

ROBO Cylinder[®]

High rigidity slider type Clean Specifications

RCP6CR-HSA6C
RCP6CR-HSA6XC
RCP6CR-HSA7C
RCP6CR-HSA7XC

Instruction Manual First edition ME3836-1B



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IAI Corporation

Please Read Before Use

Thank you for purchasing our product.

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

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

Please download the user's manual from our website.

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

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

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

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

[Important]

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

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Safety Guide

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

Safety Precautions for Our Products

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

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

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

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

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

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

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

Alert Indication

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

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

Caution in Handling

1. Do not attempt to establish the settings for the speed and acceleration/deceleration above the allowable range.
An operation with speed and acceleration/deceleration beyond the allowable range may cause an abnormal noise, vibration, malfunction or shortened life.
2. Set the allowable load moment within the allowable range.
An operation with the load beyond the allowable load moment may cause an abnormal noise, vibration, malfunction or shortened life. If it is extreme, flaking may occur on the guide, ball screw.
3. Set the overhang load length in the allowable range.
The load overhang length is a reference of offset capable for operating an actuator smoothly when a workpiece or bracket is attached offset to a slider on an actuator.
Applying a load above the allowable range of the load overhang length may cause vibration or abnormal noise.
4. If back and forth operations are performed repeatedly in short distance, it may wear out the film of grease.
Continuous back and forth operation within a distance less than 30mm may cause wear of grease. As a reference, have approximately 5 cycles of back and forth operation in a distance more than 50mm in every 5,000 to 10,000 cycles to regenerate the oil film. Keep using the actuator with the grease worn out may cause malfunction. If it is extreme, flaking may occur on the guide, ball screw.
5. Do not attempt to hit the slider against an abstacle with high speed.
It may destroy the coupling.
6. Make sure to attach the actuator properly by following this instruction manual.
Using the product with the actuator not being certainly retained or affixed may cause abnormal noise, vibration, malfunction or shorten the product life.
7. Make sure to follow the usage condition, environment and specification range of the product.
In case it is not secured, it may cause a drop in performance or malfunction of the product.

8. For PCON-CB, MCON and RCON/RSEL System (with option: T), it is available to switch over the setting between effective and ineffective of the high-output setting in the parameter setting. (In the setting at delivery, the high-output setting is set to effective.) When the high-output setting is disabled, even though the specification gets low, the current amperage can be reduced. For MSEL Controller, the high-output setting is effective and cannot switch it over to ineffective. Refer to [instruction manual for each controller] for details

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

Refer to the applicable performance specification when the high-output setting is effective or ineffective in 1.2 Specifications.

Controller	Parameter	Remarks
PCON-CB	No.152 High-output setting 0: Disabled, 1: Enabled	
MCON	No.152 High-output setting 0: Disabled, 1: Enabled	High-output setting type When (Option T) selected
RCON System	No.152 High-output setting 0: Disabled, 1: Enabled	When RCON-PC connected
RSEL System	Driver unit parameter No.152 High-output setting 0: Disabled, 1: Enabled	When RCON-PC connected

9. For Double Slider Specification (Option Code: W) in Reversed-home Specification (Option Code: NM), make sure to have the home-return operation conducted after joining the driver slider and free slider.

International Standards Compliances

This actuator complies with the following overseas standard.

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

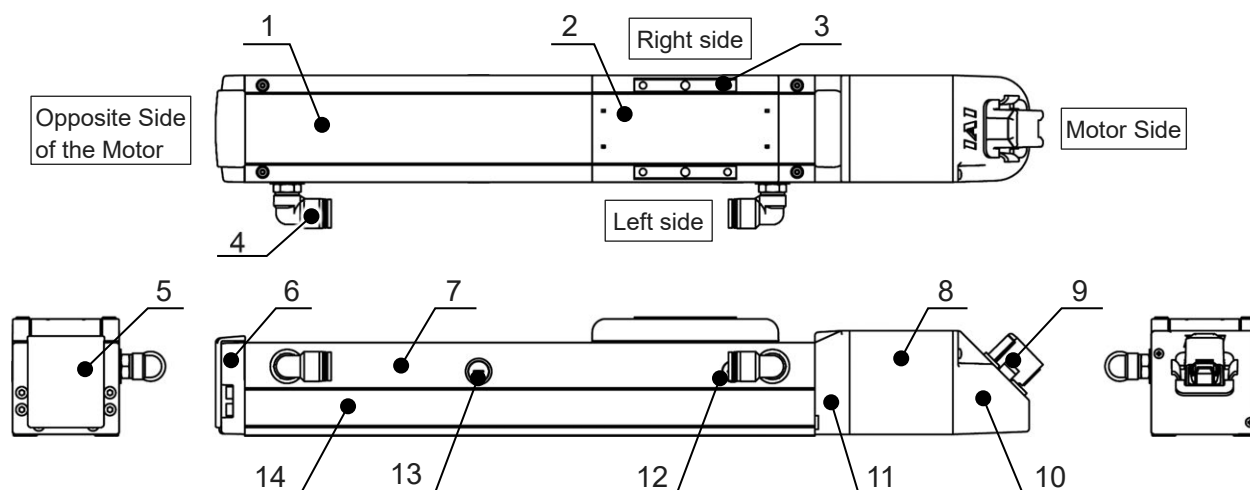
RoHS3 Directive	CE Marking
☐	☐

Names of the Parts

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

Motor Straight Type

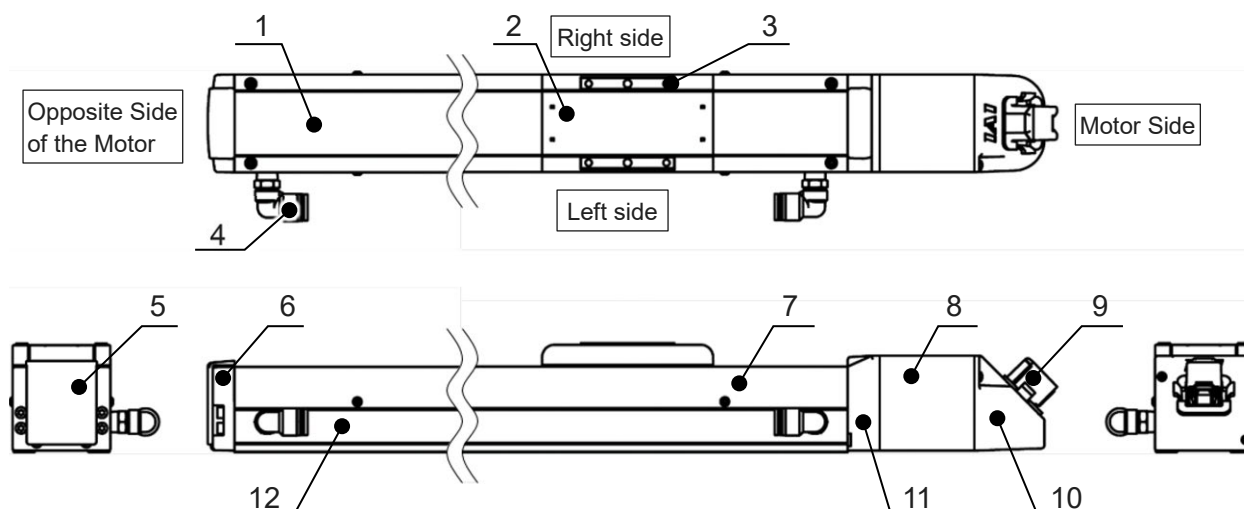
■ RCP6CR-HSA6C, HSA7C



No.	Name	Material	Surface Treatment
1	Stainless Steel Sheet	Special Stainless Steel	–
2	Slider Cover	Resin (POM)	–
3	Slider	Dedicated extruded aluminum (A6063SS-T6 or equivalent)	White alumite treatment
4	Vacuum Joint	PL10-02EG (NIHON PISCO CO., LTD.)	
5	Sheet Clamp	Resin (PBT)	–
6	Front Bracket	Aluminum die-casting (ADC12)	–
7	Side Cover	Dedicated extruded aluminum (A6063SS-T5 or equivalent)	White alumite treatment
8	Motor Cover	Dedicated extruded aluminum (A6063SS-T5 or equivalent)	White alumite treatment
9	Connector	Resin (PBT)	–
10	End Cover	Aluminum die-casting (ADC12)	–
11	Track Housing Cover	Resin (PBT)	–
12	Hole Cap (Grease Inlet)	Rubber (NBR)	–
13	Hole Cap (Double Slider Grease Inlet)	Rubber (NBR)	–
14	Base	Dedicated extruded aluminum (A6063SS-T6 or equivalent)	White alumite treatment

Motor Straight Type (Equipped with Intermediate Support)

■ RCP6CR-HSA6XC, HSA7XC



No.	Name	Material	Surface Treatment
1	Stainless Steel Sheet	Special Stainless Steel	—
2	Slider Cover	Resin (POM)	—
3	Slider	Dedicated extruded aluminum (A6063SS-T6 or equivalent)	White alumite treatment
4	Vacuum Joint	PL10-02EG (NIHON PISCO CO., LTD.)	
5	Sheet Clamp	Resin (PBT)	—
6	Front Bracket	Aluminum die-casting (ADC12)	—
7	Side Cover	Dedicated extruded aluminum (A6063SS-T5 or equivalent)	White alumite treatment
8	Motor Cover	Dedicated extruded aluminum (A6063SS-T5 or equivalent)	White alumite treatment
9	Connector	Resin (PBT)	—
10	End Cover	Aluminum die-casting (ADC12)	—
11	Track Housing Cover	Resin (PBT)	—
12	Base	Dedicated extruded aluminum (A6063SS-T6 or equivalent)	White alumite treatment

ROBO Cylinder

Chapter 1

Specifications

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1.1 Checking the Product

1.1.1 Components

The following table shows the product configuration for the standard specification.
See the packing list for the details of the enclosed components. In the unlikely case that any model number errors or missing parts come to light, contact your local IAI distributor.

Body	Accessories
<u>Main Body</u> Quantity: 1 	<u>Motor · Encoder Cable</u> Quantity: 1 Motor Encoder Integrated Cable or Motor Encoder Integrated Robot Cable 
Accessories (Documents)	
<u>Safety Guide</u> Quantity: 1 M0194 	

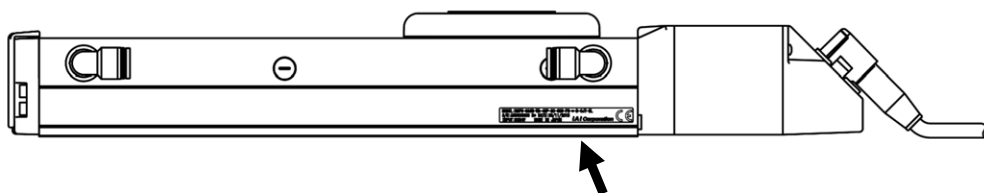
* Download instruction manual in our homepage.

1.1.2 Instruction manuals for controllers related to this product

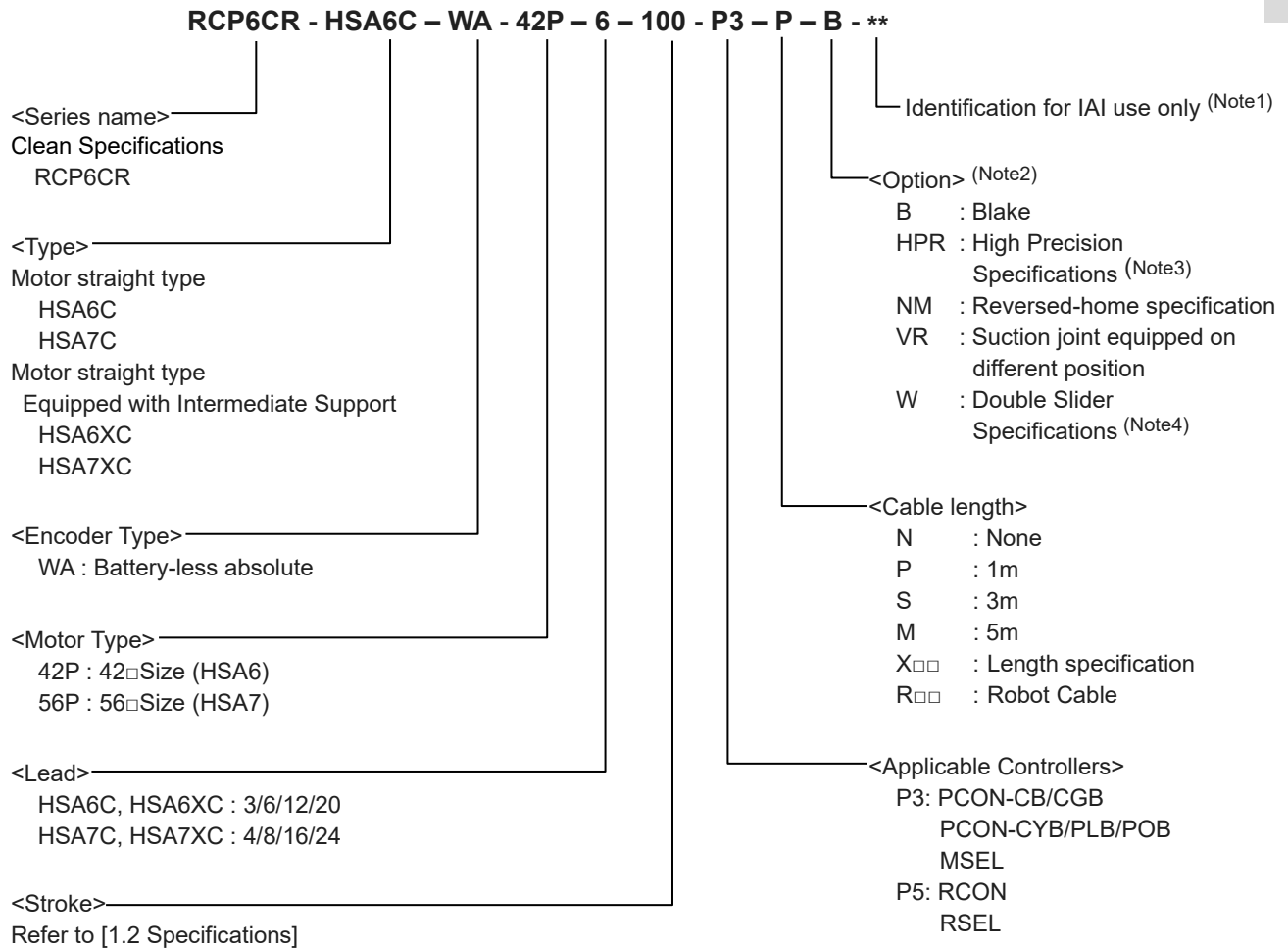
No.	Name	Control number
1	RCP6 High rigidity slider type Clean Specifications Instruction Manual (this document)	ME3836
2	PCON-CB/CFB Controller Instruction Manual	ME0342
3	PCON-CYB/PLB/POB Controller Instruction Manual	ME0353
4	MSEL-PC/PG Controller Instruction Manual	ME0336
5	RCON System Instruction Manual	ME0384
6	RSEL System Instruction Manual	ME0392
7	PC Compatible Software for XSEL IA-101-X-MW/IA-101-X-USBMW Instruction Manual	ME0154
8	PC Compatible Software for RC/EC RCM-101-MW/RCM-101-USB Instruction Manual	ME0155
9	PC Teaching Software IA-OS First Step Guide	ME0391
10	Touch Panel Teaching Pendant TB-02/02D Applicable for Position Controller Instruction Manual	ME0355
11	Touch Panel Teaching Pendant TB-02/02D Applicable for Program Controller Instruction Manual	ME0356
12	Touch Panel Teaching Pendant TB-03 Applicable for Position Controller Instruction Manual	ME0376
13	Touch Panel Teaching Pendant TB-03 Applicable for Program Controller Instruction Manual	ME0377

1.1.3 How to Read the Model Nameplate

Model → MODEL: RCP6CR-HSA6C-WA-42P-6-100-P-B
 Serial number → S/N: B01234500 DATE: 15/04/2022
 INPUT: DC24V MADE IN JAPAN **IAI Corporation** **CE**



1.1.4 How to Read the Model Number



Note 1 Identification for IAI use only: It may be described for a purpose of IAI. It is not something that represents a model code.

Note 2 There may be some options that are not available to select in some models. Refer to Selectable List in [1.5 Options] for details.

Note 3 There are some leads that are not available to select in the high precision specifications HPR. Refer to [1.5.2 High Precision Specifications] for details. Also, it cannot be selected in the double slider specifications.

Note 4 There are some leads that are not available to select in the double slider specifications and some leads that are available only to select the installation in the horizontal orientation. Refer to [◆ Max. Acceleration and Payload for Double Slider Specifications (Option) in 1.2.1 or 1.3.1] or [1.5.5 Double Slider Specifications] for details.

1.2 Mechanical Specifications (HSA6□)

1.2.1 RCP6CR-HSA6C: Motor straight type

PCON-CB, MCON, RCON/RSEL controllers can switch the high-output setting enable / disable in the parameter setting. The high-output should be enabled on delivery.

When the high-output setting is disabled, even though the specification gets low, the current amperage can be reduced.

For MSEL controller, the high-output should be set enabled, and it should not be able to set it disabled.

For details, check in the instruction manual for each controller.

[Lead and Payload]

Model Number	Lead (mm)	Horizontal (kg)		Vertical (kg)	
		High-Output Enabled	High-Output Disabled	High-Output Enabled	High-Output Disabled
RCP6CR-HSA6C-WA-42P-3-①-②-③-④	3	42	25	16	10
RCP6CR-HSA6C-WA-42P-6-①-②-③-④	6	50	20	6	5
RCP6CR-HSA6C-WA-42P-12-①-②-③-④	12	29	14	2.5	2
RCP6CR-HSA6C-WA-42P-20-①-②-③-④	20	15	8	1	0.75

Legend ①: Stroke ②: Applicable controller ③: Cable length ④: Option

[Stroke and Max. Speed]

Max. Speed (mm/s)

Lead (mm)	High-Output Setting	50 to 400 (Every 50mm)	450 (mm)	500 (mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
20	Enabled	1280<1120>			1090	940	815	715	630	560
	Disabled	800						715	630	560
12	Enabled	900	845	705	585	515	445	390	345	315
	Disabled	680<560>			585<560>	515	445	390	345	315
6	Enabled	450	415	350	295	255	220	190	170	140
	Disabled	340			295	255	220	190	170	140
3	Enabled	225	205	170	145	125	110	95	85	70
	Disabled	170			145	125	110	95	85	70

(Note) < > represents vertical operation.



Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is the lead 20 is 25mm/s, lead 12 is 15mm/s, lead 6 is 8mm/s, and the lead 3 is 4mm/s.

[Payload by Speed/Acceleration]

For percentage (%), input 1G is set as 100%.

“–” represent operation not available.

■ Lead 20

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	15	15	10	8	7	1	1	1
160	15	15	10	8	7	1	1	1
320	15	12	10	8	6	1	1	1
480	12	12	9	8	6	1	1	1
640	12	12	8	6	5	1	1	1
800	10	10	6.5	4.5	3	1	1	1
960	–	8	5	3.5	1.5	–	1	1
1120	–	5	3	2	1	–	0.5	0.5
1280	–	–	1	0.5	–	–	–	–

High-Output Disabled			
Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	8	5	0.75
160	8	5	0.75
320	8	5	0.75
480	8	4	0.75
640	6	3	0.75
800	4	1.5	0.5

■ Lead 12

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	29	27	20	17	14	2.5	2.5	2.5
80	29	27	20	17	14	2.5	2.5	2.5
200	29	27	20	17	14	2.5	2.5	2.5
320	29	27	20	14	12	2.5	2.5	2.5
440	29	26	18	12	10	2.5	2.5	2.5
560	29	20	12	8	7	2.5	2.5	2.5
700	–	13	7	5	4	–	2	1
800	–	8	4	2	1	–	1	0.5
900	–	3	1	0.5	–	–	–	–

High-Output Disabled			
Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	14	10	2
80	14	10	2
200	14	10	2
320	14	10	2
440	11	7	1.5
560	7	2.5	1
680	4	–	–

■ Lead 6

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	50	45	40	35	30	6	6	6
40	50	45	40	35	30	6	6	6
100	50	45	40	35	30	6	6	6
160	50	43	35	32	20	6	6	6
220	48	39	29	24	20	6	6	6
280	44	35	26	21	15	6	6	5.5
340	38	31	19	14	11	6	5	4.5
400	32	18	10	6	4	4.5	3	2.5
450	26	10	4	2	1	3	1.5	1

High-Output Disabled			
Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/Deceleration (G)		
	0.3	0.7	0.3
0	20	14	5
40	20	14	5
100	20	14	5
160	20	14	5
220	16	14	4
280	13	7	2.5
340	8	1	1

■ Lead 3

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	42	42	37	35	35	16	16	16
50	42	42	37	35	35	16	16	16
80	40	40	35	35	30	16	16	16
110	40	40	35	35	30	16	16	16
140	40	40	35	35	28	16	15	15
170	40	40	32	26	26	10	10	10
200	40	30	21	10	10	8	5	5
225	40	8	—	—	—	5	2	—

High-Output Disabled			
Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	25	22	10
20	25	22	10
50	25	22	10
80	25	22	10
110	20	14	8
140	15	11	5
170	5	–	1.5

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.

It may cause to generate vibration, malfunction or shorten the product life.

- The high-output setting should be enabled on delivery.

