



ROBO Cylinder RCP5/RCP5CR Actuators Slider Type

Instruction Manual

===== Seventh Edition =====

Standard Type Motor Straight Type: RCP5-SA4C, SA6C, SA7C
Standard Type Motor Reversing Type: RCP5-SA4R, SA6R, SA7R
Cleanroom Type Motor Straight Type: RCP5CR-SA4C, SA6C, SA7C

Please Read Before Use

Thank you for purchasing our product.

This instruction manual explains the handling methods, structure and maintenance of this product, among others, providing the information you need to know 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.

The DVD that comes with the product contains instruction manuals for IAI products.

When using the product, refer to the necessary portions of the applicable instruction manual by printing them out or displaying them on a PC.

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

[Important]

- This instruction manual is original.
- This product is not to be used for any other purpose from what is noted in this instruction manual. IAI shall not be liable whatsoever for any loss or damage arising from the result of using the product for any other purpose from what is noted in the manual.
- The information contained in this instruction manual is subject to change without notice for the purpose of production improvement.
- If you have any question or finding regarding the information contained in this instruction manual, contact our customer center or our sales office near you.
- Using or copying all or a part of this instruction manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

R ROBO
C CYLINDER

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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 1before 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	<ul style="list-style-type: none"> ● 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. <ol style="list-style-type: none"> 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. <ol style="list-style-type: none"> 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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation. ● Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.
4	Installation and Start	<p>(1) Installation of Robot Main Body and Controller, etc.</p> <ul style="list-style-type: none"> ● 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. <ol style="list-style-type: none"> 1) Location where electric noise is generated 2) Location where high electrical or magnetic field is present 3) Location with the mains or power lines passing nearby 4) Location where the product may come in contact with water, oil or chemical droplets

No.	Operation Description	Description
4	Installation and Start	<p>(2) Cable Wiring</p> <ul style="list-style-type: none"> ● 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. <p>(3) Grounding</p> <ul style="list-style-type: none"> ● 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 on the AC power cable of the controller and the grounding plate in the control panel, make sure to use a twisted pair cable with wire thickness 0.5mm² (AWG20 or equivalent) or more 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 technical standards). ● Perform Class D Grounding (former Class 3 Grounding with ground resistance 100Ω or below).





No.	Operation Description	Description
4	Installation and Start	<p>(4) Safety Measures</p> <ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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. <p>* Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.</p>

No.	Operation Description	Description
6	Trial Operation	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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 cover or untightened 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. <p>* Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.</p>
9	Modification and Dismantle	<ul style="list-style-type: none"> ● Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.
10	Disposal	<ul style="list-style-type: none"> ● When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste. ● When removing the actuator for disposal, pay attention to drop of components when detaching screws. ● Do not put the product in a fire when disposing of it. The product may burst or generate toxic gases.
11	Other	<ul style="list-style-type: none"> ● Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. ● See Overseas Specifications Compliance Manual to check whether complies if necessary. ● For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety.

Alert Indication

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

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

Caution in Handling

1. Ensure use of the product in the specified conditions, environments and ranges.
An operation out of the specified conditions may cause a drop in performance or malfunction of the product.
2. Do not attempt to have any handling or operation that is not stated in this instruction manual.
3. It is recommended to apply our products for the wiring between the actuator and the controller.
4. Do not attempt to establish the settings for the speed and acceleration/ deceleration above the allowable range.
An operation with speed and acceleration/deceleration beyond the allowable range may cause an abnormal noise, vibration, malfunction or shortened life.
5. Set the allowable moment within the allowable range.
An operation with the load beyond the allowable moment may cause an abnormal noise, vibration, malfunction or shortened life. If it is extreme, flaking may occur on the guide.
6. Set the overhang load within the allowable range.
Attaching a load with an overhang load above the allowable range may cause vibration and abnormal noise.
7. 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.
8. Do not attempt to hit the slider against an abstacle with high speed.
It may destroy the coupling.
9. Make sure to attach the actuator properly by following this instruction manual.
Using the product with the actuator not being certainly retained or affixed may cause abnormal noise, vibration, malfunction or shorten the product life.
10. The position will slightly move only in the first time of turning the servo on after the power is supplied.
In the first time to turn the servo on after the power is supplied only, position adjustment operation will be conducted due to the characteristics of the stepper motor. For this reason, the position will slightly move. The maximum amount of move is $0.025 * \text{lead length [mm]}$.
Pay attention not to have peripheral equipment interfere.

International Standards Compliances

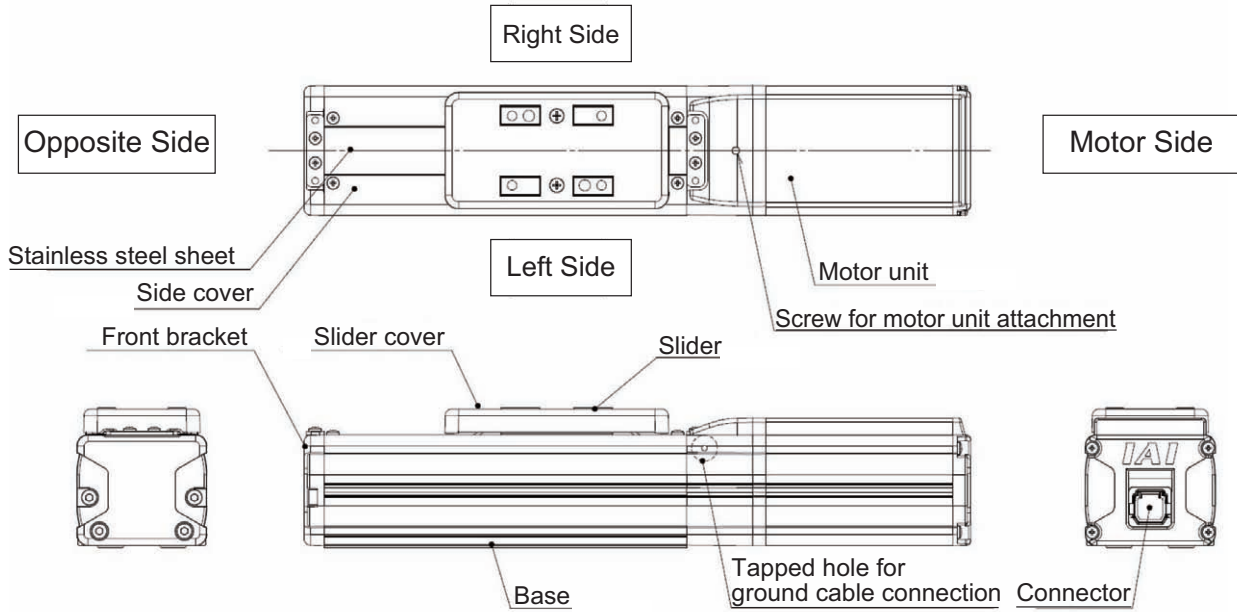
This actuator complies with the following overseas standard.
Refer to Overseas Standard Compliance Manual (ME0287) for more detailed information.

RoHS Directive	CE Marking
<input type="checkbox"/>	<input type="checkbox"/>

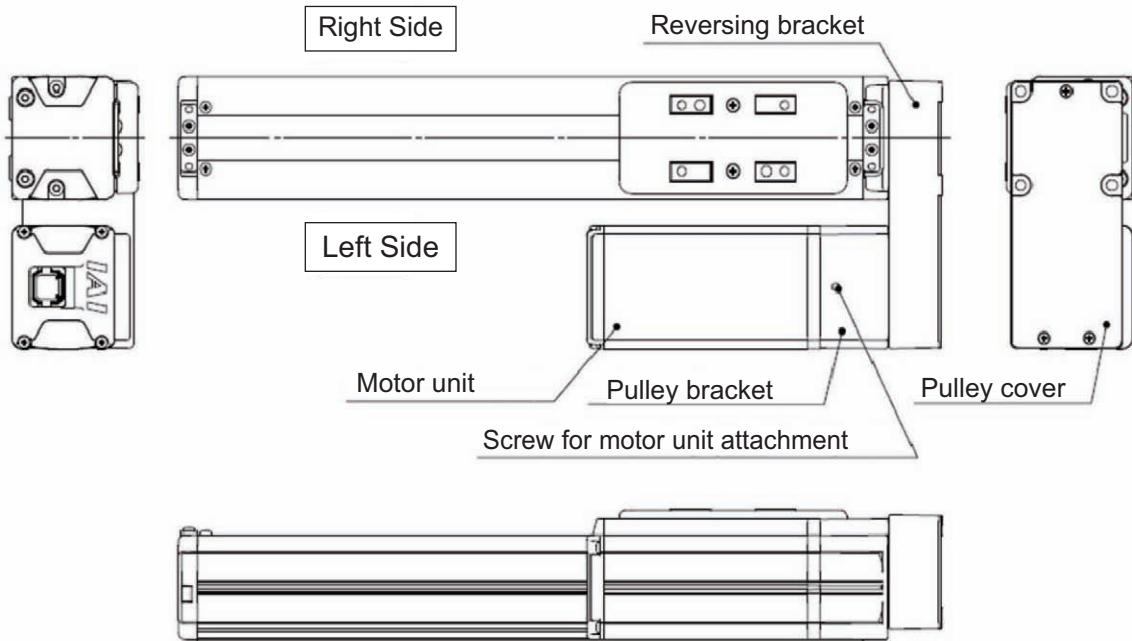
Names of the Parts

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.

1. Standard Type Motor Straight Type



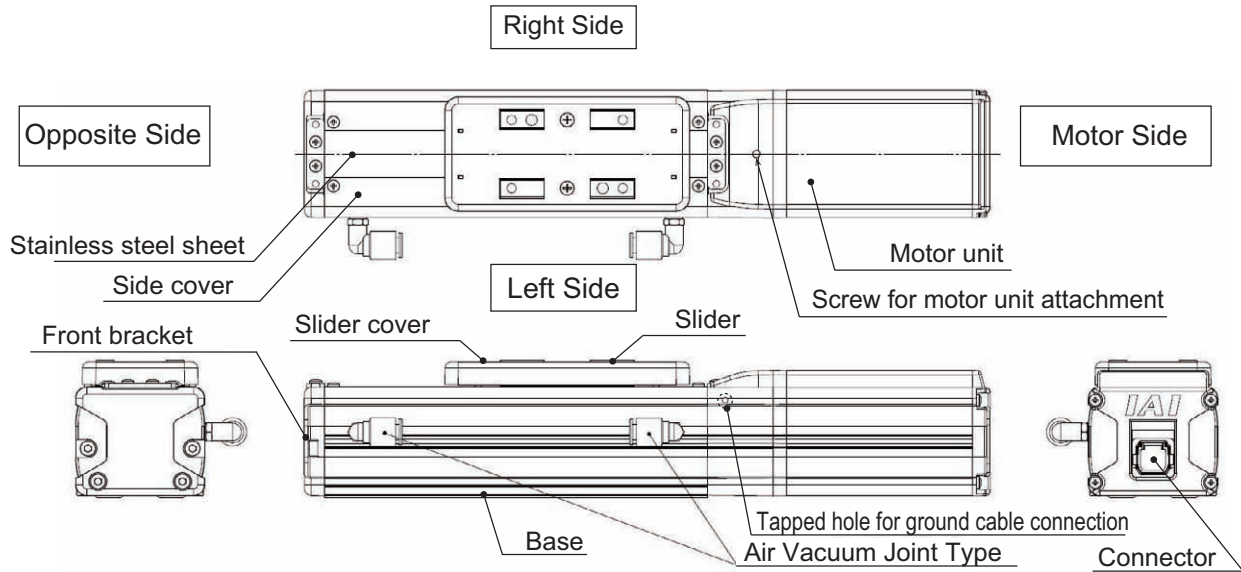
2. Standard Type Motor Reversing Type



The direction of the motor is either left reversed: ML (shown in figure above), right reversed: MR. There is no top reversed type.

Note) Reversing types are not applicable to CR specifications.

3. Cleanroom Type Motor Straight Type



Air Tube Outer Diameter

- SA4/6 : $\phi 6$
- SA7 : $\phi 8$

1. Specifications Check

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

No.	Name	Model number	Quantity	Remarks
1	Actuator	Refer to "How to Read the Model Nameplate" and "How to Read the Model Number."	1	
Accessories				
2	Motor • Encoder Cables (Note1)		1	
3	In-house made seals			
4	First Step Guide		1	
5	Instruction Manual (DVD)		1	
6	Safety Guide		1	

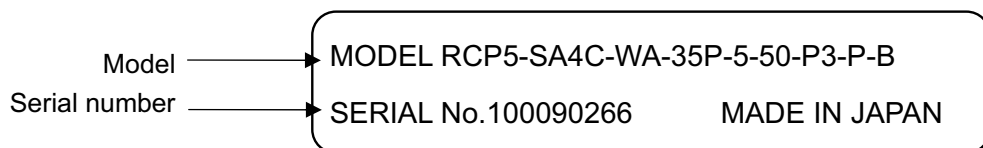
Note1 The motor • encoder cables supplied vary depending on the controller used. [Refer to 1.4, "Motor • Encoder Cables."]

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

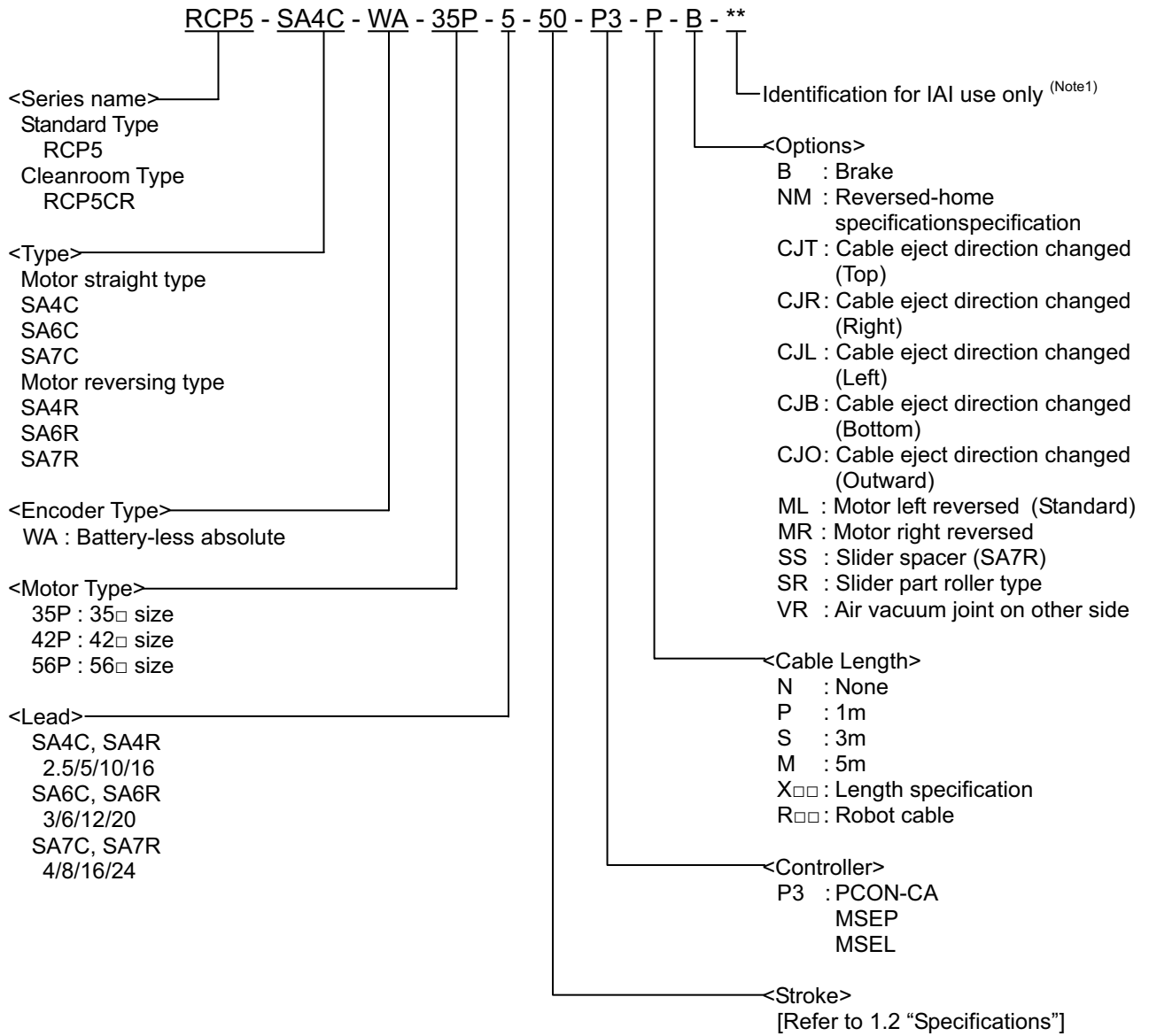
Shown below is a list of the instruction manuals for the controllers related to this product which is recorded in Instruction Manual (DVD).

No.	Name	Control No.
1	Instruction Manual for PCON-CA/CFA Controller	ME0289
2	Instruction Manual for MSEP Controller	ME0299
3	Instruction Manual for MSEL Controller	ME0336
4	Instruction Manual for RC PC Software RCM-101-MW/RCM-101-USB	ME0155
5	Instruction Manual for Touch Panel Teaching Pendant CON-PTA/PDA/PGA	ME0295
6	Instruction Manual for Touch Panel Teaching Pendant TB-01/01D/01DR Applicable for Position Controller	ME0324

1.1.3 How to Read the Model Nameplate



1.1.4 How to Read the Model Number



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

1.2 Specifications

1.2.1 Speed

[1] Motor Straight Type

[When high-output setting 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	195								165	135	-	-	-	-	-	-	-
			Vertical	195								165	135	-	-	-	-	-	-	-
		5	Horizontal	390								330	275	-	-	-	-	-	-	-
			Vertical	390								330	275	-	-	-	-	-	-	-
		10	Horizontal	785								675	555	-	-	-	-	-	-	-
			Vertical	785								675	555	-	-	-	-	-	-	-
16	Horizontal	1260								1060	875	-	-	-	-	-	-	-		
	Vertical	1260								1060	875	-	-	-	-	-	-	-		
SA6C	42P	3	Horizontal	225								215	180	150	130	115	100	85	75	
			Vertical	225								215	180	150	130	115	100	85	75	
		6	Horizontal	450								435	365	305	265	230	200	175	155	
			Vertical	450								435	365	305	265	230	200	175	155	
		12	Horizontal	900								885	735	620	535	460	405	335	315	
			Vertical	900								885	735	620	535	460	405	335	315	
20	Horizontal	1440								1335	1130	970	840	735	650	575				
	Vertical	1280								1130	970	840	735	650	575					
SA7C	56P	4	Horizontal	245								215	185	160	140	125				
			Vertical	210								185	160	140	125					
		8	Horizontal	490								430	375	325	290	255				
			Vertical	490								430	375	325	290	255				
		16	Horizontal	980								875	755	660	585	520				
			Vertical	840								755	660	585	520					
24	Horizontal	1200								1145	1000	885	785							
	Vertical	1200								1145	1000	885	785							

[When high-output setting is ineffective]

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	130											-	-	-	-	-	-
		5	Horizontal	260											-	-	-	-	-	-
			Vertical	260											-	-	-	-	-	-
		10	Horizontal	525											-	-	-	-	-	-
			Vertical	525											-	-	-	-	-	-
16	Horizontal	840											-	-	-	-	-	-		
	Vertical	840											-	-	-	-	-	-		
SA6C	42P	3	Horizontal	150											130	115	100	85	75	
			Vertical	150											130	115	100	85	75	
		6	Horizontal	300											265	230	200	175	155	
			Vertical	300											265	230	200	175	155	
		12	Horizontal	600											535	460	405	355	315	
			Vertical	600											535	460	405	355	315	
20	Horizontal	960											840	735	650	575				
	Vertical	960											840	735	650	575				
SA7C	56P	4	Horizontal	140											125					
			Vertical	140											125					
		8	Horizontal	280											255					
			Vertical	280											255					
		16	Horizontal	560											520					
			Vertical	560											520					
24	Horizontal	800											785							
	Vertical	800											785							

[2] Motor Reversing Type

[When high-output setting 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	
SA4R	35P	2.5	Horizontal	195								165	135	-	-	-	-	-	-	-
			Vertical	195								165	135	-	-	-	-	-	-	-
		5	Horizontal	390								330	275	-	-	-	-	-	-	-
			Vertical	390								330	275	-	-	-	-	-	-	-
		10	Horizontal	785								675	555	-	-	-	-	-	-	-
			Vertical	785								675	555	-	-	-	-	-	-	-
16	Horizontal	1260								1060	875	-	-	-	-	-	-	-		
	Vertical	1260								1060	875	-	-	-	-	-	-	-		
SA6R	42P	3	Horizontal	225								215	180	150	130	115	100	85	75	
			Vertical	225								215	180	150	130	115	100	85	75	
		6	Horizontal	450								435	365	305	265	230	200	175	155	
			Vertical	450								435	365	305	265	230	200	175	155	
		12	Horizontal	900								885	735	620	535	460	405	335	315	
			Vertical	800								735	620	535	460	405	335	315		
20	Horizontal	1280											1130	970	840	735	650	575		
	Vertical	1280											1130	970	840	735	650	575		
SA7R	56P	4	Horizontal	210												185	160	140	125	
			Vertical	210												185	160	140	125	
		8	Horizontal	490												430	375	325	290	255
			Vertical	490												430	375	325	290	255
		16	Horizontal	840												755	660	585	520	
			Vertical	700												660	585	520		
24	Horizontal	1000															885	785		
	Vertical	1000															885	785		

[When high-output setting is ineffective]

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	130											-	-	-	-	-	-
			Vertical	130											-	-	-	-	-	-
		5	Horizontal	260											-	-	-	-	-	-
			Vertical	260											-	-	-	-	-	-
		10	Horizontal	525											-	-	-	-	-	-
			Vertical	525											-	-	-	-	-	-
16	Horizontal	840											-	-	-	-	-	-		
	Vertical	840											-	-	-	-	-	-		
SA6R	42P	3	Horizontal	150											130	115	100	85	75	
			Vertical	150											130	115	100	85	75	
		6	Horizontal	300											265	230	200	175	155	
			Vertical	300											265	230	200	175	155	
		12	Horizontal	600											535	460	405	355	315	
			Vertical	600											535	460	405	355	315	
20	Horizontal	960											840	735	650	575				
	Vertical	960											840	735	650	575				
SA7R	56P	4	Horizontal	140											125					
			Vertical	140											125					
		8	Horizontal	280											255					
			Vertical	280											255					
		16	Horizontal	560											520					
			Vertical	560											520					
24	Horizontal	800											785							
	Vertical	600																		

1.2.2 Maximum Acceleration and Transportable Mass

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

[1] Motor Straight Type

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

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA4C	35P	2.5	Horizontal	0	12	12	12	12	12
				20	12	12	12	12	12
				40	12	12	12	12	12
				65	12	12	12	12	12
				85	12	12	12	12	12
				105	12	12	12	12	12
				130	12	12	12	12	12
				150	12	12	12	12	12
				175	12	12	12	12	12
			195	12	12	12	12	12	
			Vertical	0	9	9	9	-	-
				20	9	9	9	-	-
				40	9	9	9	-	-
				65	9	9	9	-	-
				85	9	9	9	-	-
				105	9	9	9	-	-
				130	9	9	9	-	-
				150	9	9	9	-	-
		175		9	9	9	-	-	
		195	9	9	9	-	-		
		5	Horizontal	0	12	12	12	10	10
				40	12	12	12	10	10
				85	12	12	12	10	10
				130	11	11	11	10	10
				175	10	10	10	10	10
				215	10	10	10	10	10
				260	10	10	10	10	10
				305	10	10	10	10	10
				350	10	10	10	10	10
			390	10	10	10	10	10	
			Vertical	0	4.5	4.5	4.5	-	-
				40	4.5	4.5	4.5	-	-
				85	4.5	4.5	4.5	-	-
				130	4.5	4.5	4.5	-	-
				175	4.5	4.5	4.5	-	-
				215	4.5	4.5	4.5	-	-
260	4.5			4.5	4.5	-	-		
305	4.5			4.5	4.5	-	-		
350	4.5	4.5		4.5	-	-			
390	4.5	4.5	4.5	-	-				

