

ROBO Cylinder®

Products designed for use in secondary
battery production processes

Slider Type

RCP6B-SA4C/SA4R/
SA6C/SA6R/
SA7C/SA7R/
SA8C/SA8R

Instruction Manual First Edition ME3845-1A



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IAI Corporation

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.

RCP6B Slider Type Instruction Manual Configuration

No.	Name	Control No.
1	RCP6B Slider Type Instruction Manual (this document)	ME3845
2	PCON-CB/CFB Controller Instruction Manual	ME0342
3	PCON-CYB/PLB/POB Controller Instruction Manual	ME0353
4	MCON-C/CG Controller Instruction Manual	ME0341
5	MSEL-PC/PG Controller Instruction Manual	ME0336
6	RCON System Instruction Manual	ME0384
7	RSEL System Instruction Manual	ME0392
8	PC Teaching Software IA-OS First Step Guide	ME0391
9	Touch Panel Teaching Pendant TB-02/02D Instruction Manual Applicable for Position Controller	ME0355
10	Touch Panel Teaching Pendant TB-02/02D Instruction Manual Applicable for Program Controller	ME0356
11	Touch Panel Teaching Pendant TB-03 Instruction Manual Applicable for Position Controller	ME0376
12	Touch Panel Teaching Pendant TB-03 Instruction Manual Applicable for Program Controller	ME0377

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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 Startup	(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
		(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 Startup	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	Others	• Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. • See Overseas Specifications Compliance Manual to check whether complies if necessary. • For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety. • Using the devise in a way not indicated by IAI may lose the protection performance equipped to the device.

Alert Indication

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

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

Caution in Handling

1. 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.

2. Set the allowable load moment within the allowable range.

An operation with the load beyond the allowable load moment may cause an abnormal noise, vibration, malfunction or shortened life. If it is extreme, flaking may occur on the guide, ball screw.

3. Set the overhang load length in the allowable range.

The load overhang length is a reference of offset capable for operating an actuator smoothly when a workpiece or bracket is attached offset to a slider on an actuator.

Applying a load above the allowable range of the load overhang length may cause vibration or abnormal noise.

4. If back and forth operations are performed repeatedly in short distance, it may wear out the film of grease.

Continuous back and forth operation within a distance less than 30mm may cause wear of grease.

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.

5. Do not attempt to hit the slider against an obstacle with high speed.

It may destroy the coupling.

6. 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.

7. 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.

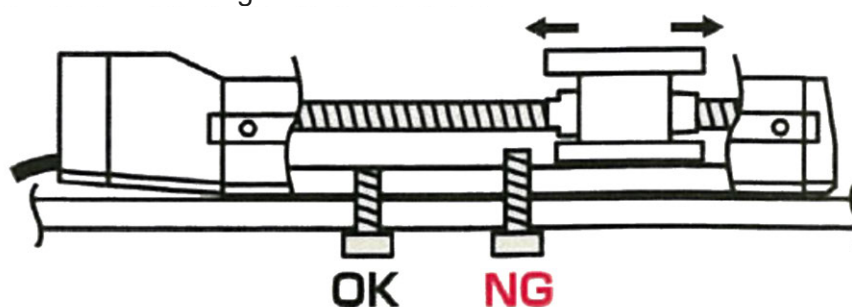
8. For PCON-CB, MCON and RCON/RSEL Syetem (with option: T), it is available to switch over the setting between effective and ineffective of the high-output setting in the parameter setting.
(In the setting at delivery, the high-output setting is set to effective.)
For MSEL Controller, the high-output setting is effective and cannot switch it over to ineffective.
Refer to [instruction manual for each controller] for details

The performance of weight capacity at each velocity and acceleration/deceleration setting differs between the high-output setting being effective and ineffective. Refer to the applicable performance specification when the high-output setting is effective or ineffective in 1.2 Specifications.

Controller	Parameter	Remarks
PCON-CB	No.152 High-output Setting 0: Ineffective, 1: Effective	
MCON	No.152 High-output Setting 0: Ineffective, 1: Effective	In the case of the high-output setting specification (option T), it is possible to enable high output.
RCON System	No.152 High-output Setting 0: Ineffective, 1: Effective	When RCON-PC connected
RSEL System	Driver unit parameter No.152 High-output Setting 0: Ineffective, 1: Effective	When RCON-PC connected

* RCP6B- SA8C/SA8R does not have a high-output setting.

9. Be sure to check srew length.
Damage can occur if too long of screws are used.



Type	Actuator Base Thread Depth
SA4	6mm or less
SA6	10mm or less
SA7	10mm or less
SA8	12mm oe less

International Standards Compliances

This actuator complies with the following overseas standard.
Refer to Overseas Standard Compliance Manual (ME0287) for more detailed information.

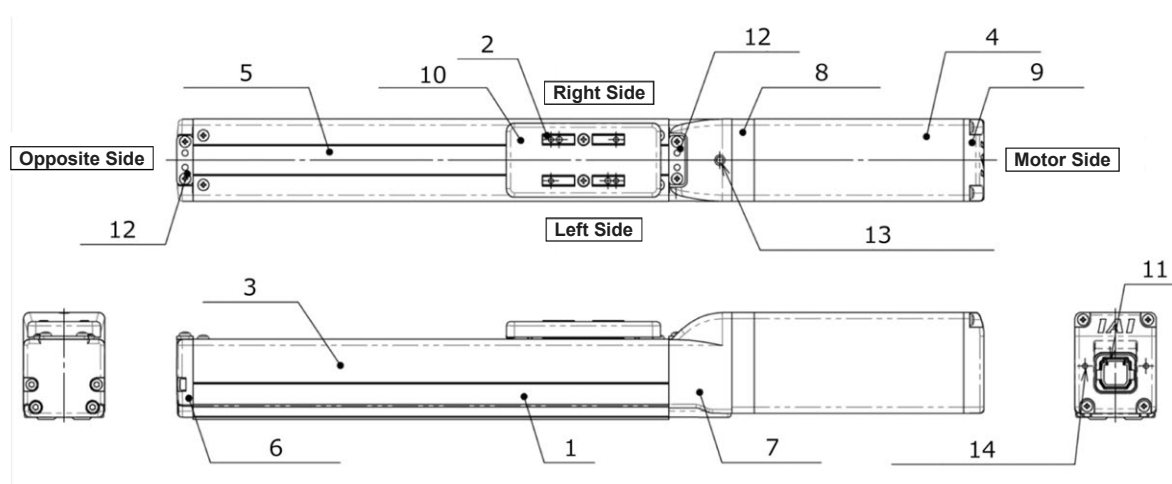
RoHS3 Directive	CE Marking
○	○

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

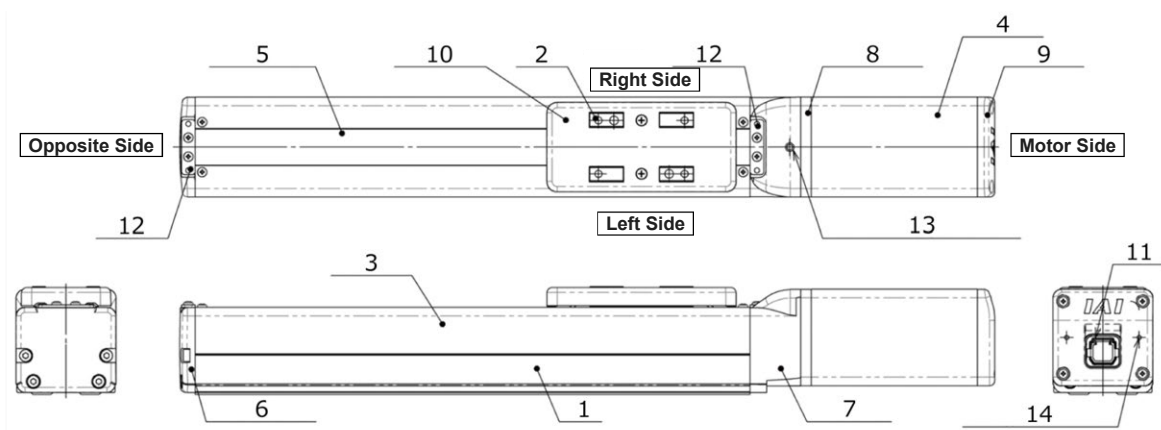
1.1 Standard Specification RCP6-SA4C



[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	White Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Side cover	Aluminum Alloy	White Anodizing Treatment
4	Motor cover	Aluminum Alloy	White Anodizing Treatment
5	Stainless steel sheet	Stainless Steel	—
6	Front bracket	Aluminum die-casting	Decorative Surface Coating
7	Rear bracket	Aluminum die-casting	Decorative Surface Coating
8	Motor bracket	Aluminum die-casting	Decorative Surface Coating
9	End cover	Aluminum die-casting	Decorative Surface Coating
10	Slider cover	Plastic	—
11	Connector	Plastic	—
12	Sheet retainer	Aluminum Alloy	—
13	Screw for motor unit attachment	—	—
14	Screw hole for ground cable connection	—	—

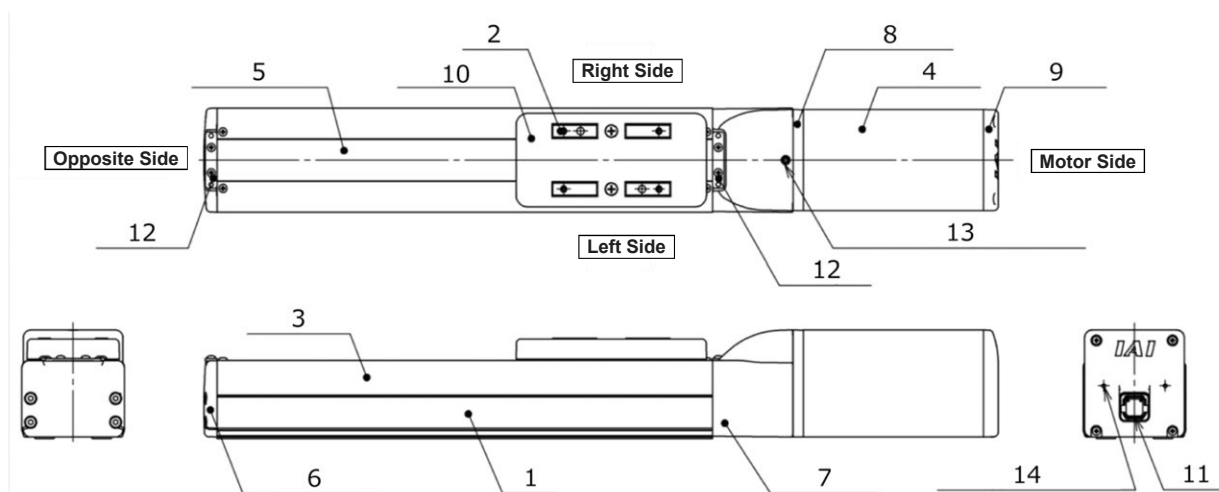
1.2 Standard Specification RCP6B-SA6C



[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	White Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Side cover	Aluminum Alloy	White Anodizing Treatment
4	Motor cover	Aluminum Alloy	White Anodizing Treatment
5	Stainless steel sheet	Stainless Steel	—
6	Front bracket	Aluminum die-casting	Decorative Surface Coating
7	Rear Bracket	Aluminum die-casting	Decorative Surface Coating
8	Motor bracket	Aluminum die-casting	Decorative Surface Coating
9	End cover	Aluminum die-casting	Decorative Surface Coating
10	Slider cover	Plastic	—
11	Connector	Plastic	—
12	Sheet retainer	Aluminum Alloy	—
13	Screw for motor unit attachment	—	—
14	Screw hole for ground cable connection	—	—

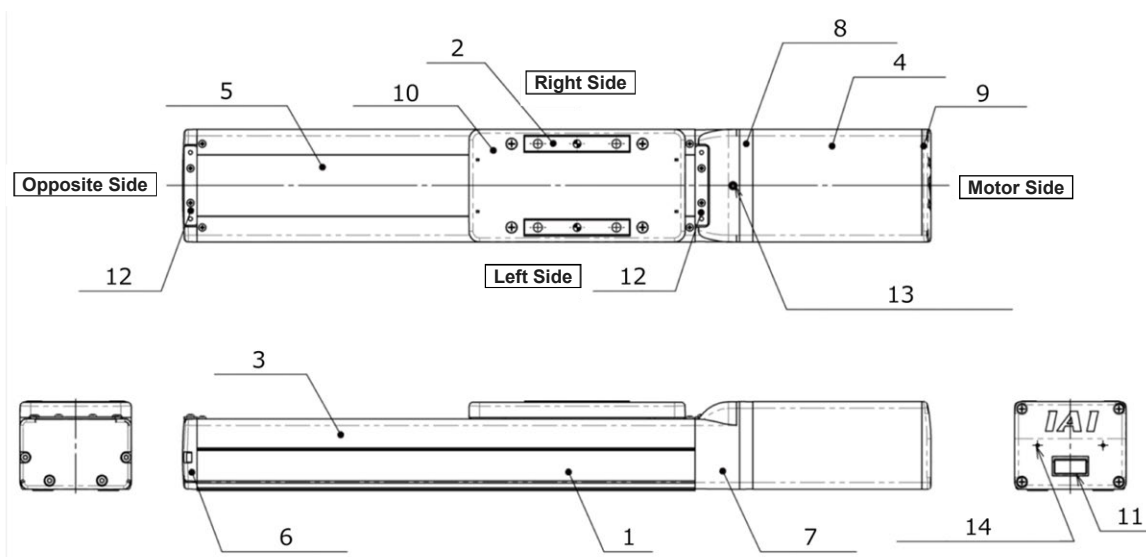
1.3 Standard Specification RCP6B-SA7C



[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	White Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Side cover	Aluminum Alloy	White Anodizing Treatment
4	Motor cover	Aluminum Alloy	White Anodizing Treatment
5	Stainless steel sheet	Stainless Steel	—
6	Front bracket	Aluminum die-casting	Decorative Surface Coating
7	Rear bracket	Aluminum die-casting	Decorative Surface Coating
8	Motor bracket	Aluminum die-casting	Decorative Surface Coating
9	End cover	Aluminum die-casting	Decorative Surface Coating
10	Slider cover	Plastic	—
11	Connector	Plastic	—
12	Sheet retainer	Aluminum Alloy	—
13	Screw for motor unit attachment	—	—
14	Screw hole for ground cable connection	—	—

1.4 Standard Specification RCP6B-SA8C

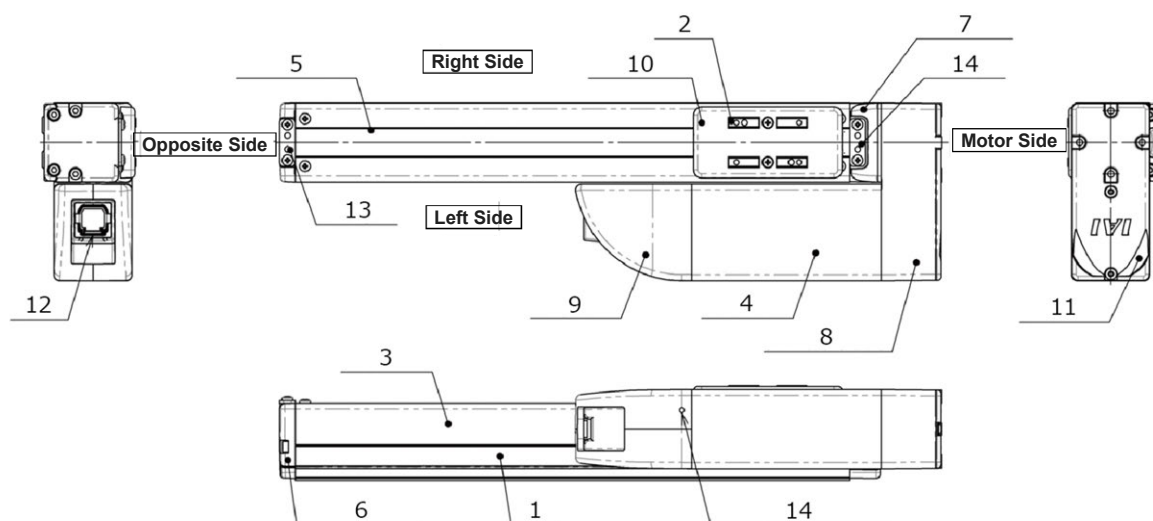


[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	White Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Side cover	Aluminum Alloy	White Anodizing Treatment
4	Motor cover	Aluminum Alloy	White Anodizing Treatment
5	Stainless steel sheet	Stainless Steel	—
6	Front bracket	Aluminum die-casting	Decorative Surface Coating
7	Rear bracket	Aluminum die-casting	Decorative Surface Coating
8	Motor bracket	Aluminum die-casting	Decorative Surface Coating
9	End cover	Aluminum die-casting	Decorative Surface Coating
10	Slider cover	Plastic	—
11	Connector	Plastic	—
12	Sheet retainer	Aluminum Alloy	—
13	Screw for motor unit attachment	—	—
14	Screw hole for ground cable connection	—	—

Side-Mounted Motor Type

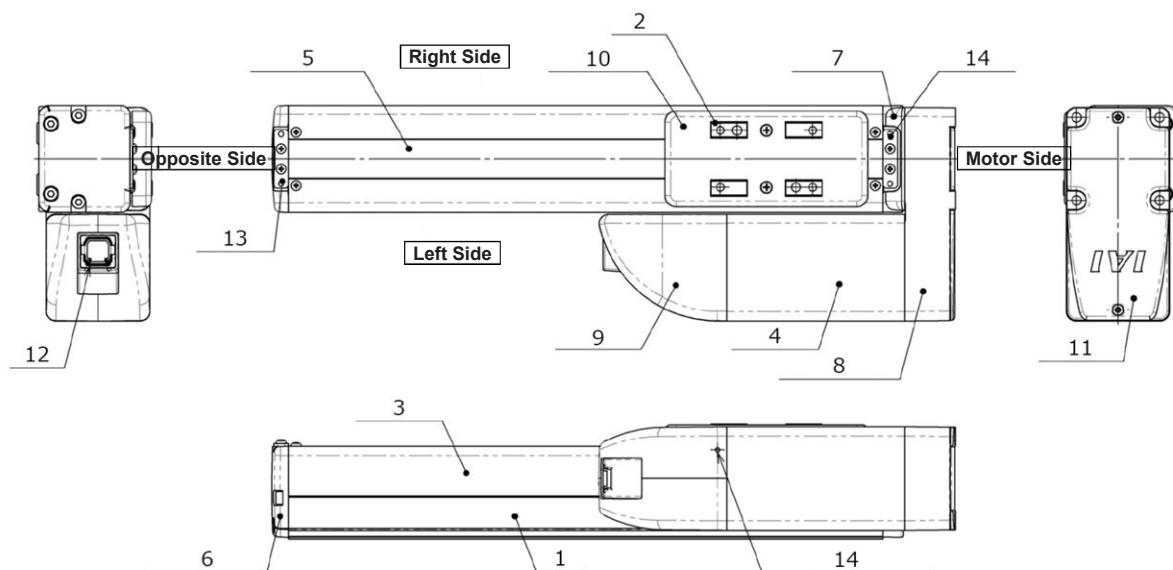
2.1 Standard Specification RCP6B-SA4R



[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	White Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Side cover	Aluminum Alloy	White Anodizing Treatment
4	Motor cover	Aluminum Alloy	White Anodizing Treatment
5	Stainless steel sheet	Stainless Steel	—
6	Front bracket	Aluminum die-casting	Decorative Surface Coating
7	Rear bracket	Aluminum die-casting	Decorative Surface Coating
8	Reverse bracket	Aluminum die-casting	Decorative Surface Coating
9	End cover	Aluminum die-casting	Decorative Surface Coating
10	Slider cover	Plastic	—
11	Pulley cover	Plastic	—
12	Connector	Plastic	—
13	Sheet retainer	Aluminum Alloy	—
14	Screw hole for ground cable connection	—	—

2.2 Standard Specification RCP6B-SA6R

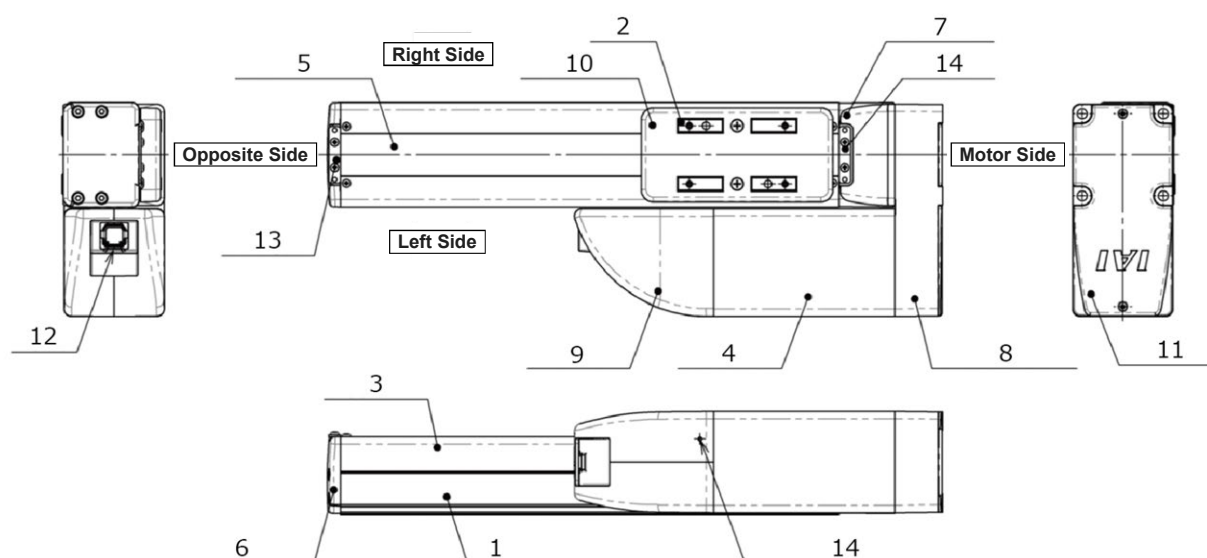


[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	White Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Side cover	Aluminum Alloy	White Anodizing Treatment
4	Motor cover	Aluminum Alloy	White Anodizing Treatment
5	Stainless steel sheet	Stainless Steel	—
6	Front bracket	Aluminum die-casting	Decorative Surface Coating
7	Rear bracket	Aluminum die-casting	Decorative Surface Coating
8	Reverse bracket	Aluminum die-casting	Decorative Surface Coating
9	End cover	Aluminum die-casting	Decorative Surface Coating
10	Slider cover	Plastic	—
11	Pulley cover	Plastic	—
12	Connector	Plastic	—
13	Sheet retainer	Aluminum Alloy	—
14	Screw hole for ground cable connection	—	—

The direction of the motor is either left reversed: ML (shown in figure above), right reversed: MR.

2.3 Standard Specification RCP6B-SA7R

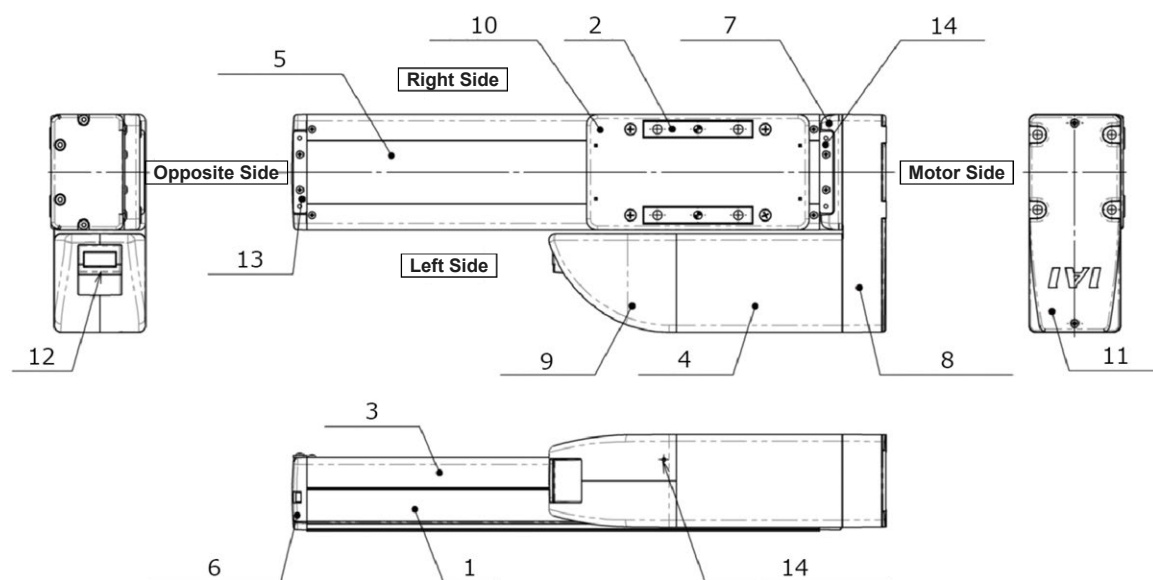


[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	White Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Side cover	Aluminum Alloy	White Anodizing Treatment
4	Motor cover	Aluminum Alloy	White Anodizing Treatment
5	Stainless steel sheet	Stainless Steel	—
6	Front bracket	Aluminum die-casting	Decorative Surface Coating
7	Rear bracket	Aluminum die-casting	Decorative Surface Coating
8	Reverse bracket	Aluminum die-casting	Decorative Surface Coating
9	End cover	Aluminum die-casting	Decorative Surface Coating
10	Slider cover	Plastic	—
11	Pulley cover	Plastic	—
12	Connector	Plastic	—
13	Sheet retainer	Aluminum Alloy	—
14	Screw hole for ground cable connection	—	—

The direction of the motor is either left reversed: ML (shown in figure above), right reversed: MR.

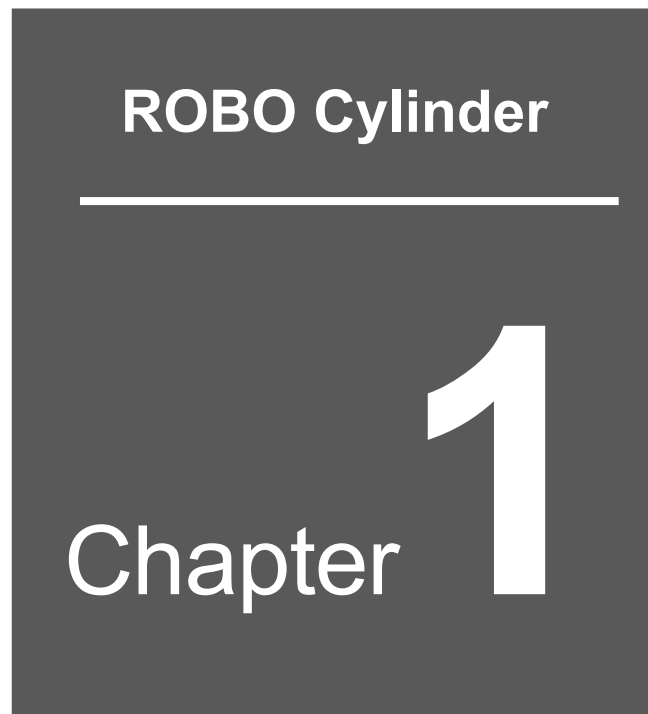
2.4 Standard Specification RCP6B-SA8R



[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	White Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Side cover	Aluminum Alloy	White Anodizing Treatment
4	Motor cover	Aluminum Alloy	White Anodizing Treatment
5	Stainless steel sheet	Stainless Steel	—
6	Front bracket	Aluminum die-casting	Decorative Surface Coating
7	Rear bracket	Aluminum die-casting	Decorative Surface Coating
8	Reverse bracket	Aluminum die-casting	Decorative Surface Coating
9	End cover	Aluminum die-casting	Decorative Surface Coating
10	Slider cover	Plastic	—
11	Pulley cover	Plastic	—
12	Connector	Plastic	—
13	Sheet retainer	Aluminum Alloy	—
14	Screw hole for ground cable connection	—	—

The direction of the motor is either left reversed: ML (shown in figure above), right reversed: MR.



Specifications

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1.1 Checking the Product

The standard configuration of this product is comprised of the following parts.

See the component list for the details of the enclosed components. If you find any fault or missing parts, contact your local IAI distributor.

1.1.1 Parts

Name	Profile	Quantity	Remarks
ROBO Cylinder Main Unit		1	
Motor Encoder Integrated Cable or Motor Encoder Integrated Robot Cable		1	
Safety Guide		1	M0194

* Download instruction manual in our homepage.

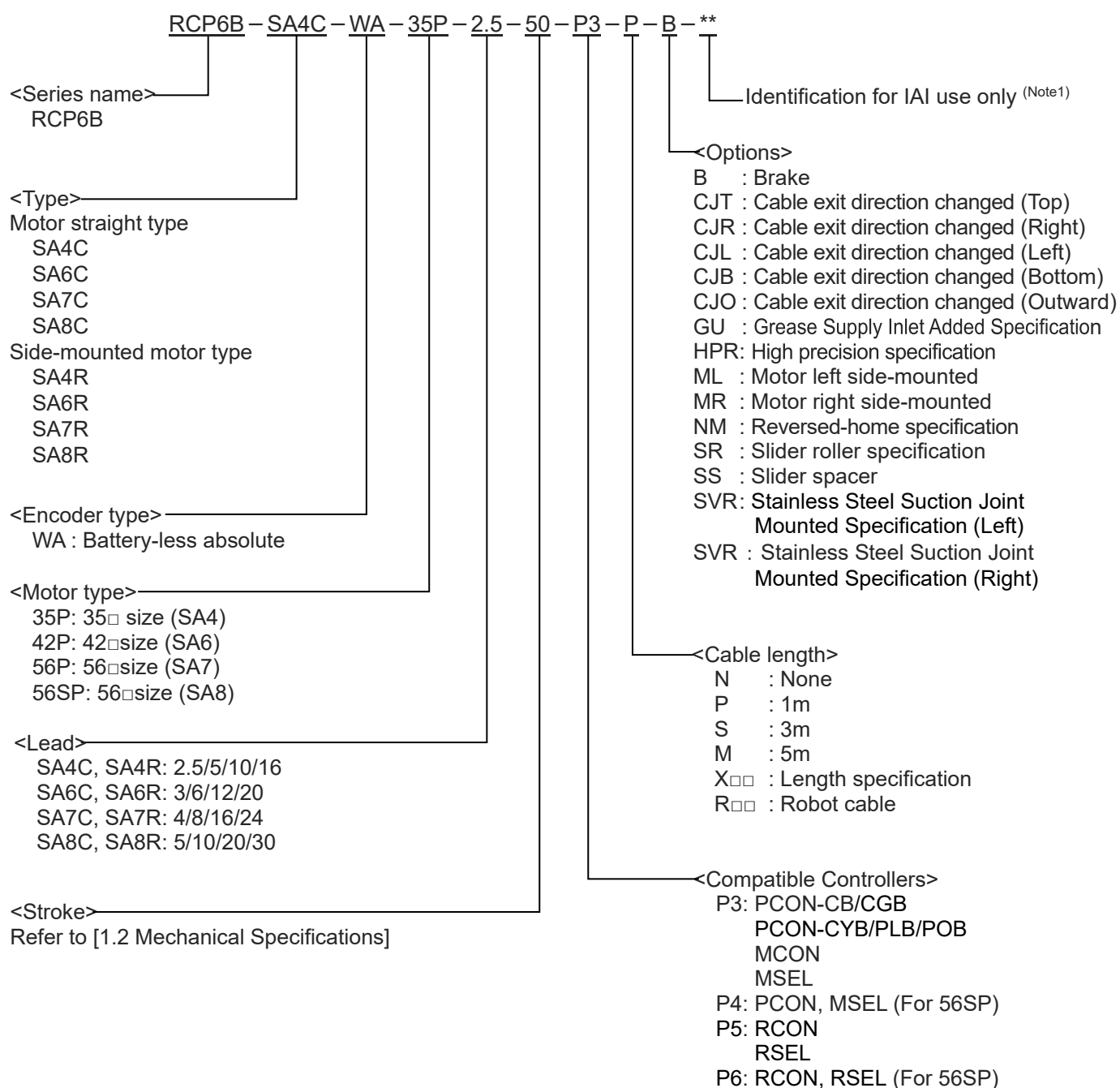
1.1.2 How to Read the Model Nameplate

Model	MODEL: RCP6B-SA4C-WA-35P-2. 5-150-P3-P-B
Serial number	S/N: B01234500 DATE: 17/03/2026 INPUT: DC24V MADE IN JAPAN
	IAI Corporation 

1.1.3 How to Read the Model Number

It is a list of the model codes.

Available options should differ depending on types and conditions. Refer to the catalog for details.



Note 1 IAI dedicated identification symbol: It may be described for purpose of IAI. It is not a symbol to represent a model code.

1.2 Mechanical Specifications

1.2.1 Speed

(Note) High-output settings are not available in SA8C or SA8R that operate with the PCON-CFB or RCON-PCF.

[When high-output setting for motor straight type is effective]

Speed limits Unit: [mm/s]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Stroke [mm]															
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
SA4C	35P	2.5	Horizontal	130										—	—	—	—	—	—
			Vertical	105										—	—	—	—	—	—
		5	Horizontal	260										—	—	—	—	—	—
			Vertical	215										—	—	—	—	—	—
		10	Horizontal	525										—	—	—	—	—	—
			Vertical	435										—	—	—	—	—	—
SA6C	42P	3	Horizontal	140										130	115	100	85	75	
			Vertical	110												100	85	75	
		6	Horizontal	280										265	230	200	175	155	
			Vertical	220												200	175	155	
		12	Horizontal	560										535	460	405	355	315	
			Vertical	440												405	355	315	
SA7C	56P	4	Horizontal	175												155	135	120	
			Vertical	140													135	120	
		8	Horizontal	350												315	275	245	
			Vertical	280													275	245	
		16	Horizontal	700												635	560	500	
			Vertical	560														500	
SA8C	56SP	24	Horizontal	1080												965	850	760	
			Vertical	860													850	760	

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Stroke [mm]															
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
SA8C	56SP	5	Horizontal	125															
			Vertical	125															
		10	Horizontal	250															
			Vertical	250															
		20	Horizontal	400															
			Vertical	400															
		30	Horizontal	650															
			Vertical	650															
				Stroke [mm]															
				850	900	950	1000	1050	1100										
		5	Horizontal	125				120	110										
			Vertical	125				120	110										
		10	Horizontal	250				235	220										
			Vertical	250				235	220										
		20	Horizontal	400															
			Vertical	400															
		30	Horizontal	650															
			Vertical	650															

1.2 Mechanical Specifications

[When high-output setting for side-mounted motor type is effective]

Speed limits Unit: [mm/s]

1. Specifications

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Stroke [mm]															
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
SA4R	35P	2.5	Horizontal	130										—	—	—	—	—	—
			Vertical	105										—	—	—	—	—	—
		5	Horizontal	260										—	—	—	—	—	—
			Vertical	215										—	—	—	—	—	—
		10	Horizontal	525										—	—	—	—	—	—
			Vertical	435										—	—	—	—	—	—
		16	Horizontal	840										—	—	—	—	—	—
			Vertical	700										—	—	—	—	—	—
SA6R	42P	3	Horizontal	140										130	115	100	85	75	
			Vertical	110												100	85	75	
		6	Horizontal	280										265	230	200	175	155	
			Vertical	220												200	175	155	
		12	Horizontal	560										535	460	405	355	315	
			Vertical	440												405	355	315	
		20	Horizontal	960										840		735	650	575	
			Vertical	800												735	650	575	
SA7R	56P	4	Horizontal	175												155	135	120	
			Vertical	140													135	120	
		8	Horizontal	350												315	275	245	
			Vertical	280													275	245	
		16	Horizontal	700												635	560	500	
			Vertical	560														500	
		24	Horizontal	1080												965	850	760	
			Vertical	860													850	760	

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Stroke [mm]															
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
SA8R	56SP	5	Horizontal	125															
			Vertical	125															
		10	Horizontal	250															
			Vertical	250															
		20	Horizontal	400															
			Vertical	400															
		30	Horizontal	650															
			Vertical	650															
				Stroke [mm]															
				850	900	950	1000	1050	1100										
		5	Horizontal	125				120	110										
			Vertical	125				120	110										
		10	Horizontal	250				235	220										
			Vertical	250				235	220										
		20	Horizontal	400															
			Vertical	400															
		30	Horizontal	650															
			Vertical	650															



Caution

When it is set at the speed less than the minimum speed, operation will not be made in the set speed.

