YAMAHA

Revs Your Heart

ENGLISH

YAMAHA

# ROBOT

## LINEUP CATALOG


YAMAHA

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202010-JE

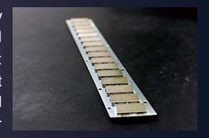
# YAMAHA ROBOT

## 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 forty 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

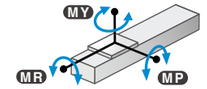
**LBAS features a new, integrated guide rail and frame structure and a compact frame size with improved load capacity that is designed to accommodate motors produced by most of the major manufacturers.**

- 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)

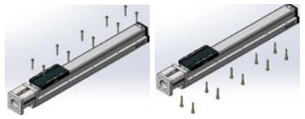
| | Existing product T9H | NEW LBAS08 |
|---|---|---|
| MY | 86 | 221 |
| MP | 133 | 309 |
| MR | 117 | 343 |

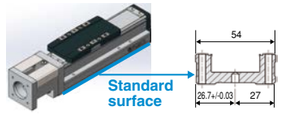
(N · m)

### Right angle attachment kit allows for motor orientation changes


### Installation is simple

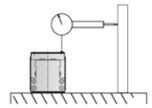
Mounting holes are accessible from both above and below. No disassembly of actuator units is required. The side features a standard surface and dowel pin holes are found on the bottom.





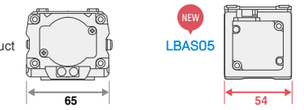

### High precision

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



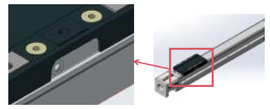
### Compact

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

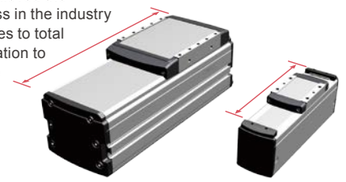
**LGXS features ground ball screws to ensure greater efficiency, accuracy and reliability, making this product ideal for use as a the base axis in a multi-axis setup.**

- 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 |

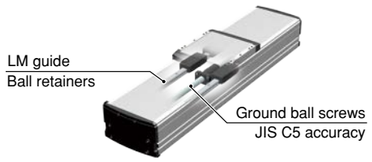
### Shortest overall length

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



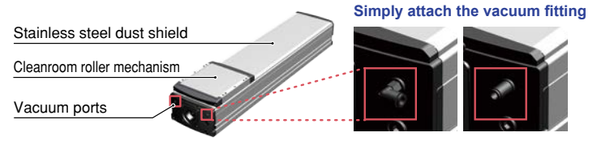
### High precision

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



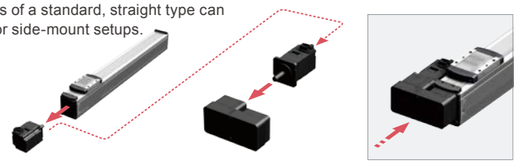

### Ready for cleanroom use

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

### 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.

### SR type — Rod type

Standard model

SR05
SR04

Model with support guide

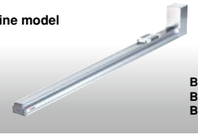
SRD05
SRD04

Foldback model

SR04-R
SRD04-U

### BD type — Belt type

Inline model



BD04
BD05
BD07

## 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.

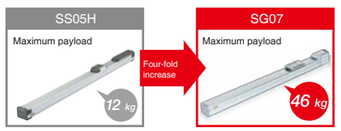
| | | |
|---|---|---|
| **Stepping Motors** | ○ • Simple design & low cost<br>• No vibration when stopped | × · High-pitched operating noise<br>· Drop in torque at high speeds<br>· Heavy power consumption when stopped |
| **Servo Motors** | ○ • Smooth movement<br>• Constant torque at all speeds<br>•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

**TRANSERVO brings together the best of both worlds**

## Features and benefits of the SG type (slider type)

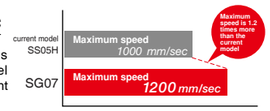
### Dynamic payload—46 kg horizontally and 20 kg vertically

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.



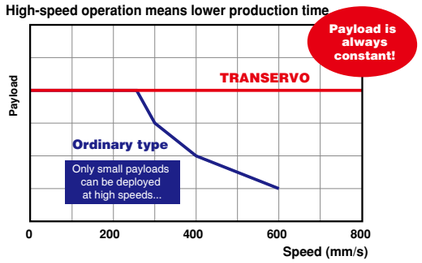

## Features and benefits of the SS type (slide type)

### 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.

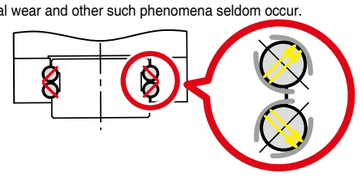
*SS05/SS05H/SSC05/SSC05H (lead: 20 mm)

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)

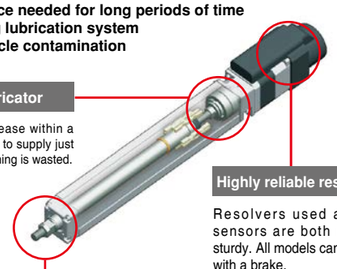
### Maintenance required less frequently

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

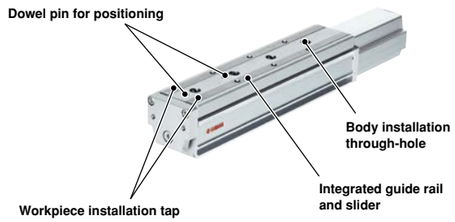
This product ensures high speed operation with its long maximum stroke of 2000 mm and a maximum transport speed of 1500 mm/sec. No exterior parts (such as the cover) need to be removed when installing. A shutter is also provided as a standard accessory, which securely covers the guide and belt to prevent 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

