

ROBO Cylinder[®]

Radial Cylinder
Dust and drip proof type

RCP6W/RCP6SW-RRA4C, RRA4R
RRA6C, RRA6R
RRA7C, RRA7R
RRA8C, RRA8R

Instruction Manual Second edition ME3761-2B



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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.

This instruction manual does not include an explanation for the controller part of RCP6SW.
Refer to the instruction manual provided separately for the controller part of RCP6SW.

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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.

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. Make sure to follow the usage condition, environment and specification range of the product.

In case it is not secured, it may cause a drop in performance or malfunction of the product.

2. Do not attempt to have any handling or operation that is not stated in this Instruction manual.
3. It is recommended to apply our products for the wiring between the actuator and the controller.

4. Do not attempt to establish the settings for the speed and acceleration/ deceleration above the allowable range.

An operation with speed and acceleration/deceleration beyond the allowable range may cause an abnormal noise, vibration, malfunction or shortened life.

5. Set the allowable load of the move on rod tip within the allowable range.

An operation with the load beyond the allowable load of the move on rod tip may cause an abnormal noise, vibration, malfunction or shortened life. If it is extreme, flaking may occur on the guide.

6. Set the load offset distance within the allowable range.

Attaching a load with a load offset distance above the allowable range may cause vibration and abnormal noise.

7. Back and forth operation continuously in short distance may wear out the grease on the surface.

It may wear out the grease on the surface if back and forth operation is held continuously in the distance of 30mm or less.

As a reference, have approximately 5 cycles of back and forth operation in a distance more than 50mm in every 5,000 to 10,000 cycles to regenerate the oil film. Keep using the actuator with the grease worn out may cause malfunction. If it is extreme, flaking may occur on the guide, ball screw.

8. Do not attempt to hit the rod against an obstacle with high speed.

It may destroy the coupling.

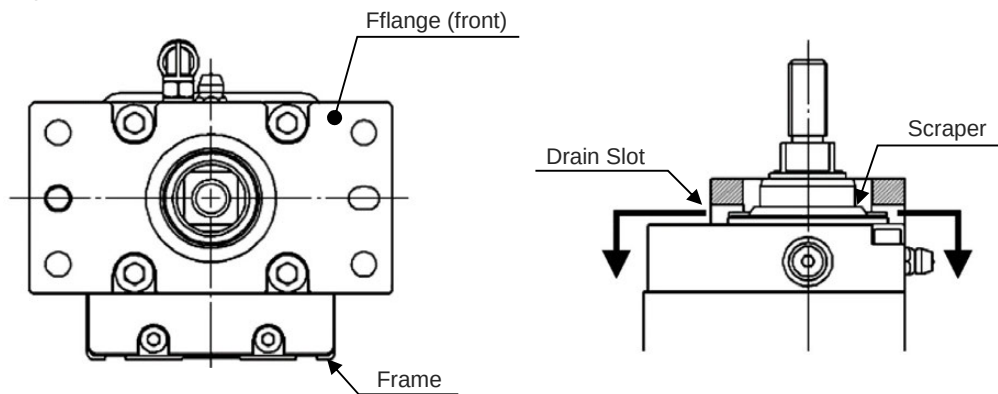
9. Make sure to attach the actuator properly by following this instruction manual.
Using the product with the actuator not being certainly retained or affixed may cause abnormal noise, vibration, malfunction or shorten the product life.

10. Avoid liquid with its temperature lower than the ambient temperature of where installed from getting applied on the unit.

It may cause condensation inside the product, which may lead to malfunction.

11. When the actuator installed on the front bracket end and the orientation of the rod is upwards, have a drain slot in order to prevent liquid staying at the scraper.

On the optional flange (front), there are drain slots. Be careful not to block the slots with an attached component.



12. Grease can flow out gradually from the rod.

For the purpose of maintaining scraper lubrication, the grease flows out gradually. Have a protection to the peripheral in case the grease may be applied on it.

13. The Degree of Protection should be IP65 (Dust tight, Water jets).

“Water jets” means there is no liquid ingress harmful to the normal operation and the safety of a device after receiving direct water jet for three minutes in the specified method. Consider appropriate protection in the condition with water jet always being applied on the device as it may cause damage.

14. Although PCON-CB, RCON-PC and MCON Controllers (Option: T) are available for switching between valid and invalid of high output setting in the parameter settings, use the controllers with the high output setting valid. (It is set to valid for the high output setting at the delivery.)

For MSEL Controller, the high output setting is effective and cannot switch it over to ineffective.

For details, refer to [Instruction Manual for each controller].

The performance of weight capacity at each speed and acceleration/deceleration setting differs between the high output setting being effective and ineffective.

For details, refer to each type in [1.2–1.5 Mechanical Specifications].

Controller	Parameter	Remarks
PCON-CB RCON-PC	No.152 High Output Setting 0: Ineffective, 1: Effective	
RSEL	Driver Unit No.152 High Output Setting 0: Ineffective, 1: Effective	
MCON	No.152 High Output Setting 0: Ineffective, 1: Effective	Option T: In high output setting, available to have high output setting effective.

15. There is no port for a teaching tool to be connected on RCP6SW equipped with a built-in controller.

Connect a teaching tool to the gateway unit, and establish settings such as the position data via the gateway unit.

International Standards Compliances

This actuator complies with the following overseas standard.

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

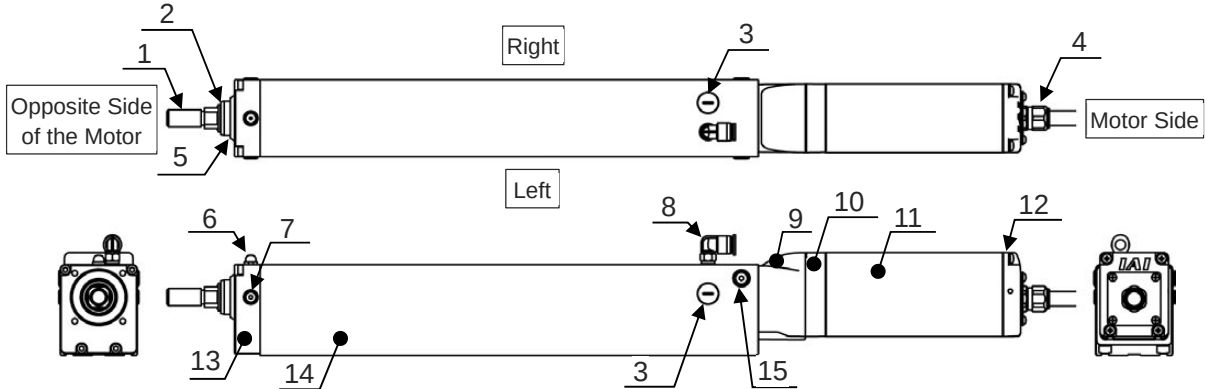
RoHS3 Directive	CE Marking
☐	☐

Names of the Parts

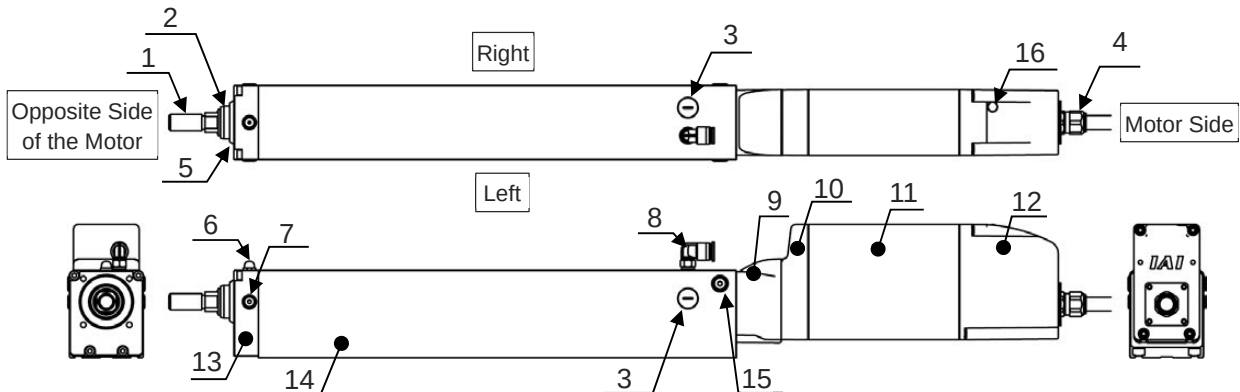
In this Instruction Manual, the left and right sides are indicated by looking at the actuator from the motor end, with the actuator placed horizontally, as shown in the figure below.

Motor Straight Type

[1] Controller Installed Separately RCP6W-RR4C

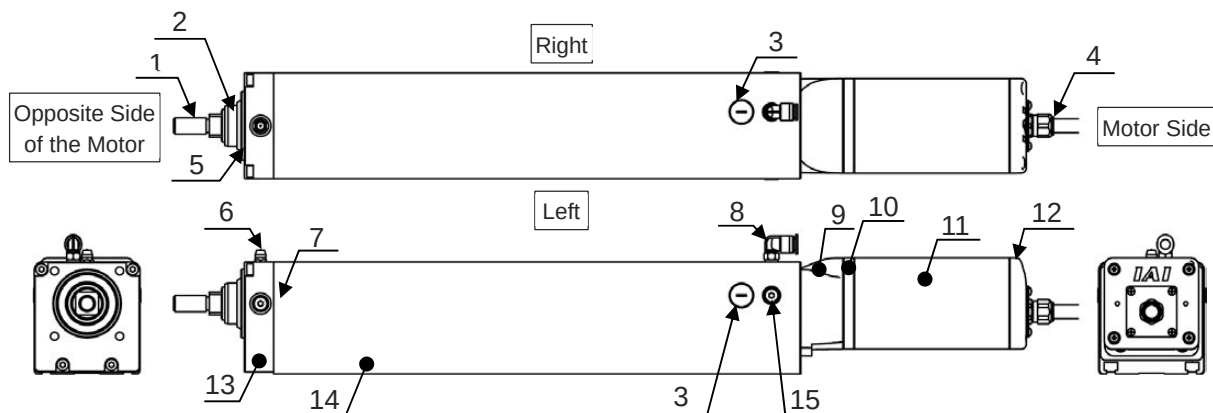


[2] Built-in Controller RCP6SW-RR4C

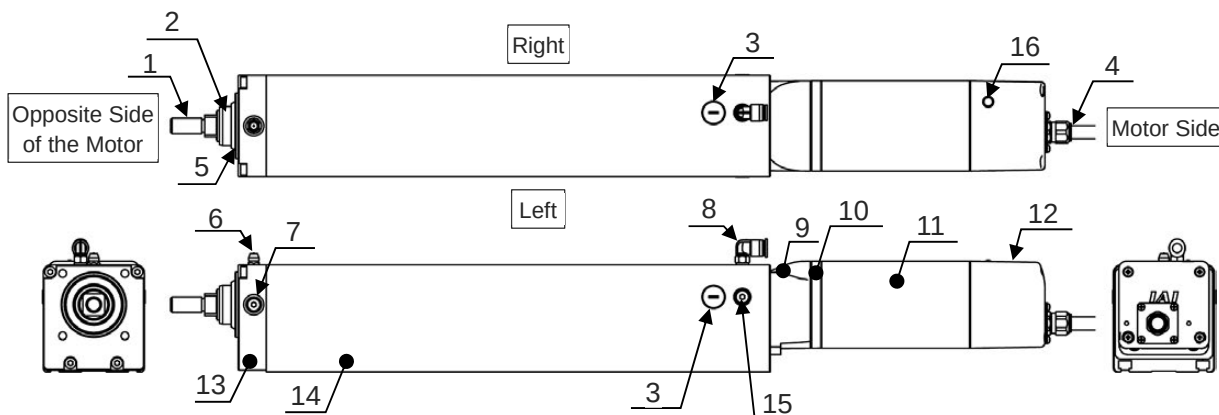


No.	Name	Material	Surface Treatment
1	Rod Tip Fitting	Stainless Steel (SUS303)	
2	Rod	Aluminum	Hard Anodizing Treatment
3	Hole Cap (Grease Supply Inlet)	Rubber (NBR)	
4	Actuator Cable	Poly Vinyl Chloride (PVC)	
5	Dust Seal	Rubber (NBR)	
6	Grease Nipple	Copper (C3604) Electroless Nickel Plating	
7	Hex Socket Head Screw (Grease Supply Inlet)		
8	Air Supply and Exhaust Port (Joint)		
9	Rear Bracket	Aluminum	
10	Motor Bracket	Aluminum	
11	Motor Cover	Aluminum	White Anodizing Treatment
12	End Cover	Aluminum	
13	Front Bracket IP	Aluminum	White Anodizing Treatment
14	Frame	Aluminum	White Anodizing Treatment
15	Hex Socket Head Screw (Suction and Discharge Port)		
16	Status LED		

[3] Controller Installed Separately RCP6W-RRA6C, RRA7C

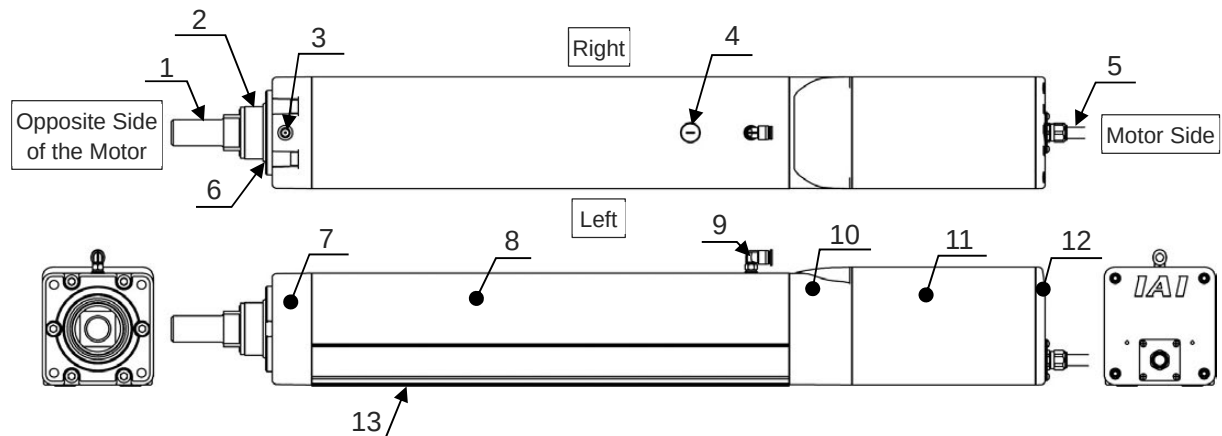


[4] Built-in Controller RCP6SW-RRA6C, RRA7C

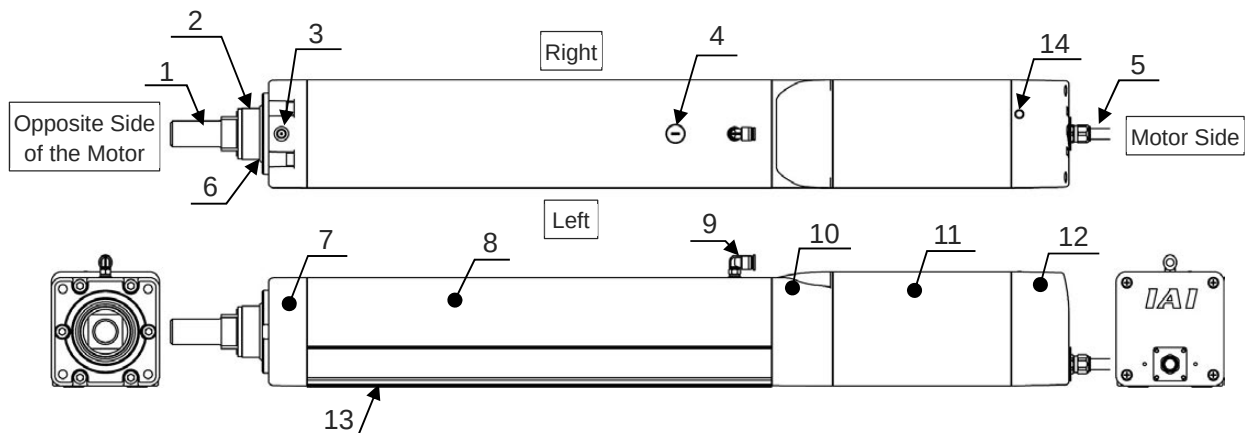


No.	Name	Material	Surface Treatment
1	Rod Tip Fitting	Stainless Steel (SUS303)	
2	Rod	Aluminum	Hard Anodizing Treatment
3	Hole Cap (Grease Supply Inlet)	Rubber (NBR)	
4	Actuator Cable	Poly Vinyl Chloride (PVC)	
5	Dust Seal	Rubber (NBR)	
6	Grease Nipple	Copper (C3604) Electroless Nickel Plating	
7	Hex Socket Head Screw (Grease Supply Inlet)		
8	Air Supply and Exhaust Port (Joint)		
9	Rear Bracket	Aluminum	
10	Motor Bracket	Aluminum	
11	Motor Cover	Aluminum	White Anodizing Treatment
12	End Cover	Aluminum	
13	Front Bracket IP	Aluminum	White Anodizing Treatment
14	Frame	Aluminum	White Anodizing Treatment
15	Hex Socket Head Screw (Suction and Discharge Port)		
16	Status LED		

[5] Controller Installed Separately RCP6W-RRA8C



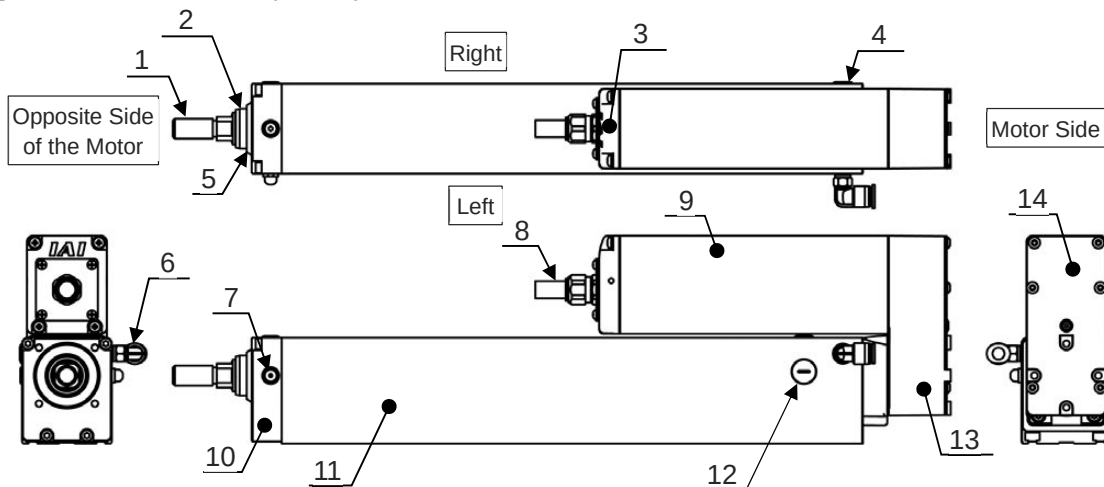
[6] Built-in Controller RCP6SW-RRA8C



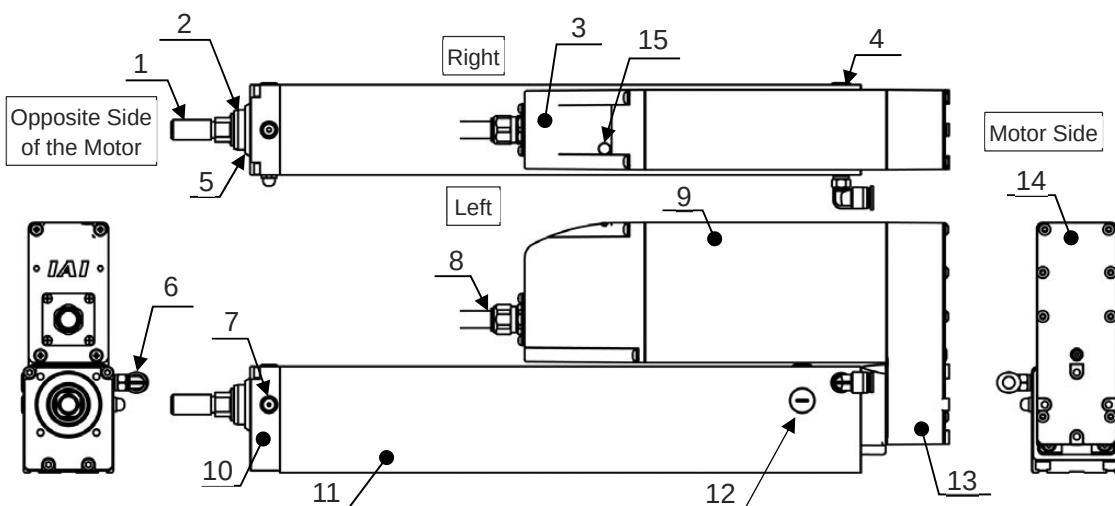
No.	Name	Material	Surface Treatment
1	Rod Tip Fitting	Stainless Steel (SUS303)	
2	Rod	Aluminum	Hard Anodizing Treatment
3	Grease Nipple	Copper (C3604) Electroless Nickel Plating	
4	Hole Cap (Grease Supply Inlet)	Rubber (NBR)	
5	Actuator Cable	Poly Vinyl Chloride (PVC)	
6	Dust Seal	Rubber (NBR)	
7	Front Bracket	Aluminum	
8	Frame Cover	Aluminum	White Anodizing Treatment
9	Air Supply and Exhaust Port (Joint)		
10	Rear Bracket	Aluminum	
11	Motor Cover	Aluminum	White Anodizing Treatment
12	End Cover	Aluminum	
13	Base	Aluminum	White Anodizing Treatment
14	Status LED		

Motor Reversing Type

[1] Controller Installed Separately RCP6W-RAA4R

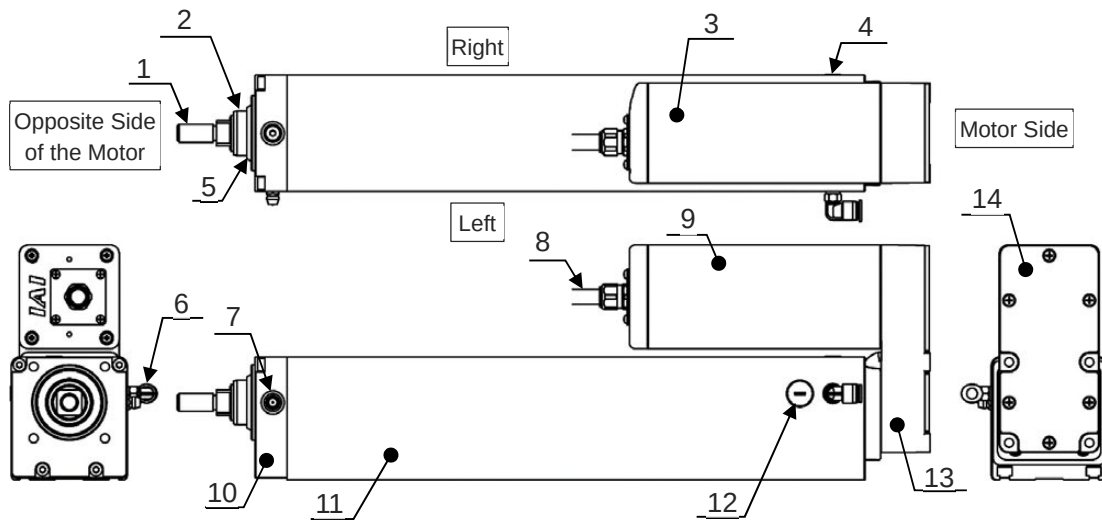


[2] Built-in Controller RCP6SW-RAA4R

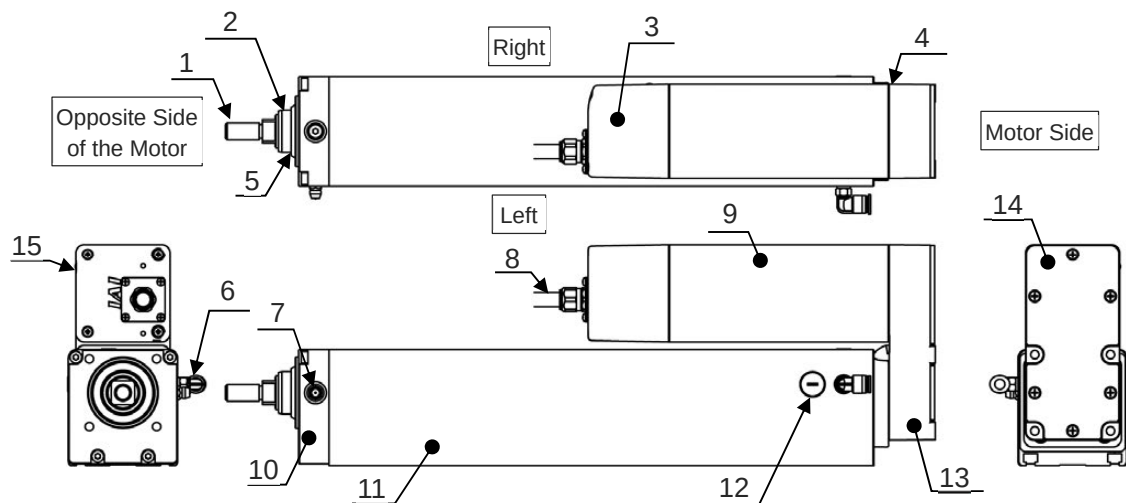


No.	Name	Material	Surface Treatment
1	Rod Tip Fitting	Stainless Steel (SUS303)	
2	Rod	Aluminum	Hard Anodizing Treatment
3	End Cover	Aluminum	
4	Hex Socket Head Screw (Suction and Discharge Port)		
5	Dust Seal	Rubber (NBR)	
6	Air Supply and Exhaust Port (Joint)		
7	Grease Nipple	Copper (C3604) Electroless Nickel Plating	
8	Actuator Cable	Poly Vinyl Chloride (PVC)	
9	Motor Cover	Aluminum	White Anodizing Treatment
10	Front Bracket IP	Aluminum	White Anodizing Treatment
11	Frame	Aluminum	White Anodizing Treatment
12	Hole Cap (Grease Supply Inlet)	Rubber (NBR)	
13	Reverse Bracket	Aluminum	
14	Pulley Cover	Stainless Steel (SUS304)	
15	Status LED		

[3] Controller Installed Separately RCP6W-RRA6R, RRA7R

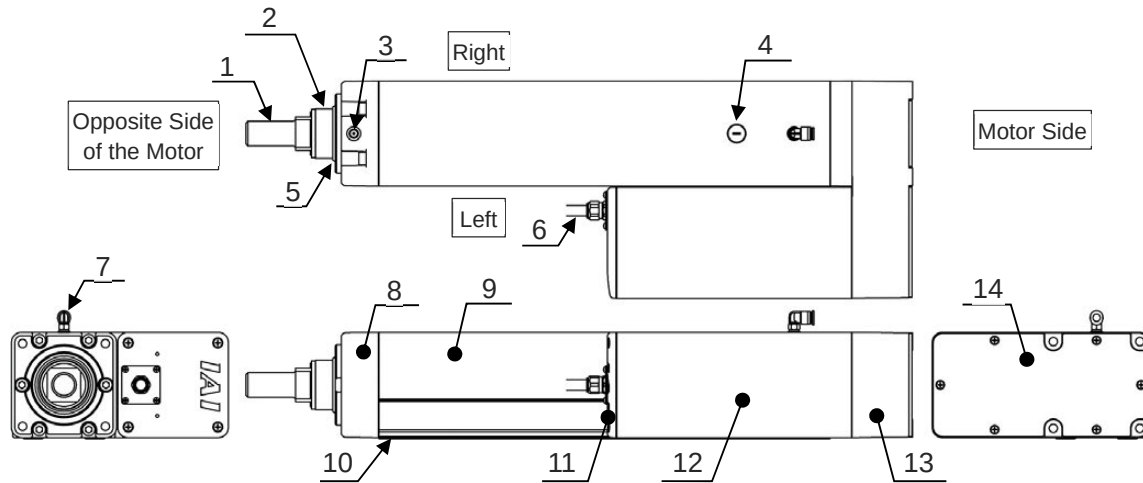


[4] Built-in Controller RCP6SW-RRA6R, RRA7R

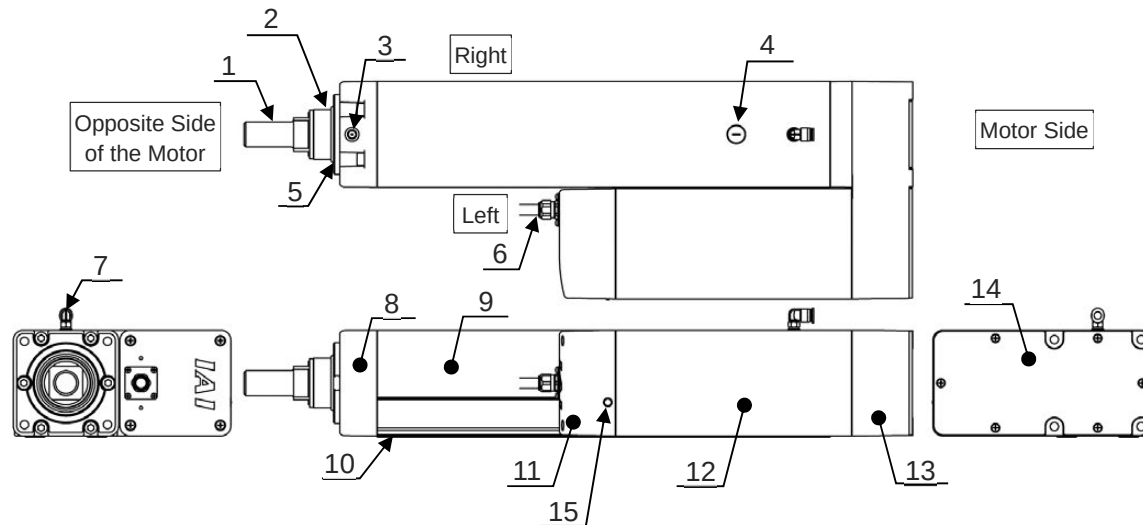


No.	Name	Material	Surface Treatment
1	Rod Tip Fitting	Stainless Steel (SUS303)	
2	Rod	Aluminum	Hard Anodizing Treatment
3	End Cover	Aluminum	
4	Hex Socket Head Screw (Suction and Discharge Port)		
5	Dust Seal	Rubber (NBR)	
6	Air Supply and Exhaust Port (Joint)		
7	Grease Nipple	Copper (C3604) Electroless Nickel Plating	
8	Actuator Cable	Poly Vinyl Chloride (PVC)	
9	Motor Cover	Aluminum	White Anodizing Treatment
10	Front Bracket IP	Aluminum	White Anodizing Treatment
11	Frame	Aluminum	White Anodizing Treatment
12	Hole Cap (Grease Supply Inlet)	Rubber (NBR)	
13	Reverse Bracket	Aluminum	
14	Pulley Cover	Stainless Steel (SUS304)	
15	Status LED		

[5] Controller Installed Separately RCP6W-RRA8R



[6] Built-in Controller RCP6SW-RRA8R



No.	Name	Material	Surface Treatment
1	Rod Tip Fitting	Stainless Steel (SUS303)	
2	Rod	Aluminum	Hard Anodizing Treatment
3	Grease Nipple	Copper (C3604) Electroless Nickel Plating	
4	Hole Cap (Grease Supply Inlet)	Rubber (NBR)	
5	Dust Seal	Rubber (NBR)	
6	Actuator Cable	Poly Vinyl Chloride (PVC)	
7	Air Supply and Exhaust Port (Joint)		
8	Front Bracket	Aluminum	
9	Frame Cover	Aluminum	White Anodizing Treatment
10	Base	Aluminum	White Anodizing Treatment
11	End Cover	Aluminum	
12	Motor Cover	Aluminum	White Anodizing Treatment
13	Reverse Bracket	Aluminum	
14	Pulley Cover	Stainless Steel (SUS304)	
15	Status LED		



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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> 																												
<u>Hex Nut</u> <table border="1"> <thead> <tr> <th>Type</th><th>Size</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>RRA4C/R</td><td>M10 × 1.25</td><td>1</td></tr> <tr> <td>RRA6C/R</td><td>M14 × 1.5</td><td>1</td></tr> <tr> <td>RRA7C/R</td><td>M14 × 1.5</td><td>1</td></tr> <tr> <td>RRA8C/R</td><td>M20 × 1.5</td><td>1</td></tr> </tbody> </table>	Type	Size	Quantity	RRA4C/R	M10 × 1.25	1	RRA6C/R	M14 × 1.5	1	RRA7C/R	M14 × 1.5	1	RRA8C/R	M20 × 1.5	1	<u>Square Nut</u> <table border="1"> <thead> <tr> <th>Type</th><th>Size</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>RRA4C/R</td><td>M4□7 × 3.2</td><td>4</td></tr> <tr> <td>RRA6C/R</td><td>M5□8 × 4.0</td><td>4</td></tr> <tr> <td>RRA7C/R</td><td>M6□10 × 5.0</td><td>8</td></tr> </tbody> </table>	Type	Size	Quantity	RRA4C/R	M4□7 × 3.2	4	RRA6C/R	M5□8 × 4.0	4	RRA7C/R	M6□10 × 5.0	8	
Type	Size	Quantity																											
RRA4C/R	M10 × 1.25	1																											
RRA6C/R	M14 × 1.5	1																											
RRA7C/R	M14 × 1.5	1																											
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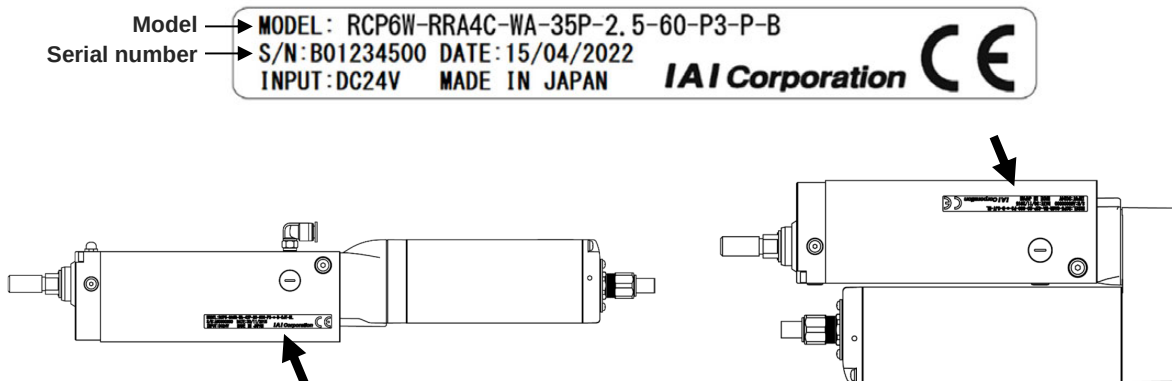
Note 1: The included motor and encoder cables differ for each of the standard cable and the robot cable. Refer to [3.2 Motor • Encoder Cables].

* Refer to [6. External Dimensions] for the dimensions of hex nuts and square nuts.

1.1.2 Related Instruction Manuals for the Each Controller Supported by This Product

No.	Name	Control No.
1	PCON-CB/CFB Controller Instruction Manual	ME0342
2	PCON-CYB/PLB/POB Controller Instruction Manual	ME0353
3	MCON-C/CG Controller Instruction Manual	ME0341
4	MSEL-PC/PG Controller Instruction Manual	ME0336
5	RCON System Instruction Manual	ME0384
6	RSEL System Instruction Manual	ME0392
7	PC Software for XSEL IA-101-X-MW/IA-101-X-USBMW Instruction Manual	ME0154
8	PC Software for RC/EC RCM-101-MW/RCM-101-USB Instruction Manual	ME0155
9	PC Teaching Software IA-OS First Step Guide	ME0391
10	Touch Panel Teaching Pendant TB-02/02D Instruction Manual Applicable for Position Controller	ME0355
11	Touch Panel Teaching Pendant TB-02/02D Instruction Manual Applicable for Program Controller	ME0356
12	Touch Panel Teaching Pendant TB-03 Instruction Manual Applicable for Position Controller	ME0376
13	Touch Panel Teaching Pendant TB-03 Instruction Manual Applicable for Program Controller	ME0377

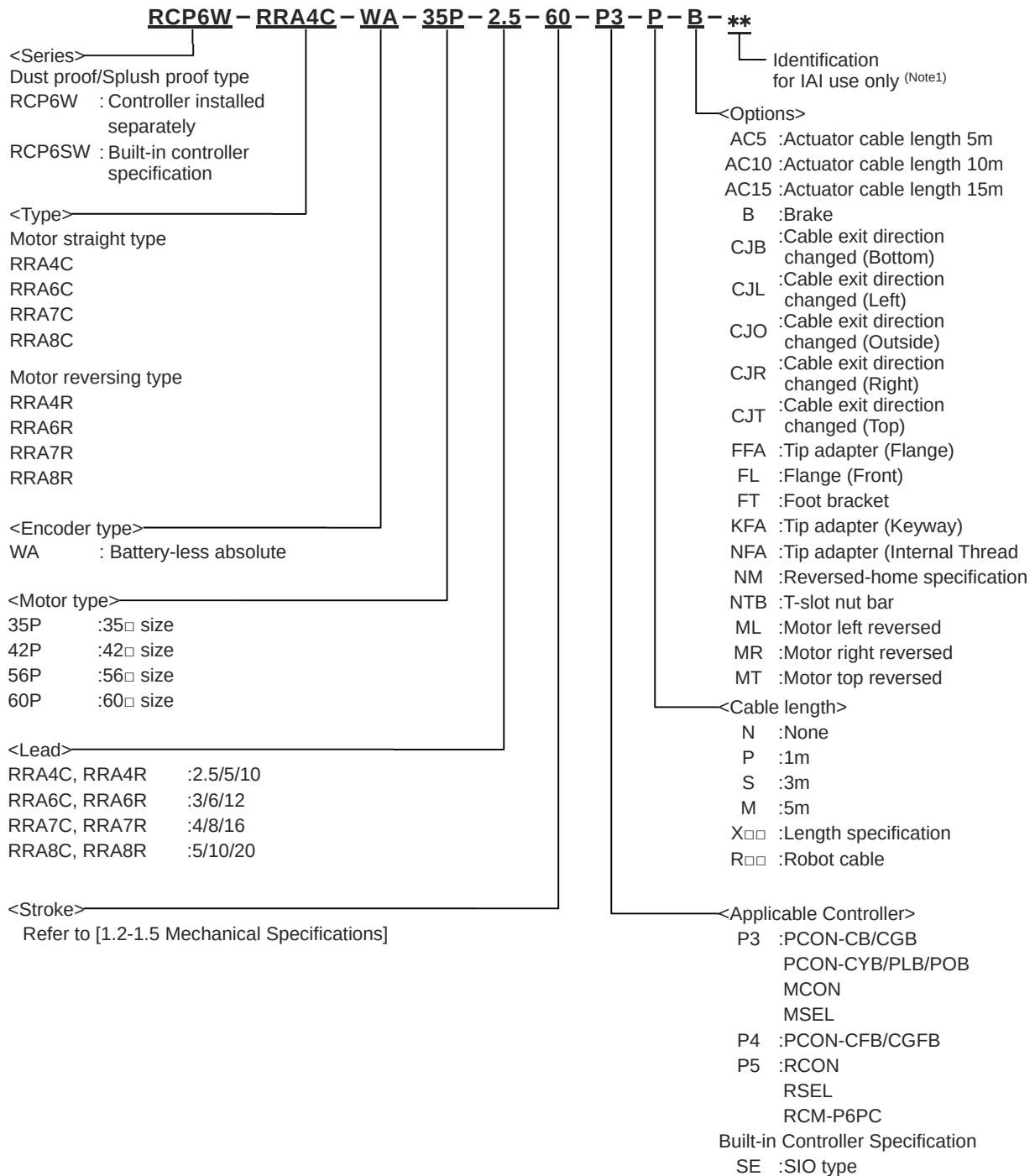
1.1.3 How to Read the Model Nameplate



1.1.4 How to Read the Model Number

This is a list of model codes.

