

ROBO Cylinder[®]

Slim and Small Type
Battery-less Absolute Specification

RCA2-RP3NC/RP4NC
RCA2-TC3NC/TC4NC
RCA2-TW3NC/TW4NC
RCA2-GD3NC/GD4NC

Instruction Manual Second edition ME3839-1A



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Please Read Before Use

Thank you for purchasing our product.

This instruction manual explains the handling methods, structure and maintenance of this product, providing the information you need in order to use the product safely.

Before using the product, be sure to read this manual and fully understand the contents explained herein to ensure safe use of the product.

Please download the user's manual from our website.

You can download it free of charge. User registration is required for the first time downloading.

URL : www.iai-robot.co.jp/data_dl/CAD_MANUAL/

When using the product, print out of the necessary portions of the relevant manual, or please display it on your computer, tablet terminal, etc. so that you can check it immediately.

After reading the instruction manual, keep it in a convenient place so that whoever is handling the product can refer to it quickly when necessary.

[Important]

- This instruction manual is an original document dedicated for this product.
- This product cannot be used in ways not shown in this instruction manual. IAI shall not be liable for any result whatsoever arising from the use of the product in any other way than what is noted in the manual.
- The information contained in this instruction manual is subject to change without notice for the purpose of product improvement.
- If any issues arise regarding the information contained in this instruction manual, contact our customer center or the nearest sales office.
- Use or reproduction of this instruction manual in full or in part without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the text are registered trademarks.

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Safety Guide

“Safety Guide” has been written to use the machine safely and so prevent personal injury or property damage beforehand. Make sure to read it before the operation of this product.

Safety Precautions for Our Products

The common safety precautions for the use of any of our robots in each operation.

No.	Operation Description	Description
1	Model Selection	• This product has not been planned and designed for the application where high level of safety is required, so the guarantee of the protection of human life is impossible. Accordingly, do not use it in any of the following applications. 1) Medical equipment used to maintain, control or otherwise affect human life or physical health. 2) Mechanisms and machinery designed for the purpose of moving or transporting people (For vehicle, railway facility or air navigation facility) 3) Important safety parts of machinery (Safety device, etc.) • Do not use the product outside the specifications. Failure to do so may considerably shorten the life of the product. • Do not use it in any of the following environments. 1) Location where there is any inflammable gas, inflammable object or explosive 2) Place with potential exposure to radiation 3) Location with the ambient temperature or relative humidity exceeding the specification range 4) Location where radiant heat is added from direct sunlight or other large heat source 5) Location where condensation occurs due to abrupt temperature changes 6) Location where there is any corrosive gas (sulfuric acid or hydrochloric acid) 7) Location exposed to significant amount of dust, salt or iron powder 8) Location subject to direct vibration or impact • For an actuator used in vertical orientation, select a model which is equipped with a brake. If selecting a model with no brake, the moving part may drop when the power is turned OFF and may cause an accident such as an injury or damage on the work piece.

No.	Operation Description	Description
2	Transportation	• When carrying a heavy object, do the work with two or more persons or utilize equipment such as crane. • When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. • When in transportation, consider well about the positions to hold, weight and weight balance and pay special attention to the carried object so it would not get hit or dropped. • Transport it using an appropriate transportation measure. The actuators available for transportation with a crane have eyebolts attached or there are tapped holes to attach bolts. Follow the instructions in the instruction manual for each model. • Do not step or sit on the package. • Do not put any heavy thing that can deform the package, on it. • When using a crane capable of 1t or more of weight, have an operator who has qualifications for crane operation and sling work. • When using a crane or equivalent equipments, make sure not to hang a load that weighs more than the equipment’s capability limit. • Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength. • Do not get on the load that is hung on a crane. • Do not leave a load hung up with a crane. • Do not stand under the load that is hung up with a crane.
3	Storage and Preservation	• The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation. • Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.
4	Installation and Start	(1) Installation of Robot Main Body and Controller, etc. • Make sure to securely hold and fix the product (including the work part). A fall, drop or abnormal motion of the product may cause a damage or injury. Also, be equipped for a fall-over or drop due to an act of God such as earthquake. • Do not get on or put anything on the product. Failure to do so may cause an accidental fall, injury or damage to the product due to a drop of anything, malfunction of the product, performance degradation, or shortening of its life. • When using the product in any of the places specified below, provide a sufficient shield. 1) Location where electric noise is generated 2) Location where high electrical or magnetic field is present 3) Location with the mains or power lines passing nearby 4) Location where the product may come in contact with water, oil or chemical droplets

No.	Operation Description	Description
4	Installation and Start	(2) Cable Wiring • Use our company's genuine cables for connecting between the actuator and controller, and for the teaching tool. • Do not scratch on the cable. Do not bend it forcibly. Do not pull it. Do not coil it around. Do not insert it. Do not put any heavy thing on it. Failure to do so may cause a fire, electric shock or malfunction due to leakage or continuity error. • Perform the wiring for the product, after turning OFF the power to the unit, so that there is no wiring error. • When the direct current power (+24V) is connected, take the great care of the directions of positive and negative poles. If the connection direction is not correct, it might cause a fire, product breakdown or malfunction. • Connect the cable connector securely so that there is no disconnection or looseness. Failure to do so may cause a fire, electric shock or malfunction of the product. • Never cut and/or reconnect the cables supplied with the product for the purpose of extending or shortening the cable length. Failure to do so may cause the product to malfunction or cause fire. (3) Grounding • The grounding operation should be performed to prevent an electric shock or electrostatic charge, enhance the noise-resistance ability and control the unnecessary electromagnetic radiation. • For the ground terminal (PE) on the AC power cable of the controller and the grounding plate in the control panel, make sure for grounding work. For security grounding, it is necessary to select an appropriate wire thickness suitable for the load. Perform wiring that satisfies the specifications (electrical equipment standards and criteria). For detail, follow the description in [an instruction manual of each controller or controller built-in actuator]. • Conduct functional grounding on the FG terminal for a controller supplying 24V DC or a controller built-in type actuator. In order to minimize influence to mechanical operation given by electromagnetic interference (noise) to an electrical device or insulation failure, conduct grounding on a terminal or a conductor that is electrically stable. The reference impedance should be Type D (Former Class 3, ground resistance 100Ω or less).

No.	Operation Description	Description
4	Installation and Start	(4) Safety Measures • When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. • When the product is under operation or in the ready mode, take the safety measures (such as the installation of safety and protection fence) so that nobody can enter the area within the robot’s movable range. When the robot under operation is touched, it may result in death or serious injury. • Make sure to install the emergency stop circuit so that the unit can be stopped immediately in an emergency during the unit operation. • Take the safety measure not to start up the unit only with the power turning ON. Failure to do so may start up the machine suddenly and cause an injury or damage to the product. • Take the safety measure not to start up the machine only with the emergency stop cancellation or recovery after the power failure. Failure to do so may result in an electric shock or injury due to unexpected power input. • When the installation or adjustment operation is to be performed, give clear warnings such as “Under Operation; Do not turn ON the power!” etc. Sudden power input may cause an electric shock or injury. • Take the measure so that the work part is not dropped in power failure or emergency stop. • Wear protection gloves, goggle or safety shoes, as necessary, to secure safety. • Do not insert a finger or object in the openings in the product. Failure to do so may cause an injury, electric shock, damage to the product or fire. • When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity.
5	Teaching	• When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. • Perform the teaching operation from outside the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. • When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. • When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. • Place a sign “Under Operation” at the position easy to see. • When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.

No.	Operation Description	Description
6	Trial Operation	• When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. • After the teaching or programming operation, perform the check operation one step by one step and then shift to the automatic operation. • When the check operation is to be performed inside the safety protection fence, perform the check operation using the previously specified work procedure like the teaching operation. • Make sure to perform the programmed operation check at the safety speed. Failure to do so may result in an accident due to unexpected motion caused by a program error, etc. • Do not touch the terminal block or any of the various setting switches in the power ON mode. Failure to do so may result in an electric shock or malfunction.
7	Automatic Operation	• Check before starting the automatic operation or rebooting after operation stop that there is nobody in the safety protection fence. • Before starting automatic operation, make sure that all peripheral equipment is in an automatic-operation-ready state and there is no alarm indication. • Make sure to operate automatic operation start from outside of the safety protection fence. • In the case that there is any abnormal heating, smoke, offensive smell, or abnormal noise in the product, immediately stop the machine and turn OFF the power switch. Failure to do so may result in a fire or damage to the product. • When a power failure occurs, turn OFF the power switch. Failure to do so may cause an injury or damage to the product, due to a sudden motion of the product in the recovery operation from the power failure.

No.	Operation Description	Description
8	Maintenance and Inspection	• When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. • Perform the work out of the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. • When the work is to be performed inside the safety protection fence, basically turn OFF the power switch. • When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. • When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. • Place a sign “Under Operation” at the position easy to see. • For the grease for the guide or ball screw, use appropriate grease according to the instruction manual for each model. • Do not perform the dielectric strength test. Failure to do so may result in a damage to the product. • When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. • The slider or rod may get misaligned OFF the stop position if the servo is turned OFF. Be careful not to get injured or damaged due to an unnecessary operation. • Pay attention not to lose the removed cover or screws, and make sure to put the product back to the original condition after maintenance and inspection works. Use in incomplete condition may cause damage to the product or an injury. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.
9	Modification and Dismantle	• Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.
10	Disposal	• When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste. • When removing the actuator for disposal, pay attention to drop of components when detaching screws. • Do not put the product in a fire when disposing of it. The product may burst or generate toxic gases.
11	Other	• Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. • See Overseas Specifications Compliance Manual to check whether complies if necessary. • For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety. • Using the devise in a way not indicated by IAI may lose the protection performance equipped to the device.

Alert Indication

The safety precautions are divided into “Danger”, “Warning”, “Caution” and “Notice” according to the warning level, as follows, and described in the instruction manual for each model.

Level	Degree of Danger and Damage	Symbol
Danger	This indicates an imminently hazardous situation which, if the product is not handled correctly, will result in death or serious injury.	 Danger
Warning	This indicates a potentially hazardous situation which, if the product is not handled correctly, could result in death or serious injury.	 Warning
Caution	This indicates a potentially hazardous situation which, if the product is not handled correctly, may result in minor injury or property damage.	 Caution
Notice	This indicates lower possibility for the injury, but should be kept to use this product properly.	 Notice

Caution in Handling

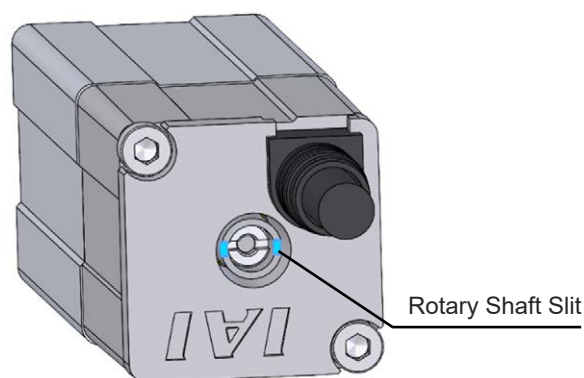
1. The Safety Guide attached with the product is intended to permit safe use of the product and thus to prevent risks and property damage. Be sure to read it before handling the product.
2. Do not attempt any handling or operation that is not indicated in this instruction manual.
3. Make sure to secure the actuator properly in accordance with this instruction manual.
If the actuator is not securely fixed, this may lead to abnormal noise, vibration, breakdown or shortened product life.
4. Make sure to observe the usage conditions and environment of the product.
Operation outside the warranty could cause decreased performance or product breakdown.
Use within the allowable range for each item.
5. It is recommended to apply our products for the wiring between the actuator and the controller.
6. Grease film may run out after back-and-forth operations over a short distance.
Grease film may run out if the actuator is moved back and forth continuously over a distance of 20 mm or less. For reference, have 5 cycles of back and forth operation in full-stroke range after 5,000 to 10,000 cycles of short-distanced back and forth operation. This will regenerate the oil film.
7. Base oil may separate from the grease and leak from the inside of the actuator to the exterior due to the operating environment, mounting orientation, operating conditions, etc.
Protect the peripheral equipment if base oil adhesion negatively affects them.
8. For the rod type RP, do not attempt to apply radial loads or load moments to the linear motion components (rod-end fixture and ball screw shaft).
Loads may be applied only in the direction aligned with the axis of the ball screw shaft.
If external forces are applied from directions other than the axis of the ball screw shaft, use an external guide in combination, or select GD, the rod type equipped with double guides, or TC or TW, the table type.

9. Do not operate the reciprocating motion of the screw shaft on the rod type RP without an external guide.

If reciprocating motion is performed from the linear motion side without a guide, an eccentric load will be applied to the screw shaft, which may cause bending of the screw shaft or damage to the internal mechanism.

10. When the unit is without a brake, the rear-side rotary shaft of the main body has a slit that allows manual rotation.

When rotating the shaft manually, turn the power off and rotate it using a slotted screwdriver or a similar tool.



11. Do not allow the linear motion part to collide with obstacles at high speed. Doing so may damage the internal mechanism.
12. Do not attempt to apply excessive impact in the thrust direction of the linear motion part. Doing so may damage the actuator.
13. Handling of Spiral Cover (* spiral cover equipped option)
The spiral cover is made of a thin stainless steel sheet wound in a spiral shape. It may deform if struck by a tool or pressed strongly with fingers. Handle it with care.
14. Grease is applied to the outer circumference of the guide shafts of the rod type GD equipped with double guides.
If surrounding equipment may be adversely affected by grease contamination, take appropriate protective measures.

International Standards Compliances

This actuator complies with the following overseas standard.

Refer to Overseas Standard Compliance Manual (ME0287) for more detailed information.

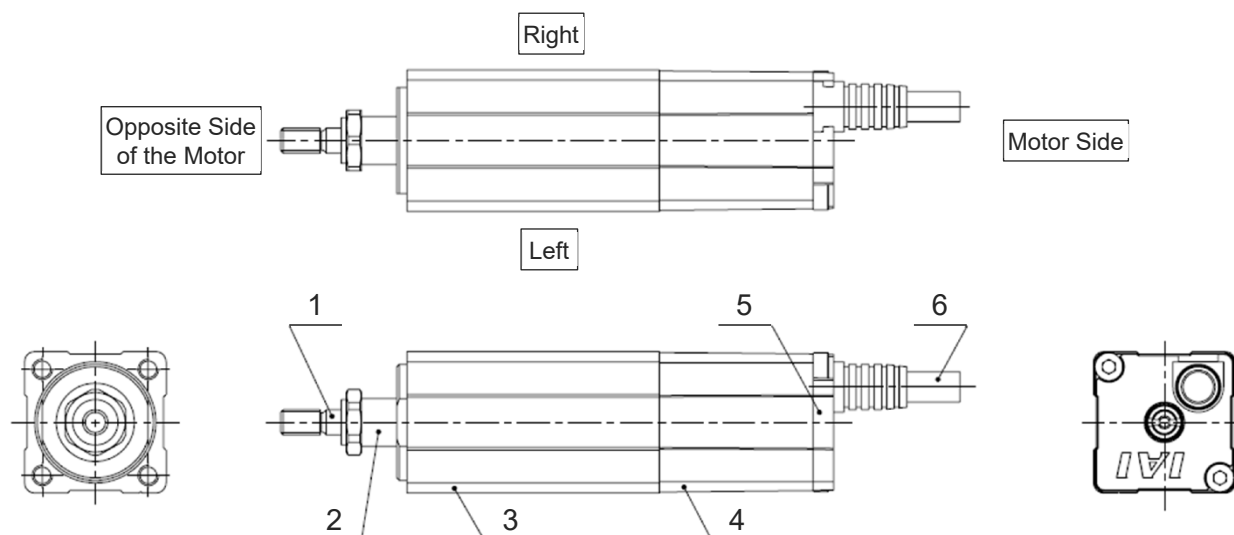
RoHS3 Directive	CE Marking
☐	☐

Names of the Parts

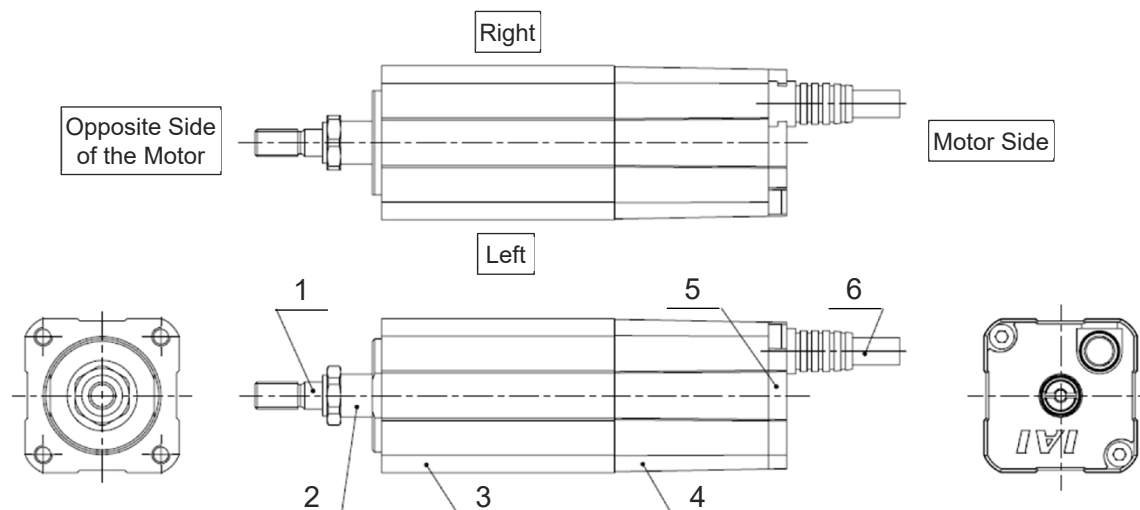
In this Instruction Manual, the left and right sides are indicated by looking at the actuator from the motor end, with the actuator placed horizontally, as shown in the figure below.

[Tapped Hole Fixed Rod Type (RP□NC)]

● RCA2-RP3NC



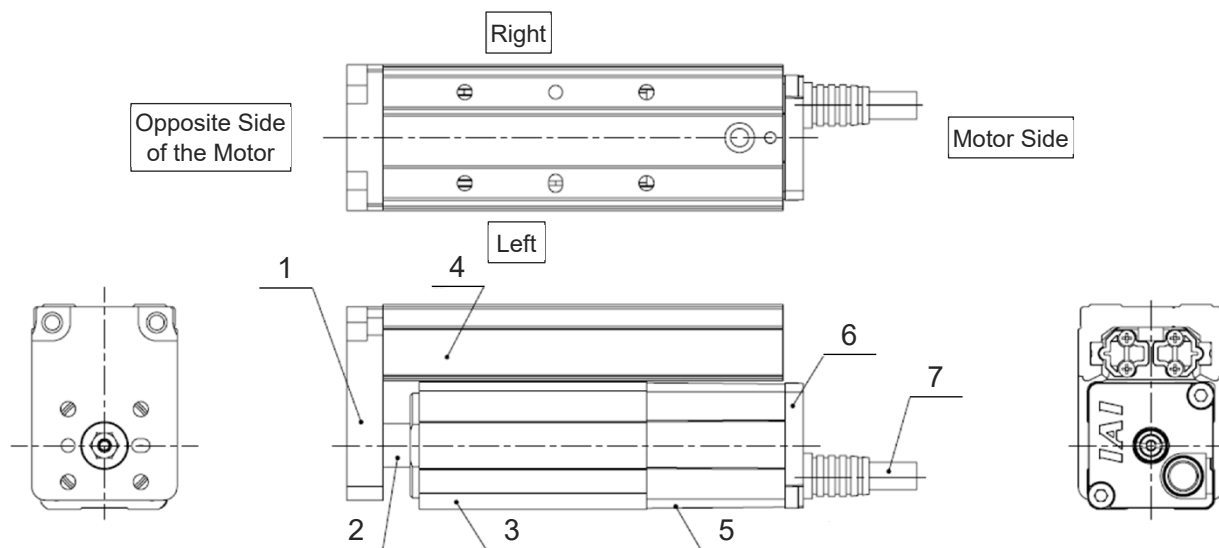
● RCA2-RP4NC



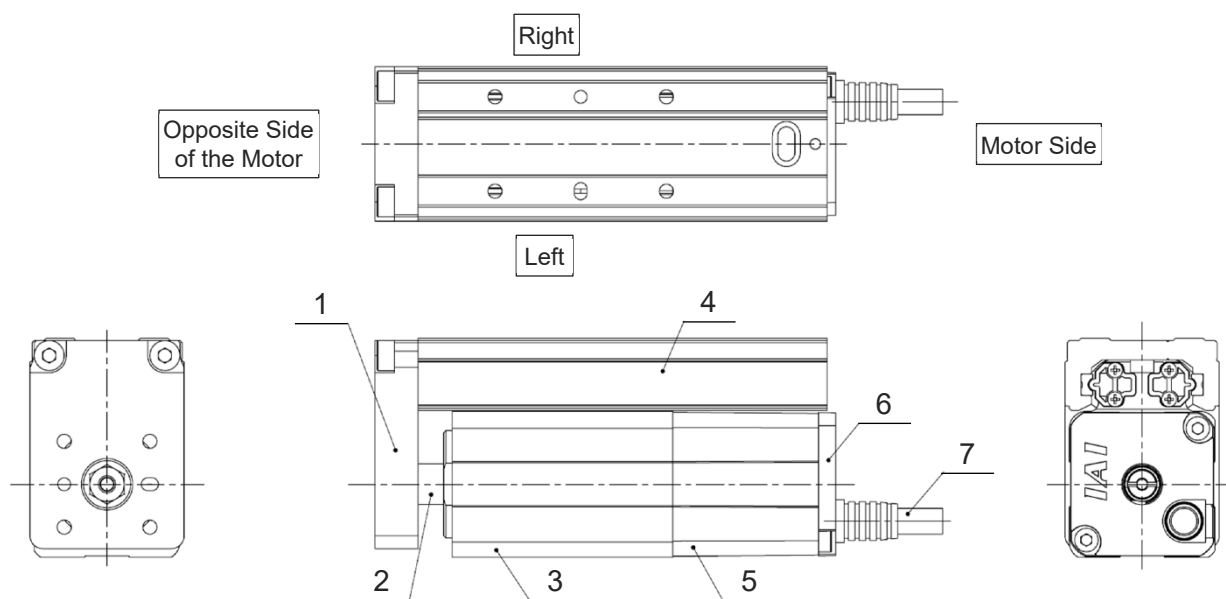
No.	Name	Material	Surface Treatment
1	Rod Tip Fitting	S45C	Electroless Nickel Plating
2	Stopper Collar	Stainless Steel	—
3	Main Frame	Aluminium Alloy	White Anodizing Treatment
4	Encoder Cover	Synthetic Resin	—
5	Rear Cover	Synthetic Resin	—
6	Cable	—	—

[Compact Table Type (TC□NC)]

● RCA2-TC3NC



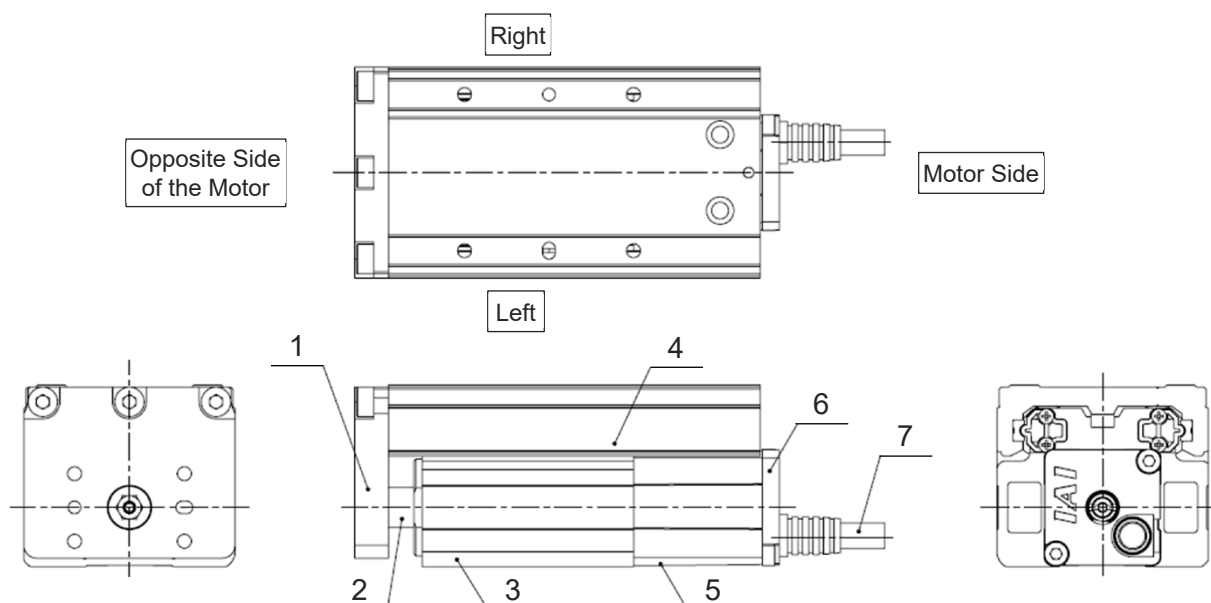
● RCA2-TC4NC



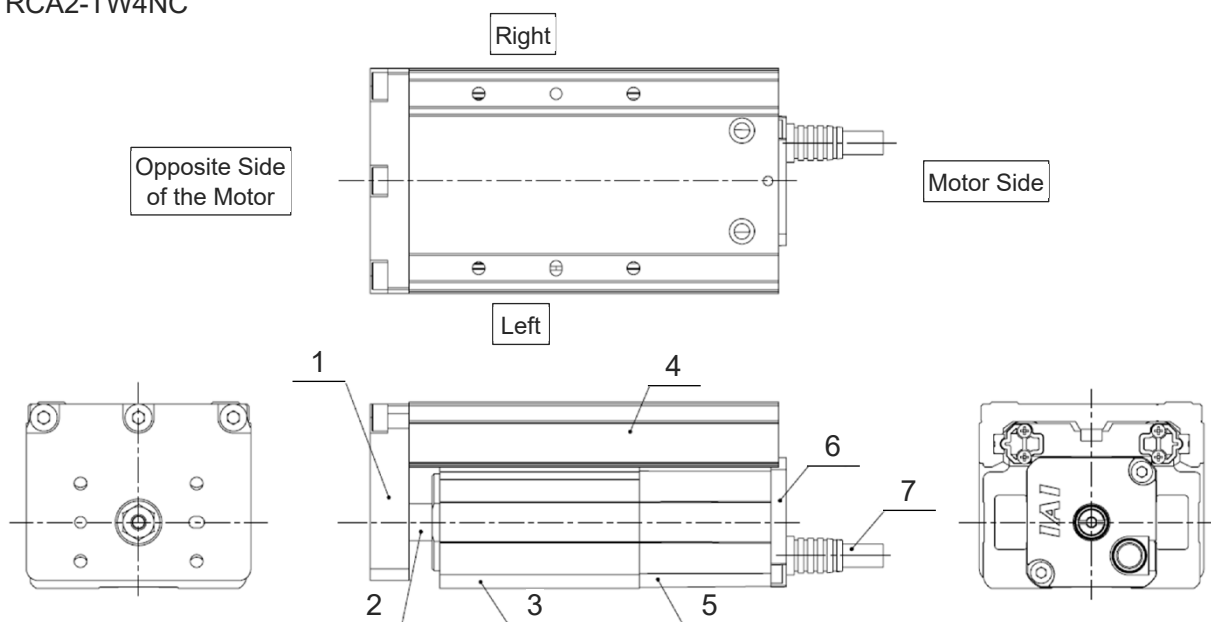
No.	Name	Material	Surface Treatment
1	Front Plate	Aluminium Alloy	White Anodizing Treatment
2	Stopper Collar	Stainless Steel	—
3	Main Frame	Aluminium Alloy	White Anodizing Treatment
4	Table	Aluminium Alloy	White Anodizing Treatment
5	Encoder Cover	Synthetic Resin	—
6	Rear Cover	Synthetic Resin	—
7	Cable	—	—

[Wide Table Type (TW□NC)]

● RCA2-TW3NC



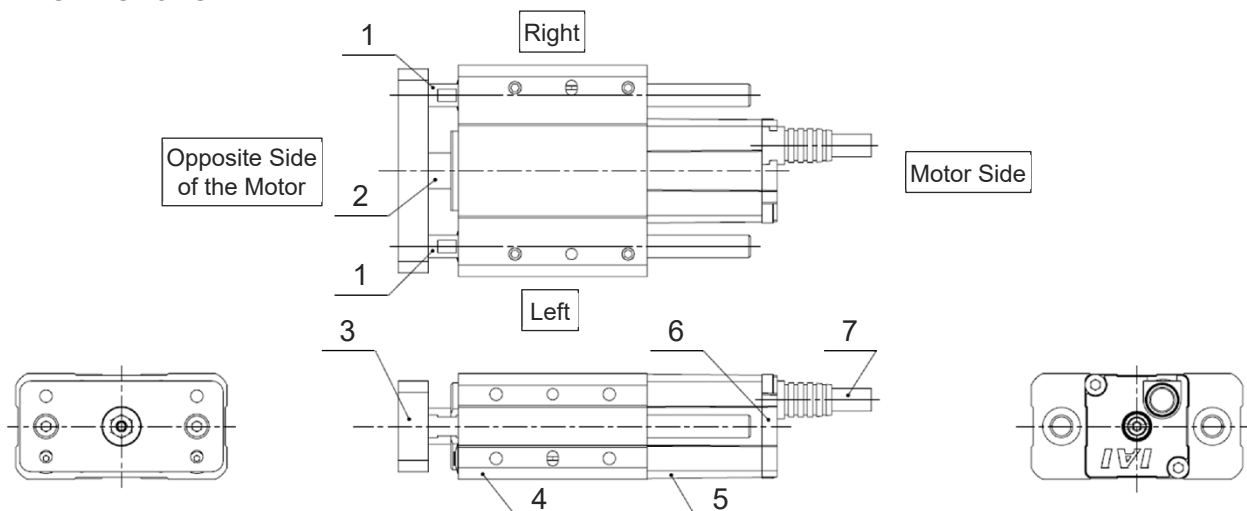
● RCA2-TW4NC



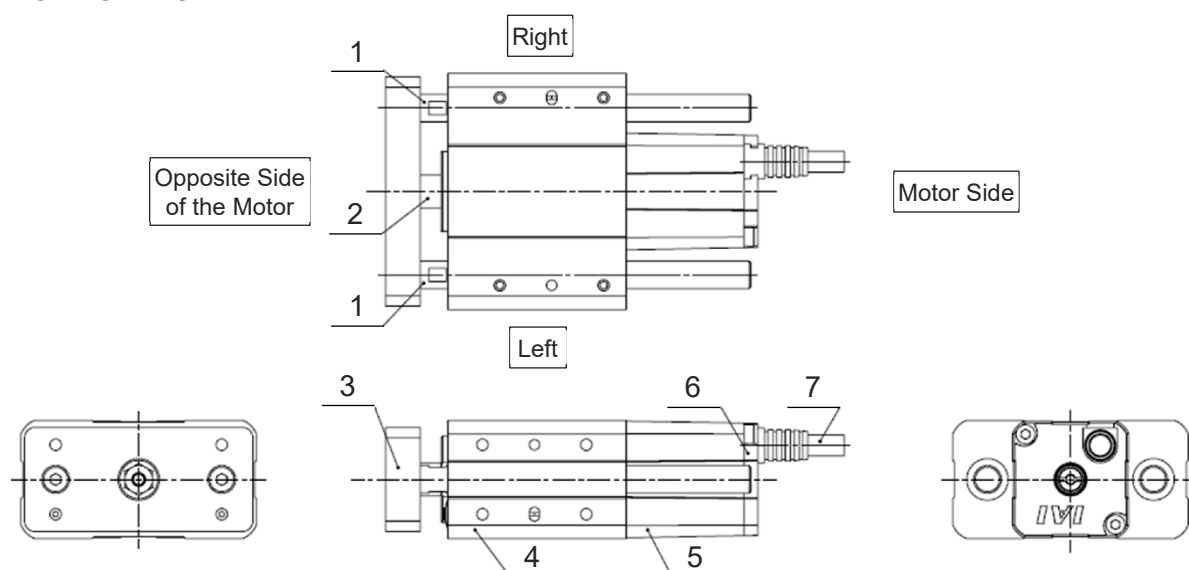
No.	Name	Material	Surface Treatment
1	Front Plate	Aluminium Alloy	White Anodizing Treatment
2	Stopper Collar	Stainless Steel	—
3	Main Frame	Aluminium Alloy	White Anodizing Treatment
4	Table	Aluminium Alloy	White Anodizing Treatment
5	Encoder Cover	Synthetic Resin	—
6	Rear Cover	Synthetic Resin	—
7	Cable	—	—

[Double-Guided Rod Type (GD□NC)]

● RCA2-GD3NC



● RCA2-GD4NC



No.	Name	Material	Surface Treatment
1	Guide Shaft	SUJ2	Induction hardened and tempered, HRC 60 or higher
2	Stopper Collar	Stainless Steel	—
3	Front Plate	Aluminium Alloy	White Anodizing Treatment
4	Main Frame	Aluminium Alloy	White Anodizing Treatment
5	Encoder Cover	Synthetic Resin	—
6	Rear Cover	Synthetic Resin	—
7	Cable	—	—



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1.1 Checking the Product

1.1.1 Components

The following table shows the product configuration for the standard specification.
See the component list for the details of the enclosed components. If you find any fault or missing parts, contact your local IAI distributor.