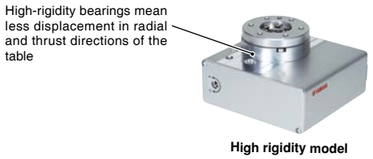
This product features a maximum pressing force of 180 N and a repeated positioning accuracy of +/-0.5 mm. Integrating a guide rail and slider ensures less bending and the circulation type linear guide provides high rigidity and accuracy. The allowable overhand provided by STH06 exceeds that seen in the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

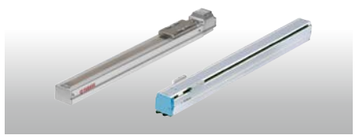
## SINGLE-AXIS ROBOTS

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

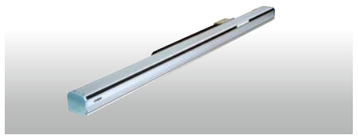
T4L/T4LH, T5L/T5LH, T6L, T9/T9H



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

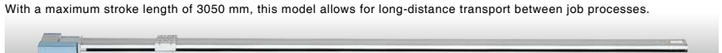
F8/F8L/F8LH, F10/F10H, F14/F14H, F17/F17L, F20/F20N, GF14XL/GF17XL

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.

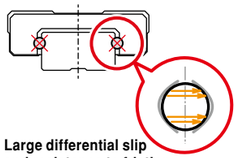
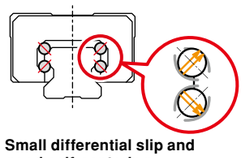
## A resolver built for harsh environments

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

## 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<br>Four-point contact guides with two rows of Gothic arch grooves | Yamaha<br>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<br>● May break down even during the calculated service life | ● Highly resistant to alignment fluctuations and moment loads<br>● Seldom breaks |

## 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.

## 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

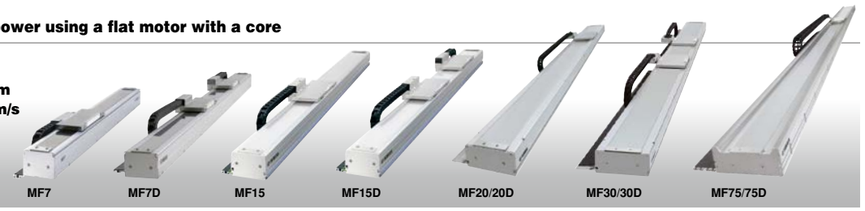
See p. 23 for a quick selection table

## 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

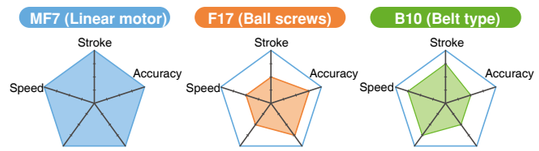
- Maximum stroke: 4050 mm
- Maximum speed: 2500 mm/s
- Repeated positioning accuracy: +/- 5 µm
- Maximum payload: 7kg to 160 kg




## 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.



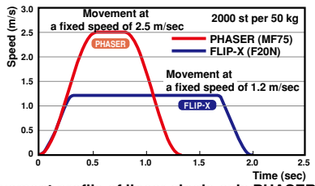

**Comparison of single-axis robot models**

| 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 | Size: Large / Maintenance: Small | 2500 | 10 (7)*3 | +/-5 | 4000 | 85 × 80 |
| F17-40-145 | Size: Medium / Maintenance: Medium | 720*4 | 40 | +/-10 | 1450 | 168 × 100 |
| B10-1450 | Size: Small / Maintenance: Large | 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

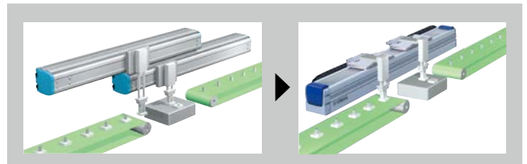
The ultimate appeal of linear motor single-axis robots is that there are critical speed limits like you would see when dealing with ball screws. Even long-distance travel means no reduction in maximum speeds. Standard maximum stroke goes up to 1050 mm with the MR type and up to 4000 mm with the MF type.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

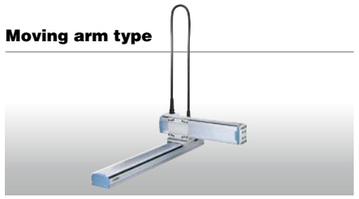
**Custom orders**

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

**Arm type**

**Gantry type**

**Moving arm type**

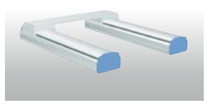


**XZ type**

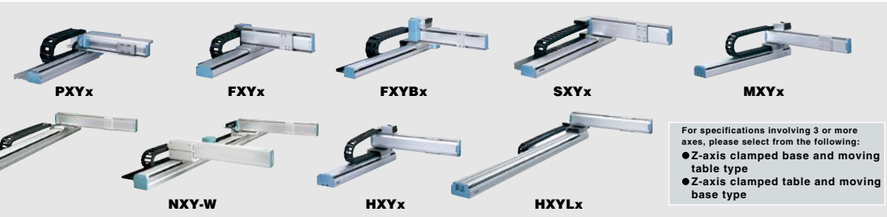
**Pole type**

**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.

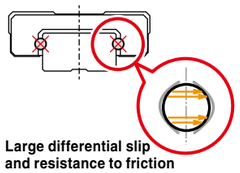
## Maintenance is easy

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

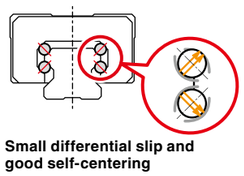
Two-point contact guides featuring four rows of circular grooves allow for less differential slip. Differential slip experienced by the ball is low when compared to four-point contact guides with two rows of Gothic arch grooves. This means that excellent rolling motions are provided even when dealing 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