Do not attempt to set at a speed less than the minimum speed.

Figure out the minimum speed using the following formula.

Min. Speed ^(Note 1) [mm/s] = Lead Length [mm] / 800 / 0.001 [s]

Note 1 For SA4C and SA4R, the minimum speed is 40mm/s when the lead length is 16mm.

[When high-output setting for motor straight type is ineffective]

(Note) High-output settings are not available in SA8C or SA8R that operate with the PCON-CFB or RCON-PCF.

Speed limits Unit: [mm/s]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Stroke [mm]															
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
SA4C	35P	2.5	Horizontal	105										—	—	—	—	—	—
			Vertical	105										—	—	—	—	—	—
		5	Horizontal	215										—	—	—	—	—	—
			Vertical	215										—	—	—	—	—	—
		10	Horizontal	435										—	—	—	—	—	—
			Vertical	435										—	—	—	—	—	—
		16	Horizontal	700										—	—	—	—	—	—
			Vertical	560										—	—	—	—	—	—
SA6C	42P	3	Horizontal	140										130	115	100	85	75	
			Vertical	110												100	85	75	
		6	Horizontal	280										265	230	200	175	155	
			Vertical	220												200	175	155	
		12	Horizontal	560										535	460	405	355	315	
			Vertical	440												405	355	315	
		20	Horizontal	960												840	735	650	575
			Vertical	800												735	650	575	
SA7C	56P	4	Horizontal	140													135	120	
			Vertical	105															
		8	Horizontal	280													275	245	
			Vertical	210															
		16	Horizontal	560														500	
			Vertical	420															
		24	Horizontal	800														760	
			Vertical	640															

1.2 Mechanical Specifications

[When high-output setting for side-mounted motor type is ineffective]

(Note) High-output settings are not available in SA8C or SA8R that operate with the PCON-CFB or RCON-PCF.

Speed limits Unit: [mm/s]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Stroke [mm]															
				50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
SA4R	35P	2.5	Horizontal	105										—	—	—	—	—	—
			Vertical	105										—	—	—	—	—	—
		5	Horizontal	215										—	—	—	—	—	—
			Vertical	215										—	—	—	—	—	—
		10	Horizontal	435										—	—	—	—	—	—
			Vertical	435										—	—	—	—	—	—
		16	Horizontal	700										—	—	—	—	—	—
			Vertical	560										—	—	—	—	—	—
SA6R	42P	3	Horizontal	140										130	115	100	85	75	
			Vertical	110												100	85	75	
		6	Horizontal	280										265	230	200	175	155	
			Vertical	220												200	175	155	
		12	Horizontal	560										535	460	405	355	315	
			Vertical	440												405	355	315	
		20	Horizontal	960										840		735	650	575	
			Vertical	800												735	650	575	
SA7R	56P	4	Horizontal	140													135	120	
			Vertical	105															
		8	Horizontal	280													275	245	
			Vertical	210															
		16	Horizontal	560														500	
			Vertical	420															
		24	Horizontal	800														760	
			Vertical	640															



Caution

When it is set at the speed less than the minimum speed, operation will not be made in the set speed.

Do not attempt to set at a speed less than the minimum speed.

Figure out the minimum speed using the following formula.

Min. Speed ^(Note 1) [mm/s] = Lead Length [mm] / 800 / 0.001 [s]

Note 1 For SA4C and SA4R, the minimum speed is 40mm/s when the lead length is 16mm.

1.2.2 Maximum Speed and Payload of the Single Slider

Below shows the payload for each acceleration/deceleration of a single slider.

If the payload is smaller than as specified, the acceleration/deceleration can be raised beyond the applicable level.

[When high-output setting for motor straight type is effective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA4C	35P	2.5	Horizontal	0	12.5	12.5	12.5	12.5	12.5
				20	12.5	12.5	12.5	12.5	12.5
				40	12.5	12.5	12.5	12.5	12.5
				65	12.5	12.5	11	11	11
				85	12.5	12.5	11	11	11
				105	12.5	12.5	6.5	6.5	5
				130	6.5	6.5	5.5	—	—
			Vertical	0	8.5	8.5	8.5	—	—
				20	8.5	8.5	8.5	—	—
				40	8.5	8.5	8.5	—	—
				65	8.5	8.5	8.5	—	—
				85	8.5	8.5	8.5	—	—
				105	8.5	8.5	8.5	—	—
				130	—	—	—	—	—
		5	Horizontal	0	10	10	10	8.5	8.5
				40	10	10	10	8.5	8.5
				85	10	10	10	8.5	8.5
				130	10	10	8.5	8.5	7.5
				175	10	10	8.5	8.5	7.5
				215	10	10	5	5	4
				260	5	5	4	—	—
			Vertical	0	4	4	4	—	—
				40	4	4	4	—	—
				85	4	4	4	—	—
				130	4	4	4	—	—
				175	4	4	4	—	—
				215	4	4	4	—	—
				260	—	—	—	—	—

[When high-output setting for motor straight type is effective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA4C	35P	10	Horizontal	0	8.5	8.5	8.5	7	6.5
				85	8.5	8.5	8.5	7	6.5
				175	8.5	8.5	8.5	7	6.5
				260	8.5	8.5	7	6.5	6.5
				350	8.5	8.5	7	6.5	6.5
				435	8.5	8.5	4	3.5	3
				525	4	4	3	—	—
			Vertical	0	2	2	2	—	—
				85	2	2	2	—	—
				175	2	2	2	—	—
				260	2	2	2	—	—
				350	2	2	2	—	—
				435	1.5	1.5	1.5	—	—
				525	—	—	—	—	—
		16	Horizontal	0	5	5	3.5	3	3
				140	5	5	3.5	3	3
				280	5	5	3.5	3	3
				420	5	5	3.5	3	3
				560	5	5	3.5	3	3
				700	—	4	2	1.5	1.5
				840	—	2	1.5	—	—
			Vertical	0	1	1	1	—	—
				140	1	1	1	—	—
				280	1	1	1	—	—
				420	1	1	1	—	—
				560	1	1	1	—	—
				700	—	0.5	0.5	—	—
				840	—	—	—	—	—

[When high-output setting for motor straight type is effective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA6C	42P	3	Horizontal	0	28	28	24.5	24.5	24.5
				20	28	28	24.5	24.5	24.5
				50	28	28	24.5	24.5	24.5
				80	28	28	24.5	24.5	21
				110	28	28	24.5	24.5	21
				140	28	28	24.5	—	—
			Vertical	0	10	10	10	—	—
				20	10	10	10	—	—
				50	10	10	10	—	—
				80	10	10	10	—	—
				110	10	10	10	—	—
				140	—	—	—	—	—
		6	Horizontal	0	22.5	22.5	18	17	14
				40	22.5	22.5	18	17	14
				100	22.5	22.5	18	17	14
				160	22.5	22.5	18	17	14
				220	22.5	22.5	18	17	14
				280	22.5	22.5	18	—	—
			Vertical	0	4	4	4	—	—
				40	4	4	4	—	—
				100	4	4	4	—	—
				160	4	4	4	—	—
				220	4	4	4	—	—
				280	—	—	—	—	—
		12	Horizontal	0	19.5	18	12.5	11	10
				80	19.5	18	12.5	11	10
				200	19.5	18	12.5	11	10
				320	19.5	18	12.5	10	8.5
				440	19.5	18	12.5	8.5	7
				560	19.5	14	8.5	—	—
			Vertical	0	1.5	1.5	1.5	—	—
				80	1.5	1.5	1.5	—	—
				200	1.5	1.5	1.5	—	—
				320	1.5	1.5	1.5	—	—
				440	1.5	1.5	1.5	—	—
				560	—	—	—	—	—
		20	Horizontal	0	10.5	10.5	7	5.5	5
				160	10.5	10.5	7	5.5	5
				320	10.5	8.5	7	5.5	4
				480	8.5	8.5	6.5	5.5	4
				640	8.5	8.5	5.5	4	3.5
				800	7	7	4.5	3	2
				960	—	5	3	—	—
			Vertical	0	0.5	0.5	0.5	—	—
				160	0.5	0.5	0.5	—	—
				320	0.5	0.5	0.5	—	—
				480	0.5	0.5	0.5	—	—
				640	0.5	0.5	0.5	—	—
				800	0.5	0.5	0.5	—	—
				960	—	—	—	—	—

[When high-output setting for motor straight type is effective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA7C	56P	4	Horizontal	0	38.5	35.5	31.5	28	28
				35	38.5	35.5	31.5	28	28
				70	38.5	35.5	31.5	28	28
				105	38.5	35.5	31.5	28	24.5
				140	38.5	31.5	22	21	17.5
				175	38.5	21	—	—	—
			Vertical	0	17.5	17.5	17.5	—	—
				35	17.5	17.5	17.5	—	—
				70	17.5	17.5	17.5	—	—
				105	15.5	14	13.5	—	—
				140	11	10	8.5	—	—
				175	—	—	—	—	—
		8	Horizontal	0	35.5	35.5	31.5	28	28
				70	35.5	35.5	31.5	28	28
				140	35.5	35.5	28	26.5	24.5
				210	35.5	31.5	24.5	21	17
				280	35.5	24.5	15.5	14	10.5
				350	28	14	—	—	—
			Vertical	0	11	11	11	—	—
				70	11	11	11	—	—
				140	11	11	11	—	—
				210	7.5	7	6.5	—	—
				280	6.5	5.5	5	—	—
				350	—	—	—	—	—
		16	Horizontal	0	32	32	24.5	19.5	19
				140	32	32	24.5	19.5	19
				280	32	32	24.5	17.5	14.5
				420	32	21	14	10.5	7
				560	24.5	14	8	7	4
				700	14	9	—	—	—
			Vertical	0	5.5	5.5	5.5	—	—
				140	5.5	5.5	5.5	—	—
				280	5.5	5.5	5.5	—	—
				420	4	3.5	3	—	—
				560	3.5	3	2	—	—
				700	—	—	—	—	—
		24	Horizontal	0	26	26	15.5	11	10
				200	26	26	15.5	11	10
				420	26	21	12.5	11	10
				640	26	12.5	10.5	7	6.5
				860	—	8.5	6.5	2	1.5
				1080	—	1.5	—	—	—
			Vertical	0	2	2	2	—	—
				200	2	2	2	—	—
				420	2	2	2	—	—
				640	2	2	2	—	—
				860	—	2	—	—	—
				1080	—	—	—	—	—

[Motor straight type]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA8C	56SP	5	Horizontal	0	56	56	56	56	56
				50	56	56	56	56	56
				75	56	56	56	56	56
				100	56	56	56	56	56
				125	56	56	50.5	38	34.5
			Vertical	0	38.5	38.5	38.5	—	—
				50	38.5	38.5	38.5	—	—
				75	21	21	21	—	—
				100	12.5	12.5	12.5	—	—
				125	12.5	12.5	12.5	—	—
		10	Horizontal	0	49	49	49	49	45.5
				50	49	49	49	49	45.5
				100	49	49	49	49	45.5
				200	49	42	35	28	24.5
				250	49	36.5	25	16.5	16.5
			Vertical	0	17.5	17.5	17.5	—	—
				50	17.5	17.5	17.5	—	—
				100	17.5	17.5	17.5	—	—
				200	10	10	10	—	—
				250	6.5	6.5	6.5	—	—
		20	Horizontal	0	38.5	35.5	24.5	23	21
				50	38.5	35.5	24.5	23	21
				100	38.5	35.5	24.5	23	21
				200	38.5	35.5	24.5	23	17.5
				300	38.5	35.5	24.5	17	11
				400	31.5	24.5	14	10	7.5
			Vertical	0	3	3	3	—	—
				50	3	3	3	—	—
				100	3	3	3	—	—
				200	3	3	3	—	—
				300	3	3	3	—	—
		30	Horizontal	400	1.5	1.5	1.5	—	—
				0	18	17	12.5	10.5	9
				100	18	17	12.5	10.5	9
				200	18	17	11	10.5	9
				400	17	14	9	8.5	7.5
				650	14.5	10	6.5	5	5
			Vertical	0	2	2	2	—	—
				100	2	2	2	—	—
				200	1.5	1.5	1.5	—	—
				400	1	1	0.5	—	—
				650	0.5	0.5	0.5	—	—

* High-output settings are not available in SA8C or SA8R that operate with the PCON-CFB or RCON-PCF.

[When high-output setting for side-mounted motor type is effective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA4R	35P	2.5	Horizontal	0	12.5	12.5	12.5	12.5	12.5
				20	12.5	12.5	12.5	12.5	12.5
				40	12.5	12.5	12.5	12.5	12.5
				65	12.5	12.5	11	11	11
				85	12.5	12.5	11	11	11
				105	12.5	12.5	6.5	6.5	5
				130	6.5	6.5	5.5	—	—
			Vertical	0	8.5	8.5	8.5	—	—
				20	8.5	8.5	8.5	—	—
				40	8.5	8.5	8.5	—	—
				65	8.5	8.5	8.5	—	—
				85	8.5	8.5	8.5	—	—
				105	8.5	8.5	8.5	—	—
				130	—	—	—	—	—
		5	Horizontal	0	10	10	10	8.5	8.5
				40	10	10	10	8.5	8.5
				85	10	10	10	8.5	8.5
				130	10	10	8.5	8.5	7.5
				175	10	10	8.5	8.5	7.5
				215	10	10	5	5	4
				260	5	5	4	—	—
			Vertical	0	4	4	4	—	—
				40	4	4	4	—	—
				85	4	4	4	—	—
				130	4	4	4	—	—
				175	4	4	4	—	—
				215	4	4	4	—	—
				260	—	—	—	—	—

[When high-output setting for side-mounted motor type is effective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA4R	35P	10	Horizontal	0	8.5	8.5	8.5	7	6.5
				85	8.5	8.5	8.5	7	6.5
				175	8.5	8.5	8.5	7	6.5
				260	8.5	8.5	7	6.5	6.5
				350	8.5	8.5	7	6.5	5.5
				435	8.5	8.5	4	3.5	3
				525	4	4	3	—	—
			Vertical	0	2	2	2	—	—
				85	2	2	2	—	—
				175	2	2	2	—	—
				260	2	2	2	—	—
				350	2	2	2	—	—
				435	1.5	1.5	1.5	—	—
				525	—	—	—	—	—
		16	Horizontal	0	5	5	3.5	3	3
				140	5	5	3.5	3	3
				280	5	5	3.5	3	3
				420	5	5	3.5	3	3
				560	5	5	3.5	3	3
				700	—	4	2	1.5	1.5
				840	—	2	1.5	—	—
			Vertical	0	1	1	1	—	—
				140	1	1	1	—	—
				280	1	1	1	—	—
				420	1	1	1	—	—
				560	1	1	1	—	—
				700	—	0.5	0.5	—	—
				840	—	—	—	—	—

[When high-output setting for side-mounted motor type is effective]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA6R	42P	3	Horizontal	0	28	28	24.5	24.5	24.5
				20	28	28	24.5	24.5	24.5
				50	28	28	24.5	24.5	24.5
				80	28	28	24.5	24.5	21
				110	28	28	24.5	24.5	21
				140	28	28	24.5	—	—
			Vertical	0	10	10	10	—	—
				20	10	10	10	—	—
				50	10	10	10	—	—
				80	10	10	10	—	—
				110	10	10	10	—	—
				140	—	—	—	—	—
		6	Horizontal	0	22.5	22.5	18	17	14
				40	22.5	22.5	18	17	14
				100	22.5	22.5	18	17	14
				160	22.5	22.5	18	17	14
				220	22.5	22.5	18	17	14
				280	22.5	22.5	18	—	—
			Vertical	0	4	4	4	—	—
				40	4	4	4	—	—
				100	4	4	4	—	—
				160	4	4	4	—	—
				220	4	4	4	—	—
				280	—	—	—	—	—
		12	Horizontal	0	19.5	18	12.5	11	10
				80	19.5	18	12.5	11	10
				200	19.5	18	12.5	11	10
				320	19.5	18	12.5	10	8.5
				440	19.5	18	12.5	8.5	7
				560	19.5	14	8.5	—	—
			Vertical	0	1.5	1.5	1.5	—	—
				80	1.5	1.5	1.5	—	—
				200	1.5	1.5	1.5	—	—
				320	1.5	1.5	1.5	—	—
				440	1.5	1.5	1.5	—	—
				560	—	—	—	—	—
		20	Horizontal	0	10.5	10.5	7	5.5	5
				160	10.5	10.5	7	5.5	5
				320	10.5	8.5	7	5.5	4
				480	8.5	8.5	6.5	5.5	4
				640	8.5	8.5	5.5	4	3.5
				800	7	7	4.5	3	2
				960	—	5	3	—	—
			Vertical	0	0.5	0.5	0.5	—	—
				160	0.5	0.5	0.5	—	—
				320	0.5	0.5	0.5	—	—
				480	0.5	0.5	0.5	—	—
				640	0.5	0.5	0.5	—	—
				800	0.5	0.5	0.5	—	—
				960	—	—	—	—	—

[When high-output setting for side-mounted motor type is effective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA7R	56P	4	Horizontal	0	38.5	35.5	31.5	28	28
				35	38.5	35.5	31.5	28	28
				70	38.5	35.5	31.5	28	28
				105	38.5	35.5	31.5	28	24.5
				140	38.5	31.5	22	21	17.5
				175	38.5	21	—	—	—
			Vertical	0	17.5	17.5	17.5	—	—
				35	17.5	17.5	17.5	—	—
				70	17.5	17.5	17.5	—	—
				105	15.5	14	13.5	—	—
				140	11	10	8.5	—	—
				175	—	—	—	—	—
		8	Horizontal	0	35.5	35.5	31.5	28	28
				70	35.5	35.5	31.5	28	28
				140	35.5	35.5	28	26.5	24.5
				210	35.5	31.5	24.5	21	17
				280	35.5	24.5	15.5	14	10.5
				350	28	14	—	—	—
			Vertical	0	11	11	11	—	—
				70	11	11	11	—	—
				140	11	11	11	—	—
				210	7.5	7	6.5	—	—
				280	6.5	5.5	5	—	—
				350	—	—	—	—	—
		16	Horizontal	0	32	32	24.5	19.5	19
				140	32	32	24.5	19.5	19
				280	32	32	24.5	17.5	14.5
				420	32	21	14	10.5	7
				560	24.5	14	8	7	4
				700	14	9	—	—	—
			Vertical	0	5.5	5.5	5.5	—	—
				140	5.5	5.5	5.5	—	—
				280	5.5	5.5	5.5	—	—
				420	4	3.5	3	—	—
				560	3.5	3	2	—	—
				700	—	—	—	—	—
		24	Horizontal	0	26	26	15.5	11	10
				200	26	26	15.5	11	10
				420	26	21	12.5	11	10
				640	26	12.5	10.5	7	6.5
				860	—	8.5	6.5	2	1.5
				1080	—	1.5	—	—	—
			Vertical	0	2	2	2	—	—
				200	2	2	2	—	—
				420	2	2	2	—	—
				640	2	2	2	—	—
				860	—	2	—	—	—
				1080	—	—	—	—	—

[When high-output setting for side-mounted motor type is effective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA8R	56SP	5	Horizontal	0	56	56	56	56	56
				50	56	56	56	56	56
				75	56	56	56	56	56
				100	56	56	56	56	56
				125	56	56	50.5	38	34.5
			Vertical	0	38.5	38.5	38.5	—	—
				50	38.5	38.5	38.5	—	—
				75	21	21	21	—	—
				100	12.5	12.5	12.5	—	—
				125	12.5	12.5	12.5	—	—
		10	Horizontal	0	49	49	49	49	45.5
				50	49	49	49	49	45.5
				100	49	49	49	49	45.5
				200	49	42	35	28	24.5
				250	49	36.5	25	16.5	16.5
			Vertical	0	17.5	17.5	17.5	—	—
				50	17.5	17.5	17.5	—	—
				100	17.5	17.5	17.5	—	—
				200	10	10	10	—	—
				250	6.5	6.5	6.5	—	—
		20	Horizontal	0	38.5	35.5	24.5	23	21
				50	38.5	35.5	24.5	23	21
				100	38.5	35.5	24.5	23	21
				200	38.5	35.5	24.5	23	17.5
				300	38.5	35.5	24.5	17	11
				400	31.5	24.5	14	10	7.5
			Vertical	0	3	3	3	—	—
				50	3	3	3	—	—
				100	3	3	3	—	—
				200	3	3	3	—	—
				300	3	3	3	—	—
		30	Horizontal	400	1.5	1.5	1.5	—	—
				0	18	17	12.5	10.5	9
				100	18	17	12.5	10.5	9
				200	18	17	11	10.5	9
				400	17	14	9	8.5	7.5
				650	14.5	10	6.5	5	5
			Vertical	0	2	2	2	—	—
				100	2	2	2	—	—
				200	1.5	1.5	1.5	—	—
				400	1	1	0.5	—	—
				650	0.5	0.5	0.5	—	—

* High-output settings are not available in SA8C or SA8R that operate with the PCON-CFB or RCON-PCF.



Caution

Do not attempt to establish the settings for the acceleration/deceleration above the allowable range. It may cause vibration, malfunction or shorten the product life. If any acceleration/deceleration above the rated acceleration/deceleration is set, creep phenomenon or slipped coupling may occur.

[When high-output setting for motor straight type is ineffective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]		
				Velocity [mm/s]	0.3G	0.7G
SA4C	35P	2.5	Horizontal	0	8.5	8.5
				20	8.5	8.5
				40	8.5	8.5
				65	8.5	7.5
				85	7.5	7
				105	7	6.5
			Vertical	0	6.5	—
				20	6.5	—
				40	6.5	—
				65	4	—
				85	4	—
				105	4	—
		5	Horizontal	0	8.5	7
				40	8.5	7
				85	8.5	7
				130	7	6.5
				175	7	6.5
				215	6.5	5
			Vertical	0	3	—
				40	3	—
				85	3	—
				130	2	—
				175	2	—
				215	2	—
		10	Horizontal	0	7	5.5
				85	7	5.5
				175	7	5.5
				260	6.5	4
				350	5	3.5
				435	4	3
			Vertical	0	1.5	—
				85	1.5	—
				175	1.5	—
				260	1	—
				350	1	—
				435	1	—
		16	Horizontal	0	3	2.5
				140	3	2.5
				280	3	2.5
				420	3	2
				560	2.5	1.5
				700	2	1.5
			Vertical	0	0.5	—
				140	0.5	—
				280	0.5	—
				420	0.5	—
				560	0.5	—
				700	—	—

[When high-output setting for motor straight type is ineffective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]		
				Velocity [mm/s]	0.3G	0.7G
SA6C	42P	3	Horizontal	0	17.5	15.5
				20	17.5	15.5
				50	17.5	15.5
				80	17.5	15.5
				110	14	10
				140	10.5	—
			Vertical	0	7	—
				20	7	—
				50	7	—
				80	7	—
				110	5.5	—
				140	—	—
		6	Horizontal	0	14	10
				40	14	10
				100	14	10
				160	14	10
				220	11	10
				280	9	—
			Vertical	0	3.5	—
				40	3.5	—
				100	3.5	—
				160	3.5	—
				220	3	—
				280	—	—
		12	Horizontal	0	10	7
				80	10	7
				200	10	7
				320	10	7
				440	7.5	5
				560	5	—
			Vertical	0	1.5	—
				80	1.5	—
				200	1.5	—
				320	1.5	—
				440	1	—
				560	—	—
		20	Horizontal	0	5.5	3.5
				160	5.5	3.5
				320	5.5	3.5
				480	5.5	2
				640	4	1.5
				800	3	0.5
				960	1.5	—
			Vertical	0	0.5	—
				160	0.5	—
				320	0.5	—
				480	0.5	—
				640	0.5	—
				800	0.5	—
				960	—	—

[When high-output setting for motor straight type is ineffective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]		
				Velocity [mm/s]	0.3G	0.7G
SA7C	56P	4	Horizontal	0	28	21
				35	28	21
				70	28	21
				105	28	21
				140	10.5	—
			Vertical	0	10.5	—
				35	10.5	—
				70	10.5	—
				105	5.5	—
				140	—	—
		8	Horizontal	0	28	17.5
				70	28	17.5
				140	28	17.5
				210	17.5	10
				280	7	—
			Vertical	0	7	—
				70	7	—
				140	5	—
				210	3	—
				280	—	—
		16	Horizontal	0	24.5	14
				140	24.5	14
				280	17.5	8.5
				420	10.5	4
				560	5	—
			Vertical	0	3.5	—
				140	3.5	—
				280	2	—
				420	1	—
				560	—	—
		24	Horizontal	0	12.5	7
				200	12.5	7
				420	12.5	7
				640	7	1.5
				800	3.5	—
			Vertical	0	1.5	—
				200	1.5	—
				420	1.5	—
				640	0.5	—
				800	—	—

[When high-output setting for side-mounted motor type is ineffective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]		
				Velocity [mm/s]	0.3G	0.7G
SA4R	35P	2.5	Horizontal	0	8.5	8.5
				20	8.5	8.5
				40	8.5	8.5
				65	8.5	7.5
				85	7.5	7
				105	7	6.5
			Vertical	0	6.5	—
				20	6.5	—
				40	6.5	—
				65	4	—
				85	4	—
				105	4	—
		5	Horizontal	0	8.5	7
				40	8.5	7
				85	8.5	7
				130	7	6.5
				175	7	5.5
				215	6.5	5
			Vertical	0	3	—
				40	3	—
				85	3	—
				130	2	—
				175	2	—
				215	2	—
		10	Horizontal	0	7	5.5
				85	7	5.5
				175	7	5.5
				260	6.5	4
				350	5	3.5
				435	4	3
			Vertical	0	1.5	—
				85	1.5	—
				175	1.5	—
				260	1	—
				350	1	—
				435	1	—
		16	Horizontal	0	3	2.5
				140	3	2.5
				280	3	2.5
				420	3	2
				560	2.5	1.5
				700	2	1.5
			Vertical	0	0.5	—
				140	0.5	—
				280	0.5	—
				420	0.5	—
				560	0.5	—
				700	—	—

[When high-output setting for side-mounted motor type is ineffective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]		
				Velocity [mm/s]	0.3G	0.7G
SA6R	42P	3	Horizontal	0	17.5	15.5
				20	17.5	15.5
				50	17.5	15.5
				80	17.5	15.5
				110	14	10
				140	10.5	—
			Vertical	0	7	—
				20	7	—
				50	7	—
				80	7	—
				110	5.5	—
				140	—	—
		6	Horizontal	0	14	10
				40	14	10
				100	14	10
				160	14	10
				220	11	10
				280	9	—
			Vertical	0	3.5	—
				40	3.5	—
				100	3.5	—
				160	3.5	—
				220	3	—
				280	—	—
		12	Horizontal	0	10	7
				80	10	7
				200	10	7
				320	10	7
				440	7.5	5
				560	5	—
			Vertical	0	1.5	—
				80	1.5	—
				200	1.5	—
				320	1.5	—
				440	1	—
				560	—	—
		20	Horizontal	0	5.5	3.5
				160	5.5	3.5
				320	5.5	3.5
				480	5.5	2
				640	4	1.5
				800	3	0.5
				960	1.5	—
			Vertical	0	0.5	—
				160	0.5	—
				320	0.5	—
				480	0.5	—
				640	0.5	—
				800	0.5	—
				960	—	—

[When high-output setting for side-mounted motor type is ineffective]

Type	Motor Type	Lead [mm]	Horizontal /Vertical	Payload by Acceleration/Deceleration [kg]		
				Velocity [mm/s]	0.3G	0.7G
SA7R	56P	4	Horizontal	0	28	21
				35	28	21
				70	28	21
				105	28	21
				140	10.5	—
			Vertical	0	10.5	—
				35	10.5	—
				70	10.5	—
				105	5.5	—
				140	—	—
		8	Horizontal	0	28	17.5
				70	28	17.5
				140	28	17.5
				210	17.5	10
				280	7	—
			Vertical	0	7	—
				70	7	—
				140	5	—
				210	3	—
				280	—	—
		16	Horizontal	0	24.5	14
				140	24.5	14
				280	17.5	8.5
				420	10.5	4
				560	5	—
			Vertical	0	3.5	—
				140	3.5	—
				280	2	—
				420	1	—
				560	—	—
		24	Horizontal	0	12.5	7
				200	12.5	7
				420	12.5	7
				640	7	1.5
				800	3.5	—
			Vertical	0	1.5	—
				200	1.5	—
				420	1.5	—
				640	0.5	—
				800	—	—



Caution

Do not attempt to establish the settings for the acceleration/deceleration above the allowable range. It may cause vibration, malfunction or shorten the product life. If any acceleration/deceleration above the rated acceleration/deceleration is set, creep phenomenon or slipped coupling may occur.

1.2.3 Driving System • Position Detector

Type	Motor Type	Lead	No. of Encoder Pulses	Ball Screw Type		
				Type	Diameter	Accuracy
SA4C SA4R	35P	2.5	8192	Rolled	Φ8mm	C10
		5				
		10				
		16				
SA6C SA6R	42P	3		Rolled	Φ10mm	C10
		6				
		12				
		20				
SA7C SA7R	56P	4		Rolled	Φ12mm	C10
		8				
		16				
		24				
SA8C SA8R	56SP	5		Rolled	Φ16mm	C10
		10				
		20				
		30				

1.2.4 Positioning Precision

Type	Lead	Item	Tolerance	
			Standard	High Precision Specification Optional Model: HPR
SA4C	2.5, 5, 10	Positioning repeatability	±0.01mm	±0.005mm
		Lost motion	0.1mm or less	0.1mm or less
	16	Positioning repeatability	±0.01mm	—
		Lost motion	0.1mm or less	—
SA4R	2.5, 5, 10, 16	Positioning repeatability	±0.01mm	—
		Lost motion	0.1mm or less	—
SA6C	3, 6, 12	Positioning repeatability	±0.01mm	±0.005mm
		Lost motion	0.1mm or less	0.1mm or less
	20	Positioning repeatability	±0.01mm	—
		Lost motion	0.1mm or less	—
SA6R	3, 6, 12, 20	Positioning repeatability	±0.01mm	—
		Lost motion	0.1mm or less	—
SA7C	4, 8	Positioning repeatability	±0.01mm	±0.005mm
		Lost motion	0.1mm or less	0.1mm or less
	16, 24	Positioning repeatability	±0.01mm	—
		Lost motion	0.1mm or less	—
SA7R	4, 8, 16, 24	Positioning repeatability	±0.01mm	—
		Lost motion	0.1mm or less	—
SA8C	5, 10	Positioning repeatability	±0.01mm	±0.005mm
		Lost motion	0.1mm or less	0.1mm or less
	20, 30	Positioning repeatability	±0.01mm	—
		Lost motion	0.1mm or less	—
SA8R	5, 10, 20, 30	Positioning repeatability	±0.01mm	—
		Lost motion	0.1mm or less	—

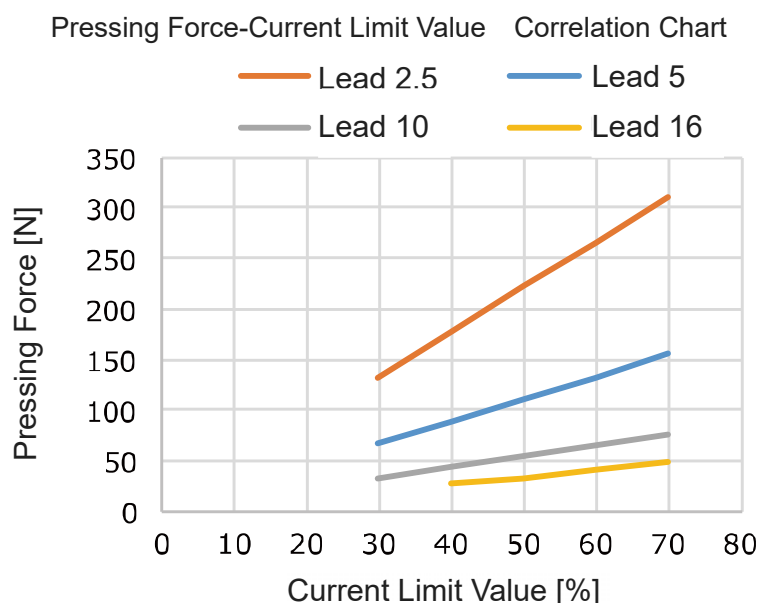
This is an option already attached when it is shipped out from the factory. It does not include the consideration of time-dependent change as it is used.

1.2.5 Current Limit Value and Pressing Force

•SA4C, SA4R

Current Limit	Lead 2.5 [N]	Lead 5 [N]	Lead 10 [N]	Lead 16 [N]
30%	133	66	33	—
40%	177	89	44	27
50%	221	111	55	34
60%	266	133	66	41
70%	310	155	77	48

* This is a reference at 20mm/s of pressing speed.^(Note1)



Caution

- The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s ^(Note 1).
- 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% (Lead 16 is 40%). 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 CON-system controllers such as PCON, when the approach speed to the pressing start position (setting in the position table) is 20mm/s ^(Note 2) or less, pressing will be performed with 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 SEL-system controllers, such as MSEL, press at the speed set by PAPR instruction, regardless of the approach speed up to the pressing start position.

Note 1 Lead 16 is 40mm/s.

