IAI
Quality and Innovation

EC
ELECYLINDER

ELECYLINDER

EC-S6/S7/S6□H/S7□H
S6□AH/S7□AH
R6/R7/RR6/RR7/
RR6□H/RR7□H
RR6□AH/RR7□AH

Instruction Manual Sixth Edition ME3766-6A

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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.

The DVD enclosed with the product contains instruction manuals for IAI products.
When using the product, refer to the necessary sections of the applicable instruction manual by printing them out or displaying them on a PC.

After reading the instruction manual, keep it in a convenient place so that whoever is handling 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.

ELECYLINDER Instruction Manual Configuration

Product name	Instruction manual name	Control number
ELECYLINDER	Quick Start Guide	ME3765
ELECYLINDER	Instruction Manual (this document)	ME3766
PC Compatible Software for RC/EC	RCM-101-MW/RCM-101-USB Instruction Manual	ME0155
Touch Panel Teaching Pendant	TB-02/02D Instruction Manual	ME0355
Data Setter	TB-03 Instruction Manual Wireless communication	ME0375
Data Setter	TB-03 Instruction Manual Wired communication For position controller	ME0376

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Safety Guide

The Safety Guide is intended to permit safe use of the product and thus to prevent risks and property damage. Be sure to read it before handling the product.

Safety Precautions for Our Products

Common safety precautions for the use of robots in various operations are indicated here.

No.	Operation	Precautions
1	Model Selection	● This product is not intended or designed for applications where high levels of safety are required, and so cannot guarantee that human lives will be protected. 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 or machinery designed for the purpose of moving or transporting people (vehicles, railway facilities, aviation facilities etc.) (3) Machinery components essential for safety (safety devices etc.) ● Do not use the product outside the range of the specifications. Otherwise, the product life may be drastically shortened, and product damage or facilities stoppage may occur. ● Do not use it in any of the following environments. (1) Locations with flammable gases, ignitable objects or explosives (2) Locations with potential exposure to radiation (3) Locations with ambient temperature or relative humidity exceeding the specifications range (4) Locations where radiant heat is applied by direct sunlight or other large heat source (5) Locations where condensation occurs due to abrupt temperature changes (6) Locations with corrosive gases (sulfuric acid, hydrochloric acid, etc.) (7) Locations exposed to significant amounts of dust, salt or iron powder (8) Locations subject to direct vibration or impact ● For an actuator used in vertical orientation, select a model which is equipped with a brake. If a model without brake is selected, the moving parts may fall when the power is turned OFF, causing accidents such as injury or workpiece damage.

No.	Operation	Precautions
2	Transportation	● When transporting heavy objects, do the work with two or more persons or utilize equipment such as a crane. ● When working with two or more persons, make it clear who is to be in charge and communicate well with each other to ensure safety. ● During transportation, carefully consider the carrying positions, weight, and weight balance, and be careful to avoid collisions or dropping. ● Use appropriate transportation measures for transport. The actuators available for transportation with a crane have eyebolts attached or tapped holes to attach bolts. Follow the instructions in the instruction manual for each model. ● Do not climb onto the package. ● Do not put anything heavy that could deform the package on it. ● When using a crane with capacity of 1t or more, have an operator qualified for crane operation and sling work. ● When using a crane or equivalent equipment, make sure not to suspend loads exceeding the equipment's rated load. ● Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength. Also, check to make sure that the hook is free of damage. ● Do not climb on loads suspended from cranes. ● Do not leave loads suspended from cranes for long periods. ● Do not stand under loads suspended from cranes.
3	Storage and Preservation	● For the storage and preservation environment, see the installation environment. However, give especial consideration to the prevention of condensation. ● Store the products so as to prevent them from falling over or down in the case of natural disasters such as earthquakes.

No.	Operation	Precautions
4	Installation and Startup	(1) Installation of robot body and controller, etc. ● Be sure to securely hold and fix the product (including the workpiece). If the product falls over, is dropped, or operates abnormally, it may lead to damage and injury. Also, be equipped for falls over or down due to natural disasters such as earthquakes. ● Do not climb on or put anything on the product. 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. ● When using the product in any of the places specified below, provide sufficient shielding. (1) Locations where electrical noise is generated (2) Locations with strong electrical or magnetic fields (3) Locations with mains or power lines passing nearby (4) Locations where the product may come in contact with water, oil or chemical spray
		(2) Cable wiring ● Use IAI genuine cables for connecting the actuator and controller, and for the teaching tools. ● Do not scratch cables, bend them forcibly, pull them, coil them, snag them, or place heavy objects on them. Otherwise, this may lead to fire, electric shock, or abnormal operation due to leakage or conduction malfunction. ● Perform the wiring for the product after turning OFF the power to the unit, and avoid miswiring. ● When wiring DC power (+24V), be careful with the positive/negative polarity. Incorrect connections may lead to fire, product breakdown or abnormal operation. ● Connect the cable connector securely so that there is no disconnection or looseness. Otherwise, this may lead to fire, electric shock, or abnormal operation of the product. ● Never cut or reconnect the cables supplied with the product for the purpose of extending or shortening the cable length. Otherwise, this may lead to fire or abnormal operation of the product.
		(3) Grounding ● Grounding must be performed, in order to prevent electric shocks or electrostatic charge, enhance noise-resistant performance and control unnecessary electromagnetic radiation. ● For the ground terminal on the AC power cable of the controller and the grounding plate in the control panel, be sure to use a twisted pair cable with wire thickness 0.5mm^2 (AWG20 or equivalent) or more for grounding work. For safeguard grounding, it is necessary to select an appropriate wire diameter for the load. Perform wiring that satisfies the specifications (electrical equipment technical standards). ● Perform Class D grounding (former Class 3 grounding, with ground resistance 100Ω or below).

No.	Operation	Precautions
4	Installation and Startup	(4) Safety measures ● When working with two or more persons, make it clear who is to be in charge and communicate well with each other to ensure safety. ● When the product is operating or in the ready mode, take safety measures (such as the installation of safety/protection fences) so that nobody can enter the area within the robot's movable range. Contact with an operating robot may lead to death or serious injury. ● Be sure to install an emergency stop circuit so that the unit can be stopped immediately in an emergency during operation. ● Take safety measures such that turning the power ON alone will not start up the unit. Otherwise, this may cause the product to start unexpectedly, leading to injury or product damage. ● Take safety measures such that emergency stop cancel or recovery after power failure alone will not start up the unit. Otherwise, this may lead to injury or equipment damage. ● When installation or adjustment operation is to be performed, display signs such as "Operating: No Power ON!" etc. Sudden power input may cause electric shock or injury. ● Take measures to prevent workpieces, etc. from falling during power failures or emergency stop. ● Wear protection gloves, goggles and safety shoes, as necessary, to secure safety. ● Do not insert fingers or objects into the openings in the product. Otherwise, this may lead to injury, electric shock, product damage, or fire. ● When releasing the brake on a vertically oriented actuator, be careful that it does not fall under its own weight, catching the operator's hand or damaging workpieces.
5	Teaching	● When working with two or more persons, make it clear who is to be in charge and communicate well with each other to ensure safety. ● Perform teaching operation from outside the safety/protection fence, if possible. If operation must be performed within the safety/protection fence, prepare "Work Regulations" and make sure that all the workers acknowledge and understand them well. ● When operation is to be performed inside the safety/protection fence, operators should have emergency stop switches available at hand so that the unit can be stopped at any time if abnormalities occur. ● When operation is to be performed inside the safety/protection fence, have a monitor standing by in addition to the operator(s) so that the unit can be stopped at any time if abnormalities occur. Also, keep watch on the operation so that a third party cannot operate the switches carelessly. ● Place a sign indicating "Operating" where it can be seen easily. ● When releasing the brake on a vertically oriented actuator, be careful that it does not fall under its own weight, catching the operator's hand or damaging workpieces. * Safety/protection fence: If there is no safety/protection fence, the movable range should be indicated.

No.	Operation	Precautions
6	Trial Operation	● When working with two or more persons, make it clear who is to be in charge and communicate well with each other to ensure safety. ● After teaching or programming, carry out trial operation step by step before switching to automatic operation. ● When trial operation is to be performed inside the safety/protection fence, use the same work procedure, determined in advance, as teaching operation. ● Be sure to confirm program operation at safe speeds. Otherwise, this may lead to accidents due to unexpected motion caused by program error, etc. ● Do not touch the terminal block or any of the various setting switches while the equipment is live. Otherwise, this may lead to electric shock or abnormal operation.
7	Automatic Operation	● Check before starting automatic operation or restarting after operation stop that there is nobody within the safety/protection fence. ● Before starting automatic operation, make sure that all peripheral equipment is ready for automatic operation and that there is no alarm indication. ● Be sure to start automatic operation from outside the safety/protection fence. ● If the product produces abnormal heat, smoke, odor, or noise, immediately stop it and turn OFF the power switch. Otherwise, this may lead to fire or damage to the product. ● When a power failure occurs, turn OFF the power switch. Otherwise, this may lead to injury or product damage due to unexpected product motion during recovery from the power failure.
8	Maintenance and Inspection	● When working with two or more persons, make it clear who is to be in charge and communicate well with each other to ensure safety. ● Perform the work outside the safety/protection fence, if possible. If operation must be performed within the safety/protection fence, prepare "Work Regulations" and make sure that all the workers acknowledge and understand them well. ● When work is to be performed inside the safety/protection fence, turn OFF the power switch as a rule. ● When operation is to be performed inside the safety/protection fence, operators should have emergency stop switches available at hand so that the unit can be stopped at any time if abnormalities occur. ● When operation is to be performed inside the safety/protection fence, have a monitor standing by in addition to the operator(s) so that the unit can be stopped at any time if abnormalities occur. Also, keep watch on the operation so that a third party cannot operate the switches carelessly. ● Place a sign indicating "Operating" where it can be seen easily. ● For the grease for the guide or ball screw, use appropriate grease according to the Instruction Manual for each model. ● Do not perform dielectric strength testing. Otherwise, this may lead to damage to the product.

No.	Operation	Precautions
8	Maintenance and Inspection	● When releasing the brake on a vertically oriented actuator, be careful that it does not fall under its own weight, catching the operator's hand or damaging workpieces. ● The slider or rod may be misaligned from the stop position if the servo is turned OFF. Avoid injury or damage due to unnecessary operation. ● Be careful not to lose the cover or any removed screws, and be sure to return the product to the original condition after maintenance and inspection work. Otherwise, this may lead to product damage or injury due to incomplete mounting. * Safety/protection fence: If there is no safety/protection fence, the movable range should be indicated.
9	Modification and Disassembly	● Do not modify, disassemble/assemble, or use maintenance parts not specified on your own discretion.
10	Disposal	● When the product exceeds its useful life or is no longer needed, dispose of it properly as industrial waste. ● When removing the actuator for disposal, avoid dropping components when detaching screws. ● Do not put the product in a fire when disposing of it. The product may rupture or generate toxic gases.
11	Other	● If you are equipped with a medical device such as a pacemaker, do not approach the product or its wiring, as the device may be affected. ● See the Overseas Specifications Compliance Manual to check compliance with overseas standards if necessary. ● For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure safety.

Precaution Indications

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 risk to persons and property	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 a situation in which, while injury is not a likely result, the precautions should be observed in order to use the product appropriately.	Notice

Precautions for Handling

1. The Safety Guide attached with the product is intended to permit safe use of the product and thus to prevent risks and property damage. Be sure to read it before handling the product.

2. Do not attempt any handling or operation that is not indicated in this instruction manual.

3. Make sure to secure the ELECYLINDER properly in accordance with this instruction manual.

   If the ELECYLINDER is not securely fixed, this may lead to abnormal noise, vibration, breakdown or shortened product life.

4. Make sure to observe the usage conditions and environment of the product.

   Operation outside the warranty could cause decreased performance or product breakdown.

   Use within the allowable range for each item.

<table>
<tr><th>Item</th><th>Cautions for use</th><th>Problems or breakdowns which may occur if the allowable range is exceeded</th></tr>
<tr><td>Speed and acceleration/deceleration</td><td>Use within the allowable range</td><td>May lead to abnormal noise, vibration, breakdown, or shortened product life.</td></tr>
<tr><td>Allowable load moment (Slider type)</td><td rowspan="2">Use within the allowable range (Static/dynamic)</td><td>May lead to abnormal noise, vibration, breakdown, or shortened product life.
In extreme cases, flaking may occur on the guide or ball screw.</td></tr>
<tr><td>Overhang load length (Slider type)</td><td>Mounting a load with an overhang length greater than the allowable values may lead to vibration or abnormal noise.</td></tr>
<tr><td>Radial load (Radial cylinder type)</td><td rowspan="3">Use within the allowable range (Static/dynamic)</td><td rowspan="3">Otherwise, this may lead to vibration, shortened product life, or damage.</td></tr>
<tr><td>Torque (Mc) (Radial cylinder type)</td></tr>
<tr><td>Uniform load (Radial cylinder type)</td></tr>
</table>

5. Do not apply radial load and load moment to the rod. (For rod type)

Loads can only be applied in the axial direction matching the rod axis.

6. If return operations are continued over a short distance, they may rapidly degrade the film of grease.

Continuous return operation within a distance less than 30mm may cause the grease film to degrade rapidly.

As a guideline, in 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. Continued use of the actuator in that state may lead to breakdown.

In extreme cases, flaking may occur on the guide or ball screw.

7. Do not attempt to have sliders or rods collide with an obstacle at high speed.

This may damage other mechanical parts.

8. Grease has been applied to the outer periphery of the rod for the rod type. Protect the peripheral equipment if grease adhesion negatively affects them.

9. The "Allow ** mm or more" indicated in the External Dimensions is intended to enable wiring without excessive force applied to the cable.
Allow *** mm or more cable linearity.

International Standard Compliance

The ELECYLINDER complies with the following overseas standards.

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

CE Marking			UL
RoHS Directive	EMC Directive	RE Directive	
○	○	○	-

If it is necessary to announce EC Declaration of Conformity with this product built in your facility, as this product itself declares the conformity to EU Directives in some specific conditions as stated below, you would be able to utilize this declaration.

EU Directives Applicable for EC Declaration of Conformity
EMC Directive (2014/30/EU) • • • • • To be checked in CE marking described in product nameplate.
RoHS Directive (2011/65/EU) • • • • Same as above.
RE Directive (2014/53/EU) • • • • • • To be checked in EC Declaration of Conformity.

EC Declaration of Conformity proving conformity to RE Directive may be modified without notice according to addition of conformed models, specification change and so on. Visit our homepage (http:/www.iai-robot/) or contact our sales site if necessary.

Precautions for Handling Wireless Operation

When the option for wireless communication support (model: WL, WL2) is selected, a wireless communication circuit board is built into the ELECYLINDER. Certificates and self-declarations regarding the wireless function are handled under the model name below for the wireless circuit board.

Model name: IABL3826

This product uses the 2.4 GHz radio band known as an ISM band. This frequency range is used by various devices such as microwave ovens and wireless LAN, so that communication may be disrupted by radio disturbance.
Use of this device is permitted within the following countries (regions) only. Use in other countries (regions) requires certification to be obtained based on the laws and regulations of the relevant country (region).

Wireless frequency	2,400～2,483.5MHz
Wireless output	+5dBm

【US】

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference and
2. This device must accept any interference received, including interference that may cause undesired operation of the device.

FCC RF Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure limits. This transmitter must not be colocated or operating with any other antenna or transmitter.

【CANADA】

This device complies with Industry Canada licence-exempt RSS standards.

Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence

L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC RF Radiation Exposure Statement:

To comply with IC RF exposure requirements, this device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.
Pour se conformer aux exigences de conformité RF canadienne l'exposition, cet appareil et son antenne ne doivent pas étre co-localisés ou fonctionnant en conjonction avec une autre antenne ou transmetteur.

【日本】

本製品で使用している無線モジュールは、工事設計認証を受けていますので、以下の事項を行うと法律で罰せられることがあります。

・ 無線モジュールを分解/改造すること

[EU Member States]

- For details of the applicable standards, please refer to above mentioned international standards compliances.
- Import Corporation Name：IAI Industrieroboter GmbH

* The product can be used in any country which is a member of EU.

【中国／CHINA 】

- 许可编号　　: CMIT ID=2017DJ6836
- 申请公司名　: IAI 株式会社
- 机型名　　: IABL3826
- 制造国　　: 日本（Made in Japan）
- 进口企业名　: IAI（Shanghai）Co., Ltd.

【 한국／KOREA 】

- 식별 부호　: MSIP-CRM-IAI-IABL3826
- 제조사명　: 주식회사 IAI
- 모델명　: IABL3826
- 제조국　: 일본(Made in Japan)
- 수입업자명　: IAI KOREA Corp.

해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다

[ประเทศไทย / Thailand]

- ผู้ผลิต　: IAI CORPORATION.
- ชื่อโมเดล　: IABL3826
- ประเทศผู้ผลิต　: ญี่ปุ่น (Made in Japan)
- ผู้นำเข้า : IAI Robot (Thailand) Co., Ltd.

Precautions for Axis Operation with Wireless Connection

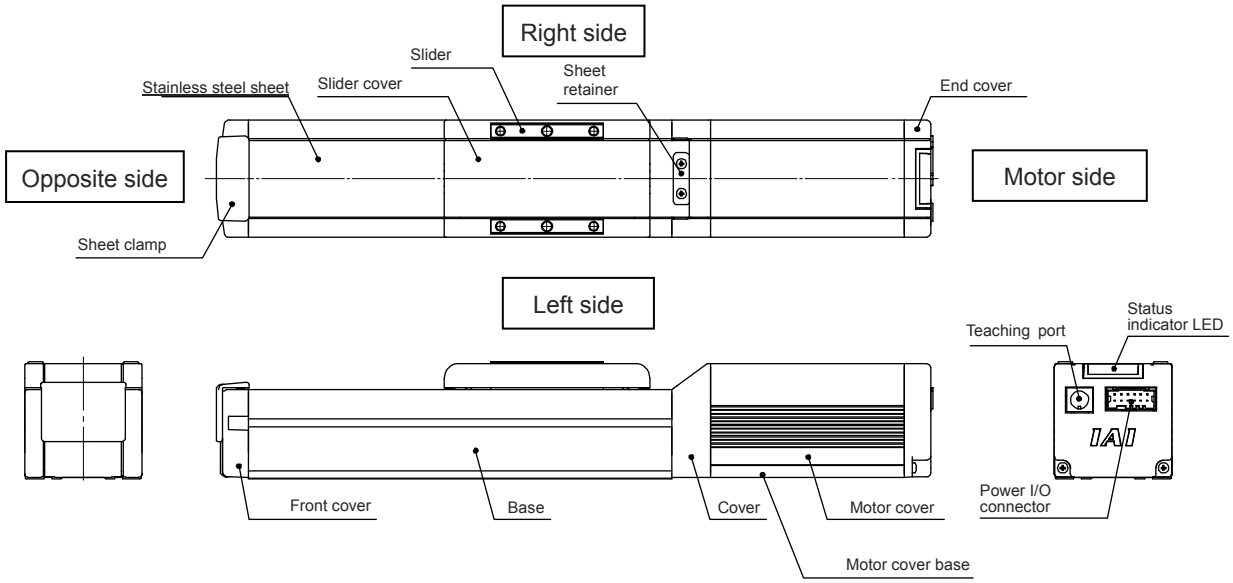
Data Setter TB-03 (V2.30 or later) can operate the option model code -WL2 ELECYLINDER with wireless connection. For operation with wireless connection, secure safety by following the precautions below before use.

- The stop switch on Data Setter TB-03 will not function during wireless connection. Prepare a device / circuit to stop the operation when emergency stop is required.
- For axis operation with wireless connection, operation testing (movement to forward and backward ends, jog operation, inching operation) is possible, but the control device is not designed for purposes of automatic operation. Construct a mechanical system based on the risks of the operating environment.
- Carry out risk assessment based on the standard/spec requirements of the machinery for installation. Dangerous operation, such as that requiring an automatic stop when control signals cannot be received (including disabled communication) is not acceptable.
- Stopping axis operation by wireless network cannot be used as a safety feature as defined in EN ISO 13849-1: 2015. It is also not compliant with Safety Category B or Categories 1 to 4 stated in EN ISO 13849-1: 2015.

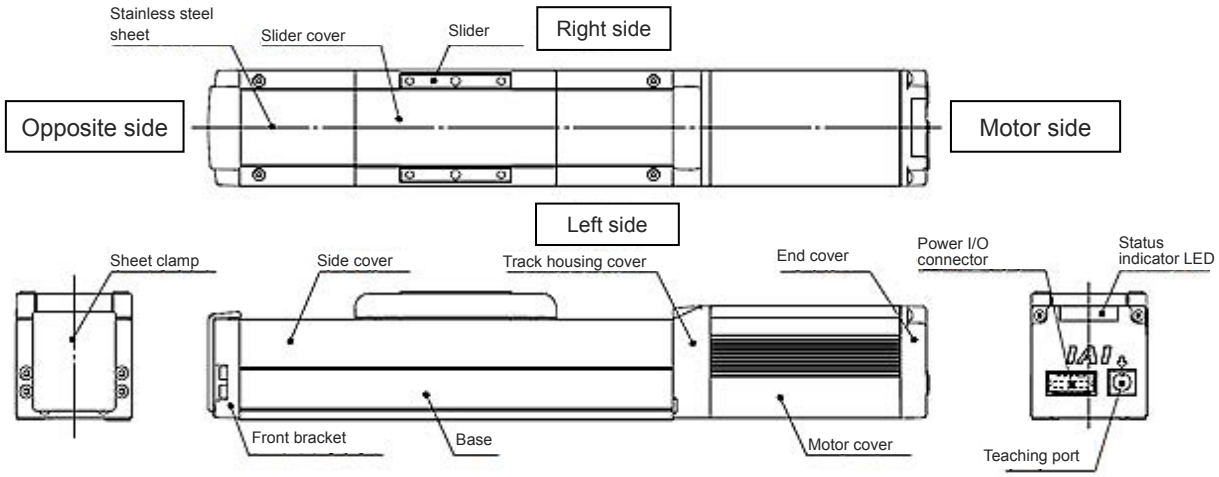
Part Names

In this manual, the ELECYLINDER's left/right sides and motor/opposite sides are shown as in the figure below.

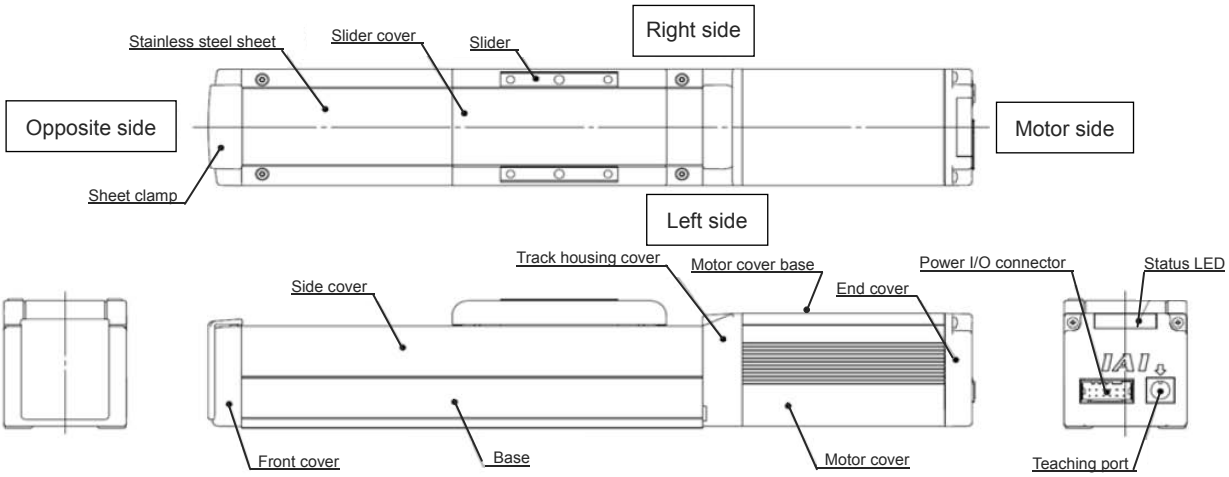
Slider type



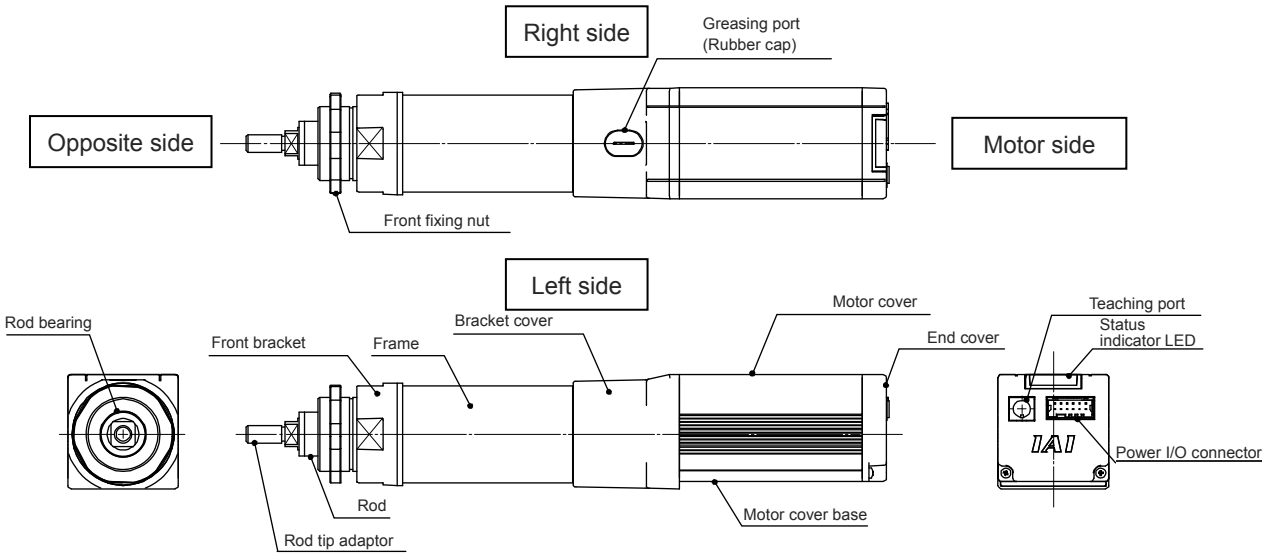
High rigidity slider type (EC-S□□AH)



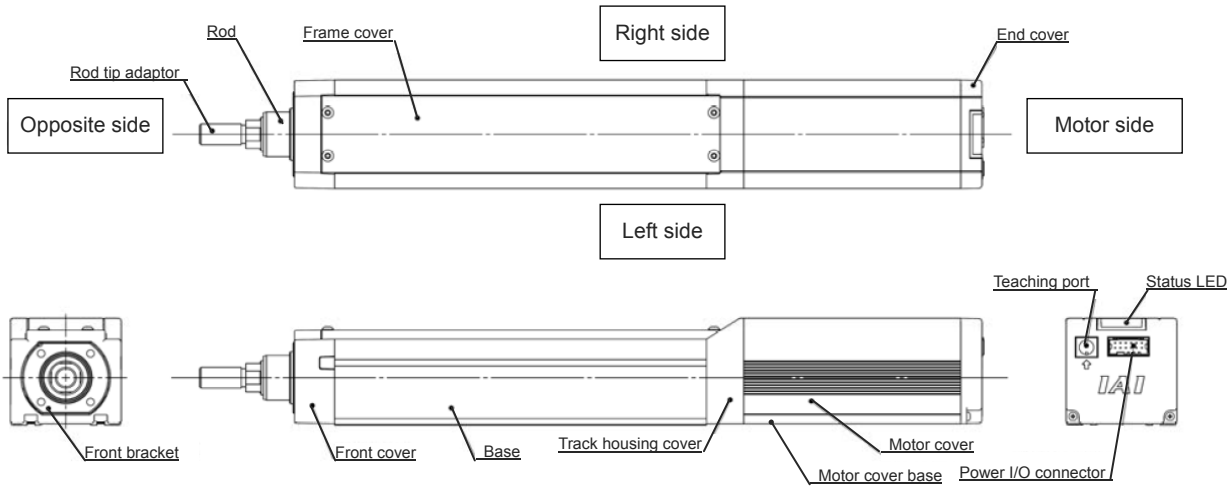
High rigidity slider type (EC-S□□H)



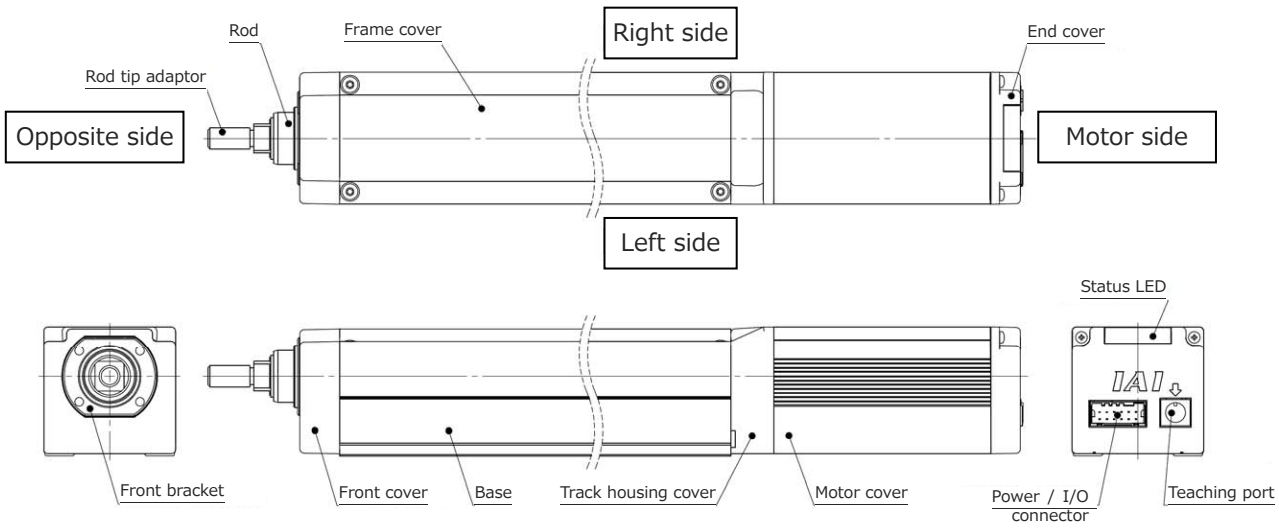
Rod type



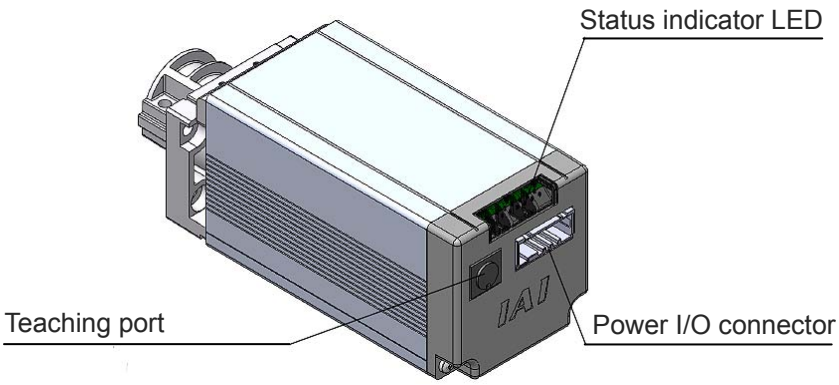
Radial cylinder type



High rigidity radial cylinder type (EC-RR□□AH), High rigidity radial cylinder type (EC-RR□□H)



Motor (built in controller)



[Teaching port]
This connector is for the connection of a teaching pendant or PC software.
When connecting, remove the cap.

[Status indicator LED]
The LED on the right side as seen from the motor side shows the servo ON/OFF status and alarm status, and the LED on the left side as seen from the motor side displays the wireless status.

[Power I/O connector]
This connector connects power and I/O wiring.

ELECYLINDER

Chapter 1

Specifications

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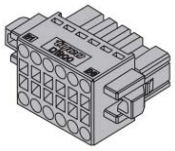
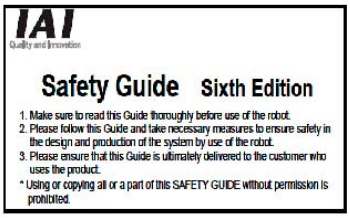
1.1 Checking the product

Components

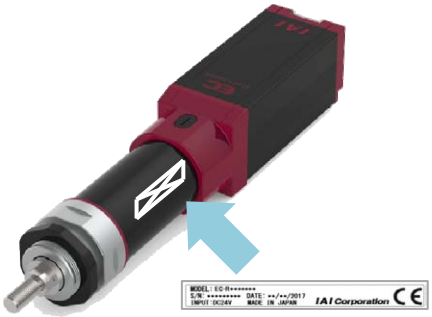
The following table shows the product configuration for the standard specification.
See the packing list for the details of the enclosed components. In the unlikely case that any model number errors or missing parts come to light, contact your local IAI distributor.

<table>
<tr><th>Body</th><th colspan="3">Accessories</th></tr>
<tr><td>ELECYLINDER Quantity: 1
 </td><td>Power I/O Cable
Quantity: 1
 </td><td>Power I/O Connector
Quantity: 1
 
Components included
as selected in the model number</td><td>Protective Cap
Quantity: 1
 </td></tr>
<tr><th colspan="4">Accessories (Documents/DVD)</th></tr>
<tr><td>Quick Start Guide
Quantity: 1
 </td><td>Safety Guide
Quantity: 1
  </td><td colspan="2">Instruction Manual DVD
Quantity: 1
 </td></tr>
<tr><th>Slider type accessories
Radial cylinder type accessories</th><th>Rod type accessories
Radial cylinder type accessories</th><th colspan="2">Rod type accessories</th></tr>
<tr><td>Square Nut Quantity: 6
(S6, RR6：M4、S7,RR7：M5)
 </td><td>Hex Nut Quantity: 1
(R6, RR6：M10、R7,RR7：M14)
 </td><td colspan="2">Front Fixing Nut Quantity: 1
(R6:M42, R7:M48)
 </td></tr>
</table>

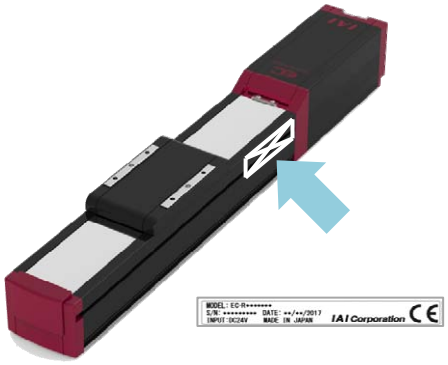
How to read the model nameplate

Model number →
Serial number →

[Rod type nameplate position]



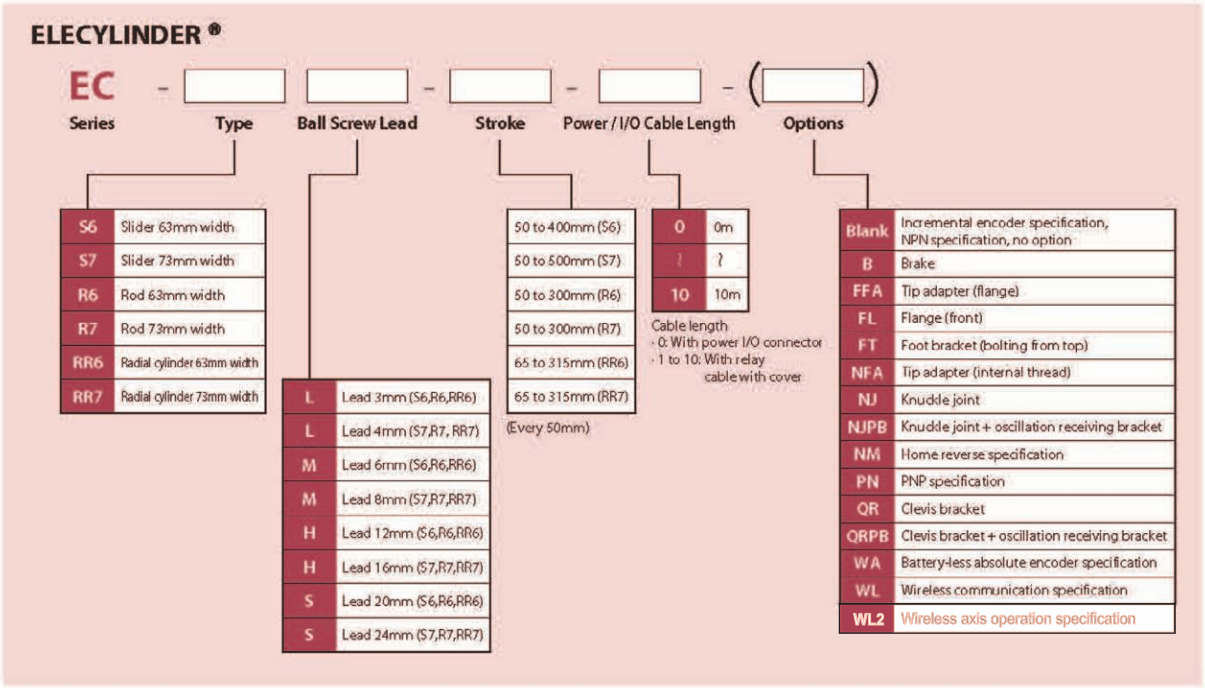
[Slider type, high rigidity slider type nameplate position]



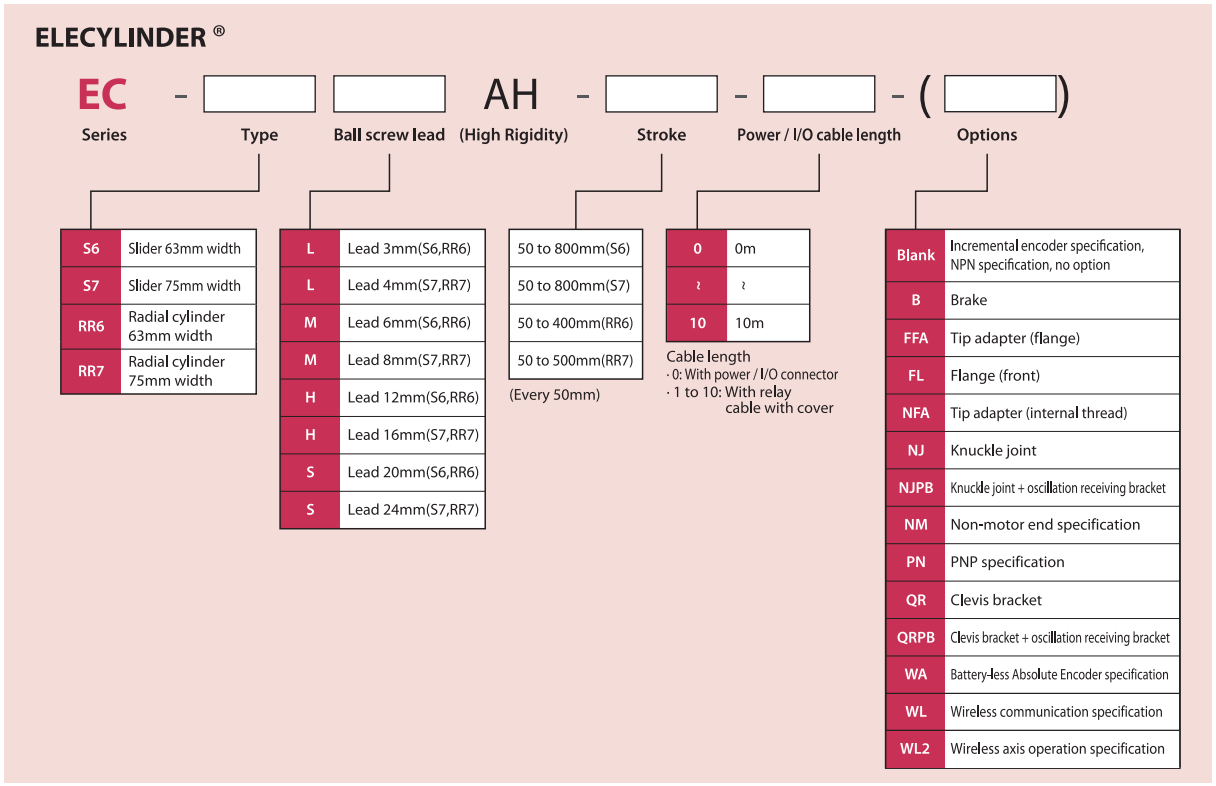
[Radial cylinder type, high rigidity radial cylinder type nameplate position]

How to read the model number

[Slider type, rod type, radial cylinder type]



[High rigidity slider type (EC-S□□AH), high rigidity radial cylinder type (EC-RR□□AH)]



[High rigidity slider type (EC-S□□H), high rigidity radial cylinder type (EC-RR□□H)]

ELECYLINDER ®

EC – [Type] [Ball screw lead] H – [Stroke] – [Power / I/O cable length] – ([Options])

Series: EC

Type	
S6	Slider 63mm width
S7	Slider 75mm width
RR6	Radial cylinder 63mm width
RR7	Radial cylinder 75mm width

Ball screw lead	
L	Lead 3mm (S6, RR6)
L	Lead 4mm (S7, RR7)
M	Lead 6mm (S6, RR6)
M	Lead 8mm (S7, RR7)
H	Lead 12mm (S6, RR6)
H	Lead 16mm (S7, RR7)
S	Lead 20mm (S6, RR6)
S	Lead 24mm (S7, RR7)

High Rigidity: H

Stroke
50 to 400mm (S6)
50 to 500mm (S7)
50 to 300mm (RR6)
50 to 300mm (RR7)

(Every 50mm)

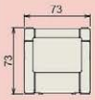
Power / I/O cable length	
0	0m
≀	≀
10	10m

Cable length
- 0: With power / I/O connector
- 1 to 10: With relay cable with cover

Options	
Blank	Incremental encoder specification, NPN specification, no option
B	Brake
FFA	Tip adapter (flange)
FL	Flange (front)
NFA	Tip adapter (internal thread)
NJ	Knuckle joint
NJPB	Knuckle joint + oscillation receiving bracket
NM	Non-motor end specification
PN	PNP specification
QR	Clevis bracket
QRPB	Clevis bracket + oscillation receiving bracket
WA	Battery-less Absolute Encoder specification
WL	Wireless communication specification
WL2	Wireless axis operation specification

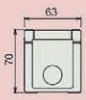
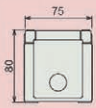
Product list

[Slider type]

Type	External view	Body width (mm)	Lead (mm)	Positioning repeatability (mm)	Stroke (mm)	Max. speed (mm/s)	Max. pressing force (N)	Max. payload (kg)	
								Horizontal	Vertical
S6		63mm	20	±0.05	50 ~ 400 (per 50st)	800	56	15	1
			12			700	93	26	2.5
			6			450	185	32	6
			3			225	370	40	12.5
S7		 73mm	24	±0.05	50 ~ 500 (per 50st)	860	112	37	3
			16			700	168	46	8
			8			420	336	51	16
			4			210 〈175〉	673	51	19

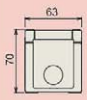
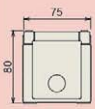
〈 〉 represents vertical operation.

[High rigidity slider type (EC-S□□AH)]

Type	External view	Body width (mm)	Lead (mm)	Positioning repeatability (mm)	Stroke (mm)	Max. speed (mm/s)	Max. pressing force (N)	Max. payload (kg)	
								Horizontal	Vertical
S6□AH		 63mm	20	±0.05	50 ~ 800 (per 50st)	1440 〈1280〉	56	15	1
			12			900	93	26	2.5
			6			450	185	32	6
			3			225	370	40	16
S7□AH		 75mm	24	±0.05	50 ~ 800 (per 50st)	1230	112	37	3
			16			980 〈840〉	168	46	8
			8			420	336	51	16
			4			210 〈175〉	673	51	25

〈 〉 represents vertical operation.

[High rigidity slider type (EC-S□□H)]

Type	External view	Body width (mm)	Lead (mm)	Positioning repeatability (mm)	Stroke (mm)	Max. speed (mm/s)	Max. pressing force (N)	Max. payload (kg)	
								Horizontal	Vertical
S6□H		 63mm	20	±0.05	50 ~ 400 (per 50st)	800	56	15	1
			12			700	93	26	2.5
			6			450	185	32	6
			3			225	370	40	12.5
S7 □H		 75mm	24	±0.05	50 ~ 500 (per 50st)	860	112	37	3
			16			700	168	46	8
			8			420	336	51	16
			4			210 〈175〉	673	51	19

〈 〉 represents vertical operation.

[Rod type]

Type	External view	Body width (mm)	Lead (mm)	Positioning repeatability (mm)	Stroke (mm)	Max. speed (mm/s)	Max. pressing force (N)	Max. payload (kg)	
								Horizontal	Vertical
R6		63mm	20	±0.05	50 ~ 300 (per 50st)	800	56	6	1.5
			12			700	93	25	4
			6			450	185	40	10
			3			225	370	60	12.5
R7		73mm	24	±0.05	50 ~ 300 (per 50st)	860 〈640〉	182	20	3
			16			700 〈560〉	273	50	8
			8			350	547	60	18
			4			175	1094	80	19

〈 〉 represents vertical operation.

[Radial cylinder type]

Type	External view	Body width (mm)	Lead (mm)	Positioning repeatability (mm)	Stroke (mm)	Max. speed (mm/s)	Max. pressing force (N)	Max. payload (kg)	
								Horizontal	Vertical
RR6		63mm	20	±0.05	65 ~ 315 (per 50st)	800	56	6	1.5
			12			700	93	25	4
			6			450	185	40	10
			3			225	370	60	12.5
RR7		73mm	24	±0.05	65 ~ 315 (per 50st)	860 〈640〉	182	20	3
			16			700 〈560〉	273	50	8
			8			350	547	60	18
			4			175	1094	80	19

〈 〉 represents vertical operation.

[High rigidity radial cylinder type (EC-RR□□AH)]

Type	External view	Body width (mm)	Lead (mm)	Positioning repeatability (mm)	Stroke (mm)	Max. speed (mm/s)	Max. pressing force (N)	MAX. payload(kg)	
								Horizontal	Vertical
RR6□AH		63mm	20	±0.05	50 ~ 400 (per 50st)	800	56	6	1.5
			12			700	93	25	4
			6			450	185	40	10
			3			225	370	60	20
RR7□AH		75mm	24	±0.05	50 ~ 500 (per 50st)	860 〈640〉	182	20	3
			16			700 〈560〉	273	50	8
			8			350	547	60	18
			4			175	1094	80	28

〈 〉 represents vertical operation.

[High rigidity radial cylinder type (EC-RR□□H)]

Type	External view	Body width (mm)	Lead (mm)	Positioning repeatability (mm)	Stroke (mm)	Max. speed (mm/s)	Max. pressing force (N)	MAX. payload(kg)	
								Horizontal	Vertical
RR6□H		63mm	20	±0.05	50 ~ 300 (per 50st)	800	56	6	1.5
			12			700	93	25	4
			6			450	185	40	10
			3			225	370	60	20
RR7□H		75mm	24	±0.05	50 ~ 300 (per 50st)	860 〈640〉	182	20	3
			16			700 〈560〉	273	50	8
			8			350	547	60	18
			4			175	1094	80	28

〈 〉 represents vertical operation.

1.2 Mechanical specifications

Slider type

[1] EC-S6

[Lead and Payload (Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S6S -① -② (-③)	20	15	1	56
EC-S6H -① -② (-③)	12	26	2.5	93
EC-S6M -① -② (-③)	6	32	6	185
EC-S6L -① -② (-③)	3	40	12.5	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Disabled)]

Lead (mm)	50～200 (Every 50mm)	250 (mm)	300 (mm)	350 (mm)	400 (mm)
20	800			727	566
12	700		521	392	305
6	450	371	265	199	155
3	225	188	134	100	79

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead20

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	15	10	8	7	1	1
160	15	10	8	7	1	1
320	12	10	8	6	1	1
480	12	9	8	6	1	1
640	12	8	6	5	1	1
800	10	6.5	4.5	3	1	1

Lead 12

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	26	18	16	14	2.5	2.5
80	26	18	16	14	2.5	2.5
200	26	18	16	14	2.5	2.5
320	26	18	14	12	2.5	2.5
440	26	18	12	10	2.5	2.5
560	20	12	8	7	2.5	2.5
700	15	9	5	4	2	1

Lead 6

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	32	26	24	20	6	6
40	32	26	24	20	6	6
100	32	26	24	20	6	6
160	32	26	24	20	6	6
220	32	26	24	20	6	6
280	32	26	24	15	6	5.5
340	32	20	18	12	5	4.5
400	22	12	11	8	3.5	3.5
450	15	8	6	4	2	2

Lead 3

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	40	35	35	35	12.5	12.5
50	40	35	35	35	12.5	12.5
80	40	35	35	30	12.5	12.5
110	40	35	35	30	12.5	12.5
140	40	35	35	28	12.5	12.5
170	40	32	32	24	12.5	12
200	35	28	23	20	10	9
225	28	20	16	12	6	

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S6S -① -② (-③)	20	8	0.75	56
EC-S6H -① -② (-③)	12	14	2	93
EC-S6M -① -② (-③)	6	20	5	185
EC-S6L -① -② (-③)	3	25	10	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	50～250 (Every 50mm)	300 (mm)	350 (mm)	400 (mm)
20	800		727	566
12	680	521	392	305
6	340	265	199	155
3	170	134	100	78

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead20

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	0.75

Lead 12

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	1	0.5

Lead 6

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	10	1	1

Lead 3

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	11	9	2

Caution

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

This may lead to vibration, breakdown, or shortened product life.

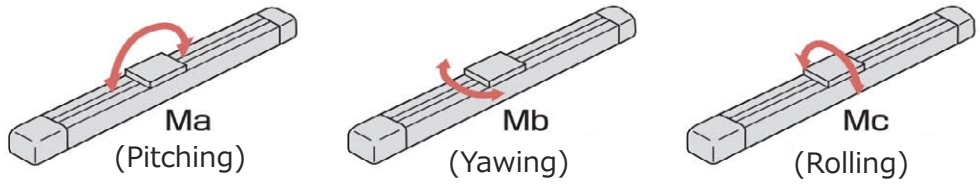
[Actuator Specifications]

Item	Content
Drive system	Ball screw ϕ10mm, rolled C10
Positioning repeatability	±0.05mm
Base	Material: Aluminum, black alumite treatment
Static allowable moment	Ma direction: 48.5N·m, Mb direction: 69.3N·m, Mc direction: 97.1N·m
Dynamic allowable moment (*)	Ma direction: 11.6N·m, Mb direction: 16.6N·m, Mc direction: 23.3N·m
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

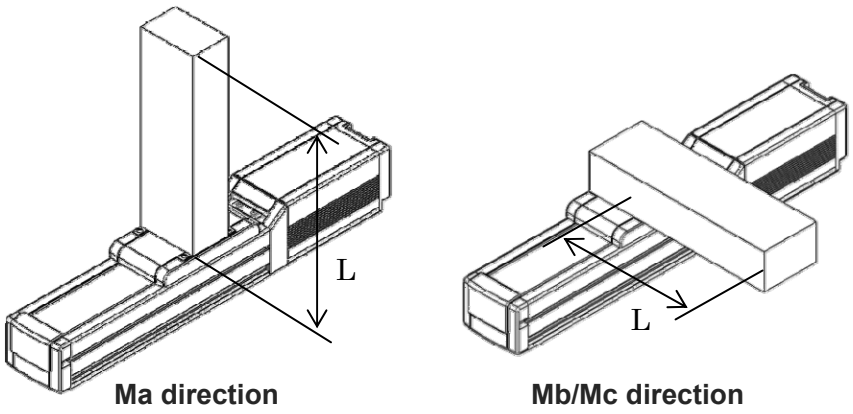
· Overhang load length guideline: 220mm or less

(*) For reference rated life of 5000km. The running life differs according to operation conditions and mounting status.