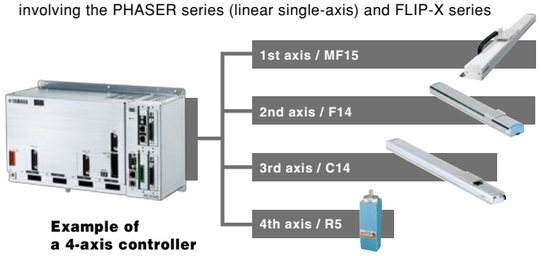
# MULTI-FLIP/ MULTI-PHASER

## 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
- RC320 and RCX340 (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

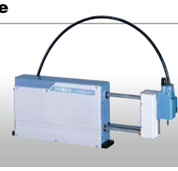
## PICK & PLACE ROBOTS

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

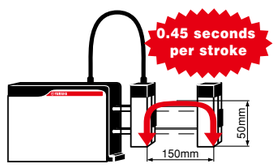
**3-axis type**
YP220BXR
YP320XR
YP330X



**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 |

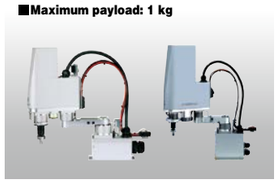
See p. 24 for a quick selection table

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

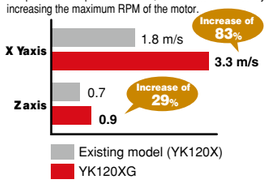
### Extra small type SCARA model

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
YK510XE-10
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

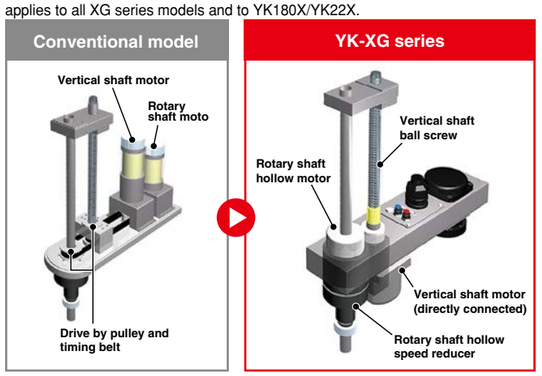
SCARA was our first robot. Since producing our first SCARA robot called CAME, we have spent some forty years bringing SCARA robot innovations to market. SCARA robots have undergone countless modifications in an ever-changing marketplace. The extensive track record we have built with SCARA robots have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


### Internal structure designed for optimal operation

Note: The example shown is YK500XG


## Completely beltless structure

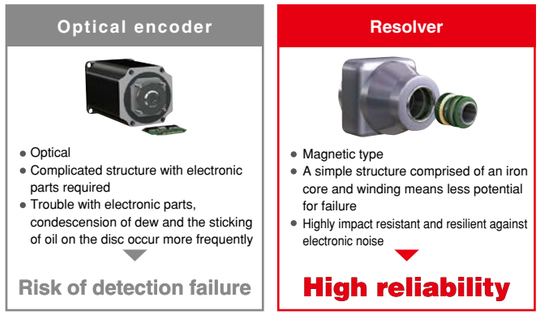
A ZR-axis direct coupling structure allows for a totally beltless structure. This direct drive structure means a dramatic reduction in wasted motion. It also serves to maintain high levels of accuracy over long periods of time and ensure maintenance-free usage over extended periods of time, meaning there 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.

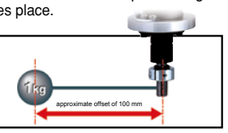



## Superior rotary axis inertia moment capacity

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.**



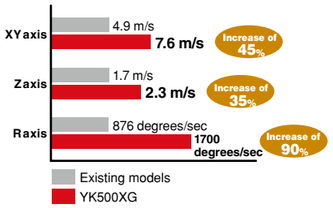

● **Allowable inertia moment of the R axis Comparison of YK120XG and a competitor's model**

| 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/YK610XE-10/YK710XE-10

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 (YK500XG 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

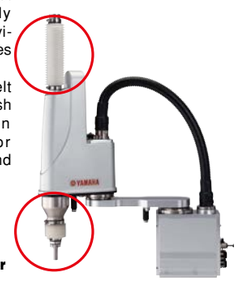
## Dust-proof and drip-proof type

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

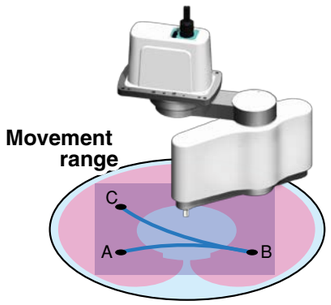
YK350TW
YK500TW

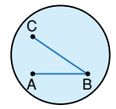
See p. 24 for a quick selection table


**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.**

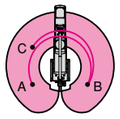
### Covers bases within a 1,000-millimeter*2 reach

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 conveyor belt assembly operations.