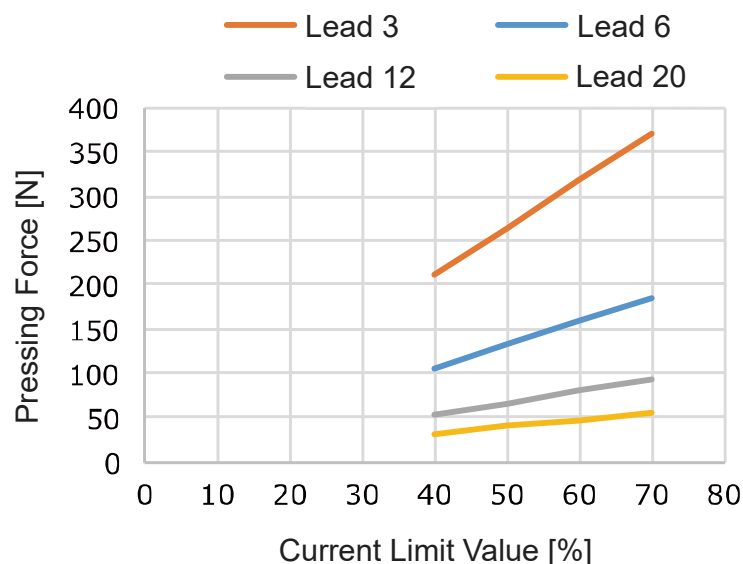
Note 2 Do not make the approach speed for lead 16 slower than 40mm/s.

●SA6C, SA6R

Current Limit	Lead 3 [N]	Lead 6 [N]	Lead 12 [N]	Lead 20 [N]
40%	211	106	53	32
50%	264	132	66	40
60%	317	159	80	48
70%	370	185	93	56

* This is a reference at 20mm/s of pressing speed.

Pressing Force-Current Limit Value Correlation Chart

**Caution**

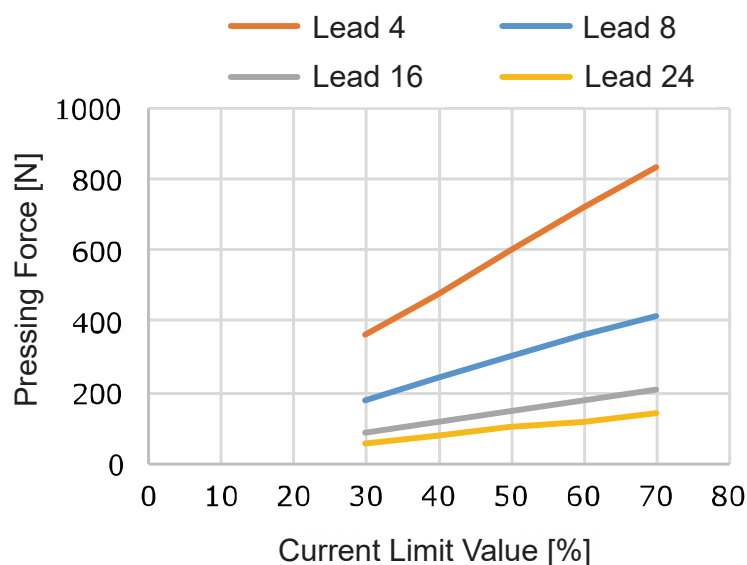
- The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s.
- There will be a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 40%. 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 CON-system controllers such as PCON, when the approach speed to the pressing start position (setting in the position table) is 20mm/s or less, pressing will be performed with 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 SEL-system controllers, such as MSEL, press at the speed set by PAPR instruction, regardless of the approach speed up to the pressing start position.

●SA7C, SA7R

Current Limit	Lead 4 [N]	Lead 8 [N]	Lead 16 [N]	Lead 24 [N]
30%	358	179	90	60
40%	478	239	119	79
50%	597	299	149	99
60%	717	358	179	119
70%	836	418	209	139

* This is a reference at 20mm/s of pressing speed.

Pressing Force-Current Limit Value Correlation Chart

**Caution**

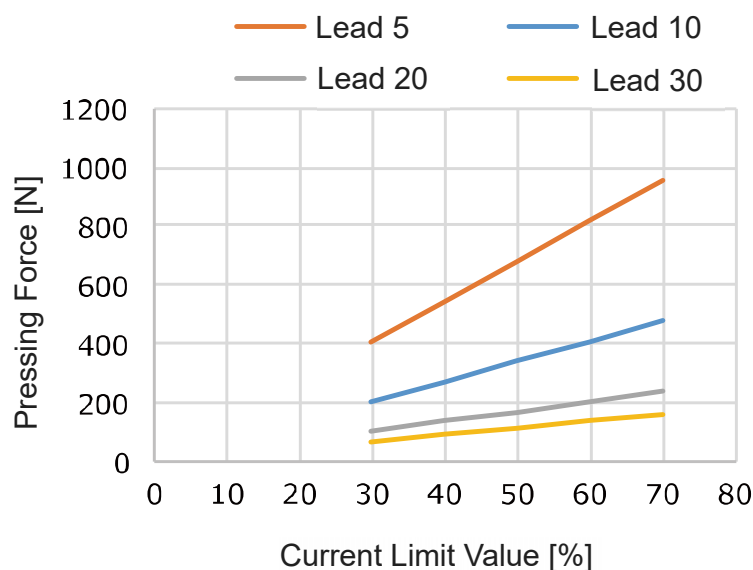
- The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s.
- There will be a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the 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 CON-system controllers such as PCON, when the approach speed to the pressing start position (setting in the position table) is 20mm/s or less, pressing will be performed with 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 SEL-system controllers, such as MSEL, press at the speed set by PAPR instruction, regardless of the approach speed up to the pressing start position.

●SA8C, SA8R

Current Limit	Lead 5 [N]	Lead 10 [N]	Lead 20 [N]	Lead 30 [N]
30%	410	205	102	68
40%	546	273	137	91
50%	683	341	171	114
60%	819	410	205	137
70%	956	478	239	159

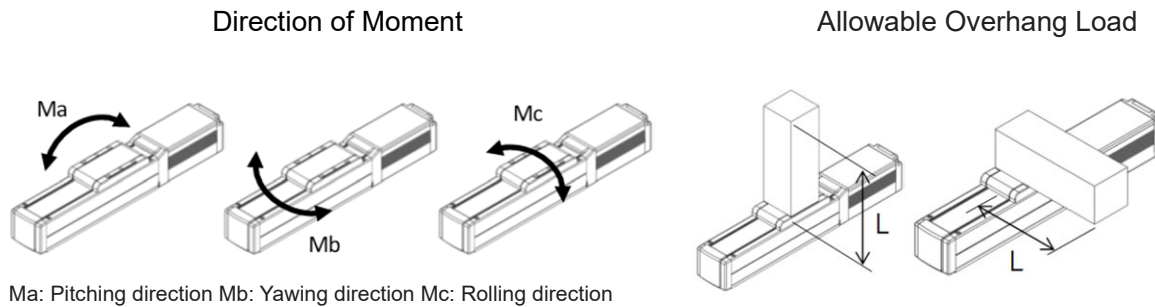
* This is a reference at 20mm/s of pressing speed.

Pressing Force-Current Limit Value Correlation Chart

**Caution**

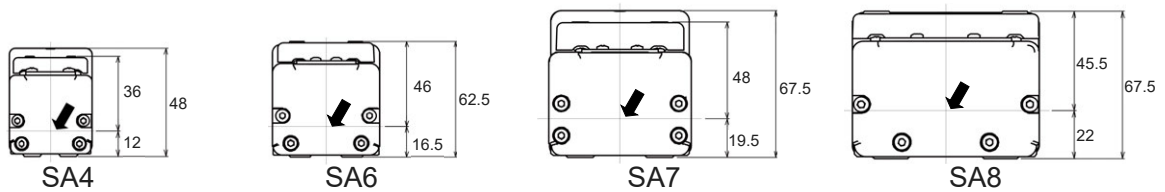
- The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s.
- There will be a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
- Use the product within the range in the 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 CON-system controllers such as PCON, when the approach speed to the pressing start position (setting in the position table) is 20mm/s or less, pressing will be performed with 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 SEL-system controllers, such as MSEL, press at the speed set by PAPR instruction, regardless of the approach speed up to the pressing start position.

1.2.6 Allowable Moment of Actuator



M_a : Pitching direction M_b : Yawing direction M_c : Rolling direction

Calculate M_a and M_c moment based on the arrow position.



Type	Allowable Static Moment [N·m]			Allowable Dynamic Moment [N·m]			Allowable Overhang Load [L]
	M_a	M_b	M_c	M_a	M_b	M_c	
SA4C SA4R	13	18.6	25.3	5.0	7.1	9.7	M_a , M_b , M_c directions: 150mm
SA6C SA6R	48.5	69.3	103	11.6	16.6	24.6	M_a , M_b , M_c directions: 220mm
SA7C SA7R	115	115	229	44.7	44.7	89.1	M_a , M_b , M_c directions: 300mm
SA8C SA8R	219	219	414	77	77	146	M_a , M_b , M_c directions: 400mm

Allowable dynamic moment is a moment in the case of the operation life of 5,000 km. Refer to [6. Life]



Caution

- If the actuator is used with excessive allowable moment and overhang load, it may not only lead to abnormal noise and vibration but also significantly reduce the life of the actuator.

1.2.7 Duty Ratio for Continuous Operation

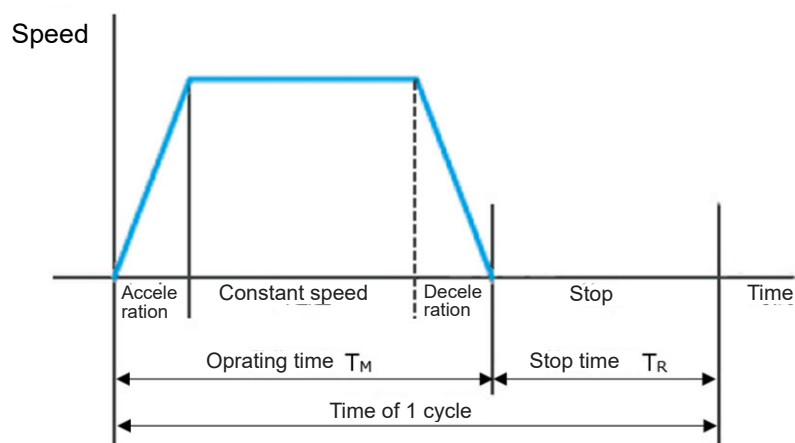
Duty ratio is an operating rate, which indicates the time that the actuator is running in one cycle by percentage (%).

$$D = \frac{T_M}{T_M + T_R} \times 100 (\%)$$

D : Duty ratio

T_M : Operating time (Including pressing Operation)

T_R : Stop time



- © RCP6B-SA4C/SA6C/SA7C/SA8C, RCP6B-SA4R/SA6R/SA7R/SA8R
It can operate continuously when the duty ratio is 100%.

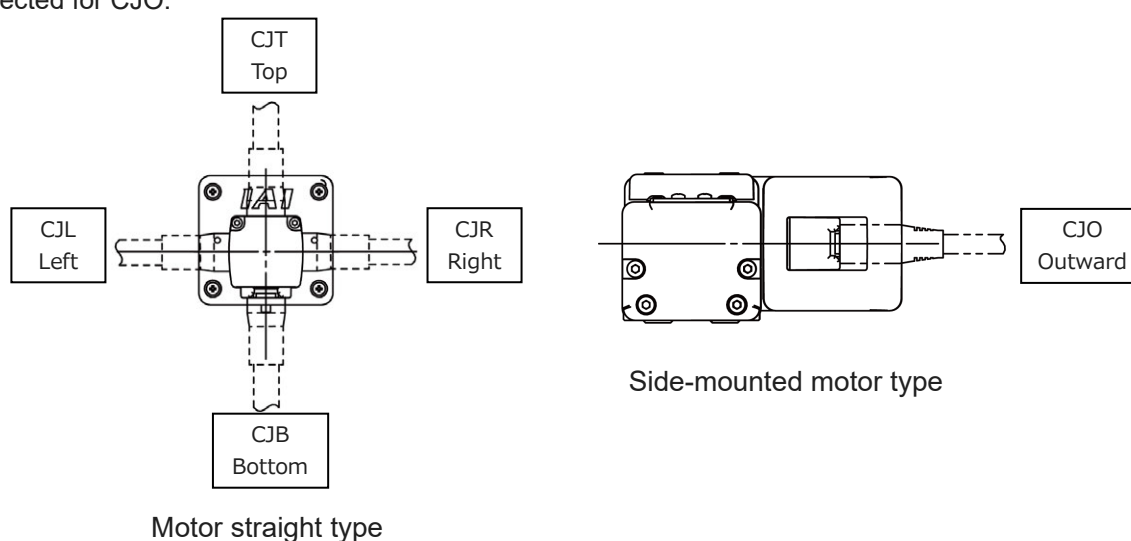
1.3 Option

1.3.1 With Brake (Model: B)

It retains a slider so it would not move during power cutoff or the servo is turned off. It can help the slider from falling down in use in the vertical installation.

1.3.2 Cable Exit Direction Changed (Model: CJT, CJR, CJL, CJB, CJO)

If a change in the cable exit direction is made, the direction of cable exit will be changed. There are ejection directions, top (model: CJT), right (model: CJR), left (model: CJL), bottom (model: CJB) and outward (model: CJO). The side-mounted motor type of SA4R, SA6R, SA7R, and SA8R can only be selected for CJO.



1.3.3 Grease Supply Inlet Added Specification (Model: GU)

A grease supply inlet can be added. For the grease supply inlet position, refer to [Chapter 5 External Dimensions].

1.3.4 High Precision Specifications (Model: HPR)

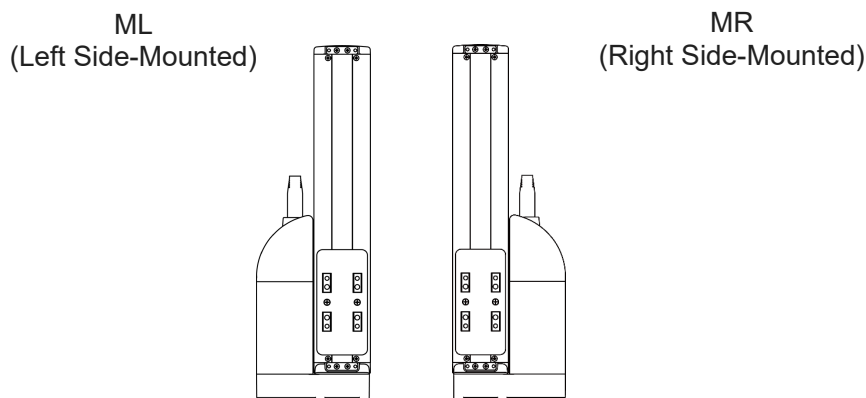
Standard positioning repeatability is $\pm 0.01\text{mm}$. When this option is specified, positioning repeatability will become $\pm 0.005\text{mm}$. Refer to [1.2.4 Positioning Precision]

Some lead lengths may not be available for selection.

Type	Available for Selection	Not Available for Selection
SA4C	Lead 2.5, 5, 10	Lead 16
SA6C	Lead 3, 6, 12	Lead 20
SA7C	Lead 4, 8	Lead 16, 24
SA8C	Lead 5, 10	Lead 20, 30

1.3.5 Motor Left Side-Mounted (Model: ML), Motor Right Side-Mounted (Model: MR)

From the view of the motor side, the type with the motor side-mounted to the left is ML and the motor side-mounted to the right is MR.



1.3.6 Reversed-home Specification (Model: NM)

The standard home position is on the motor side.

However, the opposite side specification is selected if the home position direction is reversed in accordance with equipment layout or assembly direction.

1.3.7 Slider Roller Specification (Model: SR)

The structure of the slider is a roller structure, the same as the cleanroom type.

If it gets chosen to have the slider roller type, the appearance and dimensions of the slider cover should become the same as the cleanroom type.

1.3.8 Slider spacer (Model: SS)

Application : SA7R, SA8R

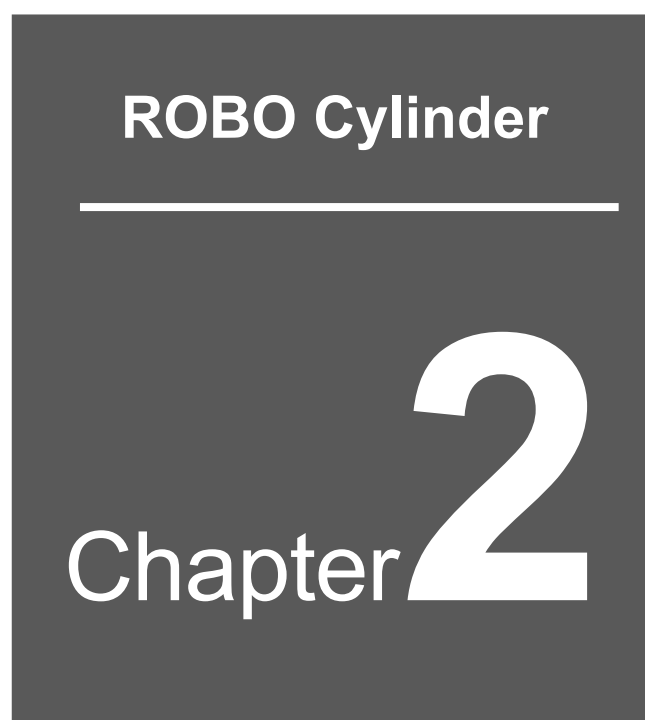
When the spacer is used, the work mounting surface of the slider can be higher than the motor unit.

This allows to ignore work interferences.

For the shapes, refer to [5. External Dimensions]

1.3.9 Stainless Steel Suction Joint Mounted Specification (Right) (Model: SVR) Stainless Steel Suction Joint Mounted Specification (Left) (Model: SVL)

Mount the stainless steel suction joint for air intake on the side. Refer to [5 External Dimensions] for the joint position.



Installation

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2.1 Transportation

2.1.1 Handling of Robot

When you want to transport the actuator alone, observe the following points.

(1) Handling the Packed Unit

Unless otherwise specified, the actuator is shipped with each axis packaged separately.

- Do not damage or drop. The package is not applied with any special treatment that enables it to resist an impact caused by a drop or crash.
- Transport a heavy package with at least more than two operators. Consider an appropriate method for transportation.
- Keep the unit in horizontal orientation when placing it on the ground or transporting. 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.

(2) Handling the Actuator After Unpacking

- Do not carry an actuator by motor unit and a cable or attempt to move it by pulling the cable.
- Be careful not to bump the actuator into anything when moving it.
- Hold the body base when transporting the actuator.
- Do not apply an excessive force to each part of the actuator.

In the case that the actuator has a stainless steel sheet, take particular care not to apply pressure to the stainless steel sheet.



Caution

- Never hold the stainless steel sheet part.

For the names of each part of the actuator, refer to [Names of the Parts].

2.1.2 Handling in the Assembled Condition

This is the case 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 slider 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.

(1) Handling the Packed Unit

- Do not damage or drop. The package is not applied with any special treatment that enables it to resist an impact caused by a drop or crash.
- Do not attempt to carry a heavy package with only one worker. Also, have 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 any load that may cause a deformation or breakage of the package.

(2) How to Handle after Unpackaged

- Fix the slider so they would not accidentally 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 with ropes, have appropriate cushioning to avoid any deformation of the actuator body. Also keep it in stable horizontal orientation. Make a fixture utilizing the attachment holes and 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.

2.1.3 Handling in Condition of being assembled in Machinery Equipment (System)

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

- Fix the slider so they would not accidentally 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

2.2.1 Installation Environment

In general, it is an environmental that an operator can work without protection gear.
Also, provide sufficient work space for maintenance and inspection.

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 10 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)
- Where the actuator is subject to splashed water, 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
- Space for replacement work of components such as a motor

If the actuator is used in any of the following locations, provide sufficient shielding measures:

- 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 in case of 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 How to Install

This chapter explains how to install the actuator on your mechanical system.

2.3.1 Installation

Below shows availability of horizontal orientation and restrictions.

Refer to the following precautions when installation is performed in the postures marked with △ (Daily Inspection Needed).

○ : Possible △ : Daily inspection is required × : Not possible

Type	Horizontal installation	Vertical installation	Sideway installation	Ceiling mount installation
SA4C, SA6C, SA7C, SA8C, SA4R, SA6R, SA7R, SA8R	○	○	△	△

Mounting Orientation

Horizontal	Vertical	Sideways	Ceiling mount
			



Caution

- It is recommended to have the motor installed on top for the vertical orientation.
- Can be installed sideways or ceiling mount, but the actuators must be checked daily. If the actuator is installed sideways or ceiling mount, the stainless steel sheet may be slacked or displaced. If the actuator is used continuously while the stainless steel sheet is slacked or displaced, the stainless steel sheet may break or other problems may occur. Check the actuator daily and if the stainless steel sheet is found slacked or displaced, make installation adjustment of the stainless steel sheet.

Refer to [4.6.1 Stainless steel sheet replacement/adjustment]

2.3.2 Installation of the Main Unit

The surface to mount the main unit should be a machined surface or a plane that possesses an equivalent accuracy and the flatness should be within 0.05mm/m. Also, the platform should have a structure stiff enough to install the unit so it would not generate vibration or other abnormality.

Also consider enough space necessary for maintenance work such as actuator replacement and inspection.

There are reference surfaces for attachment on the base.

The flatness of the slider movement is designed to be 0.05mm/m at maximum to the reference surface.

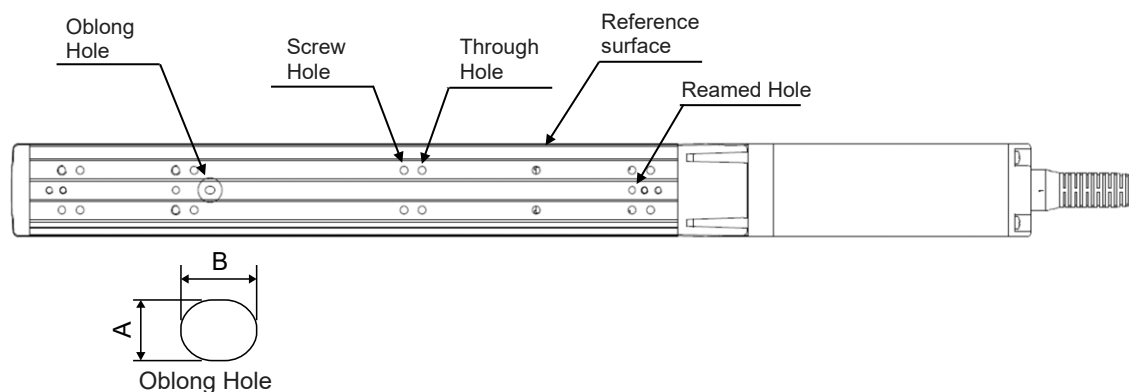
On the rear side of the actuator, there are screw holes and through holes for attachment and reamed hole and oblong hole for positioning. See the appearance drawings for the details of the position and diameters. Refer to [5. External Dimensions]

Utilize the reamed holes when repeatability in the attachment after detaching is required. However, when small tunings such as the perpendicularity is required, consider such things like to use one reamed hole.

[1] Using the Screw Holes on the Bottom of the Base

This actuator has the screw holes for mounting so it can be fixed from the bottom of the base. Also, there are reamed holes and an oblong hole for positioning pins.

(Note) Strokes 50 for SA6, SA7, and strokes 50 and 100 for SA8 do not have oblong holes. Refer to [5. External Dimensions] for the positions of the screw holes, reamed hole and oblong hole.



Type	Screw Hole Size	Screw Holes Depth (Thread Depth)	Tightening Torque		Reamed Hole [mm]	Oblong Hole
			In the case that steel is used for the bolt seating surface:	In the case that aluminum is used for the bolt seating surface:		
SA4C SA4R	M4	Through (6 mm or less)	3.59N·m	1.76N·m	Φ3H7 Depth 4	A: $3^{+0.010}_0$ B: 4 Depth 4mm
SA6C SA6R	M5	Through (10 mm or less)	7.27N·m	3.42N·m	Φ4H7 Depth 5.5	A: $4^{+0.012}_0$ B: 5 Depth 5.5mm
SA7C SA7R	M5	Through (10 mm or less)	7.27N·m	3.42N·m	Φ4H7 Depth 6	A: $4^{+0.012}_0$ B: 5 Depth 6mm
SA8C SA8R	M6	Through (12 mm or less)	12.3N·m	5.4N·m	Φ6H7 Depth 6.5	A: $6^{+0.012}_0$ B: 7 Depth 6.5mm

Tightening Screws

- Use hexagonal socket head bolts for the male threads for installing the base.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- The length of thread engagement should be 1.8 times more than the nominal diameter, and pay attention not to stick the screw out inside the actuator for through hole.

**Caution**

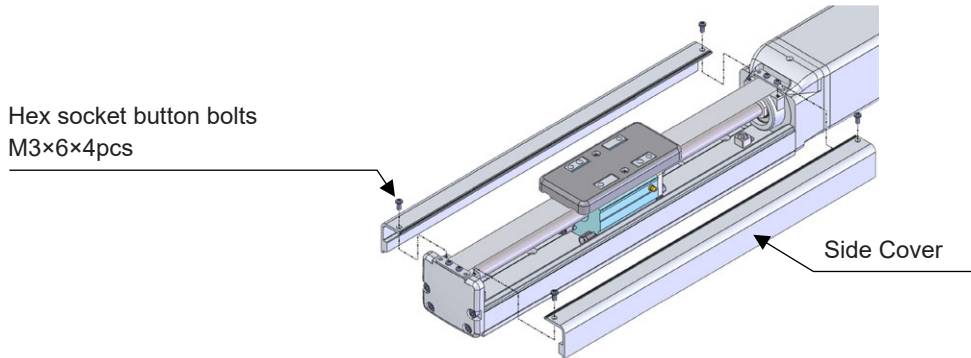
- Be careful when selecting the bolt length. If bolts of inappropriate lengths are used, the damage of the screw holes and actuator mounting strength may become insufficient, or contact with driving parts may occur, resulting in lower precision or unexpected accidents.

[2] Using the Through Holes on the Top of the Base

There are through holes equipped on the base of SA4, SA6, SA7 so the unit can be attached from the top of the base.

Detach the side covers on the sides and the stainless steel sheet when installing.

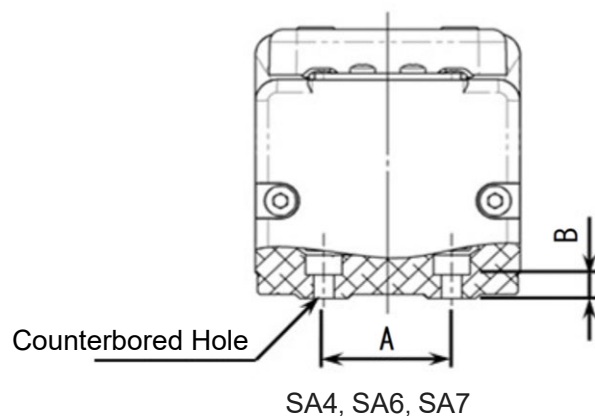
Refer to [5. External Dimensions] for the positions of the screw holes.



Tightening Screws

- For mounting screws, use hexagonal socket head screws indicated in the following table.

Type	Counterbored Hole, Through Hole	Mounting Bolt	A [mm]	B [mm]	Tightening Torque
SA4C, SA4R	$\phi 3.4$ drilled hole, $\phi 6$. counter boring depth 3.5	M3	17	2.5	$0.83\text{N}\cdot\text{m}$
SA6C, SA6R	$\phi 4.5$ drilled hole, $\phi 8$ counter boring depth 4.5	M4	28	5.5	$1.76\text{N}\cdot\text{m}$
SA7C, SA7R	$\phi 6$ drilled hole, $\phi 9.5$ counter boring depth 5.5	M5	37	5.5	$3.42\text{N}\cdot\text{m}$

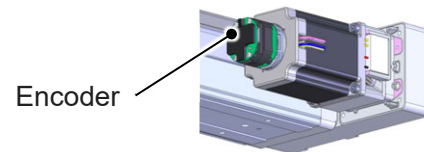


- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- For the effective engagement length between the bolt and female thread, provide at least the applicable value specified below:
 Female thread is made of steel material → Same length as the nominal diameter
 Female thread is made of aluminum → 1.8 times of nominal diameter



Caution

- For Reversed Type SA4R, SA6R or SA7R, as the motor cover will interfere with the side cover, take the motor cover off before taking the side cover off.
Refer to [4.6.3 Replacement Work of Motor Unit and Coupling Spacer]
- Do not touch the encoder part directly with hands. If touched with hands, the encoder phase may change, resulting in an error.

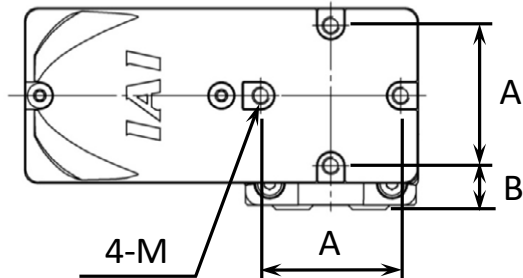


- If bolts of inappropriate lengths are used, actuator mounting strength may become insufficient, or contact with driving parts may occur, resulting in lower precision or unexpected accidents.
- Attempt not to drop the bolts, tools, etc. on the stainless steel sheet when tightening the bolts. Please avoid making a dent mark or scratches.
- The slider cannot be driven only with ROBO Cylinder itself if it is equipped with a brake. Connect a controller and have JOG operation to move the slider.
It is also available to move with using a brake release box (BKR-01).

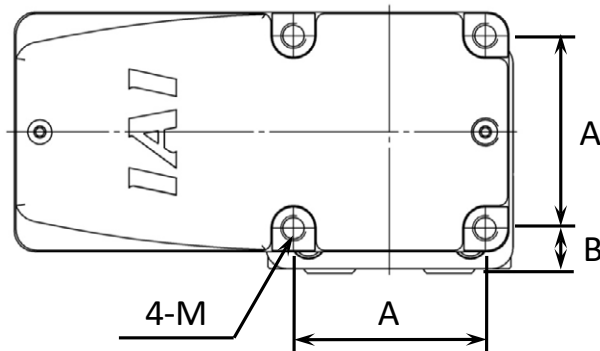
[3] When Using Attachment Holes on Bracket in Side-Mounted Motor Type

There are screw holes equipped on the side-mounted bracket. (Refer to the table below for detailed dimensions.)

- For SA4R



- For SA6R, SA7R, SA8R



Type	A	B	Attachment Hole Diameter	Attachment Hole Depth	Tightening Torque
SA4R	32	10	M4	8mm	1.76N·m
SA6R	45	10.5	M6	12mm	5.4N·m
SA7R	55	8	M8	16mm	11.5N·m
SA8R	55	9.5	M8	16mm	11.5N·m

Tightening Screws

- Use hexagonal socket head bolts for the male threads for installing the base.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- Have the length of thread engagement approximately 1.8 times of the nominal diameter.



Caution

- Be careful when selecting the bolt length. If bolts of inappropriate lengths are used, the damage of the screw holes and actuator mounting strength may become insufficient, or contact with driving parts may occur, resulting in lower precision or unexpected accidents.

[Precautions for Attachments]

Pay attention to the following when installation is conducted with using the attachment holes on the side-mounted bracket.

There may be caused vibration due to the operating condition or installation environment, which may result in operational failures or components malfunction.

- Do not attempt to affix the unit only with the screw holes on the side-mounted bracket.
- Do not apply external force to the main body.

Availability of installation for each installation posture is as shown below:

External Force

Horizontal

External Force

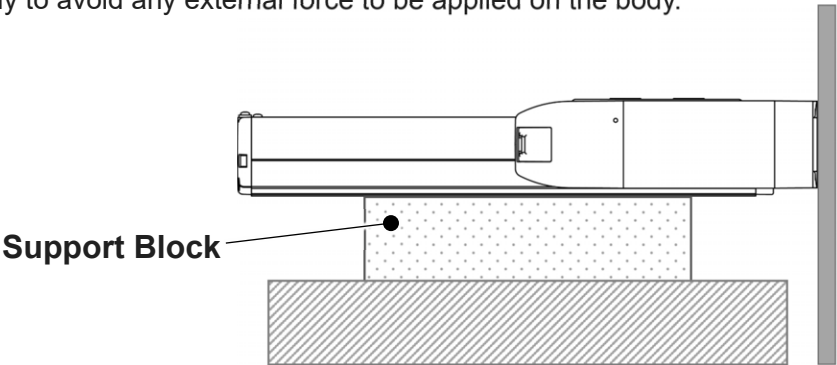
Vertical

Unmountable

Ceiling mount

Installation Posture			Support
Horizontal	Vertical	Ceiling Mount	
×	×	×	No
○	○	×	Yes

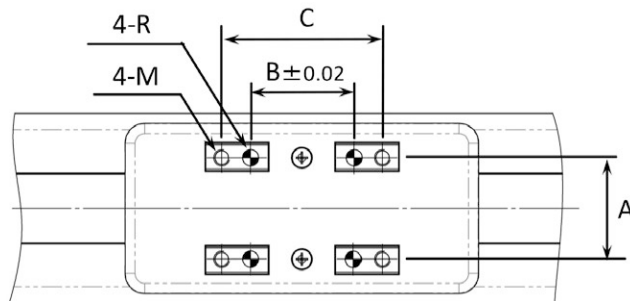
When using the product in horizontal or vertical orientation, have a support block to support the main body to avoid any external force to be applied on the body.



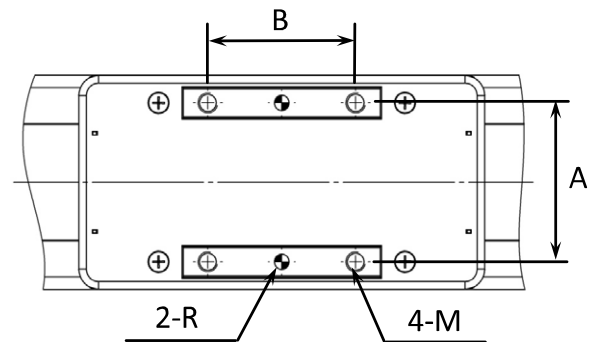
[4] Attachment of Transported Object

- There are screw holes on the top surface of the slider.
- The way to affix follows the installation of the main unit.
- There are Reamed Holes R at two positions or four positions on the top surface of the slider as shown in the figure below. Use these reamed holes if repeatability of attaching and detaching is required. Also, if small tuning such as perpendicularity is required, use one of the reamed holes for the tuning.
- Refer to the below table for the screwed depth and reamed depth. Screwing further than indicated in the table may destroy the screw hole or lower the reinforcement of the attachment of the work part, result in the drop of the accuracy or an unexpected accident.