[Actuator Specifications]

Item	Content
Drive system	Ball screw $\phi 10\text{mm}$, rolled C10
Positioning repeatability ^{*1}	$\pm 0.01\text{mm}$ [$\pm 0.005\text{mm}$]
Lost motion	0.1mm or less
Linear guide	Linear Infinite Circulation Type
Static allowable moment ^{*2}	Ma: $65\text{N}\cdot\text{m}$ [$546\text{N}\cdot\text{m}$]
	Mb: $75\text{N}\cdot\text{m}$ [$779\text{N}\cdot\text{m}$]
	Mc: $120\text{N}\cdot\text{m}$ [$205\text{N}\cdot\text{m}$]
Dynamic allowable moment ^{*3}	Ma: $33.7\text{N}\cdot\text{m}$ [$167\text{N}\cdot\text{m}$]
	Mb: $40.2\text{N}\cdot\text{m}$ [$199\text{N}\cdot\text{m}$]
	Mc: $55.3\text{N}\cdot\text{m}$ [$89.8\text{N}\cdot\text{m}$]
Ambient operating temperature/humidity	0 to 40°C , 85% RH or less (Non-condensing)
Degree of protection	IP20
Vibration and Impact resistance	4.9m/s^2
Motor type	Pulse motor
Encoder type	Battery-less absolute
Encoder pulse count	8192pulse/rev

*1 Shown in brackets [] is values for the high precision type (option model code: HPR).

*2 Shown in brackets [] is values for the double slider type (option model code: W).

Even if the load goes moment and the load overhang length are in the allowable ranges, abnormal vibration or noise may occur because of influence of the way of installing the main body or transported object or the stiffness of the overhang installation beams.
Revise the conditions for operation in such cases.

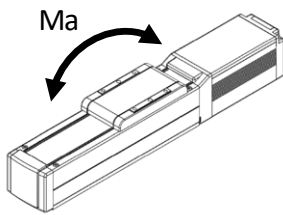
*3 For reference rated life of 5,000km. The running life differs according to operation conditions and mounting status.

Shown in brackets [] is values for the double slider type (option model code: W).

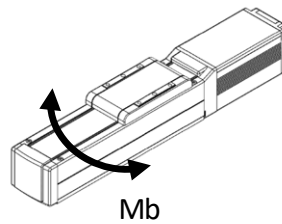
It is the value when the slider actual span is at 90mm. The dynamic allowable moment and the overhang load length should differ depending on the slider actual span.

[Moment direction]

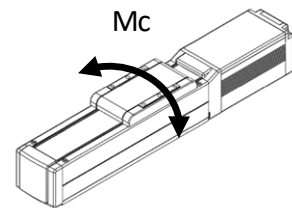
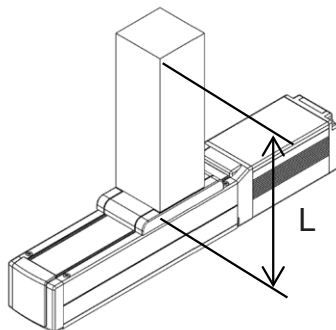
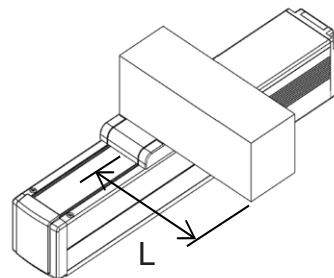
(Pitching)



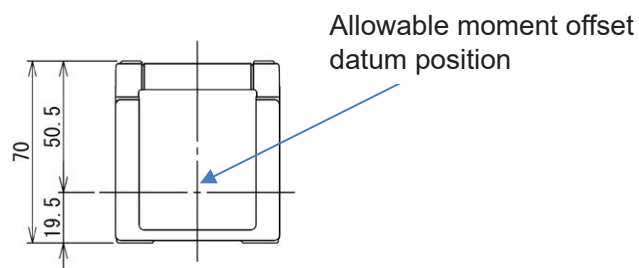
(Yawing)



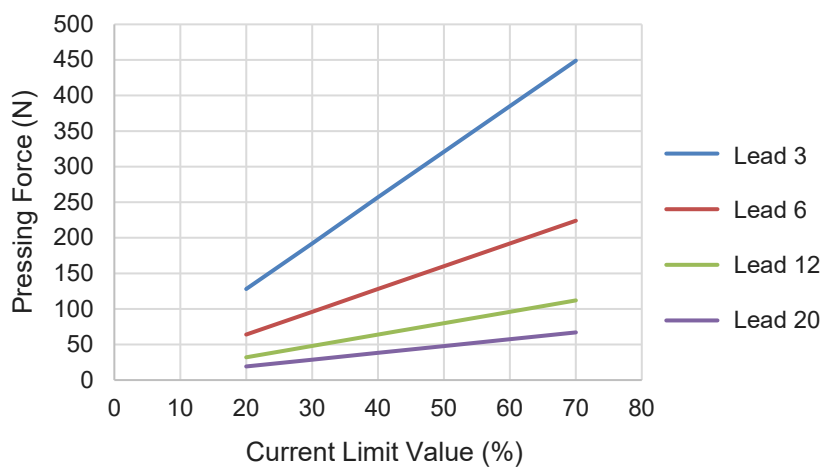
(Rolling)

**[Overhang load length]****Ma direction****Mb-Mc direction**

Reference for Load Overhang Length (L = 300mm or less)
(Double slider type is 600mm or less)

[Allowable moment offset datum position]**Caution**

- If the actuator is used with excessive allowable moment and overhang load, it may not only lead to abnormal noise and vibration but also significantly reduce the life of the actuator.
- Keep the mounted object center of gravity at or below 1/2 the overhang load length.

[Pressing Force and Current Limit Value]**Caution**

- The relation of the current limit and the pressing force is a guideline at speed of 20mm/s. There is some variance in the actual pressing force. The variance increases when the current value is low.
- The current limit value cannot be set outside the 20 to 70% range.
- When the approach speed up to the pressing start position is 20mm/s or less, pressing operation will take place at approach speed.
When the pressing speed is less than 20mm/s, it may not satisfy the pressing force shown in the graph (reference). Confirm in advance that there is no problem in the pressing force.

◆ Double slider specification (Option)

When the double slider type (model code: W) is selected, the maximum payload and velocity should drop.

Lead 20mm is not available to be selected.

[Lead and Payload]

Model Number	Lead (mm)	Horizontal (kg)		Vertical (kg)	
		High-Output Enabled	High-Output Disabled	High-Output Enabled	High-Output Disabled
RCP6CR-HSA6C-WA-42P-3-①-②-③-④	3	38	23	14	8
RCP6CR-HSA6C-WA-42P-6-①-②-③-④	6	30	18	4	3
RCP6CR-HSA6C-WA-42P-12-①-②-③-④	12	24	12	Not available for selection*	

Legend ①: Stroke ②: Applicable controller ③: Cable length ④: Option

* Lead 12mm vertical type is not available for selection

[Stroke and Max. Speed]

Max. Speed (mm/s)

Lead (mm)	Nominal Stroke	200 to 400	450	500	550	600	650	700	750	800
	Effective Stroke	50 to 250	300	350	400	450	500	550	600	650
	High-Output Setting	(Every 50mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
12	Enabled	700			585	515	445	390	345	315
	Disabled	560				515	445	390	345	315
6	Enabled	450 <340>	415 <340>	350 <340>	295	255	220	190	170	140
	Disabled	340 <220>			295 <220>	255 <220>	220	190	170	140
3	Enabled	225 <200>	205 <200>	170	145	125	110	95	85	70
	Disabled	170			145	125	110	95	85	70

(Note) < > represents vertical operation.



Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is the lead 12 is 15mm/s, lead 6 is 8mm/s and the lead 3 is 4mm/s.
- Make sure to have the driving slider and free slider linked during operation including the home-return operation. Any operation with the sliders not linked may cause damage.

[Payload by Speed/Acceleration]

For percentage (%), input 1G is set as 100%.

“–” represent operation not available.

■ Lead 12

High-Output Enabled

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration/Deceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	24	16	14	12	–	–
80	24	16	14	12	–	–
200	24	16	14	12	–	–
320	24	16	10	8	–	–
440	20	12	8	6	–	–
560	12	6	4	2	–	–
700	5	1	–	–	–	–

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	12	8	–
80	12	8	–
200	12	8	–
320	12	8	–
440	9	3	–
560	2	–	–

■ Lead 6

High-Output Enabled

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration/Deceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	30	24	22	18	4	4
40	30	24	22	18	4	4
100	30	24	22	18	4	4
160	30	24	22	18	4	4
220	30	24	20	16	4	4
280	28	22	18	10	3	3
340	20	12	10	6	1	1
400	6	4	1	–	–	–
450	1	–	–	–	–	–

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	18	12	3
40	18	12	3
100	18	12	3
160	18	12	3
220	14	12	2
280	8	4	–
340	1	–	–

■ Lead 3

High-Output Enabled

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration/Deceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	38	33	33	33	14	14
50	38	33	33	33	14	14
80	38	33	33	28	14	14
110	38	33	33	28	14	14
140	38	33	30	26	13	12
170	36	28	21	20	10	8
200	25	15	5	4	3	2
225	3	—	—	—	—	—

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	23	20	8
20	23	20	8
50	23	20	8
80	23	20	8
110	18	12	6
140	12	8	3
170	8	4	1

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.

It may cause to generate vibration, malfunction or shorten the product life.

- The high-output setting should be enabled on delivery.

1.2.2 RCP6CR-HSA6XC: Motor straight type Equipped with Intermediate Support

PCON-CB, MCON, RCON/RSEL controllers can switch the high-output setting enable / disable in the parameter setting. The high-output should be enabled on delivery.

When the high-output setting is disabled, even though the specification gets low, the current amperage can be reduced.

For MSEL controller, the high-output should be set enabled, and it should not be able to set it disabled.

For details, check in the instruction manual for each controller.

[Lead and Payload]

Model Number	Lead (mm)	Horizontal (kg)		Vertical (kg)	
		High-Output Enabled	High-Output Disabled	High-Output Enabled	High-Output Disabled
RCP6CR-HSA6XC-WA-42P-3-①-②-③-④	3	42	25	16	10
RCP6CR-HSA6XC-WA-42P-6-①-②-③-④	6	42	20	6	5
RCP6CR-HSA6XC-WA-42P-12-①-②-③-④	12	28	14	2.5	2
RCP6CR-HSA6XC-WA-42P-20-①-②-③-④	20	15	8	1	0.75

Legend ①: Stroke ②: Applicable controller ③: Cable length ④: Option

[Stroke and Max. Speed]

Max. Speed (mm/s)

Lead (mm)	High-Output Setting	50 to 650 (Every 50mm)	700 (mm)	750 (mm)	800 (mm)	850 (mm)	900 (mm)	950 (mm)	1000 (mm)
20	Enabled	1120<960>					970<960>	940	860
	Disabled	800<640>							
12	Enabled	800<700>		770<700>	680	620	560	510	460
	Disabled	560						510	460
6	Enabled	450	400	380	340	310	280	255	230
	Disabled	340<280>				310<280>	280	255	230
3	Enabled	225	200	190	165	145	135	125	115
	Disabled	140					135	125	115

Lead (mm)	High-Output Setting	1050 (Every 50mm)	1100 (mm)	1150 (mm)	1200 (mm)	1250 (mm)	1300 (mm)	1350 (mm)	1400 (mm)	1450 (mm)	1500 (mm)
20	Enabled	790	730	640	610	580	540	470	450	430	400
	Disabled	790<640>	730<640>	640	610	580	540	470	450	430	400
12	Enabled	425	380	360	330	315	285	270	250	235	220
	Disabled	425	380	360	330	315	285	270	250	235	220
6	Enabled	210	185	175	165	140	135	125	115	—	—
	Disabled	210	185	175	165	140	135	125	115	—	—
3	Enabled	—	—	—	—	—	—	—	—	—	—
	Disabled	—	—	—	—	—	—	—	—	—	—

(Note) < > represents vertical operation.

**Caution**

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is the lead 20 is 25mm/s, lead 12 is 15mm/s, lead 6 is 8mm/s, and the lead 3 is 4mm/s.

[Payload by Speed/Acceleration]

For percentage (%), input 1G is set as 100%.

“–” represent operation not available.

■ Lead 20

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	15	15	10	8	7	1	1	1
160	15	15	10	8	7	1	1	1
320	12	12	10	8	6	1	1	1
480	12	12	9	8	6	1	1	1
640	12	12	6.5	5	4	1	1	1
800	9.5	9.5	5	3	2	1	1	1
960	–	6	3	2	1	–	0.5	0.5
1120	–	3	1	–	–	–	–	–

Orientation	High-Output Disabled		
	Acceleration/Deceleration (G)		
	0.3	0.7	0.3
Speed (mm/s)			
0	8	5	0.75
160	8	5	0.75
320	8	5	0.75
480	8	4	0.75
640	6	3	0.75
800	3	0.5	–

■ Lead 12

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	28	26	18	16	14	2.5	2.5	2.5
80	28	26	18	16	14	2.5	2.5	2.5
200	28	26	18	16	14	2.5	2.5	2.5
320	26	26	18	14	12	2.5	2.5	2.5
440	26	26	13	11	7	2.5	2.5	2.5
560	17.5	17.5	9	4	3	2	2	2
700	—	9	3	2	1	—	1	0.5
800	—	3	—	—	—	—	—	—

Orientation	High-Output Disabled		
	Acceleration/Deceleration (G)		
	0.3	0.7	0.3
Speed (mm/s)			
0	14	10	2
80	14	10	2
200	14	10	2
320	14	10	2
440	11	5	1.5
560	4	0.5	0.5

■ Lead 6

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	42	38	26	24	20	6	6	6
40	42	38	26	24	20	6	6	6
100	40	38	26	24	20	6	6	6
160	40	38	26	24	20	6	6	6
220	37	36	26	24	18	6	6	6
280	32	32	26	18	13	6	6	5.5
340	26	26	16	11	8	5	5	4.5
400	22	16	6	3	1	2.5	2.5	1.5
450	12	6	1	–	–	1	1	–

High-Output Disabled			
Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	20	14	5
40	20	14	5
100	20	14	5
160	20	14	5
220	16	14	4
280	11	3	1.5
340	1	—	—

■ Lead 3

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	42	42	35	35	35	16	16	16
50	42	42	35	35	35	16	16	16
80	40	40	35	35	30	16	16	16
110	40	40	35	35	30	16	16	16
140	40	40	35	35	28	15	15	15
170	40	36	29	20	16	11	10	8
200	24	6	6	1	1	4	4	3
225	8	—	—	—	—	1	—	—

High-Output Disabled			
Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	25	22	10
20	25	22	10
50	25	22	10
80	25	22	10
110	20	14	8
140	15	4	3

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.

It may cause to generate vibration, malfunction or shorten the product life.

- The high-output setting should be enabled on delivery.

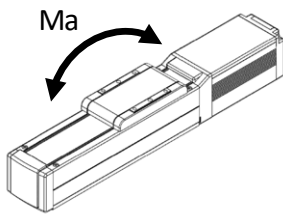
[Actuator Specifications]

Item	Content
Drive system	Ball screw $\phi 10\text{mm}$, rolled C10
Positioning repeatability	$\pm 0.01\text{mm}$
Lost motion	0.1mm or less
Linear guide	Linear Infinite Circulation Type
Static allowable moment	Ma: $65\text{N}\cdot\text{m}$
	Mb: $75\text{N}\cdot\text{m}$
	Mc: $120\text{N}\cdot\text{m}$
Dynamic allowable moment ^{*1}	Ma: $33.7\text{N}\cdot\text{m}$
	Mb: $40.2\text{N}\cdot\text{m}$
	Mc: $55.3\text{N}\cdot\text{m}$
Ambient operating temperature/humidity	0 to 40°C , 85% RH or less (Non-condensing)
Degree of protection	IP20
Vibration and Impact resistance	4.9m/s^2
Motor type	Pulse motor
Encoder type	Battery-less absolute
Encoder pulse count	8192pulse/rev

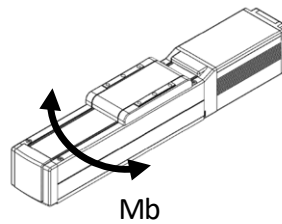
^{*1} For reference rated life of 5,000km. The running life differs according to operation conditions and mounting status.

[Moment direction]

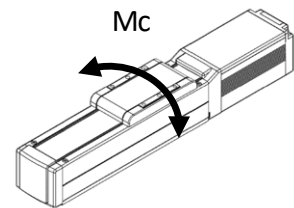
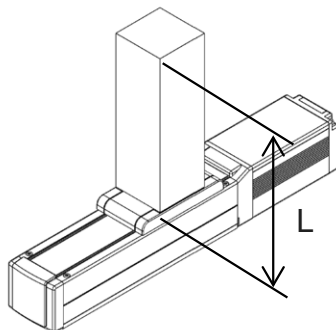
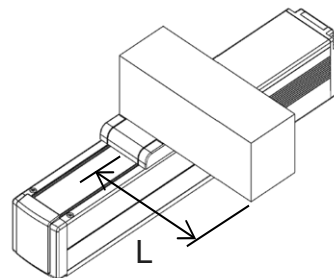
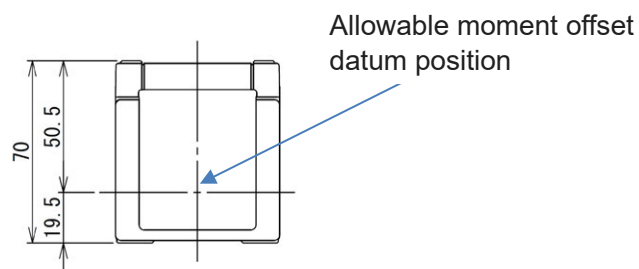
(Pitching)



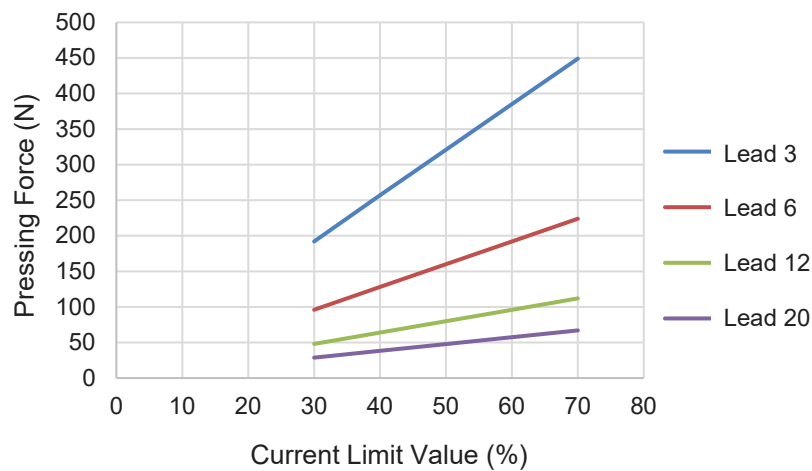
(Yawing)



(Rolling)

**[Overhang load length]****Ma direction****Mb-Mc direction**Reference for Load Overhang Length ($L = 300\text{mm}$ or less)**[Allowable moment offset datum position]****Caution**

- If the actuator is used with excessive allowable moment and overhang load, it may not only lead to abnormal noise and vibration but also significantly reduce the life of the actuator.
- Keep the mounted object center of gravity at or below 1/2 the overhang load length.

[Pressing Force and Current Limit Value]**Caution**

- The relation of the current limit and the pressing force is a guideline at speed of 20mm/s. There is some variance in the actual pressing force. The variance increases when the current value is low.
- The current limit value cannot be set outside the 30 to 70% range.
- When the approach speed up to the pressing start position is 20mm/s or less, pressing operation will take place at approach speed.
When the pressing speed is less than 20mm/s, it may not satisfy the pressing force shown in the graph (reference). Confirm in advance that there is no problem in the pressing force.

1.3 Mechanical Specifications (HSA7□)

1.3.1 RCP6CR-HSA7C: Motor straight type

PCON-CB, MCON, RCON/RSEL controllers can switch the high-output setting enable / disable in the parameter setting. The high-output should be enabled on delivery.

When the high-output setting is disabled, even though the specification gets low, the current amperage can be reduced.

For MSEL controller, the high-output should be set enabled, and it should not be able to set it disabled.

For details, check in the instruction manual for each controller.

[Lead and Payload]

Model Number	Lead (mm)	Horizontal (kg)		Vertical (kg)	
		High-Output Enabled	High-Output Disabled	High-Output Enabled	High-Output Disabled
RCP6CR-HSA7C-WA-56P-4-①-②-③-④	4	55	40	25	15
RCP6CR-HSA7C-WA-56P-8-①-②-③-④	8	61	40	16	10
RCP6CR-HSA7C-WA-56P-16-①-②-③-④	16	48	35	8	5
RCP6CR-HSA7C-WA-56P-24-①-②-③-④	24	37	18	3	2

Legend ①: Stroke ②: Applicable controller ③: Cable length ④: Option

[Stroke and Max. Speed]

Max. Speed (mm/s)

Lead (mm)	High-Output Setting	50 to 500 (Every 50mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
24	Enabled	1230<1080>			1080	950	840	750
	Disabled	800						750
16	Enabled	840	820	715	625	555	495	
	Disabled	560					555	495
8	Enabled	420	405	350	310	275	245	
	Disabled	280					275	245
4	Enabled	210	195	175	150	135	120	
	Disabled	140<105>					135<105>	120<105>

(Note) < > represents vertical operation.



Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is the lead 24 is 30mm/s, lead 16 is 20mm/s, lead 8 is 10mm/s, and the lead 4 is 5mm/s.

[Payload by Speed/Acceleration]

For percentage (%), input 1G is set as 100%.

“–” represent operation not available.