The selectable options vary depending on the type and conditions. Refer to the catalog for details.



Note 1 Identification for IAI use only: It may be displayed for IAI use. It is not a code to show the model type.

1.2 Mechanical Specifications (RRA4□)

1.2.1 RCP6(S)W-RRA4C: Motor Straight Type

[1] Actuator Specifications

Item		Content
Drive system		Ball screw $\phi 8\text{mm}$, rolled C10
Positioning repeatability		$\pm 0.01\text{mm}$ or less
Lost motion		0.1mm or less
Rod guide		Linear infinite circulation type
Brake	Specification	Non-Exciting Operation Electromagnetic Brake
	Holding Force	Lead 10: 2kgf, Lead 5: 4kgf, Lead 2.5: 10kgf
Rod non-rotation precision ^(Note 1)		0 degrees
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)
Degree of protection		IP65 (IEC60529/JIS0920)
Vibration and Impact resistance		4.9m/s ²
Motor type		Pulse motor
Encoder type		Battery-less absolute
Encoder pulse count		8192 pulse/rev

Note 1: It shows the displacement angle in the rod rotational direction at no load.

[2] 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 speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.

Minimum Speed		Unit (mm/s)	
Lead		10	5
Horizontal/Vertical		13	7
			2.5
			4

- When the environment temperature exceeds 5degC.

Unit (mm/s)		
Lead	50 to 350 (Every 50mm)	400
10	525 <435>	
5	350	340
2.5	175 <150>	

- When the environment temperature is below 5degC.

Unit (mm/s)	
Lead	50 to 400 (Every 50mm)
10	435
5	260
2.5	105

[3] Payload by Speed/Acceleration

■ High-Output Setting Effective: When the environment temperature exceeds 5degC.

(The maximum speed may vary depending on the payload.)

Lead 10 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	11	11	9	9	7	2	2	2
85	11	11	9	9	7	2	2	2
175	11	11	8	7	5	2	2	2
260	11	11	7	4	2	2	2	2
350	11	11	7	3	1	2	2	2
435	11	10	6	3	1	1.5	1	1
525	—	4	1	—	—	—	—	—

Lead 5 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	23	23	21	18	18	4	4	4
40	23	23	21	18	18	4	4	4
85	23	23	21	18	18	4	4	4
130	23	23	21	18	18	4	4	4
175	23	23	21	16	14	4	4	4
215	23	23	21	14	12	4	4	4
260	23	22	18	12	8	4	4	4
305	22	14	8	6	4	3	3	3
350	19	5	1	—	—	2	1	1

Lead 2.5 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	40	35	30	10	10	10
20	40	40	40	35	30	10	10	10
40	40	40	40	35	30	10	10	10
65	40	40	40	30	30	10	10	10
85	40	40	35	30	30	10	10	10
105	40	40	35	30	30	10	6	6
130	40	40	35	30	30	4	4	4
150	40	35	35	29	24	2	2	2
175	33	24	22	19	12	—	—	—

■ High-Output Setting Effective: When the environment temperature is below 5degC.

(The maximum speed may vary depending on the payload.)

Lead 10 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	11	11	9	9	7	2	2	2
85	11	11	9	9	7	2	2	2
175	11	11	8	7	5	2	2	2
260	11	11	7	4	2	2	2	2
350	11	11	7	3	1	2	2	2
435	11	10	6	3	1	1.5	1	1

Lead 5 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	23	23	21	18	18	4	4	4
40	23	23	21	18	18	4	4	4
85	23	23	21	18	18	4	4	4
130	23	23	21	18	18	4	4	4
175	23	23	21	16	14	4	4	4
215	23	23	21	14	12	4	4	4
260	23	22	18	12	8	4	4	4

Lead 2.5 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	40	35	30	10	10	10
20	40	40	40	35	30	10	10	10
40	40	40	40	35	30	10	10	10
65	40	40	40	30	30	10	10	10
85	40	40	35	30	30	10	10	10
105	40	40	35	30	30	10	6	6

[4] Relation Graph for Pressing Force and Current Limit Values

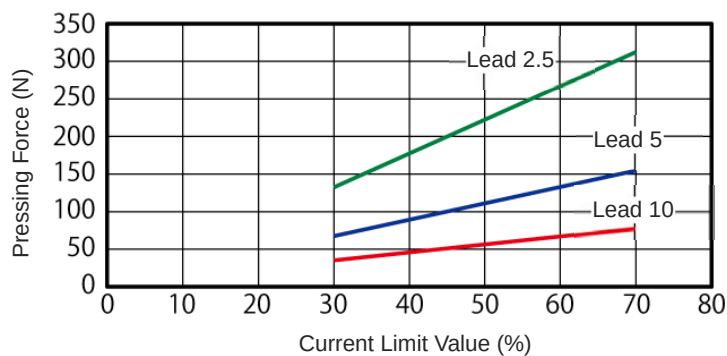
**Caution**

- The relation of the pressing force and the current limit is a reference when assuming the speed is 20mm/s.
- There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 30%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 70%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 20mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.

For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

Unit (N)

Current Limiting Value	Lead 2.5	Lead 5	Lead 10
30%	133	66	33
40%	177	88	44
50%	221	111	55
60%	266	133	66
70%	310	155	77



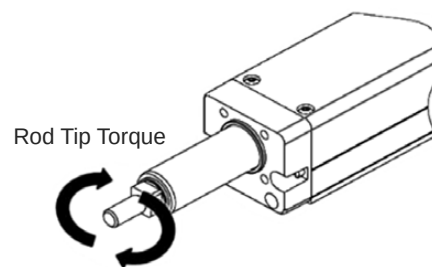
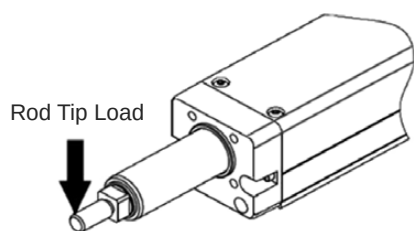
[5] Allowable Load and Torque on Rod Tip

Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque. Make sure not to exceed the load indicated in the specification table.

Applying excess load may cause an operation failure, parts malfunction and shortened life.

Item	Unit	Stroke	50	100	150	200	250	300	350	400
Rod Tip Static Allowable Load	(N)		63.4	50.7	42.1	36.0	31.3	27.6	24.6	22.2
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	28.9	22.2	17.9	14.8	12.6	10.8	9.4	8.2
	(N)	Load Offset Distance 100mm	17.9	15.5	13.4	11.6	10.2	9.0	8.0	7.1
Load Offset Distance (Center of overhang load gravity)	(mm)		100 or less							
Rod Tip Static Allowable Torque	(N·m)		6.4	5.1	4.3	3.7	3.2	2.9	2.6	2.3
Rod Tip Dynamic Allowable Torque	(N·m)		1.7	1.5	1.3	1.1	1.0	0.9	0.7	0.7
Rod Non-Rotation Accuracy (Note 1)	(deg)		0							

Note 1 It shows the displacement angle in the rod rotational direction at no load.



[Horizontal]

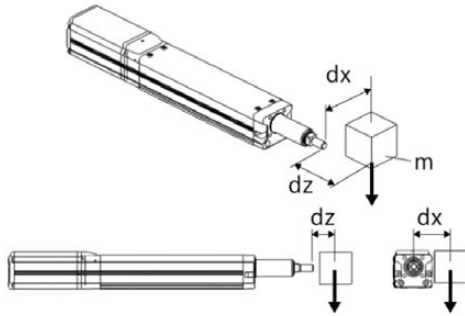
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

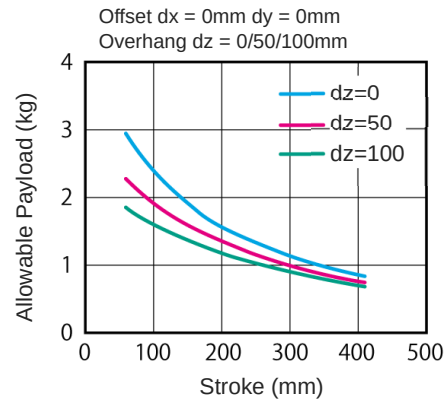
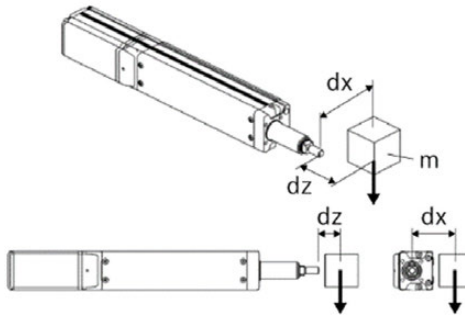
(Acceleration 1G, velocity 500mm/s)

dx: Offset distance, dz: Overhang distance, m: Load

● Horizontal Installation



● Sideways Installation



[Vertical]

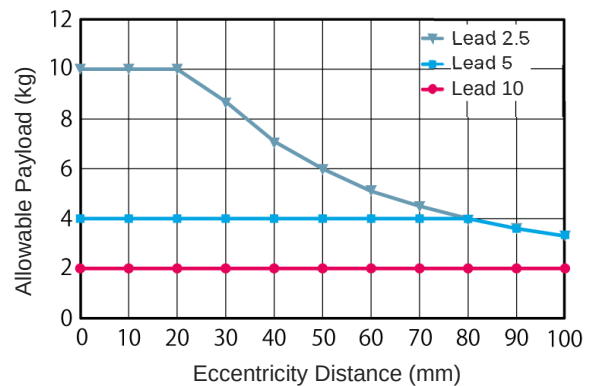
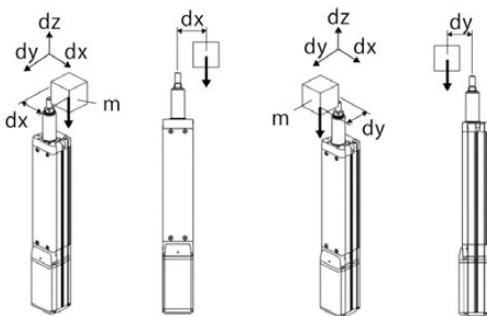
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

(Acceleration 0.5G, velocity 500mm/s)

dx: Eccentricity in dx direction distance, dy: Eccentricity in dy direction distance,

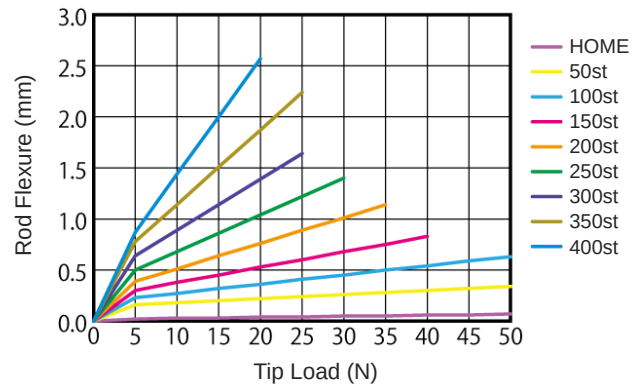
dz: Overhang distance, m: Load



[6] Rod Flexure (Reference)

This is the flexure of the rod when the actuator is installed horizontally.

It does not include the flexure caused by the weight of itself.



1.2.2 RCP6(S)W-RRA4R: Motor Reversing Type

[1] Actuator Specifications

Item		Content
Drive system		Ball screw $\phi 8\text{mm}$, rolled C10
Positioning repeatability		$\pm 0.01\text{mm}$ or less
Lost motion		0.1mm or less
Rod guide		Linear infinite circulation type
Brake	Specification	Non-Exciting Operation Electromagnetic Brake
	Holding Force	Lead 10: 2kgf, Lead 5: 4kgf, Lead 2.5: 10kgf
Rod non-rotation precision ^(Note 1)		0 degrees
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)
Degree of protection		IP65 (IEC60529/JIS0920)
Vibration and Impact resistance		4.9m/s ²
Motor type		Pulse motor
Encoder type		Battery-less absolute
Encoder pulse count		8192 pulse/rev

Note 1: It shows the displacement angle in the rod rotational direction at no load.

[2] 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 speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.

Minimum Speed			Unit (mm/s)
Lead	10	5	2.5
Horizontal/Vertical	13	7	4

- When the environment temperature exceeds 5degC.

Unit (mm/s)		
Lead	50 to 350 (Every 50mm)	400
10	525 <435>	
5	350	340
2.5	175 <150>	

- When the environment temperature is below 5degC.

Unit (mm/s)	
Lead	50 to 400 (Every 50mm)
10	435
5	260
2.5	105

[3] Payload by Speed/Acceleration

- High-Output Setting Effective: When the environment temperature exceeds 5degC.
(The maximum speed may vary depending on the payload.)

Lead 10 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	11	11	9	9	7	2	2	2
85	11	11	9	9	7	2	2	2
175	11	11	8	7	5	2	2	2
260	11	11	7	4	2	2	2	2
350	11	11	7	3	1	2	2	2
435	11	10	6	3	1	1.5	1	1
525	—	4	1	—	—	—	—	—

Lead 2.5 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	40	35	30	10	10	10
20	40	40	40	35	30	10	10	10
40	40	40	40	35	30	10	10	10
65	40	40	40	30	30	10	10	10
85	40	40	35	30	30	10	10	10
105	40	40	35	30	30	10	6	6
130	40	40	35	30	30	4	4	4
150	40	35	35	29	24	2	2	2
175	33	24	22	19	12	—	—	—

Lead 5 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	23	23	21	18	18	4	4	4
40	23	23	21	18	18	4	4	4
85	23	23	21	18	18	4	4	4
130	23	23	21	18	18	4	4	4
175	23	23	21	16	14	4	4	4
215	23	23	21	14	12	4	4	4
260	23	22	18	12	8	4	4	4
305	22	14	8	6	4	3	3	3
350	19	5	1	—	—	2	1	1

- High-Output Setting Effective: When the environment temperature is below 5degC.
(The maximum speed may vary depending on the payload.)

Lead 10 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	11	11	9	9	7	2	2	2
85	11	11	9	9	7	2	2	2
175	11	11	8	7	5	2	2	2
260	11	11	7	4	2	2	2	2
350	11	11	7	3	1	2	2	2
435	11	10	6	3	1	1.5	1	1

Lead 2.5 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	40	35	30	10	10	10
20	40	40	40	35	30	10	10	10
40	40	40	40	35	30	10	10	10
65	40	40	40	30	30	10	10	10
85	40	40	35	30	30	10	10	10
105	40	40	35	30	30	10	6	6

Lead 5 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	23	23	21	18	18	4	4	4
40	23	23	21	18	18	4	4	4
85	23	23	21	18	18	4	4	4
130	23	23	21	18	18	4	4	4
175	23	23	21	16	14	4	4	4
215	23	23	21	14	12	4	4	4
260	23	22	18	12	8	4	4	4

[4] Relation Graph for Pressing Force and Current Limit Values

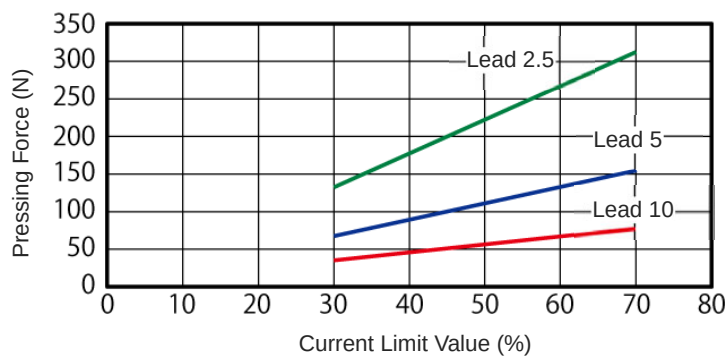
**Caution**

- The relation of the pressing force and the current limit is a reference when assuming the speed is 20mm/s.
- There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 30%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 70%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 20mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.

For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

Unit (N)

Current Limiting Value	Lead 2.5	Lead 5	Lead 10
30%	133	66	33
40%	177	88	44
50%	221	111	55
60%	266	133	66
70%	310	155	77



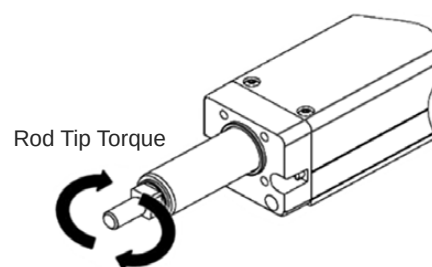
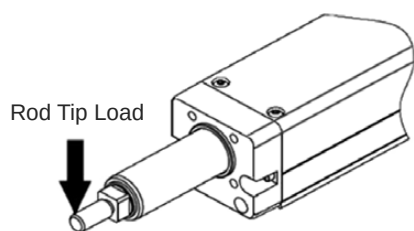
[5] Allowable Load and Torque on Rod Tip

Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque. Make sure not to exceed the load indicated in the specification table.

Applying excess load may cause an operation failure, parts malfunction and shortened life.

Item	Unit	Stroke	50	100	150	200	250	300	350	400
Rod Tip Static Allowable Load	(N)		63.4	50.7	42.1	36.0	31.3	27.6	24.6	22.2
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	28.9	22.2	17.9	14.8	12.6	10.8	9.4	8.2
	(N)	Load Offset Distance 100mm	17.9	15.5	13.4	11.6	10.2	9.0	8.0	7.1
Load Offset Distance (Center of overhang load gravity)	(mm)		100 or less							
Rod Tip Static Allowable Torque	(N·m)		6.4	5.1	4.3	3.7	3.2	2.9	2.6	2.3
Rod Tip Dynamic Allowable Torque	(N·m)		1.7	1.5	1.3	1.1	1.0	0.9	0.7	0.7
Rod Non-Rotation Accuracy (Note 1)	(deg)		0							

Note 1 It shows the displacement angle in the rod rotational direction at no load.



[Horizontal]

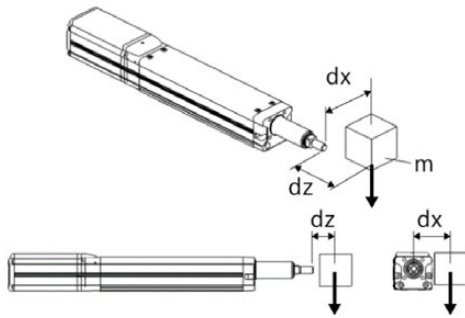
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

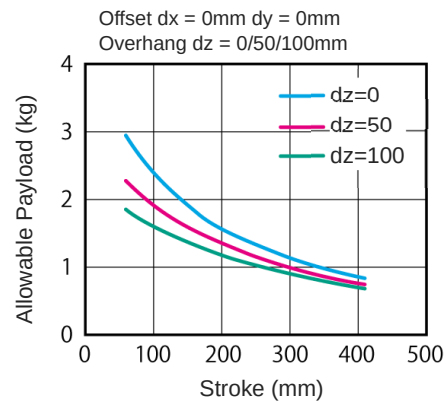
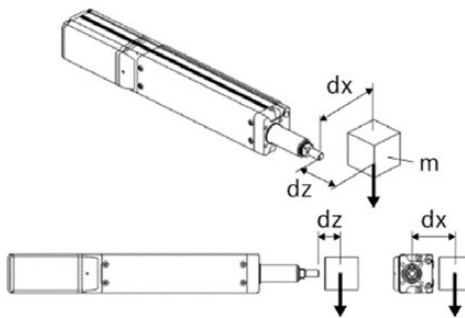
(Acceleration 1G, velocity 500mm/s)

dx: Offset distance, dz: Overhang distance, m: Load

● Horizontal Installation



● Sideways Installation



[Vertical]

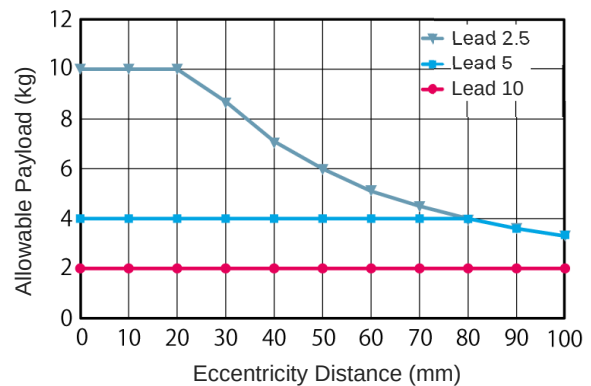
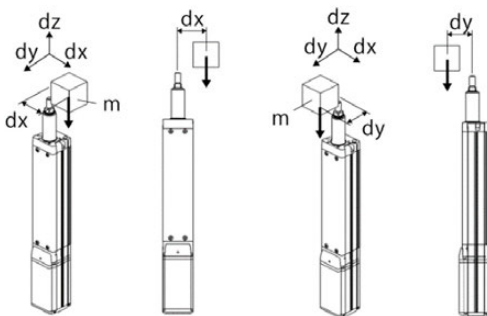
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

(Acceleration 0.5G, velocity 500mm/s)

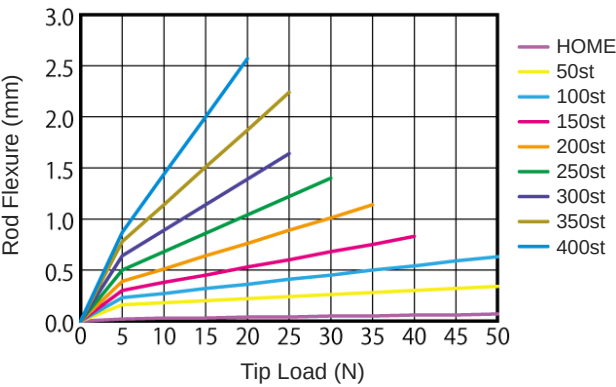
dx: Eccentricity in dx direction distance, dy: Eccentricity in dy direction distance,

dz: Overhang distance, m: Load



[6] Rod Flexure (Reference)

This is the flexure of the rod when the actuator is installed horizontally.
It does not include the flexure caused by the weight of itself.



1.3 Mechanical Specifications (RRA6□)

1.3.1 RCP6(S)W-RRA6C: Motor Straight Type

[1] Actuator Specifications

Item		Content
Drive system		Ball screw $\phi 10\text{mm}$, rolled C10
Positioning repeatability		$\pm 0.01\text{mm}$ or less
Lost motion		0.1mm or less
Rod guide		Linear infinite circulation type
Brake	Specification	Non-Exciting Operation Electromagnetic Brake
	Holding Force	Lead 12: 4kgf, Lead 6: 10kgf, Lead 3: 20kgf
Rod non-rotation precision ^(Note 1)		0 degrees
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)
Degree of protection		IP65 (IEC60529/JIS0920)
Vibration and Impact resistance		4.9m/s ²
Motor type		Pulse motor
Encoder type		Battery-less absolute
Encoder pulse count		8192 pulse/rev

Note 1: It shows the displacement angle in the rod rotational direction at no load.

[2] 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 speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.

Minimum Speed		Unit (mm/s)	
Lead		12	6
Horizontal/Vertical		15	8
			4

- When the environment temperature exceeds 5degC.

Unit (mm/s)	
Lead	50 to 400 (Every 50mm)
12	630 <525>
6	420 <370>
3	210

- When the environment temperature is below 5degC.

Unit (mm/s)	
Lead	50 to 400 (Every 50mm)
12	525
6	315
3	105

[3] Payload by Speed/Acceleration

- High-Output Setting Effective: When the environment temperature exceeds 5degC.

(The maximum speed may vary depending on the payload.)

Lead 12 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	25	25	18	16	12	4	4	4
105	25	25	18	16	12	4	4	4
210	25	25	17	14	10	4	4	4
315	25	25	15	10	6	4	4	4
420	20	20	10	10	6	4	4	4
525	15	15	8	6	4.5	2	1	1
630	—	8	3	2	1	—	—	—

Lead 6 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	35	30	25	10	10	10
55	40	40	35	30	25	10	10	10
105	40	40	35	30	25	10	10	10
160	40	40	35	25	25	10	10	10
210	40	40	30	25	20	9	9	9
265	40	40	27.5	22.5	18	8	8	7
315	40	35	21	20	14	4	4	4
370	38	16	10	8	6	2	2	2
420	28	7	6	—	—	—	—	—

Lead 3 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	60	60	50	45	40	20	20	20
20	60	60	50	45	40	20	20	20
45	60	60	50	45	40	20	20	20
70	60	60	50	45	40	20	20	20
105	60	60	50	45	40	20	20	20
130	60	60	50	40	30	18	14	10
155	60	50	40	30	25	14	10	6
180	60	40	35	25	20	9	6	5
210	60	26	22	20	14	6	4	4

- High-Output Setting Effective: When the environment temperature is below 5degC.

(The maximum speed may vary depending on the payload.)

Lead 12 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	25	25	18	16	12	4	4	4
105	25	25	18	16	12	4	4	4
210	25	25	17	14	10	4	4	4
315	25	25	15	10	6	4	4	4
420	20	20	10	10	6	4	4	4
525	15	15	8	6	4.5	2	1	1

Lead 6 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	35	30	25	10	10	10
55	40	40	35	30	25	10	10	10
105	40	40	35	30	25	10	10	10
160	40	40	35	25	25	10	10	10
210	40	40	30	25	20	9	9	9
265	40	40	27.5	22.5	18	8	8	7
315	40	35	21	20	14	4	4	4

Lead 3 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	60	60	50	45	40	20	20	20
20	60	60	50	45	40	20	20	20
45	60	60	50	45	40	20	20	20
70	60	60	50	45	40	20	20	20
105	60	60	50	45	40	20	20	20

[4] Relation Graph for Pressing Force and Current Limit Values

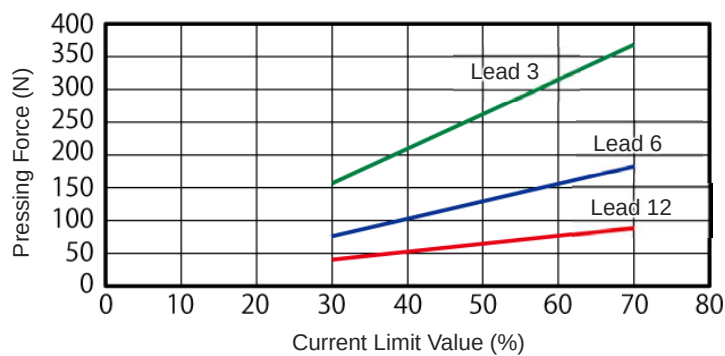
**Caution**

- The relation of the pressing force and the current limit is a reference when assuming the speed is 20mm/s.
- There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 30%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 70%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 20mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.

For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

Unit (N)

Current Limiting Value	Lead 3	Lead 6	Lead 12
30%	159	79	40
40%	211	106	53
50%	264	132	66
60%	317	159	79
70%	370	185	93



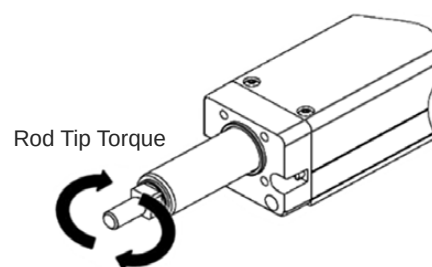
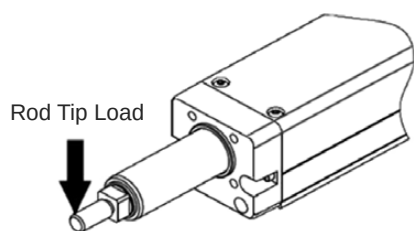
[5] Allowable Load and Torque on Rod Tip

Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque. Make sure not to exceed the load indicated in the specification table.

Applying excess load may cause an operation failure, parts malfunction and shortened life.

Item	Unit	Stroke	50	100	150	200	250	300	350	400
Rod Tip Static Allowable Load	(N)		144	117	99	85.4	75	66.7	59.9	54.3
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	58.1	46.4	38.3	32.4	27.9	24.4	21.5	19.2
	(N)	Load Offset Distance 100mm	38.8	34.0	29.7	26.2	23.2	20.8	18.7	16.8
Load Offset Distance (Center of overhang load gravity)	(mm)		100 or less							
Rod Tip Static Allowable Torque	(N·m)		14.5	11.8	10.0	8.7	7.6	6.8	6.2	5.6
Rod Tip Dynamic Allowable Torque	(N·m)		3.8	3.3	2.9	2.6	2.3	2.0	1.8	1.6
Rod Non-Rotation Accuracy (Note 1)	(deg)		0							

Note 1 It shows the displacement angle in the rod rotational direction at no load.



[Horizontal]

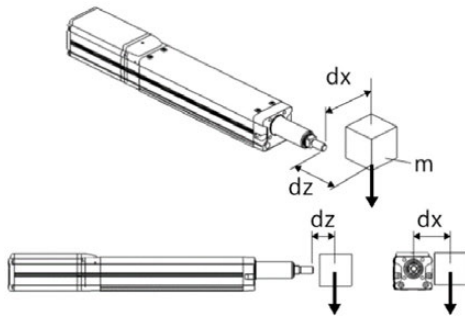
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

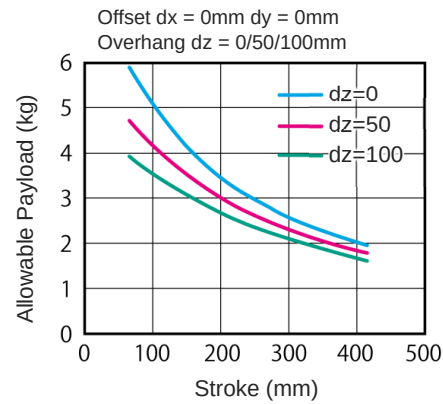
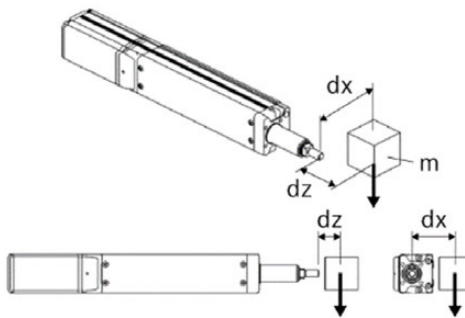
(Acceleration 1G, velocity 500mm/s)

dx: Offset distance, dz: Overhang distance, m: Load

● Horizontal Installation



● Sideways Installation



[Vertical]

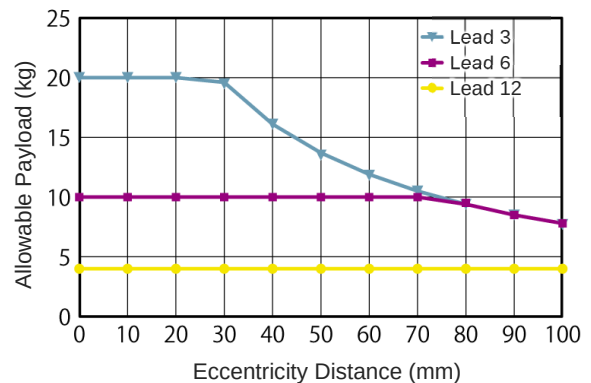
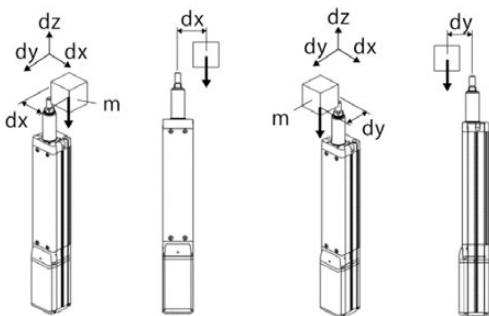
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

(Acceleration 0.5G, velocity 500mm/s)

dx: Eccentricity in dx direction distance, dy: Eccentricity in dy direction distance,

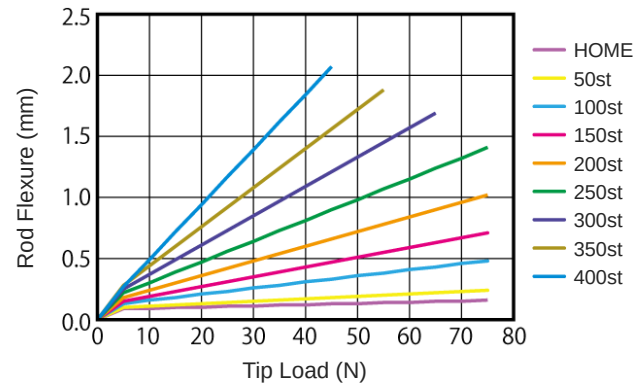
dz: Overhang distance, m: Load



[6] Rod Flexure (Reference)

This is the flexure of the rod when the actuator is installed horizontally.

It does not include the flexure caused by the weight of itself.



1.3.2 RCP6(S)W-RRA6R: Motor Reversing Type

[1] Actuator Specifications

Item		Content
Drive system		Ball screw $\phi 10\text{mm}$, rolled C10
Positioning repeatability		$\pm 0.01\text{mm}$ or less
Lost motion		0.1mm or less
Rod guide		Linear infinite circulation type
Brake	Specification	Non-Exciting Operation Electromagnetic Brake
	Holding Force	Lead 12: 4kgf, Lead 6: 10kgf, Lead 3: 20kgf
Rod non-rotation precision ^(Note 1)		0 degrees
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)
Degree of protection		IP65 (IEC60529/JIS0920)
Vibration and Impact resistance		4.9m/s ²
Motor type		Pulse motor
Encoder type		Battery-less absolute
Encoder pulse count		8192 pulse/rev

Note 1: It shows the displacement angle in the rod rotational direction at no load.

[2] 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 speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.

Minimum Speed			Unit (mm/s)
Lead	12	6	3
Horizontal/Vertical	15	8	4

- When the environment temperature exceeds 5degC.

Unit (mm/s)	
Lead	50 to 400 (Every 50mm)
12	630 <525>
6	420 <370>
3	210

- When the environment temperature is below 5degC.

Unit (mm/s)	
Lead	50 to 400 (Every 50mm)
12	525
6	315
3	105

[3] Payload by Speed/Acceleration

- High-Output Setting Effective: When the environment temperature exceeds 5degC.

(The maximum speed may vary depending on the payload.)

Lead 12 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	25	25	18	16	12	4	4	4
105	25	25	18	16	12	4	4	4
210	25	25	17	14	10	4	4	4
315	25	25	15	10	6	4	4	4
420	20	20	10	10	6	4	4	4
525	15	15	8	6	4.5	2	1	1
630	—	8	3	2	1	—	—	—

Lead 3 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	60	60	50	45	40	20	20	20
20	60	60	50	45	40	20	20	20
45	60	60	50	45	40	20	20	20
70	60	60	50	45	40	20	20	20
105	60	60	50	45	40	20	20	20
130	60	60	50	40	30	18	14	10
155	60	50	40	30	25	14	10	6
180	60	40	35	25	20	9	6	5
210	60	26	22	20	14	6	4	4

Lead 6 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	35	30	25	10	10	10
55	40	40	35	30	25	10	10	10
105	40	40	35	30	25	10	10	10
160	40	40	35	25	25	10	10	10
210	40	40	30	25	20	9	9	9
265	40	40	27.5	22.5	18	8	8	7
315	40	35	21	20	14	4	4	4
370	38	16	10	8	6	2	2	2
420	28	7	6	—	—	—	—	—

- High-Output Setting Effective: When the environment temperature is below 5degC.

(The maximum speed may vary depending on the payload.)

Lead 12 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	25	25	18	16	12	4	4	4
105	25	25	18	16	12	4	4	4
210	25	25	17	14	10	4	4	4
315	25	25	15	10	6	4	4	4
420	20	20	10	10	6	4	4	4
525	15	15	8	6	4.5	2	1	1

Lead 3 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	60	60	50	45	40	20	20	20
20	60	60	50	45	40	20	20	20
45	60	60	50	45	40	20	20	20
70	60	60	50	45	40	20	20	20
105	60	60	50	45	40	20	20	20

Lead 6 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	35	30	25	10	10	10
55	40	40	35	30	25	10	10	10
105	40	40	35	30	25	10	10	10
160	40	40	35	25	25	10	10	10
210	40	40	30	25	20	9	9	9
265	40	40	27.5	22.5	18	8	8	7
315	40	35	21	20	14	4	4	4

[4] Relation Graph for Pressing Force and Current Limit Values

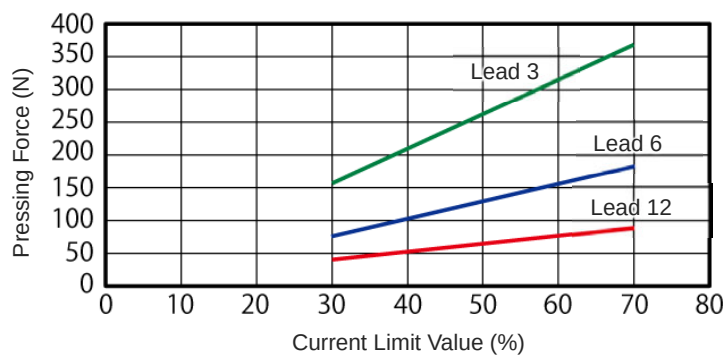
**Caution**

- The relation of the pressing force and the current limit is a reference when assuming the speed is 20mm/s.
- There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 30%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 70%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 20mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.

For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

Unit (N)

Current Limiting Value	Lead 3	Lead 6	Lead 12
30%	159	79	40
40%	211	106	53
50%	264	132	66
60%	317	159	79
70%	370	185	93



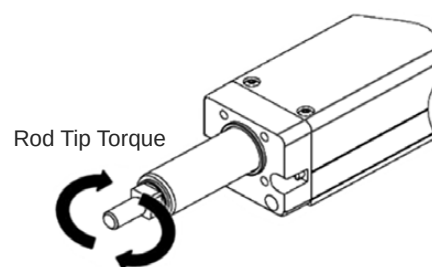
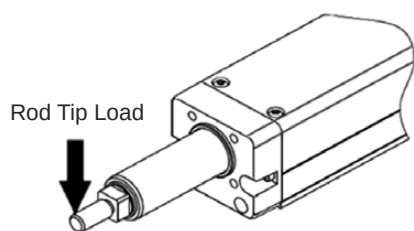
[5] Allowable Load and Torque on Rod Tip

Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque. Make sure not to exceed the load indicated in the specification table.

Applying excess load may cause an operation failure, parts malfunction and shortened life.

Item	Unit	Stroke	50	100	150	200	250	300	350	400
Rod Tip Static Allowable Load	(N)		144	117	99	85.4	75	66.7	59.9	54.3
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	58.1	46.4	38.3	32.4	27.9	24.4	21.5	19.2
	(N)	Load Offset Distance 100mm	38.8	34.0	29.7	26.2	23.2	20.8	18.7	16.8
Load Offset Distance (Center of overhang load gravity)	(mm)		100 or less							
Rod Tip Static Allowable Torque	(N·m)		14.5	11.8	10.0	8.7	7.6	6.8	6.2	5.6
Rod Tip Dynamic Allowable Torque	(N·m)		3.8	3.3	2.9	2.6	2.3	2.0	1.8	1.6
Rod Non-Rotation Accuracy (Note 1)	(deg)		0							

Note 1 It shows the displacement angle in the rod rotational direction at no load.