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

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA4C	35P	10	Horizontal	0	10	10	10	8	8
				85	10	10	10	8	8
				175	10	10	10	8	8
				260	9	9	9	8	8
				350	9	9	9	8	8
				435	8	8	8	8	8
				525	8	8	8	7	7
				610	8	8	7	6	5
				700	-	8	6	4	3
			785	-	7	4	3	3	
			Vertical	0	2.25	2.25	2.25	-	-
				85	2.25	2.25	2.25	-	-
				175	2.25	2.25	2.25	-	-
				260	2.25	2.25	2.25	-	-
				350	2.25	2.25	2.25	-	-
				435	2.25	2.25	2.25	-	-
				525	2.25	2.25	2.25	-	-
				610	2.25	2.25	2.25	-	-
		700		-	2	2	-	-	
		780	-	2	1.5	-	-		
		16	Horizontal	0	4	4	4	4	4
				140	4	4	4	4	4
				280	4	4	4	4	4
				420	4	4	4	4	4
				560	4	4	4	4	4
				700	4	4	4	4	4
				840	-	4	4	4	3.5
				980	-	4	4	3.5	3
				1120	-	4	3	2	1.5
			1260	-	-	2	1.5	1	
			Vertical	0	1	1	1	-	-
				140	1	1	1	-	-
				280	1	1	1	-	-
				420	1	1	1	-	-
				560	1	1	1	-	-
				700	1	1	1	-	-
840	-			1	1	-	-		
980	-			1	1	-	-		
1120	-	1		0.75	-	-			
1260	-	-	0.5	-	-				

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

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA6C	42P	3	Horizontal	0	25	25	25	25	25
				25	25	25	25	25	25
				50	25	25	25	25	25
				75	25	25	25	25	25
				100	25	25	25	25	25
				125	25	25	25	25	25
				150	25	25	25	25	22.5
				175	25	25	25	20	19
				200	25	25	20	18	16
			225	25	18	16	15	12	
			Vertical	0	16	16	16	-	-
				25	16	16	16	-	-
				50	16	16	16	-	-
				75	16	16	16	-	-
				100	16	16	16	-	-
				125	16	16	16	-	-
				150	16	14	13	-	-
				175	13	12	11	-	-
		200		11	10	9	-	-	
		225	9	8	-	-	-		
		6	Horizontal	0	25	25	20	16	14
				50	25	25	20	16	14
				100	25	25	20	16	14
				150	25	25	20	16	14
				200	25	25	20	16	14
				250	25	25	20	16	14
				300	25	25	20	15	11
				350	25	20	14	12	9
				400	25	16	10	8	6.5
			450	18	12	6	5	2.5	
			Vertical	0	6	6	6	-	-
				50	6	6	6	-	-
				100	6	6	6	-	-
				150	6	6	6	-	-
				200	6	6	6	-	-
				250	6	6	5.5	-	-
300	6			5.5	5	-	-		
350	6			4.5	4	-	-		
400	4.5	3.5		3	-	-			
450	3.5	2	2	-	-				

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

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA6C	42P	12	Horizontal	0	15	15	12.5	11	10
				100	15	15	12.5	11	10
				200	15	15	12.5	11	10
				300	15	15	12.5	11	10
				400	15	14	11	10	8.5
				500	15	13	10	8	6.5
				600	15	12	9	6	4
				700	12	10	8	4	2.5
				800	10	7	5	2	1
			900	-	5	3	1	1	
			Vertical	0	2.5	2.5	2.5	-	-
				100	2.5	2.5	2.5	-	-
				200	2.5	2.5	2.5	-	-
				300	2.5	2.5	2.5	-	-
				400	2.5	2.5	2.5	-	-
				500	2.5	2.5	2.5	-	-
				600	2.5	2.5	2.5	-	-
				700	2.5	2.5	2	-	-
		800		2	1.5	1	-	-	
		900	-	0.5	0.5	-	-		
		20	Horizontal	0	10	10	9	7	6
				160	10	10	9	7	6
				320	10	10	9	7	6
				480	10	10	9	7	6
				640	10	10	8	6	5
				800	10	9	6.5	4.5	3
				960	-	8	5	3.5	2
				1120	-	6.5	3	2	1.5
				1280	-	-	1	1	1
			1440	-	-	1	0.5	-	
			Vertical	0	1	1	1	-	-
				160	1	1	1	-	-
				320	1	1	1	-	-
				480	1	1	1	-	-
				640	1	1	1	-	-
				800	1	1	1	-	-
960	-			1	1	-	-		
1120	-			0.5	0.5	-	-		
1280	-	-		0.5	-	-			
1440	-	-	-	-	-				

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

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA7C	56P	4	Horizontal	0	45	45	45	40	40
				35	45	45	45	40	40
				70	45	45	45	40	40
				105	45	45	45	40	35
				140	45	45	35	30	25
				175	45	30	18	-	-
				210	40	8	-	-	-
				245	35	-	-	-	-
			Vertical	0	25	25	25	-	-
				35	25	25	25	-	-
				70	25	25	25	-	-
				105	22	20	19	-	-
				140	16	14	12	-	-
				175	11	9	7.5	-	-
				210	8	-	-	-	-
				245	-	-	-	-	-
		8	Horizontal	0	45	45	45	40	40
				70	45	45	45	40	40
				140	45	45	40	38	35
				210	45	40	35	30	24
				280	40	30	25	20	15
				350	35	20	9	4	-
				420	25	7	-	-	-
				490	15	-	-	-	-
			Vertical	0	16	16	16	-	-
				70	16	16	16	-	-
				140	16	16	16	-	-
				210	11	10	9.5	-	-
				280	9	8	7	-	-
				350	7	5	4	-	-
				420	5	2	-	-	-
				490	2	-	-	-	-
		16	Horizontal	0	40	40	35	28	27
				140	40	40	35	28	27
				280	40	38	35	25	24
				420	35	25	20	15	10
				560	25	20	15	10	6
				700	20	15	10	5	3
				840	-	9	4	2	2
				980	-	4	-	-	-
			Vertical	0	8	8	8	-	-
				140	8	8	8	-	-
				280	8	8	8	-	-
				420	6	5	4.5	-	-
				560	5	4	3	-	-
				700	4	3	2	-	-
				840	-	1	-	-	-
				980	-	-	-	-	-

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

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA7C	56P	24	Horizontal	0	20	20	18	16	14
				200	20	20	18	16	14
				400	20	20	18	16	14
				600	20	16	15	10	9
				800	16	12	10	7	4
				1000	-	8	4.5	4	2
				1200	-	5.5	2	2	1
			Vertical	0	3	3	3	-	-
				200	3	3	3	-	-
				400	3	3	3	-	-
				600	3	3	3	-	-
				800	-	3	2.5	-	-
				1000	-	2	1.5	-	-
				1200	-	1	1	-	-

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

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.2G	0.3G	0.5G	0.7G
SA4C	35P	2.5	Horizontal	0	-	12	12	12	12
				20	-	12	12	12	12
				40	-	12	12	12	12
				65	-	12	12	11	11
				85	-	12	11	10	10
				105	-	12	10	10	9
			130	-	12	10	9	8	
			Vertical	0	9	9	9	-	-
				20	9	9	9	-	-
				40	9	9	9	-	-
				65	8	8	8	-	-
				85	8	8	8	-	-
		105		8	8	8	-	-	
		130	5	5	5	-	-		
		5	Horizontal	0	-	12	12	12	10
				40	-	12	12	12	10
				85	-	12	12	12	10
				130	-	10	10	10	9
				175	-	10	10	9	8
				215	-	10	9	8	7
			260	-	9	8	7	6	
			Vertical	0	4.5	4.5	4.5	-	-
				40	4.5	4.5	4.5	-	-
				85	4.5	4.5	4.5	-	-
				130	4	4	4	-	-
				175	4	4	4	-	-
		215		4	4	4	-	-	
		260	3.5	3	2.5	-	-		
		10	Horizontal	0	-	10	10	9	8
				85	-	10	10	9	8
				175	-	10	10	9	8
				260	-	9	9	8	6
				350	-	8	7	6	5
				435	-	7	6	5	4
			525	-	6	5	4	3	
			Vertical	0	2.25	2.25	2.25	-	-
				85	2.25	2.25	2.25	-	-
				175	2.25	2.25	2.25	-	-
				260	2	2	2	-	-
				350	2	2	2	-	-
		435		2	1.5	1.5	-	-	
		525	1.5	1	1	-	-		
		16	Horizontal	0	-	4	4	4	3.5
				140	-	4	4	4	3.5
				280	-	4	4	4	3.5
				420	-	4	4	3.5	3
				560	-	4	3.5	3	2.5
				700	-	3.5	3	2.5	2
840	-		-	2.5	2	1.5			
Vertical	0		1	1	1	-	-		
	140		1	1	1	-	-		
	280		1	1	1	-	-		
	420		1	1	0.75	-	-		
	560		1	0.75	0.75	-	-		
	700	0.75	0.75	0.5	-	-			
840	-	0.5	0.5	-	-				

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

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.2G	0.3G	0.5G	0.7G
SA6C	42P	3	Horizontal	0	-	19	19	19	19
				25	-	19	19	19	19
				50	-	19	19	19	19
				75	-	19	19	19	19
				100	-	19	16	14	12
				125	-	18	14	11	10
			150	-	16	13	10	9	
			Vertical	0	10	10	10	-	-
				25	10	10	10	-	-
				50	10	10	10	-	-
				75	10	10	10	-	-
				100	10	9	8	-	-
		125		7	6	6	-	-	
		150	5	4.5	3	-	-		
		6	Horizontal	0	-	16	15	13	12
				50	-	16	15	13	12
				100	-	16	15	13	12
				150	-	16	15	13	12
				200	-	16	15	13	12
				250	-	15	12	10	7
			300	-	13	12	6	4	
			Vertical	0	5	5	5	-	-
				50	5	5	5	-	-
				100	5	5	5	-	-
				150	5	5	5	-	-
				200	5	4.5	4	-	-
		250		4	4	3	-	-	
		300	3	2.5	2	-	-		
		12	Horizontal	0	-	8.5	8.5	7	6
				100	-	8.5	8.5	7	6
				200	-	8.5	8.5	7	6
				300	-	8.5	8.5	7	6
				400	-	8	7	4	3.5
				500	-	7	6	3	2
			600	-	6	6	2	1.5	
			Vertical	0	2	2	2	-	-
				100	2	2	2	-	-
				200	2	2	2	-	-
				300	2	2	2	-	-
				400	2	2	1.5	-	-
		500		1.5	1.5	1	-	-	
		600	1	1	0.5	-	-		
		20	Horizontal	0	-	6	6	4	4
				160	-	6	6	4	4
				320	-	6	6	4	4
				480	-	5	5	3	3
				640	-	4	4	2	2
				800	-	3	3	1	1
960	-		2	2	1	0.5			
Vertical	0		0.5	0.5	-	-	-		
	160		0.5	0.5	-	-	-		
	320		0.5	0.5	-	-	-		
	480		0.5	0.5	-	-	-		
	640		0.5	0.5	-	-	-		
	800	0.5	0.5	-	-	-			
960	-	0.5	-	-	-				

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

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]						
				Velocity [mm/s]	0.1G	0.2G	0.3G	0.5G	0.7G	
SA7C	56P	4	Horizontal	0	-	40	-	-	-	
				35	-	40	-	-	-	
				70	-	40	-	-	-	
				105	-	40	-	-	-	
				140	-	40	-	-	-	
			Vertical	0	-	15	-	-	-	
				35	-	15	-	-	-	
				70	-	15	-	-	-	
				105	-	10	-	-	-	
				140	-	5	-	-	-	
			8	Horizontal	0	-	-	40	-	-
					70	-	-	40	-	-
		140			-	-	40	-	-	
		210			-	-	25	-	-	
		280			-	-	10	-	-	
		Vertical		0	-	10	-	-	-	
				70	-	10	-	-	-	
				140	-	7	-	-	-	
				210	-	4	-	-	-	
				280	-	1.5	-	-	-	
		16		Horizontal	0	-	-	35	-	-
					140	-	-	35	-	-
			280		-	-	25	-	-	
			420		-	-	15	-	-	
			560		-	-	7	-	-	
			Vertical	0	-	5	-	-	-	
				140	-	5	-	-	-	
				280	-	3	-	-	-	
				420	-	1.5	-	-	-	
				560	-	0.5	-	-	-	
			24	Horizontal	0	-	-	18	-	-
					200	-	-	18	-	-
		400			-	-	18	-	-	
		600			-	-	10	-	-	
		800			-	-	5	-	-	
		Vertical		0	-	2	-	-	-	
200	-			2	-	-	-			
400	-			2	-	-	-			
600	-			1.5	-	-	-			
800	-			1	-	-	-			



Caution: Do not attempt to establish the settings for the acceleration/deceleration above the allowable range. It may cause vibration, malfunction or shortened life. Setting of acceleration/deceleration above the ratings may cause creeping or slippage of the coupling.

[2] Motor Reversing Type

[When high-output setting is effective of the motor reversing type]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA4R	35P	2.5	Horizontal	0	12	12	12	12	12
				20	12	12	12	12	12
				40	12	12	12	12	12
				65	12	12	12	12	12
				85	12	12	12	12	12
				105	12	12	12	12	12
				130	12	12	12	12	12
				150	12	12	12	12	10
				175	12	12	12	12	9
			195	12	12	12	12	9	
			Vertical	0	9	9	9	-	-
				20	9	9	9	-	-
				40	9	9	9	-	-
				65	9	9	9	-	-
				85	9	9	9	-	-
				105	9	9	9	-	-
				130	9	9	9	-	-
				150	9	9	9	-	-
		175		9	7	7	-	-	
		195	9	7	7	-	-		
		5	Horizontal	0	12	12	12	10	10
				40	12	12	12	10	10
				85	12	12	12	10	10
				130	11	11	11	10	10
				175	10	10	10	10	10
				215	10	10	10	10	10
				260	10	10	10	10	10
				305	10	10	10	10	10
				350	10	10	10	10	10
			390	10	10	7	6	4	
			Vertical	0	4.5	4.5	4.5	-	-
				40	4.5	4.5	4.5	-	-
				85	4.5	4.5	4.5	-	-
				130	4.5	4.5	4.5	-	-
				175	4.5	4.5	4.5	-	-
				215	4.5	4.5	4.5	-	-
260	4.5			4.5	4.5	-	-		
305	4.5			4.5	4.5	-	-		
350	4	4		4	-	-			
390	4	3.5	2.5	-	-				

[When high-output setting is effective of the motor reversing type]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA4R	35P	10	Horizontal	0	10	10	10	8	8
				85	10	10	10	8	8
				175	10	10	10	8	8
				260	9	9	9	8	8
				350	9	9	9	8	8
				435	8	8	8	8	8
				525	8	8	8	7	7
				610	8	8	7	5	4
				700	-	7	4	3	2
			785	-	4	3	2	1.5	
			Vertical	0	2.25	2.25	2.25	-	-
				85	2.25	2.25	2.25	-	-
				175	2.25	2.25	2.25	-	-
				260	2.25	2.25	2.25	-	-
				350	2.25	2.25	2.25	-	-
				435	2.25	2.25	2.25	-	-
				525	2.25	2.25	2.25	-	-
				610	2.25	2	2	-	-
		700		-	1.5	1	-	-	
		780	-	1	1	-	-		
		16	Horizontal	0	4	4	4	4	4
				140	4	4	4	4	4
				280	4	4	4	4	4
				420	4	4	4	4	4
				560	4	4	4	4	4
				700	4	4	4	4	4
				840	-	4	4	3	3
				980	-	4	4	2.5	2
				1120	-	2.5	2.5	1	1
			1260	-	-	1	0.5	0.5	
			Vertical	0	1	1	1	-	-
				140	1	1	1	-	-
				280	1	1	1	-	-
				420	1	1	1	-	-
				560	1	1	1	-	-
				700	1	1	1	-	-
840	-			1	1	-	-		
980	-			1	1	-	-		
1120	-	0.75		0.5	-	-			
1260	-	-	-	-	-				

[When high-output setting is effective of the motor reversing type]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA6R	42P	3	Horizontal	0	25	25	25	25	25
				25	25	25	25	25	25
				50	25	25	25	25	25
				75	25	25	25	25	25
				100	25	25	25	25	25
				125	25	25	25	25	25
				150	25	25	25	25	22.5
				175	25	25	25	20	19
			200	25	25	20	18	12	
			225	25	18	12	6	4	
			Vertical	0	12	12	12	-	-
				25	12	12	12	-	-
				50	12	12	12	-	-
				75	12	12	12	-	-
				100	12	12	12	-	-
				125	12	12	12	-	-
		150		12	11	10	-	-	
		175		11	9	8	-	-	
		200	9	7	6	-	-		
		225	5	3	-	-	-		
		6	Horizontal	0	25	25	20	16	14
				50	25	25	20	16	14
				100	25	25	20	16	14
				150	25	25	20	16	14
				200	25	25	20	16	14
				250	25	25	20	16	14
				300	25	25	20	15	11
				350	25	20	14	12	9
			400	25	16	10	8	6.5	
			450	18	12	6	5	2.5	
			Vertical	0	6	6	6	-	-
				50	6	6	6	-	-
100	6			6	6	-	-		
150	6			6	6	-	-		
200	6			6	6	-	-		
250	6			6	5.5	-	-		
300	6	5.5		5	-	-			
350	5.5	4.5		4	-	-			
400	4.5	3.5	3	-	-				
450	2.5	2	1.5	-	-				

[When high-output setting is effective of the motor reversing type]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G
SA6R	42P	12	Horizontal	0	15	15	12.5	11	10
				100	15	15	12.5	11	10
				200	15	15	12.5	11	10
				300	15	15	12.5	11	10
				400	15	14	11	10	8.5
				500	15	13	10	8	6.5
				600	15	12	9	6	4
				700	12	10	8	4	2.5
				800	10	7	5	2	1
			900	-	4	2	1	-	
			Vertical	0	2.5	2.5	2.5	-	-
				100	2.5	2.5	2.5	-	-
				200	2.5	2.5	2.5	-	-
				300	2.5	2.5	2.5	-	-
				400	2.5	2.5	2.5	-	-
				500	2.5	2.5	2.5	-	-
				600	2.5	2.5	2.5	-	-
				700	2.5	2	1.5	-	-
		800		2	1	0.5	-	-	
		900	-	-	-	-	-		
		20	Horizontal	0	10	10	9	7	6
				160	10	10	9	7	6
				320	10	10	9	7	6
				480	10	10	9	7	6
				640	10	10	8	6	5
				800	10	9	6.5	4.5	3
				960	-	8	5	3.5	2
				1120	-	6	3	2	1.5
				1280	-	-	1	0.5	0.5
			Vertical	0	1	1	1	-	-
				160	1	1	1	-	-
				320	1	1	1	-	-
				480	1	1	1	-	-
				640	1	1	1	-	-
				800	1	1	1	-	-
				960	-	1	1	-	-
1120	-			0.5	0.5	-	-		
1280	-			-	-	-	-		

[When high-output setting is effective of the motor reversing type]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]							
				Velocity [mm/s]	0.1G	0.3G	0.5G	0.7G	1.0G		
SA7R	56P	4	Horizontal	0	45	45	45	40	40		
				35	45	45	45	40	40		
				70	45	45	45	40	40		
				105	45	45	45	40	35		
				140	45	45	35	30	25		
				175	45	30	18	-	-		
			210	40	-	-	-	-			
			Vertical	0	25	25	25	-	-		
				35	25	25	25	-	-		
				70	25	25	25	-	-		
				105	22	20	19	-	-		
				140	16	14	12	-	-		
		175		11	7	5	-	-			
		210	4	-	-	-	-				
		8	Horizontal	0	45	45	45	40	40		
				70	45	45	45	40	40		
				140	45	45	40	38	35		
				210	45	40	35	30	24		
				280	40	30	25	20	15		
				350	35	20	9	4	-		
				420	25	7	-	-	-		
				490	13	-	-	-	-		
				Vertical	0	16	16	16	-	-	
			70		16	16	16	-	-		
			140		16	16	16	-	-		
			210		11	10	9.5	-	-		
			280		9	8	7	-	-		
			350		7	5	4	-	-		
			420		5	1	-	-	-		
			490		1	-	-	-	-		
			16		Horizontal	0	40	40	35	28	27
				140		40	40	35	28	27	
		280		40		38	35	25	24		
		420		35		25	20	15	10		
		560		25		20	15	10	6		
		700		20		15	8	5	3		
		840		-		6	2	-	-		
		Vertical		0		8	8	8	-	-	
				140		8	8	8	-	-	
				280	8	8	8	-	-		
				420	6	5	4.5	-	-		
				560	5	4	3	-	-		
				700	3	2	1.5	-	-		
				840	-	-	-	-	-		
				24	Horizontal	0	20	20	18	16	14
						200	20	20	18	16	14
		400				20	20	18	16	14	
		600				20	16	15	10	9	
800	16	12	10			6	4				
1000	-	8	4.5			2	1				
Vertical	0	3	3		3	-	-				
	200	3	3		3	-	-				
	400	3	3		3	-	-				
	600	3	3		3	-	-				
	800	-	3		2.5	-	-				
	1000	-	1		1	-	-				

[When high-output setting is ineffective of the motor reversing type]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.2G	0.3G	0.5G	0.7G
SA4R	35P	2.5	Horizontal	0	-	12	12	12	12
				20	-	12	12	12	12
				40	-	12	12	12	12
				65	-	12	12	11	11
				85	-	12	11	10	10
				105	-	12	10	10	9
			130	-	12	10	9	8	
			Vertical	0	9	9	9	-	-
				20	9	9	9	-	-
				40	9	9	9	-	-
				65	8	8	8	-	-
				85	8	8	8	-	-
		105		8	8	8	-	-	
		130	5	5	5	-	-		
		5	Horizontal	0	-	12	12	12	10
				40	-	12	12	12	10
				85	-	12	12	12	10
				130	-	10	10	10	9
				175	-	10	10	9	8
				215	-	10	9	8	7
			260	-	9	8	7	6	
			Vertical	0	4.5	4.5	4.5	-	-
				40	4.5	4.5	4.5	-	-
				85	4.5	4.5	4.5	-	-
				130	4	4	4	-	-
				175	4	4	4	-	-
		215		4	4	4	-	-	
		260	3.5	3	2.5	-	-		
		10	Horizontal	0	-	10	10	9	8
				85	-	10	10	9	8
				175	-	10	10	9	8
				260	-	9	9	8	6
				350	-	8	7	6	5
				435	-	7	6	5	4
			525	-	6	5	4	3	
			Vertical	0	2.25	2.25	2.25	-	-
				85	2.25	2.25	2.25	-	-
				175	2.25	2.25	2.25	-	-
				260	2	2	2	-	-
				350	2	2	2	-	-
		435		2	1.5	1.5	-	-	
		525	1.5	1	1	-	-		
		16	Horizontal	0	-	4	4	4	3.5
				140	-	4	4	4	3.5
				280	-	4	4	4	3.5
				420	-	4	4	3.5	3
				560	-	4	3.5	3	2.5
				700	-	3.5	3	2.5	2
840	-		-	2.5	2	1.5			
Vertical	0		1	1	1	-	-		
	140		1	1	1	-	-		
	280		1	1	1	-	-		
	420		1	1	0.75	-	-		
	560		1	0.75	0.75	-	-		
	700	0.75	0.75	0.5	-	-			
840	-	0.5	0.5	-	-				

