YAMAHA

New Product information

YAMAHA Single-Axis Robots Rod type SR

TRANSERVO

SR type Standard : SR03 / SR04 / SR05 With support guide : SRD03 / SRD04 / SRD05

STEPPING MOTOR SINGLE-AXIS ROBOTS
THE LONG AWAITED ROD TYPE YAMAHA
"TRANSERVO" SERIES IS NOW ON THE SCENE !

1 Maintenance-free

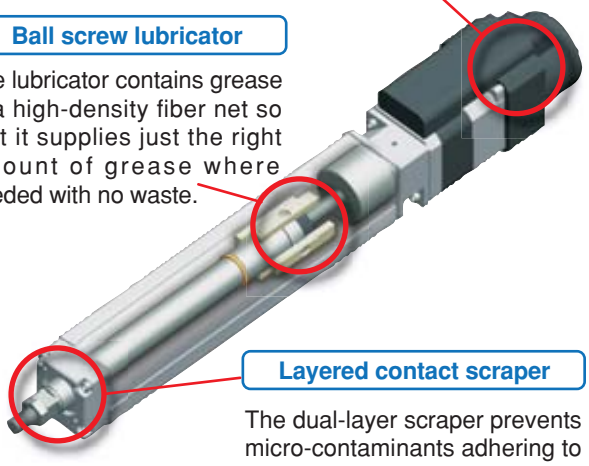
A lubricator used in the ball screw and a contact scraper installed at the entrance and exit of the rod deliver near maintenance free operation.

Uses highly reliable resolver

A rugged and sturdy resolver is used as the position sensor. All models are selectable with a brake.

Ball screw lubricator

The lubricator contains grease in a high-density fiber net so that it supplies just the right amount of grease where needed with no waste.



Layered contact scraper

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

1: Needs no maintenance for long periods

Grease lubrication on the ball screw is usually lost a little bit at a time with ball screw movement.
The SR type has a lubricator that supplies grease lost over long periods to ensure near maintenance-free operation*.

2: Grease-saving lubrication system

The lubricator uses a high-density fiber net that supplies just the right amount of grease in an eco-friendly lubrication system that wastes no grease.

3: Prevents contaminant particles

The dual-layer scraper in contact with the rod removes micro contaminant particles with near-perfect performance. It scrapes away tiny particles adhering to the rod in a multi-step operation that prevent trouble from contaminants that might otherwise penetrate to internal parts.
Synthetic foam rubber with a self-lubricating function ensures low-friction resistance.

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

2 Combines best features of servo and stepping motors

Stepping motors have great features such as a low price and no hunting when stopped, but also have defects such as a drastic drop in torque at high speeds and large power consumption while stopped. TRANSERVO uses a newly developed vector control method that ensures minimal torque loss in the high-speed range, saves energy, and produces less noise. TRANSERVO also delivers the same functions and performance as those of a servomotor at a lower cost.

Energy-Saving

Basic control is identical to a servomotor and so saves energy and helps reduce CO_2 emission by not wasting electrical power. Also settable to a “non-hunting” stop mode the same as an ordinary stepping motor.

3 Resolver with superb ruggedness

The YAMAHA TRANSERVO uses closed-loop control and so has absolutely no step-out. As the position detector for motors, TRANSERVO also uses a resolver that is well-known for high reliability and has been employed by YAMAHA higher-grade robot models. This gives stable position detection even in harsh environments including dust particles and oil mist. Position resolution is excellent since there are 20480 pulses per single rotation.

Resolver

Resolvers are magnetic position detectors. Their structure is simple since no electronic and optical components are used. They have a great feature that there are few parts to fail compared to ordinary optical encoders. Because of their ruggedness and low failure rate, large numbers of resolvers are used in fields where reliability gets high priority such as airplanes and cars.

TRANSERVO Rod Type Series

All models are selectable with a brake (horizontal and vertical mount types). Also available with guides.

Model	Lead (mm)	Payload (kg)			Stroke (mm) and maximum speed (mm/s)						Controller
		Horizontal	Vertical		50	100	150	200	250	300	
			SR	SRD							
SR03 SRD03	12	10	4	3.5	500						TS-S (Robot positioner)
	6	20	8	7.5	250						
SR04 SRD04	12	25	5	4	500				440	320	
	6	40	12	11	250				220	160	
SR05 SRD05	12	50	10	8.5	300						
	6	55	20	18.5	150						

Operating method : I/O point tracing
Points : 255 points
Input power : 24V
Position detection method : Incremental
Field networks : CC-Link, DeviceNet

Ordering Method Example: SS05-06SB-NN-600-1L-SNP

SR05 - [ ] **S** [ ] - [ ] [ ] [ ] - [ ] [ ] - **S** [ ]

