

TRANSERVO Series

Product Lineup

CLOSED LOOP STEPPING MOTOR SINGLE-AXIS ROBOTS

Excellent characteristics of both stepping motor and servomotor were combined. Stepping motor single-axis robots "TRANSERVO" series breaking through existing conventions.



Robot positioner TS-S2/TS-SH

P.115

This robot positioner is specialized for the I/O point trace input. The positioning or pushing operation can be performed using simple operation, only by specifying a point number from the host control unit and inputting the START signal.

Applicable models:

SS SG^{Note} SR STH

RF BD



TS-S2 TS-SH

Note. SG07 is only applicable to TS-SH.

Robot driver TS-SD

P.114

This robot driver omits the operation with robot languages and is dedicated to the pulse train input. This driver can be made applicable to the open collector method or line driver method using the parameter setting and signal wiring. So, you can match the robot driver to the host unit to be used.

Applicable models:

SS SR STH^{Note} RF^{Note} BD



TS-SD

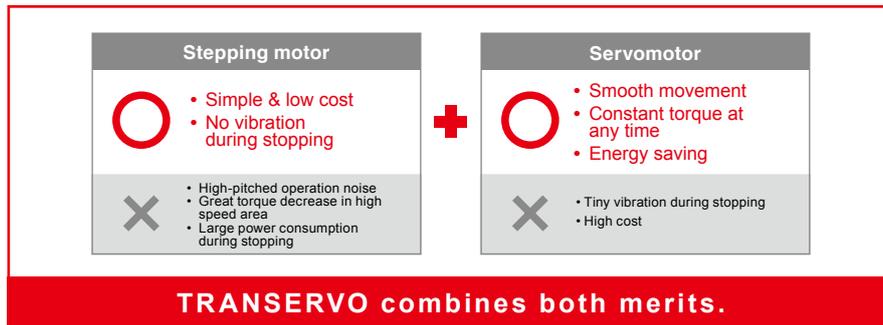
Note. Except for STH vertical specifications and RF sensor specifications.

Common features of TRANSRVO Series

POINT 1

New control method combining the advantages of both the servomotor and stepping motor

The stepping motor provides features that its price is less expensive and hunting (minute vibration) does not occur during stopping. However, this motor has disadvantages that the positional deviation due to step-out occurs (in the open loop mode), the torque decreases greatly in the high speed area, and the power consumption is large during stopping. As YAMAHA's TRANSERVO uses the closed loop control, this ensures complete "no step-out". Furthermore, use of a newly developed vector control method ensures less torque decrease in the high speed area, energy saving, and low noise. The function and performance equivalent to the servomotor are achieved at a low cost even using the stepping motor.



Energy saving

As the basic control is the same as the servomotor, waste power consumption is suppressed. This greatly contributes to the energy saving and CO₂ reduction.

No hunting during stopping

Stop mode without hunting can be set in the same manner as the general stepping motor. So, select this mode as required.

POINT 2

Closed loop control using excellent environment resistant resolver

A resolver with excellent reliability is used to detect the motor position in the same manner as YAMAHA's upper model. The stable position detection can be made even in a poor environment where fine particle dusts or oil mists exist. Additionally, a high resolution of 20480 pulses per revolution is provided.

This resolver is a magnetic position detector. The resolver features a simple structure without using electronic components and optical elements, and less potential failure factors when compared to general optical encoders. The resolver has **high environment resistance and low failure ratio**, and is used in a wide variety of fields aiming at reliability such as automobile or aircraft industry.



POINT 3

Excellent controllability

Use of a high resolution (4096, 20480 pulse/rev) makes it possible to maintain excellent controllability. Variations in speed are small and settling time during deceleration stop can be shortened.