[When high-output setting is ineffective of the motor reversing type]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]					
				Velocity [mm/s]	0.1G	0.2G	0.3G	0.5G	0.7G
SA6R	42P	3	Horizontal	0	-	19	19	19	19
				25	-	19	19	19	19
				50	-	19	19	19	19
				75	-	19	19	19	19
				100	-	19	16	14	12
				125	-	18	14	11	10
			150	-	16	13	10	9	
			Vertical	0	10	10	10	-	-
				25	10	10	10	-	-
				50	10	10	10	-	-
				75	10	10	10	-	-
				100	10	9	8	-	-
		125		7	6	6	-	-	
		150	5	4.5	3	-	-		
		6	Horizontal	0	-	16	15	13	12
				50	-	16	15	13	12
				100	-	16	15	13	12
				150	-	16	15	13	12
				200	-	16	15	13	12
				250	-	15	12	10	7
			300	-	13	12	6	4	
			Vertical	0	5	5	5	-	-
				50	5	5	5	-	-
				100	5	5	5	-	-
				150	5	5	5	-	-
				200	5	4.5	4	-	-
		250		4	4	3	-	-	
		300	2.5	2	1.5	-	-		
		12	Horizontal	0	-	8.5	8.5	7	6
				100	-	8.5	8.5	7	6
				200	-	8.5	8.5	7	6
				300	-	8.5	8.5	7	6
				400	-	8	7	4	3.5
				500	-	7	6	3	2
			600	-	6	6	2	1.5	
			Vertical	0	2	2	2	-	-
				100	2	2	2	-	-
				200	2	2	2	-	-
				300	2	2	2	-	-
				400	2	2	1.5	-	-
		500		1.5	1.5	1	-	-	
		600	1	0.5	0.5	-	-		
		20	Horizontal	0	-	6	6	4	4
				160	-	6	6	4	4
				320	-	6	6	4	4
				480	-	5	5	3	3
				640	-	4	4	2	2
				800	-	3	3	1	1
960	-		2	1.5	0.5	-			
Vertical	0		0.5	0.5	-	-	-		
	160		0.5	0.5	-	-	-		
	320		0.5	0.5	-	-	-		
	480		0.5	0.5	-	-	-		
	640		0.5	0.5	-	-	-		
	800	0.5	0.5	-	-	-			
960	-	-	-	-	-				

[When high-output setting is ineffective of the motor reversing type]

Type	Motor Type	Lead [mm]	Horizontal / Vertical	Payload capacity by acceleration/deceleration [kg]						
				Velocity [mm/s]	0.1G	0.2G	0.3G	0.5G	0.7G	
SA7R	56P	4	Horizontal	0	-	40	-	-	-	
				35	-	40	-	-	-	
				70	-	40	-	-	-	
				105	-	40	-	-	-	
				140	-	22	-	-	-	
			Vertical	0	-	15	-	-	-	
				35	-	15	-	-	-	
				70	-	15	-	-	-	
				105	-	10	-	-	-	
				140	-	3	-	-	-	
			8	Horizontal	0	-	-	40	-	-
					70	-	-	40	-	-
		140			-	-	40	-	-	
		210			-	-	25	-	-	
		280			-	-	6	-	-	
		Vertical		0	-	10	-	-	-	
				70	-	10	-	-	-	
				140	-	7	-	-	-	
				210	-	4	-	-	-	
				280	-	1	-	-	-	
		16		Horizontal	0	-	-	35	-	-
					140	-	-	35	-	-
			280		-	-	25	-	-	
			420		-	-	15	-	-	
			560		-	-	4	-	-	
			Vertical	0	-	5	-	-	-	
				140	-	5	-	-	-	
				280	-	3	-	-	-	
				420	-	1.5	-	-	-	
				560	-	0.5	-	-	-	
			24	Horizontal	0	-	-	18	-	-
					200	-	-	18	-	-
		400			-	-	18	-	-	
		600			-	-	9	-	-	
		800			-	-	1	-	-	
		Vertical		0	-	2	-	-	-	
				200	-	2	-	-	-	
				400	-	2	-	-	-	
				600	-	1.5	-	-	-	
				800	-	-	-	-	-	



Caution: Do not attempt to establish the settings for the acceleration/deceleration above the allowable range. It may cause vibration, malfunction or shortened life. Setting of acceleration/deceleration above the ratings may cause creeping or slippage of the coupling.

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	800	Rolled	φ8mm	C10		
		5						
		10						
		16						
SA6C SA6R	42P	3		800	Rolled	φ10mm	C10	
		6						
		12						
		20						
SA7C SA7R	56P	4			800	Rolled	φ12mm	C10
		8						
		16						
		24						

1.2.4 Positioning Precision

Type	Lead	Item	Tolerance
SA4C SA4R	2.5, 5, 10, 16	Positioning repeatability	±0.02mm
		Backlash	0.1mm or less
SA6C SA6R	3, 6, 12	Positioning repeatability	±0.02mm
		Backlash	0.1mm or less
	20	Positioning repeatability	±0.03mm
		Backlash	0.1mm or less
SA7C SA7R	4, 8, 16	Positioning repeatability	±0.02mm
		Backlash	0.1mm or less
	24	Positioning repeatability	±0.03mm
		Backlash	0.1mm or less

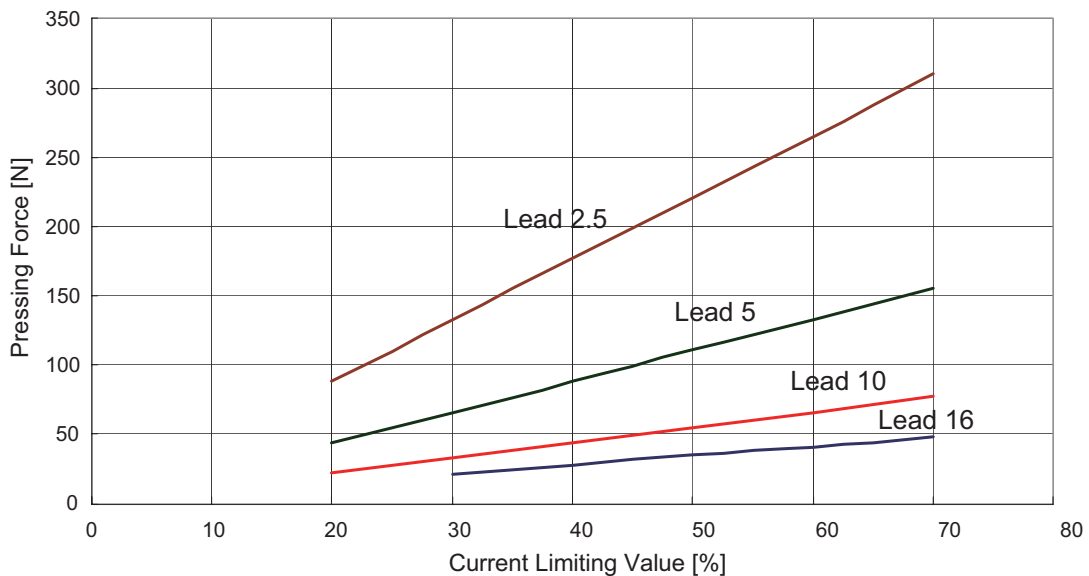
It is the accuracy when product is shipped out from the factory. It does not include the consideration of time-dependent change.

1.2.5 Current Limiting Value and Pressing Force

[1] SA4C, SA4R Motor Type 35P

Current Limiting Value	Lead 2.5 [N]	Lead 5 [N]	Lead 10 [N]	Lead 16 [N]
20%	88	44	22	-
30%	133	66	33	21
40%	177	88	44	28
50%	221	111	55	35
60%	265	133	66	41
70%	310	155	77	48

SA4C/R Current Limiting Values and Pressing Force

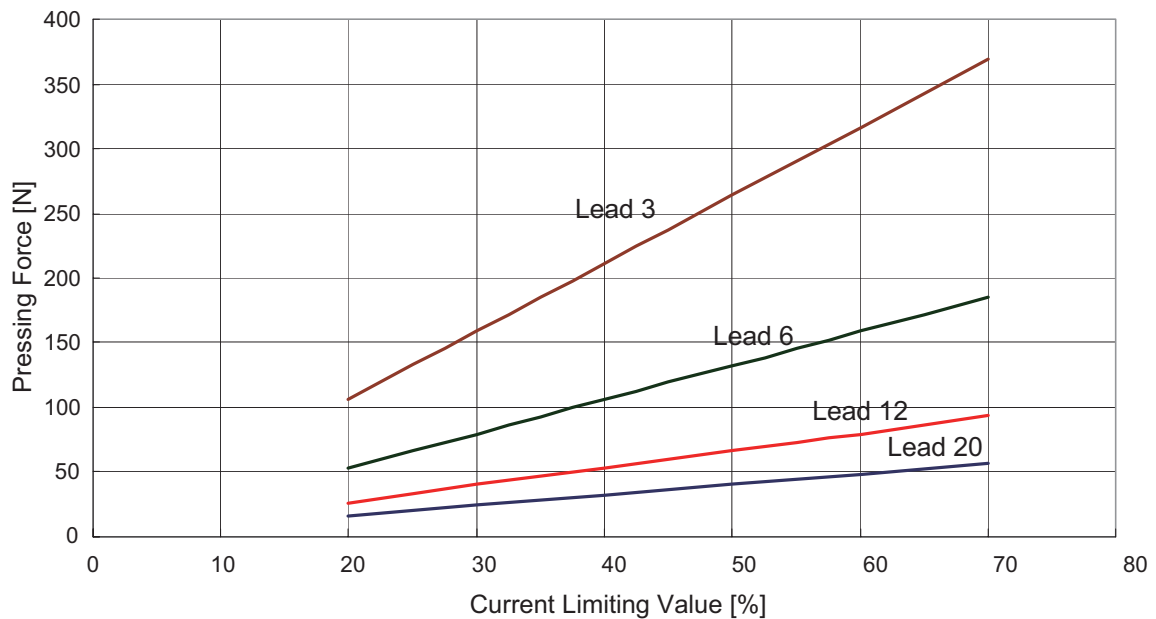


⚠ Caution: (1) The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s.
 (2) There will be a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
 (3) Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 20% (below 30% for Lead 16). 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.
 (4) 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 omitting.

[2] SA6C, SA6R Motor Type 42P

Current Limiting Value	Lead3 [N]	Lead6 [N]	Lead12 [N]	Lead20 [N]
20%	106	53	26	16
30%	159	79	40	24
40%	211	106	53	32
50%	264	132	66	40
60%	317	159	79	48
70%	370	185	93	56

SA6C/R Current Limiting Values and Pressing Force

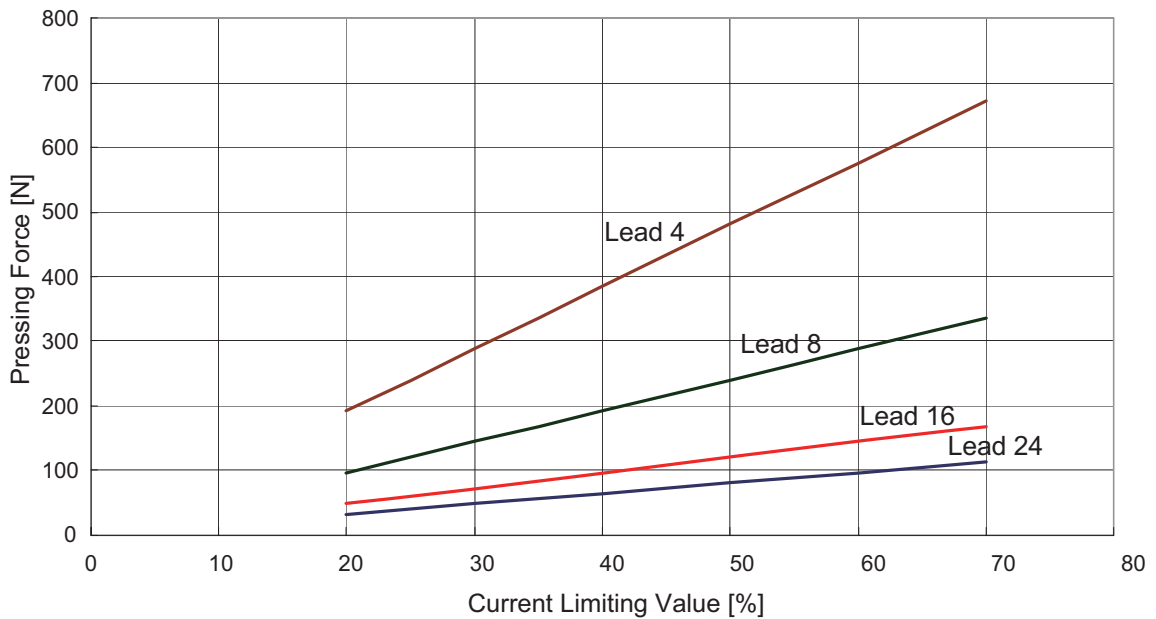


⚠ Caution: (1) The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s.
 (2) There will be a little variance in the actual pressing force. The variance of the pressing force becomes large when the current limit value is low.
 (3) Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 20%. 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.
 (4) 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.

[3] SA7C, SA7R Motor Type 56P

Current Limiting Value	Lead4 [N]	Lead8 [N]	Lead16 [N]	Lead24 [N]
20%	192	96	48	32
30%	288	144	72	48
40%	385	192	96	64
50%	481	240	120	80
60%	577	288	144	96
70%	673	336	168	112

SA7C/R Current Limiting Values and Pressing Force



Caution:

- (1) The relation of the current limit and the pressing force is a reference when assuming the speed is 20mm/s.
- (2) 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.
- (3) Use the product within the range in the graph for the current limit value. Pressing force will not be stable if used below 20%. 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.
- (4) 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.

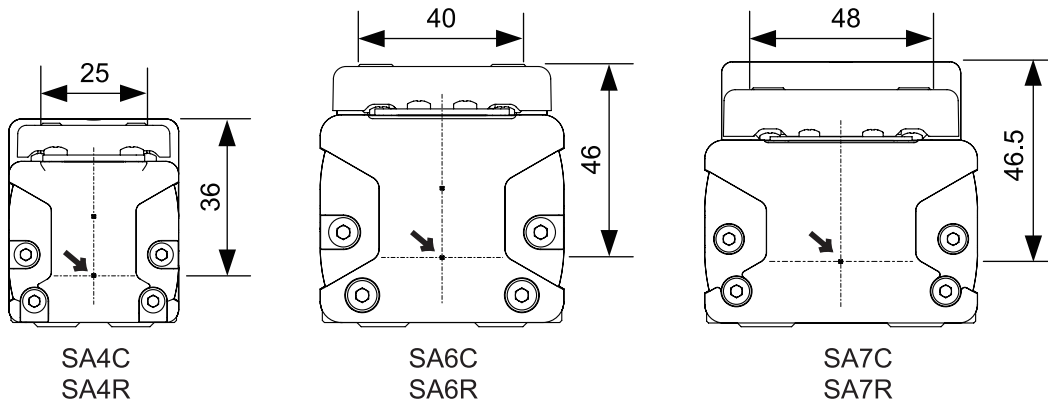
[Caution at Pressing]

Make sure to establish the pressing current limit value setting not to exceed 80% of the rated moment (Ma and Mb) specified in the specifications for the reaction force moment caused by the pressing force when pressing operation is conducted on the slider type.

If an excessive force exceeding the rated moment is applied, it may damage the guide and would shorten the product life.

For the moment calculation, the figures below show the positions (where pointed with an arrow) that the moment is applied. Take the moment applied position into consideration when calculating the moment.

● Ma or Mb Datum Point for Offset



● Example for Calculation

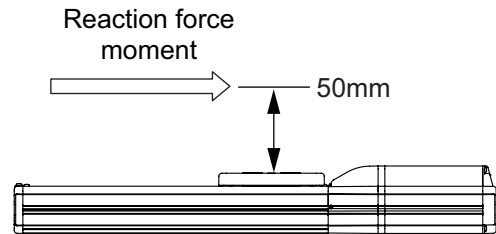
Explanation below describes an example when the pressing is conducted with 50N to Ma direction at the position shown on the right by SA7C Type.

The moment applied to the guide is;

$$Ma = (50\text{mm} + \text{Offset Datum Position } 46.5\text{mm}) \times 50\text{N}$$

$$= 4825\text{N}\cdot\text{mm}$$

$$= 4.825\text{N}\cdot\text{m}$$

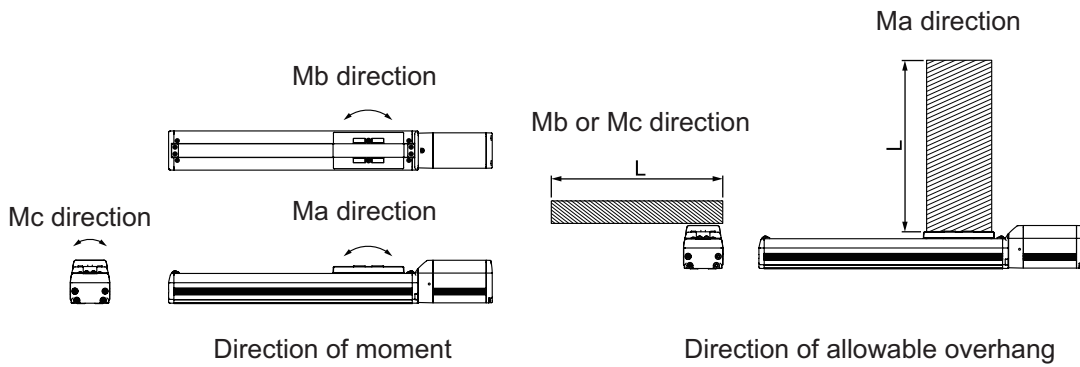


The dynamic allowable load moment for SA7C is $Ma = 10\text{N}\cdot\text{m}$.
 Up to $8\text{N}\cdot\text{m}$, which is 80% of $10\text{N}\cdot\text{m}$, is acceptable for SA7C.
 As the calculation result $4.825\text{N}\cdot\text{m}$ is below $8\text{N}\cdot\text{m}$, it can be defined acceptable for pressing.

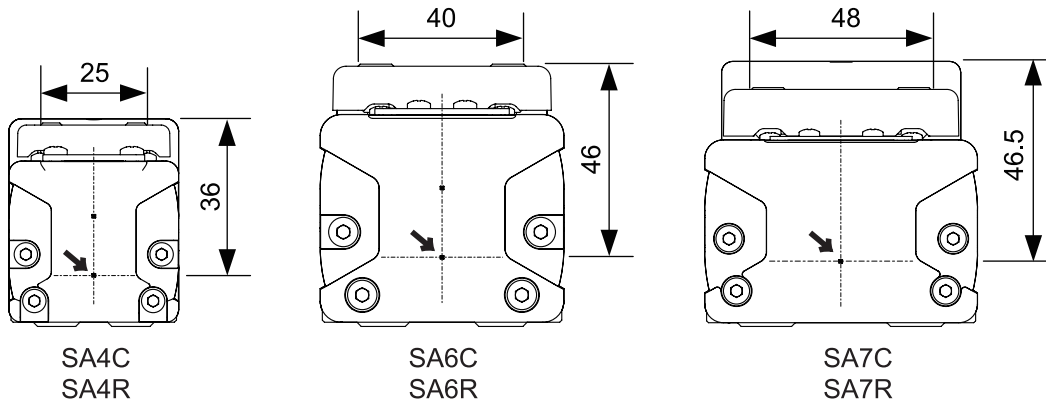
Also, when the moment in Mb direction occurs by the pressing, confirm that the moment is 80% or below the dynamic allowable load moment in Mb direction by conducting a calculation in the same manner.

1.2.6 Allowable Moment of Actuator

Type	Allowable static moment [N·m]			Allowable dynamic moment [N·m]			Allowable overhang load [L]
	Ma	Mb	Mc	Ma	Mb	Mc	
SA4C SA4R	8.6	12.2	16.7	4.98	7.11	9.68	Ma direction: 120mm Mb or Mc direction: 120mm
SA6C SA6R	38.3	54.7	81	11.6	16.6	24.6	Ma direction: 150mm Mb or Mc direction: 150mm
SA7C SA7R	51.2	73.1	148	11.6	16.6	33.7	Ma direction: 230mm Mb or Mc direction: 230mm



- Ma or Mb Datum Point for Offset (where pointed with an arrow)



1.3 Options

1.3.1 Brake Type (Model : B)

The brake is a mechanism designed to prevent the slider from dropping on a vertically installed actuator when the power or servo is turned OFF.

Use the brake to prevent the installed load, etc., from being damaged due to the falling slider.

1.3.2 Reversed-home Specification (Model : NM)

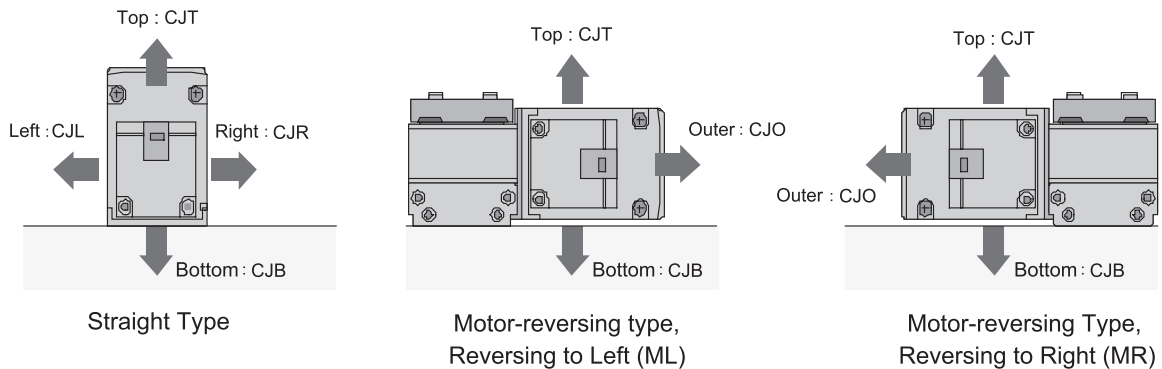
The standard home position is on the motor side. However, the motor position will be reversed if it is desirable in view of the layout of the system, etc.

(Note) The home position is adjusted at the factory before shipment. If you wish to change the home after the delivery of your actuator, you must return the actuator to IAI for adjustment.

1.3.3 Cable Eject Direction Changed (Model No. : CJT, CJR, CJL, CJB, CJO)

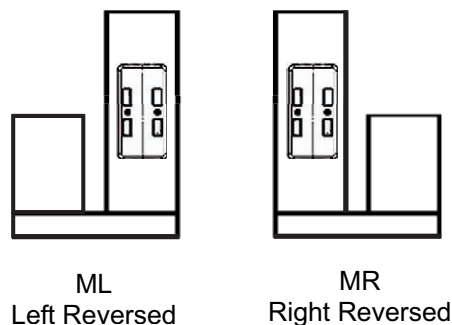
If a change in the cable ejection direction is made, the direction of cable ejection will be changed.

There are ejection directions, top (model code: CJT), right (model code: CJR), left (model code: CJL), bottom (model code: CJB) and outward (model code: CJO). CJO can be selected only in SA4R, SA6R and SA7R.



1.3.4 Motor Left Reversed, Motor Right Reversed (Model No. : ML, MR)

From the view of motor side, reversing to the left is ML and reversing to the right is MR.



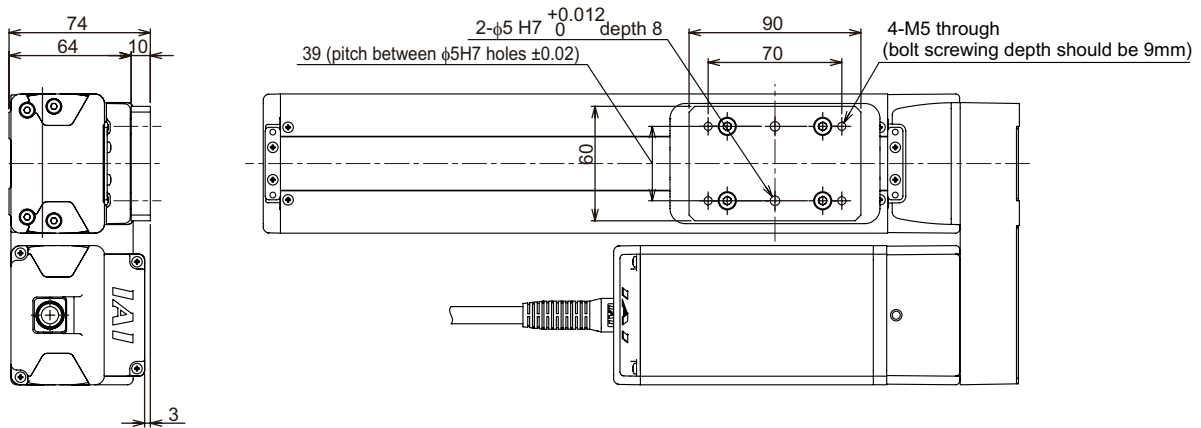
1.3.5 Slider part roller type (Model No. : SR)

It possesses the roller structure for the slider design that is the same as the cleanroom type.