Standard model	Lead	Type	Brake	Origin position	Bracket plate	Stroke	Cable length	Controller	I/O
SR03 SR04 SR05 SRD03 (with support guide) SRD04 (with support guide) SRD05 (with support guide)	06: 6mm 12: 12mm	S: Straight	B: With brake N: No brake	N: Standard Z: No-motor side	N: No plate H: With plate V: With flange	SS04: 50 to 400 SS05: 50 to 800 SS05H: 50 to 800 (50mm pitch)	1L: 1 meter 3L: 3 meters 5L: 5 meters 10L: 10 meters (flexible cables)	S: TS-S	NP: NPN PN: PNP CC: CC-Link DN: DeviceNet

Model No.			SR03/SRD03		SR04/SRD04		SR05/SRD05	
Motor			□42 Step motor				□56 Step motor	
Repeatability (mm)			±0.02					
Deceleration mechanism			ϕ8, C10				ϕ12, C10	
Ball screw lead (mm)			6	12	6	12	6	12
Maximum speed (mm/sec)*1			250	500	250	500	150	300
Maximum payload (kg)	Horizontal		20	10	40	25	55	50
	Vertical	SR	8	4	12	5	20	10
		SRD	7.5	3.5	11	4	18.5	8.5
Maximum pressing force (N)			100	75	300	150	550	250
Stroke (mm)			50 to 200		50 to 300		50 to 300	
Lost motion			0.1 mm or less					
Rotating backlash (°)			±1.0(SR) / ±0.05(SRD)					

Standard

SR03/SR04/SR05

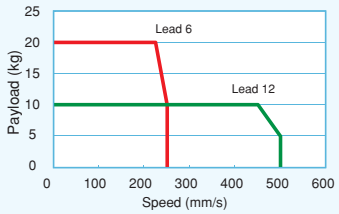
With support guide

SRD03/SRD04/SRD05

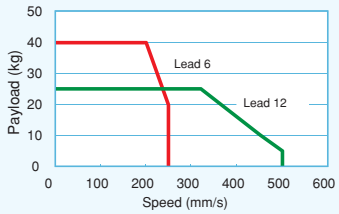
*1. Maximum speed varies with the payload. Maximum speed also decreases due to ball screw critical speed when the stroke is long. See graphs below for more information.

Speed vs. payload graph

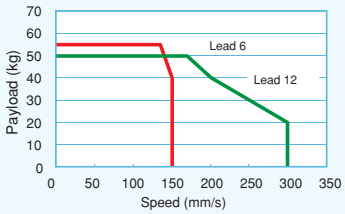
● SR03/SRD03 Horizontal



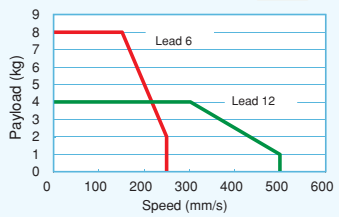
● SR04/SRD04 Horizontal



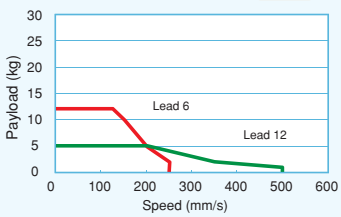
● SR05/SRD05 Horizontal



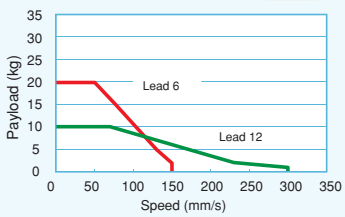
● SR03 Vertical



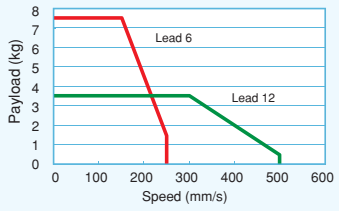
● SR04 Vertical



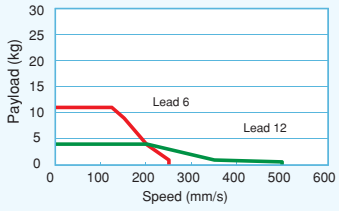
● SR05 Vertical



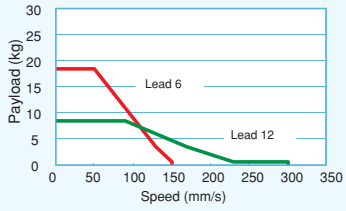
● SRD03 Vertical



● SRD04 Vertical



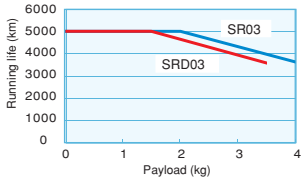
● SRD05 Vertical



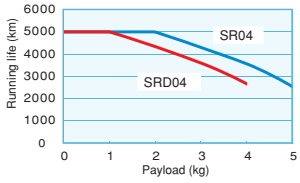
* Maximum operating speed may drop when an external force is applied or the support guide sliding resistance is large.

Running life (5000 km on models other than shown below.)