Actuator	
<u>Actuator</u> <u>Quantity 1</u> 	
Accessories	
<u>Motor • Encoder Cable</u> <u>Quantity 1</u> Motor Encoder Integrated Cable or Motor Encoder Integrated Robot Cable 	<u>Safety Guide</u> <u>Quantity 1</u> M0194 

* Download instruction manual in our homepage.

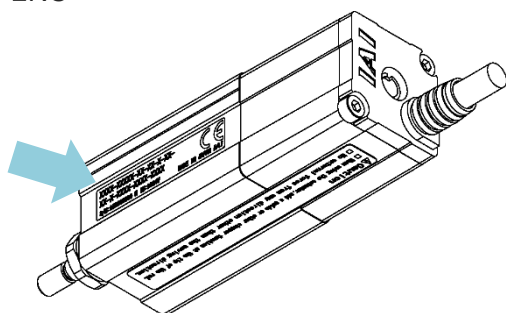
1.1.2 How to Read the Model Nameplate

Model → MODEL: RCA2-TC3NC-WA-20-2-50-A5-P-B
 Serial number → S/N: B01234500 DATE: 15/07/2024
 INPUT: DC24V MADE IN JAPAN **IAI Corporation** **CE**

[Nameplate position]

Rod Type

RP□NC



GD□NC

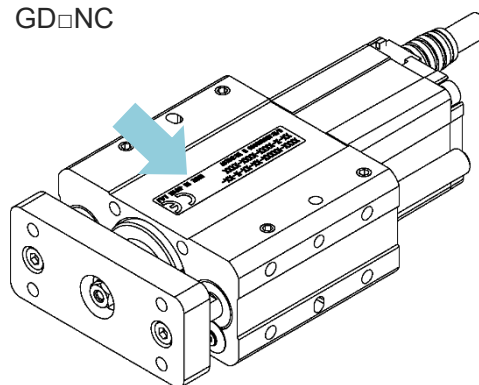
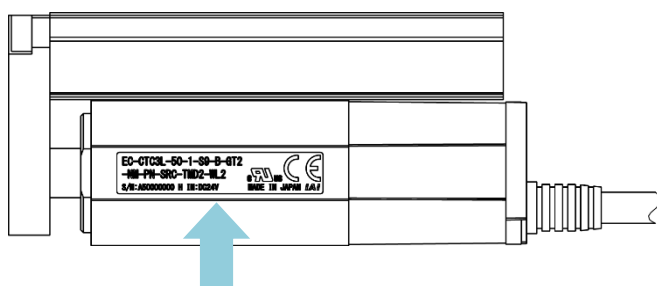
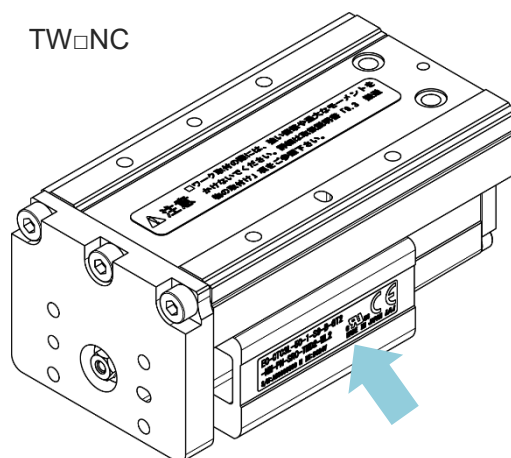


Table Type

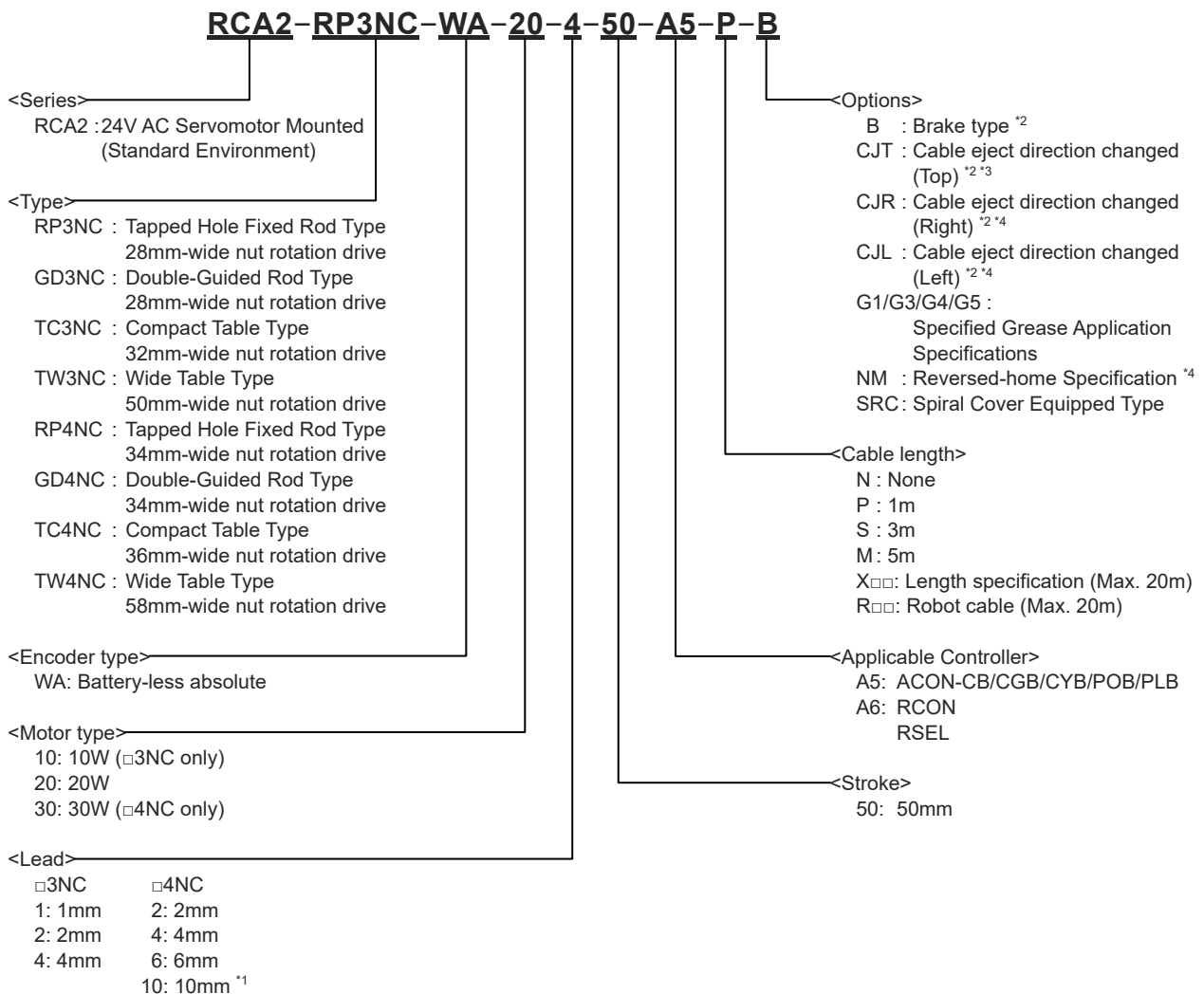
TC□NC



TW□NC



1.1.3 How to Read the Model Number



*1: Available to select 30W motor only

*2: Certainly select cable ejection direction change option when selecting brake-equipped options

*3: It is selectable only for rod type (RP□NC or GD□NC)

*4: It is selectable only for table type (TC□NC or TW□NC)

1.2 Mechanical Specifications Tapped Hole Fixed Rod Type

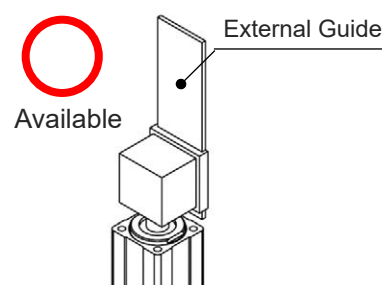
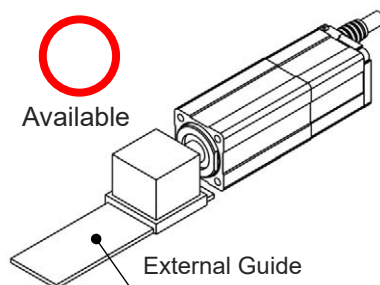
1.2.1 RCA2-RP3NC

[1] Actuator Specifications

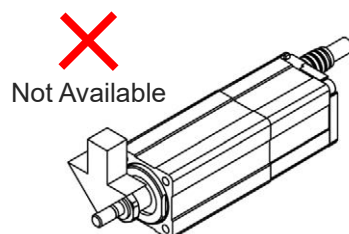
Item		Content	
		Motor 10W	Motor 20W
Drive system		Ball screw $\phi 4\text{mm}$, rolled C10	
Positioning repeatability		$\pm 0.01\text{mm}$ or less	
Backlash		0.03mm or less	
Lost motion		0.1mm or less	
Brake	Specification	Non-Exciting Operation Electromagnetic Brake	
	Holding force	Lead 4: 1kgf, Lead 2: 1.5kgf Lead 1: 2kgf	Lead 4: 1.5kgf, Lead 2: 2.5kgf Lead 1: 3kgf
Ambient operating temperature/humidity		0 to 40°C, 85%RH or less (Non-condensing)	
Degree of protection		IP20	
Vibration and Impact resistance		4.9m/s ²	
Motor type		24V AC Servomotor	
Encoder type		Battery-less absolute	
Encoder pulse count		16,384 pulse/rev	

[Limitation to Ball Screw Tip Load]

Axial Load



Radial Load



[2] Lead and Max. Payload

Lead	Maximum payload (kg)			
	Motor 10W		Motor 20W	
	Horizontal	Vertical	Horizontal	Vertical
4	2	1	3	1.5
2	4	1.5	6	2.5
1	8	2	12	3

[3] Stroke and Max. Speed

**Caution**

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower less than speed the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is 0.3 mm/s for Lead 4, 0.2 mm/s for Lead 2, and 0.1 mm/s for Lead 1 for both 10W and 20W motors.

Lead	Stroke 50mm	
	Motor 10W	Motor 20W
4	200	300
2	100	150
1	50	75

[4] Payload by Speed/Acceleration

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values. It may cause to generate vibration, malfunction or shorten the product life.

■ Motor 10W

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	2	1
200	2	1

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	4	1.5
100	4	1.5

Lead 1 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	8	2
50	8	2

■ Motor 20W

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1.5
300	3	1.5

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	6	2.5
150	6	2.5

Lead 1 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	12	3
75	12	3

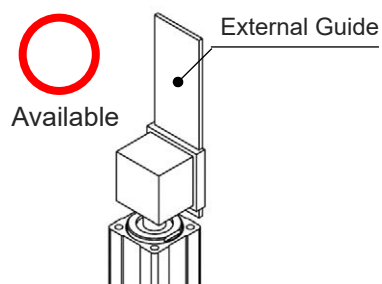
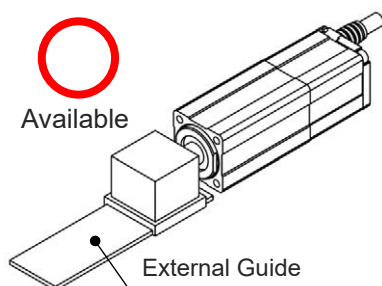
1.2.2 RCA2-RP4NC

[1] Actuator Specifications

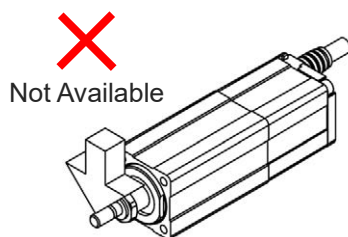
Item		Content	
		Motor 20W	Motor 30W
Drive system		Ball screw $\Phi 6\text{mm}$, rolled C10	
Positioning repeatability		$\pm 0.01\text{mm}$ or less	
Backlash		0.03mm or less	
Lost motion		0.1mm or less	
Brake	Specification	Non-Exciting Operation Electromagnetic Brake	
	Holding force	Lead 6: 1kgf, Lead 4: 2kgf Lead 2: 4kgf	Lead 10: 1kgf, Lead 6: 1.5kgf Lead 4: 3kgf, Lead 2: 6kgf
Ambient operating temperature/humidity		0 to 40°C, 85%RH or less (Non-condensing)	
Degree of protection		IP20	
Vibration and Impact resistance		4.9m/s ²	
Motor type		24V AC Servomotor	
Encoder type		Battery-less absolute	
Encoder pulse count		16,384 pulse/rev	

[Limitation to Ball Screw Tip Load]

Axial Load



Radial Load



[2] Lead and Max. Payload

Lead	Maximum payload (kg)			
	Motor 20W		Motor 30W	
	Horizontal	Vertical	Horizontal	Vertical
10	—	—	3	1
6	3	1	4.5	1.5
4	5	2	7.5	3
2	10	4	15	6

[3] Stroke and Max. Speed

**Caution**

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower less than speed the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is 0.4 mm/s for Lead 6, 0.3 mm/s for Lead 4, and 0.2 mm/s for Lead 2 for the 20W motor.
- The minimum speed is 0.7 mm/s for Lead 10, 0.4 mm/s for Lead 6, 0.3 mm/s for Lead 4, and 0.2 mm/s for Lead 2 for the 30W motor.

Lead	Stroke 50mm	
	Motor 20W	Motor 30W
10	—	550
6	300	450
4	200	300
2	100	150

[4] Payload by Speed/Acceleration

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values. It may cause to generate vibration, malfunction or shorten the product life.

■ Motor 20W

Lead 6 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1
300	3	1

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	5	2
200	5	2

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	10	4
100	10	4

■ Motor 30W

Lead 10 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1
550	3	1

Lead 6 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	4.5	1.5
450	4.5	1.5

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	7.5	3
300	7.5	3

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	15	6
150	15	6

1.3 Mechanical Specifications Compact Table Type

1.3.1 RCA2-TC3NC

[1] Actuator Specifications

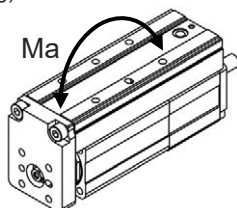
Item		Content	
		Motor 10W	Motor 20W
Drive system		Ball screw $\phi 4\text{mm}$, rolled C10	
Positioning repeatability		$\pm 0.01\text{mm}$ or less	
Backlash		0.03mm or less	
Lost motion		0.1mm or less	
Linear guide		Linear Infinite Circulation Type	
Static allowable moment (Note)		Ma: 10.4Nm, Mb: 10.4Nm Mc: 28.3Nm	Ma: 31.5Nm, Mb: 31.5Nm Mc: 51.8Nm
Dynamic allowable moment (Note)		Ma: 3.3Nm, Mb: 3.3Nm Mc: 9.0Nm	Ma: 8.3Nm, Mb: 8.3Nm Mc: 13.7Nm
Brake	Specification	Non-Exciting Operation Electromagnetic Brake	
	Holding force	Lead 4: 1kgf, Lead 2: 1.5kgf Lead 1: 2kgf	Lead 4: 1.5kgf, Lead 2: 2.5kgf Lead 1: 3kgf
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)	
Degree of protection		IP20	
Vibration and Impact resistance		4.9m/s ²	
Motor type		24V AC Servomotor	
Encoder type		Battery-less absolute	
Encoder pulse count		16,384 pulse/rev	

(Note) The center of gravity of the mounted load is assumed to be at 1/2 of the overhang length. Even if the overhang load length and load moment are within the allowable limits, abnormal vibration or noise may occur during operation depending on the mounting method of the main unit and the conveyed object, or the influence of the beam used for overhung installation. In such cases, operate the unit under reduced operating conditions. The dynamic allowable moment values are based on the life of 5,000km of travel with a reliability of 90%.

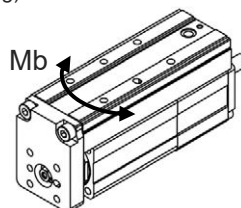
[Guide Type]

■ Moment direction

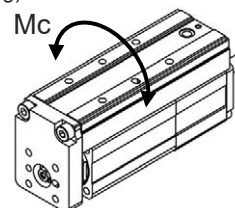
(Pitching)



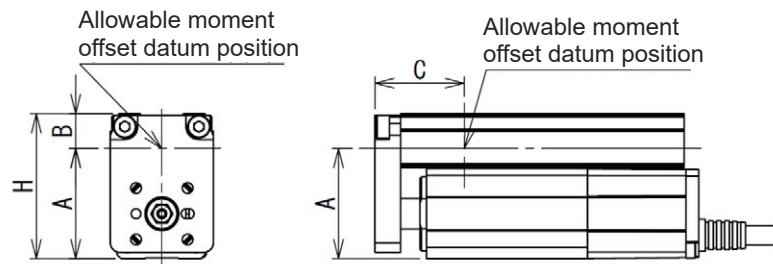
(Yawing)



(Rolling)

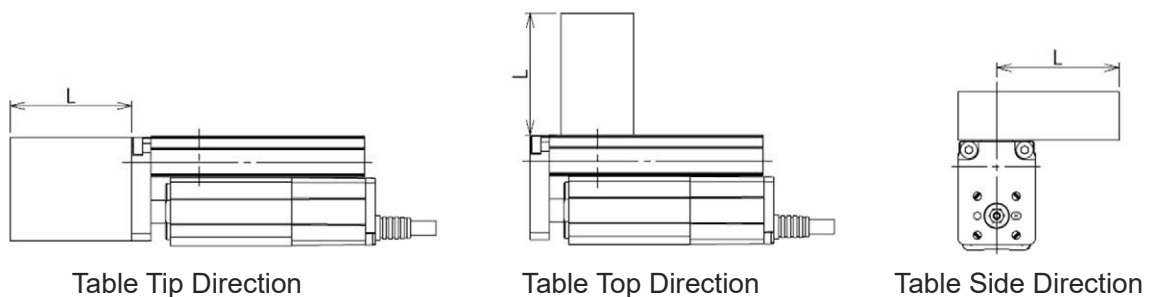


■ Allowable moment offset datum position



Motor (W)	A (mm)	B (mm)	C (mm)	H (mm)
10	34.2	10.8	27.75	45.0
20	34.2	10.8	35.25	45.0

■ Allowable overhang load length



Allowable overhang load length (L)

Motor (W)	Ma	Mb	Mc
10	50mm or less (Table top direction) 50mm or less (Table tip direction)	50mm or less	50mm or less
20	100mm or less (Table top direction) 50mm or less (Table tip direction)	120mm or less	120mm or less

[2] Lead and Max. Payload

Lead	Maximum payload (kg)			
	Motor 10W		Motor 20W	
	Horizontal	Vertical	Horizontal	Vertical
4	2	1	3	1.5
2	4	1.5	6	2.5
1	8	2	12	3

[3] Stroke and Max. Speed

**Caution**

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower less than speed the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is 0.3 mm/s for Lead 4, 0.2 mm/s for Lead 2, and 0.1 mm/s for Lead 1 for both 10W and 20W motors.

Lead	Stroke 50mm	
	Motor 10W	Motor 20W
4	200	300
2	100	150
1	50	75

[4] Payload by Speed/Acceleration

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values. It may cause to generate vibration, malfunction or shorten the product life.

■ Motor 10W

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	2	1
200	2	1

Lead 1 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	8	2
50	8	2

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	4	1.5
100	4	1.5

■ Motor 20W

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1.5
300	3	1.5

Lead 1 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	12	3
75	12	3

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	6	2.5
150	6	2.5

[5] Table Displacement

<Ma moment>

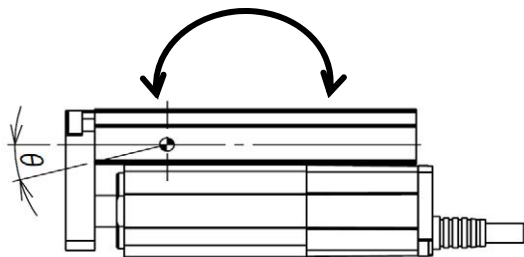
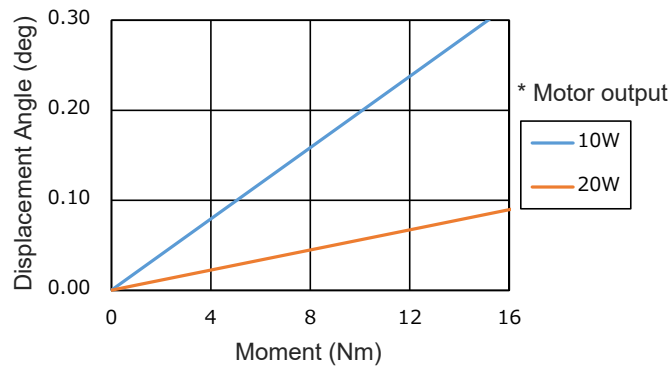


Table displacement angle (Ma direction)



<Mb moment>

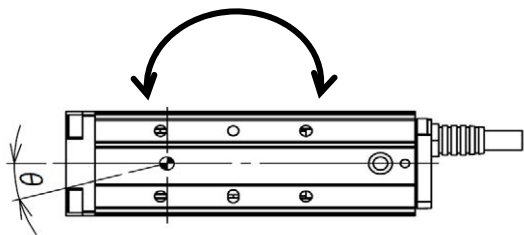
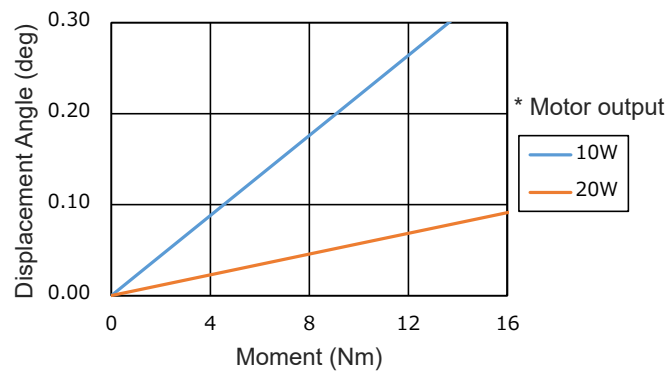


Table displacement angle (Mb direction)



<Mc moment>

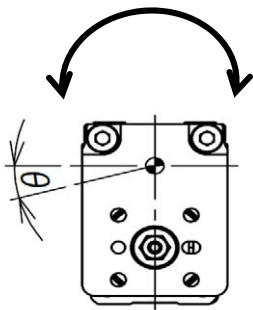
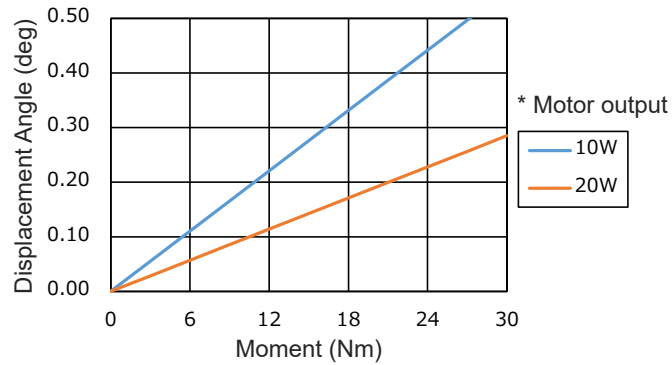


Table displacement angle (Mc direction)



1.3.2 RCA2-TC4NC

[1] Actuator Specifications

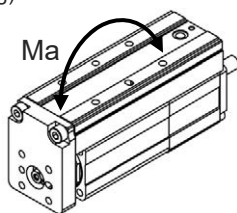
Item		Content	
		Motor 20W	Motor 30W
Drive system		Ball screw $\phi 6\text{mm}$, rolled C10	
Positioning repeatability		$\pm 0.01\text{mm}$ or less	
Backlash		0.03mm or less	
Lost motion		0.1mm or less	
Linear guide		Linear Infinite Circulation Type	
Static allowable moment (Note)		Ma: 21.7Nm, Mb: 21.7Nm Mc: 46.6Nm	Ma: 49.7Nm, Mb: 34.9Nm Mc: 72.5Nm
Dynamic allowable moment (Note)		Ma: 6.1Nm, Mb: 6.1Nm Mc: 13.1Nm	Ma: 12.2Nm, Mb: 12.2Nm Mc: 17.8Nm
Brake	Specification	Non-Exciting Operation Electromagnetic Brake	
	Holding force	Lead 6: 1kgf, Lead 4: 2kgf Lead 2: 4kgf	Lead 10: 1kgf, Lead 6: 1.5kgf Lead 4: 3kgf, Lead 2: 6kgf
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)	
Degree of protection		IP20	
Vibration and Impact resistance		4.9m/s ²	
Motor type		24V AC Servomotor	
Encoder type		Battery-less absolute	
Encoder pulse count		16,384 pulse/rev	

(Note) The center of gravity of the mounted load is assumed to be at 1/2 of the overhang length. Even if the overhang load length and load moment are within the allowable limits, abnormal vibration or noise may occur during operation depending on the mounting method of the main unit and the conveyed object, or the influence of the beam used for overhung installation. In such cases, operate the unit under reduced operating conditions. The dynamic allowable moment values are based on the life of 5,000km of travel with a reliability of 90%.

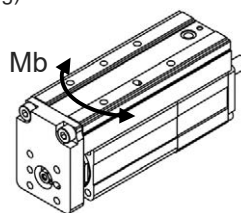
[Guide Type]

■ Moment direction

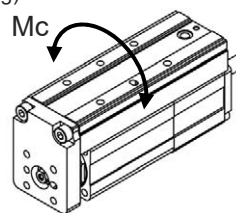
(Pitching)



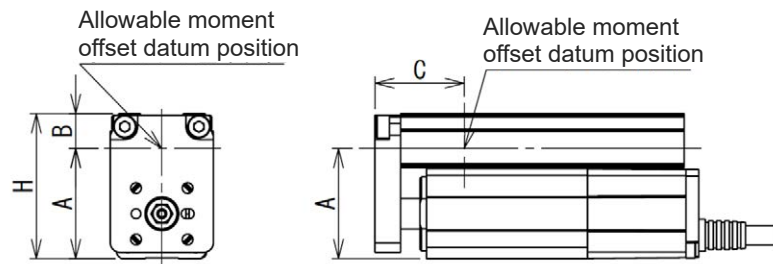
(Yawing)



(Rolling)

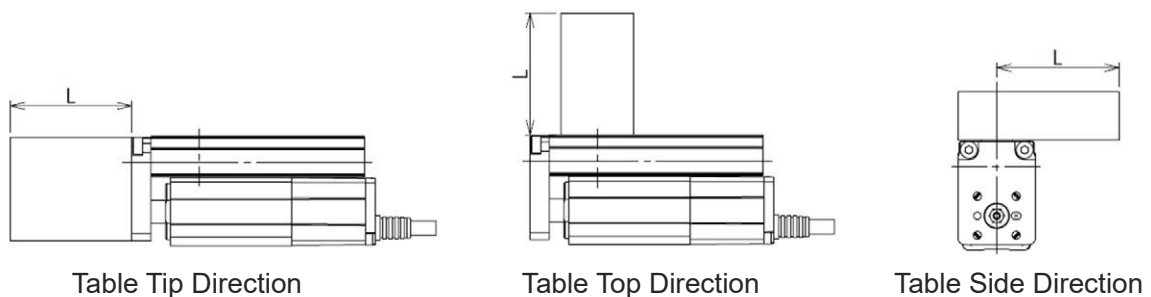


■ Allowable moment offset datum position



Motor (W)	A (mm)	B (mm)	C (mm)	H (mm)
20	40.2	10.8	33.5	51.0
30	40.2	10.8	43.0	51.0

■ Allowable overhang load length



Allowable overhang load length (L)

Motor (W)	Ma	Mb	Mc
20/30	100mm or less (Table top direction) 50mm or less (Table tip direction)	120mm or less	120mm or less

[2] Lead and Max. Payload

Lead	Maximum payload (kg)			
	Motor 20W		Motor 30W	
	Horizontal	Vertical	Horizontal	Vertical
10	—	—	3	1
6	3	1	4.5	1.5
4	5	2	7.5	3
2	10	4	15	6

[3] Stroke and Max. Speed

**Caution**

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower less than speed the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is 0.4 mm/s for Lead 6, 0.3 mm/s for Lead 4, and 0.2 mm/s for Lead 2 for the 20W motor.
- The minimum speed is 0.7 mm/s for Lead 10, 0.4 mm/s for Lead 6, 0.3 mm/s for Lead 4, and 0.2 mm/s for Lead 2 for the 30W motor.