- For SA4C/R, SA6C/R, SA7C/R



- For SA8C/R



Type	A	B	C	Reamed Hole R	Screw Hole M	Mounting Bolt	
						Bolt Nominal	Tightening Torque
SA4C, SA4R	20	24	32	Φ3H7 Depth 6	M3 Depth 7	M3	0.83N·m
SA6C, SA6R	31	32	50	Φ5H7 Depth 6	M5 Depth 10	M5	3.42N·m
SA7C, SA7R	39	42	65	Φ5H7 Depth 10	M5 Depth 10	M5	3.42N·m
SA8C, SA8R	63	60		Φ6H7 Depth 10	M8 Depth 12	M8	11.5N·m

Tightening Screws

- Use hexagonal socket head bolts for the male threads for installing the base.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- Have the length of thread engagement approximately 1.8 times of the nominal diameter.

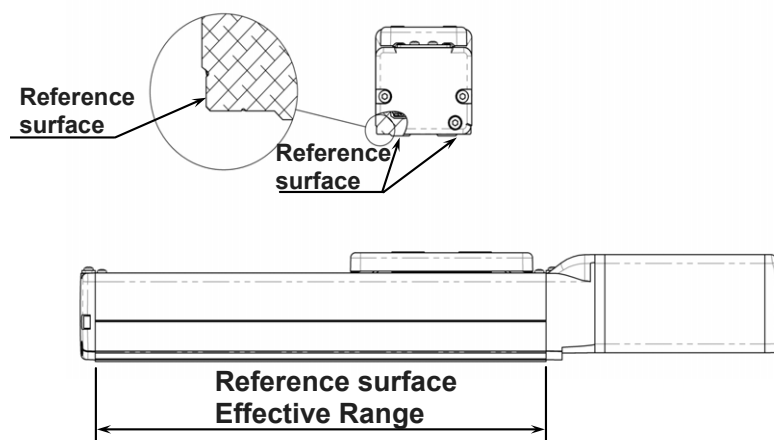


Caution

- Be careful when selecting the bolt length. If bolts of inappropriate lengths are used, the damage of the screw holes and actuator mounting strength may become insufficient, or contact with driving parts may occur, resulting in lower precision or unexpected accidents.

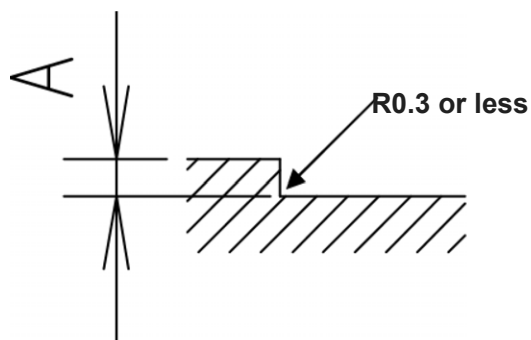
[5] Mounting Surface

- The platform to install the actuator should possess a structure that ensures enough stiffness, and should be free from vibration.
- 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.
- Ensure a room for maintenance work.
- The side and bottom surfaces of the base on the actuator work as the reference surfaces for the side of the slider.
- Use these surfaces as the reference surfaces for mounting.



In the case that the accuracy is required, use the base side surface as reference surface for mounting, as this surface works as the reference surface for the running of the slider.

Follow the below when installing the device using the reference surface.



Type	A Dimensions [mm]
SA4, SA6, SA7	2 to 4
SA8	3 to 5

**Caution**

- There are cases that the width dimensions of the front bracket and rear bracket are bigger than the width dimensions of the reference surface, so it must be abutted within the effective range of the reference surface.

If given an abutting on reference surface process outside of the effective range, it may interfere with the bracket and the motor unit.

ROBO Cylinder

Chapter 3

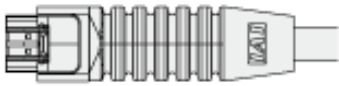
Connecting with the Controller

3.1	Connecting with the Controller	3-1
3.2	Motor • Encoder Cables	3-7
3.2.1	Dedicated connection cable for compatible controllers P3 and P4	3-7
3.2.2	Dedicated connection cable for compatible controllers P5 and P6	3-10

3.1 Connecting with the Controller

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

Dedicated Connection Cable

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



Caution

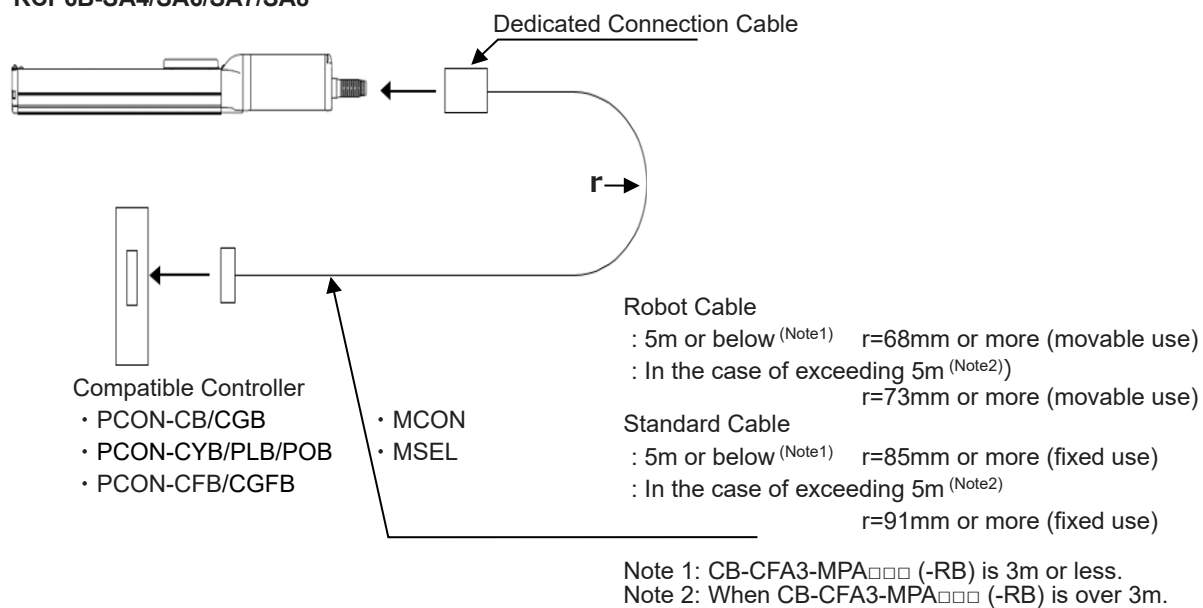
- If the dedicated connection cable cannot be secured, reduce the load on the cable by allowing it to deflect only by the weight of the cable or wire it in a self-standing cable hose, etc., having a large radius.
- Do not cut, extend, shorten or reconnect the dedicated connection cable.
- Do not pull on the dedicated connection cable or bend it forcibly.
- The 4-way connector type should not rotate in 360deg. 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)
- Interference to an actuator may occur depending on the cable ejection direction.



Contact us if you wish to have a change to the specifications of the dedicated cables.

[1] Connecting the Compatible Controller P3 and P4

RCP6B-SA4/SA6/SA7/SA8

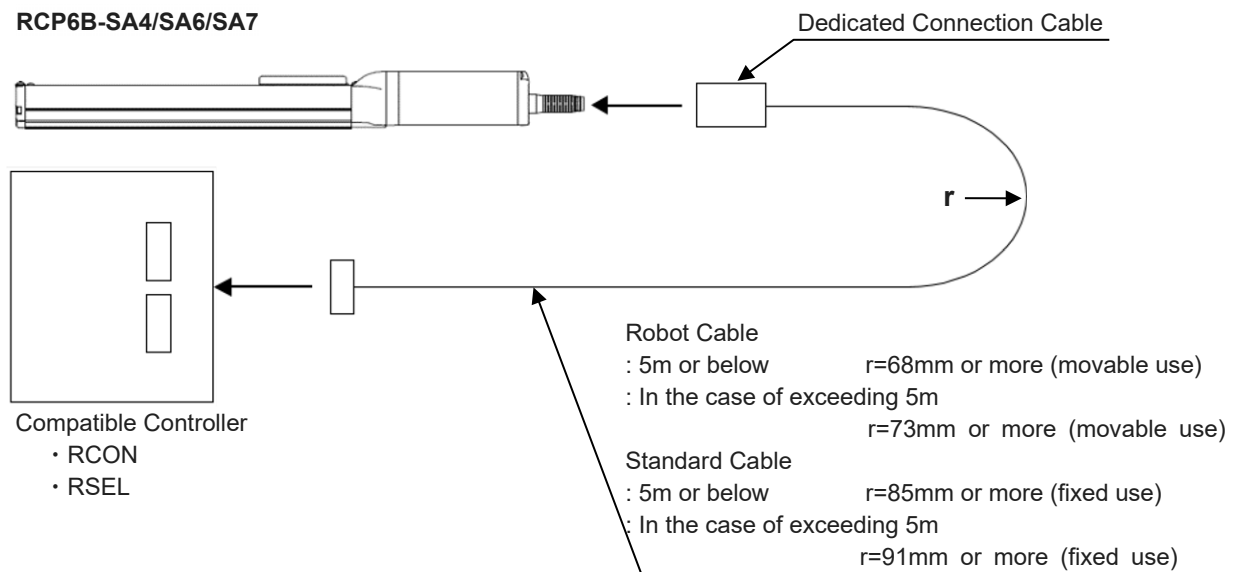


Dedicated Connection Cable Model Code

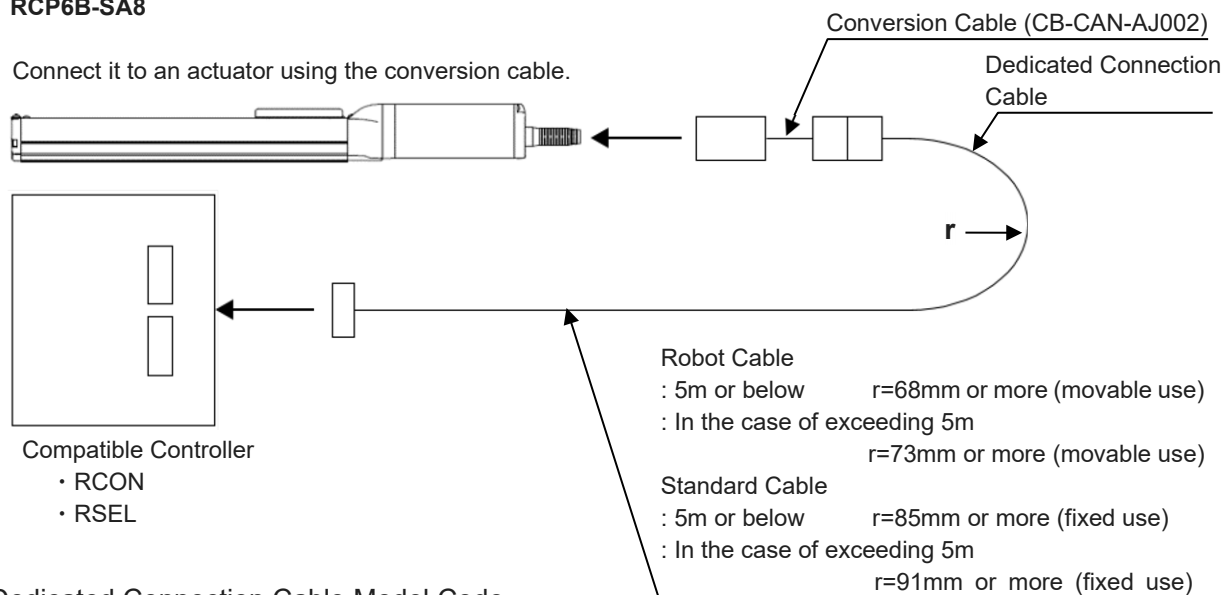
Cable	SA4, SA6, SA7	SA8
Motor Encoder Integrated Cable	CB-CAN-MPA□□□	CB-CFA3-MPA□□□
Motor Encoder Integrated Robot Cable	CB-CAN-MPA□□□-RB	CB-CFA3-MPA□□□-RB
Motor Encoder Integrated Cable 4-way Connector Type	CB-CAN2-MPA□□□	—
Motor Encoder Integrated Robot Cable 4-way Connector Type	CB-CAN2-MPA□□□-RB	—

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

[2] Connecting the Compatible Controller P5 and P6

RCP6B-SA4/SA6/SA7**RCP6B-SA8**

Connect it to an actuator using the conversion cable.

**Dedicated Connection Cable Model Code**

Cable	SA4, SA6, SA7	SA8
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

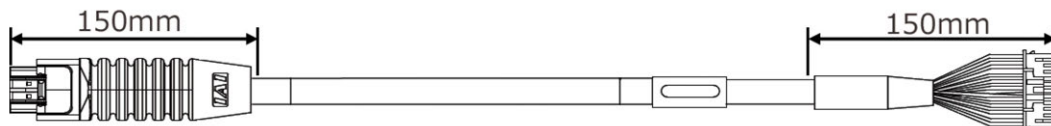


Warning

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 may cause electric shock, electric leakage or 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.

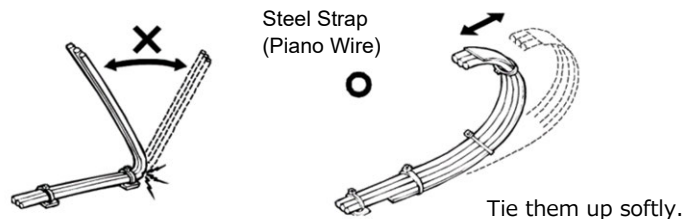
- Make sure there is not too much friction inside the cable storage equipment.
- Do not apply radiated heat to power line or cables.
- Do not bend the cable in the area from the connector tip inward to 150mm on both ends.
Standard Cable CB-CAN-MPA□□□, CB-CFA3-MPA□□□, CB-ADPC-MPA□□□
Robot Cable CB-CAN-MPA□□□-RB, CB-CFA3-MPA□□□-RB, CB-ADPC-MPA□□□-RB



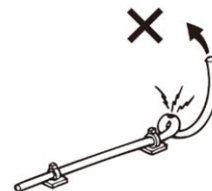
- Do not attempt to use the motor / encoder cable in a condition that the cable is bundled up in several layers such as coil winding.
There are motor driving power line and encoder signal line in the motor / encoder cable.
Therefore, if the motor / encoder cable is bundled up, the noise generated from the motor driving power line could give an influence to the encoder and may cause an error.



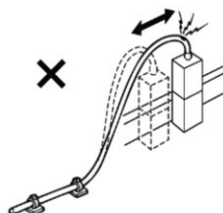
- Have a sufficient radius for bending, and avoid a bend concentrating on one point.



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

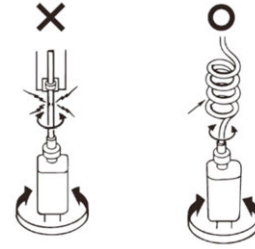


- Do not pull the cable with a strong force.

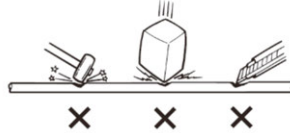


3.1 Connecting with the Controller

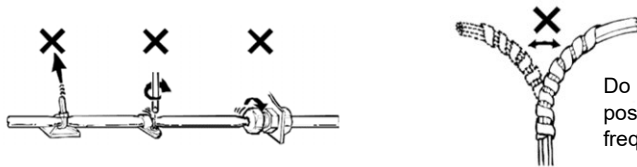
- Pay attention not to concentrate the twisting force to one point on a cable.



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

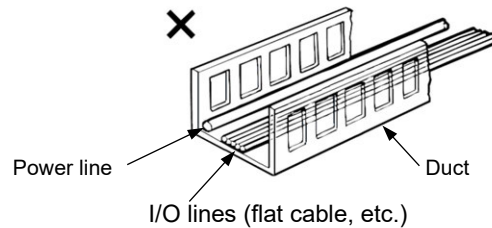


- When a cable is fastened to affix, make sure to have an appropriate force and do not tighten too much.



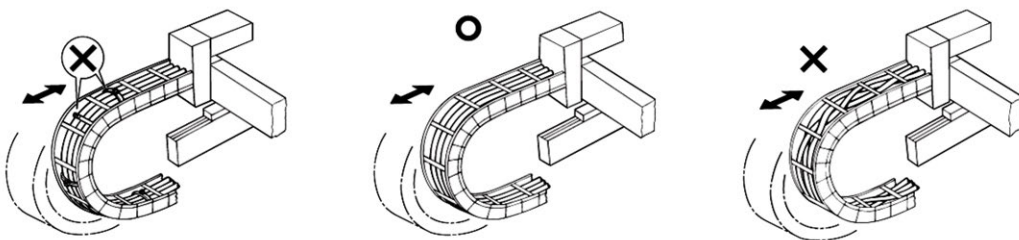
Do not use spiral tube in any position where cables are bent frequently.

- 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.



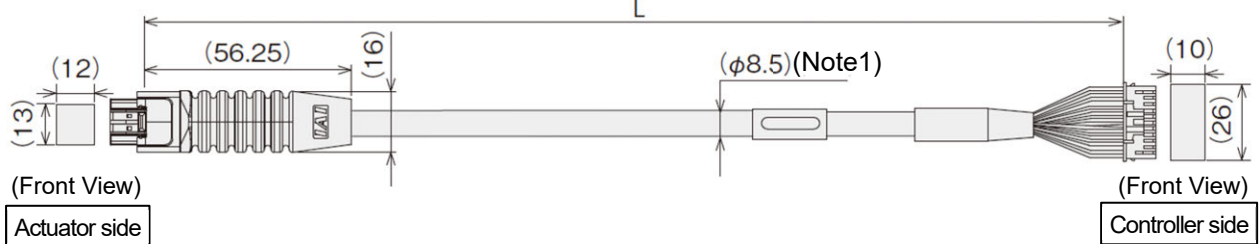
3.2 Motor • Encoder Cables

3.2.1 Dedicated connection cable for compatible controllers P3 and P4

[1] Motor • Encoder Integrated Cables Standard Connector (For SA8 refer to [3])

Model code **CB-CAN-MPA□□□ / CB-CAN-MPA□□□-RB** (Robot Cable)

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



Min. Bending Radius When cable length is 5m or less 68mm (for movable use)
When cable length is more than 5m 73mm (for movable use)

* 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.

(Note1) When the cable length is 5m or longer, it should be $\phi 9.1$.

Connection diagram

DF62DL-24S-2.2C (Hirose)

PADP-24V-1-S (JST)

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

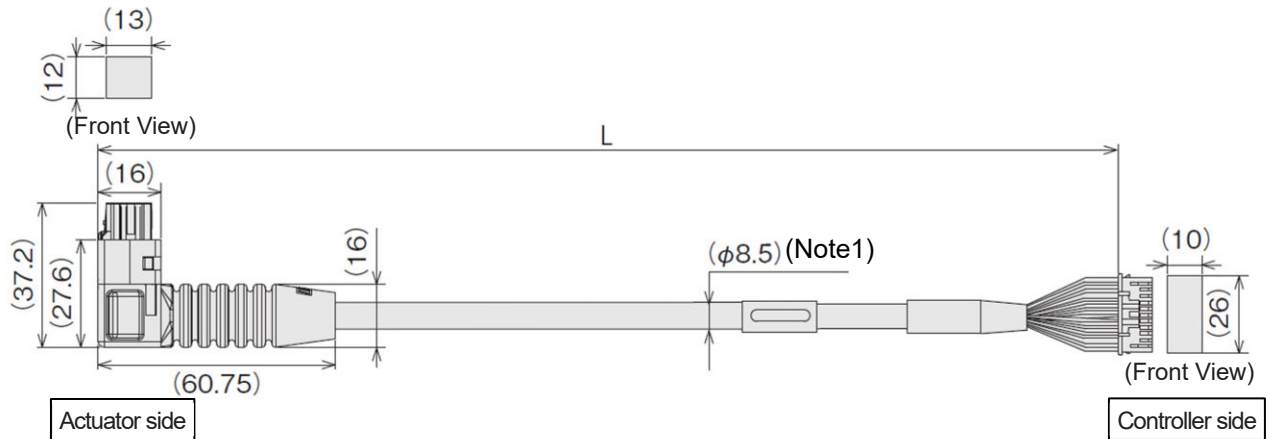
Pin No.	Symbol
1	ϕA
2	VMM
3	ϕB
4	VMM
5	ϕ_A
6	ϕ_B
11	SA [mABS]
12	SB [mABS]
13	A+
14	A-
15	B+
16	B-
18	VPS
7	LS+
9	BK+
10	BK-
17	VCC
19	GND
8	LS-
20	LS_GND
22	-
21	CF_VCC
23	-
24	FG

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

[2] Motor • Encoder Integrated Cables 4-way Connector

Model code **CB-CAN2-MPA□□□ / CB-CAN2-MPA□□□-RB** (Robot Cable)

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



Min. Bending Radius When cable length is 5m or less 68mm (for movable use)
When cable length is more than 5m 73mm (for movable)

* 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.

(Note1) When the cable length is 5m or longer, it should be $\Phi 9.1$.

Connecting diagram

DF62DL-24S-2.2C (Hirose)

PADP-24V-1-S (JST)

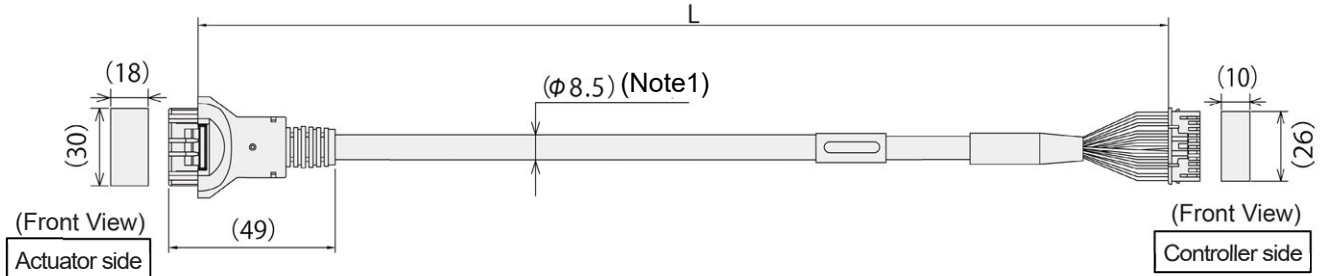
Color (Thickness)			Symbol	Pin No.		Pin No.	Symbol
Standard cable	Robot cable						
	July 2022 and later	July 2022 and earlier					
Blue (AWG22/19)	Black (AWG22/19)	Blue (AWG22/19)	ΦA	3		1	ΦA
Orange (AWG22/19)	White (AWG22/19)	Orange (AWG22/19)	VMM	5		2	VMM
Brown (AWG22/19)	Green (AWG22/19)	Brown (AWG22/19)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

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

[3] Motor • Encoder Integrated Cables (For SA8)

Model code **CB-CFA3-MPA□□□ / CB-CFA3-MPA□□□-RB** (Robot Cable)

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



Min. Bending Radius When cable length is 3m or less 68mm (for movable use)
 When cable length is more than 3m 73mm (for movable use)

* 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.

(Note1) When the cable length is 3m or longer, it should be $\phi 9.1$.

Connection diagram

1-1827863-1 (AMP)

Color (Thickness)			Symbol	Pin No.
Standard cable	Robot cable			
	July 2022 and later	July 2022 and earlier		
Blue (AWG22/19)	Black (AWG22/19)	Blue (AWG22/19)	ΦA	A1
Orange (AWG22/19)	White (AWG22/19)	Orange (AWG22/19)	VMM	B1
Green (AWG22/19)	Brown (AWG22/19)	Green (AWG22/19)	Φ_A	A2
Brown (AWG22/19)	Green (AWG22/19)	Brown (AWG22/19)	ΦB	B2
Gray (AWG22/19)	Yellow (AWG22/19)	Gray (AWG22/19)	VMM	A3
Red (AWG22/19)	Red (AWG22/19)	Red (AWG22/19)	Φ_B	B3
Light Blue (AWG26)	White (AWG26)	Light Blue (AWG26)	SA [mABS]	A6
Orange (AWG26)	Yellow (AWG26)	Orange (AWG26)	SB [mABS]	B6
Green (AWG26)	Red (AWG26)	Green (AWG26)	A+	A7
Brown (AWG26)	Green (AWG26)	Brown (AWG26)	A-	B7
Gray (AWG26)	Black (AWG26)	Gray (AWG26)	B+	A8
Red (AWG26)	Brown (AWG26)	Red (AWG26)	B-	B8
Black (AWG26)	Blue (AWG26)	Black (AWG26)	VPS	B9
Yellow (AWG26)	Pink (AWG26)	Yellow (AWG26)	LS+	A4
Light Blue (AWG26)	Black (AWG26)	Light Blue (AWG26)	BK+	A5
Orange (AWG26)	Brown (AWG26)	Orange (AWG26)	BK-	B5
Green (AWG26)	Green (AWG26)	Green (AWG26)	LS_GND	A9
Brown (AWG26)	Red (AWG26)	Brown (AWG26)	LS-	B4
Gray (AWG26)	White (AWG26)	Gray (AWG26)	VCC	A10
Red (AWG26)	Yellow (AWG26)	Red (AWG26)	GND	B10
-	-	-	—	A11
Black	Green (AWG26)	Green (AWG26)	FG	B11

PADP-24V-1-S (JST)

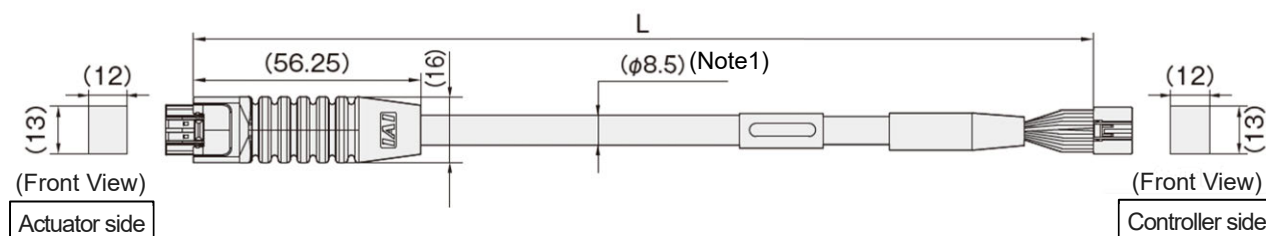
Pin No.	Symbol
1	ϕA
2	VMM
5	ϕ_A
3	ϕB
4	VMM
6	ϕ_B
11	SA [mABS]
12	SB [mABS]
13	A+
14	A-
15	B+
16	B-
18	VPS
7	LS+
9	BK+
10	BK-
20	LS_GND
8	LS-
21	VCC
19	GND
17	-
22	-
23	-
24	FG

3.2.2 Dedicated connection cable for compatible controllers P5 and P6

[1] Motor • Encoder Integrated Cables Standard Connector

Model code **CB-ADPC-MPA□□□ / CB-ADPC-MPA□□□-RB** (Robot Cable)

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



Min. Bending Radius When cable length is 5m or less 68mm (for movable use)
When cable length is more than 5m 73mm (for movable use)

* 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.

(Note1) When the cable length is 3m or longer, it should be $\phi 9.1$.

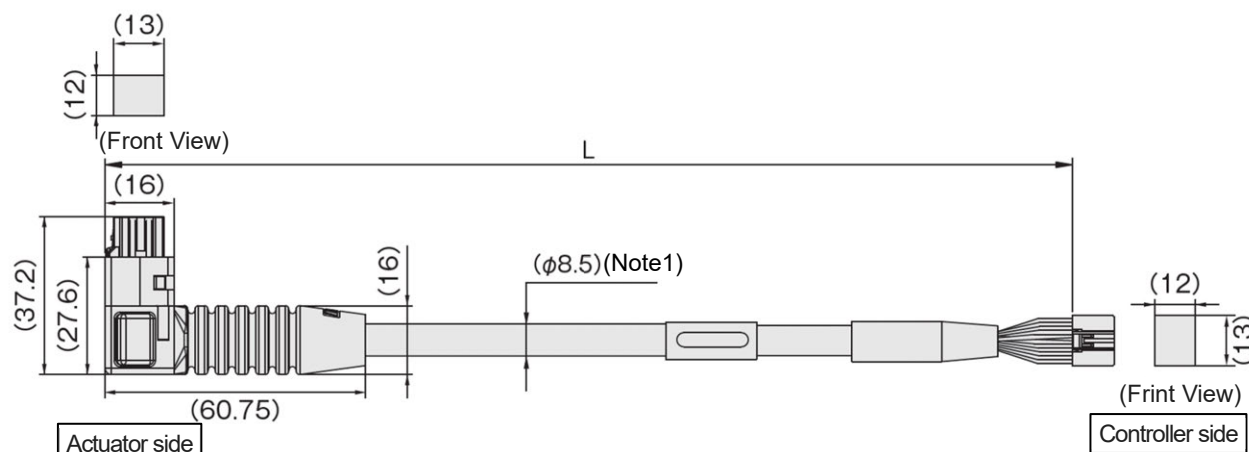
Connection diagram

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

[2] Motor • Encoder Integrated Cables 4-way Connector

Model code CB-ADPC2-MPA□□□ / CB-ADPC2-MPA□□□-RB (Robot Cable)

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



Min. Bending Radius When cable length is 5m or less 68mm (for movable use)
 When cable length is more than 5m 73mm (for movable use)

* 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.

(Note1) When the cable length is 5m or longer, it should be φ9.1.

Connection diagram

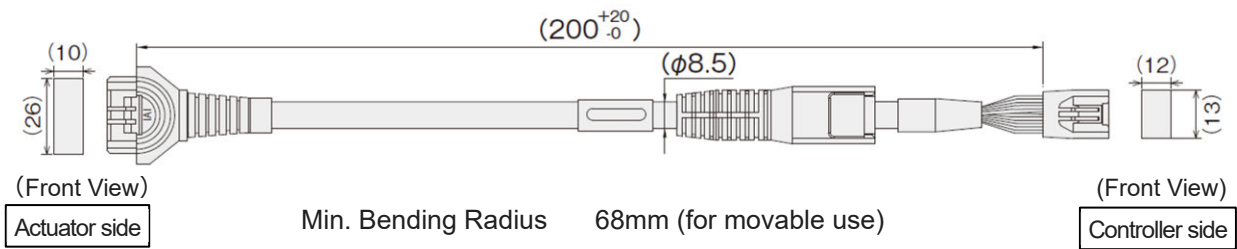
DF62DL-24S-2.2C (Hirose)

DF62DL-24S-2.2C (Hirose)

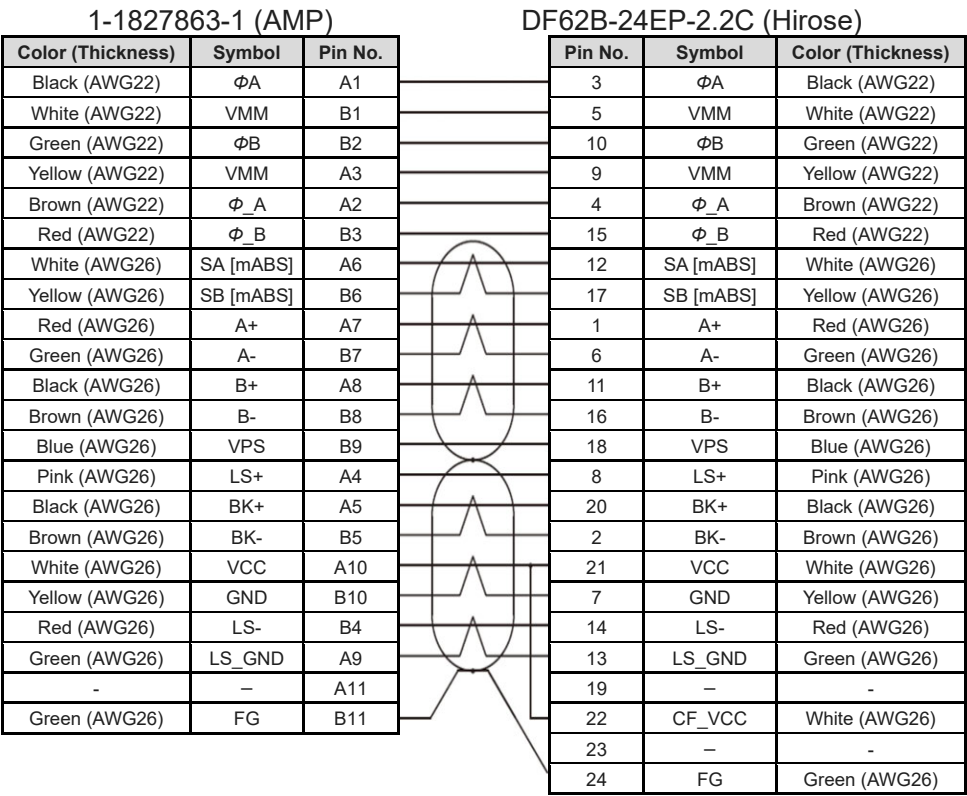
Color (Thickness)	Symbol	Pin No.	Pin No.	Symbol
Black (AWG22/19)	ΦA	3	3	ΦA
White (AWG22/19)	VMM	5	5	VMM
Green (AWG22/19)	ΦB	10	10	ΦB
Yellow (AWG22/19)	VMM	9	9	VMM
Brown (AWG22/19)	Φ_A	4	4	Φ_A
Red (AWG22/19)	Φ_B	15	15	Φ_B
White (AWG26)	SA [mABS]	12	12	SA [mABS]
Yellow (AWG26)	SB [mABS]	17	17	SB [mABS]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

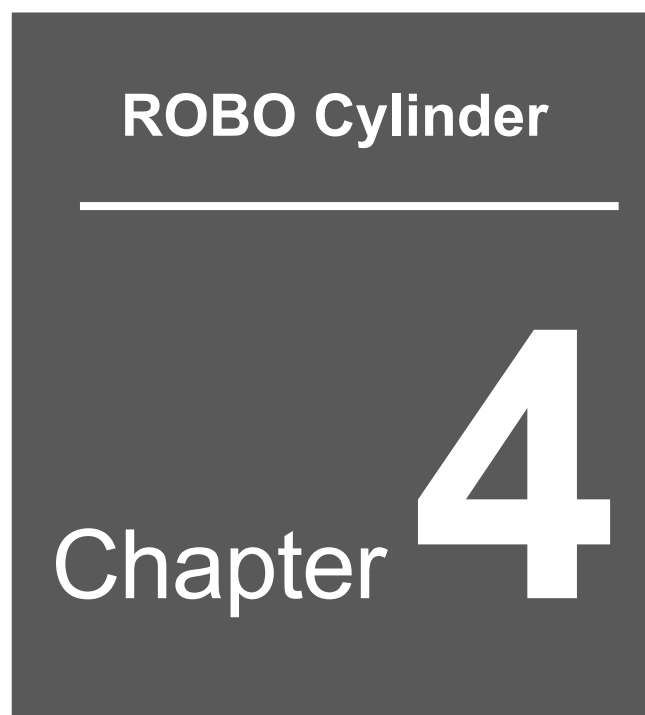
[3] Conversion Cable

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



Connection diagram





Maintenance and Inspection

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4.1 Precautions for maintenance and inspection work

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



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 slider 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.
- The grease film may run out if the actuator performs return operation continuously over a distance of 30mm or less. As a guideline, every 5,000 to 10,000 cycles, have approximately 5 cycles of return operation over a 50mm distance or more to regenerate the oil film.
The ball screw or guide may be damaged if the oil film runs out.