● SR03/SRD03 Vertical Lead 12



● SR04/SRD04 Vertical Lead 12

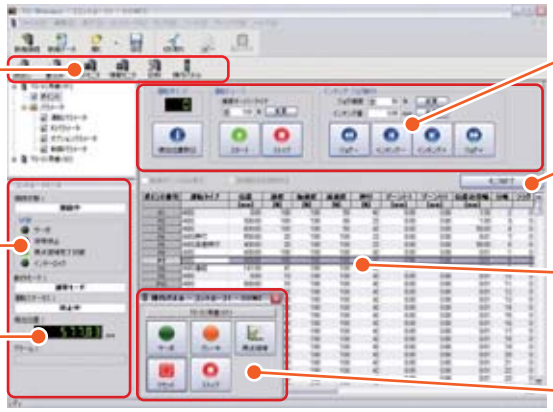


Support software "TS-Manager" main features

Besides basic functions, such as point data edit and backup, this support software TS-Manager incorporates various convenient functions to efficiently process the system debugging and analysis. The TS-Manager helps you in every scene from the system setup to the maintenance.

1 Basic functions

Detailed settings by point, such as the position information, operation pattern, speed, acceleration, and deceleration settings, and robot parameter settings can be set, edited, and backed up. Additionally, the basic operation of the robot, such as JOG movement or inching operation can also be controlled through the TS-Manager.



2 Real-time trace

This function traces the current position, speed, load factor, current value, and voltage value at real-time. Additionally, as trigger conditions are set, data can be automatically obtained when these conditions are satisfied. Furthermore, as a zone is specified from the monitor results, the maximum value, minimum value, and average value can be calculated. These values are useful for the analysis if a trouble occurs.

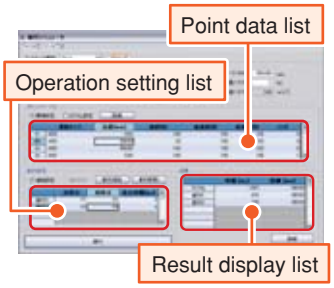
Real-time traceable items (up to four items)		
• Voltage value	• Current value	• Motor load factor
• Command speed	• Current speed	• Internal temperature
• Command current value	• Present current value	• Input/output I/O status
• Word input/output status		

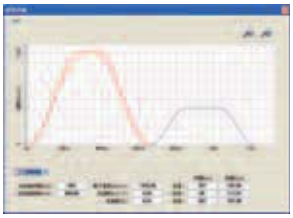
3 Various monitor functions and detailed error logs

The robot operation status (operation mode or servo status) and I/O status can be monitored.
Additionally, the Alarm Log screen also displays the input/output I/O status in addition to the carrier position, speed, operation status, current value, and voltage value in case of an alarm. This greatly contributes to the status analysis.

4 Operation simulation

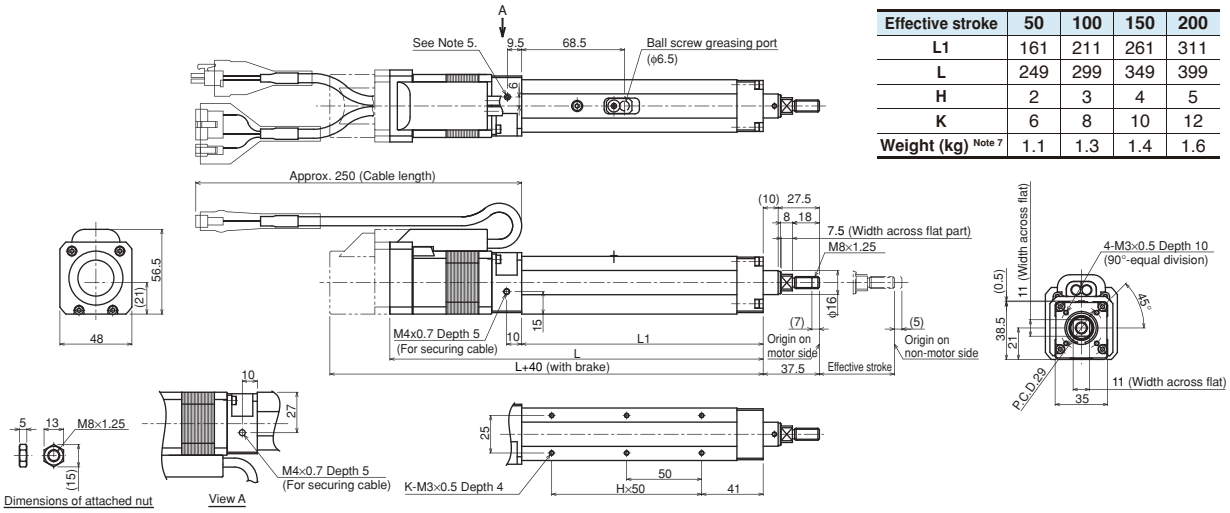
As the operation condition data or point data is input, a period of time necessary for operation is simulated.
Use of this function makes it possible to select an optimal model before purchase and simulate the speed and acceleration/deceleration settings without use of actual machine.
It is also possible to link this operation simulation function with the TS-Manager main software. This easily affects the point data you have edited in the actual machine.





Displays the detailed simulation results graphically.