Lead	Stroke 50mm	
	Motor 20W	Motor 30W
10	—	550
6	300	450
4	200	300
2	100	150

[4] Payload by Speed/Acceleration

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values. It may cause to generate vibration, malfunction or shorten the product life.

■ Motor 20W

Lead 6 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1
300	3	1

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	5	2
200	5	2

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	10	4
100	10	4

■ Motor 30W

Lead 10 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1
550	3	1

Lead 6 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	4.5	1.5
450	4.5	1.5

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	7.5	3
300	7.5	3

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	15	6
150	15	6

[5] Table Displacement

<Ma moment>

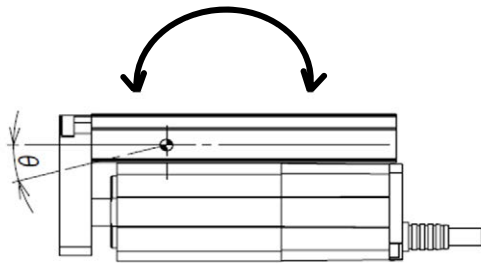
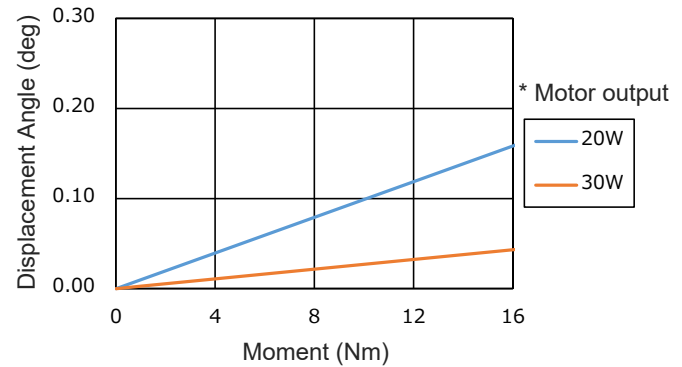


Table displacement angle (Ma direction)



<Mb moment>

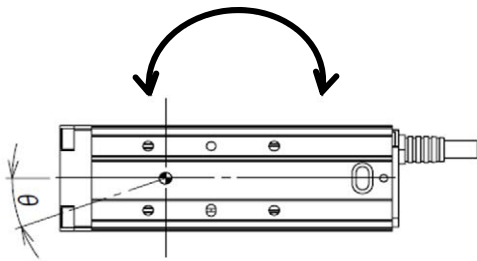
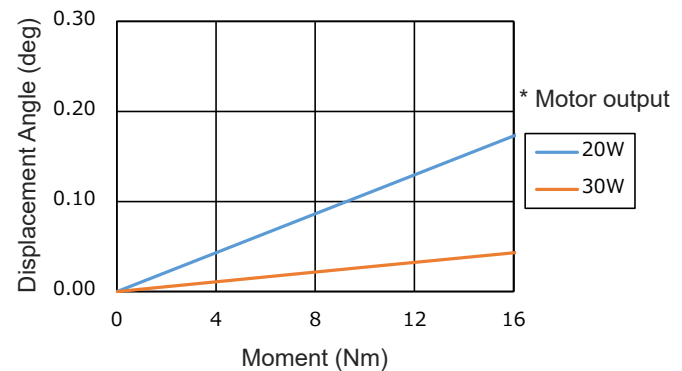


Table displacement angle (Mb direction)



<Mc moment>

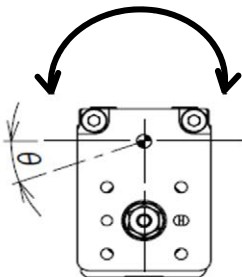
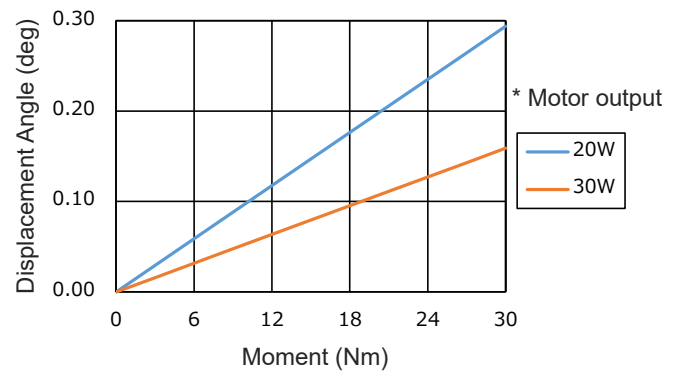


Table displacement angle (Mc direction)



1.4 Mechanical Specifications Wide Table Type

1.4.1 RCA2-TW3NC

[1] Actuator Specifications

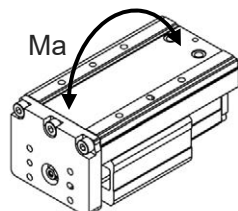
Item		Content	
		Motor 10W	Motor 20W
Drive system		Ball screw $\phi 4\text{mm}$, rolled C10	
Positioning repeatability		$\pm 0.01\text{mm}$ or less	
Backlash		0.03mm or less	
Lost motion		0.1mm or less	
Linear guide		Linear Infinite Circulation Type	
Static allowable moment (Note)		Ma: 10.4Nm, Mb: 10.4Nm Mc: 50.9Nm	Ma: 31.5Nm, Mb: 31.5Nm Mc: 93.3Nm
Dynamic allowable moment (Note)		Ma: 3.3Nm, Mb: 3.3Nm Mc: 16.2Nm	Ma: 8.3Nm, Mb: 8.3Nm Mc: 24.6Nm
Brake	Specification	Non-Exciting Operation Electromagnetic Brake	
	Holding force	Lead 4: 1kgf, Lead 2: 1.5kgf Lead 1: 2kgf	Lead 4: 1.5kgf, Lead 2: 2.5kgf Lead 1: 3kgf
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)	
Degree of protection		IP20	
Vibration and Impact resistance		4.9m/s ²	
Motor type		24V AC Servomotor	
Encoder type		Battery-less absolute	
Encoder pulse count		16,384 pulse/rev	

(Note) The center of gravity of the mounted load is assumed to be at 1/2 of the overhang length. Even if the overhang load length and load moment are within the allowable limits, abnormal vibration or noise may occur during operation depending on the mounting method of the main unit and the conveyed object, or the influence of the beam used for overhung installation. In such cases, operate the unit under reduced operating conditions. The dynamic allowable moment values are based on the life of 5,000km of travel with a reliability of 90%.

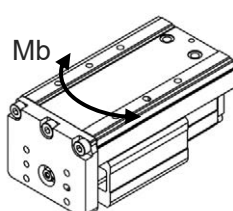
[Guide Type]

■ Moment direction

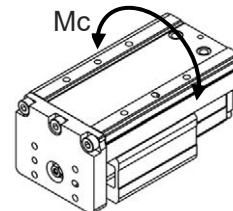
(Pitching)



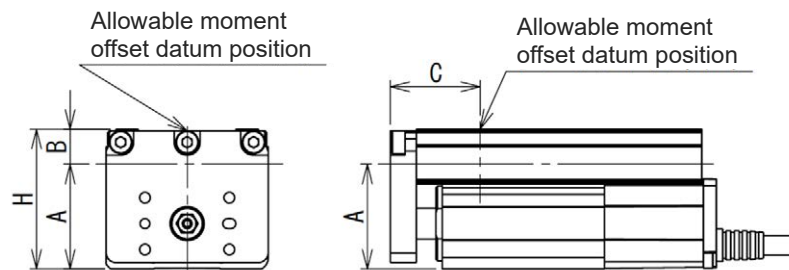
(Yawing)



(Rolling)

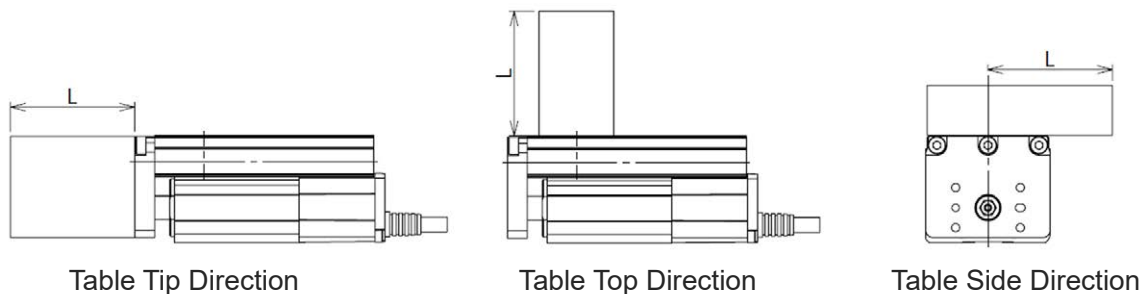


■ Allowable moment offset datum position



Motor (W)	A (mm)	B (mm)	C (mm)	H (mm)
10	32.2	10.8	27.75	43.0
20	32.2	10.8	35.25	43.0

■ Allowable overhang load length



Allowable overhang load length (L)

Motor (W)	Ma	Mb	Mc
10	50mm or less (Table top direction) 50mm or less (Table tip direction)	50mm or less	50mm or less
20	100mm or less (Table top direction) 50mm or less (Table tip direction)	120mm or less	120mm or less

[2] Lead and Max. Payload

Lead	Maximum payload (kg)			
	Motor 10W		Motor 20W	
	Horizontal	Vertical	Horizontal	Vertical
4	2	1	3	1.5
2	4	1.5	6	2.5
1	8	2	12	3

[3] Stroke and Max. Speed

**Caution**

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower less than speed the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is 0.3 mm/s for Lead 4, 0.2 mm/s for Lead 2, and 0.1 mm/s for Lead 1 for both 10W and 20W motors.

Lead	Stroke 50mm	
	Motor 10W	Motor 20W
4	200	300
2	100	150
1	50	75

[4] Payload by Speed/Acceleration

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values. It may cause to generate vibration, malfunction or shorten the product life.

■ Motor 10W

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	2	1
200	2	1

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	4	1.5
100	4	1.5

Lead 1 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	8	2
50	8	2

■ Motor 20W

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1.5
300	3	1.5

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	6	2.5
150	6	2.5

Lead 1 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	12	3
75	12	3

[5] Table Displacement

<Ma moment>

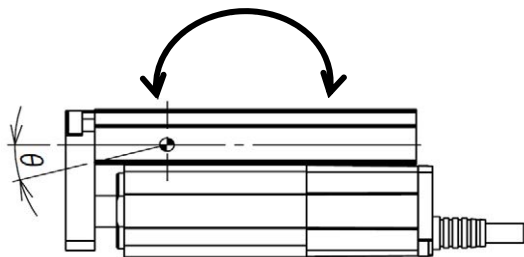
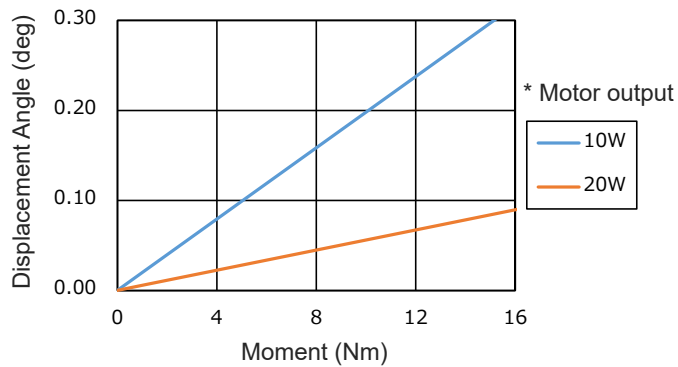


Table displacement angle (Ma direction)



<Mb moment>

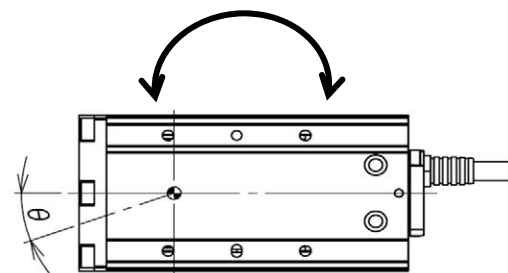
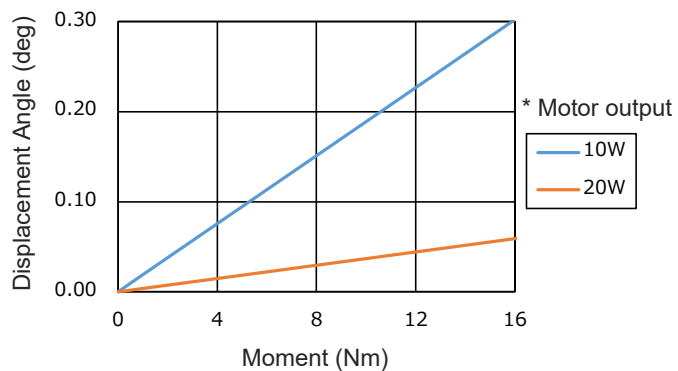


Table displacement angle (Mb direction)



<Mc moment>

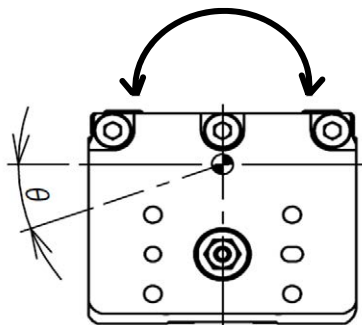
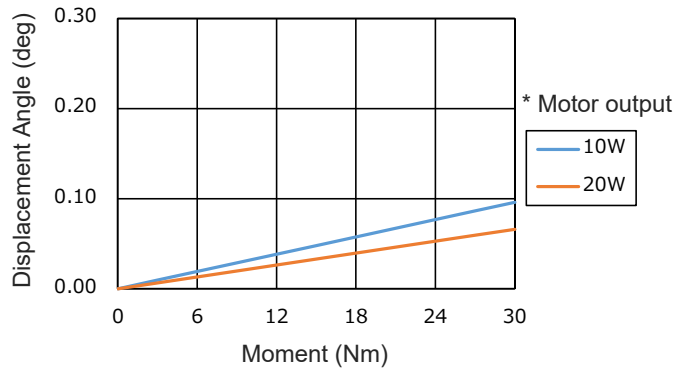


Table displacement angle (Mc direction)



1.4.2 RCA2-TW4NC

[1] Actuator Specifications

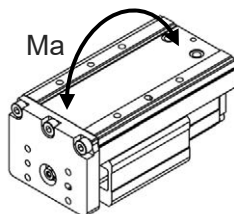
Item		Content	
		Motor 20W	Motor 30W
Drive system		Ball screw $\phi 6\text{mmmm}$, rolled C10	
Positioning repeatability		$\pm 0.01\text{mm}$ or less	
Backlash		0.03mm or less	
Lost motion		0.1mm or less	
Linear guide		Linear Infinite Circulation Type	
Static allowable moment (Note)		Ma: 21.7Nm, Mb: 21.7Nm Mc: 93.3Nm	Ma: 49.7Nm, Mb: 34.9Nm Mc: 132.0Nm
Dynamic allowable moment (Note)		Ma: 6.1Nm, Mb: 6.1Nm Mc: 26.1Nm	Ma: 12.2Nm, Mb: 12.2Nm Mc: 35.7Nm
Brake	Specification	Non-Exciting Operation Electromagnetic Brake	
	Holding force	Lead 6: 1kgf, Lead 4: 2kgf Lead 2: 4kgf	Lead 10: 1kgf, Lead 6: 1.5kgf Lead 4: 3kgf, Lead 2: 6kgf
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)	
Degree of protection		IP20	
Vibration and Impact resistance		4.9m/s ²	
Motor type		24V AC Servomotor	
Encoder type		Battery-less absolute	
Encoder pulse count		16,384 pulse/rev	

(Note) The center of gravity of the mounted load is assumed to be at 1/2 of the overhang length. Even if the overhang load length and load moment are within the allowable limits, abnormal vibration or noise may occur during operation depending on the mounting method of the main unit and the conveyed object, or the influence of the beam used for overhung installation. In such cases, operate the unit under reduced operating conditions. The dynamic allowable moment values are based on the life of 5,000km of travel with a reliability of 90%.

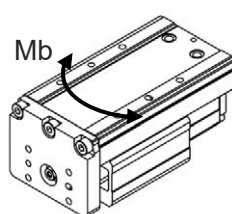
[Guide Type]

■ Moment direction

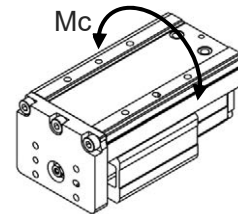
(Pitching)



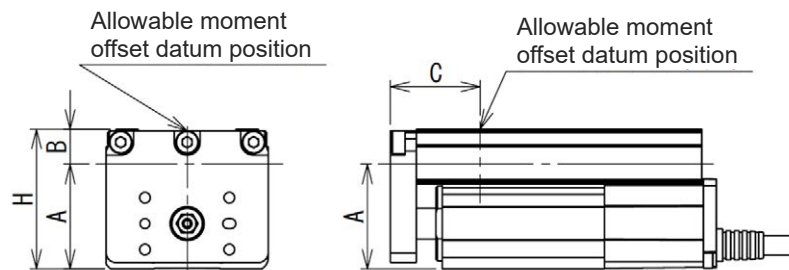
(Yawing)



(Rolling)

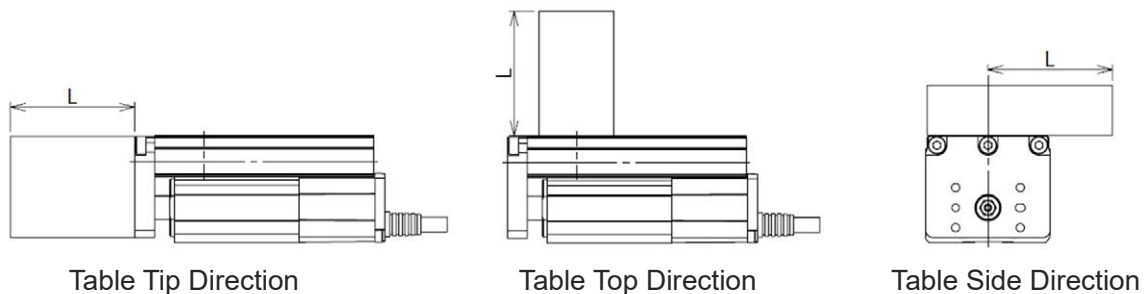


■ Allowable moment offset datum position



Motor (W)	A (mm)	B (mm)	C (mm)	H (mm)
20	37.2	10.8	33.5	48.0
30	37.2	10.8	43.0	48.0

■ Allowable overhang load length



Allowable overhang load length (L)

Motor (W)	Ma	Mb	Mc
20/30	100mm or less (Table top direction) 50mm or less (Table tip direction)	120mm or less	120mm or less

[2] Lead and Max. Payload

Lead	Maximum payload (kg)			
	Motor 20W		Motor 30W	
	Horizontal	Vertical	Horizontal	Vertical
10	—	—	3	1
6	3	1	4.5	1.5
4	5	2	7.5	3
2	10	4	15	6

[3] Stroke and Max. Speed

**Caution**

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower less than speed the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is 0.4 mm/s for Lead 6, 0.3 mm/s for Lead 4, and 0.2 mm/s for Lead 2 for the 20W motor.
- The minimum speed is 0.7 mm/s for Lead 10, 0.4 mm/s for Lead 6, 0.3 mm/s for Lead 4, and 0.2 mm/s for Lead 2 for the 30W motor.

Lead	Stroke 50mm	
	Motor 20W	Motor 30W
10	—	550
6	300	450
4	200	300
2	100	150

[4] Payload by Speed/Acceleration

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values. It may cause to generate vibration, malfunction or shorten the product life.

■ Motor 20W

Lead 6 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1
300	3	1

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	5	2
200	5	2

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	10	4
100	10	4

■ Motor 30W

Lead 10 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1
550	3	1

Lead 6 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	4.5	1.5
450	4.5	1.5

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	7.5	3
300	7.5	3

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	15	6
150	15	6

[5] Table Displacement

<Ma moment>

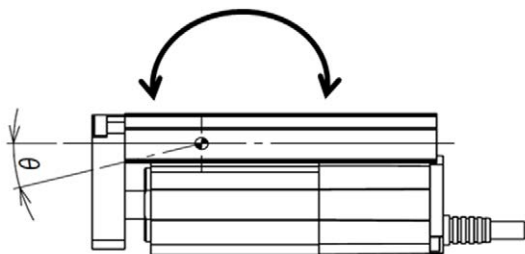
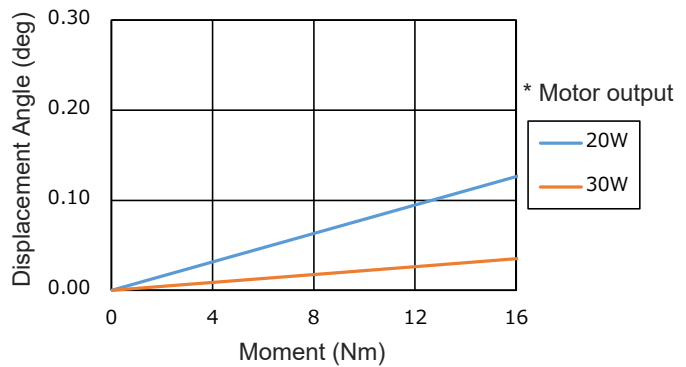


Table displacement angle (Ma direction)



<Mb moment>

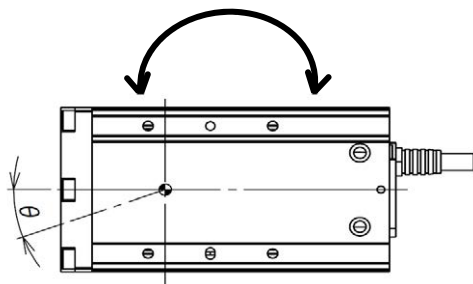
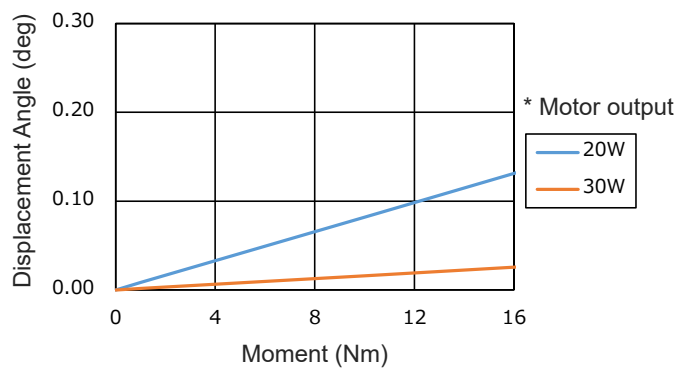


Table displacement angle (Mb direction)



<Mc moment>

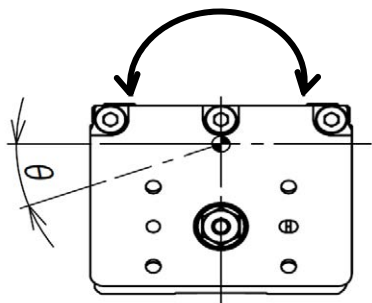
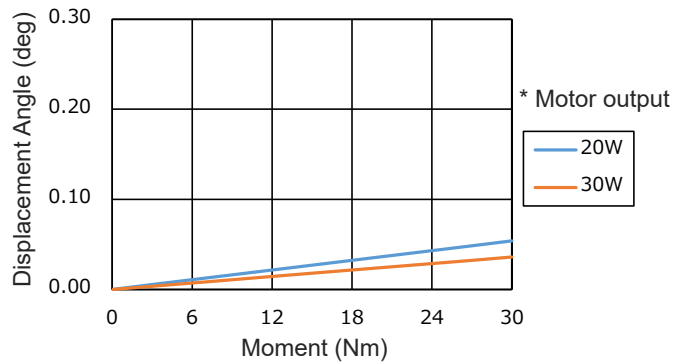


Table displacement angle (Mc direction)



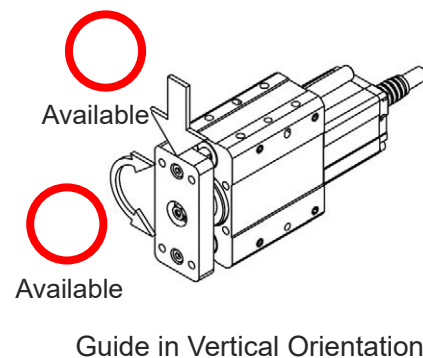
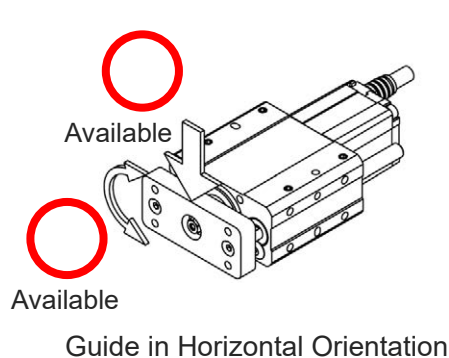
1.5 Mechanical Specifications Double-Guided Rod Type

1.5.1 RCA2-GD3NC

[1] Actuator Specifications

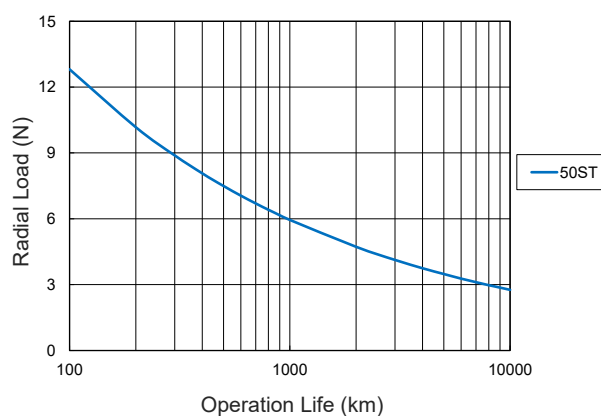
Item		Content	
		Motor 10W	Motor 20W
Drive system		Ball screw $\Phi 4\text{mm}$, rolled C10	
Positioning repeatability		$\pm 0.01\text{mm}$ or less	
Backlash		0.03mm or less	
Lost motion		0.1mm or less	
Linear guide		Linear Infinite Circulation Type	
Brake	Specification	Non-Exciting Operation Electromagnetic Brake	
	Holding force	Lead 4: 1kgf, Lead 2: 1.5kgf Lead 1: 2kgf	Lead 4: 1.5kgf, Lead 2: 2.5kgf Lead 1: 3kgf
Ambient operating temperature/humidity		0 to 40°C, 85%RH or less (Non-condensing)	
Degree of protection		IP20	
Vibration and Impact resistance		4.9m/s ²	
Motor type		24V AC Servomotor	
Encoder type		Battery-less absolute	
Encoder pulse count		16,384 pulse/rev	

[Limitation to Rod Tip Load]

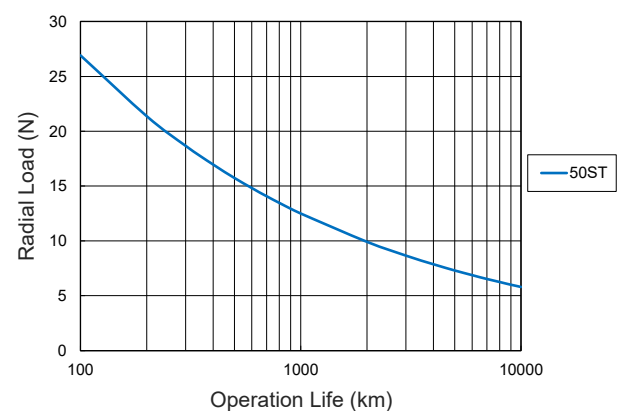


[Radial Load and Operation Life]

■ Motor 10W



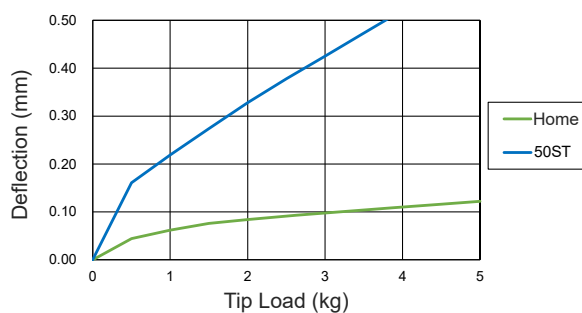
■ Motor 20W



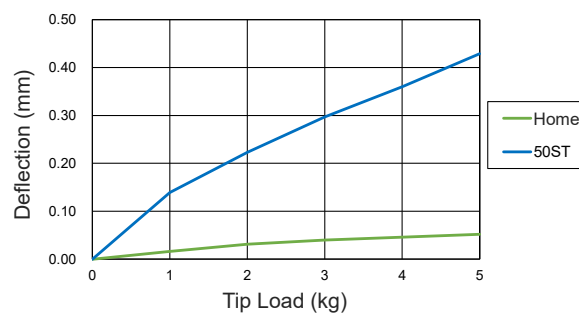
[Rod Tip Deflection]

<Guide in Horizontal Orientation>

■ Motor 10W

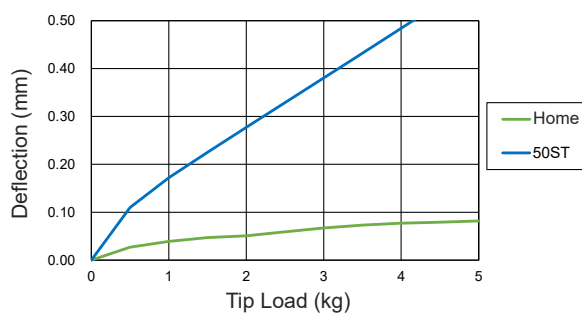


■ Motor 20W

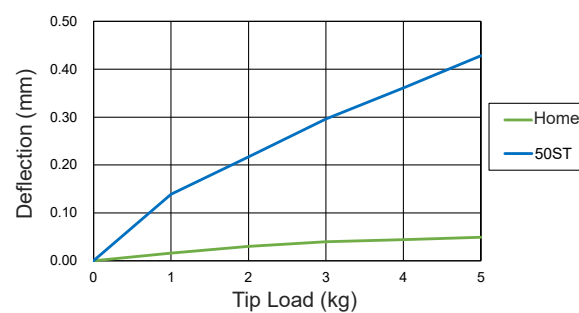


<Guide in Vertical Orientation>

■ Motor 10W



■ Motor 20W

**[2] Lead and Max. Payload**

Lead	Maximum payload (kg)			
	Motor 10W		Motor 20W	
	Horizontal	Vertical	Horizontal	Vertical
4	2	1	3	1.5
2	4	1.5	6	2.5
1	8	2	12	3

[3] Stroke and Max. Speed

**Caution**

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower less than speed the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is 0.3 mm/s for Lead 4, 0.2 mm/s for Lead 2, and 0.1 mm/s for Lead 1 for both 10W and 20W motors.