SS type (Slider type)

Straight model



SS05H-S

Space-saving model (Side mounted motor model)



SS05H-R (L)

Type	Model	Size (mm) ^{Note 1}	Lead (mm)	Maximum payload (kg) ^{Note 2}		Maximum speed (mm/sec.) ^{Note 3}	Stroke (mm)
				Horizontal	Vertical		
SS type (Slider type) Straight model/ Space-saving model	SS04-S SS04-R (L)	W49 × H59	12	2	1	600	50 to 400
			6	4	2	300	
			2	6	4	100	
	SS05-S SS05-R (L)	W55 × H56	20	4	-	1000	50 to 800
			12	6	1	600	
			6	10	2	300	
	SS05H-S SS05H-R (L)	W55 × H56	20	6	-	1000	50 to 800
			12	8	2	600 (Horizontal) 500 (Vertical)	
			6	12	4	300 (Horizontal) 250 (Vertical)	

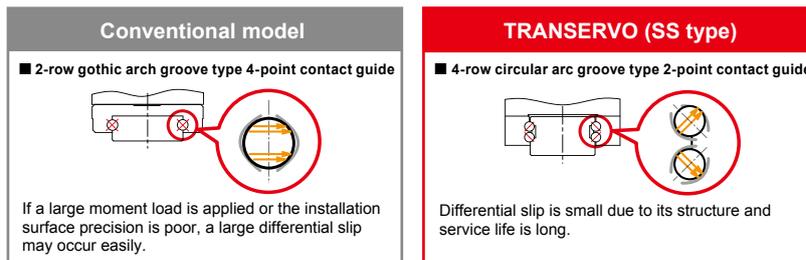
Note 1. The size shows approximate maximum cross sectional size.
 Note 2. The payload may vary depending on the operation speed.
 Note 3. The maximum speed may vary depending on the transfer weight or stroke length.

■ Allowable ambient temperature for robot installation
 SS/SR type 0 to 40 °C

POINT

4-row circular arc groove type 2-point contact guide applicable to even large moment load

A newly developed module guide is employed with a 4-row circular arc groove type 2-point contact guide built into a very compact body similar to the conventional model. This guide maintains a satisfactory rolling movement with less ball differential slip due to its structure even if a large moment load is applied or the installation surface precision is poor, and has characteristics that are difficult to malfunction, such as unusual wear.

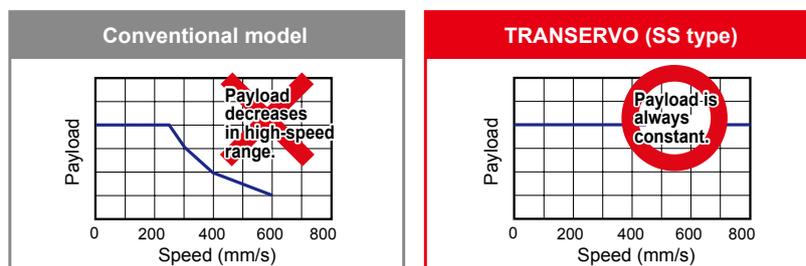


POINT

Tact is shortened by high-speed movement.

As advantages of the vector control method are utilized at maximum level, the TRANSERVO maintains a constant payload even in a high-speed range. This greatly contributes to shortening of the tact time. Additionally, by combining this feature with high-lead ball screws, the TRANSERVO has achieved a maximum speed of 1 m/sec. ^{Note} which is faster than any single-axis servo motor.

Note. SS05-S/SS05H-S with 20 mm-lead specifications



SG type (Slider type)

Straight model



SG07

Type	Model	Size (mm) ^{Note 1}	Lead (mm)	Maximum payload (kg) ^{Note 2}		Maximum speed (mm/sec.) ^{Note 3}	Stroke (mm)
				Horizontal	Vertical		
SG type (Slider type)	SG07	W65 × H64	20	36	4	1200	50 to 800
			12	43	12	800	
			6	46	20	350	

Note 1. The size shows approximate maximum cross sectional size.

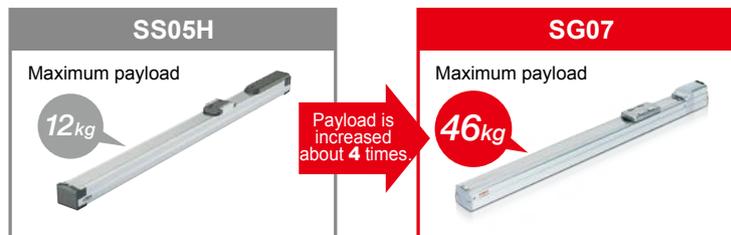
Note 2. The payload may vary depending on the operation speed.