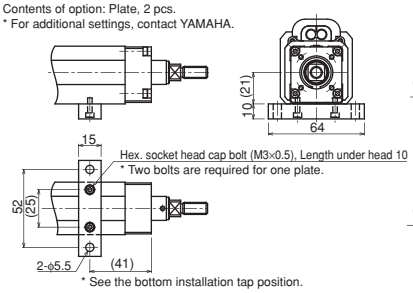
SR03 : Standard



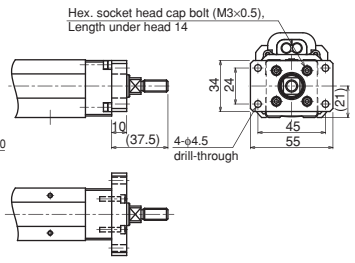
Effective stroke	50	100	150	200
L1	161	211	261	311
L	249	299	349	399
H	2	3	4	5
K	6	8	10	12
Weight (kg) Note 7	1.1	1.3	1.4	1.6

Option: Horizontal installation plate

Contents of option: Plate, 2 pcs.
* For additional settings, contact YAMAHA.

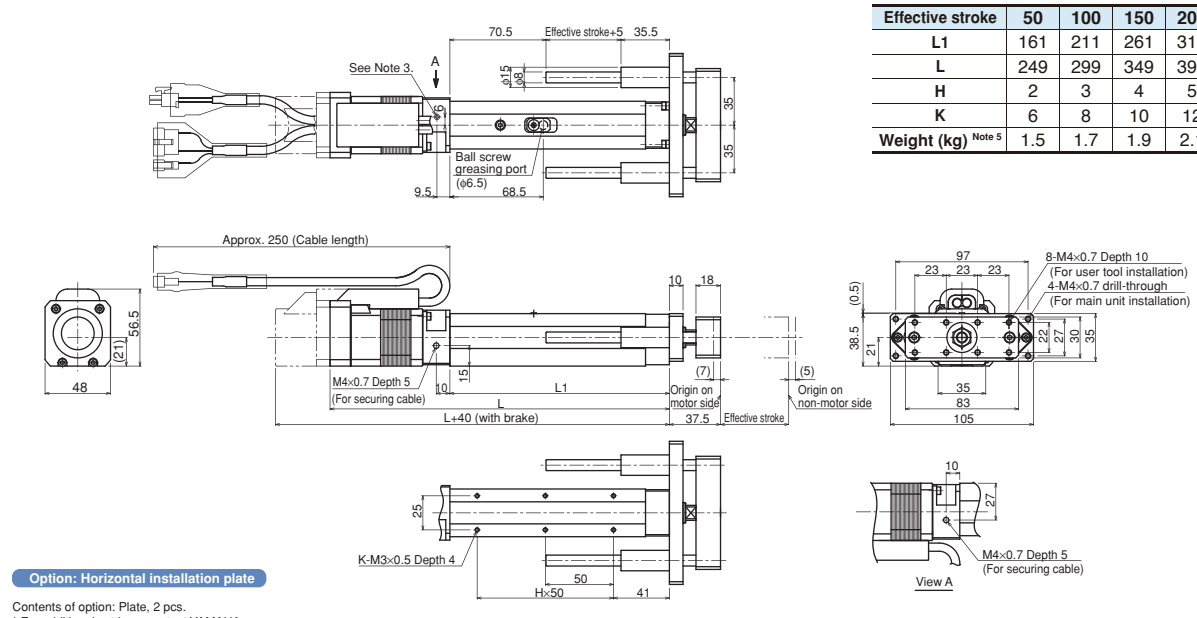


Option: Vertical installation plate



Note 1. It is possible to apply only the axial load.
Use the external guide together so that any radial load is not applied to the rod.
Note 2. The orientation of the width across flat part is undefined to the base surface.
Note 3. Use the support guide together to maintain the straightness.
Note 4. When running the cables, secure cables so that any load is not applied to them.
Note 5. Remove the M4 hex. socket head cap set bolts and use them to secure the cables. (Effective screw thread depth 5)
Note 6. The cable's minimum bend radius is R30.
Note 7. Models with a brake will be 0.2kg heavier.

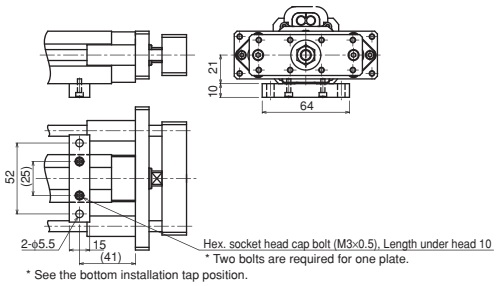
SRD03 : With support guide



Effective stroke	50	100	150	200
L1	161	211	261	311
L	249	299	349	399
H	2	3	4	5
K	6	8	10	12
Weight (kg) Note 5	1.5	1.7	1.9	2.1