■ Lead 24

High-Output Enabled

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	37	37	22	16	14	3	3	3
200	37	37	22	16	14	3	3	3
420	37	34	20	16	14	3	3	3
640	37	20	15	10	9	3	3	3
860	–	12	9	6	4	–	2	2
1080	–	6	3	1.5	0.5	–	0.5	0.5
1230	–	3	1	–	–	–	–	–

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	18	10	2
200	18	10	2
420	18	10	2
640	10	2	1
800	4	0.5	0.5

■ Lead 16

High-Output Enabled

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	48	46	35	28	27	8	8	8
140	48	46	35	28	27	8	8	8
280	48	46	35	25	24	8	8	8
420	46	34	25	15	10	6	5	4.5
560	35	20	15	10	6	5	4	3
700	20	14	8	5	2.5	3	1	1
840	—	6	2	—	—	—	0.5	—

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	35	20	5
140	35	20	5
280	25	12	3
420	15	6	1.5
580	7	0.5	0.5

■ Lead 8

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	61	55	50	45	40	16	16	16
70	61	55	50	45	40	16	16	16
140	61	55	50	45	37	16	16	16
210	61	55	40	33	24	11	10	9.5
280	55	40	28	20	13	9	8	7
350	51	21	9	4	–	7	4	3
420	40	7	–	–	–	4	1	–

High-Output Disabled			
Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	40	25	10
70	40	25	10
140	40	25	7
210	25	14	4
280	10	–	1.5

■ Lead 4

High-Output Enabled								
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	55	51	45	40	40	25	25	25
35	55	51	45	40	40	25	25	25
70	55	51	45	40	40	25	25	25
105	55	51	45	40	35	22	20	19
140	55	45	35	30	25	16	14	12
175	55	30	14	—	—	11	7	3
210	45	—	—	—	—	5	—	—

High-Output Disabled			
Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	40	30	15
35	40	30	15
70	40	30	15
105	40	30	8
140	3	—	—

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.

It may cause to generate vibration, malfunction or shorten the product life.

- The high-output setting should be enabled on delivery.

[Actuator Specifications]

Item	Content
Drive system	Ball screw $\phi 12\text{mm}$, rolled C10
Positioning repeatability ^{*1}	$\pm 0.01\text{mm}$ [$\pm 0.005\text{mm}$]
Lost motion	0.1mm or less
Linear guide	Linear Infinite Circulation Type
Static allowable moment ^{*2}	Ma: $145\text{N}\cdot\text{m}$ [$900\text{N}\cdot\text{m}$]
	Mb: $145\text{N}\cdot\text{m}$ [$900\text{N}\cdot\text{m}$]
	Mc: $300\text{N}\cdot\text{m}$ [$458\text{N}\cdot\text{m}$]
Dynamic allowable moment ^{*3}	Ma: $75.5\text{N}\cdot\text{m}$ [$316\text{N}\cdot\text{m}$]
	Mb: $90\text{N}\cdot\text{m}$ [$376\text{N}\cdot\text{m}$]
	Mc: $134\text{N}\cdot\text{m}$ [$218\text{N}\cdot\text{m}$]
Ambient operating temperature/humidity	0 to 40°C , 85% RH or less (Non-condensing)
Degree of protection	IP20
Vibration and Impact resistance	4.9m/s^2
Motor type	Pulse motor
Encoder type	Battery-less absolute
Encoder pulse count	8192pulse/rev

*1 Shown in brackets [] is values for the high precision type (option model code: HPR).

*2 Shown in brackets [] is values for the double slider type (option model code: W).

Even if the load goes moment and the load overhang length are in the allowable ranges, abnormal vibration or noise may occur because of influence of the way of installing the main body or transported object or the stiffness of the overhang installation beams.
Revise the conditions for operation in such cases.

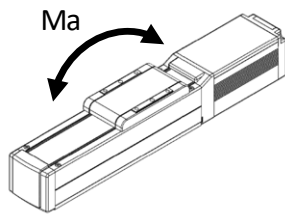
*3 For reference rated life of 5,000km. The running life differs according to operation conditions and mounting status.

Shown in brackets [] is values for the double slider type (option model code: W).

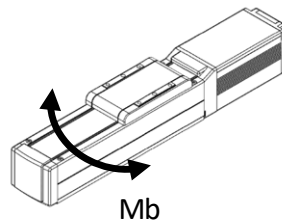
It is the value when the slider actual span is at 73mm. The dynamic allowable moment and the overhang load length should differ depending on the slider actual span.

[Moment direction]

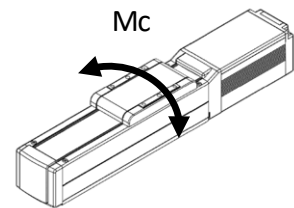
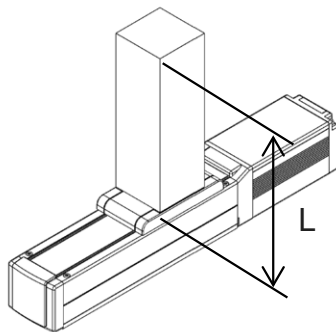
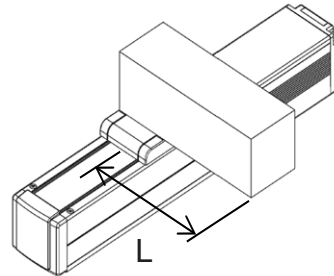
(Pitching)



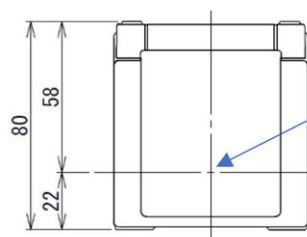
(Yawing)



(Rolling)

**[Overhang load length]****Ma direction****Mb-Mc direction**

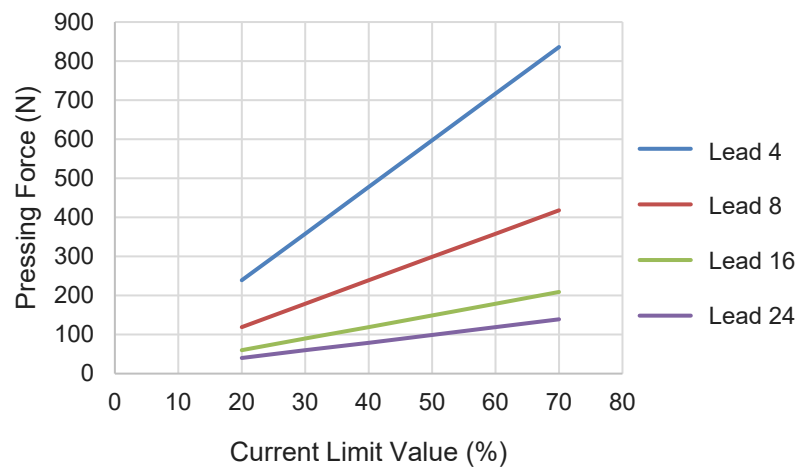
Reference for Load Overhang Length ($L = 400\text{mm}$ or less)
 (Double slider type is 600mm or less)

[Allowable moment offset datum position]

Allowable moment offset
datum position

**Caution**

- If the actuator is used with excessive allowable moment and overhang load, it may not only lead to abnormal noise and vibration but also significantly reduce the life of the actuator.
- Keep the mounted object center of gravity at or below $1/2$ the overhang load length.

[Pressing Force and Current Limit Value]**Caution**

- The relation of the current limit and the pressing force is a guideline at speed of 20mm/s. There is some variance in the actual pressing force. The variance increases when the current value is low.
- The current limit value cannot be set outside the 20 to 70% range.
- When the approach speed up to the pressing start position is 20mm/s or less, pressing operation will take place at approach speed.
When the pressing speed is less than 20mm/s, it may not satisfy the pressing force shown in the graph (reference). Confirm in advance that there is no problem in the pressing force.

◆ Double slider specification (Option)

When the double slider type (model code: W) is selected, the maximum payload and velocity should drop.

Lead 24mm is not available to be selected.

[Lead and Payload]

Model Number	Lead (mm)	Horizontal (kg)		Vertical (kg)	
		High-Output Enabled	High-Output Disabled	High-Output Enabled	High-Output Disabled
RCP6CR-HSA7C-WA-56P-4-①-②-③-④	4	49	38	23	13
RCP6CR-HSA7C-WA-56P-8-①-②-③-④	8	49	38	14	8
RCP6CR-HSA7C-WA-56P-16-①-②-③-④	16	44	33	Not available for selection*	

Legend ①: Stroke ②: Applicable controller ③: Cable length ④: Option

* Lead 16mm vertical type is not available for selection

[Stroke and Max. Speed]

Max. Speed (mm/s)

Lead (mm)	Nominal Stroke	200 to 550	600	650	700	750	800
	Effective Stroke	50 to 400	450	500	550	600	650
	High-Output Setting	(Every 50mm)	(mm)	(mm)	(mm)	(mm)	(mm)
16	Enabled	560				555	495
	Disabled	420					
8	Enabled	420 <350>	405 <350>	350	310	275	245
	Disabled	280<210>				275 <210>	245 <210>
4	Enabled	175			150	135	120
	Disabled	140<105>				135 <105>	120 <105>

(Note) < > represents vertical operation.



Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is the lead 16 is 20mm/s, lead 8 is 10mm/s and the lead 4 is 5mm/s.
- Make sure to have the driving slider and free slider linked during operation including the home-return operation. Any operation with the sliders not linked may cause damage.

[Payload by Speed/Acceleration]

For percentage (%), input 1G is set as 100%.

“–” represent operation not available.

■ Lead 16

High-Output Enabled

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration/Deceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	44	33	26	25	–	–
140	44	33	26	25	–	–
280	44	32	22	20	–	–
420	30	20	10	6	–	–
560	10	6	4	2	–	–

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	33	18	–
140	33	18	–
280	23	10	–
420	10	3	–

■ Lead 8

High-Output Enabled

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration/Deceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	49	43	38	38	14	14
70	49	43	38	38	14	14
140	49	38	36	33	14	14
210	49	33	28	20	8	7
280	36	24	16	10	5	4
350	14	4	1	–	1	–
420	3	–	–	–	–	–

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	38	23	8
70	38	23	8
140	38	23	5
210	20	10	2
280	5	–	–

■ Lead 4

High-Output Enabled

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration/Deceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	49	43	38	38	23	23
35	49	43	38	38	23	23
70	49	43	38	38	23	23
105	49	43	38	33	18	17
140	40	30	25	20	9	7
175	25	7	–	–	4	1

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	38	28	13
35	38	28	13
70	38	28	13
105	36	26	4
140	6	—	—

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.

It may cause to generate vibration, malfunction or shorten the product life.

- The high-output setting should be enabled on delivery.

1.3.2 RCP6CR-HSA7XC: Motor straight type Equipped with Intermediate Support

PCON-CB, MCON, RCON/RSEL controllers can switch the high-output setting enable / disable in the parameter setting. The high-output should be enabled on delivery.

When the high-output setting is disabled, even though the specification gets low, the current amperage can be reduced.

For MSEL controller, the high-output should be set enabled, and it should not be able to set it disabled.

For details, check in the instruction manual for each controller.

[Lead and Payload]

Model Number	Lead (mm)	Horizontal (kg)		Vertical (kg)	
		High-Output Enabled	High-Output Disabled	High-Output Enabled	High-Output Disabled
RCP6CR-HSA7XC-WA-56P-4-①-②-③-④	4	53	40	25	15
RCP6CR-HSA7XC-WA-56P-8-①-②-③-④	8	53	40	16	10
RCP6CR-HSA7XC-WA-56P-16-①-②-③-④	16	48	35	8	5
RCP6CR-HSA7XC-WA-56P-24-①-②-③-④	24	37	18	3	2

Legend ①: Stroke ②: Applicable controller ③: Cable length ④: Option

[Stroke and Max. Speed]

Max. Speed (mm/s)

Lead (mm)	High-Output Setting	700 to 950 (Every 50mm)	1000 (mm)	1050 (mm)	1100 (mm)	1150 (mm)	1200 (mm)	1250 (mm)	1300 (mm)	1350 (mm)	1400 (mm)	1450 (mm)	1500 (mm)
24	Enabled	1080<860>			990<860>	920<860>	850	770	735	680	635	565	550
	Disabled	800<640>						770<640>	735<640>	680<640>	635	565	550
16	Enabled	700<560>			645<560>	590<560>	555	510	470	440	420	375	355
	Disabled	500<420>								470<420>	440<420>	420	375
8	Enabled	420	375	345	310	285	255	245	230	215	190	180	170
	Disabled	210									190	180	170
4	Enabled	175<140>		165<140>	150<140>	—	—	—	—	—	—	—	—
	Disabled	120<105>				—	—	—	—	—	—	—	—

(Note) < > represents vertical operation.



Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower speed than the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The minimum speed is the lead 24 is 30mm/s, lead 16 is 20mm/s, lead 8 is 10mm/s, and the lead 4 is 5mm/s.

[Payload by Speed/Acceleration]

For percentage (%), input 1G is set as 100%.

“–” represent operation not available.

■ Lead 24

High-Output Enabled

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	37	37	22	16	14	3	3	3
200	37	37	22	16	14	3	3	3
420	34	34	20	16	11	3	3	3
640	15	15	10	8	6.5	3	3	2
860	–	9	6	3	2	–	1	0.5
1080	–	3	–	–	–	–	–	–

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	18	10	2
200	18	10	2
420	18	10	2
640	9	2	1
800	1	–	–

■ Lead 16

High-Output Enabled

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	48	46	35	28	27	8	8	8
140	48	46	35	28	27	8	8	8
280	48	46	35	25	19	8	8	8
420	35	30	19	15	10	5	5	4.5
560	15	15	9	5	2	2.5	2.5	2
700	3	3	1	–	–	–	–	–

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	35	20	5
140	35	20	5
280	25	12	3
420	14	4	1.5
500	4	–	–

■ Lead 8

High-Output Enabled

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	53	51	45	40	40	16	16	16
70	53	51	45	40	40	16	16	16
140	53	51	40	38	35	16	16	16
210	51	51	35	30	24	10	10	9.5
280	40	40	28	20	15	8	8	7
350	26	20	8	2	–	3	3	2
420	5	1	–	–	–	–	–	–

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	40	25	10
70	40	25	10
140	40	25	7
210	25	14	4

■ Lead 4

High-Output Enabled

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration/Deceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	53	51	45	40	40	25	25	25
35	53	51	45	40	40	25	25	25
70	53	51	45	40	40	25	25	25
105	51	51	45	40	35	20	20	19
140	45	45	35	30	25	14	14	12
175	11	–	–	–	–	4	3	–

High-Output Disabled

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration/ Deceleration (G)		
	0.3	0.7	0.3
0	40	30	15
35	40	30	15
70	40	30	15
105	40	20	8
120	8	—	—

**Caution**

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.

It may cause to generate vibration, malfunction or shorten the product life.

- The high-output setting should be enabled on delivery.

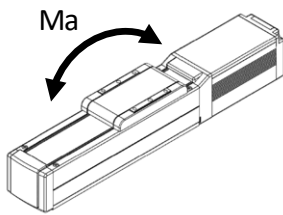
[Actuator Specifications]

Item	Content
Drive system	Ball screw $\Phi 12\text{mm}$, rolled C10
Positioning repeatability	$\pm 0.01\text{mm}$
Lost motion	0.1mm or less
Linear guide	Linear Infinite Circulation Type
Static allowable moment	Ma: $145\text{N}\cdot\text{m}$
	Mb: $145\text{N}\cdot\text{m}$
	Mc: $300\text{N}\cdot\text{m}$
Dynamic allowable moment ^{*1}	Ma: $75.5\text{N}\cdot\text{m}$
	Mb: $90\text{N}\cdot\text{m}$
	Mc: $134\text{N}\cdot\text{m}$
Ambient operating temperature/humidity	0 to 40°C , 85% RH or less (Non-condensing)
Degree of protection	IP20
Vibration and Impact resistance	4.9m/s^2
Motor type	Pulse motor
Encoder type	Battery-less absolute
Encoder pulse count	8192pulse/rev

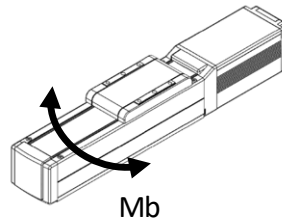
^{*1} For reference rated life of 5,000km. The running life differs according to operation conditions and mounting status.

[Moment direction]

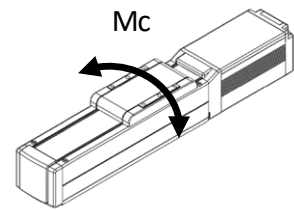
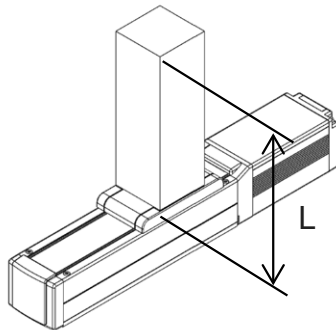
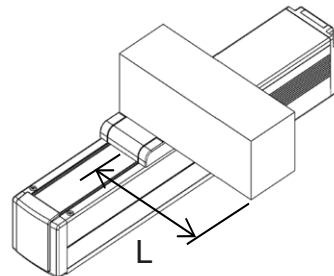
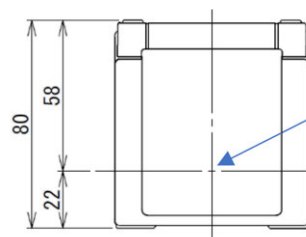
(Pitching)



(Yawing)



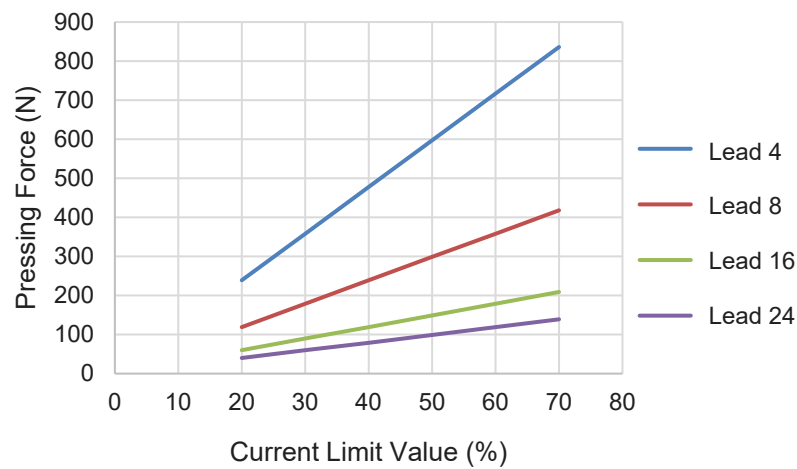
(Rolling)

**[Overhang load length]****Ma direction****Mb-Mc direction**Reference for Load Overhang Length ($L = 400\text{mm}$ or less)**[Allowable moment offset datum position]**

Allowable moment offset datum position

**Caution**

- If the actuator is used with excessive allowable moment and overhang load, it may not only lead to abnormal noise and vibration but also significantly reduce the life of the actuator.
- Keep the mounted object center of gravity at or below 1/2 the overhang load length.

[Pressing Force and Current Limit Value]**Caution**

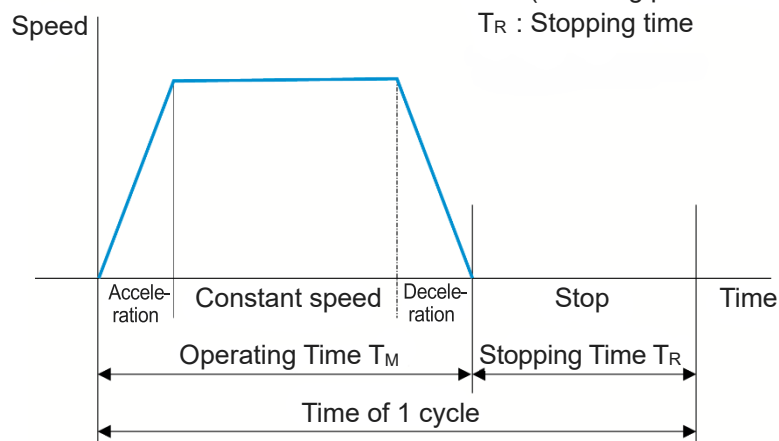
- The relation of the current limit and the pressing force is a guideline at speed of 20mm/s. There is some variance in the actual pressing force. The variance increases when the current value is low.
- The current limit value cannot be set outside the 20 to 70% range.
- When the approach speed up to the pressing start position is 20mm/s or less, pressing operation will take place at approach speed.
When the pressing speed is less than 20mm/s, it may not satisfy the pressing force shown in the graph (reference). Confirm in advance that there is no problem in the pressing force.

1.4 Duty Ratio

The duty ratio is the operating rate, shown in percentage (%), of the actuator operating time within one cycle.

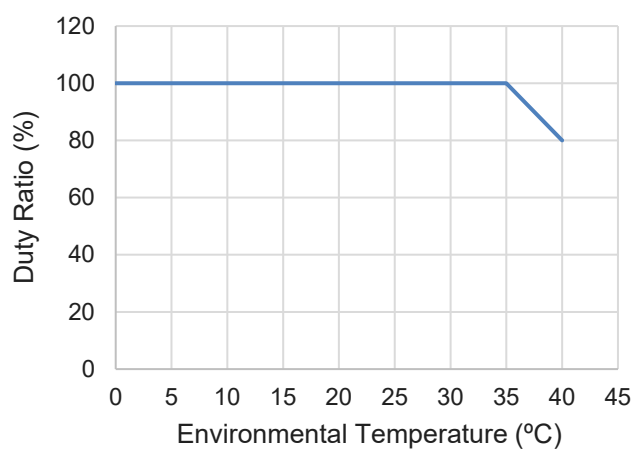
$$D = \frac{T_M}{T_M + T_R} \times 100 (\%)$$

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

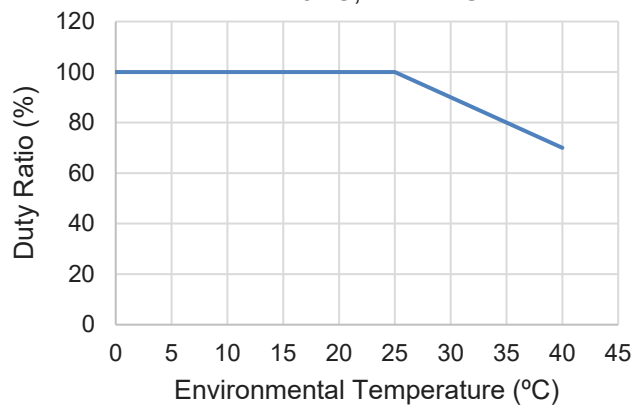


There is a limitation in the duty ratio due to the ambient temperature as shown below.