[Horizontal]

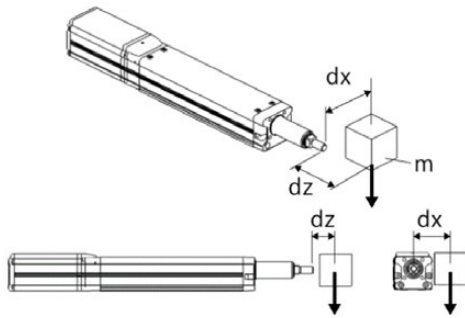
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

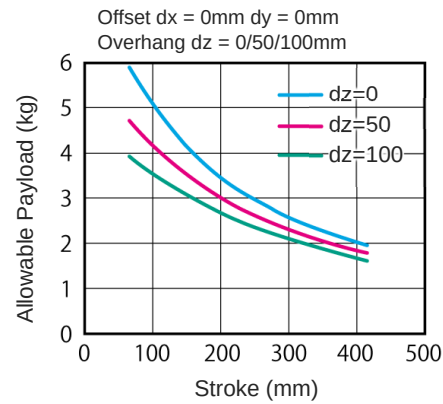
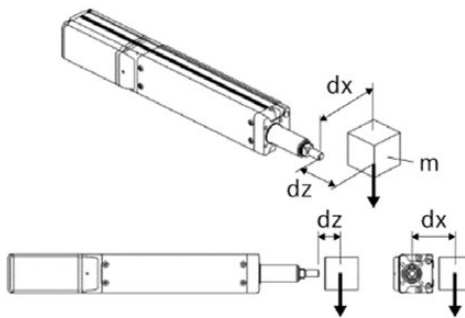
(Acceleration 1G, velocity 500mm/s)

dx: Offset distance, dz: Overhang distance, m: Load

● Horizontal Installation



● Sideways Installation



[Vertical]

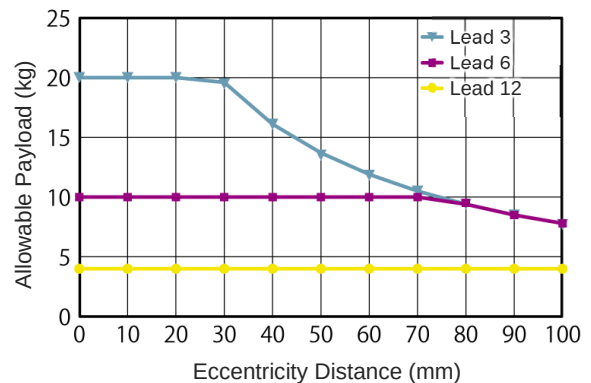
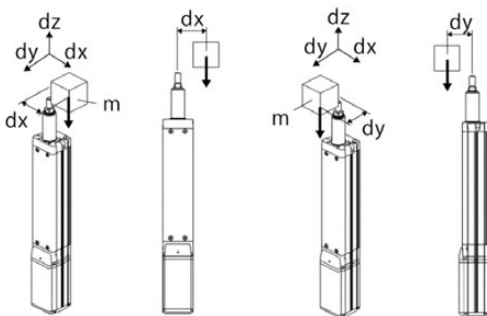
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

(Acceleration 0.5G, velocity 500mm/s)

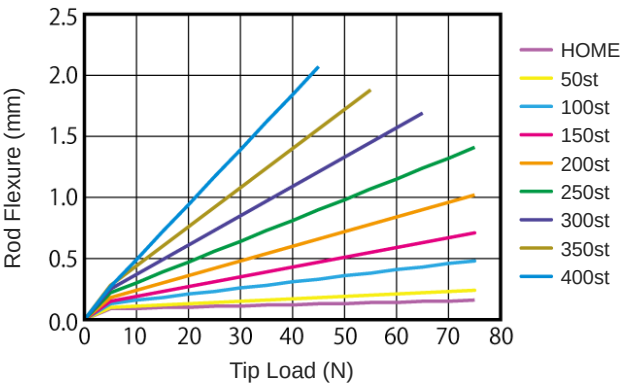
dx: Eccentricity in dx direction distance, dy: Eccentricity in dy direction distance,

dz: Overhang distance, m: Load



[6] Rod Flexure (Reference)

This is the flexure of the rod when the actuator is installed horizontally.
It does not include the flexure caused by the weight of itself.



1.4 Mechanical Specifications (RRA7□)

1.4.1 RCP6(S)W-RRA7C: Motor Straight Type

[1] Actuator Specifications

Item		Content
Drive system		Ball screw $\phi 12\text{mm}$, rolled C10
Positioning repeatability		$\pm 0.01\text{mm}$ or less
Lost motion		0.1mm or less
Rod guide		Linear infinite circulation type
Brake	Specification	Non-Exciting Operation Electromagnetic Brake
	Holding Force	Lead 16: 8kgf, Lead 8: 18kgf, Lead 4: 28kgf
Rod non-rotation precision ^(Note 1)		0 degrees
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)
Degree of protection		IP65 (IEC60529/JIS0920)
Vibration and Impact resistance		4.9m/s ²
Motor type		Pulse motor
Encoder type		Battery-less absolute
Encoder pulse count		8192 pulse/rev

Note 1: It shows the displacement angle in the rod rotational direction at no load.

[2] 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 speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.

Minimum Speed		Unit (mm/s)	
Lead		16	8
Horizontal/Vertical		20	10
			5

- When the environment temperature exceeds 5degC.

Unit (mm/s)	
Lead	50 to 500 (Every 50mm)
16	420
8	350 <280>
4	140

- When the environment temperature is below 5degC.

Unit (mm/s)	
Lead	50 to 500 (Every 50mm)
16	280
8	140
4	105

[3] Payload by Speed/Acceleration

- High-Output Setting Effective: When the environment temperature exceeds 5degC.

(The maximum speed may vary depending on the payload.)

Lead 16 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	50	50	40	35	30	8	8	8
140	50	50	40	35	30	8	8	8
280	50	45	32	22	17	6	6	5
420	50	18	9	6	5	1.5	1	0.5

Lead 8 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	60	60	50	45	40	18	18	18
70	60	60	50	45	40	18	18	18
140	60	60	50	45	40	16	16	12
210	60	60	40	30	20	8	7	6
280	60	20	9	6	3	3	2	1
350	20	—	—	—	—	—	—	—

Lead 4 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	80	80	70	65	60	28	28	28
35	80	80	70	65	60	28	28	28
70	80	80	70	65	60	28	28	28
105	80	80	60	50	40	21	20	18
140	67	47	10	6	6	8	6	6

- High-Output Setting Effective: When the environment temperature is below 5degC.

(The maximum speed may vary depending on the payload.)

Lead 16 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	50	50	40	35	30	8	8	8
140	50	50	40	35	30	8	8	8
280	50	45	32	22	17	6	6	5

Lead 8 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	60	60	50	45	40	18	18	18
70	60	60	50	45	40	18	18	18
140	60	60	50	45	40	8	8	8

Lead 4 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	80	80	70	65	60	28	28	28
35	80	80	70	65	60	28	28	28
70	80	80	70	65	60	28	28	28
105	80	80	60	50	40	6	6	6

[4] Relation Graph for Pressing Force and Current Limit Values

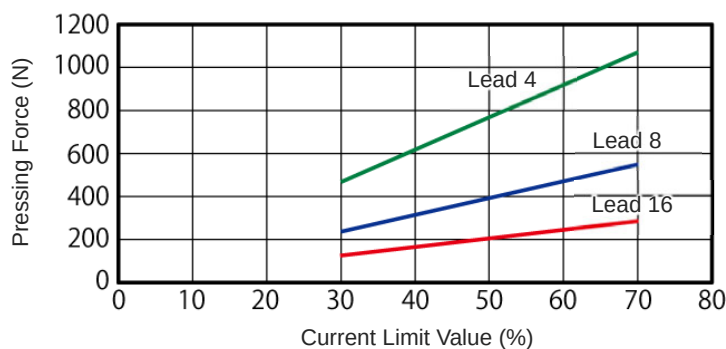
**Caution**

- The relation of the pressing force and the current limit is a reference when assuming the speed is 20mm/s.
- There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 30%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 70%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 20mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.

For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

Unit (N)

Current Limiting Value	Lead 4	Lead 8	Lead 16
30%	469	234	117
40%	625	312	156
50%	781	391	195
60%	937	469	234
70%	1094	547	273



[5] Allowable Load and Torque on Rod Tip

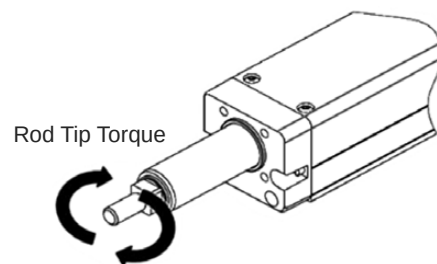
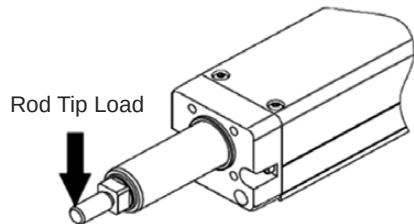
Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque. Make sure not to exceed the load indicated in the specification table.

Applying excess load may cause an operation failure, parts malfunction and shortened life.

Item	Unit	Stroke	50	100	150	200	250
Rod Tip Static Allowable Load	(N)		175	147	126	111	98.6
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	75.7	62.6	53.1	46.0	40.5
	(N)	Load Offset Distance 100mm	49.8	45.1	40.5	36.5	33.1
Load Offset Distance (Center of overhang load gravity)	(mm)		150 or less				
Rod Tip Static Allowable Torque	(N·m)		17.6	14.7	12.7	11.2	9.9
Rod Tip Dynamic Allowable Torque	(N·m)		5.0	4.5	4.0	3.6	3.3
Rod Non-Rotation Accuracy ^(Note 1)	(deg)		0				

Item	Unit	Stroke	300	350	400	450	500
Rod Tip Static Allowable Load	(N)		88.7	80.6	73.8	68	63
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	36.1	32.5	29.4	26.9	24.7
	(N)	Load Offset Distance 100mm	30.2	27.7	25.5	23.6	21.9
Load Offset Distance (Center of overhang load gravity)	(mm)		150 or less				
Rod Tip Static Allowable Torque	(N·m)		9.0	8.2	7.5	6.94	6.45
Rod Tip Dynamic Allowable Torque	(N·m)		3.0	2.8	2.5	2.32	2.16
Rod Non-Rotation Accuracy ^(Note 1)	(deg)		0				

Note 1 It shows the displacement angle in the rod rotational direction at no load.



[Horizontal]

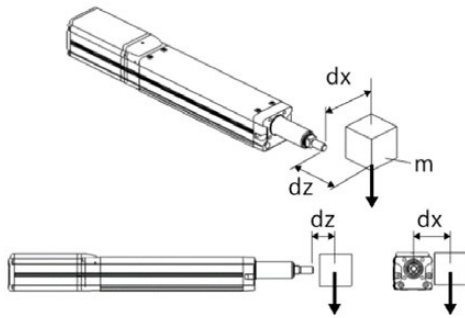
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

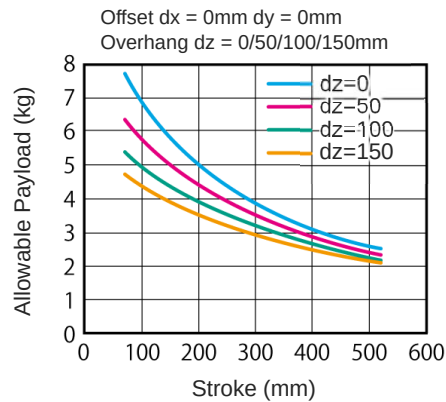
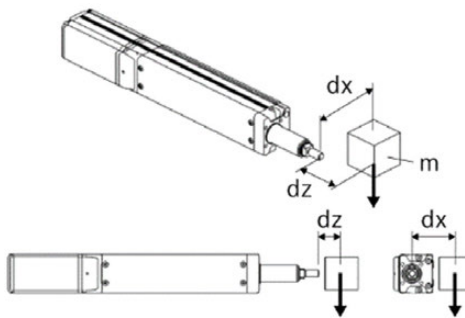
(Acceleration 1G, velocity 500mm/s)

dx: Offset distance, dz: Overhang distance, m: Load

● Horizontal Installation



● Sideways Installation



[Vertical]

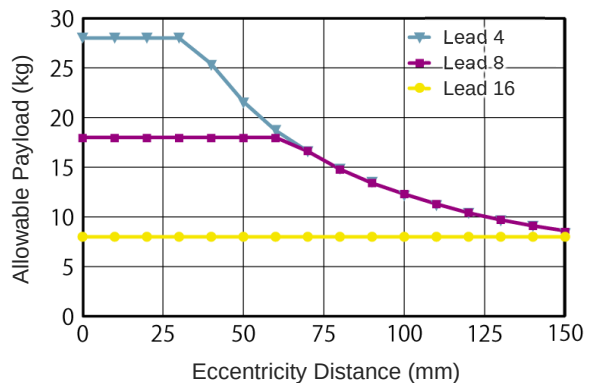
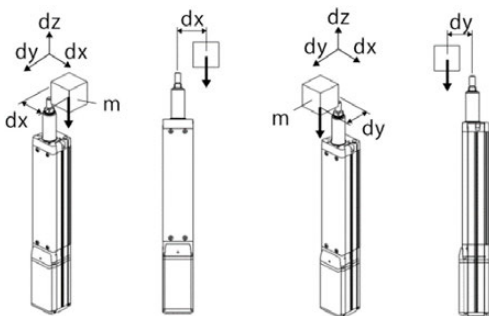
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

(Acceleration 0.5G, velocity 500mm/s)

dx: Eccentricity in dx direction distance, dy: Eccentricity in dy direction distance,

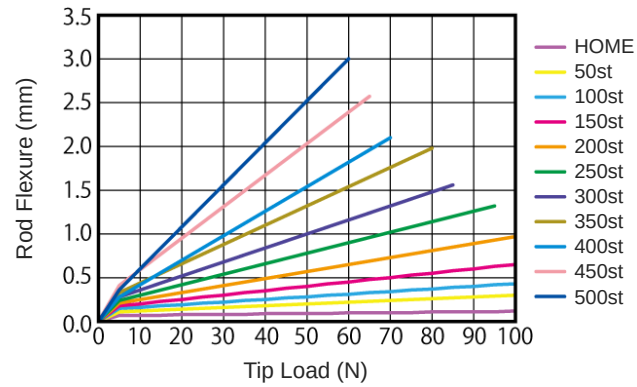
dz: Overhang distance, m: Load



[6] Rod Flexure (Reference)

This is the flexure of the rod when the actuator is installed horizontally.

It does not include the flexure caused by the weight of itself.



1.4.2 RCP6(S)W-RRA7R: Motor Reversing Type

[1] Actuator Specifications

Item		Content
Drive system		Ball screw $\phi 12\text{mm}$, rolled C10
Positioning repeatability		$\pm 0.01\text{mm}$ or less
Lost motion		0.1mm or less
Rod guide		Linear infinite circulation type
Brake	Specification	Non-Exciting Operation Electromagnetic Brake
	Holding Force	Lead 16: 8kgf, Lead 8: 18kgf, Lead 4: 28kgf
Rod non-rotation precision ^(Note 1)		0 degrees
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)
Degree of protection		IP65 (IEC60529/JIS0920)
Vibration and Impact resistance		4.9m/s ²
Motor type		Pulse motor
Encoder type		Battery-less absolute
Encoder pulse count		8192 pulse/rev

Note 1: It shows the displacement angle in the rod rotational direction at no load.

[2] 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 speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.

Minimum Speed			Unit (mm/s)
Lead	16	8	4
Horizontal/Vertical	20	10	5

- When the environment temperature exceeds 5degC.

Unit (mm/s)	
Lead	50 to 500 (Every 50mm)
16	420
8	350 <280>
4	140

- When the environment temperature is below 5degC.

Unit (mm/s)	
Lead	50 to 500 (Every 50mm)
16	280
8	140
4	105

[3] Payload by Speed/Acceleration

- High-Output Setting Effective: When the environment temperature exceeds 5degC.

(The maximum speed may vary depending on the payload.)

Lead 16 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	50	50	40	35	30	8	8	8
140	50	50	40	35	30	8	8	8
280	50	45	32	22	17	6	6	5
420	50	18	9	6	5	1.5	1	0.5

Lead 8 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	60	60	50	45	40	18	18	18
70	60	60	50	45	40	18	18	18
140	60	60	50	45	40	16	16	12
210	60	60	40	30	20	8	7	6
280	60	20	9	6	3	3	2	1
350	20	—	—	—	—	—	—	—

Lead 4 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	80	80	70	65	60	28	28	28
35	80	80	70	65	60	28	28	28
70	80	80	70	65	60	28	28	28
105	80	80	60	50	40	21	20	18
140	67	47	10	6	6	8	6	6

- High-Output Setting Effective: When the environment temperature is below 5degC.

(The maximum speed may vary depending on the payload.)

Lead 16 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	50	50	40	35	30	8	8	8
140	50	50	40	35	30	8	8	8
280	50	45	32	22	17	6	6	5

Lead 8 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	60	60	50	45	40	18	18	18
70	60	60	50	45	40	18	18	18
140	60	60	50	45	40	8	8	8

Lead 4 (Unit: kg)

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	80	80	70	65	60	28	28	28
35	80	80	70	65	60	28	28	28
70	80	80	70	65	60	28	28	28
105	80	80	60	50	40	6	6	6

[4] Relation Graph for Pressing Force and Current Limit Values

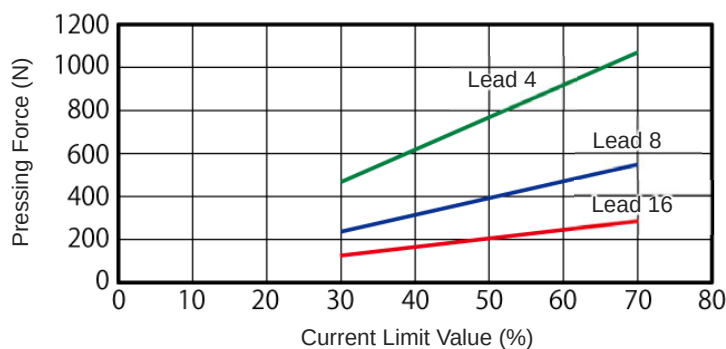
**Caution**

- The relation of the pressing force and the current limit is a reference when assuming the speed is 20mm/s.
- There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 30%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 70%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 20mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.

For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

Unit (N)

Current Limiting Value	Lead 4	Lead 8	Lead 16
30%	469	234	117
40%	625	312	156
50%	781	391	195
60%	937	469	234
70%	1094	547	273



[5] Allowable Load and Torque on Rod Tip

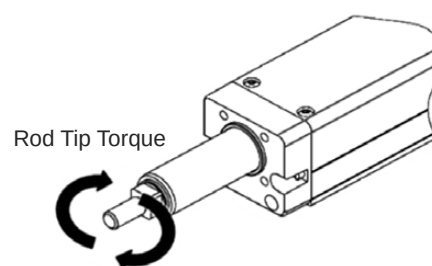
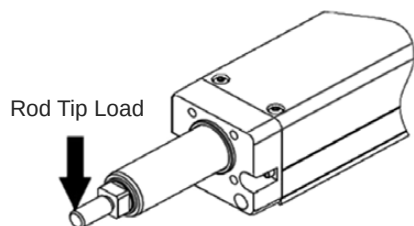
Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque. Make sure not to exceed the load indicated in the specification table.

Applying excess load may cause an operation failure, parts malfunction and shortened life.

Item	Unit	Stroke	50	100	150	200	250
Rod Tip Static Allowable Load	(N)		175	147	126	111	98.6
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	75.7	62.6	53.1	46.0	40.5
	(N)	Load Offset Distance 100mm	49.8	45.1	40.5	36.5	33.1
Load Offset Distance (Center of overhang load gravity)	(mm)		150 or less				
Rod Tip Static Allowable Torque	(N·m)		17.6	14.7	12.7	11.2	9.9
Rod Tip Dynamic Allowable Torque	(N·m)		5.0	4.5	4.0	3.6	3.3
Rod Non-Rotation Accuracy ^(Note 1)	(deg)		0				

Item	Unit	Stroke	300	350	400	450	500
Rod Tip Static Allowable Load	(N)		88.7	80.6	73.8	68	63
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	36.1	32.5	29.4	26.9	24.7
	(N)	Load Offset Distance 100mm	30.2	27.7	25.5	23.6	21.9
Load Offset Distance (Center of overhang load gravity)	(mm)		150 or less				
Rod Tip Static Allowable Torque	(N·m)		9.0	8.2	7.5	6.94	6.45
Rod Tip Dynamic Allowable Torque	(N·m)		3.0	2.8	2.5	2.32	2.16
Rod Non-Rotation Accuracy ^(Note 1)	(deg)		0				

Note 1 It shows the displacement angle in the rod rotational direction at no load.



[Horizontal]

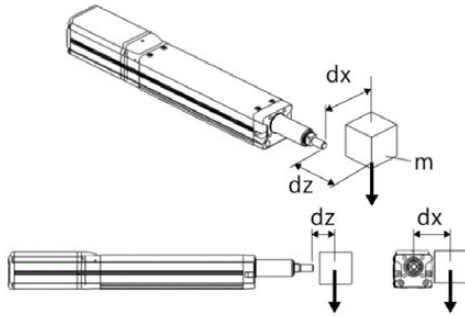
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

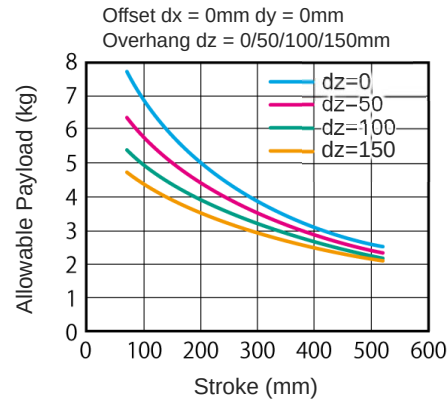
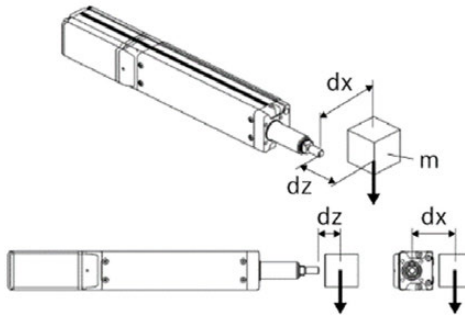
(Acceleration 1G, velocity 500mm/s)

dx: Offset distance, dz: Overhang distance, m: Load

● Horizontal Installation



● Sideways Installation



[Vertical]

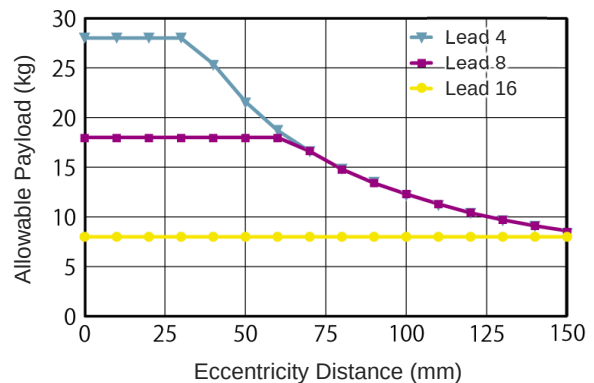
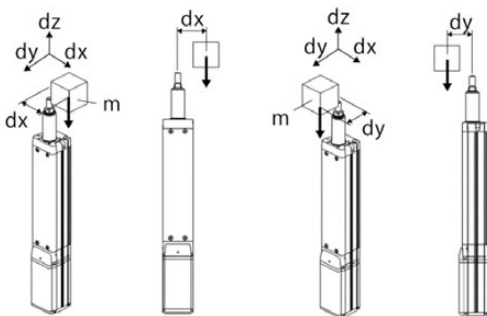
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

(Acceleration 0.5G, velocity 500mm/s)

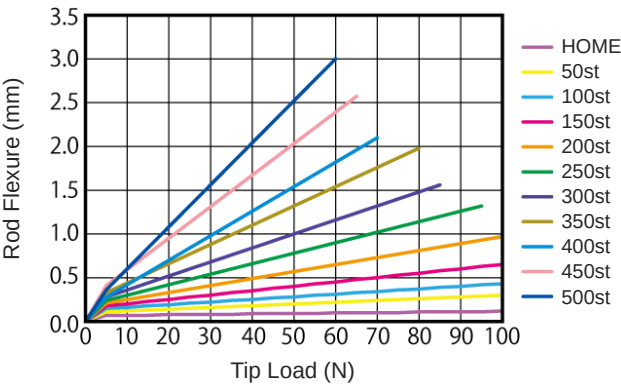
dx: Eccentricity in dx direction distance, dy: Eccentricity in dy direction distance,

dz: Overhang distance, m: Load



[6] Rod Flexure (Reference)

This is the flexure of the rod when the actuator is installed horizontally.
It does not include the flexure caused by the weight of itself.



1.5 Mechanical Specifications (RRA8□)

1.5.1 RCP6(S)W-RRA8C: Motor Straight Type

[1] Actuator Specifications

Item		Content
Drive system		Ball screw $\phi 16\text{mm}$, rolled C10
Positioning repeatability		$\pm 0.01\text{mm}$ or less
Lost motion		0.1mm or less
Rod guide		Linear infinite circulation type
Brake	Specification	Non-Exciting Operation Electromagnetic Brake
	Holding Force	Lead 20: 3kgf, Lead 10: 35kgf, Lead 5: 70kgf
Rod non-rotation precision ^(Note 1)		0 degrees
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)
Degree of protection		IP65 (IEC60529/JIS0920)
Vibration and Impact resistance		4.9m/s ²
Motor type		Pulse motor
Encoder type		Battery-less absolute
Encoder pulse count		8192 pulse/rev

Note 1: It shows the displacement angle in the rod rotational direction at no load.

[2] 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 speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.

Minimum Speed	Unit (mm/s)		
Lead	20	10	5
Horizontal/Vertical	25	13	7

■ When the environment temperature exceeds 5degC.

Unit (mm/s)

Lead (mm)	50	100 to 450 (Every 50mm)	500	550	600	650	700
20	280	350 <330>		320	280	240	220
10	200		180	160	140	120	110
5	100		90	80	70	60	55

■ When the environment temperature is below 5degC.

Unit (mm/s)

Lead (mm)	50	100 to 450 (Every 50mm)	500	550	600	650	700
20	210						
10	130					120	110
5	60						55

[3] Payload by Speed/Acceleration

- High-Output Setting Effective: When the environment temperature exceeds 5degC.

(The maximum speed may vary depending on the payload.)

Lead 20

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	
0	30	3
210	30	3
300	30	3
330	14	1
350	14	—

Lead 10

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	
0	60	35
80	60	35
90	60	34
100	60	28
110	60	23
120	60	18
130	60	15
140	60	12
150	60	10
160	60	8
170	40	6
180	25	4
190	15	3
200	12	2

Lead 5

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.1	
0	100	70
45	100	70
60	100	45
70	100	35
80	100	25
90	100	14
100	75	9

- High-Output Setting Effective: When the environment temperature is below 5degC.

(The maximum speed may vary depending on the payload.)

Lead 20

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	
0	30	3
210	30	3

Lead 10

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	
0	60	35
80	60	35
90	60	34
100	60	28
110	60	23
120	60	18
130	60	2

Lead 5

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.1	
0	100	70
45	100	70
60	100	9

[4] Relation Graph for Pressing Force and Current Limit Values

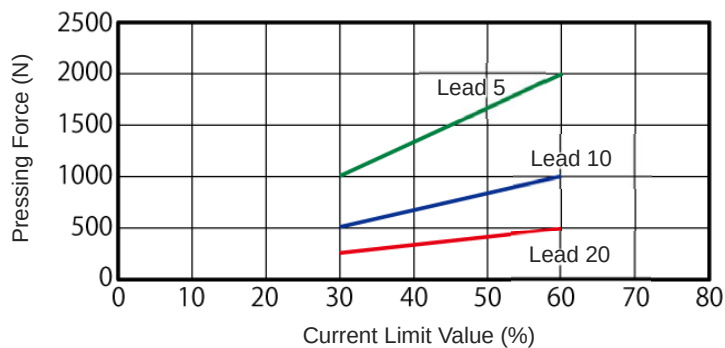
**Caution**

- The relation of the pressing force and the current limit is a reference when assuming the speed is 10mm/s.
- There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 30%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 60%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 10mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.

For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

Unit (N)

Current Limiting Value	Lead 5	Lead 10	Lead 20
30%	1000	500	250
40%	1333	667	333
50%	1667	833	417
60%	2000	1000	500



[5] Allowable Load and Torque on Rod Tip

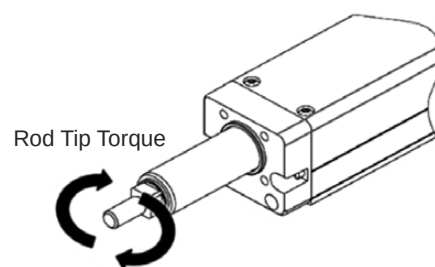
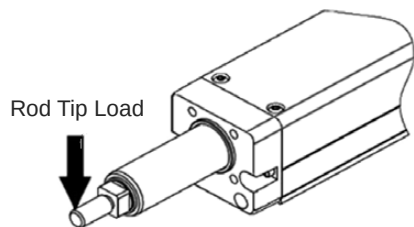
Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque. Make sure not to exceed the load indicated in the specification table.

Applying excess load may cause an operation failure, parts malfunction and shortened life.

Item	Unit	Stroke	50	100	150	200	250	300	350
Rod Tip Static Allowable Load	(N)		222	186	159	139	124	111	101
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	93.0	76.3	64.7	56.0	49.2	43.8	39.3
	(N)	Load Offset Distance 100mm	72.0	61.6	53.9	48.0	43.0	38.9	35.4
Load Offset Distance (Center of overhang load gravity)	(mm)		150 or less						
Rod Tip Static Allowable Torque	(N·m)		22.3	18.7	16.1	14.1	12.6	11.3	10.3
Rod Tip Dynamic Allowable Torque	(N·m)		7.2	6.2	5.4	4.8	4.3	3.9	3.5
Rod Non-Rotation Accuracy (Note 1)	(deg)		0						

Item	Unit	Stroke	400	450	500	550	600	650	700
Rod Tip Static Allowable Load	(N)		92.1	84.7	78.4	72.8	68.0	63.7	59.8
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	35.6	32.4	29.7	27.3	25.2	23.3	21.7
	(N)	Load Offset Distance 100mm	32.3	29.7	27.4	25.3	23.5	21.9	20.4
Load Offset Distance (Center of overhang load gravity)	(mm)		150 or less						
Rod Tip Static Allowable Torque	(N·m)		9.4	8.7	8.1	7.6	7.1	6.7	6.3
Rod Tip Dynamic Allowable Torque	(N·m)		3.2	3.0	2.7	2.5	2.4	2.2	2.0
Rod Non-Rotation Accuracy (Note 1)	(deg)		0						

Note 1 It shows the displacement angle in the rod rotational direction at no load.



[Horizontal]

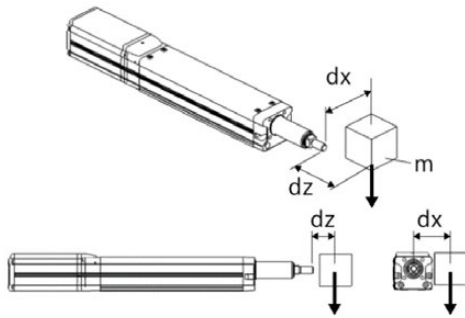
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

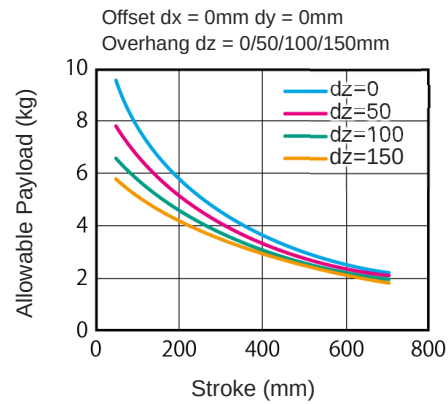
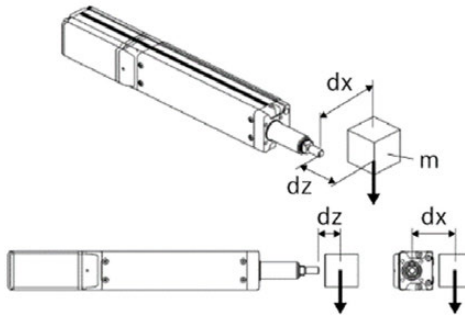
(Acceleration 0.2G, velocity 600mm/s)

dx: Offset distance, dz: Overhang distance, m: Load

● Horizontal Installation



● Sideways Installation



[Vertical]

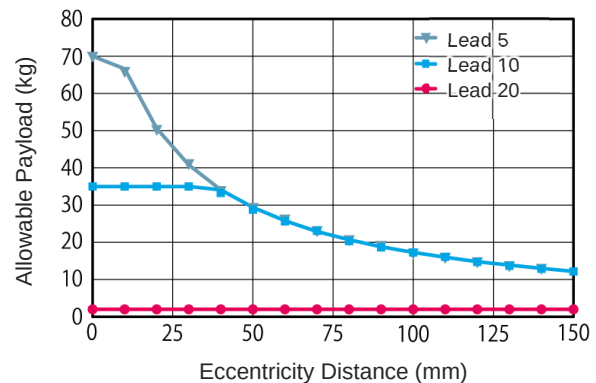
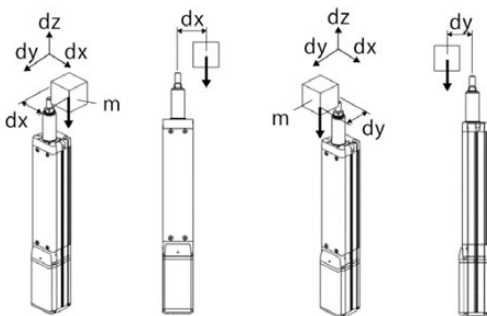
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

(Acceleration 0.2G, velocity 450mm/s)

dx: Eccentricity in dx direction distance, dy: Eccentricity in dy direction distance,

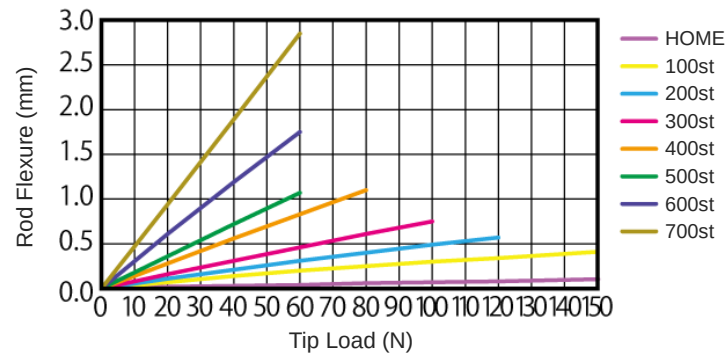
dz: Overhang distance, m: Load



[6] Rod Flexure (Reference)

This is the flexure of the rod when the actuator is installed horizontally.

It does not include the flexure caused by the weight of itself.



1.5.2 RCP6(S)W-RRA8R: Motor Reversing Type

[1] Actuator Specifications

Item		Content
Drive system		Ball screw $\phi 16\text{mm}$, rolled C10
Positioning repeatability		$\pm 0.01\text{mm}$ or less
Lost motion		0.1mm or less
Rod guide		Linear infinite circulation type
Brake	Specification	Non-Exciting Operation Electromagnetic Brake
	Holding Force	Lead 20: 3kgf, Lead 10: 35kgf, Lead 5: 70kgf
Rod non-rotation precision ^(Note 1)		0 degrees
Ambient operating		0 to 40°C, 85%RH or less (Non-condensing)
Degree of protection		IP65 (IEC60529/JIS0920)
Vibration and Impact resistance		4.9m/s ²
Motor type		Pulse motor
Encoder type		Battery-less absolute
Encoder pulse count		8192 pulse/rev

Note 1: It shows the displacement angle in the rod rotational direction at no load.

[2] 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 speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.

Minimum Speed		Unit (mm/s)		
Lead		20	10	5
Horizontal/Vertical		25	13	7

■ When the environment temperature exceeds 5degC.

Unit (mm/s)

Lead (mm)	50	100 to 450 (Every 50mm)	500	550	600	650	700
20	280	350 <330>		320	280	240	220
10	200		180	160	140	120	110
5	100		90	80	70	60	55

■ When the environment temperature is below 5degC.

Unit (mm/s)

Lead (mm)	50	100 to 450 (Every 50mm)	500	550	600	650	700
20	210						
10	130					120	110
5	60						55

[3] Payload by Speed/Acceleration

- High-Output Setting Effective: When the environment temperature exceeds 5degC.

(The maximum speed may vary depending on the payload.)

Lead 20

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	
0	30	3
210	30	3
300	30	3
330	14	1
350	14	—

Lead 10

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	
0	60	35
80	60	35
90	60	34
100	60	28
110	60	23
120	60	18
130	60	15
140	60	12
150	60	10
160	60	8
170	40	6
180	25	4
190	15	3
200	12	2

Lead 5

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.1	
0	100	70
45	100	70
60	100	45
70	100	35
80	100	25
90	100	14
100	75	9

- High-Output Setting Effective: When the environment temperature is below 5degC.

(The maximum speed may vary depending on the payload.)

Lead 20

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	
0	30	3
210	30	3

Lead 10

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.2	
0	60	35
80	60	35
90	60	34
100	60	28
110	60	23
120	60	18
130	60	2

Lead 5

(Unit: kg)

Orientation	Horizontal	Vertical
Speed (mm/s)	Acceleration (G)	
	0.1	
0	100	70
45	100	70
60	100	9

[4] Relation Graph for Pressing Force and Current Limit Values

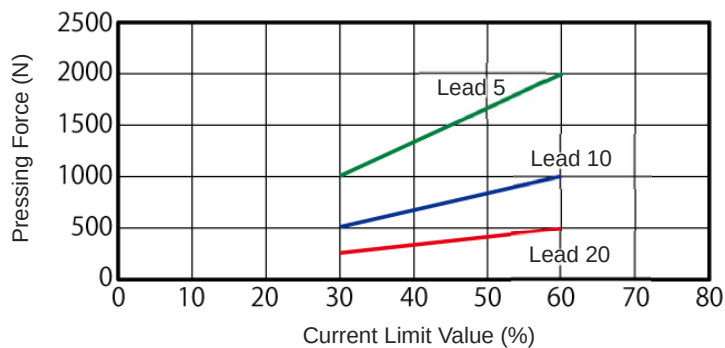
**Caution**

- The relation of the pressing force and the current limit is a reference when assuming the speed is 10mm/s.
- There is a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 30%. There is even a case that it would not operate. An operation cannot be made also when it is beyond 60%. Doing so may cause degradation in the motor coil insulation by heat radiation, which results in shortening the product life.
- For the CON system controllers such as PCON, when the approach speed (setting in the position table) to the pressing start position is 10mm/s or less, pressing is performed at the approach speed. In such a case also the pressing force will be unstable. In such cases, check in advance that the actuator can be used with no problem before omit using.

For the SEL system controllers such as MSEL, pressing operation is performed at the speed set in PAPR Command regardless of the approach speed to the pressing start position.

Unit (N)

Current Limiting Value	Lead 5	Lead 10	Lead 20
30%	1000	500	250
40%	1333	667	333
50%	1667	833	417
60%	2000	1000	500



[5] Allowable Load and Torque on Rod Tip

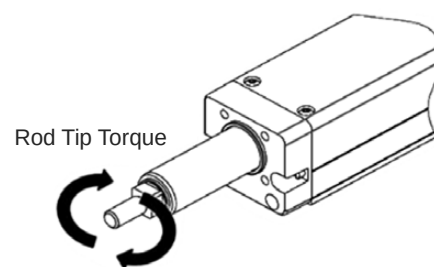
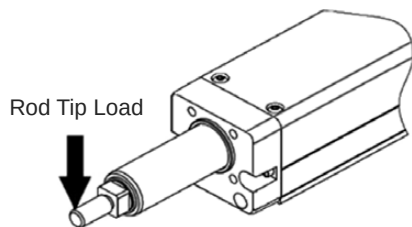
Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque. Make sure not to exceed the load indicated in the specification table.