Slider type moment direction



Slider type overhang load length (L = 220mm or less)



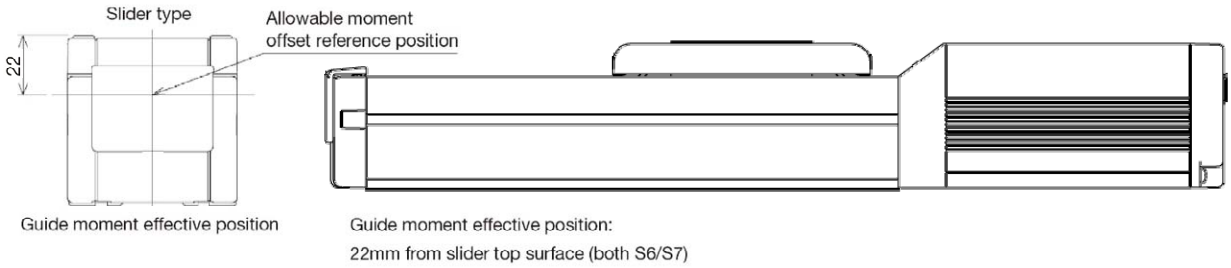
Ma direction **Mb/Mc direction**

Caution

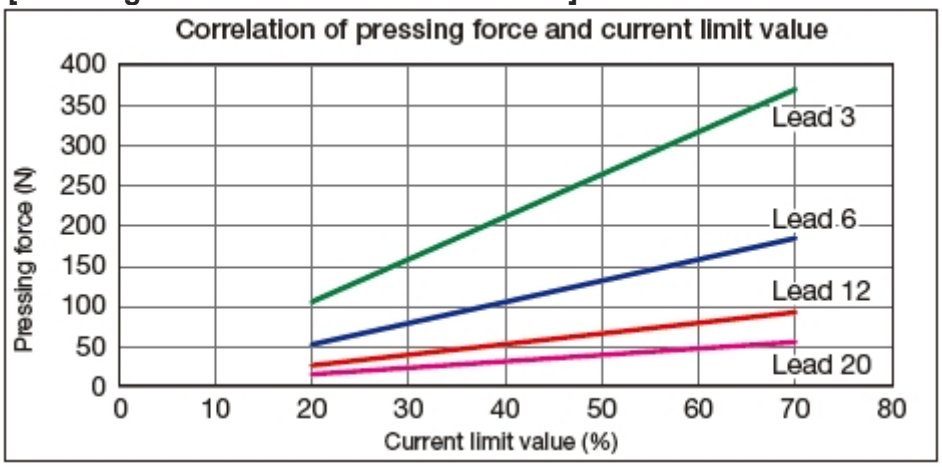
If the actuator is used with excessive allowable moment and overhang load, it may not only lead to abnormal noise and vibration but also significantly reduce the life of the ELECYLINDER.

Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type. The allowable moment offset reference position is shown for the calculation.

Configure the current limit value to ensure that the recoil moment does not exceed 80% of the (Ma/Mb) dynamic allowable moment given in the catalog specifications.



[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 20mm/s or less, the pressing force will become unstable and failure to operate normally is possible.

[2] EC-S7

[Lead and Payload(Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S7S -① -② (-③)	24	37	3	112
EC-S7H -① -② (-③)	16	46	8	168
EC-S7M -① -② (-③)	8	51	16	336
EC-S7L -① -② (-③)	4	51	19	673

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed(Energy-Saving: Disabled)]

Lead (mm)	50～300 (Every 50mm)	350 (mm)	400 (mm)	450 (mm)	500 (mm)
24	860		774	619	506
16	700	631	492	395	323
8	420	322	251	200	164
4	210<175>	163	126	101	83

<> represents vertical operation (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration(Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead24

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	37	22	16	14	3	3
200	37	22	16	14	3	3
420	34	20	16	14	3	3
640	20	15	10	9	3	3
860	12	10	7	4	3	2.5

Lead 16

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

Lead 8

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	51	45	40	40	16	16
70	51	45	40	40	16	16
140	51	40	38	35	16	16
210	51	35	30	24	10	9.5
280	40	28	20	15	8	7
350	30	9	4		5	4
420	7				2	

Lead 4

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	51	45	40	40	19	19
35	51	45	40	40	19	19
70	51	45	40	40	19	19
105	51	45	40	35	19	19
140	45	35	30	25	14	12
175	30	18			9	7.5
210	6					

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S7S -① -② (-③)	24	18	2	112
EC-S7H -① -② (-③)	16	35	5	168
EC-S7M -① -② (-③)	8	40	10	336
EC-S7L -① -② (-③)	4	40	15	673

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	50～350 (Every 50mm)	400 (mm)	450 (mm)	500 (mm)
24	800	774	619	506
16	560	492	395	323
8	280	251	200	164
4	140	126	101	83

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead24

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	18	10	2
200	18	10	2
420	18	10	2
640	10	2	1
800	5	0.5	0.5

Lead 16

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	35	20	5
140	35	20	5
280	25	12	3
420	15	6	1.5
560	7	0.5	0.5

Lead 8

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	1.5

Lead 4

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	40	30	15
35	40	30	15
70	40	30	15
105	40	30	8
140	15	6	2

Caution

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

This may lead to vibration, breakdown, or shortened product life.

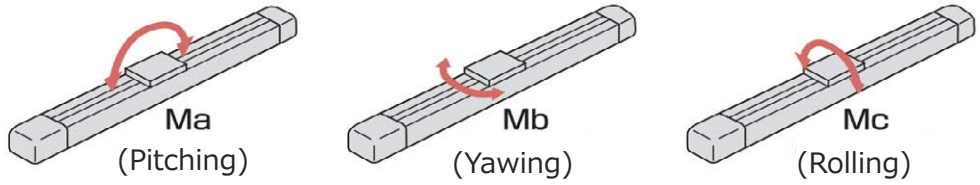
[Actuator Specifications]

Item	Content
Drive system	Ball screw φ12mm, rolled C10
Positioning repeatability	±0.05mm
Base	Material: Aluminum, black alumite treatment
Static allowable moment	Ma direction:79.7N·m, Mb direction:114N·m, Mc direction:157N·m
Dynamic allowable moment(*)	Ma direction:17.7N·m, Mb direction:25.3N·m, Mc direction:34.9N·m
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

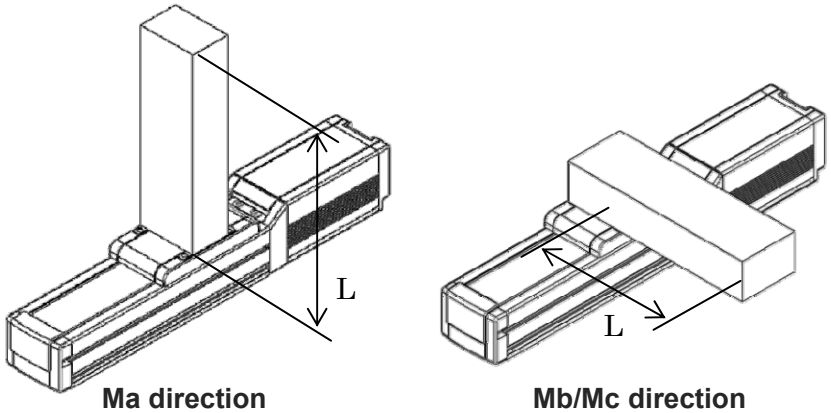
・Overhang load length guideline: 280mm or less

(*) For reference rated life of 5000km. The running life differs according to operation conditions and mounting status.

Slider type moment direction



Slider type overhang load length (L = 280mm or less)



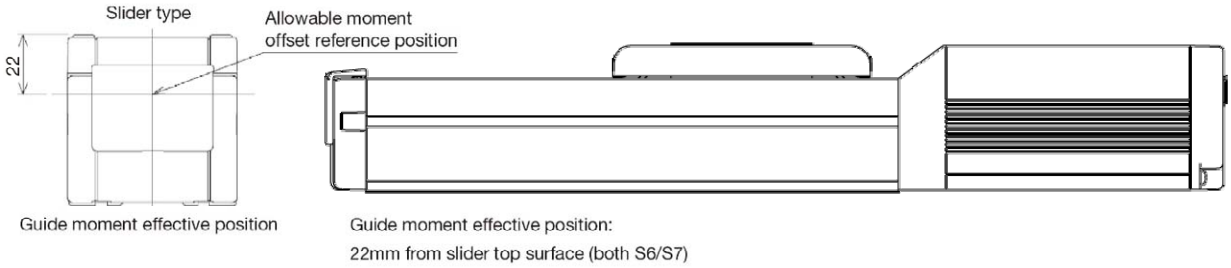
Ma direction **Mb/Mc direction**

Caution

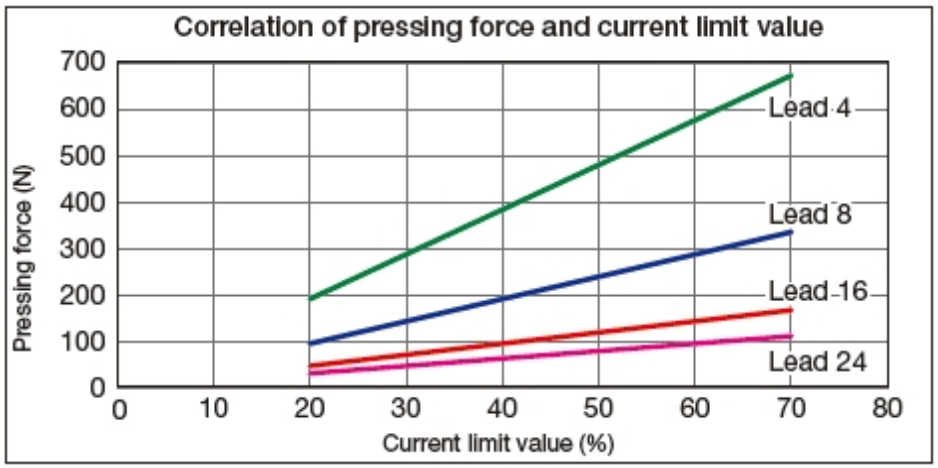
If the actuator is used with excessive allowable moment and overhang load, it may not only lead to abnormal noise and vibration but also significantly reduce the life of the ELECYLINDER.

Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type. The allowable moment offset reference position is shown for the calculation.

Configure the current limit value to ensure that the recoil moment does not exceed 80% of the (Ma/Mb) dynamic allowable moment given in the catalog specifications.



[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 20mm/s or less, the pressing force will become unstable, and failure to operate normally is possible.

High rigidity slider type (EC-S□□AH)

[1] EC-S6□AH

[Lead and Payload (Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S6SAH -① -② (-③)	20	15	1	56
EC-S6HAH -① -② (-③)	12	26	2.5	93
EC-S6MAH -① -② (-③)	6	32	6	185
EC-S6LAH -① -② (-③)	3	40	16.0	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max. Speed (Energy-Saving: Disabled)]

Lead (mm)	50 to 400 (Every 50mm)	450 (mm)	500 (mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
20	1440 <1280>		1280	1090	940	815	715	630	560
12	900	845	705	585	515	445	390	345	305
6	450	415	350	295	255	220	190	170	140
3	225	205	170	145	125	110	95	85	70

< > represents vertical operation (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] × 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead 20

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	15	10	8	7	1	1
160	15	10	8	7	1	1
320	12	10	8	6	1	1
480	12	9	8	6	1	1
640	12	8	6	5	1	1
800	10	6.5	4.5	3	1	1
960	8	5	3.5	1.5	1	1
1120	5	3	2	1	0.5	0.5
1280		1	1	0.5		0.5
1440		1	0.5			

Lead 12

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	26	18	16	14	2.5	2.5
80	26	18	16	14	2.5	2.5
200	26	18	16	14	2.5	2.5
320	26	18	14	12	2.5	2.5
440	26	18	12	10	2.5	2.5
560	20	12	8	7	2.5	2.5
700	15	9	5	4	2	1
800	9	5	2	1	1.5	1
900	5	3	1	1	0.5	0.5

Lead 6

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	32	26	24	20	6	6
40	32	26	24	20	6	6
100	32	26	24	20	6	6
160	32	26	24	20	6	6
220	32	26	24	20	6	6
280	32	26	24	15	6	5.5
340	32	20	18	12	5	4.5
400	22	12	11	8	3.5	3.5
450	15	8	6	4	2	2

Lead 3

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	40	35	35	35	16	16
50	40	35	35	35	16	16
80	40	35	35	30	16	16
110	40	35	35	30	16	16
140	40	35	35	28	15	15
170	40	32	32	24	12.5	12
200	35	28	23	20	10	9
225	28	20	16	12	6	

Caution

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.
  This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S6SAH -① -② (-③)	20	8	0.75	56
EC-S6HAH -① -② (-③)	12	14	2	93
EC-S6MAH -① -② (-③)	6	20	5	185
EC-S6LAH -① -② (-③)	3	25	10	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max. Speed (Energy-Saving: Enabled)]

Lead (mm)	50 to 400 (Every 50mm)	450 (mm)	500 (mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
20	800						715	630	560
12	680			585	515	445	390	345	305
6	340			295	255	220	190	170	140
3	170			145	125	110	95	85	70

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] × 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.
The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.
For % input, 1.0G is set as 100%.

Lead 20

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	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	0.75

Lead 12

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	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	1	0.5

Lead 6

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	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	10	1	1

Lead 3

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	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	11	9	2

Caution

Do not attempt to configure settings for acceleration/deceleration above the allowable values.
This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

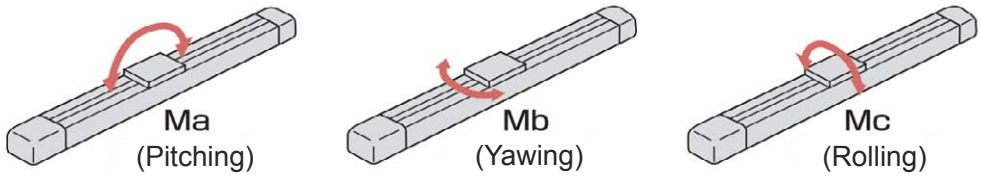
Item	Content
Drive system	Ball screw φ10mm, rolled C10
Positioning repeatability	±0.05mm
Base	Material: Aluminum, black alumite treatment
Static allowable moment	Ma direction:48.5N·m, Mb direction:69.3N·m, Mc direction:103N·m
Dynamic allowable moment(*)	Ma direction:33.7N·m, Mb direction:40.2N·m, Mc direction:55.3N·m
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

•Overhang load length guideline: 300mm or less

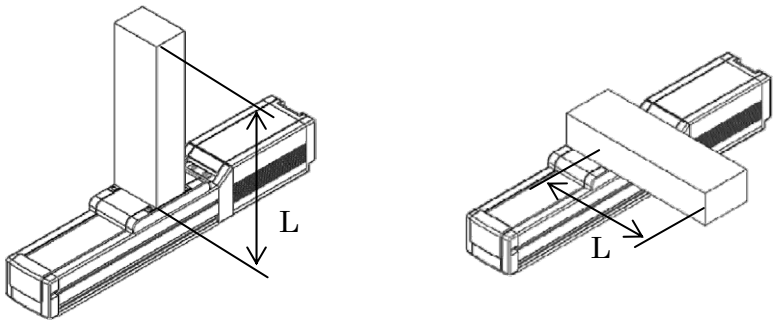
(*) For reference rated life of 5000km. The running life differs according to operation conditions and mounting status.

Keep the mounted object center of gravity at or below 1/2 the overhang length.

Slider type moment direction



Slider type overhang load length (L = 300mm or less)



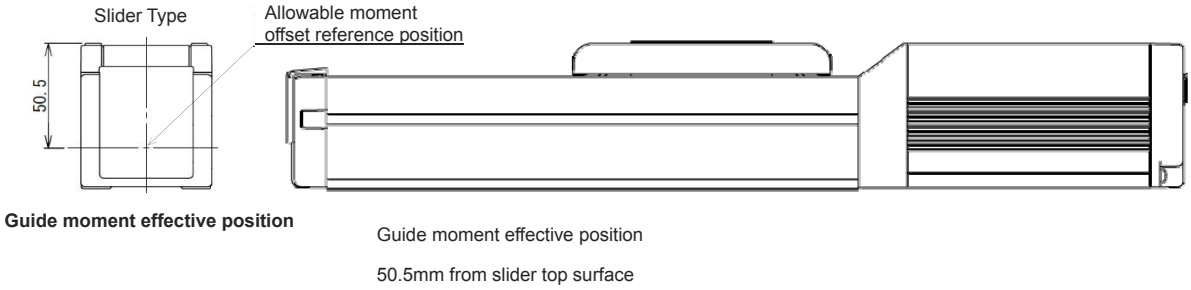
Ma direction **Mb/Mc direction**

Caution

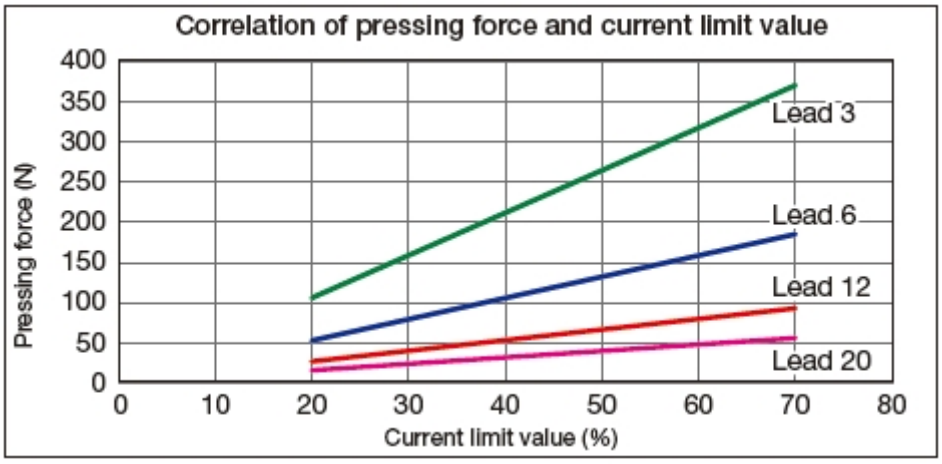
If the actuator is used with excessive allowable moment and overhang load, it may not only lead to abnormal noise and vibration but also significantly reduce the life of the ELECYLINDER.

Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type. The allowable moment offset reference position is shown for the calculation.

Configure the current limit value to ensure that the recoil moment does not exceed the (Ma/Mb) dynamic allowable moment given in the catalog specifications.



[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 20mm/s or less, the pressing force will become unstable and failure to operate normally is possible.

[2] EC-S7□AH

[Lead and Payload (Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S7SAH -① -② (-③)	24	37	3	112
EC-S7HAH -① -② (-③)	16	46	8	168
EC-S7MAH -① -② (-③)	8	51	16	336
EC-S7LAH -① -② (-③)	4	51	25	673

Legend ①Stroke ②Cable length ③Option

[Stroke and Max. Speed (Energy-Saving: Disabled)]

Lead (mm)	50 to 500 (Every 50mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
24	1230			1080	950	840	750
16	980 <840>	955 <840>	820	715	625	555	495
8	420		405	350	310	275	245
4	210 <175>		195 <175>	175	150	135	120

< > represents vertical operation (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] × 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.
The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.
For % input, 1.0G is set as 100%.

Lead 24

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	37	22	16	14	3	3
200	37	22	16	14	3	3
420	34	20	16	14	3	3
640	20	15	10	9	3	3
860	12	10	7	4	3	2.5
1080	8	4.5	3	1.5	1	0.5
1230	3	1.5	1	0.5	0.5	

Lead 16

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	46	35	28	27	8	8
140	46	35	28	27	8	8
280	46	35	25	24	8	8
420	34	25	15	10	5	4.5
560	20	15	10	6	4	3
700	15	10	5	3	3	2
840	7	4	2		0.5	
980	4					

Lead 8

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	51	45	40	40	16	16
70	51	45	40	40	16	16
140	51	40	38	35	16	16
210	51	35	30	24	10	9.5
280	40	28	20	15	8	7
350	30	9	4		5	4
420	7				2	

Lead 4

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	51	45	40	40	25	25
35	51	45	40	40	25	25
70	51	45	40	40	25	25
105	51	45	40	35	20	19
140	45	35	30	25	14	12
175	30	18			9	7.5
210	6					

Caution

Do not attempt to configure settings for acceleration/deceleration above the allowable values.
This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S7SAH -① -② (-③)	24	18	2	112
EC-S7HAH -① -② (-③)	16	35	5	168
EC-S7MAH -① -② (-③)	8	40	10	336
EC-S7LAH -① -② (-③)	4	40	15	673

Legend ①Stroke ②Cable length ③Option

[Stroke and Max. Speed (Energy-Saving: Enabled)]

Lead (mm)	50 to 400 (Every 50mm)	450 (mm)	500 (mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
20	800								750
12	560							555	495
6	280							275	245
3	140							135	120

< > represents vertical operation (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] × 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.
The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.
For % input, 1.0G is set as 100%.

Lead 24

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration (G)		
	0.3	0.7	0.3
0	18	10	2
200	18	10	2
420	18	10	2
640	10	2	1
800	5	0.5	0.5

Lead 16

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration (G)		
	0.3	0.7	0.3
0	35	20	5
140	35	20	5
280	25	12	3
420	15	6	1.5
560	7	0.5	0.5

Lead 8

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration (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	1.5

Lead 4

Orientation	Horizontal		Vertical
Speed (mm/s)	Acceleration (G)		
	0.3	0.7	0.3
0	40	30	15
35	40	30	15
70	40	30	15
105	40	30	8
140	15	6	2

Caution

Do not attempt to configure settings for acceleration/deceleration above the allowable values.
This may lead to vibration, breakdown, or shortened product life.

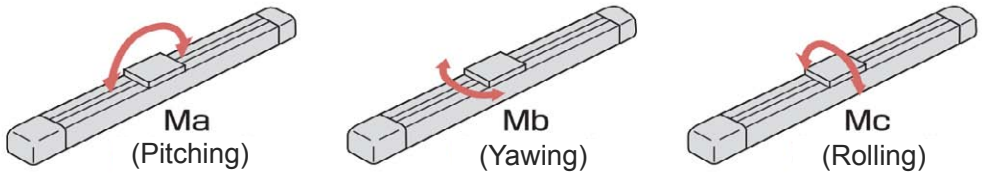
Item	Content
Drive system	Ball screw φ12mm, rolled C10
Positioning repeatability	±0.05mm
Base	Material: Aluminum, black alumite treatment
Static allowable moment	Ma direction:115N·m, Mb direction:115N·m, Mc direction:229N·m
Dynamic allowable moment(*)	Ma direction:75.5N·m, Mb direction:90N·m, Mc direction:134N·m
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

・Overhang load length guideline: 300mm or less

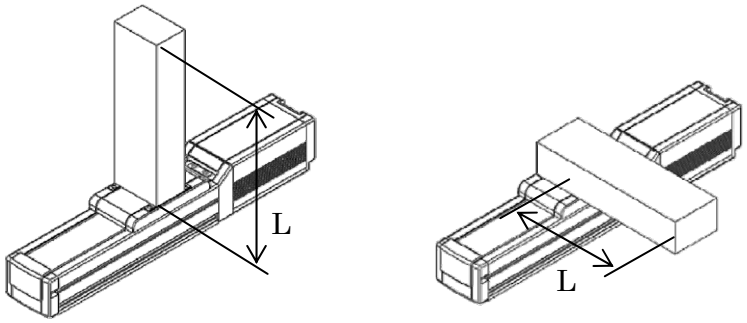
(*) For reference rated life of 5000km. The running life differs according to operation conditions and mounting status.

Keep the mounted object center of gravity at or below 1/2 the overhang length.

Slider type moment direction



Slider type overhang load length (L = 300mm or less)



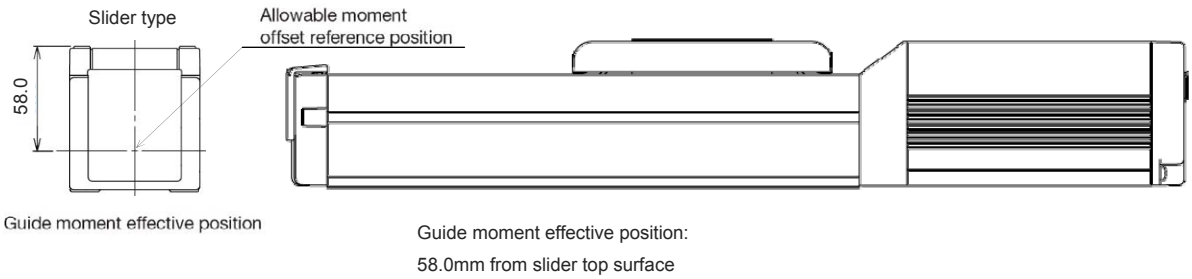
Ma direction **Mb/Mc direction**

Caution

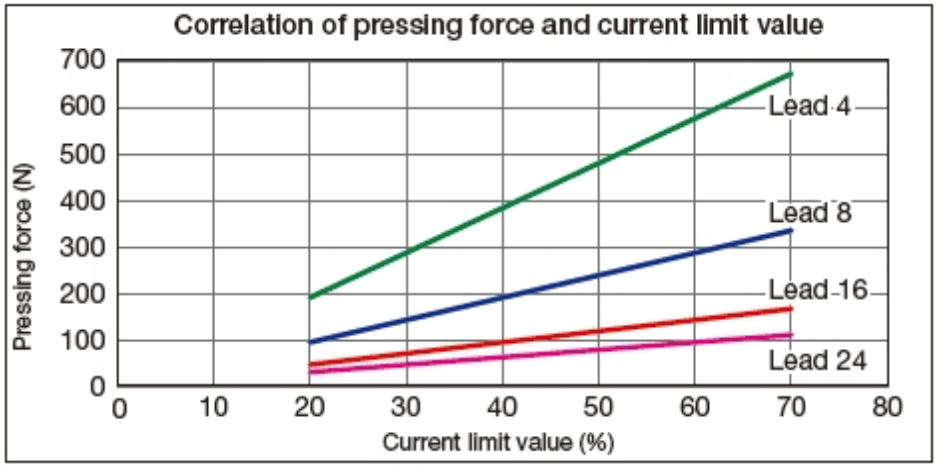
If the actuator is used with excessive allowable moment and overhang load, it may not only lead to abnormal noise and vibration but also significantly reduce the life of the ELECYLINDER.

Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type. The allowable moment offset reference position is shown for the calculation.

Configure the current limit value to ensure that the recoil moment does not exceed the (Ma/Mb) dynamic allowable moment given in the catalog specifications.



[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 20mm/s or less, the pressing force will become unstable, and failure to operate normally is possible.

High rigidity slider type (EC-S□□H)

[1] EC-S6□H

[Lead and Payload (Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S6SH -① -② (-③)	20	15	1	56
EC-S6HH -① -② (-③)	12	26	2.5	93
EC-S6MH -① -② (-③)	6	32	6	185
EC-S6LH -① -② (-③)	3	40	12.5	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Disabled)]

Lead (mm)	50～200 (Every 50mm)	250 (mm)	300 (mm)	350 (mm)	400 (mm)
20	800			717	559
12	700		513	386	301
6	450	364	261	196	152
3	225	184	131	98	76

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.
  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration(Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead20

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	15	10	8	7	1	1
160	15	10	8	7	1	1
320	12	10	8	6	1	1
480	12	9	8	6	1	1
640	12	8	6	5	1	1
800	10	6.5	4.5	3	1	1

Lead 12

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	26	18	16	14	2.5	2.5
80	26	18	16	14	2.5	2.5
200	26	18	16	14	2.5	2.5
320	26	18	14	12	2.5	2.5
440	26	18	12	10	2.5	2.5
560	20	12	8	7	2.5	2.5
700	15	9	5	4	2	1

Lead 6

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	32	26	24	20	6	6
40	32	26	24	20	6	6
100	32	26	24	20	6	6
160	32	26	24	20	6	6
220	32	26	24	20	6	6
280	32	26	24	15	6	5.5
340	32	20	18	12	5	4.5
400	22	12	11	8	3.5	3.5
450	15	8	6	4	2	2

Lead 3

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	40	35	35	35	12.5	12.5
50	40	35	35	35	12.5	12.5
80	40	35	35	30	12.5	12.5
110	40	35	35	30	12.5	12.5
140	40	35	35	28	12.5	12.5
170	40	32	32	24	12.5	12
200	35	28	23	20	10	9
225	28	20	16	12	6	

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S6SH -① -② (-③)	20	8	0.75	56
EC-S6HH -① -② (-③)	12	14	2	93
EC-S6MH -① -② (-③)	6	20	5	185
EC-S6LH -① -② (-③)	3	25	10	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	50～250 (Every 50mm)	300 (mm)	350 (mm)	400 (mm)
20	800		717	559
12	680	513	386	301
6	340	261	196	152
3	170	131	98	76

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead20

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	0.75

Lead 12

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	1	0.5

Lead 6

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	10	1	1

Lead 3

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	11	9	2

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

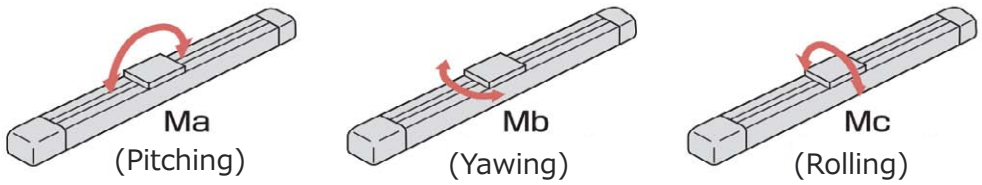
Item	Content
Drive system	Ball screw φ10mm, rolled C10
Positioning repeatability	±0.05mm
Base	Material: Aluminum, black alumite treatment
Static allowable moment	Ma direction:48.5N·m, Mb direction:69.3N·m, Mc direction:103N·m
Dynamic allowable moment(*)	Ma direction:33.7N·m, Mb direction:40.2N·m, Mc direction:55.3N·m
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

•Overhang load length guideline: 300mm or less

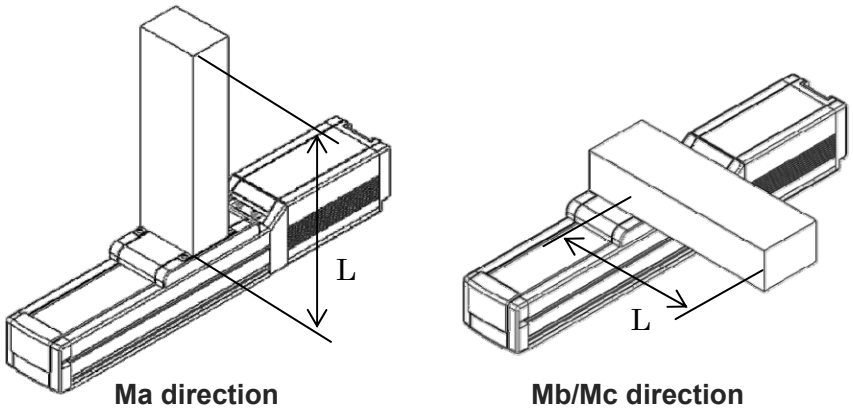
(*) For reference rated life of 5000km. The running life differs according to operation conditions and mounting status.

Keep the mounted object center of gravity at or below 1/2 the overhang length.

Slider type moment direction



Slider type overhang load length (L = 300mm or less)



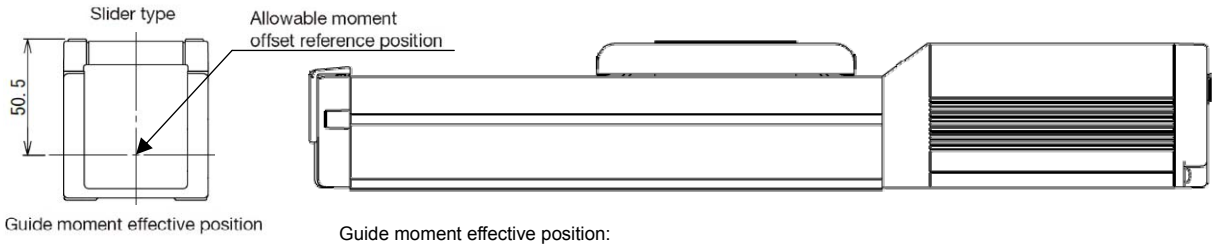
Ma direction **Mb/Mc direction**

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 ELECYLINDER.

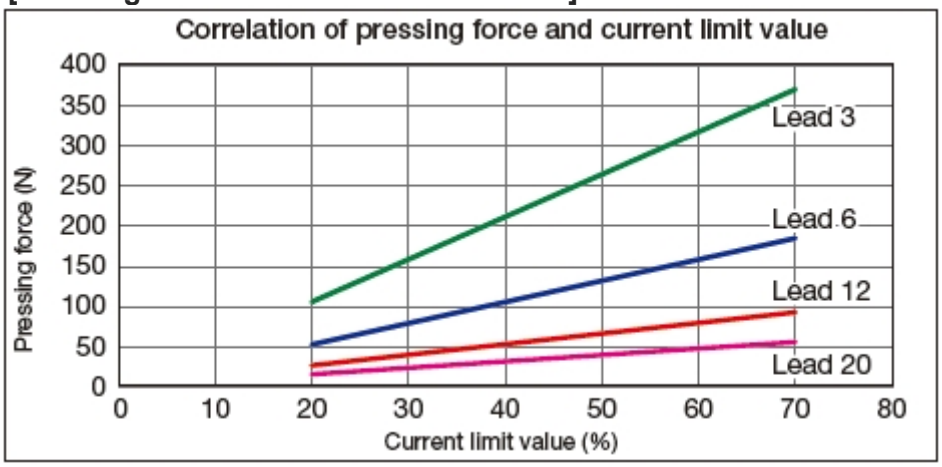
Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type. The allowable moment offset reference position is shown for the calculation.

Configure the current limit value to ensure that the recoil moment does not exceed the (Ma/Mb) dynamic allowable moment given in the catalog specifications.



Guide moment effective position:
50.5mm from slider top surface

[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 20mm/s or less, the pressing force will become unstable and failure to operate normally is possible.

[2] EC-S7□H

[Lead and Payload (Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S7SH -① -② (-③)	24	37	3	112
EC-S7HH -① -② (-③)	16	46	8	168
EC-S7MH -① -② (-③)	8	51	16	336
EC-S7LH -① -② (-③)	4	51	19	673

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Disabled)]

Lead (mm)	50～300 (Every 50mm)	350 (mm)	400 (mm)	450 (mm)	500 (mm)
24	860		768	615	503
16	700	626	488	392	321
8	420	319	248	199	163
4	210<175>	161	125	100	82

<> represents vertical operation (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration(Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead24

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	37	22	16	14	3	3
200	37	22	16	14	3	3
420	34	20	16	14	3	3
640	20	15	10	9	3	3
860	12	10	7	4	3	2.5

Lead 16

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

Lead 8

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	51	45	40	40	16	16
70	51	45	40	40	16	16
140	51	40	38	35	16	16
210	51	35	30	24	10	9.5
280	40	28	20	15	8	7
350	30	9	4		5	4
420	7				2	

Lead 4

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	51	45	40	40	19	19
35	51	45	40	40	19	19
70	51	45	40	40	19	19
105	51	45	40	35	19	19
140	45	35	30	25	14	12
175	30	18			9	7.5
210	6					

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-S7SH -① -② (-③)	24	18	2	112
EC-S7HH -① -② (-③)	16	35	5	168
EC-S7MH -① -② (-③)	8	40	10	336
EC-S7LH -① -② (-③)	4	40	15	673

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	50～350 (Every 50mm)	400 (mm)	450 (mm)	500 (mm)
24	800	768	615	503
16	560	488	392	321
8	280	248	199	163
4	140	125	100	82

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead24

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	18	10	2
200	18	10	2
420	18	10	2
640	10	2	1
800	5	0.5	0.5

Lead 16

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	35	20	5
140	35	20	5
280	25	12	3
420	15	6	1.5
560	7	0.5	0.5

Lead 8

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	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	1.5

Lead 4

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	40	30	15
35	40	30	15
70	40	30	15
105	40	30	8
140	15	6	2

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

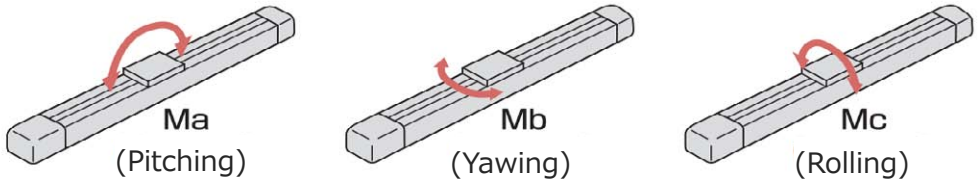
Item	Content
Drive system	Ball screw φ12mm, rolled C10
Positioning repeatability	±0.05mm
Base	Material: Aluminum, black alumite treatment
Static allowable moment	Ma direction:115N·m, Mb direction:115N·m, Mc direction:229N·m
Dynamic allowable moment(*)	Ma direction:75.5N·m, Mb direction:90N·m, Mc direction:134N·m
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

•Overhang load length guideline: 300mm or less

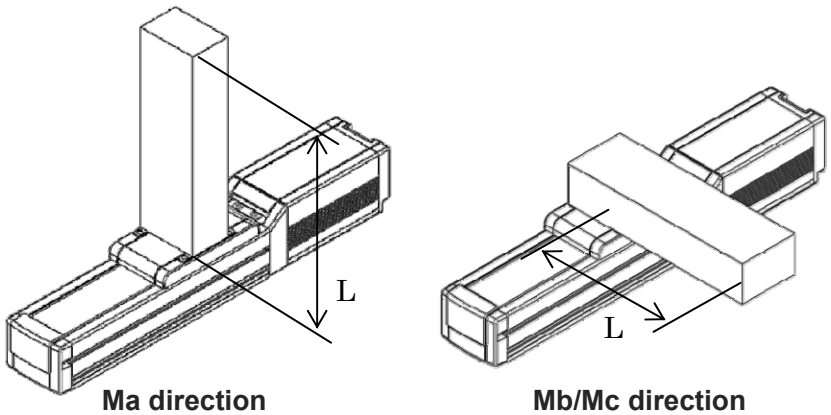
(*) For reference rated life of 5000km. The running life differs according to operation conditions and mounting status.

Keep the mounted object center of gravity at or below 1/2 the overhang length.

Slider type moment direction



Slider type overhang load length (L = 300mm or less)



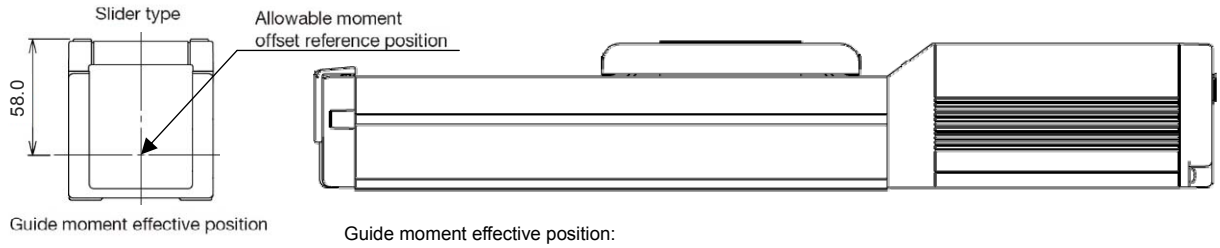
Ma direction **Mb/Mc direction**

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 ELECYLINDER.

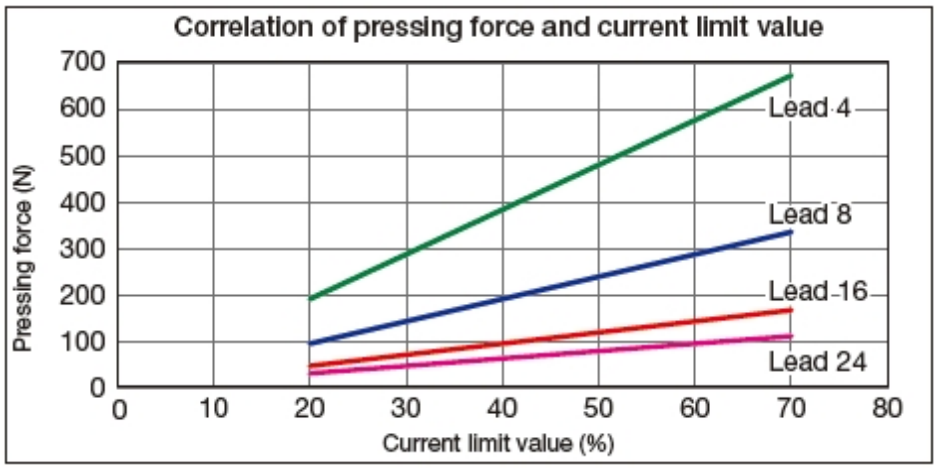
Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type. The allowable moment offset reference position is shown for the calculation.

Configure the current limit value to ensure that the recoil moment does not exceed the (Ma/Mb) dynamic allowable moment given in the catalog specifications.



Guide moment effective position:
58.0mm from slider top surface

[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 20mm/s or less, the pressing force will become unstable, and failure to operate normally is possible.

Rod type

[1] EC-R6

[Lead and Payload (Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-R6S -① -② (-③)	20	6	1.5	56
EC-R6H -① -② (-③)	12	25	4	93
EC-R6M -① -② (-③)	6	40	10	185
EC-R6L -① -② (-③)	3	60	12.5	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Disabled)]

Lead (mm)	50～200 (Every 50mm)	250 (mm)	300 (mm)
20	800		
12	700		547
6	450	376	268
3	225	186	133

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration(Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead20

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	6	6	5	5	1.5	1.5
160	6	6	5	5	1.5	1.5
320	6	6	5	3	1.5	1.5
480	6	6	5	3	1.5	1.5
640	6	4	3	2	1.5	1.5
800	4	3			1	1

Lead 12

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	25	18	16	12	4	4
100	25	18	16	12	4	4
200	25	18	16	10	4	4
400	20	14	10	6	4	4
500	15	8	6	4	3.5	3
700	6	2			2	1

Lead 6

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	40	35	30	25	10	10
50	40	35	30	25	10	10
100	40	35	30	25	10	10
200	40	30	25	20	10	10
250	40	27.5	22.5	18	9	8
350	30	14	12	10	5	5
400	18	10	6	5	3	3
450	8	3			2	1

Lead 3

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	60	50	45	40	12.5	12.5
50	60	50	45	40	12.5	12.5
100	60	50	45	40	12.5	12.5
125	60	50	40	30	10	10
175	40	35	25	20	6	5
200	35	30	20	14	5	4.5
225	16	16	10	6	5	4

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-R6S -① -② (-③)	20	6	1	56
EC-R6H -① -② (-③)	12	25	4	93
EC-R6M -① -② (-③)	6	40	10	185
EC-R6L -① -② (-③)	3	40	12.5	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	50～200 (Every 50mm)	250 (mm)	300 (mm)
20	640		
12	500		
6	250		
3	125		

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead20

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	6	5	1
160	6	5	1
320	6	5	1
480	4	3	1
640	3	1	0.5

Lead 12

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	25	10	4
100	25	10	4
200	25	10	4
300	20	8	3
400	10	5	2
500	5	2	1

Lead 6

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	40	20	10
50	40	20	10
100	40	20	10
150	40	20	8
200	35	18	5
250	10	6	3

Lead 3

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	40	25	12.5
25	40	25	12.5
50	40	25	12.5
75	40	25	12
100	40	25	9
125	40	25	5

Caution

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

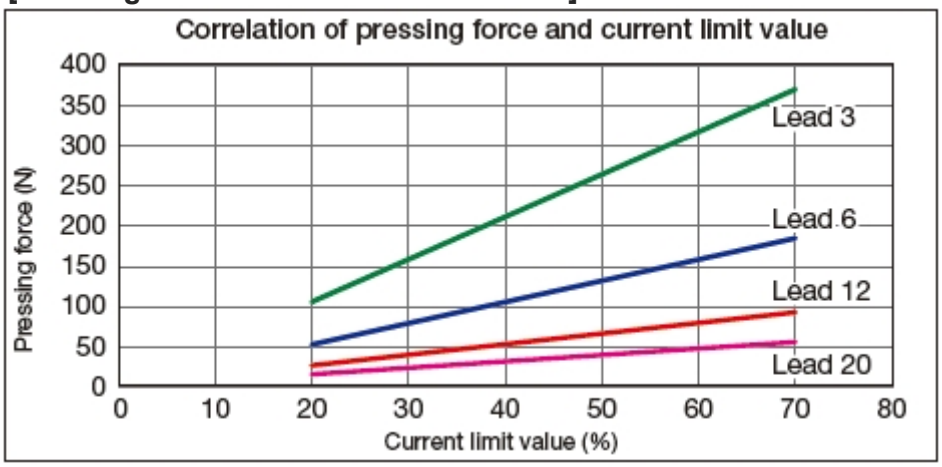
This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

Item	Content
Drive system	Ball screw φ10mm, rolled C10
Positioning repeatability	±0.05mm
Rod	φ25mm Material: Aluminum, hard alumite treatment
Rod tip static allowable torque	0.5N・m
Rod tip maximum angular displacement (*)	±1.5 degrees
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

(*) The rod tip angular displacement (initial value guideline) when the rod tip static allowable torque is applied with the rod fully within the body.

[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 20mm/s or less, the pressing force will become unstable and failure to operate normally is possible.

[2] EC-R7

[Lead and Payload(Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-R7S -① -② (-③)	24	20	3	182
EC-R7H -① -② (-③)	16	50	8	273
EC-R7M -① -② (-③)	8	60	18	547
EC-R7L -① -② (-③)	4	80	19	1094

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed(Energy-Saving: Disabled)]

Lead (mm)	50～300 (mm)
24	860<640>
16	700<560>
8	350
4	175

<> represents vertical operation (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration(Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead24

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	20	18	15	12	3	3
200	20	18	15	12	3	3
400	20	14	12	8	3	3
420	17	12	10	6	3	3
600	14	6	5	4	3	2
640	5	3	2	1.5	2	1
800	5	1	1			
860	2	0.5				

Lead 16

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	50	40	35	30	8	8
140	50	40	35	30	8	8
280	50	35	25	20	7	7
420	25	18	14	10	4.5	4
560	10	5	3	2	2	1
700	2					

Lead 8

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	60	50	45	40	18	18
70	60	50	45	40	18	18
140	60	50	45	40	16	12
210	60	40	31	26	10	9
280	34	20	15	11	5	4
350	12	4	1		2	1

Lead 4

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	80	70	65	60	19	19
35	80	70	65	60	19	19
70	80	70	65	60	19	19
105	80	60	50	40	18	18
140	50	30	20	15	12	10
175	15				2	

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-R7S -① -② (-③)	24	18	3	182
EC-R7H -① -② (-③)	16	40	5	273
EC-R7M -① -② (-③)	8	50	17.5	547
EC-R7L -① -② (-③)	4	55	19	1094

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	50～300 (mm)
24	600<400>
16	420<280>
8	210
4	105

<> represents vertical operation (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead24

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	18	9.5	3
200	18	9.5	3
400	11	6	1.5
420	10	5	
600	1		

Lead 16

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	40	25	5
140	40	25	5
280	18	12	2
420	1.5	1	

Lead 8

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	50	30	17.5
70	50	30	17.5
140	50	30	7
210	14	7	2

Lead 4

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	55	50	19
35	55	50	19
70	55	50	13
105	30	15	2

Caution

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

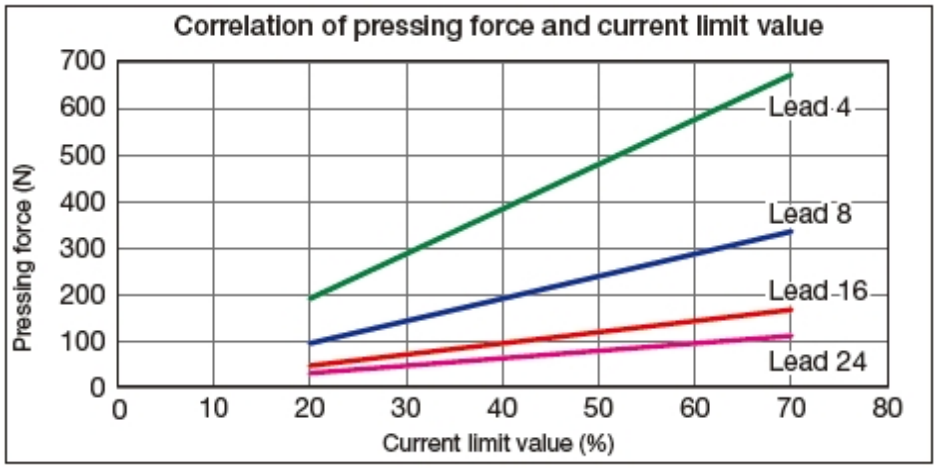
This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

Item	Content
Drive system	Ball screw φ12mm, rolled C10
Positioning repeatability	±0.05mm
Rod	φ30mm Material: Aluminum, hard alumite treatment
Rod tip static allowable torque	0.5N・m
Rod tip maximum angular displacement (*)	±1.5 degrees
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

(*) The rod tip angular displacement (initial value guideline) when the rod tip static allowable torque is applied with the rod fully within the body.

[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 20mm/s or less, the pressing force will become unstable and failure to operate normally is possible.

Radial cylinder type

[1] EC-RR6

[Lead and Payload (Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR6S -① -② (-③)	20	6	1.5	56
EC-RR6H -① -② (-③)	12	25	4	93
EC-RR6M -① -② (-③)	6	40	10	185
EC-RR6L -① -② (-③)	3	60	12.5	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Disabled)]

Lead (mm)	65～215 (Every 50mm)	265 (mm)	315 (mm)
20	800		
12	700	660	480
6	450	325	235
3	225	160	115

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration(Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead20

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration(G)					
	0.3	0.5	0.7	1	0.3	0.5
0	6	6	5	5	1.5	1.5
160	6	6	5	5	1.5	1.5
320	6	6	5	3	1.5	1.5
480	6	6	5	3	1.5	1.5
640	6	4	3	2	1.5	1.5
800	4	3			1	1

Lead 12

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration(G)					
	0.3	0.5	0.7	1	0.3	0.5
0	25	18	16	12	4	4
100	25	18	16	12	4	4
200	25	18	16	10	4	4
400	20	14	10	6	4	4
500	15	8	6	4	3.5	3
700	6	2			2	1

Lead 6

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration(G)					
	0.3	0.5	0.7	1	0.3	0.5
0	40	35	30	25	10	10
50	40	35	30	25	10	10
100	40	35	30	25	10	10
200	40	30	25	20	10	10
250	40	27.5	22.5	18	9	8
350	30	14	12	10	5	5
400	18	10	6	5	3	3
450	8	3			2	1

Lead 3

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration(G)					
	0.3	0.5	0.7	1	0.3	0.5
0	60	50	45	40	12.5	12.5
50	60	50	45	40	12.5	12.5
100	60	50	45	40	12.5	12.5
125	60	50	40	30	10	10
175	40	35	25	20	6	5
200	35	30	20	14	5	4.5
225	16	16	10	6	5	4

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR6S -① -② (-③)	20	6	1	56
EC-RR6H -① -② (-③)	12	25	4	93
EC-RR6M -① -② (-③)	6	40	10	185
EC-RR6L -① -② (-③)	3	40	12.5	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	65～215 (Every 50mm)	265 (mm)	315 (mm)
20	640		
12	500		480
6	250		235
3	125		115

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead20

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	6	5	1
160	6	5	1
320	6	5	1
480	4	3	1
640	3	1	0.5

Lead 12

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	25	10	4
100	25	10	4
200	25	10	4
300	20	8	3
400	10	5	2
500	5	2	1

Lead 6

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	40	20	10
50	40	20	10
100	40	20	10
150	40	20	8
200	35	18	5
250	10	6	3

Lead 3

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	40	25	12.5
25	40	25	12.5
50	40	25	12.5
75	40	25	12
100	40	25	9
125	40	25	5

Caution

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

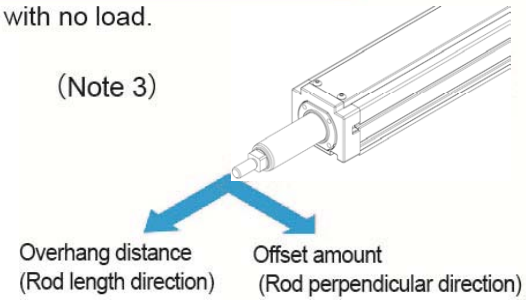
This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

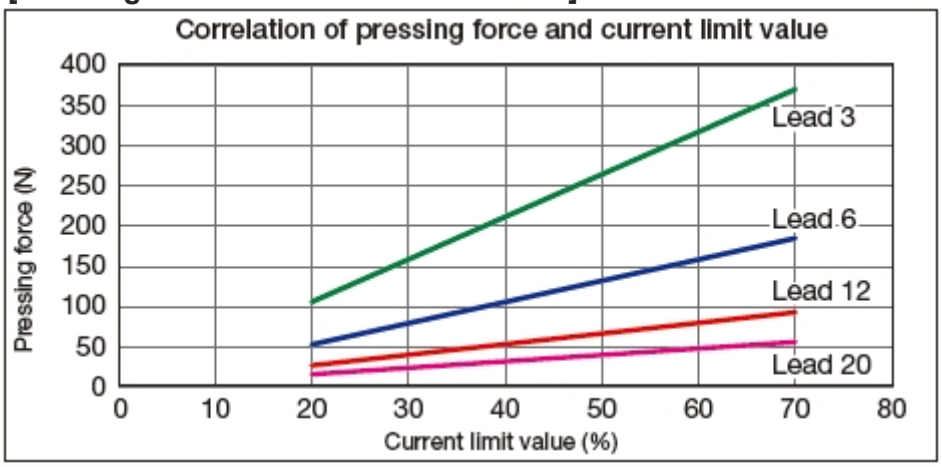
Item	Content
Drive system	Ball screw φ10mm, rolled C10
Positioning repeatability	±0.05mm
Rod	φ25mm Material: Aluminum, hard alumite treatment
Rod non-rotation precision (Note 2)	0 degrees
Rod tip static allowable torque	5.5N・m
Rod tip allowable overhang distance (Note 3)	100mm
Rod tip allowable Offset amount (Note 3)	100mm
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

(Note 2) Rod rotating direction displacement angle with no load.