HSA6C, HSA7C



HSA6XC, HSA7XC



1.5 Options

●: Available to Select ○: Selectable with Exclusion ×: Unavailable to Select

No.	Option name	Model	HSA6C HSA7C	HSA6XC HSA7XC
1	With Brake	B	●	●
2	High Precision Specifications	HPR	○	×
3	Reversed-home Specification	NM	●	●
4	Suction joint equipped on different position	VR	●	●
5	Double Slider Specifications	W	○	×

1.5.1 With Brake (Model: B)

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

1.5.2 High Precision Specifications (Model: HPR)

* Lead 20 of HSA6C and Lead 16 and 24 of HSA7C are not available for selection

The positioning accuracy repeatability should be $\pm 0.005\text{mm}$.

The double slider specification (model code: W) cannot be selected when this option is selected.

1.5.3 Reversed-home Specification (Model: NM)

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

1.5.4 Suction joint equipped on different position (Model: VR)

The suction joint in standard is mounted on the left side of the main body in the view from the motor end. It is that the joint is mounted on the opposite side (opposite type).

1.5.5 Double Slider Specification (Model: W)

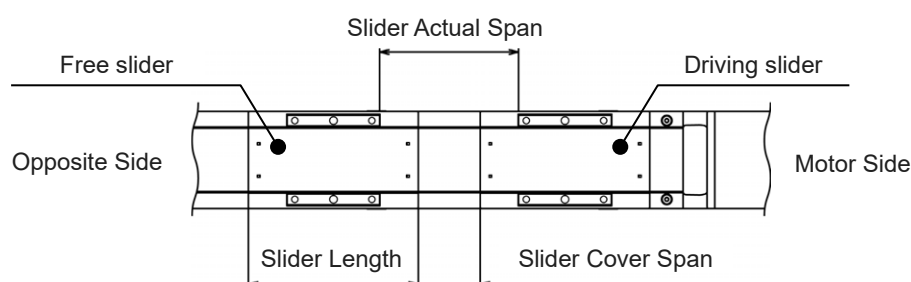
It is an option to add a free slider not connected to a ball screw on the opposite side of the motor. Doubling the slider makes it possible to increase the allowable moment and the overhang load length.

The high-accuracy type (model code: HPR) cannot be selected when this option is selected.

List of Double Slider Availability for Selection

○: Available to Select ×: Unavailable to Select

Type	Lead	Orientation	
		Horizontal	Vertical
RCP6CR-HSA6C	20	×	×
	12	○	×
	6	○	○
	3	○	○
RCP6CR-HSA7C	24	×	×
	16	○	×
	8	○	○
	4	○	○

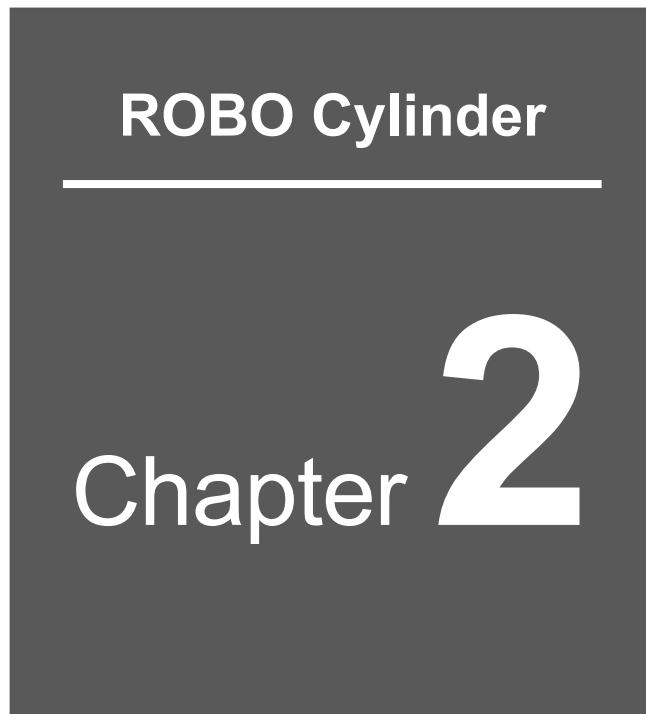


Type	Slider Span (mm)		Slider Length (mm)
	Slider Actual Span	Slider Cover Span	
HSA6C	90	40	110
HSA7C	73	24	126



Caution

- When the product is delivered from the factory, the driving slider and the free slider are not linked with each other. It is necessary that a user links the sliders.
- Make sure to have the driving slider and free slider linked during operation including the home-return operation. Any operation with the sliders not linked may cause damage.
- When the double slider is indicated, the length that the slider length from the nominal stroke (stroke for model) + slider actual span or the slider cover span is subtracted should be the actual effective stroke (operation available stroke).



Installation

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2.2	Installation and Storage/Preservation Environment.....	2-2
2.2.1	Installation environment.....	2-2
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2.1 Precautions for Transportation

[Handling the package]

- Do not damage or drop the package.
The package is not specially designed to withstand dropping or shock due to collision.
- Do not attempt to carry a heavy package with only one worker. Also, have an appropriate method for transportation.
- Keep the unit in horizontal position for storage or transportation.
- Do not climb onto the package.
- Do not put anything that could deform the package on it.

[Handling after unpacking]

- Carry while holding the frame, motor cover, and front bracket.
- Do not carry the unit by its end cover or controller cover assembly.
- Do not damage or drop the package during transportation.
- Do not apply excessive force to any part of the ROBO Cylinder. Do not attempt to grab on the stainless steel sheet or apply force on it.

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

[Handling when assembled into machinery (system)]

- Secure sliders to prevent sudden movement during transport.
- If the ROBO Cylinder body or any moving part is overhanging, fix it appropriately to avoid large wobbles due to external vibration.
When transporting without fixing the tip, do not apply impact of 0.3G or more.
- When suspending machinery (system) with ropes, be careful not to catch the rope on the ROBO Cylinder or cable.

2.2 Installation and Storage/Preservation Environment

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

Pollution degree 3: Environment with conductive pollution or dry nonconductive pollution but may get to conductive pollution due to occasional temporary condensation.
(IEC 60664-1)

2.2.1 Installation environment

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

Avoid the following locations for installation.

- Where the unit 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 unit receives direct sunlight
- Where the unit is exposed to corrosive or combustible gases
- Where the ambient air contains a large amount of dust, salt or iron (at levels exceeding those typical of an assembly plant)
- Where the unit is subject to splashed water or oil (including oil mist or cutting fluid) or chemical solutions
- Where the body receives impact or vibration
- Where the altitude is more than 2,000m

Provide sufficient work space for the following maintenance and inspection.

- Space to replenish grease
 - Space for replacement work of components such as a motor
- For details, refer to [Chapter 4 Maintenance and Inspection].

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

- Where noise is generated due to static electricity, etc.
- Where the unit is subject to a strong electric or magnetic field
- Where the unit is subject to ultraviolet or radiation

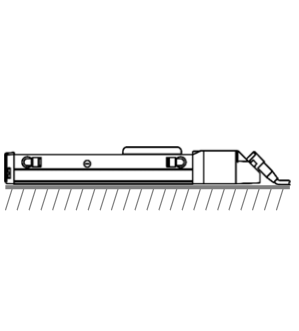
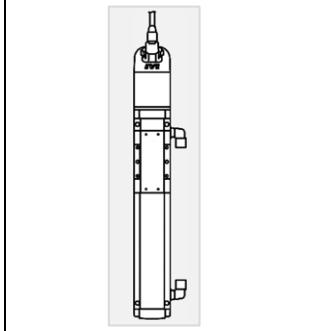
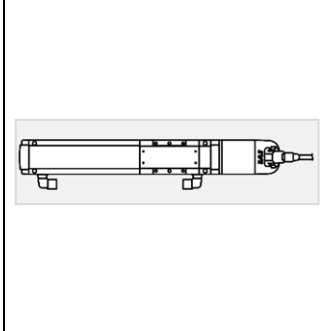
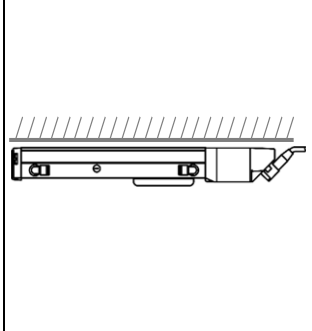
2.2.2 Storage/preservation environment

- For the storage and preservation environment, see the installation environment.
Give especial consideration to the prevention of condensation during long-term storage/preservation.
- Unless especially specified, desiccant is not included in the package at shipping.
If the product is to be stored/preserved in an environment where condensation is anticipated, take condensation preventive measures.
- For short-term storage, it can be stored at 60°C or below.
For storage of one month or more, make sure that the temperature does not exceed 50°C.
- The product should be placed horizontally for storage and preservation.
If storing in the packaged condition, observe the conditions, if any, regarding storage orientation.
Refer to Horizontal installation in [2.3.1 Mounting orientation] for the horizontal condition.

2.3 Caution for Installation

2.3.1 Mounting orientation

In common for types

Mounting orientation			
			
Horizontal installation	Vertical installation	Sideways installation	Ceiling Mount
○	○	△	△

○: Available for Installation

△: Confirm in [2.3.5 About stainless steel sheet] for use.



Caution

- When the motor straight type is to be installed in the vertical orientation, it is recommended to orient the motor at the top.

2.3.2 About installation surface

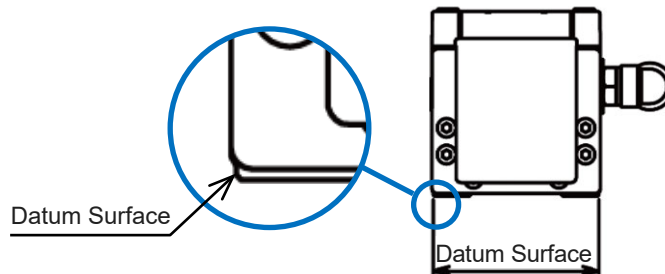
- The body mounting surface should be a machined surface or a plane with similar accuracy, with flatness within 0.05mm/m.
- The mounting frame should have a structure rigid enough to prevent the generation of vibration.
- Also consider the necessary space for maintenance work such as ROBO Cylinder replacement and inspection.

2.3.3 About attachment screws

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

2.3.4 About installation of main body

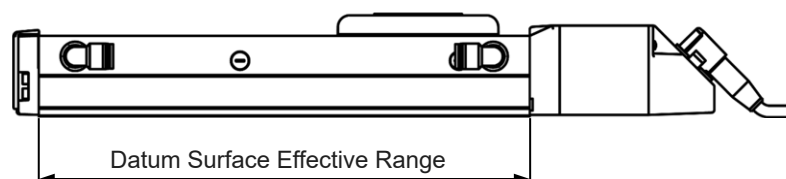
- The side and bottom of the base of an actuator are the datum surfaces for a slider for its run. Have these surfaces as datum when driving accuracy is required.

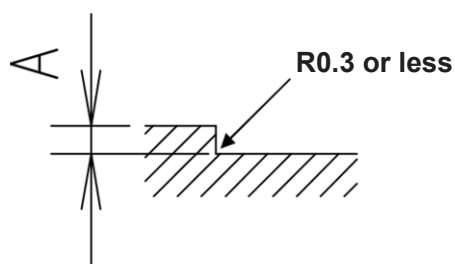


- When installation is performed using the datum surface on the side, follow the figure below for machining of the installation surface.

As the width dimension of a front bracket or rear bracket may be wider than the dimension of the datum surface on the side, have it put in the datum effective range.

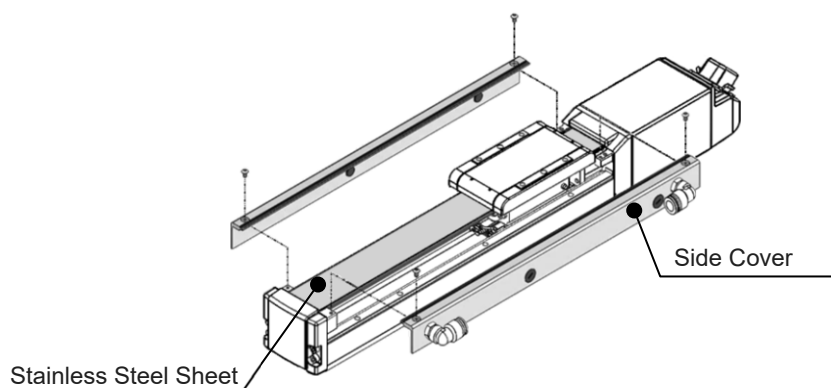
Having the machining of the datum surface out of the datum effective range may cause interference to a bracket or a part of a motor.





Type	A dimension (mm)
HSA6□ HSA7□	2 to 4

- There are threaded holes, through holes, positioning reamed hole and oblong hole equipped on the bottom of an actuator. When repeatability is required after taking it off and put back again, use the reamed hole. However, when it is necessary to have fine tuning of such as perpendicularity, consider to use only the reamed hole on the motor side.
- For fixation of an actuator, use all the threaded holes.
- When using attachment holes on the top surface, the side cover and stainless steel sheet need to be taken off in advance. For how to take it off, refer to [4.6.1 Stainless Steel Sheet Replacement/Adjustment].



- Using the top of the motor is recommended when installing vertically.
- The actuator equipped with a brake (option model code: B) is not capable of activating slider by the actuator itself. Connect a teaching tool or controller to have the slider perform jog operation.

2.3.5 About stainless steel sheet

- During installation, do not grasp or press on the stainless steel sheet. Otherwise, this may lead to stainless steel sheet damage.
- Although lateral or ceiling installation is possible, it may cause slackness or misalignment of the stainless steel sheet. Continued usage in this orientation may lead to damage to the stainless steel sheet.
- Adjust the stainless steel sheet if slackness or misalignment occurs.
- Keep adhesive, paint, and other viscous material off the stainless steel sheet. Such material adhering to the stainless steel sheet can lead to defective slider operation or sheet damage.
- Pay attention to the stainless steel sheet not to make a dent mark or damage by dropping a screw or a tool.

2.4 How to Install (HSA6□)

2.4.1 Body mounting

◆ HSA6C, HSA6XC

* Check [2.3 Caution for Installation] for installation.

Installation is available on the two surfaces on the base of the main body.

There are a reamed hole and an oblong hole for positioning pins on the base bottom surface.

Use the reamed hole and oblong hole if mounting reproducibility after detachment is required.

When fine adjustment of angles, etc. is required, consider using only the reamed hole.

For details regarding the position and dimensions, refer to [Chapter 5 External Dimensions].

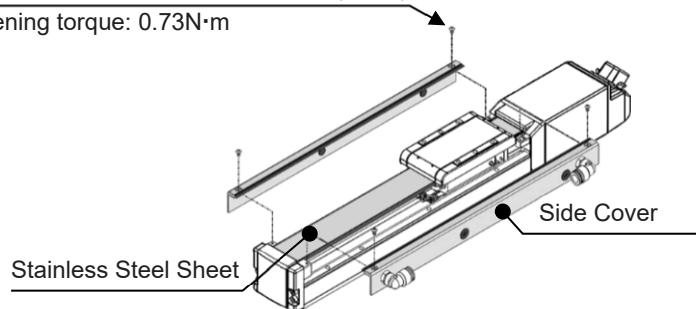
[1] Using the Through Holes on the Top of the Base

1. Remove the hex socket button head screws (4 pcs) to take the side cover off.

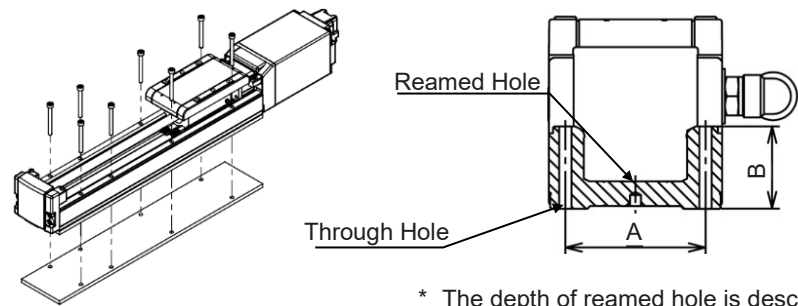
2. Take off the stainless steel sheet.

For how to take it off, refer to [4.6.1 Stainless Steel Sheet Replacement/Adjustment].

Hex socket button head screw M3×8 (4 pcs)
Tightening torque: 0.73N·m



3. Fix it with screws from the top of the base.



* The depth of reamed hole is described as those from the base seating surface

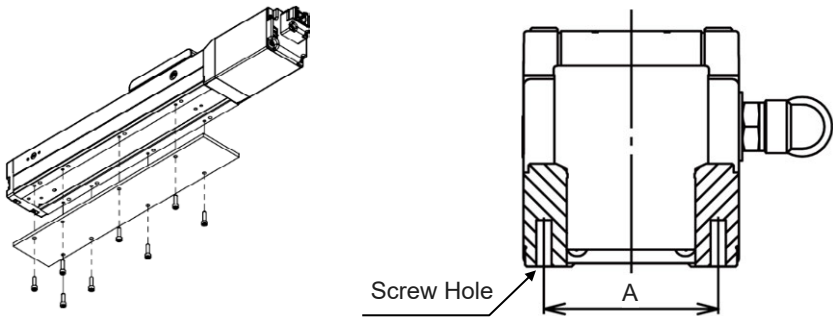
Type	Through Hole Diameter (mm)	A (mm)	B (mm)	Reamed Hole
HSA6C, HSA6XC	Φ4.5	51	30	Φ4H7 depth 5

Fixing Bolt	Tightening Torque (N·m)	
	When tightened surface is iron	When tightened surface is aluminum
M4	3.6	1.8

4. Assemble it in the order from Step 2 to 1.

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

Fix it with screws from the bottom of the base.



Type	Screw Hole	A (mm)
HSA6C, HSA6XC	M4 depth 8	51

Fixing Bolt	Tightening Torque (N·m)	
	When tightened surface is iron	When tightened surface is aluminum
M4	3.6	1.8

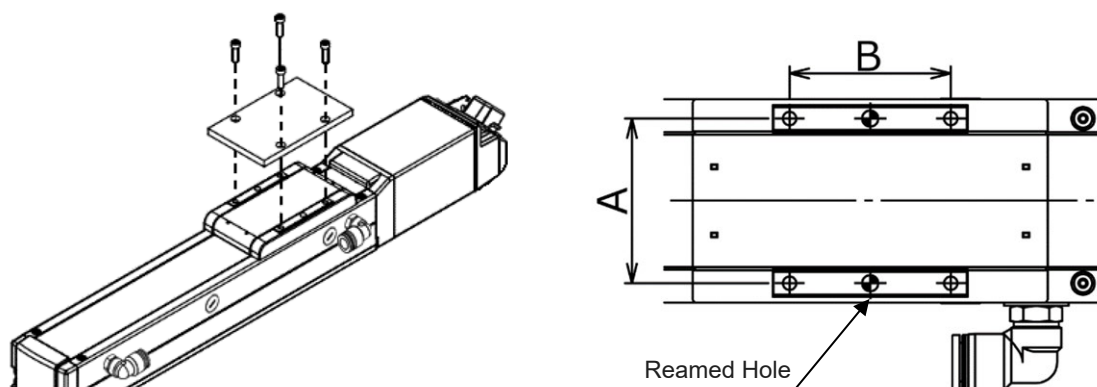
2.4.2 Mounting transported objects

Use the screw holes on the top surface of the slider to fix transported objects.

There are two reamed holes on the top surface of the slider.

Use these reamed holes if repeated attaching and detaching is required.

If fine-tuning of perpendicularity, etc. is required, use one of the reamed holes for this adjustment.



* Reamed hole pitch tolerance: $\pm 0.02\text{mm}$

Type	Screw Hole	A (mm)	B (mm)	Reamed Hole
HSA6C, HSA6XC	M5 depth 10	51	50	$\Phi 5\text{H7}$ depth 5

Fixing Bolt	Tightening Torque (N·m)	
	When tightened surface is iron	When tightened surface is aluminum
M5	7.3	3.4



Caution

- Be careful with regard to the length of the mounting bolt and positioning pin.
- The use of screw-in depth greater than that of the tapped or reamed mounting holes may damage the tapped hole or reduce the mounting strength of the transported object, leading to decreased accuracy or unexpected accidents.
- Check in [2.3 Caution for Installation] for cautions during installation.

2.5 How to Install (HSA7□)

2.5.1 Body mounting

◆ HSA7C, HSA7XC

* Check [2.3 Caution for Installation] for installation.

Installation is available on the two surfaces on the base of the main body.

There are a reamed hole and an oblong hole for positioning pins on the base bottom surface.

Use the reamed hole and oblong hole if mounting reproducibility after detachment is required.

When fine adjustment of angles, etc. is required, consider using only the reamed hole.

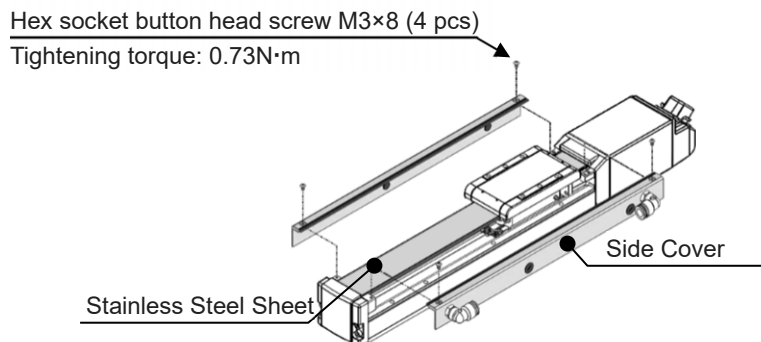
For details regarding the position and dimensions, refer to [Chapter 5 External Dimensions].