1.3.6 Slider spacer (Model No. : SS)

Application SA7R

As the motor unit is higher than the top face of the slider, it is a spacer to make higher than the motor unit.



1.3.7 Air vacuum joint on other side (Model No. : VR)

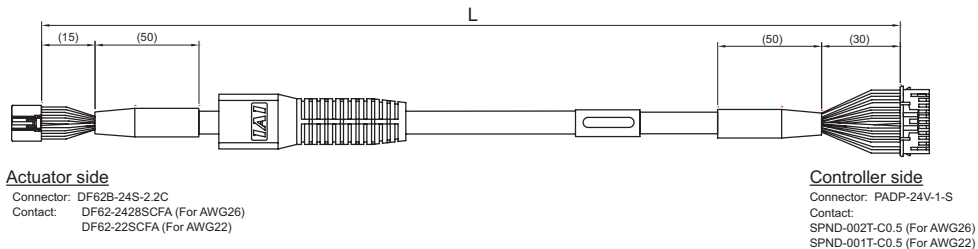
The vacuum joint on the cleanroom use is mounted on the left side of the body from the view of the motor end in standard. This is the type that has the joint on the other side (in mirror).

1.4 Motor • Encoder Cables

1.4.1 Motor • Encoder Integrated Cables

CB-CAN-MPA□□□

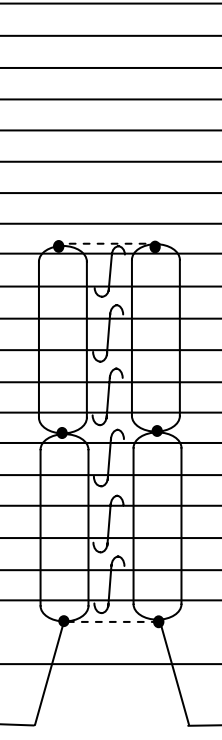
□□□ indicates the cable length (L) (Example: 030=3m), Max.20m



Connection diagram

Actuator side

Controller side

Thickness	Electric Wire Color	Symbol	Pin No.		Pin No.	Symbol	Electric Wire Color	Thickness
AWG22/19	Blue	ϕ A	3		1	ϕ A	Blue	AWG22/19
AWG22/19	Orange	VMM	5		2	VMM	Orange	AWG22/19
AWG22/19	Brown	ϕ B	10		3	ϕ B	Brown	AWG22/19
AWG22/19	Gray	VMM	9		4	VMM	Gray	AWG22/19
AWG22/19	Green	ϕ _A	4		5	ϕ _A	Green	AWG22/19
AWG22/19	Red	ϕ _B	15		6	ϕ _B	Red	AWG22/19
AWG26	Black	LS+	8		7	LS+	Black	AWG26
AWG26	Yellow	LS-	14		8	LS-	Yellow	AWG26
AWG26	Blue	SA	12		11	SA	Blue	AWG26
AWG26	Orange	SB	17		12	SB	Orange	AWG26
AWG26	Green	A+	1		13	A+	Green	AWG26
AWG26	Brown	A-	6		14	A-	Brown	AWG26
AWG26	Gray	B+	11		15	B+	Gray	AWG26
AWG26	Red	B-	16		16	B-	Red	AWG26
AWG26	Blue	BK+	20		9	BK+	Blue	AWG26
AWG26	Orange	BK-	2		10	BK-	Orange	AWG26
AWG26	Gray	VCC	21		17	VCC	Gray	AWG26
AWG26	Red	GND	7		19	GND	Red	AWG26
AWG26	Brown	VPS	18		18	VPS	Brown	AWG26
AWG26	Green	LS_GND	13		20	LS_GND	Green	AWG26
-	-	-	19		22	-	-	-
AWG26	Pink	-	22		21	-	Pink	AWG26
-	-	-	23		23	-	-	-
AWG26	Black	FG	24		24	FG	Black	AWG26

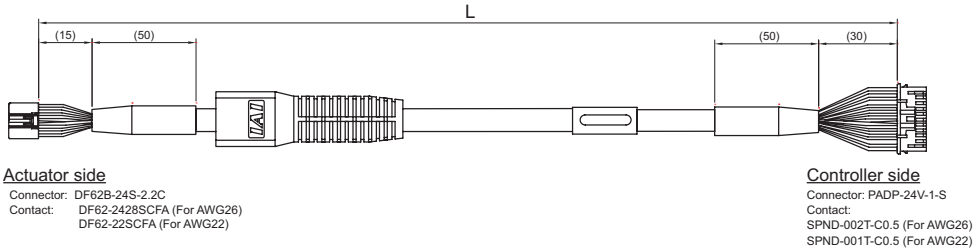
(Note) About thickness AWG22/19

The thickness is AWG22 when the cable length is 5m or less, and AWG19 when longer than 5m.

1.4.2 Motor • Encoder Integrated Cables Robot Type

CB-CAN-MPA□□□-RB

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



Connection diagram

Actuator side

Controller side

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

(Note) About thickness AWG22/19
 The thickness is AWG22 when the cable length is 5m or less, and AWG19 when longer than 5m.

2. Installation

2.1 Transportation

[1] Handling of Robot

(1) Handling of the Packed Product

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 attempt to force any part of the actuator. Take particular care not to apply pressure to the stainless steel sheet.

Supplement) For the names of each part of the actuator, refer to "Name of the Parts."

[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) How to Handle the Package

- Do not hit or drop the package. No special treatment is conducted on this package to endure a drop or impact on it.
- Do not attempt to carry a heavy package with only one worker. 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 anything on the package that could deform or damage it.

(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 tapped holes on the actuator body if necessary.
- Do not attempt to apply load on the actuators or the connector box. Also pay attention not to pinch cables and bend or deform them forcefully.

[3] Handling in Condition of being assembled in Machinery Equipment (System)

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

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

2.2 Installation and Storage • Preservation Environment

[1] Installation Environment

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

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

Also provide sufficient work space required for maintenance inspection.

- Where the actuator receives radiant heat from strong heat sources such as heat treatment furnaces
- Where the ambient temperature exceeds the range of 0 to 40°C
- Where the temperature changes rapidly and condensation occurs
- Where the relative humidity exceeds 85% RH
- Where the actuator receives direct sunlight
- Where the actuator is exposed to corrosive or combustible gases
- Where the ambient air contains a large amount of powder dust, salt or iron (at level exceeding what is normally expected in an assembly plant)
- 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 2000m

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] Storage • Preservation Environment

- The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no dew condensation forms.
- Unless specially specified, moisture absorbency protection is not included in the package when the machine is delivered. In the case that the machine is to be stored and preserved in an environment where dew condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.
- For storage and preservation temperature, the machine withstands temperatures up to 60°C for a short time, but in the case of the storage and preservation period of 1 month or more, control the temperature to 50°C or less.
- Storage and preservation should be performed in the horizontal condition. In the case it is stored in the packaged condition, follow the posture instruction if any displayed on the package.

2.3 How to Install

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


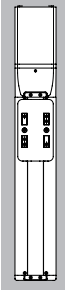
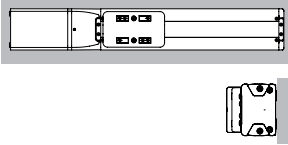
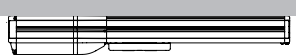
2.3.1 Installation


Follow the information below when installing the actuator, as a rule. Do pay attention to these items (except with custom-order models).

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

Model	Horizontal installation	Vertical installation	Sideways installation	Ceiling Mount installation
SA4C, SA4R, SA6C, SA6R, SA7C, SA7R	○	○	△	△

Installation Orientation

Horizontal	Vertical	Sideways	Ceiling mount
			

-  **Caution:**
- When the unit is installed vertically oriented, Motor straight type is attempt to put the motor up unless there is a special reason. Putting the motor on the lower side would not cause a problem in an ordinary operation. However, it may rarely cause a problem, when it is not operated for a long period, depending on the surrounding environment (especially high temperature), caused by the grease being separated and the base oil flowing into the motor unit.
 - 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 4.7 Procedure for Stainless Steel Sheet Replacement and 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 datum surfaces for attachment on the base.

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

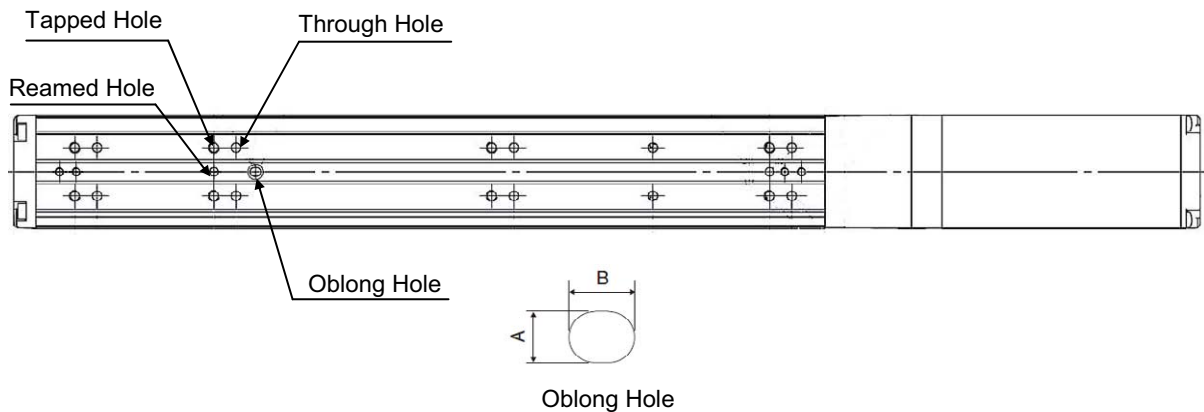
On the rear side of the actuator, there are tapped holes and through holes for attachment and reamed hole and oblong hole for positioning. See the appearance drawings for the details of the position and diameters. [Refer to 5. External Dimensions"]

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 Tapped Holes on the Bottom of the Base

This actuator has the tapped holes for mounting so it can be fixed from the bottom of the base. (Note that tapped hole size depends on the model. Please see the diagrams below and 5 "External Dimensions".)

Also, there are reamed holes and a slotted hole for positioning pins.



Model Name	Tapped Hole Size	Tapped Holes 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 (screwing depth should be 6mm max.)	3.59N•m (0.37kgf•m)	1.76N•m (0.18kgf•m)	φ3H7 Depth 4	A: $3^{+0.010}_0$ B: 4 Depth 4mm or less
SA6C SA6R	M5	Through (screwing depth should be 10mm max.)	7.27N•m (0.74kgf•m)	3.42N•m (0.35kgf•m)	φ4H7 Depth 5.5	A: $4^{+0.012}_0$ B: 5 Depth 5.5mm or less
SA7C SA7R	M5	9mm	7.27N•m (0.74kgf•m)	3.42N•m (0.35kgf•m)	φ4H7 Depth 6	A: $4^{+0.012}_0$ B: 5 Depth 6mm or less

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.



Caution: Be careful when selecting the bolt length. If bolts of inappropriate lengths are used, the tapped holes may be damaged, 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 so the unit can be attached from the top of the base. Detach the side covers on the sides when installing.

(Remove 4 attachment screws (+) with a Philips screwdriver.)

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.

Detach the motor unit once to move the slider for installation, and put the motor unit back on. [Refer to 4.8 Motor Replacement Process]

Or, connect a controller and have JOG operation to move the slider to perform installation.

Apply the socket head cap bolt indicated of the appropriate length suitable for the platform material.


Model Name	Through Hole	Mounting Bolt	Tightening Torque
SA4C SA4R	φ3.4 drilled hole, φ6.5 counter boring depth 3.5	M3	0.83N•m (0.085kgf•m)
SA6C SA6R	φ4.5 drilled hole, φ8 counter boring depth 4.5	M4	1.76N•m (0.18kgf•m)
SA7C SA7R	φ6 drilled hole, φ9.5 counter boring depth 5.5	M5	3.42N•m (0.35kgf•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.
- 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

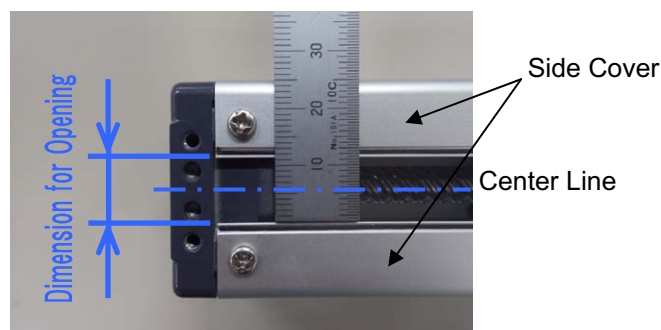
 **Caution:** Be careful when selecting the bolt length. If bolts of inappropriate lengths are used, actuator mounting strength may become insufficient, or contact with driving parts may occur, resulting in lower precision or unexpected accidents.


ⓄCaution When Attaching Side Covers

Keep the dimension shown below for the opening when attaching the side covers.

Also, have the side covers attached in symmetry to the center line.

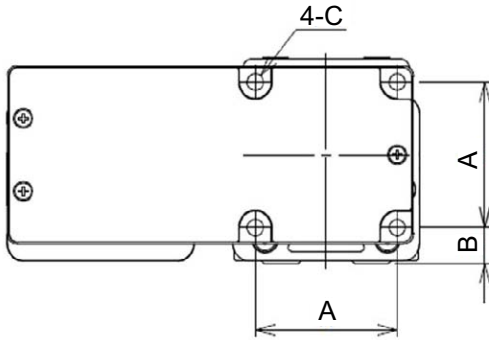
Model Name	SA4C SA4R	SA6C SA6R	SA7C SA7R
Dimension for Opening [mm]	11.4±0.4	16±0.4	24±0.4



 **Caution:** The side covers and slider may interfere if the side covers are not attached with the dimension for the opening described above, or not in symmetry.

[3] When Using Attachment Holes on Bracket in Motor Reversing Type

There are tapped holes equipped on the reversing bracket. (Refer to the table below for detailed dimensions.)



Model Name	A	B	C
SA4R	32	10	M4 Depth 9
SA6R	44	11	M6 Depth 13
SA7R	52	7	M6 Depth 13

Model Name	Attachment Hole Diameter	Attachment Hole Depth	Tightening Torque
SA4R	M4	9mm	1.76N·m (0.18kgf·m)
SA6R	M6	13mm	5.36 N·m (0.55kgf·m)
SA7R	M6	13mm	5.36 N·m (0.55kgf·m)

Tightening Screws

- Use hexagonal socket head bolts for the male threads for installing.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- Make sure to have the effective length of thread engagement at least approximately 1.8 times of the nominal diameter of bolts and screws.



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

[Caution at Pressing]

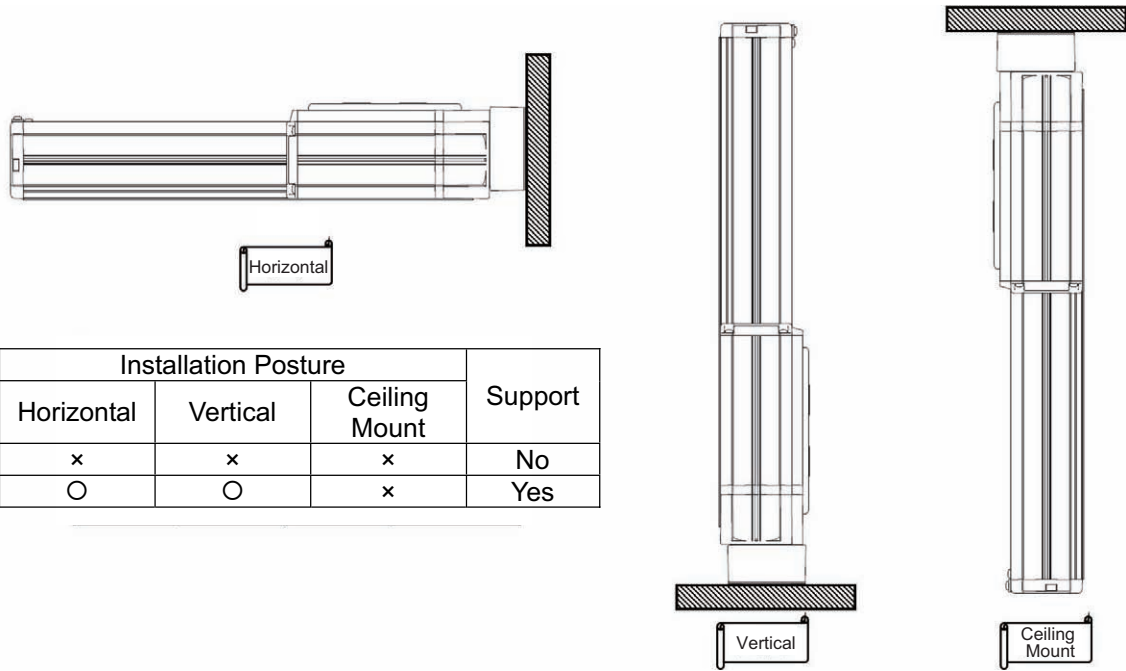
Pay attention to the following when installation is conducted with using the attachment holes on the reversing bracket.

Do not attempt to use only the attachment holes on the reversing bracket for installation.

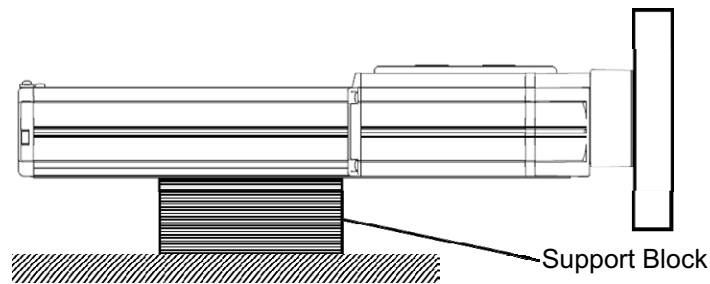
Avoid external force to be applied on the main body.

Some operational conditions and conditions of installation environment could generate vibration, which may cause operational error or parts malfunction.

Refer below for the availability of orientations for installation.

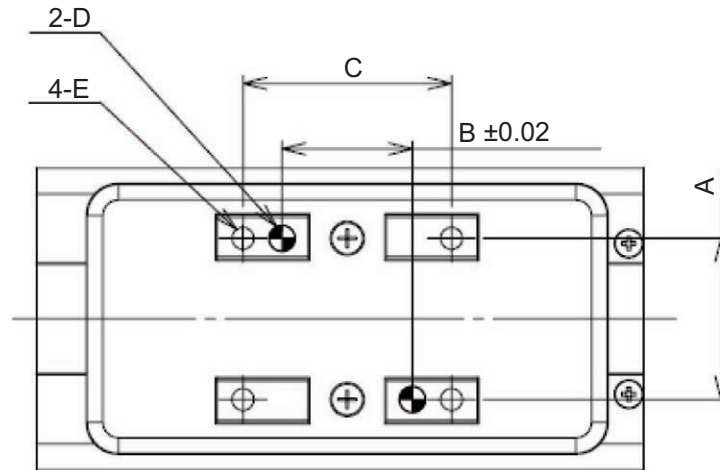


When using the product in horizontal or vertical orientation, have a support block to support the main body to avoid any external force to be applied on the body.



[4] Attachment of Transported Object

- There are tapped holes on the top surface of the slider. Affix the work part (transported object) here.
- The way to affix follows the installation of the main unit.
- There are two reamed holes on the top surface of the slider. 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 tapped hole or lower the reinforcement of the attachment of the work part, result in the drop of the accuracy or an unexpected accident.



Reamed Hole Pitch Tolerance: ± 0.02

Model Name	A	B	C	D	E	Mounting Bolt	
						Bolt Nominal Diameter	Tightening Torque
SA4C SA4R	20	24	32	$\phi 3H7$ depth 6	M3 depth 7	M3	$0.83N \cdot m (0.085Kgf \cdot m)$
SA6C SA6R	31	32	50	$\phi 5H7$ depth 6	M5 depth 10	M5	$3.42N \cdot m (0.35Kgf \cdot m)$
SA7C SA7R	39	32	50	$\phi 5H7$ depth 10	M5 depth 10	M5	$3.42N \cdot m (0.35Kgf \cdot m)$

Tightening Screws

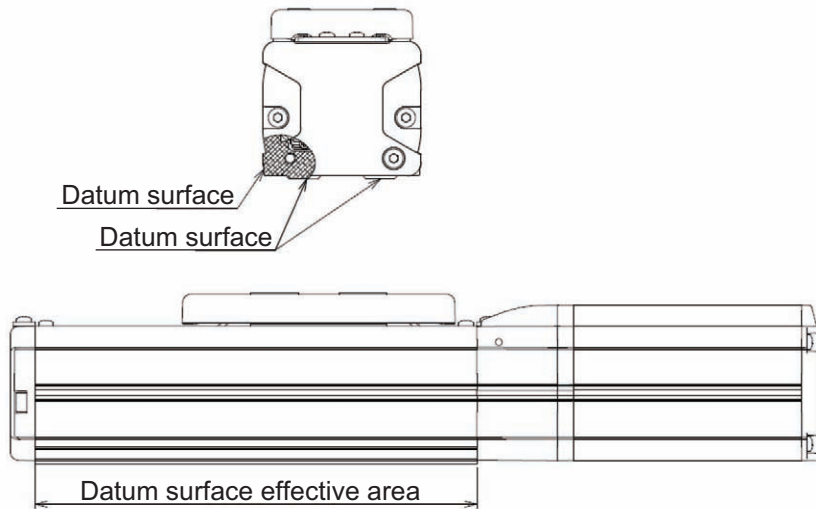
- Use hexagonal socket head bolts for the male threads for installing.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.
- Make sure to have the effective length of thread engagement at least approximately 1.8 times of the nominal diameter of bolts and screws.



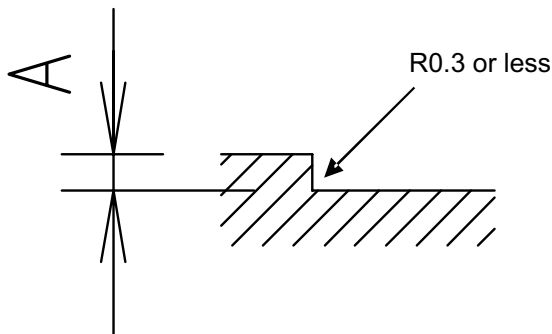
Caution: Pay attention when selecting the bolt length. Selection of inappropriate length of bolts may cause a breakage of tapped holes or insufficient strength of attachment for transportation.

[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 datum surfaces for the side of the slider.
- Use these surfaces as the datum surfaces for mounting.



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



Model Name	A Dimensions [mm]
SA4C, SA4R, SA6C, SA6R, SA7C, SA7R	2 to 4 or less

2.3.3 Vacuum of Cleanroom Type

Cleanroom type actuator realizes the performance complied with Cleanroom Class 10 (0.1 μ m) by absorbing air from the vacuum joints. In the table below, shows the amount of absorbing as a reference in the rated velocity for each model.

- Perform air absorbing from the two vacuum joint on the sides of the body with the amount of absorbing (total of 2 places) described in the table below. Also, have the pipe layout to allocate equal absorbing performance at the two joints.
- Use the system with all the attachment holes on the bottom of the body closed. The cleanliness performance will drop if a through hole exists on the body.