Applying excess load may cause an operation failure, parts malfunction and shortened life.

Item	Unit	Stroke	50	100	150	200	250	300	350
Rod Tip Static Allowable Load	(N)		222	186	159	139	124	111	101
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	93.0	76.3	64.7	56.0	49.2	43.8	39.3
	(N)	Load Offset Distance 100mm	72.0	61.6	53.9	48.0	43.0	38.9	35.4
Load Offset Distance (Center of overhang load gravity)	(mm)		150 or less						
Rod Tip Static Allowable Torque	(N·m)		22.3	18.7	16.1	14.1	12.6	11.3	10.3
Rod Tip Dynamic Allowable Torque	(N·m)		7.2	6.2	5.4	4.8	4.3	3.9	3.5
Rod Non-Rotation Accuracy (Note 1)	(deg)		0						

Item	Unit	Stroke	400	450	500	550	600	650	700
Rod Tip Static Allowable Load	(N)		92.1	84.7	78.4	72.8	68.0	63.7	59.8
Rod Tip Dynamic Allowable Load (Operating life 5,000km Remaining Probability 90%)	(N)	Load Offset Distance 0mm	35.6	32.4	29.7	27.3	25.2	23.3	21.7
	(N)	Load Offset Distance 100mm	32.3	29.7	27.4	25.3	23.5	21.9	20.4
Load Offset Distance (Center of overhang load gravity)	(mm)		150 or less						
Rod Tip Static Allowable Torque	(N·m)		9.4	8.7	8.1	7.6	7.1	6.7	6.3
Rod Tip Dynamic Allowable Torque	(N·m)		3.2	3.0	2.7	2.5	2.4	2.2	2.0
Rod Non-Rotation Accuracy (Note 1)	(deg)		0						

Note 1 It shows the displacement angle in the rod rotational direction at no load.



[Horizontal]

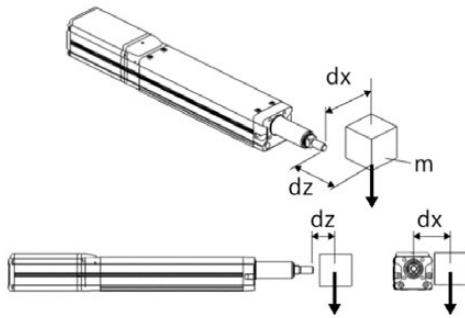
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

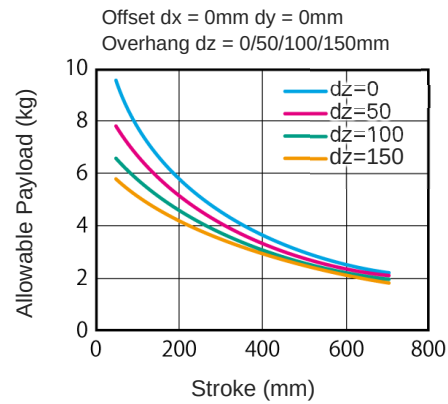
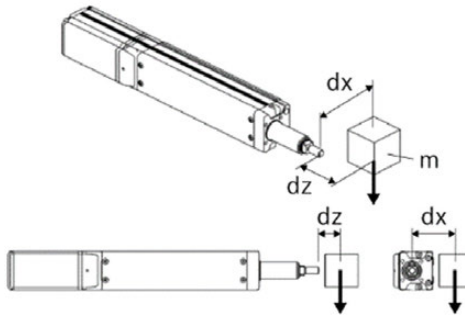
(Acceleration 0.2G, velocity 600mm/s)

dx: Offset distance, dz: Overhang distance, m: Load

● Horizontal Installation



● Sideways Installation



[Vertical]

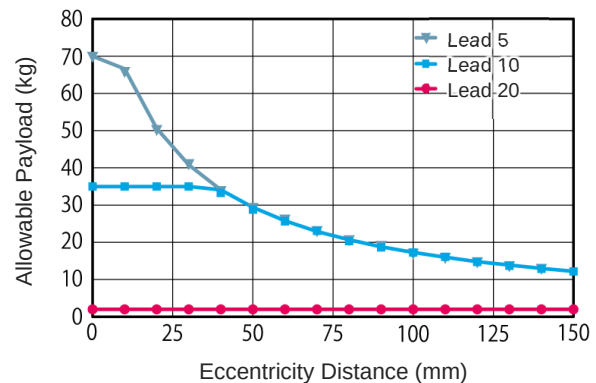
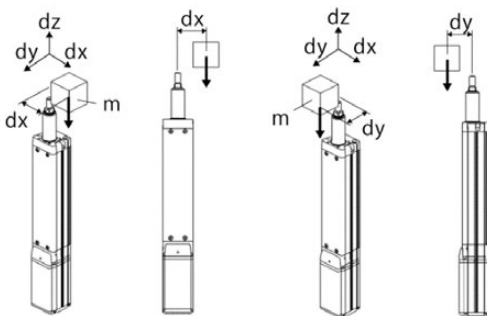
Condition to Calculate Allowable Payload

Load mass that comes to a guide travel life of 5,000 km, taking into account the moment generated by acceleration/deceleration.

(Acceleration 0.2G, velocity 450mm/s)

dx: Eccentricity in dx direction distance, dy: Eccentricity in dy direction distance,

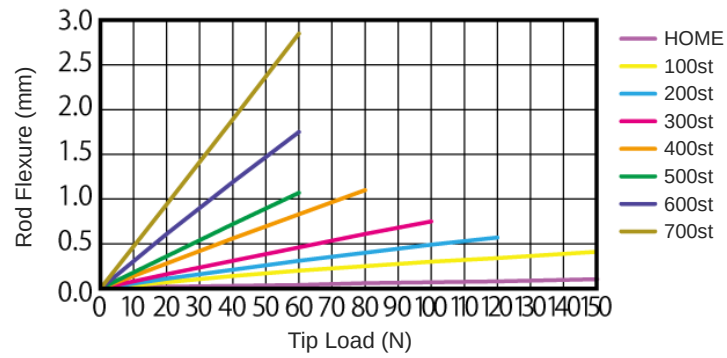
dz: Overhang distance, m: Load



[6] Rod Flexure (Reference)

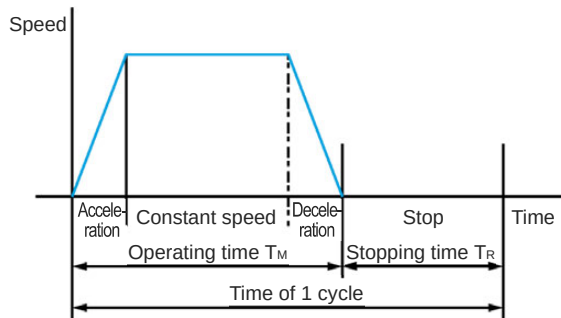
This is the flexure of the rod when the actuator is installed horizontally.

It does not include the flexure caused by the weight of itself.



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

Use so that the duty ratio falls within the specified conditions based on ambient temperature.

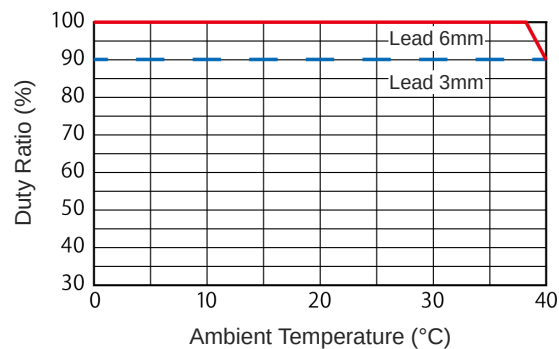
[1] Controller Installed Separately

- RCP6W-RRA4C/R, RRA6C/R, RRA8C/R
 Continuous operation is available with the duty ratio 100%.

[2] Built-in Controller Specification

- RCP6SW-RRA4C/R
 Continuous operation is available with the duty ratio 100%.
- RCP6SW-RRA6C/R
 Lead 12mm are available for continuous operation at 100% of the duty ratio.
 Follow the graph below for the duty ratio when operating Lead 3mm and 6mm.

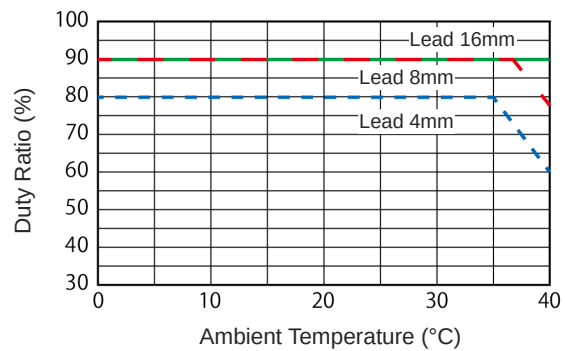
Lead	3mm	6mm
Duty Ratio Limitation	90% or less	38°C or less 100% 40°C 90%



- RCP6SW-RRA7C/R

Follow the graph below for the duty ratio when operating Lead 4mm, Lead 8mm and 16mm.

Lead	4mm	8mm	16mm
Duty Ratio Limitation	35°C or less 80% 40°C 60% or less	37°C or less 90% 40°C 78% or less	90% or less



- RCP6SW-RRA8C/R

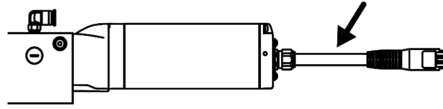
Perform operation at 70% of duty ratio or less.

1.7 Options

1.7.1 Changing Actuator Cable Length (Model Code: AC5, AC10, AC15)

It should be indicated when it is required to change the actuator cable length.

AC5: 5m, AC10: 10m, AC15: 15m



1.7.2 Brake Type (Model Code: B)

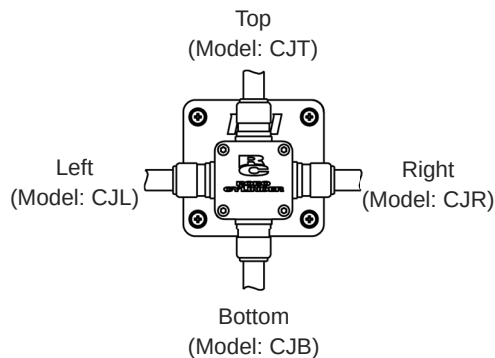
It retains a rod so it would not move during power cutoff or the servo is turned off.

It can also be used to prevent the rod from falling when mounted vertically.

1.7.3 Cable Eject Direction Changed (Model Code: CJB, CJL, CJO, CJR, CJT)

The direction to eject the motor / encoder cable applied on the actuator main unit can be changed to top/bottom/left/right.

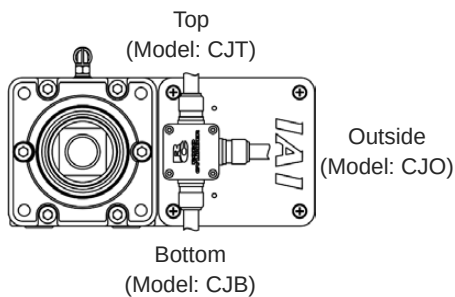
Motor Straight Type



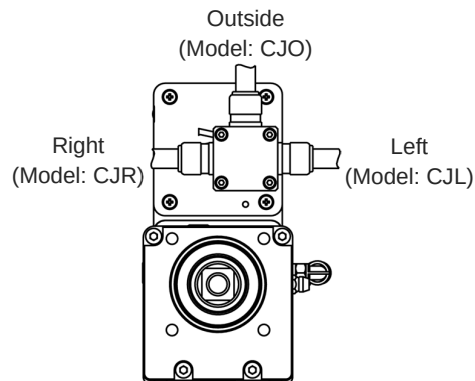
Motor Reversing Type

Motor Right Reversed (MR)

Motor Left Reversed (ML)



Motor Top Reversed (MT)

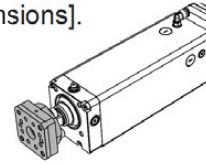


1.7.4 Tip Adapter (Flange) (Model Code: FFA)

Applicable Model: RRA4C, RRA4R, RRA6C, RRA6R, RRA7C, RRA7R

This is an adapter to attach on the rod tip an object such as a fixture with four screws.
(Delivered assembled)

* For details, refer to [Chapter 2 Installation] and [Chapter 6 External Dimensions].



1.7.5 Flange (Front) (Model Code: FL)

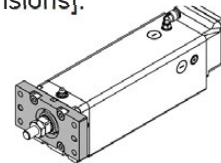
It is a bracket for installation to affix with screws from the actuator main unit side.

* If selected together with the tip adapter (flange) “FFA”, the unit will be assembled prior to shipment.

* The flange is basically intended for horizontal mounting.

Depending on the stroke and the motor mounting orientation, installation may not be possible.

* For details, refer to [Chapter 2 Installation] and [Chapter 6 External Dimensions].

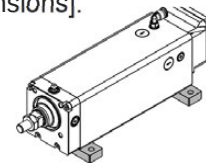


1.7.6 Foot Bracket (Model Code: FT)

Applicable Model: RRA4C, RRA4R, RRA6C, RRA6R, RRA7C, RRA7R

This metal part is used for fixing the actuator from the top side using the bolts.

* For details, refer to [Chapter 2 Installation] and [Chapter 6 External Dimensions].

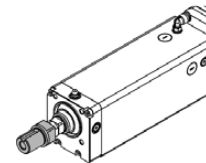


1.7.7 Tip Adapter (Keyway) (Model Code: KFA)

Applicable Model: RRA4C, RRA4R, RRA6C, RRA6R, RRA7C, RRA7R

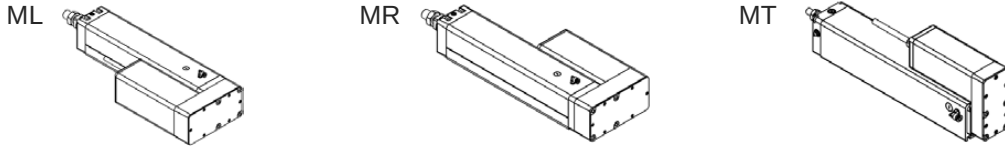
This is an adapter to attach on the rod end an object such as a fixture with one screw and a parallel key. (Delivered assembled)

* For details, refer to [Chapter 2 Installation] and [Chapter 6 External Dimensions].



1.7.8 Motor Reversed Specification (Model Code: ML, MR, MT)

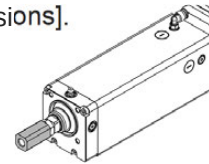
It is the code to indicate the direction of motor reversed when selecting the motor reversed type. When viewed from the motor side, a left-side reversing is denoted as ML, a right-side reversing as MR, and an upward reversing as MT.



1.7.9 Tip Adapter (Internal Thread) (Model Code: NFA)

This is an adapter to attach on the rod end an object such as a fixture with one screw. (Delivered assembled)

* For details, refer to [Chapter 2 Installation] and [Chapter 6 External Dimensions].



1.7.10 Reversed-home specification (Model Code: NM)

The normal home position is on the motor side.

This option is selected when the home position direction needs to be reversed due to the equipment layout or the assembly orientation.

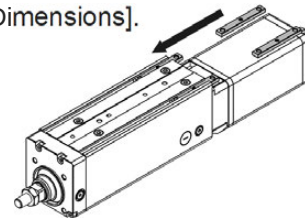
1.7.11 T-Slot Nut Bar (Model Code: NTB)

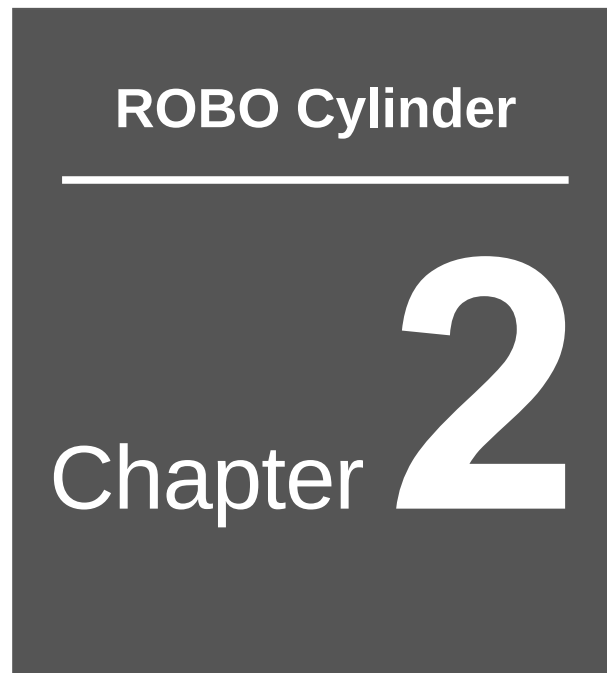
Applicable Model: RRA4C, RRA4R, RRA6C, RRA6R, RRA7C, RRA7R

It is a bracket with a shape of bar which is to be inserted to the T-slot on the actuator.

There is a nut hole equipped at the specified position on the T-slot nut bar.

* For details, refer to [Chapter 2 Installation] and [Chapter 6 External Dimensions].





Installation

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2.1 Precautions for Transportation

[1] Handling of Robot

[Handling the package]

- Do not damage or drop.
No special treatment is conducted on this package to endure a drop or impact on it.
- Do not attempt to carry a heavy package with only one worker. Consider an appropriate method for transportation.
- Keep the unit in horizontal position for storage or transportation.
Follow the instruction if there is any for the packaging condition.
- 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]

- Do not carry an actuator by motor cover and a cable or attempt to move it by pulling the cable.
- Do not damage or drop the package during transportation.
- Carry while holding the frame, motor cover, and front bracket.
- Do not apply an excessive force to each part of the actuator.
For the names of each part, refer to [Names of the Parts].

[2] Handling in the Assembled Condition

(When the product is delivered from our factory under a condition that it is assembled with other actuators)

The combined axes are delivered in a package that the frame is nailed on the lumber base. Fix the rod so that would not accidentally move during transportation. The actuators are also fixed so the tip of it would not shake due to the external vibration.

[Handling the package]

- Do not damage or drop.

No special treatment is conducted on this package to endure a drop or impact on it.

- Do not attempt to carry a heavy package with only one worker. Consider an appropriate method for transportation.
- When hanging up with ropes, support on the reinforcement frame on the bottom of the lumber base.
When bringing up the package with a forklift, also support on the bottom of the lumber base.
- Handle with care when putting the package down to avoid impact or bounce.
- Do not step on the package.
- Do not put anything on the package that could deform or damage it.

[Handling after unpacking]

- Secure the rods to prevent sudden movement during transport.
- 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 with ropes, have appropriate cushioning to avoid any deformation of the actuator body. Also keep it in stable horizontal orientation. Make a fixture using the attachment holes or the screw holes on the actuator body if necessary.
- Do not attempt to apply load on the actuators or the connector box. Also pay attention not to pinch cables and bend or deform them forcefully.

[3] Handling in Condition of being assembled in 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 or the connector box. Also pay attention not to pinch cables and bend or deform them forcefully.

2.2 Installation and Storage • Preservation Environment

Usage is possible in environments of pollution degree 3 or equivalent.

Pollution degree 3: Environment with conductive pollution or dry nonconductive pollution but may get to conductive pollution due to occasional temporary condensation.
(IEC60664-1)

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 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)
- Environment not protectable with the protection feature of IP65
 IP65: Solid Substance : No ingress of dust with complete protection against contact
 Liquid : Water projected by a nozzle against enclosure from any direction shall have no harmful effects
- Where the actuator is subject to splashed oil (including oil mist or cutting fluid) or chemical solutions
- Where the actuator receives impact or vibration
- Where the altitude is more than 2,000m

Provide sufficient work space for the following maintenance and inspection.

- Space to replenish grease

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.

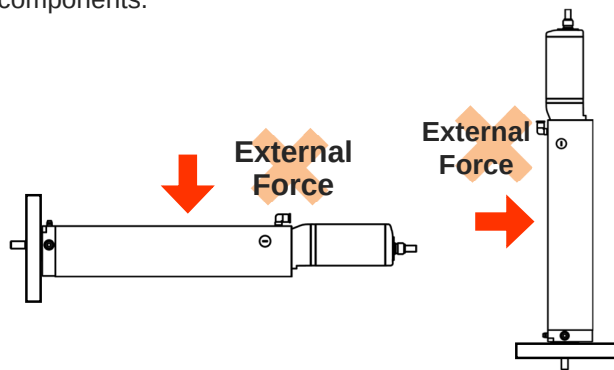
2.3 Installation of Main Body

2.3.1 Caution for Installation of Main Body

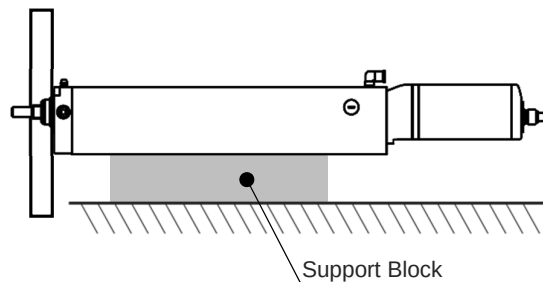
- Pay attention when selecting bolt lengths. Using bolts of improper length may result in damage to the threaded holes, insufficient mounting strength of the actuator, or interference with the drive section, which may lead to reduced accuracy or unexpected accidents.
- Ensure that sufficient space is provided for maintenance work.
- The actuator cable connectors are not waterproof. Connect the motor and encoder cables in an environment free from dust and moisture, or apply appropriate waterproofing measures.

[When Installing Using Front Bracket / flange]

- Ensure that no external force is applied to the main unit. External force may cause operation error or damage to components.



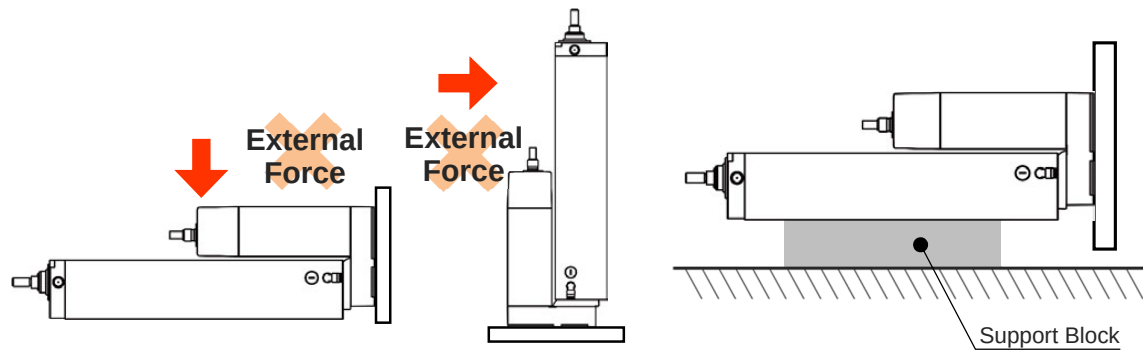
- For strokes of 150 mm or longer, provide a support block to support the main unit as shown in the figure.
- Even for strokes shorter than 150 mm, vibration may occur depending on the operating conditions and installation environment, which may lead to operation error or damage to components. Providing a support stand is strongly recommended.
- If the actuator operates without a support block, external force generated by acceleration/deceleration multiplied by the own weight of the actuator will be applied.
- If the actuator operates without a support block, operate it at acceleration/deceleration of 0.05 G or less (reference).



[When Installing Using Bracket Mounting Holes of Motor Reversed type]

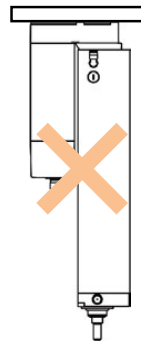
- Provide a support block or similar structure to support the main unit so that no external force is applied to it.

External force may cause an operation failure or parts malfunction.



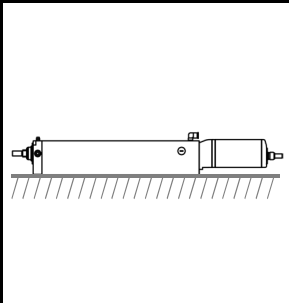
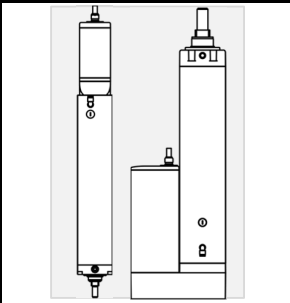
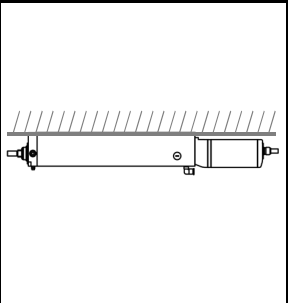
2. Installation

- It is not available for the ceiling mount.



2.3.2 Mounting Orientation

In common for types
○: Available for Installation

Mounting Orientation			
			
Horizontal	Vertical	Sideways	Ceiling Mount
○	○	○	○



Caution

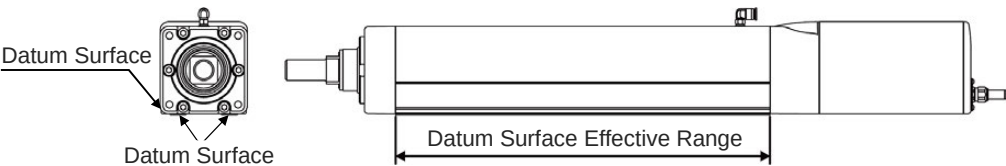
- When the motor straight type is to be installed vertically, it is recommended that the motor comes to the top.

2.3.3 Attachment Screws

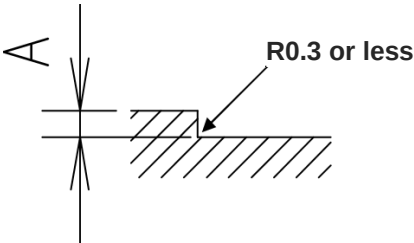
- Consider sufficient space for maintenance work such as replacement and inspection.
- Use high-strength hex socket head cap screws of ISO-10.9 or higher for screws for installation.
- Make sure the internal thread and bolt effective engagement length is approximately 1.8 times or more of bolt nominal diameter.
- Screws to hold the actuator are to be prepared by the user.
- Be careful with regard to the length of the mounting bolt and positioning pin. The use of screw-in depth greater than that of the screw or reamed mounting holes may damage the screw hole or reduce the mounting strength of the transported object, leading to decreased accuracy or unexpected accidents.

2.3.4 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.
- The side and bottom surfaces of the base on RRA8C/R work as the datum surfaces for the side of the rod.
If running accuracy is required, use this surface as the datum for installation.



- As there could be a case that the width dimension of the front bracket or rear bracket is wider than the datum surface dimension on the side, have them pushed towards the datum surface within the datum surface effective range.
- Having machining work to press the brackets towards the datum surface outside the datum surface effective range may cause interference to brackets and motors.
- Follow the diagram below when installing the device using the datum surface.



Type	A Dimensions (mm)
RRA8C/R	3 to 5

2.3.5 Mounting Method of Main Unit

* Check [2.3.1 Caution for Installation of Main Body] for installation.

There are T-shaped slots on the back of an actuator, and threaded holes on the frame front and the reversed type rear bracket. By using them, installation in the following ways is available.

For detailed dimensions, refer to [Chapter 6 External Dimensions].

- (1) Installation by using T-slots (RRA4C/R, RRA6C/R, RRA7C/R)
- (2) Installation by using foot brackets (option: model FT) (RRA4C/R, RRA6C/R, RRA7C/R)
- (3) Mounting using threaded holes on back side of frame (RRA8C/R)
- (4) Mounting using threaded holes of front bracket on front side of main frame
- (5) Installation by using flange (option: model FL)
- (6) Installation by using rear bracket (Motor Reversing Type)

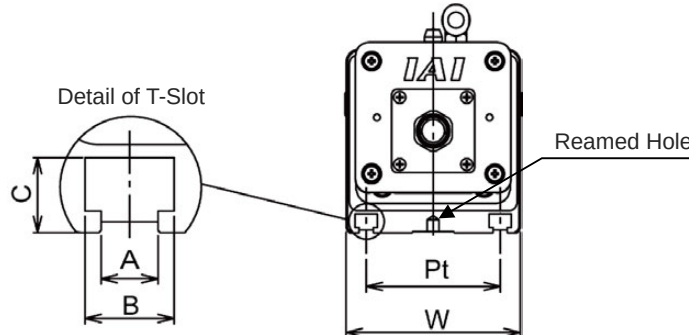
[1] Installation by Using T-slots

Applicable Models: RRA4C/R, RRA6C/R and RRA7C/R

There are T-slots equipped for installation so this actuator can be fixed on the back side.

Installation is available using square nuts or T-slot nut bars (Model Code: NTB) applied to the T-slots.

T-Slot Dimensions



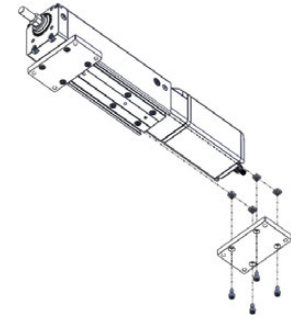
Type	W (mm)	Pt (mm)	A (mm)	B (mm)	C (mm)	Reamed Hole (mm)
RRA4C/R	45	34	4.3	7.3	5.5	Φ3H7 depth 4
RRA6C/R	65	50	5.3	8.3	7	Φ3H7 depth 5
RRA7C/R	78	60	6.3	10.3	9.3	Φ5H7 depth 6

(1) Use Square Nuts

Applicable Models: RRA4C/R, RRA6C/R, RRA7C/R

Insert square nuts into the T-shaped slot for attachment.

For detailed dimensions, refer to [Chapter 6 External Dimensions].



- Square Nut Enclosed Quantity

Type	Enclosed Quantity	Attachment Screw
RRA4C/R	4	M4
RRA6C/R	4	M5
RRA7C/R	8	M6



(Note) There should be no square nut enclosed when T-slot nut bar (Model Code: NTB) is selected in the option.

- In order to secure length of thread engagement of a nut and a screw, adjust the screw length from the frame bottom following the table below.
- Make sure to follow the minimum number of screw fixation and tightening torque for installation.

Type	Screw Length from Frame Bottom (mm)	Min. Number of Screw Fixation (points)	Tightening Torque (N·m)	
			Bolt Seating Surface	
			Steel	Aluminum
RRA4C/R	4.5 to 5	4	3.59	1.76
RRA6C/R	5.5 to 6.5	4	7.27	3.42
RRA7C/R	7 to 8.5	6	12.34	5.36

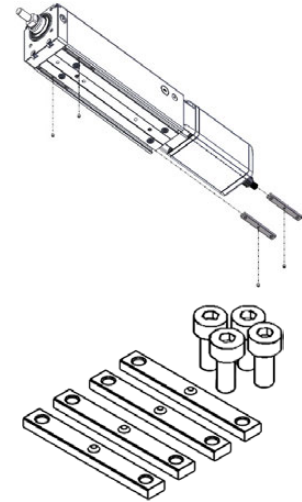
(2) Use T-shaped slot nut bars (option model code: NTB)

Applicable Models: RRA4C/R, RRA6C/R, RRA7C/R

Attach using the T-shaped slot bar inserted into the T-shaped slot.

(The T-shaped slot nut bars are shipped as a set of four.)

For detailed dimensions, refer to [Chapter 6 External Dimensions].



● Single Unit Model Code

Type	Single Unit Model Code	Material	Single Unit Weight (kg)
RRA4C/R	RCP6W-NTB-RRA4	Nickel Plating	0.05
RRA6C/R	RCP6W-NTB-RRA6	Nickel Plating	0.06
RRA7C/R	RCP6W-NTB-RRA7	Nickel Plating	0.09

● When use, loosen the hex socket set screw in the center of the nut bar and move to a desired position.

● Do not attempt to tight the hex socket set screw too tight as it works as a positioning.

● Allocate the nut bars in a wide pitch as much as possible so the installation can be stable.

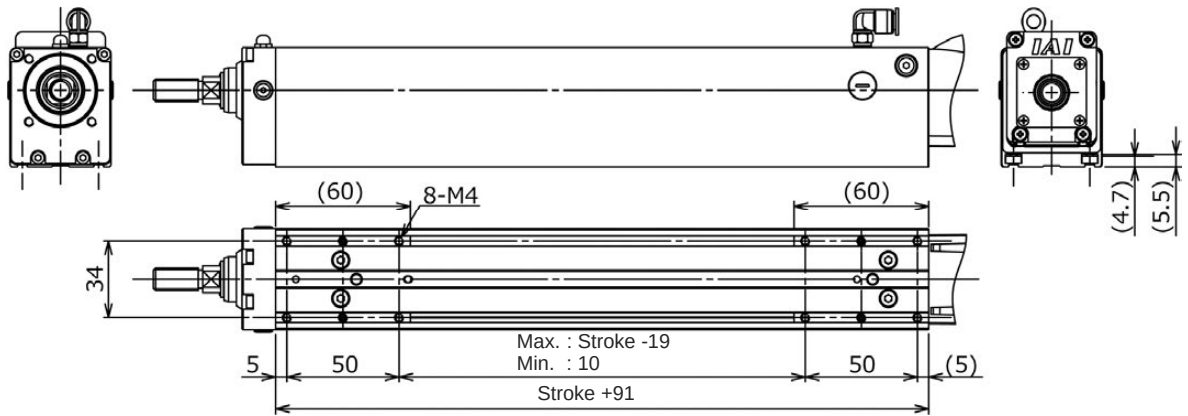
● In order to secure length of thread engagement of a nut bar and a screw, adjust the screw length from the frame bottom following the table below.

● Make sure to follow the minimum number of screw fixation and tightening torque for installation.

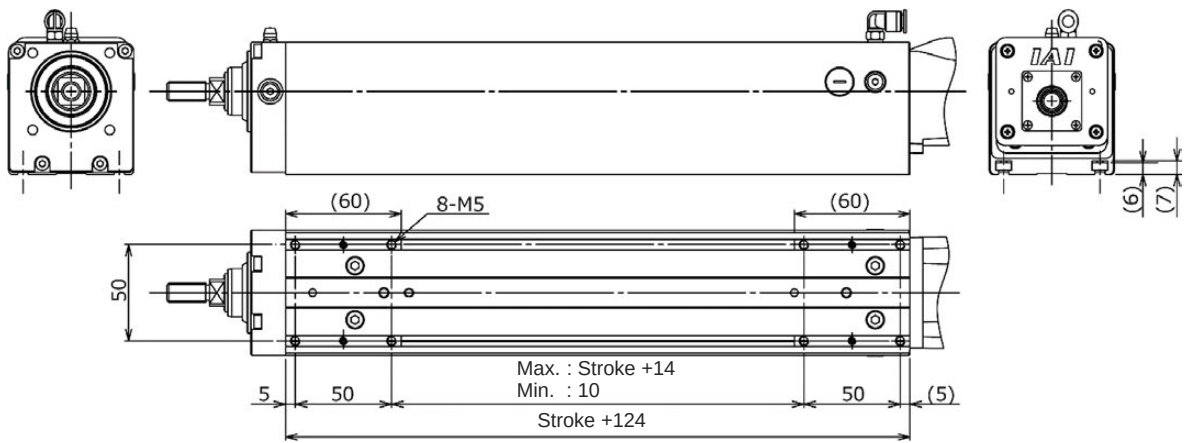
Type	Screw Length from Frame Bottom (mm)	Min. Number of Screw Fixation (pieces)	Tightening Torque (N·m)	
			Bolt Seating Surface	
			Steel	Aluminum
RRA4C/R	4.5 to 5	4	3.59	1.76
RRA6C/R	5.5 to 6.5	4	7.27	3.42
RRA7C/R	7 to 8.5	6	12.34	5.36

● Attachment Available Position

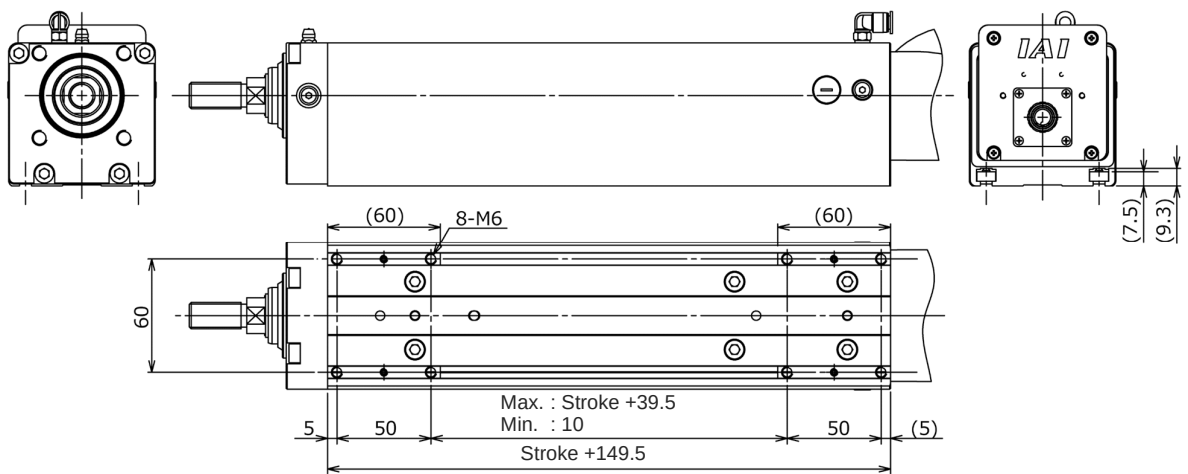
[RRA4C/R]



[RRA6C/R]



[RRA7C/R]



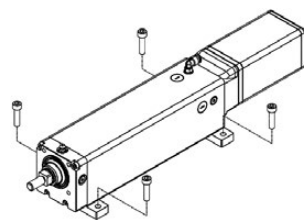
[2] Installation by Using Foot Brackets (option: model FT)

Applicable Models: RRA4C/R, RRA6C/R, RRA7C/R

The foot bracket should be delivered in the condition that it is fixed on the both sides of the main body frame.

Loosen the screws affixing the foot bracket and move the base to the desired position.

For detailed dimensions, refer to [Chapter 6 External Dimensions].

