum payload capacity of MF Series

The MF series robot adopts the flat type magnet. It can transfers a heavy object at a high speed with a high accuracy.

Lower noise level and longer life

Comparing with ball screw type robots, there are few sliding and rotating sections so the operation is amazingly quiet. Moreover the coil and magnet do not make contact so there is no wear and the robot can be used for extended periods.

XY-X Series

CARTESIAN ROBOTS

Quick selection table ▶▶ P23

Wide variety of pre-configured multi-axis systems to choose from.
From compact economical light duty to Large heavy duty systems.

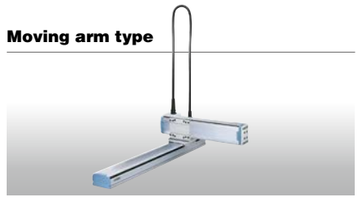
Custom orders

Custom designed multi-axis system is available. Please consult nearby YAMAHA representatives.

Arm type

Gantry type

Moving arm type



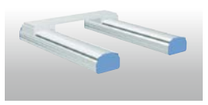
XZ type

Pole type

Dual-synchronous drive

Equipped with the dual drive function to control 2 axis in synchronization, which is of effective use for carrying heavy items and long stroke operation with the Cartesian robot.

Note. For the dual drive function, custom order arrangement is required.



Various variations

Models with 3 or more axes can be selected from:
- Z-axis clamped base and moving table type
- Z-axis clamped table and moving base type

Durable and Reliable Position Detection: Resolver

The position detector is a resolver. The resolver has a simple yet strong structure using non-electronic components or elements and so has great features such as being extremely tough in harsh environments as well as a low breakdown rate. The resolver structure has none of the detection problems that occur in other detectors such as optical encoders whose electronic components breakdown or suffer from moisture or oil that sticks to the disk. Moreover, mechanical specifications for both absolute and incremental are common to all controllers so one can switch to either absolute or incremental specifications just by setting a parameter.
Also, even if the absolute battery is completely worn down, the XY-X can operate on incremental specifications so in the unlikely event of trouble one can feel secure knowing that there will be no need to stop the production line. The backup circuit has been completely renovated and now has a backup period extending to 1 year.

Economy Solution

We achieved an even lower price by cutting down the number of parts while boosting basic performance. Using a resolver in the structure helped to finally eliminate the “absolute units are expensive” idea. Moreover, the mechanical components are the same regardless of whether incremental or absolute unit specifications are used.

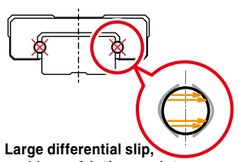
Field Serviceable Structure

Even though it uses a built-in structure, components such as the motor and ball screw can be replaced individually so maintenance tasks are smooth and simple.

4-row 2-point groove guide rail for superb durability.

4-row circular-arc-groove 2-point contact guide with less differential slip is adopted. When compared to the 2-row gothic-arch-groove 4-point contact guide, the 4-row circular-arc-groove 2-point contact guide has characteristics that the differential slip of the ball is small due to its structure and excellent rolling motion is maintained even when a large moment load is applied or the installation surface accuracy is poor. So this guide is difficult to produce a malfunction, such as unusual wear.

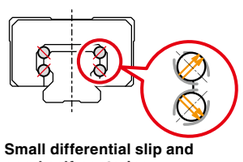
2-row gothic arch groove 4-point contact guide



Large differential slip, and large friction resistance

- Very susceptible to effects from poor installation precision, friction and elastic deformation
- Might break even within the calculated service life.

4-row circular arc groove 2-point contact guide



Small differential slip and good self-centering

- Highly resistant to alignment fluctuations and moment loads
- Resistant to breakage

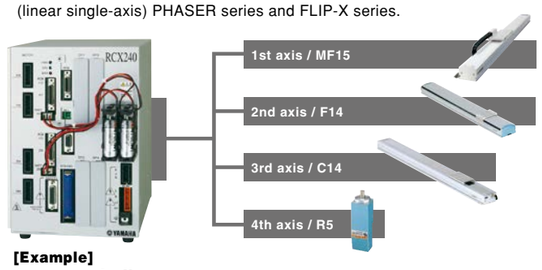
MULTI-FLIP / MULTI-PHASER

MULTI-AXIS ROBOT

One controller for multiple single-axis robots.

The advantage of multi-axis controller operation

- Sequence control is simple. System upgrades are inexpensive.
- More compact and saves more space than when operating multiple single-axis controllers.
- Allows more sophisticated control.
- Multi-axis controllers RCX221/RCX240 provide mixed control of the (linear single-axis) PHASER series and FLIP-X series.



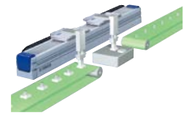
[Example]
4 axes controller

Robot set-up

2-unit robot setting:
Using a multi-task program along with this 2-unit setting allows asynchronous independent operation.
Using this along with an auxiliary axis setting allows even more freedom in assigning axes to tasks.

Synchronized double carrier:
This setting allows adding 2 motors to 1 axis on robot types where the motor unit runs separately such as the linear motor single-axis PHASER series or the N-type (nut rotation type) FLIP-X series.

Main auxiliary axis setting:
Use this auxiliary axis setting when simultaneous movement with the MOVE command is impossible. An axis set for the mainauxiliary axis moves only by the DRIVE command (axis separate movement command) and cannot operate from the MOVE command. Using this setting is recommended for operating on an axis that is not synchronized with the main robot.



Synchronized dual setting:
Make this setting when operating dual -drive (2-axis simultaneous control). Use this dual-drive setting on gantry type Cartesian robots having a long Y axis stroke when stabilizing at high acceleration/deceleration or when high-thrust is needed with high loads.

YP-X Series

PICK & PLACE ROBOTS

Quick selection table ▶▶ P23

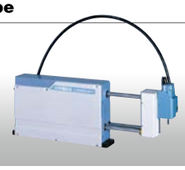
Ideal for high-speed pick & place tasks of small parts.
Positioning by servo control to eliminate mechanical adjustment.

2 axes type

YP220BX
YP320X

3 axes type

YP220BXR
YP320XR
YP330X

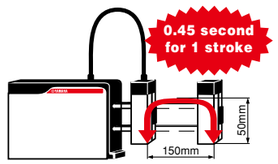


2 axes type

YP340X

High speed

High speed pick & place operation contributes largely to higher productivity.YP220BX under operation conditions of 50mm in vertical direction, 150mm in longitudinal direction, 50 in arch volume and 1kg load can achieve a total cycle time or .45 seconds.



High repeatability

Both extremely high-speed performance and high repeatability of +/-0.02mm (YP320X, YP320XR, YP330X, YP340X) are assured.

Compact size

Compact size with an overall length of 109mm (YP220BX) and moving arm mechanism enable construction of a space saving production line with less interference with 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

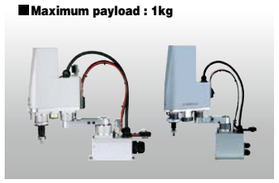
Quick selection table ▶▶ P24

Arm length of 120mm to 1200mm. Widest selection in industry. High-speed high-precision operation contributes to increased productivity.

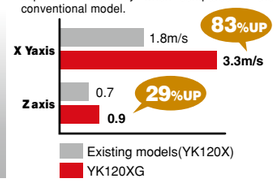
Extra small type SCARA model

YK120XG, YK150XG
YK180XG, YK180X
YK220X

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



Using a completely beltless structure exclusively this class, even extra small type achieves the high rigidity and high accuracy. By increasing the maximum motor rpm, the maximum speed is improved remarkably when compared to the conventional model.