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

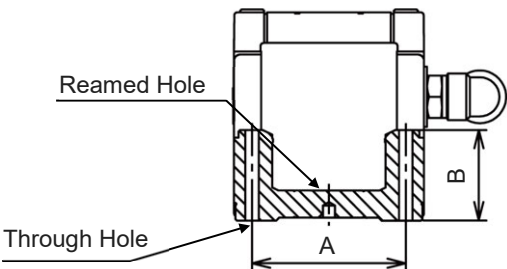
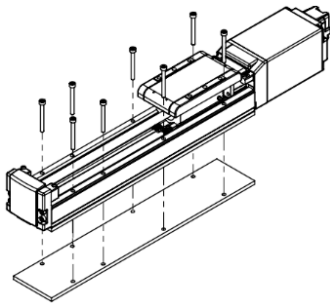
1. Remove the hex socket button head screws (4 pcs) to take the side cover off.

2. Take off the stainless steel sheet.

For how to take it off, refer to [4.6.1 Stainless Steel Sheet Replacement/Adjustment].



3. Fix it with screws from the top of the base.



* The depth of reamed hole is described as those from the base seating surface

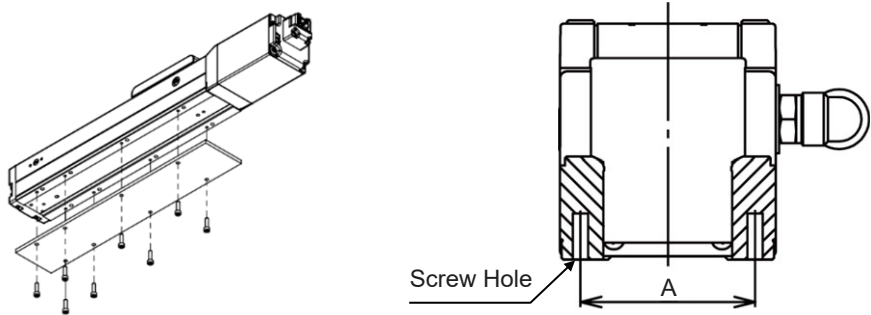
Type	Through Hole Diameter (mm)	A (mm)	B (mm)	Reamed Hole
HSA7C, HSA7XC	φ5.5	61	35	φ4H7 depth 5

Fixing Bolt	Tightening Torque (N·m)	
	When tightened surface is iron	When tightened surface is aluminum
M4	3.6	1.8

4. Assemble it in the order from Step 2 to 1.

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

Fix it with screws from the bottom of the base.



Type	Screw Hole	A (mm)
HSA7C, HSA7XC	M5 depth 10	61

Fixing Bolt	Tightening Torque (N·m)	
	When tightened surface is iron	When tightened surface is aluminum
M5	7.3	3.4

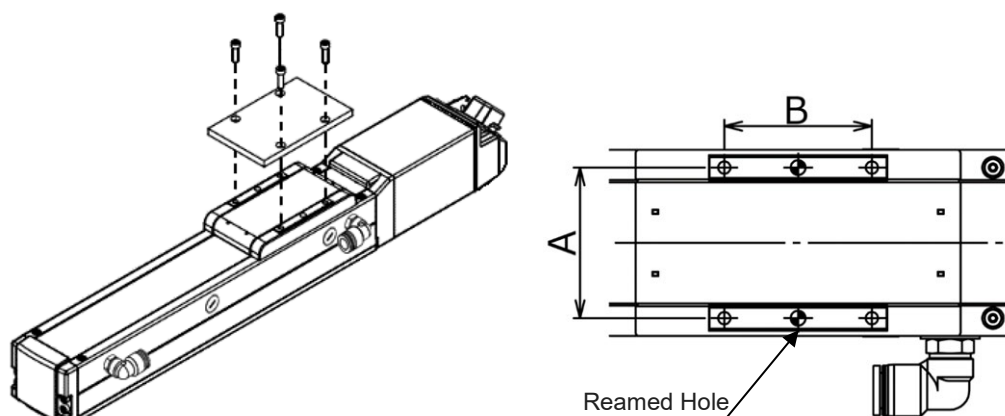
2.5.2 Mounting transported objects

Use the screw holes on the top surface of the slider to fix transported objects.

There are two reamed holes on the top surface of the slider.

Use these reamed holes if repeated attaching and detaching is required.

If fine-tuning of perpendicularity, etc. is required, use one of the reamed holes for this adjustment.



* Reamed hole pitch tolerance: $\pm 0.02\text{mm}$

Type	Screw Hole	A (mm)	B (mm)	Reamed Hole
HSA7C, HSA7XC	M5 depth 10	61	50	$\Phi 5\text{H7}$ depth 5

Fixing Bolt	Tightening Torque (N·m)	
	When tightened surface is iron	When tightened surface is aluminum
M5	7.3	3.4



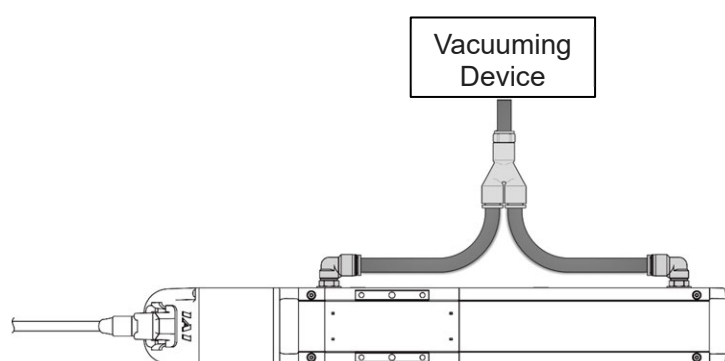
Caution

- Be careful with regard to the length of the mounting bolt and positioning pin.
- The use of screw-in depth greater than that of the tapped or reamed mounting holes may damage the tapped hole or reduce the mounting strength of the transported object, leading to decreased accuracy or unexpected accidents.
- Check in [2.3 Caution for Installation] for cautions during installation.

2.6 Suction in Clean Specifications

An actuator applicable for clean specification is capable of performing cleanliness complied with Cleanroom ISO Class 2.5 (ISO 14644-1 standard) by vacuuming air from the joint for suction. The table below shows a reference of vacuuming volume in each lead (maximum velocity) in each model.

- Air vacuuming should be conducted at the two points of suction joints allocated on the side of the unit with the vacuuming volume (total of two points) described in the table below. Also, mind the piping of vacuuming so the vacuuming volume will get even at the two points.
- Cover up all the base attachment holes on the bottom of the main unit when use. With a through hole on the main unit, the cleanliness level should decrease.



Vacuum Volume for Each Lead

Type	Lead (mm)	Vacuuming Volume	
		NL/min	L/min
RCP6CR-HSA6C	20	100	107
	12	70 (100)	75 (107)
	6	40 (60)	43 (64)
	3	30 (35)	32 (38)
RCP6CR-HSA7C	24	130	139
	16	80 (100)	86 (107)
	8	50 (60)	54 (64)
	4	30 (40)	32 (43)
RCP6CR-HSA6XC	20	110	118
	12	110	118
	6	55	59
	3	40	43
RCP6CR-HSA7XC	24	140	150
	16	120	129
	8	55	59
	4	35	38

Values in brackets () show double slider specifications

* The vacuum volumes described in this manual are the flow volume under the conditions below.

NL/min : Pressure 0.1013MPa, Temp. 0degC, Humidity 0%

L/min : Pressure 0.1013MPa, Temp. 20degC, Humidity 65%

ROBO Cylinder

Chapter 3

Connecting with the Controller

3.1	Connecting with the Controller	3-1
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3.1 Connecting with the Controller

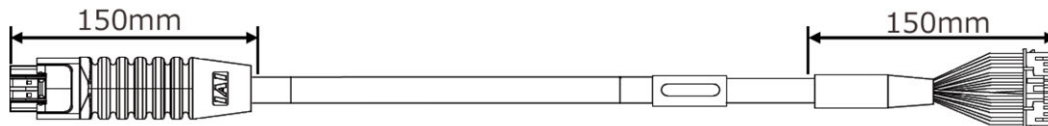


Caution

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.

- For the dedicated cables indicated in this manual, use those provided by IAI. If there is any requirement of changing the dedicated cable specification, consult with IAI.
- 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.

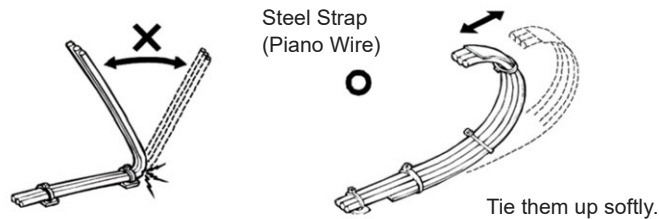
- Make sure there is not too much friction inside the cable storage equipment.
- Do not apply radiated heat to power line or cables.
- Do not attempt to bend the cable at any point within 150mm from the end of the connector.
 Standard Cables CB-CAN-MPA□□□, CB-ADPC-MPA□□□
 Robot Cables CB-CAN-MPA□□□-RB, CB-ADPC-MPA□□□-RB



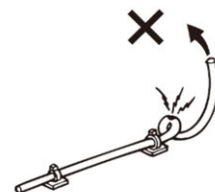
- Do not attempt to use the motor / encoder cable in a condition that the cable is bundled up in several layers such as coil winding.
 There are motor driving power line and encoder signal line in the motor / encoder cable.
 Therefore, if the motor / encoder cable is bundled up, the noise generated from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



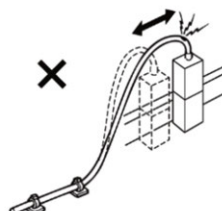
- Have a sufficient radius for bending, and avoid a bend concentrating on one point.



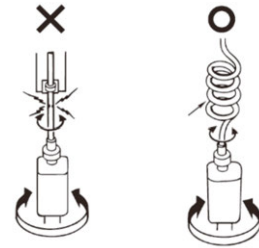
- Do not let the cable bend, kink or twist.



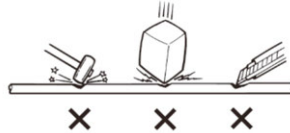
- Do not pull the cable with a strong force.



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



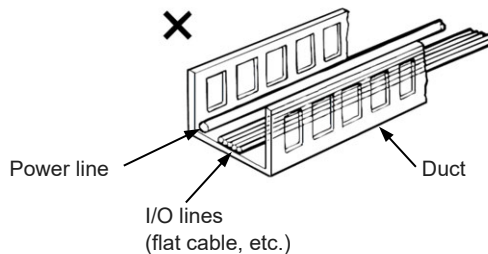
- Do not pinch, drop a heavy object onto or cut the cable.



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

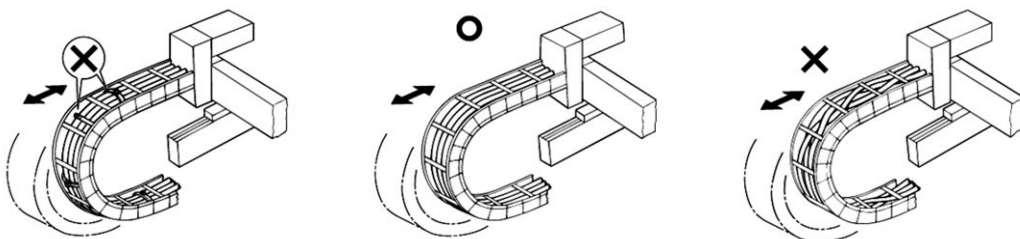


- PIO line, communication line, power and driving lines are to be put separately from each other and do not tie them together. Arrange so that such lines are independently routed in the duct.

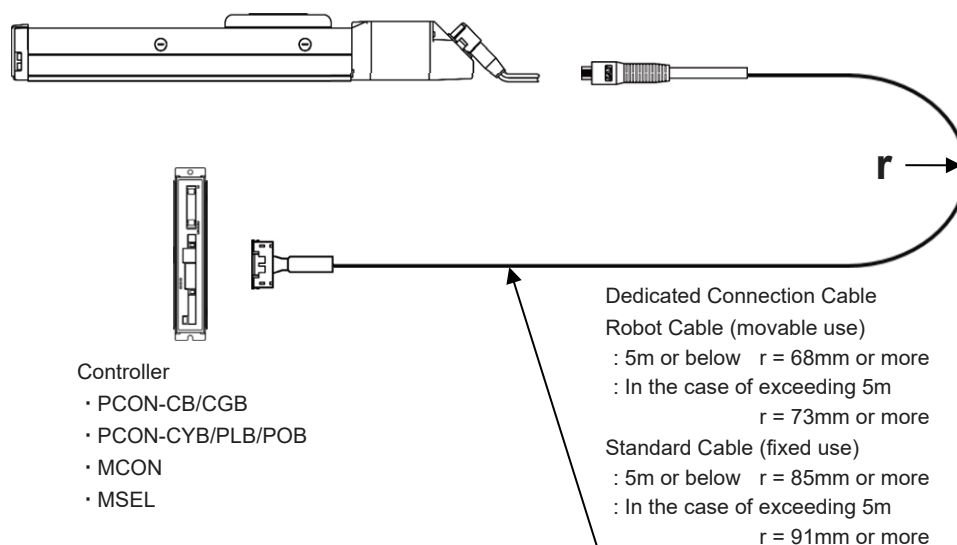


[Follow the instructions below when using a cable track.]

- 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.



[1] For Controllers PCON, MCON and MSEL

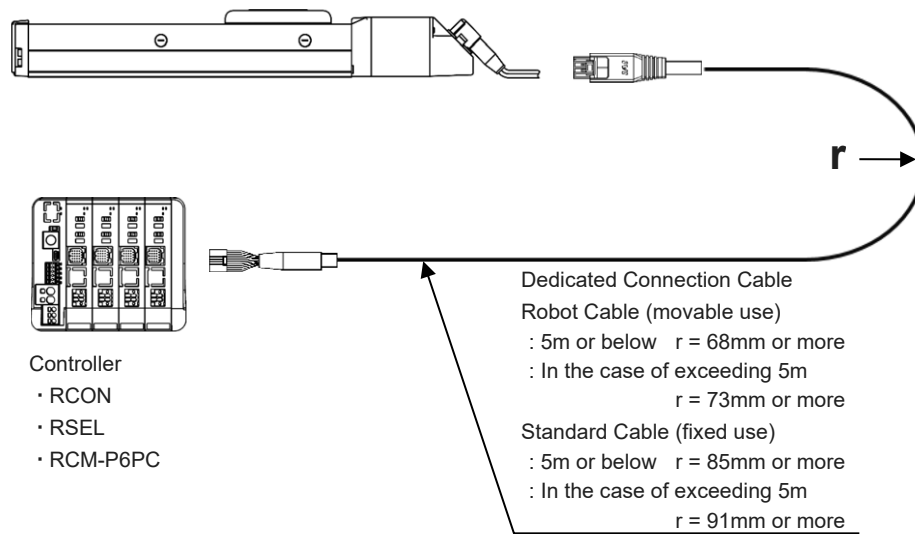


Dedicated Connection Cable Model Code

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

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

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



Dedicated Connection Cable Model Code

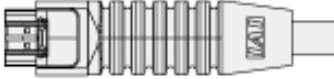
Cable type	Model Code
Motor Encoder Integrated Cable	CB-ADPC-MPA□□□
Motor Encoder Integrated Robot Cable	CB-ADPC-MPA□□□-RB
Motor Encoder Integrated Cable 4-way Connector Type	CB-ADPC2-MPA□□□
Motor Encoder Integrated Robot Cable 4-way Connector Type	CB-ADPC2-MPA□□□-RB

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

3.1 Connecting with the Controller

[4-Way Connector Cable]

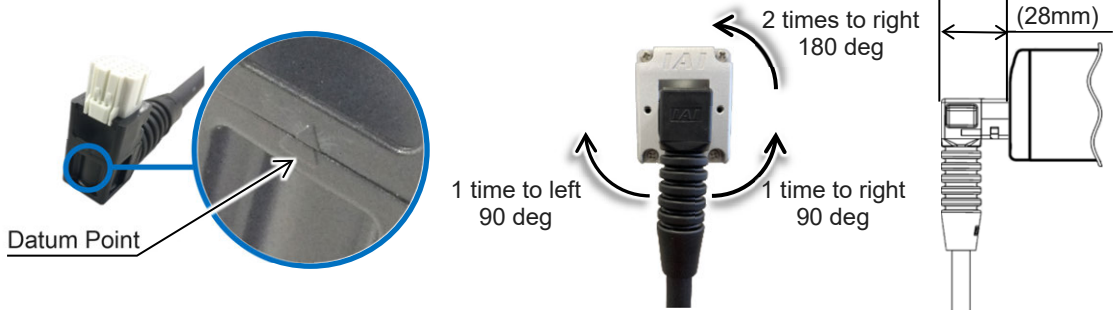
It is a cable capable of changing its orientation in four ways at the cable connector for ROBO Cylinder.

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



Caution

- The four-way connector type cannot turn in 360deg.
A turn "in 1 time to left" and "in 2 times to right" can be made from the datum position.
(The count for turn should be 10 times or less)
- In some directions of cable ejection, it may interfere with an actuator.



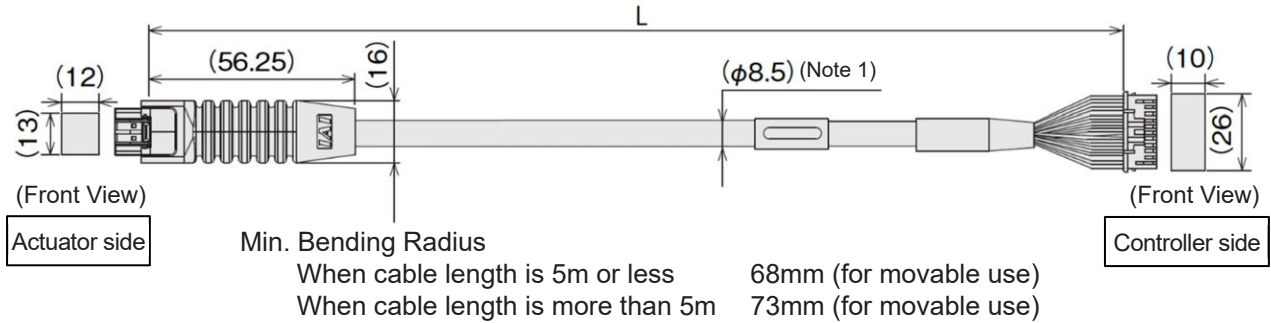
3.2 Motor • Encoder Cables

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

[1] Motor Encoder Integrated Cable

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

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



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

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

Connection Diagram

DF62DL-24S-2.2C (Hirose)

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

PADP-24V-1-S (JST)

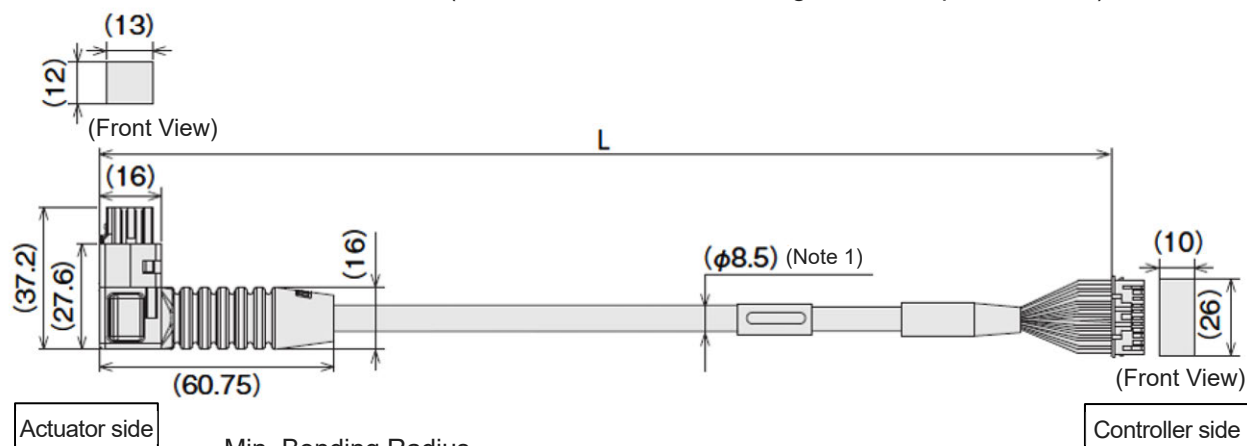
Pin No.	Symbol
1	ϕA
2	VMM
3	ϕB
4	VMM
5	ϕ_A
6	ϕ_B
11	SA [mABS]
12	SB [mABS]
13	A+
14	A-
15	B+
16	B-
18	VPS
7	LS+
9	BK+
10	BK-
17	VCC
19	GND
8	LS-
20	LS_GND
22	-
21	CF_VCC
23	-
24	FG

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

[2] Motor Encoder Integrated Cable 4-way Connector

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

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



Min. Bending Radius

When cable length is 5m or less 68mm (for movable use)

When cable length is more than 5m 73mm (for movable use)

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

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

Connection Diagram

DF62DL-24S-2.2C (Hirose)

PADP-24V-1-S (JST)