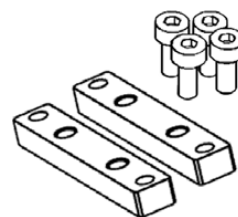


- Single Unit Model Code

Type	Single Unit Model Code	Material	Hole Pitch in Width Direction (mm)	Thickness (mm)
RRA4C/R	RCP6W-FT-RRA4	Steel	60	8
RRA6C/R	RCP6W-FT-RRA6	Steel	80	10
RRA7C/R	RCP6W-FT-RRA7	Steel	100	12

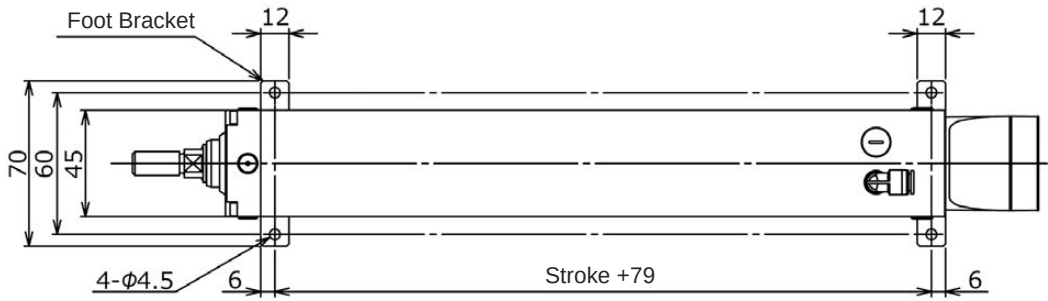
- Attachment Screw

Type	Screw Size	Tightening Torque
		Bolt Seating Surface Steel
RRA4C/R	M4	3.59N·m
RRA6C/R RRA7C/R	M6	12.3N·m

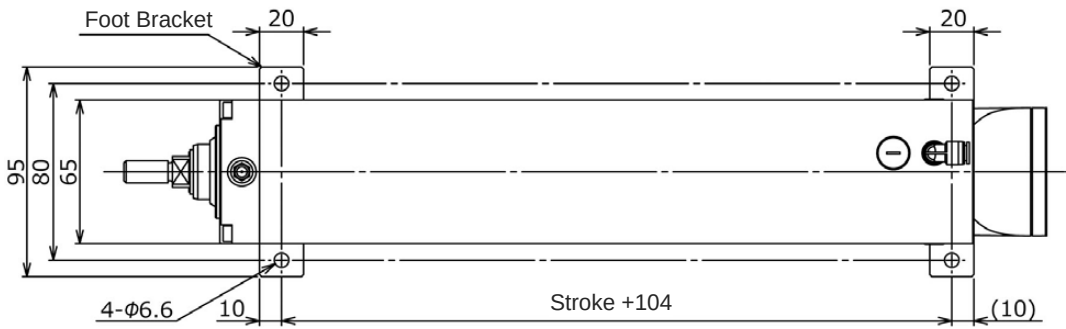


● Foot Bracket Attached Position on Delivery

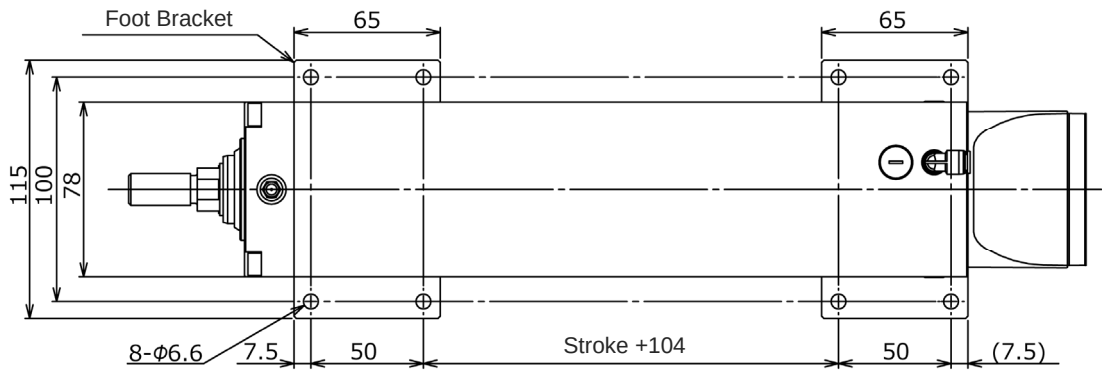
[RRA4C/R]



[RRA6C/R]



[RRA7C/R]



[3] Mounting Using Threaded Holes on Back Side of Frame

* Check [2.3.1 Caution for Installation of Main Body] for installation.

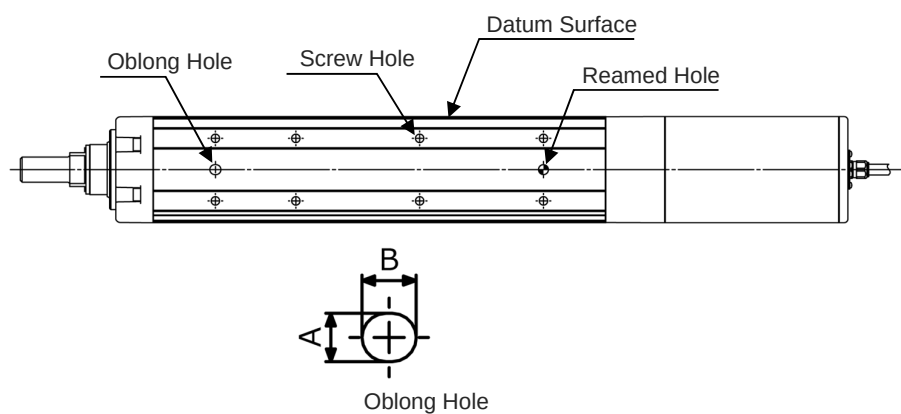
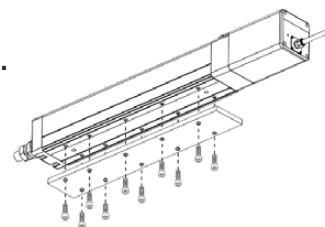
Applicable Model: RRA8C/R

There are threaded holes and reamed holes for mounting from the back side provided.

When it is required to have repeatability in reinstallation after detaching, utilize the reamed hole.

However, when it is necessary to have a fine-tuning such as for perpendicularity, consider the holes to use such as to use only one position of a reamed hole on the motor end and so on.

For detailed dimensions, refer to [Chapter 6 External Dimensions].



Type	Screw Hole Size	Screw Holes Depth (mm)	Tightening Torque		Reamed Hole (mm)	Oblong Hole
			Bolt Seating Surface			
			Steel	Aluminum		
RRA8C/R	M8	8.5	30.0N·m	11.4N·m	Φ8H7 depth 6.5	A:8 ^{+0.015} ₀ B:9 depth 6.5mm or less

[4] Mounting Using Threaded Holes of Front Bracket on Front Side of Main Frame

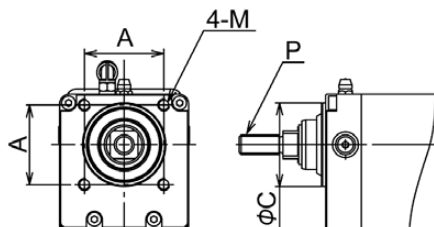
* Check [2.3.1 Caution for Installation of Main Body] for installation.

Applicable Models: All Types

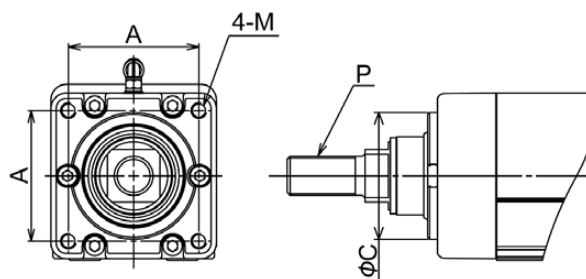
There are screw holes equipped on the front bracket.

For detailed dimensions, refer to [Chapter 6 External Dimensions].

- RRA4C/R, RRA6C/R, RRA7C/R



- RRA8C/R



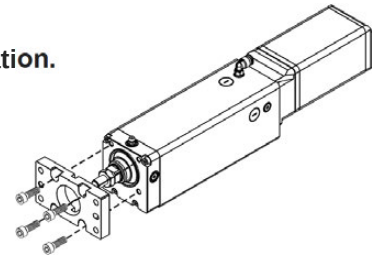
Type	Screw Hole Size M	Screw Effective Depth (mm)	Tightening Torque		A (mm)	ΦC (mm)	P (mm)
			Bolt Seating Surface				
			Steel	Aluminum			
RRA4C/R	M4	8	3.59N·m	1.76N·m	28		M10 × 1.25
RRA6C/R	M6	9	12.3N·m	5.4N·m	40	Φ42h7	M10 × 1.25
RRA7C/R	M8	12	30N·m	11.5N·m	45	Φ45h7	M14 × 1.25
RRA8C/R	M8	16	30N·m	11.5N·m	67	Φ65h7	M20 × 1.5

[5] Installation by Using Flange (option: model FL)

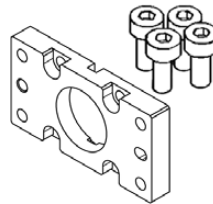
* Check [2.3.1 Caution for Installation of Main Body] for installation.

Attach the flange to the threaded holes on the front bracket and secure it with bolts from the actuator main unit side.

For detailed dimensions, refer to [Chapter 6 External Dimensions].



Type	Single Unit Model Code	Material	Weight (kg)	Hex Socket Head Screw	Tightening Torque (N·m)
RRA4C/R	RCP6W-FL-RRA4	Steel [Nickel Plating]	0.2	M4 × 12 4 pieces	3.59
RRA6C/R	RCP6W-FL-RRA6	Steel [Nickel Plating]	0.4	M6 × 15 4 pieces	12.3
RRA7C/R	RCP6W-FL-RRA7	Steel [Nickel Plating]	0.7	M8 × 20 4 pieces	30
RRA8C/R	RCP6W-FL-RRA8	Steel [Nickel Plating]	1.5	M8 × 25 4 pieces	30

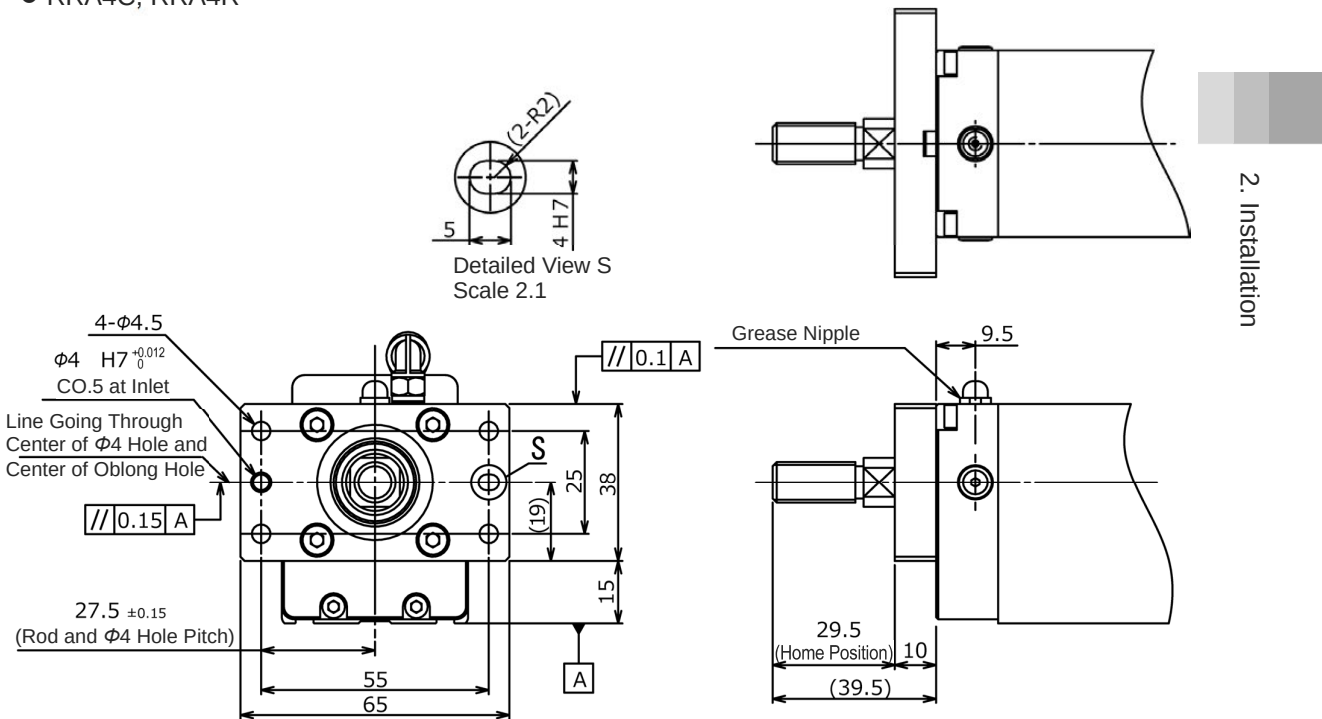


- Install as shown in the figure.

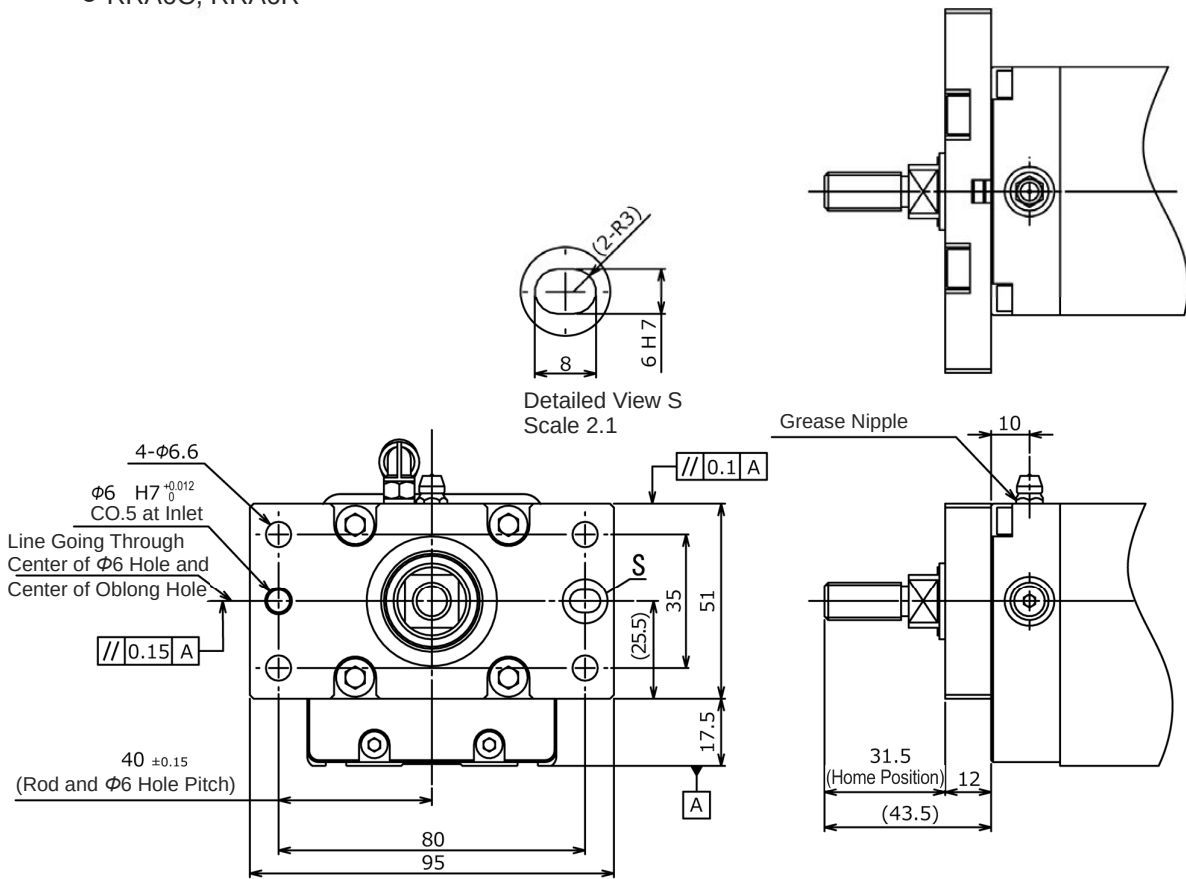
However, if selected together with the tip adapter (flange) “FFA”, the unit will be assembled prior to shipment.

- The front flange cannot be used for Stroke 50 of RCP6W-RRA□R (reversed) as the motor unit interferes to it. Stroke 100 is available to be installed for CJO, CJL and CJR of cable ejection direction.
- The front flange cannot be used for Stroke 50/100 of RCP6SW-RRA□R (reversed) as the motor unit interferes to it. Stroke 150 is available to be installed for CJO, CJL and CJR of cable ejection direction.
- In some stroke variations, the mounting surface can interfere to the cable. Pay attention to interference to peripherals when a short stroke is selected.

● RRA4C, RRA4R

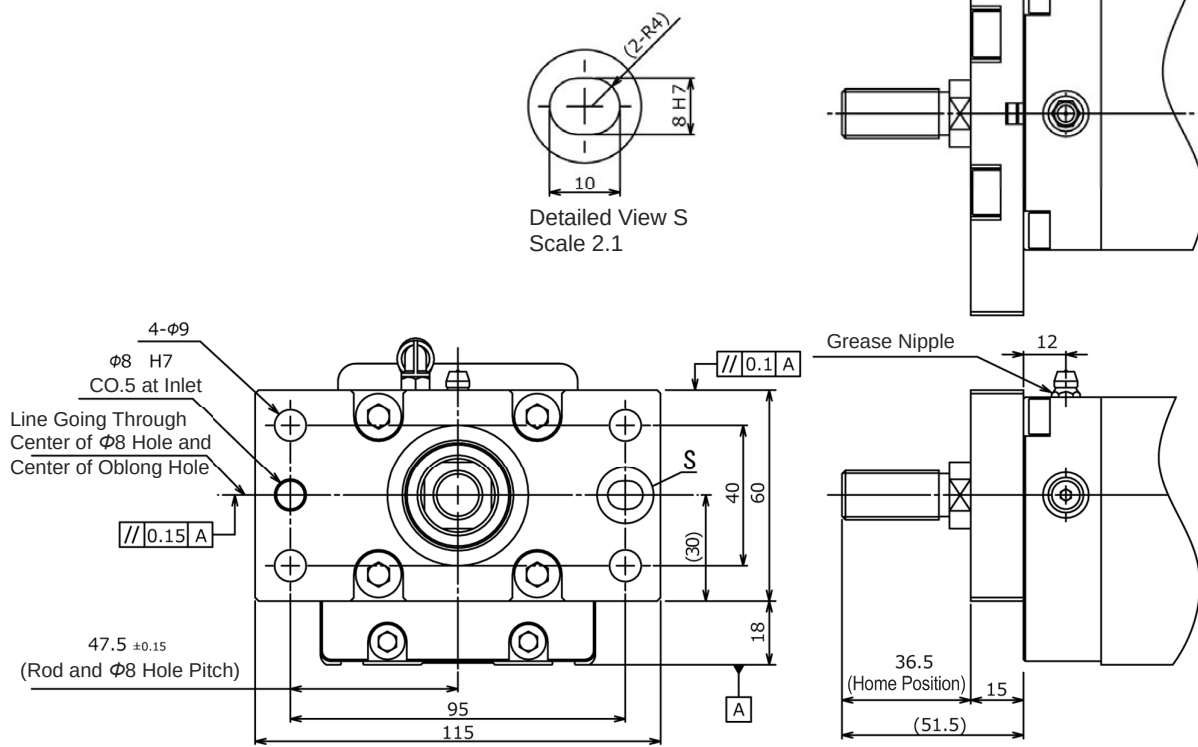


● RRA6C, RRA6R



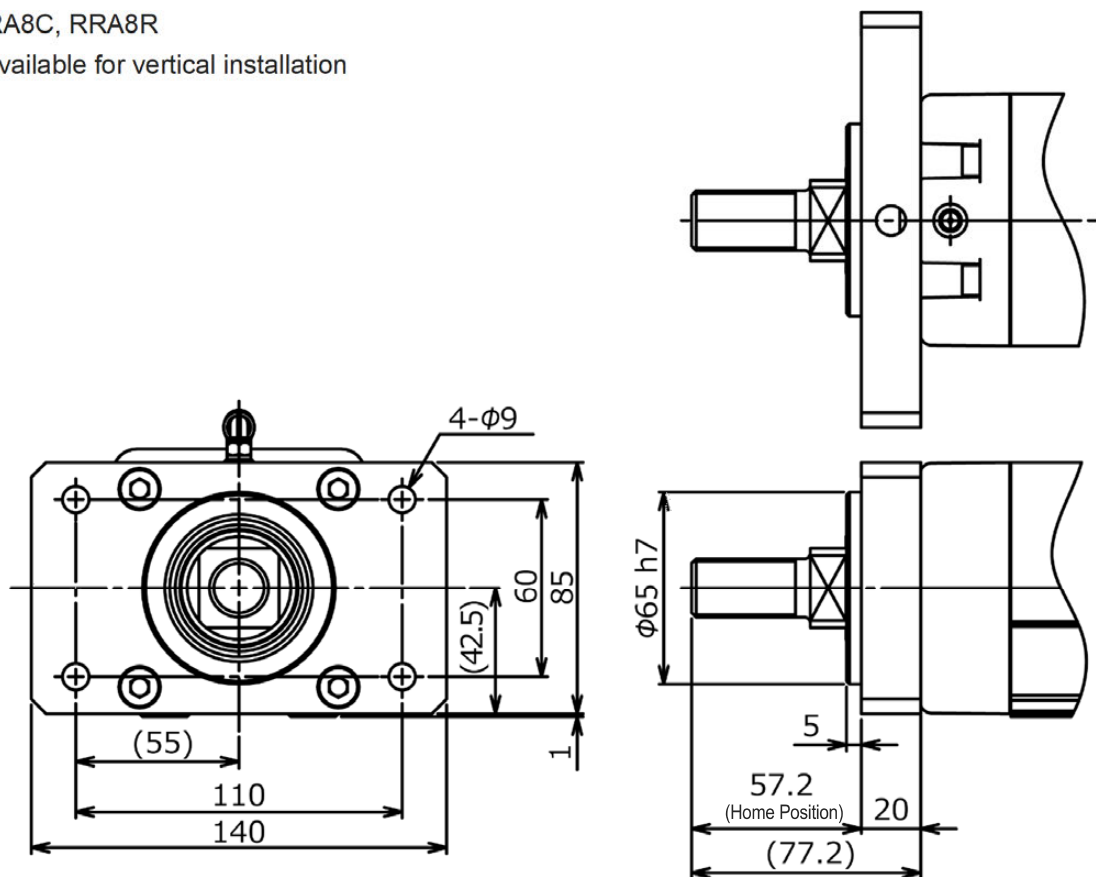
2.3 Installation of Main Body

● RRA7C, RRA7R



● RRA8C, RRA8R

* Available for vertical installation



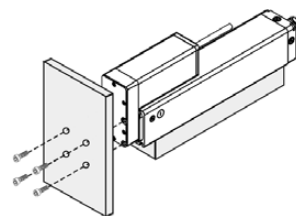
[6] Installation by Using Rear Bracket (Motor Reversing Type)

* Check [2.3.1 Caution for Installation of Main Body] for installation.

Applicable Models: RRA4R, RRA6R, RRA7R, RRA8R

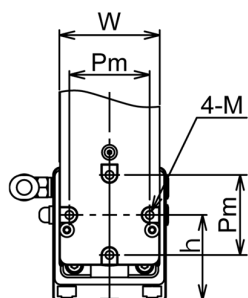
There are threaded holes equipped on the reversing bracket.

For detailed dimensions, refer to [Chapter 6 External Dimensions].

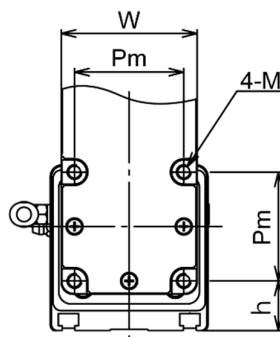


2. Installation

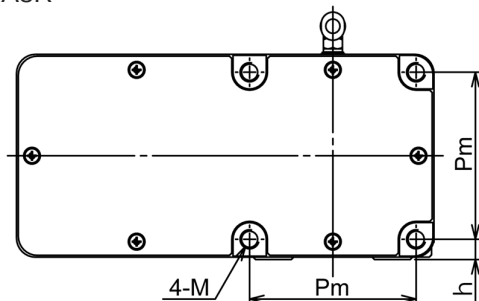
● RRA4R



● RRA6R, RRA7R



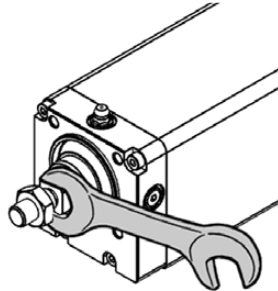
● RRA8R



Type	W (mm)	H (mm)	Pm (mm)	M (mm)	Tightening Torque (N·m)	
					Bolt Seating Surface	
					Steel	Aluminum
RRA4R	40	34	32	M4 depth 8	3.59	1.76
RRA6R	56	20.5	45	M6 depth 12	12.3	5.4
RRA7R	68	20.5	55	M8 depth 16	30.0	11.4
RRA8R	—	8.5	70	M8 depth 16	30.0	11.4

2.3.6 Caution for Rod When Mounting Conveyed Object

- Make sure to hold 2 faces on the tip with a wrench so the tightening torque would not be applied to the rod.

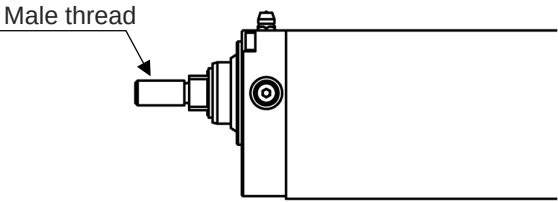


- Actuator possesses a built-in guide structure that enables it to apply a side-way load (radial load) and torque, but make sure not to exceed the load indicated in the specification table. Applying excess load may cause an operation failure, parts malfunction and shortened life. For details, refer to each type in [1.2–1.5 Mechanical Specifications].

2.3.7 How to Mount Conveyed Object

[1] Use Male Thread of Rod Tip Fitting

Transported objects can be secured using the male thread of the rod tip adapter.
For detailed dimensions, refer to [Chapter 6 External Dimensions].

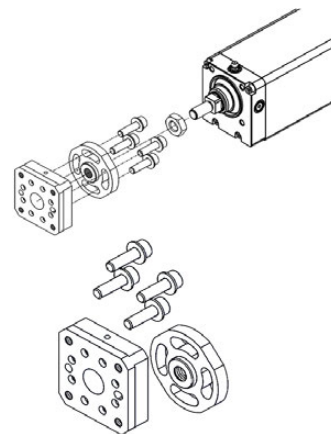


Type	Male thread dimensions
RRA4C/R	M10 × 1.25 Effective thread length 20.0mm
RRA6C/R	M10 × 1.25 Effective thread length 20.0mm
RRA7C/R	M14 × 1.5 Effective thread length 27.5mm
RRA8C/R	M20 × 1.5 Effective thread length 35.0mm

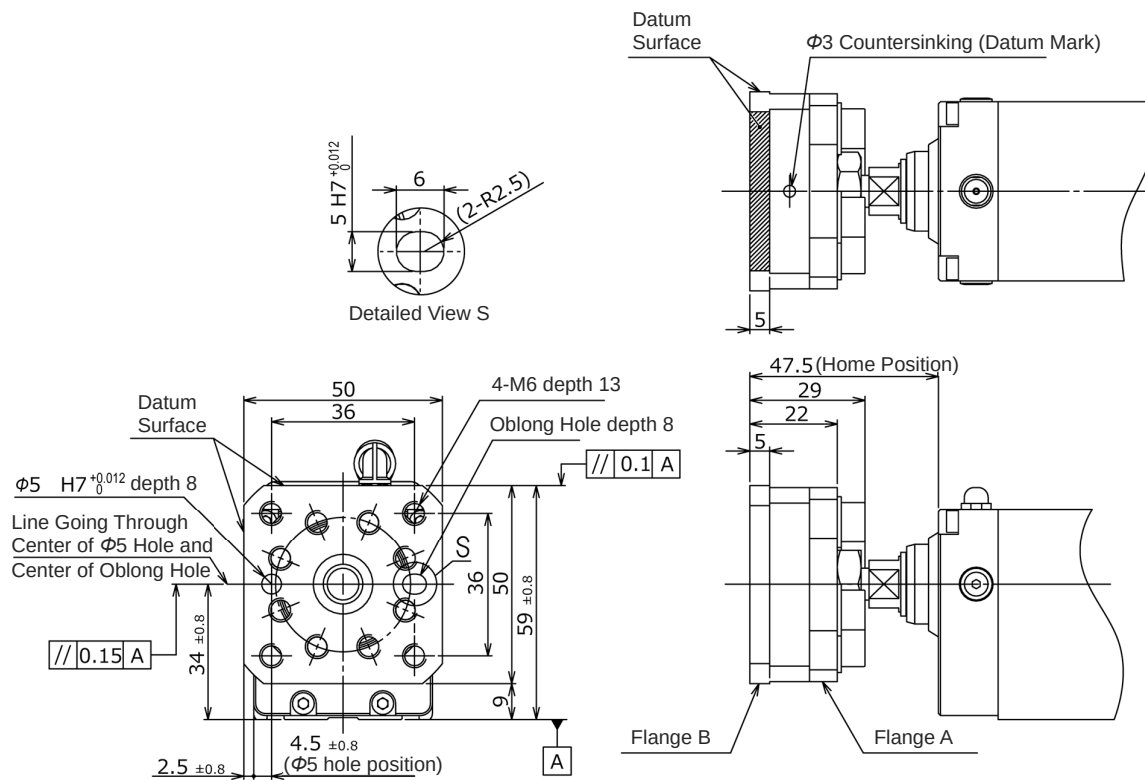
[2] Use Tip Flange

Fix the conveyed object using the flange of the tip adapter
(option model code: FFA). (Delivered assembled)

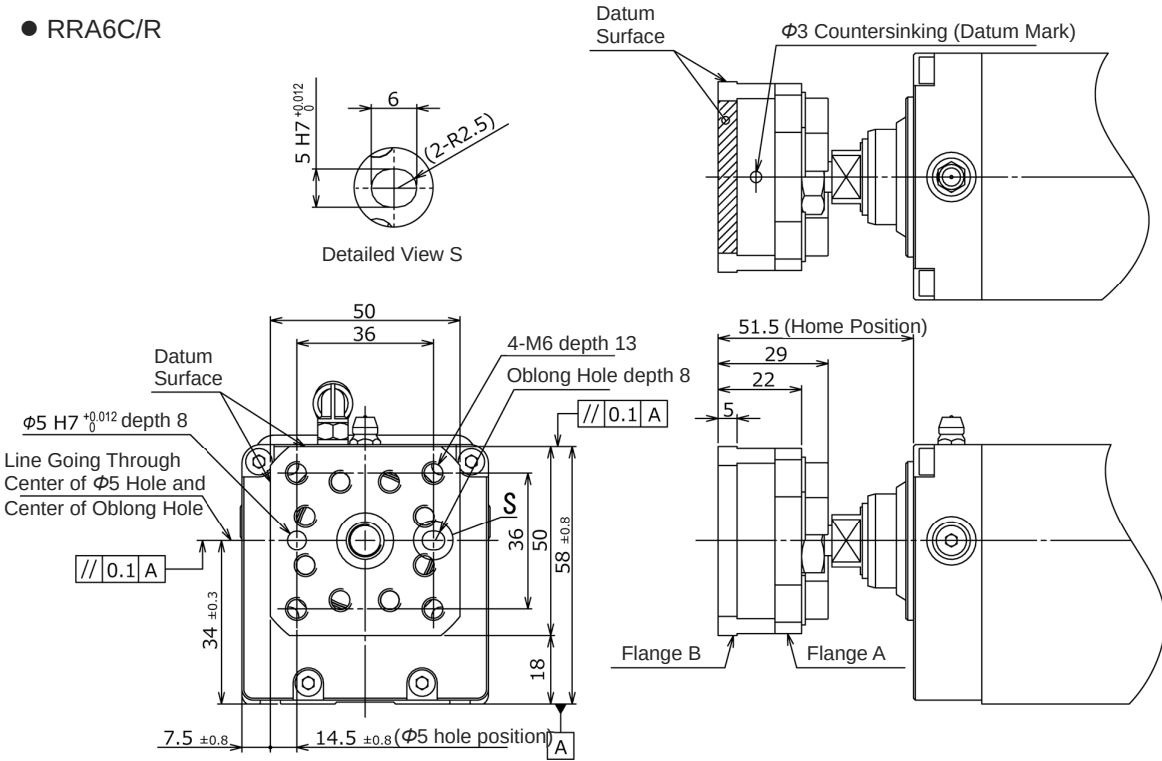
Type	Single Unit Model Code	Material	Weight (kg)
RRA4C/R	RCP6W-FFA-RRA4	Stainless Steel / Aluminum	0.2
RRA6C/R	RCP6W-FFA-RRA6	Stainless Steel / Aluminum	0.2
RRA7C/R	RCP6W-FFA-RRA7	Stainless Steel / Aluminum	0.5



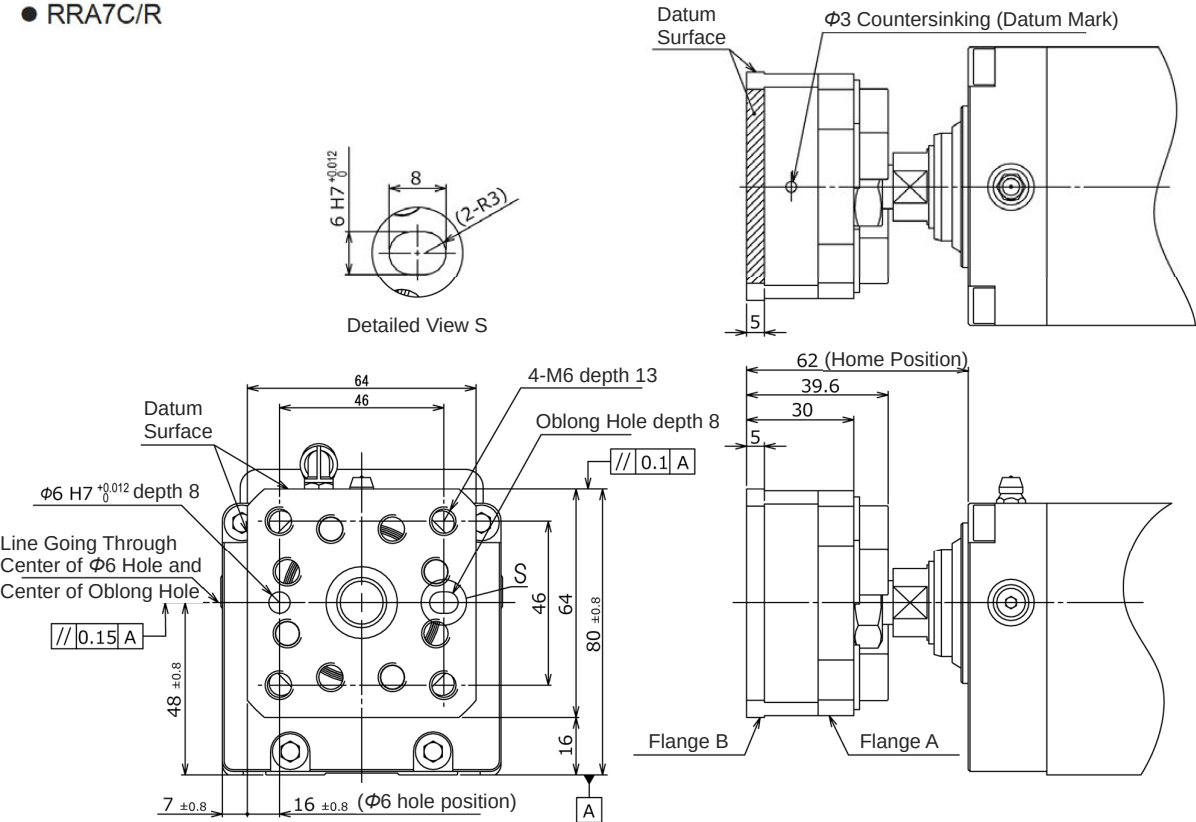
● RRA4C/R



● RRA6C/R



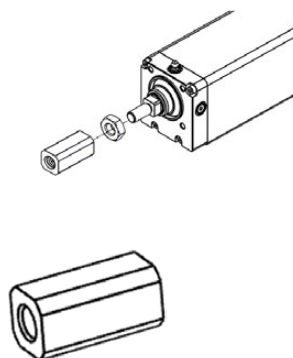
● RRA7C/R



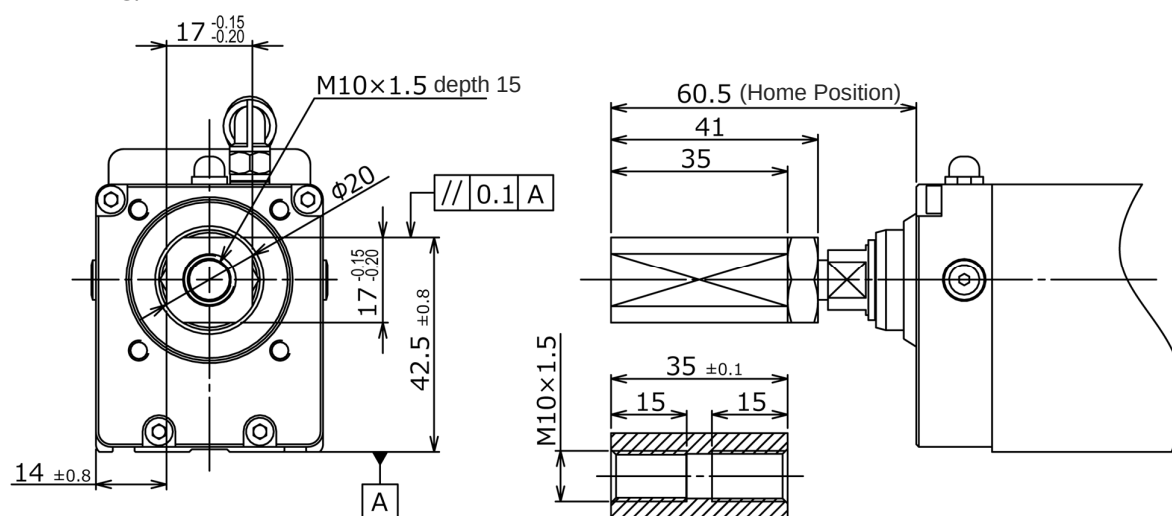
[3] Use Tip Adapter

Fix the conveyed object using the female thread of the tip adapter (option model code: NFA). (Delivered assembled)

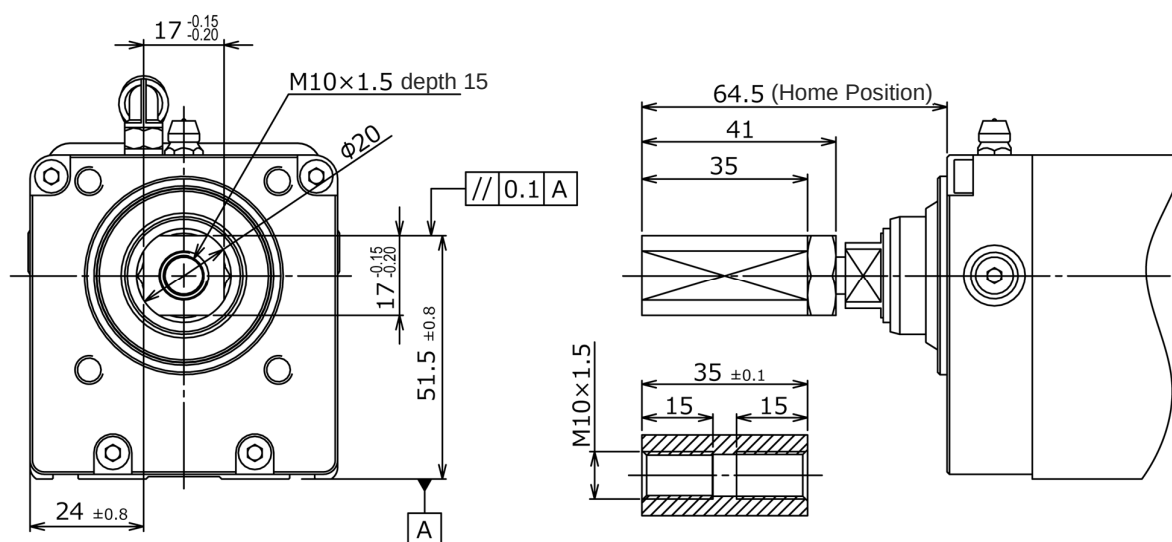
Type	Single Unit Model Code	Material	Weight (kg)
RRA4C/R	RCP6W-NFA-RR4A	Stainless Steel	0.06
RRA6C/R	RCP6W-NFA-RR6A	Stainless Steel	0.06
RRA7C/R	RCP6W-NFA-RR7A	Stainless Steel	0.2
RRA8C/R	RCP6W-NFA-RR8A	Stainless Steel	0.4



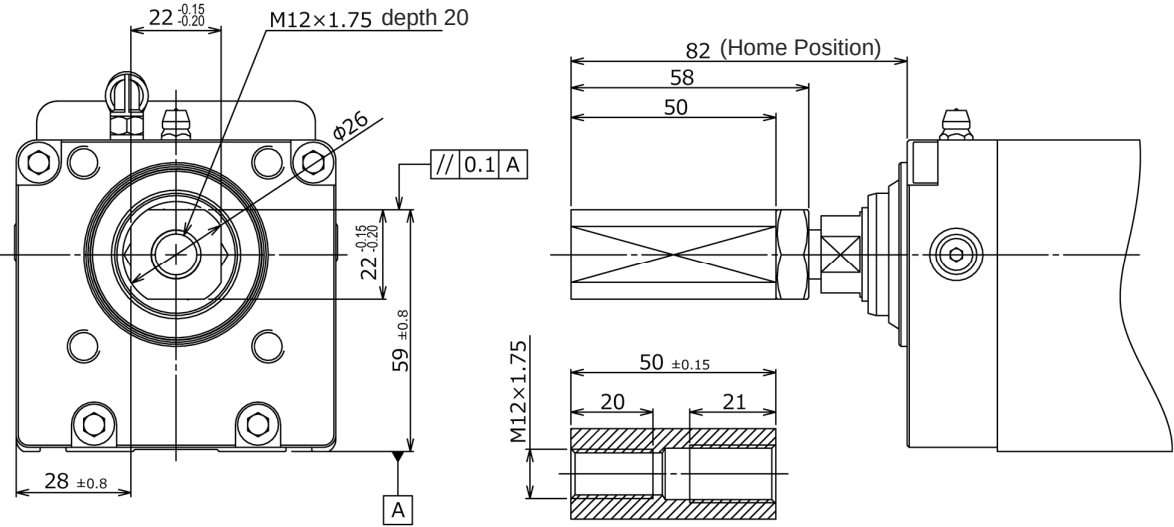
● RRA4C/R



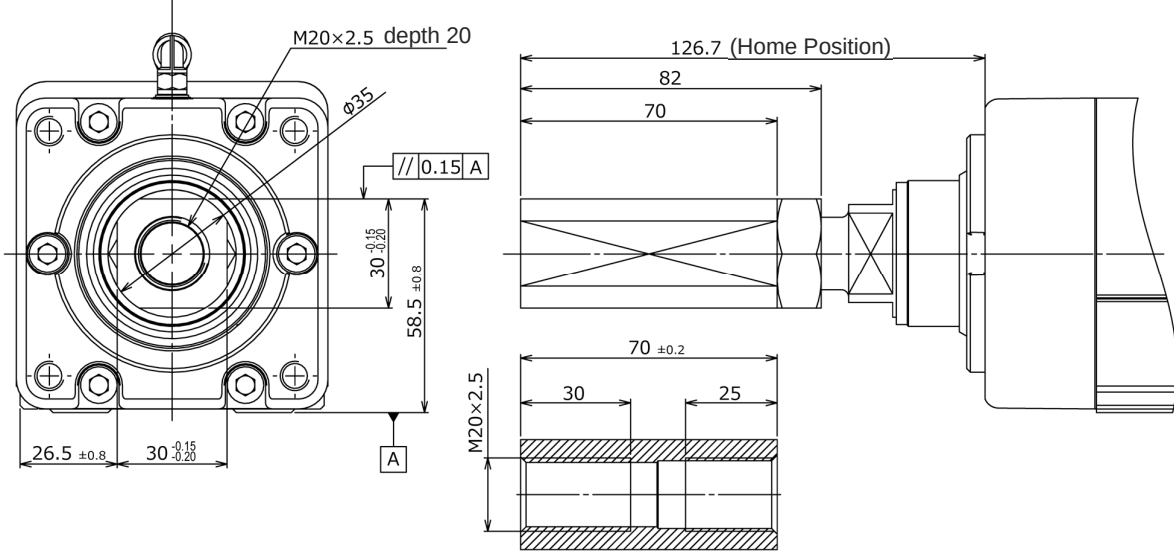
● RRA6C/R



● RRA7C/R

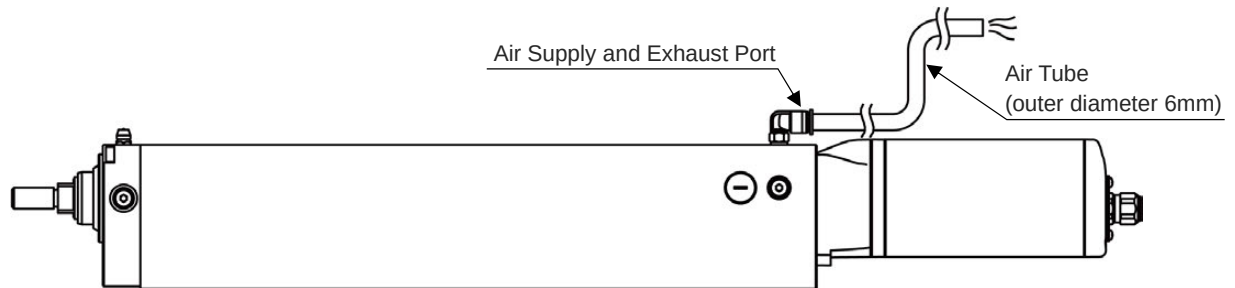


● RRA8C/R



2.4 Installation of Air Supply and Exhaust Port

- Connect an air tube with an outer diameter of 6 mm to the air supply and exhaust port.
- Place the tube end where it is protected from dust and water, and ensure that the tube is not bent or crushed.
- Do not perform air purging.
- Do not suck in water. Doing so may cause a malfunction.