Medium type

YK500XGL / XG
YK600XGL / XG/XGH

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

Small type

YK250XG
YK350XG
YK400XG

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

YK400XE

■Arm length : 400mm
■Maximum payload : 4kg

Large type

YK700XGL
YK700XG
YK800XG
YK900XG
YK1000XG
YK1200X

■Arm length : 700mm to 1200mm
■Maximum payload : 10kg to 50kg

Note : YK700XGL is a custom order model.
Please consult YAMAHA representative for details.

Wall-mount / inverse model

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

■Arm length : 300mm to 1000mm
■Maximum payload : 20kg

Wall-mount type
Type where the robot body is installed in the wall.

Inverse type
Type where 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 : 250mm to 1000mm
■Maximum payload : 20kg

Designed for applications in environment with water splash and dust (protection class equivalent to IP65).
●Please consult us for anti-droplet moisture protection for anything other than water.
Note : YK700XGP/YK800XGP/YK1000XGP is a custom order model.
Please consult YAMAHA representative for details.

30 Years of history

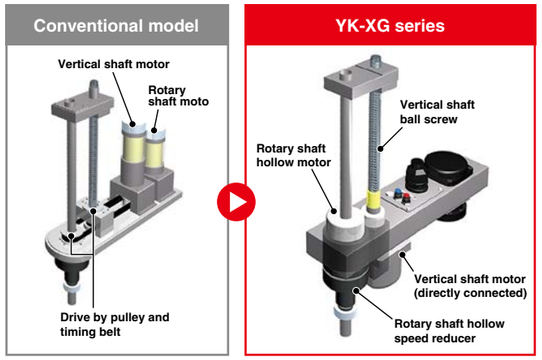
The first robot YAMAHA released was SCARA robot. Since that first SCARA robot called “CAME” was produced in 1979, some 30 years of SCARA robot innovations have been developed. These SCARA robots have undergone countless modifications in an ever-changing marketplace and amassed a hefty record of successful products making them an essential part of the YAMAHA robot lineup.

Internal structure designed for optimal operation

Note : Example shown is YK500XG.

Completely beltless structure

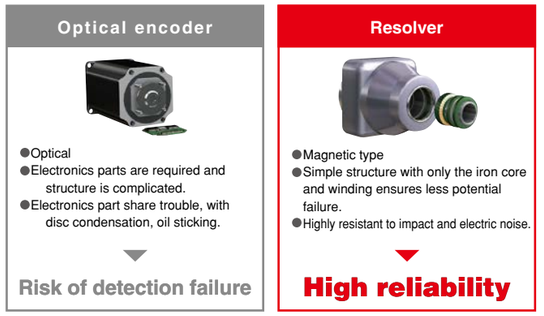
A totally beltless structure was achieved by using a ZR axis direct coupling structure. This direct drive structure drastically reduces wasted motion. It also maintains high accuracy over a long period of time. It ensures maintenance-free usage for extended periods with no worries about belt breakage, stretching or deterioration with age (feature applies to all XG series models and the YK180X/YK220X).



Environmentally rugged resolver provides closed loop control

The position detector is a resolver. The resolver has a simple yet strong structure using not electronic components or elements so these features make the structure extremely tough in harsh environments with a low breakdown rate. The resolver structure has none of the detection problems that occur in other detectors such as optical encoders whose electronic components breakdown or suffer from moisture or oil that sticks to the disk. Moreover, mechanical specifications for both absolute and incremental are common to all controllers so one can switch to either absolute or incremental just by setting a parameter.
Also if the absolute battery is completely worn down, the SCARA can operate on incremental. In the unlikely event of trouble one can feel secure knowing that there will be no need to stop the production line. The backup circuit has been completely renovated and now has a backup period extending to 1 year.

Note : The resolver has a simple structure not using electronic components at all. It is highly resistant to low and high temperatures, impacts, electrical noise, dust particles, oil, etc. and is used in automobiles, trains, and airplanes.

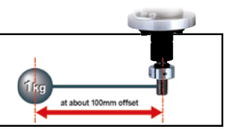


Superior rotary axis inertia moment capacity

SCARA robot performance is not limited to just standard cycle time. Actual work situations include a diverse range of heavy work pieces as well as work with large offsets. Using a low R axis inertia moment in those cases will help drastically cut the cycle time. All YAMAHA SCARA robots have a speed reducer directly coupled to the tip of the rotating axis. The R axis produces an extremely high allowable inertia moment which delivers high speed operation compared to structures where positioning is usually done by a belt after decelerating.

YK120XG
(R axis allowable moment inertia : 0.1kgfcms²)

If the tip load weight is 1kg, it is possible to operate at about 100mm offset.



●R axis allowable inertia moment :
Comparing YK120XG with competitor’s models

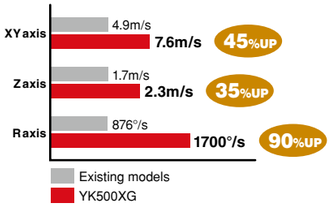
Figures when using 1kg load ○ Operation OK ✕ Operation deviates from allowable range of catalog values

Offset (mm)	Inertia (kgfcms²)	Operation	
		YK120XG	A Corp.
0	0.0039	○	○
45	0.025	○	✕
97	0.1	○	✕

◆ R axis allowable inertia moment : YK120XG 0.1kgfcms²
A Corp. 0.0039kgfcms²

High speed

The standard cycle time is fast of course but the YAMAHA design also stresses cycle time in the actual usage region. A drastic improvement in maximum speed was made by changing the gear ratio and maximum motor rpm. This also resulted in a better cycle time during long distance movement.



Hollow shaft and tool flange options are selectable

Useful options include a hollow shaft for easy wiring to the tip tool and a tool flange for tool clamping.

Note : YK250XG/YK350XG/YK400XG/YK500XGL/YK600XGL

Hollow shaft option for easy routing of air tubes and harness wires

Tool flange option for easy mounting of a tool to the tip

Improved maintenance features

The covers on the YAMAHA SCARA robot YK-XG series can be removed from the front or upwards. The cover is separate from the cable so maintenance tasks are easy.
On ordinary robots replacing the grease on the harmonic gear takes a great deal of time and trouble because the gear must be disassembled and position deviations might occur. On YAMAHA SCARA robots however the harmonic gear is the grease-sealed type so no grease replacement is needed (YK-500XG to YK1000XG).

Superior performance at low cost

YK-XE

For improved efficiency and reliability in production at affordable price.

Features of wall-mount / inverse type

YK-XGS

Completely beltless structure ensures high rigidity.

As the conventional ceiling-mount type was changed to the wall-mount type, the flexibility of the system design is improved. This enables downsizing of the production equipment. Additionally, as the inverse type allowing upward operation is added to the lineup, the flexibility of the work direction becomes wide. Additionally, completely beltless structure achieves a maximum payload of 20kg and a R-axis allowable inertia moment of 1kgm²* that is the maximum level in this class. A large hand can also be installed. This robot is suitable for heavy load work.

Note : YK700XGS to YK1000XGS

Dust-proof and Drip-proof type

YK-XGP

Bellows improved dust/drip proofing capability

The conventional robot was renewed to a dust-proof and drip-proof type completely beltless structure that can be used in a work environment where water droplets or dust particles scatter.
Belt deterioration is eliminated and the robot is highly resistant to harsh environments. Additionally, using up/down bellows structure makes it possible to improve the dust-proof and drip-proof performance.