Lead	Stroke 50mm	
	Motor 10W	Motor 20W
4	200	300
2	100	150
1	50	75

[4] Payload by Speed/Acceleration

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values. It may cause to generate vibration, malfunction or shorten the product life.

■ Motor 10W

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	2	1
200	2	1

Lead 1 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	8	2
50	8	2

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	4	1.5
100	4	1.5

■ Motor 20W

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1.5
300	3	1.5

Lead 1 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	12	3
75	12	3

Lead 2 Unit (kg)

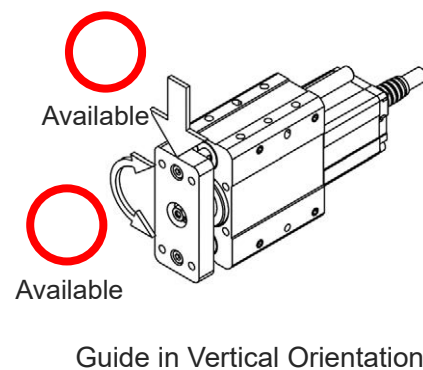
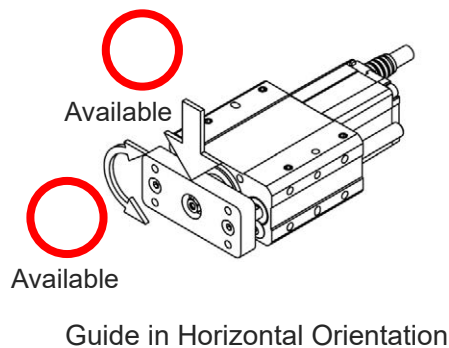
Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	6	2.5
150	6	2.5

1.5.2 RCA2-GD4NC

[1] Actuator Specifications

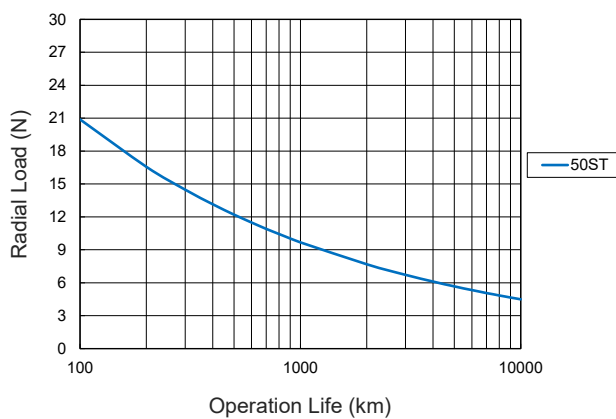
Item		Content	
		Motor 20W	Motor 30W
Drive system		Ball screw $\phi 6\text{mmmm}$, rolled C10	
Positioning repeatability		$\pm 0.01\text{mm}$ or less	
Backlash		0.03mm or less	
Lost motion		0.1mm or less	
Linear guide		Linear Infinite Circulation Type	
Brake	Specification	Non-Exciting Operation Electromagnetic Brake	
	Holding force	Lead 6: 1kgf, Lead 4: 2kgf Lead 2: 4kgf	Lead 10: 1kgf, Lead 6: 1.5kgf Lead 4: 3kgf, Lead 2: 6kgf
Ambient operating temperature/humidity		0 to 40°C, 85%RH or less (Non-condensing)	
Degree of protection		IP20	
Vibration and Impact resistance		4.9m/s ²	
Motor type		24V AC Servomotor	
Encoder type		Battery-less absolute	
Encoder pulse count		16,384 pulse/rev	

[Limitation to Rod Tip Load]

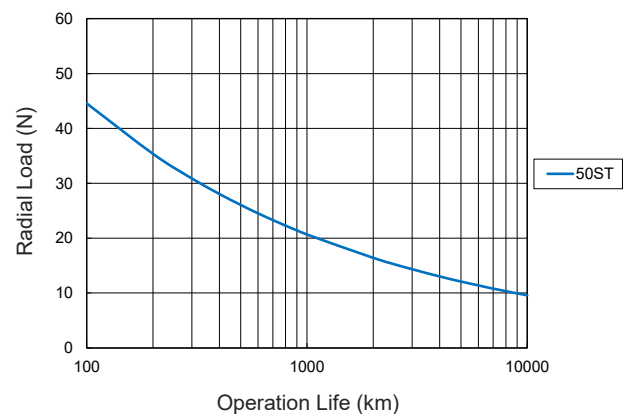


[Radial Load and Operation Life]

■ Motor 20W



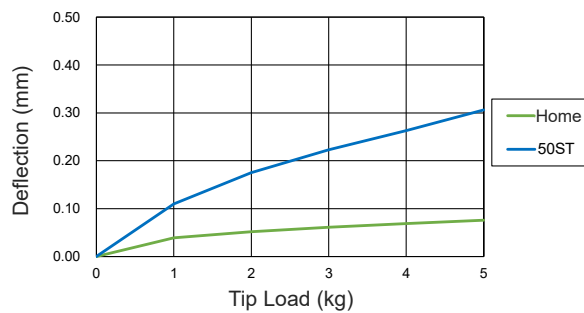
■ Motor 30W



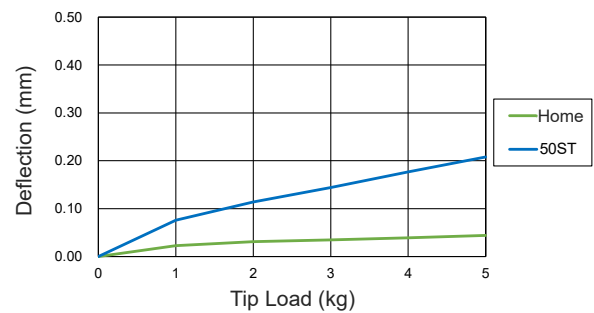
[Rod Tip Deflection]

<Guide in Horizontal Orientation>

■ Motor 20W

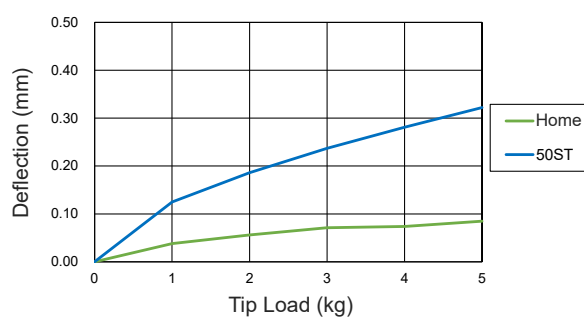


■ Motor 30W

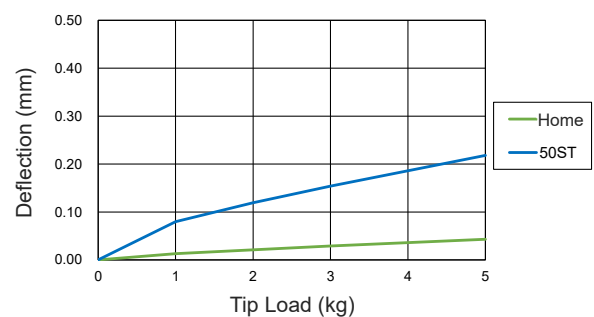


<Guide in Vertical Orientation>

■ Motor 20W



■ Motor 30W

**[2] Lead and Max. Payload**

Lead	Maximum payload (kg)			
	Motor 20W		Motor 30W	
	Horizontal	Vertical	Horizontal	Vertical
10	—	—	3	1
6	3	1	4.5	1.5
4	5	2	7.5	3
2	10	4	15	6

[3] Stroke and Max. Speed

**Caution**

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower less than speed the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is 0.4 mm/s for Lead 6, 0.3 mm/s for Lead 4, and 0.2 mm/s for Lead 2 for the 20W motor.
- The minimum speed is 0.7 mm/s for Lead 10, 0.4 mm/s for Lead 6, 0.3 mm/s for Lead 4, and 0.2 mm/s for Lead 2 for the 30W motor.

Lead	Stroke 50mm	
	Motor 20W	Motor 30W
10	—	550
6	300	450
4	200	300
2	100	150

[4] Payload by Speed/Acceleration

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values. It may cause to generate vibration, malfunction or shorten the product life.

■ Motor 20W

Lead 6 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1
300	3	1

Lead 4 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	5	2
200	5	2

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	0.2
0	10	4
100	10	4

■ Motor 30W

Lead 10 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	3	1
550	3	1

Lead 6 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	4.5	1.5
450	4.5	1.5

Lead 4 Unit (kg)

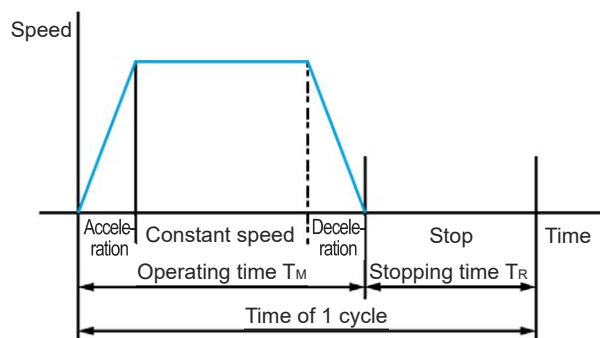
Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	7.5	3
300	7.5	3

Lead 2 Unit (kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.3	0.3
0	15	6
150	15	6

1.6 Duty Ratio

Duty ratio is the rate of operation expressed in percentage (%) that presents the time of the actuator being operated in 1 cycle of operation.



$$D = \frac{T_M}{T_M + T_R} \times 100 \text{ [\%]}$$

D : Duty ratio
 T_M : Operating time
 (including push-motion operation)
 T_R : Stopping time

Continuous operation is available with the duty ratio 100%.

1.7 Options

1.7.1 Brake Type (Model Code: B)

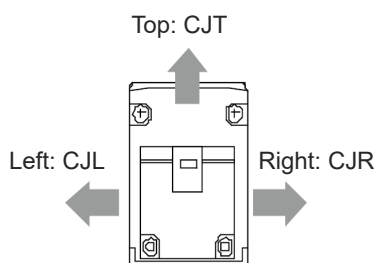
It retains the rod or table so it would not move during power cutoff or the servo is turned off. This option is necessary when an actuator is installed in the vertical orientation.

1.7.2 Cable Eject Direction Changed (Model Code: CJL, CJR, CJT)

The direction to eject the motor / encoder cable applied on the actuator main unit can be changed to top (Note 1)/ left (Note 2)/ right (Note 2).

(Note 1) It is selectable only for rod type (RP□NC or GD□NC).

(Note 2) It is selectable only for table type (TC□NC or TW□NC).



1.7.3 Specified Grease Application Specifications (Model Code: G1, G3, G4, G5)

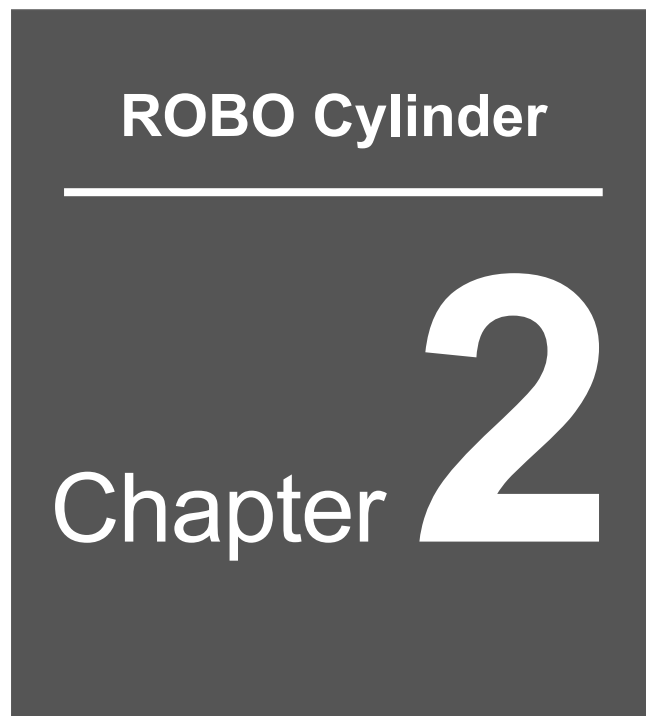
The grease applied to the ball screw, linear guide, and rod sliding surfaces of the actuator can be changed to clean-environment low-dust grease (G1: Kuroda C Grease, G3: AFF Grease, G4: AFE-CA Grease) or food machinery grease (G5: White Alcom Grease).

1.7.4 Reversed-home Specification (Model Code: NM)

Although the home position is set on the motor side in normal, when it is required to set on the other side due to the layout of the equipment and so on, the orientation of the home position can be set opposite in the option.

1.7.5 Spiral Cover Equipped Type (Model Code: SRC)

This is a symbol to indicate the specification for installing a spiral cover. It prevents the intrusion of foreign matter from outside and also prevents particle generation from the ball screw as well as the scattering of grease.



Installation

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2.1 Precautions for Transportation

[Handling the package]

- Do not damage or drop the package.
The package is not specially designed to withstand dropping or shock due to collision.
- Do not attempt to carry a heavy package with only one worker. Consider an appropriate method for transportation.
- Keep the unit in horizontal orientation when placing it on the ground or transporting.
- Do not step or sit on the package.
- Do not put any load that may cause a deformation or breakage of the package.

[Handling after unpacking]

- Carry while holding the frame.
- Do not carry the unit by the cable.
- Do not damage or drop the package during transportation.
- Do not apply an excessive force to each part of the actuator.

For the names of each part, refer to [Intro-11 to 14 Names of the Parts].

[Handling when assembled into machinery (system)]

These are some caution notes for when transporting the actuator being assembled in the machinery equipment (system).

- Fix the rod so that it would not move during transportation.
- If the tip of an actuator is overhanging, have an appropriate way to fix it to avoid shake due to the external vibration. In the transportation without the tip being fixed, do not apply any impact with 0.3G or more.
- When hanging up the machinery equipment (system) with ropes, do not attempt to apply load on the actuators. Also pay attention not to pinch cables and bend or deform them forcefully.

2.2 Installation and Storage • Preservation Environment

2.2.1 Installation Environment

In general, the installation environment should be one in which an operator can work without protective gear.

The actuator should be installed in a location other than those specified below.

- Where the actuator receives radiant heat from strong heat sources such as heat treatment furnaces
- Where the ambient temperature exceeds the range of 0 to 40°C
- Where the temperature changes rapidly and condensation occurs
- Where the relative humidity exceeds the range of 10% RH to 85% RH
- Where the actuator receives direct sunlight
- Where the actuator is exposed to corrosive or combustible gases
- Where the ambient air contains a large amount of powder dust, salt or iron (at level exceeding what is normally expected in an assembly plant)
- Where the unit is subject to splashed water or oil (including oil mist or cutting fluid) or chemical solutions
- Where the actuator receives impact or vibration
- Where the altitude is more than 1,000m

Provide sufficient work space for the following maintenance and inspection.

- Space to replenish grease
- Space to replace the spiral cover (option)

When using the product in any of the locations specified below, provide a sufficient shield.

- Where noise generates due to static electricity, etc
- Where the actuator is subject to a strong electric or magnetic field
- Where the actuator is subject to ultraviolet ray or radiation

2.2.2 Storage • Preservation Environment

- For the storage and preservation environment, see the installation environment.
Give especial consideration to the prevention of condensation during long-term storage/preservation.
- Unless especially specified, desiccant is not included in the package at shipping.
If the product is to be stored/preserved in an environment where condensation is anticipated, take condensation preventive measures.
- For short-term storage, it can be stored at 60°C or below.
For storage of one month or more, make sure that the temperature does not exceed 50°C.
- The product should be placed horizontally for storage and preservation.
If storing in the packaged condition, observe the conditions, if any, regarding storage orientation.
* Refer to Horizontal installation in [2.3.2 Mounting Orientation] for the horizontal condition.

2.3 Rod Type (RP□NC, GD□NC)

2.3.1 Installation Surface

- The surface where the actuator will be mounted should be a machined surface or that with an accuracy equivalent to it, and the flatness should be 0.05mm/m or below.
- The platform to install the actuator should possess a structure that ensures enough stiffness, and should be free from vibration.
- Also consider the necessary space for maintenance work such as actuator replacement and inspection.

2.3.2 Mounting Orientation

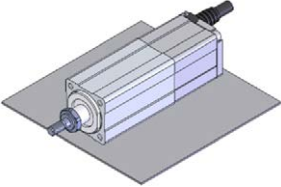
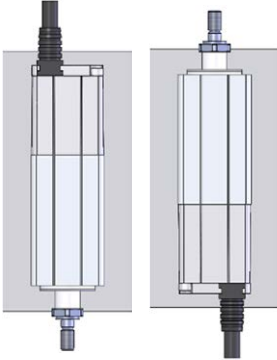
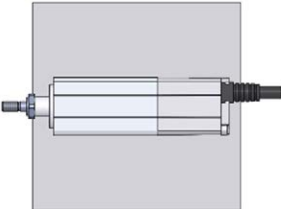
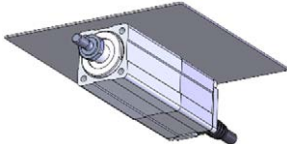


Caution

- Applying excessive grease may cause it to drip.
If surrounding equipment may be adversely affected by grease or oil contamination, provide appropriate protection.

In common for types

○: Available for Installation

Mounting Orientation			
			
Horizontal	Vertical	Sideways	Ceiling Mount
○	○	○	○

2.3.3 Fixing Bolts

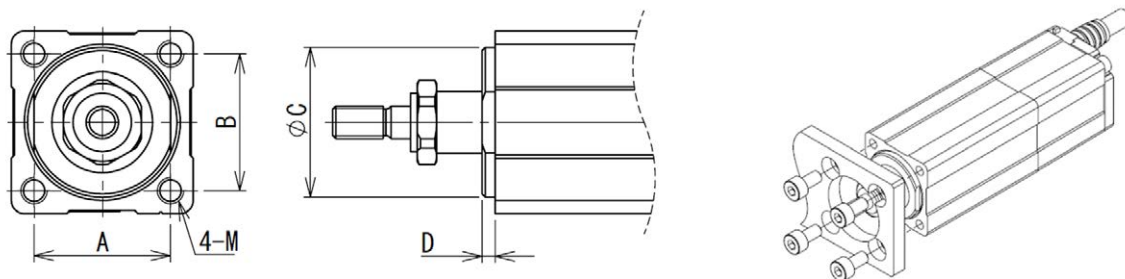
- The bolts for fixing actuator on the installation surface are to be prepared by the customer.
- Use hex socket head screws for the mounting male threads.
- The use of high-strength bolts of ISO-10.9 or higher is recommended.
- Make sure the internal thread and bolt effective engagement length is approximately equal to the nominal diameter or greater.

Type	Screw Nominal Diameter	Tightening Torque (N·m)	
		Bolt Seating Surface	
		Steel	Aluminum
RP3NC	M4	1.8	1.8
	Hex Nut M5	2.8	2.8
RP4NC	M4	1.8	1.8
	Hex Nut M6	4.2	4.2
GD3NC/4NC	M4	1.8	1.8

2.3.4 Installation of the Main Unit

[1] RP3NC, RP4NC

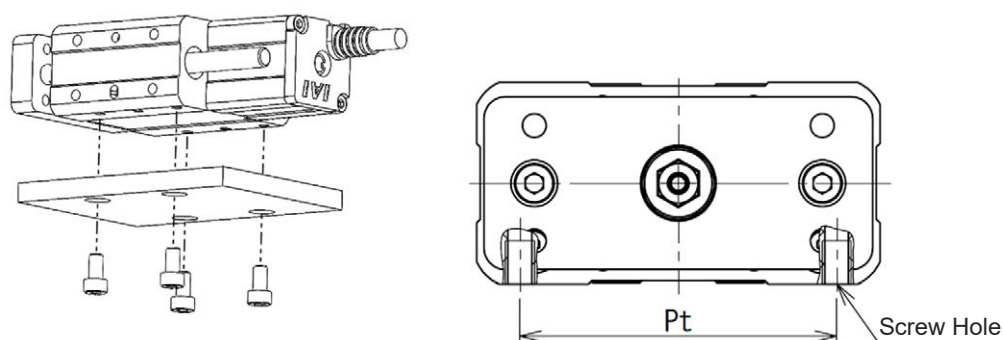
[When using front bracket]



Type	A (mm)	B (mm)	C (mm)	D (mm)	M (mm)
RP3NC	21	21	Φ23h8	2	M4 depth 8
RP4NC	26	26	Φ25h8	2	M4 depth 8

[2] GD3NC, GD4NC

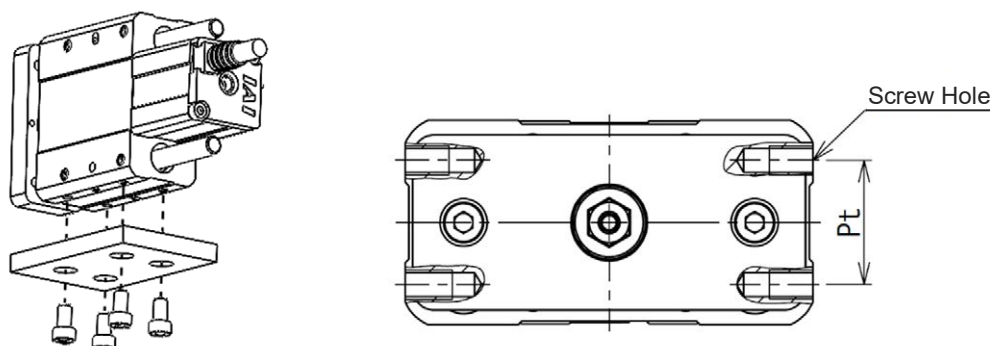
[When using attachment holes on bottom of main frame]



Type	Screw Hole	Pt (mm)
GD3NC	M4 depth 6	44
GD4NC	M4 depth 8	54

* For the positions of the mounting holes and the reamed hole dimensions, refer to [Chapter 5 External Dimensions].

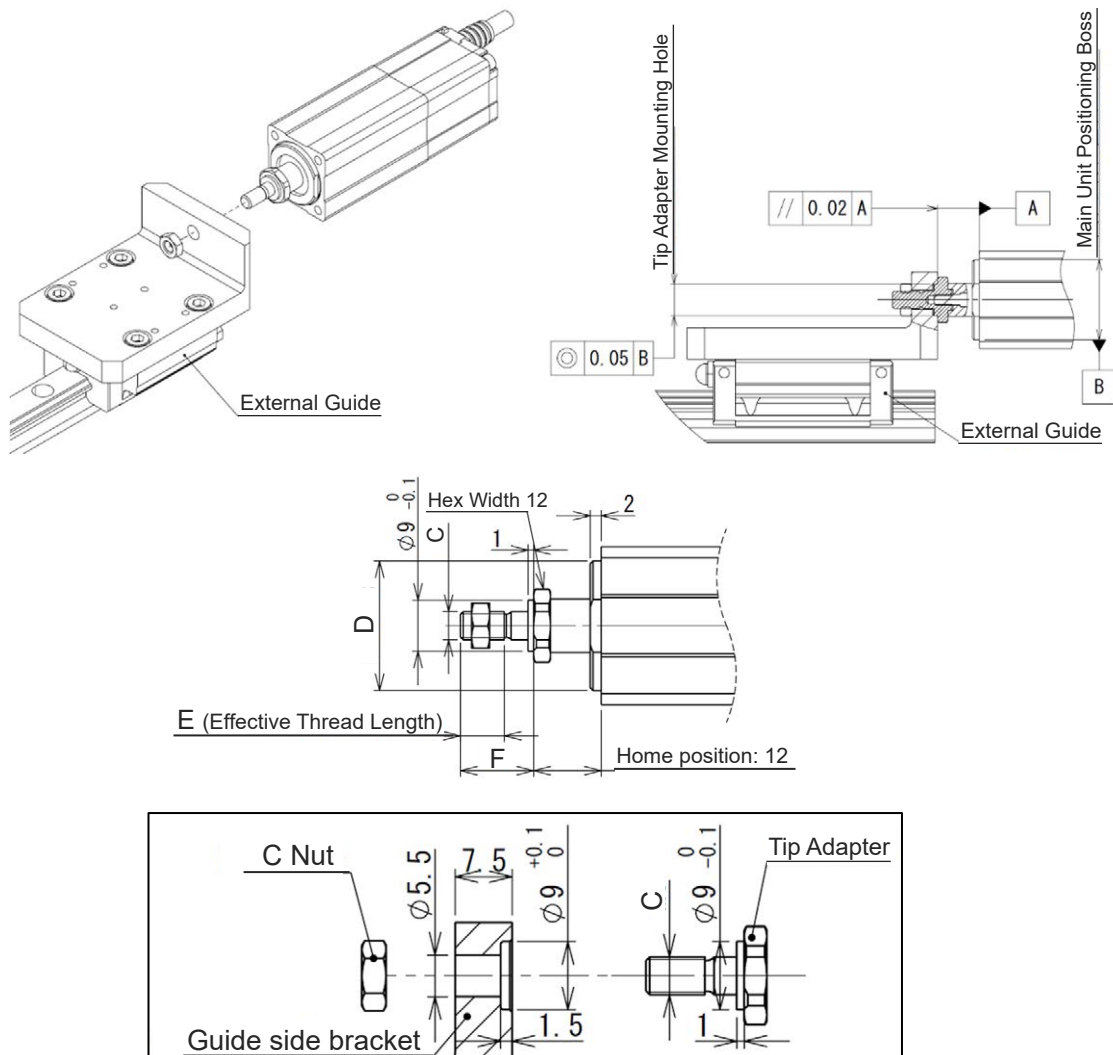
[When using attachment holes on side of main frame]



Type	Screw Hole	Pt (mm)
GD3NC	M4 depth 6	17
GD4NC	M4 depth 8	20

* For the positions of the mounting holes and the reamed hole dimensions, refer to [Chapter 5 External Dimensions].

2.3.5 Mounting External Guides



Type	C	D (mm)	Effective Thread Length E (mm)	F (mm)
RP3NC	M5	Φ23 h8	7.8	13
RP4NC	M6	Φ25 h8	9.5	16

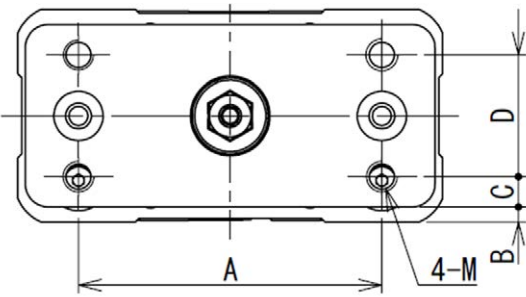


Caution

- After completing the installation of the external guide, make sure to perform the home-return operation.
- Rigid fixing is recommended when securing the unit to an external guide.
If a floating joint, which has freedom in the rotational direction, is used, as the ball screw will not be constrained in rotation, it will interrupt normal operation.
In addition, if a floating joint, which has freedom in angular or eccentric directions, is used, the ball screw may become tilted, which can lead to premature failure of the actuator.

2.3.6 Mounting Transported Objects

[Mounting to Front Plate]



Type	A (mm)	B (mm)	C (mm)	D (mm)	M (mm)
GD3NC	40	2	4	16	M4 depth 8
GD4NC	48	2	5	20	M4 depth 10

2.4 Table Type (TC□NC, TW□NC)

2.4.1 Installation Surface

- The surface where the actuator will be mounted should be a machined surface or that with an accuracy equivalent to it, and the flatness should be 0.05mm/m or below.
- The platform to install the actuator should possess a structure that ensures enough stiffness, and should be free from vibration.
- Also consider the necessary space for maintenance work such as actuator replacement and inspection.