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.

For details, refer to [4.5 Grease Supply].

4.2 Inspection

Follow the maintenance inspection schedule below.

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

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

4.2.1 Inspection items and schedule

Period of Time	External visual inspection	Internal visual inspection	Greasing ^(Note 1)	
			Ball screw	Guide
Start of work inspection	○			
1 month inspection	○			
3 month inspection			○	○
3 months after starting operation			Depends on grease supply timing (reference)	
6 month inspection	○	○ ^(Note 2)		
Every 6 months thereafter	○	○ ^(Note 2)		

Note 1 Grease film may run out if the actuator is moved back and forth continuously over a distance of 30 mm or less. As a guide, perform a back-and-forth operation five times or so over a distance of 50 mm or more after a back-and-forth operation over such short distance has been repeated 5,000 to 10,000 times. This will restore oil film.

Note 2 Check the condition of grease, and wipe off the grease before supplying new in case it is extremely dirty.

4.2.2 Grease Supply Timing (Reference)

Perform grease supply when it has reached to either the operation distance or spent months described in the table below.

Maximum Speed of Use [mm/s]	Grease Supply Timing (Reference)	
	Operated distance	Months
0 to 750 or less	1,250km	6 months
750 to 1440	2,500km	

4.3 Visual Inspection

For the detailed way to supply grease, refer to [4.5 Grease Supply] and [4.6 Replacing Components].

4.3.1 External visual inspection

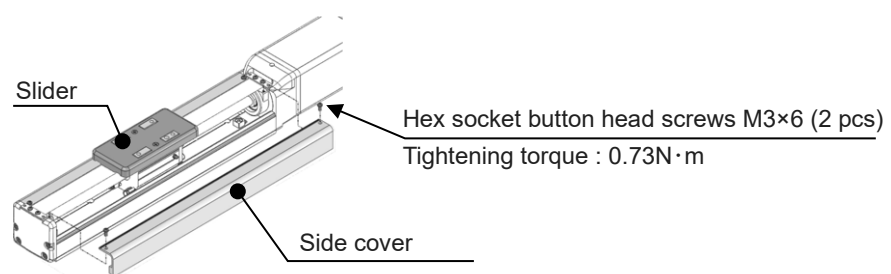
Inspection items	Maintenance work
Is abnormal noise or vibration generated?	Take an action by referring to [Troubleshooting in Controller Instruction Manual].
Are actuator mounting bolts loose?	Tighten them further.
Is the cable scratched?	Replace if the damage is severe.
Is the connector loose?	Re-insert correctly.
Is grease dripping out? (especially if vertically mounted)	Clean up any drips. Replenish the grease.
Is the stainless steel sheet scratched?	Replace the stainless steel sheet.
Is the stainless steel sheet misaligned or slack?	Adjust the alignment and hang.

4.3.2 Internal visual inspection

[1] Inspection Items Inside Slider and How to Inspect

Inspection items	Maintenance work
Backlash/play or wear debris found?	The ball screw guide may be damaged. Contact IAI.
Has foreign matter penetrated inside?	Remove the foreign matter, clean, and inspect the interior for any damage.
Is the ball screw or guide grease not lubricating well? (Even if the grease is brown, lubrication is adequate if the running surface is shiny)	Wipe away the old grease, then replenish with new grease.
Is dust or foreign matter adhered to the ball screw or guide?	Replenish with new grease after cleaning.

1. Remove the hex socket button head screws (2 pcs) and take the side cover off.
2. Check inside.
3. Attach the side cover with the hex socket button head screws (2 pcs).
Put a shim (approx. 0.1 to 0.2mm) between the stainless steel sheet and the side cover so the side cover slightly offsets.
The stainless steel sheet contacting the side cover may cause damage or waviness on the stainless steel sheet which could lead to early degradation or abrasion.
4. Make sure that the slider and the side cover do not interfere, moving the slider backwards and forwards between the strokes.





Caution

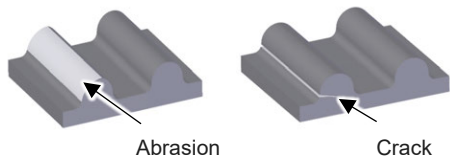
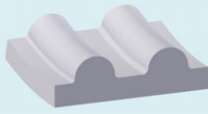
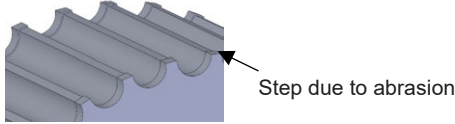
- Do not bend the stainless steel sheet forcefully or damage it during internal inspection. Do not tug on the stainless steel sheet or in any way attempt to reposition it. Change in the attached condition may cause the sheet to be mounted unevenly or impact the product life.
 - Keep in mind that the edges of the stainless steel sheet can cause injuries. Always wear gloves when working on it.
-

[2] Inspection items and how to inspect on timing belt on motor reversing type

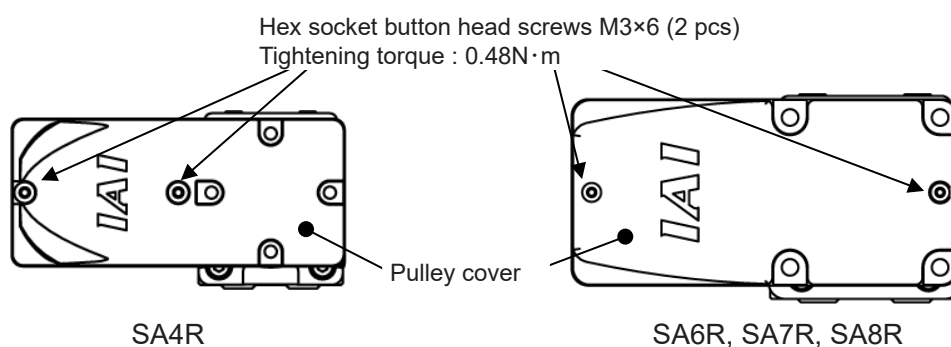
Application : SA4R, SA6R, SA7R, SA8R

The durability of a belt could fluctuate depending on the operating period and there is no specific period for replacement.

As abrasion and degradation of a belt could go along as it is used time by time, it is necessary to check the following inspection items for the motor reversed type.

Inspection items	Maintenance work
Is the belt significantly worn out on the teeth area? Is there any crack on the teeth area? Is there any chipped tooth? 	Replace the timing belt in case any of those stated on the left is found.
Is the timing belt hardened, softened or deformed (shrunk or expanded)? 	Replace the timing belt in case any of those stated on the left is found.
Is there any significant abrasion on pulley teeth? 	Consult with IAI in case any of those stated on the left is found.

1. Remove the hex socket button head screws (2 pcs) to take the pulley cover off.



2. Check the condition of the timing belt visually.

3. Attach the pulley cover with the hex socket button head screws (2 pcs).

4.4 Cleaning

4.4.1 External cleaning

- Clean exterior surfaces as necessary.
- 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.

4.4.2 Internal cleaning

- When cleaning up inside, use a soft cloth to wipe up dirt.
- 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, neutral detergent or alcohol.

4.5 Grease Supply

4.5.1 Grease used

Type	Oil Supply Point	During Maintenance (recommended product)	Default (reference)
SA4 SA6 SA7 SA8	Ball screw	IAI Corporation IAGR-LDP01-400	IAI Corporation IAGR-LDP01-400
	Guide		
	Coupling Spacer	NOK NOXLUB TL1013 (Lithium grease)	NOK NOXLUB TL1013 (Lithium grease)



Caution

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

4.5.2 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.
- Do not damage the stainless steel sheet by bending it forcefully during work.
- Keep in mind that the edges of the stainless steel sheet can cause injuries. Always wear gloves when working on it.
- The front bracket is supporting the ball screw. Do not detach it.
If the front bracket loses its tuned condition, it may cause an increase of driving resistance, shortened life of each component or abnormal noise due to the center of the axis being off the right position.
- 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

- Hexagonal wrench (Opposite side 2mm)
- Protection Gear (e.g. Cotton Work Gloves)
- Grease Gun

Grease Gun	Nozzle	Supplier of nozzle
Grease gun of mounting screw R1/8 (Example) GC-57K (Yamada Corporation)	NZ3	NSK

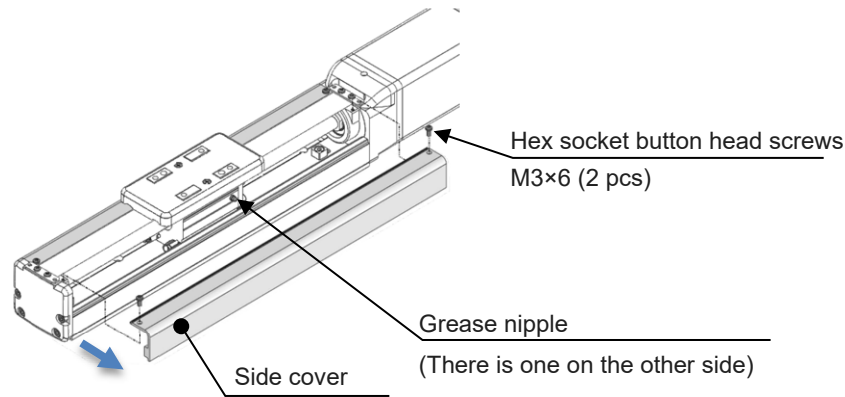
- Grease

Type	Amount of Grease Supply (Reference)	Grease Nipple Diameter
SA4	0.5cc to 1.0cc	Φ3.5
SA6	1.5cc to 2.0cc	
SA7	2.0cc to 2.5cc	
SA8	3.5cc to 4.0cc	

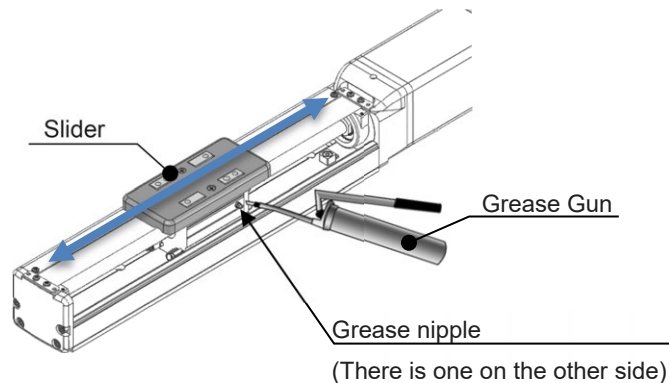
◆ Grease Supply Procedure

1. Remove the hex socket button head screws (2 pcs) on either side of the side covers and take the side cover off.

* There is another grease nipple on the other side.



2. Supply grease with a grease gun at the grease nipple.
Wipe off the grease before supplying new in case it is extremely dirty.
- * There is another grease nipple available for grease supply on the other side.
Either side is available for grease supply on the ball screw and the guides.

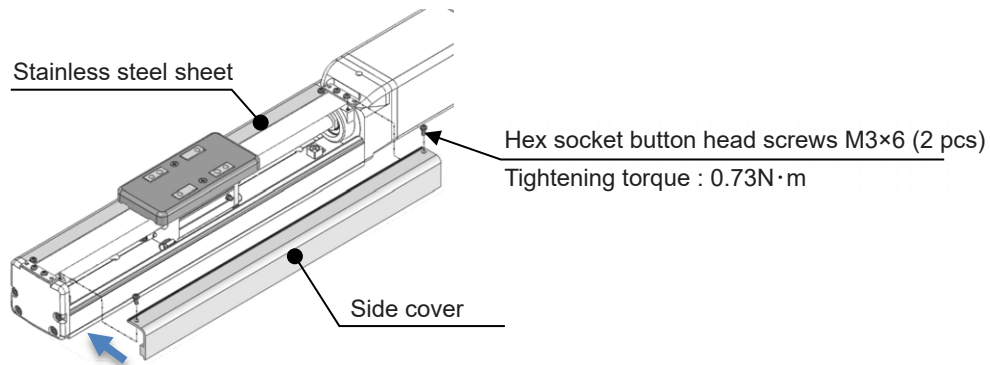


3. Move the slider in the full stroke range to spread the grease evenly.
 - Confirm the surface on the ball screw and the ball feeding area on the guides are glossy with grease oil.
If grease is not spread evenly, supply grease again.
 - Wipe off excess grease.

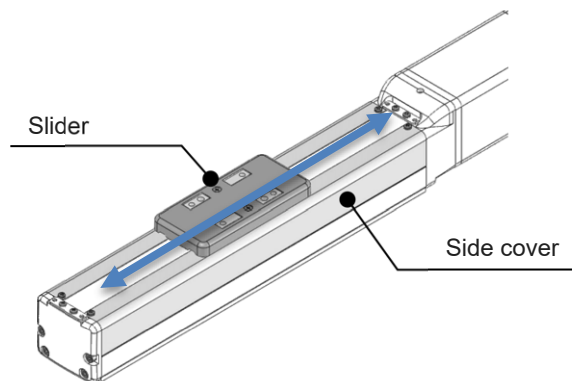
4. Put the side cover on with the hex socket button head screws (2 pcs).

(Note) Put a shim (approx. 0.1 to 0.2mm) between the stainless steel sheet and the side cover so the side cover slightly offsets.

The stainless steel sheet contacting the side cover may cause damage or waviness on the stainless steel sheet which could lead to early degradation or abrasion.



5. Move the slider in the full stroke range to make sure there is no interference of the slider and the side covers.



4.6 Replacing Components

4.6.1 Stainless steel sheet replacement/adjustment

◆Preparation

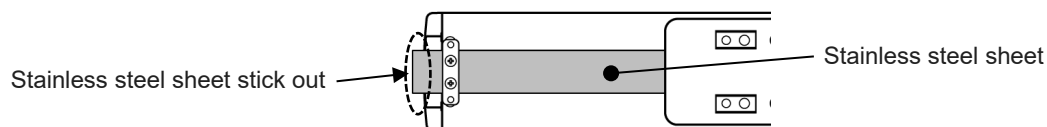
- Hexagonal wrench (Opposite side 2mm)
- Protection Gear (e.g. Cotton Work Gloves)
- Tape
- Scissors
- Replacement stainless steel sheet

Type	Model Code
SA4C/SA4R	ST-6A4- (Stroke)
SA6C/SA6R	ST-6A6- (Stroke)
SA7C/SA7R	ST-6A7- (Stroke)
SA8C/SA8R	ST-6A8- (Stroke)



Caution

- Degradation and wear-out of the stainless steel sheet relies on its tension of attachment. Pulling it with high tension making the gap to the slider cover too big may cause fatigue fracture, and if the tension is too loose, the stainless steel sheet may interfere with the back of the slider cover, which could generate dust.
- Ensure that the stainless steel sheet does not stick out of the end of the actuator when it is mounted. It may lead to a risk of cutting your finger on the stainless steel sheet.



- As a guideline, the stainless steel sheet should last for about 5,000km of motion. However, depending on the usage or environment, replace the stainless steel sheet appropriately.

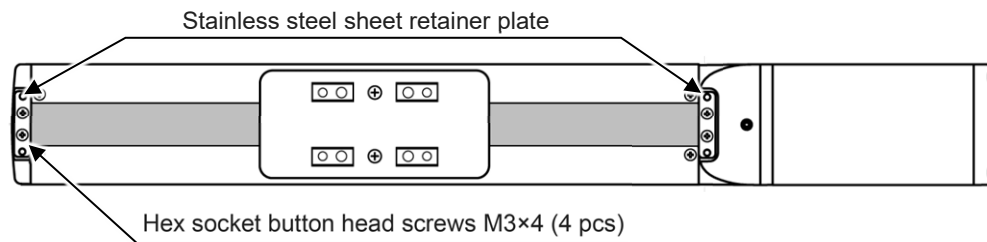
◆Procedure for Replacement

Have a replacement and tuning in Procedure 1 for SA7, SA8.

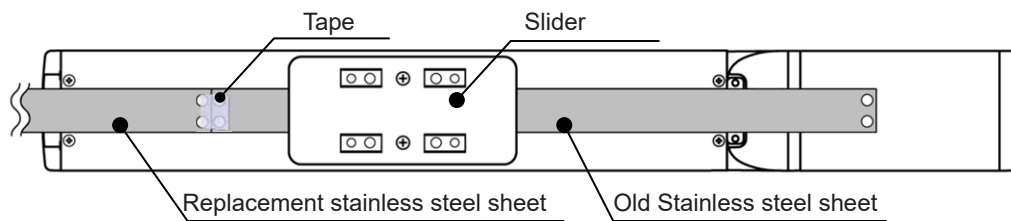
For SA4, SA6 have a replacement and tuning in Procedure 1 or Procedure 2.

● Procedure 1

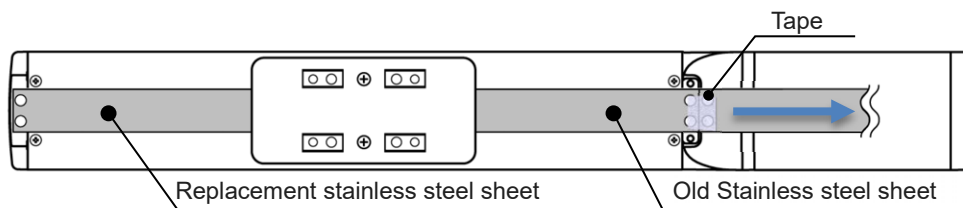
1. Remove the hex socket button head screws (4 pcs) and take the stainless steel sheet retainers off.



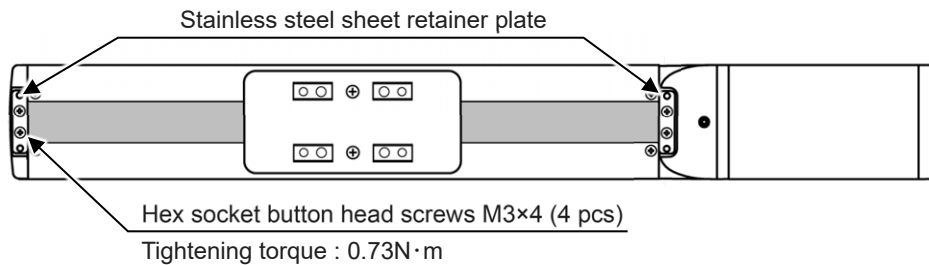
2. Join the old stainless steel sheet with a stainless steel sheet for replacement.
* Make sure width of adhesive tape would not go out of the stainless steel sheet width.



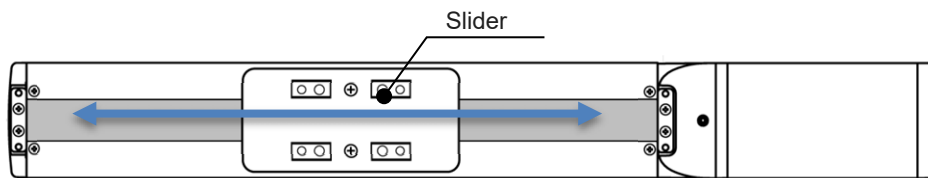
3. Pull the old stainless steel sheet slowly to replace it with the stainless steel sheet for replacement, and take off the old stainless steel sheet and the tape.



4. Attach the stainless steel sheet retainers with the hex socket button head screws (4 pcs).
* There are two grooves on the main body for the stainless steel sheet attachment guide.
Set the stainless steel sheet in the center between the two grooves.

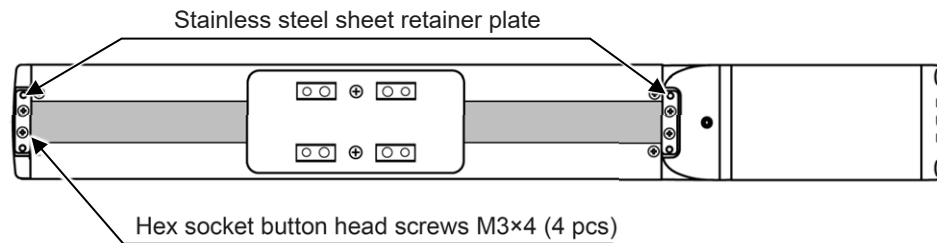


5. Move the slider in the full stroke range to make sure there is no waviness or looseness on the stainless steel sheet.
Redo the from Procedure 4 if there is any problem.

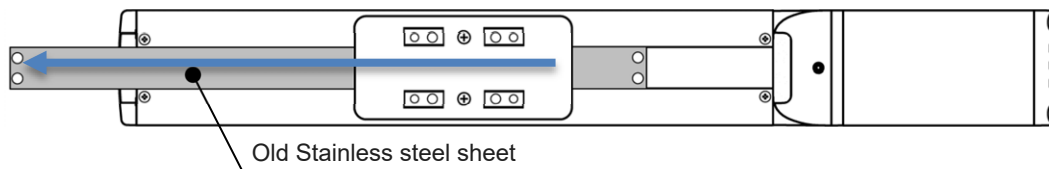


• Procedure 2

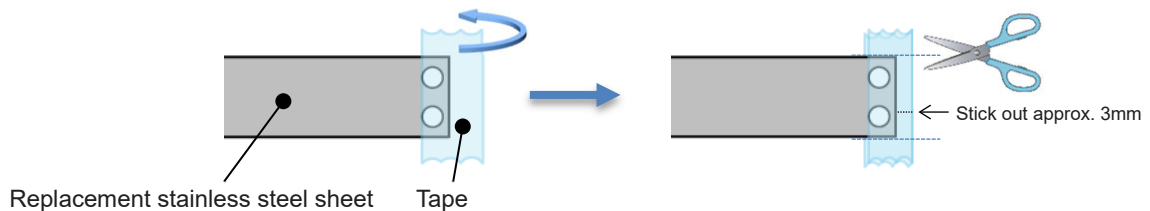
1. Remove the hex socket button head screws (4 pcs) and take the stainless steel sheet retainer plate off.



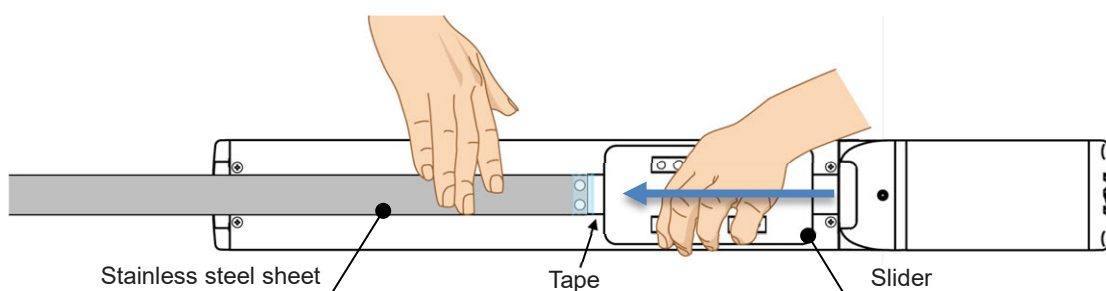
2. Pull out the old stainless steel sheet.



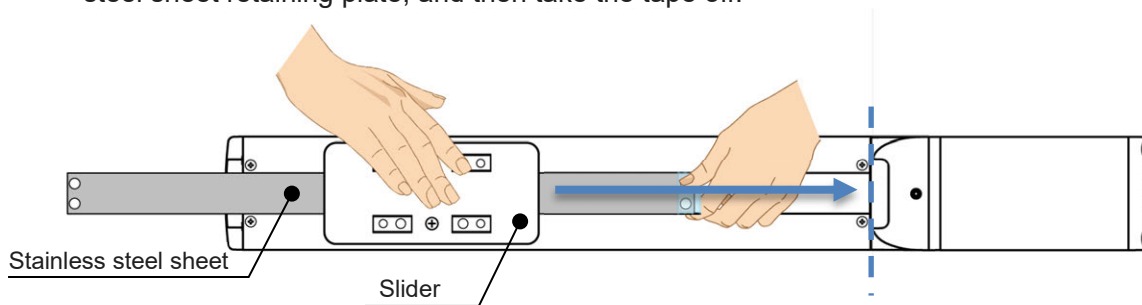
3. Put adhesive tape on one end of a stainless steel sheet for replacement.
Put tape and fold it to cover both sides of the stainless steel sheet (with approximately 3mm sticking out from the stainless steel sheet) and cut excess parts.



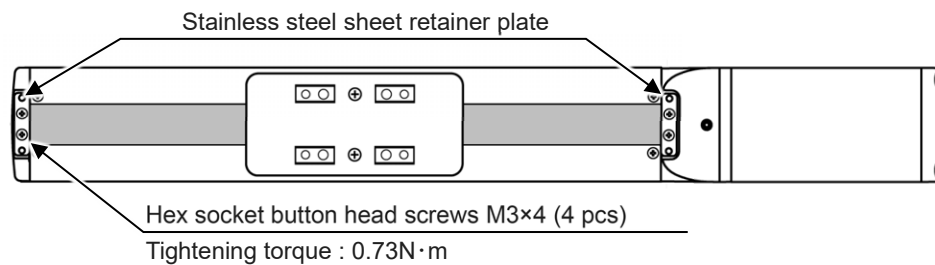
4. Put the stainless steel sheet for replacement with adhesive tape on the main body, and move the slider while holding the stainless steel sheet to set the stainless steel sheet through.
* There are two grooves on the main body for the stainless steel sheet attachment guide.
Set the stainless steel sheet in the center between the two grooves.



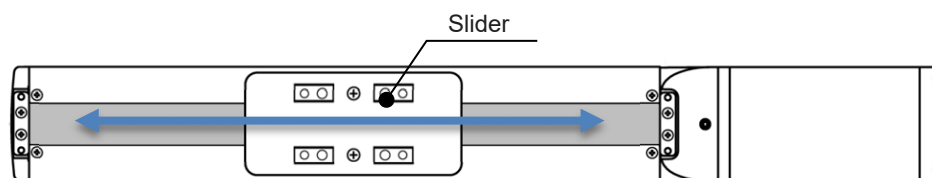
5. Hold the stainless steel sheet on the end and pull it out slowly to the position of the stainless steel sheet retaining plate, and then take the tape off.



6. Attach the stainless steel sheet retainer plate with the hex socket button head screws (4 pcs).



7. Move the slider in the full stroke range to make sure there is no waviness or looseness on the stainless steel sheet.
Redo the from Procedure 6 if there is any problem.

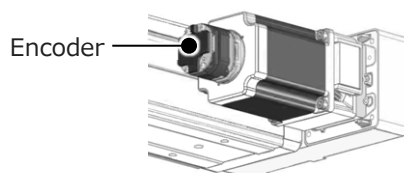


4.6.2 Timing belt replacement/adjustment



Caution

- Do not attempt to touch on the encoder part of the motor directly with hand.
If touched with hands, the encoder phase may change, resulting in an error.

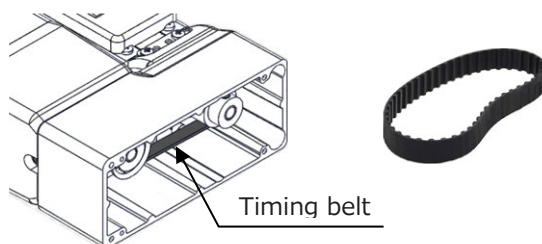


- In case of replacing the timing belt while keeping the vertical orientation, fix the slider in advance. The slider will drop and cause danger.

◆Preparation

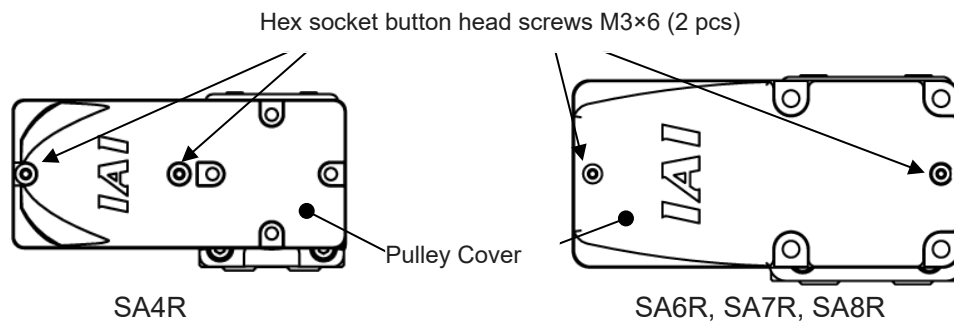
- Hexagon Wrench 2mm, 2.5mm, 3mm
- Phillips screwdriver
- Tension Gauge (capable thing of tensioning to 90N or greater)
- Long zip ties, etc. (thin string)
- Timing belt for replacement

Type	Model Code
SA4R	TB-RCP6-STRA4R
SA6R	TB-RCP6-STRA6R
SA7R	TB-RCP6-STRA7R
SA8R	TB-RCP6-SA8R



◆Procedure for Replacement

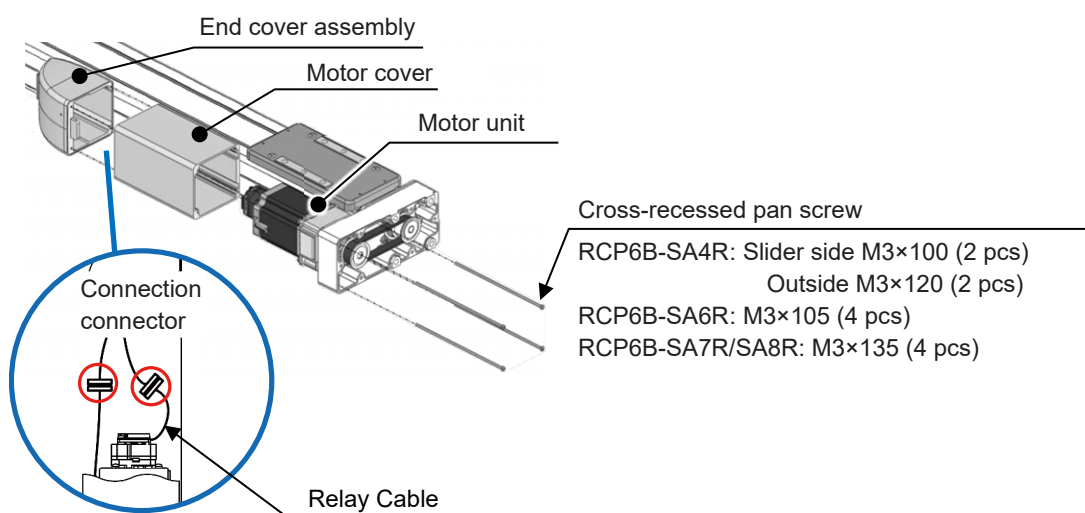
1. Remove the hex socket button head screws (2 pcs) and take the pulley cover off.



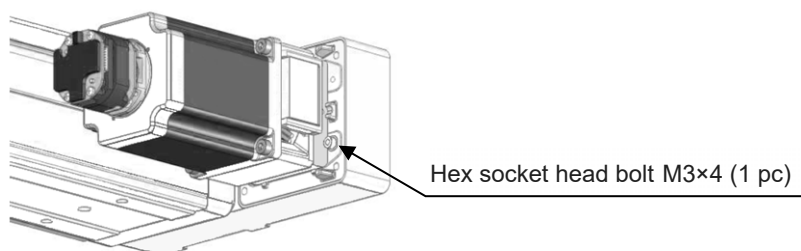
2. Remove the cross recessed pan head machine screws (4 pcs), unplug the connectors on the motor unit and end cover assembly at two places ^(*) and take the motor cover off.

*1 The connectors should be at three places.

* Be aware that the cross recessed pan head machine screws for SA4R are different in length.

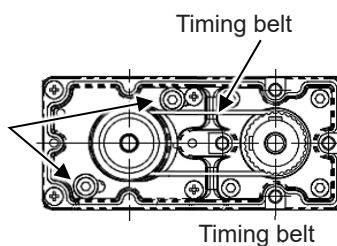


3. Loosen the hex socket head bolt (1 pc).

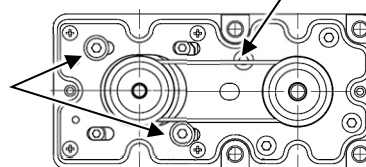


4. Loosen the flanged hexagonal socket head bolts and replace the timing belt.

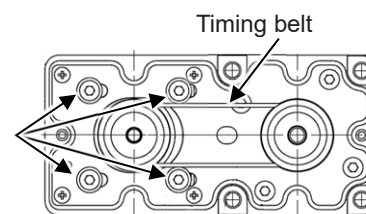
SA4R
Flanged hexagonal socket head bolt
M3×12 (2 pcs)



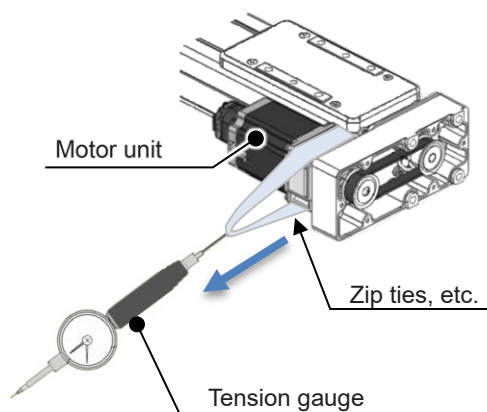
SA6R
Flanged hexagonal socket head bolt
M4×12 (2 pcs)



SA7R, SA8R
Flanged hexagonal socket head bolt
M4×12 (4 pcs)



5. Hang a zip ties or equivalent on the motor unit and apply the specified load (tensile strength) with a tension gauge.



Type	Tensile Strength
SA4R	20 to 25N
SA6R	25 to 30N
SA7R	80 to 90N
SA8R	80 to 90N

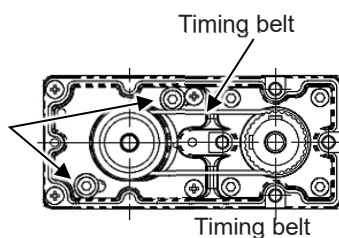
6. While the specified load (tensile strength) is applied, tighten up the flanged hex socket set screw to hold the motor.