Note : YK250XGP to YK600XGLP

•Equivalent to protection grade IP65(IEC60529)
•Dust-proof and drip-proof connector for user wiring is available as a standard.

YK-TW Series

ORBIT TYPE SCARA ROBOT

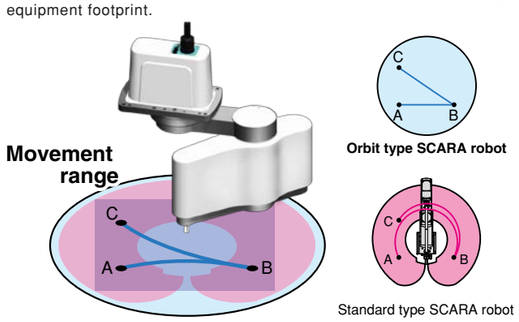
YK350TW
YK500TW

Quick selection table ▶▶ P24

Superior Positioning Accuracy and High Speed Enables a smaller equipment footprint by eliminating the dead space at the center of the movement range.

YK-TW can move anywhere through the full ϕ1000 mm*2 work envelope.

Featuring a ceiling-mount configuration with a wide arm rotation angle, the YK-TW can access any point within the full ϕ1000 mm downward range. This eliminates all motion-related restrictions with regard to pallet and conveyor placement operations, while dramatically reducing the equipment footprint.

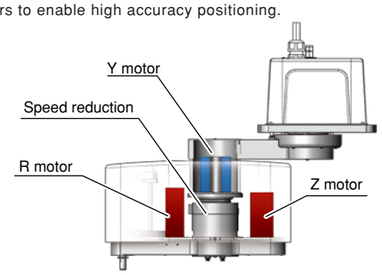


Orbit type SCARA robot

Standard type SCARA robot

YK-TW offers a repeated positioning accuracy of ±0.01 mm*1 (XY axes).

Higher repeated posi t ioning accuracy than that of fered by a parallel-link robot. This was accomplished by optimizing the robot's weight balance through an extensive re-design of its internal construction. The lightweight yet highly rigid arm has also been fitted with optimally tuned motors to enable high accuracy positioning.



Hollow construction

Y-motor and reduction gear feature a hollow construction which allows them to be housed inside the harness arm.

360 ° Rotation.

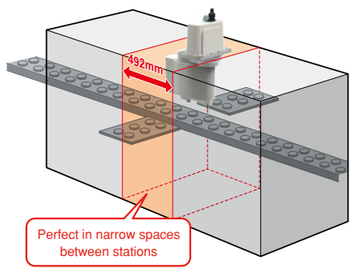
Optimized rotation center of gravity moment

Weight balance was optimized by placing the R-motor and Z-motor at the left and right sides respectively.

Reduced inertia enables high-speed motion.

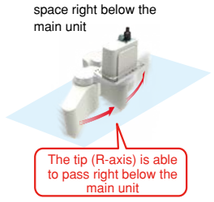
Ideal for narrow space applications

Minimum installation width 492mm



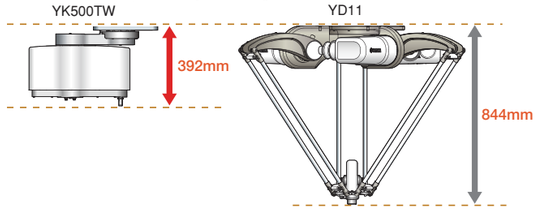
Underpass motion

Optimize use of the space right below the main unit



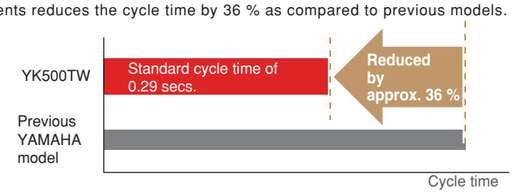
YK-TW offers both a lower profile and a smaller footprint.

YK-TW height is only 392 mm. This compact size enables more freedom in the equipment layout design.



Standard cycle time of 0.29 secs.*2

Y-axis (arm 2) passes beneath the X-axis (arm 1) and it has a horizontal articulated structure, allowing it to move along the optimal path between points. Moreover, the optimized weight balance of the internal compo-nents reduces the cycle time by 36 % as compared to previous models.



The standard cycle time for moving a 1-kg load horizontally 300 mm and up/down 25 mm is shortened by approximately 36 % compared to existing YAMAHA models.

YK-TW has a total height of only 392 mm, and weighs only 27 kg*2. Lower inertia = Lighter frame

An optional dedicated installation frame is available for the YK-TW.
For details, contact a YAMAHA sales representative.

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

CLEAN ROOM Type

CLEAN ROBOTS

Quick selection table ▶▶ P24-25

Class 10 rating sealed structure reduces particle generation, and air-intake efficiency improvement to establish both high cleanliness and high performance.

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

- Arm length : 180mm to 1000mm
- Intake air : 30 to 60N /min
- Degree of cleanliness : CLASS ISO3 (ISO14644-1) CLASS10 (FED-STD-209D)
- Maximum payload : 20kg

YK250XGC

YK400XGC

The Z-axis spline is covered with bellows made of materials with lower dust emission and other sliding parts are sealed completely. The harness is also completely built-in and the suction inside the robot is performed from the rear of the base to prevent dust emission.

Bellows on vertical axis improves reliability of the clean performance.

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

- Stroke : 50 to 2050mm
- Intake air : 15 to 90N /min
- Cleanliness rating : CLASS 10 Note
- Maximum payload : 120kg (Horizontal installation)

Note : C4L/C4LH, C5L/C5LH, and C6L conform to CLASS ISO3 (ISO14644-1).

C6L C5L C4L

Clean room specifications of “FLIP-X series”. An appropriate model suitable for the application can be selected from 14 models ranging from lightweight and compact model to large model with a maximum payload of 120 kg. A suction air joint is available as a standard, low dust emission grease is used, and stainless steel sheet with excellent durability is mounted on the slide table surface to achieve high cleanliness.

Completely beltless structure improves rigidity.

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

- Stroke : 50 to 800mm
- Intake air : 15 to 80N /min
- Cleanliness rating : CLASS 10
- Maximum payload : 12kg (Horizontal installation)

SSC04 SSC05 SSC05H

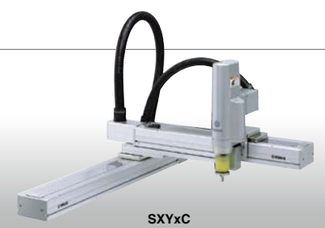
Clean room specifications of “TRANSERVO series”. Use of a newly developed vector control system with adoption of stepping motor makes it possible to achieve the functions and performances similar to the servomotor at a low cost.
A suction air joint is available as a standard, low dust emission grease is used, and stainless steel sheet with excellent durability is mounted on the slide table surface to achieve high cleanliness.

Improved maintenance features

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

- Intake air : 60 to 90N /min
- Cleanliness rating : CLASS 10
- Maximum payload : 20kg
- Maximum speed : 1000mm/sec

Note : User cable D-Sub 25 pin connector 24 conductors, 0.3 sq
Note : User tube three 6 air tubes.



SXYxC

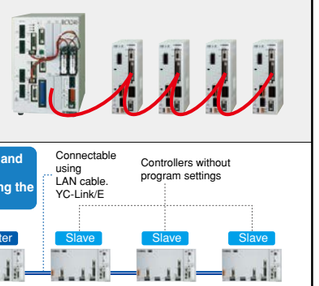
Clean room applicable type of “Cartesian robot”. Use of stainless steel sheets with excellent durability makes it possible to design the opening at its minimum level. The robot is applicable to CLASS10 with less suction amount. Furthermore, as a super-high speed unit of the SCARA robot is used for the ZR-axis of SXYxC, the cycle time is greatly shortened.