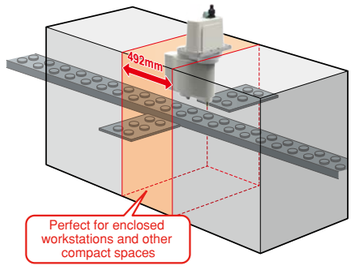

Orbit type SCARA robot




Standard type SCARA robot

### Ideal for work in narrow spaces

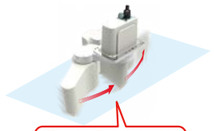
**Minimum installation width 492 mm**




Perfect for enclosed workstations and other compact spaces

**Freedom of movement**

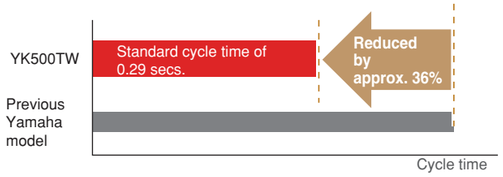
Full use of workspace underneath the unit



The tip (R-axis) is able to cross right under the main unit

### Standard cycle time down to 0.29 seconds*2

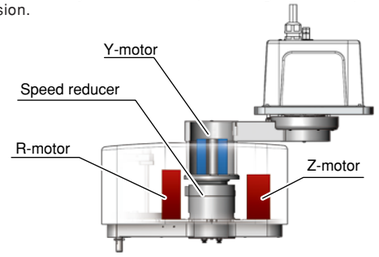
TK-TW robots are able to move with more flexibility in a horizontal plane. They are built with a second arm (Y-axis) that moves under the first (X-axis). Due to their multiple-joint structure, TK-TW robots can move more efficiently from point-to-point. Furthermore, with the weight balance of the internal 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**

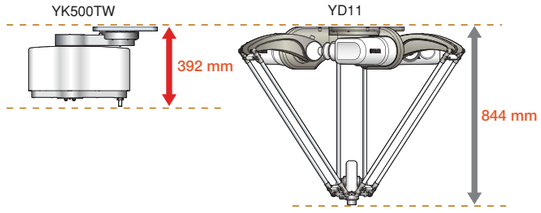
**Optimized gravitational moment for rotation**

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

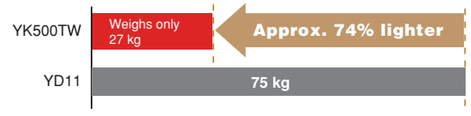
**High speed, reduced inertia**

### 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*2 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 p. 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

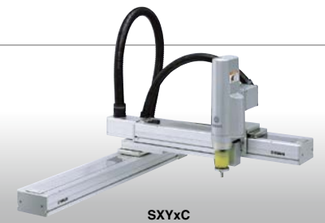
Specifications of the TRANSERVO series. TRANSERVO robots use stepper motors and a newly developed vector control system to keep performance costs low and achieve functionality similar to servomotors'. To achieve high cleanliness, these robots have suction joints installed as standard features and use 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



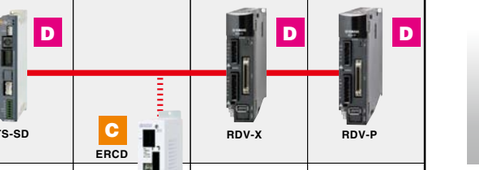
SXYxC

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 | P TS-S2 TS-SH | | P TS-X | P TS-P |
| 1 axis ● Pulse train | D TS-SD | C ERCD | D RDV-X | D RDV-P |
| 1 axis ● Program (Yamaha SRC language) ● I/O point trace ● Remote command ● Online command | | | C SR1-X | C SR1-P |
| 2 axes ● Program (Yamaha BASIC language) ● I/O point trace ● Remote command ● Online command | | | C RCX320 C RCX222 | C RCX221 |
| 3, 4 axes ● Program (Yamaha BASIC language) ● I/O point trace ● Remote command ● Online command | | | | C RCX340 |
| 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 consodes.

### 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 2020*

*Web download only.

# RCXiVY2+ System

## ROBOT VISION FOR THE RCX320/340

## Yamaha's own unique solution for integrated robot vision Advanced RCXiVY2+ has been launched.

### RCXiVY2+ features:

- Adjusting parts orientation on the fly
- Conveyor follower
- Searching randomly placed part
- Top/bottom judgement
- OK/NG judgement

NEW

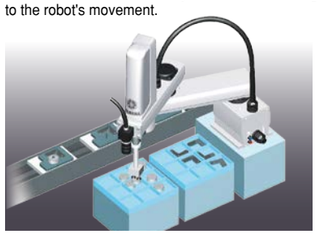
## High speed positioning of irregular shaped parts (foods or clothes)

### Blob search function

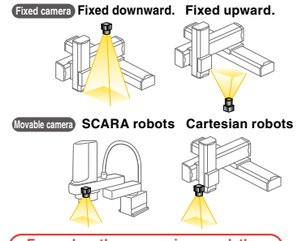
Suitable for pick & place or detection of parts with wide tolerance in shape and size, or high speed counting.
Detection speed is 2 to 10 times faster that edge detection.

## Also supports moving camera

Even if the camera is mounted on the robot, coordinates are automatically converted according to the robot's movement.



**Camera position can be selected in accordance with the application.**

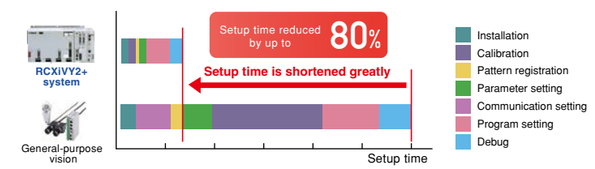



Even when the camera is moved, the coordinates are corrected automatically.