ROBO Cylinder

Chapter 3

Connecting with the Controller

3.1	Connecting with the Controller	3-1
3.2	Motor • Encoder Cables	3-7
3.2.1	Dedicated connection cable for other than RCON, RSEL and RCM-P6PC	3-7
3.2.2	Connection cable dedicated for RCON, RSEL, and RCM-P6PC ...	3-9

3.1 Connecting with the Controller



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 carrier.
- 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 bend the cable in the area from the connector tip inward to 150mm on both ends.
 Standard Cables CB-CAN-MPA□□□, CB-CFA3-MPA□□□, CB-ADPC-MPA□□□
 Robot Cables CB-CAN-MPA□□□-RB, CB-CFA3-MPA□□□-RB, CB-ADPC-MPA□□□-RB

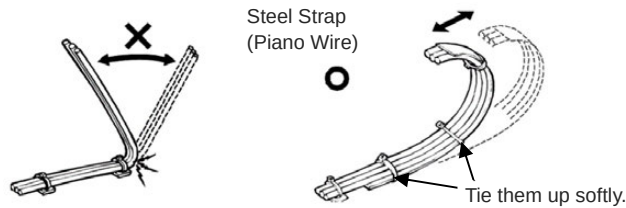


- Do not attempt to use the motor / encoder cable in a condition that the cable is bundled up in several layers such as coil winding.

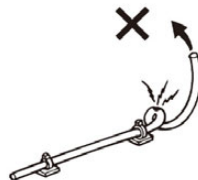
There are motor driving power line and encoder signal line in the motor / encoder cable. Therefore, if the motor / encoder cable is bundled up, the noise generated from the motor driving power line could give an influence to the encoder and may cause an error.



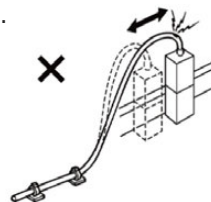
- Have a sufficient radius for bending, and avoid a bend concentrating on one point.



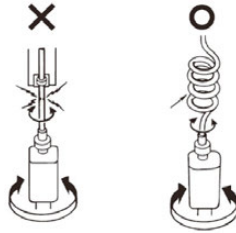
- Do not let the cable bend, kink or twist.



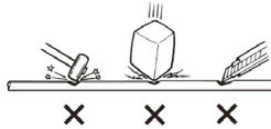
- Do not pull the cable with a strong force.



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



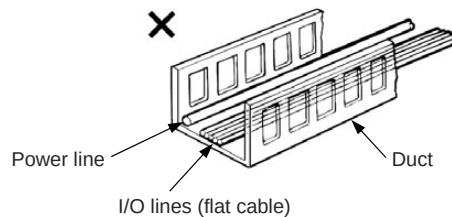
- Do not pinch, drop a heavy object onto or cut the cable.



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

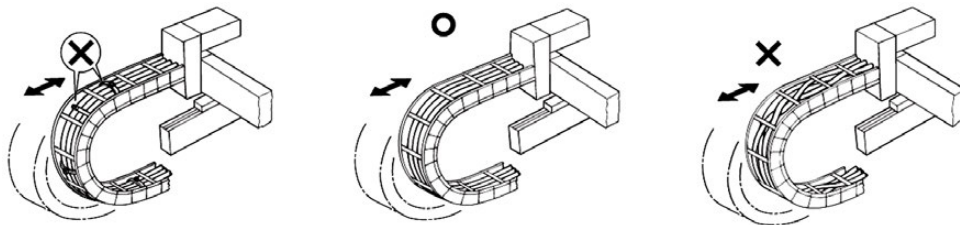


- PIO line, communication line, power and driving lines are to be put separately from each other and do not tie them together. Arrange so that such lines are independently routed in the duct.

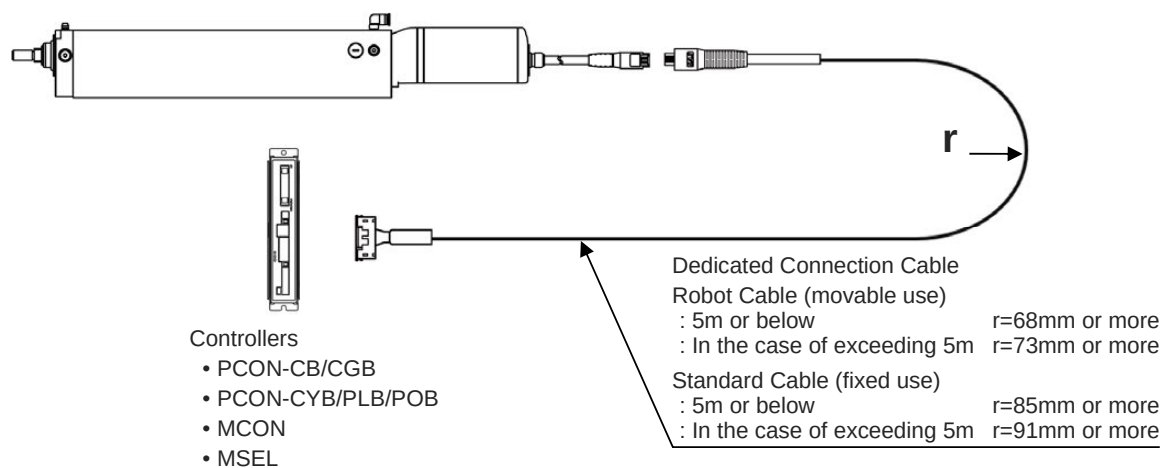


[Follow the instructions below when using a cable carrier.]

- If there is an indication to the cable for the space factor in a cable carrier, refer to the wiring instruction given by the supplier when storing the cable in the cable carrier.
- Avoid the cables to get twined or twisted in the cable carrier, 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.



[1] For Controllers PCON, MCON and MSEL



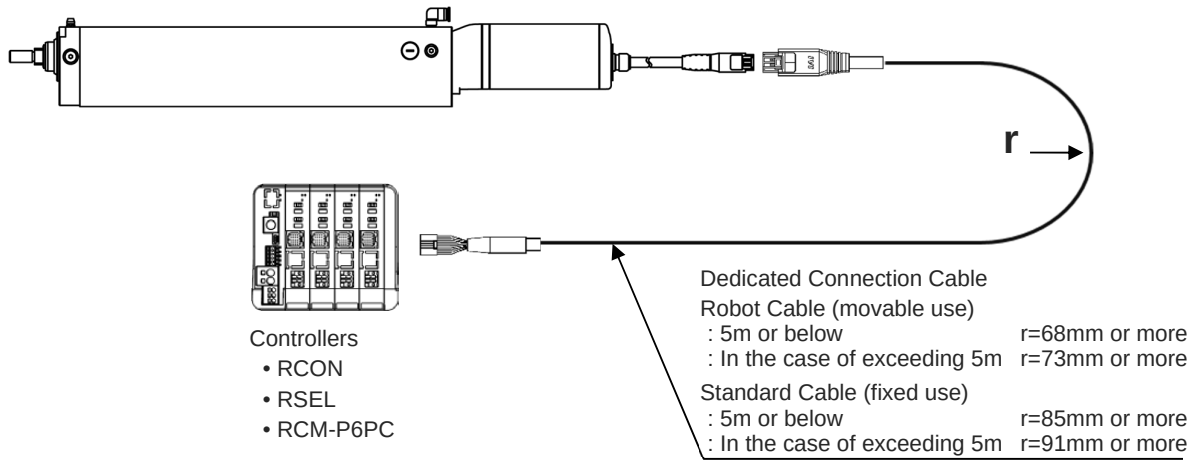
Dedicated Connection Cable Model Code

Cable Type	RRA4C/R, RRA6C/R, RRA7C/R	RRA8C/R
Motor Encoder Integrated Cable	CB-CAN-MPA□□□	CB-CFA3-MPA□□□
Motor Encoder Integrated Robot Cable	CB-CAN-MPA□□□-RB	CB-CFA3-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	—

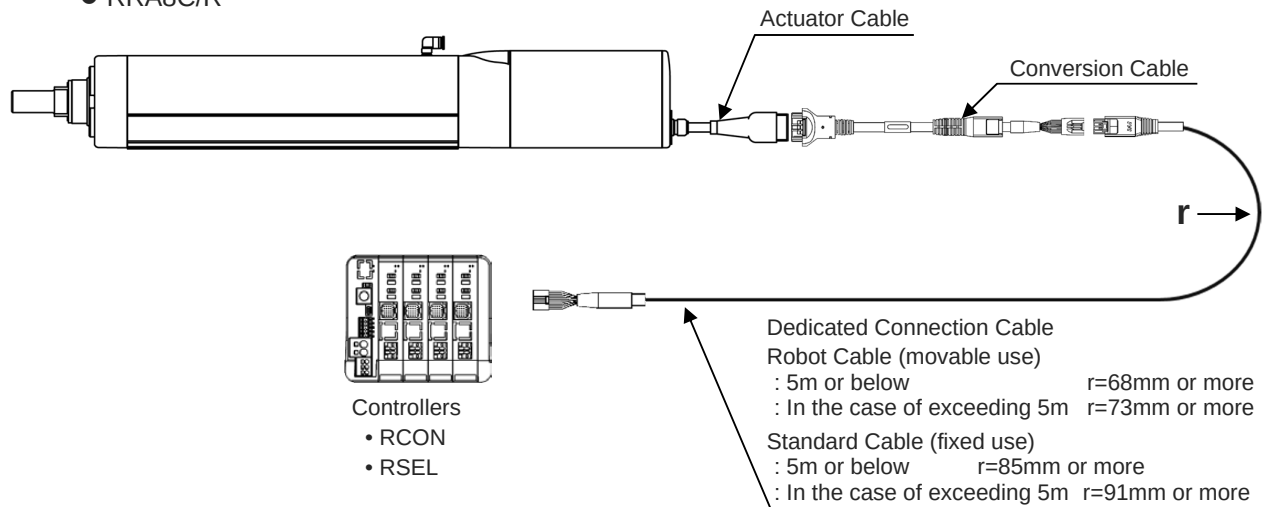
* □□□ represents the cable length. The longest corresponds to 20m. e.g.) 080 = 8m

[2] For Controllers RCON, RSEL and RCM-P6PC

- RRA4C/R, RRA6C/R, RRA7C/R



- RRA8C/R



Dedicated Connection Cable Model Code

Cable Type	RRA4C/R, RRA6C/R, RRA7C/R	RRA8C/R
Motor Encoder Integrated Cable	CB-ADPC-MPA□□□	CB-ADPC-MPA□□□
Motor Encoder Integrated Robot Cable	CB-ADPC-MPA□□□-RB	CB-ADPC-MPA□□□-RB
Motor Encoder Integrated Cable 4-way Connector Type	CB-ADPC2-MPA□□□	CB-ADPC2-MPA□□□
Motor Encoder Integrated Robot Cable 4-way Connector Type	CB-ADPC2-MPA□□□-RB	CB-ADPC2-MPA□□□-RB
Conversion Cable	—	CB-CAN-AJ002

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

[4-way Connector Cable]

This is a cable capable of changing the orientation of the cable connector on a ROBO Cylinder in four ways.

Appearance		Standard Connector Type (Actuator side)	4-way Connector Type (Actuator side)
MSEP	MCON	CB-CAN-MPA□□□ (-RB)	CB-CAN2-MPA□□□ (-RB)
PCON	ACON		
DCON	MSEL		
RCON	RSEL	CB-ADPC-MPA□□□ (-RB)	CB-ADPC2-MPA□□□ (-RB)



Caution

- The 4-way connector type should not rotate in 360degC.
It can be turned “1 time to left” and “2 times to right” from the datum point.
(Have the count of rotation at 10 times or less)
- There could be an interference of a cable to an actuator for some cable ejection directions.

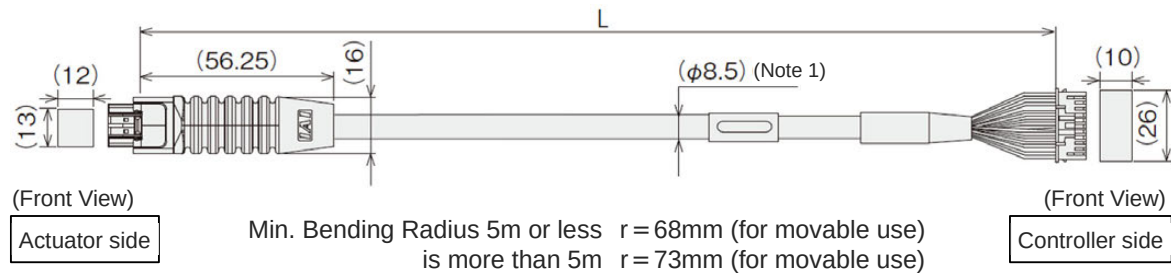
3.2 Motor • Encoder Cables

3.2.1 Dedicated connection cable for other than RCON, RSEL and RCM-P6PC

[1] Motor • Encoder Integrated Cables (For RRA4, RRA6 and RRA7)

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

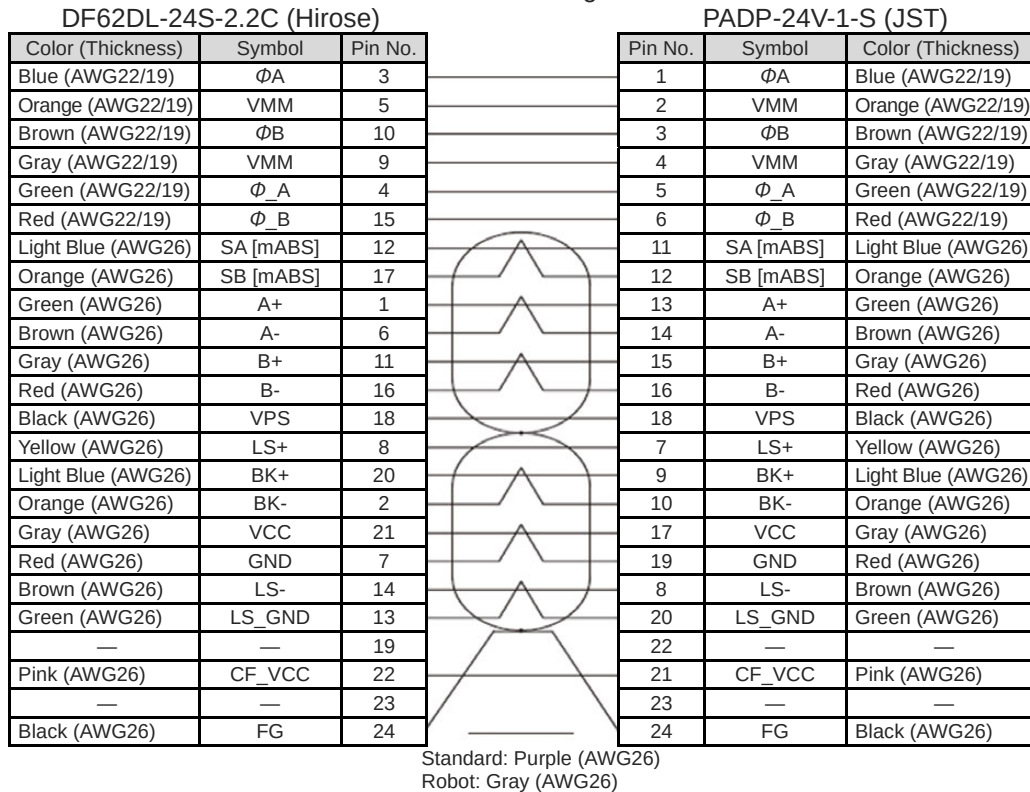
(□□□ indicates the cable length L, Example: 030=3m), Max.20m



* 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 carrier.

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

Connection Diagram

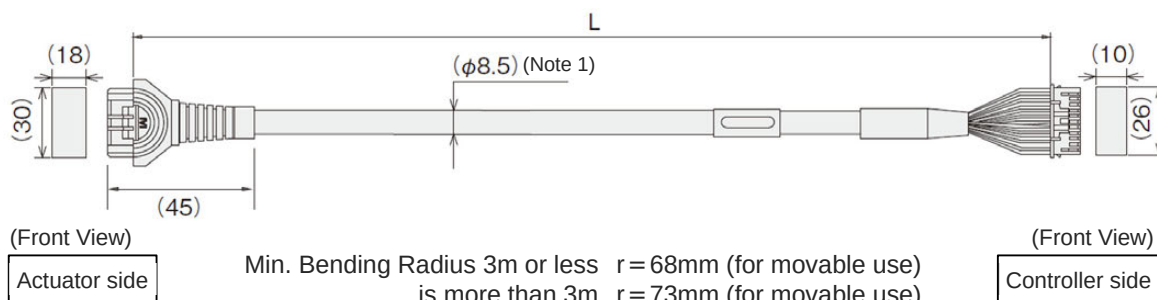


(Note) The colors of the lines shown are the colors after lines are changed. The cable color before change should be different.

[2] Motor • Encoder Integrated Cables (For RA8)

Model CB-CFA3-MPA□□□/CB-CFA3-MPA□□□-RB (robot cable)

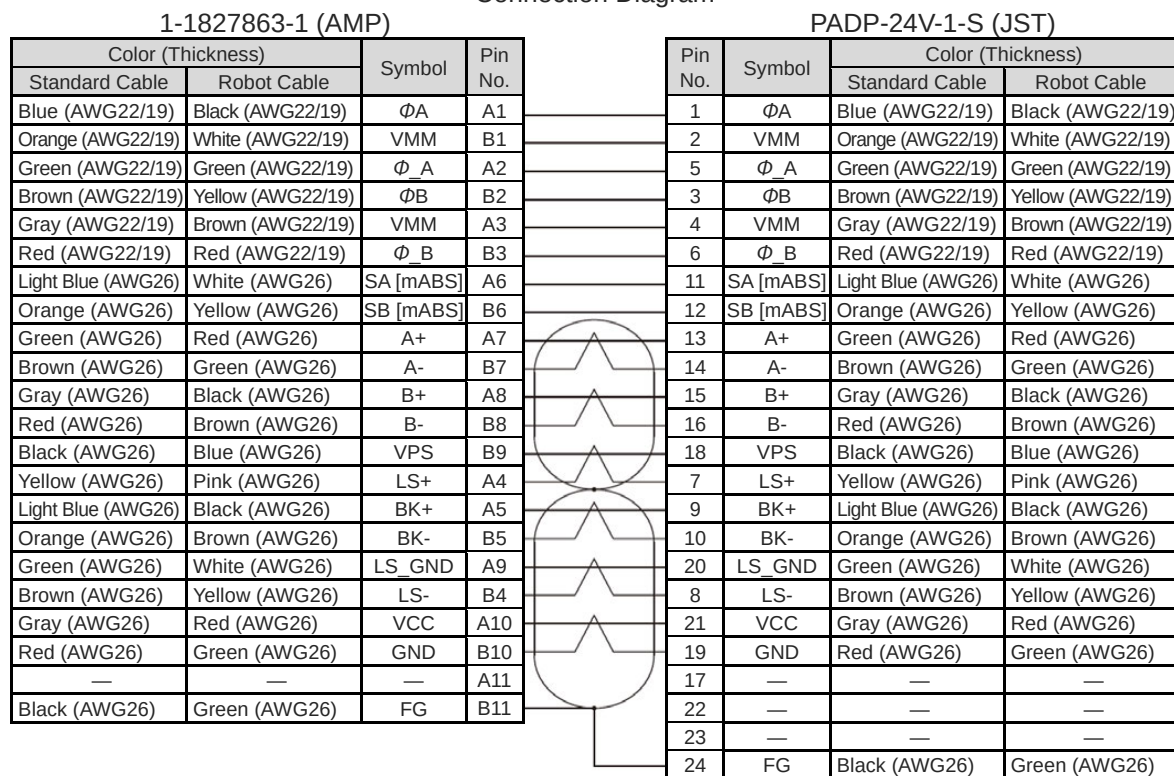
(□□□ indicates the cable length L, Example: 030=3m), Max.20m



* 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 carrier.

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

Connection Diagram



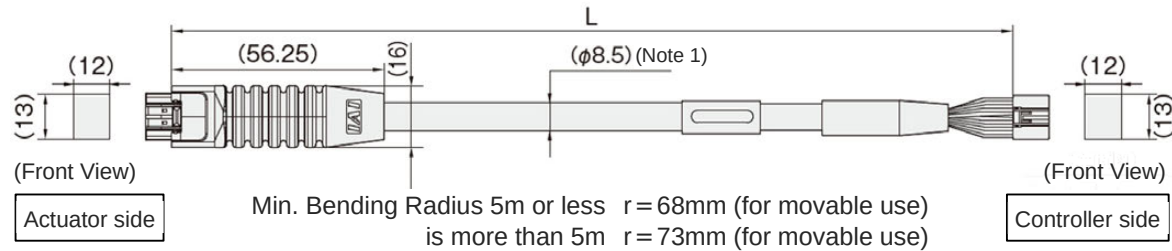
(Note) The colors of the lines shown are the colors after lines are changed. The cable color before change should be different.

3.2.2 Connection cable dedicated for RCON, RSEL, and RCM-P6PC

[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 carrier.

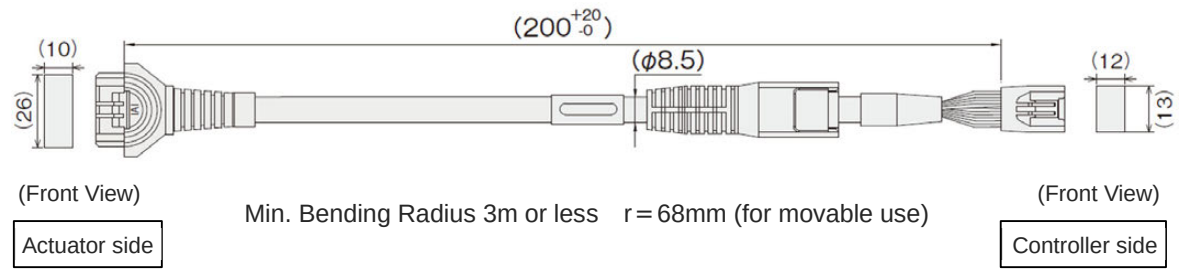
(Note 1) When the cable length is 5m or longer, it should be $\phi 9.1$.

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)	

[2] Conversion Cable

Model **CB-CAN-AJ002** length 0.2m



Connection Diagram

1-1827863-1 (AMP)

DF62B-24EP-2.2C (Hirose)

Color (Thickness)	Symbol	Pin No.	Pin No.	Symbol	Color (Thickness)
Black (AWG22)	ϕA	A1	3	ϕA	Black (AWG22)
White (AWG22)	VMM	B1	5	VMM	White (AWG22)
Green (AWG22)	ϕB	B2	10	ϕB	Green (AWG22)
Yellow (AWG22)	VMM	A3	9	VMM	Yellow (AWG22)
Brown (AWG22)	ϕA	A2	4	ϕA	Brown (AWG22)
Red (AWG22)	ϕB	B3	15	ϕB	Red (AWG22)
White (AWG26)	SA [mABS]	A6	12	SA [mABS]	White (AWG26)
Yellow (AWG26)	SB [mABS]	B6	17	SB [mABS]	Yellow (AWG26)
Red (AWG26)	A+	A7	1	A+	Red (AWG26)
Green (AWG26)	A-	B7	6	A-	Green (AWG26)
Black (AWG26)	B+	A8	11	B+	Black (AWG26)
Brown (AWG26)	B-	B8	16	B-	Brown (AWG26)
Blue (AWG26)	VPS	B9	18	VPS	Blue (AWG26)
Pink (AWG26)	LS+	A4	8	LS+	Pink (AWG26)
Black (AWG26)	BK+	A5	20	BK+	Black (AWG26)
Brown (AWG26)	BK-	B5	2	BK-	Brown (AWG26)
White (AWG26)	VCC	A10	21	VCC	White (AWG26)
Yellow (AWG26)	GND	B10	7	GND	Yellow (AWG26)
Red (AWG26)	LS-	B4	14	LS-	Red (AWG26)
Green (AWG26)	LS_GND	A9	13	LS_GND	Green (AWG26)
—	—	A11	19	—	—
Green (AWG26)	FG	B11	22	CF_VCC	White (AWG26)
			23	—	—
			24	FG	Green (AWG26)

ROBO Cylinder

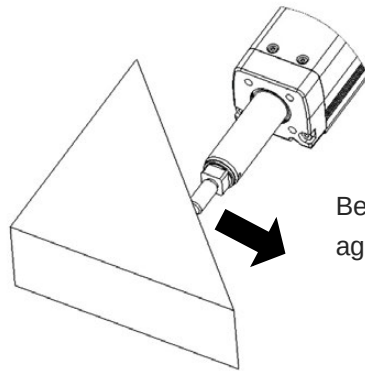
Chapter 4

Operation

4.1	Caution for Operation	4-1
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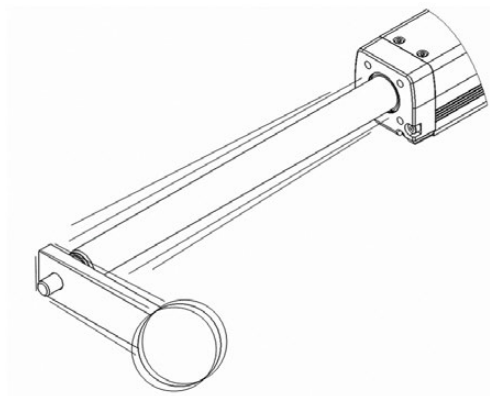
4.1 Caution for Operation

- When the reaction force against the pressing operation is the side-way force, make sure it would not exceed the allowable load.



Be careful on the direction of the reaction force against the pressing operation.

- When using a stroke of more than 200 and the load is eccentric (offset), the rod may generate vibration in some operation conditions. Apply guides to control the vibration.

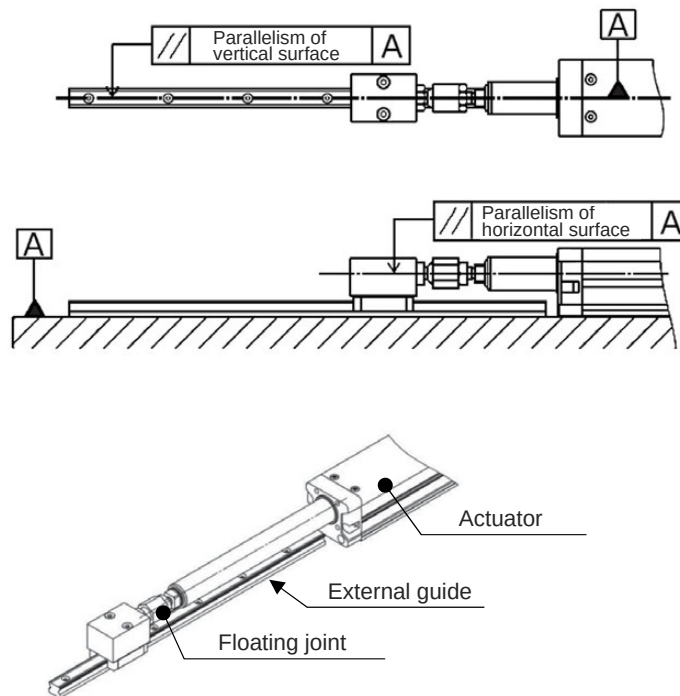


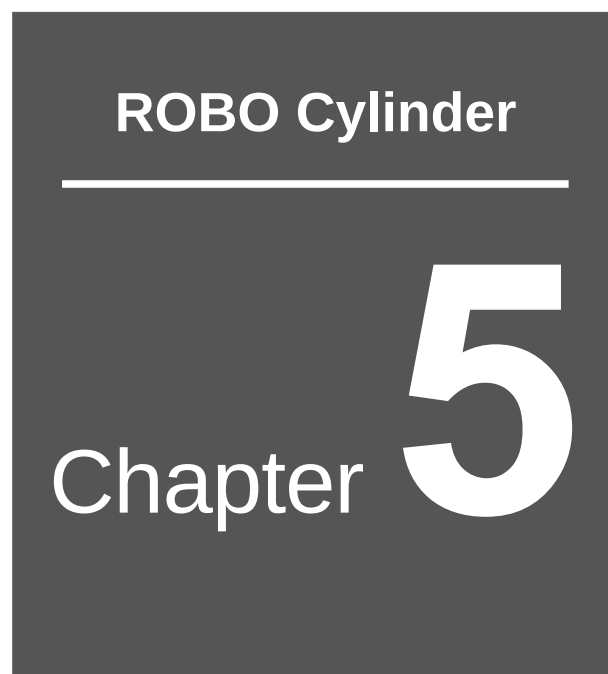
[When Using External Guide Together]

- If the parallelism between the actuator and external guide (horizontal/vertical surfaces) is not adjusted with sufficient precision, malfunctions and premature actuator damage may occur.
- When mounting the guide, perform centering for the actuator and guide. Make sure that the sliding resistance is constant over the entire stroke.
- Make sure that the current value is constant, using the monitoring function of the teaching tool.
- For the radial cylinder type, it is recommended to have a “floating joint” for fixation with an external guide.

A floating joint enables to make adjustment easy by absorbing the misalignment in parallelism between a built-in guide and an external guide.

“Rigid fixing” makes the parallelism adjustment between a built-in guide and an external guide difficult. Even with a slight misalignment in parallelism may apply load on the guide, which may damage in early stage.





Maintenance and Inspection

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	(Air Supply and Exhaust Port)	5-16

5.1 Precautions for Maintenance and Inspection Work

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



Caution

- 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 may fall, possibly injuring the operator or people nearby and damaging the actuator, workpiece or equipment.
- 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.
- An actuator stored for 6 months or more may suffer from grease degradation.
Supply grease before the start of use. Refer to [5.4 Grease Supply]

5.2 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.

5.2.1 Inspection Items and Schedule

Period of Time	Visual Inspection		Grease Supply	
	External	Internal	Ball Screw Guide	Scraper
Start of work inspection	○			
1 month inspection	○			
3 month inspection or every 300km of operated distance	○			○
Every 3 months thereafter or every 300km of operated distance	○			○
6 month inspection or every 5000km of operated distance	○	○	○	
Every 1 year thereafter	○	○	○	



Caution

- If the actuators are moved back and forth continuously over a short distance of 30mm or less, grease film may run out. As a guide, move the actuators back and forth repeatedly for around 5 cycles over a distance of 50mm or more after every 5,000 to 10,000 cycles. A layer of the grease will recover.
- To maintain the level of water protection, apply grease to the scraper regularly. Otherwise, it may cause malfunction.

5.2.2 External Visual Inspection

Check the following things.

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.
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 there any damage or scratch on the scraper?	In case that any abnormality is found, request IAI for repair.
Is there any damage or scratch on the hole cap (grease supply inlet)?	Replace the rubber cap. Refer to [5.5.1 List of Parts for Replacement].

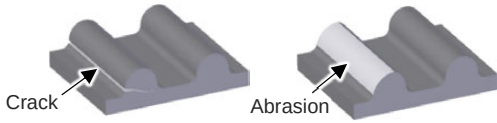
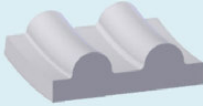
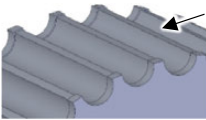
* Scraper (front bracket) is a consumable part.

The reference for replacement should be every 1,000km of drive distance, or if the drive distance in one year is less than 1,000km, should be one year.

Deterioration and wear may get accelerated in some environment of use and operational conditions. Replace it in case of any abnormality found.

5.2.3 Internal Visual Inspection

Check the following things.

Inspection Items	Maintenance Work
Is there any damage or scratch on the scraper?	Replace the rod seal assembly. Refer to [5.5.2 Replacing Rod Seal Assembly].
Is there any damage or scratch on the soft wiper?	
Is there any damage or scratch on the gasket?	
Is the lubrication condition of the sliding bearing grease adequate?	Wipe away the old grease, then replenish with new grease. Refer to [5.4 Grease Supply].
Is the belt significantly worn out on the teeth area? Is there any crack on the teeth area? Is there any chipped tooth? 	Consult with IAI when there is abnormality confirmed. Applicable Models: Motor Reversing Type (RRA4R, RRA6R, RRA7R, RRA8R) * To secure the performance of IP65, the timing belt replacement work cannot be conducted on the customer's site.
Is the timing belt hardened, softened or deformed (shrunk or expanded)? 	
Is there any significant abrasion on pulley teeth? 	



Caution

- The replacement period cannot be determined in general because the durability of the timing belt can be greatly influenced by the conditions of operation. In general, it has a bending life of several million cycles, but wear and other deterioration progress over time, so regular replacement is necessary.

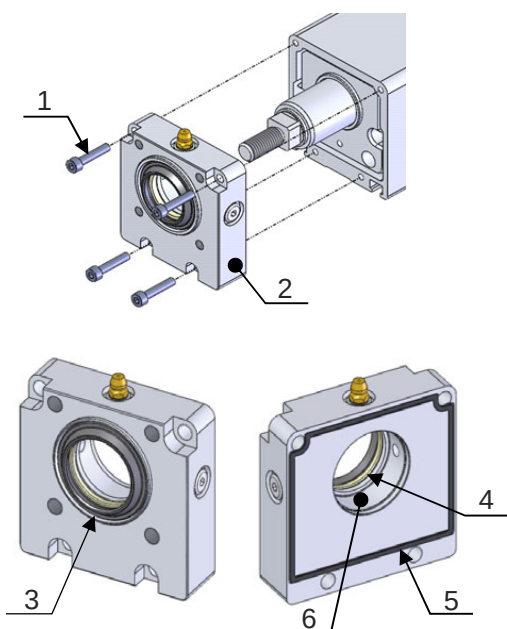
Also, since it is difficult to confirm the degradation of the core wires to retain the strength of the toothed belt by visual or looseness caused by being elongated, it is recommended to set regular replacement periods in advance in case the product is used under such conditions that gives the core wires great fatigue due to high acceleration and deceleration speed.

[1] Procedures to Inspect Scraper

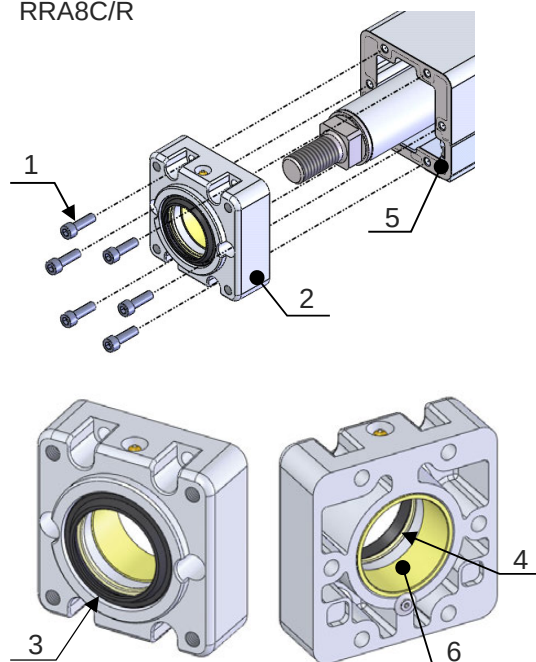
Have the work conducted in a place where there is no influence of dust or water.