Note 3. The maximum speed may vary depending on the transfer weight or stroke length.

POINT

Maximum payload is 46 kg. A maximum payload of 20 kg is supported even with the vertical specifications.

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



POINT

Maximum speed is 1200 mm/sec.

The maximum speed is made 1.2 times faster than that of the current model SS05H.

The fact-up of the equipment can be achieved.



SR type (Rod type standard)

Straight model



Space-saving model (Side mounted motor model)



SR type (Rod type with support guide)

Straight model



Space-saving model (Side mounted motor model)



Type	Model	Size (mm) ^{Note 1}	Lead (mm)	Maximum payload (kg) ^{Note 2}		Maximum speed (mm/sec.) ^{Note 3}	Stroke (mm)
				Horizontal	Vertical		
SR type (Rod type standard) Straight model/ Space-saving model	SR03-S	W48 × H56.5	12	10	4	500	50 to 200
	SR03-R (L)		6	20	8	250	
	SR03-U						
	SR04-S	W48 × H58	12	25	5	500	50 to 300
			6	40	12	250	
			2	45	25	80	
	SR05-S	W56.4 × H71	12	50	10	300	50 to 300
			6	55	20	150	
			2	60	30	50	
SR type (Rod type with support guide) Straight model/ Space-saving model	SRD03-S	W105 × H56.5	12	10	3.5	500	50 to 200
	SRD03-U		6	20	7.5	250	
	SRD04-S	W135 × H58	12	25	4	500	50 to 300
			6	40	11	250	
			2	45	24	80	
	SRD05-S	W157 × H71	12	50	8.5	300	50 to 300
			6	55	18.5	150	
			2	60	28.5	50	

Note 1. The size shows approximate maximum cross sectional size.
 Note 2. The payload may vary depending on the operation speed.
 Note 3. The maximum speed may vary depending on the transfer weight or stroke length.

■ Allowable ambient temperature for robot installation
 SS/SR type 0 to 40 °C

POINT

Long-term maintenance free is achieved.

A lubricator used in the ball screw and a contact scraper installed at the rod inlet and outlet provide maintenance-free operation.

Maintenance interval is greatly extended.

Normal grease lubrication on the ball screw loses a very small amount of oil as the ball screw moves.

The SR type has a lubricator that supplies grease lost over long periods to greatly extend the maintenance interval and ensure near maintenance-free operation^{Note}.

Note. The maintenance-free period is within the running life of the robot.

Environment-friendly lubrication system

The lubrication system is environment-friendly as it uses a high density fiber net and supplies an adequate amount of oil to appropriate locations to eliminate waste lubrication.

Prevention of foreign object entry

The dual-layer scraper is in contact with the front of the rod to ensure excellent fine contaminant particle removal performance. The scraper removes fine contaminant particles sticking to the rod through multi steps to prevent them from entering the inside and troubles caused by foreign objects. Additionally, oleo-synthetic foam rubber with a self-lubricating function ensures low-friction resistance.

Highly reliable resolver is used.

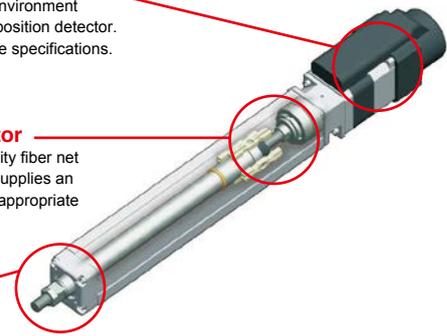
A resolver with excellent environment resistance is used for the position detector. All models can select brake specifications.

Ball screw lubricator

A lubricator with high density fiber net impregnated with grease supplies an adequate amount of oil to appropriate locations.

Laminated type contact scraper

A dual-layer scraper removes fine foreign objects sticking to the rod to prevent them from entering the inside and troubles caused by foreign objects. Rod rattle is suppressed effectively.