CONTROLLERS

CONTROLLERS

Wide range of control systems to choose from. From single axis positioner to multi-axis comprehensive absolute controller covering DC Stepping Motor, AC Servo Motor, and Linear Motor.

	TRANSERVO	FLIP-X		PHASER
	Stepping motor	[T4L/T5L] Small servo (24V・30W)	General-purpose servo (30 to 600W)	Linear motor
1 axis ●I/O point trace ●Remote command	TS-S2, TS-SH (P)		TS-X (P)	TS-P (P)
1 axis ●Pulse train	TS-SD (D)	ERCD (C)	RDV-X (D)	RDV-P (D)
2 axes ●Program (YAMAHA SRC language) ●I/O point trace ●Remote command ●Online instructions			SR1-X (C)	SR1-P (C)
2 axes ●Program (YAMAHA BASIC language) ●I/O point trace ●Remote command ●Online instructions			RCX320 (C), RCX222 (C)	RCX221 (C)
3, 4 axes ●Program (YAMAHA BASIC language) ●I/O point trace ●Remote command ●Online instructions				RCX340 (C)
5 to 8 axes	YC-Link: YC-LINK couples 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: Up to four RCX340 controllers (up to 16 controllable axes) can be connected.			



P Robot positioner

Simple operation only by specifying point number data

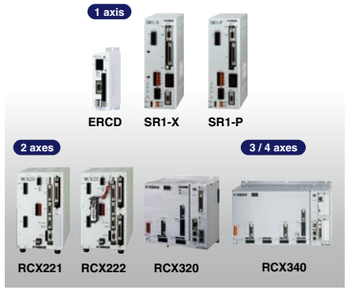
The TS series are robot positioners that operate just by specifying a point No. and entering a START signal.These can do positioning or push operations without having to write a program. Speed changes can be made during movement by carrying out linked operation.

D Robot driver

Pulse train input driver for single-axis robot

As the operation with the robot language is omitted and the driver is dedicated to the pulse train input, the driver can be easily built into the automatic machine unit as a compact control unit.

C Robot controllers



Diverse command methods

Select an optimal method from the different command methods including program operation, point trace, remote command, and on-line command. Program uses the YAMAHA SRC language resembling BASIC. Use it to execute a variety of operations ranging from simple tasks to I/O output and conditional branching, etc.

Powerful support software

The low-cost and high-performance TS-Manager was newly developed for the TS series. This single software performs all operations such as point data settings, editing, backup and teaching tasks. It also comes loaded with real-time trace functions such as current values, speed, load factors, current values, and voltage values.

TS-Manager　VIP+　RCX-Studio Pro[Note]

Note : This software is only downloaded from the website.

iVY2 System

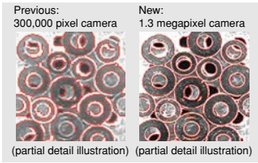
ROBOT VISION FOR THE RCX340

A robot-integrated vision system means simplicity, high functionality, and reliability. Ease of original iVY, with greatly improved performance.

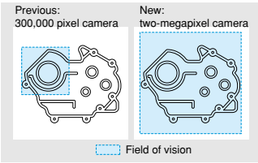
Supporting five-megapixel cameras

(Choose from 300,000 pixel, 1.3 megapixel, 2 megapixel and 5 megapixel)

Detailed edge detection is possible even if workpieces are touching each other or have a complex shape.



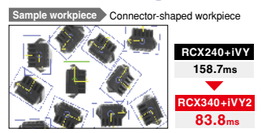
A single search allows detection even for a large workpiece, improving takt.



Approximately double the search speed

(compared to previous model)

The search speed is approximately double that of the previous model. Even a large number of workpieces can be detected at high speed.This can be used for a wide variety of applications, including molded plastic parts or food items.



254 types can be registered

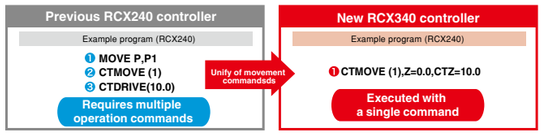
Setup changes require only that part numbers be changed.

With monitor output

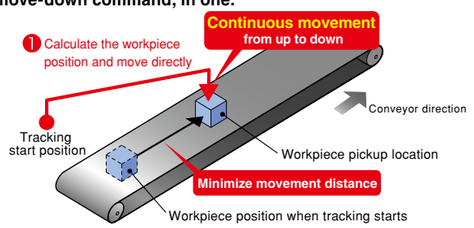
Monitor the search status while making calibration settings or during automatic operation.

Conveyor tracking capability up to 100 CPM.

The vision camera detects the position and orientation of parts on moving conveyor for pick & place application.

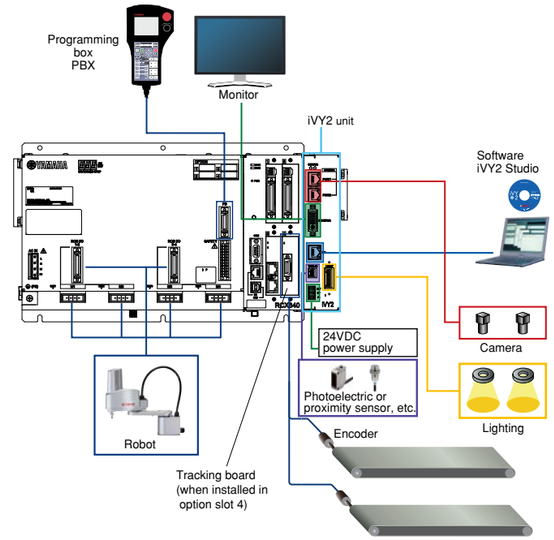


Move-up command, track workpiece command, and move-down command, in one.



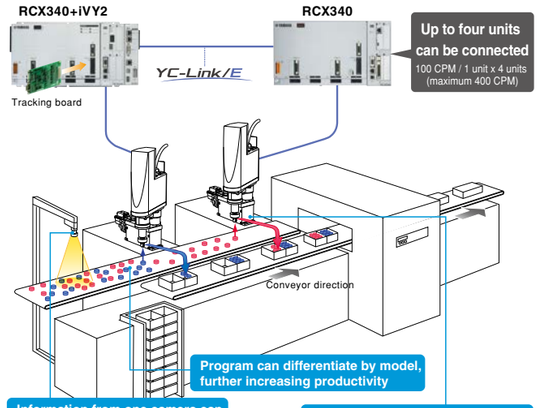
Operating conditions: YK500XG / Payload mass 1 kg (total of tool and workpiece) / Horizontal movement 250 mm / Vertical movement 1 mm / Conveyer speed 100 mm/sec

System configuration illustration iVY2



* The illustration above shows an example system with the tracking board and an iVY2 unit (when the lighting control board option is selected).
* Connections to the STD.DIO, ACIN, and SAFETY connectors are not shown in the above illustration.

Control multiple robots for additional increase in productivity.



YRG Series

ELECTRIC GRIPPER

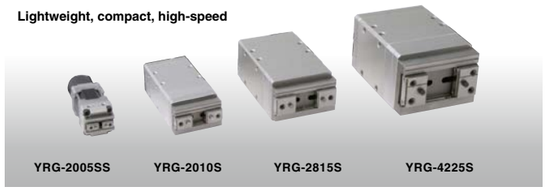
Quick selection table ▶▶ P23

Easy operation by YAMAHA's robot language.