2.4.2 Mounting Orientation

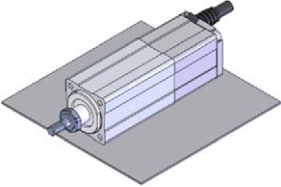
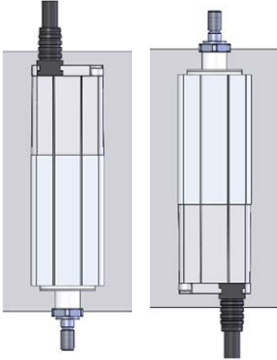
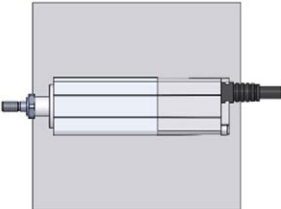
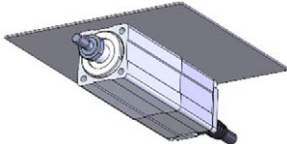


Caution

- Applying excessive grease may cause it to drip.
If surrounding equipment may be adversely affected by grease or oil contamination, provide appropriate protection.

In common for types

○: Available for Installation

Mounting Orientation			
			
Horizontal	Vertical	Sideways	Ceiling Mount
○	○	○	○

2.4.3 Fixing Bolts

- The bolts for fixing actuator on the installation surface are to be prepared by the customer.
- Use hex socket head screws for the mounting male threads.
- The use of high-strength bolts of ISO-10.9 or higher is recommended.
- Make sure the internal thread and bolt effective engagement length is approximately equal to the nominal diameter or greater.

Type	Screw Nominal Diameter	Tightening Torque (N·m)	
		Bolt Seating Surface	
		Steel	Aluminum
TC3NC/4NC TW3NC/4NC	M4	1.8	1.8

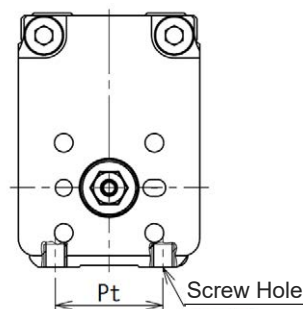
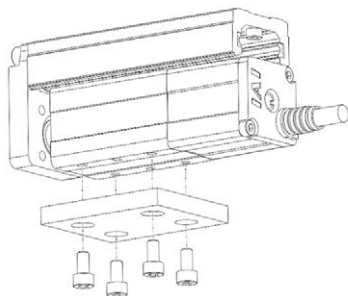
2.4.4 Installation of the Main Unit



Caution

- Do not attempt to use a screw with its length longer than the threaded hole depth. As the threaded holes are through holes, using excessively long screws may interfere with the internal mechanism and cause damage.

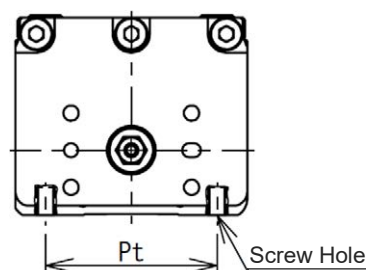
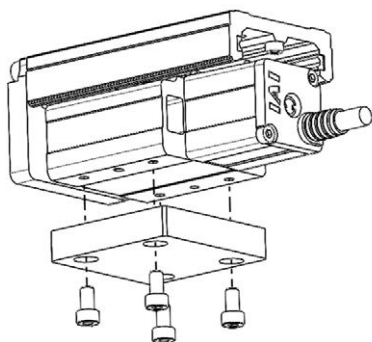
[1] TC3NC, TC4NC



Type	Screw Hole	Pt (mm)
TC3NC	M4 depth 4	19
TC4NC	M4 depth 4	21

* For the positions of the mounting holes and the reamed hole dimensions, refer to [Chapter 5 External Dimensions].

[2] TW3NC, TW4NC



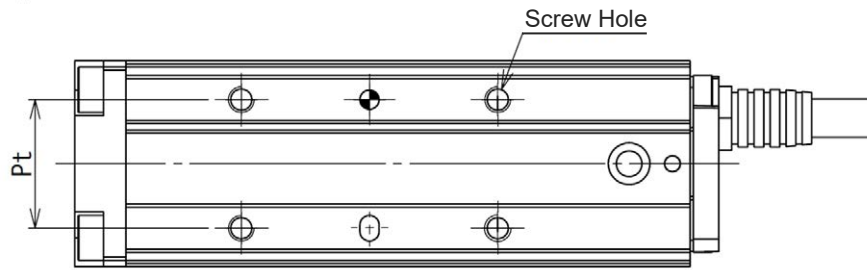
Type	Screw Hole	Pt (mm)
TW3NC	M4 depth 6	37
TW4NC	M4 depth 8	45

* For the positions of the mounting holes and the reamed hole dimensions, refer to [Chapter 5 External Dimensions].

2.4.5 Mounting Transported Objects

[1] TC3NC, TC4NC

[Mounting to Table]



Type	Screw Hole	Pt (mm)
TC3NC	M4 depth 4	20
TC4NC	M4 depth 4	22

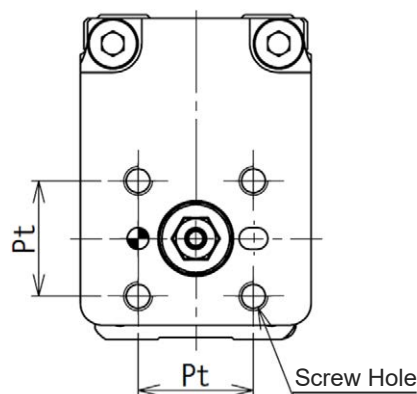
* For the positions of the mounting holes and the reamed hole dimensions, refer to [Chapter 5 External Dimensions].



Caution

- Do not attempt to use a screw with its length longer than the threaded hole depth. As the threaded holes are through holes, using excessively long screws may interfere with the internal mechanism and cause damage.

[Mounting to Front Plate]

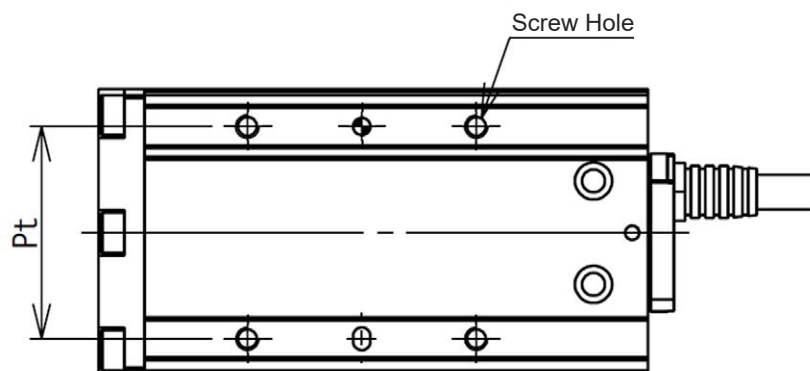


Type	Screw Hole	Pt (mm)
TC3NC	M4 depth 8	16
TC4NC	M4 depth 10	20

* For the positions of the mounting holes and the reamed hole dimensions, refer to [Chapter 5 External Dimensions].

[2] TW3NC, TW4NC

[Mounting to Table]



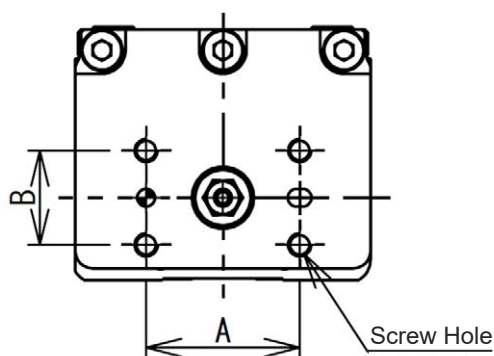
Type	Screw Hole	Pt (mm)
TW3NC	M4 depth 4	37
TW4NC	M4 depth 4	45

* For the positions of the mounting holes and the reamed hole dimensions, refer to [Chapter 5 External Dimensions].

**Caution**

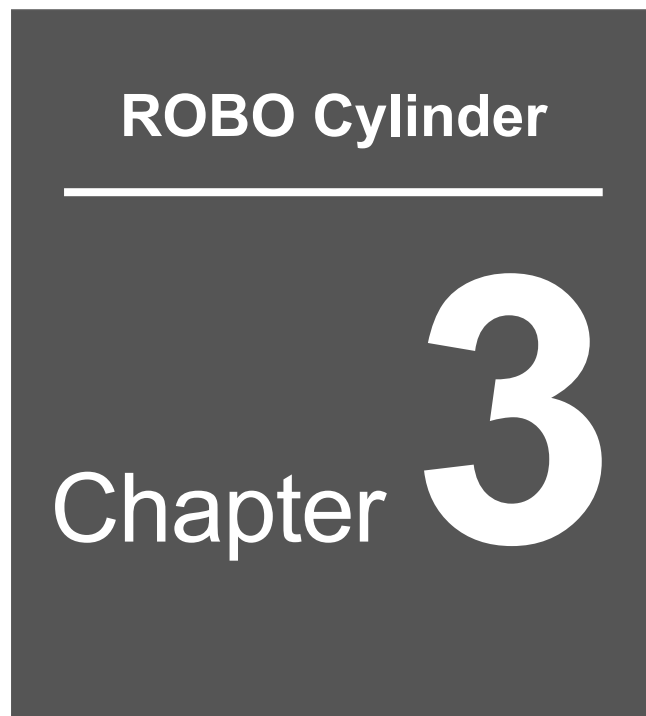
- Do not attempt to use a screw with its length longer than the threaded hole depth. As the threaded holes are through holes, using excessively long screws may interfere with the internal mechanism and cause damage.

[Mounting to Front Plate]



Type	Screw Hole	A (mm)	B (mm)
TW3NC	M4 depth 8	26	16
TW4NC	M4 depth 10	30	20

* For the positions of the mounting holes and the reamed hole dimensions, refer to [Chapter 5 External Dimensions].



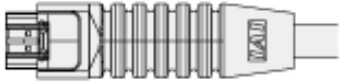
Connecting with the Controller

3.1	Connecting with the Controller	3-1
3.2	Motor • Encoder Cables	3-7
3.2.1	Motor Encoder Cable (Applicable Controller A5)	3-7
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3.3	About 4-Direction Adjustable Cable (for cable ejection direction change option only)	3-11

3.1 Connecting with the Controller

As the connection cable for the controller and the actuator, use the IAI-dedicated connection cable.

Dedicated Connection Cable

Standard Connector Type (Actuator side)	4-way Connector Type (Actuator side)
	
CB-CAN-MPA□□□ (-RB)	CB-CAN2-MPA□□□ (-RB)
CB-ADPC-MPA□□□ (-RB)	CB-ADPC2-MPA□□□ (-RB)

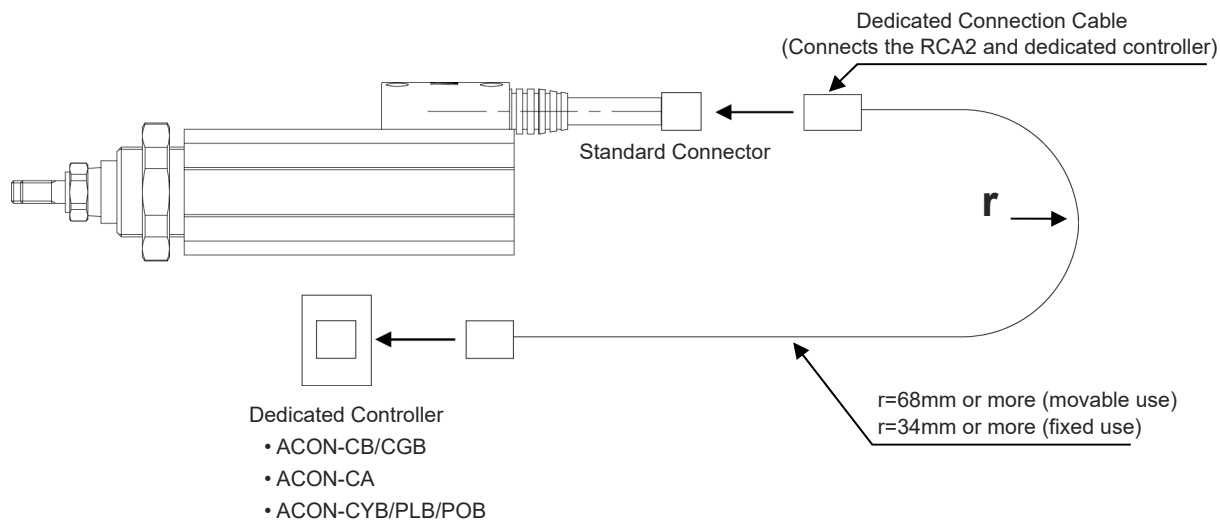


Caution

- If the dedicated connection cable cannot be secured, reduce the load on the cable by allowing it to deflect only by the weight of the cable or wire it in a self-standing cable hose, etc., having a large radius.
- Do not cut and reconnect the dedicated connection cable for extension or shorten the cable.
- Do not pull on the dedicated connection cable or bend it forcibly.
- Hold the actuator cable so it would not move as applying force on the actuator cable out from the motor unit may cause malfunction.
- Contact us if you wish to have a change to the specifications of the dedicated cables.



[1] For Controllers ACON-CB/CGB/CYB/PLB/POB

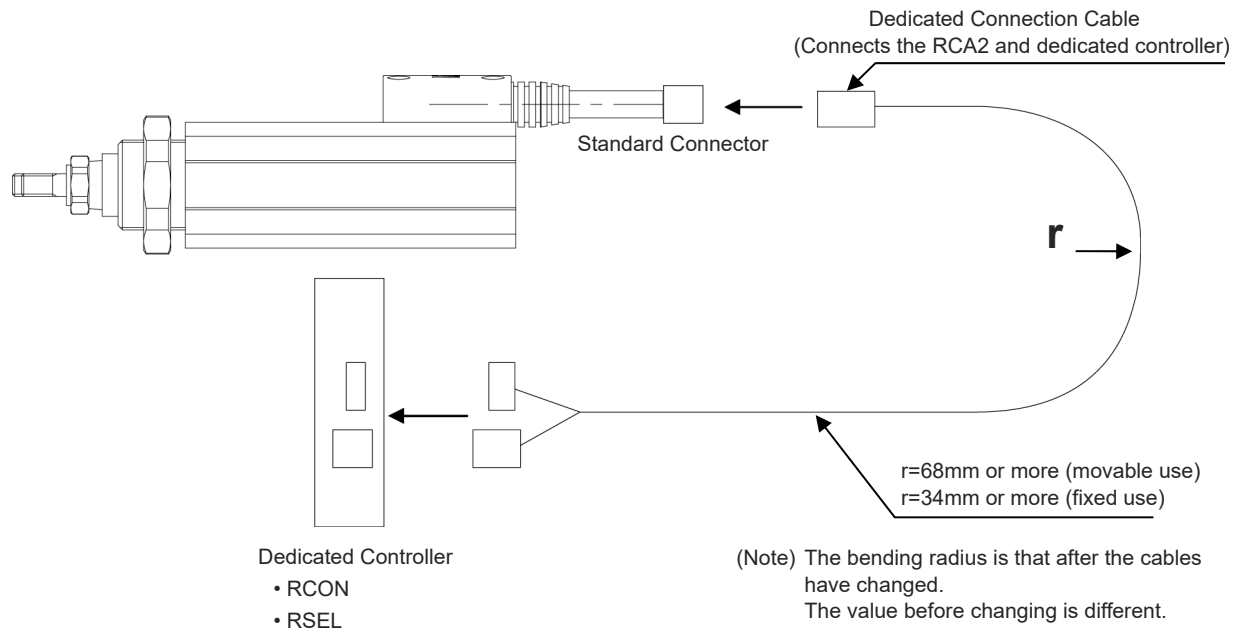


Dedicated Connection Cable Model Code

Cable	Model Code
Motor Encoder Integrated Cable	CB-CAN-MPA□□□
Motor Encoder Integrated Robot Cable	CB-CAN-MPA□□□-RB
Motor Encoder Integrated Cable 4-way Connector Type	CB-CAN2-MPA□□□
Motor Encoder Integrated Robot Cable 4-way Connector Type	CB-CAN2-MPA□□□-RB

* □□□ represents the cable length. The longest corresponds to 20m. e.g.) 080 = 8m

[2] For Controllers RCON and RSEL



Dedicated Connection Cable Model Code

Cable	Model Code
Motor Encoder Integrated Cable	CB-ADPC-MPA□□□
Motor Encoder Integrated Robot Cable	CB-ADPC-MPA□□□-RB
Motor Encoder Integrated Cable 4-way Connector Type	CB-ADPC2-MPA□□□
Motor Encoder Integrated Robot Cable 4-way Connector Type	CB-ADPC2-MPA□□□-RB

* □□□ represents the cable length. The longest corresponds to 20m. e.g.) 080 = 8m



Warning

For wiring, please follow the warnings stated below. When constructing a system as the machinery equipment, pay attention to the wiring and connection of each cable so they are conducted properly. Not following them may cause not only a malfunction such as cable breakage or connection failure, or an operation error, but also electric shock or electric leakage, or may even cause a fire.

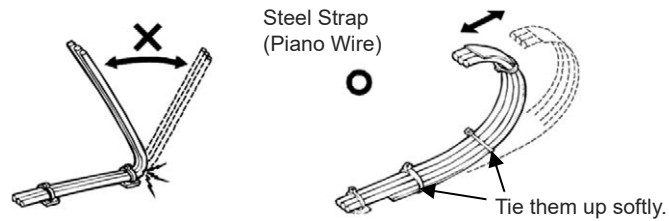
- Use dedicated cables of IAI indicated in this instruction manual. Contact us if you wish to have a change to the specifications of the dedicated cables.
- Make sure to turn the power off in the process of power line or cable connection or disconnection.
- Do not attempt to cut a dedicated cable with connectors on both ends to extend, shorten or re-joint it.
- Hold the dedicated cable to avoid mechanical force being applied to the terminals and connectors.
- Use a cable pipe or duct to have an appropriate protection when there is a possibility of mechanical damage on a dedicated cable.
- In case a dedicated cable is to be used at a moving part, make sure to lay out the cable without applying any force to pull the connector or extreme bend on the cable. Do not attempt to use the cable with a bending radius below the allowable value.
- Make certain that the connectors are plugged properly. Insufficient connection may cause an operation error, thus it is extremely risky.
- Do not lay out the cables to where the machine runs over them.
- Pay attention to the cable layout so it would not hit peripherals during an operation. In case it does, have an appropriate protection such as a cable carriers.
- When a cable is used hanging on the ceiling, prevent an environment that the cable swings with acceleration or wind velocity.
- Make sure there is not too much friction inside the cable storage equipment.

- Do not apply radiated heat to power line or cables.
- Do not attempt to use the motor / encoder cable in a condition that the cable is bundled up in several layers such as coil winding.

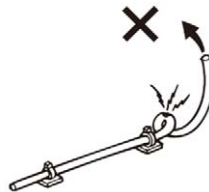
There are motor driving power line and encoder signal line in the motor / encoder cable. Therefore, if the motor / encoder cable is bundled up, the noise generated from the motor driving power line could give an influence to the encoder and may cause an error.



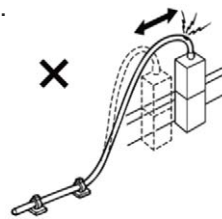
- Have a sufficient radius for bending, and avoid a bend concentrating on one point.



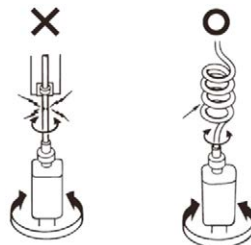
- Do not let the cable bend, kink or twist.



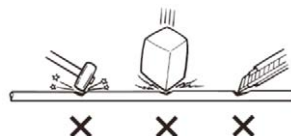
- Do not pull the cable with a strong force.



- Pay attention not to concentrate the twisting force to one point on a cable.



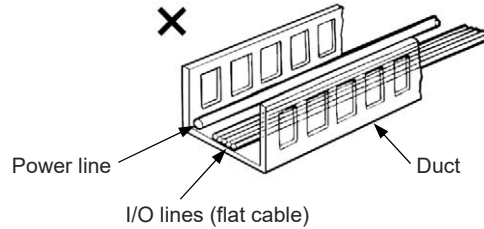
- Do not pinch, drop a heavy object onto or cut the cable.



- When a cable is fastened to affix, make sure to have an appropriate force and do not tighten too much.

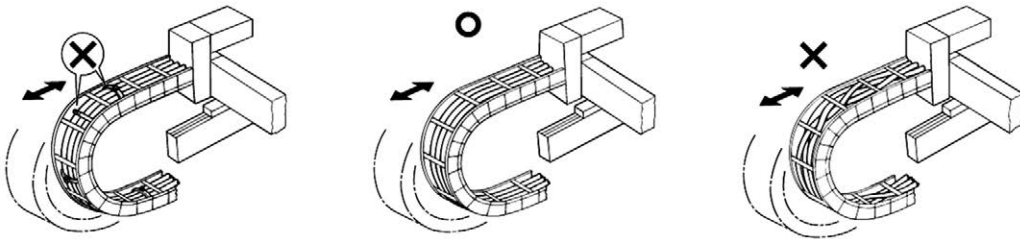


- PIO line, communication line, power and driving lines are to be put separately from each other and do not tie them together. Arrange so that such lines are independently routed in the duct.



[Follow the instructions below when using a cable carriers.]

- If there is an indication to the cable for the space factor in a cable carriers, refer to the wiring instruction given by the supplier when storing the cable in the cable carriers.
- Avoid the cables to get twined or twisted in the cable carriers, and also to have the cables move freely and do not tie them up. (Avoid tension being applied when the cables are bent.) Do not pile up cables. It may cause faster abrasion of the sheaths or cable breakage.



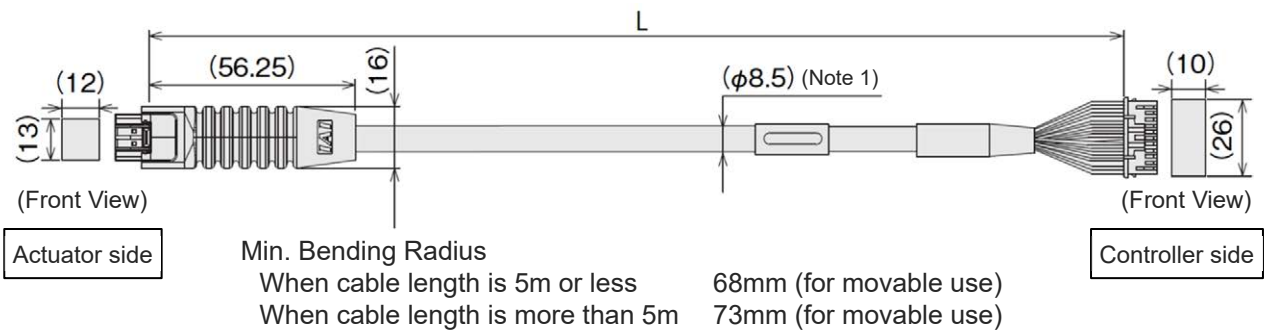
3.2 Motor • Encoder Cables

3.2.1 Motor Encoder Cable (Applicable Controller A5)

[1] Motor Encoder Integrated Cable Standard Cable

Model **CB-CAN-MPA□□□ / CB-CAN-MPA□□□-RB** (robot cable)

(□□□ indicates the cable length L, Example: 030=3m), Max.20m



* A robot cable is a cable with high bending resistance performance.
A robot cable is to be used when cables laid through in a cable carriers.

(Note 1) When the cable length is 5m or longer, it should be $\phi 9.1$.

Connection Diagram

DF62DL-24S-2.2C (Hirose)

Color (Thickness)			Symbol	Pin No.
Standard cable	Robot cable			
	July 2022 and later	July 2022 and earlier		
Blue (AWG22/19)	Black (AWG22/19)	Blue (AWG22/19)	ΦA	3
Orange (AWG22/19)	White (AWG22/19)	Orange (AWG22/19)	VMM	5
Brown (AWG22/19)	Green (AWG22/19)	Brown (AWG22/19)	ΦB	10
Gray (AWG22/19)	Yellow (AWG22/19)	Gray (AWG22/19)	VMM	9
Green (AWG22/19)	Brown (AWG22/19)	Green (AWG22/19)	Φ_A	4
Red (AWG22/19)	Red (AWG22/19)	Red (AWG22/19)	Φ_B	15
Light Blue (AWG26)	White (AWG26)	Light Blue (AWG26)	SA [mABS]	12
Orange (AWG26)	Yellow (AWG26)	Orange (AWG26)	SB [mABS]	17
Green (AWG26)	Red (AWG26)	Green (AWG26)	A+	1
Brown (AWG26)	Green (AWG26)	Brown (AWG26)	A-	6
Gray (AWG26)	Black (AWG26)	Gray (AWG26)	B+	11
Red (AWG26)	Brown (AWG26)	Red (AWG26)	B-	16
Black (AWG26)	Blue (AWG26)	Black (AWG26)	VPS	18
Yellow (AWG26)	Pink (AWG26)	Yellow (AWG26)	LS+	8
Light Blue (AWG26)	Black (AWG26)	Light Blue (AWG26)	BK+	20
Orange (AWG26)	Brown (AWG26)	Orange (AWG26)	BK-	2
Gray (AWG26)	White (AWG26)	Gray (AWG26)	VCC	21
Red (AWG26)	Yellow (AWG26)	Red (AWG26)	GND	7
Brown (AWG26)	Red (AWG26)	Brown (AWG26)	LS-	14
Green (AWG26)	Green (AWG26)	Green (AWG26)	LS_GND	13
—	—	—	—	19
Pink (AWG26)	Orange (AWG26)	Pink (AWG26)	CF_VCC	22
—	—	—	—	23
Black (AWG26)	Green (AWG26)	Black (AWG26)	FG	24

PADP-24V-1-S (JST)

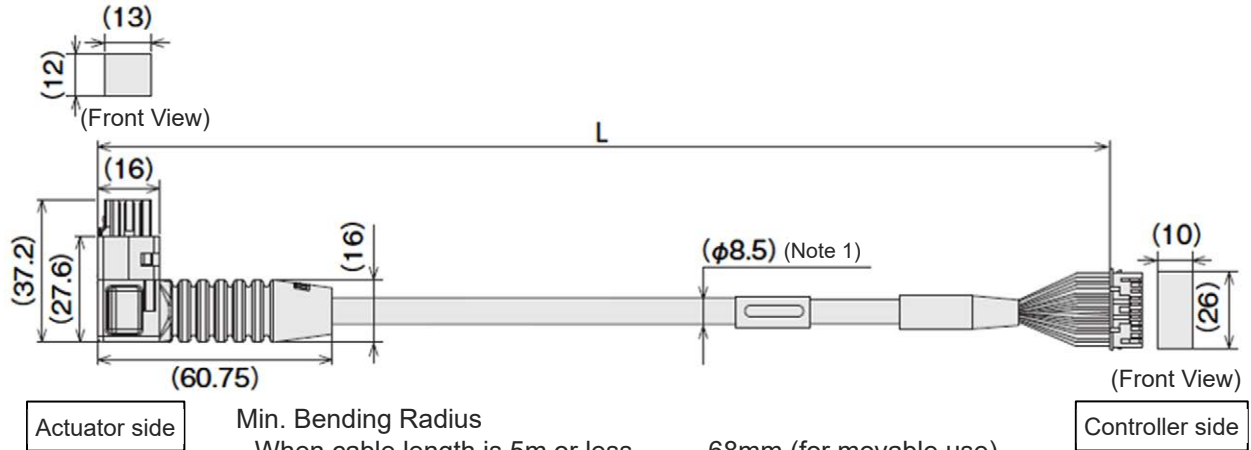
Pin No.	Symbol
1	ϕA
2	VMM
3	ϕB
4	VMM
5	ϕ_A
6	ϕ_B
11	SA [mABS]
12	SB [mABS]
13	A+
14	A-
15	B+
16	B-
18	VPS
7	LS+
9	BK+
10	BK-
17	VCC
19	GND
8	LS-
20	LS_GND
22	-
21	CF_VCC
23	-
24	FG

Standard: Purple (AWG26)
Robot: Gray (AWG26)

[2] Motor Encoder Integrated Cable 4-way Connector

Model **CB-CAN2-MPA□□□ / CB-CAN2-MPA□□□-RB** (robot cable)

(□□□ indicates the cable length L, Example: 030=3m), Max.20m



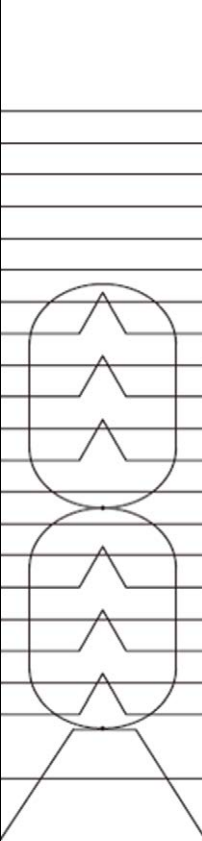
* A robot cable is a cable with high bending resistance performance.
A robot cable is to be used when cables laid through in a cable carriers.

(Note 1) When the cable length is 5m or longer, it should be $\phi 9.1$.