(Note 3)



[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 20mm/s or less, the pressing force will become unstable and failure to operate normally is possible.

[2] EC-RR7

[Lead and Payload(Energy-Saving: Disabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR7S -① -② (-③)	24	20	3	182
EC-RR7H -① -② (-③)	16	50	8	273
EC-RR7M -① -② (-③)	8	60	18	547
EC-RR7L -① -② (-③)	4	80	19	1094

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed(Energy-Saving: Disabled)]

Lead (mm)	65～315 (Every 50mm)
24	860<640>
16	700<560>
8	450
4	175

<> represents vertical operation (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration(Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead24

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	20	18	15	12	3	3
200	20	18	15	12	3	3
400	20	14	12	8	3	3
420	17	12	10	6	3	3
600	14	6	5	4	3	2
640	5	3	2	1.5	2	1
800	5	1	1			
860	2	0.5				

Lead 16

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	50	40	35	30	8	8
140	50	40	35	30	8	8
280	50	35	25	20	7	7
420	25	18	14	10	4.5	4
560	10	5	3	2	2	1
700	2					

Lead 8

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	60	50	45	40	18	18
70	60	50	45	40	18	18
140	60	50	45	40	16	12
210	60	40	31	26	10	9
280	34	20	15	11	5	4
350	12	4	1		2	1

Lead 4

Orientation	Horizontal				Vertical	
Speed	Acceleration(G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	80	70	65	60	19	19
35	80	70	65	60	19	19
70	80	70	65	60	19	19
105	80	60	50	40	18	18
140	50	30	20	15	12	10
175	15				2	

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model number	Lead (mm)	Maximum payload		Maximum pressing force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR7S -① -② (-③)	24	18	3	182
EC-RR7H -① -② (-③)	16	40	5	273
EC-RR7M -① -② (-③)	8	50	17.5	547
EC-RR7L -① -② (-③)	4	55	19	1094

Legend ①Stroke ②Cable length ③Option

[Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	65～315 (Every 50mm)
24	600<420>
16	420<280>
8	210
4	105

<> represents vertical operation (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead24

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	18	9.5	3
200	18	9.5	3
420	10	5	1.5
600	1		

Lead 16

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	40	25	5
140	40	25	5
280	18	12	2
420	1.5	1	

Lead 8

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	50	30	17.5
70	50	30	17.5
140	50	30	7
210	14	7	2

Lead 4

Orientation	Horizontal		Vertical
Speed	Acceleration(G)		
(mm/s)	0.3	0.7	0.3
0	55	50	19
35	55	50	19
70	55	50	13
105	30	15	2

Caution

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

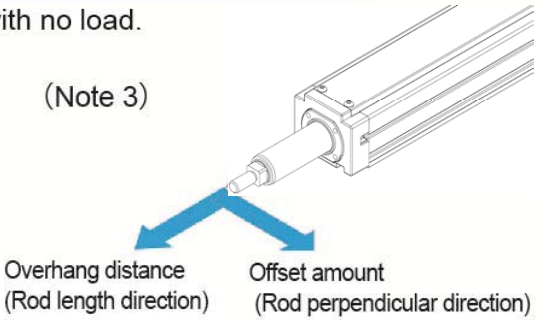
This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

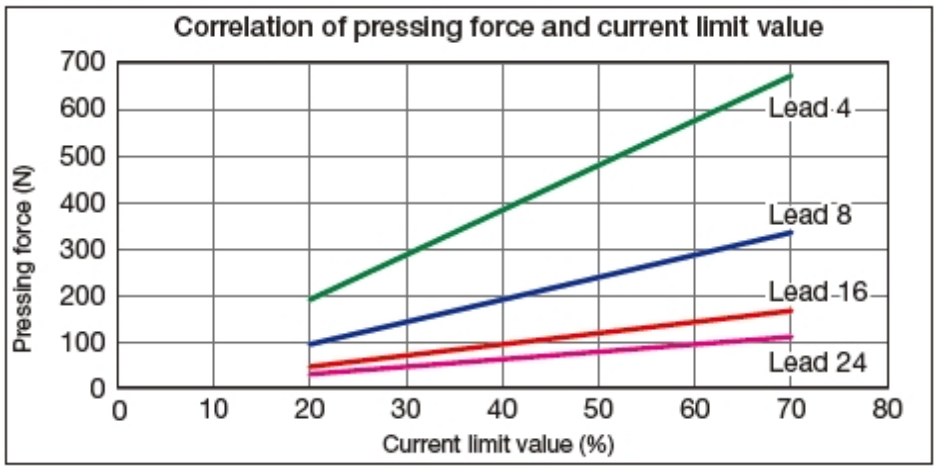
Item	Content
Drive system	Ball screw φ12mm, rolled C10
Positioning repeatability	±0.05mm
Rod	φ30mm Material: Aluminum, hard alumite treatment
Rod non-rotation precision (Note 2)	0 degrees
Rod tip static allowable torque	10.5N・m
Rod tip allowable overhang distance (Note 3)	100mm
Rod tip allowable Offset amount (Note 3)	100mm
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

(Note 2) Rod rotating direction displacement angle with no load.

(Note 3)



[Pressing Force and Current Limit Value]

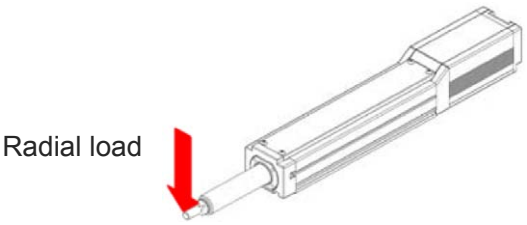


Caution

- 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 20mm/s or less, the pressing force will become unstable and failure to operate normally is possible.

Because the radial cylinder type has a linear guide built into the body, radial and moment loads can be applied to the rod.
The applicable radial and moment loads must meet the following three conditions.

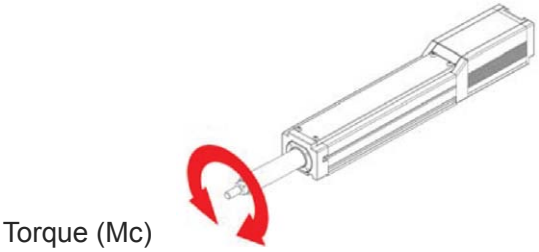
1. The radial load acting on the rod must not exceed the allowable value.



Type	Rod tip static allowable radial load	Rod tip dynamic allowable radial load(Note 1)
EC-RR6	90N	45N
EC-RR7	120N	60N

(Note 1) The value assumes a basic rated life of 5,000km.

2. The torque (Mc) acting on the rod must not exceed the allowable value.



Type	Rod tip static allowable torque	Rod tip dynamic allowable torque(Note 1)
EC-RR6	5.5N·m	5.5N·m
EC-RR7	10.5N·m	10.5N·m

(Note 1) The value assumes a basic rated life of 5,000km.

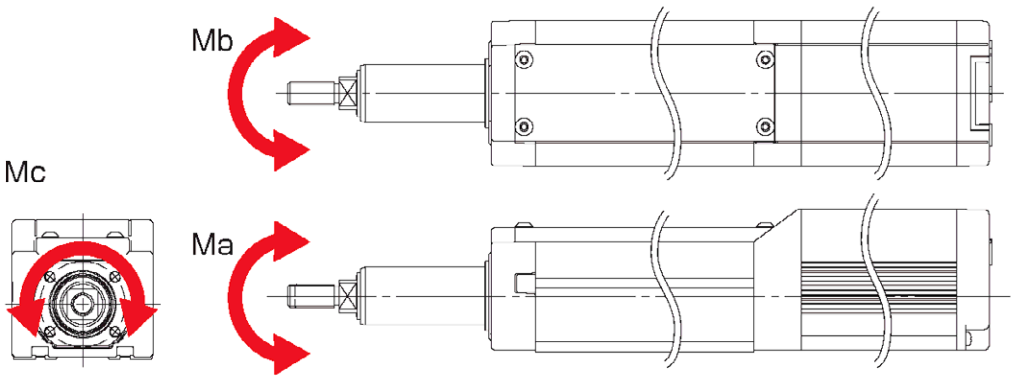
3. The uniform load (*) acting on the rod must not exceed the allowable value.

(*) Uniform load = Ma・Ka + Mb・Kb + Mc・Kc

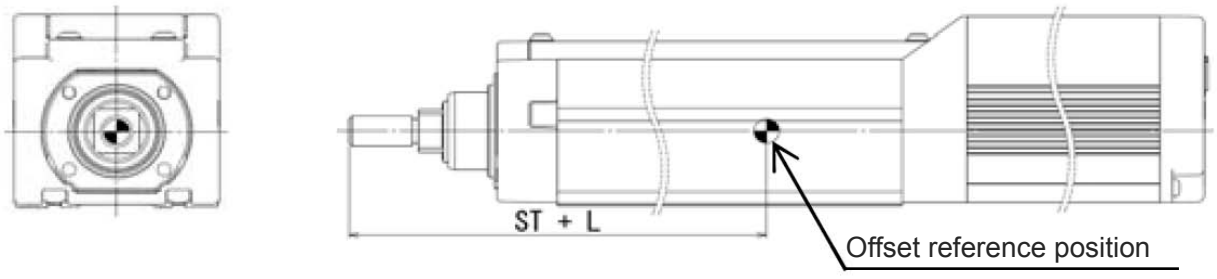
Type	Static allowable uniform load	Dynamic allowable uniform load(Note 1)	Load uniform coefficient Ka	Load uniform coefficient Kb	Load uniform coefficient Kc
EC-RR6	4400N	1050N	124/m	87/m	62/m
EC-RR7	5680N	1260N	98/m	69/m	50/m

(Note 1) The value assumes a basic rated life of 5,000km.

Ma, Mb, Mc: Moment load

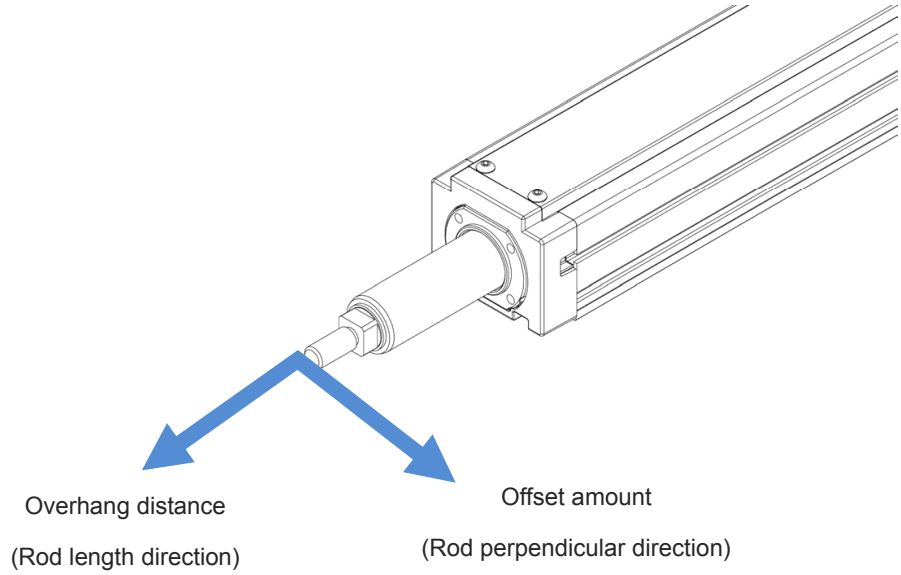


Moment offset reference position



Type	L
EC-RR6	111mm
EC-RR7	144.5mm

Allowable offset amount, allowable overhang distance



Type	Allowable offset amount	Allowable overhang distance
EC-RR6	100mm	100mm
EC-RR7	100mm	100mm

Caution

Keep the radial load acting on the rod within the allowable offset amount and overhang distance for use.
If the allowable values are exceeded, this may lead to vibration, shortened product life, or damage.

High rigidity radial cylinder type (EC-RR□□AH)

[1] EC-RR6□AH

[Lead and Payload (Energy-Saving: Disabled)]

Model	Lead (mm)	Max. payload		Max. push force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR6SAH -① -② (-③)	20	6	1.5	56
EC-RR6HAH -① -② (-③)	12	25	4	93
EC-RR6MAH -① -② (-③)	6	40	10	185
EC-RR6LAH -① -② (-③)	3	60	20	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max. Speed (Energy-Saving: Disabled)]

Lead (mm)	50 to 400 (Every 50mm)
20	800
12	700
6	450
3	225

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] × 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.
The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.
For % input, 1.0G is set as 100%.

Lead 20

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	6	6	5	5	1.5	1.5
160	6	6	5	5	1.5	1.5
320	6	6	5	3	1.5	1.5
480	6	6	5	3	1.5	1.5
640	6	4	3	2	1.5	1.5
800	4	3			1	1

Lead 12

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	25	18	16	12	4	4
100	25	18	16	12	4	4
200	25	18	16	10	4	4
400	20	14	10	6	4	4
500	15	8	6	4	3.5	3
700	6	2			2	1

Lead 6

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	40	35	30	25	10	10
50	40	35	30	25	10	10
100	40	35	30	25	10	10
200	40	30	25	20	10	10
250	40	27.5	22.5	18	9	8
350	30	14	12	10	5	5
400	18	10	6	5	3	3
450	8	3			2	1

Lead 3

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	60	50	45	40	20	20
50	60	50	45	40	20	20
100	60	50	45	40	20	20
125	60	50	40	30	10	10
175	40	35	25	20	6	5
200	35	30	20	14	5	4.5
225	16	16	10	6	5	4

Caution

Do not attempt to configure settings for acceleration/deceleration above the allowable values.
This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model	Lead (mm)	Maximum payload		Max. push force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR6SAH -① -② (-③)	20	6	1	56
EC-RR6HAH -① -② (-③)	12	25	4	93
EC-RR6MAH -① -② (-③)	6	40	10	185
EC-RR6LAH -① -② (-③)	3	40	20	370

Legend ①Stroke ②Cable length ③Option

[Stroke and Max. Speed (Energy-Saving: Enabled)]

Lead (mm)	50 to 400 (Every 50mm)
20	640
12	500
6	250
3	125

(Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] × 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.
The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.
For % input, 1.0G is set as 100%.

Lead 20

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	6	5	1
160	6	5	1
320	6	5	1
480	4	3	1
640	3	1	0.5

Lead 12

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	25	10	4
100	25	10	4
200	25	10	4
300	20	8	3
400	10	5	2
500	5	2	1

Lead 6

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	40	20	10
50	40	20	10
100	40	20	10
150	40	20	8
200	35	18	5
250	10	6	3

Lead 3

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	40	25	20
25	40	25	20
50	40	25	20
75	40	25	12
100	40	25	9
125	40	25	5

Caution

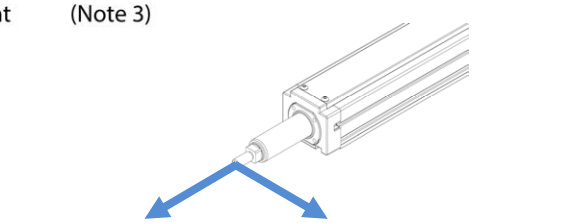
Do not attempt to configure settings for acceleration/deceleration above the allowable values.
This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

Item	Description
Drive system	Ball screw ϕ10mm, rolled C10
Positioning repeatability	±0.05mm
Rod	ϕ25mm Material: Aluminum, hard alumite treatment
Rod non-rotation precision (Note 2)	0 degrees
Rod tip static allowable torque	9N·m
Rod tip allowable overhang distance (Note 3)	100mm
Rod tip allowable offset amount (Note 3)	100mm
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

(Note 2) Rod rotating direction displacement angle with no load.

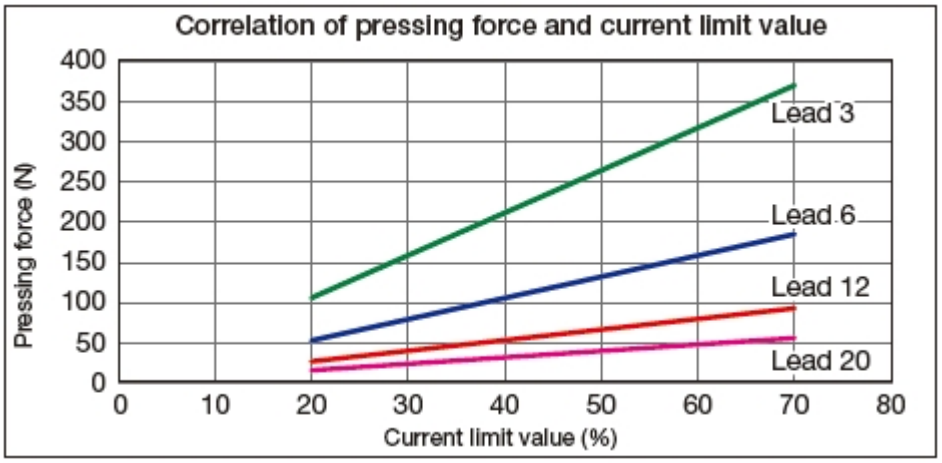
(Note 3)



Overhang distance (Rod length direction)

Offset amount (Rod perpendicular direction)

[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 20mm/s or less, the pressing force will become unstable, and failure to operate normally is possible.

[2] EC-RR7□AH

[Lead and Payload (Energy-Saving: Disabled)]

Model	Lead (mm)	Maximum payload		Max. push force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR7SAH -① -② (-③)	24	20	3	182
EC-RR7HAH -① -② (-③)	16	50	8	273
EC-RR7MAH -① -② (-③)	8	60	18	547
EC-RR7LAH -① -② (-③)	4	80	28	1094

Legend ①Stroke ②Cable length ③Option

[Stroke and Max. Speed (Energy-Saving: Disabled)]

Lead (mm)	50 to 500 (Every 50mm)
20	860 <640>
12	700 <560>
6	350
3	175

Values in brackets < > are for vertical use. (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] × 1000 [1/s]

  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.
The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.
For % input, 1.0G is set as 100%.

Lead 24

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	20	18	15	12	3	3
200	20	18	15	12	3	3
400	20	14	12	8	3	3
420	17	12	10	6	3	3
600	14	6	5	4	3	2
640	5	3	2	1.5	2	1
800	5	1	1			
860	2	0.5				

Lead 16

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	50	40	35	30	8	8
140	50	40	35	30	8	8
280	50	35	25	20	7	7
420	25	18	14	10	4.5	4
560	10	5	3	2	2	1
700	2					

Lead 8

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	60	50	45	40	18	18
70	60	50	45	40	18	18
140	60	50	45	40	16	12
210	60	40	31	26	10	9
280	34	20	15	11	5	4
350	12	4	1		2	1

Lead 4

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	80	70	65	60	28	28
35	80	70	65	60	28	28
70	80	70	65	60	28	28
105	80	60	50	40	18	18
140	50	30	20	15	12	10
175	15				2	

Caution

Do not attempt to configure settings for acceleration/deceleration above the allowable values.
This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model	Lead (mm)	Maximum payload		Max. push force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR7SAH -① -② (-③)	24	18	3	182
EC-RR7HAH -① -② (-③)	16	40	5	273
EC-RR7MAH -① -② (-③)	8	50	17.5	547
EC-RR7LAH -① -② (-③)	4	55	26	1094

Legend ①Stroke ②Cable length ③Option

[Stroke and Max. Speed (Energy-Saving: Enabled)]

Lead (mm)	50 to 500 (Every 50mm)
20	630 <420>
12	420 <280>
6	210
3	105

Values in brackets < > are for vertical use. (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.

  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] × 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.
The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.
For % input, 1.0G is set as 100%.

Lead 24

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	18	9.5	3
200	18	9.5	3
420	10	5	1.5
630	1		

Lead 16

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	40	25	5
140	40	25	5
280	18	12	2
420	1.5	1	

Lead 8

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	50	30	17.5
70	50	30	17.5
140	50	30	7
210	14	7	2

Lead 4

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	55	50	26
35	55	50	26
70	55	50	13
105	30	15	2

Caution

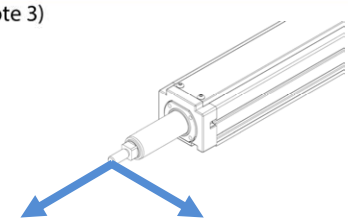
Do not attempt to configure settings for acceleration/deceleration above the allowable values.
This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

Item	Description
Drive system	Ball screw ϕ12mm, rolled C10
Positioning repeatability	±0.05mm
Rod	ϕ30mm Material: Aluminum, hard alumite treatment
Rod non-rotation precision (Note 2)	0 degrees
Rod tip static allowable torque	17.6N·m
Rod tip allowable overhang distance (Note 3)	150mm
Rod tip allowable offset amount (Note 3)	150mm
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

(Note 2) Rod rotating direction displacement angle with no load.

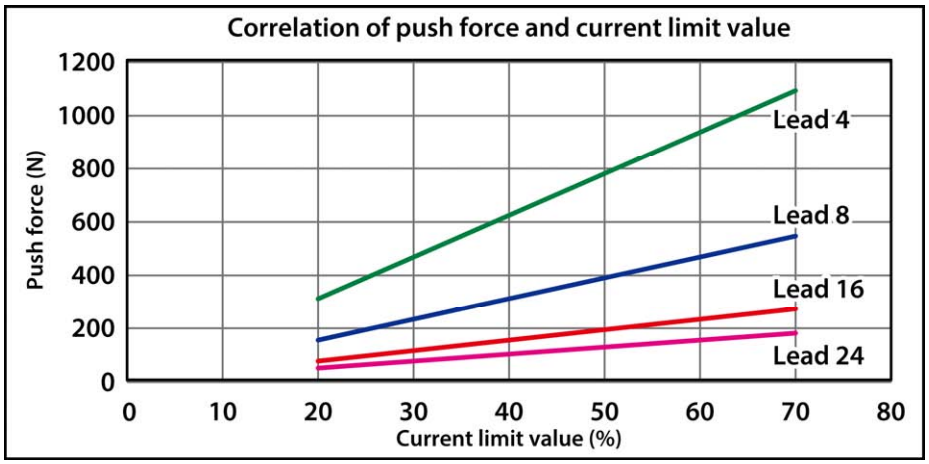
(Note 3)



Overhang distance (Rod length direction)

Offset amount (Rod perpendicular direction)

[Pressing Force and Current Limit Value]

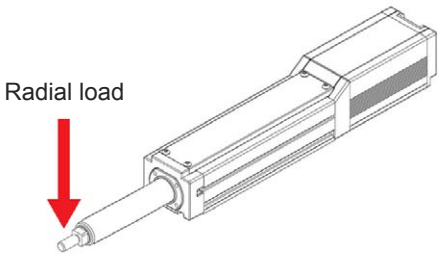


Caution

- 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 20mm/s or less, the pressing force will become unstable, and failure to operate normally is possible.

Because the radial cylinder type has a linear guide built into the body, radial and moment loads can be applied to the rod.
The applicable radial and moment loads must meet the following three conditions.

1. The radial load acting on the rod must not exceed the allowable value.



Type	Rod tip static allowable radial load	Rod tip dynamic allowable radial load (Note 1)
EC-RR6□AH	190N	130N (Note 2)
EC-RR7□AH	250N	170N (Note 3)

(Note 1) The value assumes a basic rated life of 5,000km.

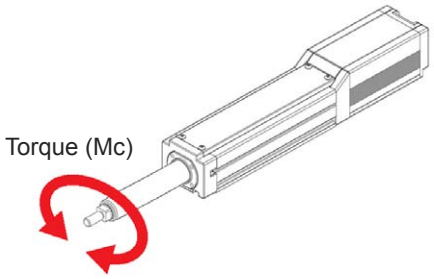
(Note 2) For stroke 300mm or more, set the value specified in the table or below.

Stroke (mm)	300	350	400
Rod tip dynamic allowable radial load	40	35	25

(Note 3) For stroke 300mm or more, set the value specified in the table or below.

Stroke (mm)	300	350	400	450	500
Rod tip dynamic allowable radial load	50	45	40	35	30

2. The torque (Mc) acting on the rod must not exceed the allowable value.



Type	Rod tip static allowable torque	Rod tip dynamic allowable torque (Note 1)
EC-RR6□AH	9N·m	5.5N·m
EC-RR7□AH	17.6N·m	10.5N·m

(Note 1) The value assumes a basic rated life of 5,000km.

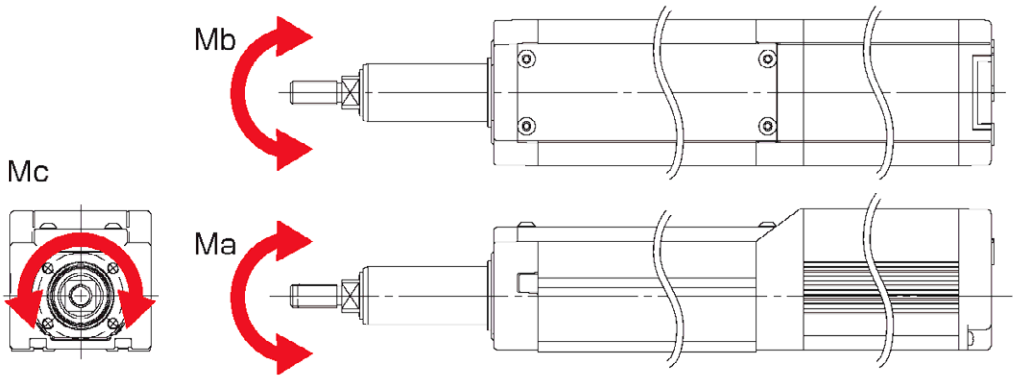
3. The uniform load (*) acting on the rod must not exceed the allowable value.

(*) Uniform load = Ma・Ka + Mb・Kb + Mc・Kc

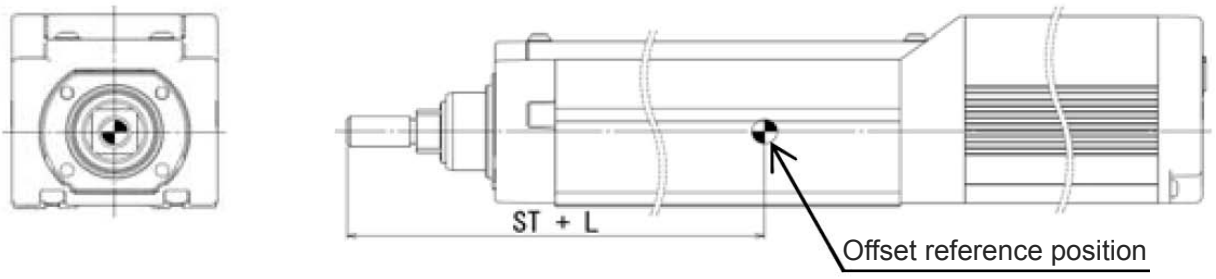
Type	Static allowable uniform load	Dynamic allowable uniform load (Note 1)	Load uniform coefficient Ka	Load uniform coefficient Kb	Load uniform coefficient Kc
EC-RR6□AH	6700N	2400N	104/m	87/m	62/m
EC-RR7□AH	11400N	3000N	90/m	76/m	50/m

(Note 1) The value assumes a basic rated life of 5,000km.

Ma, Mb, Mc: Moment load

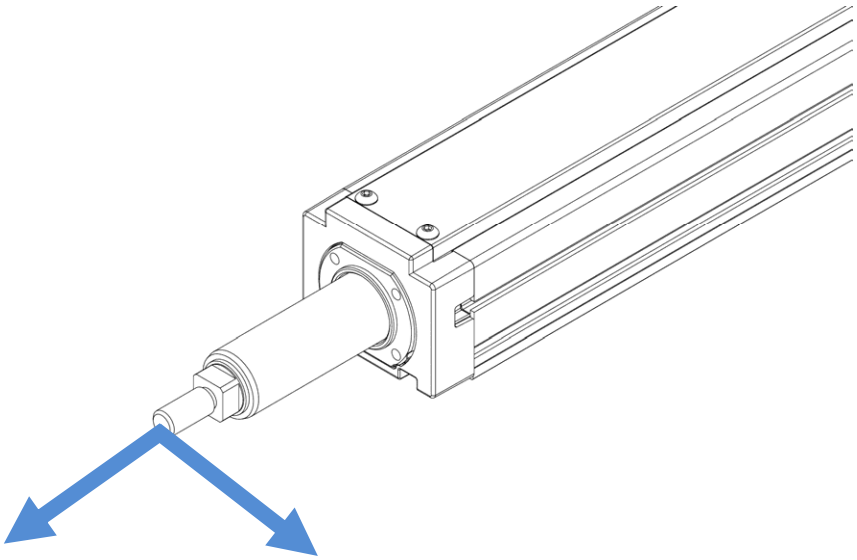


Moment offset reference position



Type	L
EC-RR6□AH	126mm
EC-RR7□AH	153.5mm

Allowable offset amount, allowable overhang distance



Overhang distance
(Rod length direction)

Offset amount
(Rod perpendicular direction)

Type	Allowable offset amount	Allowable overhang distance
EC-RR6□AH	100mm	100mm
EC-RR7□AH	150mm	150mm

Caution

- Keep the radial load acting on the rod within the allowable offset amount and overhang distance for use.
  If the allowable values are exceeded, this may lead to vibration, shortened product life, or damage.
- If abnormal vibration or noise occurs during operation, even when within allowable values for radial and torque loads, use less stringent operating conditions.
- Keep the mounted object center mass location at or below 1/2 the overhang distance or offset amount.

High rigidity radial cylinder type (EC-RR□□H)

[1] EC-RR6□H

[Lead and Payload (Energy-Saving: Disabled)]

Model	Lead (mm)	Max. payload		Max. push force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR6SH-①-② (-③)	20	6	1.5	56
EC-RR6HH-①-② (-③)	12	25	4	93
EC-RR6MH-①-② (-③)	6	40	10	185
EC-RR6LH-①-② (-③)	3	60	20	370

Legend ①Stroke ②Cable length ③Option

Stroke and Max Speed (Energy-Saving: Disabled)]

Lead (mm)	50 (mm	100 (mm)	150 (mm)	200 (mm)	250 (mm)	300 (mm)
20	650<500>	785<685>	800			
12	630<480>	700<660>	700		660	480
6	450				325	235
3	225				160	115

Values in brackets < > are for vertical use. (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.
  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead 20

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	6	6	5	5	1.5	1.5
160	6	6	5	5	1.5	1.5
320	6	6	5	3	1.5	1.5
480	6	6	5	3	1.5	1.5
640	6	4	3	2	1.5	1.5
800	4	3			1	1

Lead 12

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	25	18	16	12	4	4
100	25	18	16	12	4	4
200	25	18	16	10	4	4
400	20	14	10	6	4	4
500	15	8	6	4	3.5	3
700	6	2			2	1

Lead 6

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	40	35	30	25	10	10
50	40	35	30	25	10	10
100	40	35	30	25	10	10
200	40	30	25	20	10	10
250	40	27.5	22.5	18	9	8
350	30	14	12	10	5	5
400	18	10	6	5	3	3
450	8	3			2	1

Lead 3

Orientation	Horizontal				Vertical	
Speed (mm/s)	Acceleration (G)					
	0.3	0.5	0.7	1	0.3	0.5
0	60	50	45	40	20	20
50	60	50	45	40	20	20
100	60	50	45	40	20	20
125	60	50	40	30	10	10
175	40	35	25	20	6	5
200	35	30	20	14	5	4.5
225	16	16	10	6	5	4

Caution

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.
  This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model	Lead (mm)	Maximum payload		Max. push force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR6SH-①-② (-③)	20	6	1	56
EC-RR6HH-①-② (-③)	12	25	4	93
EC-RR6MH-①-② (-③)	6	40	10	185
EC-RR6LH-①-② (-③)	3	40	20	370

Legend ①Stroke ②Cable length ③Option

Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	50 (mm	100 (mm)	150 (mm)	200 (mm)	250 (mm)	300 (mm)
20	540<370>	620<520>	640<610>	640		
12	470<375>	500<480>	500			480
6	250					235
3	125					115

Values in brackets < > are for vertical use. (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.
  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead 20

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	6	5	1
160	6	5	1
320	6	5	1
480	4	3	1
640	3	1	0.5

Lead 12

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	25	10	4
100	25	10	4
200	25	10	4
300	20	8	3
400	10	5	2
500	5	2	1

Lead 6

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	40	20	10
50	40	20	10
100	40	20	10
150	40	20	8
200	35	18	5
250	10	6	3

Lead 3

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	40	25	20
25	40	25	20
50	40	25	20
75	40	25	12
100	40	25	9
125	40	25	5

Caution

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

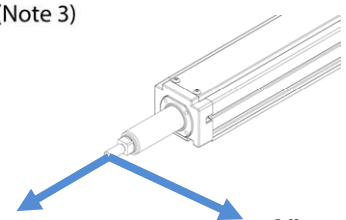
This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

Item	Description
Drive system	Ball screw ϕ10mm, rolled C10
Positioning repeatability	±0.05mm
Rod	ϕ25mm Material: Aluminum, hard alumite treatment
Rod non-rotation precision (Note 2)	0 degrees
Rod tip static allowable torque	9N·m
Rod tip allowable overhang distance (Note 3)	100mm
Rod tip allowable offset amount (Note 3)	100mm
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

(Note 2) Rod rotating direction displacement angle with no load.

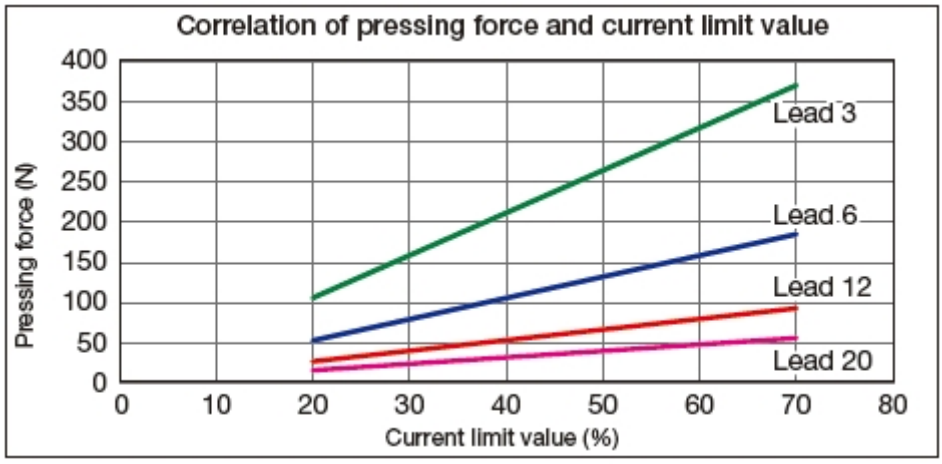
(Note 3)



Overhang distance (Rod length direction)

Offset amount (Rod perpendicular direction)

[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 20mm/s or less, the pressing force will become unstable, and failure to operate normally is possible.

[2] EC-RR7□H

[Lead and Payload (Energy-Saving: Disabled)]

Model	Lead (mm)	Maximum payload		Max. push force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR7SH-①-② (-③)	24	20	3	182
EC-RR7HH-①-② (-③)	16	50	8	273
EC-RR7MH-①-② (-③)	8	60	18	547
EC-RR7LH-①-② (-③)	4	80	28	1094

Legend ①Stroke ②Cable length ③Option

Stroke and Max Speed (Energy-Saving: Disabled)]

Lead (mm)	50 (mm)	100 (mm)	150 to 300 (Every 50mm)
24	655<540>	835<640>	860<640>
16	635<490>	700<560>	
8	350		
4	175		

Values in brackets < > are for vertical use. (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.
  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Disabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 1.0G in the horizontal direction and 0.5G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead 24

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	20	18	15	12	3	3
200	20	18	15	12	3	3
400	20	14	12	8	3	3
420	17	12	10	6	3	3
600	14	6	5	4	3	2
640	5	3	2	1.5	2	1
800	5	1	1			
860	2	0.5				

Lead 16

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	50	40	35	30	8	8
140	50	40	35	30	8	8
280	50	35	25	20	7	7
420	25	18	14	10	4.5	4
560	10	5	3	2	2	1
700	2					

Lead 8

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	60	50	45	40	18	18
70	60	50	45	40	18	18
140	60	50	45	40	16	12
210	60	40	31	26	10	9
280	34	20	15	11	5	4
350	12	4	1		2	1

Lead 4

Orientation	Horizontal				Vertical	
Speed	Acceleration (G)					
(mm/s)	0.3	0.5	0.7	1	0.3	0.5
0	80	70	65	60	28	28
35	80	70	65	60	28	28
70	80	70	65	60	28	28
105	80	60	50	40	18	18
140	50	30	20	15	12	10
175	15				2	

Caution

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

This may lead to vibration, breakdown, or shortened product life.

[Lead and Payload (Energy-Saving: Enabled)]

Model	Lead (mm)	Maximum payload		Max. push force (N)
		Horizontal (kg)	Vertical (kg)	
EC-RR7SH-①-② (-③)	24	18	3	182
EC-RR7HH-①-② (-③)	16	40	5	273
EC-RR7MH-①-② (-③)	8	50	17.5	547
EC-RR7LH-①-② (-③)	4	55	26	1094

Legend ①Stroke ②Cable length ③Option

Stroke and Max Speed (Energy-Saving: Enabled)]

Lead (mm)	50 (mm)	100 to 300 (Every 50mm)
24	525<375>	600<420>
16	420<280>	
8	210	
4	105	

Values in brackets < > are for vertical use. (Unit: mm/s)

Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is low.
- Setting at or below the minimum speed may lead to abnormal noise or unstable speeds.
- The minimum speed can be calculated with the equation below.
  Minimum speed [mm/s] = ball screw lead [mm/r] ÷ 800 [p/r] x 1000 [1/s]
  (mm/r: movement per 1 motor revolution, p/r: pulse per 1 motor revolution)

[Payload by Speed/Acceleration (Energy-Saving: Enabled)]

At low load capacity, the acceleration/deceleration can be increased.

The maximum acceleration/deceleration is 0.7G in the horizontal direction and 0.3G in the vertical direction.

For % input, 1.0G is set as 100%.

Lead 24

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	18	9.5	3
200	18	9.5	3
420	10	5	1.5
600	1		

Lead 16

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	40	25	5
140	40	25	5
280	18	12	2
420	1.5	1	

Lead 8

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	50	30	17.5
70	50	30	17.5
140	50	30	7
210	14	7	2

Lead 4

Orientation	Horizontal		Vertical
Speed	Acceleration (G)		
(mm/s)	0.3	0.7	0.3
0	55	50	26
35	55	50	26
70	55	50	13
105	30	15	2

Caution

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

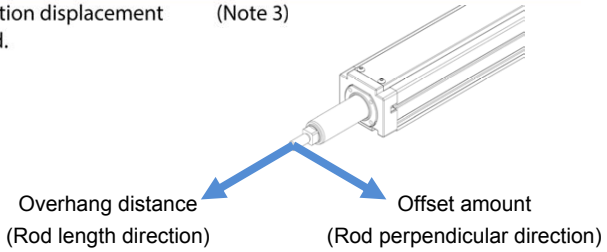
This may lead to vibration, breakdown, or shortened product life.

[Actuator Specifications]

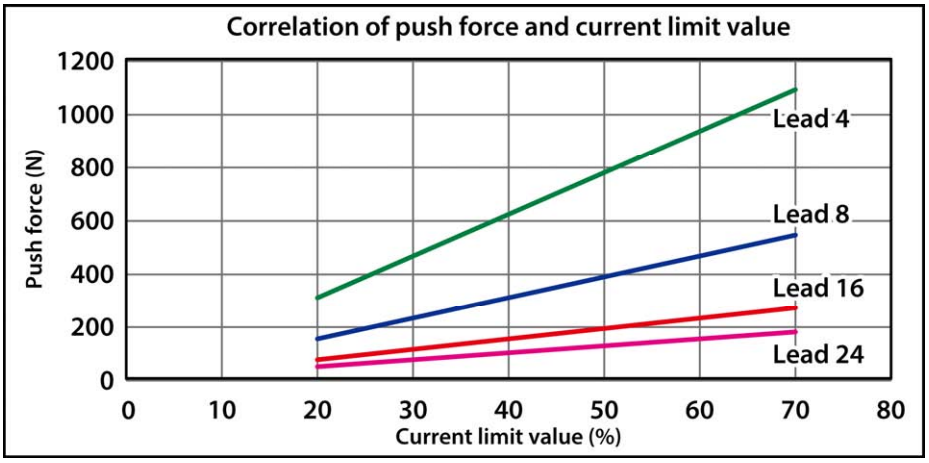
Item	Description
Drive system	Ball screw ϕ12mm, rolled C10
Positioning repeatability	±0.05mm
Rod	ϕ30mm Material: Aluminum, hard alumite treatment
Rod non-rotation precision (Note 2)	0 degrees
Rod tip static allowable torque	17.6N·m
Rod tip allowable overhang distance (Note 3)	150mm
Rod tip allowable offset amount (Note 3)	150mm
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)

(Note 2) Rod rotating direction displacement angle with no load.

(Note 3)



[Pressing Force and Current Limit Value]

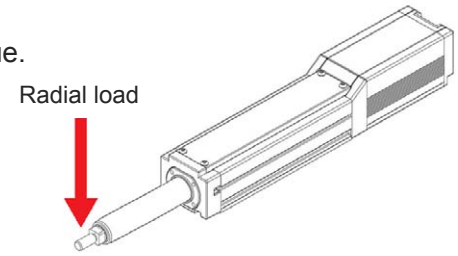


Caution

- 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 20mm/s or less, the pressing force will become unstable, and failure to operate normally is possible.

Because the radial cylinder type has a linear guide built into the body, radial and moment loads can be applied to the rod.
The applicable radial and moment loads must meet the following three conditions.

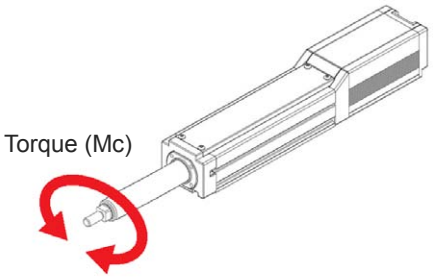
1. The radial load acting on the rod must not exceed the allowable value.



Type	Rod tip static allowable radial load	Rod tip dynamic allowable radial load(Note 1)
EC-RR6□H	190N	130N(Note 2)
EC-RR7□H	250N	170N(Note 3)

(Note 1) The value assumes a basic rated life of 5,000km.
(Note 2) For stroke of 300mm, use 40N or below.
(Note 3) For stroke of 300mm, use 50N or below.

2. The torque (Mc) acting on the rod must not exceed the allowable value.



Type	Rod tip static allowable torque	Rod tip dynamic allowable torque(Note 1)
EC-RR6□H	9N·m	5.5N·m
EC-RR7□H	17.6N·m	10.5N·m

(Note 1) The value assumes a basic rated life of 5,000km.

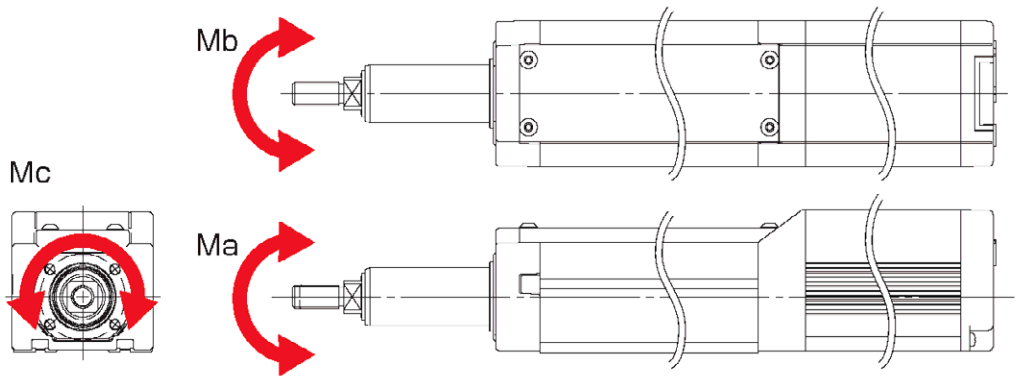
3. The uniform load (*) acting on the rod must not exceed the allowable value.

(*) Uniform load = Ma・Ka + Mb・Kb + Mc・Kc

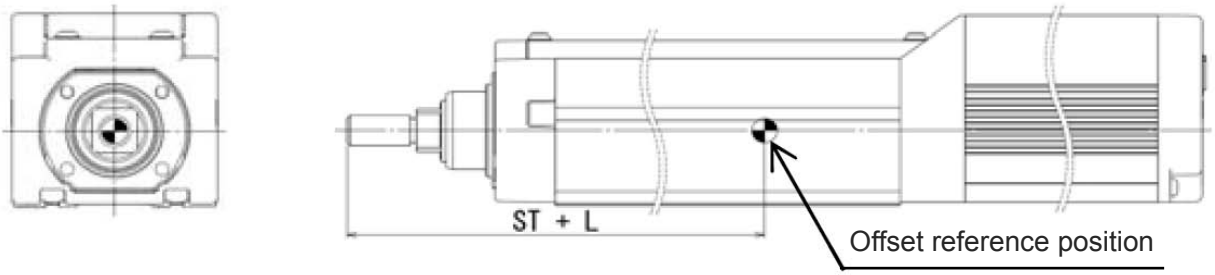
Type	Static allowable uniform load	Dynamic allowable uniform load(Note 1)	Load uniform coefficient Ka	Load uniform coefficient Kb	Load uniform coefficient Kc
EC-RR6□H	6700N	2400N	104/m	87/m	62/m
EC-RR7□H	11400N	3000N	90/m	76/m	50/m

(Note 1) The value assumes a basic rated life of 5,000km.

Ma, Mb, Mc: Moment load

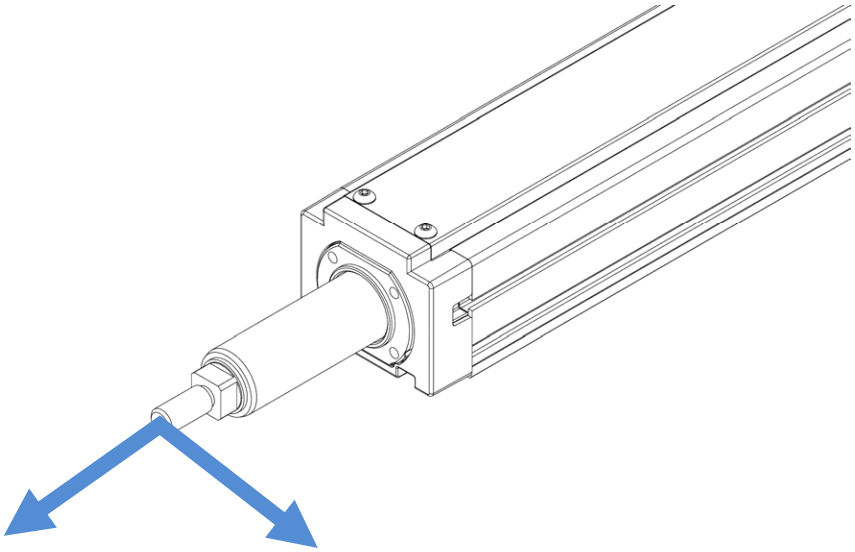


Moment offset reference position



Type	L
EC-RR6□H	126mm
EC-RR7□H	153.5mm

Allowable offset amount, allowable overhang distance



Overhang distance
(Rod length direction)

Offset amount
(Rod perpendicular direction)

Type	Allowable offset amount	Allowable overhang distance
EC-RR6□H	100mm	100mm
EC-RR7□H	150mm	150mm

Caution

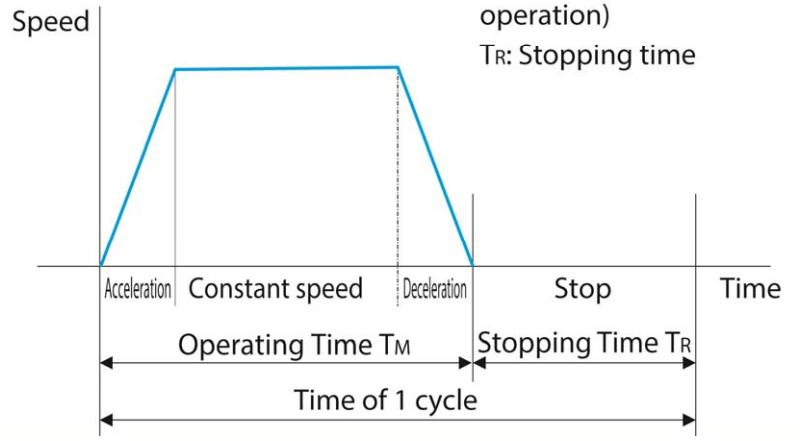
- Keep the radial load acting on the rod within the allowable offset amount and overhang distance for use.
  If the allowable values are exceeded, this may lead to vibration, shortened product life, or damage.
- If abnormal vibration or noise occurs during operation, even when within allowable values for radial and torque loads, use less stringent operating conditions.
- Keep the mounted object center mass location at or below 1/2 the overhang distance or offset amount.

Duty ratio

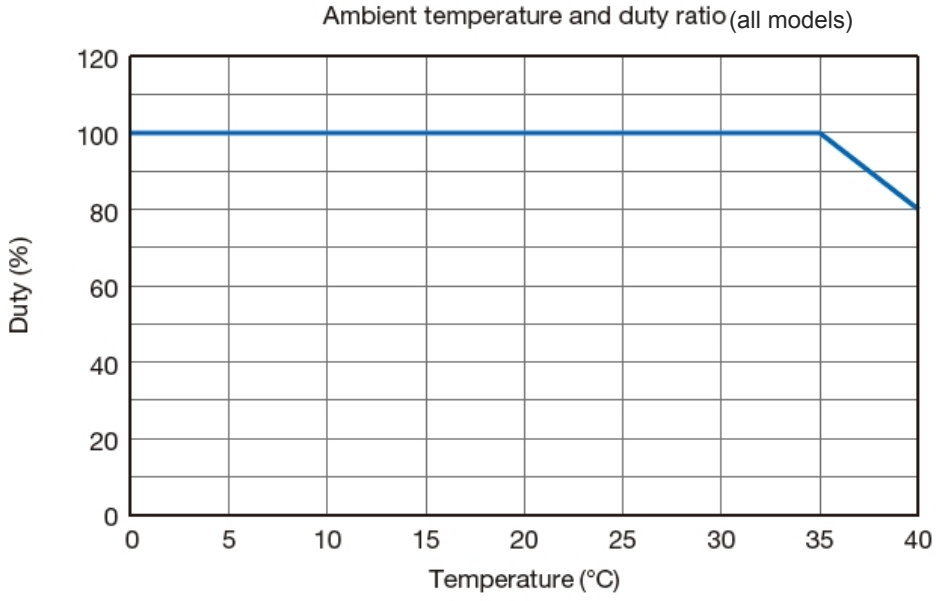
The duty ratio is the operating rate, shown in %, of the actuator operating time within one cycle.

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

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



The duty ratio for the ELECYLINDER is limited to the values below.
Use so that the duty ratio falls within the specified conditions based on ambient temperature.



1.3 Options

With brake (model: B)

This is used to prevent the slider or rod from moving during power outages or when the servo is OFF.
It can also be used to prevent the slider or rod from falling when mounted vertically.

Tip adapter (flange) (model: FFA)

This adapter is used to mount jigs, etc., on the rod tip with four bolts.

* Refer to Body Mounting (page 2-45/62) for details.

Flange (model: FL)

This bracket is used for fixing the actuator body side with bolts.

* Refer to Body Mounting (pages 2- 26/40/57) for details.

Foot bracket (model: FT)

This bracket is used for fixing the actuator body from the top with bolts.

* Refer to Body Mounting (pages 2-10/23/38) for details.

Tip adapter (Internal thread) (model: NFA)

This adapter is used to secure jigs, etc., on the rod tip with one bolt for rod types.

* Refer to Body Mounting (page 2-32/44/61) for details.

Knuckle joint (model: NJ)

When using a clevis bracket, this bracket is used to allow the actuator rod tip to move freely (rotate).

* Refer to Body Mounting (page 2-48/65) for details.

Oscillation receiving bracket (knuckle joint) (model: NJPB)

This is the oscillation receiving bracket for the knuckle joint.

* Refer to Body Mounting (page 2-50/68) for details.

Home reverse specification (model: NM)

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

PNP specification (model: PN)

I/O input/output specifications are NPN specification as standard.
Specifying this option changes the unit to PNP specification.