[Reference for Amount of Absorbing]

Model	Lead	Amount of Absorbing
	[mm]	NI/min (L/min)
RCP5CR-SA4C	2.5	10 (11)
	5	20 (22)
	10	40 (43)
	16	60 (65)
RCP5CR-SA6C	3	15 (16)
	6	30 (32)
	12	70 (76)
	20	100 (108)
RCP5CR-SA7C	4	30 (32)
	8	40 (43)
	16	70 (76)
	24	90 (97)

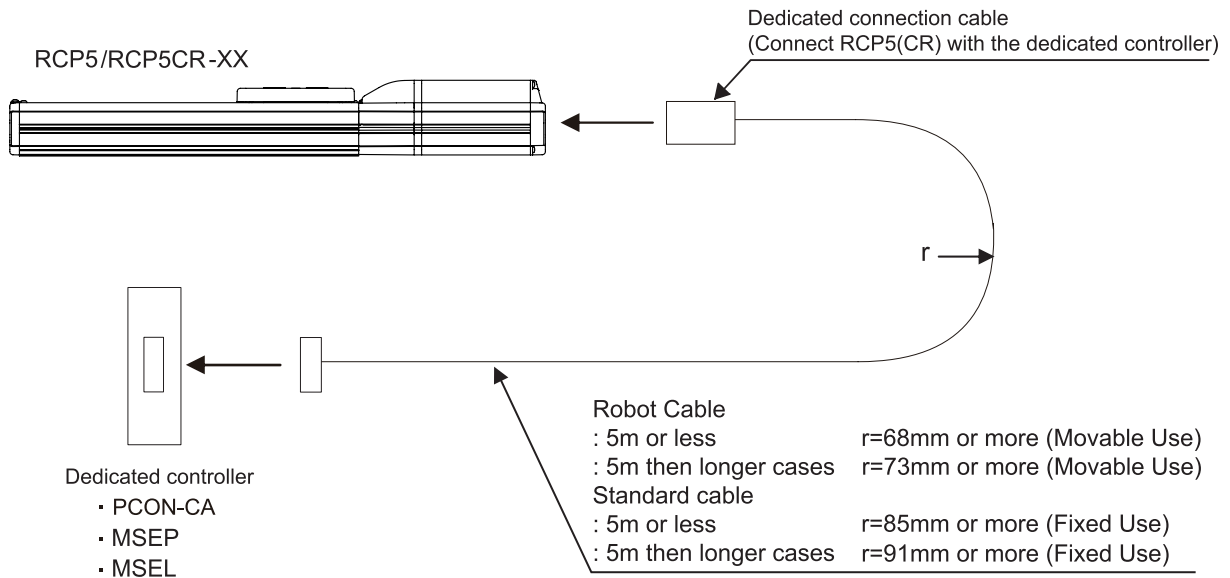
3. Connecting with the Controller

As the connection cable for the controller and RCP5/RCP5CR (this actuator), use the IAI-dedicated controller and dedicated connection cable.

This section explains the wiring method for a single axis.

- If the dedicated connection cable cannot be secured, reduce the load on the cable by allowing it to deflect only by the weight of the cable or wire it in a self-standing cable hose, etc., having a large radius.
- Do not cut and reconnect the dedicated connection cable for extension or shorten the cable.
- Do not pull on the dedicated connection cable or bend it forcibly.
- The actuator cable coming out of the motor unit is not meant to be bent. Fix the cable so it would not be bent repeatedly

Please consult with IAI if you require a different kind of cable than the one supplied.



Dedicated connection cable

- Motor • encoder integrated cables: CB-CAN-MPA□□□
- Motor • encoder integrated cables robot type: CB-CAN-MPA□□□-RB

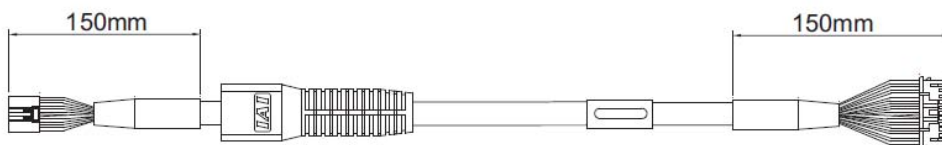
*) □□□ indicates the cable length. Up to 20m can be specified.

Example) 080 = 8m

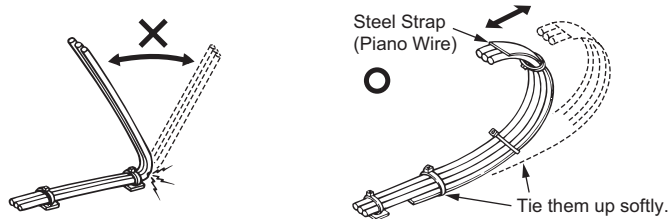


Warning: For wiring, please follow the warnings stated below. When constructing a system as the machinery equipment, pay attention to the wiring and connection of each cable so they are conducted properly. Not following them may cause not only a malfunction such as cable breakage or connection failure,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

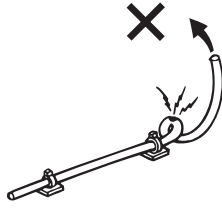
- Use dedicated cables of IAI indicated in this instruction manual. Contact us if you wish to have a change to the specifications of the dedicated cables.
- Make sure to turn the power off in the process of power line or cable connection or disconnection.
- Do not attempt to cut a dedicated cable with connectors on both ends to extend, shorten or re-joint it.
- Hold the dedicated cable to avoid mechanical force being applied to the terminals and connectors.
- Use a cable pipe or duct to have an appropriate protection when there is a possibility of mechanical damage on a dedicated cable.
- In case a dedicated cable is to be used at a moving part, make sure to lay out the cable without applying any force to pull the connector or extreme bend on the cable. Do not attempt to use the cable with a bending radius below the allowable value.
- Make certain that the connectors are plugged properly. Insufficient connection may cause an operation error, thus it is extremely risky.
- Do not lay out the cables to where the machine runs over them.
- Pay attention to the cable layout so it would not hit peripherals during an operation. In case it does, have an appropriate protection such as a cable track.
- 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.
CB-CAN-MPA□□□, CB-CAN-MPA□□□-RB
- Do not bend the cable in the area from the connector tip inward to 150mm on both ends.
Motor • Encoder Integrated Cables CB-CAN-MPA□□□
Motor • Encoder Integrated Cables Robot Type CB-CAN-MPA□□□-RB



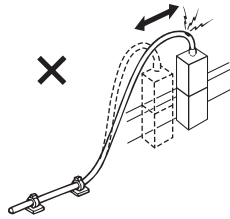
- Have a sufficient radius for bending, and avoid a bend concentrating on one point.



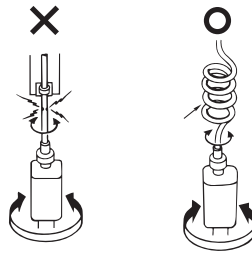
- Do not let the cable bend, kink or twist.



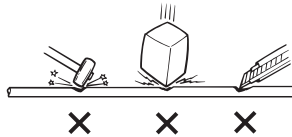
- Do not pull the cable with a strong force.



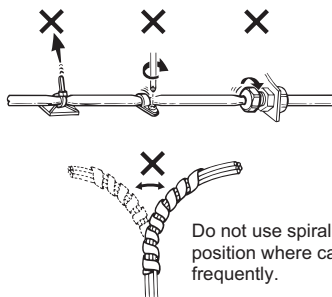
- Pay attention not to concentrate the twisting force to one point on a cable.



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

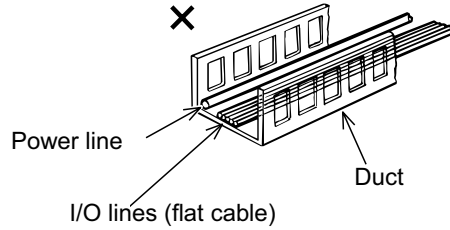


- When a cable is fastened to affix, make sure to have an appropriate force and do not tighten too much.



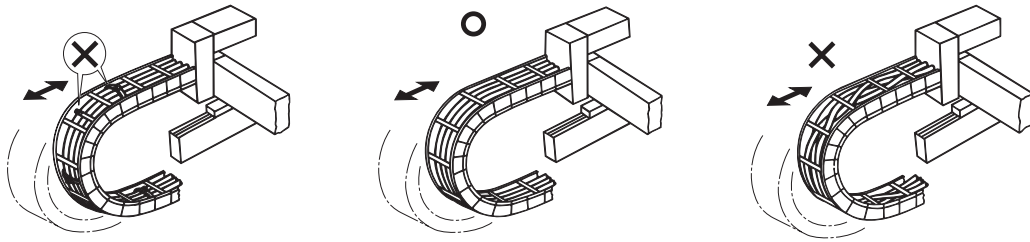
Do not use spiral tube in any position where cables are bent frequently.

- 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 track.

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



4. Maintenance and Inspection

4.1 Inspection Items and Schedule

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.

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

[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	1,250 km	12 month
750 to 1440	2,500 km	

- ⚠ Caution:**
- An actuator after 6 months of storage may have caused a degradation of the grease. Supply grease before start using. [Refer to 4.6 “Grease Supply”]
 - Degradation speed of grease may differ depending on the environment of use (temperature, humidity and ambient conditions). It is recommended to shorten the grease supply period if the actuator is used under a bad condition such as in high temperature, high humidity or in dusty ambience. Also, it is recommended to improve the environment conditions in case the grease changes its color due to the bad condition of use.

4.2 External Visual Inspection

An external visual inspection should check the following things.

Main unit	Loose actuator mounting bolts, other loose items
Cables	Scratches, proper connections
Stainless steel sheet	Scratches
Overall	Irregular noise, vibration

- As a rule of thumb, the stainless steel sheet should last for about 5000km of slider motion. However, under certain conditions, the stainless steel sheet may need to be replaced earlier. Generally, replacing the stainless steel sheet will require that you bring the unit to our plant or have one of our technicians come to your plant to perform the replacement.
- If the actuator is installed vertically, certain conditions may cause grease to drip from the guide. Please ensure that proper cleaning is performed and grease is replenished.

4.3 Cleaning

- Clean exterior surfaces as necessary.
- Use a soft cloth to wipe away dirt and buildup.
- 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 Internal Inspections

Turn OFF the power, remove the side cover and have a visual inspection. When inspecting the interior, check the following items.

Main unit	Loose mounting bolts, other loose items
Guide section	Lubrication, buildup

Visually inspect the interior of the equipment. Check whether dust or other foreign matter has gotten inside and check the lubrication state.

The lubrication may have turned brown. This is not a problem as long as the travel surfaces shine as though they are wet.

If the grease is mixed with dust and does not have a shiny appearance, or if the grease has lost its efficacy due to prolonged use, then clean each section and reapply grease.

The procedure for internal inspections is outlined below.

- 1) Loosen the screws on the side cover and detach the side cover.
- 2) Check inside.
- 3) After finishing the inspection, assemble back in the reverse order.
 If you touch the edge of the stainless steel sheet in the attaching the side cover process, the sheet may get damaged or wavy which result in shortening life or earlier wear-out.
 To avoid touching the edge of the sheet, insert a spacer (approximately 0.1 to 0.2mm) between the sheet and cover to push up the sheet, and then push in the cover.
 Also, make sure to follow the notice of caution when attaching side covers described in the next page when side covers are attached.

When affixing the side cover, tighten the screws with the tightening torque described below.

Model Name	Screw Diameter	Tightening Torque
SA4C, SA4R, SA6C, SA6R, SA7C, SA7R	M3	41.4N•cm

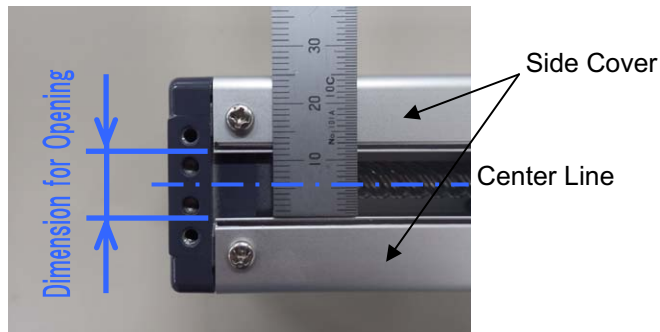


Caution: When checking inside the equipment, be careful not to forcibly bend the stainless steel sheet or scratch it.
 Do not tug on the stainless steel sheet or in any way attempt to reposition it.
 Change in the attached condition may cause the sheet to be mounted unevenly or impact the product life. In such cases, please contact IAI Sales Engineer Department.
 Keep in mind that the edges of the stainless steel sheet can cause injuries. Always wear gloves when working on it.

Ⓞ Caution When Attaching Side Covers

Keep the dimension shown below for the opening when attaching the side covers.
Also, have the side covers attached in symmetry to the center line.

Model Name	SA4C SA4R	SA6C SA6R	SA7C SA7R
Dimension for Opening [mm]	11.4±0.4	16±0.4	24±0.4



Caution: The side covers and slider may interfere if the side covers are not attached with the dimension for the opening described above, or not in symmetry.

4.5 Internal Cleaning

- Use a soft cloth to wipe away dirt and buildup.
- 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.

4.6 Grease Supply


4.6.1 What Grease to Use

[1] Standard Type

IAI uses the following grease in our plant.

Guide and Ball Screw	Kyodo Yushi	Multitemp LRL 3
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Other companies also sell similar types of grease. For more detailed information, ask the supplier to find an equivalent for you by telling them the name of the grease.

 **Warning:** Never use any fluorine-based grease. Mixing with lithium-based grease with other grease not only reduces the performance of the grease, it may even cause damage to the actuator.

[2] Cleanroom Type

On the cleanroom type, the urea based grease that has great low particle-emission, stable torque characteristics, brilliant lubrication and anti-dust effect equivalent to the lithium based grease is applied. IAI uses the following grease in our plant.

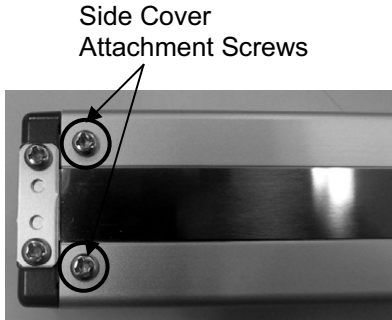
Guide and Ball Screw	Kuroda Precision Industries	C Grease
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 **Warning:**

- Apply low particle-emission grease on Cleanroom Type Actuator. Particles may be generated if standard grease is applied.
- Do not attempt to apply fluorine and lithium grease. Mixing with urea based grease may lose the lubrication performance the grease originally has, which may result in such cases as damaging the mechanical parts or causing a drop in the cleanliness characteristics.

4.6.2 How to Apply Grease

- 1) Remove the screw and detach the side cover on either side, right or left.
The grease nipple will appear.
When the side cover on the other side has been detached, the other grease nipple also appears.



Opposite Side of the Motor



Motor Side

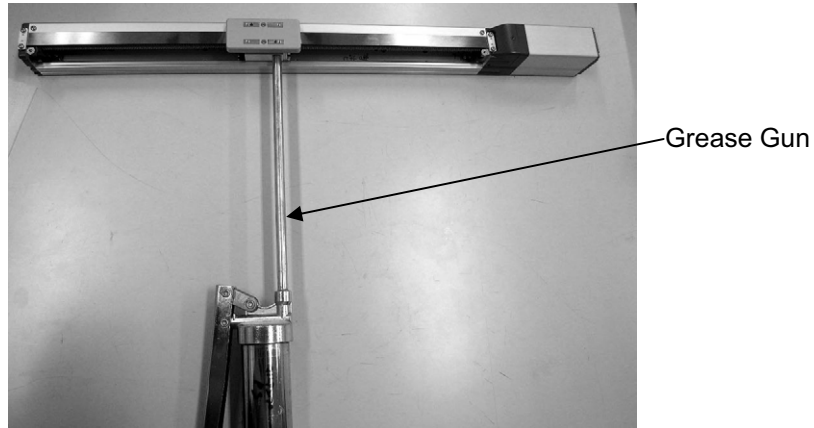


After removal of the side cover on either side



Grease Nipple
There is one on the other side.

- 2) Supply grease from the grease nipple on either side, using the grease gun.
Wipe off the grease before supplying new in case it is extremely dirty.
(Note) Grease can also be applied from the grease nipple on the other side.
When grease is applied from the grease nipple on either side, grease is supplied to the ball screw and the guides on both sides.



(Note) Make sure to use a grease gun that is applicable for the grease nipple inlet diameter shown below.

Grease Nipple Diameter
$\phi 3.5$

Recommended Grease Gun	Nozzle	Supplier
HGP	NZ3	NSK

Model Name	Amount of Grease Supply (Reference)
SA4	0.5cc to 1.0cc
SA6, SA7	1.5cc to 2.0cc

Move the slider back and forth in the stroke range after supplying grease so it spreads out evenly in the area.

- Confirm that the ball tracks on the ball screw and guide look glossy with oil of grease. Supply grease again if it is not spread enough.
- Wipe off excess grease.



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.

- 3) Attach the side covers after grease supply is finished.
 If you touch the edge of the stainless steel sheet in the attaching process, the sheet may get damaged or wavy which result in shortening life or earlier wear-out.
 To avoid touching the edge of the sheet, insert a spacer (approximately 0.1 to 0.2mm) between the sheet and cover to push up the sheet, and then push in the cover.
 Also, make sure to follow the notice of caution when attaching side covers described in the next page when side covers are attached.

When affixing the side cover, tighten the screws with the tightening torque described below.

Model Name	Screw Diameter	Tightening Torque
SA4C, SA4R, SA6C, SA6R, SA7C, SA7R	M3	41.4N•cm

⚠ Caution:

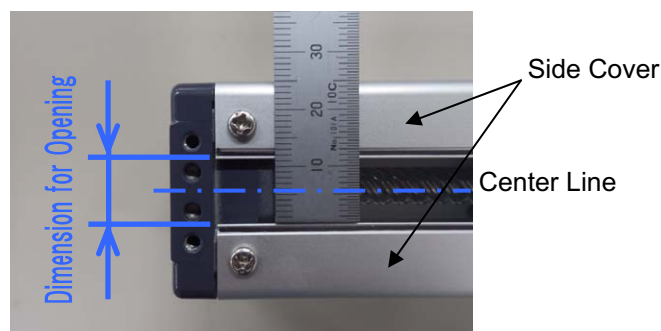
- Do not damage the stainless steel sheet by bending it forcefully during work. Also you may get hurt on the edge of the stainless steel sheet. Wear gloves when you work on it.
- The front bracket is supporting the ball screw. Do not detach it. If the front bracket loses its tuned condition, it may cause 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, 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.

Ⓢ Caution When Attaching Side Covers

Keep the dimension shown below for the opening when attaching the side covers. Also, have the side covers attached in symmetry to the center line.

Model Name	SA4C SA4R	SA6C SA6R	SA7C SA7R
Dimension for Opening [mm]	11.4±0.4	16±0.4	24±0.4



⚠ Caution: The side covers and slider may interfere if the side covers are not attached with the dimension for the opening described above, or not in symmetry.

4.7 Procedure for Stainless Steel Sheet Replacement and Adjustment

In this section, explains how to replace and adjust the stainless steel sheet.
The stainless steel sheet can be changed without removing the side cover.

4.7.1 Preparation

(1) Items required for replacing the stainless steel sheet

- Replacement stainless steel sheet
- Phillips screwdriver
- Adhesive tape

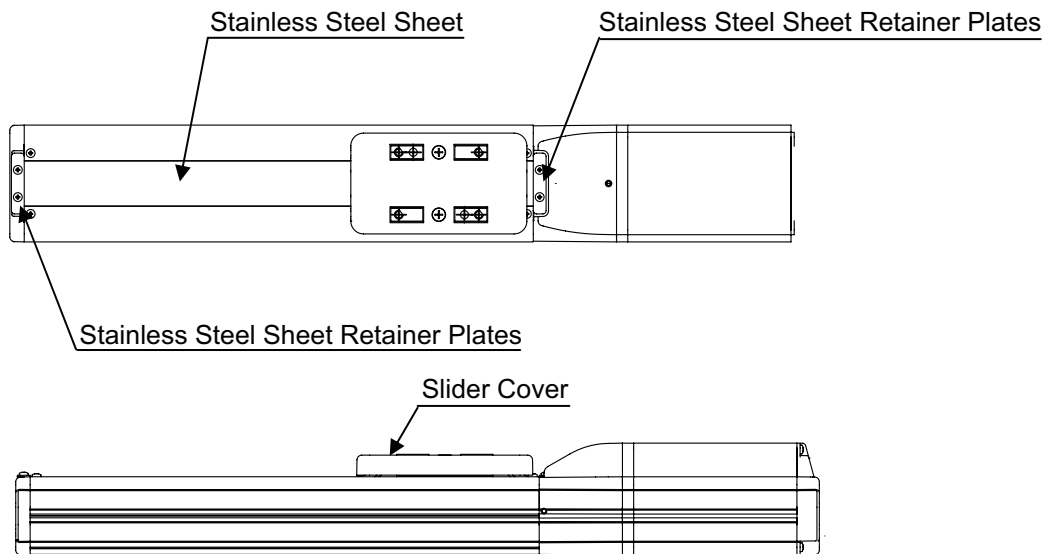
(2) Caution for the stainless steel sheet tension

Degradation and wear-out of the stainless steel sheet relies on its tension of attachment.

If the stainless steel sheet is pulled with a huge force and the gap between the sheet and the slider cover is large, there is a risk of metal fatigue.

On the other hand, if the tensile strength is too low, the stainless steel sheet would interfere with the back side of the slider cover and make dust to be generated.

(3) Names of the Parts



4.7.2 Procedure for Replacement and Tuning

Have a replacement and tuning in (1) Procedure 1 for RCP5-SA4.

For other models, have a replacement and tuning in either (1) Procedure 1 or (2) Procedure 2.

(1) Procedure 1

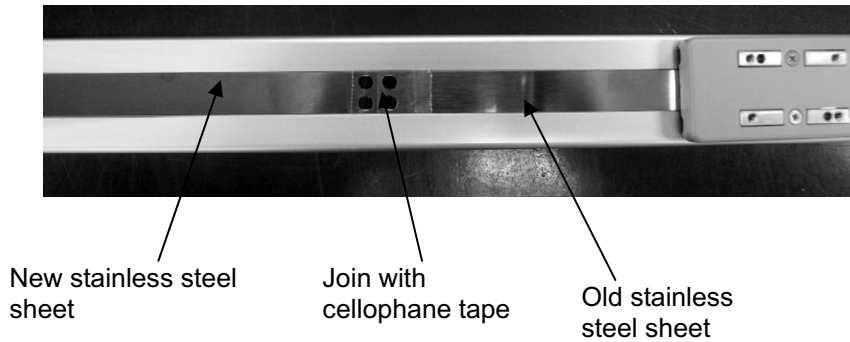
- 1) Remove the screws (4 places) holding the stainless steel sheet and stainless steel sheet retainer plates (2 pieces) with using a Phillips screwdriver.
- 2) Pull the old stainless steel sheet till in front of the slider. Make sure not to pull it out completely off the slider.