Connection Diagram

DF62DL-24S-2.2C (Hirose)

PADP-24V-1-S (JST)

Color (Thickness)			Symbol	Pin No.		Pin No.	Symbol
Standard cable	Robot cable						
	July 2022 and later	July 2022 and earlier					
Blue (AWG22/19)	Black (AWG22/19)	Blue (AWG22/19)	ΦA	3		1	ΦA
Orange (AWG22/19)	White (AWG22/19)	Orange (AWG22/19)	VMM	5		2	VMM
Brown (AWG22/19)	Green (AWG22/19)	Brown (AWG22/19)	ΦB	10		3	ΦB
Gray (AWG22/19)	Yellow (AWG22/19)	Gray (AWG22/19)	VMM	9		4	VMM
Green (AWG22/19)	Brown (AWG22/19)	Green (AWG22/19)	Φ_A	4		5	Φ_A
Red (AWG22/19)	Red (AWG22/19)	Red (AWG22/19)	Φ_B	15		6	Φ_B
Light Blue (AWG26)	White (AWG26)	Light Blue (AWG26)	SA [mABS]	12		11	SA [mABS]
Orange (AWG26)	Yellow (AWG26)	Orange (AWG26)	SB [mABS]	17		12	SB [mABS]
Green (AWG26)	Red (AWG26)	Green (AWG26)	A+	1		13	A+
Brown (AWG26)	Green (AWG26)	Brown (AWG26)	A-	6		14	A-
Gray (AWG26)	Black (AWG26)	Gray (AWG26)	B+	11		15	B+
Red (AWG26)	Brown (AWG26)	Red (AWG26)	B-	16		16	B-
Black (AWG26)	Blue (AWG26)	Black (AWG26)	VPS	18		18	VPS
Yellow (AWG26)	Pink (AWG26)	Yellow (AWG26)	LS+	8		7	LS+
Light Blue (AWG26)	Black (AWG26)	Light Blue (AWG26)	BK+	20		9	BK+
Orange (AWG26)	Brown (AWG26)	Orange (AWG26)	BK-	2		10	BK-
Gray (AWG26)	White (AWG26)	Gray (AWG26)	VCC	21		17	VCC
Red (AWG26)	Yellow (AWG26)	Red (AWG26)	GND	7		19	GND
Brown (AWG26)	Red (AWG26)	Brown (AWG26)	LS-	14		8	LS-
Green (AWG26)	Green (AWG26)	Green (AWG26)	LS_GND	13		20	LS_GND
—	—	—	—	19		22	—
Pink (AWG26)	Orange (AWG26)	Pink (AWG26)	CF_VCC	22		21	CF_VCC
—	—	—	—	23		23	—
Black (AWG26)	Green (AWG26)	Black (AWG26)	FG	24		24	FG

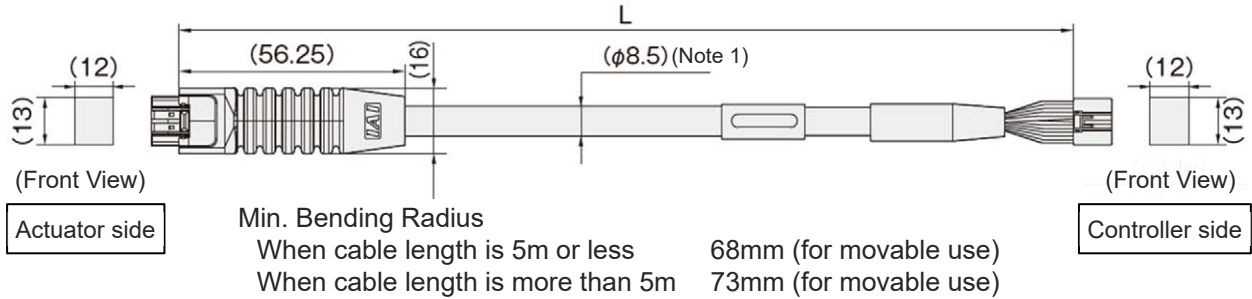
Standard: Purple (AWG26)
Robot: Gray (AWG26)

3.2.2 Motor Encoder Cable (Applicable Controller A6)

[1] Motor • Encoder Integrated Cables Standard Connector

Model CB-ADPC-MPA□□□/CB-ADPC-MPA□□□-RB (robot cable)

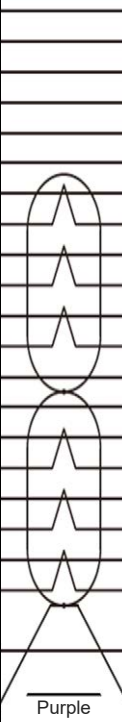
(□□□ indicates the cable length L, Example: 030=3m), Max.20m



* A robot cable is a cable with high bending resistance performance.
A robot cable is to be used when cables laid through in a cable carriers.

(Note 1) When the cable length is 5m or longer, it should be φ9.1.

Connection Diagram

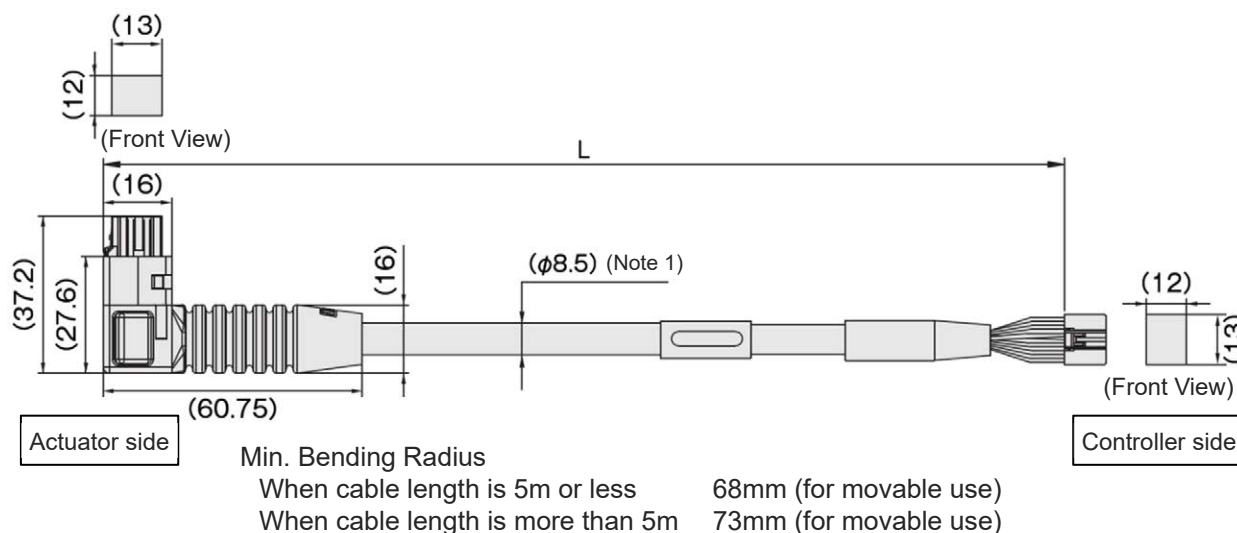
DF62DL-24S-2.2C (Hirose)					DF62DL-24S-2.2C (Hirose)			
Color (Thickness)		Symbol	Pin No.		Pin No.	Symbol	Color (Thickness)	
Standard Cable	Robot Cable						Standard Cable	Robot Cable
Blue (AWG22/19)	Black (AWG22/19)	ΦA	3	3	ΦA	Blue (AWG22/19)	Black (AWG22/19)	
Orange (AWG22/19)	White (AWG22/19)	VMM	5	5	VMM	Orange (AWG22/19)	White (AWG22/19)	
Brown (AWG22/19)	Green (AWG22/19)	ΦB	10	10	ΦB	Brown (AWG22/19)	Green (AWG22/19)	
Gray (AWG22/19)	Yellow (AWG22/19)	VMM	9	9	VMM	Gray (AWG22/19)	Yellow (AWG22/19)	
Green (AWG22/19)	Brown (AWG22/19)	Φ_A	4	4	Φ_A	Green (AWG22/19)	Brown (AWG22/19)	
Red (AWG22/19)	Red (AWG22/19)	Φ_B	15	15	Φ_B	Red (AWG22/19)	Red (AWG22/19)	
Light Blue (AWG26)	White (AWG26)	SA [mABS]	12	12	SA [mABS]	Light Blue (AWG26)	White (AWG26)	
Orange (AWG26)	Yellow (AWG26)	SB [mABS]	17	17	SB [mABS]	Orange (AWG26)	Yellow (AWG26)	
Green (AWG26)	Red (AWG26)	A+	1	1	A+	Green (AWG26)	Red (AWG26)	
Brown (AWG26)	Green (AWG26)	A-	6	6	A-	Brown (AWG26)	Green (AWG26)	
Gray (AWG26)	Black (AWG26)	B+	11	11	B+	Gray (AWG26)	Black (AWG26)	
Red (AWG26)	Brown (AWG26)	B-	16	16	B-	Red (AWG26)	Brown (AWG26)	
Black (AWG26)	Blue (AWG26)	VPS	18	18	VPS	Black (AWG26)	Blue (AWG26)	
Yellow (AWG26)	Pink (AWG26)	LS+	8	8	LS+	Yellow (AWG26)	Pink (AWG26)	
Light Blue (AWG26)	Black (AWG26)	BK+	20	20	BK+	Light Blue (AWG26)	Black (AWG26)	
Orange (AWG26)	Brown (AWG26)	BK-	2	2	BK-	Orange (AWG26)	Brown (AWG26)	
Gray (AWG26)	White (AWG26)	VCC	21	21	VCC	Gray (AWG26)	White (AWG26)	
Red (AWG26)	Yellow (AWG26)	GND	7	7	GND	Red (AWG26)	Yellow (AWG26)	
Brown (AWG26)	Red (AWG26)	LS-	14	14	LS-	Brown (AWG26)	Red (AWG26)	
Green (AWG26)	Green (AWG26)	LS_GND	13	13	LS_GND	Green (AWG26)	Green (AWG26)	
—	—	—	19	19	—	—	—	
Pink (AWG26)	Orange (AWG26)	CF_VCC	22	22	CF_VCC	Pink (AWG26)	Orange (AWG26)	
—	—	—	23	23	—	—	—	
Black (AWG26)	Green (AWG26)	FG	24	24	FG	Black (AWG26)	Green (AWG26)	

Purple
(AWG26)

[2] Motor Encoder Integrated Cable 4-way Connector

Model **CB-ADPC2-MPA□□□ / CB-ADPC2-MPA□□□-RB** (robot cable)

(□□□ indicates the cable length L, Example: 030=3m), Max.20m



* A robot cable is a cable with high bending resistance performance.
A robot cable is to be used when cables laid through in a cable carriers.

(Note 1) When the cable length is 5m or longer, it should be $\phi 9.1$.

Connection Diagram

DF62DL-24S-2.2C (Hirose)

Color (Thickness)		Symbol	Pin No.
Standard cable	Robot cable		
Blue (AWG22/19)	Black (AWG22/19)	ϕA	3
Orange (AWG22/19)	White (AWG22/19)	VMM	5
Brown (AWG22/19)	Green (AWG22/19)	ϕB	10
Gray (AWG22/19)	Yellow (AWG22/19)	VMM	9
Green (AWG22/19)	Brown (AWG22/19)	ϕ_A	4
Red (AWG22/19)	Red (AWG22/19)	ϕ_B	15
Light Blue (AWG26)	White (AWG26)	SA [mABS]	12
Orange (AWG26)	Yellow (AWG26)	SB [mABS]	17
Green (AWG26)	Red (AWG26)	A+	1
Brown (AWG26)	Green (AWG26)	A-	6
Gray (AWG26)	Black (AWG26)	B+	11
Red (AWG26)	Brown (AWG26)	B-	16
Black (AWG26)	Blue (AWG26)	VPS	18
Yellow (AWG26)	Pink (AWG26)	LS+	8
Light Blue (AWG26)	Black (AWG26)	BK+	20
Orange (AWG26)	Brown (AWG26)	BK-	2
Gray (AWG26)	White (AWG26)	VCC	21
Red (AWG26)	Yellow (AWG26)	GND	7
Brown (AWG26)	Red (AWG26)	LS-	14
Green (AWG26)	Green (AWG26)	LS_GND	13
-	-	-	19
Pink (AWG26)	Orange (AWG26)	CF_VCC	22
-	-	-	23
Black (AWG26)	Green (AWG26)	FG	24

DF62DL-24S-2.2C (Hirose)

Pin No.	Symbol	Color (Thickness)	
		Standard cable	Robot cable
3	ϕA	Blue (AWG22/19)	Black (AWG22/19)
5	VMM	Orange (AWG22/19)	White (AWG22/19)
10	ϕB	Brown (AWG22/19)	Green (AWG22/19)
9	VMM	Gray (AWG22/19)	Yellow (AWG22/19)
4	ϕ_A	Green (AWG22/19)	Brown (AWG22/19)
15	ϕ_B	Red (AWG22/19)	Red (AWG22/19)
12	SA [mABS]	Light Blue (AWG26)	White (AWG26)
17	SB [mABS]	Orange (AWG26)	Yellow (AWG26)
1	A+	Green (AWG26)	Red (AWG26)
6	A-	Brown (AWG26)	Green (AWG26)
11	B+	Gray (AWG26)	Black (AWG26)
16	B-	Red (AWG26)	Brown (AWG26)
18	VPS	Black (AWG26)	Blue (AWG26)
8	LS+	Yellow (AWG26)	Pink (AWG26)
20	BK+	Light Blue (AWG26)	Black (AWG26)
2	BK-	Orange (AWG26)	Brown (AWG26)
21	VCC	Gray (AWG26)	White (AWG26)
7	GND	Red (AWG26)	Yellow (AWG26)
14	LS-	Brown (AWG26)	Red (AWG26)
13	LS_GND	Green (AWG26)	Green (AWG26)
19	-	-	-
22	CF_VCC	Pink (AWG26)	Orange (AWG26)
23	-	-	-
24	FG	Black (AWG26)	Green (AWG26)

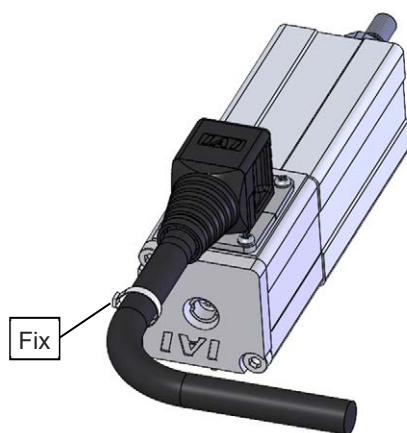
Purple
(AWG26)

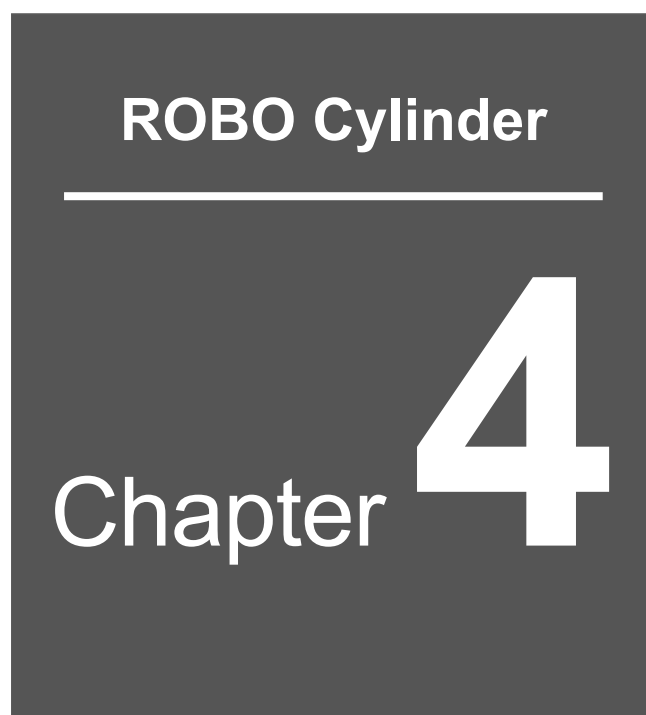
3.3 About 4-Direction Adjustable Cable (for cable ejection direction change option only)

The actuator cable ejection direction can be changed by manually rotating the four-direction adjustable cable.

Limit the number of 90-degree rotations of the cable box to five or fewer.

After determining the ejection direction, secure the cable to prevent excessive load from being applied to the base of the actuator cable.





Maintenance and Inspection

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4.1 Precautions for Maintenance and Inspection Work

Make sure to read the following precautions before conducting any maintenance or inspection work.



Warning

- Do not climb on or put anything on the actuator.
Otherwise, this may lead to accidental falling, injury or damage to the product due to falling objects, product loss of function or performance degradation, or shortening of product life.
- Before releasing the brake, make sure to check there is nothing that will interfere with moving parts within the operation range.
The rod or table may fall, possibly injuring the operator or people nearby and damaging the actuator, workpiece or equipment.



Caution

- Check that the power to the actuator is OFF before conducting any maintenance or inspections.
- Be careful not to lose the cover or any removed screws.
Be sure to return the product to the original condition after maintenance and inspection work.
Mounting in an incomplete state may cause injuries or damage to the product.
- Do not modify, disassemble/assemble, or use maintenance parts not specified on your own discretion under any circumstances.



Notice

- First, be sure to wipe off the old grease, and then supply new grease.
- The degradation speed of grease may differ depending on the operating environment (temperature, humidity and ambient atmosphere).

It is recommended to shorten the grease supply period if the actuator is used under poor environmental conditions such as high temperatures, high humidity or dusty atmospheres.

Also, it is recommended to improve the environmental conditions in case the grease changes color notably due to poor operating conditions.

- Base oil may separate from the grease due to the mounting orientation or operating conditions.

Base oil may also leak from the inside of the actuator to the exterior through gaps.

Check visually for oil drips when supplying grease.

Wipe it off in case of any dripping.

- An actuator stored for 6 months or more may suffer from grease degradation.
Supply grease before the start of use. Refer to [4.4 Grease Supply]

4.2 Inspection

Follow the maintenance and inspection schedule below.

It is assumed that the equipment is operating 8 hours per day.

If the equipment is running continuously night and day or otherwise running at a high operating rate, inspect more often as needed.

4.2.1 Inspection Items and Schedule

Inspection Period	External Inspection	Internal Inspection	Greasing
Start of work inspection	○	—	—
1 month inspection	○	—	—
3-month inspection	—	—	○
6-month inspection	○	○	Depends on grease supply timing (guideline)
Every 6 months thereafter	○	○	



Caution

- If return operations are repeated over a short distance, they may degrade the film of grease. As a guideline, in every 5,000 to 10,000 cycles, have approximately 5 cycles of return operation over the full stroke distance or more to regenerate the oil film.
- Check the condition of the grease, and if it is heavily contaminated, wipe it off before applying fresh grease.

4.2.2 Grease Supply Timing (Guideline)

Maximum operating speed (mm/s)	Grease supply timing (Guideline)	
	Travel distance	Months
0 to 550 or less	1,250km	12 months



Caution

- An actuator stored for 6 months or more may suffer from grease degradation.
Supply grease before the start of use.
- The degradation speed of grease may differ depending on the operating environment (temperature, humidity and ambient atmosphere).
It is recommended to shorten the grease supply period if the actuator is used under poor environmental conditions such as high temperatures, high humidity or dusty atmospheres.
- It is recommended to improve the environmental conditions in case the grease changes color notably due to poor operating conditions.

4.2.3 External Visual Inspection

Inspection Items	Maintenance Work
Is abnormal noise or vibration generated?	Take an action by referring to [Troubleshooting in Controller Instruction Manual].
Are actuator mounting bolts loose?	Tighten them further. Refer to the tightening torque described in [Chapter 2 Installation].
Is the cable scratched?	Replace if the damage is severe.
Is the connector loose?	Re-insert correctly.
Is grease dripping out? (especially if vertically mounted)	Clean up any drips. Replenish the grease.
Is the guide shaft scratched or dented?	Replace if the damage is severe.
Is there any dust or contamination adhered on the guide shaft sliding surface?	Clean up the guide shaft sliding surface before applying new grease.



Caution

- Depending on the operating environment, mounting orientation, and operating conditions, the grease applied to the screw and guide may drip. Clean it and apply grease as necessary.
- The spiral cover is a consumable part. Its life is 2,000,000 cycles of back and forth operation as a reference.
Refer to [4.5.2 Spiral Cover Replacement/Adjustment] when replacing the spiral cover.
 - * The life of the spiral cover varies due to the environment of use.
Foreign object (dust, high-viscosity oil) attached on the surface could disturb the expansion and contraction operation, which leads to a shorter life.
To obtain a longer life, clean the surface regularly.

4.2.4 Internal Visual Inspection

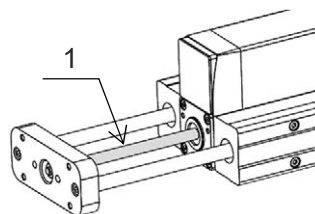
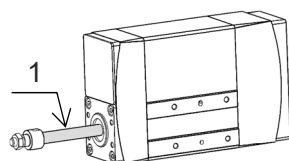
Inspection Items	Maintenance Work
Are actuator mounting bolts loose?	Tighten them further. Refer to the tightening torque described in [Chapter 2 Installation].
Are the ball screw and table guide (TC/TW) or guide shaft (GD) properly lubricated? (The lubrication may have turned brown. This is not a problem as long as the travel surfaces shine.)	First, wipe off the old grease, clean, and then supply new grease.
Is there foreign matter or dust adhered to the ball screw or guide?	Replenish with new grease after cleaning the ball screw.

[Ball screw inspection method]

◆ With No Spiral Cover

With the power off, pull out the ball screw for visual inspection.

If the ball screw will not move at low lead, connect to the PC teaching software or teaching pendant to move the ball screw.



No.	Type	Part Name	Size	Quantity	Tightening Torque
1	Common	Ball screw	—	1	—

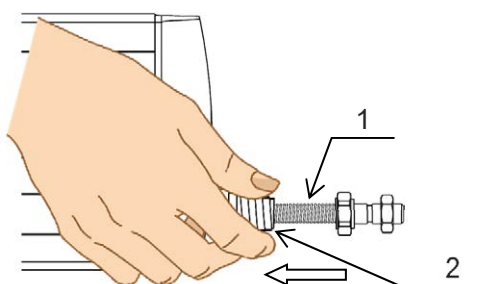
◆ With Spiral Cover (Option)

With the power off, pull out the ball screw and pull the spiral cover narrow diameter side toward the thick diameter side (arrow direction); then expose the screw shaft for visual inspection.

If the ball screw does not move due to a low lead, use the rotary shaft slit on the rear side of the main unit. For brake-equipped models, turn the power on and connect to the PC software or a teaching pendant to move the front plate.

Even if the grease has turned brown, lubrication is sufficient as long as the running surface appears wet and glossy.

If the grease is contaminated with dust and lacks gloss, or if the grease has deteriorated due to long-term use, clean all relevant parts and then supply grease.

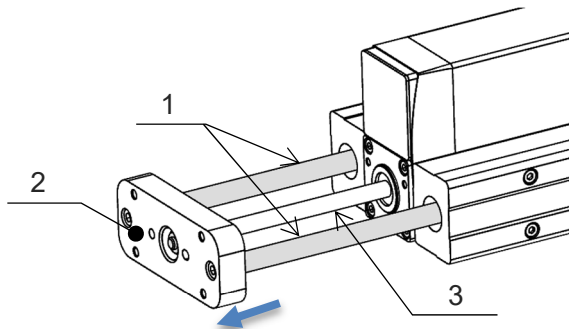


No.	Type	Part Name	Size	Quantity	Tightening Torque
1	Common	Ball screw	—	1	—
2	Common	Spiral cover	—	1	—

[EC-GD□ Guide Shaft Inspection Method]

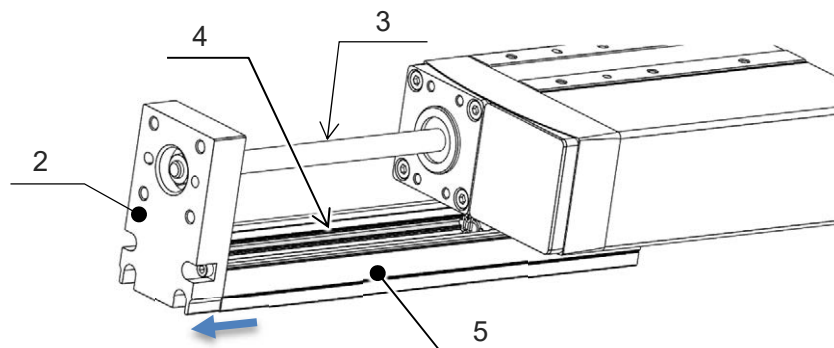
Pull the rod bracket out while the power is turned off, and have a visual inspection on the guide shafts.

If the ball screw does not move due to a low lead, use the rotary shaft slit on the rear side of the main unit. For brake-equipped models, turn the power on and connect to the PC software or a teaching pendant to move the rod bracket.

**[EC-TC□/TW□ Table Guide Inspection Method]**

Pull the table out while the power is turned off, and have a visual inspection on the guide rails inside the table.

If the ball screw does not move due to a low lead, use the rotary shaft slit on the rear side of the main unit. For brake-equipped models, turn the power on and connect to the PC software or a teaching pendant to move the rod bracket.



No.	Type	Part Name	Size	Quantity	Tightening Torque
1	GD3NC/4NC	Guide shaft	—	2	—
2	Common	Rod bracket	—	1	—
3	Common	Ball screw	—	1	—
4	TC3NC/4NC TW3NC/4NC	Guide rail	—	1	—
5	TC3NC/4NC TW3NC/4NC	Table	—	1	—

4.3 Cleaning

4.3.1 External Cleaning

- Clean exterior surfaces as necessary.
- For the rod type, if grease base oil etc. drips on the rod sliding surface and its periphery, wipe it off with a soft cloth, etc.
- Use a soft cloth when wiping up appearance.
- Do not blow too hard with compressed air, as it may cause dust to get in through gaps.
- Do not use petroleum-based solvents as they can harm resin and painted surfaces.
- To remove severe buildup, wipe gently with a soft cloth soaked in a neutral detergent or alcohol.

4.3.2 Internal Cleaning

- When cleaning the inner surfaces, wipe off dirt using a soft cloth or a similar material.
- Do not blow too hard with compressed air, as it may cause dust to get in through gaps.
- Do not use petroleum-based solvents, neutral detergent or alcohol.

4.4 Grease Supply

4.4.1 Grease Used

Use recommended or equivalent product.

◆ Standard specifications

Type	Application location	Recommended Product Grease
RP□NC	Ball screw	Kyodo Yushi Multitemp PS No.2 (Lithium Based Grease)
TC□NC TW□NC	Ball screw Table guide	
GD□NC	Ball screw Guide shaft	

[Reference] The greased used on delivery is the recommended one.



Caution

- Do not attempt to apply any grease other than lithium grease.
Mixing with grease types other than lithium grease not only reduces the performance of the grease, but it may even cause damage to the actuator.

◆ Specified Grease Application Specification Clean-Environment Low-Dust Grease (Option Model Code: G1)

Type	Application location	Recommended Product Grease
RP□NC	Ball screw	Kuroda Precision Industries Ltd. Kuroda C Grease
TC□NC TW□NC	Ball screw Table guide	
GD□NC	Ball screw Guide shaft	

[Reference] The greased used on delivery is the recommended one.

◆ Specified Grease Application Specification Clean-Environment Low-Dust Grease (Option Model Code: G3)

Type	Application location	Recommended Product Grease
RP□NC	Ball screw	THK Co., Ltd. AFF Grease
TC□NC TW□NC	Ball screw Table guide	
GD□NC	Ball screw Guide shaft	

[Reference] The greased used on delivery is the recommended one.

◆ Specified Grease Application Specification Clean-Environment Low-Dust Grease
(Option Model Code: G4)

Type	Application location	Recommended Product Grease
RP□NC	Ball screw	THK Co., Ltd. AFE-CA Grease
TC□NC TW□NC	Ball screw Table guide	
GD□NC	Ball screw Guide shaft	

[Reference] The greased used on delivery is the recommended one.

◆ Specified Grease Application Specification Food Machinery Grade Grease
(Option Model Code: G5)

Type	Application location	Recommended Product Grease
RP□NC	Ball screw	Sumitomo Lubricant Co., Ltd. White Alcom Grease No.2
TC□NC TW□NC	Ball screw Table guide	
GD□NC	Ball screw Guide shaft	

[Reference] The greased used on delivery is the recommended one.

4.4.2 Grease Supply Procedure



Caution

- Supplying too much grease may increase sliding resistance and load to the motor, resulting in a drop of performance.
Also, excess grease on the ball screw may be splashed around in the ambience.
- In case the grease got into your eye, rinse it off with clean water for 15 minutes and immediately go see the doctor to get appropriate care.
- After finishing the grease supply work, wash your hands carefully with water and soap to rinse the grease OFF.

◆ Preparation

- Protection Gear (e.g. Rubber Gloves)
- Syringe (For grease supply to table guide)

Reference Tools

Type	Grease Supply Inlet Diameter (mm)
TC3NC	Φ2.5
TC4NC	Φ1.4
TW3NC, TW4NC	Φ2.5

* Select a syringe with an outer diameter equal to or smaller than the diameter of the grease supply inlet.

- Grease

Application Location	Amount of Grease Supply (Reference)
Ball screw	0.1 to 0.15cc
Table guide	0.1 to 0.4cc

◆ Grease Supply Procedure

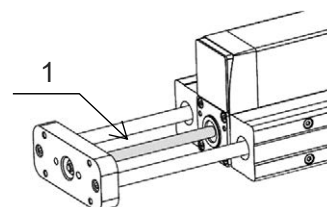
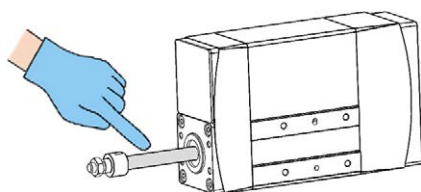
[Ball Screw]

● With No Spiral Cover

With the power off, pull out the ball screw. If the ball screw does not move due to a low lead, use the rotary shaft slit on the rear side of the main unit. For brake-equipped models, turn the power on and connect to the PC software or a teaching pendant to move the rod bracket.

1. Wipe off the grease adhered to the ball screw and apply the designated grease (0.1 to 0.15cc).

Type	Amount of Grease Supply (Reference)
RP3NC, TC3NC, TW3NC, GD3NC	0.1cc
RP4NC, TC4NC, TW4NC, GD4NC	0.15cc



2. Move the ball screw to spread the grease evenly.

No.	Type	Part Name	Size	Quantity	Tightening Torque
1	Common	Ball screw	—	1	—

● With Spiral Cover (Option)

1. With the power off, pull out the ball screw and make sure there is no cutting powder or dust on the spiral cover surface.

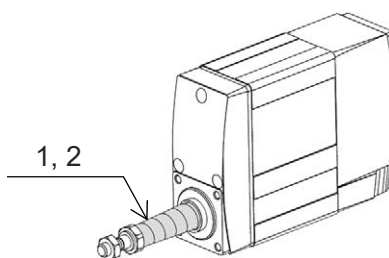
Wipe off any cutting powder or dust with a soft cloth, etc.

If the ball screw does not move due to a low lead, use the rotary shaft slit on the rear side of the main unit. For brake-equipped models, turn the power on and connect to the PC software or a teaching pendant to move the ball screw.