## Setup time reduced greatly

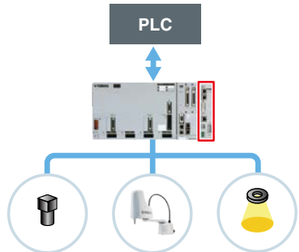
When using third-party vision, a coordinate conversion program needs to be created in the robot controller since the robot coordinate data differs from the vision format.
In RCXiVY2+, vision system is incorporated in robot controller the robot coordinate data can be stored into the robot point data using single process. This ensures very simple operation. Additionally, the unified control of the camera control and light control can be performed using the robot program. Start-up process will be greatly simplified.

**Comparison of setup time**




## Robot controller integrated type

### RCXiVY2+ system

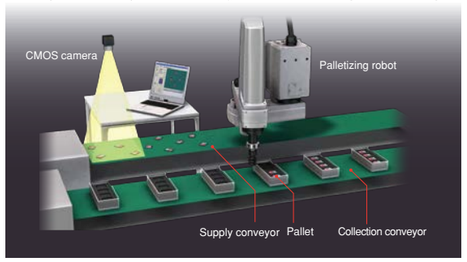



1 Simple calibration function is incorporated.
2 Coordinates are corrected automatically even when the camera moves.
3 High-speed connections through dedicated bus line.
4 Controller is incorporated to provide the central operation.
5 Applicable to all models of YAMAHA robot lineup.

- Easy to use
- Various applications are supported using easy operation.
- Cost reduction by reducing work steps.
- Robot and vision supported by Yamaha

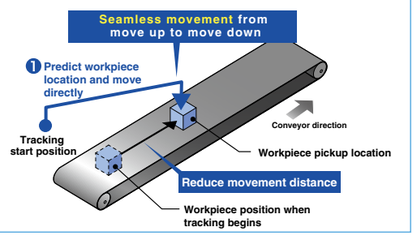
## Conveyor tracking

Ideal for high-speed packaging arrangement high-speed transport of multiple types of items such as pharmaceuticals, cosmetics, and food products.The vision camera detects the position and orientation of parts moving on the conveyor, and the robot picks them up.




**Example program**

1 New CTMOVE CTMOVE (1),Z=0.0,CTZ=10.0
Can be executed with a single command
Unify the move up command, follow workpiece command, move down command




Operating conditions: YK500XG / payload 1 kg (total of workpiece and tool) / horizontal movement 250 mm / vertical movement 1 mm / conveyor speed 100 mm/sec

# YRG Series

## ELECTRIC GRIPPERS

See p. 26 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

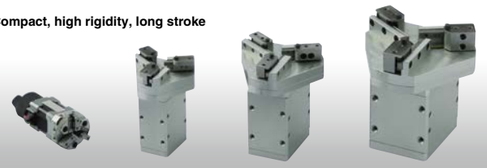
YRG-2020FS/YRG-2840FS

**"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.

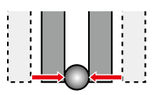
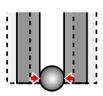
### Gripping force control

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. |
|  |  |

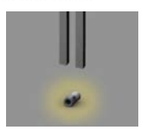
### Multi-point control

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. |
|  |  |

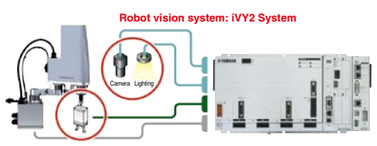
### Only a single controller needed for control

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.






# YA Series

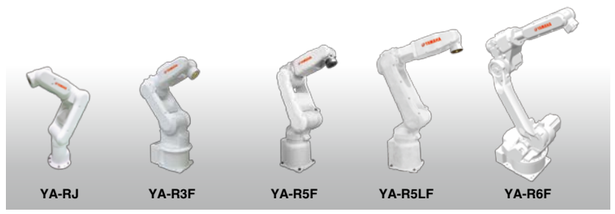
## VERTICALLY ARTICULATED ROBOTS

6-axis 7-axis

See p. 26 for a quick selection table

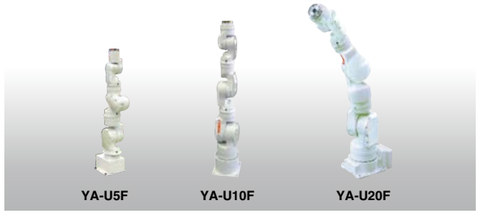
## Increase productivity Ideal for constructing compact cells, moving and assembling small parts, or inspection processes.

### 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

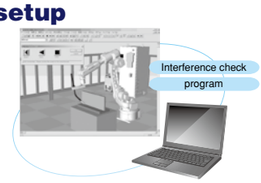
Thanks to high-speed, low-inertia AC servo motors, an arm designed to be lightweight, and the latest control technology, these robots achieve an operating speed that is best in their class. From supply, assembly, inspection, and packing to palletization, all applications can enjoy shorter cycle time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

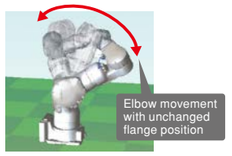
### Able to reach workpieces from around or under

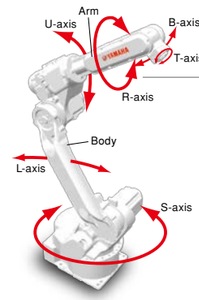
Rotation of the seventh axis enables flexible movements with the same freedom of movement as a human arm, allowing the workpiece to be accessed from around or from under. This allows the robot to enter narrow locations that a person cannot fit in, or to approach the workpiece in a way that avoids obstructions, 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.