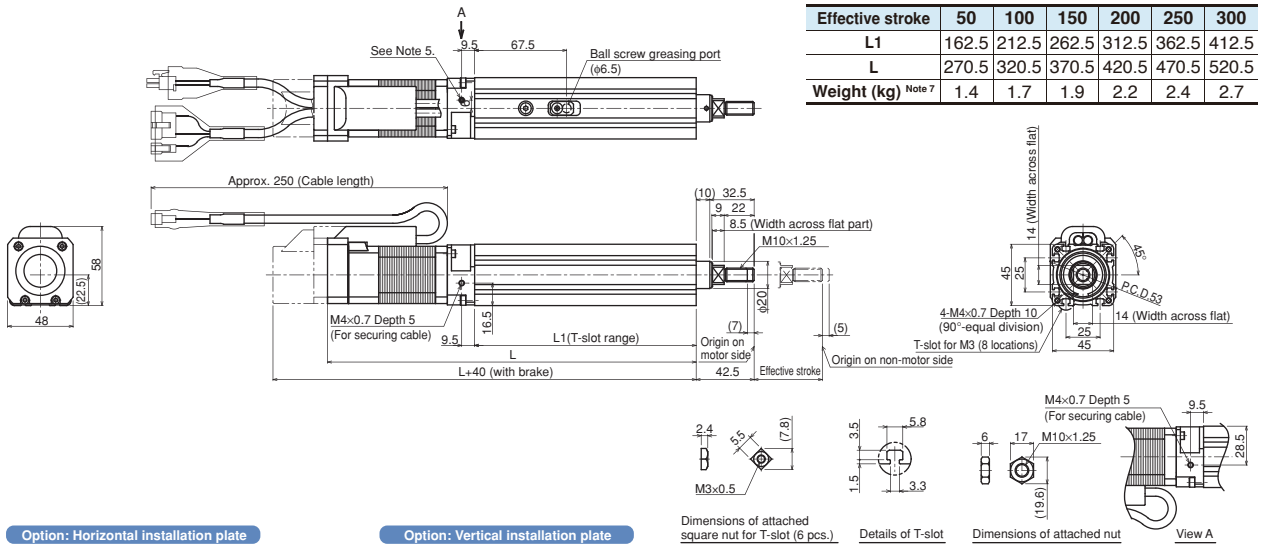
Option: Horizontal installation plate

Contents of option: Plate, 2 pcs.
* For additional settings, contact YAMAHA.



Note 1. It is possible to apply only the axial load.
Use the external guide together so that any radial load is not applied to the rod.
Note 2. When running the cables, secure cables so that any load is not applied to them.
Note 3. Remove the M4 hex. socket head cap set bolts and use them to secure the cables. (Effective screw thread depth 5)
Note 4. The cable's minimum bend radius is R30.
Note 5. Models with a brake will be 0.2kg heavier.

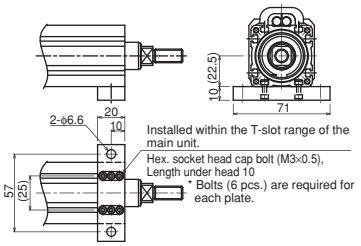
SR04 : Standard



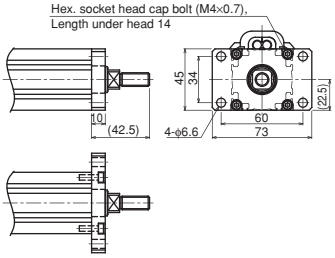
Effective stroke	50	100	150	200	250	300
L1	162.5	212.5	262.5	312.5	362.5	412.5
L	270.5	320.5	370.5	420.5	470.5	520.5
Weight (kg) Note 7	1.4	1.7	1.9	2.2	2.4	2.7

Option: Horizontal installation plate

Contents of option: Plate, 2 pcs., Nut, 12 pcs.
* For additional settings, contact YAMAHA.