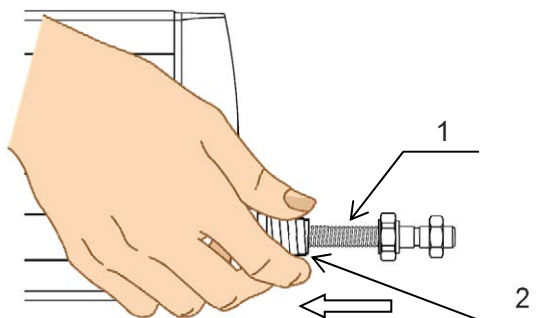
* If the model is equipped with a brake, the rod cannot be moved by the ROBO Cylinder alone.

Connect the controller and move the rod with the jog operation.

It is also possible to operate it using the brake release box (BKR-01).



2. Pull the spiral cover narrow diameter side toward the thick diameter side (arrow direction); then expose the ball screw.

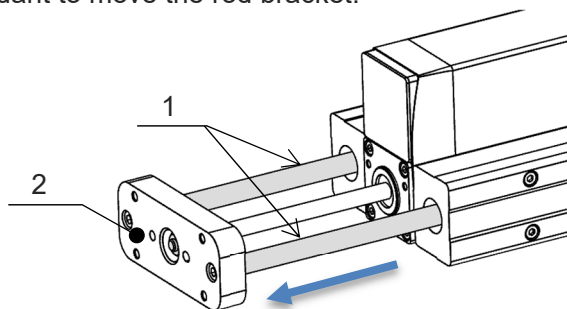


3. Wipe off the grease adhered to the ball screw and apply the designated grease (0.1 to 0.15cc).
4. Put the spiral cover back on.
Move the ball screw to spread the grease evenly.

No.	Type	Part Name	Size	Quantity	Tightening Torque
1	Common	Ball screw	—	1	—
2	Common	Spiral cover	—	1	—

[EC-GD□ Guide Shaft]

1. With the power off, pull out the rod bracket.
If the rod bracket does not move due to a low lead, use the rotary shaft slit on the rear side of the main unit. For brake-equipped models, turn the power on and connect to the PC software or a teaching pendant to move the rod bracket.



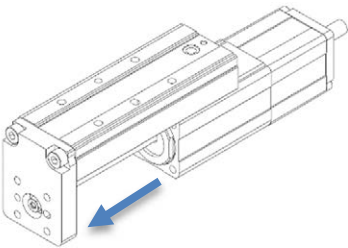
* To release the brake, refer to [Chapter 3 Wiring, Brake release method in Actuator Electricity Section Instruction Manual (ME3816)]

2. Wipe off the grease adhered to the guide shaft and apply the designated grease (0.1 to 0.15cc per shaft).
3. Move the rod bracket to spread the grease evenly.

No.	Type	Part Name	Size	Quantity	Tightening Torque
1	GD3NC, GD4NC	Guide shaft	—	2	—
2	GD3NC, GD4NC	Rod bracket	—	1	—

[EC-TC□/TW□ Table Guide]

1. Move the table to the stroke end to match the table grease port with the frame grease port.



2. Insert the syringe from the table grease port and apply grease to the frame grease port. Be careful not to let the grease leak to the exterior.

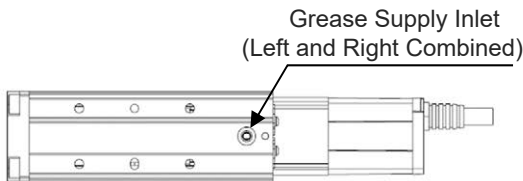
* The diameter of the grease supply inlet is as shown below.
Select a syringe with an outer diameter equal to or smaller than the diameter of the grease supply inlet.

Type	Grease Supply Inlet Diameter (mm)
TC3NC	Φ2.5
TC4NC	Φ1.4
TW3NC, TW4NC	Φ2.5

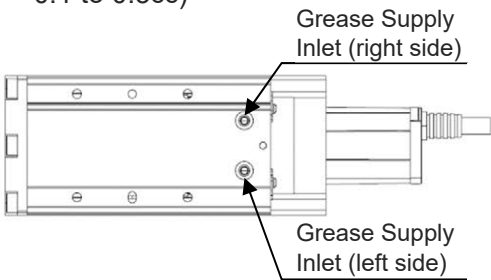
3. Move the table to spread the grease evenly.

Type	Grease Supply Point	Grease Supply Volume per Point (Reference)
TC3NC	1 place	0.2 to 0.4cc
TC4NC TW3NC, TW4NC	2 places	0.1 to 0.3cc

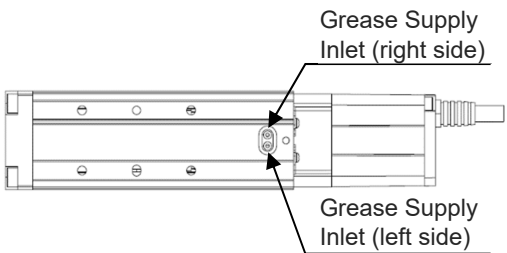
- **TC3NC**
(Grease Supply Amount: 0.2 to 0.4cc)



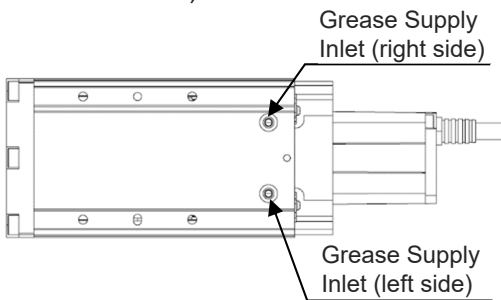
- **TW3NC**
(Grease Supply Amount per Grease Supply Inlet: 0.1 to 0.3cc)



- **TC4NC**
(Grease Supply Amount per Grease Supply Inlet: 0.1 to 0.3cc)



- **TW4NC**
(Grease Supply Amount per Grease Supply Inlet: 0.1 to 0.3cc)



4.5 Replacing Components

4.5.1 List of Parts for Replacement

Components Available for Maintenance

Type	Model Number
RP□NC GD□NC TC□NC TW□NC	RCA2-SPC-50

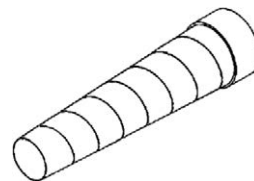
4.5.2 Spiral Cover Replacement/Adjustment

Applicable Models: Option

◆ Preparation

- Protection Equipment (e.g. Cotton Work Gloves)
- Grease Refer to [4.4.1 Grease Used]
- Spiral Cover for Replacement

Type	Stroke	Model Number
Common	50mm	RCA2-SPC-50



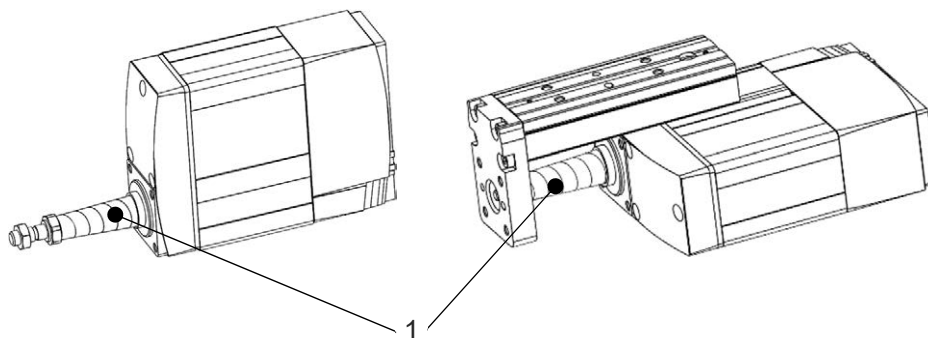
◆ Replacement procedure

1. With the power off, pull out the spiral cover.

If the ball screw does not move due to a low lead, connect to the PC teaching software or a teaching pendant to move it.

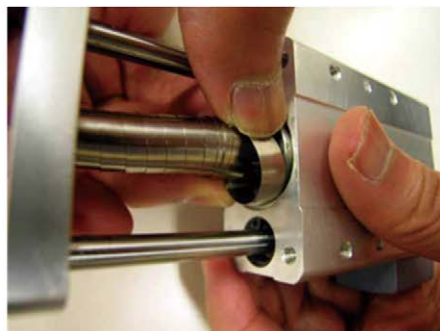
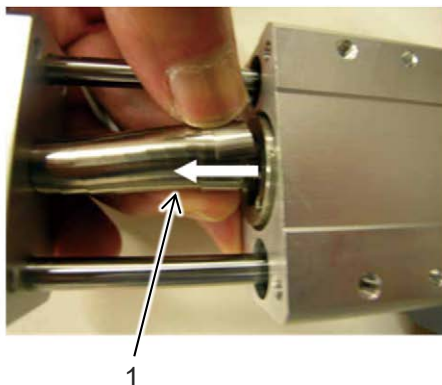
* If the model is equipped with a brake, the rod cannot be moved by the ROBO Cylinder alone. Connect the controller and move the rod with the jog operation.

It is also possible to operate it using the brake release box (BKR-01).

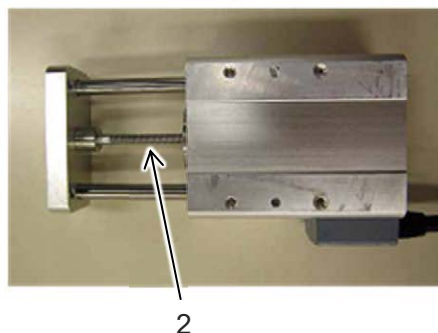
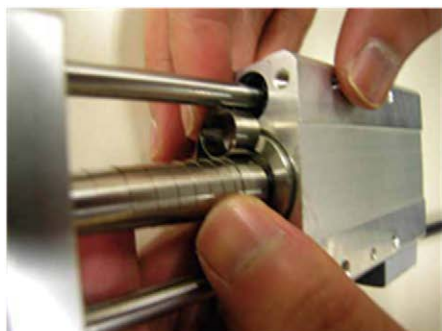


No.	Type	Part Name	Size	Quantity	Tightening Torque
1	Common	Spiral cover (Ball screw)	—	1	—

2. Remove the spiral cover.
Pull out the spiral cover base and roll the cover tip.

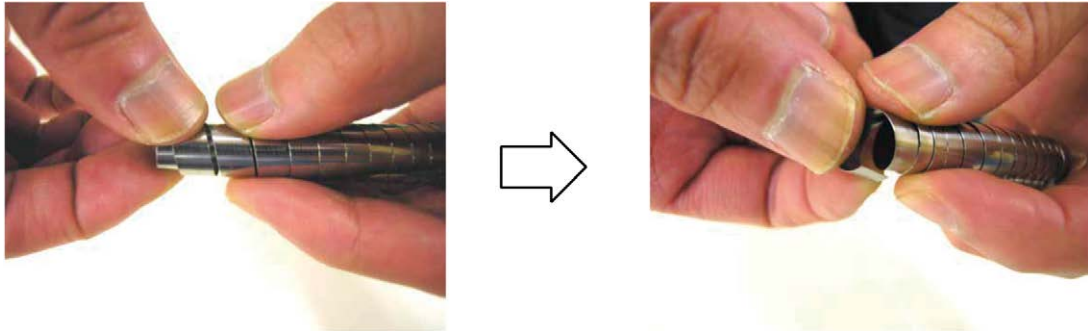


3. Remove the spiral cover from the ball screw while rolling it up.
Wipe off the old grease from the ball screw and apply fresh grease.
Refer to [4.4.2 Grease Supply Procedure].

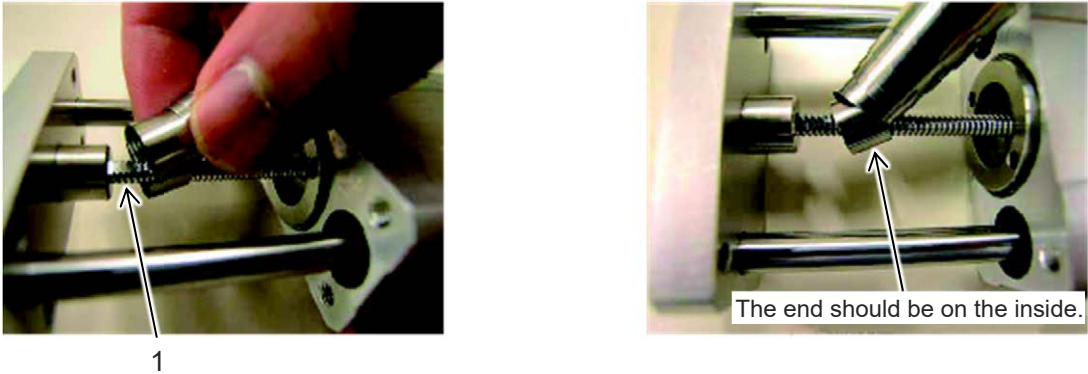


No.	Type	Part Name	Size	Quantity	Tightening Torque
1	Common	Spiral cover	—	1	—
2	Common	Ball screw	—	1	—

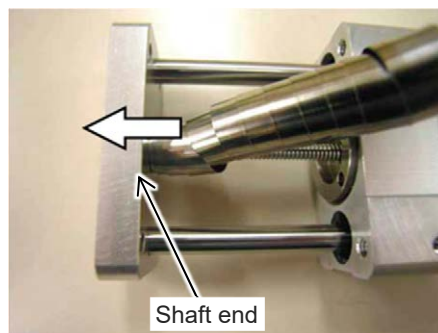
4. Pull out the thin end of the replacement spiral cover and bring the interior end to the outside.



5. Attach a spiral cover for replacement.
Pull it outside and hang the end of the spiral cover for replacement on the ball screw.
Have the end come inside after it is hanged.

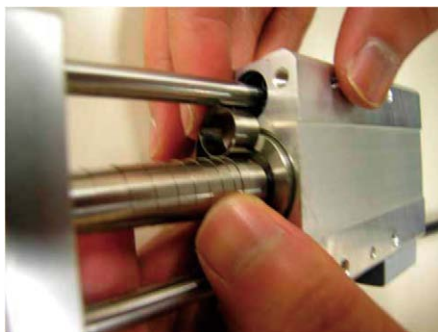


6. Rolling slightly, press the end onto the shaft end side.

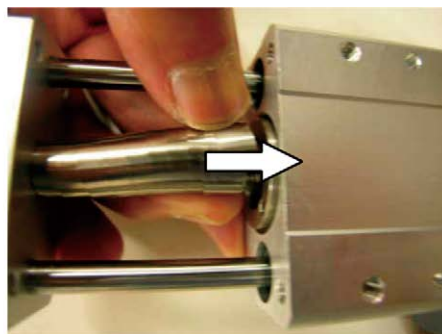
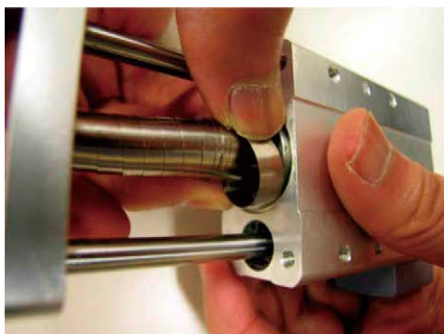


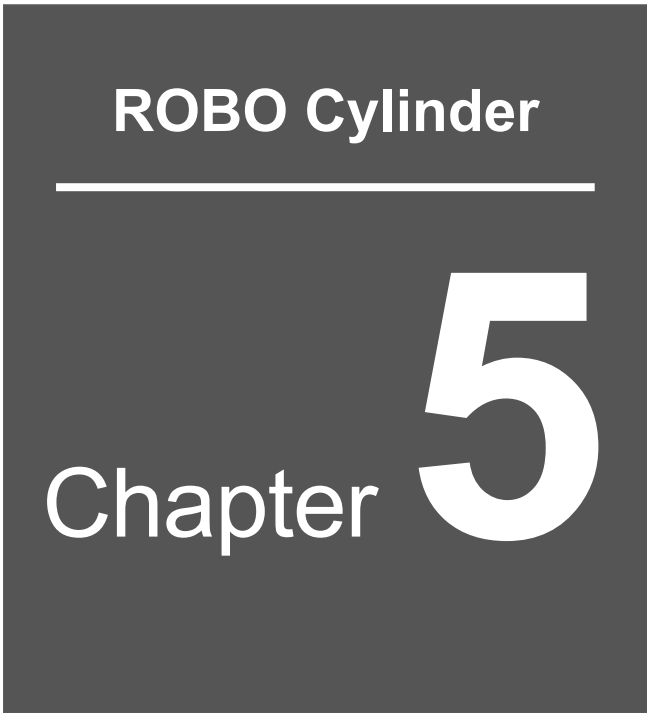
No.	Type	Part Name	Size	Quantity	Tightening Torque
1	Common	Ball screw	—	1	—

7. Roll on the replacement spiral cover.



8. Finally, bring the end to the outside and fit it into the actuator groove.





External Dimensions

5.1	RCA2-RP3NC	5-1
5.2	RCA2-RP4NC	5-3
5.3	RCA2-TC3NC	5-5
5.4	RCA2-TC4NC	5-7
5.5	RCA2-TW3NC	5-9
5.6	RCA2-TW4NC	5-11
5.7	RCA2-GD3NC	5-13
5.8	RCA2-GD4NC	5-15

5.1 RCA2-RP3NC

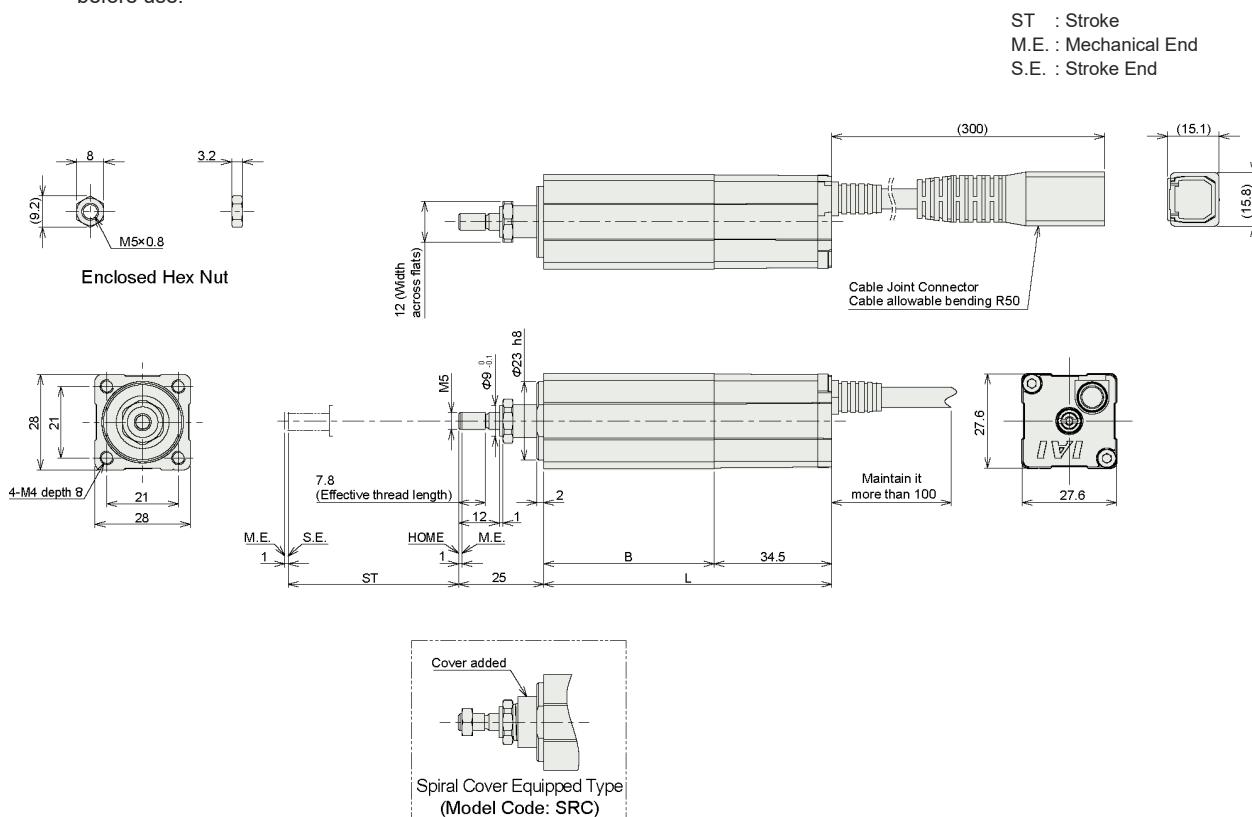
■ Without Brake

(Note) The motor/encoder cable is to be connected to the cable joint connector.

(Note) When performing home return, the rod moves to the M.E. position. Be careful to avoid interference with surrounding objects.

(Note) The orientation of the width-across-flats surface varies depending on the product.

(Note) This product is not equipped with an anti-rotation mechanism for the feed screw. Add an external anti-rotation mechanism before use.



■ Dimensions by Stroke

Unit (mm)

Stroke		50	
Motor Output (W)		10	20
L	W/o Brake	84.5	99.5
	With Brake	123.0	138.0
B		50	65

■ Mass by Stroke

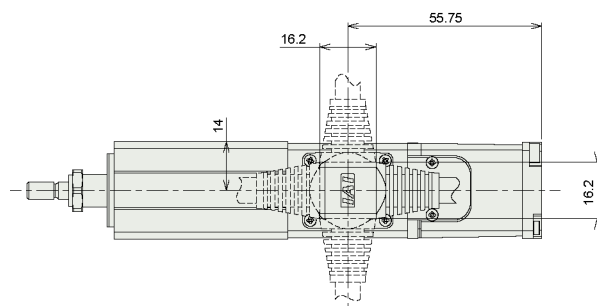
Unit (kg)

Stroke		50	
Motor Output (W)		10	20
Mass	W/o Brake	0.22	0.27
	With Brake	0.32	0.36

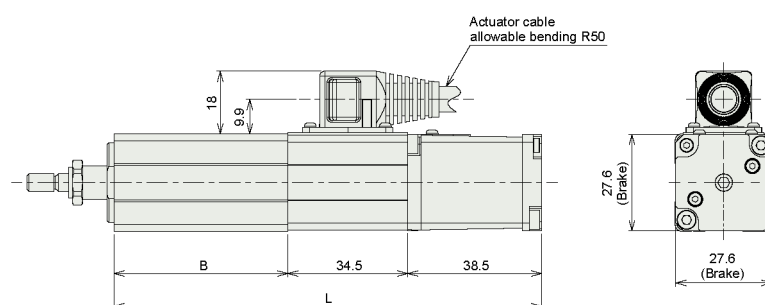
5. External Dimensions

■ With Brake (Option)

(Note) The motor/encoder cable is to be connected to the cable joint connector.

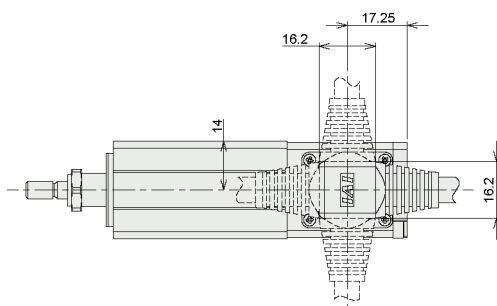


Cable Ejection Direction (Rotation)

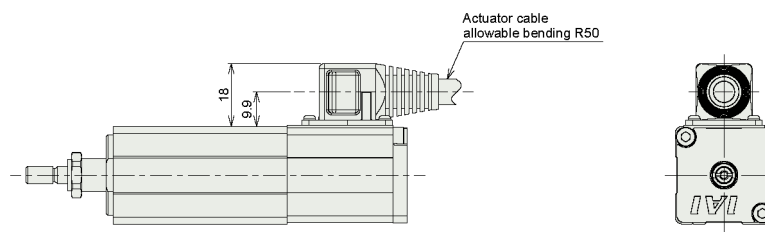


■ Cable Eject Direction Changed (Option)

(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Ejection Direction (Rotation)



■ Without Brake

(Note) This product is not equipped with an anti-rotation mechanism for the feed screw. Add an external anti-rotation mechanism before use.

[illegible]

Unit (mm)

Stroke		50	
Motor Output (W)		20	30
L	W/o Brake	89.5	110.5
	With Brake	132.5	153.5
B		51.5	72.5

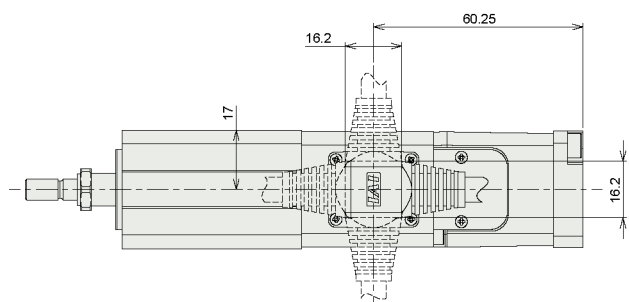
Unit (kg)

Stroke		50	
Motor Output (W)		20	30
Mass	W/o Brake	0.32	0.41
	With Brake	0.47	0.58

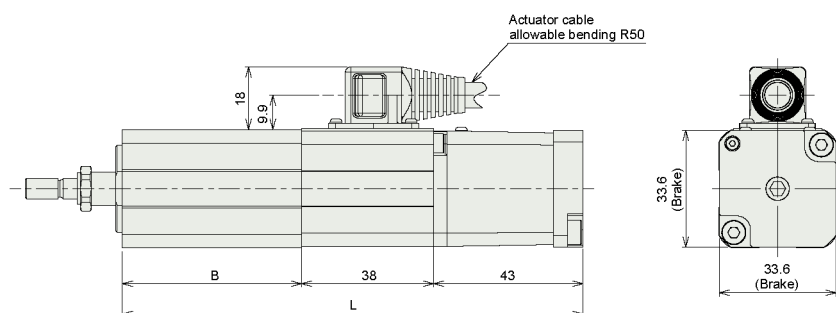
5. External Dimensions

■ With Brake (Option)

(Note) The motor/encoder cable is to be connected to the cable joint connector.

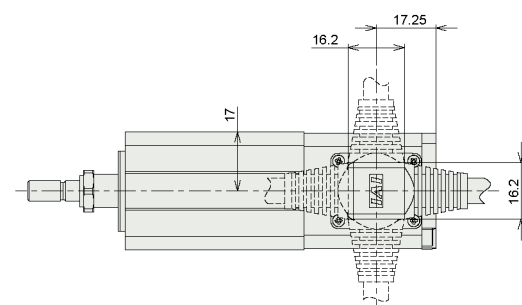


Cable Ejection Direction (Rotation)

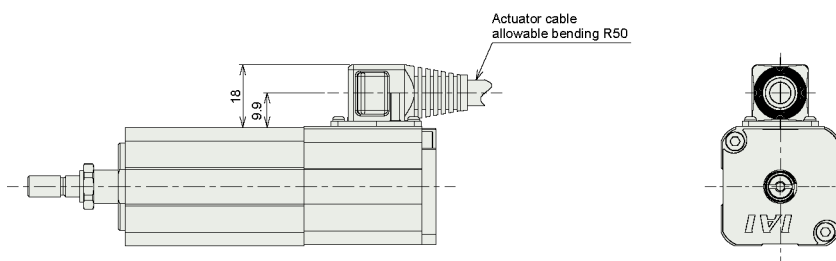


■ Cable Eject Direction Changed (Option)

(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Ejection Direction (Rotation)



5.3 RCA2-TC3NC

■ Without Brake

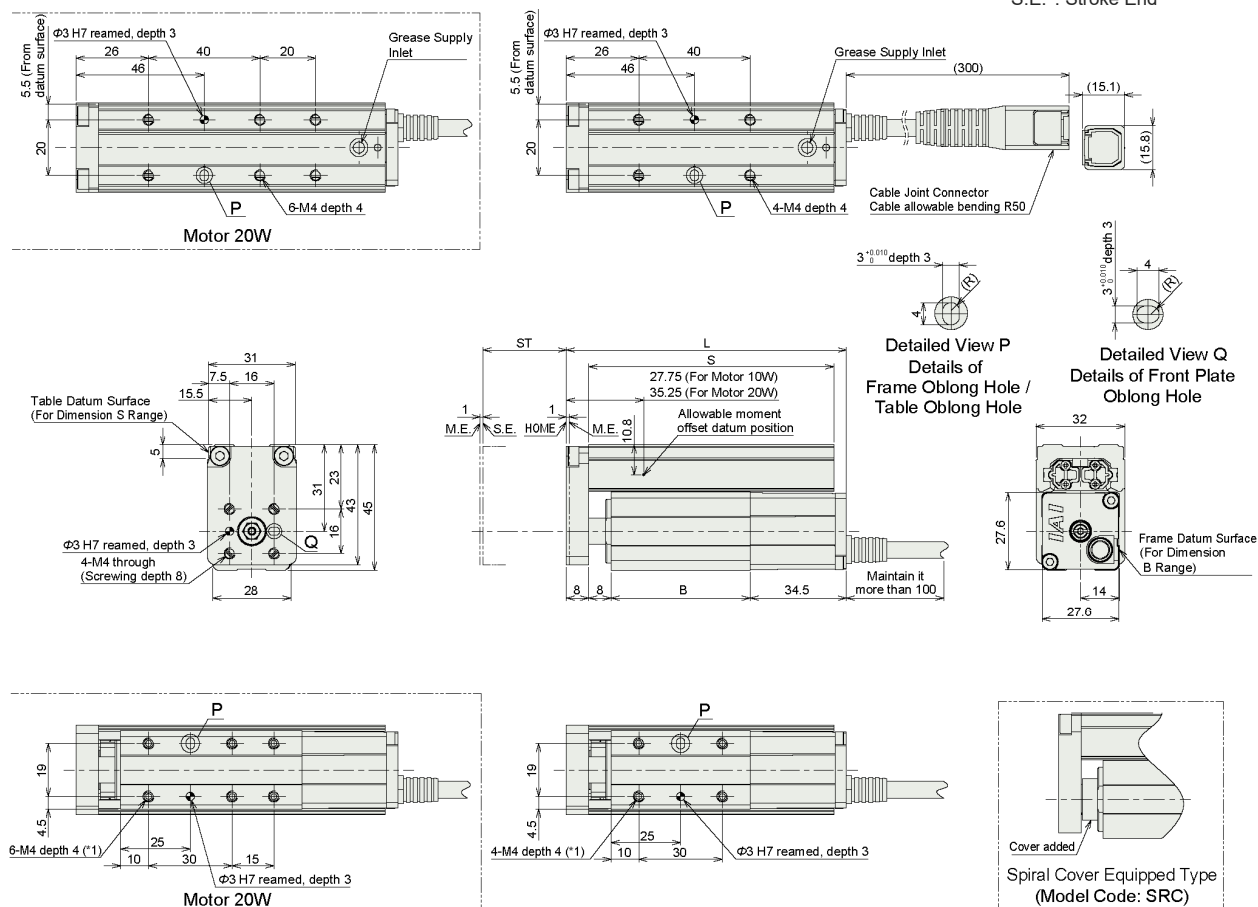
*1 To prevent foreign matter from entering, this port is sealed with a set screw. Remove it before use.