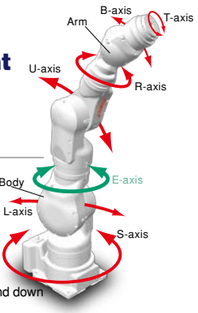



6-axis robots

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 x 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<br>Three-phase 200/220 VAC (+10%, -15%), 50/60 Hz |
| Grounding | Grounding resistance: 100 or less |
| Digital I/Os | Specialized signals: 10 inputs and 1 output<br>General signals: 28 inputs and 28 outputs<br>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<br>CIO ladder: 1,500 steps |
| Expansion slots | MP2000 bus x 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

# LCMR200 / LCM100

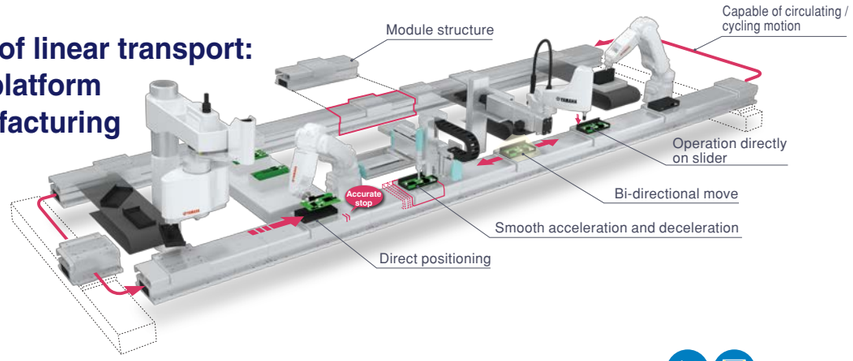
## LINEAR CONVEYOR MODULE

See p. 28-30 for a quick selection table

## Proposed by the pioneer of linear transport: Revolutionary transport platform for next generation manufacturing

**Production line using LCMR200**

Reduce transport time. | Improve productivity. | Cost reduction | Save space.

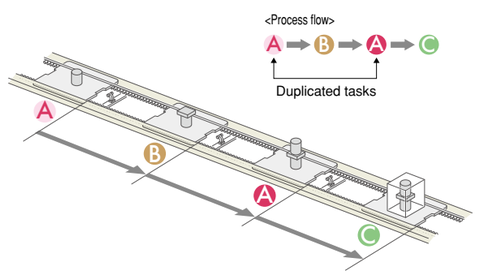



## Process sharing

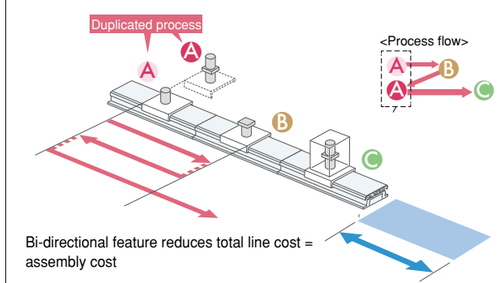
Direct drive | Slider backward travel

- Carriage is bi-directional and one work station can perform more than one task. Saving total line cost and floor space.
- High speed bi-directional move and simultaneous independent operation of multiple carriages.

**Conventional method** Requires two duplicated work stations in one line




**LCMR200 / LCM100** Eliminating duplicated work station

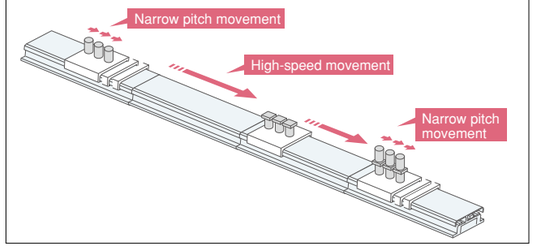



## Variable speed control between work stations.

Direct drive | Narrow pitch operation

- Servo controlled direct drive eliminates mechanical stoppers and position sensors.
- Simple position setting by entering point data in a program.
- Flexibility in setup for production lot change
- Saving flow time by narrow pitch incremental move and high speed move.

**LCMR200 / LCM100**

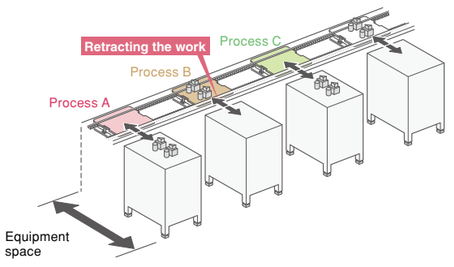



## Assembly can be done while parts are on conveyor

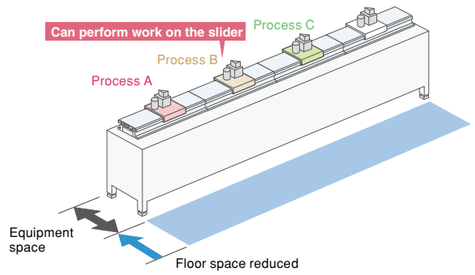
Highly rigid guide

- The highly rigid guide enables assembly and processing on the transport line.
- No need to reposition parts to/from conveyor. Floor line space is reduced substantially.