1. Turn the power supply off.
2. Remove the screw and take off the rod seal assembly.
3. Inspect the rod seal assembly that was taken off.
4. Put on the rod seal assembly.

RRA4C/R, RRA6C/R, RRA7C/R



RRA8C/R



No.	Type	Part Name	Size	Quantity	Tightening Torque
1	RRA4	Hex socket head screw	M3 × 15	4	0.88N·m
	RRA6		M4 × 20	4	2.1N·m
	RRA7		M6 × 25	4	6.4N·m
	RRA8		M6 × 20	8	6.4N·m
2	Common	Rod seal assembly	—	1	—
3	Common	Scraper	—	1	—
4	Common	Soft wiper	—	1	—
5	Common	Gasket	—	1	—
6	Common	Sliding bearing	—	1	—

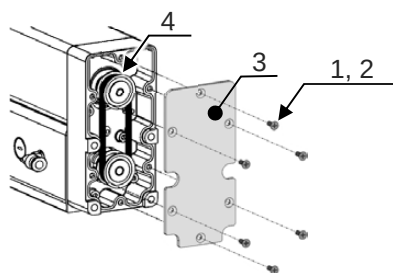
[2] Procedures to Have Inspection on Timing Belt

Applicable Models: Motor Reversing Type (RRA4R, RRA6R, RRA7R, RRA8R)

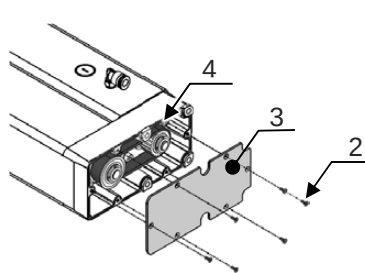
Inspection work should be conducted in a condition that will not give any influence of dust and water.

1. Turn the power supply off.
2. Remove the screw and take off the pulley cover gasket assembly.

RRA4, RRA6, RRA7



RRA8



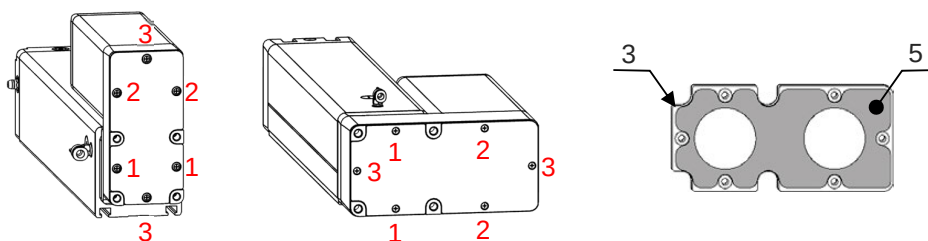
3. Inspect the timing belt.
4. Temporarily attach the pulley cover gasket assembly, then tighten it in the order shown in the figure. (from the rod shaft side)

* Pay attention not to have any deposits or scratch applied inside the main body or on the gasket inside the pulley cover.

* Tighten the screws gradually to ensure the gasket is compressed evenly.

* It is recommended to replace the gasket to the new ones in reassembly as their sealing effect will decrease due to rubber deform if they are already used once.

Order for Tightening



No.	Type	Part Name	Size	Quantity	Tightening Torque
1	RRA4R	Hex socket button head screw	M3 × 6	7	0.73N·m
	RRA4R (RCP6SW)		M3 × 6	9	0.73N·m
2	RRA6, RRA7, RRA8	Cross recessed flat-head	M3 × 6	6	0.51N·m
3	Common	Pulley cover	—	—	—
4	Common	Timing belt	—	—	—
5	Common	Gasket	—	—	—

5.3 Cleaning

5.3.1 External Cleaning

- Clean exterior surfaces as necessary.
- If the grease base oil or others drip 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 the gaps.
- Do not use oil-based solvents as they can harm lacquered and painted surfaces.
- To remove severe buildup, wipe gently with a soft cloth soaked in a neutral detergent or alcohol.

5.4 Grease Supply

5.4.1 Grease Used

Use an equivalent product.

Applied Area	Grease (Recommended product)
Scraper	Kyodo Yushi / Multitemp ET-R (Urea based grease)
Sliding Bearing Part (Rod sliding surfaces)	
Ball Screw	
Guide	

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



Caution

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

5.4.2 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)
- Cloth
- Hex Wrench (RRA4, RRA6, RRA7)
- Grease Gun (Prepare one considering diameter of grease nipple.)

Reference: Grease gun : CH-400 (Yamada Corporation)

Nozzle : NZ3 (NSK), N type + Dedicated nozzle U type (THK),
HGP NZ1 (NSK), H type (THK)

Type	Nipple Diameter	
	Ball Screw Guide	Scraper Sliding Bearing
RRA4C/R	Φ3.5	Φ6
RRA6C/R	Φ3.5	JIS A type M6 × 1.0
RRA7C/R	Φ3.5	JIS A type M6 × 1.0
RRA8C/R	Φ6	Φ6

◆ Grease Supply Procedure

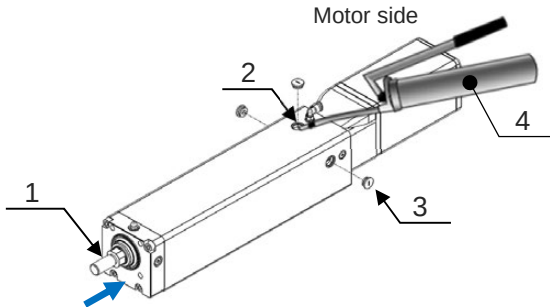
[1] Ball Screw and Guide

The RRA4C/R, RRA6C/R, and RRA7C/R have three lubrication ports. Supply grease at one of these grease inlets.

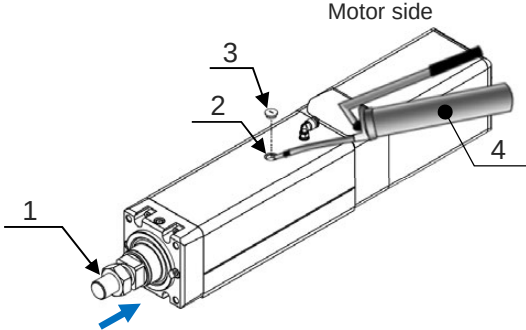
1. Move the rod toward the motor side manually or by using a teaching tool.
2. Remove a cap at one port.
3. Supply grease at the grease nipple. (Both the ball screw and the guides will be lubricated.)
4. Move the rod in its full stroke to spread the grease evenly.

Type	Amount of Grease Supply (Reference)
RRA4C/R	0.5cc to 1.0cc
RRA6C/R	1.5cc to 2.0cc
RRA7C/R	2.0cc to 2.5cc
RRA8C/R	3.0cc to 3.5cc

RRA4C/R, RRA6C/R, RRA7C/R



RRA8C/R



No.	Type	Part Name	Size	Quantity	Tightening Torque
1	Common	Rod	—	—	—
2	RRA4C/R, RRA6C/R, RRA7C/R	Grease nipple	$\phi 3.5$	3	—
	RRA8C/R		$\phi 6$	1	—
3	RRA4C/R, RRA6C/R, RRA7C/R	Hole cap	—	3	—
	RRA8C/R		—	1	—
4	Common	Grease gun	—	1	—

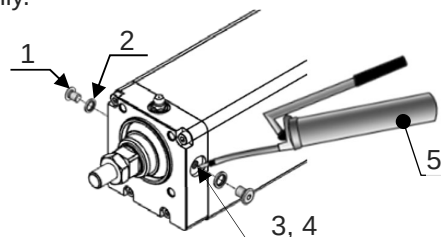
[2] Scraper and Sliding Bearings

◆ RRA4C/R, RRA6C/R, RRA7C/R, RRA8C/R

1. Remove the slim-head hex screw and seal washer from either grease outlet on the right or left.
2. Supply grease at the grease nipple until grease comes out of the outlet.
3. Attach the slim-head hex screw into the grease outlet.
4. Remove the slim-head hex screw on the opposite side and perform greasing as in Step 2.
5. Move the rod in its full stroke to spread the grease evenly.
6. Wipe off excess grease on the surface.

Reference for Grease Supply Volume
Until grease comes out of outlet

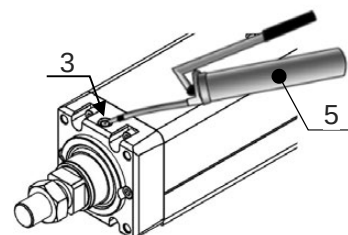
* It is recommended to replace the seal washer to the new ones in reassembly as their sealing effect will decrease due to rubber deform.



◆ RRA8C/R

1. Supply grease with a grease gun at the grease nipple.
2. Move the rod in its full stroke to spread the grease evenly.

Reference for Grease Supply Volume
1.0cc



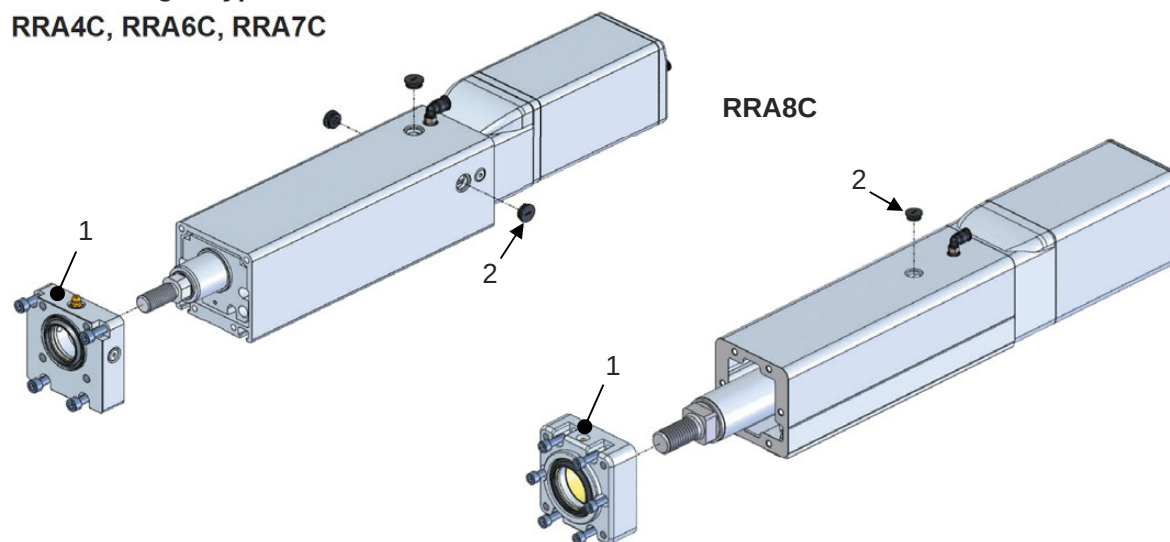
No.	Type	Part Name	Size	Quantity	Tightening Torque
1	RRA4C/R	Slim-head hex screw	M4 × 4	2	0.96N·m
	RRA6C/R, RRA7C/R		M6 × 8	2	3.9N·m
2	RRA4C/R	Seal washer	For M4	2	—
	RRA6C/R, RRA7C/R		For M6	2	—
3	RRA4C/R, RRA8C/R	Grease nipple	Φ6	1	—
	RRA6C/R, RRA7C/R		For JIS A type M6 × 1.0	1	—
4	RRA4C/R, RRA6C/R, RRA7C/R	Grease discharge outlet	—	2	—
5	Common	Grease gun	—	1	—

5.5 Replacing Components

5.5.1 List of Parts for Replacement

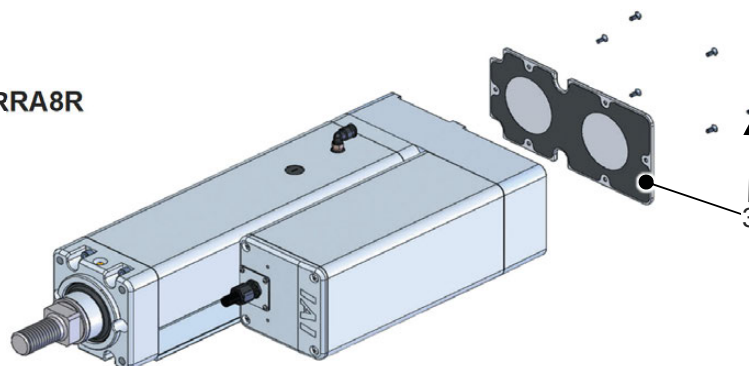
Motor Straight Type

RRA4C, RRA6C, RRA7C



Motor Reversing Type

RRA4R, RRA6R, RRA7R, RRA8R



1. Rod Seal Assembly

Type	Model Code
RRA4C/R	RCP6W-FBA-RRA4
RRA6C/R	RCP6W-FBA-RRA6
RRA7C/R	RCP6W-FBA-RRA7
RRA8C/R	RCP6W-FBA-RRA8

2. Hole Cap

Type	Model Code
RRA4C/R	RCP6W-CS-RRA4
RRA6, 7, 8C/R	RCP5W-CS-RA

3. Pulley Cover Gasket Assembly

Type	Model Code
RRA4R	RCP6W-PCA-RA4R
RRA4R (RCP6SW)	RCP6SW-PCA-RA4R
RRA6R	RCP6W-PCA-RA6R
RRA7R	RCP6W-PCA-RA7R
RRA8R	RCP6W-PCA-RA8R

Contact us if the motor or belt needs to be replaced to secure IP65 performance. The quantity arranged for the above models is one piece.

For Item 2, the quantity per axis varies depending on the type.

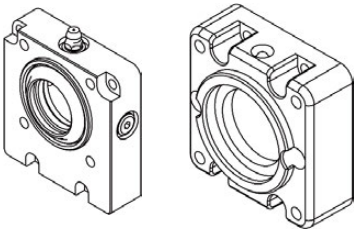
RRA4C/6C/7C: 3 pieces, RRA4R/6R/7R: 2 pieces
RRA8C/RRA8R: 1 piece

5.5.2 Replacing Rod Seal Assembly

◆ Preparation

- Hex Wrench and Torque Wrench
- Protection Equipment (e.g. Cotton Work Gloves)
- Rod Seal Assembly for Replacement

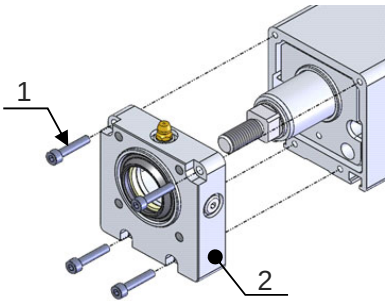
Type	Model Code
RRA4C/R	RCP6W-FBA-RR4
RRA6C/R	RCP6W-FBA-RR6
RRA7C/R	RCP6W-FBA-RR7
RRA8C/R	RCP6W-FBA-RR8



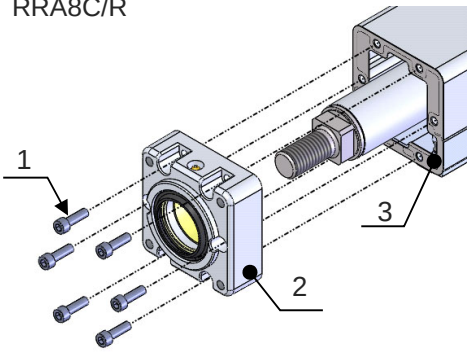
◆ Replacement procedure

1. Turn the power supply off.
2. Remove the screw and take off the rod seal assembly.
3. Attach the rod seal assembly for replacement.
4. Affix a rod seal assembly

RRA4C/R, RRA6C/R, RRA7C/R



RRA8C/R



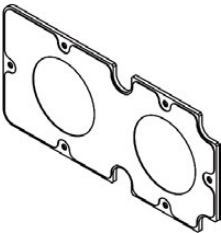
No.	Type	Part Name	Size	Quantity	Tightening Torque
1	RRA4C/R	Hex socket head screw	M3 × 15	4	0.88N·m
	RRA6C/R		M4 × 20	4	2.1N·m
	RRA7C/R		M6 × 25	4	6.4N·m
	RRA8C/R		M6 × 20	8	6.4N·m
2	Common	Rod seal assembly	—	1	—
3	Common	Gasket	—	1	—

5.5.3 Replacing Pulley Cover Gasket Assembly

◆ Preparation

- Hex Wrench and Torque Wrench
- Protection Equipment (e.g. Cotton Work Gloves)
- Rod Seal Assembly for Replacement

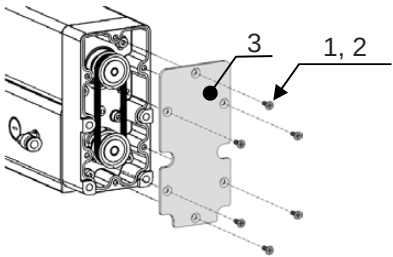
Type	Model Code
RRA4R	RCP6W-PCA-RA4R
RRA4R (RCP6SW)	RCP6SW-PCA-RA4R
RRA6R	RCP6W-PCA-RA6R
RRA7R	RCP6W-PCA-RA7R
RRA8R	RCP6W-PCA-RA8R



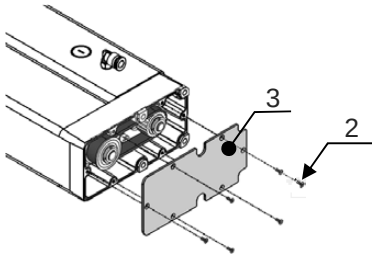
◆ Replacement procedure

1. Turn the power supply off.
2. Remove the screw and take off the pulley cover gasket assembly.

RRA4R, RRA6R, RRA7R



RRA8R



No.	Type	Part Name	Size	Quantity	Tightening Torque
1	RRA4R	Hex socket button head screw	M3 × 6	7	0.73N·m
	RRA4R (RCP6SW)		M3 × 6	9	0.73N·m
2	RRA6R, RRA7R, RRA8R	Cross recessed flat-head screw	M3 × 6	6	0.51N·m
3	Common	Pulley cover gasket assembly	—	—	—

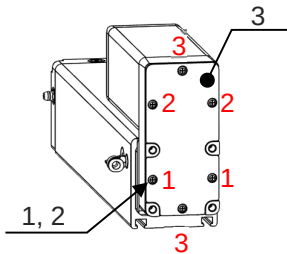
3. Temporarily attach the pulley cover gasket assembly for replacement, then tighten it up in the order shown in the figure below. (from the rod shaft side)

* Pay attention not to have any deposits or scratch applied inside the main body or on the gasket inside the pulley cover.

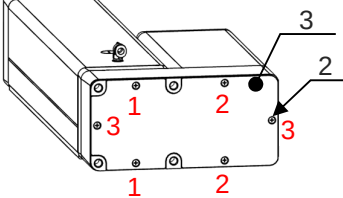
* Tighten the screws gradually to ensure the gasket is compressed evenly.

Order for Tightening

RRA4R, RRA6R, RRA7R



RRA8R



No.	Type	Part Name	Size	Quantity	Tightening Torque
1	RRA4R	Hex socket button head screw	M3 × 6	7	0.73N·m
	RRA4R (RCP6SW)		M3 × 6	9	0.73N·m
2	RRA6R, RRA7R, RRA8R	Cross recessed flat-head screw	M3 × 6	6	0.51N·m
3	Common	Pulley cover gasket assembly	—	—	—

5.5.4 Change Position of Grease Nipples and Joint (Air Supply and Exhaust Port)

Applicable Models: RRA4C/R, RRA6C/R, RRA7C/R

◆ Preparation

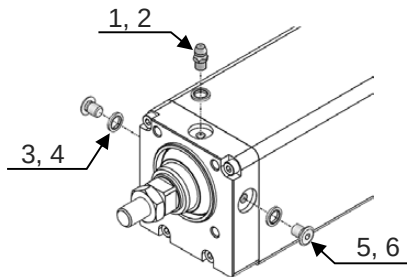
- Spanner and Spanner-Type Torque Wrench
- Hex Wrench and Torque Wrench
- Protection Equipment (e.g. Cotton Work Gloves)
- Seal Washer

(It is recommended to replace the seal washer to the new ones in reassembly as their sealing effect will decrease due to rubber deform.)

◆ Process to Change Position

[1] Grease Nipple

1. Use a spanner to remove the grease nipple and seal washer.
2. Remove the hex socket slim-head screw and seal washer at the position where the grease nipple will be installed.
3. Install the grease nipple and seal washer at the new position.
4. Install the hex socket slim-head screw and seal washer at the position from which the grease nipple was removed.
5. Supply grease. Refer to [5.4.2 Grease Supply Procedure].

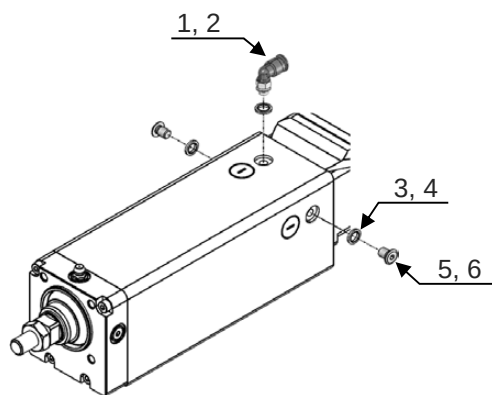


No.	Type	Part Name	Size	Quantity	Tightening Torque
1	RRA4C/R	Grease nipple	Φ6	1	0.42N·m
2	RRA6C/R, RRA7C/R		JIS A type M6 × 1.0	1	1.7N·m
3	RRA4C/R	Seal washer	For M4	3	—
4	RRA6C/R, RRA7C/R		For M6	3	—
5	RRA4C/R	Hex socket slim-head screw	M4 × 4	2	1.0N·m
6	RRA6C/R, RRA7C/R		M6 × 8	2	4.0N·m

[2] Joint

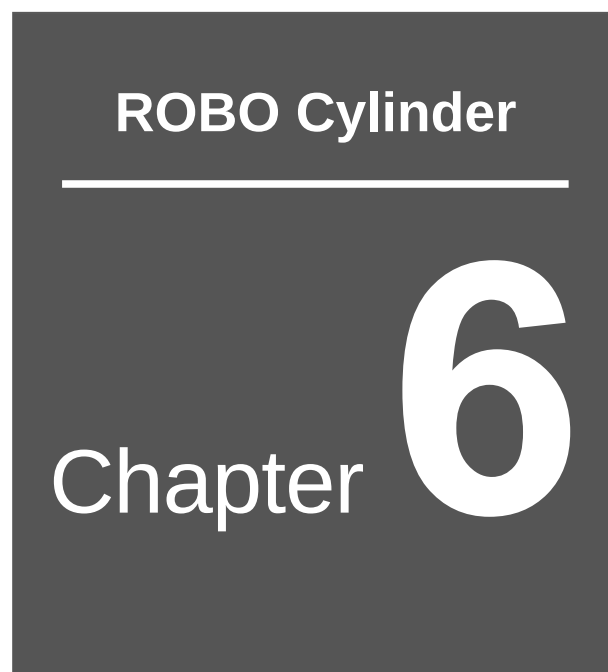
1. Use a spanner to remove the joint and seal washer.
2. Remove the slim-head hex screw and seal washer at the position where the joint will be installed.
3. Install the joint and seal washer at the new position.
4. Install the slim-head hex screw and seal washer at the position from which the joint was removed.

*When changing the positions, pay attention to interference to peripherals in case the stroke of the actuator is short or for motor reversed type.



No.	Type	Part Name	Size	Quantity	Tightening Torque
1	RRA4C/R	Joint	PL6-M5M	1	1.5N·m
2	RRA6C/R, RRA7C/R		PL6-M6M	1	2.5N·m
3	RRA4C/R	Seal washer	For M5	3	—
4	RRA6C/R, RRA7C/R		For M6	3	—
5	RRA4C/R	Slim-head hex screw	M5 × 6	2	2.0N·m
6	RRA6C/R, RRA7C/R		M6 × 8	2	4.0N·m





External Dimensions

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6. External Dimensions

6.2 RCP6SW-RAA4C Built-in Controller Specification

*1 Although a part of the gasket is raised, it does not affect the splash proof performance.

*2 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.

*3 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.

(Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.

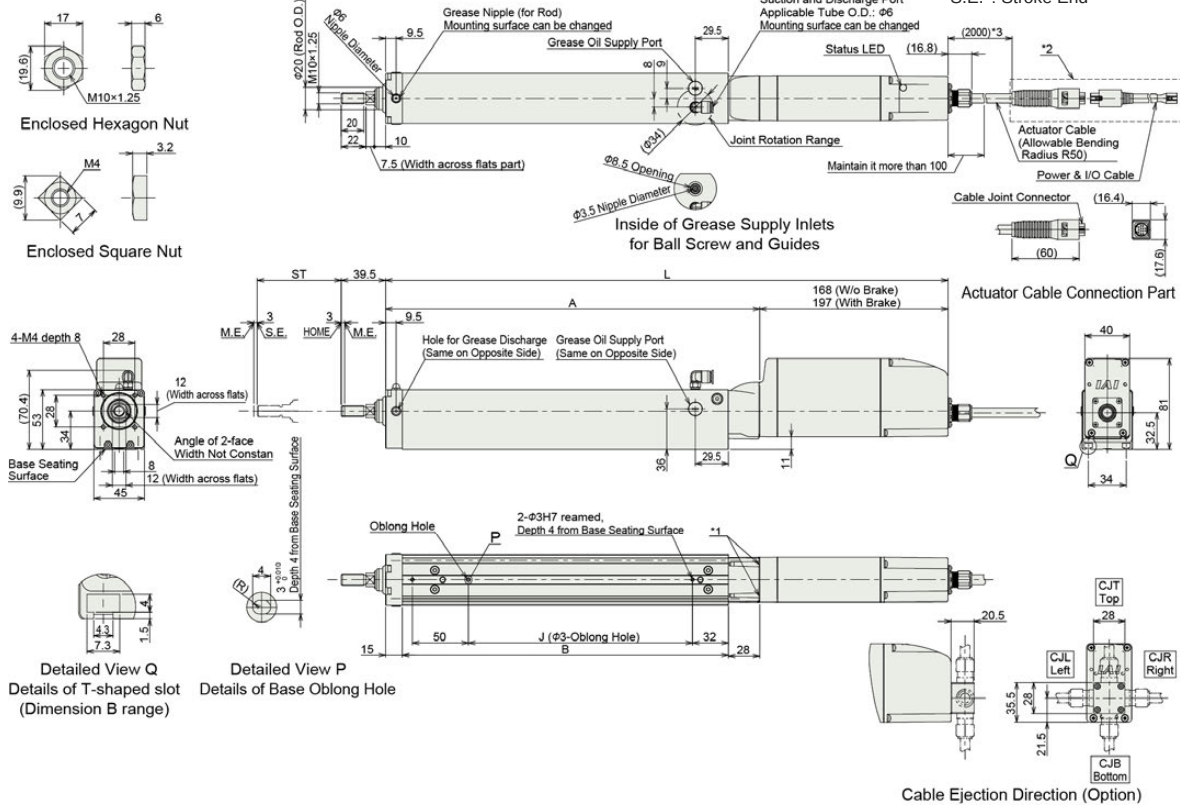
(Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.

(Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.

(Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.

(Note) There are one piece of hex nut and four pieces of square nuts enclosed.

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



■ Dimensions by Stroke

Stroke		Unit (mm)							
L	W/o Brake	352	402	452	502	552	602	652	702
	With Brake	381	431	481	531	581	631	681	731
A		184	234	284	334	384	434	484	534
B		141	191	241	291	341	391	441	491
J		50	100	150	200	250	300	350	400
Rod Tip Static Allowable Load (N)		63.4	50.7	42.1	36.0	31.3	27.6	24.6	22.2
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	28.9	22.2	17.9	14.8	12.6	10.8	9.4	8.2
	Offset 100mm	17.9	15.5	13.4	11.6	10.2	9.0	8.0	7.1
Rod Tip Static Allowable Torque (N·m)		6.4	5.1	4.3	3.7	3.2	2.9	2.6	2.3
Rod Tip Dynamic Allowable Torque (N·m)		1.7	1.5	1.3	1.1	1.0	0.9	0.7	0.7

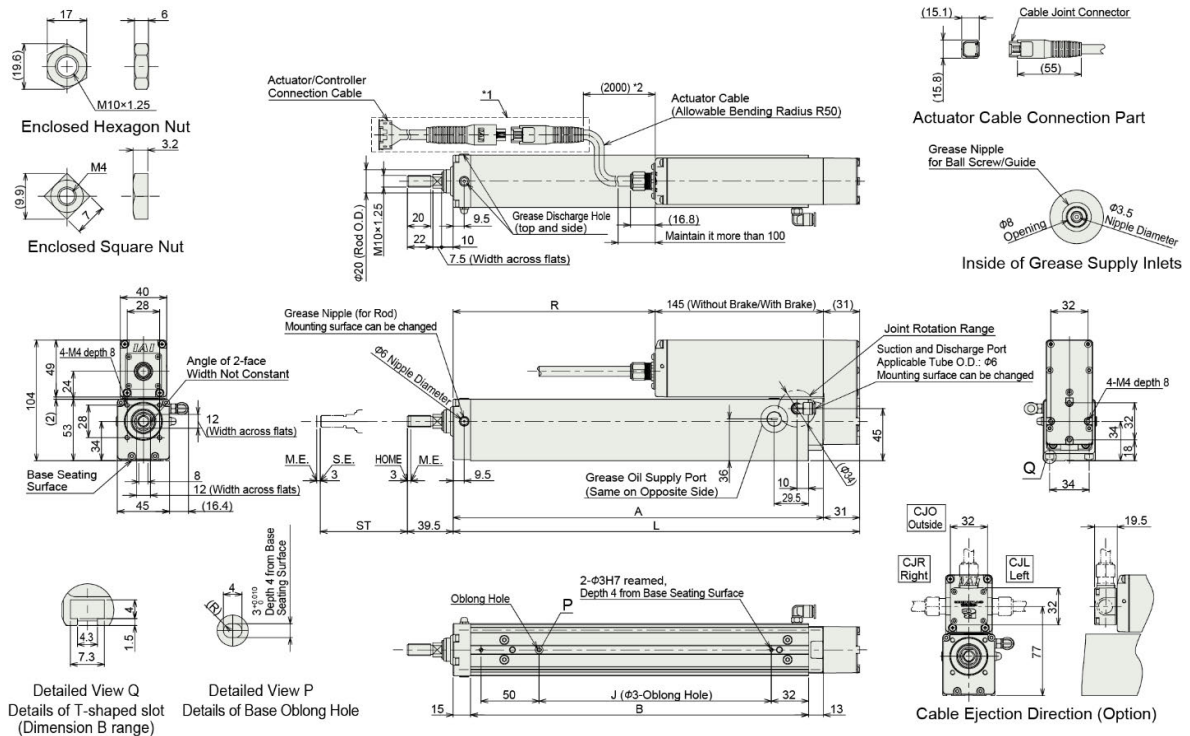
■ Mass by Stroke

Stroke		Unit (kg)							
Mass	W/o Brake	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1
	With Brake	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2

6.3 RCP6W-RA4R

- *1 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.
- *2 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.
- (Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.
- (Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.
- (Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.
- (Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.
- (Note) There are one piece of hex nut and four pieces of square nuts enclosed.

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



6. External Dimensions

■ Dimensions by Stroke

Unit (mm)

Stroke		50	100	150	200	250	300	350	400
L	W/o Brake	309	359	409	459	509	559	609	659
	With Brake	340	390	440	490	540	590	640	690
A		184	234	284	334	384	434	484	534
B		141	191	241	291	341	391	441	491
J		50	100	150	200	250	300	350	400
Rod Tip Static Allowable Load (N)		63.4	50.7	42.1	36.0	31.3	27.6	24.6	22.2
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	28.9	22.2	17.9	14.8	12.6	10.8	9.4	8.2
	Offset 100mm	17.9	15.5	13.4	11.6	10.2	9.0	8.0	7.1
Rod Tip Static Allowable Torque (N·m)		6.4	5.1	4.3	3.7	3.2	2.9	2.6	2.3
Rod Tip Dynamic Allowable Torque (N·m)		1.7	1.5	1.3	1.1	1.0	0.9	0.7	0.7

■ Mass by Stroke

Unit (kg)

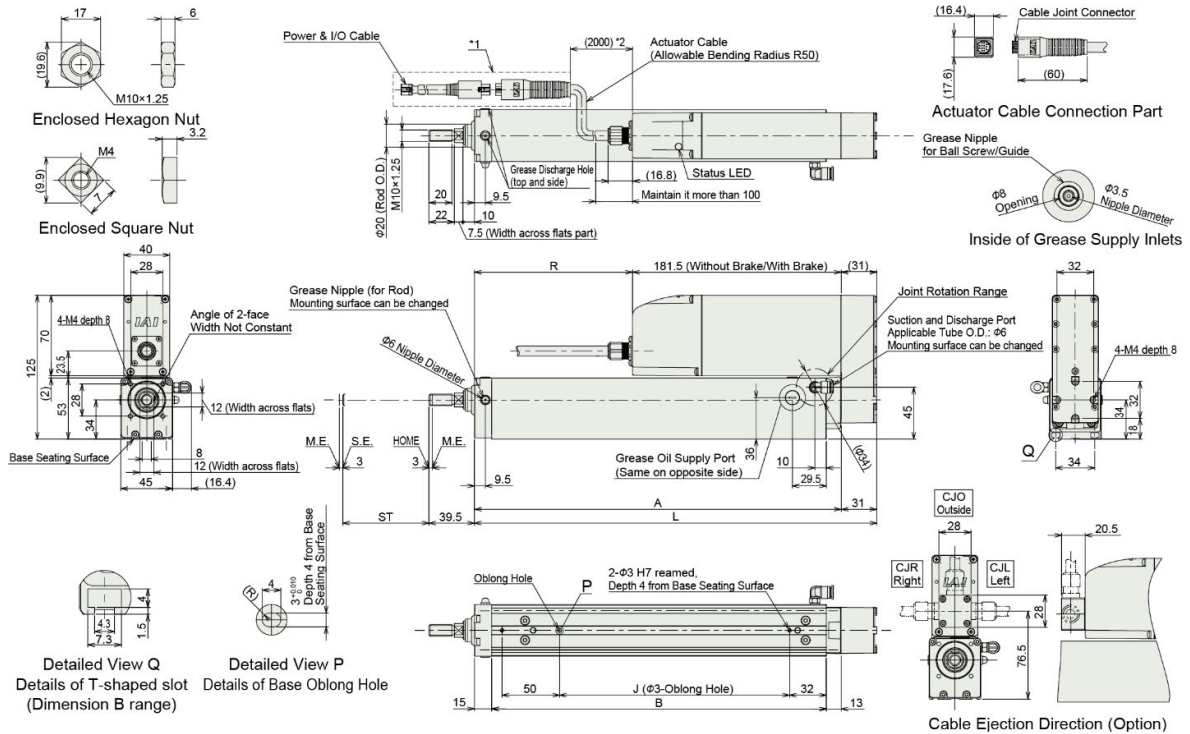
Stroke		50	100	150	200	250	300	350	400
Mass	W/o Brake	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9
	With Brake	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0

6. External Dimensions

6.4 RCP6SW-RAA4R Built-in Controller Specification

- *1 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.
 *2 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.
 (Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.
 (Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.
 (Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.
 (Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.
 (Note) There are one piece of hex nut and four pieces of square nuts enclosed.

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



■ Dimensions by Stroke

Unit (mm)

Stroke		50	100	150	200	250	300	350	400
L	W/o Brake	352	402	452	502	552	602	652	702
	With Brake	381	431	481	531	581	631	681	731
A		184	234	284	334	384	434	484	534
B		141	191	241	291	341	391	441	491
J		50	100	150	200	250	300	350	400
Rod Tip Static Allowable Load (N)		63.4	50.7	42.1	36.0	31.3	27.6	24.6	22.2
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	28.9	22.2	17.9	14.8	12.6	10.8	9.4	8.2
	Offset 100mm	17.9	15.5	13.4	11.6	10.2	9.0	8.0	7.1
Rod Tip Static Allowable Torque (N·m)		6.4	5.1	4.3	3.7	3.2	2.9	2.6	2.3
Rod Tip Dynamic Allowable Torque (N·m)		1.7	1.5	1.3	1.1	1.0	0.9	0.7	0.7

■ Mass by Stroke

Unit (kg)

Stroke		50	100	150	200	250	300	350	400
Mass	W/o Brake	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1
	With Brake	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2

6.6 RCP6SW-RAA6C Built-in Controller Specification

*1 Although a part of the gasket is raised, it does not affect the splash proof performance.

*2 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.

*3 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.

(Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.

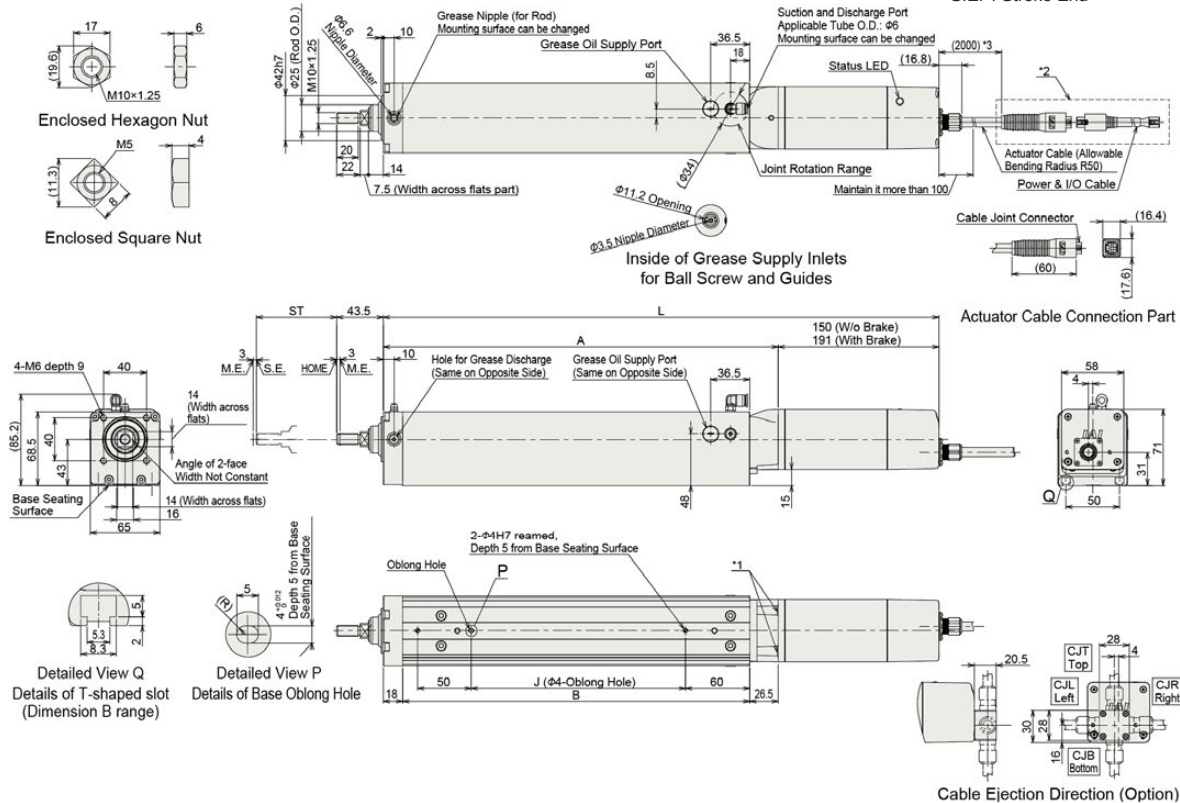
(Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.

(Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.

(Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.

(Note) There are one piece of hex nut and four pieces of square nuts enclosed.