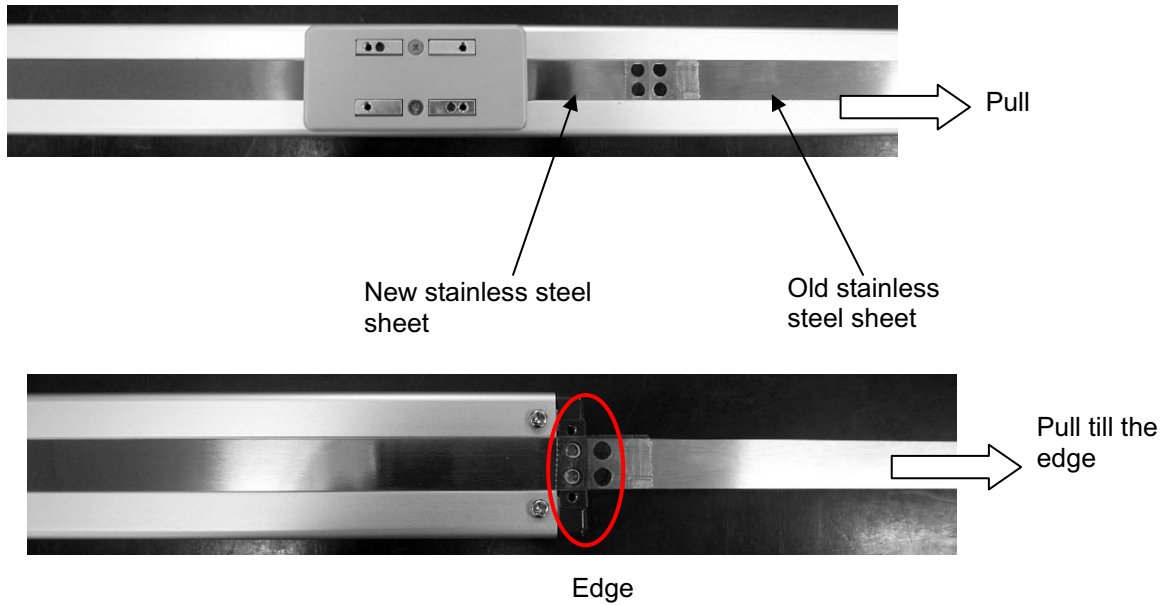
Pull it till in front of the slider.

In front of Slider

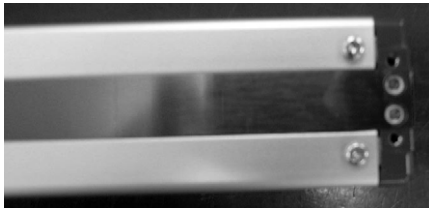
- 3) Join a new stainless steel sheet to the old one with using cellophane tape.



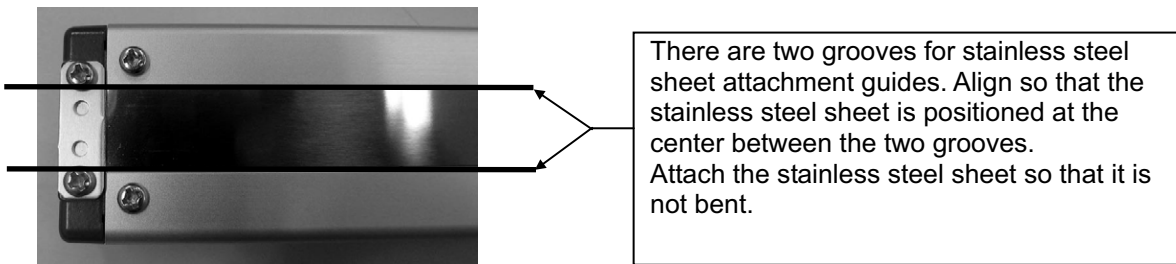
- 4) Pull the old stainless steel sheet so the new one goes through below the slider. Pull it till the new stainless steel sheet comes to the edge of the actuator.



- 5) Remove the old stainless steel sheet.



- 6) Fix the two stainless steel sheet retainer plates using the screws (four locations). Use a Phillips screwdriver to attach it.

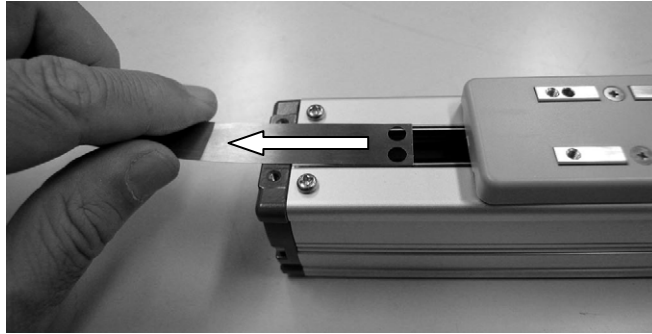


Tightening Torque
41.4N•cm

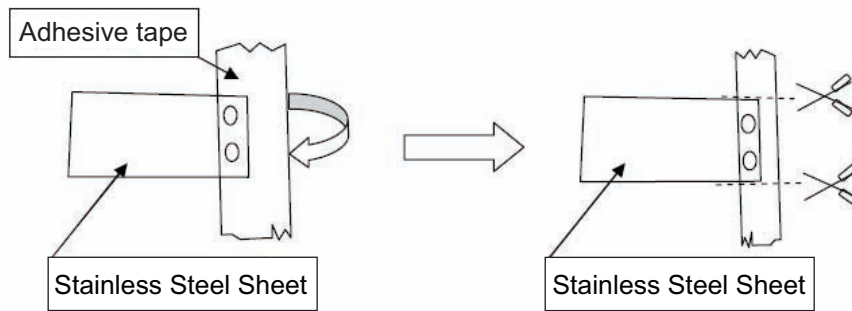
- 7) After the stainless steel sheet retainer plates have been fixed, move the slider from one side to the other side (full stroke) with your hand to check that there is no rise or slackness in the stainless steel sheet. If there is any problem, repeat from step 6).

(1) Procedure 2

- 1) Remove the screws (four locations) fixing the stainless steel sheet using a Phillips screwdriver and remove the stainless steel sheet retainer plates (two plates).
- 2) Pull out the old stainless steel sheet.

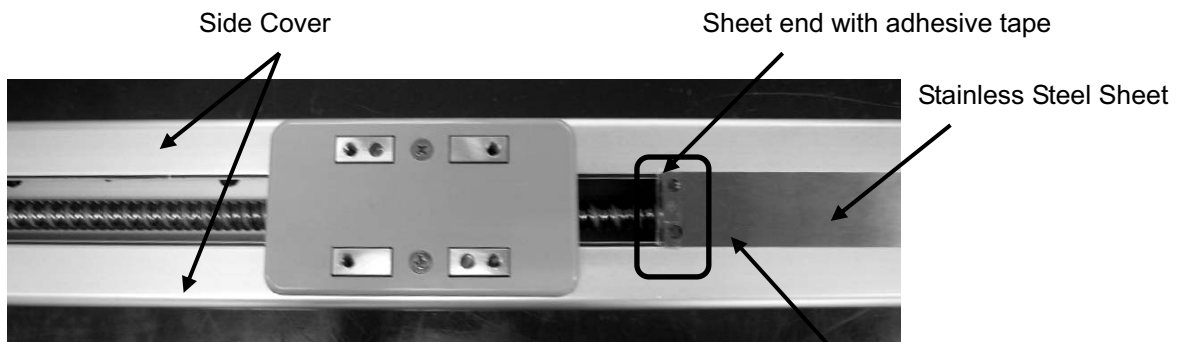


- 3) Attach adhesive tape on one side of new stainless steel sheet.



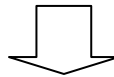
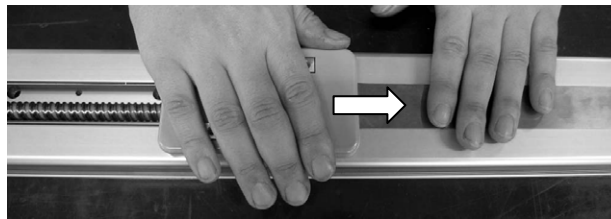
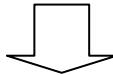
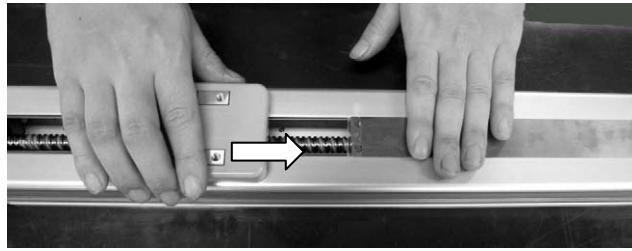
Attach adhesive tape so that it wraps around the end side of the stainless steel sheet. At that time, arrange it so that about 3mm of the end of the tape projects from the stainless steel sheet. Cut any tape excess.

- 4) Put the stainless steel sheet with an adhesive tape on the side cover.

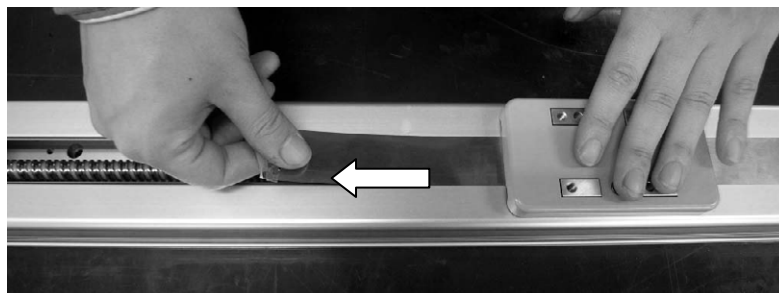


Take care not to drop the stainless steel sheet into the hole.

- 5) With the stainless steel sheet being held, move the slider to put through the stainless steel sheet.



- 6) After the stainless steel sheet passes through the slider, pull one end of the stainless steel sheet out to the position of the stainless steel retainer plate. Take off the adhesive tape once positioning is finished.



- 7) Fix the two stainless steel sheet retainer plates using the screws (four locations). Use a Phillips screwdriver to attach it.



There are two grooves for stainless steel sheet attachment guides. Align so that the stainless steel sheet is positioned at the center between the two grooves. Attach the stainless steel sheet so that it is not bent.

Tightening Torque
41.4N•cm

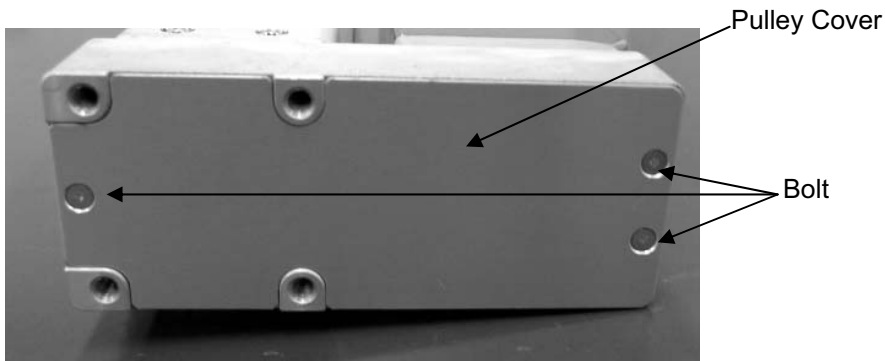
- 8) After the stainless steel sheet retainer plates have been fixed, move the slider from one side to the other side (full stroke) with your hand to check that there is no rise or slackness in the stainless steel sheet. If there is any problem, repeat from step 7).

4.8 Procedure for Belt Replacement and Tuning

Application : RCP4-SA4R, SA6R, SA7R

4.8.1 Inspection of the Belt

For inspection work, detach the pulley cover with phillips screwdriver and carry it out by visual.



The period of replacement for the deceleration belt cannot be clearly defined as the durability of it is impacted so much by the operational conditions.

In generally speaking, it possesses bending life of several million times.

The timing belt gets worn away as the time passes, and it is necessary to have replacement at regular intervals with the following conditions as reference.

- When the gear and belt area show obvious friction.
- When swelling occurs as a result of oil adhesion.
- When damages such as a crack occurs on the belt gear and back side.

Also, for the toothed belt, it is recommended to set the interval of regular replacement cycle when in use under high wire fatigue condition in high acceleration and deceleration because it is difficult to judge the right timing for replacement by checking appearance or looseness of the wires strengthening the belt.

4.8.2 Belt to Use

IAI uses the following belt in our plant

SA4R	• 60S2M168R	Rubber	STS Clean type (Bando Chemical Industries, Ltd.)
SA6R	• 60S2M208R	Rubbe	STS Clean type (Bando Chemical Industries, Ltd.)
SA7R	• 100S3M243R	Rubber	STS Clean type (Bando Chemical Industries, Ltd.)

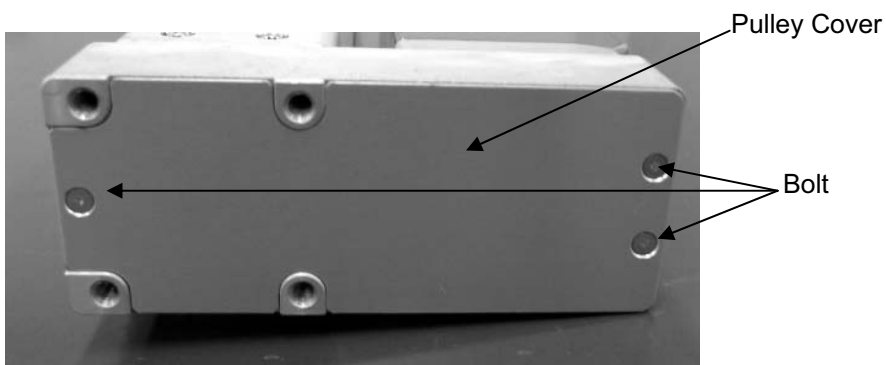
4.8.3 Belt Replacement

[Items required for replacing the motor]

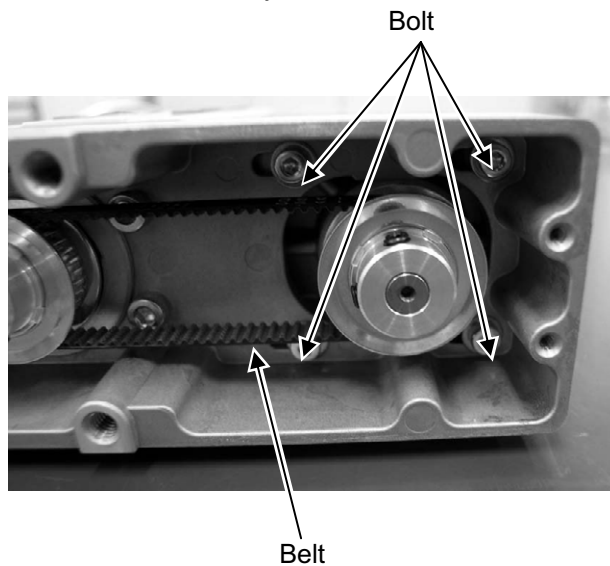
- Belt for Replacement
- Phillips Screwdriver
- Hexagon Wrench 2.5mm(SA4R/SA6R) or 3mm(SA7R)
- Tension Gauge (that is available for pulling with 80N)
- Long Tie-Band (thin string)

[Procedure]

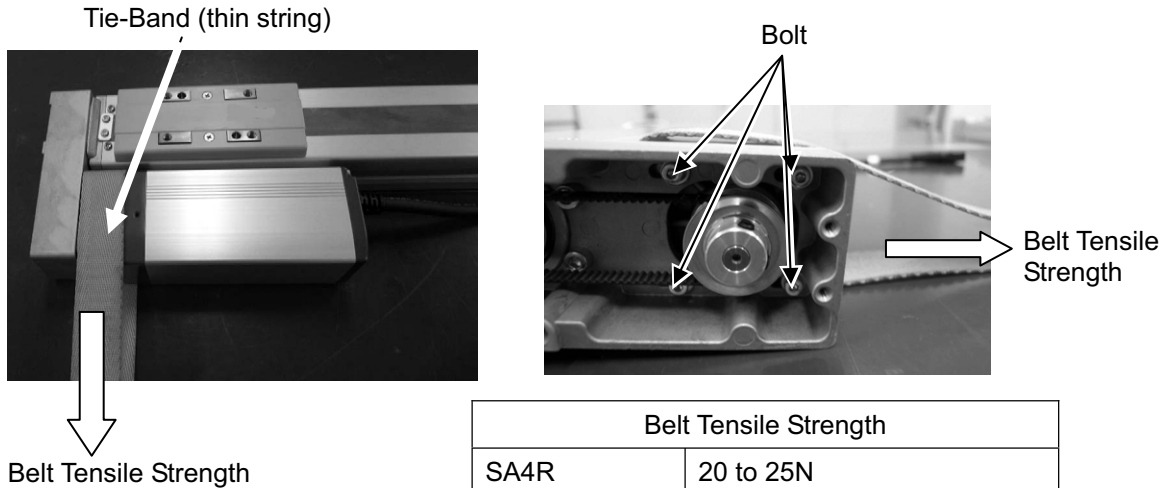
- 1) Remove the three bolts holding the pulley cover with a Phillips screwdriver, and detach the pulley cover.



- 2) Loosen the four bolts holding the pulley on the motor side with a 2.5mm-sized (for SA4R/SA6R) or 3mm-sized (for SA7R) hex wrench. Replace the belt if it is necessary.

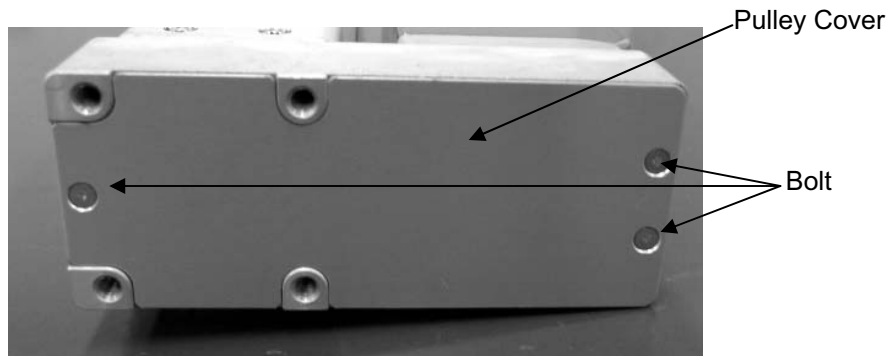


- 3) Adjust the belt tension.
 Hang a tie-band (thin string) on the end of the motor unit and pull it in specified load (specified tensile strength) with a tension gauge.
 Once the load reached the specified, tighten the bolts with a 2.5 mm-sized (for SA4R/SA6R) or 3mm-sized (for SA7R) hex wrench to affix.



Belt Tensile Strength	
SA4R	20 to 25N
SA6R	25 to 30N
SA7R	80 to 90N
SA4R, SA6R	Tightening Torque : 152N•cm
SA7R	Tightening Torque : 323N•cm

- 4) Tighten the three bolts holding the pulley cover with a Phillips screwdriver to attach the pulley cover.



Model Name	Tightening Torque
SA4R, SA6R	43.1N•cm
SA7R	76.8N•cm

4.9 Motor Replacement Process

4.9.1 SA4C, SA6C, SA7C

[Items required for replacing the motor]

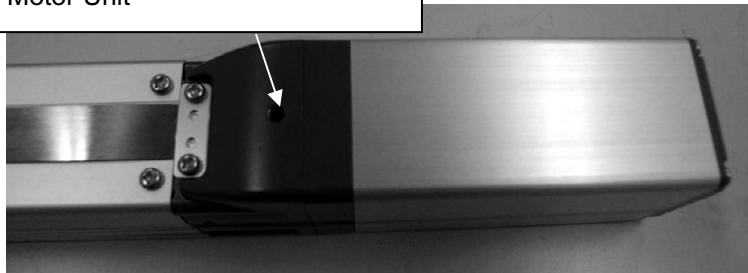
- Motor Unit for Replacement
- Hex wrench set 2mm-sized or 2.5mm-sized



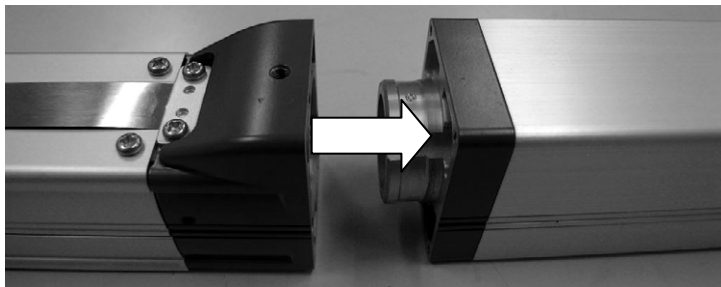
[Procedure]

- 1) Remove the screw affixing the actuator and the motor unit with a 2mm-sized (SA4C, SA6C), 2.5mm-sized (SA7C) hex wrench.

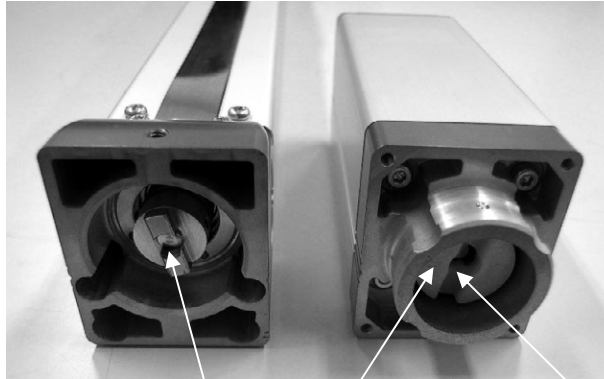
For Fixed screws actuator and Motor Unit



- 2) Detach the motor unit.



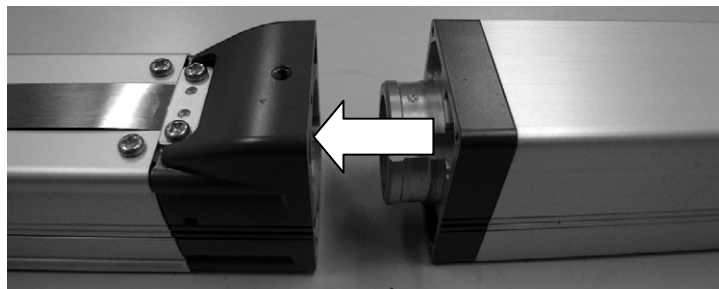
- 3) Make the profiles on the actuator side and motor unit side aligned so the projection matches to the slit.



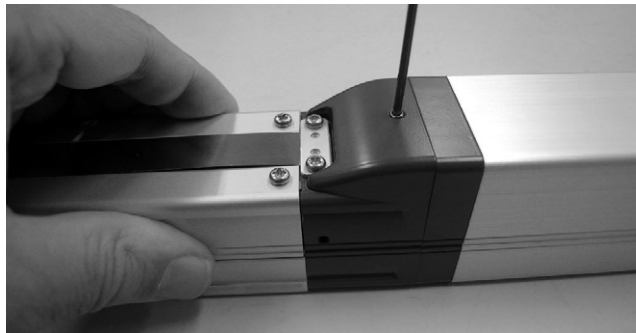
Make the projection and slit matched with each other.

Apply grease to the coupling part. NOXLUB TL1010 grease made by NOK

- 4) Attach the motor unit for replacement with the projection being matched with the slit.



- 5) Tighten the fixing screw to affixing the motor unit to the actuator with a 2mm-sized (SA4C, SA6C), 2.5mm-sized (SA7C) hex wrench.



Model Name	Tightening Torque
SA4C, SA6C	167N•cm
SA7C	353N•cm

- 6) For Battery-less Absolute Type (Model Code WA), make sure to have a home-return operation on the PC or touch panel teaching after the motor replacement.