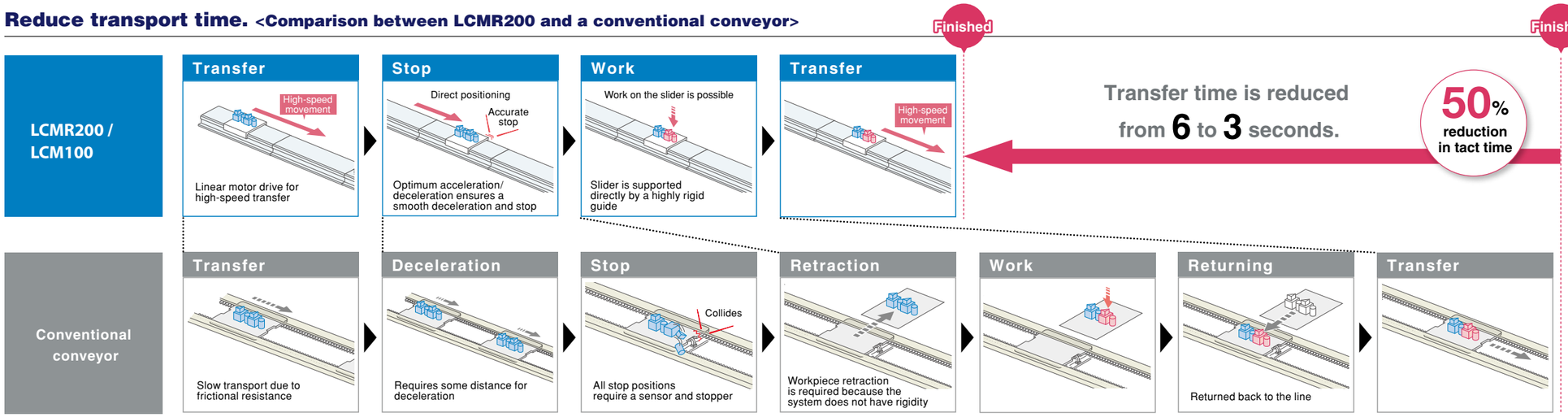
**Conventional method** Parts need to be moved to work bench




**LCMR200 / LCM100** **Assembly work is done while parts are on conveyor**




## Reduce transport time. <Comparison between LCMR200 and a conventional conveyor>




Note. May vary depending on conditions

## Controller

**Controller for LCMR200**

**YHX controller**

- One YHX controller set can control the entire LCMR200.
- Stacking structure does not require any wiring among the units.

**Controller for LCM100**

**LCC140**

- SR1 controller based operation system
- Controller-to-controller linkage function
- Position correction function by RFID

# 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 x 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)<br>100 to 2000(Wall mount) |
| | | MF7D | Double | | | 100 to 3800(Horizontal)<br>100 to 1800(Wall mount) |
| | 100 × 80 | MF15 | Single | 30 (15)*2 | | 100 to 4000(Horizontal)<br>100 to 2000(Wall mount) |
| | | MF15D | Double | | | 100 to 3800(Horizontal)<br>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 |

## 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 (sec. ) |
|---|---|---|---|---|---|
| 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)*3 | 0.43 |
| | | YK350XG | 350 | | 0.44 |
| | | YK400XG | 400 | | 0.45 |
| Low cost high performance model | | YK400XE-4 | 400 | 4.0(3.0)*3 | 0.41 |
| Completely beltless model | Medium type | YK500XGL | 500 | 5.0(4.0)*3 | 0.48 |
| | | YK500XG | 500 | 10.0 | 0.42 |
| Low cost high performance model | | YK510XE-10 | 510 | 10.0(9.0)*3 | 0.38 |
| Completely beltless model | | YK600XGL | 600 | 5.0(4.0)*3 | 0.54 |
| | | YK600XG | 600 | 10.0 | 0.43 |
| Low cost high performance model | | YK610XE-10 | 610 | 10.0(9.0)*3 | 0.39 |
| Completely beltless model | | YK600XGH | 600 | 20.0(19.0)*3 | 0.47 |
| | Large type | YK700XGL | 700 | 10.0(9.0)*3 | 0.50 |
| Low cost high performance model | | YK710XE-10 | 710 | 10.0(9.0)*3 | 0.42 |
| Completely beltless model | | 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 | 0.5 |
| | | YK350XGP | 350 | | 0.52 |
| | | YK400XGP | 400 | | 0.5 |
| | | 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 type | | 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 | 0.5 | ○ |
| | YK350XGC | 350 | 4.0 | 0.52 | ○ |
| | YK400XGC | 400 | 4.0 | 0.5 | ○ |
| 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 | |

## 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)

## 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.

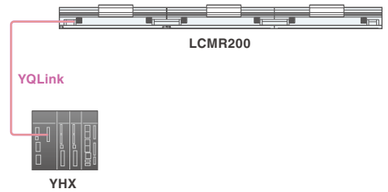
MEMO

# LCMR200
## Linear conveyor module

| Basic specifications | | |
|---|---|---|
| Drive method | | Linear motor with moving magnet type core |
| Position Search | | Magnetic absolute position sensor |
| Maximum payload | | 15 kg |
| Maximum speed | | 2,500 mm/sec *1 |
| Repeatability | | +/-5 µm |
| Mechanical tolerance between robot sliders | | +/-30 µm (Dowel hole standard) |
| Total stroke limit | | 25.5 m *2 |
| Maximum number of robot sliders | | 64 units *2 |
| Minimum spacing between robot sliders | | 210 mm *3 |
| Main frame dimensions | Max. external size of frame cross-section | W175 × H109 mm (Including robot slider) |
| | Linear module length | 200 mm / 300 mm / 500 mm / 1000 mm |
| | Robot slider length | 198 mm |
| Weight | Linear module | Approx 20 kg [Per 1 m of linear module] |
| | Robot slider | 2.4 kg |
| Power supply | Control power supply | 48 VDC +5 %, -10 %, Max. 30 A *4 |
| | Motor power supply | 48 VDC +/-10 %, Max. 30 A *5 |
| Operating environment | Operating temperature | 0 °C to 40 °C *6 |
| | Storage temperature | -10 °C to 65 °C |
| | Operating humidity | 35 % to 85 %RH [No condensation] |
| Controller | | YHX controller *7 |

1. When the conveying weight exceeds 10 kg, it will drop to 2,000 mm/sec according to the weight.
2. It may differ depending on the system configuration.
3. When the jig palette to equip to the robot slider is longer, it shall be the jig palette length + 10 mm.
4. Up to 10 m linear module can be supplied with the optional 1000 W power source.
5. Up to 2 robot sliders can be supplied with the optional 1000 W power source.
6. Operate LCMR200 in the temperature environment (+/-5 °C) that installation and adjustment were performed.
7. The YHX controller requires a separate electrical power supply.