Clevis bracket (model: QR)

When the motion of the object mounted on the rod tip differs from the rod operation direction, this bracket is used to make it track the cylinder body.

* Refer to Body Mounting (page 2-49/66) for details.

Oscillation receiving bracket (clevis) (model: QRPB)

This is the oscillation receiving bracket for the clevis.

* Refer to Body Mounting (page 2-50/68) for details.

Battery-less absolute encoder specification (model: WA)

The standard specification is for incremental encoder.
Specifying this option changes the unit to battery-less absolute encoder specification.

Wireless communication specification (model: WL)

The models with wireless communication specification have built-in wireless circuit boards and enable wireless communication between ELECYLINDERs and data setting devices.
Certificates and self-declarations regarding the wireless function are handled under the model name below for the wireless circuit board.

Model name: IABL3826

Wireless axis operation specification (model: WL2)

The wireless axis operation specification includes a built-in wireless circuit board enabling wireless communication between the ELECYLINDER and the Data Setter.
Specifying WL2 enables operation testing of axis operation (movement to forward and backward ends, jog operation, inching operation) as well as the operation via wireless communication enabled with WL. However, the control device is not designed for purposes of automatic operation. Be sure to refer to the Precautions for Axis Operation with Wireless Communication.
Certification and self-declaration regarding the wireless function are handled with the wireless circuit board model name below.

Model name: IABL3826

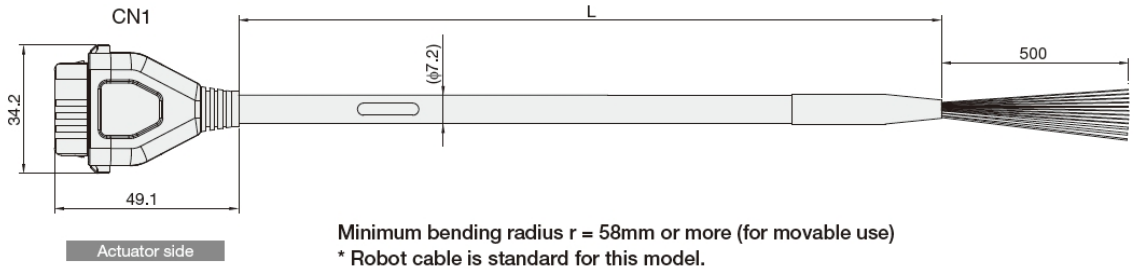
(Note) Changes from WL to WL2 and from WL2 to WL cannot be performed by the customer. Please contact us.

1.4 Accessories

Power I/O cable

Supplied when length (value other than 0) is specified in the model number cable length.

Model CB-EC-PWBIO□□□-RB



Minimum bending radius r = 58mm or more (for movable use)
* Robot cable is standard for this model.

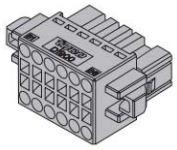
Color	Signal name	Pin No.
Black (AWG18)	0V	A1
Red (AWG18)	24V	B1
Light blue (AWG22)	(reserve)	A2
Orange (AWG26)	ST0	B3
Yellow (AWG26)	ST1	B4
Green (AWG26)	RES	B5
Pink (AWG26)	(reserve)	B6
Blue (AWG26)	LS0/PE0	A3
Purple (AWG26)	LS1/PS1	A4
Gray (AWG26)	＊ALM	A5
White (AWG26)	(reserve)	A6
Brown (AWG26)	BKRLS	B2

- The wiring on the opposite side of the connector has not been processed.
- The cable length is available from 1m to 10m.
  Specify the length in increments of 1m.
- The following shows a sample model number.

  Cable length **1**m → CB-EC-PWBIO**010**-RB
  Cable length **3**m → CB-EC-PWBIO**030**-RB
  Cable length **10**m → CB-EC-PWBIO**100**-RB

Power I/O connector

Supplied when cable length is specified as "0" in the model number.



Name	Model number	Quantity
Power I/O connector	1-1871940-6 (Tyco Electronics)	1 pc

ELECYLINDER

Chapter 2

Installation

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2.1 Precautions for transportation

[Handling the package]

- Do not damage or drop the package.
  The package is not specially designed to withstand dropping or shock due to collision.
- 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.

[Package opened]

[Handling after unpacking]

- Carry the slider type by its base part and the rod type by its body frame.
- Do not carry the unit by its motor cover, side cover, or stainless steel sheet
- Do not damage or drop the package during transportation.
- Do not apply excessive force to any part of the ELECYLINDER.
- The teaching port and power I/O connector are connected to the built-in controller, so be especially careful not to apply external force.

→ For the names of each part, refer to "Part Names" on page Intro-14 to 17.

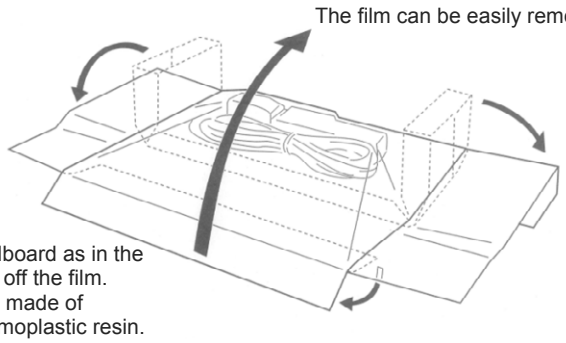
Take out the optional part tray, and remove the actuator wrapped in film

Unfold the cardboard and take out the actuator

Reference

These packaging materials can be recycled as cardboard.

The cardboard and urethane film are attached only with thermal bonding and use no adhesive.
This means they can be recycled as cardboard when disposed of, reducing industrial waste cost burdens.



Unfold the cardboard as in the figure, and pull off the film.
The film is also made of recyclable thermoplastic resin.

[Handling when assembled into machinery (system)]

- Secure sliders and rods to prevent sudden movement during transport.
- If the ELECYLINDER 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 ELECYLINDER or cable.

2.2 Installation and storage/preservation environment

Usage is possible in environments of pollution degree 2 or equivalent.

Pollution degree 2: Environment in which generally only nonconductive pollution occurs, but temporary conductive pollution may occur due to condensation (IEC 60664-1)

Installation environment

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

- 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 1000m

Also, provide sufficient work space for the following maintenance and inspection:

- Space to insert the teaching tool connector
- Space to replenish grease
- Space to replace the motor or controller

→ For details, refer to "Chapter 8 Maintenance and Inspection".

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

- 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

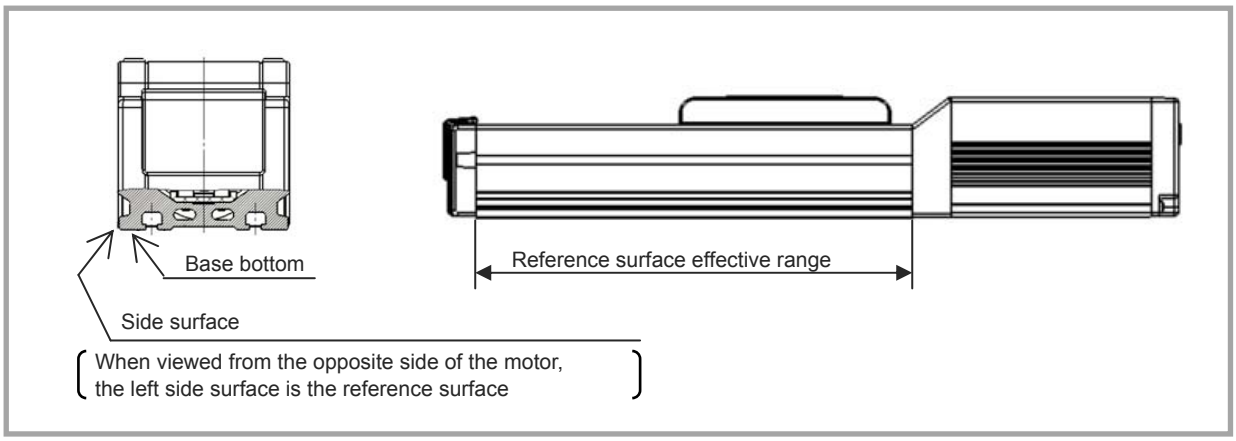
Storage/preservation environment

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

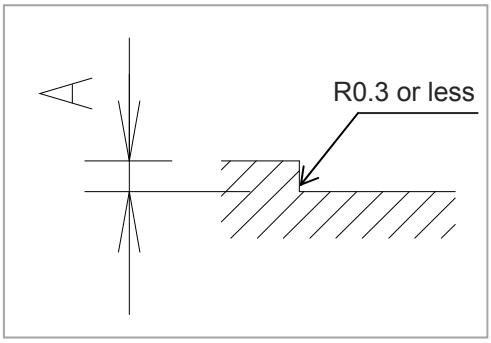
2.3 Installation of slider type

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 ELECYLINDER replacement and inspection.
- The bottom surface and left side surface (viewed from motor opposite side) of the body base serve as the reference surfaces for slider running accuracy.
  Use these surfaces as the reference surfaces for mounting when running accuracy is required.

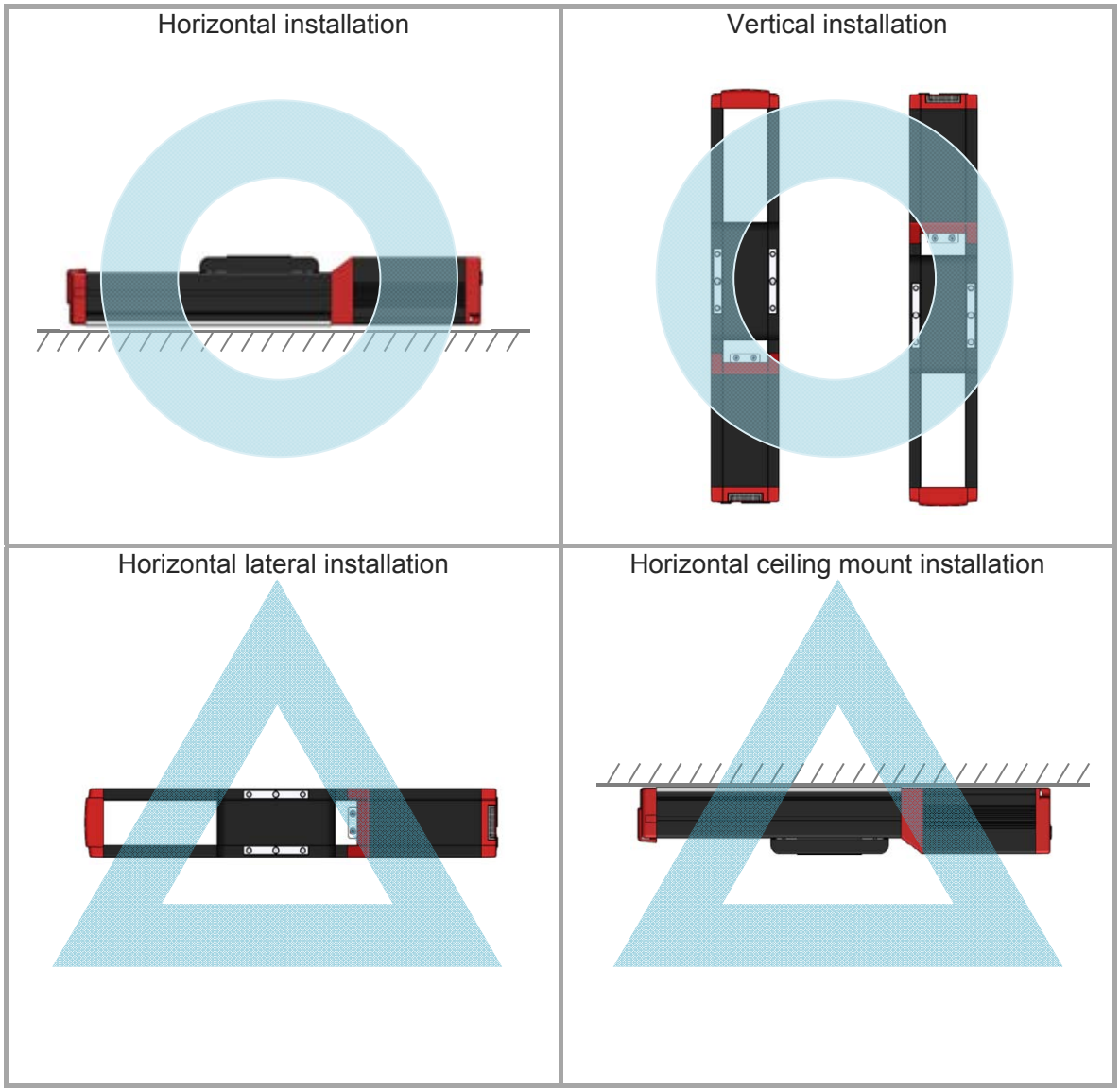


When mounting using the side reference surface, machine the installation surface according to the figure below.



A dimension
2 to 4mm

Mounting orientation Type: EC-S6/S7



Caution

- When installing the unit vertically, keep the motor on top to the greatest extent possible.
- If the motor is installed on the bottom, the grease may separate due to long-term disuse, causing the base oil to flow into the motor part and leading to controller or motor/encoder breakdown.
- If the motor is installed on the top, cap the teaching port.
  Clogging with foreign matter may lead to a breakdown.

Precautions regarding stainless steel sheet

- During installation and transport, 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.
  Avoid installation in environments of this kind, or take safety measures to prevent adhesion.

Square nuts

The square nuts regulated in JIS B1163 can be used for the T-slots.
The square nut quantities enclosed at shipping and related information are as follows.

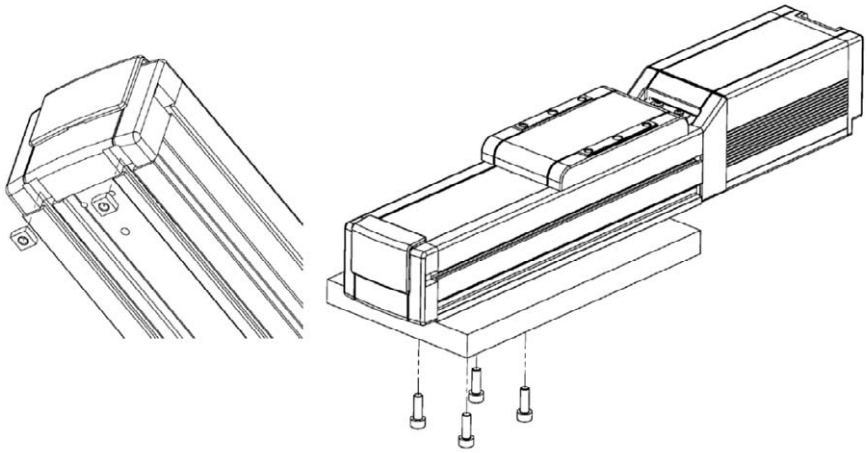
Type	Square nut quantity enclosed	Screw size	Required bolt length from base bottom	Minimum number of fixing bolts	Tightening torque
EC-S6	6 pcs	M4	5 to 6mm	4 pcs	1.76N·m
EC-S7	6 pcs	M5	6.5 to 8mm	4 pcs	3.42N·m

Body mounting

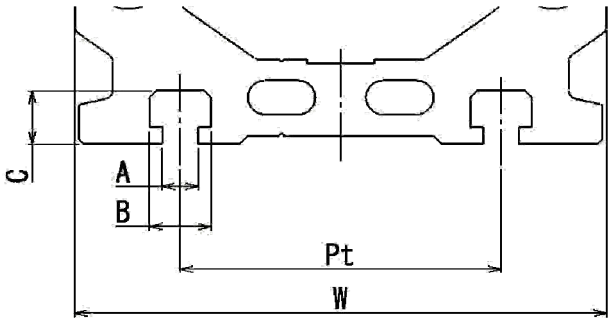
[When using the T-slot on the base bottom]

The unit has a T-slot at the bottom of the base for mounting.
Insert a square nut into the T-slot and fix it from the back.

→ For details regarding the position and dimensions,
refer to "Chapter 9 External Dimensions".



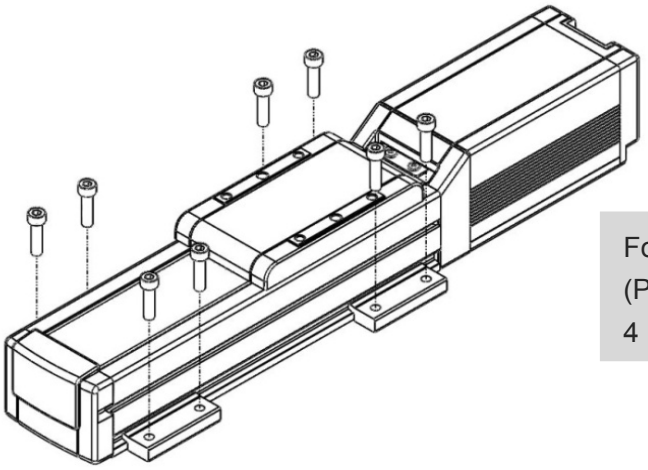
T-slot dimensions



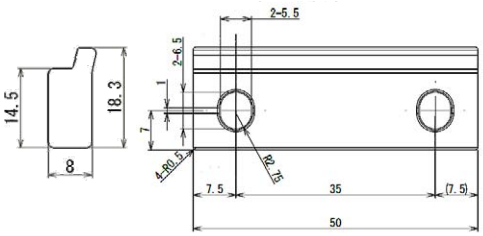
Type	W	Pt	A	B	C
EC-S6	63mm	38mm	4.3mm	7.3mm	6.3mm
EC-R7	73mm	46mm	5.3mm	8.5mm	8.5mm

[When using foot brackets]

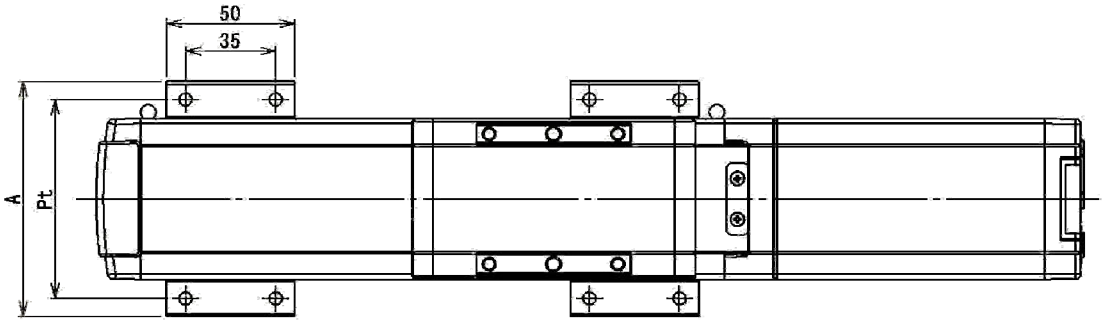
Mounting from the top is possible using foot brackets.
The groove on the side of the main body can be fixed from the top.



Foot bracket
(Part model number EC-FTSB,
4 pcs/set)



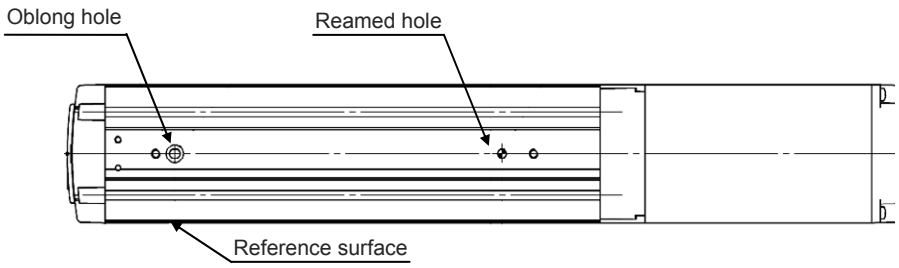
Foot bracket mounting dimensions

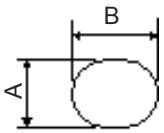


Type	Pt	A	Screw size	Minimum number of brackets	Tightening torque
EC-S6	78mm	92mm	M5	4 locations	7.27N·m
EC-S7	88mm	102mm	M5	4 locations	7.27N·m

There are a reamed hole and an oblong hole for the positioning pins.
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.

Reamed hole/oblong hole position dimensions





Oblong hole

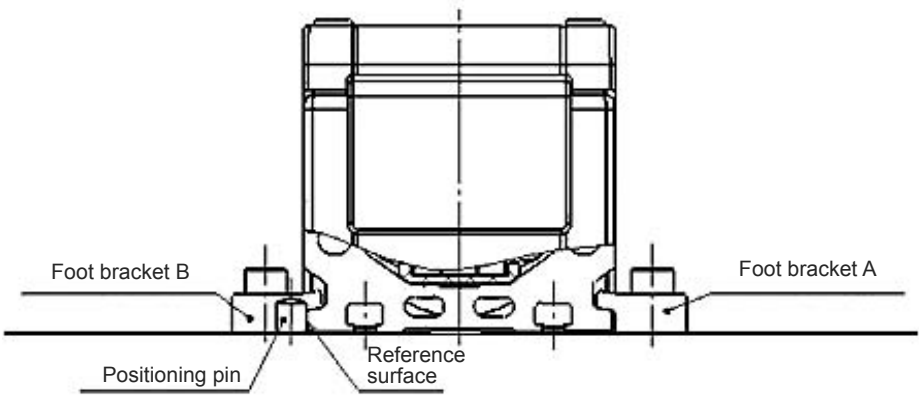
Type	Reamed hole	Oblong hole
EC-S6	φ4H7 depth 5	A: $4\,^{+0.012}_{0}$ B: 5 depth 5 mm or less
EC-S7	φ4H7 depth 5	A: $4\,^{+0.012}_{0}$ B: 5 depth 5 mm or less

Foot bracket mounting procedure

Before fixing, use a positioning pin or the like to position the bracket in the width direction.

The mounting procedure is as follows.

(1) Press against the base reference surface with a positioning pin, etc.
(2) Maintaining the pressure, fix foot bracket A on the opposite side.
(3) Finally, fix foot bracket B.



Caution

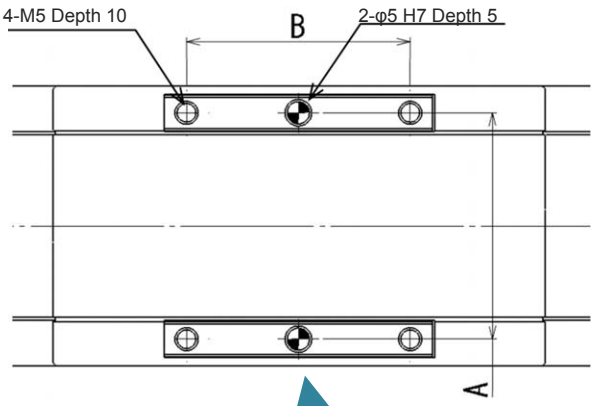
- Sufficient fastening force may not be obtainable when mounting with methods other than the procedure above.

Notice

- The bolts for fixing foot brackets on the installation surface are to be prepared by the customer.
- The use of high-strength bolts of ISO-10.9 or higher is recommended.
- Make sure the internal thread and bolt effective engagement length is approximately 1.8 times the nominal diameter or more.

Mounting transported objects

- Use the tapped mounting holes on the top surface of the slider to fix transported objects.
- There are 2 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.
- Refer to the figure below for the screw-in depth and reamed hole depth.



Type	A	B
EC-S6	51mm	50mm
EC-S7	61mm	50mm

* Reamed hole pitch tolerance ±0.02

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.

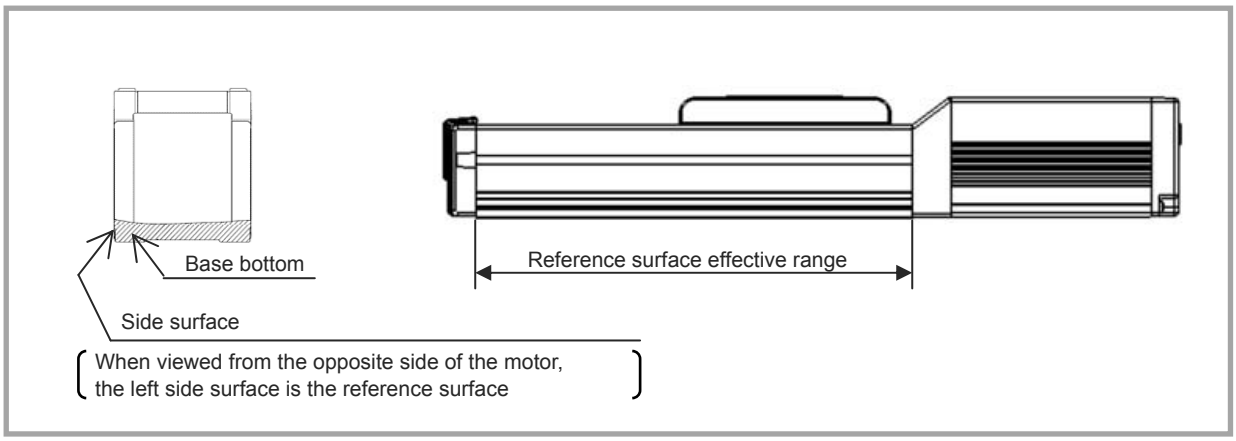
Notice

- The mounting bolts are to be prepared by the customer.
- The use of high-strength bolts of ISO-10.9 or higher is recommended.

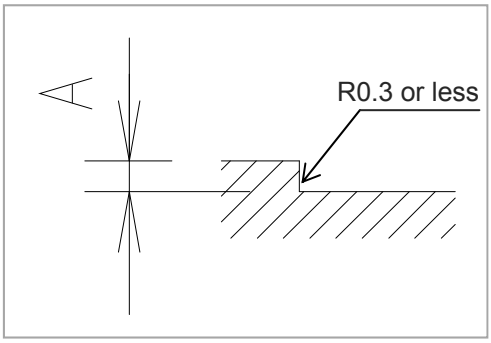
2.4 Installation of high rigidity slider type

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 ELECYLINDER replacement and inspection.
- The bottom surface and left side surface (viewed from motor opposite side) of the body base serve as the reference surfaces for slider running accuracy.
  Use these surfaces as the reference surfaces for mounting when running accuracy is required.



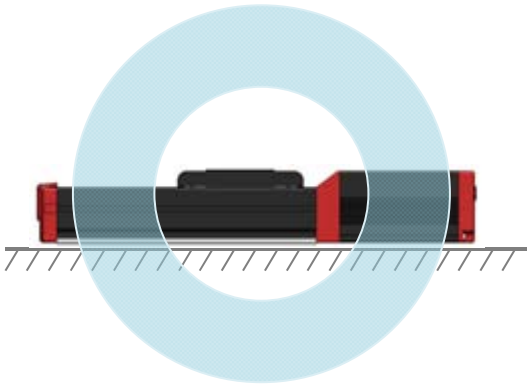
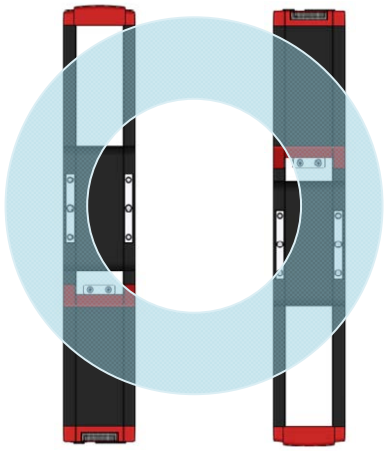
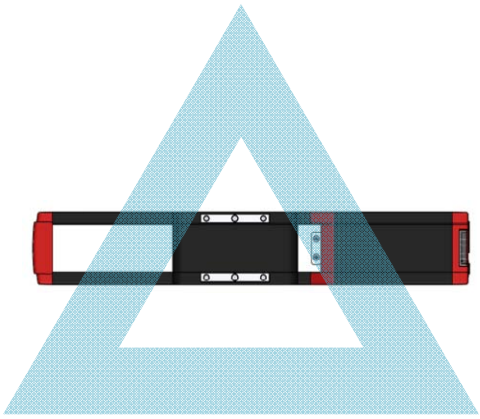
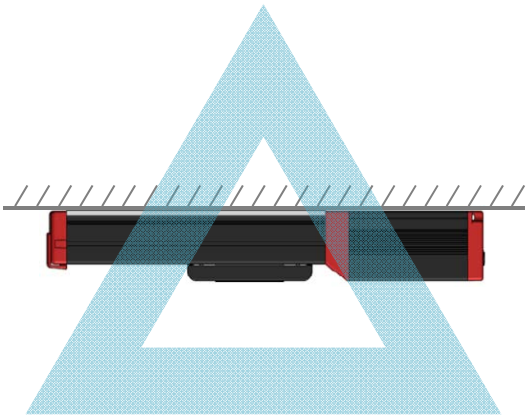
When mounting using the side reference surface, machine the installation surface according to the figure below.



A dimension
2 to 4mm

Mounting orientation

Type: EC-S6□AH/S7□AH, EC-S6□H/S7□H

Horizontal installation	Vertical installation
	
Horizontal lateral installation	**Horizontal ceiling mount installation**
	

Caution

- When installing the unit vertically, keep the motor on top to the greatest extent possible.
- If the motor is installed on the bottom, the grease may separate due to long-term disuse, causing the base oil to flow into the motor part and leading to controller or motor/encoder breakdown.
- If the motor is installed on the top, cap the teaching port.
  Clogging with foreign matter may lead to a breakdown.

Precautions regarding stainless steel sheet

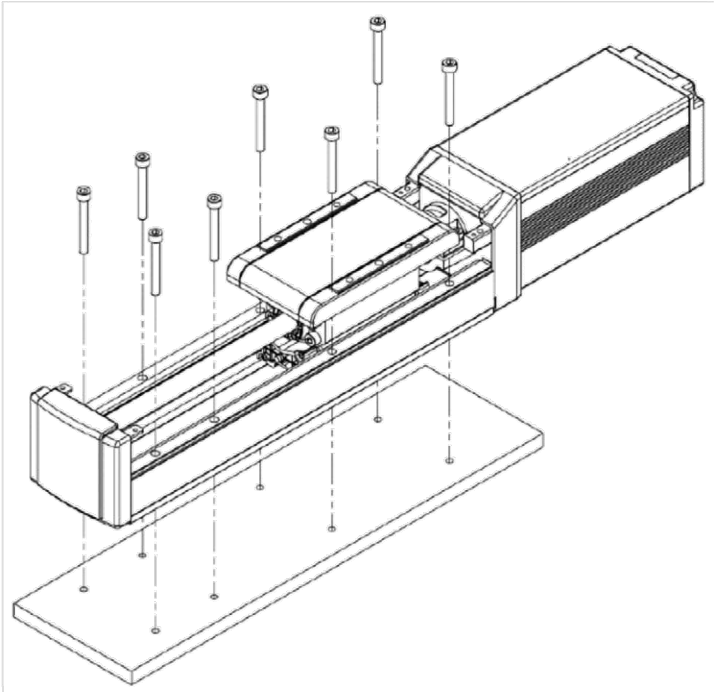
- During installation and transport, do not grasp or press on the stainless steel sheet.
  Otherwise, this may lead to stainless steel sheet damage.
- Although lateral or ceiling installation is possible, it may cause slackness or misalignment of the stainless steel sheet.
  Continued usage in this orientation 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.
  Avoid installation in environments of this kind, or take safety measures to prevent adhesion.

Body mounting

[When using base through holes]

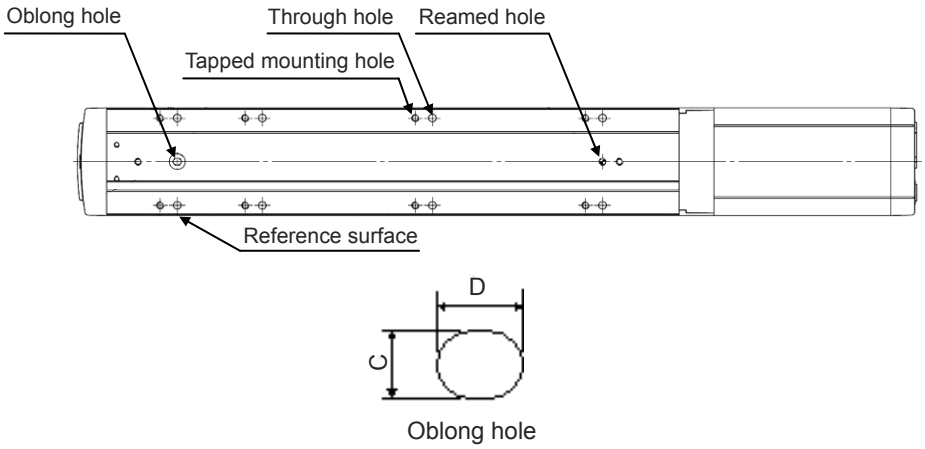
When fixing the actuator with the base through holes, remove the side cover and stainless steel sheet before work.

→ For details regarding the position and dimensions, refer to "Chapter 9 External Dimensions".

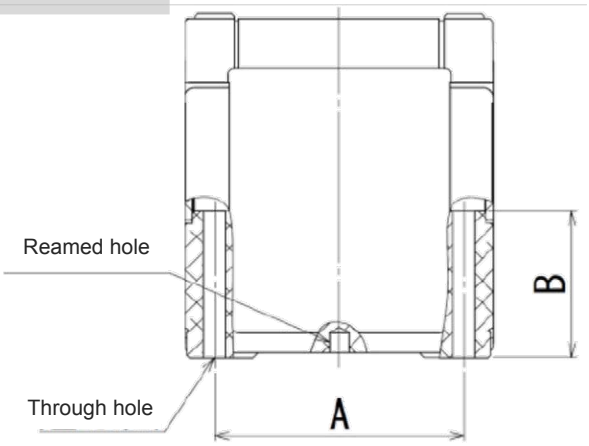


There are a reamed hole and an oblong hole for the positioning pins.
Use the reamed hole and oblong hole if mounting reproducibility after detachment is required.
When fine adjustment of angles, etc. is required, consider using only the reamed hole.

Reamed hole/oblong hole position dimensions



Through hole dimensions

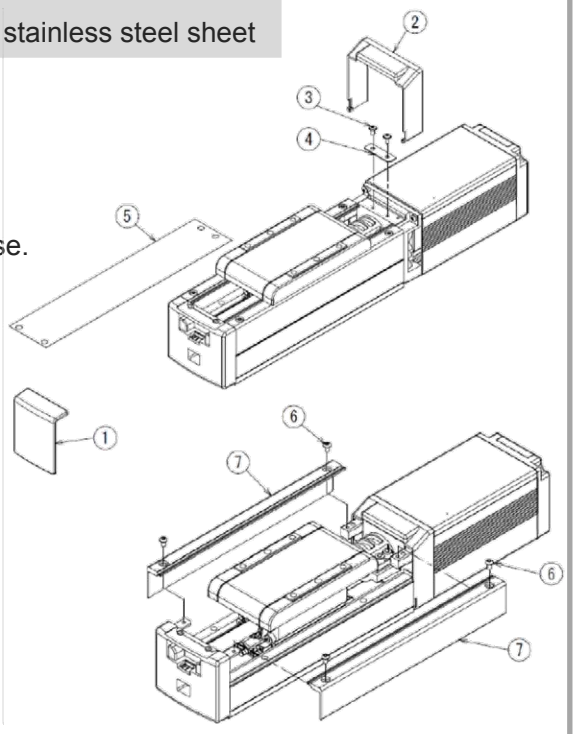


Type	Through hole diameter	A	B	Reamed hole	Oblong hole
EC-S6□AH **EC-S6□H**	φ4.5	51mm	30mm	φ4H7 depth 5	C: 4 $^{+0.012}_{0}$ D: 5 depth 5mm or more
EC-S7□AH **EC-S7□H**	φ5.5	61mm	35mm	φ4H7 depth 5	C: 4 $^{+0.012}_{0}$ D: 5 depth 5mm or more

Procedure for removing the side cover and stainless steel sheet

1. Remove (1) and (2).
2. Loosen bolts (3) and remove (4).
3. Pull out stainless steel sheet (5).
4. Loosen bolts (6) and remove (7).

* For assembly, follow the procedure in reverse.

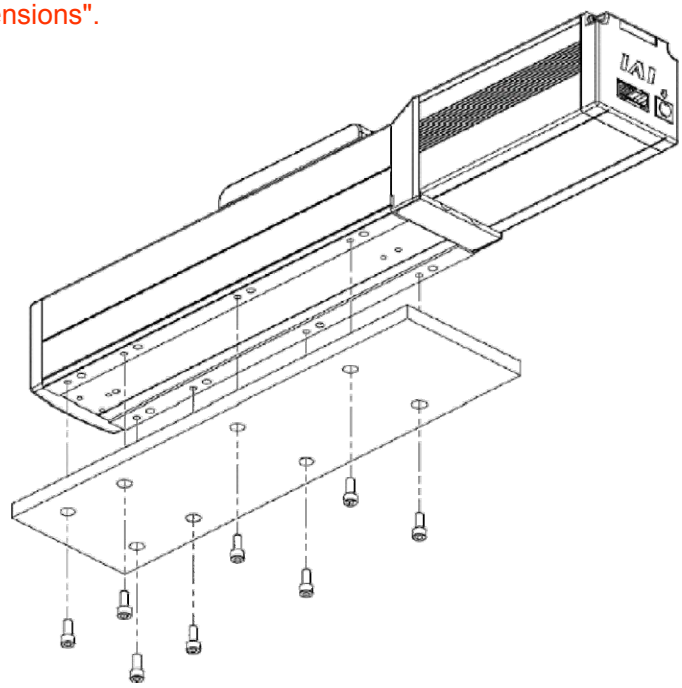


No.	Model	Part name	S6□AH S6□H	S7□AH S7□H
1		Sheet clamp	1	1
2		Track housing cover	1	1
3	M3 × 5	Bolt	2	2
4		Sheet retainer	1	1
5	ST-EC-S6-***	Stainless steel sheet	1	
	ST-EC-S7-***			1
6	M3 × 5	Bolt	4	4
7		Side cover	2	2

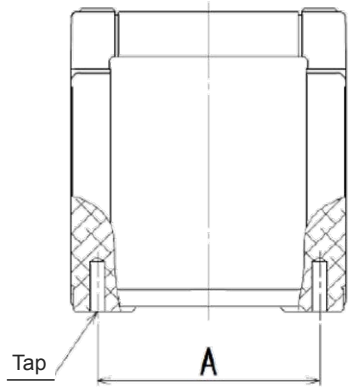
[When using the tapped mounting hole on the base bottom]

The unit has a tapped mounting hole at the bottom of the base for mounting.

→ For details regarding the position and dimensions, refer to "Chapter 9 External Dimensions".



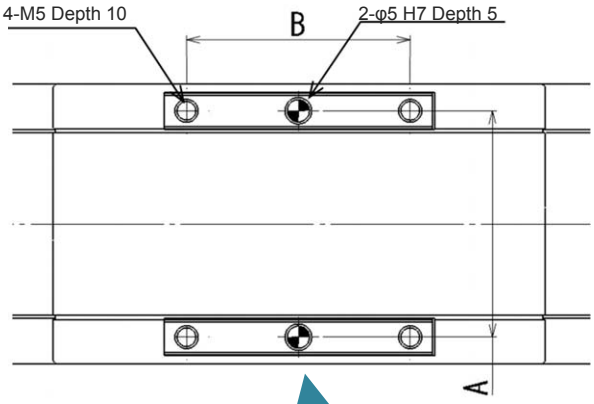
Tapped mounting hole dimensions



Type	Tap diameter	A	Effective thread depth
EC-S6□AH EC-S6□H	M4	51mm	8mm
EC-S7□AH EC-S7□H	M5	61mm	10mm

Mounting transported objects

- Use the tapped mounting holes on the top surface of the slider to fix transported objects.
- There are 2 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.
- Refer to the figure below for the screw-in depth and reamed hole depth.



Type	A	B
EC-S6□AH **EC-S6□H**	51mm	50mm
EC-S7□AH **EC-S7□H**	61mm	50mm

* Reamed hole pitch tolerance ±0.02

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.

Notice

- The mounting bolts are to be prepared by the customer.
- The use of high-strength bolts of ISO-10.9 or higher is recommended.

2.5 Installation of rod type

Installation surface

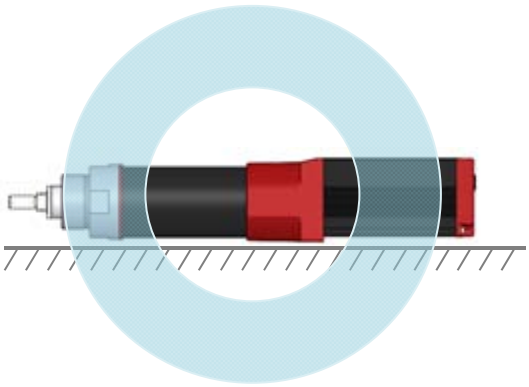
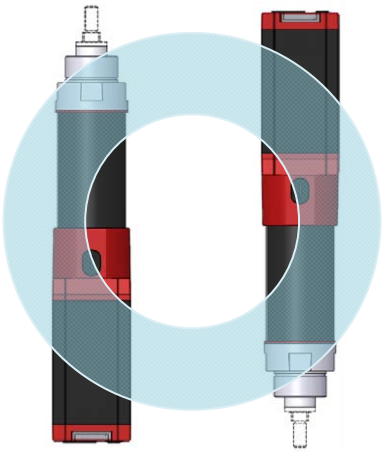
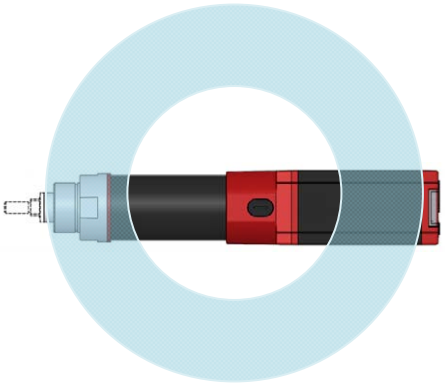
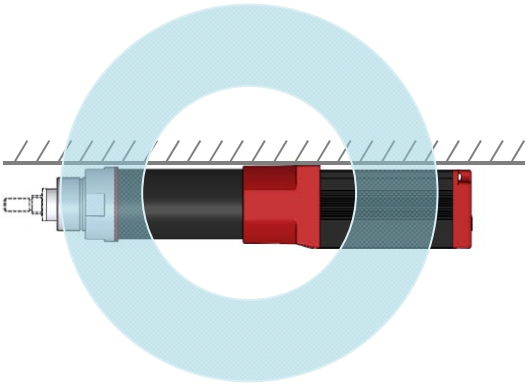
- The mounting frame should have a structure rigid enough to prevent the generation of vibrationc.
- Also consider the necessary space for maintenance work such as ELECYLINDER replacement and inspection.
- The body mounting surface should be a machined surface or a plane with similar accuracy, with flatness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

Fixing bolt

- The bolts for fixing foot brackets and flanges on the installation surface are to be prepared by the customer.
- The use of high-strength bolts of ISO-10.9 or higher is recommended.
- Make sure the internal thread and bolt effective engagement length is approximately 1.8 times the nominal diameter or more.
- When the tightening torque is not specified, tighten with the recommended values in the table below.

Type	Fixing bolt	For iron installation surface	For aluminum installation surface
EC-R6	M6	12.34N·m	5.36N·m
EC-R7	M8	29.90N·m	11.48N·m

Mounting orientation Type: EC-R6/R7

Horizontal installation	Vertical installation
	
Horizontal lateral installation	**Horizontal ceiling mount installation**
	

Caution

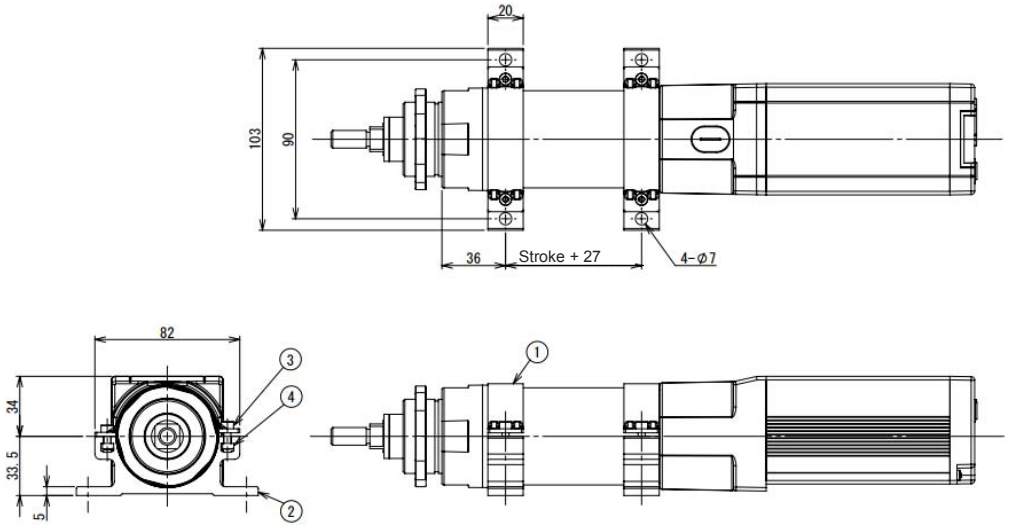
- Excessive greasing may cause the grease to drip from the rod.
- When installing the unit vertically, keep the motor on top to the greatest extent possible.
- If the motor is installed on the bottom, the grease may separate due to long-term disuse, causing the base oil to flow into the motor part and leading to controller or motor/encoder breakdown.
- If the motor is installed on the top, cap the teaching port.
  Clogging with foreign matter may lead to a breakdown.

Body mounting

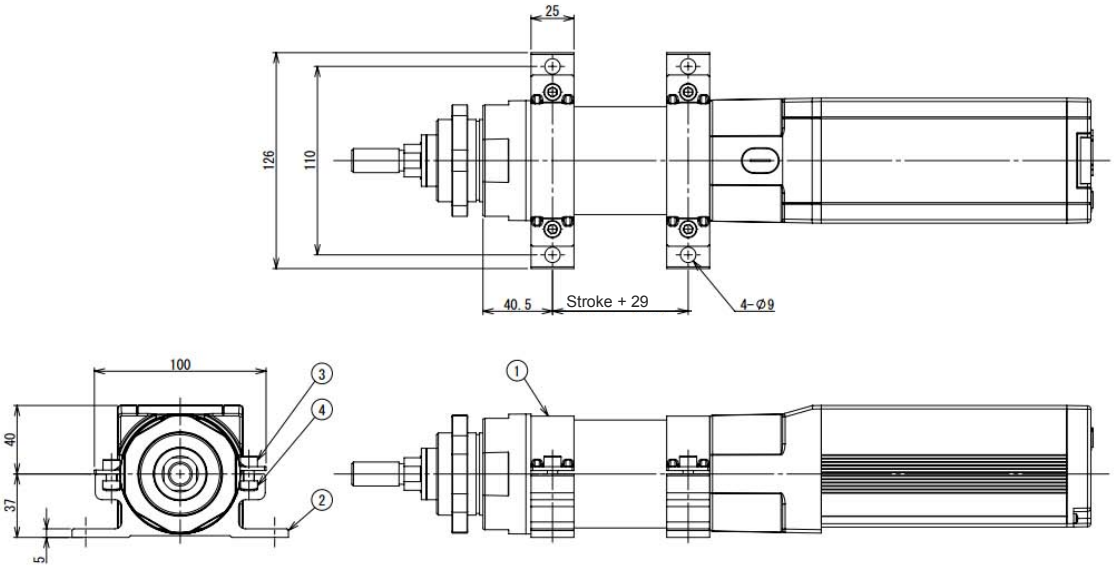
[When using foot brackets]

ELECYLINDERs can be mounted with foot brackets (option: model FT).

For EC-R6 (Part model number EC-FT-R6)



For EC-R7 (Part model number EC-FT-R7)



The accessories for the foot bracket option are as follows.

Type	(1) Fixing bracket	(2) Foot bracket	(3) Hex socket head bolt	(4) Square nut (unichrome)
EC-R6	2 pcs	2 pcs	4 pcs (M4 x 10)	4 pcs (M4)
EC-R7	2 pcs	2 pcs	4 pcs (M6 x 10)	4 pcs (M6)

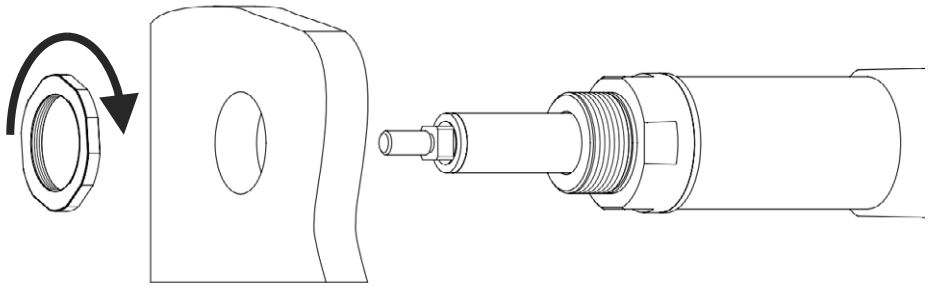
Caution

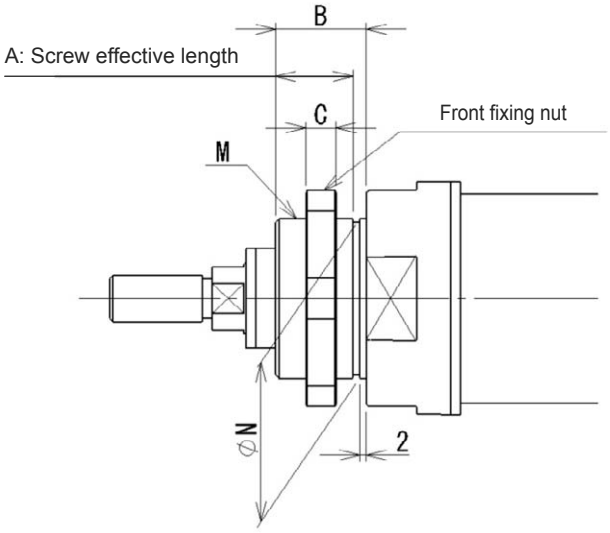
- The ELECYLINDER is grounded through the installation surface.
  However, it may not be grounded if it is mounted using foot brackets.
  After mounting, make sure to check whether it is grounded.
- If it is not, refer to " **Frame grounding** (page 3-4)" and connect the ground wire to one of the two fixing screws at the bottom of the end cover.
- Failure to ground may lead to malfunctions or damage to parts.

[When using front brackets]

Either the enclosed fixing nuts or the bracket screws can be used.

→ For precautions for mounting, refer to pages 2-27 to 28.





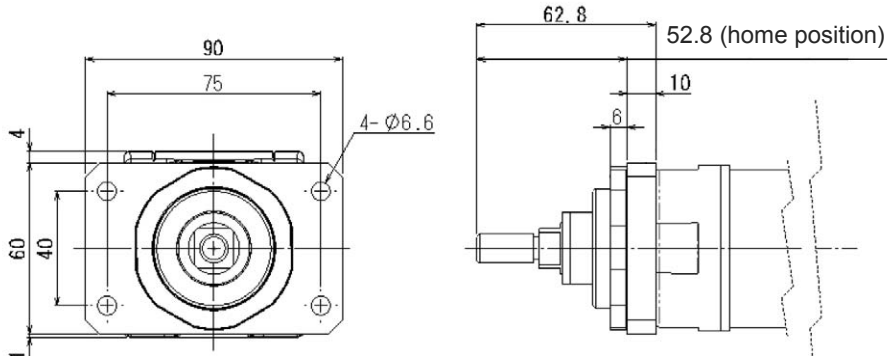
Type	Mounting screw M	Spigot diameter N	Screw effective length A	Boss height B	Fixing nut thickness C	Tightening torque
EC-R6	M42×1.5	φ42	18mm	22mm	6mm	30.00N·m
EC-R7	M48×1.5	φ48	23mm	27mm	9mm	35.00N·m

[When using flanges]

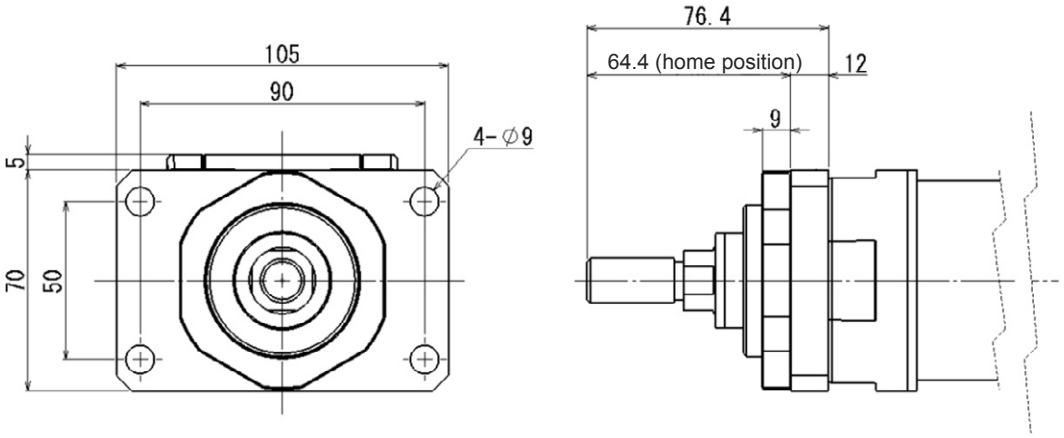
ELECYLINDERs can be mounted with flanges (option: model FL).