Gripping power control	Measuring	Speed control	Multi-point Control	Workpiece check function
Adjustable in 1% increment from 30 to 100%.	Measures a workpiece by position detection.	Adjustable in 1% increment from 20 to 100% for speed and 1 to 100% for acceleration.	Up to 10,000 points	Utilizes the HOLD output signal to check if the gripper fails to grip a workpiece or drops it, without using a sensor.

S type Single cam type

Lightweight, compact, high-speed



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

Three fingers type

Compact, high rigidity, long stroke

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

Electric gripper for high-precision gripping force, positioning, and speed control

YRG delivers gripping power control, speed and acceleration control, multi-point positioning, and measuring of workpieces, which have been difficult for air-driven devices. The YRG proves a flexible fit for a wide range of applications.

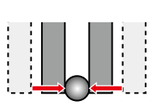
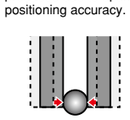
Gripping force control

The gripping force can be set in 1% increments. A fragile or deformable workpiece, such as glass or spring can also be gripped. The gripping force is constant even when the finger position is changed.

Pneumatic control	Electric control
Fine adjustment of the regulator is difficult.	Gripping force can be set in a range of 30% to 100% in 1% increments.
	

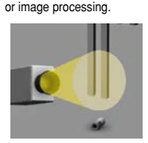
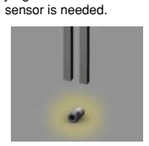
Multi-point Control

The finger position can be set to a desired position corresponding to the workpiece size. This contributes to efficiency improvement of the line with workpiece size and material mixed or the line needing frequent setup.

Pneumatic control	Electric control
Stroke loss is produced.	Stroke loss is not produced due to optimal positioning accuracy.
	 Contributes to tact-up.

Workpiece presence check function

The electric gripper outputs the HOLD signal. Missing workpiece gripping and workpiece drop during transfer can be checked. No external sensor is needed.

Pneumatic control	Electric control
Workpiece miss-gripping or drop is judged by the sensor or image processing.	Workpiece drop can be judged. No external sensor is needed.
	

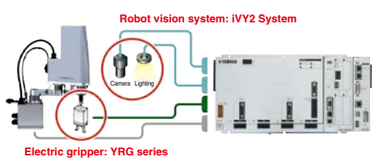
Controllable with a single controller

The gripper can be controlled with a single controller. Since there's no need for interchange with a PLC or other host device, setup and startup is dramatically simpler.

Combination with a vision system supports a wide range of applications

As the YRG series is combined with controller integrated robot vision "iVY2 System", the operations from the positioning using the camera to workpiece handling can be controlled in the batch mode using the RCX340 controller. Sophisticated systems can be easily configured.

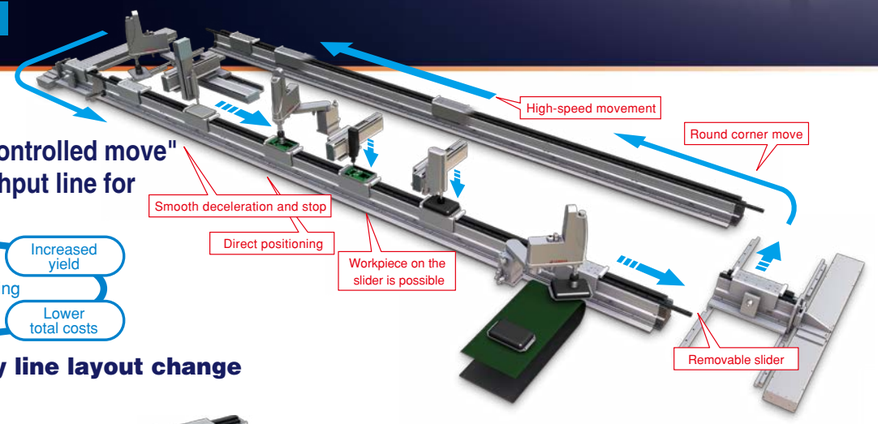
* Can also be used with the RCX240 controller



LCM100

LINEAR CONVEYOR MODULES

Basic specifications ▶▶ P26

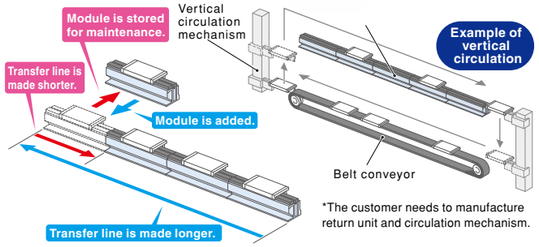


From "simple flow" to "controlled move" Construct a rapid-throughput line for increased profitability.

Module system for easy line layout change

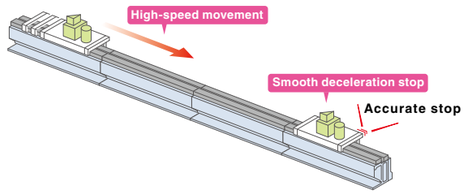
A transfer line is configured by connecting the number of necessary modules as required. Of course, new line configuration and line change can be started up speedily. Additionally, operations, such as shortening of the line, diversion of excess modules to other line, and storing of excess modules for the maintenance work can be performed.


Linear conveyor



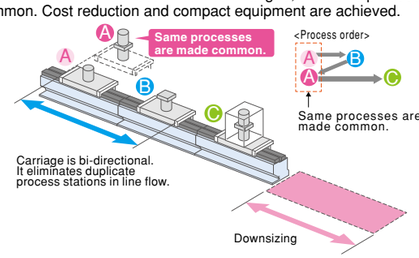
High-speed movement and smooth deceleration stop using servo control prevent mechanical stopper collision.

Smooth deceleration stop by servo control. Since workpiece deviation by stopper collision or damage is eliminated, the highspeed movement is possible.



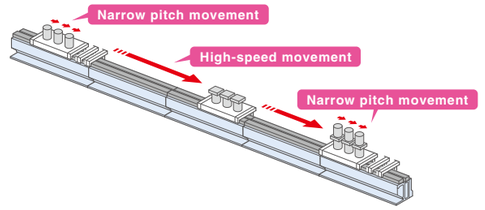
Freedom in line configuration using flexible slider movement.

LCM100 can freely change the forward movement, backward movement, acceleration, and deceleration. As flexible operations, such as stopping at necessary location correctly. speed change, or moving only some sliders backward can be made, the line can be designed with a higher flexibility.
Since the movement direction can be changed, the same processes are made common. Cost reduction and compact equipment are achieved.



Efficient move between tasks in line

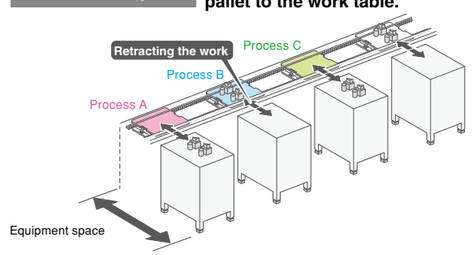
- Narrow pitch movement is possible.
- Movement time can be reduced by combining the use of different move ments, such as using pitch-feed for the same processes inshort-time processes while transferring three workpieces at the same time at a high speed in long-time processes.