**Controller connection image**




# YHX
## Controller for LCMR200

**Host controller unit** + **Driver power unit** **Set model**

**Ordering method:** **YHX-HD** – [ ] – [ ]

| Controller | Language | Network |
|---|---|---|
| | J (Japanese) | N : None |
| | E (English) | CC : CC-Link |
| | | PT : PROFINET |
| | | EP : Ethernet/IP™ |
| | | ES : EtherCAT |

### Host controller unit YHX-HCU

| Item | | Host controller unit |
|---|---|---|
| Power supply | Control power supply | Voltage: 21.6 to 26.4 VDC (24 V +/-0%) |
| | | Current: 3.5 A (Including PoE) |
| Connector | External I/F | Giga bit Ethernet<br>· Compatible with PoE yet 1 port (23 W)<br>· Not compatible with PoE yet 1 port<br>Field network (Slave) Select one from the following 4 kinds.<br>· EtherCAT · CC-Link<br>· EtherNet/IP * A separate adaptor is necessary.<br>· PROFINET<br>USB<br>· USB 2.0 1 Port (Bus power 0.5 A)<br>· USB 3.0 1 port (Bus power 1.0 A) |
| | HMI | Connector for connecting programming pad |
| | SAFETY | Emergency stop contact output<br>Enable switch contact output<br>Emergency stop input<br>External automatic mode input |
| | MODE | CPU OK output<br>Programming pad AUTO/MANUAL select key switch output |
| Indicator | LCD | 128 x 64 dots, Yellow |
| Dimensions | | 41.6×150×125 (mm) |
| Weight | | 750g |
| Protection structure / Protection rating | | IP20 / class 1 |

### Driver power unit YHX-DPU

| Item | | Driver power unit |
|---|---|---|
| Power supply | Control power supply | Voltage: 21.6 to 26.4 VDC (24 V +/-10%) |
| | | Current: 0.5A |
| | Main power supply | Input: Single phase / 3-phase 180 to 253 VAC / (200 to 230 VAC +/-10%), 50/60 Hz |
| | | Power supply capacity: Single phase 3.5 kVA 3-phase 6 kVA |
| Connection motor capacity | | Single phase within 1.6 kW, 3-phase within 3.0kW / Driver unit within 16 units (16 axes) |
| Connector | Regenerative | Regenerative unit connector |
| | External I/F | YQLink |
| | ABS Battery | ABS Battery connector |
| Dimensions | | 63.2×150×125 (mm) |
| Weight | | 1050g |
| Protection structure / Protection rating | | IP20 / class 1 |

### Driver unit/Servo motor specifications (30A/10A) YHX-A30/A10

| Item | | Driver unit 30 A/10 A |
|---|---|---|
| Power supply | Control power supply | Voltage: 21.6 to 26.4 VDC (24 V +/-10%) |
| | | Current: 0.8A (Including brake unit power supply) |
| Connector | ENC.A | Encoder input |
| | ENC.B | Encoder input (Dedicated application) |
| | STOP | Gate off input, 2 points<br>Gate status output, 1 point |
| | MOTOR | Motor drive power supply output<br>Brake power supply output |
| | ABS Battery | ABS Battery connector |
| | Fan unit connector | Fan unit is connectable. (YHX-A30 includes the fan unit.) |
| | Brake unit connector | Brake unit is connectable. |
| Dimensions | | 31.6×150×125 (mm) |
| Weight | | 30 A : 570g / 10 A : 560g |
| Protection structure / Protection rating | | IP20 / class 1 |

### YQLink expansion unit YHX-YQL

| Item | | YQLink expansion unit |
|---|---|---|
| Power supply | Control power supply | Voltage: 21.6 to 26.4 VDC (24 V +/-10%) |
| | | Current: 0.3A |
| Connector | External I/F | YQLink |
| | SAFETY | Emergency stop input |
| Dimensions | | 31.6×150×125 (mm) |
| Weight | | 380g |
| Protection structure / Protection rating | | IP20 / class 1 |

### Regenerative unit YHX-RU

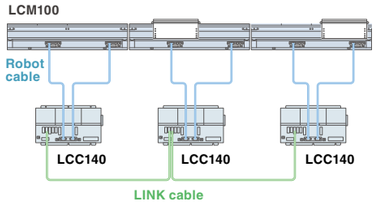
| Item | | Regenerative unit |
|---|---|---|
| Power supply | Input | 254 to 357 VDC (Controller DCBUS connected) |
| Connector | | Regenerative connector (For connecting regenerative unit / For adding regenerative unit) |
| Dimensions | | 62.5×180×110 (mm) |
| Weight | | 1450g |
| Protection structure / Protection rating | | IP20 / class 1 |

# 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<br>0.1 mm (mutual width difference between sliders)*2 |
| **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.

**Controller connection image**




## 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) |

# LCC140
## Controller for LCM100

| 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,<br>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) |