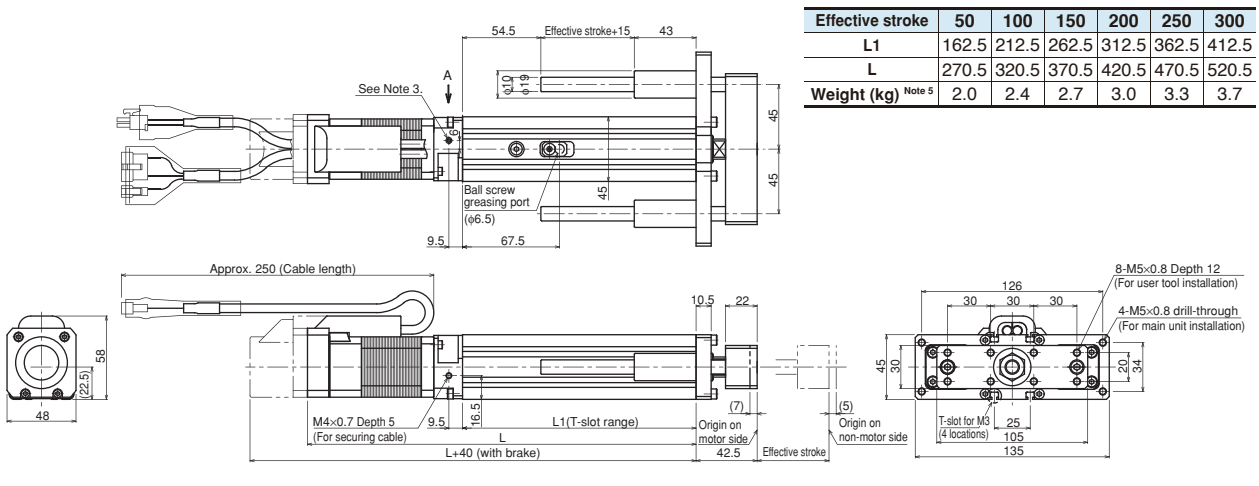


Option: Vertical installation plate



Note 1. It is possible to apply only the axial load.
Use the external guide together so that any radial load is not applied to the rod.
Note 2. The orientation of the width across flat part is undefined to the base surface.
Note 3. Use the support guide together to maintain the straightness.
Note 4. When running the cables, secure cables so that any load is not applied to them.
Note 5. Remove the M4 hex. socket head cap set bolts and use them to secure the cables. (Effective screw thread depth 5)
Note 6. The cable's minimum bend radius is R30.
Note 7. Models with a brake will be 0.2kg heavier.

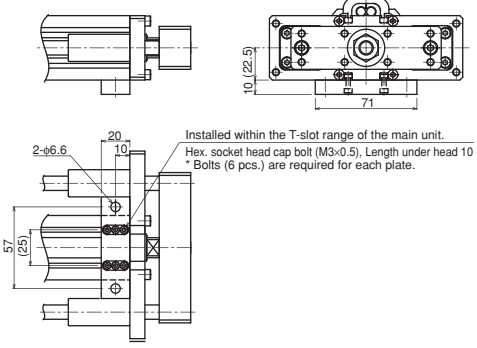
SRD04 : With support guide

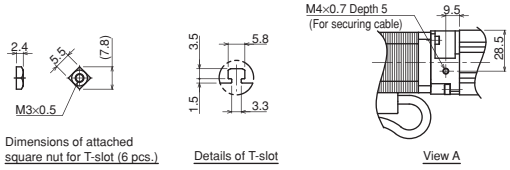


Effective stroke	50	100	150	200	250	300
L1	162.5	212.5	262.5	312.5	362.5	412.5
L	270.5	320.5	370.5	420.5	470.5	520.5
Weight (kg) Note 5	2.0	2.4	2.7	3.0	3.3	3.7

Option: Horizontal installation plate

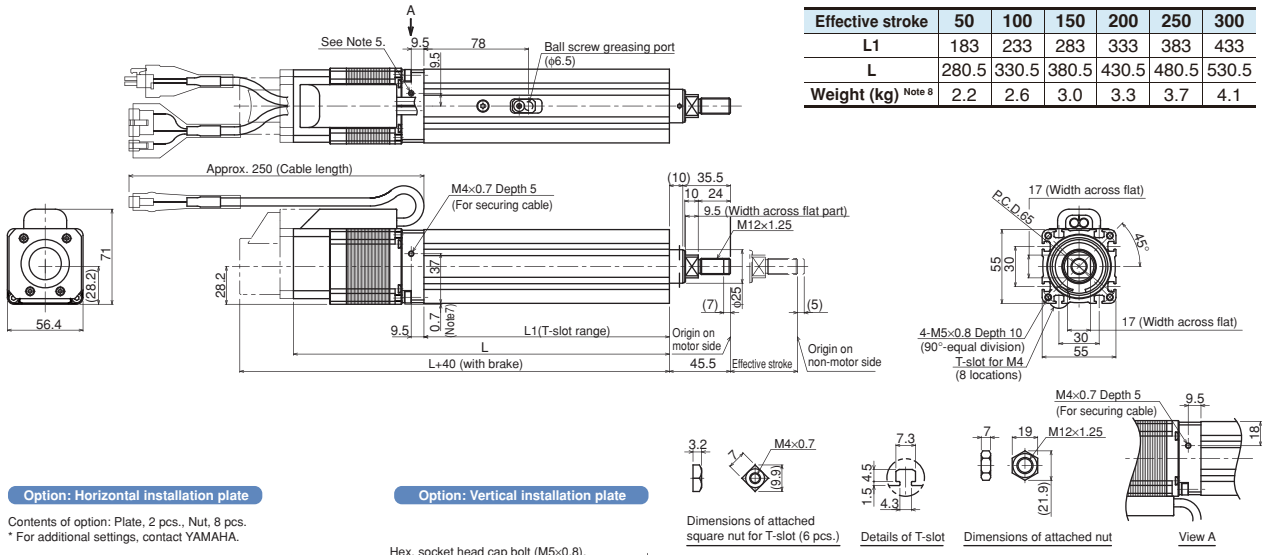
Contents of option: Plate, 2 pcs., Nut, 12 pcs.
* For additional settings, contact YAMAHA.