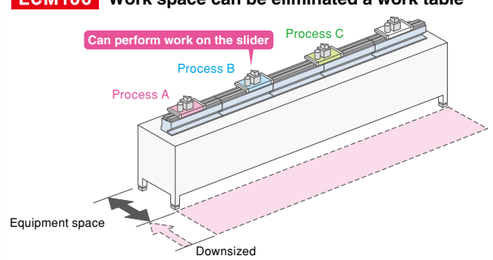
Performing tasks directly on the conveyor

- Reduces operation time and work space = $$.

Conventional system Have to retract the work from the pallet to the work table.



LCM100 Work space can be eliminated a work table



YA Series

VERTICALLY ARTICULATED ROBOTS

6-axis | 7-axis

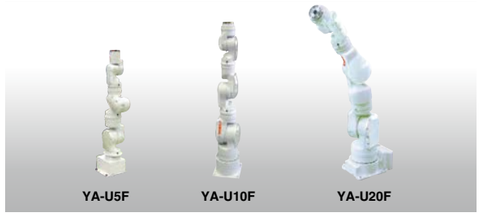
Quick selection table ▶▶ P26

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

6-axis

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

7-axis



YA-U5F YA-U10F YA-U20F

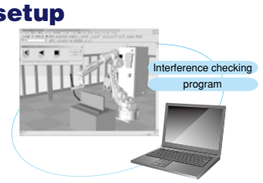
High-speed operation reduces cycle time

Thanks to high-speed, low-inertia AC servo motors, an arm designed for light weight, 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.

Workpieces with a high wrist load 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 in a personal computer, and easily perform engineering tasks such 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 support

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 short-ened.

7-axis

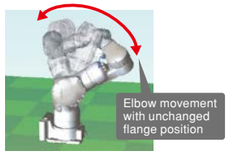
Access the workpiece from the opposite side or from below

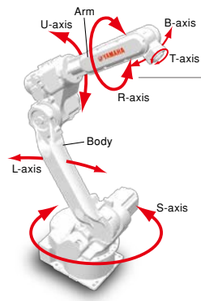
Rotation of the seventh axis enables flexible movement with the same freedom of motion as a human arm, allowing the workpiece to be accessed from the opposite side or from below. This allows the robot to enter narrow locations that a person could not fit in, or to approach the workpiece in a way that 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.

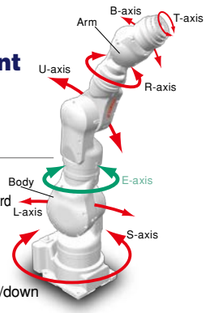




6-axis robots

S-axis: Rotate the body horizontally
L-axis: Move the body forward/backward
U-axis: Move the arm up/down
R-axis: Rotate the arm
B-axis: Move the tip of the arm up/down
T-axis: Rotate the tip of the arm

Free arm movement further boosts productivity.



7-axis robots

S-axis: Rotate the body horizontally
L-axis: Move the body forward/backward
E-axis: Twist the arm
U-axis: Move the arm up/down
R-axis: Rotate the arm
B-axis: Move the tip of the arm up/down
T-axis: Rotate the tip of the arm

Controller Specifications **YAC100**

YAC100 Controller Specifications	
Configuration	Standard: IP20 (open structure), Option: IP54 (dustproof housing)
Dimensions	470 (W)×420 (D)×200 (H) mm (Protrusions are not included.)
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% to -15%), 50/60 Hz Three-phase 200/220 VAC (+10% to -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. (Can be installed in the controller.)
Painting Color	Munsell notation 5Y7/1 (reference value)

* YA-R6F: Three-phase only.

MEMO

Robonity MOTOR-LESS SINGLE AXIS ACTUATOR

Basic model LBAS

Model		LBAS04		LBAS05				LBAS08		
Adaptable motor		50 W		100 W				200 W		
Repeatability Note 1		+/-0.01 mm		+/-0.01 mm				+/-0.01 mm		
Deceleration mechanism		Shifting position ball screw ϕ 10 (C7 class)		Shifting position ball screw ϕ 12 (C7 class)				Shifting position ball screw ϕ 16 (C7 class)		
Stroke		50 mm to 800 mm (50 mm pitch)		50 mm to 800 mm (50 mm pitch)				50 mm to 1100 mm (50 mm pitch)		
Maximum speed Note 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 Note 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 Note 3 (or equivalent)		71 N	141 N	84 N	169 N	339 N	854 N	174 N	341 N	683 N
Maximum dimensions of cross section of main unit		W 44 mm × H 52 mm		W 54 mm × H 60 mm				W 82 mm × H 78 mm		
Overall length		ST + 214 mm		ST + 220.5 mm				ST + 278 mm		
Using ambient temperature and humidity		0 to 40 °C, 35 to 80 %RH (non-condensing)								

Note 1. Positioning repeatability in one direction.
Note 2. When a moving distance is short and depending on an operation condition, it may not reach the maximum speed.
Note 3. The rated thrust and maximum transferable weight are values assuming the attached motor outputs the rated torque.

Advanced model LGXS

Model		LGXS05			LGXS05L			LGXS07			
Adaptable motor		50 W			100 W			100 W			
Repeatability Note 1		+/-0.005 mm			+/-0.005 mm			+/-0.005 mm			
Deceleration mechanism		Ground ball screw ϕ 12 (C5 class)			Ground ball screw ϕ 12 (C5 class)			Ground ball screw ϕ 15 (C5 class)			
Stroke		50 mm to 800 mm (50 mm pitch)			50 mm to 800 mm (50 mm pitch)			50 mm to 1100 mm (50 mm pitch)			
Maximum speed Note 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 Note 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 Note 3 (or equivalent)		41 N	69 N	138 N	84 N	169 N	339 N	56 N	84 N	169 N	339 N
Maximum dimensions of cross section of main unit		W 48 mm × H 65 mm			W 48 mm × H 65 mm			W 70 mm × H 76.5 mm			
Overall length		ST + 131.5 mm			ST + 161.5 mm			ST + 202 mm			
Degree of cleanliness Note 4		ISO CLASS 3 (ISO14644-1) or equivalent									
Intake air Note 5		30 Nℓ/min to 100 Nℓ/min			30 Nℓ/min to 100 Nℓ/min			30 Nℓ/min to 115 Nℓ/min			
Using ambient temperature and humidity		0 to 40 °C, 35 to 80 %RH (non-condensing)									

Model		LGXS10				LGXS12				LGXS16			LGXS20		
Adaptable motor		200 W				400 W				750 W			750 W		
Repeatability Note 1		+/-0.005 mm				+/-0.005 mm				+/-0.005 mm			+/-0.005 mm		
Deceleration mechanism		Ground ball screw ϕ 15 (C5 class)				Ground ball screw ϕ 15 (C5 class)				Ground ball screw ϕ 20 (C5 class)			Ground ball screw ϕ 20 (C5 class)		
Stroke		100 mm to 1250 mm (50 mm pitch)				100 mm to 1250 mm (50 mm pitch)				100 mm to 1450 mm (50 mm pitch)			100 mm to 1450 mm (50 mm pitch)		
Maximum speed Note 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 Note 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 Note 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
Maximum dimensions of cross section of main unit		W 100 mm × H 99.5 mm				W 125 mm × H 101 mm				W 160 mm × H 130 mm			W 200 mm × H 140 mm		
Overall length		ST + 175.5 mm				ST + 211.5 mm				ST + 242.5 mm			ST + 288.5 mm		
Degree of cleanliness Note 4		ISO CLASS 3 (ISO14644-1) or equivalent													
Intake air Note 5		30 Nℓ/min to 90 Nℓ/min													
Using ambient temperature and humidity		0 to 40 °C, 35 to 80 %RH (non-condensing)													

Note 1. Positioning repeatability in one direction.
Note 2. When a moving distance is short and depending on an operation condition, it may not reach the maximum speed.
Note 3. The rated thrust and maximum transferable weight are values assuming the attached motor outputs the rated torque.
Note 4. When using in a clean environment, attach a suction air joint. The degree of cleanliness is the cleanliness level achieved when using at 1000 mm/sec or less.
Note 5. The required suction amount will vary according to the operating conditions and operating environment.