SA4R

Flanged hexagonal socket head bolt

M3×12 (2 pcs)

Tightening torque: 1.0N·m

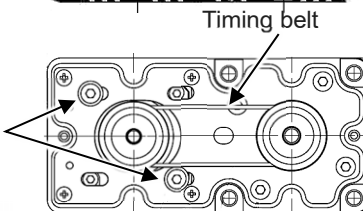


SA6R

Flanged hexagonal socket head bolt

M4×12 (2 pcs)

Tightening torque: 2.2N·m

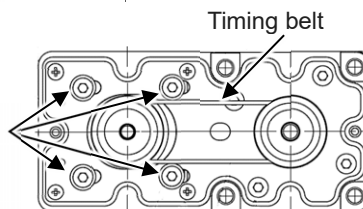


SA7R, SA8R

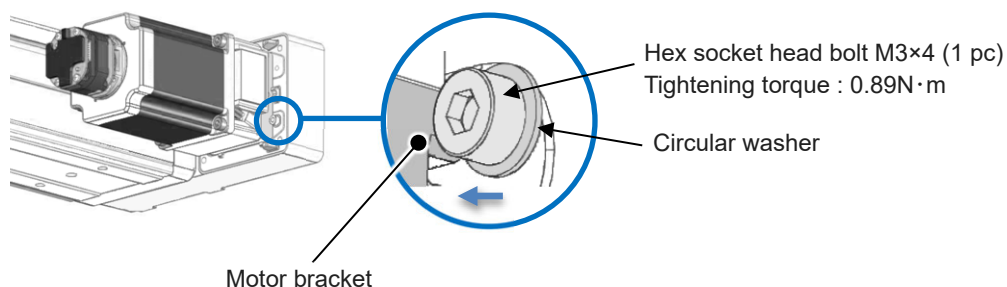
Flanged hexagonal socket head bolt

M4×12 (4 pcs)

Tightening torque: 2.2N·m



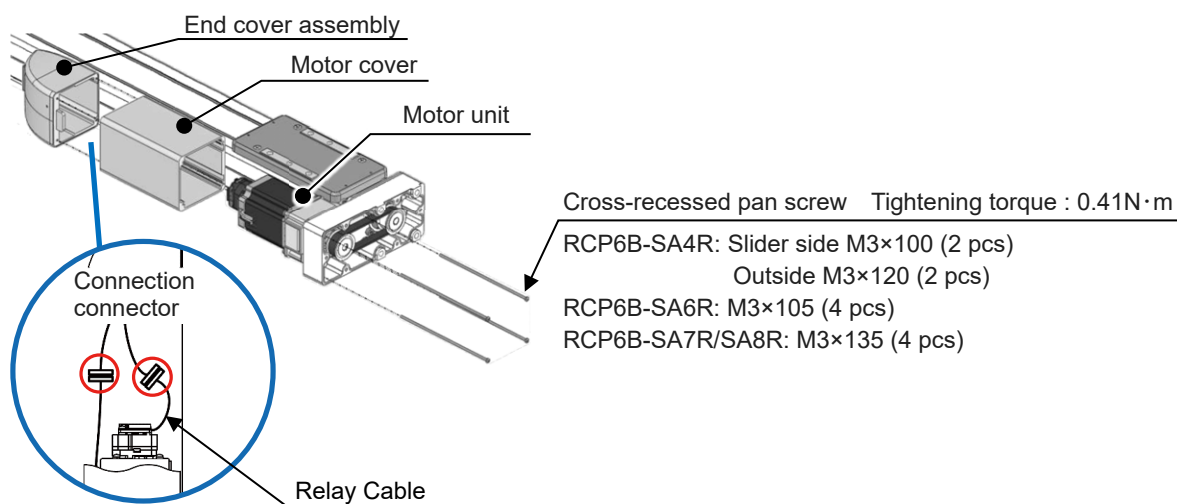
7. Put the circular washer tightly on the motor bracket and tighten it up with the hex socket head cap screw (1 pc).



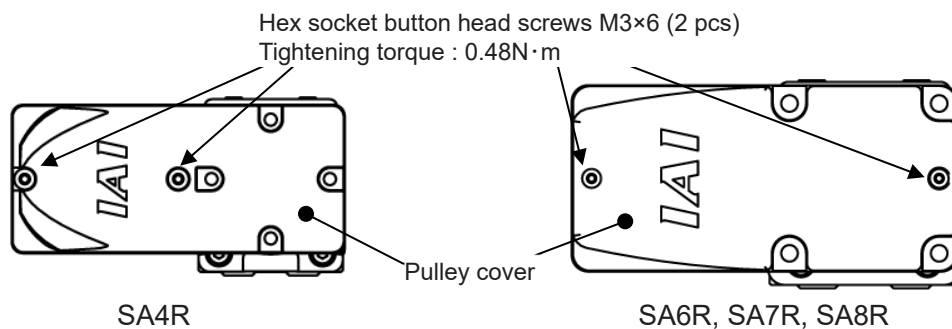
8. Put the motor cover over the motor unit, plug in the connectors on the motor unit and end cover assembly at two places ^(*), and fix them with the cross recessed pan head machine screws (4 pcs).

*1 The connectors should be at three places.

* Be aware that the cross recessed pan head machine screws for SA4R are different in length.



9. Attach the pulley cover with the hex socket button head screws (2 pcs)



4.6.3 Replacement Work of Motor Unit and Coupling Spacer

[1] Motor straight type SA4C, SA6C, SA7C, SA8C

◆Preparation

- Hexagonal wrench Opposite side 2mm, 2.5mm
- Motor unit for replacement

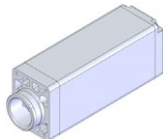
Example of Model Code:

For RCP6B-SA6C equipped with Brake / Cable Ejected in Right Orientation

Model Code: RCP6-MUSRTA6C-B-CJR

Series	Type	Basic Model Code	Brake	Cable Ejected Orientation (Option)
RCP6B	SA4	RCP6-MUSRTA4C	No Description (w/o brake)	CJT/CJR CJL/CJB
	SA6	RCP6-MUSRTA6C		
	SA7	RCP6-MUSTA7C	B (with brake)	
	SA8	RCP6-MUSA8C		

Motor unit for RCP6B



SA4C, SA6C,
SA7C, SA8C

- Coupling Spacer for Replacement

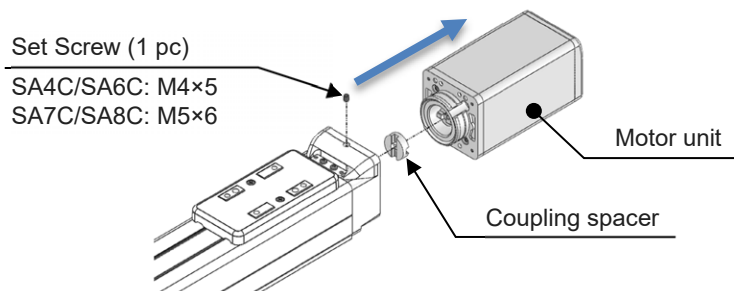
Type	Model Code
SA4C, SA6C	CPG-RCP6-S
SA7C, SA8C	CPG-RCP6-M



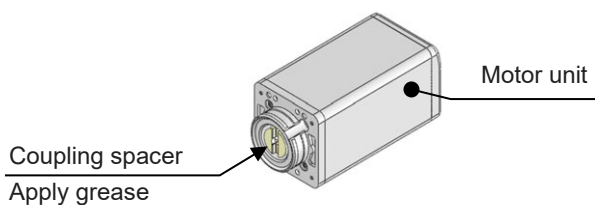
- Grease NOXLUB TL1013 Grease manufactured by NOK (To be applied to coupling spacer)

◆Procedure for Replacement

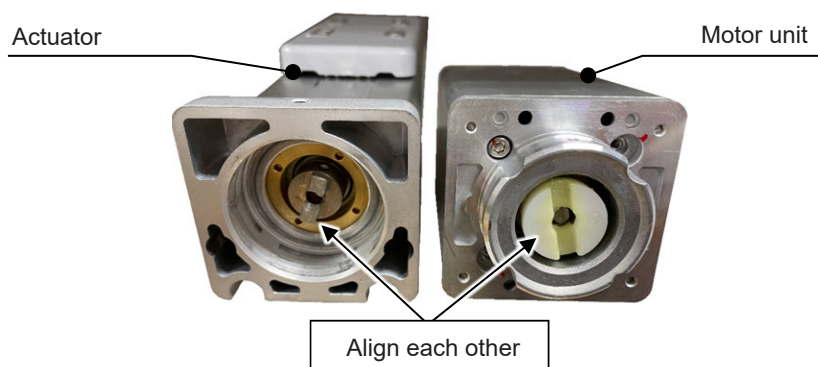
1. Remove the set screw (1 pc) to take off the motor unit and coupling spacer.



2. Apply grease (NOXLUB TL1013 Grease manufactured by NOK) on a coupling spacer for replacement for appropriate amount and put it on a motor unit for replacement.



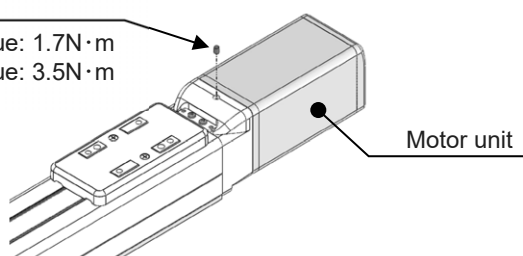
3. Align the convex on the actuator side and the recess on the motor unit for replacement and attach them.



4. Attach the motor unit with the set screw (1 pc).

Set screw (1 pc)

SA4C/SA6C: M4×5 Tightening torque: 1.7N·m
SA7C/SA8C: M5×6 Tightening torque: 3.5N·m



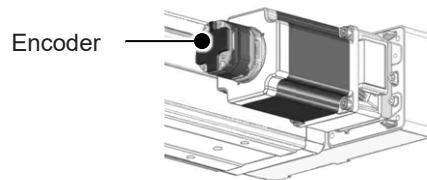
5. Make sure to conduct a home return on a PC teaching software or a touch panel teaching.

[2] Motor reversed type SA4R, SA6R, SA7R, SA8R



Caution

- Do not attempt to touch on the encoder part of the motor directly with hand.
If touched with hands, the encoder phase may change, resulting in an error.



- Do not attempt to touch the control circuit board.
- Static electricity may cause malfunction.
Do not attempt to do the replacement work in any place that is easy to cause static electricity (such as on a carpet).
Touch a metal to remove static electricity from the body before start replacement work.

◆Preparation

- Hexagonal wrench Opposite side 2mm, 2.5mm, 3mm-sized
- Phillips screwdriver
- Tension gauge (capable thing of tensioning to 90N or greater)
- Stiff string or long zip ties
- Motor unit for replacement

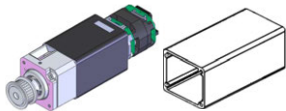
Example of Model Code:

For RCP6B-SA6R equipped with Brake / Cable Ejected in Outward Orientation
Model Code: RCP6-MUSRTA6E-B-CJO-PU

Type	Basic Model Code	Brake	Cable Ejected Orientation (Option)	Pulley
SA4R	RCP6-MUSRTA4WSRA10RV	B	—	PU
SA6R	RCP6-MUSRTA6E		CJO	
SA7R	RCP6-MUSTA7WSA14R		—	
SA8R	RCP6-MUSA8R		—	

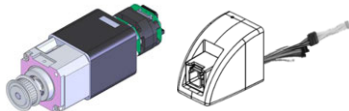
*Make sure to use the enclosed components.

SA4R



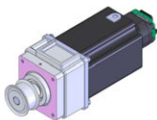
Accessories: Motor Cover and Bolts (4 pcs)

SA6R

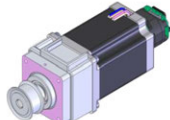


Accessories: End Cover Assembly

SA7R

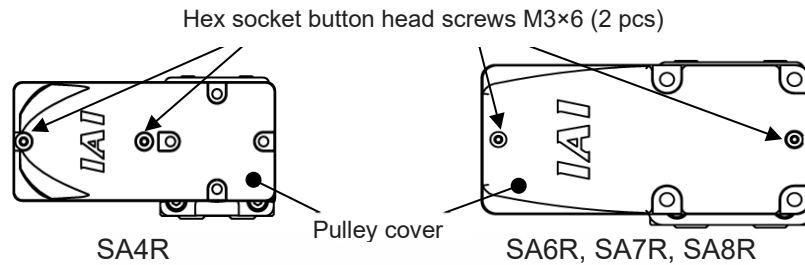


SA8R



◆Procedure for Replacement

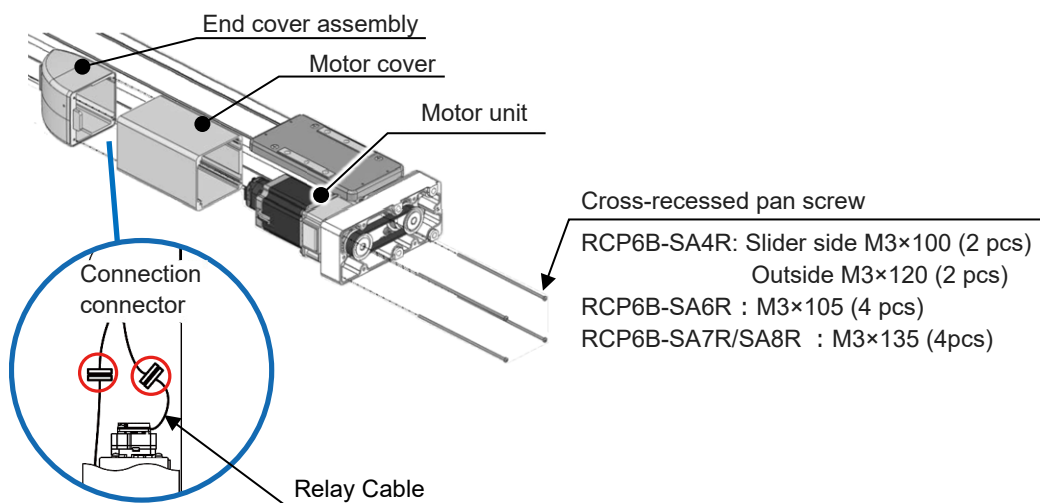
1. Remove the hex socket button head screws (2 pcs) to take the pulley cover off.



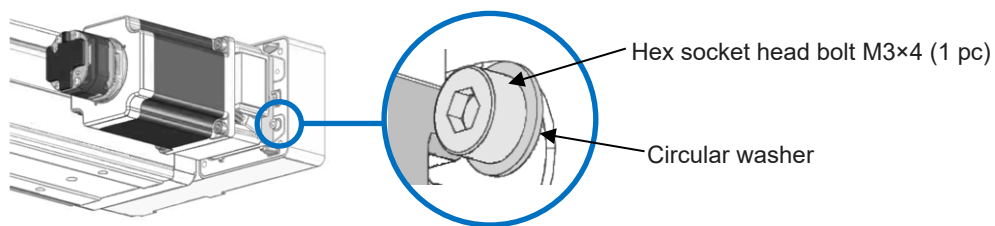
2. Remove the cross recessed pan head machine screws (4 pcs), unplug the connectors on the motor unit and end cover assembly at two places ^(*) and take the motor cover off.

*1 The connectors should be at three places.

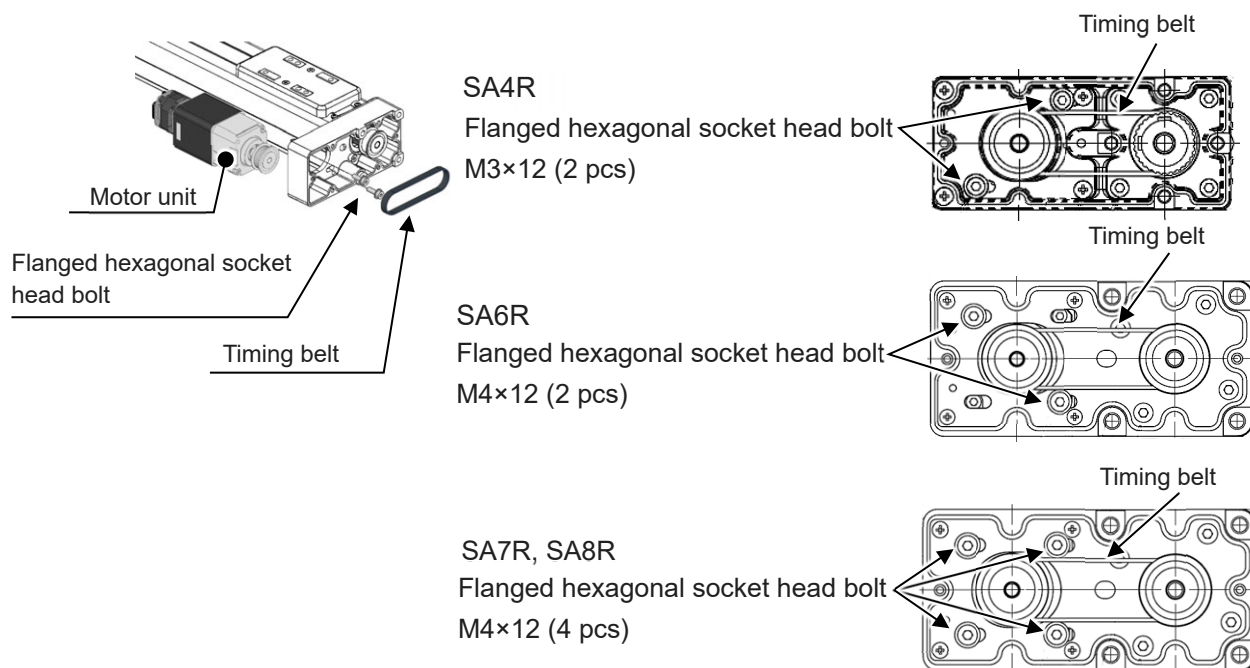
* Be aware that the cross recessed pan head machine screws for SA4R are different in length.



3. Take off the hex socket head cap screw (1 pc) and the circular washer.



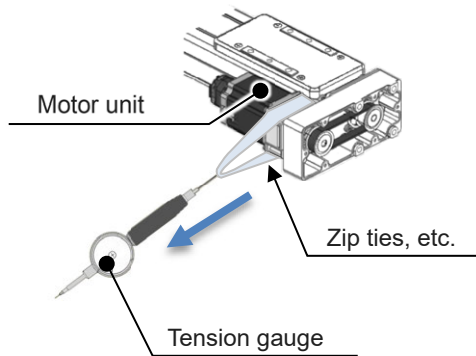
4. Remove the flanged hex socket set screw to take off the motor unit and timing belt.
5. Tighten the flanged hex socket set screw loosely on the motor unit for replacement and put the timing belt on.



6. Adjust the tension of the timing belt.

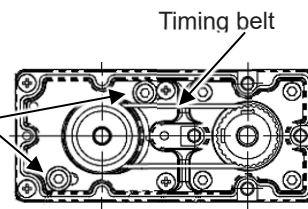
Hang a tool such as a zip ties on the edge of the motor unit and apply load with a tension gauge and pull it..

Once it has reached the specified load, tighten up the flanged hex socket set screws to fix it.

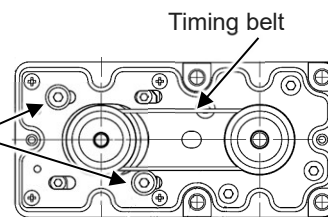


Type	Tensile Strength
SA4R	20 to 25N
SA6R	25 to 30N
SA7R	80 to 90N
SA8R	80 to 90N

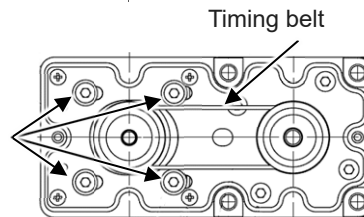
SA4R
Flanged Hexagonal Socket Head Bolt
M3×12 (2 pcs)
Tightening torque: 1.0N·m



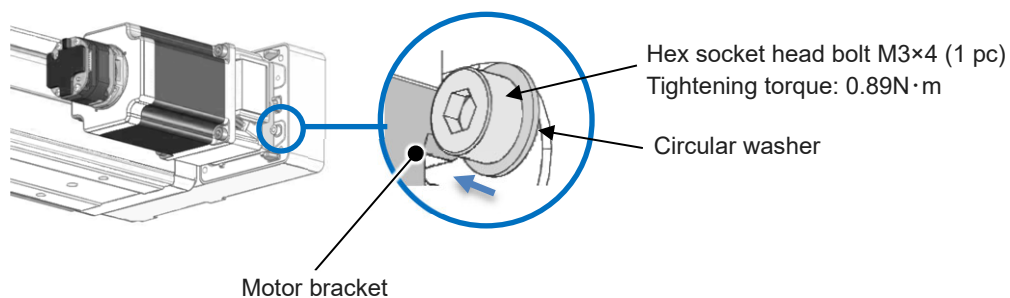
SA6R
Flanged Hexagonal Socket Head Bolt
M4×12 (2 pcs)
Tightening torque: 2.2N·m



SA7R, SA8R
Flanged Hexagonal Socket Head Bolt
M4×12 (4 pcs)
Tightening torque: 2.2N·m



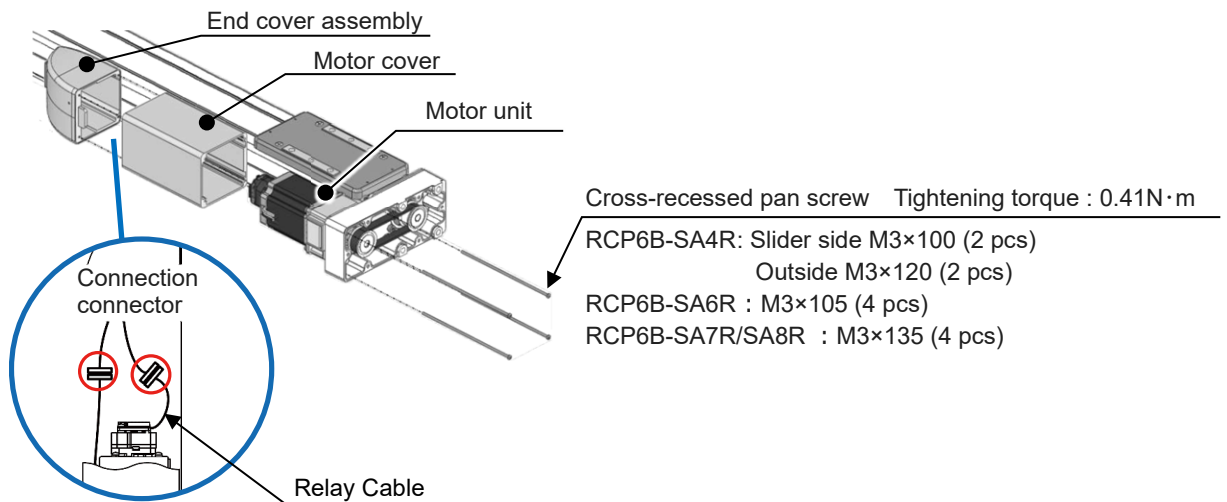
7. Put the circular washer tightly on the motor bracket and tighten it up with the hex socket head cap screw (1 pc).



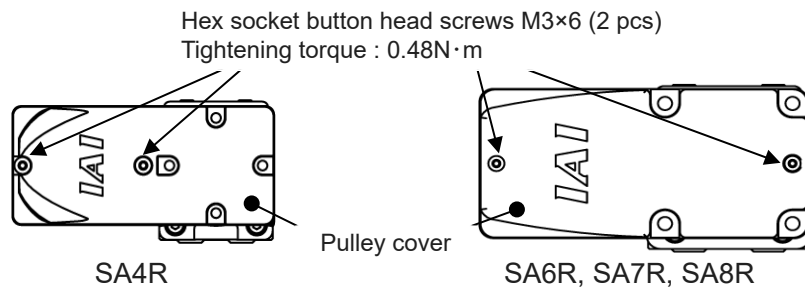
8. Put the motor cover over the motor unit, plug in the connectors on the motor unit and end cover assembly at two places ^(*), and fix them with the cross recessed pan head machine screws (4 pcs).

*1 The connectors should be at three places.

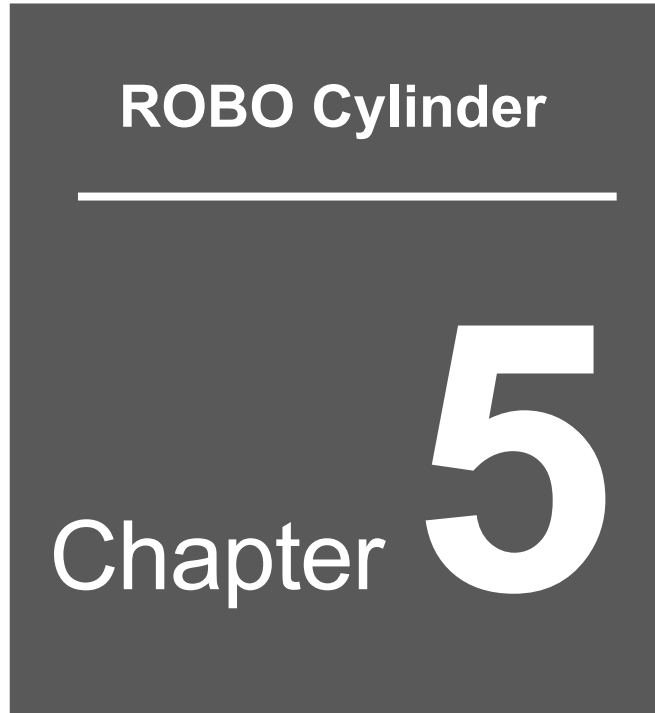
* Be aware that the cross recessed pan head machine screws for SA4R are different in length.



9. Attach the pulley cover with the hex socket button head screws (2 pcs).



10. Make sure to conduct a home return on a PC teaching software or a touch panel teaching.

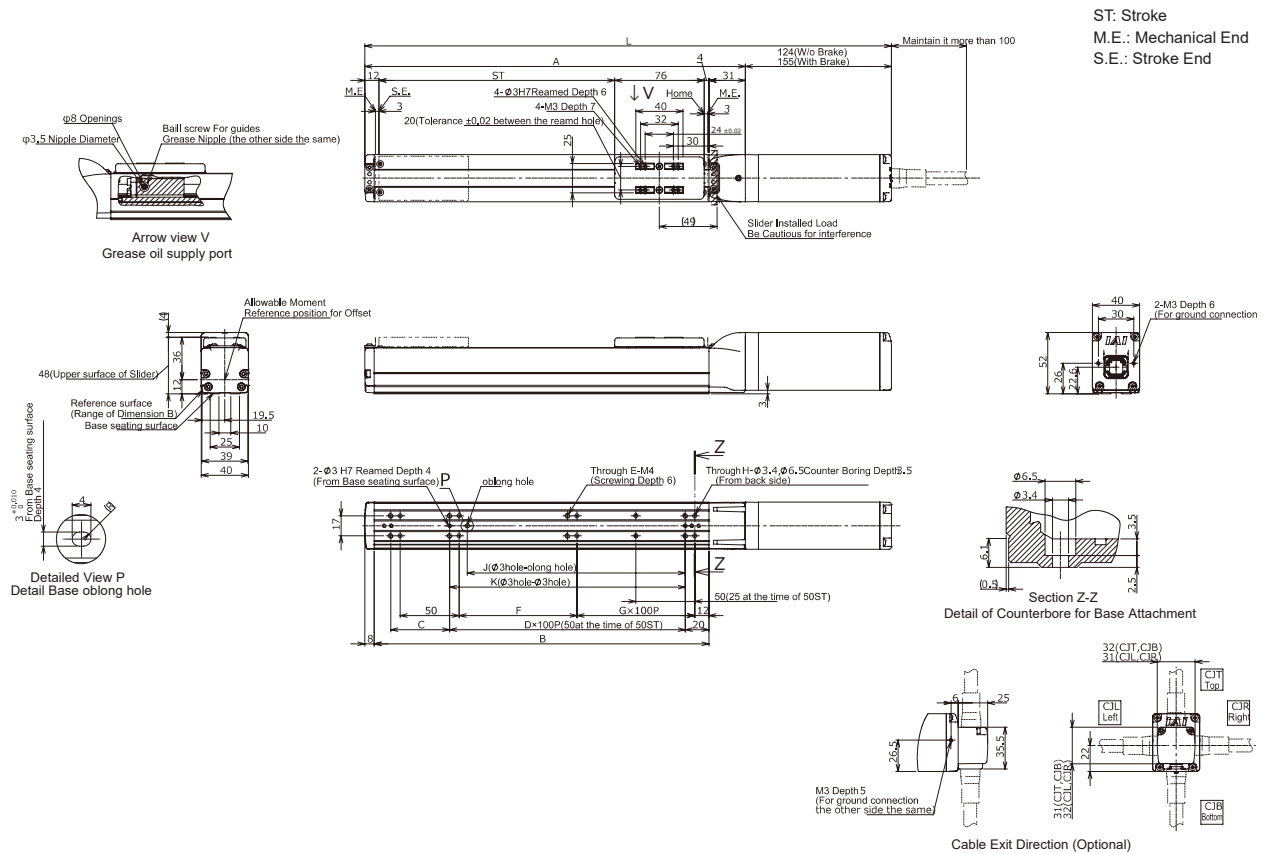


External Dimensions

5.1	RCP6B-SA4C	5-1
5.2	RCP6B-SA6C	5-3
5.3	RCP6B-SA7C	5-5
5.4	RCP6B-SA8C	5-7
5.5	RCP6B-SA4R	5-9
5.6	RCP6B-SA6R	5-11
5.7	RCP6B-SA7R	5-13
5.8	RCP6B-SA8R	5-15

5.1 RCP6B-SA4C

(Note) When the home-return operation is performed, the slider moves to the mechanical end.
Pay attention to interference to peripherals.



Unit [mm]

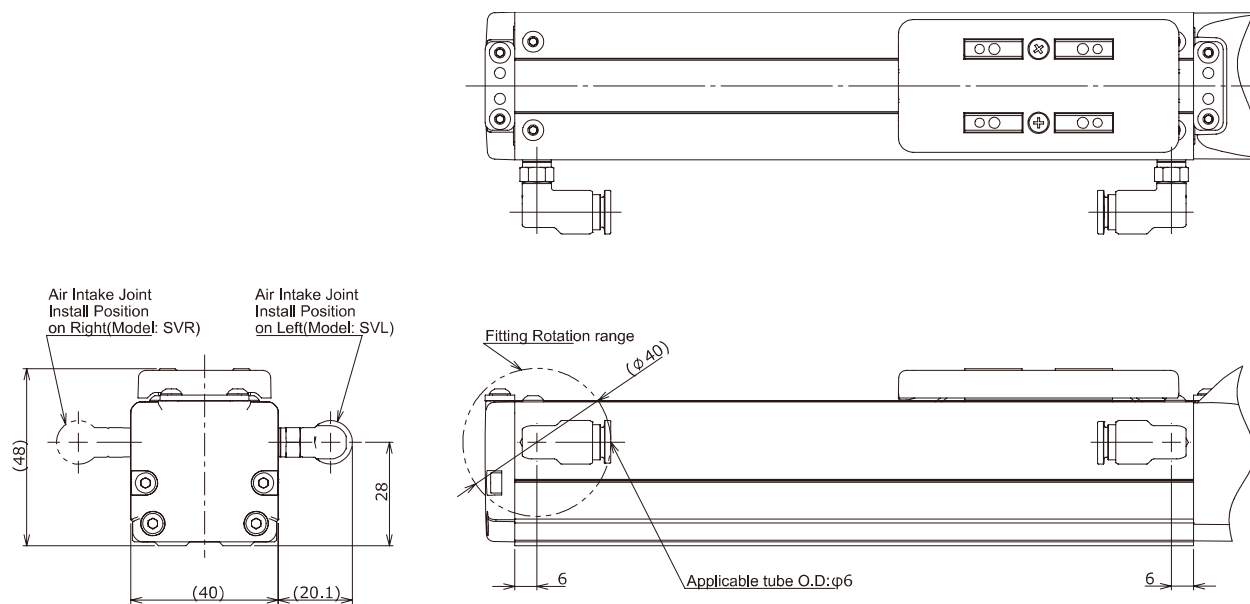
Stroke		50	100	150	200	250	300	350	400	450	500
L	W/o Brake	297	347	397	447	497	547	597	647	697	747
	With Brake	328	378	428	478	528	578	628	678	728	778
A		173	223	273	323	373	423	473	523	573	623
B		134	184	234	284	334	384	434	484	534	584
C		50	50	100	50	100	50	100	50	100	50
D		—	1	1	2	2	3	3	4	4	5
E		6	6	6	8	8	10	10	12	12	14
F		50	100	50	100	50	100	50	100	50	100
G		0	0	1	1	2	2	3	3	4	4
H		8	8	10	10	12	12	14	14	16	16
J		35	85	85	185	185	285	285	385	385	485
K		50	100	100	200	200	300	300	400	400	500

(Note) L dimensions described in the table are those with no cable exit direction (option). For cable exit direction types (option), the dimensions are longer in 25mm.