Note 1. It is possible to apply only the axial load.
Use the external guide together so that any radial load is not applied to the rod.
Note 2. When running the cables, secure cables so that any load is not applied to them.
Note 3. Remove the M4 hex. socket head cap set bolts and use them to secure the cables. (Effective screw thread depth 5)
Note 4. The cable's minimum bend radius is R30.
Note 5. Models with a brake will be 0.2kg heavier.

SR05 : Standard



Dimensions of attached square nut for T-slot (6 pcs.)

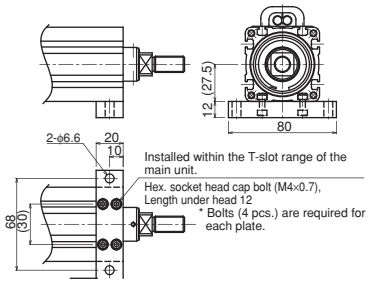
Details of T-slot

Dimensions of attached nut

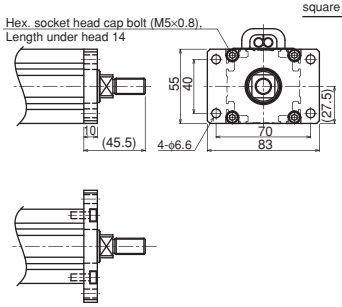
View A

Option: Horizontal installation plate

Contents of option: Plate, 2 pcs., Nut, 8 pcs.
* For additional settings, contact YAMAHA.



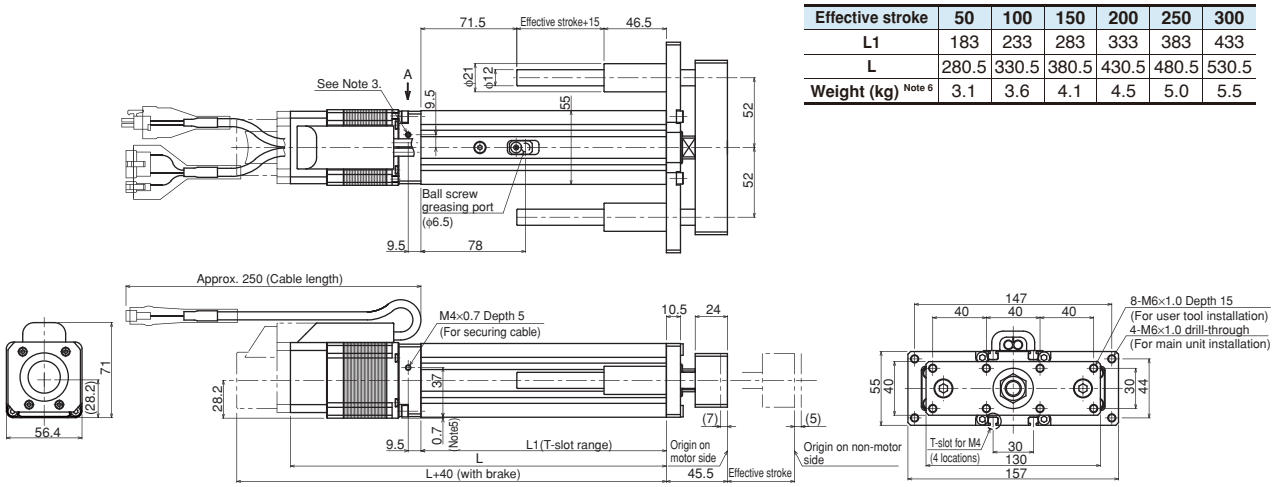
Option: Vertical installation plate

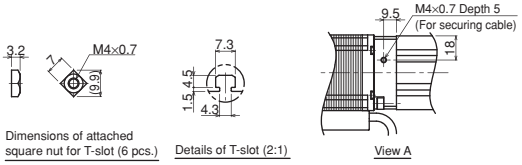


Note 1. It is possible to apply only the axial load.
Use the external guide together so that any radial load is not applied to the rod.
Note 2. The orientation of the width across flat part is undefined to the base surface.
Note 3. Use the support guide together to maintain the straightness.
Note 4. When running the cables, secure cables so that any load is not applied to them.
Note 5. Remove the M4 hex. socket head cap set bolts and use them to secure the cables. (Effective screw thread depth 5)
Note 6. The cable's minimum bend radius is R30.
Note 7. Take great care as the outer case of the motor projects from the bottom of the main unit.
Note 8. Models with a brake will be 0.2kg heavier.

Effective stroke	50	100	150	200	250	300
L1	183	233	283	333	383	433
L	280.5	330.5	380.5	430.5	480.5	530.5
Weight (kg) Note 8	2.2	2.6	3.0	3.3	3.7	4.1

SRD05 : With support guide





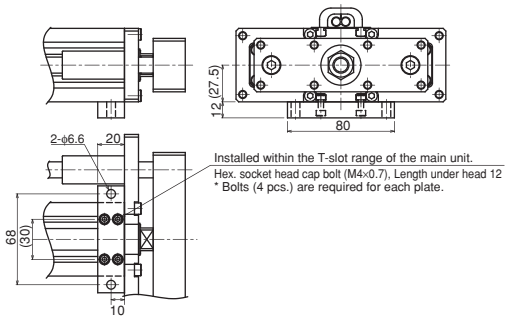
Dimensions of attached square nut for T-slot (6 pcs.)