TRANSERVO CLOSED LOOP STEPPING MOTOR SINGLE-AXIS ROBOTS

Type	Size (mm) Note 1	Model	Lead (mm)	Maximum payload(kg) Note 2			Maximum speed (mm/sec) Note 3	Stroke (mm)
				Horizontal	Vertical			
					SR	SRD		
SS type (Slide type) Inline model / Foldback model	W49 × H59	SS04-S SS04-R(L)	12	2	1		600	50 to 400
			6	4	2		300	
			2	6	4		100	
	W55 × H56	SS05-S SS05-R(L)	20	4	-		1000	50 to 800
			12	6	1		600	
			6	10	2		300	
	W55 × H56	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)	W65 × H64	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	W48 × H56.5	SR03-S SR03-R(L) SR03-U	12	10	4		500	50 to 200
			6	20	8		250	
	W48 × H58	SR04-S SRD04-R(L)	12	25	5		500	50 to 300
			6	40	12		250	
			2	45	25		80	
	W56.4 × H71	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	W105 × H56.5	SRD03-S SRD03-U	12	10	3.5		500	50 to 200
			6	20	7.5		250	
	W135 × H58	SRD04-S SRD04-U	12	25	4		500	50 to 300
			6	40	11		250	
			2	45	24		80	
	W157 × H71	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 type) Inline model/ Foldback model	W45 × H46	STH04-S	5	6	2		200	50 to 100
	W73 × H51	STH04-R(L) Note 4	10	4	1		400	
	W61 × H65	STH06	8	9	2		150	50 to 150
	W106 × H70	STH06-R(L)	16	6	4		400	

Type	High(mm)	Model	Torque type	Rotational torque (N/m)	Maximum pushing torque (N/m)	Maximum speed (mm/sec) Note 3	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 (mm) Note 1	Model	Lead (mm)	Maximum payload(kg) Note 2		Maximum speed (mm/sec) Note 3	Stroke (mm)
				Horizontal	Vertical		
BD type (Belt type)	W40 × H40	BD04	48	1	-	1100	300 to 1000
	W58 × H48	BD05	48	5	-	1400	300 to 2000
	W70 × H60	BD07	48	14	-	1500	300 to 2000

Note 1. Size is the approximate cross sectional size.
Note 2. Maximum speed varies with the payload. See the SR type page for more details.
Note 3. Maximum speed decreases due to ball screw critical speed when the stroke is long. See the SR type page for more details.
Note 4. STH04-R (L) with 50st brake is not available.

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

FLIP-X SINGLE-AXIS ROBOTS

Type	Size (mm) Note 1	Model	Lead (mm)	Maximum payload (kg)		Maximum speed (mm/sec)	Stroke (mm)
				Horizontal	Vertical		
T type Compact model	W45 × H53	T4L/T4LH	12	4.5	1.2	720	50 to 400
			6	6	2.4	360	
			2	6	7.2	120	
	W55 × H52	T5L/T5LH	20	3	-	1200	50 to 800
			12	5	1.2	800	
			6	9	2.4	400	
	W65 × H56	T6L	20	10	-	1333	50 to 800
			12	12	4	800	
			6	30	8	400	
	W94 × H98	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	W80 × H65	F8	20	12	-	1200	150 to 800
			12	20	4	720	
			6	40	8	360	
	W80 × H65	F8L	30	7	-	1800	150 to 1050
			20	20	4	1200	
			10	40	8	600	
			5	50	16	300	
	W80 × H65	F8LH	20	30	-	1200	150 to 1050
			10	60	-	600	
			5	80	-	300	
	W110 × H71	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	
	W136 × H83	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	
	W168 × H100	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	
	W202 × H115	F20	40	60	-	2400	200 to 1450
			20	120	25	1200	200 to 1250
			10	-	45	600	
	W202 × H120	F20N	20	80	-	1200	1150 to 2050
GF type High rigidity model	W145 × H91.5	GF14XL	20	45	-	1200	750 to 2000
	W168 × H105.5	GF17XL	20	90	-	1200	850 to 2500
N type Nut rotation model	W145 × H120	N15 (Single carriage)	20	50	-	1200	500 to 2000
		N15D(Double carriage)					250 to 1750
	W180 × H115	N18 (Single carriage)		80	-		500 to 2500
		N18D (Double carriage)					250 to 2250
B type Timing belt drive model	W100 × H81	B10	Belt drive	10	-	1875	150 to 2550
	W146 × H94	B14(Standard)	Belt drive	20	-	1875	150 to 3050
		B14H(High thrust)	Belt drive	30	-	1875	
R type Rotation axis model	-	R5	-	0.12kgm ^{2}	-	360°/sec	360°
		R10		0.36kgm ^{2}	-		
		R20		1.83kgm ^{2}	-		

Note 1. Size is the approximate cross sectional size.

PHASER LINEAR MOTOR SINGLE-AXIS ROBOTS

Type	Size (mm) Note 1	Model	Carriage	Maximum payload(kg)	Maximum speed (mm/sec)	Stroke (mm)
MF type Steel cored linear motor with falt magnet	W85 × H80	MF7	Single	10 (7) Note 2	2500	100 to 4000(Horizontal) 100 to 2000(Wall mount)
		MF7D	Double			100 to 3800(Horizontal) 100 to 1800(Wall mount)
	W100 × H80	MF15	Single	30 (15) Note 2		100 to 4000(Horizontal) 100 to 2000(Wall mount)
		MF15D	Double			100 to 3800(Horizontal) 100 to 1800(Wall mount)
	W150 × H80	MF20	Single	40 (20) Note 2		150 to 4050
		MF20D	Double			150 to 3850
		MF30	Single	60 (30) Note 2		100 to 4000
		MF30D	Double			150 to 3750
	W210 × H100	MF75	Single	160 (75) Note 2		1000 to 4000
		MF75D	Double			680 to 3680

Note 1. Size is the approximate cross sectional size. Note 2. If using at maximum speed then the payload will be as shown in the ( ).

XY-X CARTESIAN ROBOTS

Model	Arm variations					Number of axes	Maximumpayload (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. The above maximum payloads are maximum stroke lengths are values when using arm type/cable carrier specifications.