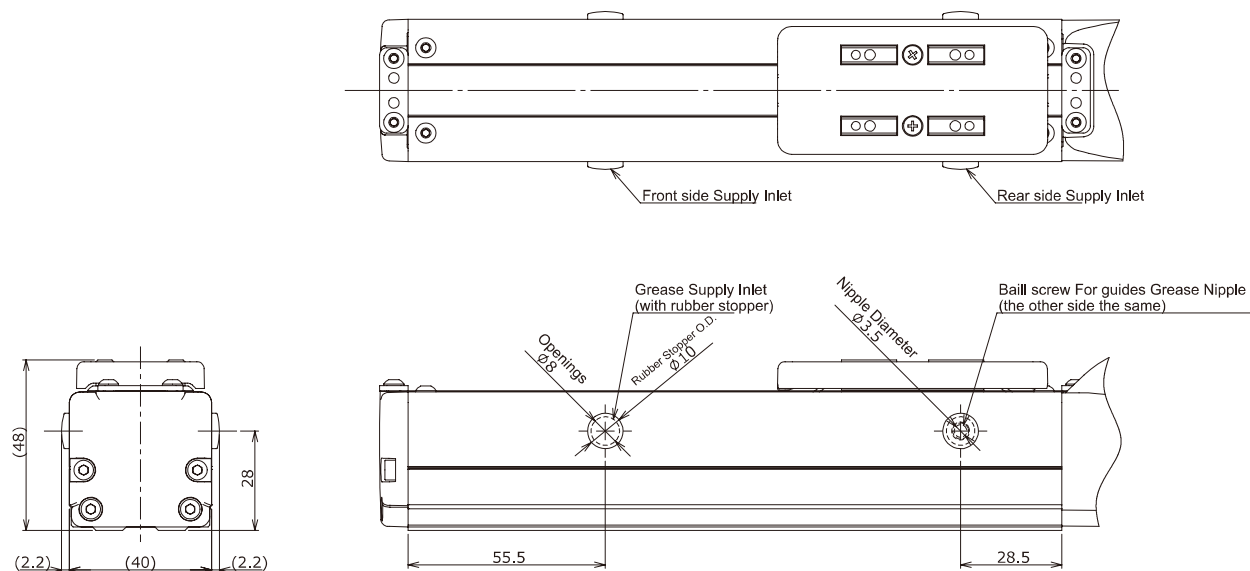
Stroke	50	100	150	200	250	300	350	400	450	500
Mass [kg]	W/o Brake	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
	With Brake	1.3	1.4	1.5	1.5	1.6	1.7	1.8	2.0	2.1

5. External Dimensions

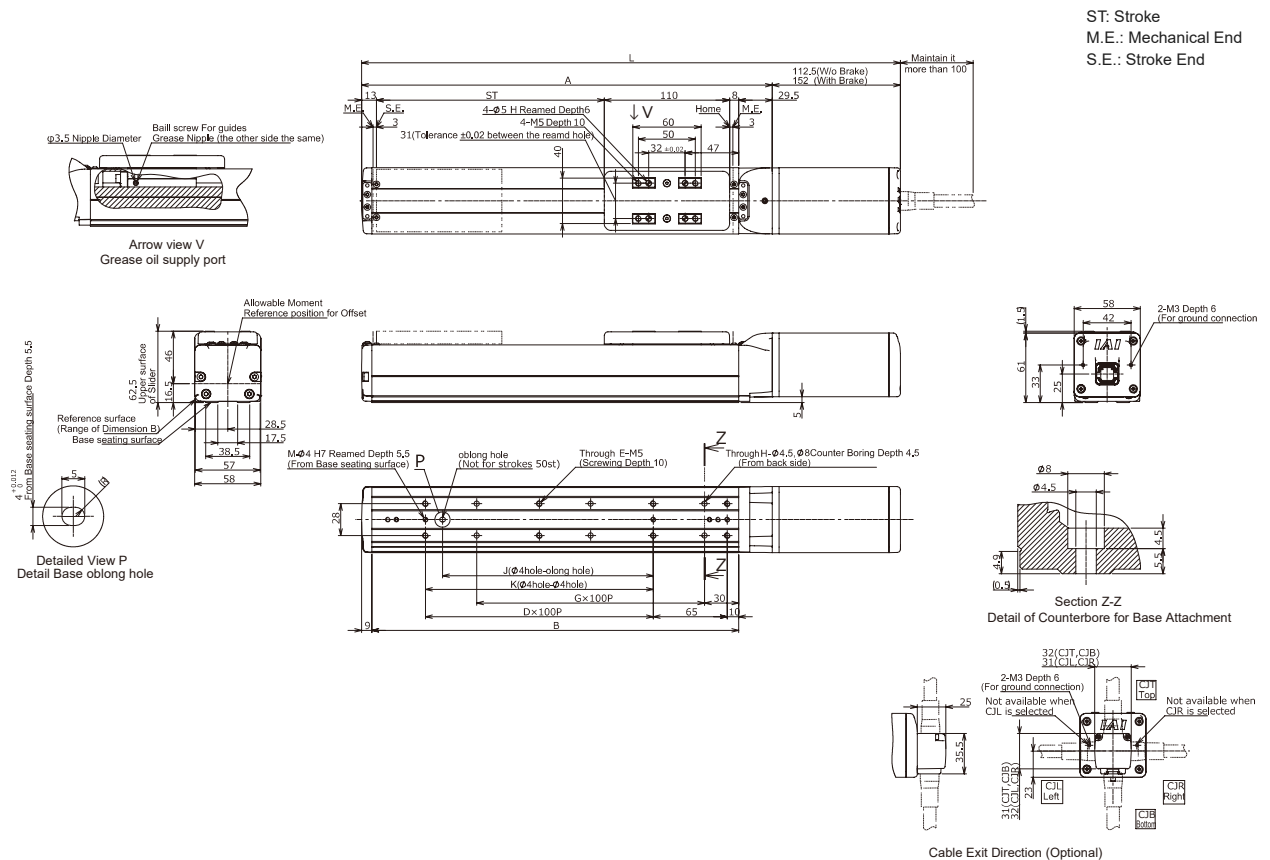
■Stainless Steel Suction Joint Mounted Specification (Right) (Model Code: SVR) Stainless Steel Suction Joint Mounted Specification (Left) (Model Code: SVL)



■Grease Supply Inlet Added Specification (Model Code: GU)



5.2 RCP6B-SA6C



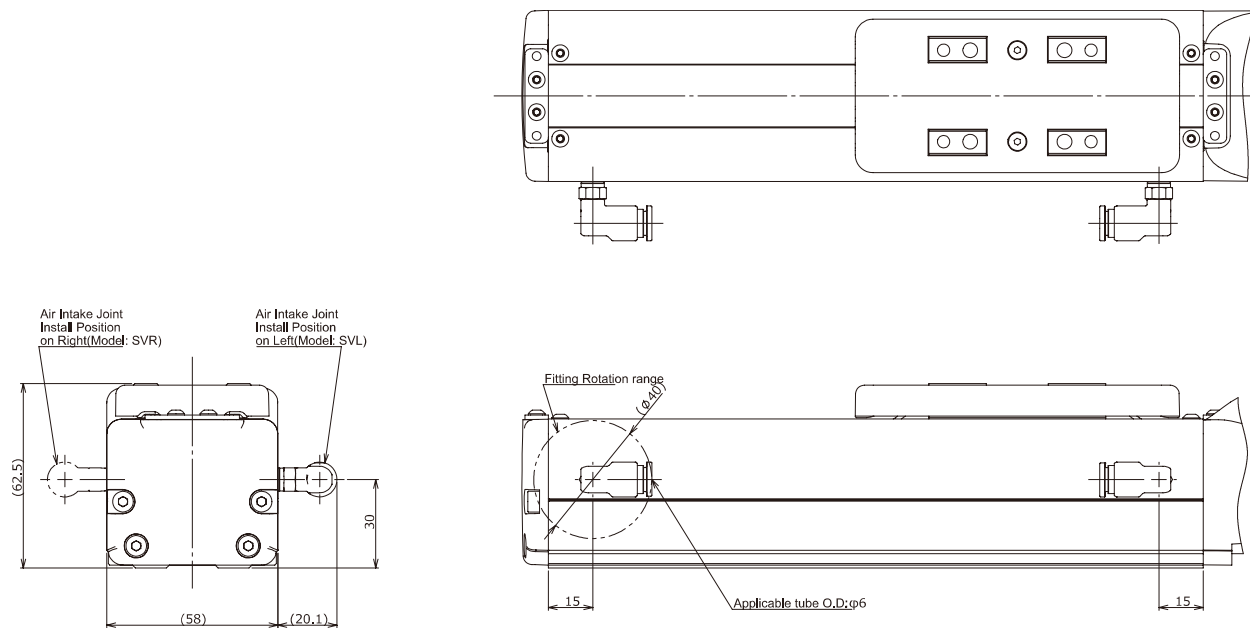
		Unit [mm]															
L	Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
	W/o Brake	323	373	423	473	523	573	623	673	723	773	823	873	923	973	1023	1073
	With Brake	362.5	412.5	462.5	512.5	562.5	612.5	662.5	712.5	762.5	812.5	862.5	912.5	962.5	1012.5	1062.5	1112.5
	A	210.5	260.5	310.5	360.5	410.5	460.5	510.5	560.5	610.5	660.5	710.5	760.5	810.5	860.5	910.5	960.5
	B	172	222	272	322	372	422	472	522	572	622	672	722	772	822	872	922
	D	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
	E	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18	20
	G	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
	H	4	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18
	J	0	85	85	185	185	285	285	385	385	485	485	585	585	685	685	785
	K	0	100	100	200	200	300	300	400	400	500	500	600	600	700	700	800
	M	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

(Note) L dimensions described in the table are those with no cable exit direction (option). For cable exit direction types (option), the dimensions are longer in 25mm.

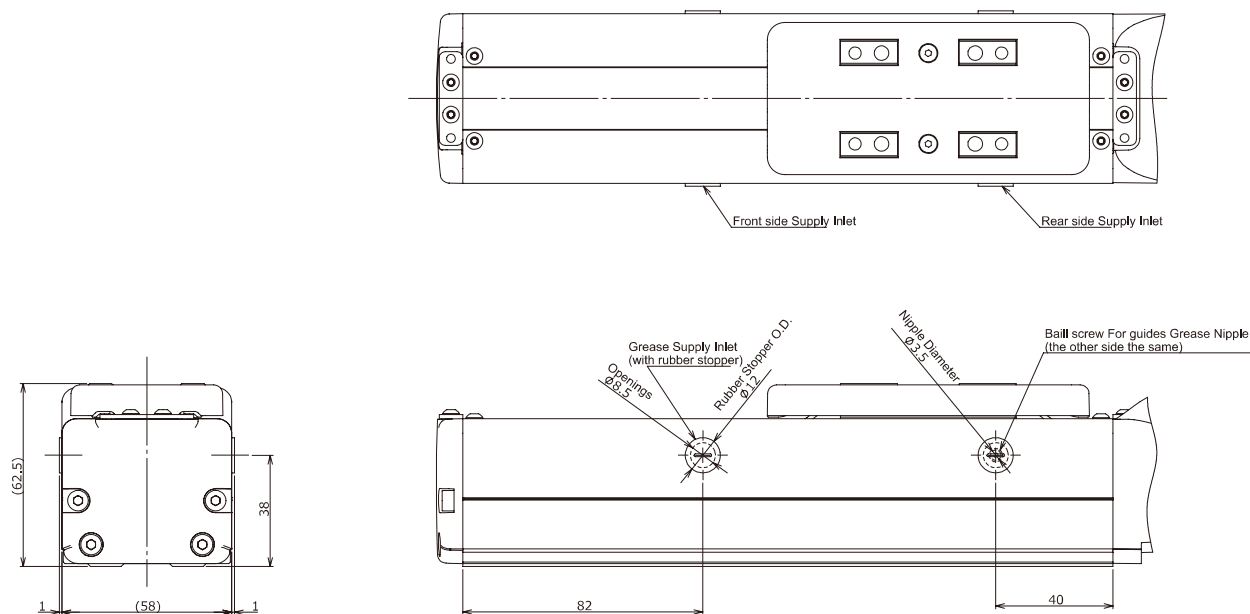
Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Mass [kg]	W/o Brake	2.0	2.2	2.3	2.5	2.7	2.8	3.0	3.2	3.4	3.5	3.7	3.9	4.1	4.2	4.4	4.6
	With Brake	2.2	2.4	2.6	2.8	2.9	3.1	3.3	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.6	4.8

5. External Dimensions

■Stainless Steel Suction Joint Mounted Specification (Right) (Model Code: SVR) Stainless Steel Suction Joint Mounted Specification (Left) (Model Code: SVL)

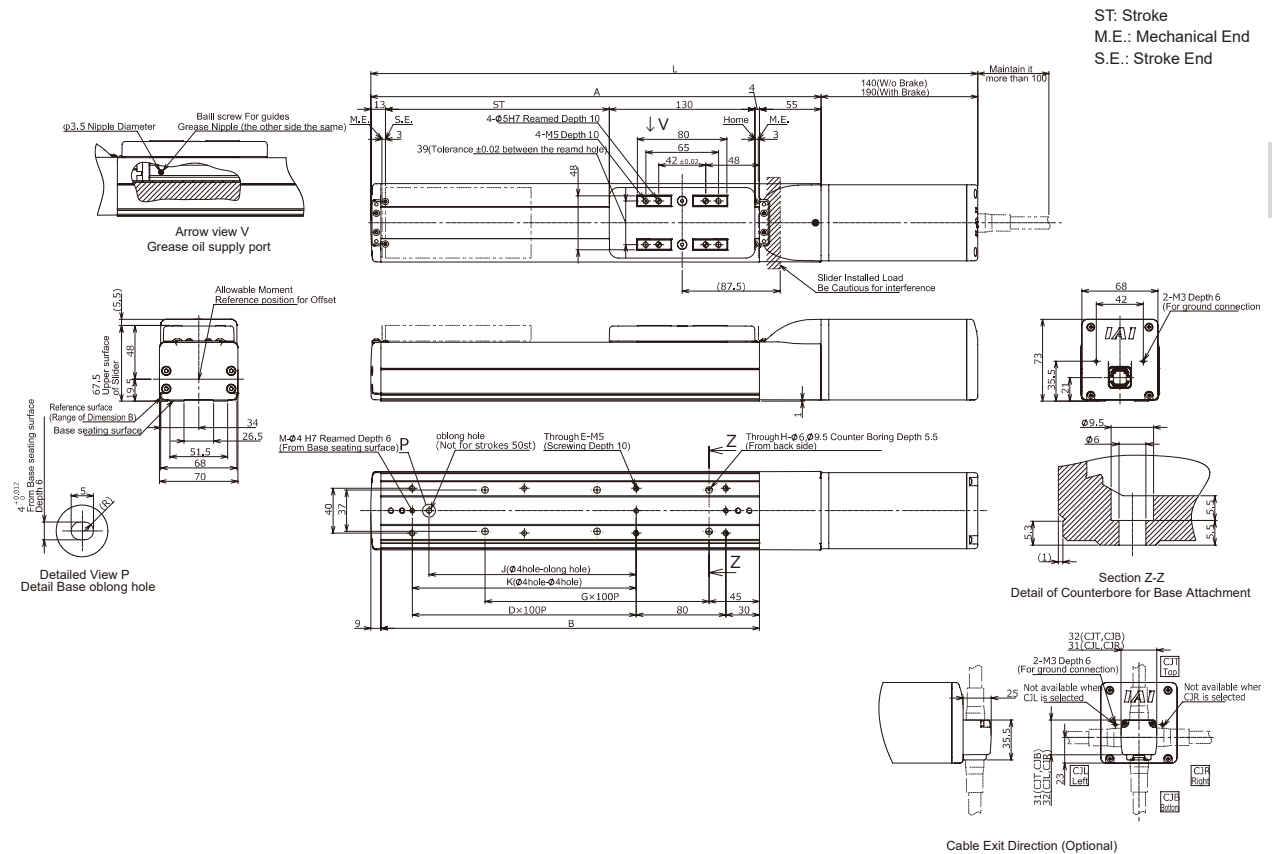


■Grease Supply Inlet Added Specification (Model Code: GU)



5.3 RCP6B-SA7C

(Note) When the home-return operation is performed, the slider moves to the mechanical end.
Pay attention to interference to peripherals.



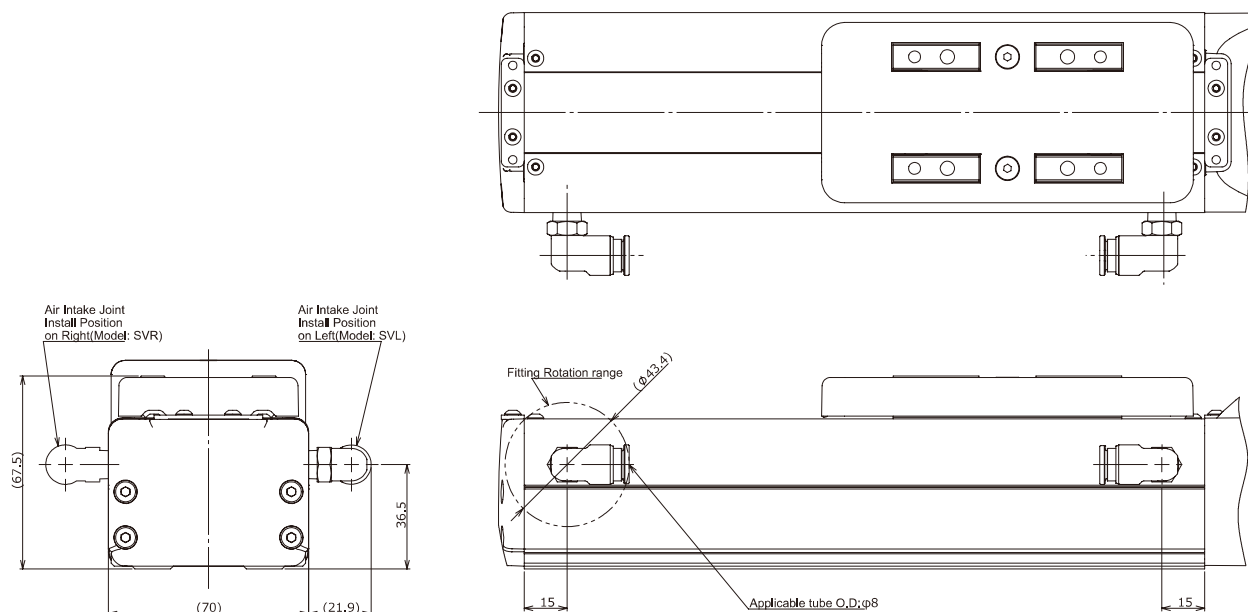
Unit [mm]

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	W/o Brake	392	442	492	542	592	642	692	742	792	842	892	942	992	1042	1092	1142
	With Brake	442	492	542	592	642	692	742	792	842	892	942	992	1042	1092	1142	1192
A		252	302	352	402	452	502	552	602	652	702	752	802	852	902	952	1002
B		188	238	288	338	388	438	488	538	588	638	688	738	788	838	888	938
D		0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
E		4	6	6	8	8	10	10	12	12	14	14	16	16	18	18	20
G		1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
H		4	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18
J		0	85	85	185	185	285	285	385	385	485	485	585	585	685	685	785
K		0	0	100	200	200	300	300	400	400	500	500	600	600	700	700	800
M		2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3

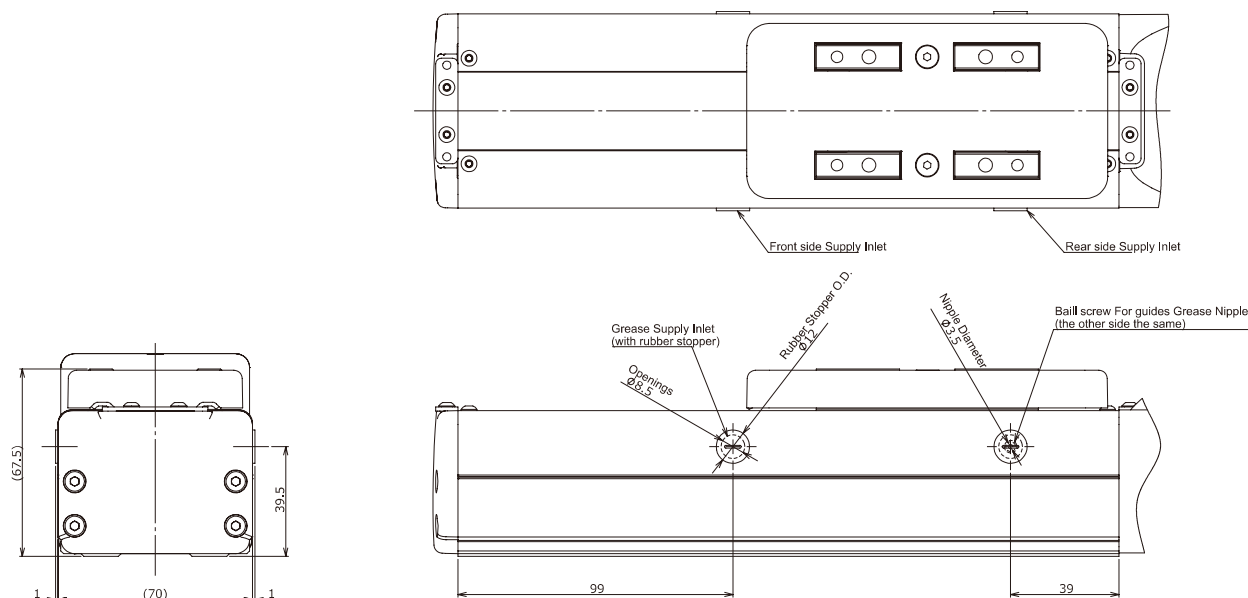
(Note) L dimensions described in the table are those with no cable exit direction (option). For cable exit direction types (option), the dimensions are longer in 20mm.

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Mass [kg]	W/o Brake	3.6	3.8	4.0	4.3	4.5	4.7	4.9	5.2	5.4	5.6	5.9	6.1	6.3	6.5	6.8	7.0
	With Brake	4.0	4.2	4.5	4.7	4.9	5.1	5.4	5.6	5.8	6.1	6.3	6.5	6.7	7.0	7.2	7.4

■Stainless Steel Suction Joint Mounted Specification (Right) (Model Code: SVR) Stainless Steel Suction Joint Mounted Specification (Left) (Model Code: SVL)



■Grease Supply Inlet Added Specification (Model Code: GU)



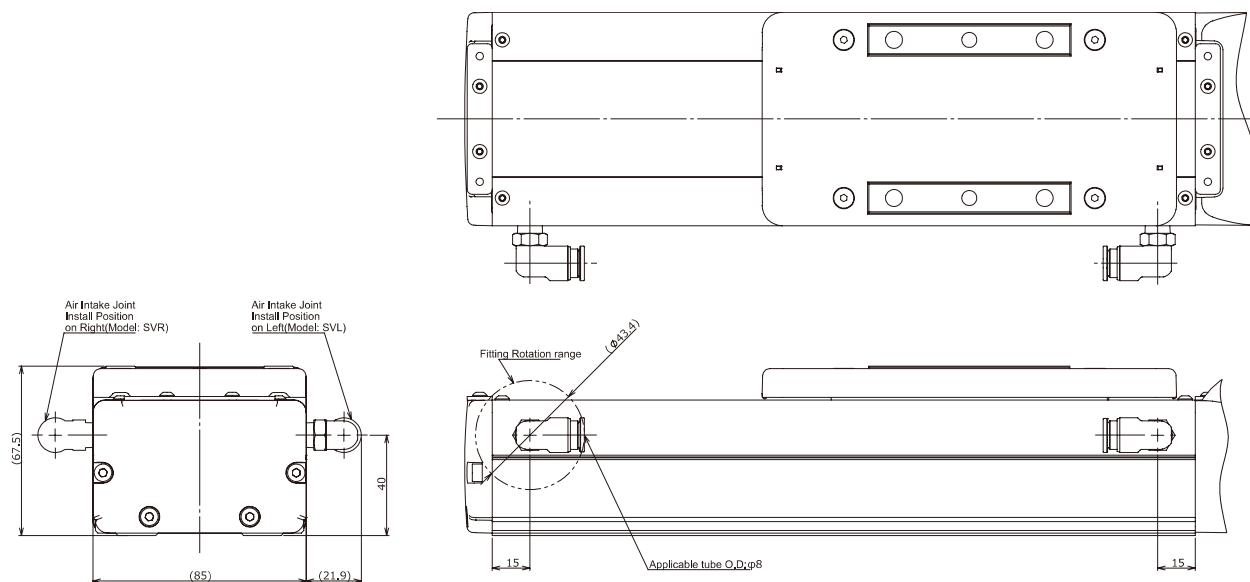
ST :ストローク
M.E. :メカニカルエンド
S.E. :ストロークエンド

[illegible]

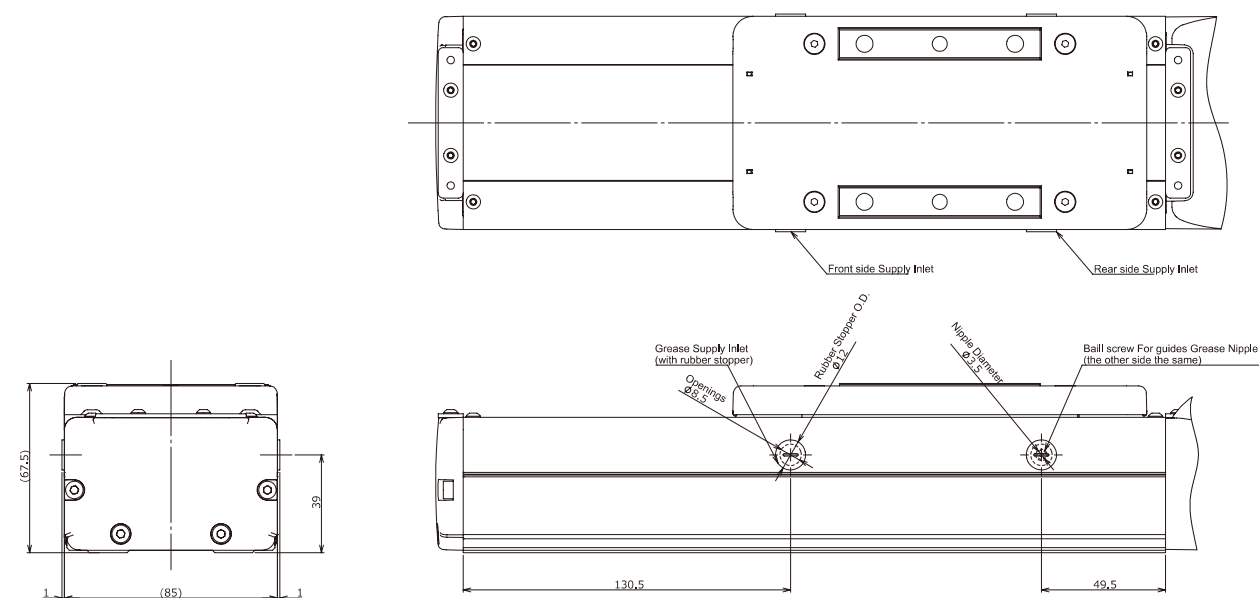
Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100
Mass [kg]	W/o Brake	4.5	4.7	5.0	5.3	5.5	5.8	6.1	6.4	6.6	6.9	7.2	7.5	7.7	8.0	8.3	8.5	8.8	9.1	9.4	9.6	9.9	10.2
	With Brake	5.0	5.2	5.5	5.8	6.1	6.3	6.6	6.9	7.1	7.4	7.7	8.0	8.2	8.5	8.8	9.1	9.3	9.6	9.9	10.1	10.4	10.7

5. External Dimensions

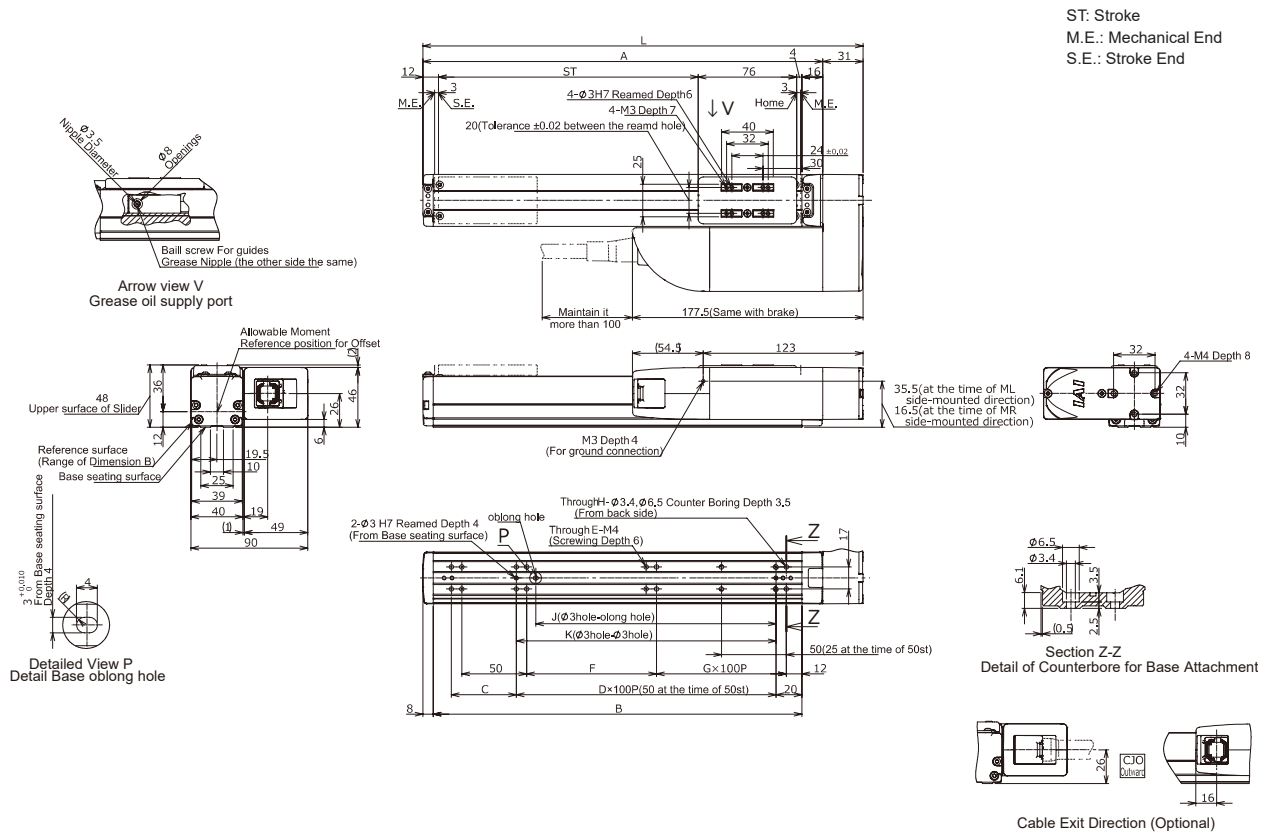
■Stainless Steel Suction Joint Mounted Specification (Right) (Model Code: SVR) Stainless Steel Suction Joint Mounted Specification (Left) (Model Code: SVL)



■Grease Supply Inlet Added Specification (Model Code: GU)



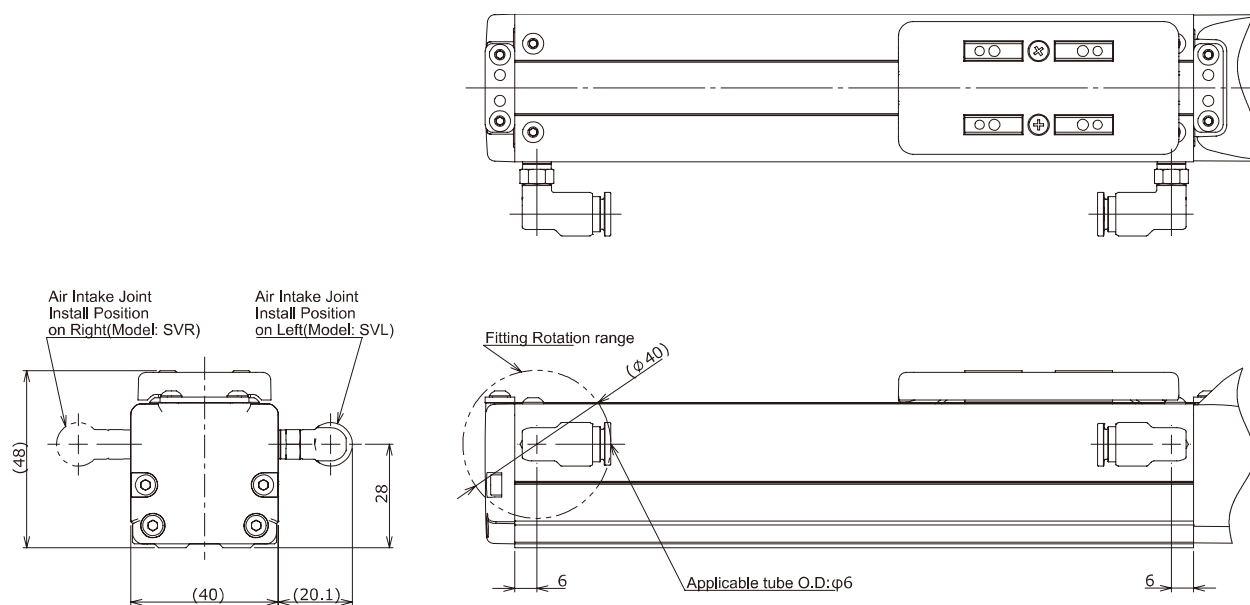
For the right reversed type (model code: MR), the motor part should be allocated on the opposite side of the slider.



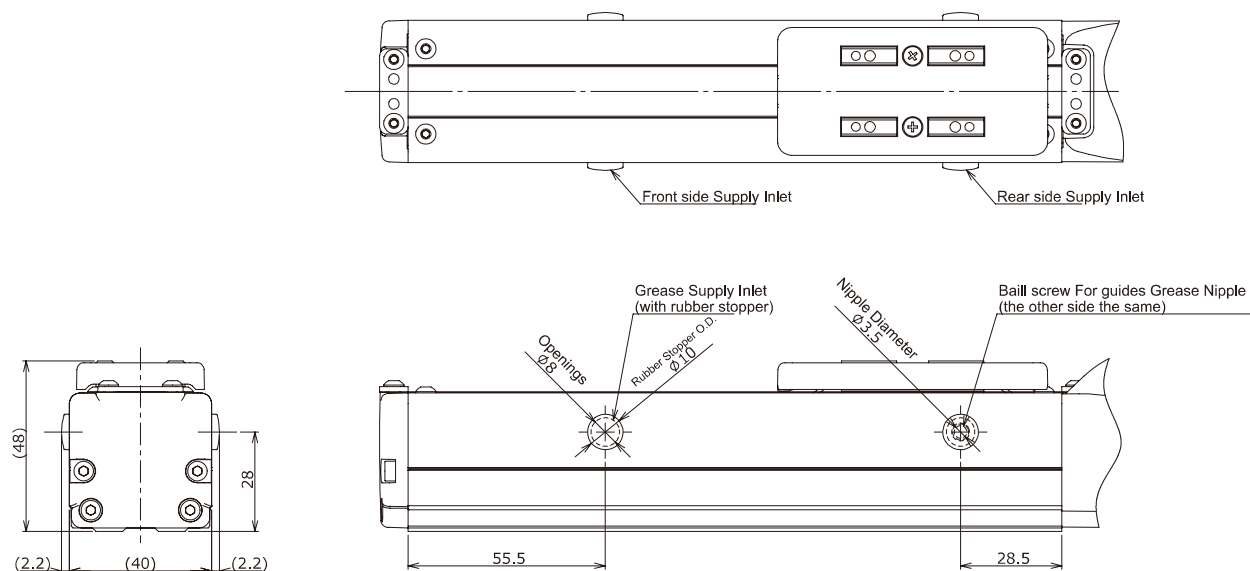
	Unit [mm]									
Stroke	50	100	150	200	250	300	350	400	450	500
L	189	239	289	339	389	439	489	539	589	639
A	158	208	258	308	358	408	458	508	558	608
B	134	184	234	284	334	384	434	484	534	584
C	50	50	100	50	100	50	100	50	100	50
D	—	1	1	2	2	3	3	4	4	5
E	6	6	6	8	8	10	10	12	12	14
F	50	100	50	100	50	100	50	100	50	100
G	0	0	1	1	2	2	3	3	4	4
H	8	8	10	10	12	12	14	14	16	16
J	35	85	85	185	185	285	285	385	385	485
K	50	100	100	200	200	300	300	400	400	500

Stroke		50	100	150	200	250	300	350	400	450	500
Mass [kg]	W/o Brake	1.3	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.1
	With Brake	1.4	1.5	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2

■Stainless Steel Suction Joint Mounted Specification (Right) (Model Code: SVR) Stainless Steel Suction Joint Mounted Specification (Left) (Model Code: SVL)



■Grease Supply Inlet Added Specification (Model Code: GU)

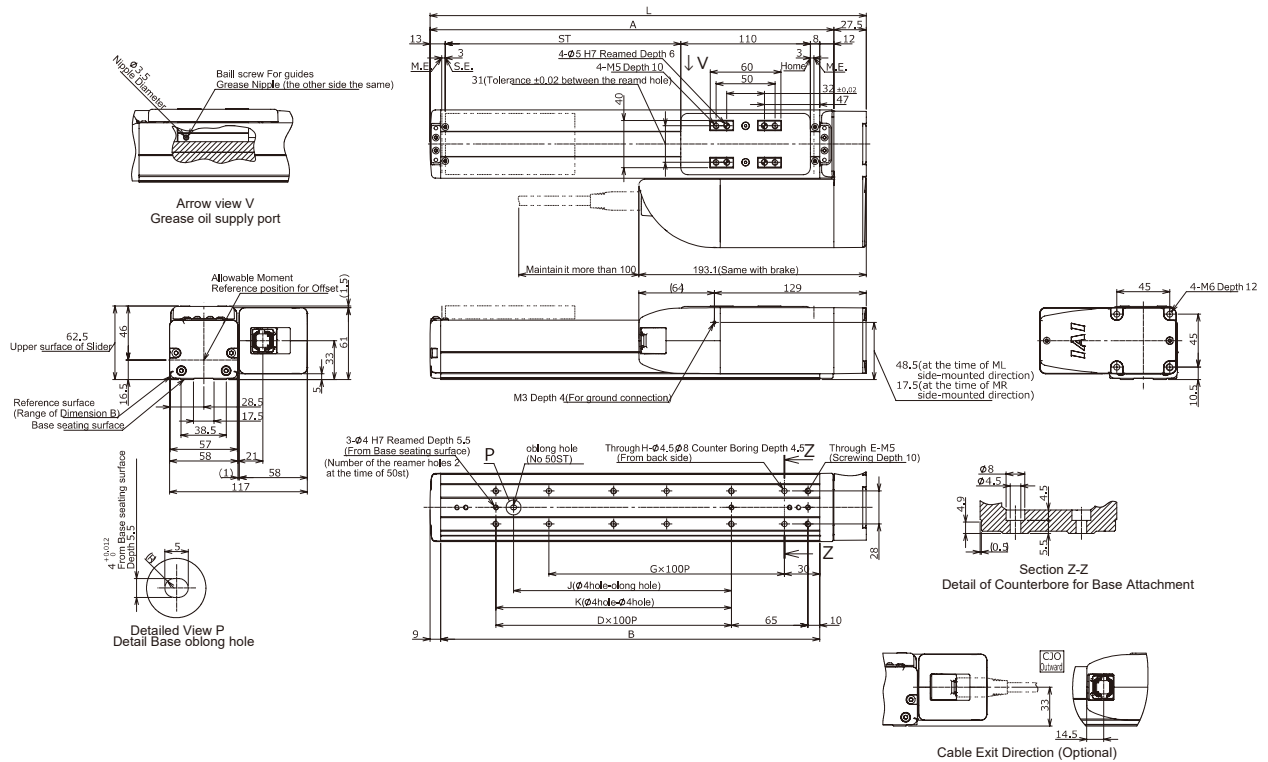


5.6 RCP6B-SA6R

(Note) Shown in the figure below is the case of motor left reversed type (model code: ML).