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

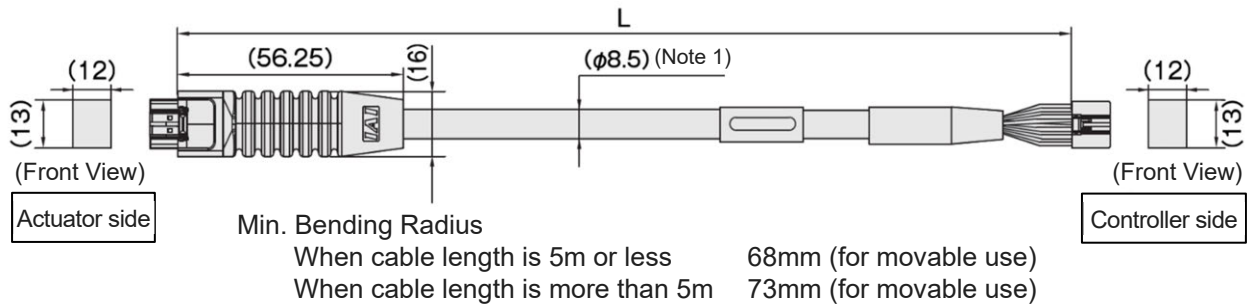
Standard: Purple (AWG26)
Robot: Gray (AWG26)

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

[1] Motor • Encoder Integrated Cable Standard Connector

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

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



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

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

Connection Diagram

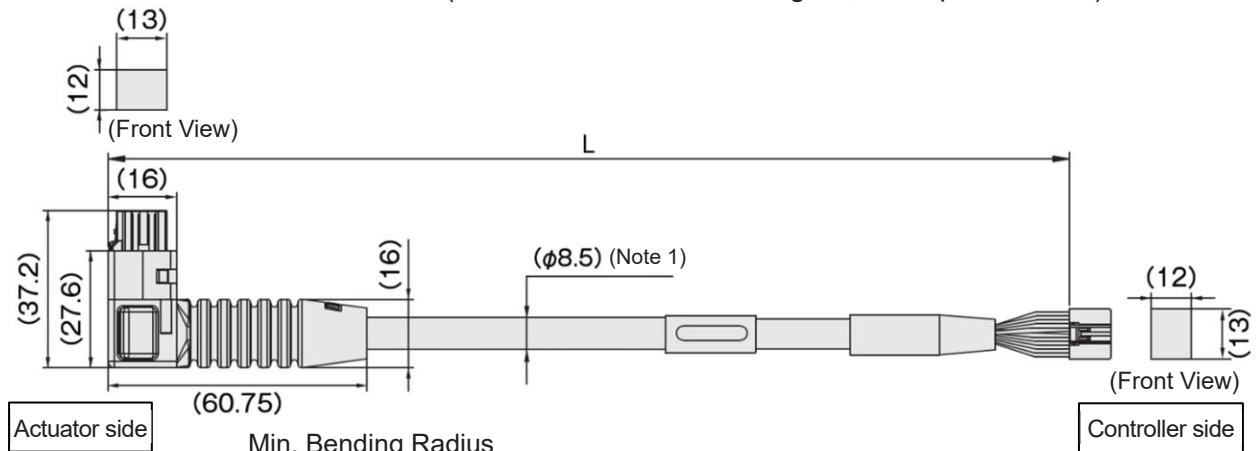
DF62DL-24S-2.2C (Hirose)				DF62DL-24S-2.2C (Hirose)			
Color (Thickness)		Symbol	Pin No.	Pin No.	Symbol	Color (Thickness)	
Standard Cable	Robot Cable					Standard Cable	Robot Cable
Blue (AWG22/19)	Black (AWG22/19)	ϕA	3	3	ϕA	Blue (AWG22/19)	Black (AWG22/19)
Orange (AWG22/19)	White (AWG22/19)	VMM	5	5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

Purple
(AWG26)

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

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

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



Min. Bending Radius

When cable length is 5m or less 68mm (for movable use)

When cable length is more than 5m 73mm (for movable use)

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

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

Connection Diagram

DF62DL-24S-2.2C (Hirose)

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

DF62DL-24S-2.2C (Hirose)

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

Purple
(AWG26)

3.3 About 8-Way Connector

These models have a connector to change the direction of ejection by a user.
This connector is available for free selection for direction from eight directions.

- RCP6CR-HSA6C/HSA6XC
- RCP6CR-HSA7C/HSA7XC

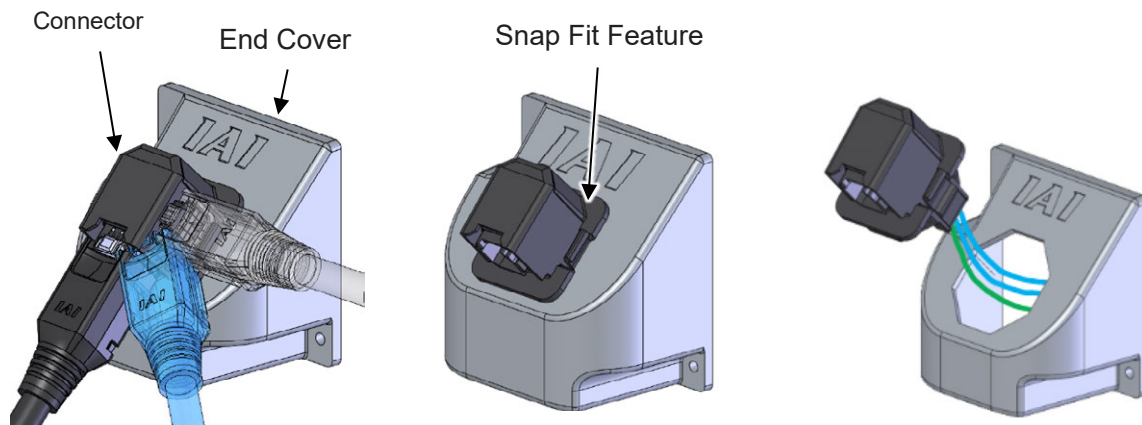
◆ Changing Cable Ejection Direction

Push in the snap fit features on the both side holding the connector to take the connector off.
Turn the connector to a direction desire to have the cable ejected, and push in the snap fit features till they make a click noise and stop.



Caution

- There are internal wirings in the connector. Pay attention not to pull forcefully and damage the wirings.
- Turning the connector over 360deg could apply load to internal wirings, which may cause malfunction.
If you feel load when turning it, turn it back to the other way.
- When taking the connector off, pay attention to contamination and dirt getting inside.



ROBO Cylinder

Chapter 4

Maintenance and Inspection

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4.1 Precautions for Maintenance and Inspection Work

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



Caution

- Do not climb on or put anything on the actuator.
Otherwise, this may lead to accidental falling, injury or damage to the product due to falling objects, product loss of function or performance degradation, or shortening of product life.
- Before releasing the brake, make sure to check there is nothing that will interfere with moving parts within the operation range.
The slider may fall, possibly injuring the operator or people nearby and damaging the actuator, workpiece or equipment.
- Check that the power to the actuator is OFF before conducting any maintenance or inspections.
- Be careful not to lose the cover or any removed screws.
Be sure to return the product to the original condition after maintenance and inspection work.
Mounting in an incomplete state may cause injuries or damage to the product.
- Do not modify, disassemble/assemble, or use maintenance parts not specified on your own discretion under any circumstances.
- The grease film may run out if the actuator performs return operation continuously over a distance of 30mm or less. As a guideline, every 5,000 to 10,000 cycles, have approximately 5 cycles of return operation over a 50mm distance or more to regenerate the oil film.
The ball screw or guide may be damaged if the oil film runs out.



Notice

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

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

- It is recommended to improve the environmental conditions in case the grease changes color notably due to poor operating conditions.
- Base oil may separate from the grease due to the mounting orientation or operating conditions.

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

Check visually for oil drips when supplying grease.

- An actuator stored for 6 months or more may suffer from grease degradation.

Supply grease before the start of use.

For details, refer to [4.5 Grease Supply].

4.2 Inspection

Follow the maintenance inspection schedule below.

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

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

4.2.1 Inspection items and schedule

Period of Time	External Visual Inspection	Internal Inspection	Grease Supply
Start of work inspection	○		
1 month inspection	○		
6 month inspection	○	○	
1 year inspection	○	○	○
Every 6 months thereafter	○		
Every year thereafter	○	○	○

4.2.2 Grease supply timing (Reference)

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

Maximum Speed of Use (mm/s)	Grease Supply Timing (Reference)	
	Operated distance	Months
0 to 750 or less	1,250km	12 months
750 to 1500	2,500km	

4.3 Visual Inspection

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

4.3.1 External visual inspection

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

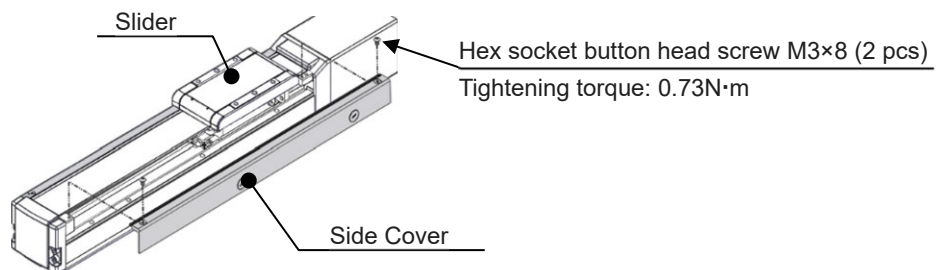
* Reference of life of stainless steel sheet :5,000km

4.3.2 Internal visual inspection

Inspection Items	Maintenance Work
Backlash/play or wear debris found?	The ball screw guide may be damaged. Contact IAI.
Has foreign matter penetrated inside?	Remove the foreign matter, clean, and inspect the interior for any damage.
Is the ball screw or guide grease not lubricating well? (Even if the grease is brown, lubrication is adequate if the running surface is shiny)	Wipe away the old grease, then replenish with new grease.
Is dust or foreign matter adhered to the ball screw or guide?	Replenish with new grease after cleaning.
Is there any remarkable abrasion, crack or chipping on the intermediate support cushion?	In case there is any abnormality confirmed, replace the intermediate support cushions. Refer to [4.6.4 Replacement of intermediate support cushion] Applicable Models: HSA6XC,HSA7XC

◆ Internal inspection method

1. Remove the hex socket button head screws (2 pcs) and take the side cover off.
* There is no matter which of right side cover or left is to be taken off.
2. Check inside.
3. Attach the side cover with the hex socket button head screws (2 pcs).
* Have the stainless steel sheet slightly pushed up to press in the side cover.
The stainless steel sheet contacting the side cover may cause damage or waviness on the stainless steel sheet which could lead to early degradation or abrasion.
4. Make sure that the slider and the side cover do not interfere, moving the slider backwards and forwards between the strokes.



Caution

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

4.4 Cleaning

4.4.1 External 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.

4.4.2 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.

4.5 Grease Supply

4.5.1 Grease used

Use recommended or equivalent product.

Oil Supply Point	Recommended Product Grease
Ball Screw	Kuroda Precision Industries / Kuroda C Grease (Urea Based Grease)
Guide	

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



Caution

- Do not attempt to use any type of grease other than urea based grease (low particle-emission grease).

In case the grease gets mixed with any other than the urea based Grease, it may disable the original lubricating performance, which could cause damage to the mechanicals or drop the cleanliness performance.

4.5.2 Grease supply procedure



Caution

- Supplying too much grease may increase sliding resistance and load to the motor, resulting in a drop of performance.
Also, excess grease on the ball screw may be splashed around in the ambience.
- Do not damage the stainless steel sheet by bending it forcefully during work.
- Keep in mind that the edges of the stainless steel sheet can cause injuries. Always wear gloves when working on it.
- The front bracket is supporting the ball screw. Do not detach it.
If the front bracket loses its tuned condition, it may cause an increase of driving resistance, shortened life of each component or abnormal noise due to the center of the axis being off the right position.
- In case the grease got into your eye, rinse it off with clean water for 15 minutes and immediately go see the doctor to get appropriate care.
- Wash your hands well with soap to rinse grease off after supplying grease.

◆ Preparation

- Phillips Screwdriver
- Protection Gear (e.g. Cotton Work Gloves)
- Grease Gun

Grease Gun	Nozzle	Supplier of Nozzle	Grease Nipple Diameter
Grease gun of mounting screw R1/8 (e.g.) GC-57K (Yamada Corporation)	NZ3	NSK	Φ3.5

- Grease

Type	Amount of Grease Supply (Reference)
HSA6C, HSA7C	1.5cc to 2.0cc
HSA6XC, HSA7XC	3.0cc to 4.0cc

◆ Grease Supply Procedure

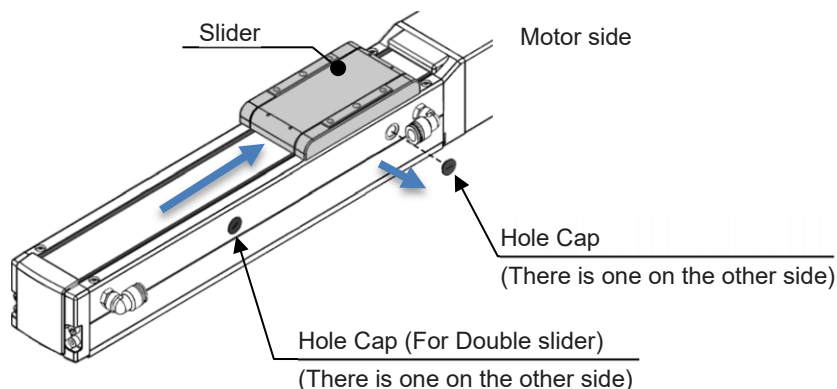
[1] HSA6C, HSA7C (Single slider, Double slider)

* For the single slider, grease supply can also be conducted with Procedure [2].

1. Move the slider to the motor end.

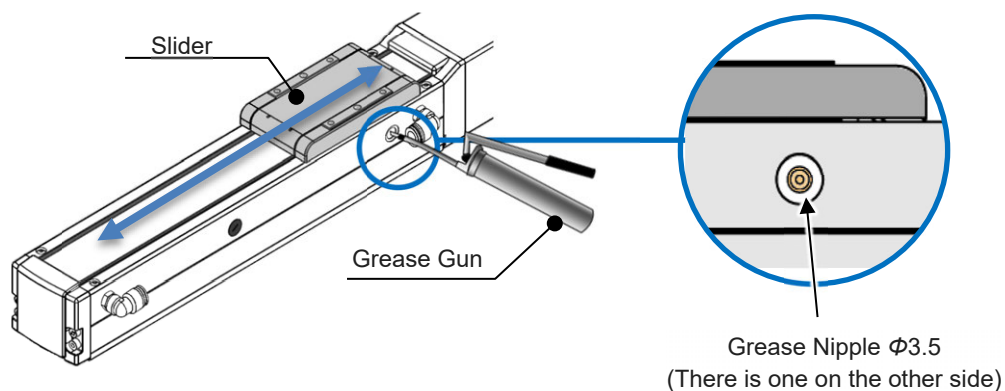
2. Remove the hole cap.

* There is another grease nipple available for grease supply on the other side.
Either side is available for grease supply on the ball screw and the guides.

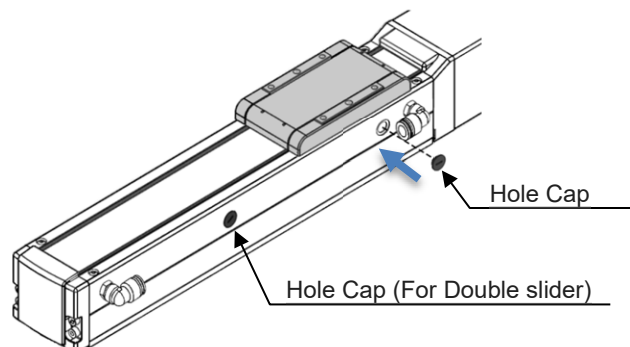


3. Supply grease with a grease gun at the grease nipple ($\phi 3.5$).

Move the slider in the full stroke range after supplying grease to spread the grease evenly.

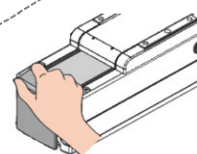
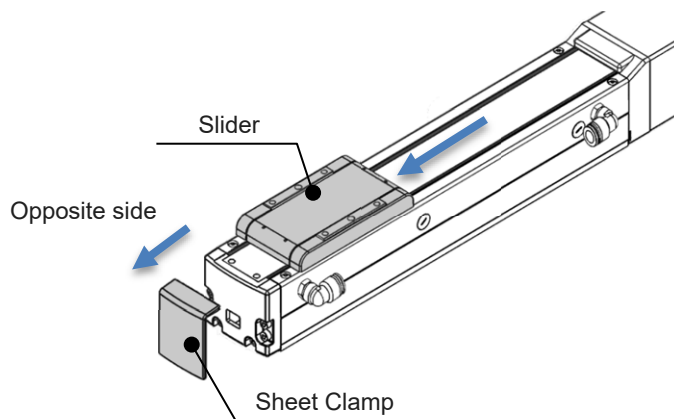


4. Put on the hole cap that was removed in step 2.



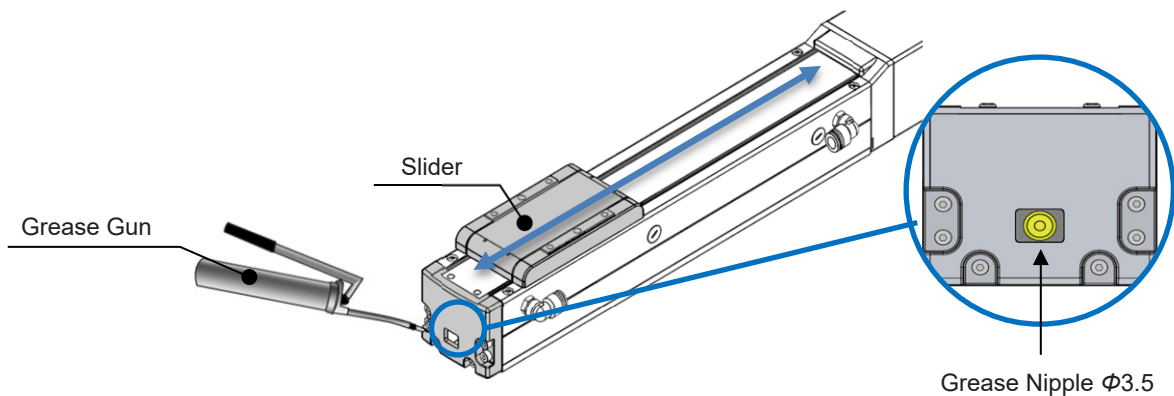
[2] HSA6C, HSA7C (Single slider only)
HSA6XC, HSA7XC

1. Move the slider to the opposite side of the motor.
2. Take the sheet clamp off.

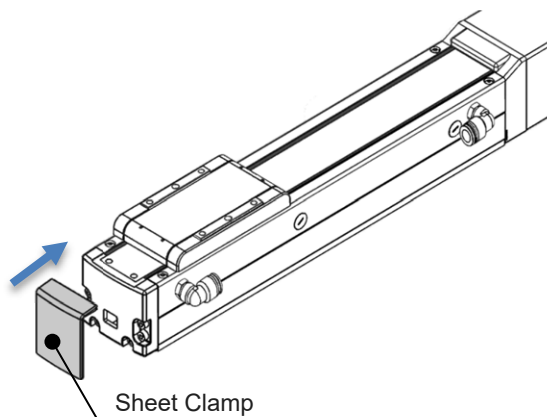


To take the sheet clamp off, put a finger between the stainless steel sheet and the sheet clamp and push the clamp up to pull it off.

3. Supply grease with a grease gun at the grease nipple ($\Phi 3.5$).
* Grease should be supplied on the ball screw and guides.
Move the slider in the full stroke range after supplying grease to spread the grease evenly.



4. Put the sheet clamp on.



4.6 Replacing Components

4.6.1 Stainless steel sheet replacement/adjustment

◆ **Preparation**

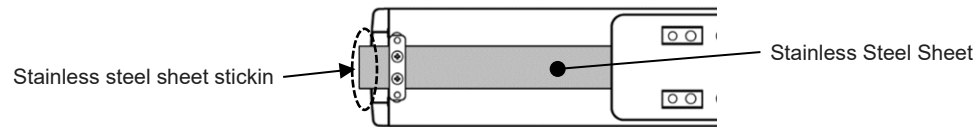
- Phillips Screwdriver
- Protection Gear (e.g. Cotton Work Gloves)
- Tape
- Scissors
- Stainless Steel Sheet for Replacement

Type	Model Code	
	Single Slider	Double Slider
HSA6C	ST-ECH-S6-(Stroke)	ST-ECH-S6D-(Stroke)
HSA6XC	ST-ECXH-S6-(Stroke)	—
HSA7C	ST-ECH-S7-(Stroke)	ST-ECH-S7D-(Stroke)
HSA7XC	ST-ECXH-S7-(Stroke)	—



Caution

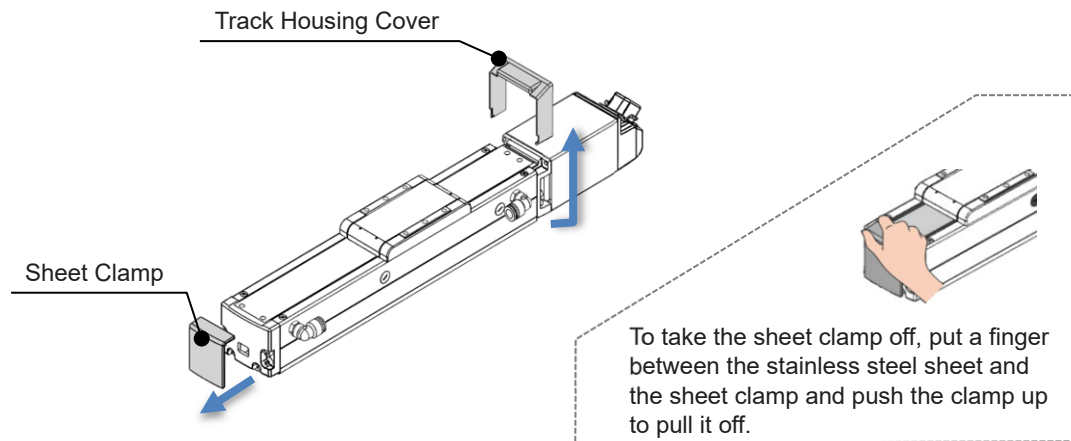
- Degradation and wear-out of the stainless steel sheet relies on its tension of attachment. Pulling it with high tension making the gap to the slider cover too big may cause fatigue fracture, and if the tension is too loose, the stainless steel sheet may interfere with the back of the slider cover,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



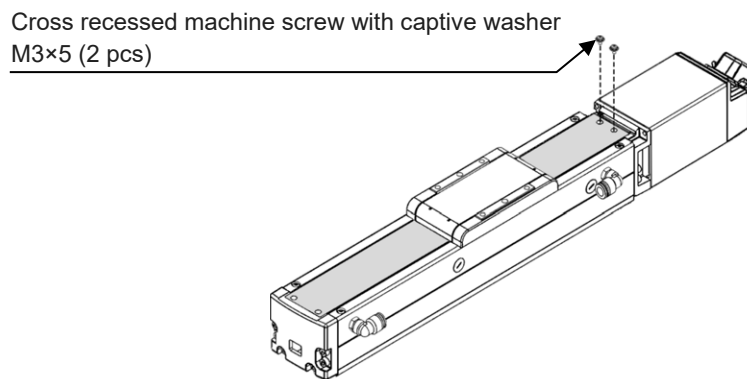
- As a guideline, the stainless steel sheet should last for about 5,000km of motion. However, depending on the usage or environment, replace the stainless steel sheet appropriately.