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



■ Dimensions by Stroke

Stroke		Unit (mm)							
L	W/o Brake	368.5	418.5	468.5	518.5	568.5	618.5	668.5	718.5
	With Brake	409.5	459.5	509.5	559.5	609.5	659.5	709.5	759.5
A		218.5	268.5	318.5	368.5	418.5	468.5	518.5	568.5
B		174	224	274	324	374	424	474	524
J		50	100	150	200	250	300	350	400
Rod Tip Static Allowable Load (N)		144	117	99	85.4	75	66.7	59.9	54.3
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	58.1	46.4	38.3	32.4	27.9	24.4	21.5	19.2
	Offset 100mm	38.8	34.0	29.7	26.2	23.2	20.8	18.7	16.8
Rod Tip Static Allowable Torque (N·m)		14.5	11.8	10.0	8.7	7.6	6.8	6.2	5.6
Rod Tip Dynamic Allowable Torque (N·m)		3.8	3.3	2.9	2.6	2.3	2.0	1.8	1.6

■ Mass by Stroke

Stroke		Unit (kg)							
Mass	W/o Brake	2.9	3.2	3.6	4.0	4.3	4.7	5.0	5.4
	With Brake	3.2	3.5	3.9	4.3	4.6	5.0	5.3	5.7

6.7 RCP6W-RAA6R

*1 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.

*2 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.

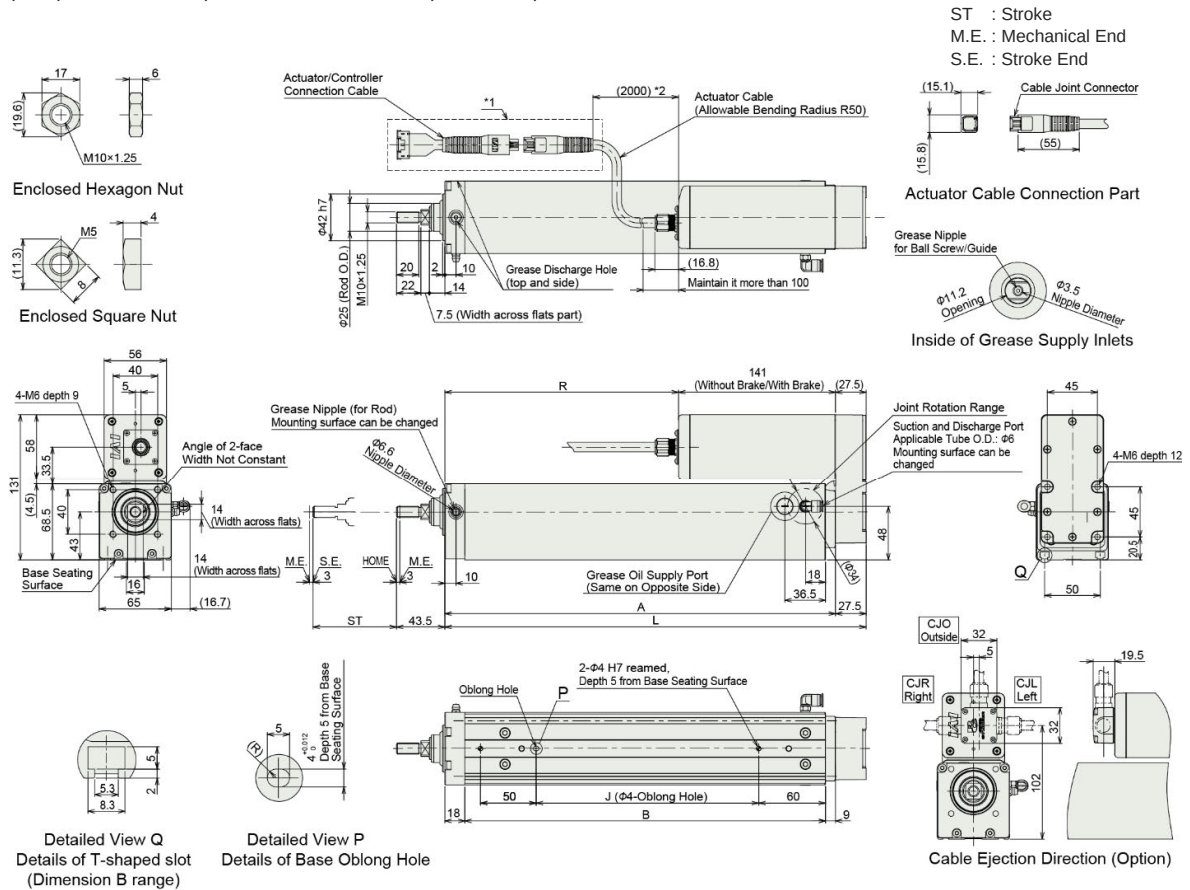
(Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.

(Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.

(Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.

(Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.

(Note) There are one piece of hex nut and four pieces of square nuts enclosed.



■ Dimensions by Stroke

		Unit (mm)							
Stroke		50	100	150	200	250	300	350	400
L		228.5	278.5	328.5	378.5	428.5	478.5	528.5	578.5
A		201	251	301	351	401	451	501	551
B		174	224	274	324	374	424	474	524
J		50	100	150	200	250	300	350	400
R		60	110	160	210	260	310	360	410
Rod Tip Static Allowable Load (N)		144	117	99	85.4	75	66.7	59.9	54.3
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	58.1	46.4	38.3	32.4	27.9	24.4	21.5	19.2
	Offset 100mm	38.8	34.0	29.7	26.2	23.2	20.8	18.7	16.8
Rod Tip Static Allowable Torque (N·m)		14.5	11.8	10.0	8.7	7.6	6.8	6.2	5.6
Rod Tip Dynamic Allowable Torque (N·m)		3.8	3.3	2.9	2.6	2.3	2.0	1.8	1.6

■ Mass by Stroke

		Unit (kg)							
Stroke		50	100	150	200	250	300	350	400
Mass	W/o Brake	3.1	3.4	3.8	4.2	4.5	4.9	5.2	5.6
	With Brake	3.2	3.5	3.9	4.3	4.6	5.0	5.3	5.7

6. External Dimensions

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



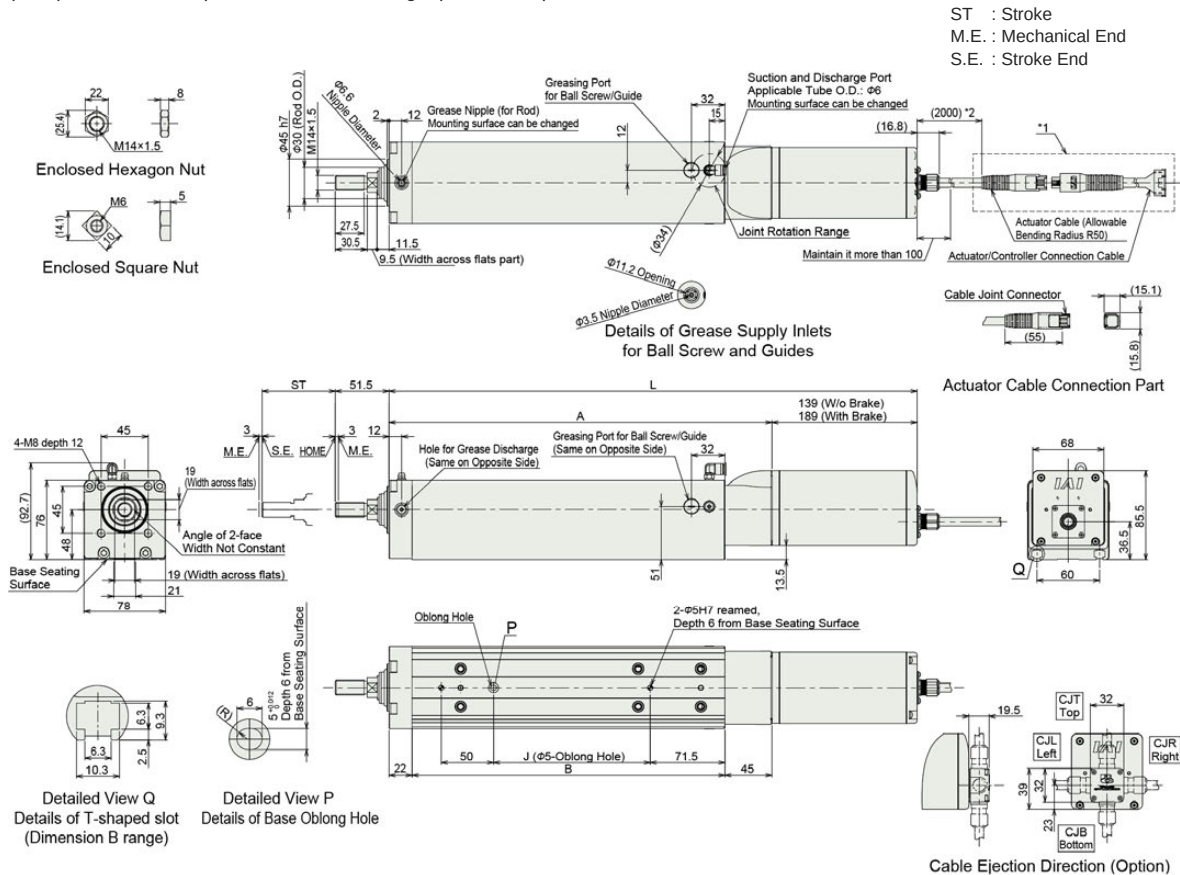
Unit (mm)

- Mass by Stroke

Stroke		50	100	150	200	250	300	350	400
Mass	W/o Brake	3.3	3.6	4.0	4.4	4.7	5.1	5.4	5.8
	With Brake	3.4	3.7	4.1	4.5	4.8	5.2	5.5	5.9

6.9 RCP6W-RAA7C

- *1 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.
- *2 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.
- (Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.
- (Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.
- (Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.
- (Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.
- (Note) There are one piece of hex nut and eight pieces of square nuts enclosed.



■ Dimensions by Stroke

Unit (mm)

Stroke		50	100	150	200	250	300	350	400	450	500
L	W/o Brake	405.5	455.5	505.5	555.5	605.5	655.5	705.5	755.5	805.5	855.5
	With Brake	455.5	505.5	555.5	605.5	655.5	705.5	755.5	805.5	855.5	905.5
A		266.5	316.5	366.5	416.5	466.5	516.5	566.5	616.5	666.5	716.5
B		199.5	249.5	299.5	349.5	399.5	449.5	499.5	549.5	599.5	649.5
J		50	100	150	200	250	300	350	400	450	500
Rod Tip Static Allowable Load (N)		175.2	146.8	126.3	110.8	98.6	88.7	80.6	73.8	68.0	63.0
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	75.7	62.6	53.1	46.0	40.5	36.1	32.5	29.4	26.9	24.7
	Offset 100mm	49.8	45.1	40.5	36.5	33.1	30.2	27.7	25.5	23.6	21.9
Rod Tip Static Allowable Torque (N·m)		17.6	14.7	12.7	11.2	9.9	9.0	8.2	7.5	6.9	6.4
Rod Tip Dynamic Allowable Torque (N·m)		5.0	4.5	4.0	3.6	3.3	3.0	2.8	2.5	2.3	2.2

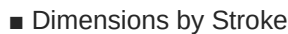
■ Mass by Stroke

Unit (kg)

Stroke		50	100	150	200	250	300	350	400	450	500
Mass	W/o Brake	5.0	5.5	6.0	6.5	6.9	7.4	7.9	8.4	8.9	9.4
	With Brake	5.4	5.9	6.4	6.9	7.3	7.8	8.3	8.8	9.3	9.8

6. External Dimensions

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

Unit (mm)

Unit (kg)

Stroke		50	100	150	200	250	300	350	400	450	500
Mass	W/o Brake	5.2	5.7	6.2	6.7	7.1	7.6	8.1	8.6	9.1	9.6
	With Brake	5.6	6.1	6.6	7.1	7.5	8.0	8.5	9.0	9.5	10.0

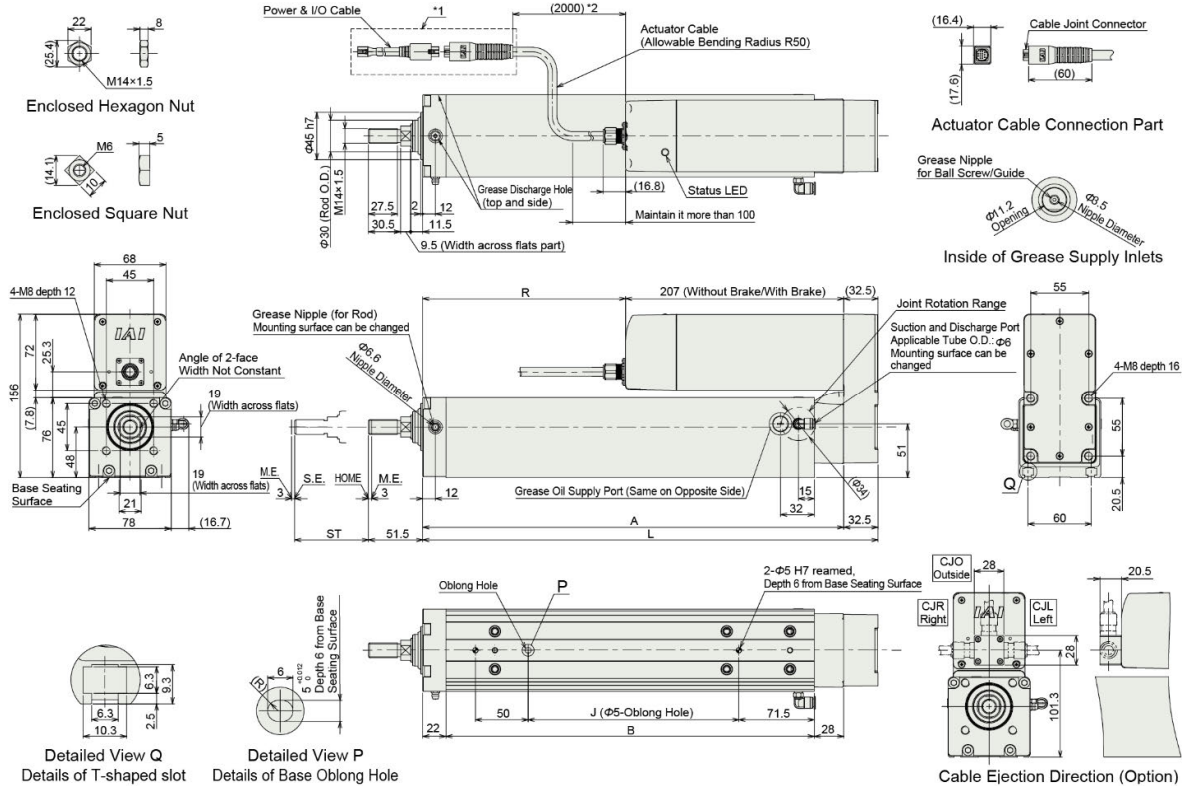
6-11

6. External Dimensions

6.12 RCP6SW-RAA7R Built-in Controller Specification

- *1 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.
 *2 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.
 (Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.
 (Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.
 (Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.
 (Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.
 (Note) There are one piece of hex nut and eight pieces of square nuts enclosed.

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



■ Dimensions by Stroke

Unit (mm)

Stroke	50	100	150	200	250	300	350	400	450	500
L	282	332	382	432	482	532	582	632	682	732
A	249.5	299.5	349.5	399.5	449.5	499.5	549.5	599.5	649.5	699.5
B	199.5	249.5	299.5	349.5	399.5	449.5	499.5	549.5	599.5	649.5
J	50	100	150	200	250	300	350	400	450	500
R	42.5	92.5	142.5	192.5	242.5	292.5	342.5	392.5	442.5	492.5
Rod Tip Static Allowable Load (N)	175.2	146.8	126.3	110.8	98.6	88.7	80.6	73.8	68.0	63.0
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	75.7	62.6	53.1	46.0	40.5	36.1	32.5	29.4	26.9
	Offset 100mm	49.8	45.1	40.5	36.5	33.1	30.2	27.7	25.5	23.6
Rod Tip Static Allowable Torque (N·m)	17.6	14.7	12.7	11.2	9.9	9.0	8.2	7.5	6.9	6.4
Rod Tip Dynamic Allowable Torque (N·m)	5.0	4.5	4.0	3.6	3.3	3.0	2.8	2.5	2.3	2.2

■ Mass by Stroke

Unit (kg)

Stroke	50	100	150	200	250	300	350	400	450	500
Mass	W/o Brake	5.8	6.3	6.8	7.3	7.7	8.2	8.7	9.2	10.2
	With Brake	5.9	6.4	6.9	7.4	7.8	8.3	8.8	9.3	10.3

6. External Dimensions

6.14 RCP6SW-RRA8C Built-in Controller Specification

*1 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.

*2 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.

(Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.

(Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.

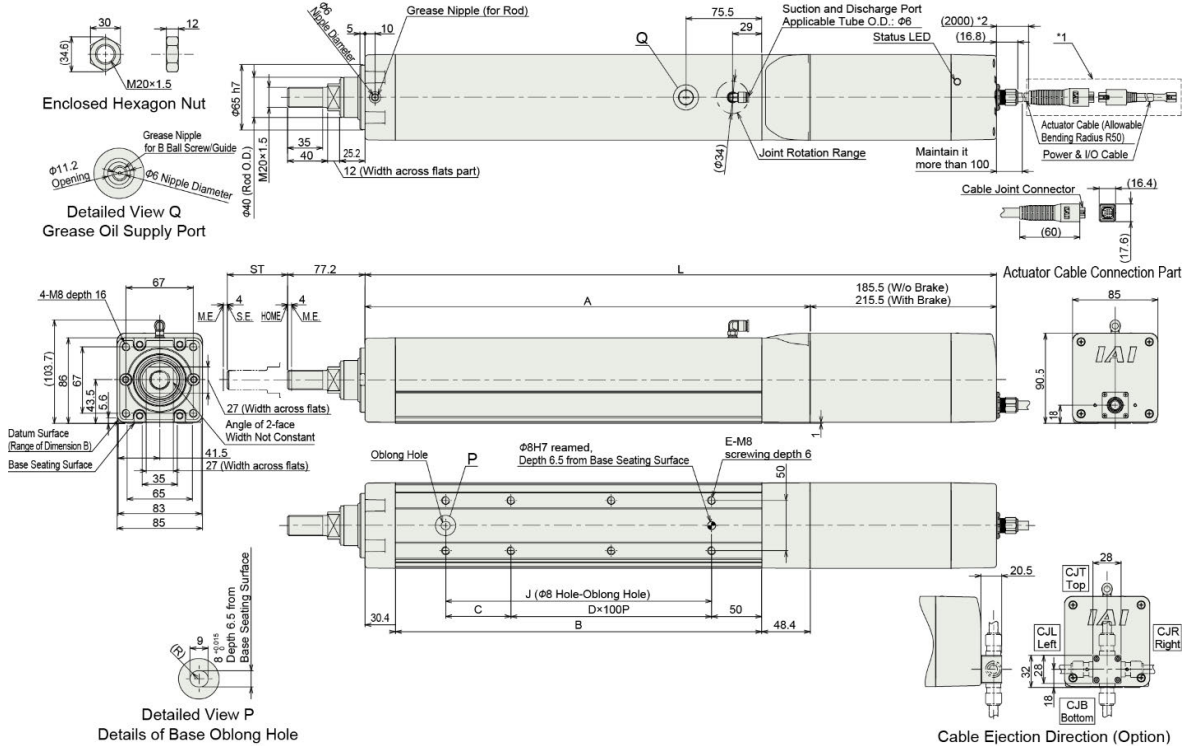
(Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.

(Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.

ST : Stroke

M.E. : Mechanical End

S.E. : Stroke End



■ Dimensions by Stroke

Unit (mm)

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700
L	W/o Brake	479.3	529.3	579.3	629.3	679.3	729.3	779.3	829.3	879.3	929.3	979.3	1029.3	1079.3	1129.3
	With Brake	509.3	559.3	609.3	659.3	709.3	759.3	809.3	859.3	909.3	959.3	1009.3	1059.3	1109.3	1159.3
A		293.8	343.8	393.8	443.8	493.8	543.8	593.8	643.8	693.8	743.8	793.8	843.8	893.8	943.8
B		215	265	315	365	415	465	515	565	615	665	715	765	815	865
C		115	65	115	65	115	65	115	65	115	65	115	65	115	65
D		0	1	1	2	2	3	3	4	4	5	5	6	6	7
E		4	6	6	8	8	10	10	12	12	14	14	16	16	18
J		115	165	215	265	315	365	415	465	515	565	615	665	715	765
Rod Tip Static Allowable Load (N)		222	186	159	139	124	111	101	92.1	84.7	78.4	72.8	68	63.7	59.8
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	93.0	76.3	64.7	56.0	49.2	43.8	39.3	35.6	32.4	29.7	27.3	25.2	23.3	21.7
	Offset 100mm	72.0	61.6	53.9	48.0	43.0	38.9	35.4	32.3	29.7	27.4	25.3	23.5	21.9	20.4
Rod Tip Static Allowable Torque (N·m)		22.3	18.7	16.1	14.1	12.6	11.3	10.3	9.4	8.7	8.1	7.6	7.1	6.7	6.3
Rod Tip Dynamic Allowable Torque (N·m)		7.2	6.2	5.4	4.8	4.3	3.9	3.5	3.2	3.0	2.7	2.5	2.4	2.2	2.0

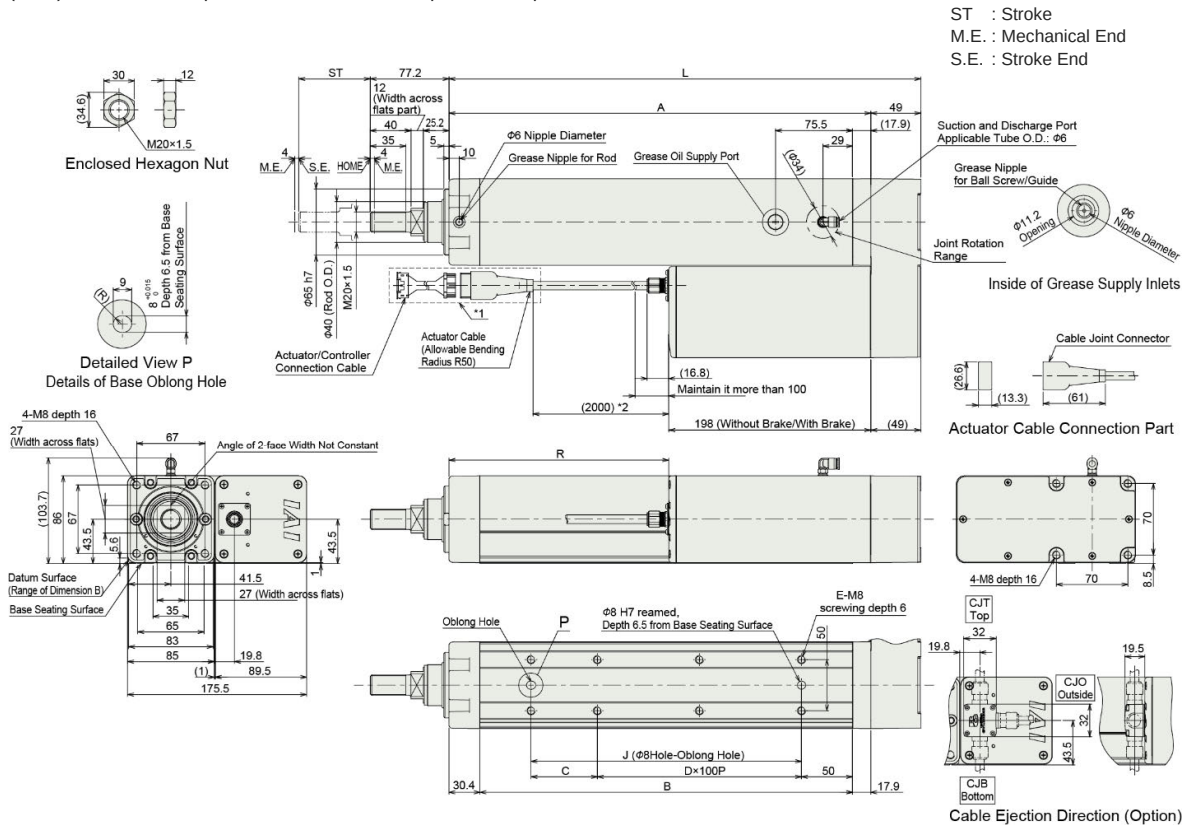
■ Mass by Stroke

Unit (kg)

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700
Mass	W/o Brake	7.1	7.6	8.1	8.6	9.1	9.5	10.0	10.5	11.0	11.5	12.0	12.4	12.9	13.4
	With Brake	7.7	8.2	8.7	9.2	9.7	10.1	10.6	11.1	11.6	12.1	12.6	13.0	13.5	14.0

6.15 RCP6W-RAA8R

- *1 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.
- *2 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.
- (Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.
- (Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.
- (Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.
- (Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.
- (Note) There are one piece of hex nut and four pieces of square nuts enclosed.



■ Dimensions by Stroke

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700
L		312.3	362.3	412.3	462.3	512.3	562.3	612.3	662.3	712.3	762.3	812.3	862.3	912.3	962.3
A		263.3	313.3	363.3	413.3	463.3	513.3	563.3	613.3	663.3	713.3	763.3	813.3	863.3	913.3
B		215	265	315	365	415	465	515	565	615	665	715	765	815	865
C		115	65	115	65	115	65	115	65	115	65	115	65	115	65
D		0	1	1	2	2	3	3	4	4	5	5	6	6	7
E		4	6	6	8	8	10	10	12	12	14	14	16	16	18
J		115	165	215	265	315	365	415	465	515	565	615	665	715	765
R		65.3	115.3	165.3	215.3	265.3	315.3	365.3	415.3	465.3	515.3	565.3	615.3	665.3	715.3
Rod Tip Static Allowable Load (N)		222	186	159	139	124	111	101	92.1	84.7	78.4	72.8	68	63.7	59.8
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	93.0	76.3	64.7	56.0	49.2	43.8	39.3	35.6	32.4	29.7	27.3	25.2	23.3	21.7
	Offset 100mm	72.0	61.6	53.9	48.0	43.0	38.9	35.4	32.3	29.7	27.4	25.3	23.5	21.9	20.4
Rod Tip Static Allowable Torque (N·m)		22.3	18.7	16.1	14.1	12.6	11.3	10.3	9.4	8.7	8.1	7.6	7.1	6.7	6.3
Rod Tip Dynamic Allowable Torque (N·m)		7.2	6.2	5.4	4.8	4.3	3.9	3.5	3.2	3.0	2.7	2.5	2.4	2.2	2.0

■ Mass by Stroke

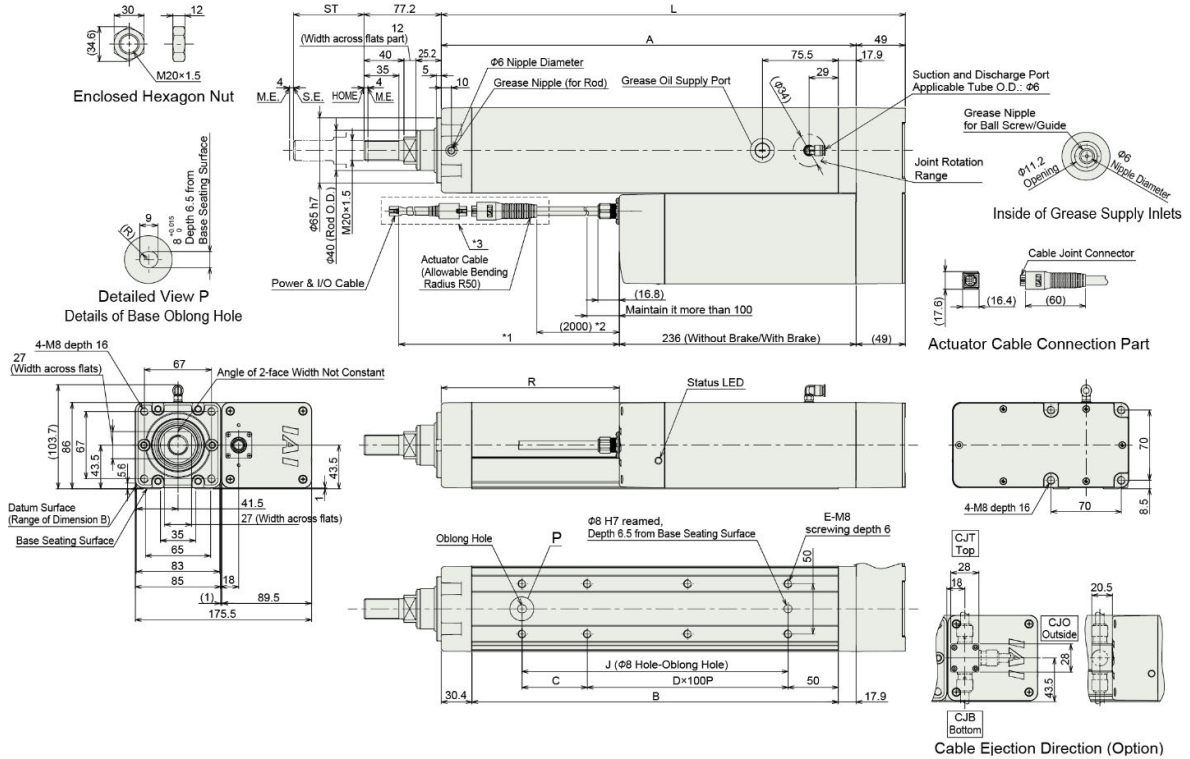
Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700
Mass	W/o Brake	8.0	8.5	9.0	9.5	10.0	10.4	10.9	11.4	11.9	12.4	12.9	13.3	13.8	14.3
	With Brake	8.3	8.8	9.3	9.8	10.3	10.7	11.2	11.7	12.2	12.7	13.2	13.6	14.1	14.6

6. External Dimensions

6.16 RCP6SW-RAA8R Built-in Controller Specification

- *1 There is no drip proof treatment apply to the cable relay part (cable joint connectors) in the area marked with the dashed line.
- *2 The length of an actuator cable can be selected from 5m, 10m and 15m as an option.
- (Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.
- (Note) The orientation of the width across flats should differ depending on products. Also, the orientation of the width across flats cannot be changed.
- (Note) Do not perform air purge from the suction port. Join a tube to extend it to a place where water or dust will not be applied.
- (Note) When mounting the main unit using the front bracket and flange, ensure that no external force is applied to the main unit.
- (Note) There are one piece of hex nut and four pieces of square nuts enclosed.

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

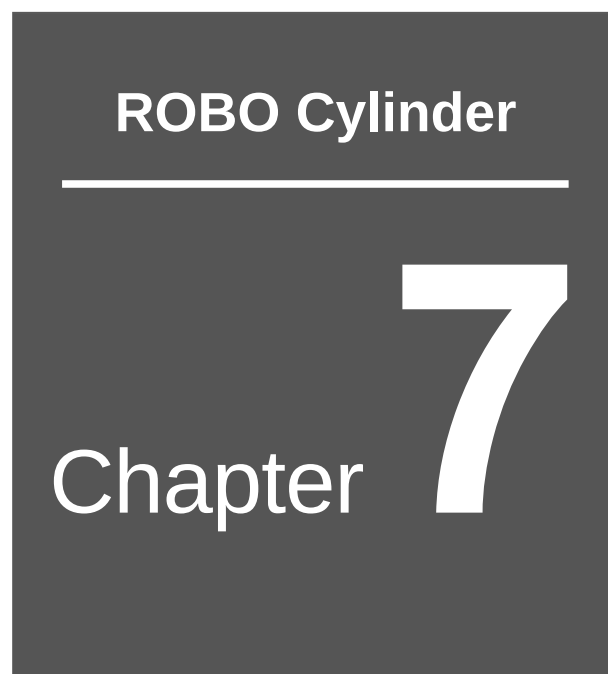


■ Dimensions by Stroke

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700
L		312.3	362.3	412.3	462.3	512.3	562.3	612.3	662.3	712.3	762.3	812.3	862.3	912.3	962.3
A		263.3	313.3	363.3	413.3	463.3	513.3	563.3	613.3	663.3	713.3	763.3	813.3	863.3	913.3
B		215	265	315	365	415	465	515	565	615	665	715	765	815	865
C		115	65	115	65	115	65	115	65	115	65	115	65	115	65
D		0	1	1	2	2	3	3	4	4	5	5	6	6	7
E		4	6	6	8	8	10	10	12	12	14	14	16	16	18
J		115	165	215	265	315	365	415	465	515	565	615	665	715	765
R		27.3	77.3	127.3	177.3	227.3	277.3	327.3	377.3	427.3	477.3	527.3	577.3	627.3	677.3
Rod Tip Static Allowable Load (N)		222	186	159	139	124	111	101	92.1	84.7	78.4	72.8	68	63.7	59.8
Rod Tip Dynamic Allowable Load (N) (Product Life 5000km)	Offset 0mm	93.0	76.3	64.7	56.0	49.2	43.8	39.3	35.6	32.4	29.7	27.3	25.2	23.3	21.7
	Offset 100mm	72.0	61.6	53.9	48.0	43.0	38.9	35.4	32.3	29.7	27.4	25.3	23.5	21.9	20.4
Rod Tip Static Allowable Torque (N-m)		22.3	18.7	16.1	14.1	12.6	11.3	10.3	9.4	8.7	8.1	7.6	7.1	6.7	6.3
Rod Tip Dynamic Allowable Torque (N-m)		7.2	6.2	5.4	4.8	4.3	3.9	3.5	3.2	3.0	2.7	2.5	2.4	2.2	2.0

■ Mass by Stroke

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700
Mass	W/o Brake	8.4	8.9	9.4	9.9	10.4	10.8	11.3	11.8	12.3	12.8	13.3	13.7	14.2	14.7
	With Brake	8.6	9.1	9.6	10.1	10.6	11.0	11.5	12.0	12.5	13.0	13.5	13.9	14.4	14.9



Life

7.1	Operation Life	7-1
7.1.1	RRA4C, RRA4R, RRA6C, RRA6R, RRA7C and RRA7R	7-1
7.1.2	RRA8C and RRA8R	7-1

7.1 Operation Life

When using under load, ensure that it is within the allowable value.

Using beyond the allowable value will reduce the service life.

The service life may vary significantly depending on the operating conditions, environment, and maintenance status.

* Scraper is not considered in the product life as it is an expendable part.

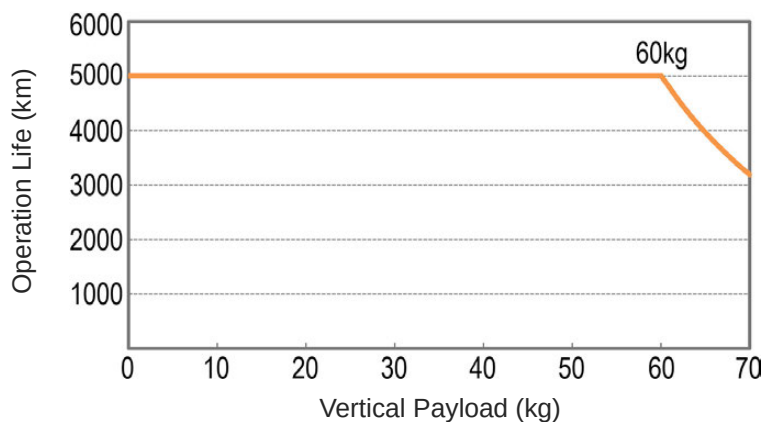
7.1.1 RRA4C, RRA4R, RRA6C, RRA6R, RRA7C and RRA7R

The life is assumed under condition of operation with maximum payload and maximum acceleration/deceleration, and it is 5,000km (reference).

7.1.2 RRA8C and RRA8R

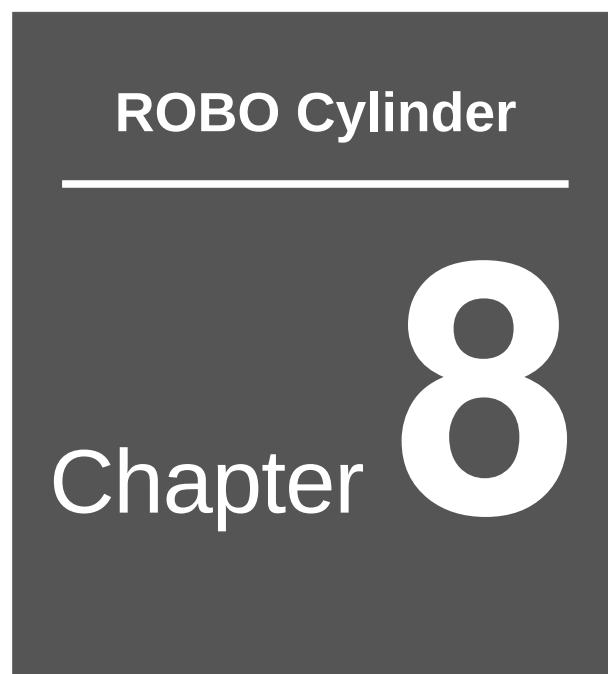
The life of horizontal installation is assumed 5,000km (reference) under the condition of maximum payload, maximum acceleration and deceleration.

The service life in vertical installation varies depending on the payload. The graph below shows the relation of payload and life.





7. Life



Warranty

8.1	Warranty period	8-1
8.2	Scope of the warranty	8-1
8.3	Honoring the warranty.....	8-1
8.4	Limited liability.....	8-2
8.5	Conformance with applicable standards/regulations, etc., and application conditions.....	8-2
8.6	Other items excluded from warranty.....	8-2

8.1 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

8.2 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.

8.3 Honoring the warranty

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

8.4 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.

8.5 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.

8.6 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

Change History

Revision Date	Description of Revision
2017.05	First edition
2017.06	1B edition p. 131
2017.07	1C edition p. 107
5.8	How to Change Positions of Grease Nipple and Joints added
2017.12	1D edition • p. 105 • p. 133, 134 • p. 136
2018.07	1E edition
2019.02	1F edition • p. 122
2020.03	1G edition • p. 78
2020.10	1H edition • p. 82, 83 • p. 88
2021.03	1I edition • p. 78 • p. 79 to 81
2025.12	Second edition • Overall • International Standards Compliances • 1.2 to 1.5 • 1.7 • 1.4 • Chapter 2 • 3.2 • 4.1 • 5.1 • 5.4.2 • 5.5.1 • 5.2.2 • 5.5.3

Correction made to L dimension for brake-equipped type

Note added stating CB-CFA3-MPA□□□(-RB) should be 3m or less or more than 3m

How to Change Positions of Grease Nipple and Joints added

Note added stating "Do not have air purge performed."

Length changed for motor unit equipped with brake

Length changed for motor unit not equipped with brake

Contents added for RCON

Correction made for grease supply inlet of RRA6 and RRA7 from $\Phi 8.5$ to $\Phi 11$

Electric wire color changed

Note added stating finished outer diameter is $\Phi 9.1$ when exceeds 5m

Description added stating installation with motor on the bottom not recommended

Change made to cable drawing

Change made to tables in cable drawing and connection diagram

Correction made, Terms integrated and layout changed

Changed to "Revised RoHS Directive"

Rearranged by model

Options Order changed to alphabetical order

Motor • Encoder Cables moved to Chapter 3

Caution note added

Description revised for each installation method

Motor • Encoder Cables added

[When Using External Guide Together] added

Caution in Maintenance/Inspection Work added

Note added

List of parts for replacement added

Rod Seal Assembly replacement added

Replacing Front Seal Assembly (Dust Seal Housing) added

Change History

Revision Date	Description of Revision	
2026.07	• Chapter 6	Correction made to dimension of rotation range for joint $\Phi 32 \rightarrow \Phi 34$ Note added for applicable locations for grease supply inlet Dimensions added for grease supply inlet and joint “for ball screw / anti-rotation” and “for ball screw / guides”
	2B edition • Chapter 3	Terms integrated (cable carrier)



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