For the right reversed type (model code: MR), the motor part should be allocated on the opposite side of the slider.

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



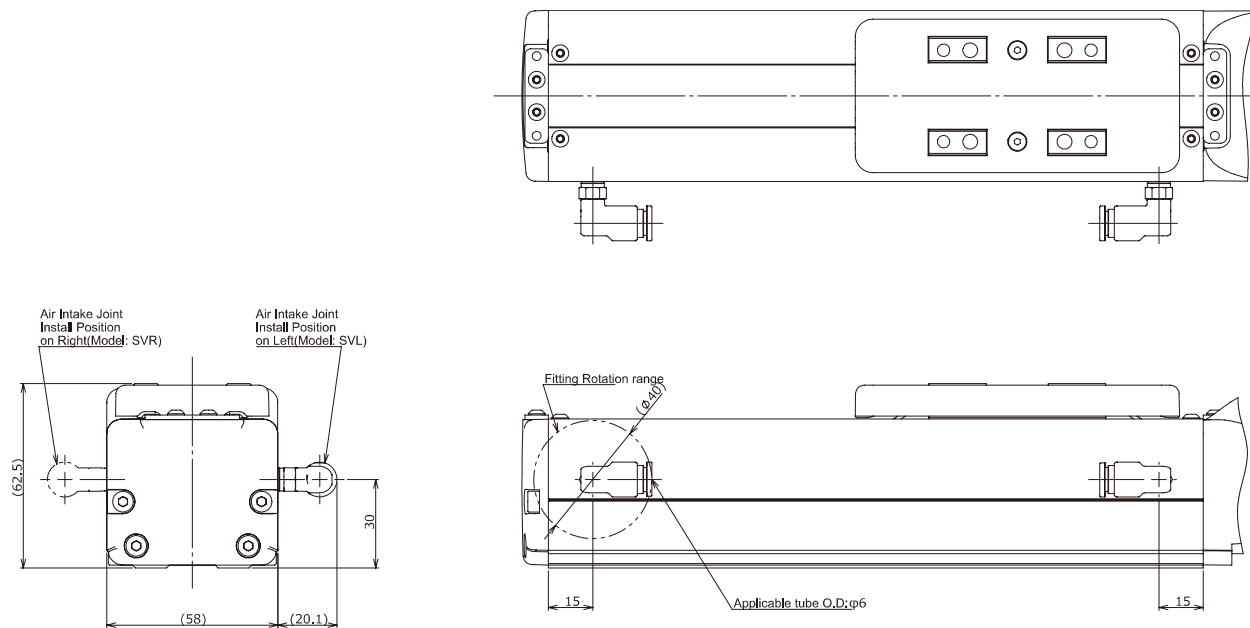
Unit [mm]

Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	220.5	270.5	320.5	370.5	420.5	470.5	520.5	570.5	620.5	670.5	720.5	770.5	820.5	870.5	920.5	970.5
A	193	243	293	343	393	443	493	543	593	643	693	743	793	843	893	943
B	172	222	272	322	372	422	472	522	572	622	672	722	772	822	872	922
D	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
E	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18	20
G	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
H	4	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18
J	0	85	85	185	185	285	285	385	385	485	485	585	585	685	685	785
K	0	100	100	200	200	300	300	400	400	500	500	600	600	700	700	800

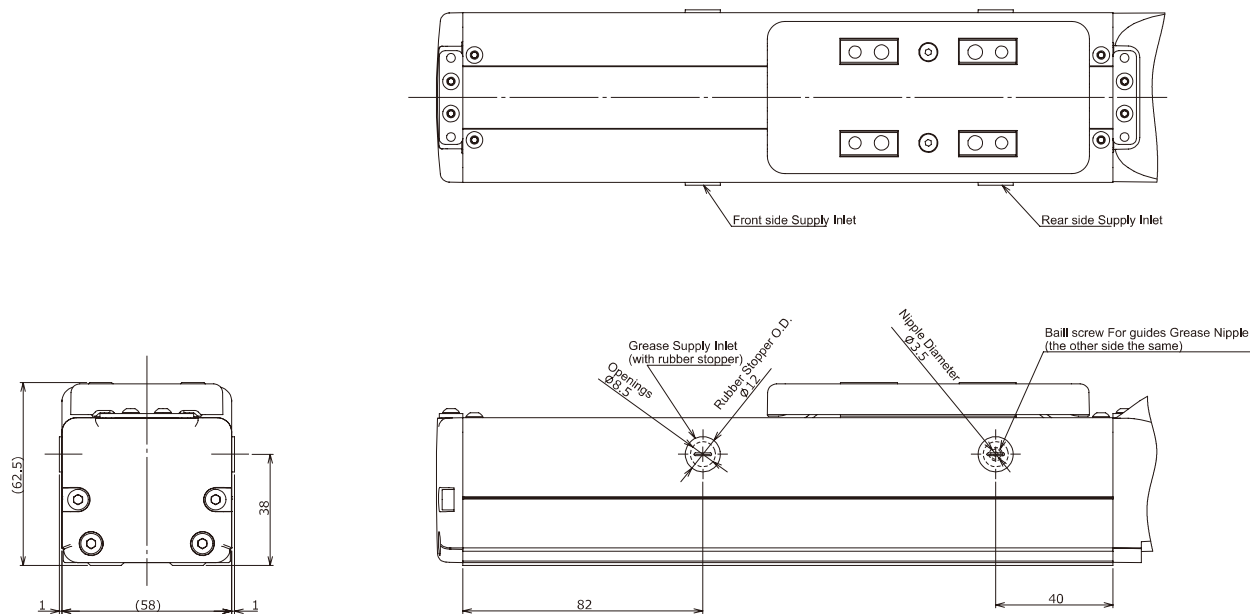
Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Mass [kg]	W/o Brake	2.3	2.5	2.6	2.8	3.0	3.1	3.3	3.5	3.7	3.8	4.0	4.2	4.4	4.5	4.7	4.9
	With Brake	2.4	2.5	2.7	2.9	3.0	3.2	3.4	3.6	3.7	3.9	4.1	4.3	4.4	4.6	4.8	4.9

5. External Dimensions

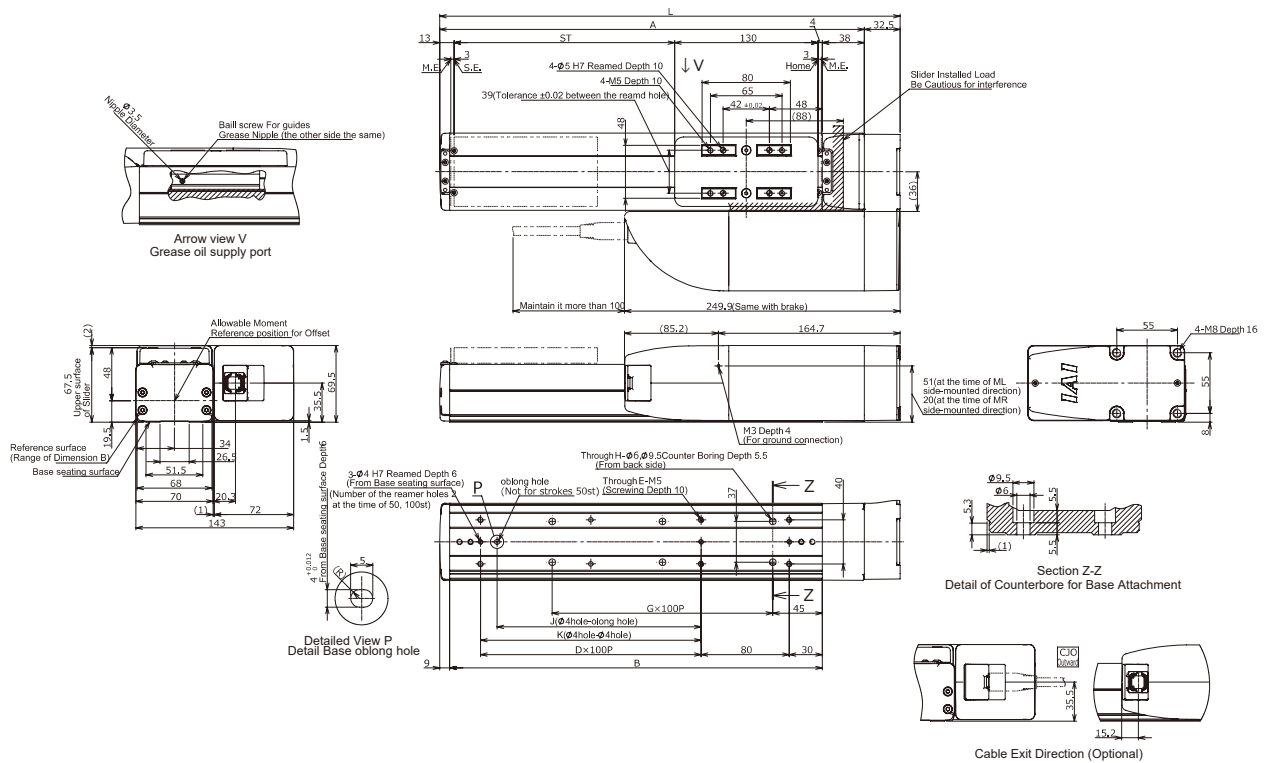
■Stainless Steel Suction Joint Mounted Specification (Right) (Model Code: SVR) Stainless Steel Suction Joint Mounted Specification (Left) (Model Code: SVL)



■Grease Supply Inlet Added Specification (Model Code: GU)



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

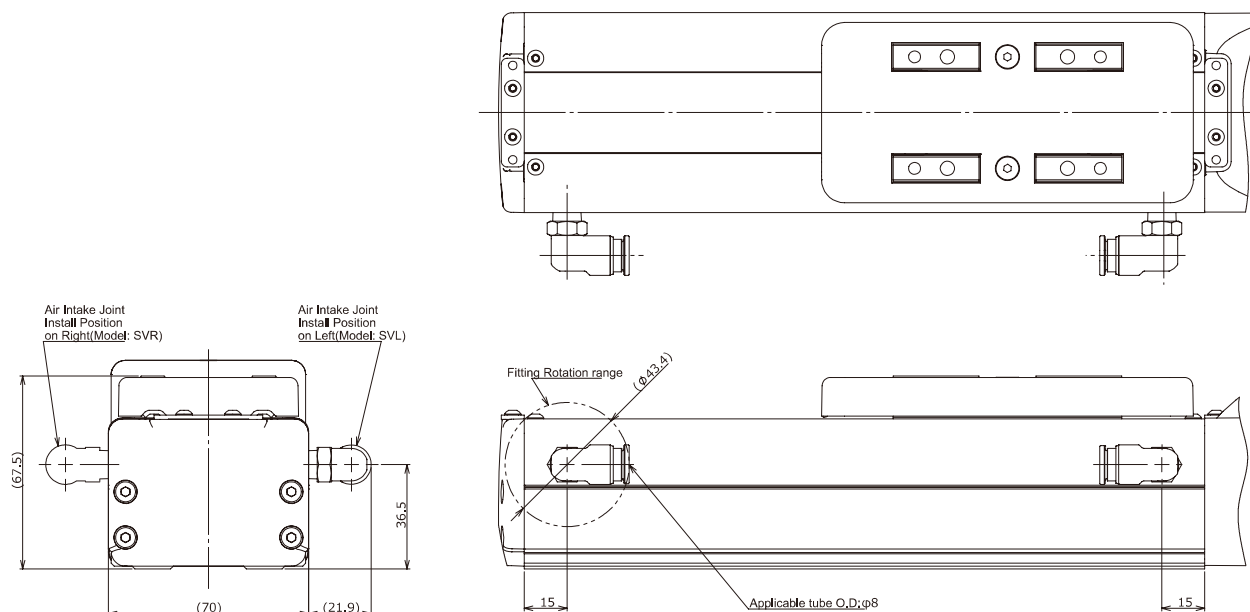


	Unit [mm]															
Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	267.5	317.5	367.5	417.5	467.5	517.5	567.5	617.5	667.5	717.5	767.5	817.5	867.5	917.5	967.5	1017.5
A	235	285	335	385	435	485	535	585	635	685	735	785	835	885	935	985
B	188	238	288	338	388	438	488	538	588	638	688	738	788	838	888	938
D	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8
E	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18	20
G	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
H	4	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18
J	0	85	85	185	185	285	285	385	385	485	485	585	585	685	685	785
K	0	0	100	200	200	300	300	400	400	500	500	600	600	700	700	800

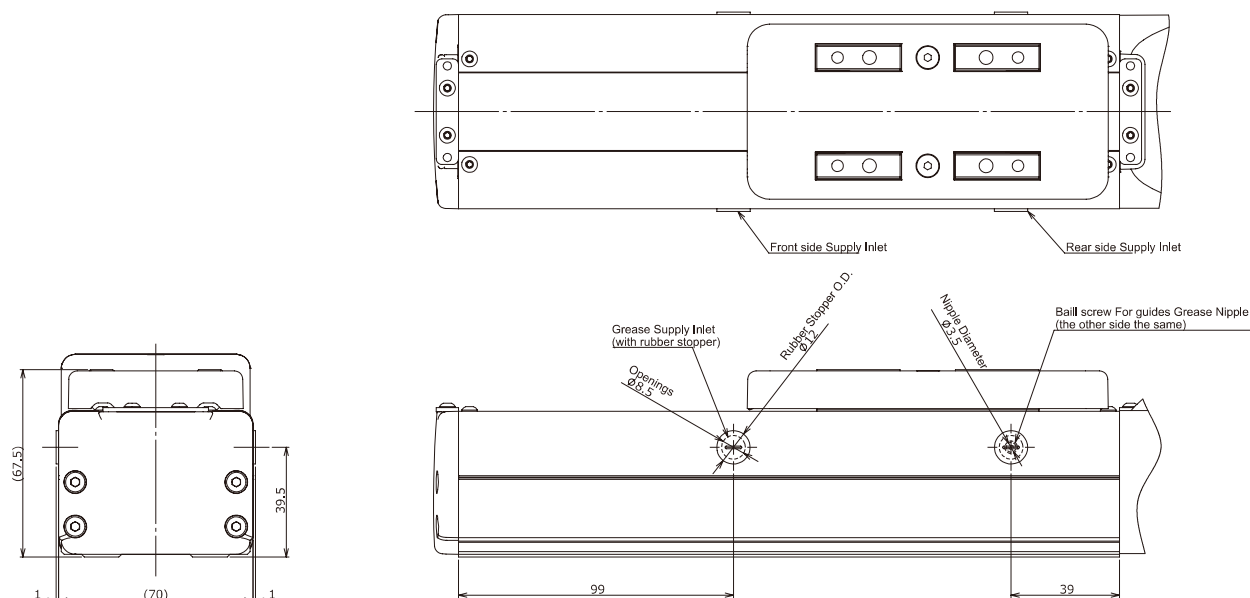
Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Mass [kg]	W/o Brake	4.2	4.4	4.6	4.9	5.1	5.3	5.5	5.8	6.0	6.2	6.4	6.7	6.9	7.1	7.3	7.6
	With Brake	4.3	4.5	4.7	5.0	5.2	5.4	5.6	5.9	6.1	6.3	6.6	6.8	7.0	7.2	7.5	7.7

5. External Dimensions

■Stainless Steel Suction Joint Mounted Specification (Right) (Model Code: SVR) Stainless Steel Suction Joint Mounted Specification (Left) (Model Code: SVL)



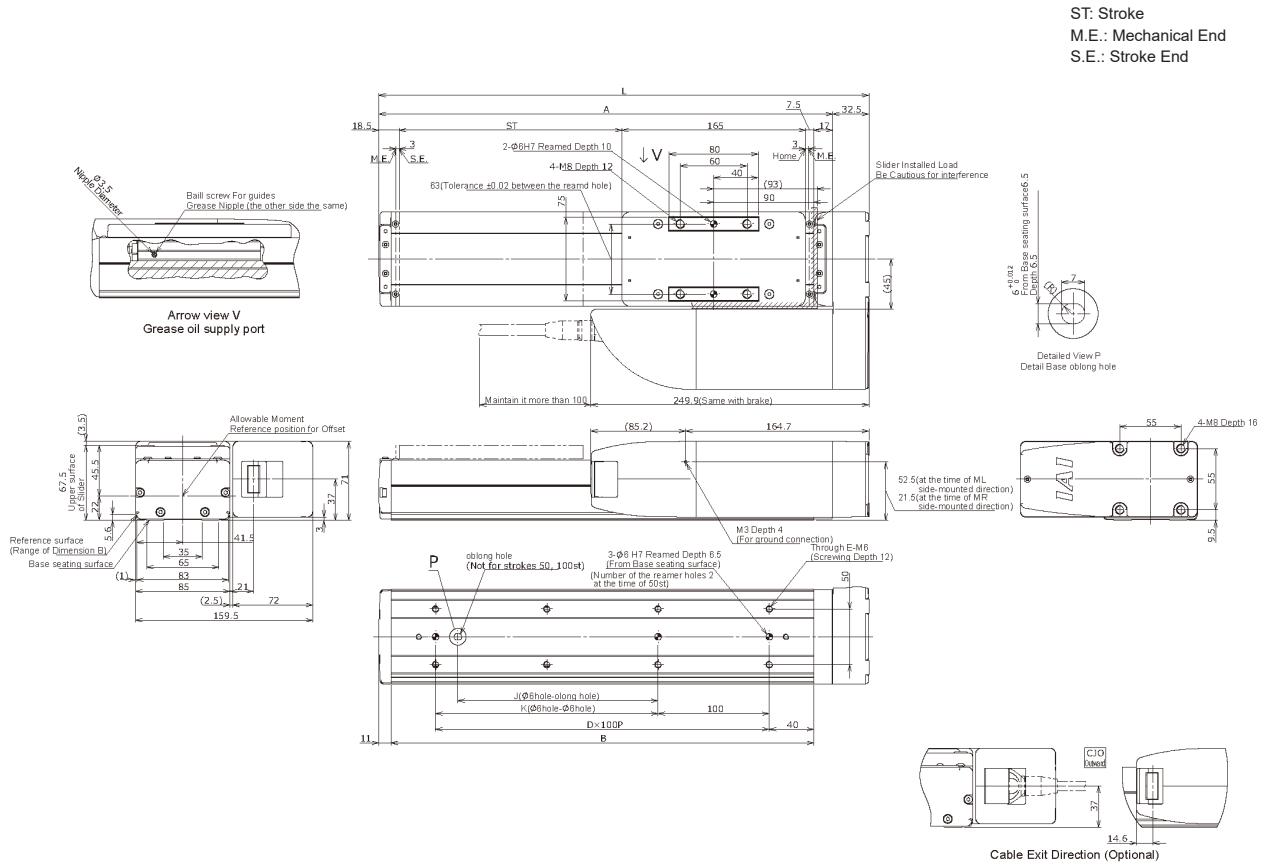
■Grease Supply Inlet Added Specification (Model Code: GU)



5.8 RCP6B-SA8R

(Note) Shown in the figure below is the case of motor left reversed type (model code: ML).

For the right reversed type (model code: MR), the motor part should be allocated on the opposite side of the slider.



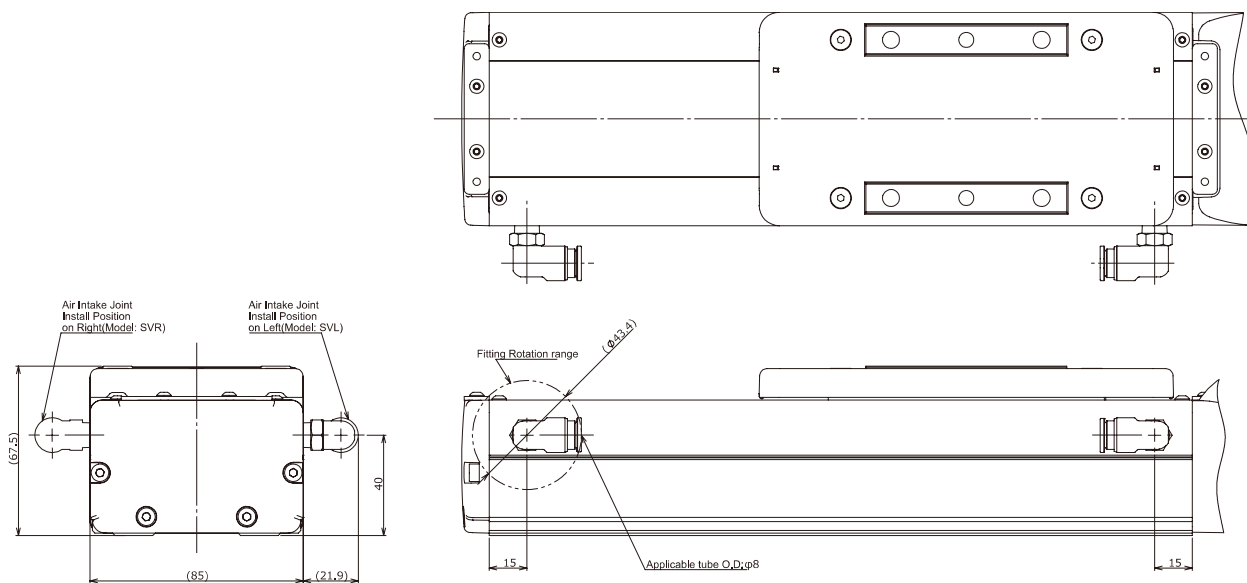
Unit [mm]

Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100
L	290.5	340.5	390.5	440.5	490.5	540.5	590.5	640.5	690.5	740.5	790.5	840.5	890.5	940.5	990.5	1040.5	1090.5	1140.5	1190.5	1240.5	1290.5	1340.5
A	258	308	358	408	458	508	558	608	658	708	758	808	858	908	958	1008	1058	1108	1158	1208	1258	1308
B	230	280	330	380	430	480	530	580	630	680	730	780	830	880	930	980	1030	1080	1130	1180	1230	1280
D	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12
E	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26
J	0	0	80	180	180	280	280	380	380	480	480	580	580	680	680	780	780	880	880	980	980	1080
K	0	100	100	200	200	300	300	400	400	500	500	600	600	700	700	800	800	900	900	1000	1000	1100

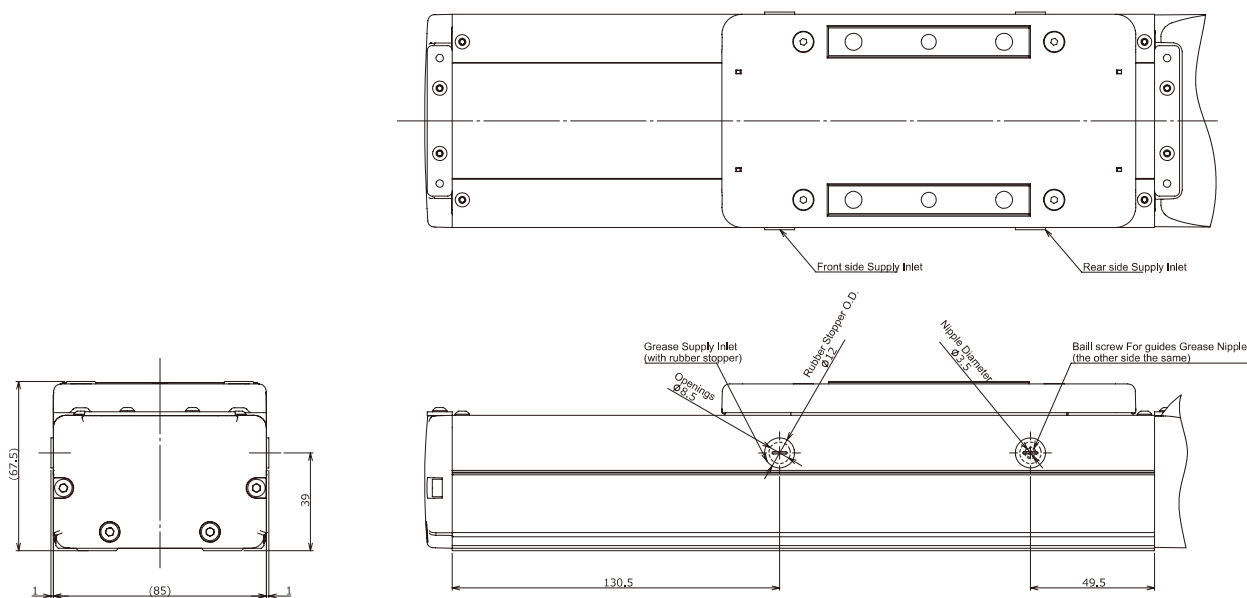
Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100
Mass [kg]	W/o Brake	4.8	5.1	5.4	5.7	5.9	6.2	6.5	6.8	7.1	7.4	7.6	7.9	8.2	8.5	8.8	9.0	9.3	9.6	9.9	10.2	10.5	10.7
	With Brake	5.0	5.3	5.5	5.8	6.1	6.4	6.7	6.9	7.2	7.5	7.8	8.1	8.4	8.6	8.9	9.2	9.5	9.8	10.1	10.3	10.6	10.9

5. External Dimensions

■Stainless Steel Suction Joint Mounted Specification (Right) (Model Code: SVR) Stainless Steel Suction Joint Mounted Specification (Left) (Model Code: SVL)



■Grease Supply Inlet Added Specification (Model Code: GU)



ROBO Cylinder

Chapter 6

Life

6.1	Concept of Operation Life	6-1
6.1.1	How to Calculate Operation Life	6-1
6.1.2	Relation Between Operation Life and Moment	6-2

6.1 Concept of Operation Life

The mechanical life of the actuator is represented by that of the guide receiving the greatest moment load.

Operation life of the linear guide is to be determined by the total driving distance which can reach without having 90% flaking (peeling on rail surface).

Operation life can be figured out with the calculation method shown below.

6.1.1 How to Calculate Operation Life

For the operation life of the linear guide, use the dynamic allowable moment stated in [1.2 Mechanical Specifications], and figure out with the formula below.

$$L = \left(\frac{C_M}{M} \right)^3 \cdot 5000\text{km}$$

L : Operation life [km] C_M : Allowable dynamic moment [N·m]

M : Moment to work [N·m] 5000km : Standard rated life of ROBO Cylinder

In addition, have a calculation for the drop of life with the formula below if there is a concern that the life could drop due to the condition of vibration or way to be attached.

$$L = \left(\frac{C_M}{M} \cdot \frac{f_{ws}}{f_w} \cdot \frac{1}{f_\alpha} \right)^3 \cdot 5000\text{km}$$

L : Operation life [km] C_M : Allowable dynamic moment [N·m]

M : Moment to work [N·m]

f_{ws} : Standard operational coefficient f_w : Load coefficient f_α : Attachment coefficient

5000km : Standard rated life of ROBO Cylinder

Explained below is regarding the standard operational coefficient f_{ws} , load coefficient f_w and attachment coefficient f_α .

Refer to the contents below to set them up.

[Standard operational coefficient f_{ws}]

For ROBO Cylinders described in this manual, $f_{ws} = 1.2$. It is a coefficient defined for each model, some models such as RCS3 high-speed type is 1.35.

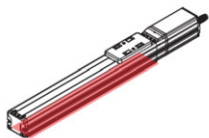
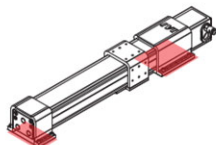
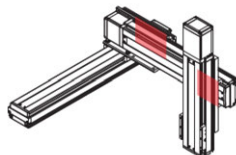
[Load coefficient f_w]

It is a coefficient to consider the life drop due to operational conditions.

Load coefficient f_w	Operation Condition	Reference for acceleration/deceleration
1.0 to 1.5	Small vibration or impact in slow operation	1.0G or less

[Attachment coefficient f_a]

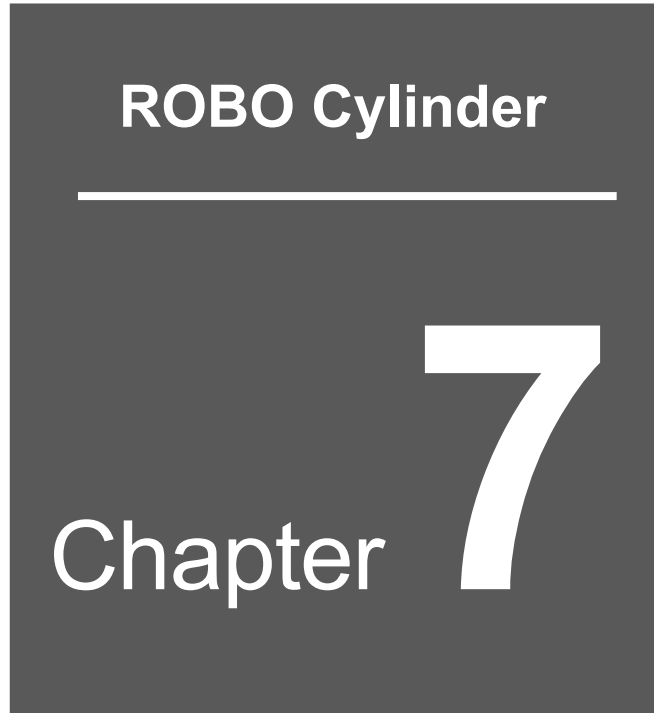
Attachment coefficient f_a is a coefficient to consider the life drop due to the condition of actuator attachment.

Attachment coefficient f_a	1.0	1.2	1.5
	Attachment in whole area	Attachment on both ends	Attachment on spots
Attached condition			

- * As the figures are those in common for each manual, they are not for RCP6B Slider Type. Replace to figures for RCP6B Slider Type and select the attachment coefficient.
- * Even when in attachment in whole area, and the actuator is seated in the whole length of the product, select 1.2 or 1.5 for the attachment coefficient depending on the position of screw fixing.
- * For attachment in whole area, use all of the screw holes (counterbored holes) on the seat surface to fix.

6.1.2 Relation Between Operation Life and Moment

The operation life depends on the moment to work. With light load, it will be longer than 5,000km, the standard rated life. With no consideration of vibration and attachment condition, the operation life is 40,000km according to the calculation with formula in the previous page under assumption that 0.5 C_M (half of dynamic allowable moment) of moment is applied on. It shows that it can be 8 times longer than the standard rated life, which is 5,000km.



Warranty

- 7.1 Warranty period 7-1
- 7.2 Scope of the warranty 7-1
- 7.3 Honoring the warranty 7-1
- 7.4 Limited liability 7-2
- 7.5 Conformance with applicable standards/regulations, etc.,
and application conditions 7-2
- 7.6 Other items excluded from warranty 7-2

7.1 Warranty period

Whichever of the following periods is shorter:

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

7.2 Scope of the warranty

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

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

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

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

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

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

7.3 Honoring the warranty

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

7.4 Limited liability

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

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

- (1) If our product is combined with another product or any system, equipment, etc., used by the customer, the customer must first check the applicable standards, regulations and/or rules. The customer is also responsible for confirming that such combination with our product conforms to the applicable standards, etc.
In such a case we assume no liability for the conformance of our product with the applicable standards, etc.
- (2) Our product is for general industrial use. It is not intended or designed for the applications specified below, which require a high level of safety. Accordingly, as a rule our product cannot be used in these applications.

Contact IAI if you must use our product for any of these applications:

- Medical equipment used to maintain, control or otherwise affect human life or physical health
 - Mechanisms and machinery designed for the purpose of moving or transporting people (vehicles, railway facilities, aviation facilities etc.)
 - Machinery components essential for safety (safety devices etc.)
 - Equipment used to handle cultural assets, art or other irreplaceable items
- (3) Contact IAI in advance if our product is to be used in any condition or environment that differs from that specified in the catalog or instruction manual.

7.6 Other items excluded from warranty

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

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

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Change History

Revision Date	Description of Revision
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