(Note) The motor/encoder cable is to be connected to the cable joint connector.

(Note) During home return, the table moves to the M.E. position. Be careful to avoid interference with surrounding objects.

(Note) Be sure to use the correct mounting bolt length. If the bolts are too long, they may interfere with internal parts, causing abnormal sliding or damage to components.

ST : Stroke
M.E. : Mechanical End
S.E. : Stroke End



■ Dimensions by Stroke

Unit (mm)

Stroke		50	
Motor Output (W)		10	20
L	W/o Brake	100.5	115.5
	With Brake	139.0	154.0
B		50	65
S		88	103

■ Mass by Stroke

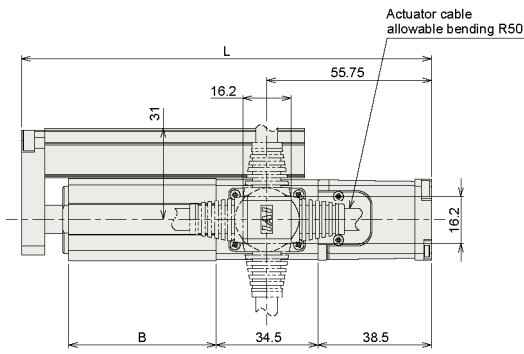
Unit (kg)

Stroke		50	
Motor Output (W)		10	20
Mass	W/o Brake	0.33	0.40
	With Brake	0.43	0.49

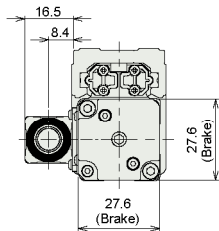
5. External Dimensions

■ With Brake (Option)

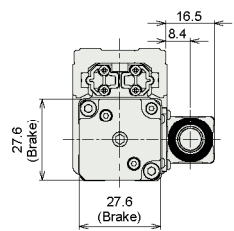
(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Eject Direction Changed (Rotation)



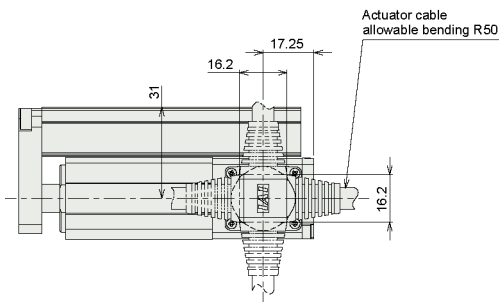
Cable Eject Direction Changed (Left)
(Model Code: CJL)



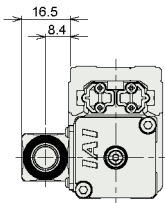
Cable Eject Direction Changed (Right)
(Model Code: CJR)

■ Cable Eject Direction Changed (Option)

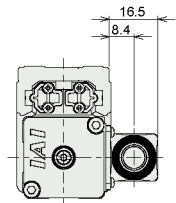
(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Eject Direction Changed (Rotation)



Cable Eject Direction Changed (Left)
(Model Code: CJL)



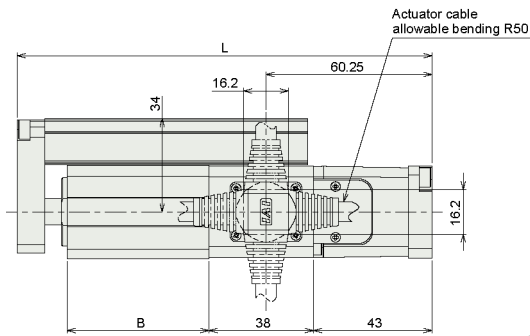
Cable Eject Direction Changed (Right)
(Model Code: CJR)

5-7

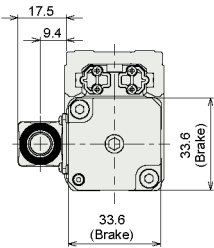
5. External Dimensions

■ With Brake (Option)

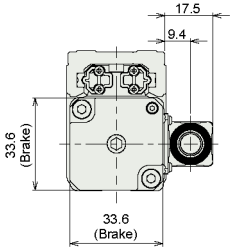
(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Eject Direction Changed (Rotation)



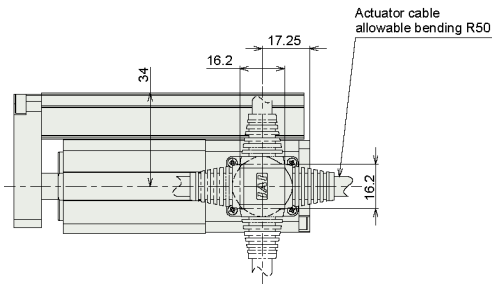
Cable Eject Direction Changed (Left)
(Model Code: CJL)



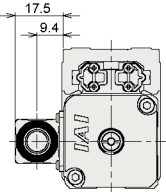
Cable Eject Direction Changed (Right)
(Model Code: CJR)

■ Cable Eject Direction Changed (Option)

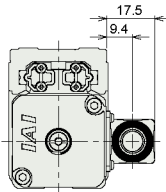
(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Eject Direction Changed (Rotation)



Cable Eject Direction Changed (Left)
(Model Code: CJL)

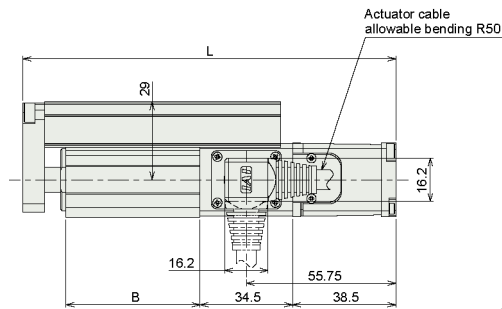


Cable Eject Direction Changed (Right)
(Model Code: CJR)

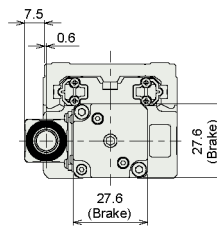
5. External Dimensions

■ With Brake (Option)

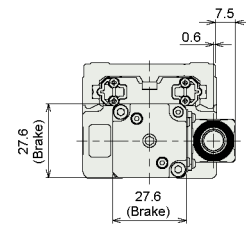
(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Eject Direction Changed (Rotation)



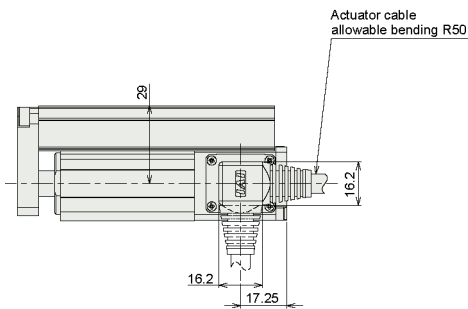
Cable Eject Direction Changed (Left)
(Model Code: CJL)



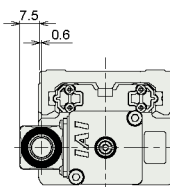
Cable Eject Direction Changed (Right)
(Model Code: CJR)

■ Cable Eject Direction Changed (Option)

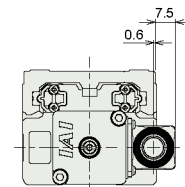
(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Eject Direction Changed (Rotation)



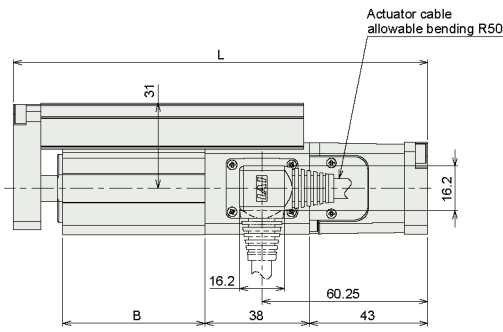
Cable Eject Direction Changed (Left)
(Model Code: CJL)



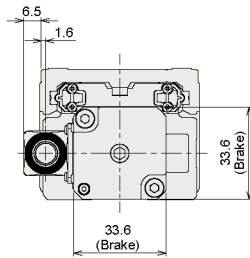
Cable Eject Direction Changed (Right)
(Model Code: CJR)

■ With Brake (Option)

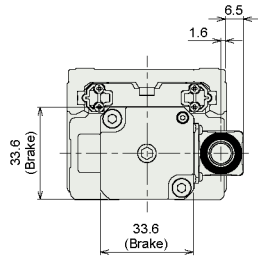
(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Eject Direction Changed (Rotation)



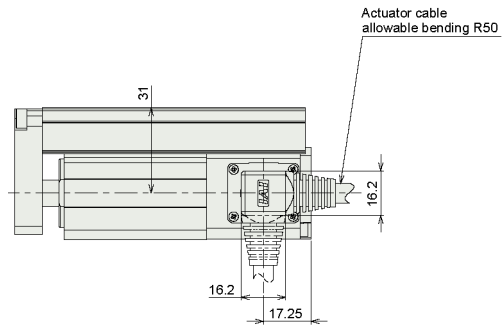
Cable Eject Direction Changed (Left)
(Model Code: CJL)



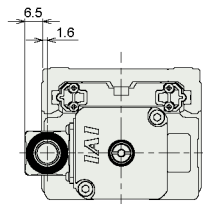
Cable Eject Direction Changed (Right)
(Model Code: CJR)

■ Cable Eject Direction Changed (Option)

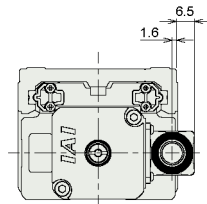
(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Eject Direction Changed (Rotation)



Cable Eject Direction Changed (Left)
(Model Code: CJL)

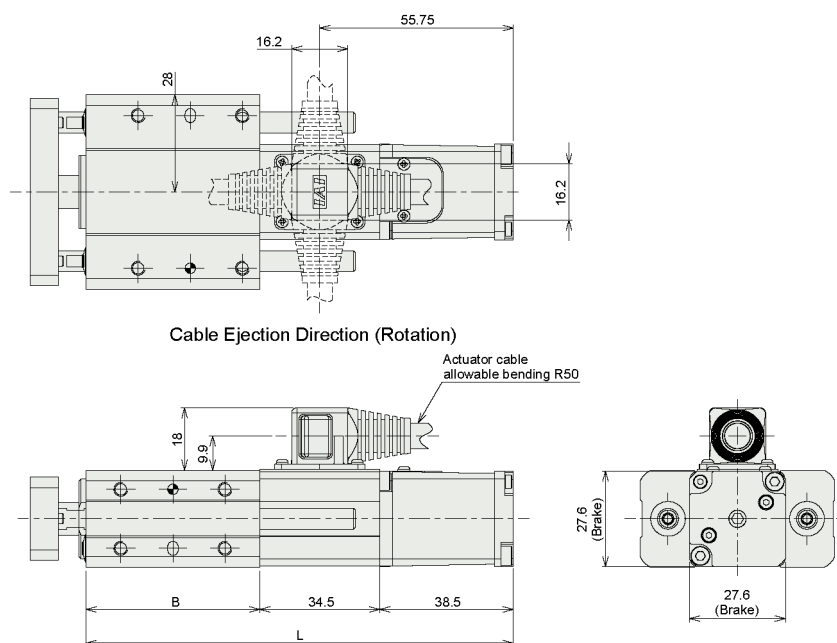


Cable Eject Direction Changed (Right)
(Model Code: CJR)

5. External Dimensions

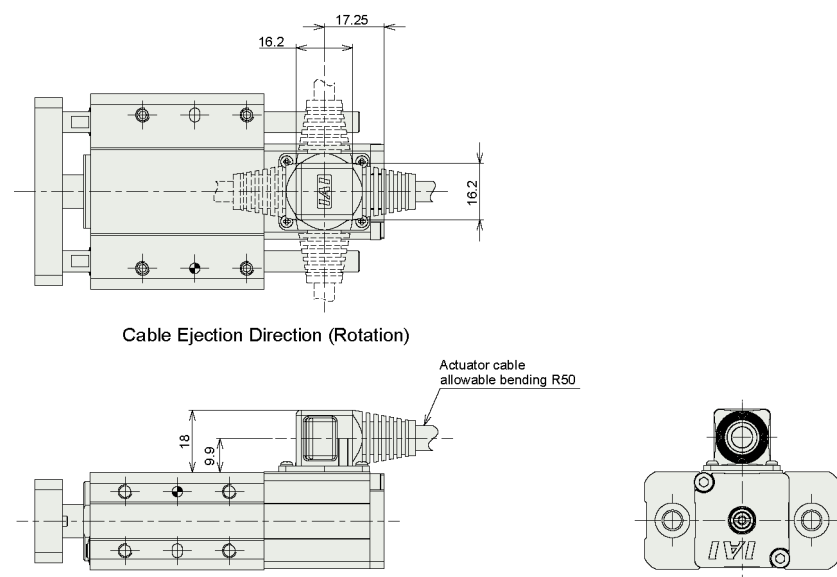
■ With Brake (Option)

(Note) The motor/encoder cable is to be connected to the cable joint connector.

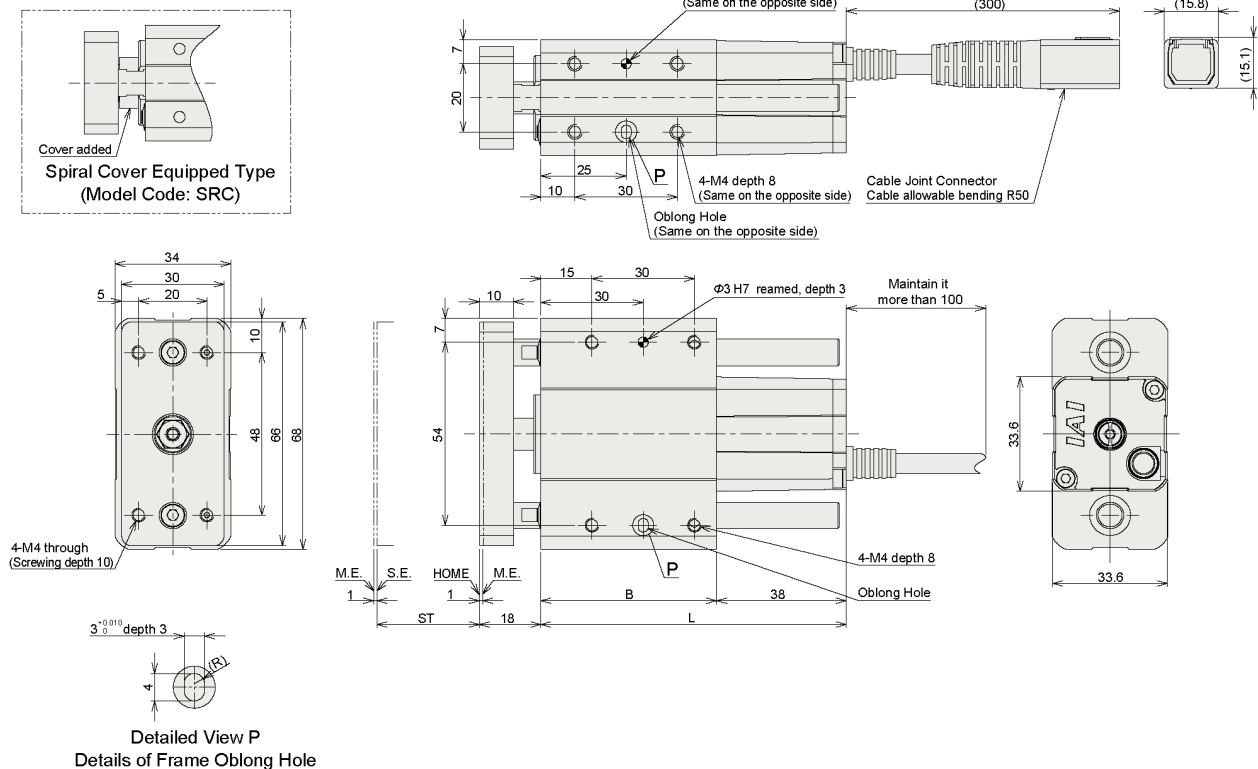


■ Cable Eject Direction Changed (Option)

(Note) The motor/encoder cable is to be connected to the cable joint connector.



ST : Stroke
M.E. : Mechanical End
S.E. : Stroke End



Unit (mm)

Stroke		50	
Motor Output (W)		20	30
L	W/o Brake	89.5	110.5
	With Brake	132.5	153.5
B		51.5	72.5

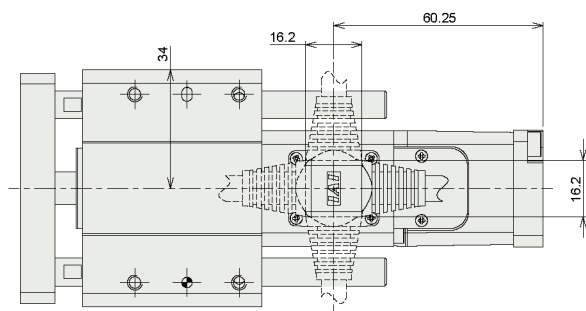
Unit (kg)

Stroke		50	
Motor Output (W)		20	30
Mass	W/o Brake	0.58	0.72
	With Brake	0.74	0.89

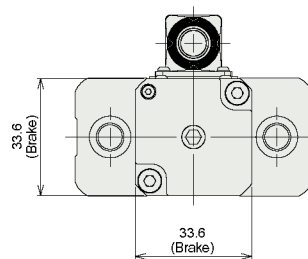
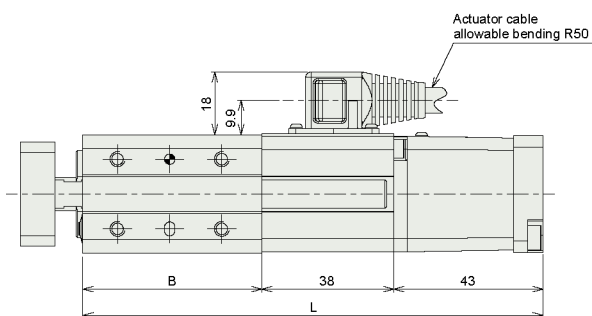
5. External Dimensions

■ With Brake (Option)

(Note) The motor/encoder cable is to be connected to the cable joint connector.

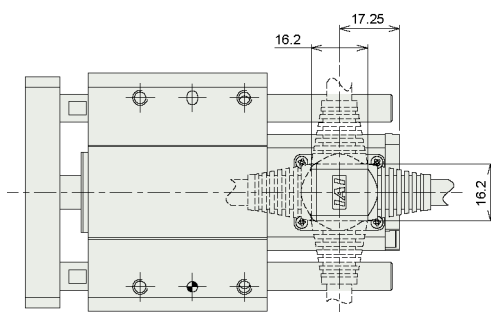


Cable Ejection Direction (Rotation)

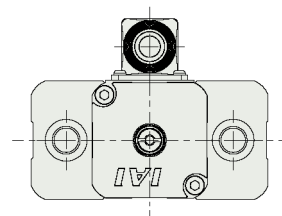
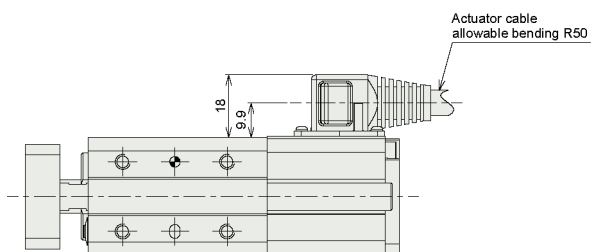


■ Cable Eject Direction Changed (Option)

(Note) The motor/encoder cable is to be connected to the cable joint connector.



Cable Ejection Direction (Rotation)



ROBO Cylinder

Chapter 6

Life

6.1	Product Life of Ball Screw Type Actuators	6-1
6.2	Relation between Tip Radial Load and Operation Life	6-2

6.1 Product Life of Ball Screw Type Actuators

The product life of ball screw type actuators, when operated under conditions of maximum allowable load and maximum acceleration/deceleration, is as indicated below as reference.

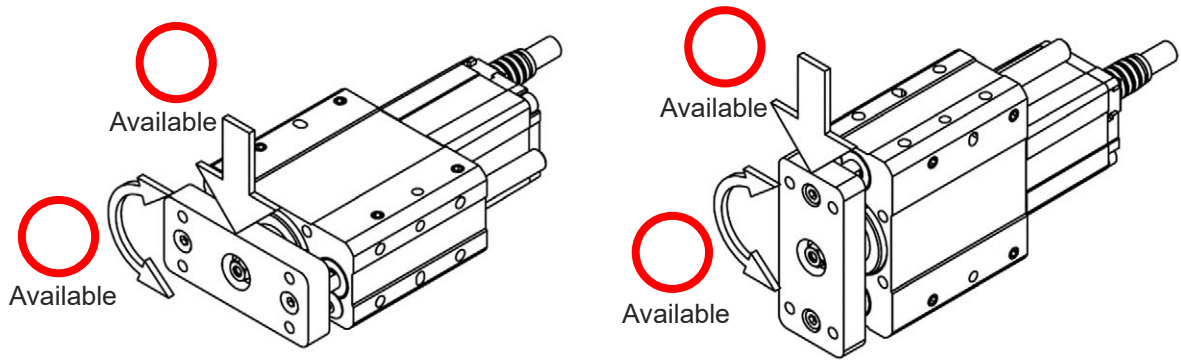
* The service life varies greatly depending on operating conditions, environment, and maintenance status.

Model	Motor Type	Life (guideline)
RP3NC, TC3NC, TW3NC, GD3NC	10W	5,000km
	20W	2,000km
RP4NC, TC4NC, TW4NC, GD4NC	20W	5,000km
	30W	2,000km

6.2 Relation between Tip Radial Load and Operation Life

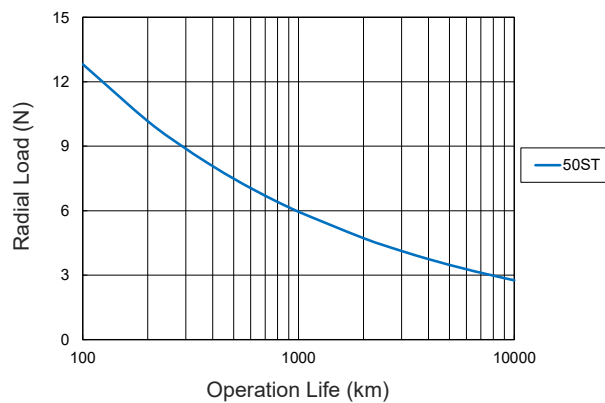
The life decreases as the tip radial load increases.

[Load Direction]

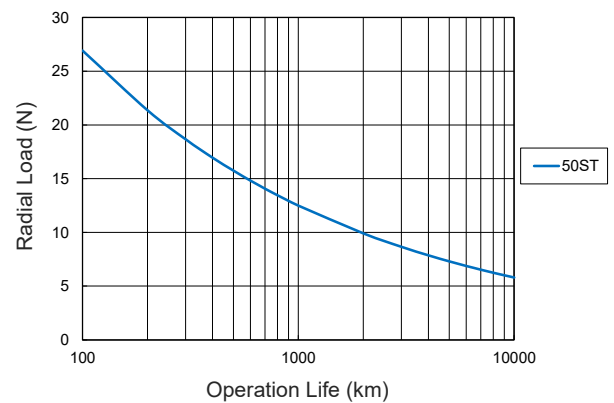


● RCA2-GD3NC

Motor 10W

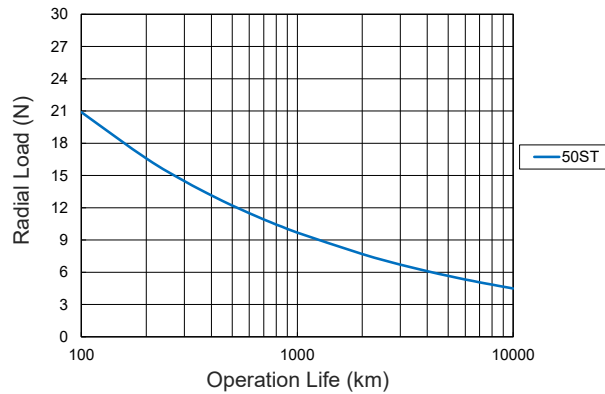


Motor 20W

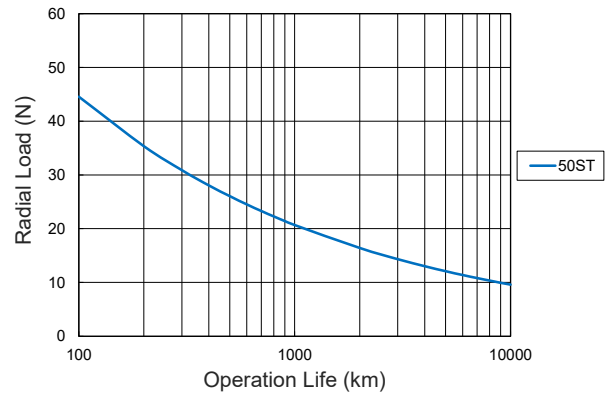


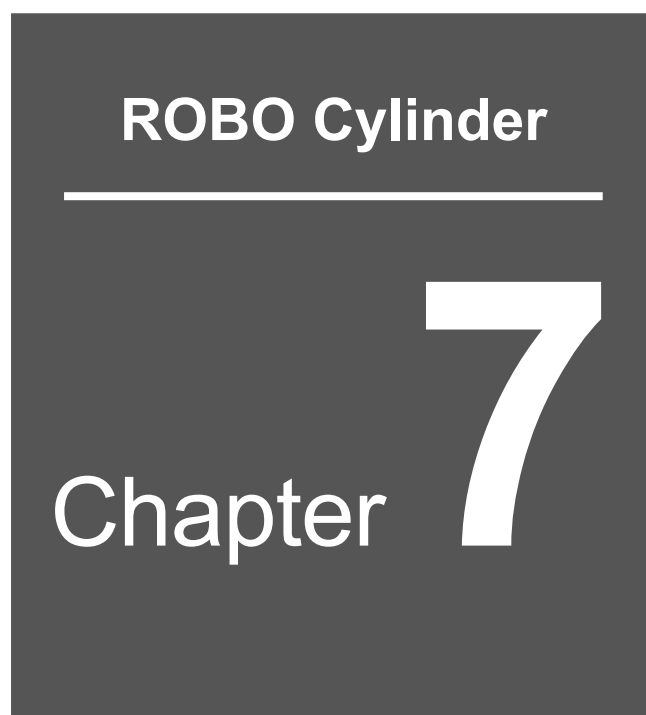
● RCA2-GD4NC

Motor 20W



Motor 30W





Warranty

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7.3	Honoring the warranty	7-1
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7.5	Conformance with applicable standards/regulations, etc., and application conditions	7-2
7.6	Other items excluded from warranty	7-2

7.1 Warranty period

Whichever of the following periods is shorter:

- 18 months after shipment from IAI
- 12 months after delivery to a specified location
- 2,500 operational hours

7.2 Scope of the warranty

Our products are covered by warranty when all of the following conditions are met.

Faulty products covered by warranty will be replaced or repaired free of charge:

- (1) The breakdown or malfunction in question pertains to our product as delivered by IAI or our authorized dealer.
- (2) The breakdown or malfunction in question occurred during the warranty period.
- (3) The breakdown or malfunction in question occurred while the product was in use for an appropriate purpose under the operating conditions and operating environment specified in the instruction manual and catalog.
- (4) The breakdown or malfunction in question was caused by a specification defect, malfunction, or poor product quality.

Note that breakdowns due to any of the following reasons are excluded from the scope of warranty:

- Anything other than our product
- Modification or repair performed by a party other than IAI (unless approved by IAI)
- Anything that could not be easily predicted with the level of science and technology available at the time of shipment from IAI
- Natural disaster, unnatural disaster, incident or accident for which we are not liable
- Natural fading of paint or other symptoms of aging
- Wear, depletion or other expected results of use
- Operation noise, vibration or other subjective sensations not affecting function or maintenance

Note that the warranty only covers our product as delivered and that any secondary loss arising from a breakdown of our product is excluded from the scope of warranty.

7.3 Honoring the warranty

As a rule, the product must be consigned to IAI for repair under warranty.

7.4 Limited liability

- (1) We assume no liability for any special damage, consequential loss or passive loss such as a loss of expected profit arising from or in connection with our product.
- (2) We assume no liability for any program or control method created by the customer to operate our product or for the results of any such program or control method.

7.5 Conformance with applicable standards/regulations, etc., and application conditions

- (1) If our product is combined with another product or any system, equipment, etc., used by the customer, the customer must first check the applicable standards, regulations and/or rules. The customer is also responsible for confirming that such combination with our product conforms to the applicable standards, etc.
In such a case we assume no liability for the conformance of our product with the applicable standards, etc.
- (2) Our product is for general industrial use. It is not intended or designed for the applications specified below, which require a high level of safety. Accordingly, as a rule our product cannot be used in these applications.
Contact IAI if you must use our product for any of these applications:
 - Medical equipment used to maintain, control or otherwise affect human life or physical health
 - Mechanisms and machinery designed for the purpose of moving or transporting people (vehicles, railway facilities, aviation facilities etc.)
 - Machinery components essential for safety (safety devices etc.)
 - Equipment used to handle cultural assets, art or other irreplaceable items
- (3) Contact IAI in advance if our product is to be used in any condition or environment that differs from that specified in the catalog or instruction manual.

7.6 Other items excluded from warranty

The price of the product delivered to you does not include expenses associated with programming, the dispatch of engineers, etc. Accordingly, a separate fee will be charged in the following cases even during the warranty period:

- Guidance for mounting/adjustment and witnessing of test operation
- Maintenance and inspection
- Technical guidance and education on operating/wiring methods, etc.
- Technical guidance and education on programming and other items related to programs

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Change History

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2026.05	First edition



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