4.9.2 SA4R, SA6R, SA7R

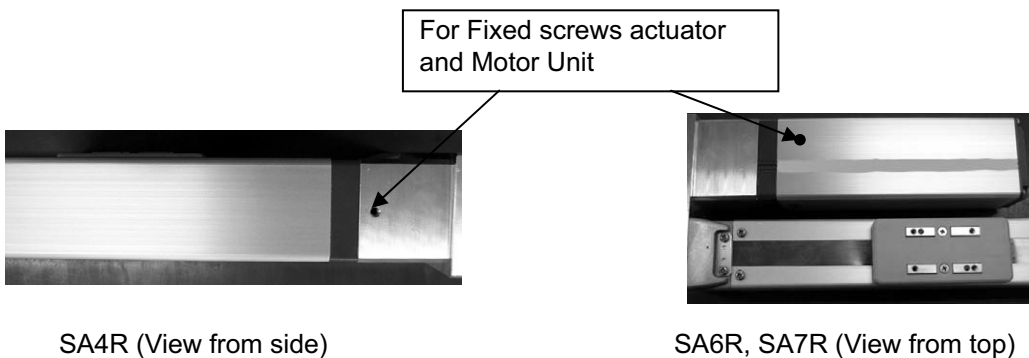
[Items required for replacing the motor]

- Motor Unit for Replacement
- Hexagon Wrench Set 2mm-sized
2.5mm-sized

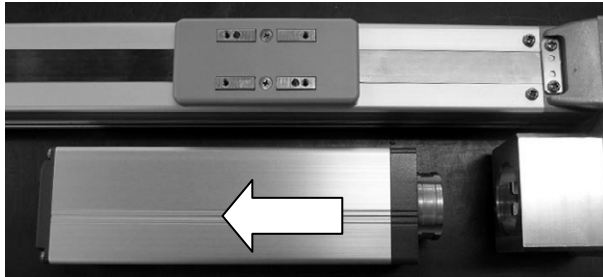


[Procedure]

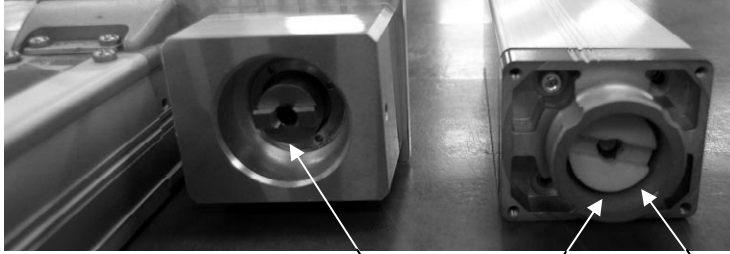
- 1) Remove the screw affixing the actuator and the motor unit with a 2mm-sized (SA4R, SA6R), 2.5mm-sized (SA7R) hex wrench.
SA4R fixing screw to affixing is side, SA6R, SA7R fixing screw to affixing is top.



- 2) Detach the motor unit.



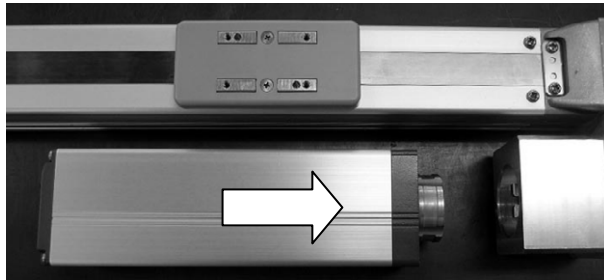
- 3) Make the profiles on the actuator side and motor unit side aligned so the projection matches to the slit.



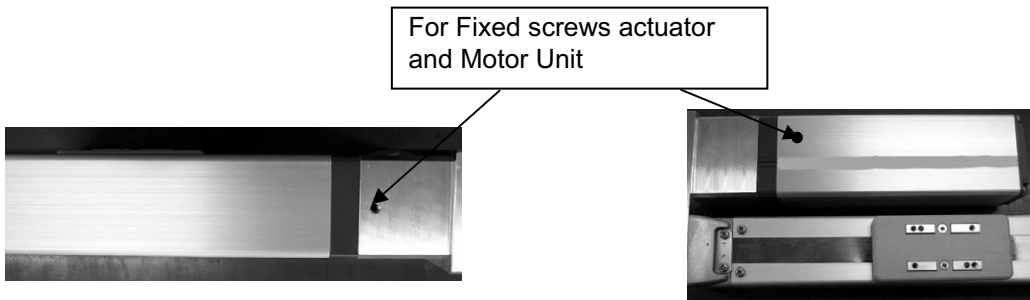
Make the projection and slit matched with each other.

Apply grease to the coupling part.
NOXLUB TL1010 grease made by NOK

- 4) Attach the motor unit for replacement with the projection being matched with the slit.



- 5) Tighten fixing screw to affixing the motor unit to the actuator with a 2mm-sized (SA4R, SA6R), 2.5mm-sized (SA7R) hex wrench.



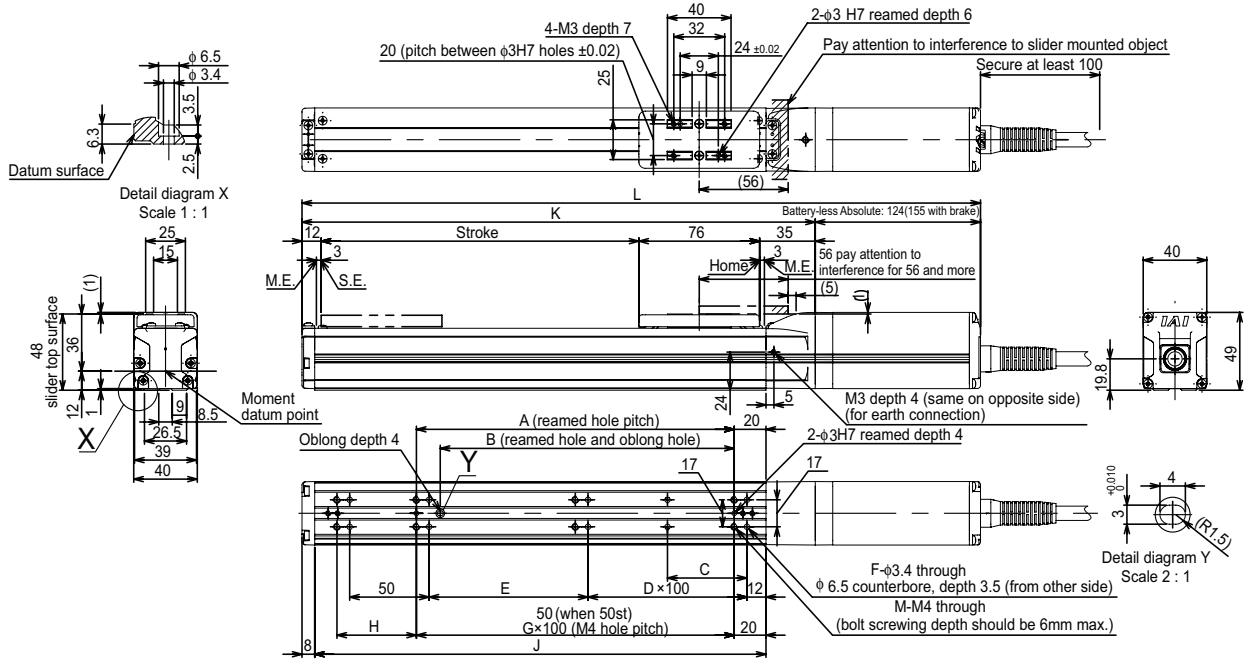
SA4R (View from side)

SA6R, SA7R (View from top)

Model Name	Tightening Torque
SA4R, SA6R	167N•cm
SA7R	353N•cm

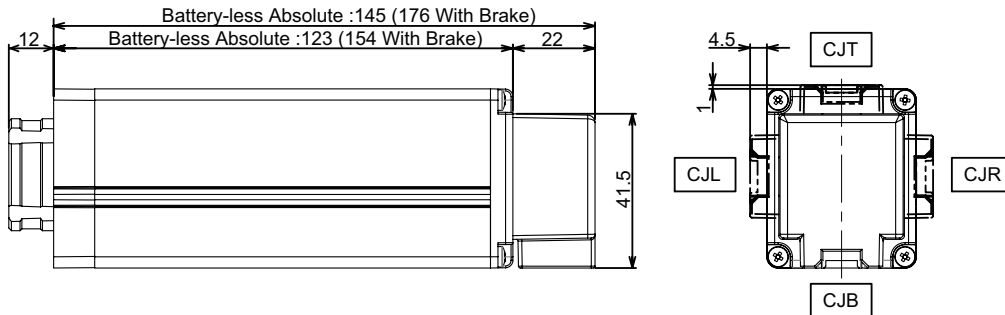
5. External Dimensions

5.1 RCP5-SA4C



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

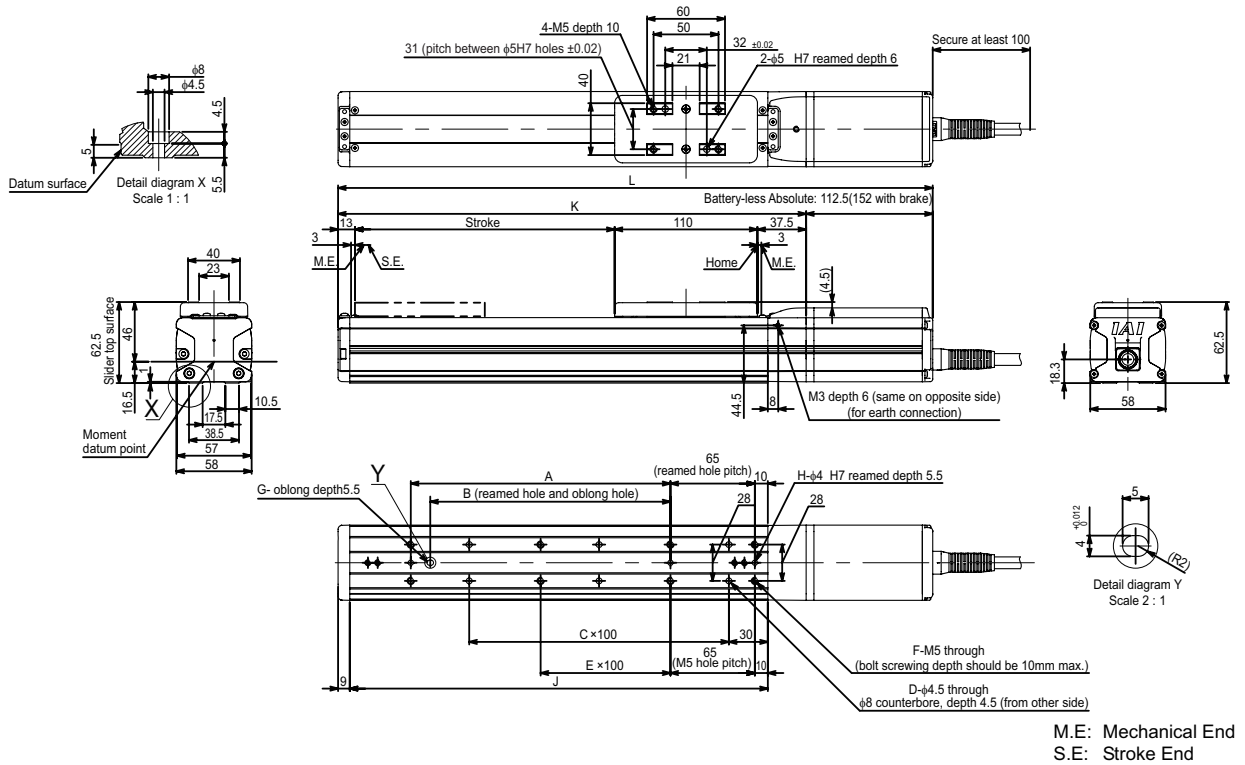
Cable eject direction changed (Option)



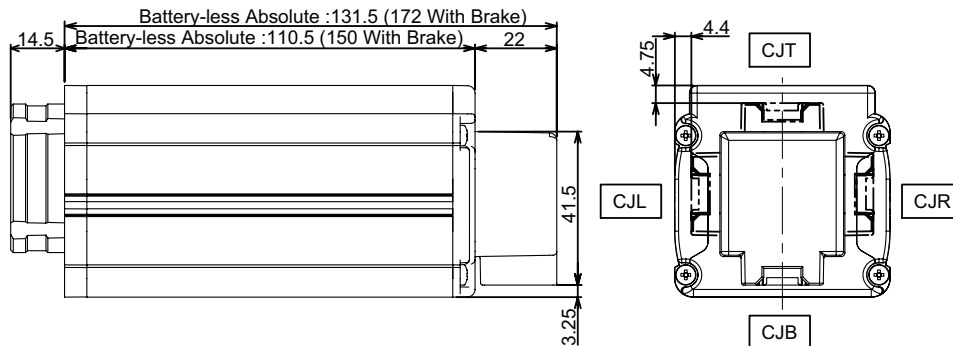
Stroke	L (Battery-less Absolute)		A	B	C	D	E	F	G	H	J	K	M	Mass [kg]	
	w/o Brake	With Brake												w/o Brake	With Brake
50	297	328	50	35	25	0	50	8	—	50	134	173	6	1.0	1.2
100	347	378	100	85	50	0	100	8	1	50	184	223	6	1.1	1.3
150	397	428	100	85	50	1	50	10	1	100	234	273	6	1.2	1.4
200	447	478	200	185	50	1	100	10	2	50	284	323	8	1.3	1.5
250	497	528	200	185	50	2	50	12	2	100	334	373	8	1.3	1.5
300	547	578	300	285	50	2	100	12	3	50	384	423	10	1.4	1.6
350	597	628	300	285	50	3	50	14	3	100	434	473	10	1.5	1.7
400	647	678	400	385	50	3	100	14	4	50	484	523	12	1.6	1.8
450	697	728	400	385	50	4	50	16	4	100	534	573	12	1.7	1.9
500	747	778	500	485	50	4	100	16	5	50	584	623	14	1.8	2.0

(Note) L dimensions described in the table are those with no cable ejection direction (option).
For cable ejection direction types (option), the dimensions are longer in 21mm.

5.2 RCP5-SA6C



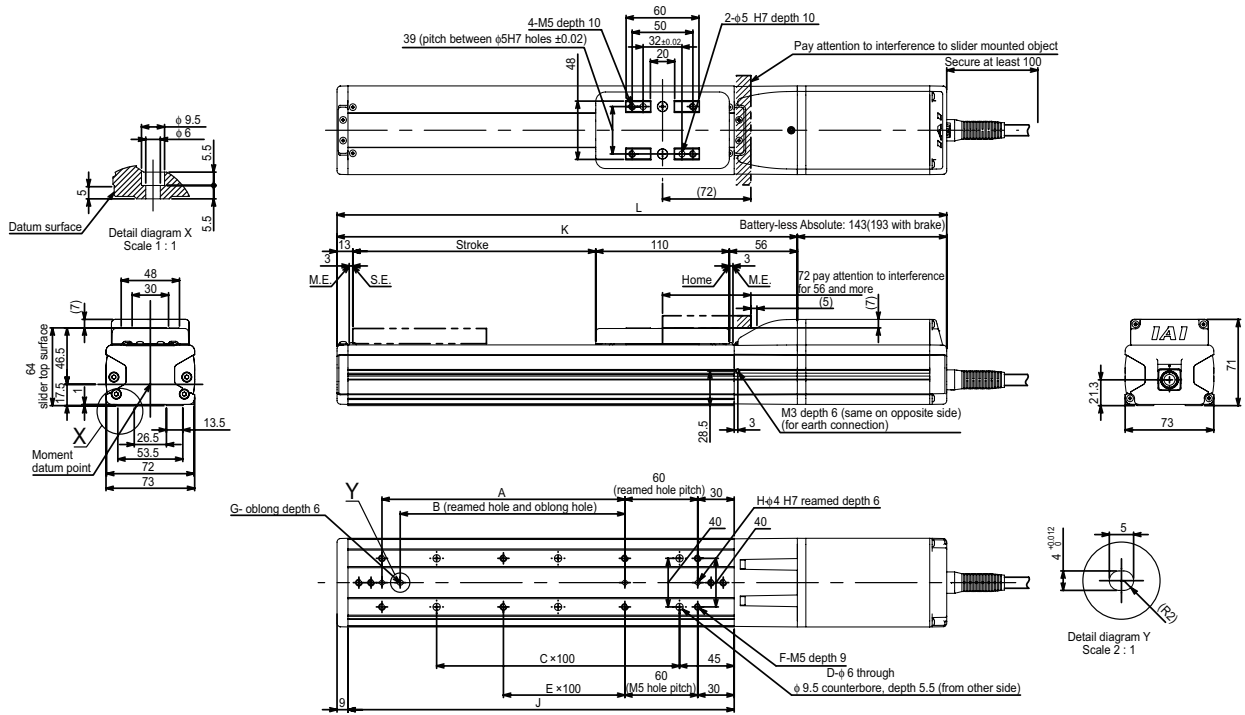
Cable eject direction changed (Option)



Stroke	L(Battery-less Absolute)		A	B	C	D	E	F	G	H	J	K	Mass [kg]	
	w/o Brake	With Brake											w/o Brake	With Brake
50	323	362.5	0	0	1	4	0	4	0	2	172	210.5	1.7	1.9
100	373	412.5	100	85	1	4	0	6	1	3	222	260.5	1.8	2.0
150	423	462.5	100	85	2	6	0	6	1	3	272	310.5	2.0	2.2
200	473	512.5	200	185	2	6	1	8	1	3	322	360.5	2.2	2.4
250	523	562.5	200	185	3	8	1	8	1	3	372	410.5	2.4	2.6
300	573	612.5	300	285	3	8	2	10	1	3	422	460.5	2.5	2.7
350	623	662.5	300	285	4	10	2	10	1	3	472	510.5	2.7	2.9
400	673	712.5	400	385	4	10	3	12	1	3	522	560.5	2.9	3.1
450	723	762.5	400	385	5	12	3	12	1	3	572	610.5	3.1	3.3
500	773	812.5	500	485	5	12	4	14	1	3	622	660.5	3.2	3.4
550	823	862.5	500	485	6	14	4	14	1	3	672	710.5	3.4	3.6
600	873	912.5	600	585	6	14	5	16	1	3	722	760.5	3.6	3.8
650	923	962.5	600	585	7	16	5	16	1	3	772	810.5	3.8	4.0
700	973	1012.5	700	685	7	16	6	18	1	3	822	860.5	3.9	4.1
750	1023	1062.5	700	685	8	18	6	18	1	3	872	910.5	4.1	4.3
800	1073	1112.5	800	785	8	18	7	20	1	3	922	960.5	4.3	4.5

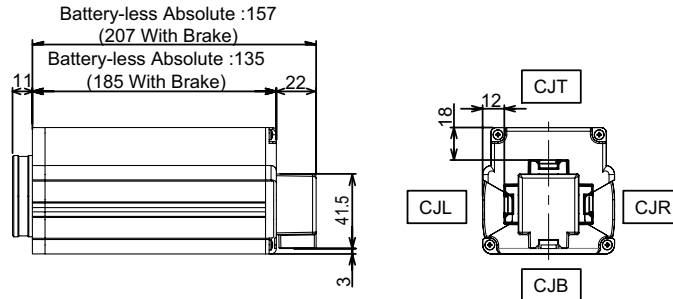
(Note) L dimensions described in the table are those with no cable ejection direction (option).
For cable ejection direction types (option), the dimensions are longer in 20mm.

5.3 RCP5-SA7C



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

Cable eject direction changed (Option)

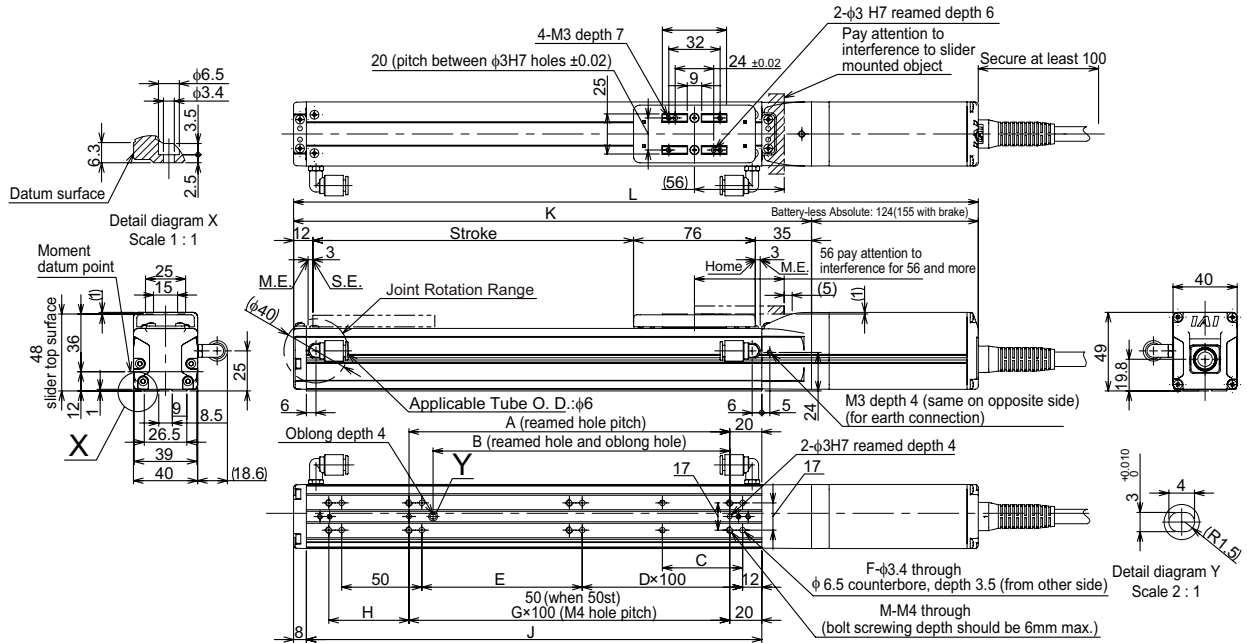


Stroke	L(Battery-less Absolute)		A	B	C	D	E	F	G	H	J	K	Mass [kg]	
	w/o Brake	With Brake											w/o Brake	With Brake
50	372	422	0	0	1	4	0	4	0	2	168	229	3.0	3.5
100	422	472	100	85	1	4	0	6	1	3	218	279	3.2	3.7
150	472	522	100	85	2	6	0	6	1	3	268	329	3.5	4.0
200	522	572	200	185	2	6	1	8	1	3	318	379	3.7	4.2
250	572	622	200	185	3	8	1	8	1	3	368	429	3.9	4.4
300	622	672	300	285	3	8	2	10	1	3	418	479	4.1	4.6
350	672	722	300	285	4	10	2	10	1	3	468	529	4.4	4.9
400	722	772	400	385	4	10	3	12	1	3	518	579	4.6	5.1
450	772	822	400	385	5	12	3	12	1	3	568	629	4.8	5.3
500	822	872	500	485	5	12	4	14	1	3	618	679	5.0	5.5
550	872	922	500	485	6	14	4	14	1	3	668	729	5.3	5.8
600	922	972	600	585	6	14	5	16	1	3	718	779	5.5	6.0
650	972	1022	600	585	7	16	5	16	1	3	768	829	5.7	6.2
700	1022	1072	700	685	7	16	6	18	1	3	818	879	5.9	6.4
750	1072	1122	700	685	8	18	6	18	1	3	868	929	6.1	6.6
800	1122	1172	800	785	8	18	7	20	1	3	918	979	6.4	6.9

(Note) L dimensions described in the table are those with no cable ejection direction (option).
For cable ejection direction types (option), the dimensions are longer in 14mm.

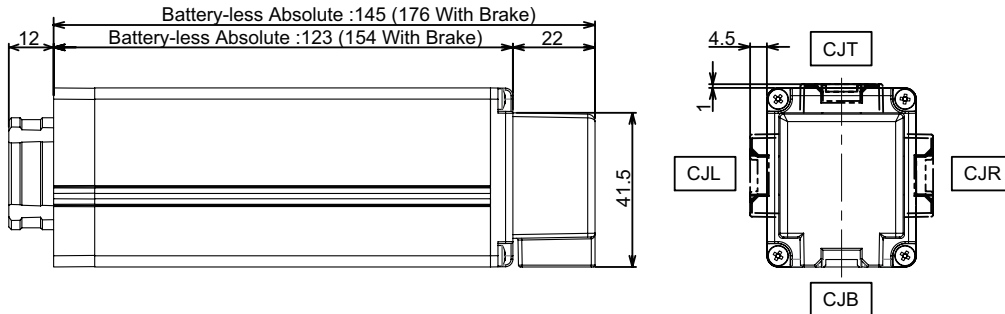
5.4 RCP5CR-SA4C, RCP5-SA4C (Option Model SR)

* There is no pipe joint in Slider Roller Type (SR).