→ For precautions for mounting, refer to pages 2-27 to 28.

For EC-R6 (Part model number EC-FL-R6)

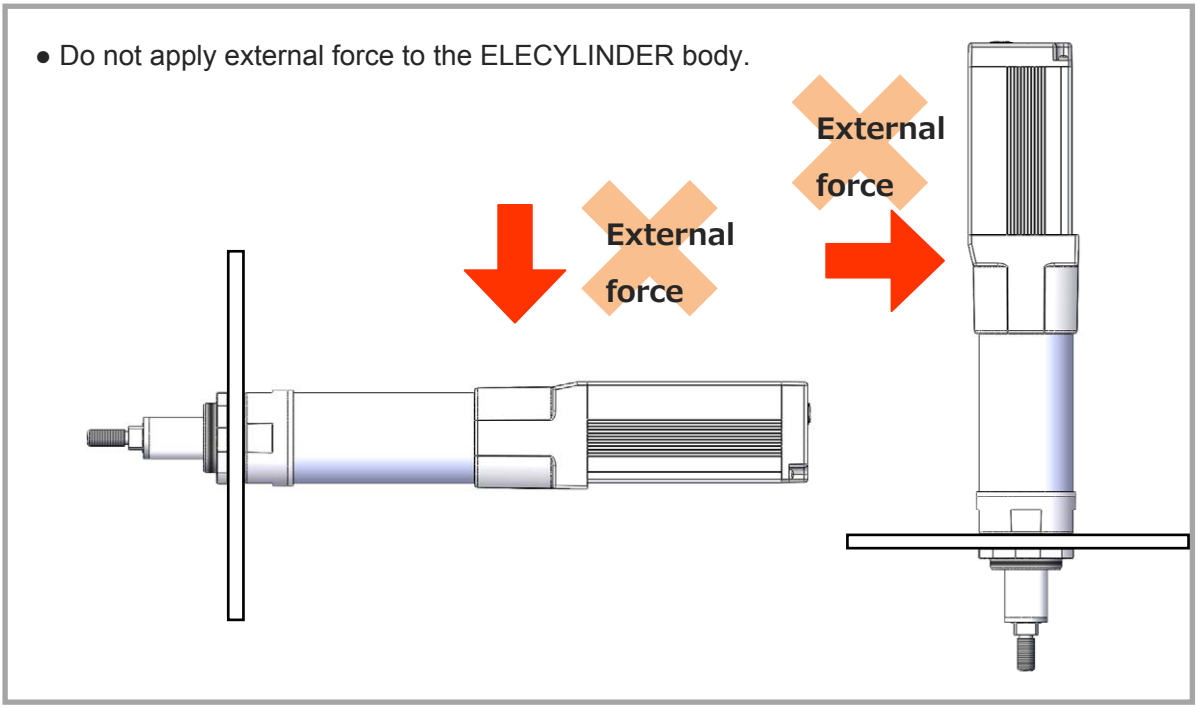


For EC-R7 (Part model number EC-FL-R7)



Type	Material	Tightening torque when mounting ELECYLINDER
EC-R6	Iron (unichrome)	30.00N·m
EC-R7	Iron (unichrome)	35.00N·m

[Precautions when using front brackets/flanges]

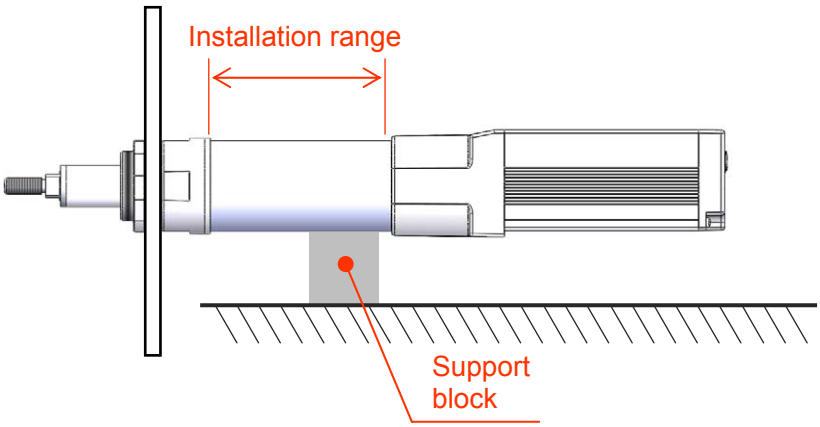


Caution

Do not apply external force to the ELECYLINDER body after installation.
External force may cause malfunctions or damage to parts.

[Precautions for horizontal mounting using front brackets/flanges]

- Prepare a support block for the body, as shown in the figure below, for a stroke of 150mm or more.
- The support block should be installed on the frame motor side.
- We recommend either using the optional foot bracket or keeping the support block (aluminum alloy, etc.) close against the frame.



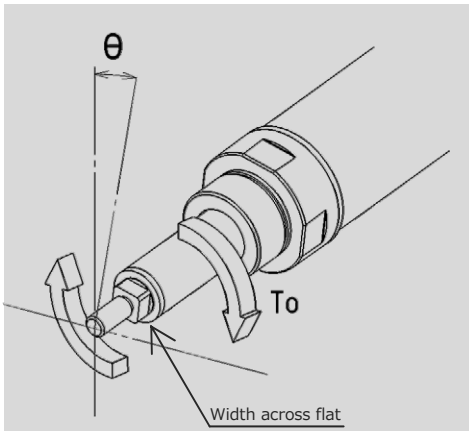
Caution

Even when the stroke is less than 150mm, a support block is strongly recommended in order to avoid vibration generated due to the operation conditions or installation environment, which may lead to malfunctions or damage to parts.

Precautions regarding the rod

- Do not apply radial load or load moment to the rod.
  Loads can only be applied in the axial direction matching the rod axis.
- In this case, be sure to use an external guide (such as a linear guide).

- When fastening a nut onto the tip bracket thread, make sure that the rod does not rotate. Use a wrench to fix the width across flat of the tip bracket with the rod in the maximum retraction position.
- The static allowable torque and the reference value (initial value) of the rod tip angular displacement are as follows.



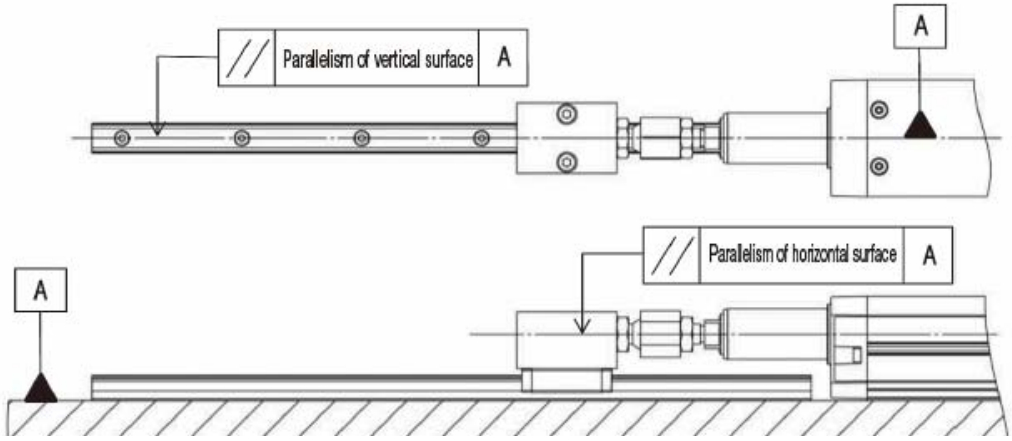
Type	Static allowable torque T_0	Angular displacement θ	Width across flat dimensions
EC-R6	0.50N·m	±1.5°	14mm
EC-R7	0.50N·m	±1.5°	19mm

Caution

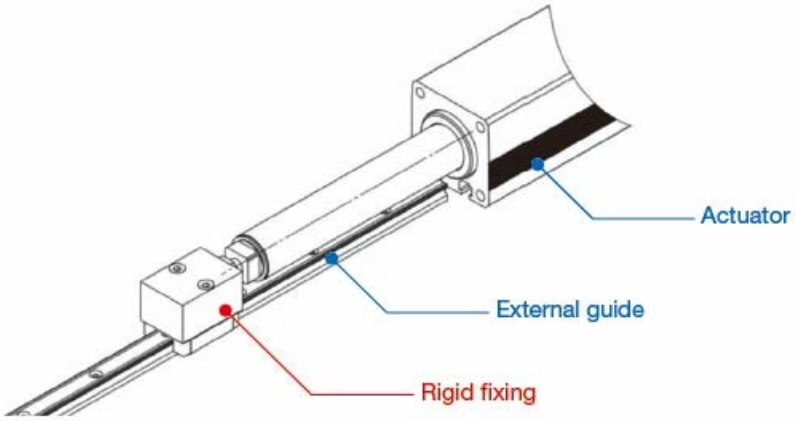
- If torque exceeding the allowable value acts on the rod, the rotation stop inside the ELECYLINDER may be damaged, preventing normal operation.
- When reaction force due to pressing operation acts on the rod as lateral load, make sure that the torque does not exceed the allowable value.
  Exceeding the allowable torque may lead to malfunctions or damage to parts.
- When the workpiece center of gravity is on the rod axis during vertical operation, rotational vibration may be generated by the clearance of the internal rotation-stopper. Attachment of an external guide is recommended to suppress such vibration.

External guide mounting

- If the parallelism between the ELECYLINDER and external guide (horizontal/vertical surfaces) is not adjusted with sufficient precision, malfunctions and premature ELECYLINDER damage may occur.
- When mounting the guide, perform centering for the ELECYLINDER and guide. Make sure that the sliding resistance is constant over the entire stroke.
- Make sure that the current value is constant, using the monitoring function of the teaching tool.



- "Rigid fixing" is recommended for the method of fixing to the external guide.
- If a "floating joint" is used, the rod rotation direction will not be restricted. Therefore, when operating the ELECYLINDER, force will be applied to the internal rotation-stopper in the direction of rod rotation, which may cause premature wear of the rotation-stopper. (Floating joints with rotation direction restrictions are acceptable.)

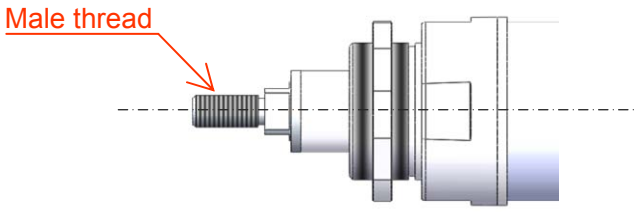


Mounting transported objects

[When using the rod tip adapter male thread]

- Remove the male thread cap.
- Transported objects can be secured using the male thread of the rod tip adapter.

→ For precautions for mounting, refer to page 2-29.

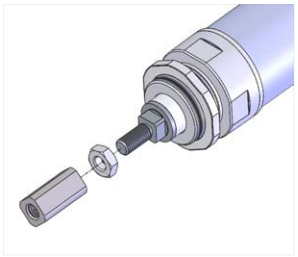


Type	Male thread dimensions	Tightening torque
EC-R6	M10 × 1.25, effective thread length 20.0mm	30.00N·m
EC-R7	M14 × 1.5, effective thread length 27.5mm	35.00N·m

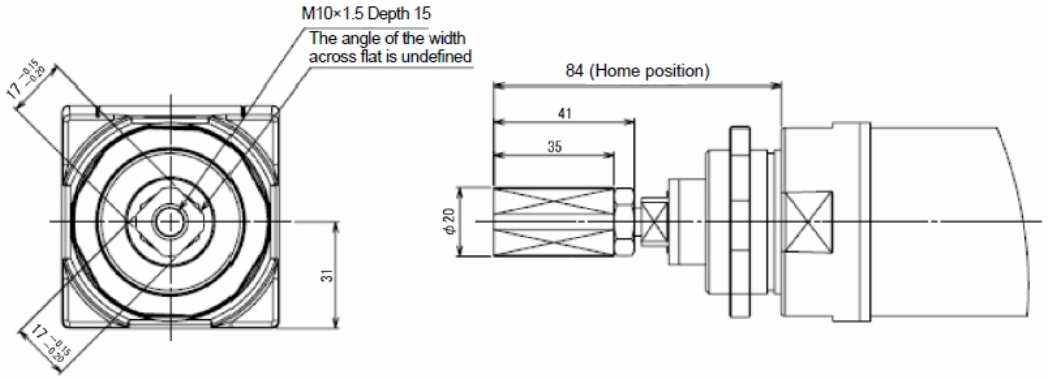
[When using tip adapter]

Transported objects can be secured using the internal thread of the tip adapter.

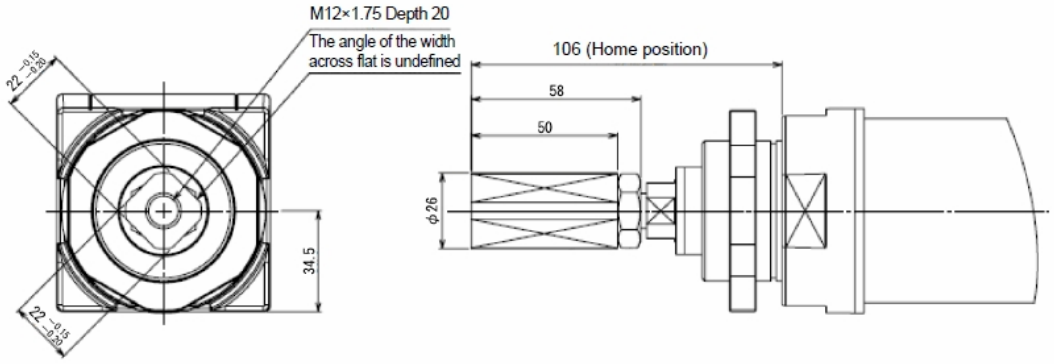
→ For precautions for mounting, refer to page 2-29.



For EC-R6 (Part model number EC-NFA-R6)



For EC-R7 (Part model number EC-NFA-R7)

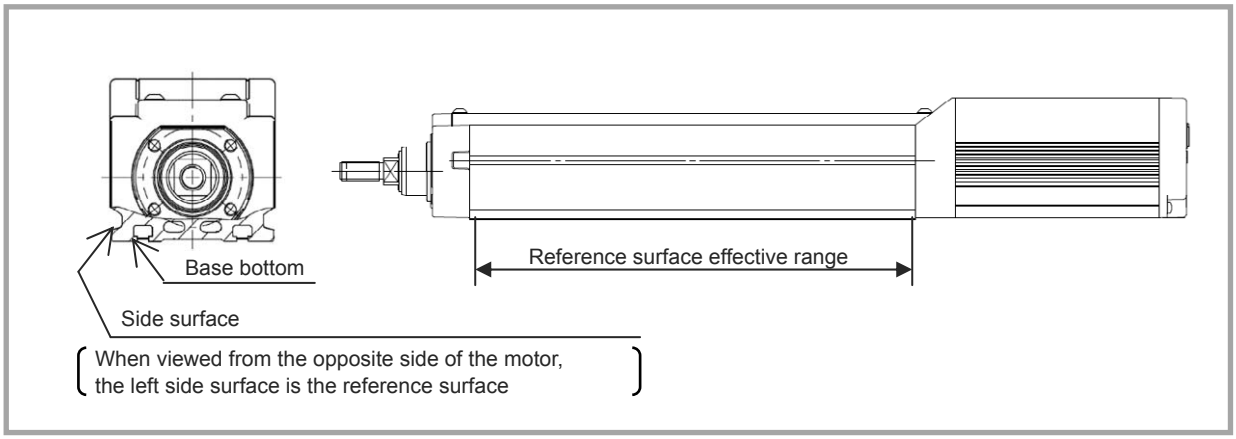


Type	Tightening torque when mounting ELECYLINDER
EC-R6	30.00N·m
EC-R7	35.00N·m

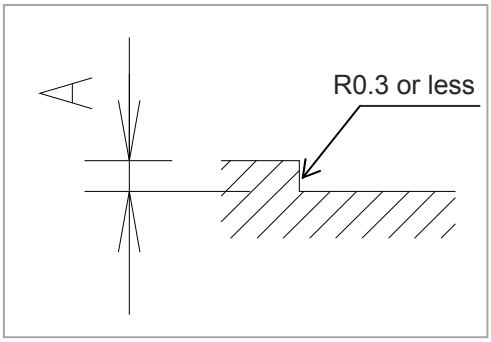
2.6 Installation of radial cylinder type

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 ELECYLINDER replacement and inspection.
- The bottom surface and left side surface (viewed from motor opposite side) of the body base serve as the reference surfaces for rod running. Use these surfaces as the reference surfaces for mounting when running accuracy is required.
  Use these surfaces as the reference surfaces for mounting when running accuracy is required.
- When applying radial load/moment load, fix the entire surface of the base bottom.
  Flange fixing may cause deflection or reflexion throughout the product due to radial load/moment load, leading to vibration, shortened product life, or breakdown.



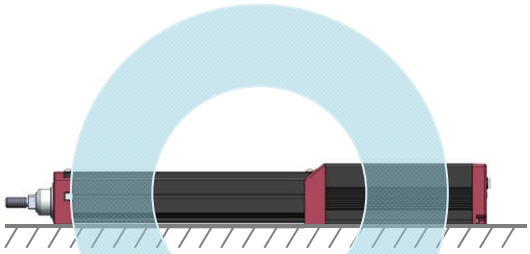
When mounting using the side reference surface, machine the installation surface according to the figure below.



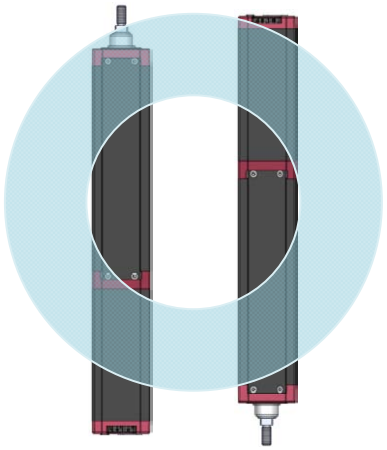
A dimension
2 to 4mm

Mounting orientation Type: EC-RR6/RR7

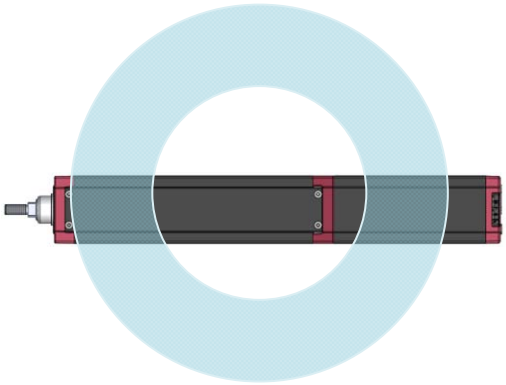
Horizontal installation



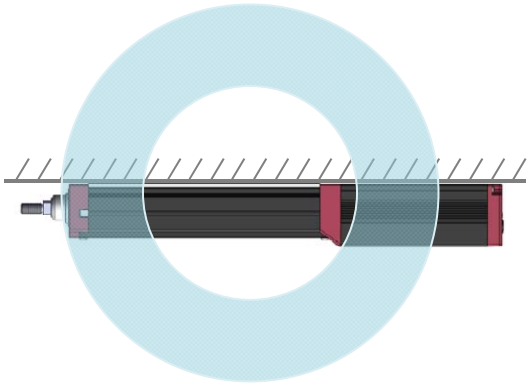
Vertical installation



Horizontal lateral installation



Horizontal ceiling mount installation



Caution

- When installing the unit vertically, keep the motor on top to the greatest extent possible.
- If the motor is installed on the bottom, the grease may separate due to long-term disuse, causing the base oil to flow into the motor part and leading to controller or motor/encoder breakdown.
- If the motor is installed on the top, cap the teaching port.
  Clogging with foreign matter may lead to a breakdown.
  Sometimes base oil separates from the grease due to the operating environment, mounting orientation, or operating conditions, and leaks from the inside of ELECYLINDER to the exterior. Protect the peripheral equipment if base oil adhesion negatively affects them.

Square nuts

The square nuts regulated in JIS B1163 can be used for the T-slots.
The square nut quantities enclosed at shipping and related information are as follows.

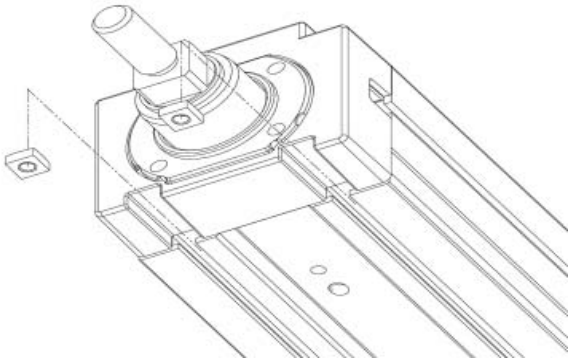
Type	Square nut quantity enclosed	Screw size	Required bolt length from base bottom	Minimum number of fixing bolts	Tightening torque
EC-RR6	6 pcs	M4	5 to 6mm	4 pcs	1.76N·m
EC-RR7	6 pcs	M5	6.5 to 8mm	4 pcs	3.42N·m

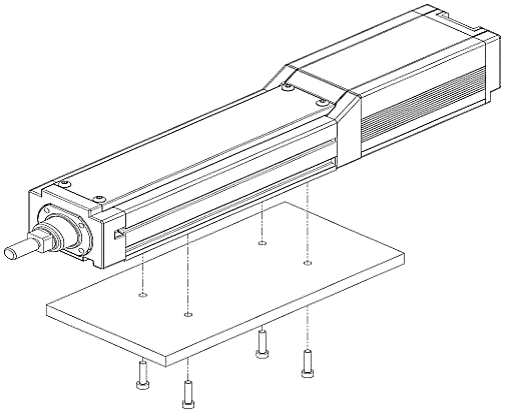
Body mounting

[When using the T-slot on the base bottom]

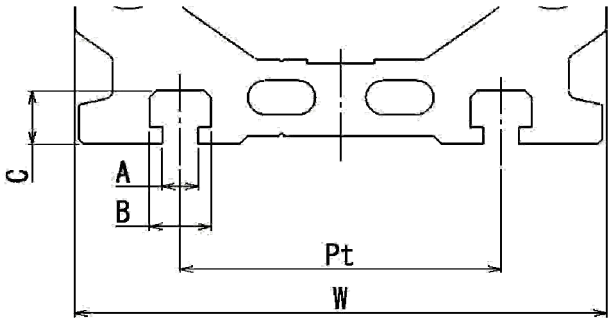
The unit has a T-slot at the bottom of the base for mounting.
Insert a square nut into the T-slot and fix it from the back.

→ For details regarding the position and dimensions, refer to "Chapter 9 External Dimensions".





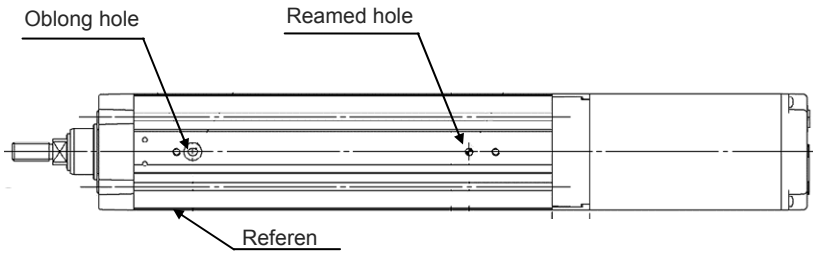
T-slot dimensions

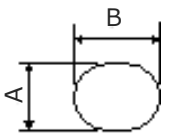


Type	W	Pt	A	B	C
EC-RR6	63mm	38mm	4.3mm	7.3mm	6.3mm
EC-RR7	73mm	46mm	5.3mm	8.5mm	8.5mm

There are a reamed hole and an oblong hole for the positioning pins.
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.

Reamed hole/oblong hole position dimensions



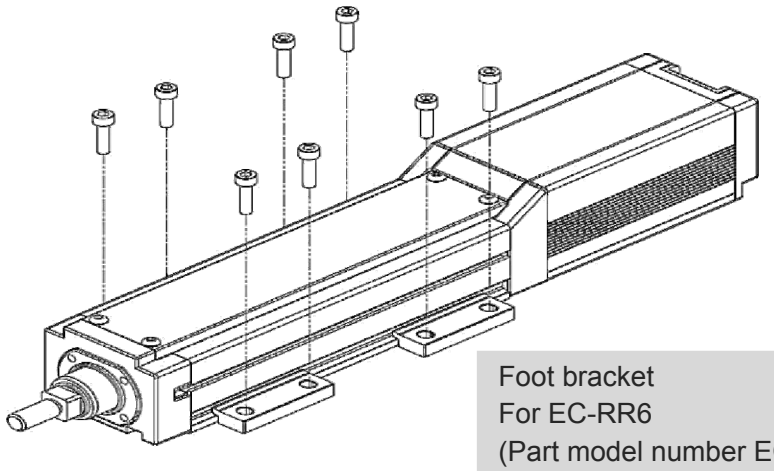


Oblong hole

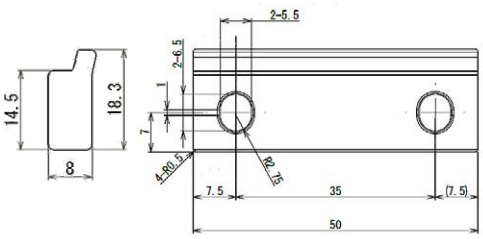
Type	Reamed hole	Oblong hole
EC-RR6	φ4H7 depth 5	A: $4_{0}^{+0.012}$ B: 5 depth 5 mm or less
EC-RR7	φ4H7 depth 5	A: $4_{0}^{+0.012}$ B: 5 depth 5 mm or less

[When using foot brackets]

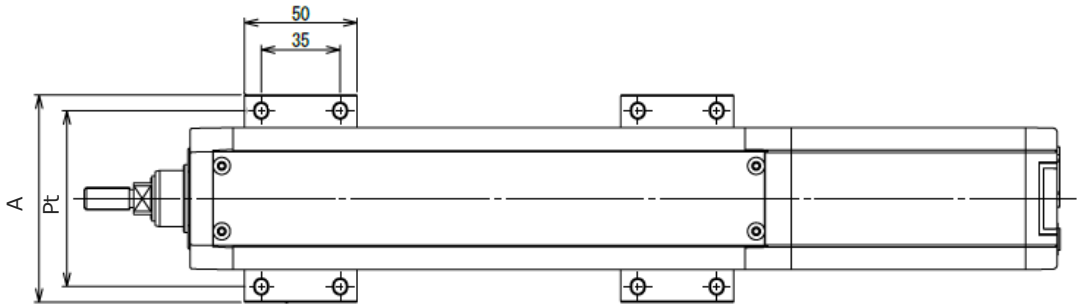
Mounting from the top is possible using foot brackets.
The groove on the side of the main body can be fixed from the top.



Foot bracket
For EC-RR6
(Part model number EC-FTSB、4pcs/set)
For EC-RR7
(Part model number EC-FTSB-02、6pcs/set)



Foot bracket mounting dimensions



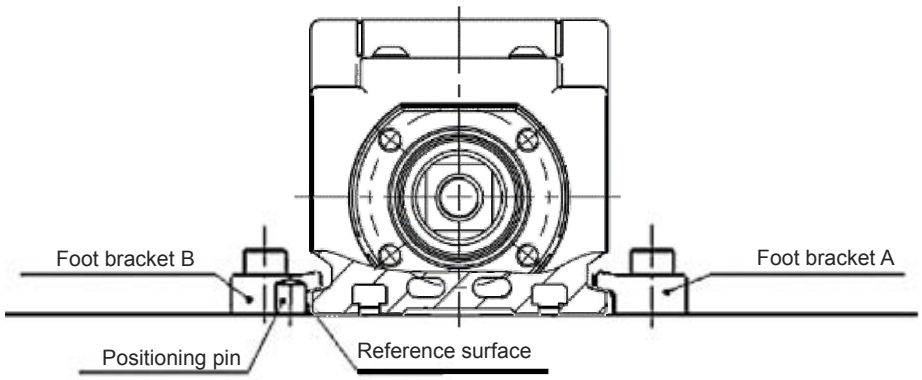
Type	Pt	A	Screw size	Minimum number of brackets	Tightening torque
EC-RR6	78mm	92mm	M5	4 locations	7.27N·m
EC-RR7	88mm	102mm	M5	6 locations	7.27N·m

Foot bracket mounting procedure

Before fixing, use a positioning pin or the like to position the bracket in the width direction.

The mounting procedure is as follows.

(1) Press against the base reference surface with a positioning pin, etc.
(2) Maintaining the pressure, fix foot bracket A on the opposite side.
(3) Finally, fix foot bracket B.



Caution

Sufficient fastening force may not be obtainable when mounting with methods other than the procedure above.

Notice

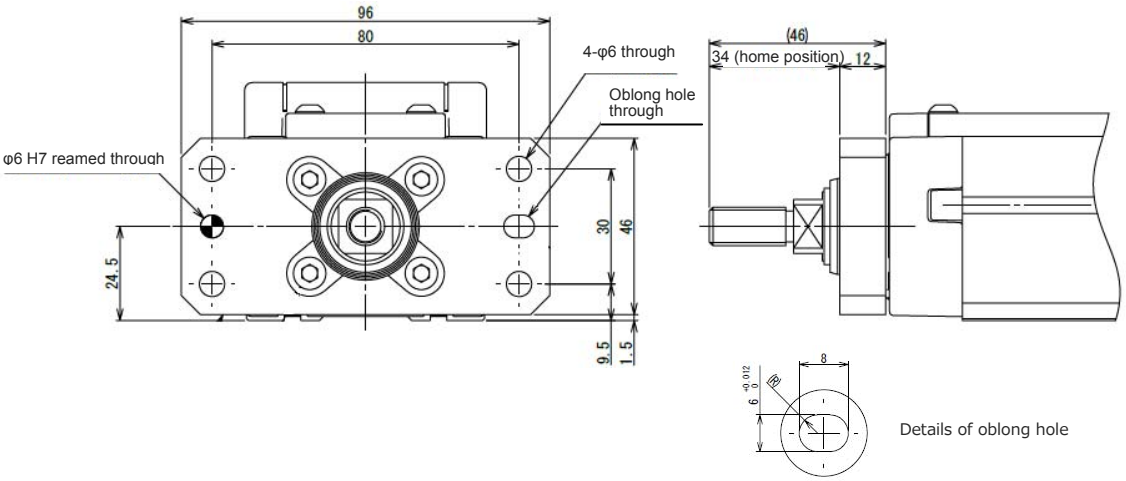
- The bolts for fixing foot brackets on the installation surface are to be prepared by the customer.
- The use of high-strength bolts of ISO-10.9 or higher is recommended.
- Make sure the internal thread and bolt effective engagement length is approximately 1.8 times the nominal diameter or more.

[When using flanges]

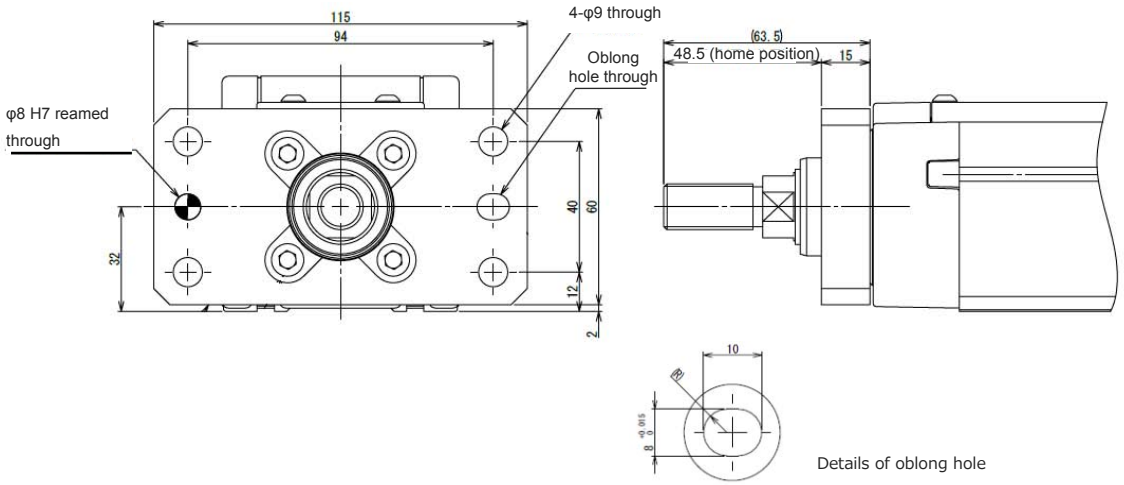
ELECYLINDERs can be mounted with flanges (option: model FL).

→ For precautions for mounting, refer to pages 2-41 to 42.

For EC-RR6 (Part model number EC-FL-RR6)

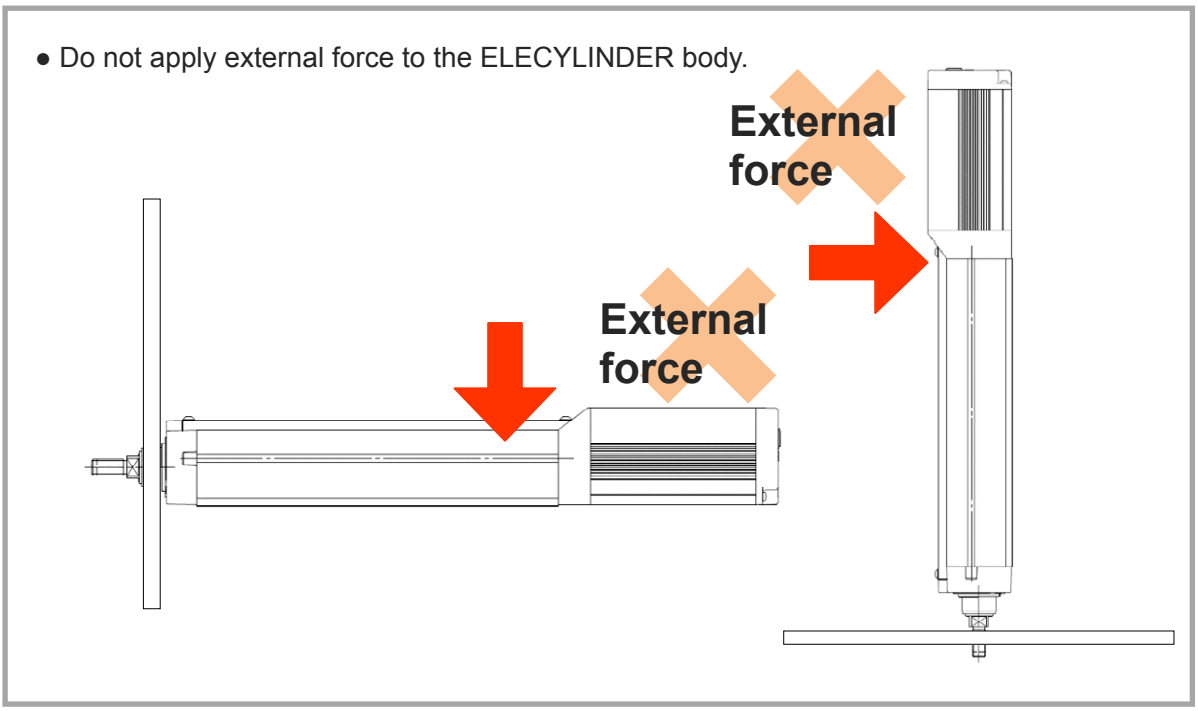


For EC-RR7 (Part model number EC-FL-RR7)



Type	Material	Tightening torque when mounting ELECYLINDER
EC-RR6	Iron (unichrome)	3.42N·m
EC-RR7	Iron (unichrome)	5.36N·m

[Precautions when using flanges]

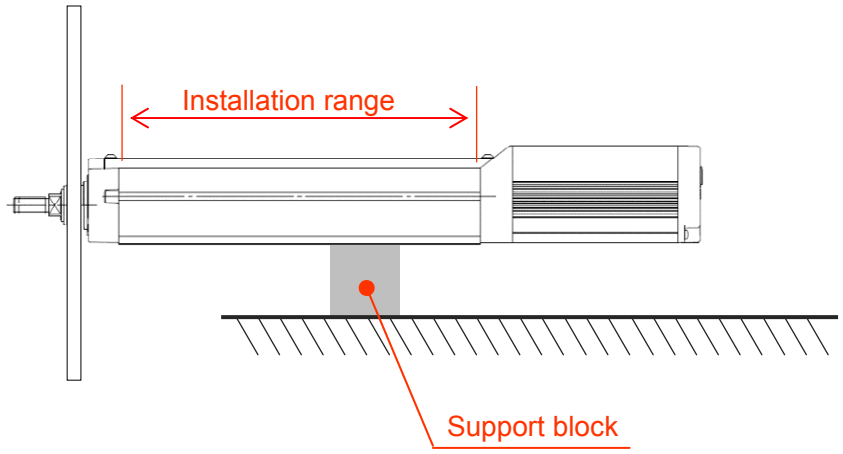


Caution

Do not apply external force to the ELECYLINDER body after installation.
External force may cause malfunctions or damage to parts.

[Precautions for horizontal mounting using flanges]

- Prepare a support block for the body, as shown in the figure below, for a stroke of 150mm or more.
- The support block should be installed on the frame motor side.
- We recommend either using the optional foot bracket or keeping the support block (aluminum alloy, etc.) close against the frame.



Caution

Even when the stroke is less than 150mm, a support block is strongly recommended in order to avoid vibration generated due to the operation conditions or installation environment, which may lead to malfunctions or damage to parts.

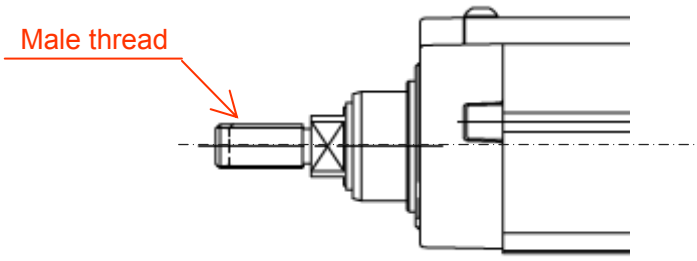
.

Mounting transported objects

[When using the rod tip adapter male thread]

- Remove the male thread cap.
- Transported objects can be secured using the male thread of the rod tip adapter.

* Fix the rod tip bracket width across flats with a wrench, etc., to prevent loads from being applied to the rod.

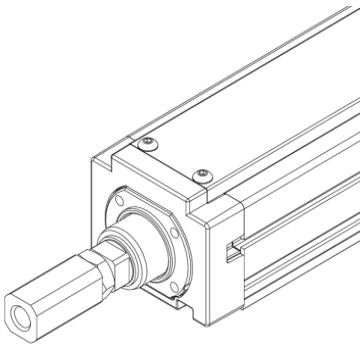


Type	Male thread dimensions	Tightening torque
EC-RR6	M10 × 1.25, effective thread length 20.0mm	30.00N·m
EC-RR7	M14 × 1.5, effective thread length 27.5mm	35.00N·m

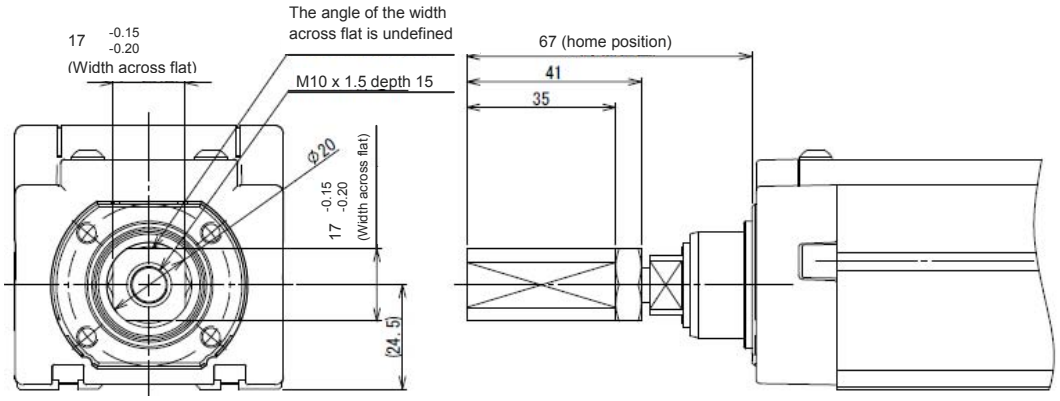
[When using tip adapter]

Transported objects can be secured using the internal thread of the tip adapter.

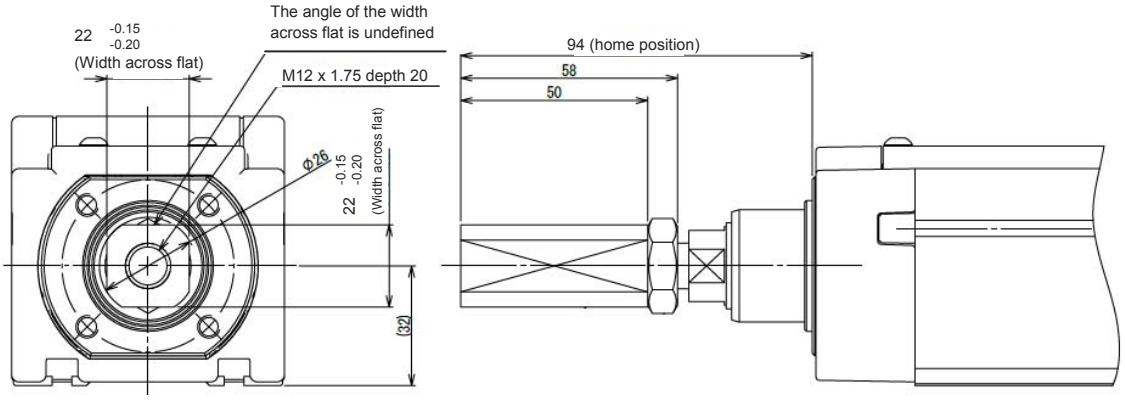
* Fix the rod tip bracket width across flats with a wrench, etc., to prevent loads from being applied to the rod.



For EC-RR6 (Part model number EC-NFA-R6)



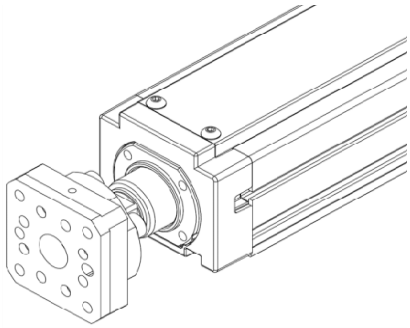
For EC-RR7 (Part model number EC-NFA-R7)



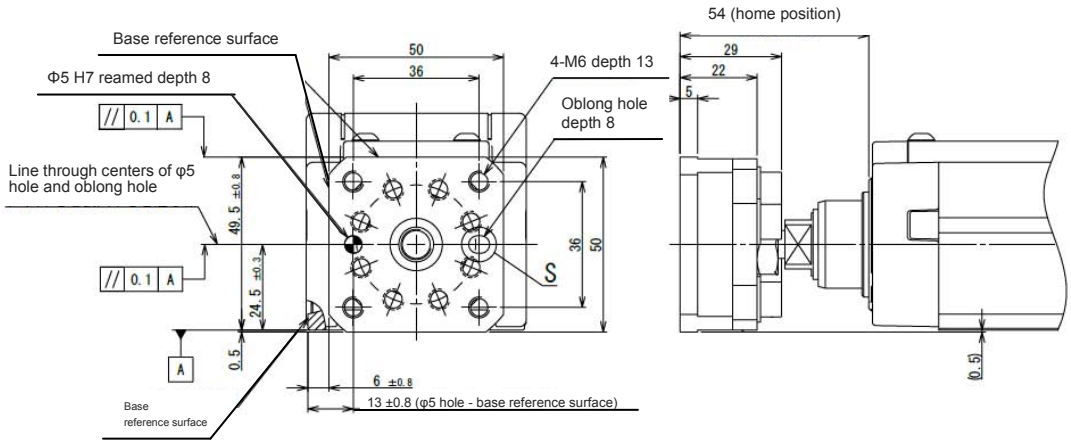
Type	Tightening torque when mounting ELECYLINDER
EC-RR6	30.00N·m
EC-RR7	35.00N·m

[When using tip flange]

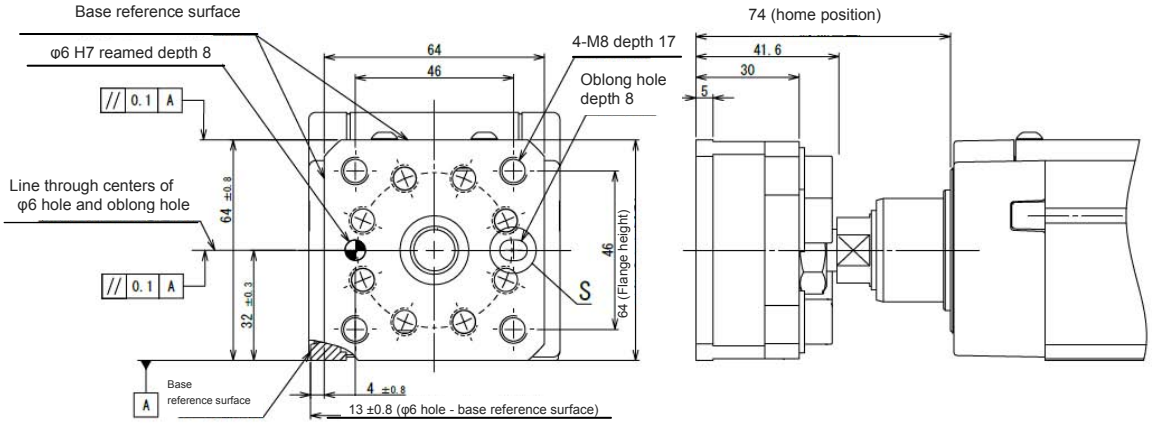
Transported objects can be secured using the flange of the tip adapter.



For EC-RR6 (Part model number EC-FFA-RR6)



For EC-RR7 (Part model number EC-FFA-RR7)

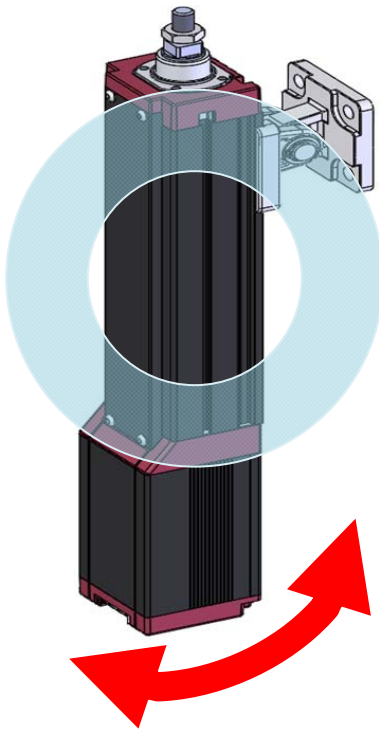
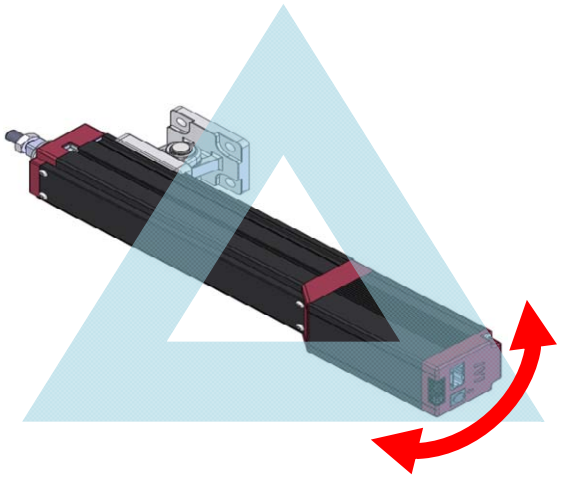


Type	Tightening torque when mounting flanges A and B	Tightening torque when mounting ELECYLINDER
EC-RR6	7.1N·m (M6)	30.00N·m
EC-RR7	17.2N·m (M8)	35.00N·m

Mounting with oscillation

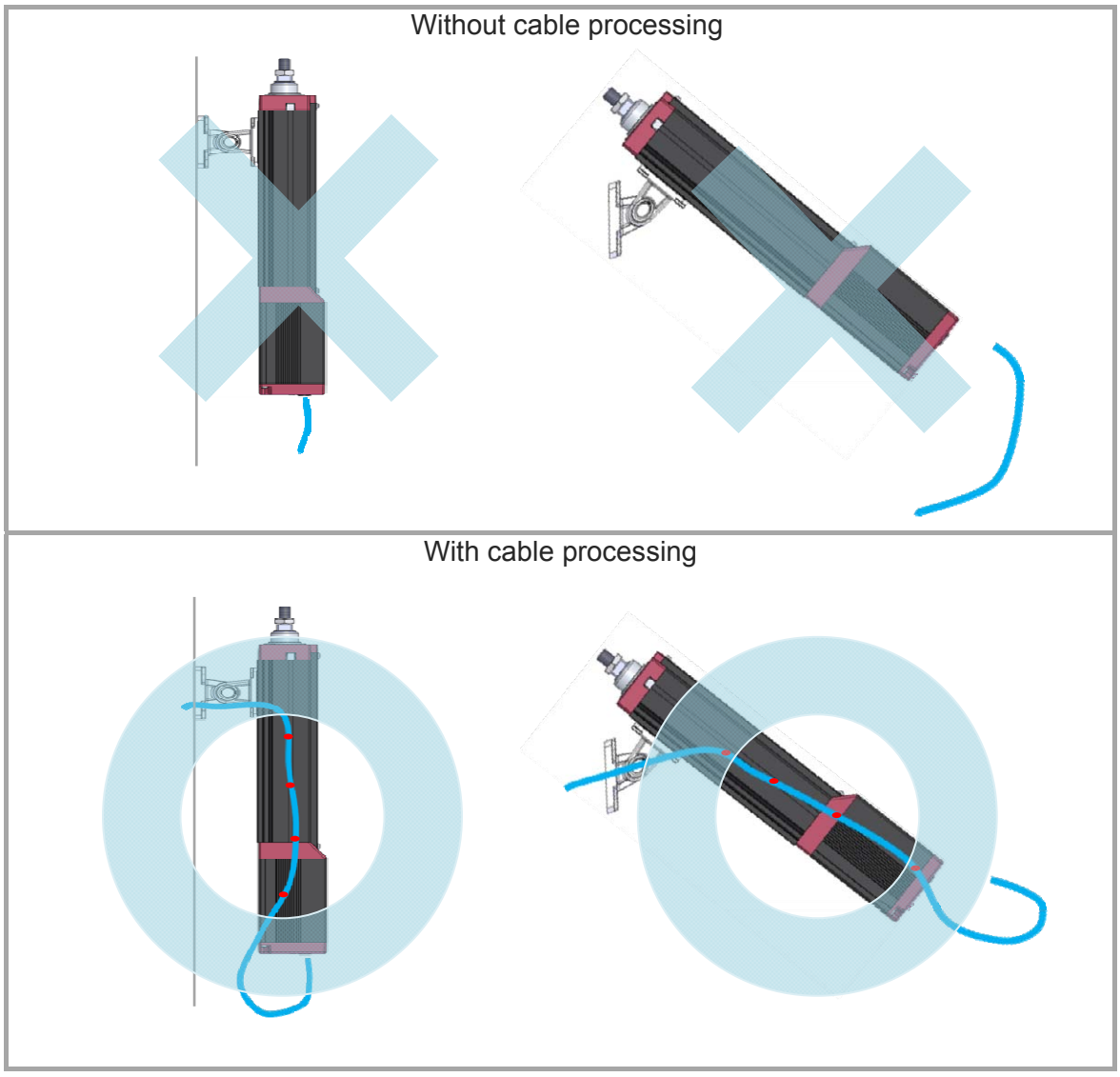
[Installation orientation for oscillation]

- We recommend vertical mounting for oscillation.
  When oscillation is performed with horizontal mounting, the product's self-weight causes moment loads to be applied to the joint, increasing the sliding friction on the joint and leading to thrust loss.
  As well, note that sliding in the joint may cause wear on the bracket.

Vertical installation	Horizontal installation
	

[Cable processing for oscillation]

- For oscillation, use a robot cable with bending resistance.
  Fix the cable using the product body T-slots, etc., so that oscillation of the body does not cause load to be applied to the connector.
  Be careful to arrange the cable so as not to exceed its flex radius allowable value.