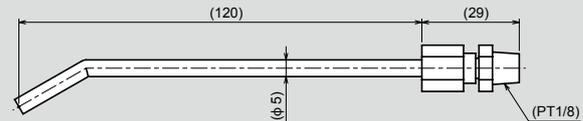


Tip nozzle for grease application

When applying the grease to the ball screw of the SR type space-saving model SR03-UB or SRD03-UB, use a grease gun with the tip bent.

Model	KCU-M3861-00
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Note. YAMAHA's recommended product. This tip nozzle can be attached to a generally available grease gun.



STH type (Slide table type)

Straight model



Space-saving model



Type	Model	Size (mm) ^{Note 1}	Lead (mm)	Maximum payload (kg) ^{Note 2}		Maximum speed (mm/sec.) ^{Note 3}	Stroke (mm)
				Horizontal	Vertical		
STH type (Slide table type)	STH04-S	W45 × H46	5	6	2	200	50 to 100
	STH04-R (L) ^{Note 4}	W73 × H51	10	4	1	400	
Straight model/ Space-saving model	STH06	W61 × H65	8	9	2	150	50 to 150
	STH06-R(L)	W106 × H70	16	6	4	400	

Note 1. The size shows approximate maximum cross sectional size.

Note 2. The payload may vary depending on the operation speed.

Note 3. The maximum speed may vary depending on the transfer weight or stroke length.

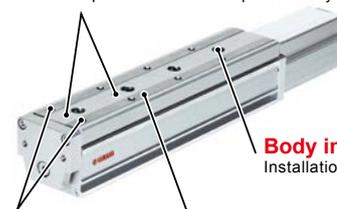
POINT

Use of a circulation type linear guide achieves the high rigidity and high accuracy.

- Guide rail is integrated with the table.
- Table deflection amount is small.
- Use of a circulation type linear guide achieves the high rigidity and high accuracy.
- STH06 provides an allowable overhang exceeding that of FLIP-X series T9.
- Space-saving model with the motor built-into the body is also added to the product lineup.
- Suitable for precision assembly.

Positioning pin hole

Workpiece installation reproducibility is improved.



Workpiece installation tap

Guide rail is integrated with the table.

Body installation through hole
Installation is possible from the top surface.

RF type (Rotary type)

Standard model



High rigidity model



RF02
RF03
RF04

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

POINT

Rotation axis model, first in TRANSERVO series

- Rotation axis model, first in TRANSERVO series
- Thin and compact
- Can be secured from the top or bottom surface.
- Hollow hole, through which the tool wiring is passed, is prepared.
- Workpiece can be attached easily.
- Motor is built-into the body to achieve the space-saving.
- Standard model or high rigidity model can be selected.

Use of highly rigid bearing makes it possible to reduce displacement amount in the radial thrust direction of the table.



Standard model



High rigidity model

BD type (Belt type)

Straight model



BD04
BD05
BD07

Type	Model	Size (mm) ^{Note 1}	Lead (mm)	Maximum payload (kg) ^{Note 2}		Maximum speed (mm/sec.) ^{Note 3}	Stroke (mm)
				Horizontal	Vertical		
BD type (Belt type)	BD04	W40 × H40	48	1	-	1100	300 to 1000
	BD05	W58 × H48	48	5	-	1400	300 to 2000
	BD07	W70 × H60	48	14	-	1500	300 to 2000

Note 1. The size shows approximate maximum cross sectional size.
 Note 2. The payload may vary depending on the operation speed.
 Note 3. The maximum speed may vary depending on the transfer weight or stroke length.
 Note 4. STH04-R (L) with 50-stroke and brake is not supported.

■ Allowable ambient temperature for robot installation
 STH/RF/BD type 5 to 40 °C

POINT

Belt type applicable to long stroke

- Applicable to up to 2000 mm-stroke.
- High speed movement at a speed of up to 1500 mm/sec. can be made.
- Maximum payload 14 kg
- Main body can be installed without disassembling the robot.
- Shutter is provided as standard equipment. This prevents grease scattering or entry of foreign object.



Shutter is provided as standard equipment.

This shutter covers the guide, ball screw, and belt. The shutter prevents grease scattering or entry of external foreign object.