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
Three fingers	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

● Holding power control: 30 to 100% (1% steps) ● Speed control: 20 to 100% (1% steps) ● Acceleration control: 1 to 100% (1% steps)
● Multipoint position control: 10,000 max. ● Workpiece size judgment: 0.01 mm units (by ZON signal)

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 (sec) Note 1
Completely beltless model	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) Note 3	0.49
		YK350XG	350		
		YK400XG	400		
Low cost high performance model		YK400XE	400	4.0 (3.0) Note 3	0.41
Completely beltless model	Medium type	YK500XGL	500	5.0 (4.0) Note 3	0.59
		YK500XG	500	10.0	0.45
		YK600XGL	600	5.0 (4.0) Note 3	0.63
		YK600XG	600	10.0	0.46
		YK600XGH	600	20.0 (19.0) Note 3	0.47
	Large type	YK700XGL	700	10.0 (9.0) Note 3	0.50
		YK700XG	700	20.0 (19.0) Note 3	0.42
		YK800XG	800		0.48
		YK900XG	900		0.49
		YK1000XG	1000		
-		YK1200X	1200	50.0	0.91
Wall mount/inverse model		YK300XGS Note 2	300	5.0 (4.0) Note 3	0.49
		YK400XGS Note 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	0.57
		YK350XGP	350		
		YK400XGP	400		
		YK500XGLP	500	4.0	0.74
		YK500XGP	500	10.0	0.55
		YK600XGLP	600	4.0	0.74
		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) Note 3	0.29

Note 1. **Extra small type** Maximum payload: 0.1kg (100mm in the horizontal direction, 25mm-reciprocating in the vertical direction, coarse positioning)
Orbit type Maximum payload: 1kg (300mm in the horizontal direction, 25mm-reciprocating in the reciprocating direction, coarse positioning)
Other type Maximum payload: 2kg (300mm in the horizontal direction, 25mm-reciprocating in the reciprocating direction, coarse positioning)
Note 2. The YK300XGS and YK400XGS are custom-order products. For details about the delivery time, please contact YAMAHA.
Note 3. For the option specifications (tool flange mount type and user wiring/tubing through spline type), the maximum payload becomes the value in ( ).

CLEAN ROOM SCARA ROBOTS

Type	Model	Arm length (mm)	Maximum payload (kg)	Standard cycle time (sec) Note	Beltless structure
Extra small type	YK180XC	180	1.0	0.42	○
	YK220XC	220	1.0	0.45	○
Small type	YK250XGC	250	4.0	0.57	○
	YK350XGC	350	4.0	0.57	○
	YK400XGC	400	4.0	0.57	○
Medium type	YK500XC	500	10.0	0.53	-
	YK500XGLC	500	4.0	0.74	○
	YK600XC	600	10.0	0.56	-
	YK600XGLC	600	4.0	0.74	○
Large type	YK700XC	700	20.0	0.57	-
	YK800XC	800	20.0	0.57	-
	YK1000XC	1000	20.0	0.60	-

Note. **Extra small type** Maximum payload: 0.1kg (100mm in the horizontal direction, 25mm-reciprocating in the vertical direction, coarse positioning)
Other type Maximum payload: 2kg (300mm in the horizontal direction, 25mm-reciprocating in the reciprocating direction, coarse positioning)

CLEAN ROOM SINGLE-AXIS ROBOTS

Type	Model	Size (mm) Note	Lead (mm)	Maximum payload (kg)		Maximum speed (mm/sec)	Stroke (mm)
				Horizontal	Vertical		
FLIP-XC type	C4L C4LH	W45xH55	12	4.5	1.2	720	50 to 400
			6	6	2.4	360	
			2	6	7.2	120	
	C5L C5LH	W55xH65	20	3	-	1000	50 to 800
			12	5	1.2	800	
			6	9	2.4	400	
	C6L	W65xH65	20	10	-	1000	50 to 800
			12	12	4	800	
			6	30	8	400	
	C8	W80xH75	20	12	-	1000	150 to 800
			12	20	4	720	
			6	40	8	360	
	C8L	W80xH75	20	20	4	1000	150 to 1050
			10	40	8	600	
			5	50	16	300	
	C8LH	W80xH75	20	30	-	1000	150 to 1050
			10	60	-	600	
			5	80	-	300	
	C10	W104xH85	20	20	4	1000	150 to 1050
			10	40	10	500	
			5	60	20	250	
	C14	W136xH96	20	30	4	1000	150 to 1050
			10	55	10	500	
			5	80	20	250	
	C14H	W136xH96	20	40	8	1000	150 to 1050
			10	80	20	500	
			5	100	30	250	
	C17	W168xH114	20	80	15	1000	250 to 1250
			10	120	35	600	
	C17L	W168xH114	50	50	10	1000	1150 to 2050
	C20	W202xH117	20	120	25	1000	250 to 1250
			10	-	45	500	
SSC type (TRANSERVO)	SSC04	W49xH59	12	2	1	600	50 to 400
			6	4	2	300	
			2	6	4	100	
	SSC05	W55xH56	20	4	-	1000	50 to 800
			12	6	1	600	
			6	10	2	300	
	SSC05H	W55xH56	20	6	-	1000	50 to 800
			12	8	2	600(Horizontal)/ 500(Vertical)	
			6	12	4	300(Horizontal)/ 250(Vertical)	

Note. Size is the approximate cross sectional size.

CLEAN ROOM CARTESIAN ROBOTS

Type	Model	Axes	Moving range (mm)	Maximum speed (mm/sec)	Maximum payload (kg)
2 axes	SXYxC	X	150 to 1050mm	1000	20
		Y	150 to 650mm	1000	
3 axes	SXYxC (ZSC12)	X	150 to 1050mm	1000	3
		Y	150 to 650mm	1000	
		Z	150mm	1000	
	SXYxC (ZSC6)	X	150 to 1050mm	1000	5
		Y	150 to 650mm	1000	
		Z	150mm	500	
4 axes	SXYxC (ZRSC12)	X	150 to 1050mm	1000	3
		Y	150 to 650mm	1000	
		Z	150mm	1000	
		R	360°	1020°/sec	
	SXYxC (ZRSC6)	X	150 to 1050mm	1000	5
		Y	150 to 650mm	1000	
		Z	150mm	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
Repeat positioning accuracy	+/-0.015 mm (single slider)[Note 1] / width 0.1 mm (mutual difference among all sliders)[Note 2]
Scale	Electromagnetic type / resolution 5 µm
Max. speed	3000 mm/sec
Max. acceleration	2G
Max. payload	15kg[Note 3 Note 4]
Rated thrust	48N
Total module length	640 mm (4M) / 480 mm (3M) / 400 mm (for 2MT circulation)
Max. number of combined modules	16 (total length: 10240 mm)
Max. number of sliders	16 (when 16 modules are combined)
Min. pitch between sliders	420mm
Mutual height difference between sliders	0.08mm
Max. external size of body cross-section	W 136.5 mm × H 155 mm (including slider)
Bearing method	1 guide rail / 2 blocks (with retainer)
Module weight	12.5kg (4M) /9.4kg (3M) /7.6kg (2MT)
Slider weight	2.4 kg / 3.4 kg (when the belt module is used.)
Cable length	3m/5m
Controller	LCC140

Note 1. Repeatability when positioning in the same direction (pulsating).
Note 2. Positioning accuracy in the pulsating when using the position correction function with the RFID.
Note 3. Weight per single slider.
Note 4. When used together with the belt module, the max. payload becomes 14 kg since the parts dedicated to the belt are attached to the slider.

LCC140 Controller

Basic specifications	
Controllable robot	Linear conveyor module LCM series
Outside dimensions	W402.5×H229×D106.5mm
Main body weight	4.8kg
Input power voltage	Single-phase AC200 to 230V +/-10% or less (50/60Hz)
Maximum power consumption	350VA (LCM100-4M 1 slider is driven.)
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	560mm/sec
Max. payload	14kg
Module length	640mm (4B) /480mm (3B)
Max. number of sliders	1 slider / 1 module
Main unit maximum cross-section outside dimensions	W173.8mm×H155mm(including slider)
Cable length	None
Controller	Dedicated driver (Included)
Power supply	DC24V 5A
Communication I/F	Dedicated input/output 16 points
Module weight	11.2kg (4B) /8.8kg (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

* When a load is more than 1 kg, the motion range is reduced. Use the robot within the recommended motion range.