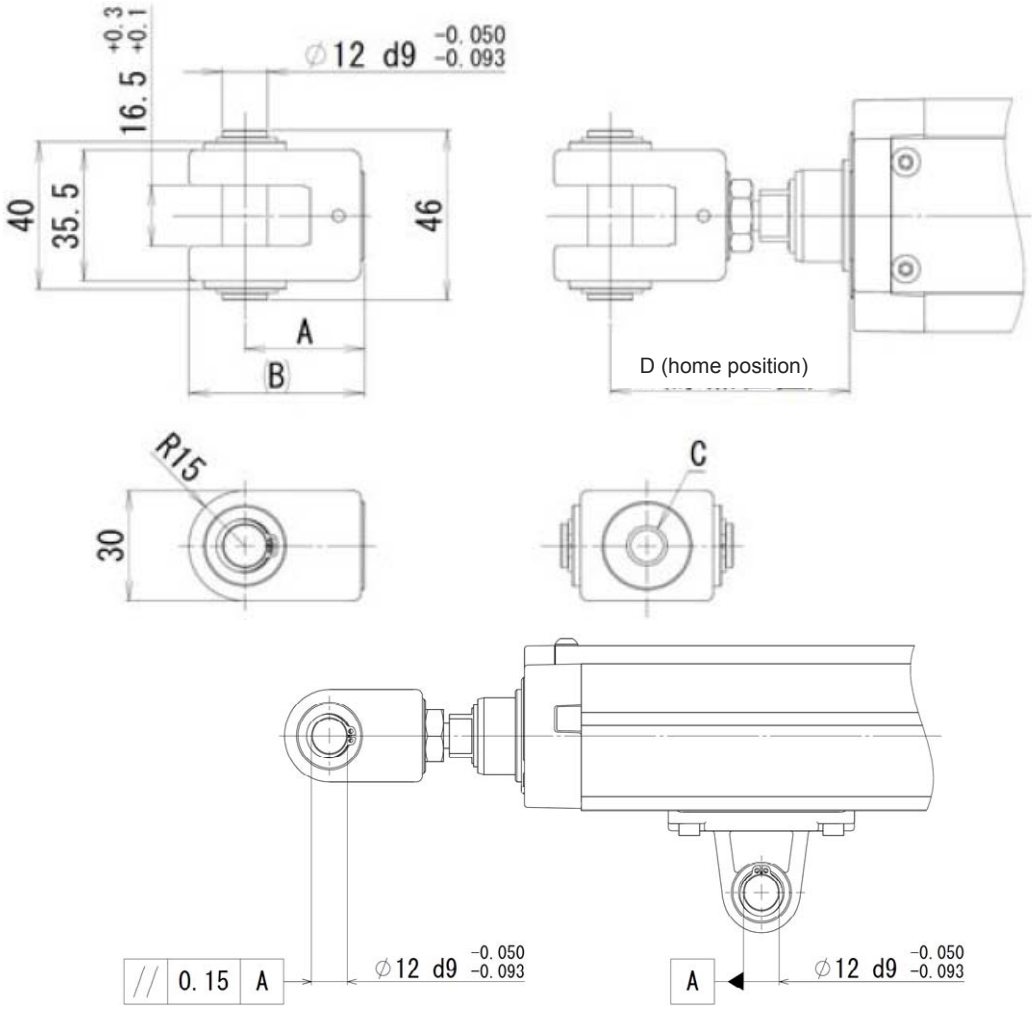


[Bracket mounting for oscillation]

Oscillation requires fixing the body with a joint able to move freely in the rotation direction.
Configured options include the tip knuckle joint (-NJ), the body clevis (-QR), the tip knuckle joint + oscillation receiving bracket (-NJPB), and the body clevis + oscillation receiving bracket (-QRPB).

● Knuckle joint (-NJ) mounting method and component dimensions

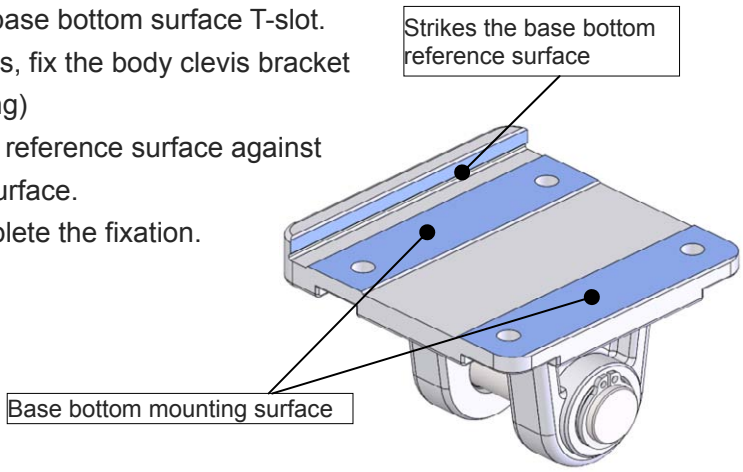
1. Pass the nut and knuckle joint through the rod tip male thread.
2. Adjust the knuckle joint position to the specified dimensions.
   * Adjust the knuckle joint angle so as to operate smoothly, with no load applied to the bracket or rod, when operating embedded in the equipment.
   * Mount with the geometric tolerance in the figure below as a guideline.
3. Fix by tightening the nut so that load is not applied to the rod.



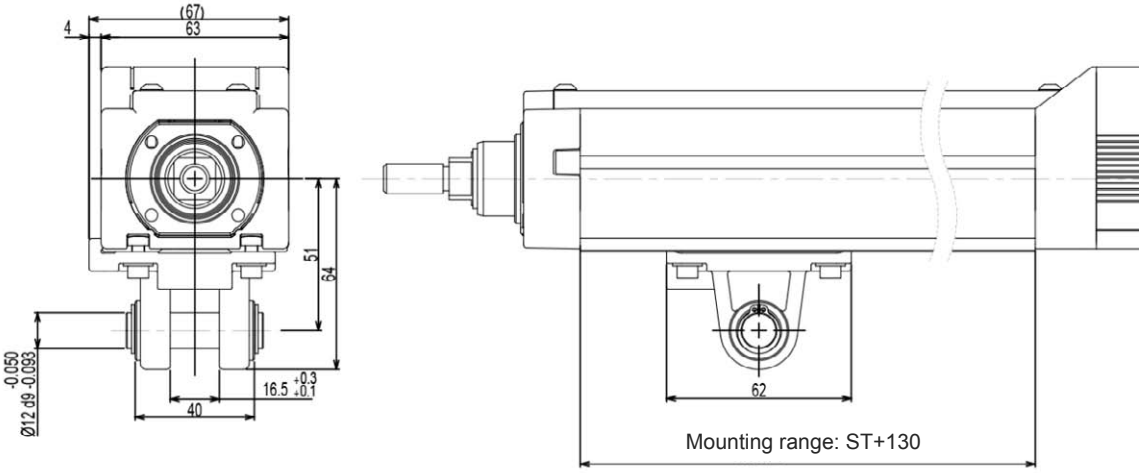
Type	A	B	C	D	Nut tightening torque
EC-RR6	32mm	47mm	M10×1.25	64mm	30.00N·m
EC-RR7	37.5mm	52.5mm	M14×1.5	81.5mm	35.00N·m

●Body clevis (-QR) mounting method and component dimensions

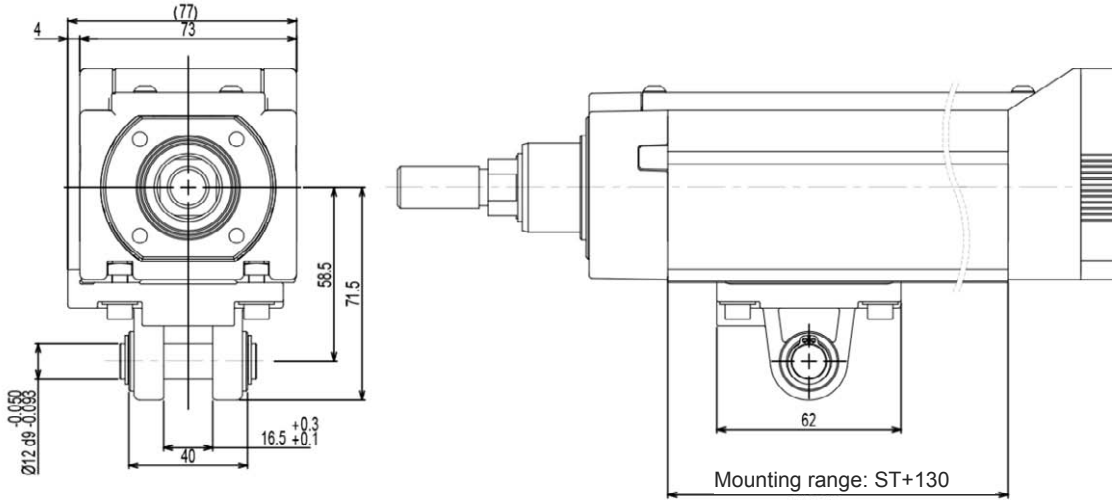
1. Insert 4 square nuts into the base bottom surface T-slot.
2. Using the inserted square nuts, fix the body clevis bracket with the bolt. (temporary fixing)
3. Press the body clevis bracket reference surface against the base bottom reference surface.
4. Fully tighten the bolts to complete the fixation.



For EC-RR6

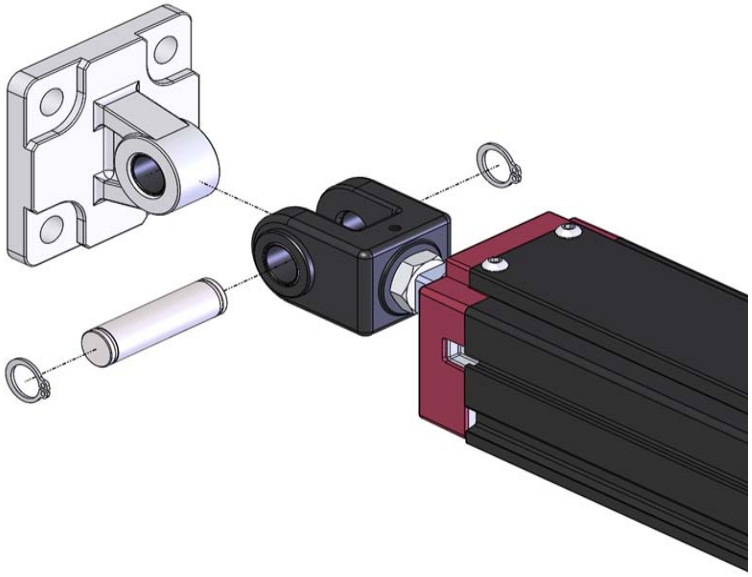


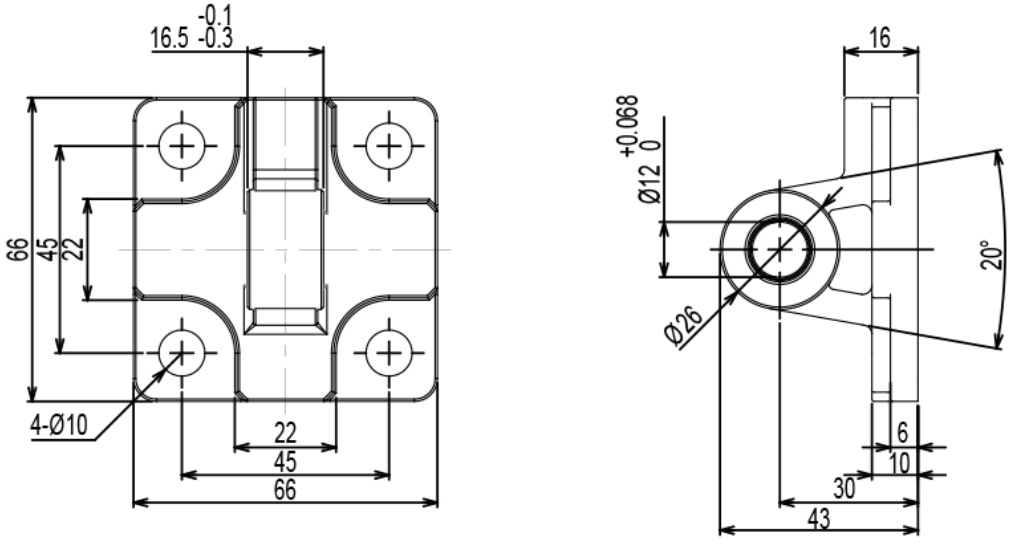
For EC-RR7



●Oscillation receiving bracket mounting method and component dimensions

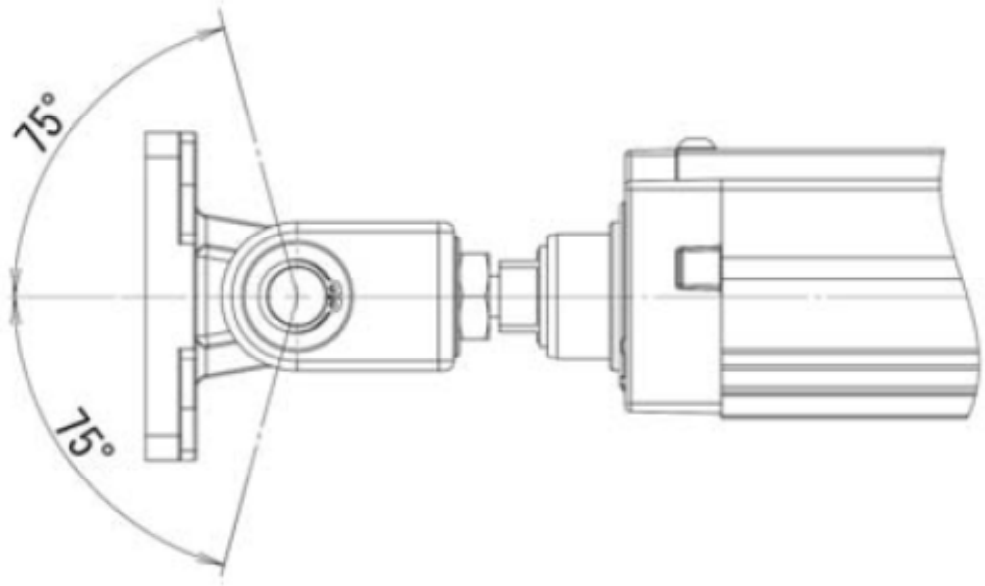
1. Insert the oscillation receiving bracket ridge between the knuckle joint and body clevis ridges.
2. Match the positions of the ridges and pass the clevis pin through.
3. Mount a stop ring on each end of the clevis pin.
   * Stop ring: C-shaped stop ring for shaft, nominal diameter 12
4. Mount the oscillation receiving bracket on the equipment.
   * Adjust so as to operate smoothly, with no load applied to the bracket or rod, when operating embedded in the equipment.



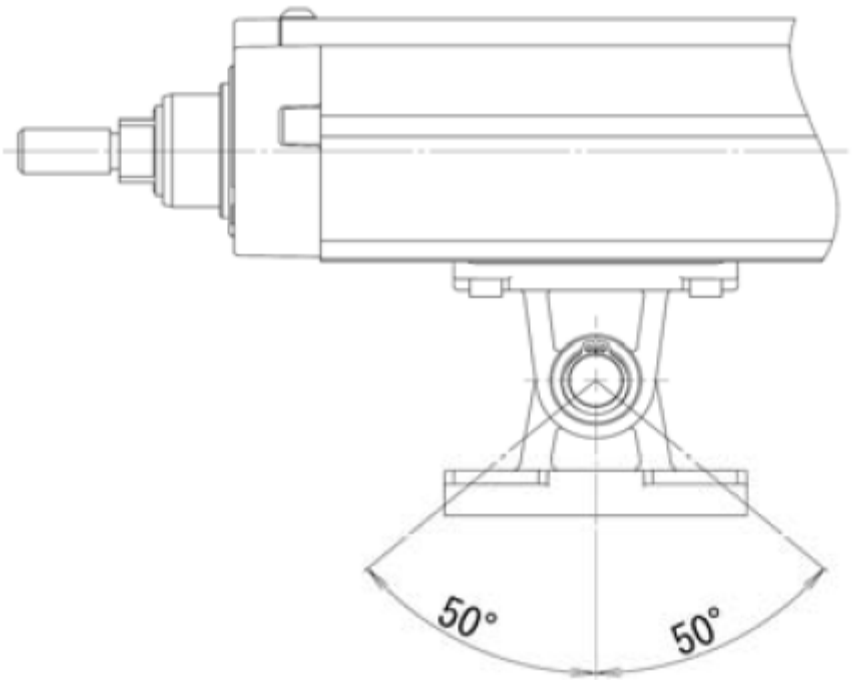


●Oscillation receiving bracket movable range

-NJPB



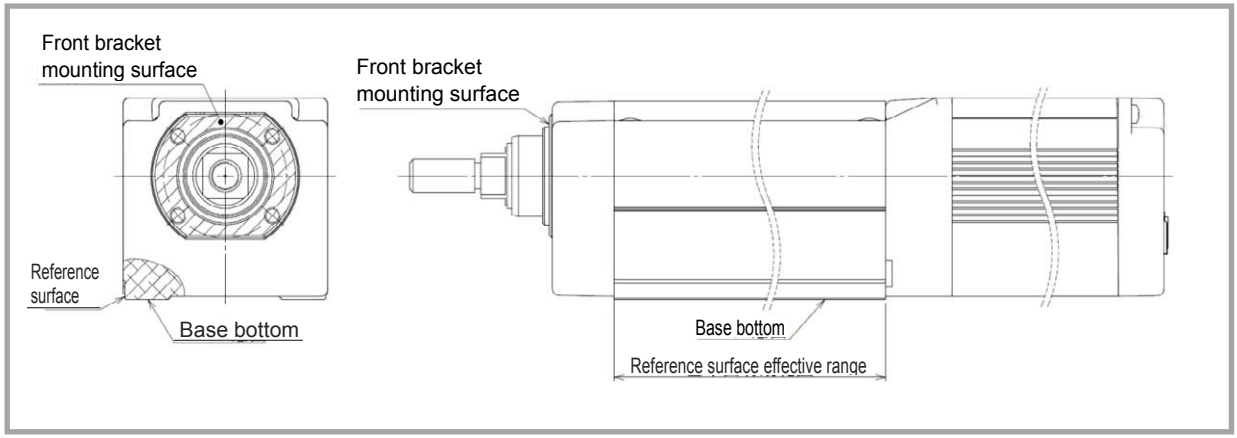
-QRPB



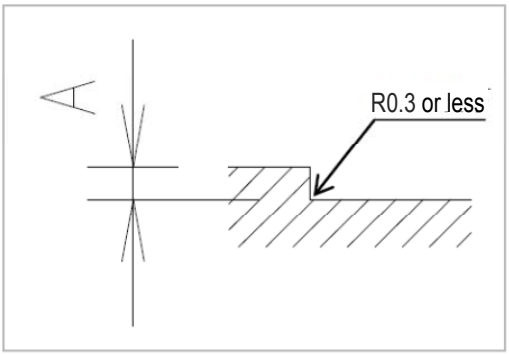
2.7 Installation of high rigidity radial cylinder type

Installation surface

- The body installation 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 ELECYLINDER replacement and inspection.
- The bottom surface and left side surface (viewed from motor opposite side) of the body base serve as the reference surfaces for rod running. Use these surfaces as the reference surfaces for mounting when running accuracy is required.
- When applying radial load/moment load, fix the entire surface of the base bottom. Flange fixing may cause deflection or reflexion throughout the product due to radial load/moment load, leading to vibration, shortened product life, or breakdown.

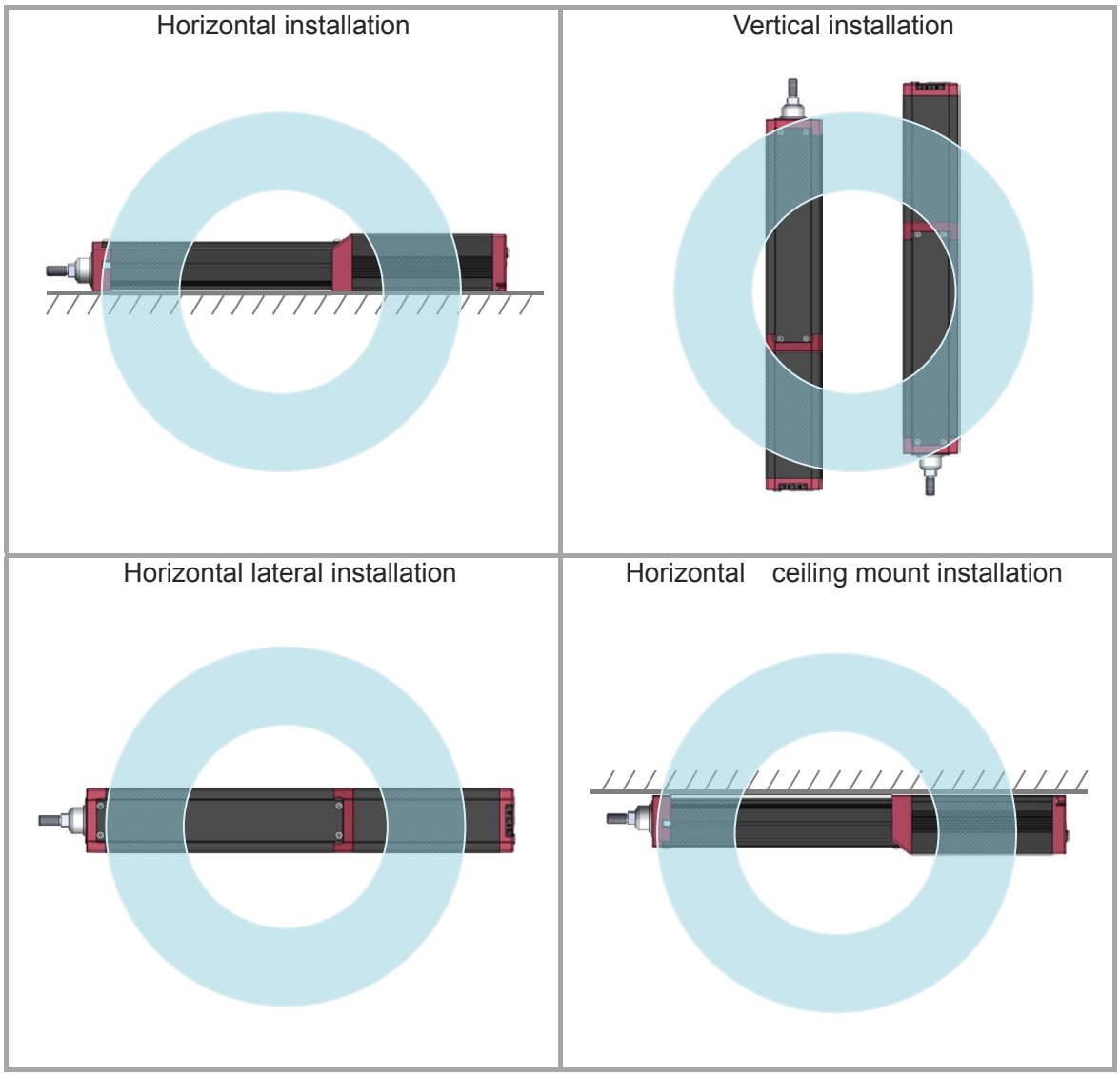


When mounting using the side reference surface, machine the installation surface according to the figure below.



A dimension
2 to 4mm

Mounting orientation Type: EC-RR6□AH/RR7□AH, EC-RR6□H/RR7□H



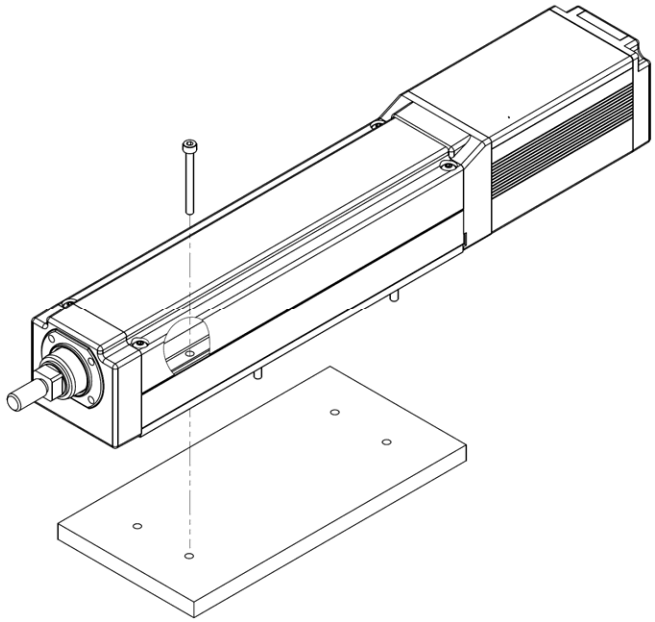
Caution

- When installing the unit vertically, keep the motor on top to the greatest extent possible.
- If the motor is installed on the bottom, the grease may separate due to long-term disuse, causing the base oil to flow into the motor part and leading to controller or motor/encoder breakdown.
- If the motor is installed on the top, cap the teaching port.
  Clogging with foreign matter may lead to a breakdown.
  Sometimes base oil separates from the grease due to the operating environment, mounting orientation, or operating conditions, and leaks from the inside of ELECYLINDER to the exterior.
  Protect the peripheral equipment if base oil adhesion negatively affects them.

Body mounting

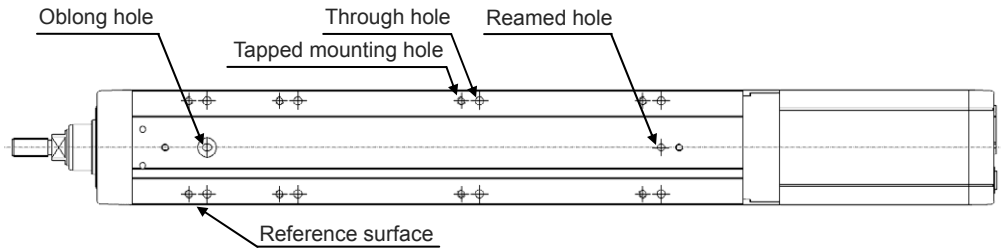
[When using base through holes]

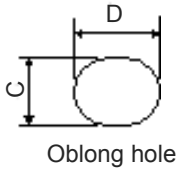
When fixing the actuator with the base through holes, remove the frame cover before work.
→ For details regarding the position and dimensions, refer to "Chapter 9 External Dimensions".



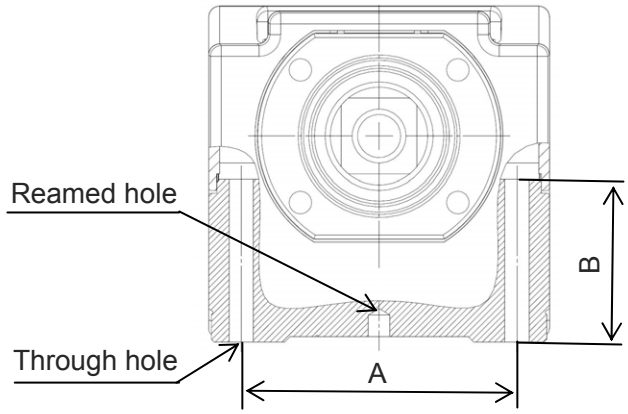
There are a reamed hole and an oblong hole for the positioning pins.
Use the reamed hole and oblong hole if mounting reproducibility after detachment is required.
When fine adjustment of angles, etc. is required, consider using only the reamed hole.

Reamed hole/oblong hole position dimensions





Through hole dimensions

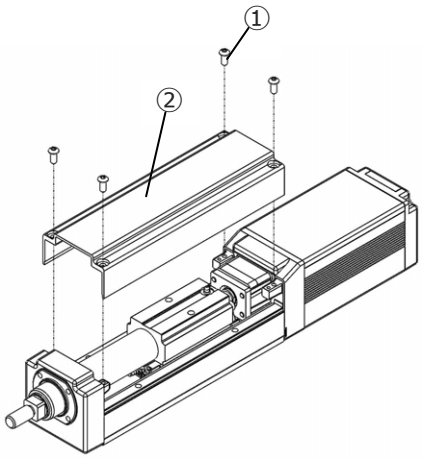


Type	Through hole diameter	A	B	Reamed hole	Oblong hole
EC-RR6□AH **EC-RR6□H**	φ4.5	51mm	30mm	φ4H7 depth 5	C: $4^{+0.012}_{0}$ D: 5 depth 5mm or more
EC-RR7□AH **EC-RR7□H**	φ5.5	61mm	35mm	φ4H7 depth 5	C: $4^{+0.012}_{0}$ D: 5 depth 5mm or more

Procedure for removing the frame cover

1. Loosen bolts (1) and remove (2).

* For assembly, follow the procedure in reverse.

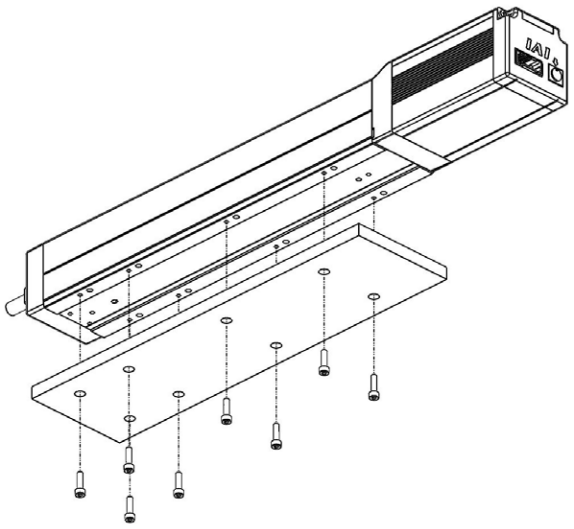


No.	Model	Part name	RR6□AH RR6□H	RR7□AH RR7□H
1	M4 x 10	Bolt	4	4
2		Frame cover	1	1

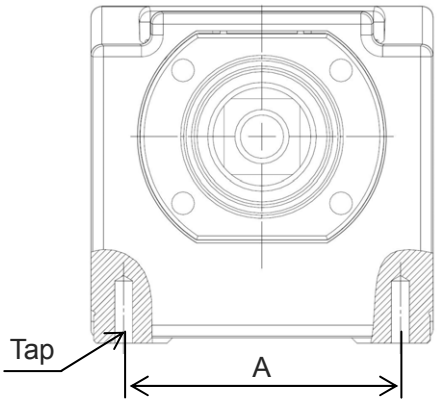
[When using the tapped mounting hole on the base bottom]

The unit has a tapped mounting hole at the bottom of the base for mounting.

→ For details regarding the position and dimensions, refer to "Chapter 9 External Dimensions".



Tapped mounting hole dimensions



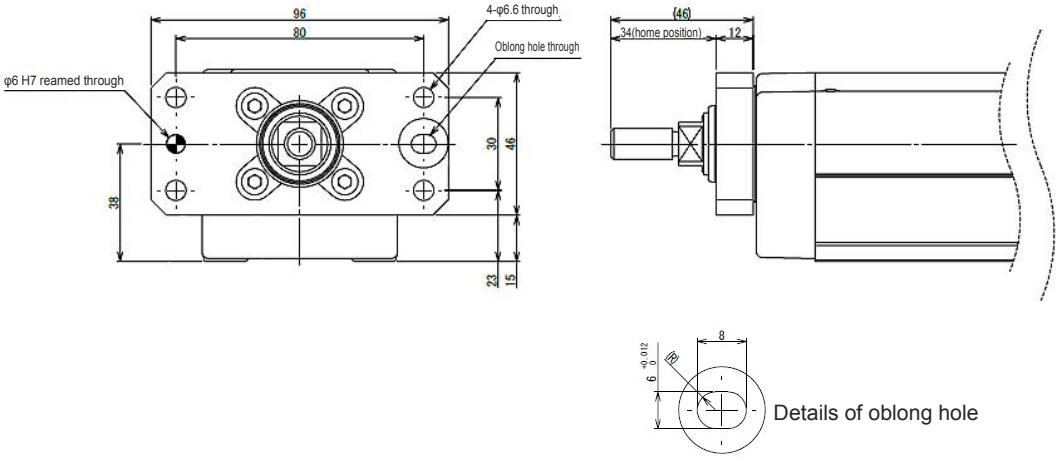
Type	Tap diameter	A	Effective thread depth
EC-RR6□AH EC-RR6□H	M4	51mm	8mm
EC-RR7□AH EC-RR7□H	M5	61mm	10mm

[When using flanges]

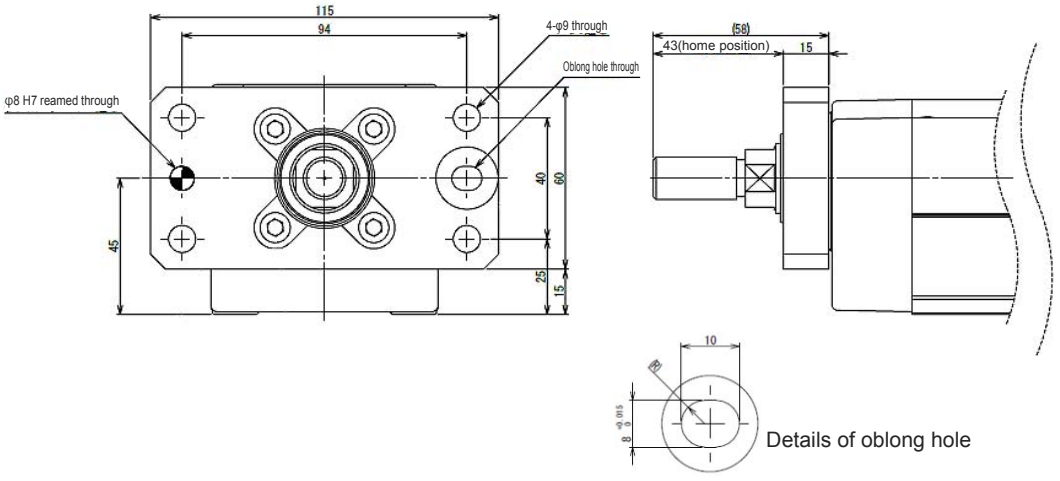
ELECYLINDERs can be mounted with flanges (option: model FL).

→ For precautions for mounting, refer to pages 2-58 to 59.

For EC-RR6□AH and EC-RR6□H (Part model number EC-FL-RR6)

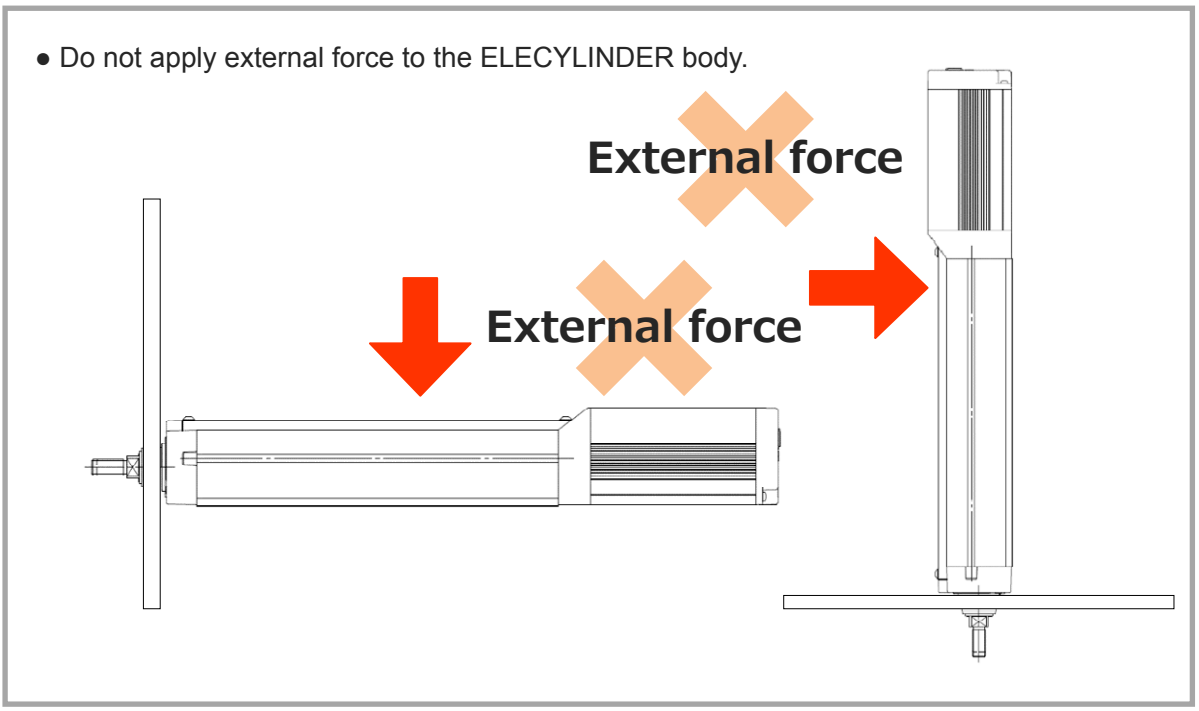


For EC-RR7□AH and EC-RR7□H (Part model number EC-FL-RR7)



Type	Material	Tightening torque when mounting ELECYLINDER
EC-RR6□AH **EC-RR6□H**	Iron (unichrome)	3.42N·m
EC-RR7□AH **EC-RR7□H**	Iron (unichrome)	5.36N·m

[Precautions when using flanges]

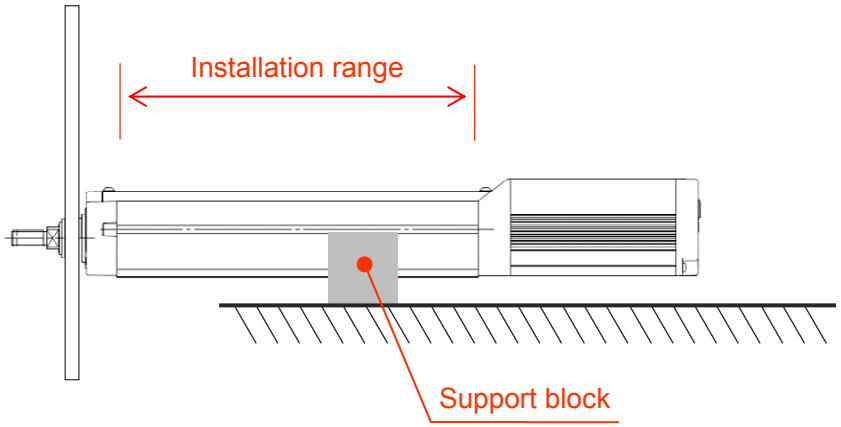


Caution

Do not apply external force to the ELECYLINDER body after installation.
External force may cause malfunctions or damage to parts.

[Precautions for horizontal mounting using flanges]

- Prepare a support block for the body, as shown in the figure below, for a stroke of 150mm or more.
- The support block should be installed on the frame motor side.
- We recommend either keeping the support block (aluminum alloy, etc.) close against the frame.



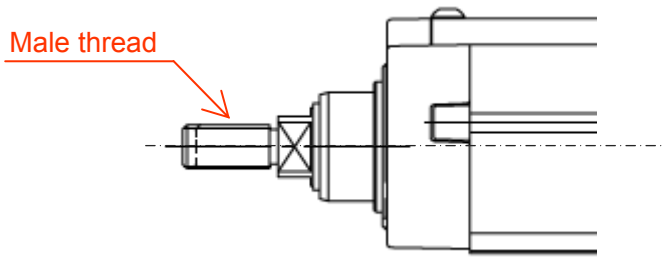
Caution

Even when the stroke is less than 150mm, a support block is strongly recommended in order to avoid vibration generated due to the operation conditions or installation environment, which may lead to malfunctions or damage to parts.

Mounting transported objects

[When using the rod tip adapter male thread]

- Remove the male thread cap.
- Transported objects can be secured using the male thread of the rod tip adapter.
  * Fix the rod tip bracket width across flats with a wrench, etc., to prevent loads from being applied to the rod.

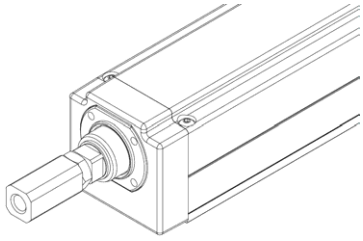


Type	Male thread dimensions	Tightening torque
EC-RR6□AH **EC-RR6□H**	M10 × 1.25, effective thread length 20.0mm	30.00N·m
EC-RR7□AH **EC-RR7□H**	M14 × 1.5, effective thread length 27.5mm	35.00N·m

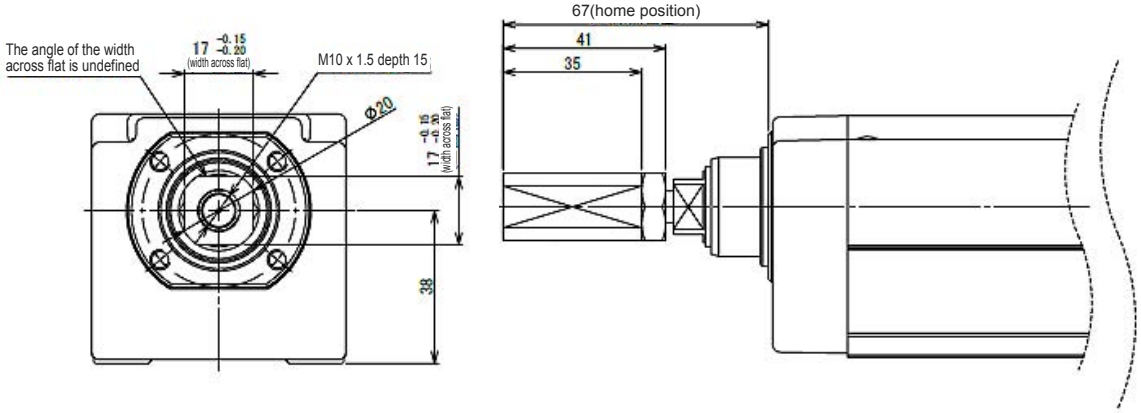
[When using tip adapter]

Transported objects can be secured using the internal thread of the tip adapter.

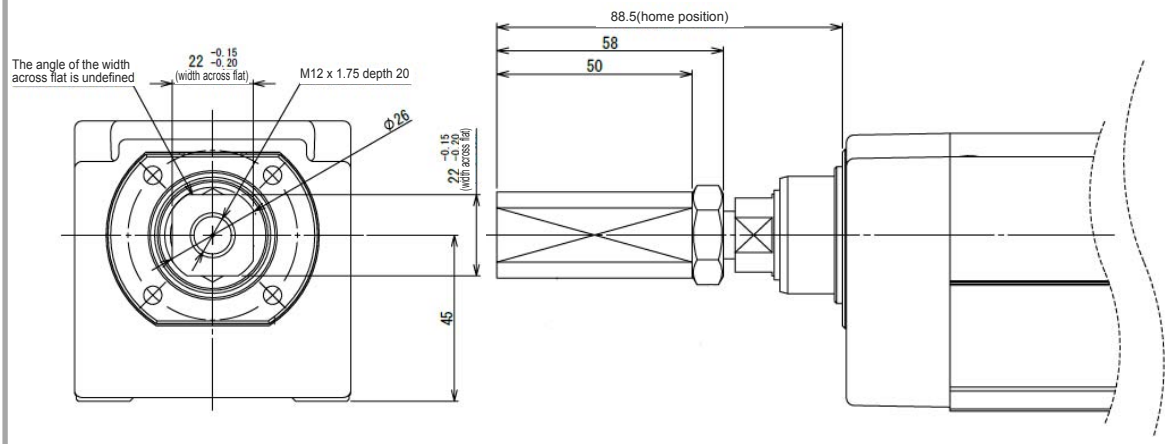
* Fix the rod tip bracket width across flats with a wrench, etc., to prevent loads from being applied to the rod.



For EC-RR6□AH and EC-RR6□H (Part model number EC-NFA-R6)



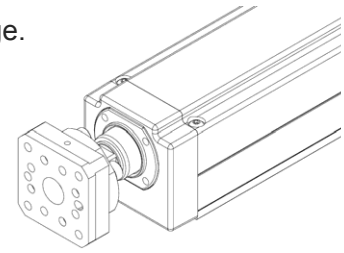
For EC-RR7□AH and EC-RR7□H (Part model number EC-NFA-R7)



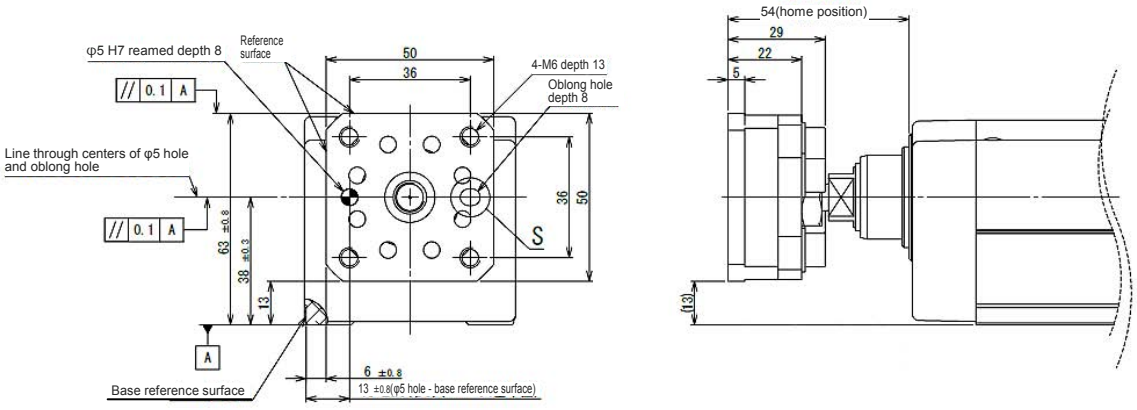
Type	Tightening torque when mounting ELECYLINDER
EC-RR6□AH EC-RR6□H	30.00N·m
EC-RR7□AH EC-RR7□H	35.00N·m

[When using tip flange]

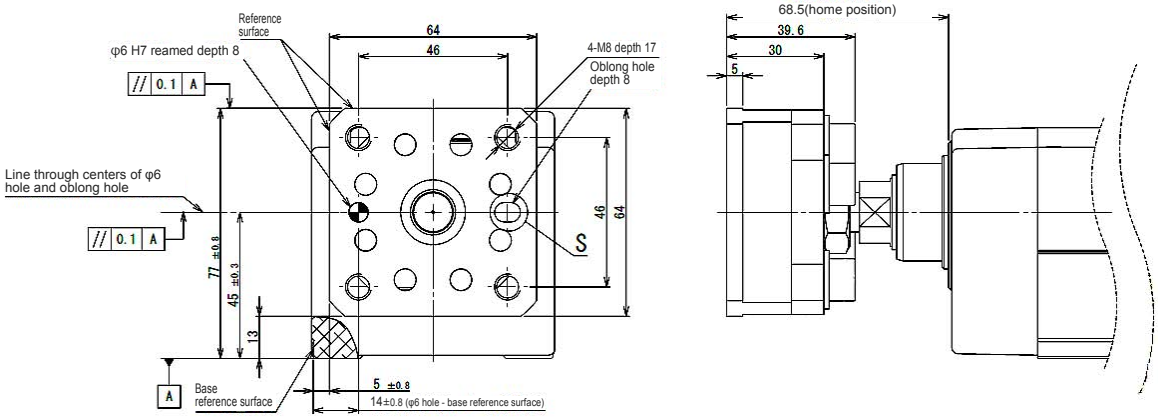
Transported objects can be secured using the tip adapter flange.



For EC-RR6□AH and EC-RR6□H (Part model number EC-FFA-RR6)



For EC-RR7□AH and EC-RR7□H (Part model number EC-FFA-RR7)

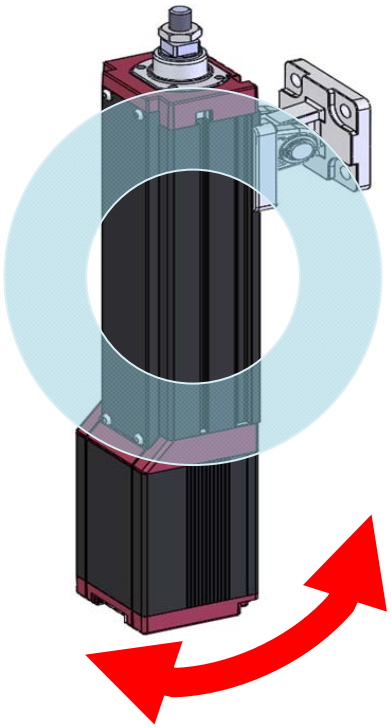
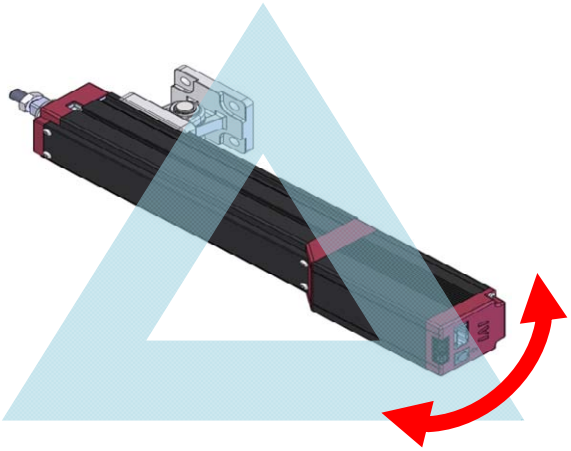


Type	Tightening torque when mounting flanges A and B	Tightening torque when mounting ELECYLINDER
EC-RR6□AH EC-RR6□H	7.1N·m (M6)	30.00N·m
EC-RR7□AH EC-RR7□H	17.2N·m (M8)	35.00N·m

Mounting with oscillation

[Installation orientation for oscillation]

- We recommend vertical mounting for oscillation.
  When oscillation is performed with horizontal mounting, the product's self-weight causes moment loads to be applied to the joint, increasing the sliding friction on the joint and leading to thrust loss.
  As well, note that sliding in the joint may cause wear on the bracket.

Vertical installation	Horizontal installation
	

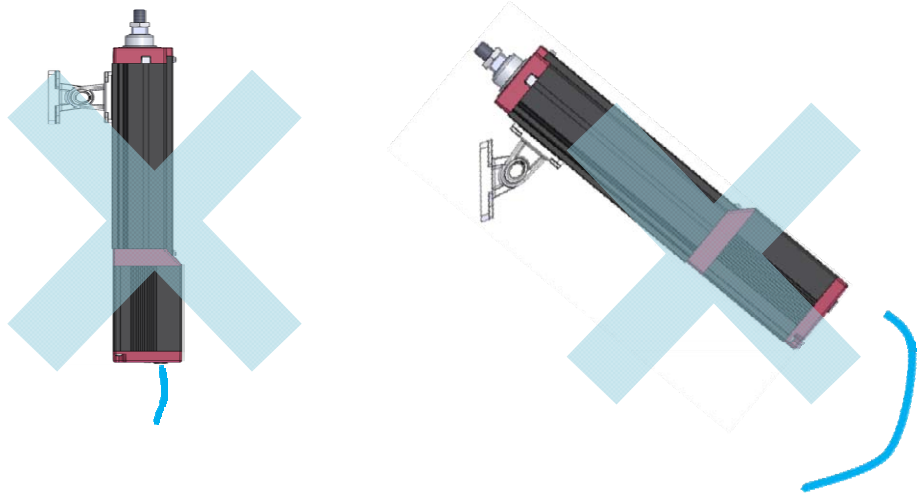
[Cable processing for oscillation]

● For oscillation, use a robot cable with bending resistance.

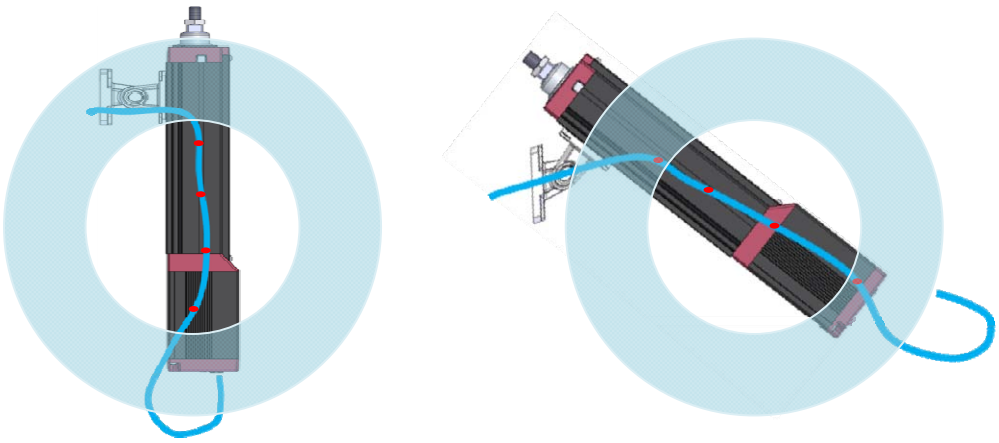
Fix the cable using the product body T-slots, etc., so that oscillation of the body does not cause load to be applied to the connector.