Details of T-slot (2:1)

View A

Option: Horizontal installation plate

Contents of option: Plate, 2 pcs., Nut, 8 pcs.
* For additional settings, contact YAMAHA.



Note 1. It is possible to apply only the axial load.
Use the external guide together so that any radial load is not applied to the rod.
Note 2. When running the cables, secure cables so that any load is not applied to them.
Note 3. Remove the M4 hex. socket head cap set bolts and use them to secure the cables. (Effective screw thread depth 5)
Note 4. The cable's minimum bend radius is R30.
Note 5. Take great care as the outer case of the motor projects from the bottom of the main unit.
Note 6. Models with a brake will be 0.2kg heavier.

Effective stroke	50	100	150	200	250	300
L1	183	233	283	333	383	433
L	280.5	330.5	380.5	430.5	480.5	530.5
Weight (kg) Note 6	3.1	3.6	4.1	4.5	5.0	5.5

Connection to Peripheral Units

Input signal

Signal name	Meaning	Description
PIN0 to PIN7	Point number selection	• Point number used to perform positioning operation • Point number to teach current position
JOG+	Jog (+)	Jogs in plus (+) direction when ON.
JOG-	Jog (-)	Jogs in plus (-) direction when ON.
MANUAL	Manual mode	ON: manual mode
ORG	Return-to-origin	Starts return-to-origin.
/LOCK	Interlock	ON: Movement possible, OFF: Movement impossible
START	Start	Starts moving to position specified by point number.
TEACH	Teach	Teaches current position to specified point number.
RESET	Reset	• Resets alarm. • Resets point number output. • Clears remaining distance in relative positioning operation.
SERVO	Servo ON	ON: Servo ON, OFF: Servo OFF

Output signal

Signal name	Meaning	Description
POUT0 to POUT7	Point number selection	• Point number used to perform positioning operation • Alarm number when alarm has occurred
OUT0 OUT1 OUT2 OUT3	Control output 0 Control output 1 Control output 2 Control output 3	Allocate the following outputs to OUT0 to OUT3. • Zone output • Personal zone output • Manual mode status • Return-to-origin status • Near width output • Movement-in-progress output • Push status • Warning output
ZONE	Zone output	Turns ON while at the zone specified by parameter.
PZONE	Personal zone output	Turns ON while at the zone specified by point setting.
MANU-S	Manual mode status	Turns ON when in manual mode.
ORG-S	Return-to-origin status	Turns ON when return-to-origin is complete.
TLM-S	Push status	Turns ON during push in pushing operation.
/WARN	Warning output	Turns ON when warning is issued.
NEAR	Near width output	Turns ON when near width (position margin zone) is entered.
MOVE	Movement in progress	Turns on during movement.
BUSY	Operation in progress	Outputs ON during operation.
END	Operation complete	Outputs operation result. Turns ON when operation has ended normally.
/ALM	Alarm	Turns ON when operation is normal. Turns OFF when alarm has occurred.
SRV-S	Servo status	Outputs ON at servo-on.

Options

Handy Terminal: HT1/HT1-D

Has a back light graphic LCD for easy viewing. Use to manually operate the robot, set parameters, edit point data, or teaching tasks.

Name	Enable switch	Model No.
HT1 (standard)	None	KCA-M5110-0E
HT1-D	3-position switch	KCA-M5110-1E

Support software TS-Manager

Besides data writing, editing and backup functions,the TS-Manager also offers cycle time simulatio-nand various types of monitor func-tions.

Name	Model No.
TS-Manager	KCA-M4966-0E

Data cables

These are data cables that connect the PC to the controller. Select from USB or D-Sub cables.

Type	Model No.
USB connection (5m)	KCA-M538F-A0
D-Sub connection (5m)	KCA-M538F-00

SR03/SRD03 bracket plates

Feet (horizontal mount)

Flange (vertical mount)

Type	Model No.
Feet (2 plates per set)	KCU-M223F-00
Flange (1 piece)	KCU-M224F-00

SR04/SRD04 bracket plates

Feet (horizontal mount)

Flange (vertical mount)

Type	Model No.
Feet (2 plates per set)*	KCV-M223F-00
Flange (1 piece)	KCV-M224F-00

* Comes with 12 mounting nuts for feet.

SR05/SRD05 bracket plates

Feet (horizontal mount)

Flange (vertical mount)

Type	Model No.
Feet (2 plates per set)*	KCW-M223F-00
Flange (1 piece)	KCW-M224F-00

* Comes with 8 mounting nuts for feet.

* See the general catalog for options other than those listed above.

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