◆ Procedure for Replacement

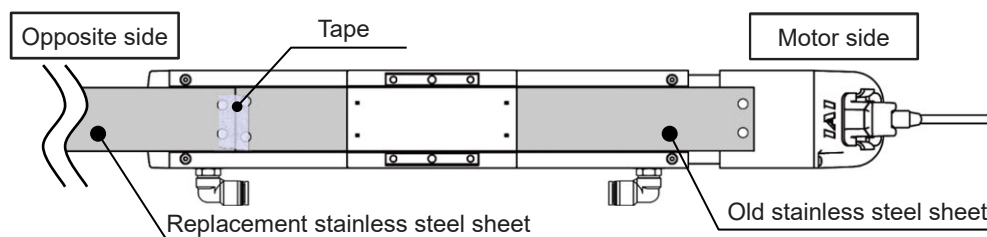
1. Take off the track housing cover and the sheet clamp.



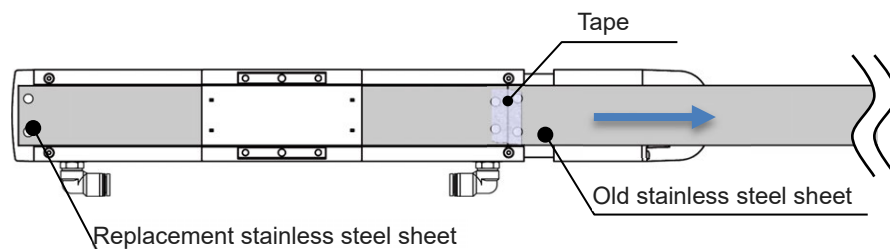
2. Remove the cross recessed machine screws with captive washer (2 pcs).



3. Join the old stainless steel sheet with a stainless steel sheet for replacement.
 - * Make sure width of adhesive tape would not go out of the stainless steel sheet width.
 - * The pitches between holes are different. The pitch is wider on the end opposite the motor.



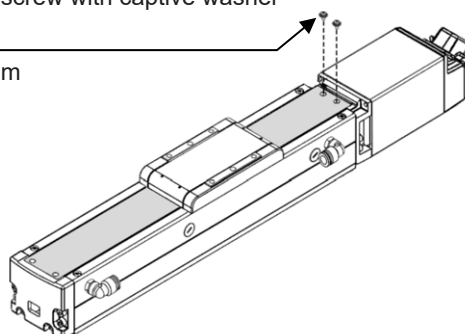
4. Pull the old stainless steel sheet slowly to replace it with the stainless steel sheet for replacement, and take off the old stainless steel sheet and the tape.



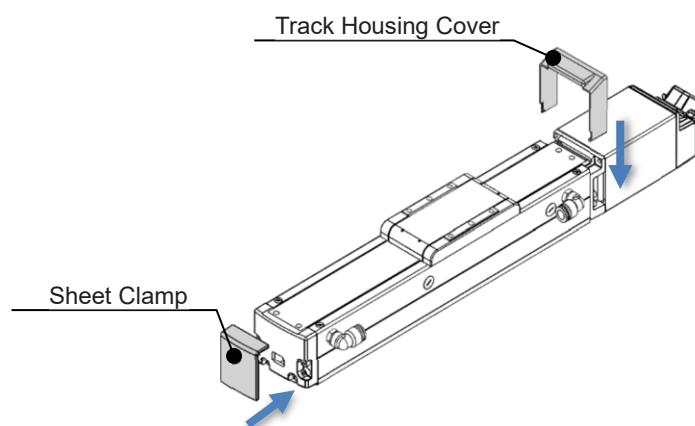
5. Put on the cross recessed machine screws with captive washer (2 pcs).

Cross recessed machine screw with captive washer
M3×5 (2 pcs)

Tightening torque: 0.42N·m

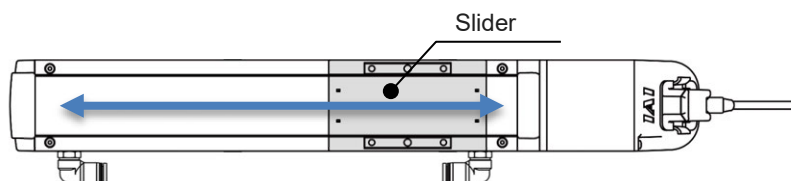


6. Put on the track housing cover and the sheet clamp.



7. Move the slider in the full stroke range to make sure there is no waviness or looseness on the stainless steel sheet.

Redo the Step 5 and 6 if there is any problem.

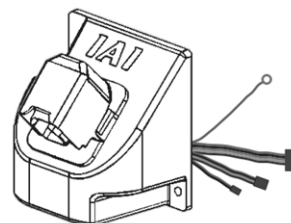


4.6.2 End cover assembly replacement

◆ Preparation

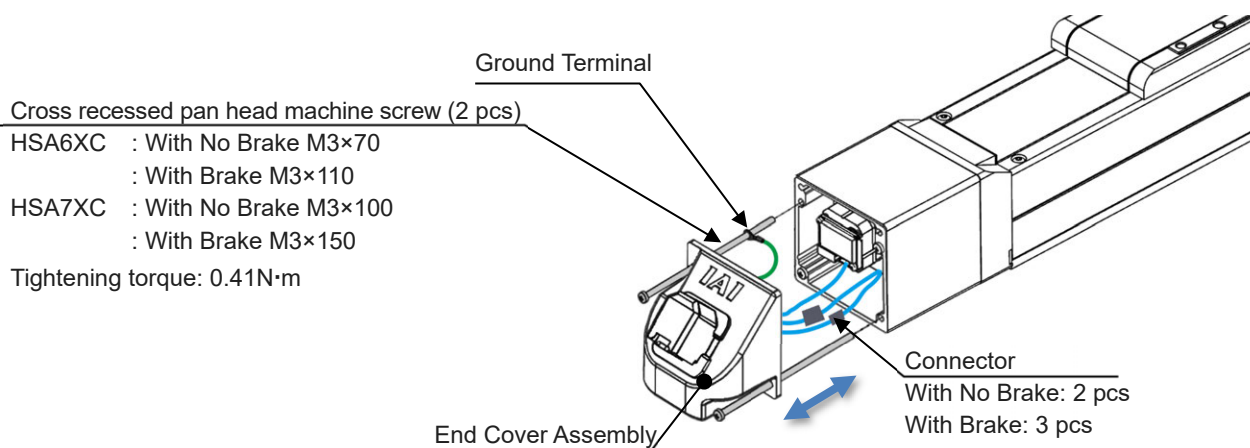
- Phillips Screwdriver
- End Cover Assembly for Replacement

Type	Model Code
HSA6(X)C	EWB-RCP6-HSA6
HSA7(X)C	EWB-RCP6-HSA7



◆ Procedure for Replacement

1. Remove the cross recessed pan head machine screws (2 pcs) and take the end cover assembly off.
 * A ground terminal is tightened together.
 * As a cable is connected, do not attempt to pull it forcefully.
2. Take the connector off.
3. Put on the connector for an end cover assembly for replacement.
4. Put the ground terminal through the cross recessed pan head machine screw (1 pc) and put it on the end cover.

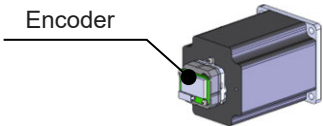


4.6.3 Replacement work of motor unit and coupling spacer



Caution

- Do not attempt to touch on the encoder part of the motor directly with hand.
If touched with hands, the encoder phase may change, resulting in an error.
- Static electricity may cause malfunction.
Do not attempt to do the replacement work in any place that is easy to cause static electricity (such as on a carpet).
Touch a metal to remove static electricity from the body before start replacement work.



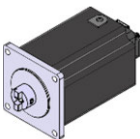
◆ Preparation

- Hex Wrench and Torque Wrench Parallel Faces: 2.5mm, 3mm
- Open-ended Wrench (with Width Across Flats 14mm)
- Grease to be Applied on Coupling Spacer (NOXLUB TL1010 Grease manufactured by NOK)
- Motor Unit for Replacement

Type	Brake	Model Code
HSA6C HSA6XC	No	RCP6-MUHSA6C
	Yes	RCP6-MUHSA6C-B
HSA7C HSA7XC	No	RCP6-MUHSA7C
	Yes	RCP6-MUHSA7C-B



HSA6(X)C



HSA7(X)C * The image shows a model equipped with no brake.

- Coupling Spacer for Replacement

Type	Model Code
HSA6C, HSA6XC	CPG-RCP6-S
HSA7C, HSA7XC	CPG-RCP6-M

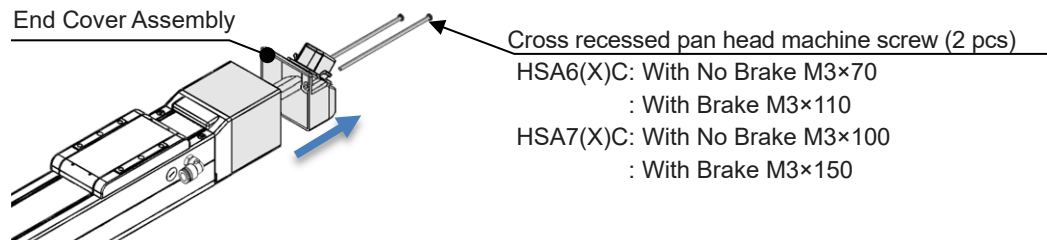


◆ Procedure for Replacement

1. Remove the cross recessed pan head machine screws and slide the end cover assembly.

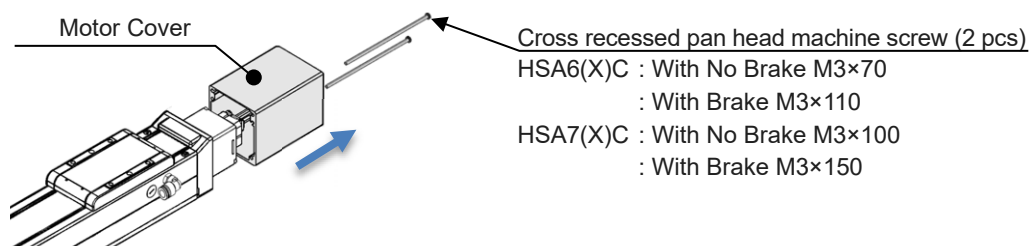
* For HSA6XC and HSA7XC, there is a ground terminal tightened together.

* As the cables are joined, do not pull it forcefully.



2. Take the motor cover off.

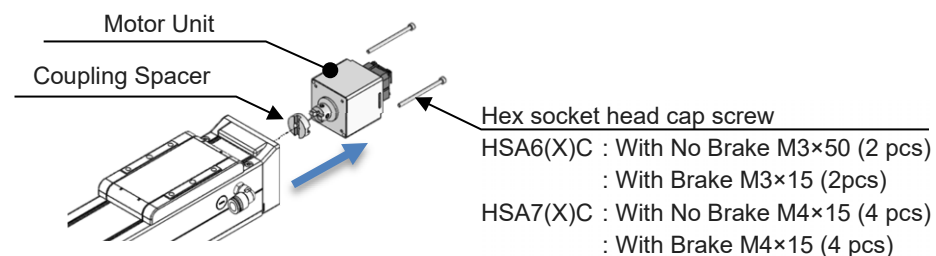
Remove the cross recessed pan head machine screws (2 pcs) and take the motor cover off.



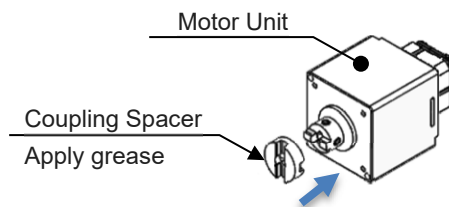
3. Unplug the cables joining the motor unit and the end cover assembly.

Connector: With No Brake 2 pcs
 With Brake 3 pcs

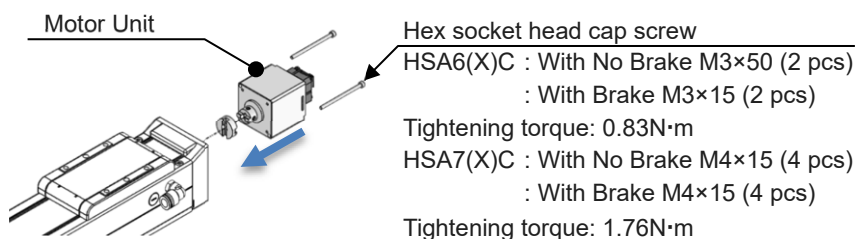
4. Remove the hex socket head cap screws and take off the motor unit and the coupling spacer.



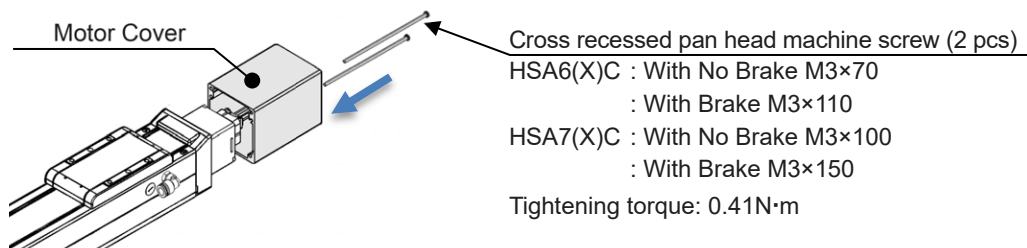
5. Apply grease (NOXLUB TL1010 Grease manufactured by NOK) on a coupling spacer for replacement for appropriate amount and put it on a motor unit for replacement.



6. Attach the motor unit with the hex socket head cap screws.



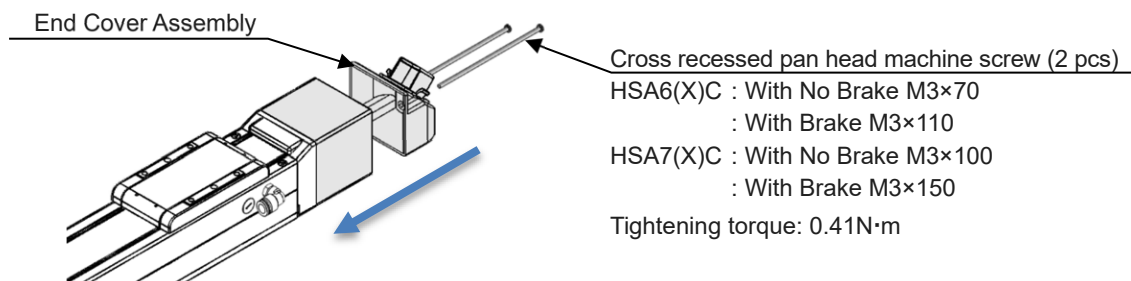
7. Put the motor cover with the cross recessed pan head machine screws (2 pcs).



8. Put the end cover assembly with the cross recessed pan head machine screws.

* For HSA6XC and HSA7XC, there is a ground terminal tightened together.

* Pay attention not to pinch the cables.



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

4.6.4 Replacement of intermediate support cushion

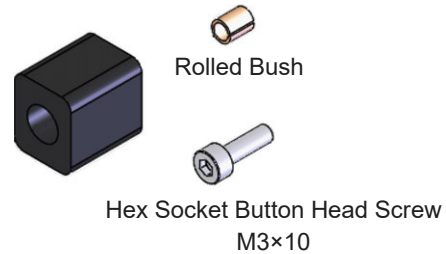
Applicable Models : HSA6XC, HSA7XC

◆ Preparation

- Hex Wrench and Torque Wrench
- Phillips Screwdriver
- Protection Gear (e.g. Cotton Work Gloves)
- End Cover Assembly for Replacement

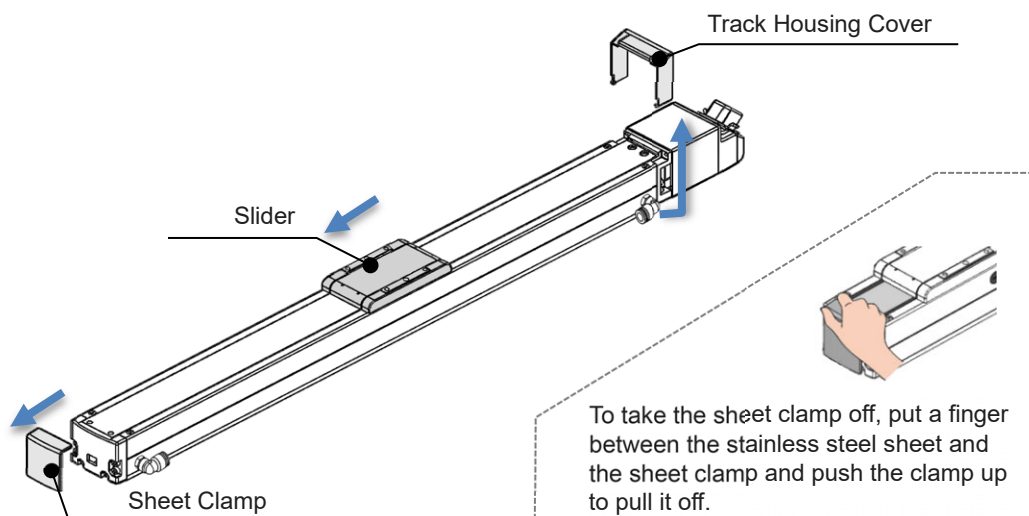
Model Code
IMSC-EC-S6S7

(Note) Intermediate support cushion should be 1 piece in 1 model code.
1 unit requires 8 pieces.



◆ Procedure for Replacement

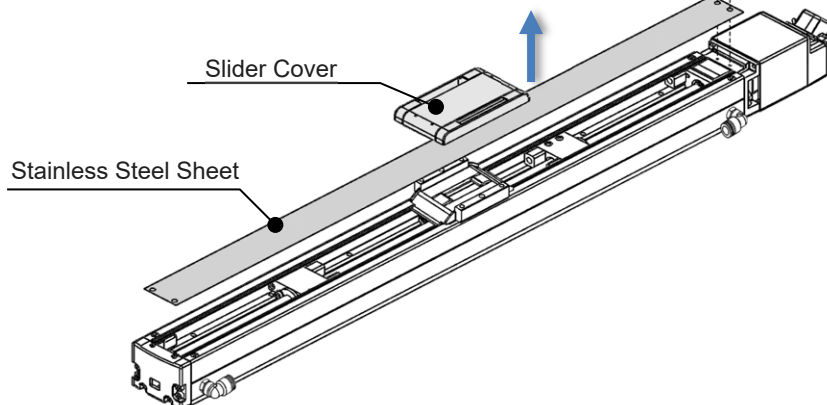
1. Move the slider to a position near the stroke center.
2. For the motor straight type, take off the track housing cover and the sheet clamp.



3. Take off the slider cover and the cross recessed machine screws with captive washer (2 pcs) and take the stainless steel sheet off.