Be careful to arrange the cable so as not to exceed its flex radius allowable value. Because there is no T-slot on the body side, use an adhesive wiring bracket or similar to fix the cable.

Without cable processing



With cable processing



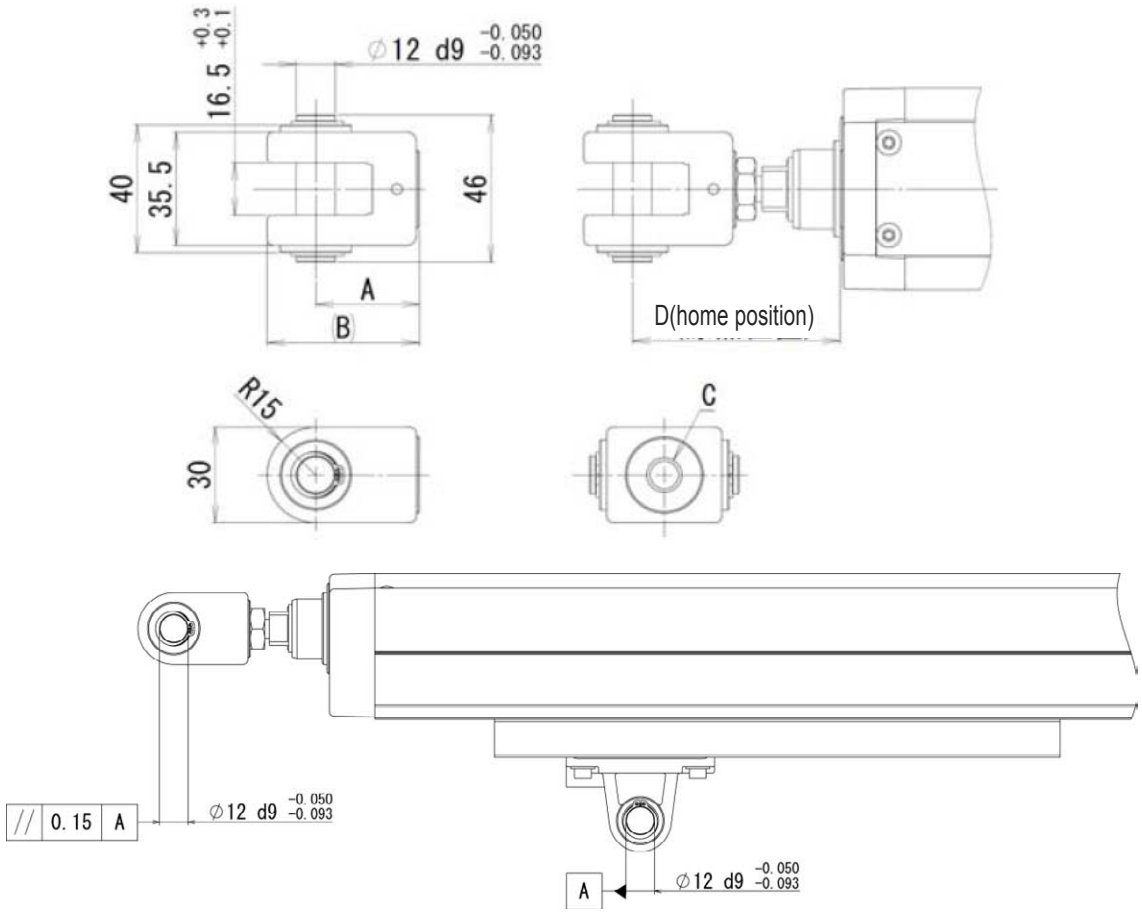
[Bracket mounting for oscillation]

Oscillation requires fixing the body with a joint able to move freely in the rotation direction.

Configured options include the tip knuckle joint (-NJ), the body clevis (-QR), the tip knuckle joint + oscillation receiving bracket (-NJPB), and the body clevis + oscillation receiving bracket (-QRPB).

● Knuckle joint (-NJ) mounting method

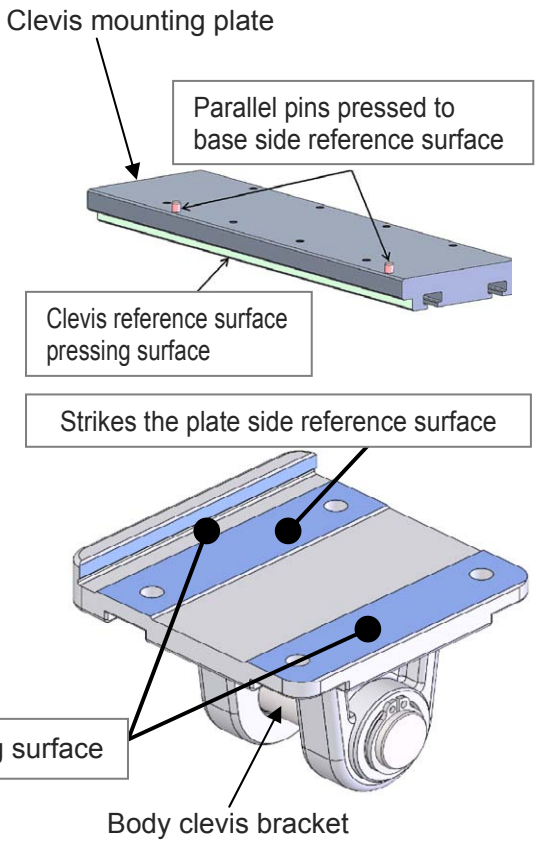
1. Pass the nut and knuckle joint through the rod tip male thread.
2. Adjust the knuckle joint position to the specified dimensions.
   * Adjust the knuckle joint angle so as to operate smoothly, with no load applied to the bracket or rod, when operating embedded in the equipment.
   * Mount with the geometric tolerance in the figure below as a guideline.
3. Fix by tightening the nut so that load is not applied to the rod.



Type	A	B	C	D	Nut tightening torque
EC-RR6□AH EC-RR6□H	32mm	47mm	M10×1.25	64mm	30.00N·m
EC-RR7□AH EC-RR7□H	37.5mm	52.5mm	M14×1.5	76mm	35.00N·m

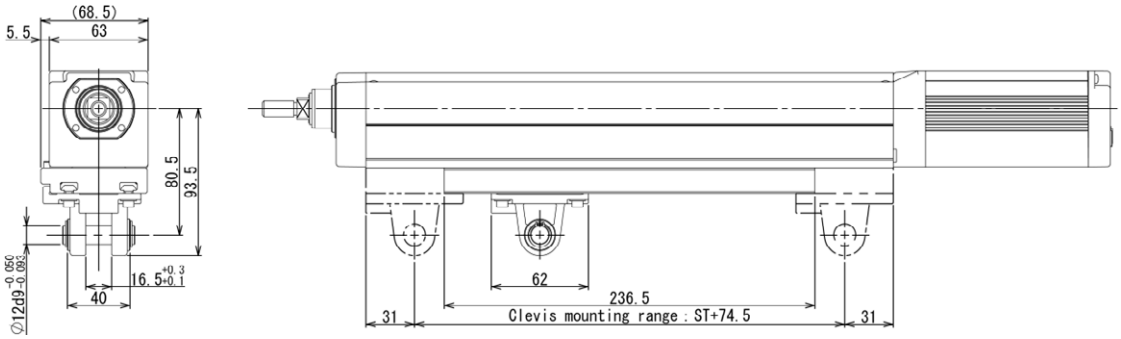
● Body clevis (-QR) mounting method and mounting dimensions

1. Press the 2 parallel pins on the clevis mounting plate against the base side reference surface.
2. Mount the clevis mounting plate on the base.
   * Fix the clevis mounting plate with at least 4 bolts.
   The clevis mounting plate position can be adjusted at a 50 mm pitch.
3. Insert 4 square nuts into the clevis mounting plate T-slot.
4. Using the inserted square nuts, fix the body clevis bracket with the bolt. (temporary fixing)
5. Press the body clevis bracket reference surface against the clevis mounting plate reference surface.
6. Fully tighten the bolts to complete the fixation.



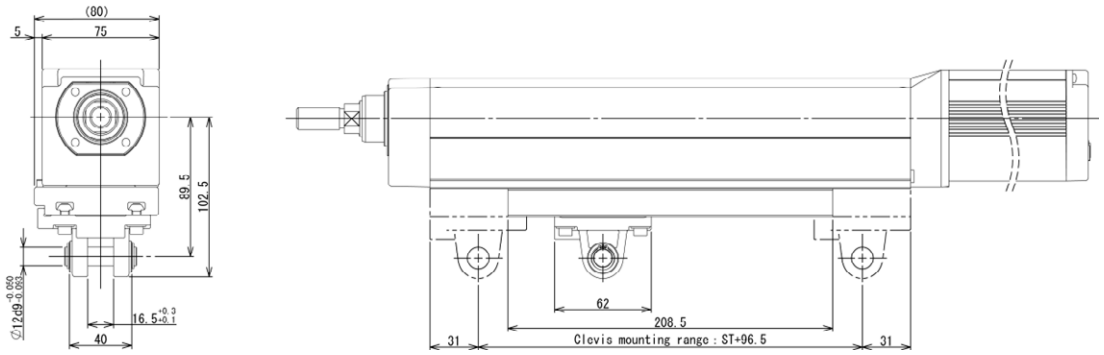
For EC-RR6□AH and EC-RR6□H

【-QR】
Body clevis



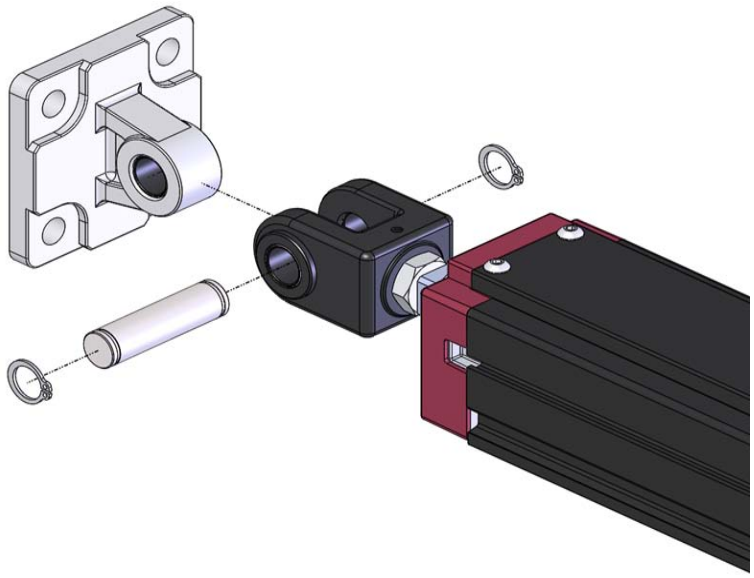
For EC-RR7□AH and EC-RR7□H

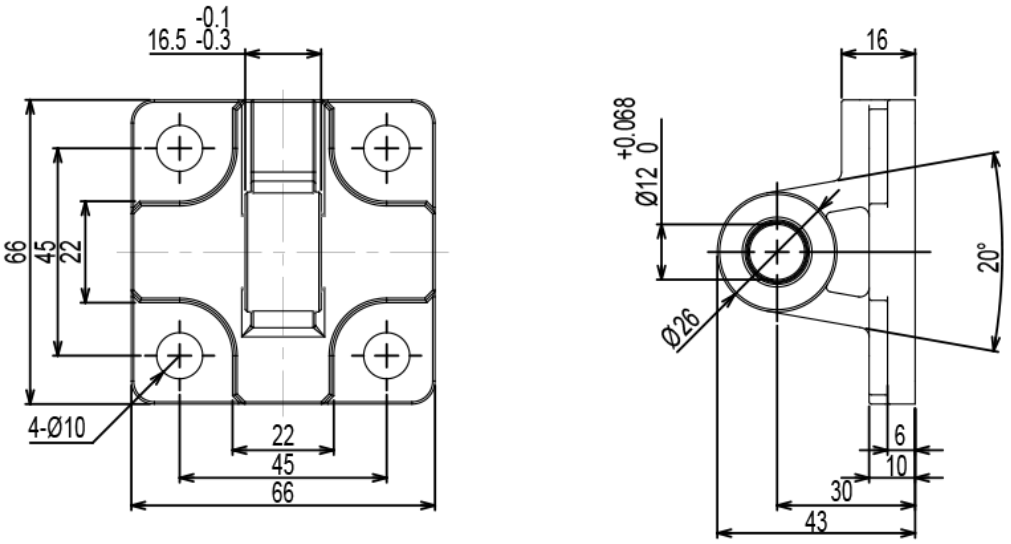
【-QR】
Body clevis



● Oscillation receiving bracket mounting method and component dimensions

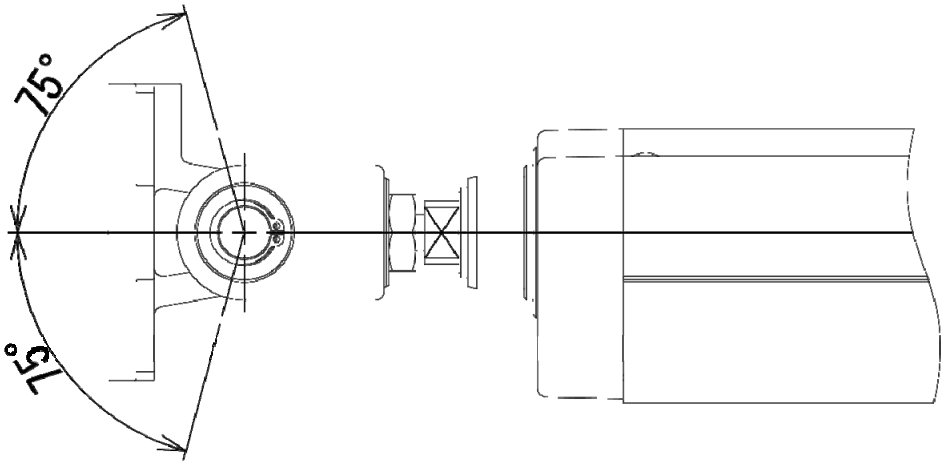
1. Insert the oscillation receiving bracket ridge between the knuckle joint and body clevis ridges.
2. Match the positions of the ridges and pass the clevis pin through.
3. Mount a stop ring on each end of the clevis pin.
   * Stop ring: C-shaped stop ring for shaft, nominal diameter 12
4. Mount the oscillation receiving bracket on the equipment.
   * Adjust so as to operate smoothly, with no load applied to the bracket or rod, when operating embedded in the equipment.



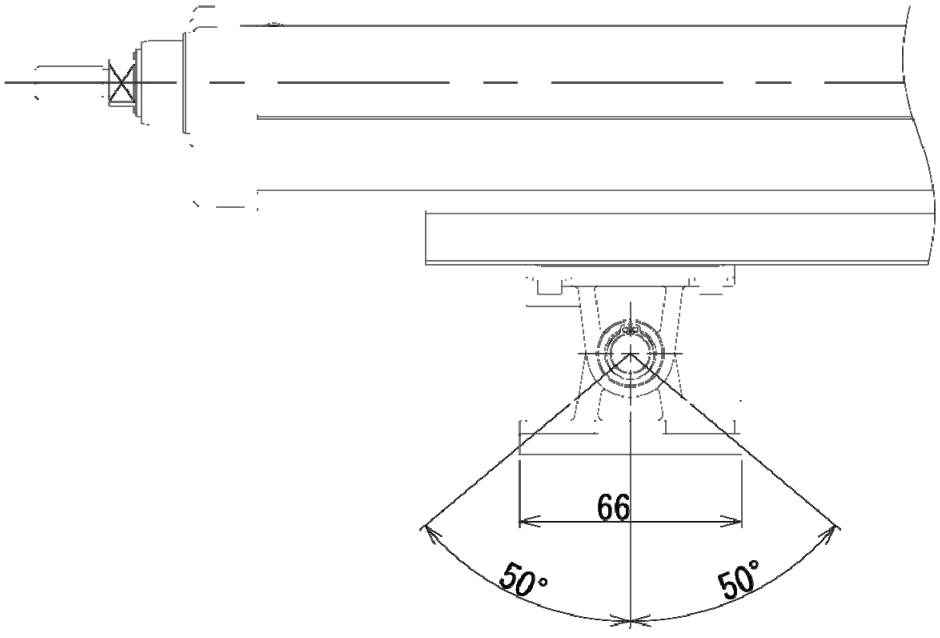


● Oscillation receiving bracket movable range

-NJPB



-QRPB



ELECYLINDER

Chapter 3

Wiring

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Brake release wiring ····· 3-10

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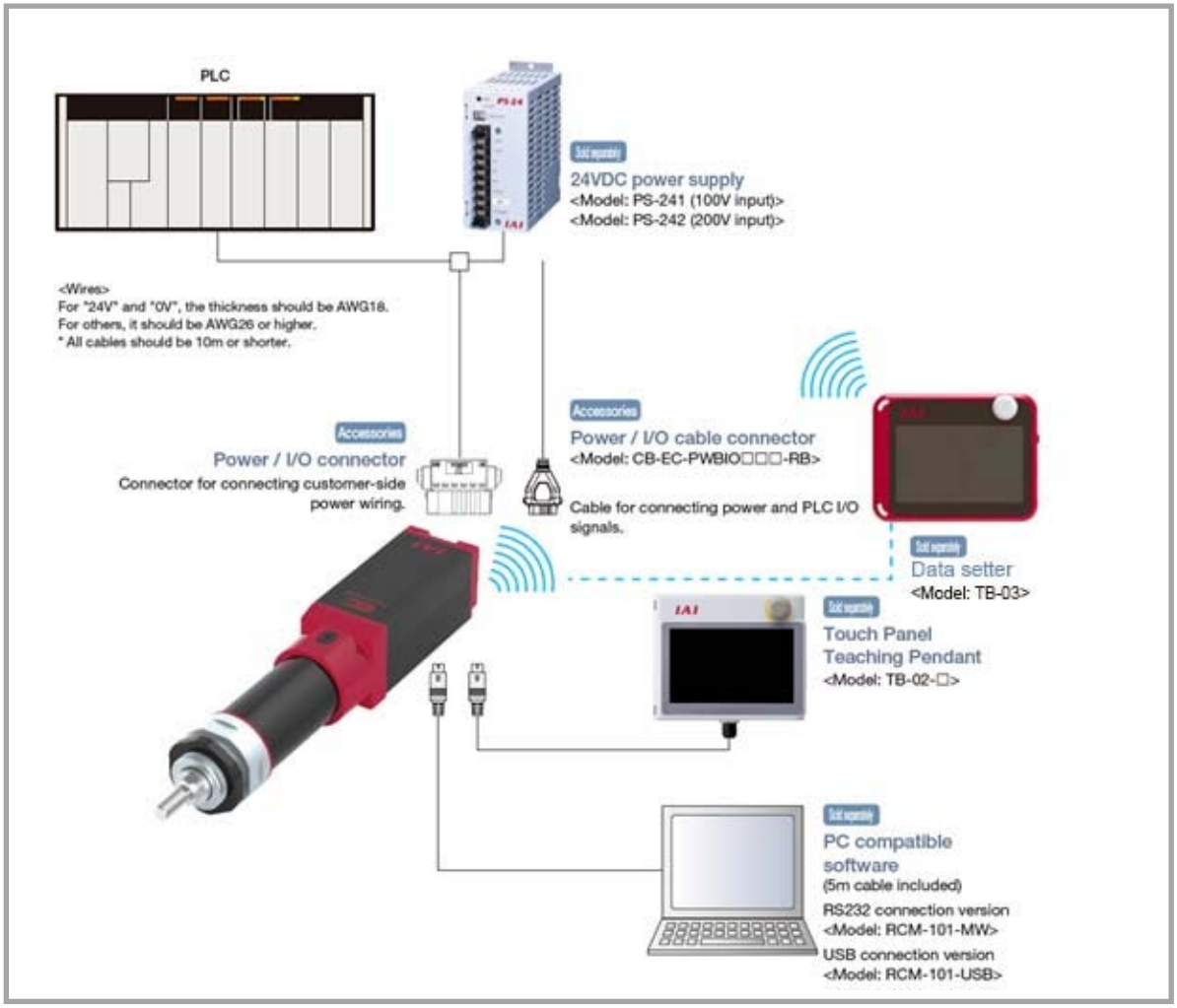
Brake release wiring ····· 3-14

3.1 System configuration

The following shows the system configuration.



Supply 24VDC to the ELECYLINDER and input a signal from a master device to the ELECYLINDER.
This enables the ELECYLINDER to operate.

This manual introduces an example using a PLC connected as the master device.

3.2 Electrical specifications

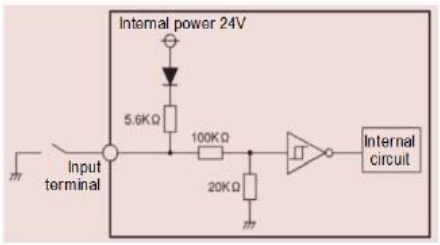
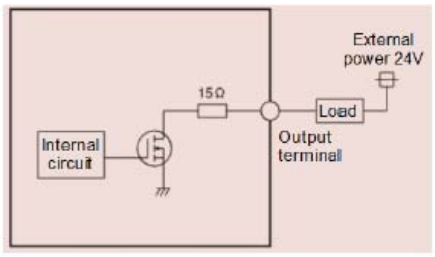
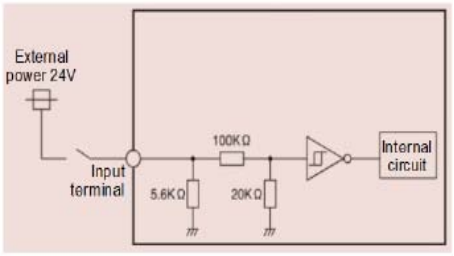
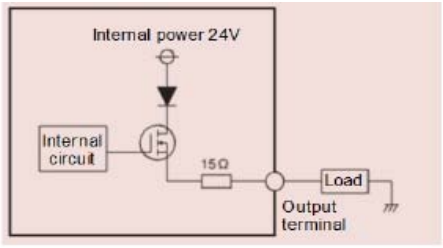
Specifications table

Item	Content
Number of controlled axes	1 axis
Power supply voltage	24VDC ±10%
Power capacity	Rated 3.5A, max. 4.2A
Brake release power supply	24VDC ±10%, 200mA (only for external brake release)
Generated heat	8W
Inrush current	8.3A (with inrush current limit circuit)
Momentary power failure resistance	max500μs
Motor size	□42/□56
Motor rated current	1.2A
Encoder (Position detector)	Incremental (resolution of 800p/r) Battery-less absolute encoder (resolution of 800p/r)
Teaching port specifications	RS485 1ch (Modbus protocol compliant)
I/O specifications	Input x 3, output x 3 (power input common with body)
Data setting and input methods	PC compatible software/teaching pendant TB-02
Data retention memory	Data and parameters are saved in the nonvolatile memory. (Unlimited number of write cycles)
LED display	Green light ON: Servo ON Red light ON: Alarm or stoppage with teaching pendant Green/red simultaneously ON: Initializing when power comes ON Green/red alternately blinking: Minor failure alarm
Insulation resistance	500VDC 10MΩ
Electric shock protection mechanism	Class I basic insulation
Cooling method	Natural air cooling
Degree of protection	IP20

Caution

Inrush current flows for about 5msec after the power comes ON.
The inrush current varies depending on the impedance of the power wiring.

I/O specifications

I/O		Input part		Output part	
Specs		Input voltage	24VDC ±10%	Load voltage	24VDC ±10%
		Input current	5mA per circuit	Max. load current	50mA per point
		ON/OFF voltage	ON voltage MIN 18VDC OFF voltage MAX 6VDC	Residual voltage	2V or less
		Leakage current	MAX 1mA per point	Leakage current	MAX 0.1mA per point
Isolation type		Non-isolated from external circuitry		Non-isolated from external circuitry	
I/O logic	NPN				
	PNP				

Brake release method (for specifications with brakes)

Refer to the following method to release the brake.

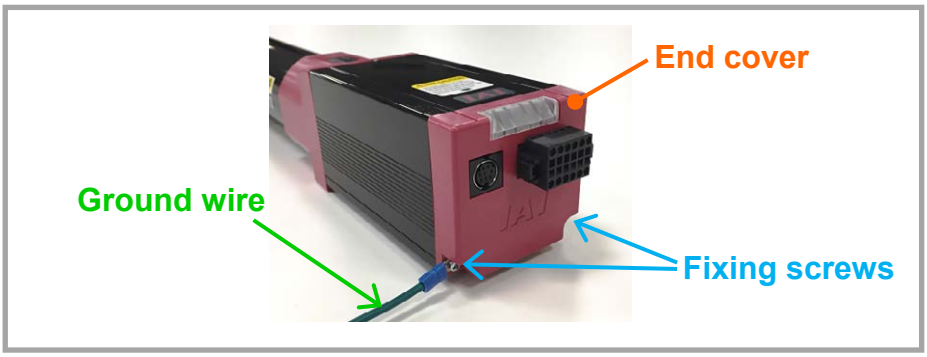
	Brake release method
1	Input 24V to the brake release (signal abbreviation: BKRLS) terminal. → Refer to "3.3 Connection arrangement diagram" and "3.4/3.5 Wiring connections".
2	Operate the teaching pendant to force the brake to release. → Refer to " **Brake release wiring** (pages 3-10 and 3-14)".

Frame grounding

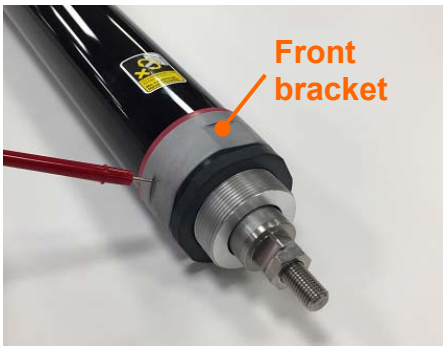
The ELECYLINDER has a built-in controller circuit board.

The controller frame grounding line is connected to the ELECYLINDER body and through to ground via the ELECYLINDER mounting surface.

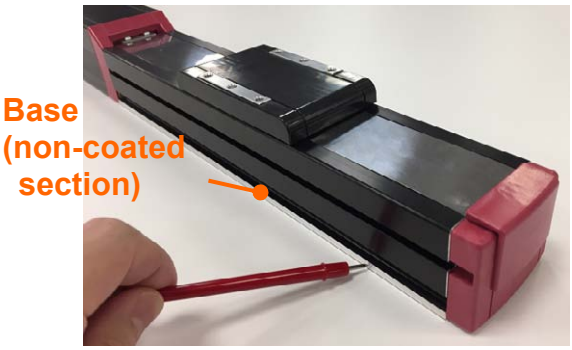
If not grounding through the mounting surface, there are fixing screws (2 locations) under the end cover, of which either one can be used for the ground wire connection.



Use a tester to measure the continuity between the fixing screws and grounding surface to check whether it is grounded or not.
The front bracket for rod types and base bottom for slider types are not coated, so can be used for checking continuity.



<Rod type>

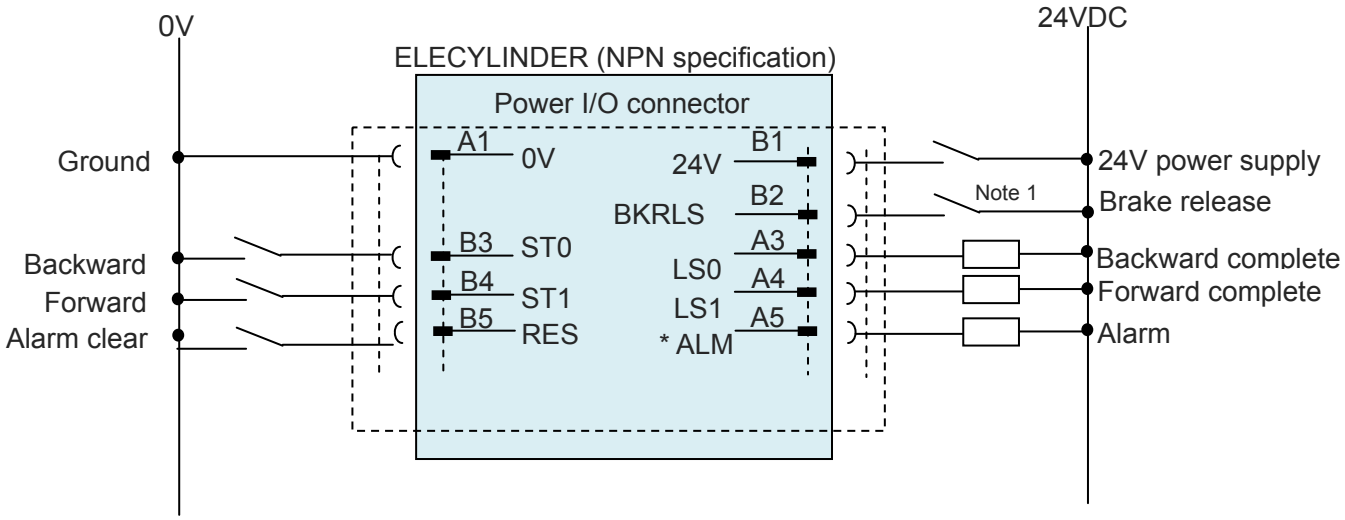


<Slider type>

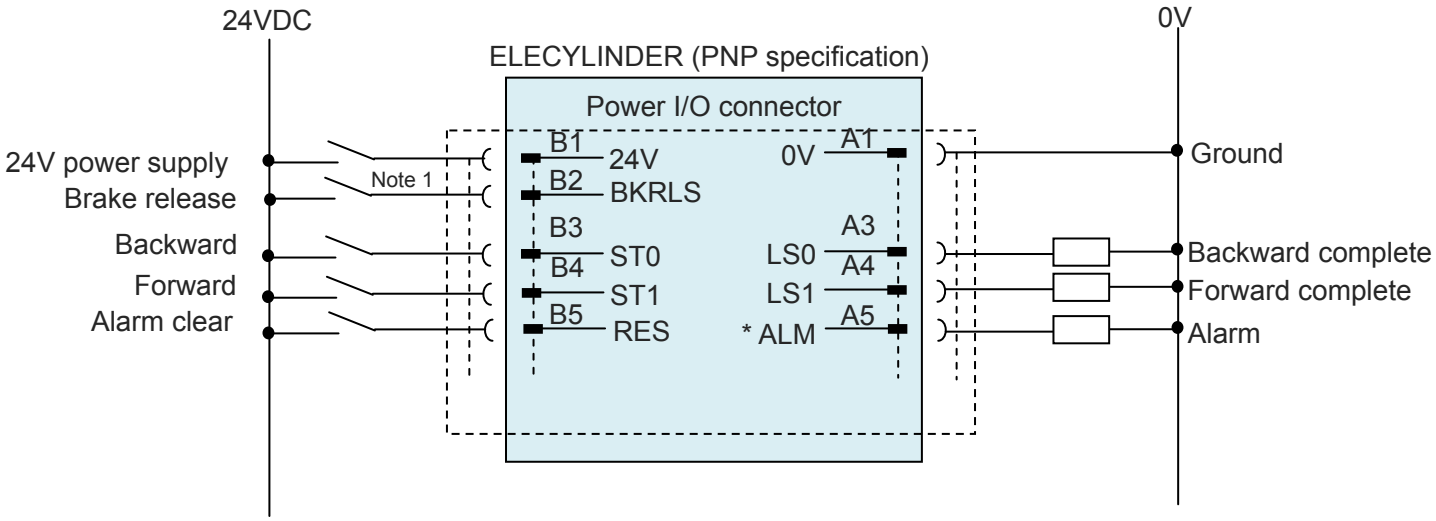
3.3 Connection arrangement diagram

Here the wiring connection method with a power I/O connector is introduced.

[For NPN specification]



[For PNP specification]



Caution

- [Note 1] This switch releases the brake forcibly for actuators equipped with a brake.
  The switch power capacity requires 24VDC ±10% and 200mA or more.
- [*ALM] is a b-contact (active-low) signal.
  The output signal is ON in normal conditions and OFF when an alarm occurs.

3.4 Wiring connections (for connectors)

Here the wiring connection method with a power I/O connector is introduced.

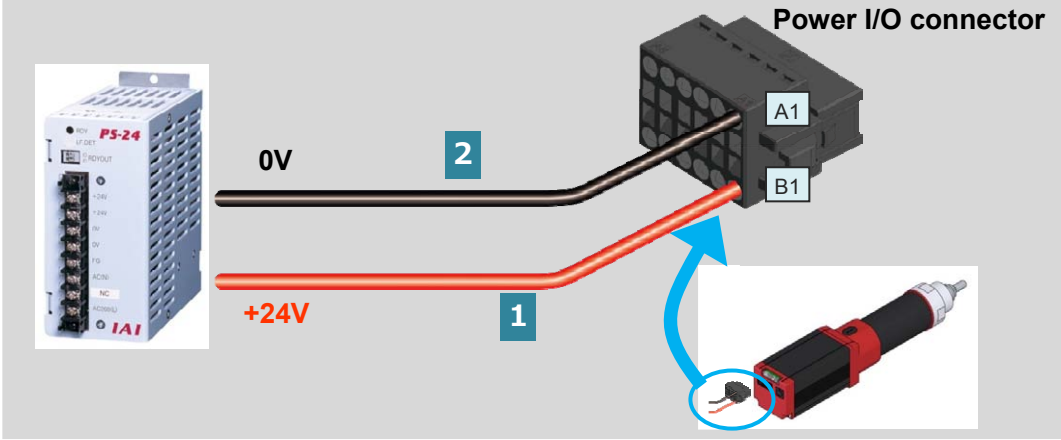
24VDC power supply wiring

Connect the power wiring to the power I/O connector.
Connect the 1 and 2 wiring to the connector terminal block while referring to the connection diagram.

1 Connect the [B1] connector terminal and the +24V terminal of the 24VDC power supply.
2 Connect the [A1] connector terminal and the 0V terminal of the 24VDC power supply.

24VDC power supply connection diagram

Before starting connector wiring, check the details on pages 3-8 to 9



Pin No.	Connector nameplate name	Compatible wire diameter	Required specifications
B1	24V	KIV 0.75mm^2 (AWG18)	Power supply voltage: 24VDC ±10% Power capacity: 3.5A, max. 4.2A Wiring length: 10m or less
A1	0V		

Reference

When establishing an external stop switch, add a b-contact switch to the [B1] terminal wiring. This shuts off the 24V power supply in the stopped state (control/drive power OFF).

PLC wiring

For I/O between the PLC and signals, the signal wiring must be connected to the connector terminal block.
Connect the 3 to 8 wiring to the connector terminal block while referring to the connection diagram.

3 Connect the [B3] connector terminal and the [Backward] output terminal.

4 Connect the [B4] connector terminal and the [Forward] output terminal.

5 Connect the [B5] connector terminal and the [Alarm clear] output terminal.

6 Connect the [A3] connector terminal and the [Backward complete] input terminal.

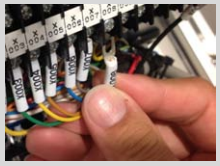
7 Connect the [A4] connector terminal and the [Forward complete] input terminal.

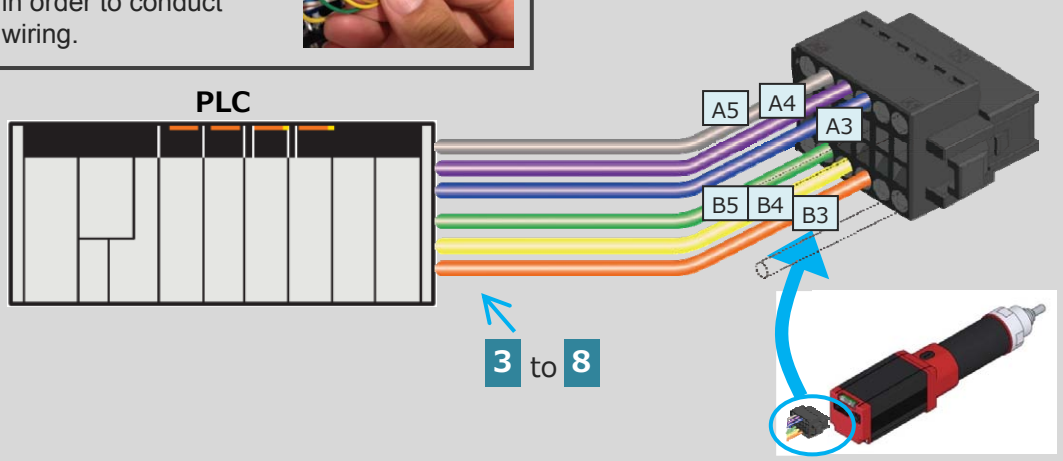
8 Connect the [A5] connector terminal and the [Alarm] input terminal.

PLC connection diagram

Before starting connector wiring, check the details on pages 3-8 to 9

Process the terminals in accordance with PLC specifications in order to conduct wiring.

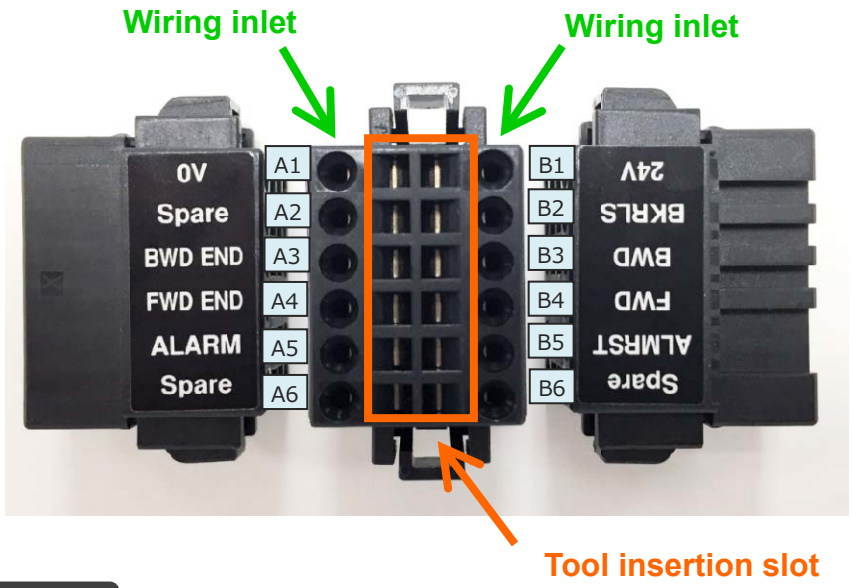




Pin No.	Connector nameplate name	Signal abbreviation	Compatible wire diameter	Function overview
B3	Backward	ST0	KIV 0.20mm^2 (AWG24)	Backward command
B4	Forward	ST1		Forward command
B5	Alarm clear	RES		Alarm clear
A3	Backward complete	LS0/PE0		Backward complete/ pressing complete
A4	Forward complete	LS1/PE1		Forward complete/pressing complete
A5	Alarm	* ALM		Alarm detection (b-contact)

Connector wiring method

The name of each terminal is affixed to the power I/O connector.
The connector nameplate name and pin number relationship is as below.



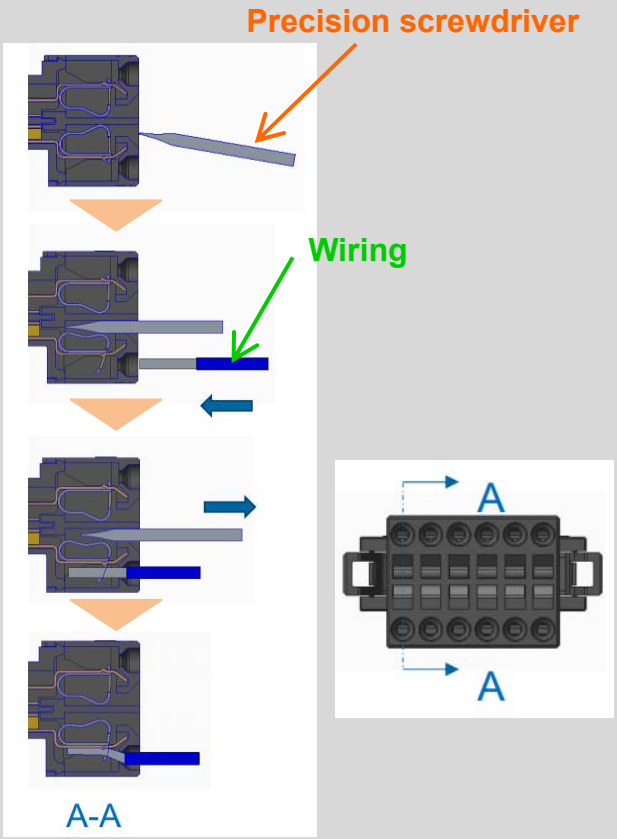
Reference

Power I/O connector internal structure looks like this.

Insert a precision screwdriver fully into the tool insertion slot.

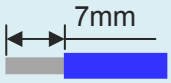
Press the spring within the connector down, then insert the core wire, slightly twisted.

Pulling out the precision screwdriver causes the spring within the connector to rebound, clamping the core wire inserted in place.

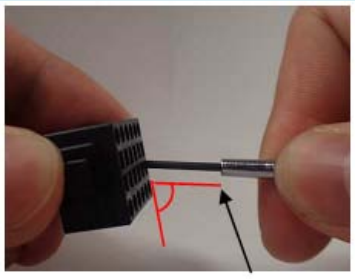


Wiring mounting method

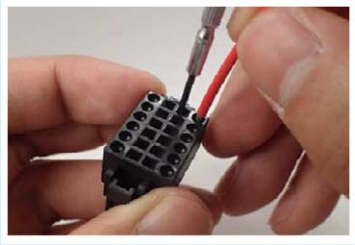
7mm of insulation should be stripped from the wire end.
Slightly twist the core wire.



Insert the recommended precision screwdriver slowly into the connector tool insertion slot at an angle.

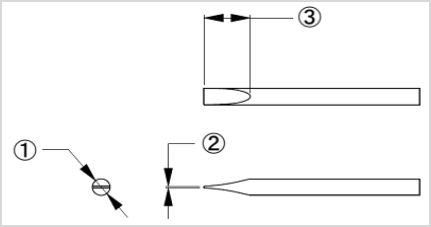


After fully inserting the wire, pull out the precision screwdriver.



Recommended precision screwdriver

Item	Specifications
(1) Shaft diameter	1.6 ±0.03mm
(2) Blade thickness	0.2 ±0.1mm
(3) Tip angle length	4.2 ±0.2mm



Caution

- Take care not to twist the core wire too far. This will reduce the retention force, causing the wire to fall out of the connector and possibly causing insufficient current or short-circuit.
- Do not insert the precision screwdriver violently into the connector, or twist it hard. This may damage the connector housing and internal spring.
- If an electric wire thinner than the applicable diameter or wiring longer than 10m is used, insufficient current may trigger an alarm and the performance of the ELECYLINDER may be degraded.

Brake release wiring

For the specification with brake, when installing a forcible brake release switch, connect wiring to the [B2] connector terminal.
Power capacity of 24VDC ±10%/200mA or higher is required.

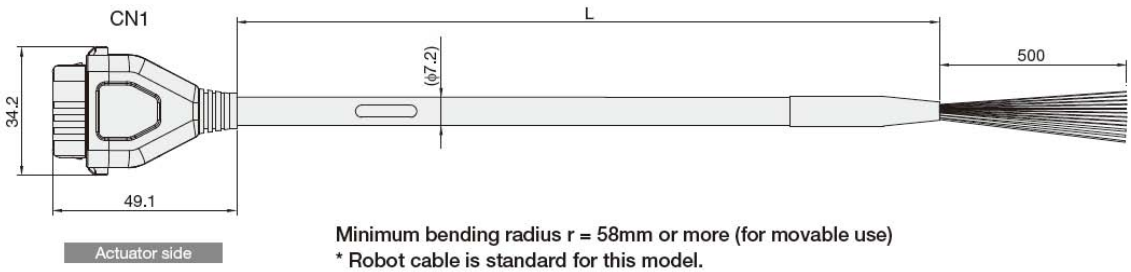
Pin No.	Connector nameplate name	Signal abbreviation	Compatible wire diameter	Required specifications
B2	Brake release	BKRLS	KIV 0.20mm^2 (AWG24)	24VDC ±10%/200mA or higher

3.5 Wiring connections (for cables)

Here the wiring connection method with a power I/O cable is introduced.

Power I/O cable

Model CB-EC-PWBIO□□□-RB



Minimum bending radius r = 58mm or more (for movable use)
* Robot cable is standard for this model.

Color	Signal name	Pin No.
Black (AWG18)	0V	A1
Red (AWG18)	24V	B1
Light blue (AWG22)	(reserve)	A2
Orange (AWG26)	IN0 ST0	B3
Yellow (AWG26)	IN1 ST1	B4
Green (AWG26)	IN2 RES	B5
Pink (AWG26)	(reserve)	B6
Blue (AWG26)	OUT0 LS0/PE0	A3
Purple (AWG26)	OUT1 LS1/PS1	A4
Gray (AWG26)	OUT2 * ALM	A5
White (AWG26)	(reserve)	A6
Brown (AWG26)	BKRLS	B2

- The wiring on the opposite side of the connector has not been processed.
- The cable length is available from 1m to 10m.
  Specify the length in increments of 1m.
- The following shows a sample model number.

  Cable length **1**m → CB-EC-PWBIO**010**-RB
  Cable length **3**m → CB-EC-PWBIO**030**-RB
  Cable length **10**m → CB-EC-PWBIO**100**-RB

Power I/O cable connection

Connect the power I/O cable.
Insert the connector until it clicks into place.

Cable connection diagram

Caution

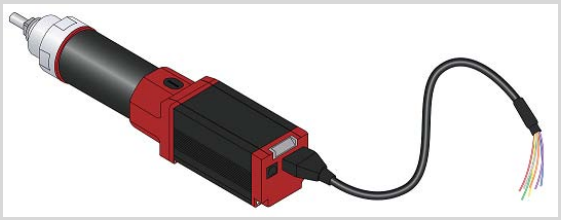
- The connector must be inserted in a given direction.
  A section of the connector protrudes. Orient this section downwards and insert until it clicks into place.
- Take appropriate care to prevent unused wiring on the opposite side of the connector from shorting out other wires by protecting them with insulation tape.

24VDC power supply wiring

Connect the power wiring to the power I/O cable.
Connect the 24VDC power supply to the terminal block after terminal-processing the 24V and 0V wires of the power I/O cable.

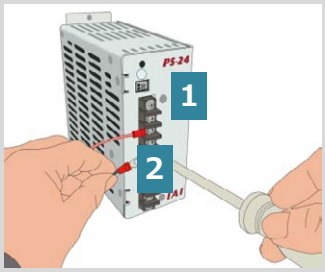
1. Connect the 24V wire (insulation color: red) to the +24V terminal of the 24VDC power supply.
2. Connect the 0V wire (insulation color: black) to the 0V terminal of the 24VDC power supply.

24VDC power supply connection diagram



ELECYLINDER/Power I/O cable

24VDC power supply



Wiring color	Signal abbreviation	Function overview	Required specifications
Red	24V	Power supply input	Power supply voltage: 24VDC ±10% Power capacity: 3.5A, max. 4.2A
Black	0V	Ground	

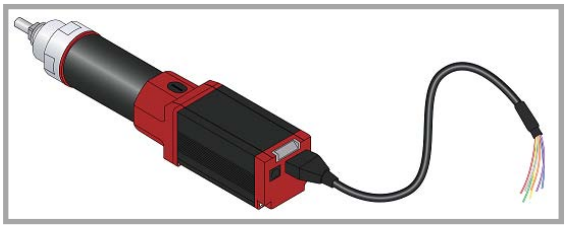
Reference

When establishing an external stop switch, add a b-contact switch to the [red] terminal wiring.
This shuts off the 24V power supply in the stopped state (control/drive power OFF).

PLC wiring

For I/O between the PLC and signals, the wiring of the power I/O cable must be connected to the PLC.
Connect the 3 to 8 wiring to the PLC terminal block while referring to the connection diagram.

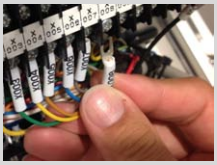
3 Connect the [orange] cable wire and the [Backward] output terminal.
4 Connect the [yellow] cable wire and the [Forward] output terminal.
5 Connect the [green] cable wire and the [Alarm clear] output terminal.
6 Connect the [blue] cable wire and the [Backward complete] input terminal.
7 Connect the [purple] cable wire and the [Forward complete] input terminal.
8 Connect the [gray] cable wire and the [Alarm] input terminal.



ELECYLINDER/Power I/O cable

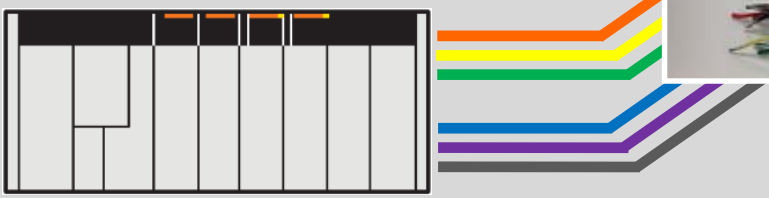
PLC connection

Process the terminals in accordance with PLC specifications in order to conduct wiring.



Enlarged view of power I/O cable connector terminal section

PLC



Brake release wiring

For the specification with brake, when installing a forcible brake release switch, connect the [brown] cable wire.
Power capacity of 24VDC ±10%/200mA or higher is required.

Wiring color	Signal abbreviation	Function overview	Required specifications
Brown	BKRLS	Brake release	24VDC ±10%/200mA or higher

ELECYLINDER

Chapter 4

Operation

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4.2 Teaching tool connections and testing operation ····· 4-2

Teaching pendant connection ····· 4-2

ELECYLINDER test operation ····· 4-3

4.3 Stop position/operating conditions (AVD) setting/adjustment ····· 4-4

Stop position setting/adjustment ····· 4-5

Operating conditions (AVD) setting/adjustment ····· 4-6

Pressing operation setting ····· 4-9

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I/O signal list ····· 4-11

[ST0] [ST1] signals: Movement command input ····· 4-12

[RES] signal: Alarm clear input ····· 4-13

[BKRLS] input: Brake release input ····· 4-13

[LS0] [LS1] signals: Position detection output ····· 4-14

[PE0] [PE1] signals: Pressing complete output ····· 4-15

[*ALM] signal: Alarm output ····· 4-15

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4.5 Operating method from master device ····· 4-16

Home return operation/positioning operation ····· 4-16

Pressing operation ····· 4-19

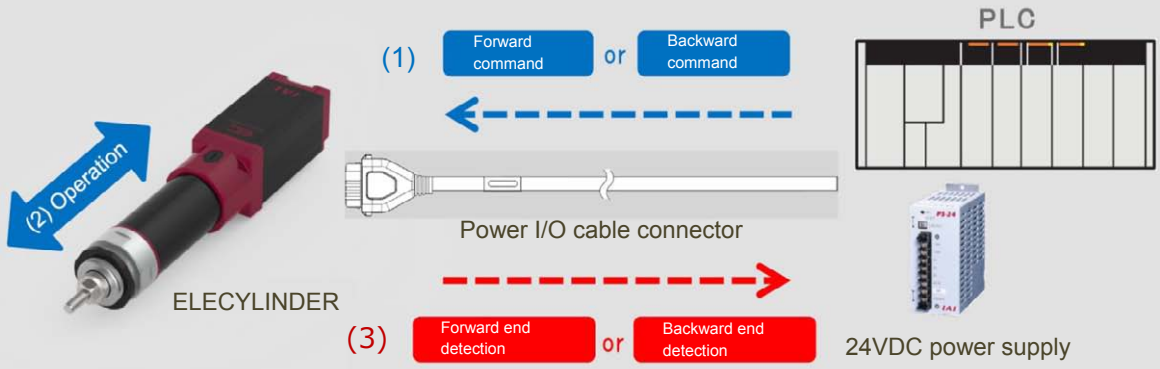
4.1 Basic operation

An input signal from a master device to the ELECYLINDER triggers operation of the ELECYLINDER.
The ELECYLINDER status can also be determined when the master device receives signal output from the ELECYLINDER.

Control is just as simple as when using a solenoid valve (SOL valve) and air cylinder drive.
This manual introduces an example using a PLC connected as the master device.

Connection image PLC/ELECYLINDER connection

(1) Input a movement command signal from the PLC. (forward or backward)
(2) The ELECYLINDER operates.
(3) A position detection signal is output from the ELECYLINDER. (forward end or backward end)



Reference

The ELECYLINDER continues operation while a movement command signal is input, outputting a position detected signal when the movement is complete.
Turning the movement command signal OFF before the movement is complete interrupts the operation and causes a gradual stop.
Home return operation is similar.

4.2 Teaching tool connections and testing operation

A teaching pendant or PC software can be used to test operation or configure data settings. This manual introduces operating methods using a teaching pendant TB-02.