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

Cable eject direction changed (Option)

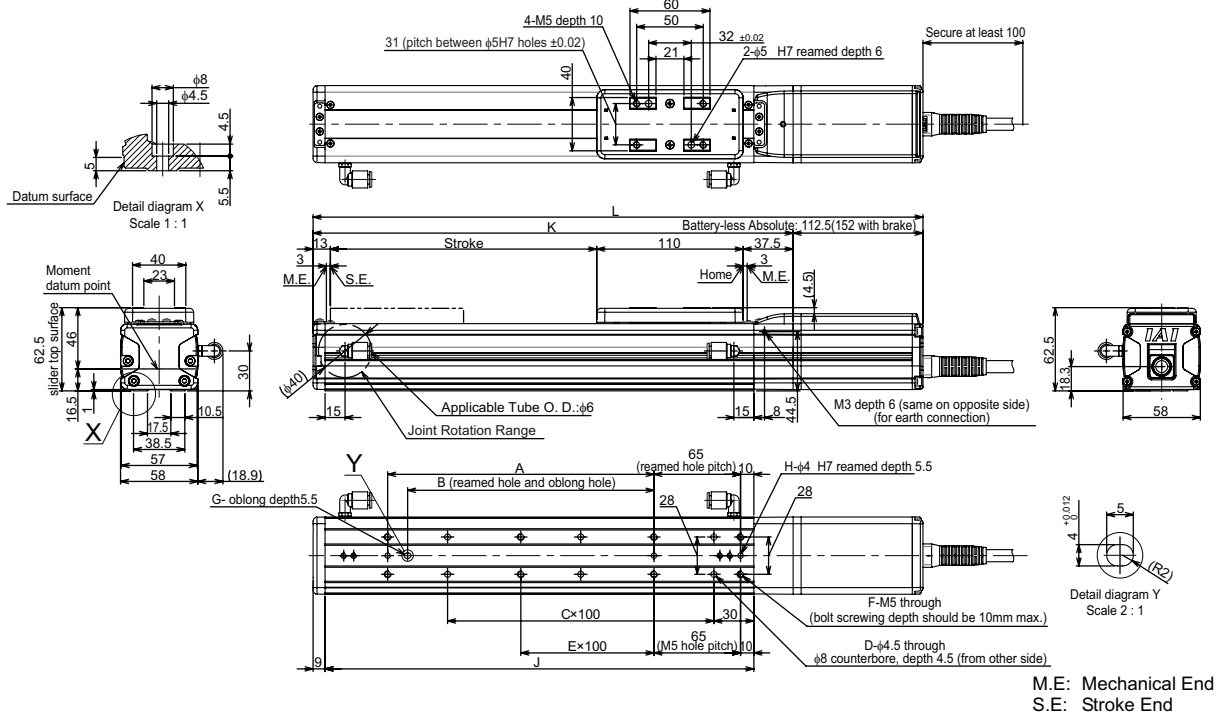


Stroke	L(Battery-less Absolute)		A	B	C	D	E	F	G	H	J	K	M	Mass [kg]	
	w/o Brake	With Brake												w/o Brake	With Brake
50	297	328	50	35	25	0	50	8	—	50	134	173	6	1.0	1.2
100	347	378	100	85	50	0	100	8	1	50	184	223	6	1.1	1.3
150	397	428	100	85	50	1	50	10	1	100	234	273	6	1.2	1.4
200	447	478	200	185	50	1	100	10	2	50	284	323	8	1.3	1.5
250	497	528	200	185	50	2	50	12	2	100	334	373	8	1.3	1.5
300	547	578	300	285	50	2	100	12	3	50	384	423	10	1.4	1.6
350	597	628	300	285	50	3	50	14	3	100	434	473	10	1.5	1.7
400	647	678	400	385	50	3	100	14	4	50	484	523	12	1.6	1.8
450	697	728	400	385	50	4	50	16	4	100	534	573	12	1.7	1.9
500	747	778	500	485	50	4	100	16	5	50	584	623	14	1.8	2.0

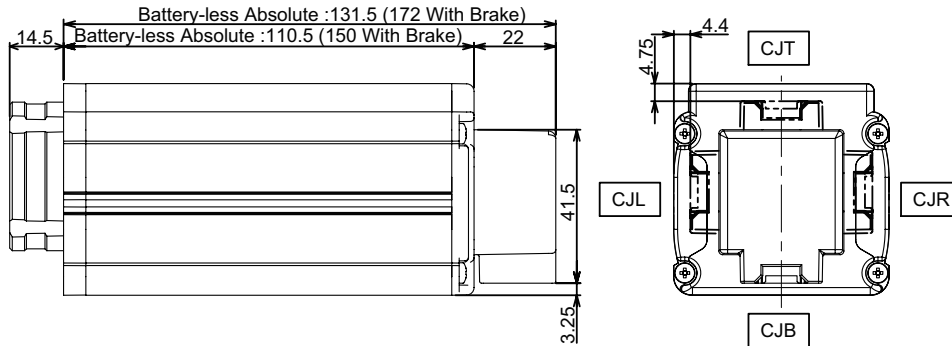
(Note) L dimensions described in the table are those with no cable ejection direction (option).
For cable ejection direction types (option), the dimensions are longer in 21mm.

5.5 RCP5CR-SA6C, RCP5-SA6C (Option Model SR)

* There is no pipe joint in Slider Roller Type (SR).



Cable eject direction changed (Option)



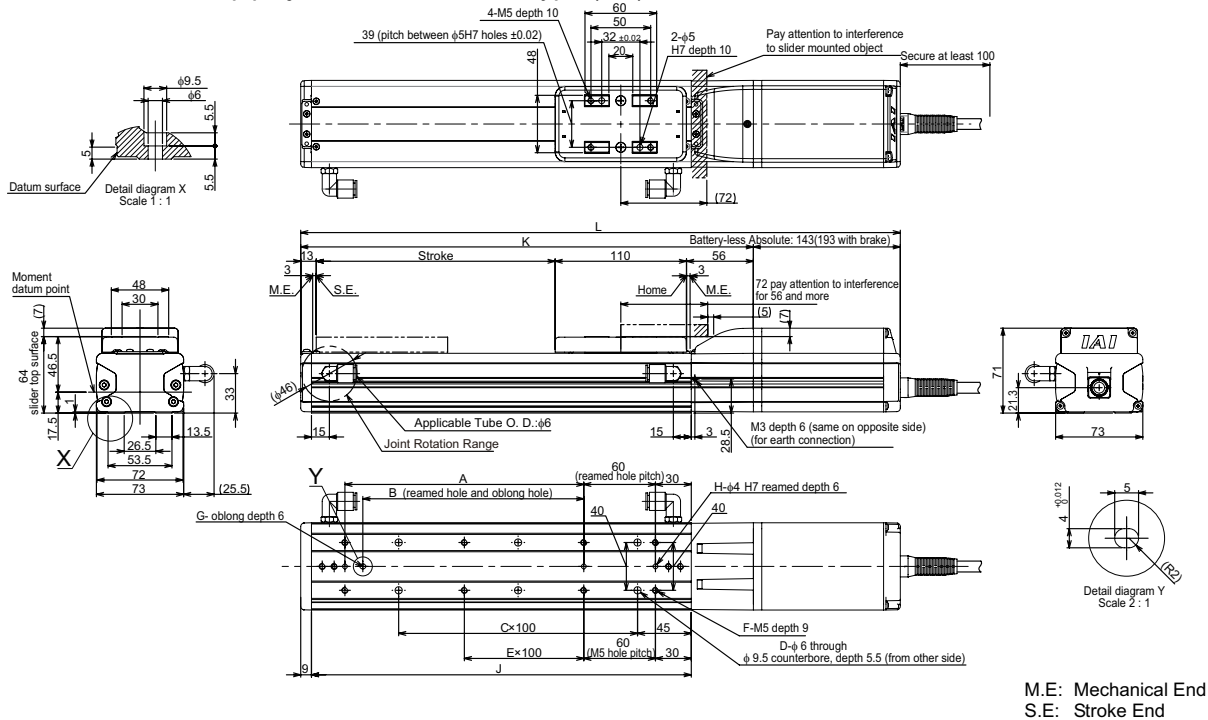
Stroke	L(Battery-less Absolute)		A	B	C	D	E	F	G	H	J	K	Mass [kg]	
	w/o Brake	With Brake											w/o Brake	With Brake
50	323	362.5	0	0	1	4	0	4	0	2	172	210.5	1.7	1.9
100	373	412.5	100	85	1	4	0	6	1	3	222	260.5	1.8	2.0
150	423	462.5	100	85	2	6	0	6	1	3	272	310.5	2.0	2.2
200	473	512.5	200	185	2	6	1	8	1	3	322	360.5	2.2	2.4
250	523	562.5	200	185	3	8	1	8	1	3	372	410.5	2.4	2.6
300	573	612.5	300	285	3	8	2	10	1	3	422	460.5	2.5	2.7
350	623	662.5	300	285	4	10	2	10	1	3	472	510.5	2.7	2.9
400	673	712.5	400	385	4	10	3	12	1	3	522	560.5	2.9	3.1
450	723	762.5	400	385	5	12	3	12	1	3	572	610.5	3.1	3.3
500	773	812.5	500	485	5	12	4	14	1	3	622	660.5	3.2	3.4
550	823	862.5	500	485	6	14	4	14	1	3	672	710.5	3.4	3.6
600	873	912.5	600	585	6	14	5	16	1	3	722	760.5	3.6	3.8
650	923	962.5	600	585	7	16	5	16	1	3	772	810.5	3.8	4.0
700	973	1012.5	700	685	7	16	6	18	1	3	822	860.5	3.9	4.1
750	1023	1062.5	700	685	8	18	6	18	1	3	872	910.5	4.1	4.3
800	1073	1112.5	800	785	8	18	7	20	1	3	922	960.5	4.3	4.5

(Note) L dimensions described in the table are those with no cable eject direction (option).

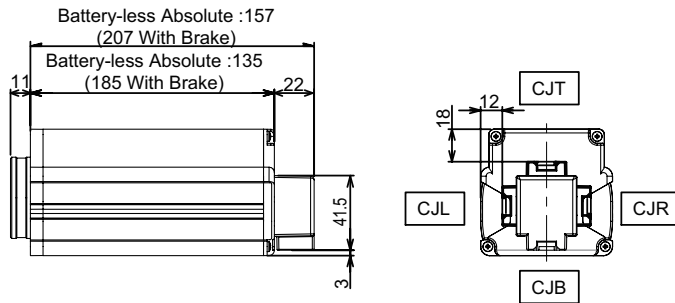
For cable eject direction types (option), the dimensions are longer in 20mm.

5.6 RCP5CR-SA7C, RCP5-SA7C (Option Model SR)

* There is no pipe joint in Slider Roller Type (SR).



Cable eject direction changed (Option)

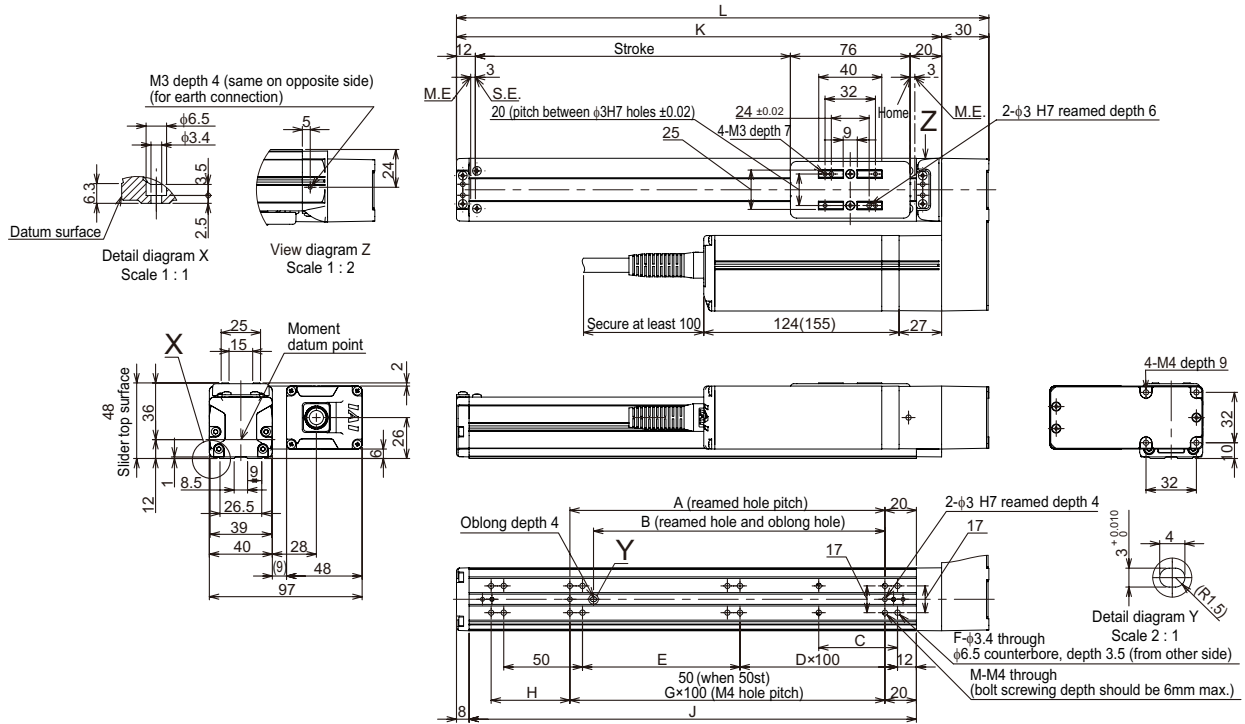


Stroke	L(Battery-less Absolute)		A	B	C	D	E	F	G	H	J	K	Mass [kg]	
	w/o Brake	With Brake											w/o Brake	With Brake
50	372	422	0	0	1	4	0	4	0	2	168	229	3.0	3.5
100	422	472	100	85	1	4	0	6	1	3	218	279	3.2	3.7
150	472	522	100	85	2	6	0	6	1	3	268	329	3.5	4.0
200	522	572	200	185	2	6	1	8	1	3	318	379	3.7	4.2
250	572	622	200	185	3	8	1	8	1	3	368	429	3.9	4.4
300	622	672	300	285	3	8	2	10	1	3	418	479	4.1	4.6
350	672	722	300	285	4	10	2	10	1	3	468	529	4.4	4.9
400	722	772	400	385	4	10	3	12	1	3	518	579	4.6	5.1
450	772	822	400	385	5	12	3	12	1	3	568	629	4.8	5.3
500	822	872	500	485	5	12	4	14	1	3	618	679	5.0	5.5
550	872	922	500	485	6	14	4	14	1	3	668	729	5.3	5.8
600	922	972	600	585	6	14	5	16	1	3	718	779	5.5	6.0
650	972	1022	600	585	7	16	5	16	1	3	768	829	5.7	6.2
700	1022	1072	700	685	7	16	6	18	1	3	818	879	5.9	6.4
750	1072	1122	700	685	8	18	6	18	1	3	868	929	6.1	6.6
800	1122	1172	800	785	8	18	7	20	1	3	918	229	6.4	6.9

(Note) L dimensions described in the table are those with no cable ejection direction (option).

For cable ejection direction types (option), the dimensions are longer in 14mm.

5.7 RCP5-SA4R

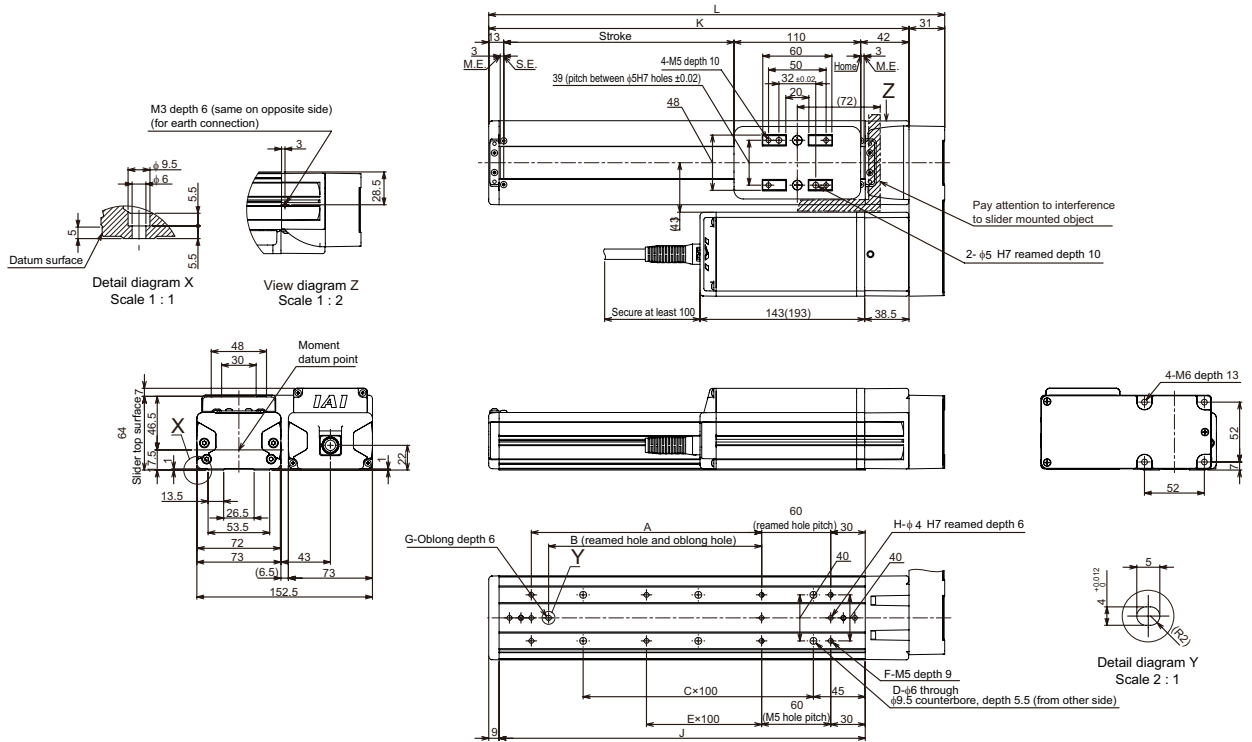


* Dimension () is for brake-equipped

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

Stroke	L	A	B	C	D	E	F	G	H	J	K	M	Mass [kg]	
													w/o Brake	With Brake
50	188	50	35	25	0	50	8	-	50	134	158	6	1.3	1.5
100	238	100	85	50	0	100	8	1	50	184	208	6	1.4	1.6
150	288	100	85	50	1	50	10	1	100	234	258	6	1.5	1.7
200	338	200	185	50	1	100	10	2	50	284	308	8	1.6	1.8
250	388	200	185	50	2	50	12	2	100	334	358	8	1.6	1.8
300	438	300	285	50	2	100	12	3	50	384	408	10	1.7	1.9
350	488	300	285	50	3	50	14	3	100	434	458	10	1.8	2.0
400	538	400	385	50	3	100	14	4	50	484	508	12	1.9	2.1
450	588	400	385	50	4	50	16	4	100	534	558	12	2.0	2.2
500	638	500	485	50	4	100	16	5	50	584	608	14	2.1	2.3

5.9 RCP5-SA7R



* Dimension () is for brake-equipped

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

Stroke	L	A	B	C	D	E	F	G	H	J	K	Mass [kg]	
												w/o Brake	With Brake
50	246	0	0	1	4	0	4	0	2	168	215	3.7	4.2
100	296	100	85	1	4	0	6	1	3	218	265	3.9	4.4
150	346	100	85	2	6	0	6	1	3	268	315	4.2	4.7
200	396	200	185	2	6	1	8	1	3	318	365	4.4	4.9
250	446	200	185	3	8	1	8	1	3	368	415	4.6	5.1
300	496	300	285	3	8	2	10	1	3	418	465	4.8	5.3
350	546	300	285	4	10	2	10	1	3	468	515	5.1	5.6
400	596	400	385	4	10	3	12	1	3	518	565	5.3	5.8
450	646	400	385	5	12	3	12	1	3	568	615	5.5	6.0
500	696	500	485	5	12	4	14	1	3	618	665	5.7	6.2
550	746	500	485	6	14	4	14	1	3	668	715	6.0	6.5
600	796	600	585	6	14	5	16	1	3	718	765	6.2	6.7
650	846	600	585	7	16	5	16	1	3	768	815	6.4	6.9
700	896	700	685	7	16	6	18	1	3	818	865	6.6	7.1
750	946	700	685	8	18	6	18	1	3	868	915	6.8	7.3
800	996	800	785	8	18	7	20	1	3	918	965	7.1	7.6

6. 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 How to Calculate Operation Life

For the operation life of the linear guide, use the dynamic allowable moment stated in 1.2 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.


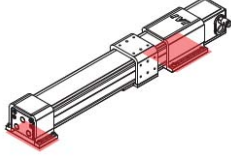
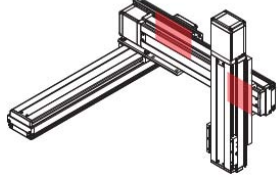
[Load coefficient f_w]

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_α]

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

Attachment coefficient f_α	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 RCP5 Slider Type.

Replace to figures for RCP5 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 tapped holes (counterbored holes) on the seat surface to fix.

6.2 Operation Life

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.

7. Warranty

7.1 Warranty Period

One of the following periods, whichever is shorter:

- 18 months after shipment from IAI
- 12 months after delivery to the specified location
- 2,500 hours of operation

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

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

- [1] Anything other than our product
- [2] Modification or repair performed by a party other than us (unless we have approved such modification or repair)
- [3] Anything that could not be easily predicted with the level of science and technology available at the time of shipment from our company
- [4] A natural disaster, man-made disaster, incident or accident for which we are not liable
- [5] Natural fading of paint or other symptoms of aging
- [6] Wear, depletion or other expected result of use
- [7] Operation noise, vibration or other subjective sensation 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 brought to us for repair under warranty.

7.4 Limited Liability

- (1) We shall 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 shall not be liable for any program or control method created by the customer to operate our product or for the result of such program or control method.

7.5 Conditions of Conformance with Applicable Standards/Regulations, Etc., and Applications

- (1) If our product is combined with another product or any system, device, 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 will not be liable 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 us if you must use our product for any of these applications:
 - [1] Medical equipment pertaining to maintenance or management of human life or health
 - [2] A mechanism or mechanical equipment intended to move or transport people (such as a vehicle, railway facility or aviation facility)
 - [3] Important safety parts of mechanical equipment (such as safety devices)
 - [4] Equipment used to handle cultural assets, art or other irreplaceable items
- (3) Contact us at the earliest opportunity if our product is to be used in any condition or environment that differs from what is 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:

- [1] Guidance for installation/adjustment and witnessing of test operation
- [2] Maintenance and inspection
- [3] Technical guidance and education on operating/wiring methods, etc.
- [4] Technical guidance and education on programming and other items related to programs

Change History

Revision Date	Description of Revision
March 2014	First edition
March 2014	Second edition <ul style="list-style-type: none"> • Value at high-output setting invalid added to 1.2.1 Speed and 1.2.2 Maximum Acceleration and Transportable Mass. • Procedure 6) added to 4.8 Motor Replacement Process
April 2014	Third edition <ul style="list-style-type: none"> • Change made to stainless steel sheet replacement process
July 2014	Fourth edition <ul style="list-style-type: none"> • Notice of caution when attaching side covers added in pg. 39, 48 and 52
September 2014	Fifth edition <ul style="list-style-type: none"> • Procedure for replacement of stainless steel sheet added
October 2014	Sixth edition <ul style="list-style-type: none"> • Pg. 9 CE Marking × → ○ • Pg. 13, 31 Model : CJT, CJR, C JL, CJB, SR and VR added • Change made in grease supply period • Note added for grease supply amount and recommended grease gun • Contents of RCP5CR for Cleanroom Type added • Pg. 39 Caution note added for installation of brake-equipped type
November 2014	Edition 6B <ul style="list-style-type: none"> • Pg. 8 Caution note added to warn position slightly move in first servo-on after power getting supplied
February 2015	Edition 6C <ul style="list-style-type: none"> • Pg. 53 Note corrected Supplier NSG → NSK
April 2015	Seventh edition <ul style="list-style-type: none"> • Contents added for motor reversing types SA4R, SA6R and SA7R • Pg. 12, 13, 57 Dedicated controller added • Pg. 40 Value changed for allowable dynamic moment • Pg. 91 Change made about life
June 2015	Edition 7B <ul style="list-style-type: none"> • Pg.39, 40 Offset positions of Ma and Mb indicated with arrow



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