Cross recessed machine screw with captive washer M3×5 (2 pcs)

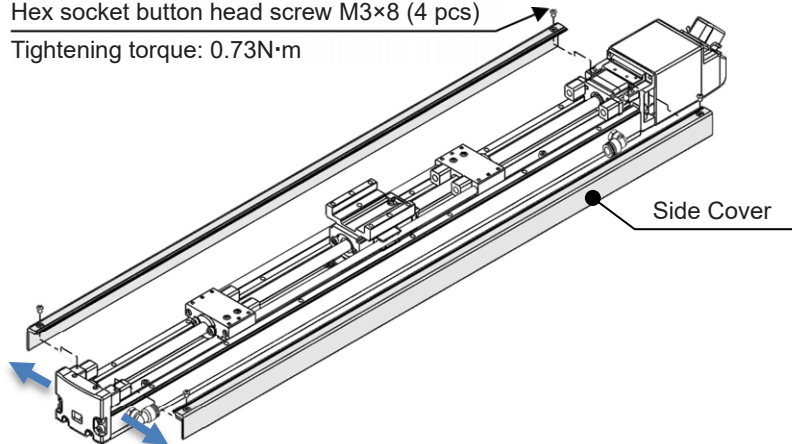
Tightening torque: 0.42N·m



4. Remove the hex socket button head screws (4 pcs) and take the side covers off.

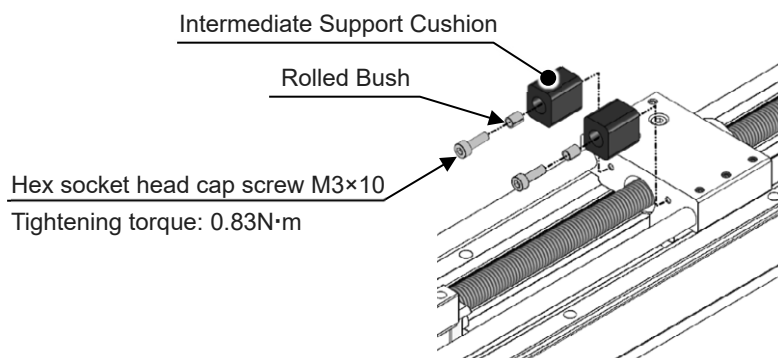
Hex socket button head screw M3×8 (4 pcs)

Tightening torque: 0.73N·m

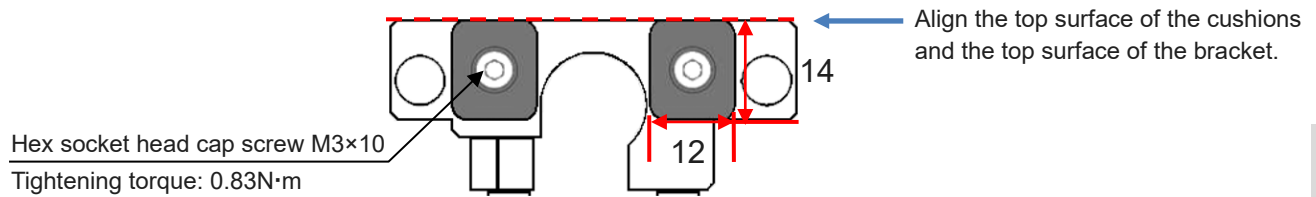


5. Remove the hex socket head cap screws holding the intermediate support cushions and take the intermediate support cushions off.

* Take off the cushions also on the motor side and stroke end side in the same procedures.



6. Insert a rolled bush to an intermediate support cushion for replacement and hold it with the hex socket head cap screw.



(Note) Installation orientation of intermediate support cushions

7. Assemble in order from step 4 to 2.
8. Move the slider in the full stroke range to make sure there is no waviness or looseness on the stainless steel sheet.

4.6.5 Slider roller replacement

◆ Preparation

- Slider Roller for Replacement

Model Code
EC-SR-S467

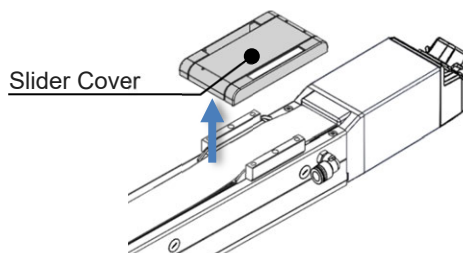
(Note) The model code of the slider roller represents the model code for one piece.

Order for the quantity necessary for replacement. (Single slider : 2 pcs, Double slider : 4 pcs)

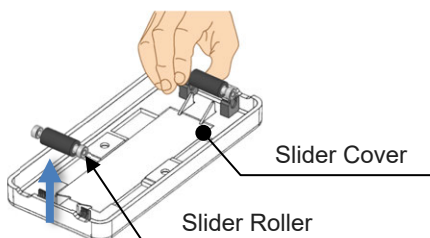


◆ Procedure for Replacement

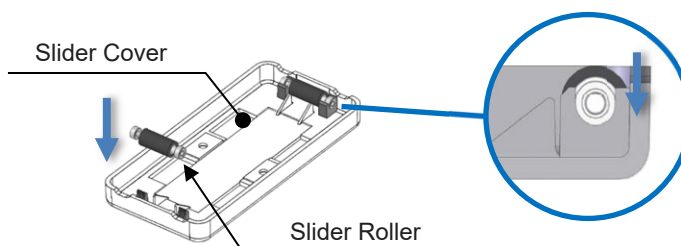
1. Take the slider cover off.



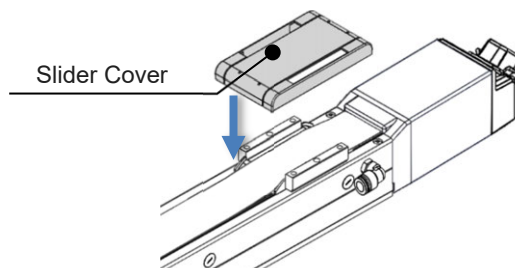
2. Pull the slider roller in the center to take it off.



3. Push in the bearings on the both end of a slider roller for replacement evenly until they make a "click" noise to put the slider cover on.



4. Attach the slider to the slider cover.



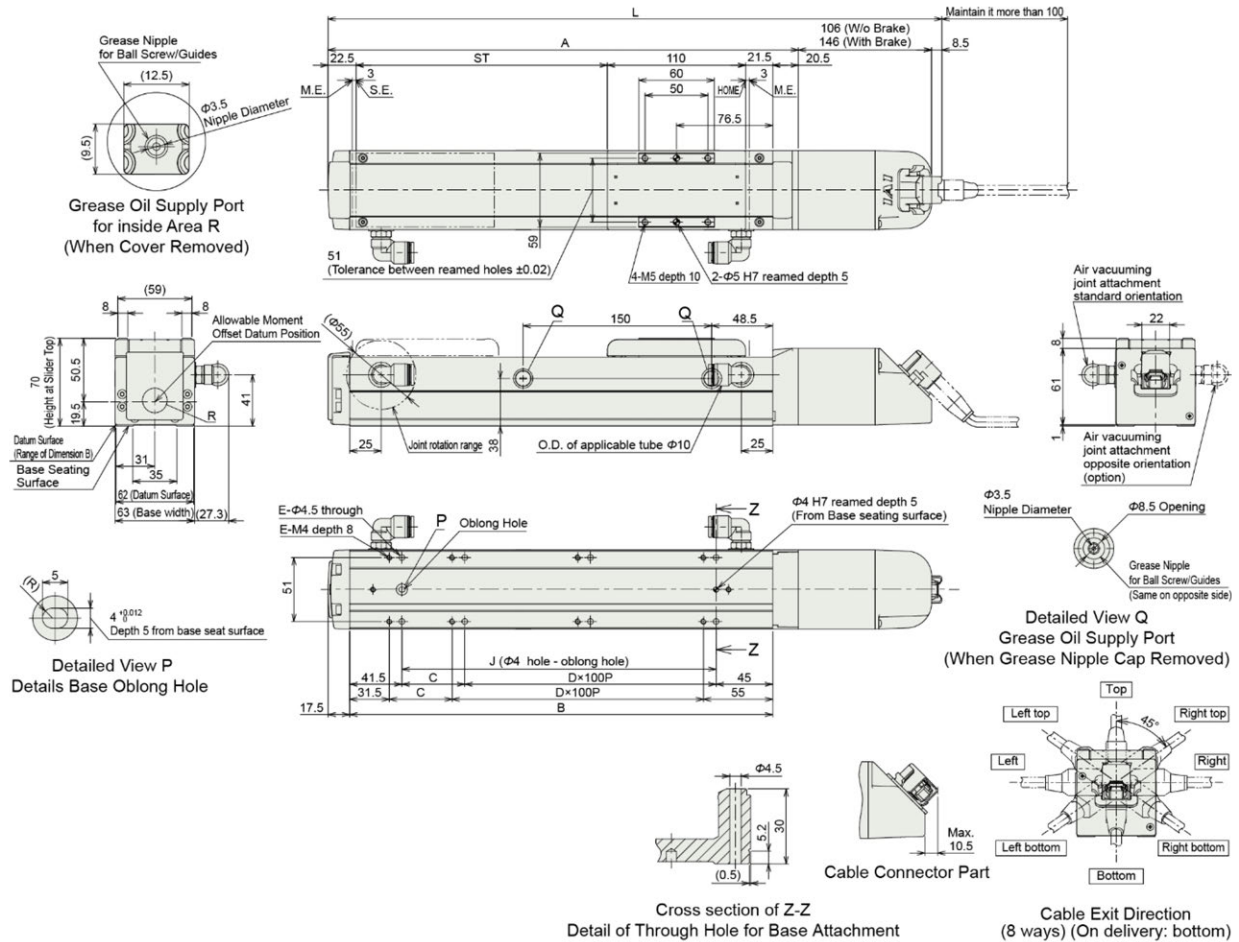
ROBO Cylinder

Chapter 5

External Dimensions

5.1	RCP6CR-HSA6C	5-1
	RCP6CR-HSA6C Double Slider Specifications	5-2
5.2	RCP6CR-HSA6XC	5-3
5.3	RCP6CR-HSA7C	5-4
	RCP6CR-HSA7C Double Slider Specifications	5-5
5.4	RCP6CR-HSA7XC	5-6

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



Dimensions by Stroke

Unit (mm)

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	W/o Brake	339	389	439	489	539	589	639	689	739	789	839	889	939	989	1039	1089
	With Brake	379	429	479	529	579	629	679	729	779	829	879	929	979	1029	1079	1129
A		224.5	274.5	324.5	374.5	424.5	474.5	524.5	574.5	624.5	674.5	724.5	774.5	824.5	874.5	924.5	974.5
B		186.5	236.5	286.5	336.5	386.5	436.5	486.5	536.5	586.5	636.5	686.5	736.5	786.5	836.5	886.5	936.5
C		0	50	0	50	0	50	0	50	0	50	0	50	0	50	0	50
D		1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
E		4	6	6	8	8	10	10	12	12	14	14	16	16	18	18	20
J		100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850

Mass by Stroke

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Mass (kg)	W/o Brake	1.9	2.1	2.3	2.5	2.8	3.0	3.2	3.4	3.7	3.9	4.1	4.3	4.6	4.8	5.0	5.2
	With Brake	2.3	2.5	2.7	2.9	3.2	3.4	3.6	3.8	4.1	4.3	4.5	4.7	5.0	5.2	5.4	5.6

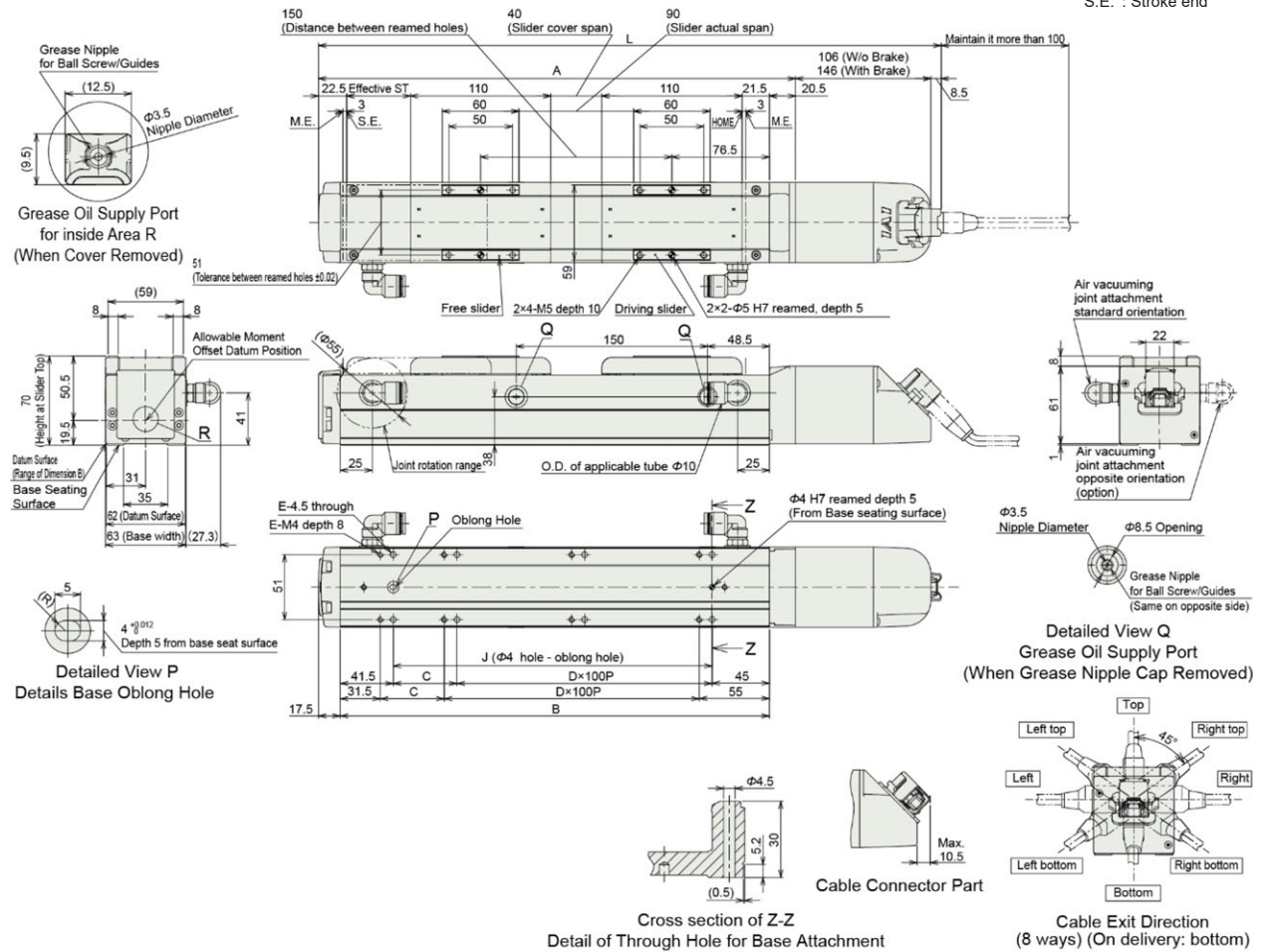
5. External Dimensions

RCP6CR-HSA6C Double Slider Specifications

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

(Note) For details of cable ejection directions, refer to [3.3 About 8-Way Connector].

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



Dimensions by Stroke

Unit (mm)

Nominal Stroke	200	250	300	350	400	450	500	550	600	650	700	750	800
Effective Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650
L	W/o Brake	489	539	589	639	689	739	789	839	889	939	989	1089
	With Brake	529	579	629	679	729	779	829	879	929	979	1029	1129
A	374.5	424.5	474.5	524.5	574.5	624.5	674.5	724.5	774.5	824.5	874.5	924.5	974.5
B	336.5	386.5	436.5	486.5	536.5	586.5	636.5	686.5	736.5	786.5	836.5	886.5	936.5
C	50	0	50	0	50	0	50	0	50	0	50	0	50
D	2	3	3	4	4	5	5	6	6	7	7	8	8
E	8	8	10	10	12	12	14	14	16	16	18	18	20
J	250	300	350	400	450	500	550	600	650	700	750	800	850

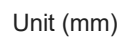
(Note) Nominal Stroke: Stroke described in the model code, Effective Stroke: Stroke actually available for operation

Mass by Stroke

Nominal Stroke	200	250	300	350	400	450	500	550	600	650	700	750	800
Effective Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650
Mass (kg)	W/o Brake	2.93	3.23	3.43	3.63	3.83	4.13	4.33	4.53	4.73	5.03	5.23	5.63
	With Brake	3.33	3.63	3.83	4.03	4.23	4.53	4.73	4.93	5.13	5.43	5.63	6.03

(Note) It is the mass adding 0.43kg of a free slider to the single slider type.

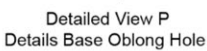
ST : Stroke
M.E. : Mechanical end
S.E. : Stroke end



5-3

5. External Dimensions

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



Unit (mm)

Mass by Stroke

ME3836-1B

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

(Note) For details of cable ejection directions, refer to [3.3 About 8-Way Connector].

S.E. : Stroke end

Grease Nipple for Ball Screw/Guides
 (12.5)
 $\phi 3.5$ Nipple Diameter
 (9.5)

Grease Oil Supply Port for inside Area R (When Cover Removed)

Allowable Moment Offset Datum Position

Free slider: 2x4-M5 depth 10

Driving slider: 2x2- $\phi 5$ H7 reamed, depth 5

Joint rotation range

E-5.5 through

E-M5 depth 10

Oblong Hole

$\phi 4$ H7 reamed depth 5 (From Base seating surface)

$\phi 3.5$ Nipple Diameter

$\phi 8.5$ Opening

Grease Nipple for Ball Screw/Guides (Same on opposite side)

Detailed View Q
Grease Oil Supply Port (When Grease Nipple Cap Removed)

Top
Left top
Right top
Left
Right
Left bottom
Right bottom
Bottom

Cable Exit Direction (8 ways) (On delivery: bottom)

Cable Connector Part

Max. 10.5

Cross section of Z-Z

Detail of Through Hole for Base Attachment

150 (Distance between reamed holes)

24 (Slider cover span)

73 (Slider actual span)

137 (W/o Brake)
187 (With Brake)

Maintain it more than 100

8.5

22.5

Effective ST

126

77

50

126

77

50

27.5

24.5

3

S.E.

61

Distance between reamed holes (9.02)

HOME

90.5

3

M.E.

69

69

150

61.8

44.5

Joint rotation range

O.D. of applicable tube $\phi 10$

44.5

80 (Height at Slider Top)

58

22

48

37

45

74 (Datum Surface)

75 (Base width)

(26.3)

61

28

16

17.5

5

(R)

4 $\phi 0.12$

Depth 5 from base seat surface

30.5

42.5

35

5.2

(0.5)

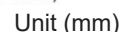
Unit (mm)

(Note) Nominal Stroke: Stroke described in the model code, Effective Stroke: Stroke actually available for operation

Nominal Stroke		200	250	300	350	400	450	500	550	600	650	700	750	800
Effective Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650
Mass (kg)	W/o Brake	5.33	5.53	5.83	6.13	6.33	6.63	6.93	7.13	7.43	7.73	7.93	8.23	8.53
	With Brake	5.83	6.03	6.33	6.63	6.83	7.13	7.43	7.63	7.93	8.23	8.43	8.73	9.03

5-5

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



Unit (mm)

Stroke		700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
質量 〔kg〕	W/o Brake	8.4	8.7	8.9	9.2	9.5	9.8	10.0	10.3	10.6	10.8	11.1	11.4	11.6	11.9	12.2	12.4	12.7
	With Brake	8.9	9.2	9.5	9.7	10.0	10.3	10.5	10.8	11.1	11.3	11.6	11.9	12.1	12.4	12.7	12.9	13.2

ROBO Cylinder

Chapter 6

Life

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6.1.1	How to calculate operation life	6-1
6.1.2	Relation between operation life and moment.....	6-3

6.1 Concept of Life for Slider Type

The mechanical life of the high rigidity slider type is represented by that of the linear guide receiving the greatest moment load.

The operation life of the linear guide is to be determined by the total driving distance reachable without flaking (peeling on rail surface) in 90% of a group of products operated under the same conditions.

Operation life can be calculated with the method shown below.

6.1.1 How to calculate operation life

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

$$L = \left(\frac{C_M}{M} \right)^3 \times 5,000\text{km}$$

L: Operation life (km)

C_M: Dynamic allowable moment (N·m)

M: Moment acting (N·m)

5,000km: Standard rated life of ROBO Cylinder

In addition, calculate with the formula below if the life may be shortened due to vibration or mounting status.

$$L = \left(\frac{C_M}{M} \cdot \frac{f_{ws}}{f_w} \cdot \frac{1}{f_\alpha} \right)^3 \times 5,000\text{km}$$

L: Operation life (km)

C_M: Dynamic allowable moment (N·m)

M: Moment acting (N·m)

5,000km: Standard rated life of ROBO Cylinder

f_{ws}: Standard load coefficient

w: Load coefficient

f_α: Mounting coefficient

For "Standard load coefficient fws", "Load coefficient fw" and "Mounting coefficient fa", refer to the contents below for configuration and selection.

[Standard load coefficient: fws]

For ROBO Cylinder described in this manual, calculate with fws = 1.2.

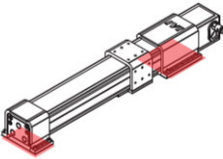
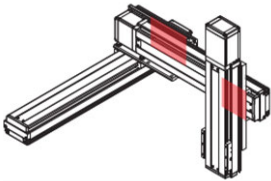
[Load coefficient: fw]

This coefficient allows consideration of the effects on life due to operating conditions.

Load coefficient fw	Operating conditions	Guideline for acceleration/deceleration
1.0 to 1.5	Low vibration/impact, slow operation	1.0G or less

[Mounting coefficient: fa]

This coefficient allows consideration of the effects on life due to ROBO Cylinder mounting status.

Mounting coefficient fa	1.0	1.2	1.5
Mounting status	Fixed on entire surface 	Fixed at both ends 	Fixed locally 

- The actuator used in the explanatory figures above is not the ROBO Cylinder. Replace with ROBO Cylinder and select the mounting coefficient.
- Even when seated over the total length of the product, select 1.2 or 1.5 for the mounting coefficient depending on the position of screw fixing and not "fixing over the entire surface".
- Various mounting methods are available for the ROBO Cylinder. "Fixing over the entire surface" is considered to be the case only when fixing with the T-shaped slot and square nut provided on the mounting surface.

6.1.2 Relation between operation life and moment

The operation life depends on the moment acting on the slider.

With a light load, it may be longer than 5,000km, the standard rated life.

With no consideration of vibration and mounting conditions, the operation life is 40,000km according to the calculation with the formula on the previous page, assuming that $0.5 C_M$ (half of dynamic allowable moment) of moment is applied.

We see that it can be 8 times longer than the standard rated life, which is 5,000km.

* The product life fluctuates drastically depending on the condition of use, environment and condition of maintenance.



ROBO Cylinder

Chapter 7

Warranty

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7.1 Warranty period

Whichever of the following periods is shorter:

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

7.2 Scope of the warranty

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

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

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

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

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

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

7.3 Honoring the warranty

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

7.4 Limited liability

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

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

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

7.6 Other items excluded from warranty

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

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

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Revision History

Revision Date	Revised Content
2025.01	First Edition
2026.03	1B Edition Changes due to discontinuation of including the First Step Guide



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