Reference

PC software operating method	PC software manual (ME0155)
Teaching pendant operating method	Teaching pendant manual (ME0355)
Data setter operation method	Data setter manual (ME0375)

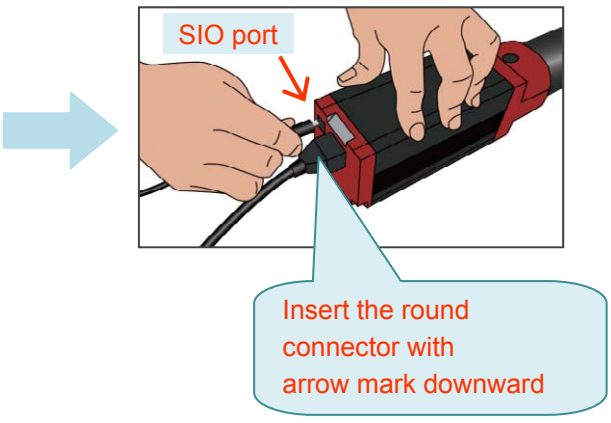
Caution

- Maximum stroke operation is configured at shipping.
- Before operating the ELECYLINDER, make sure to check there is nothing that will interfere with moving parts within the operation range.

Teaching pendant connection

1 Connect the teaching pendant/TB-02 while the power is OFF.
Insert the round connector of TB-02 to the SIO port of the ELECYLINDER.

[TB-02]



2 Turn ON the 24VDC power supply.

Action

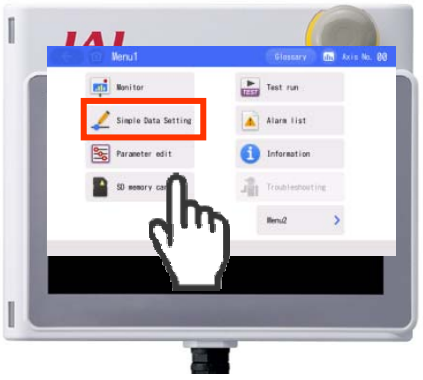
TB-02 will start up and the Menu screen will be displayed.

ELECYLINDER test operation

1 Touch [Simple Data Setting].

Action

The screen will switch to the Simple Data Setting window.
If the position edit password is set to a value other than "0000", the password input screen will be displayed.



However, if the operating mode is not [Monitor mode], the Message screen will be displayed.
Switch to Monitor mode by following the displayed instructions.

2 If the position edit password is set to a value other than "0000", enter the password and press the [ENT] key on the touch panel.

Action

The screen will switch to the Simple Data Setting window.

Reference

The position edit password is set to "0000" at shipping.
Refer to the teaching pendant manual (ME0355) for information about changing the password.

3 Touch the [Homing] button.

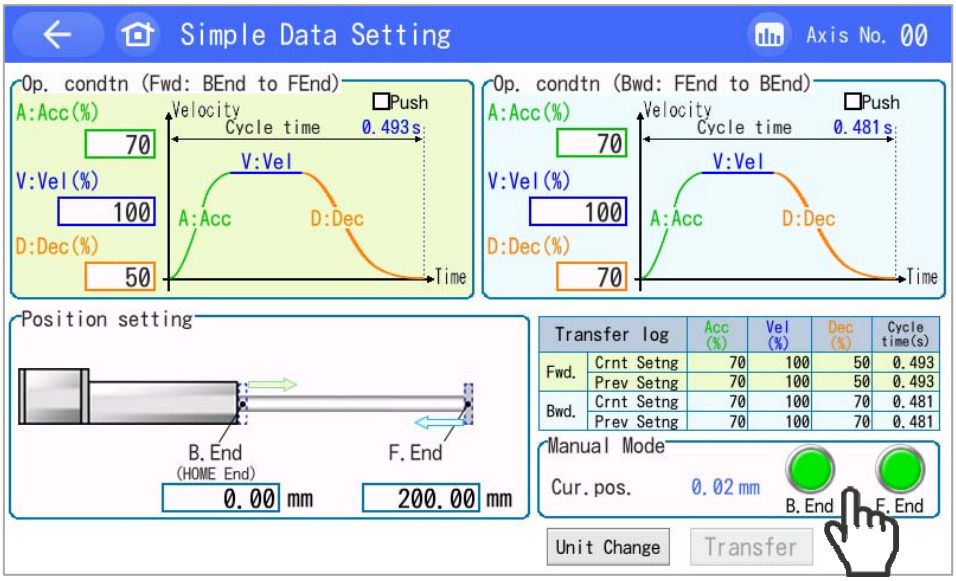
Action

The ELECYLINDER returns to the home position.
After home return operation completes, the [BEnd] and [FEnd] buttons will appear.

4 Touch the [FEnd] (forward) button or [BEnd] (backward) button.

Action

The ELECYLINDER will move toward the forward or backward end.
Releasing the controls during operation will cause the unit to slow to a stop.



4.3 Stop position/operating conditions (AVD) setting/adjustment

A: Acceleration
V: Velocity
D: Deceleration
→AVD

The stop position and operating conditions are set for the ELECYLINDER at shipping.
The Simple Data Setting screen can be used to adjust the stop position and operating conditions.

Caution

- Be sure to touch the [Transfer] key after configuring or adjusting data.
- The data will return to the previous state if the screen is changed without pressing [Transfer].
  Moreover, the [Manual operation] button will not work if data is not transferred.

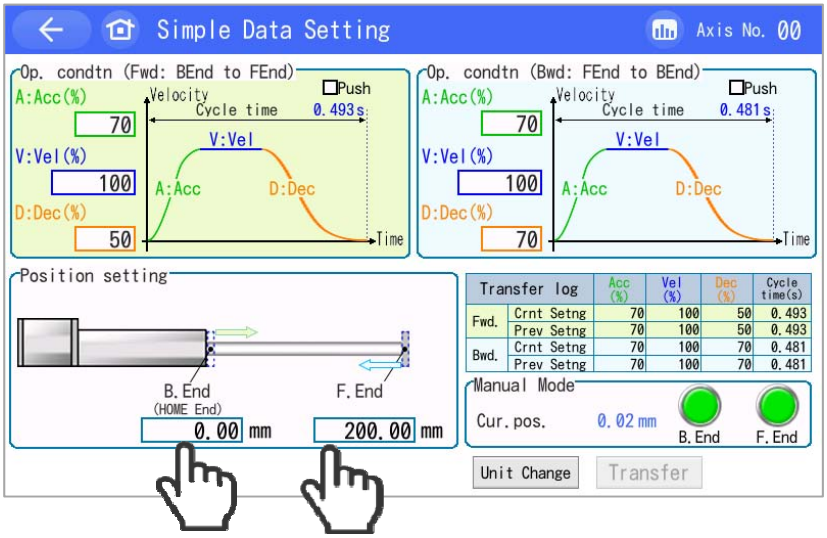
Stop position setting/adjustment (forward end/backward end)

Setting item	Unit	Explanation
Backward end, forward end	mm	Enter as the distance from the home position. Entries can be made in increments of 0.01mm.

1 Touch the position you want to configure/adjust.

Action

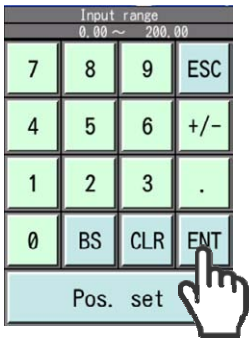
Ten Key window will open.



2 After setting the numerical value, touch the [ENT] key.
Then touch the [Transfer] key.

Action

A value will be written to the controller and the [BEnd] button and [FEnd] button will turn green.



3 Press the [FEnd] or [BEnd] buttons to operate.
Check the results of the new setting/adjustment.
Note that pressing the button while operating will cause the ELECYLINDER to slow to a stop in place.

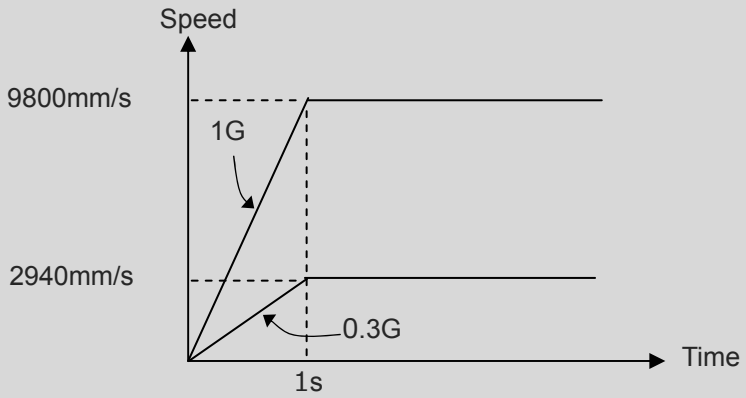
A: Acceleration
V: Velocity
D: Deceleration
→AVD

Operating conditions (AVD) setting/adjustment

Setting item	Unit	Explanation
A: Acceleration	% or G	Set the acceleration between 1 and 100%. Touch the [Switch units] button to switch the units to G, allowing entries to be made in increments of 0.01G.
V: Velocity	% or mm/s	Set the speed between 1 and 100%. Touch the [Switch units] button to switch the units to mm/s, allowing entries to be made in increments of 0.01mm/s.
D: Deceleration	% or G	Set the deceleration between 1 and 100%. Touch the [Switch units] button to switch the units to G, allowing entries to be made in increments of 0.01G.

Reference

The acceleration/deceleration unit of [G] is described below.
1G = 9,800mm/s^2: Acceleration possible up to 9,800mm/s per second.
For 0.3G, the acceleration per second is 9,800mm/s^2 x 0.3 = 2,940mm/s^2.

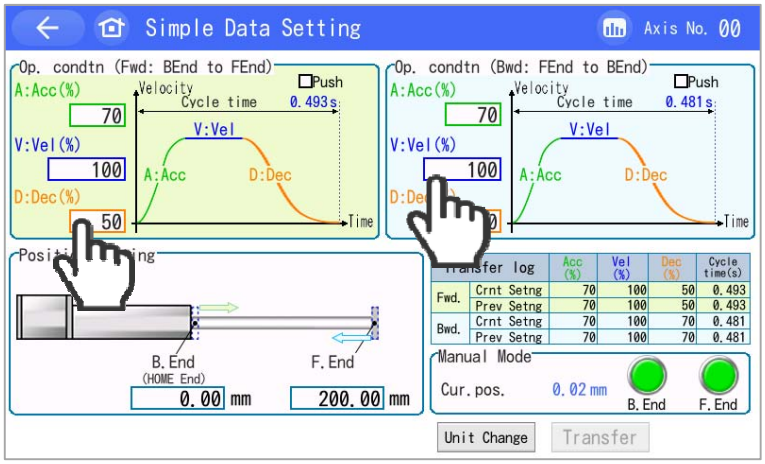


The procedure on the following page can be used to configure/adjust the operating conditions (AVD).
Note that the ELECYLINDER has an automatic calculation function for [Maximum velocity and maximum acceleration/deceleration].
Configure/adjust the operating conditions after setting the [Installation orientation] and [Transport load] parameters.

1 Touch Acceleration, Velocity or Deceleration.

Action

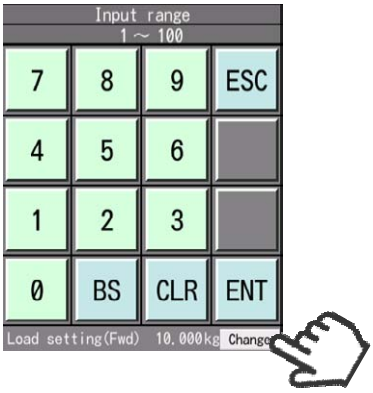
Ten Key window will open.



2 The current transport load set value will be displayed below the ten key pad. To configure a new setting, touch the [Change] key.

Action

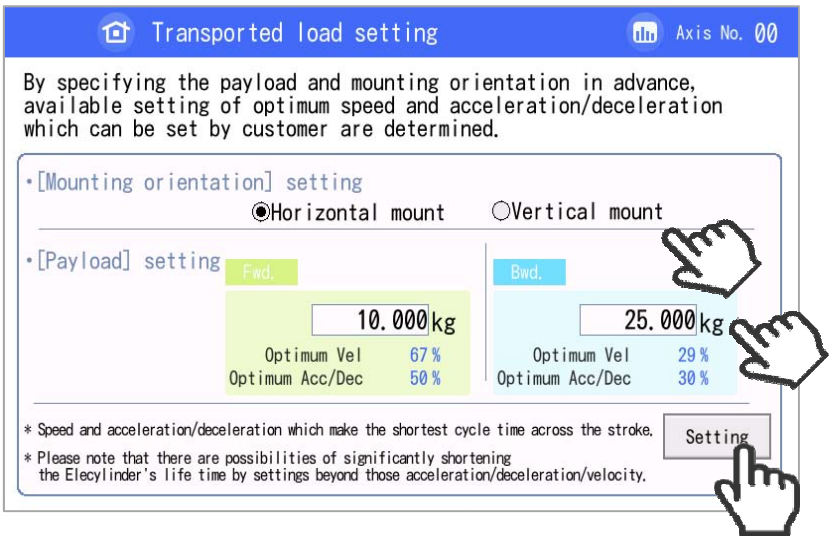
The [Transport load setting] window will open.



3 Select [Installation orientation] and enter the [Transport load], then touch the [Set] button.

Action

The [Optimal speed] and [Optimal acceleration/deceleration] for the shortest cycle time for the configured conditions will be displayed.

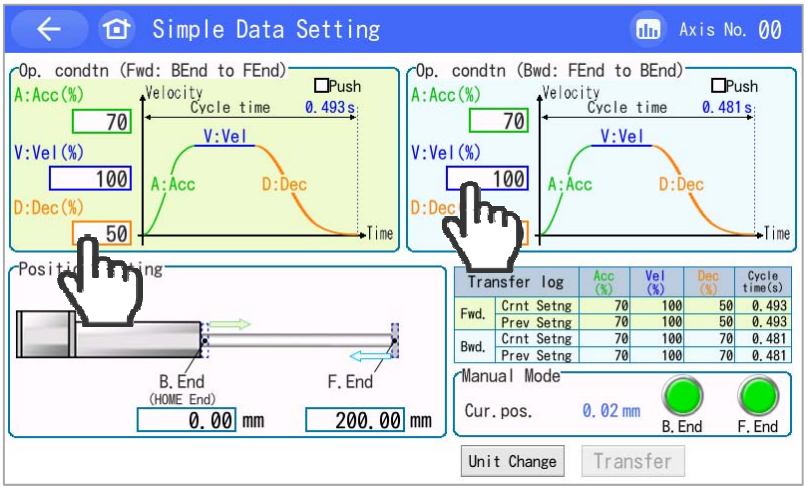


4

Touch the operating condition to configure/adjust.

Action

Ten Key window will open.

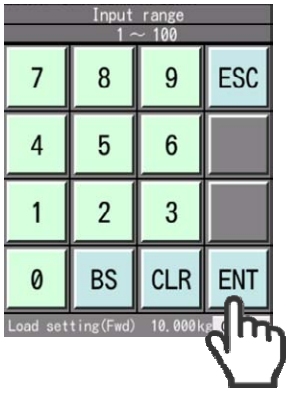


5

After setting the numerical value, touch the [ENT] key.
Then touch the [Transfer] key.

Action

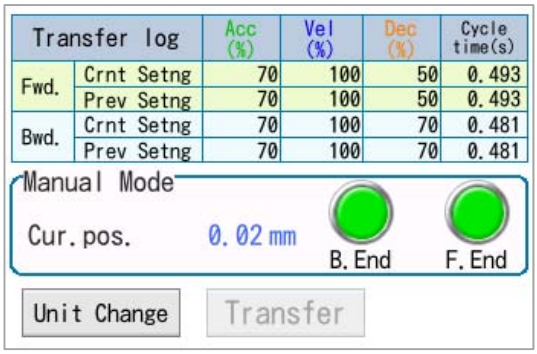
A value will be written to the controller and the [BEnd] button and [FEnd] button will turn green.
The [Transfer history] will also be updated.



6

[Present set value] and [Previous set value] cycle time calculation results are updated.

Press the [FEnd] or [BEnd] buttons to operate.
Check the results of the new setting/adjustment.



Caution

If abnormal noise, vibration or impacts occur when the ELECYLINDER is operated, lower the acceleration and deceleration rates.
Usage without lowering these rates may lead to breakdowns.

Pressing operation setting

Setting item	Unit	Explanation
Pressing starting point	mm	The position where pressing operation starts. Enter as the distance from the home position. Entries can be made in increments of 0.01mm.
Pressing force	% or N	The current limit value during the pressing operation. Set between 20 and 70%. [Switch units] can be used to input values in N units.
		The pressing speed is 20 mm/s. If [V: Velocity] is set to 20mm/s or below, pressing will take place at the speed of [V: Velocity].

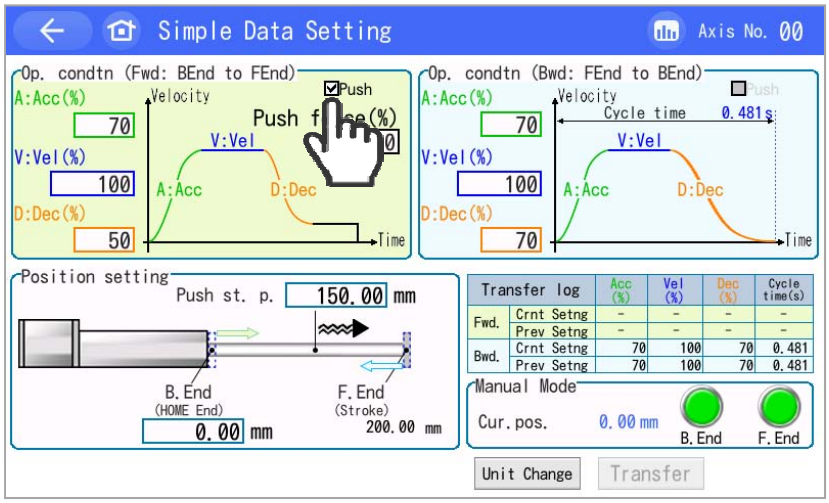
Caution

- The pressing force displayed in N units serves as a guideline.
  → Refer to "Pressing force and current limit value relationship" on pages 1-11/17/23/29/34/39/44/49
- When the pressing speed is 20mm/s or less, the pressing force will become unstable, and failure to operate normally is possible.

1 Check [Press].

Action

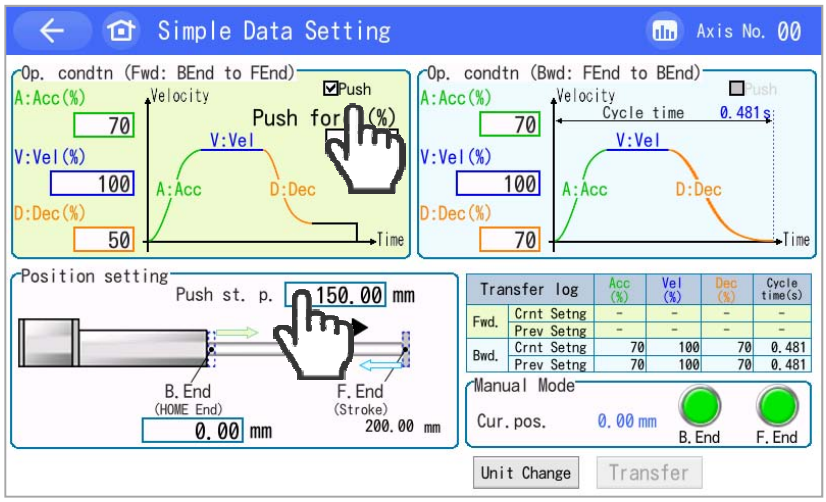
The screen will switch to the pressing operation window.



2 Touch the [Pressing force] and [Press starting point] buttons.

Action

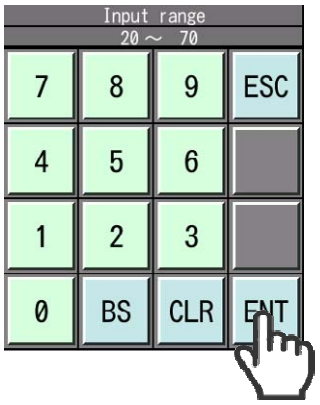
Ten Key window will open.



3 After setting the numerical value, touch the [ENT] key.

Action

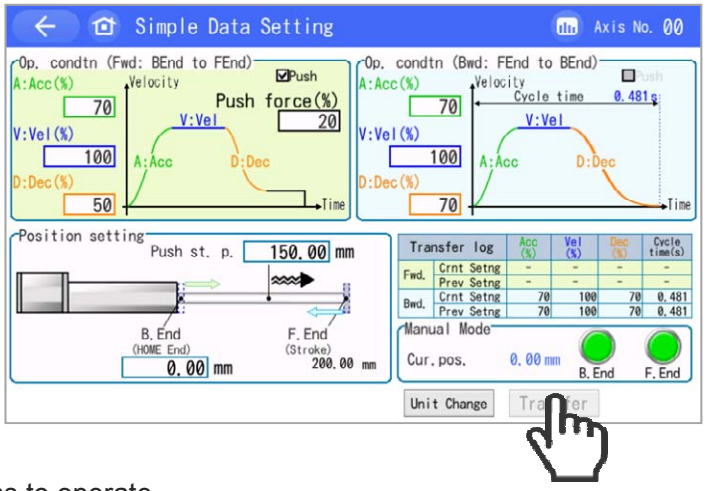
The screen will switch to the Simple Data Setting window.



4 Touch the [Transfer] key.

Action

The numerical values will be written to the controller. The [BEnd] button and [FEnd] button will turn green.



5 Press the [FEnd] or [BEnd] buttons to operate.

Check the results of the new setting/adjustment.

4.4 I/O signals

I/O signal list

ELECYLINDER I/O signals are as follows.

Category	Signal name	Signal abbreviation	Function overview
Input	Backward	ST0	Turning ON sends it backward. Turning OFF midway through operation will cause a gradual stop.
			Turning ON when home return is not complete triggers home return operation. Turning OFF midway through operation will cause a gradual stop.
	Forward	ST1	Turning ON sends it forward. Turning OFF midway through operation will cause a gradual stop.
			Turning ON when home return is not complete triggers home return operation. Turning OFF midway through operation will cause a gradual stop.
	Alarm clear	RES	Turning ON resets the alarm.
	Brake release	BKRLS	Inputting 24VDC releases the brake.
Output	Backward complete/ Pressing complete	LS0/PE0	ON when entering the backward end detection range. ON when pressing operation is complete.
	Forward complete/ Pressing complete	LS1/PE1	ON when entering the forward end detection range. ON when pressing operation is complete.
	Alarm (b-contact)	* ALM	ON in normal conditions. OFF when an alarm occurs.

Caution

When home return is complete and when it is not, the [ST0] signal and [ST1] signal have different functions.

[ST0] [ST1] signals: Movement command input (backward/forward)

The ST signal function automatically switches depending on whether the unit has completed home return or not.

Signal name	Signal abbreviation	Function overview by status	
		Home return: Not complete	Home return: Complete
Backward	ST0	Home return operation	Backward
Forward	ST1		Forward

[Home return status: Not complete]

- When the [ST0] signal is turned ON, home return operation begins.
- When the [ST1] signal is turned ON, as with the [ST0] signal, home return operation begins.
- Turning the ST signal OFF midway through home return operation will cause a gradual stop.

[Home return status: complete]

- When the ST signal is turned ON, the ELECYLINDER moves [Backward] and [Forward].
- While the ST signal is ON, operation will continue until the [Backward end] or [Forward end] is reached.
- Turning the ST signal OFF midway through operation will cause a gradual stop.

→ For details, refer to "4.5 Operating method from master device".

Caution

- If stopped when the LS or PE signals are not ON, the ELECYLINDER may be stopped on the way to the backward or forward end, or it may have stopped at the backward or forward end during pressing operation with no contact.
  We recommend first inputting the [ST0] signal and then performing the following actions after returning to the backward end.
- If battery-less absolute specification (option) is selected, the home return complete status is retained.
  However, if the [Change home return direction] or [Adjust home position] parameters are changed, home return status will be not-complete; perform homing (absolute reset).

→ For details, refer to "6.4 Parameter function descriptions".

[RES] signal: Alarm clear input

- When the [RES] signal is turned ON, the currently triggered alarm will be cleared.
- Alarm clear may not be possible depending on the alarm itself.

→ For details, refer to "7.4 Troubleshooting by alarm groups".

[BKRLS] input: Brake release input

- To release the brake, input 24VDC into [BKRLS] input.
- The brake will release while the signal is input.
- The power capacity requires 24VDC ±10% and 200mA or more.

Reference

The ELECYLINDER brake is a non-excitation actuating solenoid brake.
In normal operation the brake is automatically released, but when the servo is OFF or power is OFF the brake engages.
The brake must be released in order to move the movable part (slider or rod) by hand.

Warning

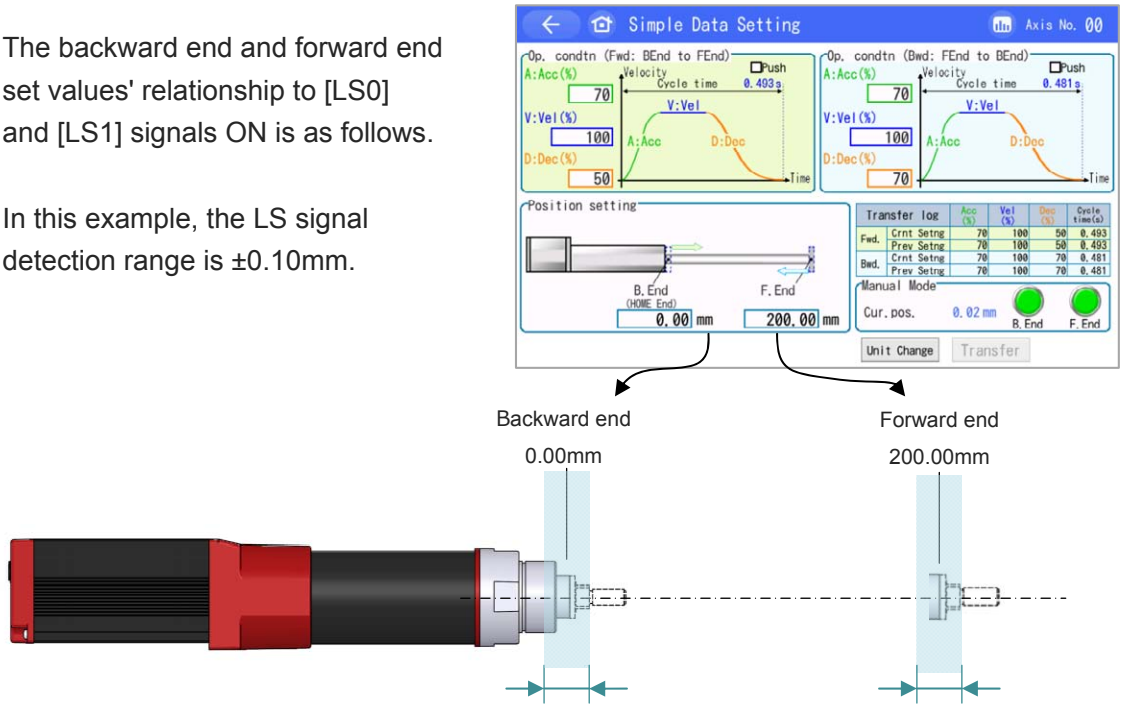
- Before releasing the brake, make sure to check there is nothing that will interfere with moving parts within the operation range.
- The slider or rod may fall, possibly injuring the operator or people nearby and damaging the ELECYLINDER, workpiece or equipment.

[LS0] [LS1] signals: Position detection output (backward end/forward end)

- The LS signals perform the same operation as an air cylinder automatic switch. They are not positioning complete signals.
- The LS signals turn ON when the current ELECYLINDER position is within the detection range configured at the backward and forward ends.
- They turn ON when within the detection range regardless of whether the servo is ON or OFF.

The backward end and forward end set values' relationship to [LS0] and [LS1] signals ON is as follows.

In this example, the LS signal detection range is ±0.10mm.



[LS0 detection range]
-0.10 to 0.10mm

[LS1 detection range]
199.90 to 200.10mm

To adjust the LS signal detection range, open the [Edit parameters window].
Parameter No.2
[Auto switch LS signal detection range adjustment] can be used to make adjustments.

[PE0] [PE1] signals: Pressing complete output (backward end/forward end)

- Turns ON when "pressing complete" is determined during pressing operation.
- Turns OFF if no contact can be made.

→ Refer to Pressing Operation (page 4-19) for details about pressing operation.

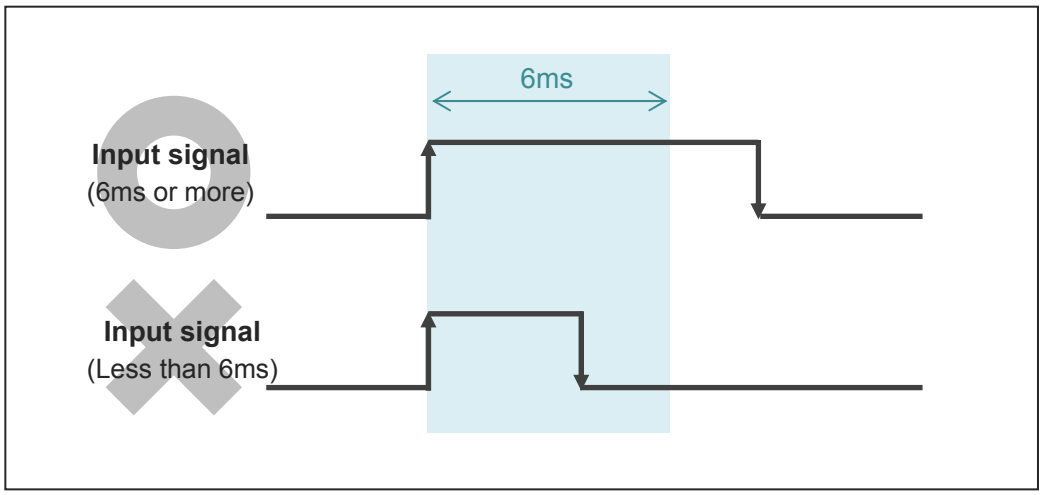
[*ALM] signal: Alarm output

- Turns ON when the ELECYLINDER is in normal status.
  Turns OFF when an alarm occurs.
- Always monitor the *ALM signal using the master device.
  If it turns OFF, immediately take appropriate safety countermeasures with the equipment as a whole.

→ For details, refer to "7.4 Troubleshooting by alarm groups".

Signal input time constant

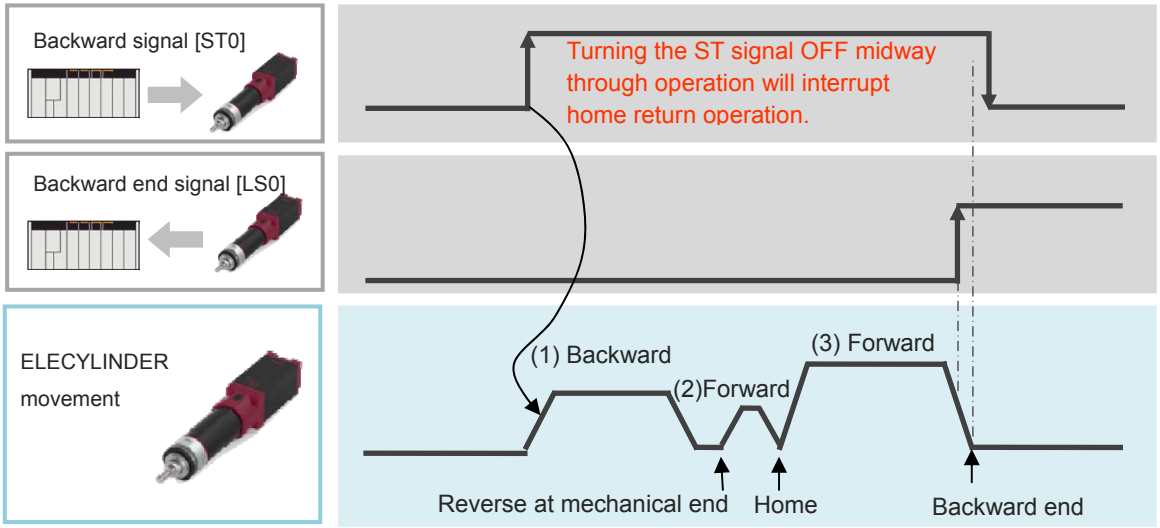
In order to prevent mis-operation due to chattering or noise, [ST0], [ST1] and [RES] signals are set with a 6ms input time constant.
For signals less than 6ms the device will not consistently recognize the signal, so input signals continuously for 6ms or longer.

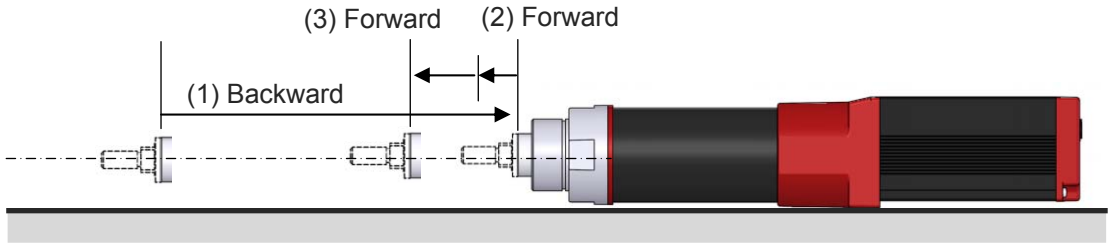


4.5 Operating method from master device

Home return operation/positioning operation : [ST0] [LS0] [ST1] [LS1] signals

Turning the [ST0] signal ON when home return is not complete will first trigger home return operation. After a momentary stop at the home position, it will then move to the backward end. As well, when the [ST1] signal is turned ON, the unit will move to the forward end after home return operation. However, for battery-less absolute encoder specification, the operation is complete when home return operation is done.





(1) When the [ST0] signal is turned ON, backward motion begins towards the mechanical end. The movement speed is 20mm/s.

(2) Once the mechanical end is struck, the direction will be reversed and forward motion will begin.
The unit will move forward until the home position, then stop.

(3) After that, it will continuously move forward until the backward end, where it stops as operation is complete.

Caution

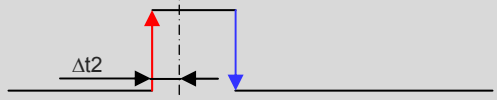
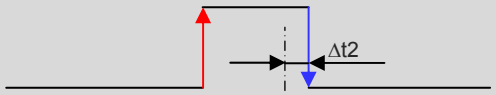
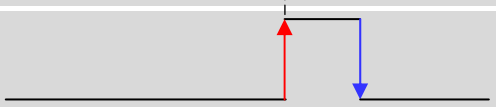
In the home reverse specification (model: NM), home return operation is in the reverse direction.

This shows the PLC timing chart for operating the ELECYLINDER.
The basic process is as follows.

[Basic timing chart]

Output ELECYLINDER → output signals to PLC

Input PLC → input signals to ELECYLINDER

Category		Signal abbreviation	Timing chart	Remarks
1	**Power**	Power ON		24VDC power supply is turned ON.
2	Output	* ALM		Turns ON if no alarm has been triggered.
3	Input	ST0		When the [ST0] signal is turned ON, home return operation begins.
4	Output	LS0		Home return operation is complete and the unit moves to the backward end.
5	Input	ST1		Moves to the forward end.
6	Output	LS1		Moved to the forward end.
7	Input	ST0		Moves to the backward end.
8	Output	LS0		Moved to the backward end.
9	After this, "**5**" to "**8**" repeat.			

Δt1: Wait approximately 0.5 seconds from when the *ALM signal turns ON before inputting the first command.

Δt2: The time taken for the ELECYLINDER actually to reach the forward or backward end after the LS signal turns ON.

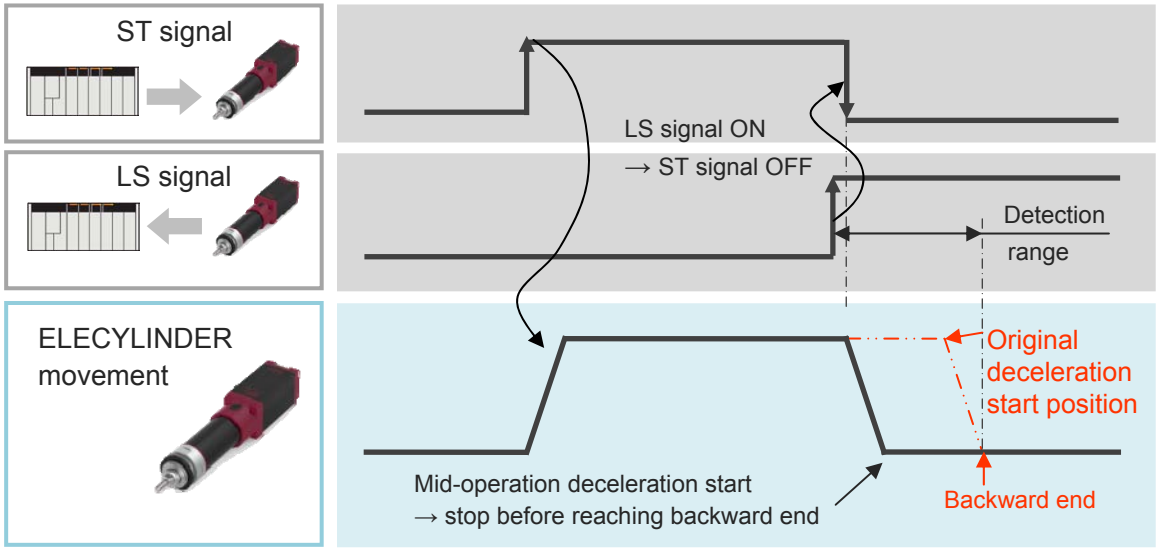
Consider Δt2 when giving instructions for the next operation from the PLC to the ELECYLINDER.

Δt2 becomes longer for larger detection ranges.

Δt2 also changes with the size of the transported load and acceleration/deceleration speeds.

Turning the ST signal OFF midway through operation will cause a gradual stop.
For example, be careful of the following point with a large LS signal detection range.

If the sequence is set to turn the ST signal OFF immediately after the LS signal turns ON, the ELECYLINDER may not have reached the forward/backward end.

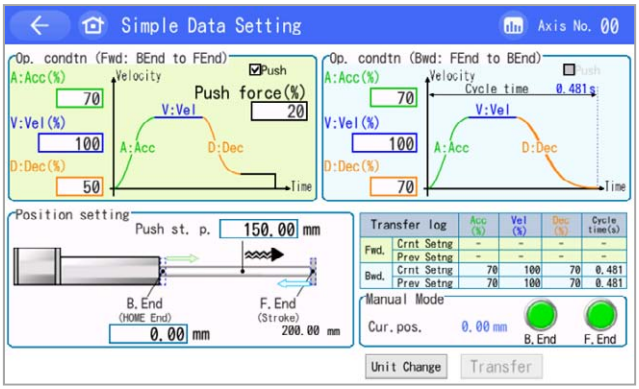


Caution

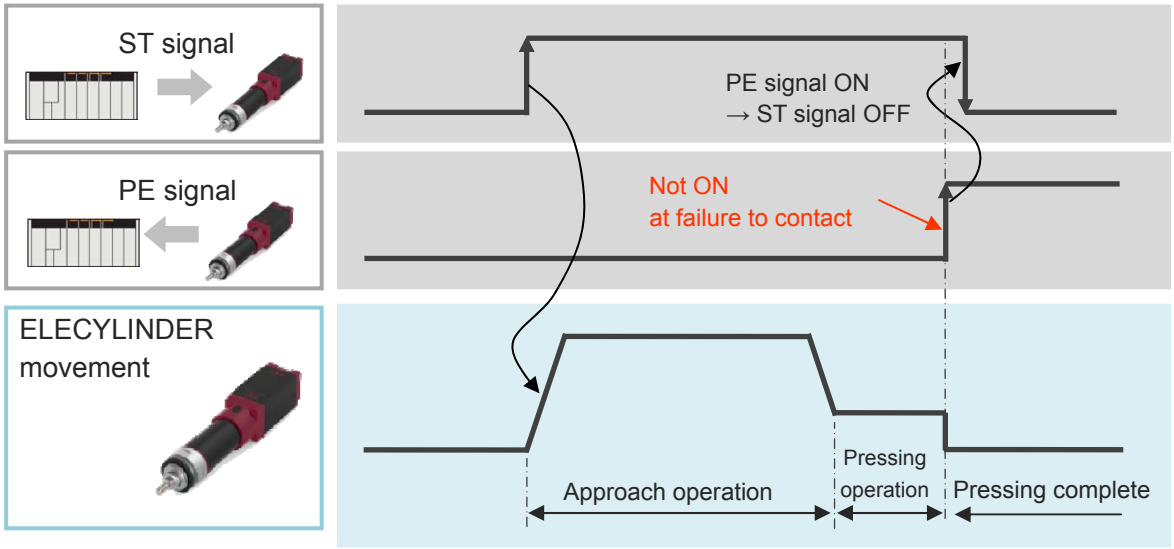
- Turning the ST signal ON again after the gradual stop causes the ELECYLINDER to begin operation again.
- Within the detection range, the LS signal turns ON even if the ELECYLINDER is mid-operation.
- Make sure that [ST0] and [ST1] do not turn ON simultaneously.
  This may result in unpredictable operation.

Pressing operation : [ST0] [ST1] [PE0] [PE1] signals

Before conducting pressing operation, refer to **Pressing operation setting** (page 4-9) and configure the operating conditions and position settings using the Simple Data Setting screen.



The basic time chart is as follows.



Caution

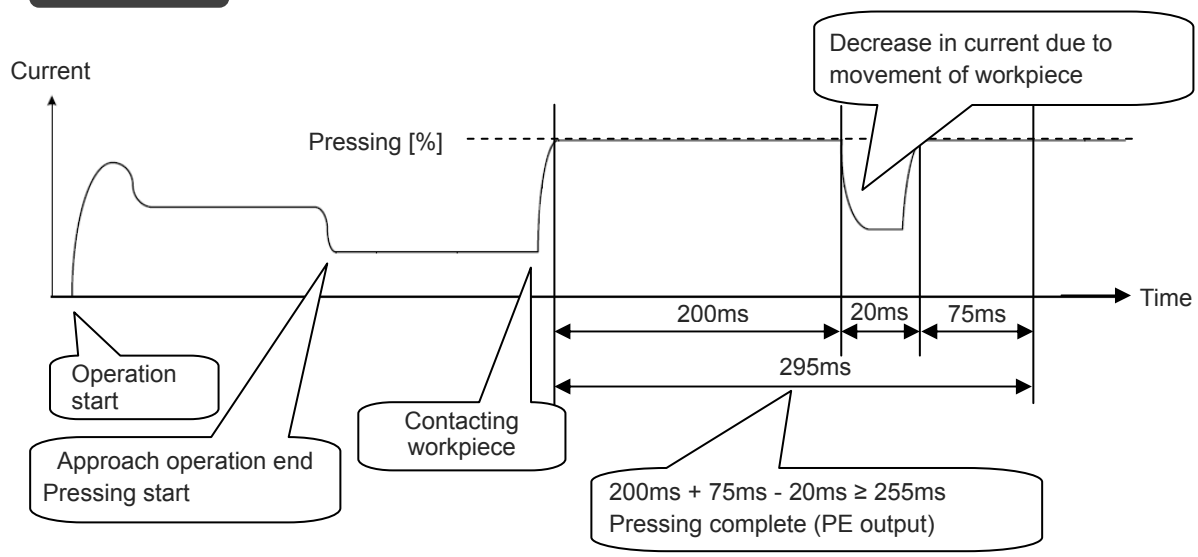
- The pressing operation speed is 20 mm/s.
- The workpiece remains pressed after the pressing is completed.
  If the workpiece moves or pushes back, it may be pressed even further.
- If the workpiece is struck during approach operation,
  [Alarm group A: Overload alarm] will be triggered.
  → For details, refer to **Alarm group A: Overload alarm** (page 7-11)

The torque (current limit value) configured for [Pressing force] in the Simple Data Setting screen judges completion of pressing operation.

When the ELECYLINDER is performing pressing operation, satisfying the following conditions will produce a judgment of pressing complete, turning ON the PE signal.

(Accumulated time in which current has reached pressing value [%]) -
(Accumulated time in which current is less than pressing value [%]) ≥ 255ms

Reference



Reference

Points of caution for when the workpiece is not struck (no contact) and the movement to forward end or backward end is complete. Consider a master device sequence or detection method based on the content below.

- If no contact is made, the PE signal will not turn ON.
  A timer is required to determine if no contact has been made.
- After a non-contact operation, the unit will stop in the pressing operation status.
- If the workpiece shifts once pressing complete is determined and the PE signal is ON, the ELECYLINDER will start another approach operation with the PE signal still ON. If the workpiece cannot be pressed again, it will remain ON even with no contact.

ELECYLINDER

Chapter 5

Preventive/Predictive Maintenance

5.1 Preventive/predictive maintenance ····· 5-1

5.2 Maintenance information ····· 5-2

Total travel count ····· 5-2

Total travel distance ····· 5-2

Overload warning level ····· 5-3

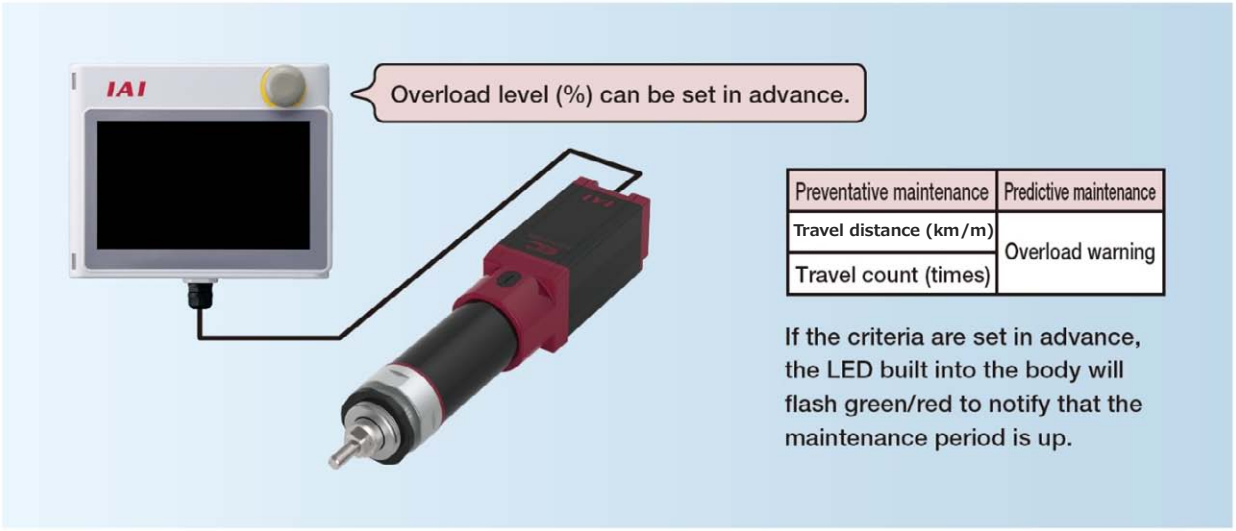
5.3 Setting maintenance information ····· 5-4

Switching to maintenance information window ····· 5-4

Basic operation ····· 5-5

5.1 Preventive/predictive maintenance

The ELECYLINDER has a **predictive maintenance function** that notifies the user with an "overload warning" when the load exceeds normal status.
It also has a **preventive maintenance function** that prompts the user to perform maintenance if the travel count or the travel distance exceeds the set values.



Preventative maintenance

- Regular maintenance that is performed based on a reference period regardless of whether or not there are equipment breakdowns.
- Prevents unexpected breakdowns.
- Extends service life.

Predictive maintenance

- Maintenance that is performed when, based on regular equipment monitoring, an abnormality is predicted to occur.
- Predicts unexpected breakdowns.
- Prevents sudden line stoppages.

5.2 Maintenance information

This section introduces three items that can be configured and managed as maintenance information.
When the set values are exceeded, a "maintenance warning" is issued and the status display LEDs flash alternately in red and green.

Even if a "maintenance warning" is generated, the ELECYLINDER will continue to operate without interruption.

Total travel count

Name	Symbol	Unit	Input range	Default setting at shipping
Total travel count	TMCT	times	0 to 999, 999,999	0 (disabled setting)

- When the total travel count exceeds the set value, the user will be notified with "Maintenance warning 1".
- When "Maintenance warning 1" is output, maintenance is recommended, such as greasing. Set the target value to a value larger than the present one and update.
- Setting it to "0 times" will disable this function.

Total travel distance

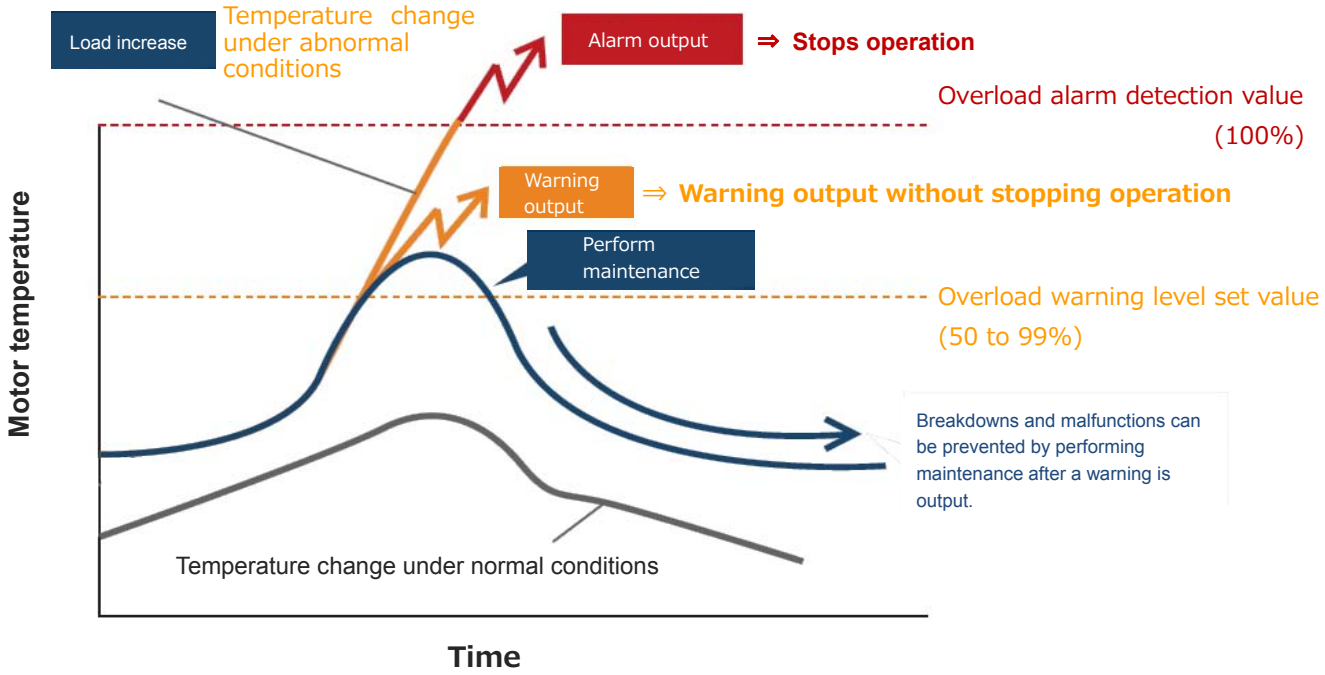
Name	Symbol	Unit	Input range	Default setting at shipping
Total travel distance	ODOT	m	0 to 999, 999,999	0 (disabled setting)

- When the total travel distance exceeds the set value, the user will be notified with "Maintenance warning 2".
- When "Maintenance warning 2" is output, maintenance is recommended, such as greasing. Set the target value to a value larger than the present one and update.
- Setting it to "0m" will disable this function.
- The displayed units can be switched. (m ⇔ km)

Overload warning level

Name	Symbol	Unit	Input range	Default setting at shipping
Overload warning level	OLWL	%	50 to 100	100 (disabled setting)

- With the motor temperature rise value which triggers an overload alarm as 100%, set the level to output an overload warning between 50 and 99%.
- When the motor temperature rise value during operation exceeds the ratio set as "overload warning level", the user will be notified with "Maintenance warning 3".
- When the motor temperature rise value falls below the ratio set as "overload warning level", "Maintenance warning 3" will be automatically cleared.
- When "Maintenance warning 3" is output, investigate the cause of the increase in load. Maintenance such as greasing or reviewing the operating conditions is recommended.
- Setting it to "100%" will disable this function.



5.3 Setting maintenance information

The maintenance information can be configured and changed using the teaching pendant or PC software. This manual introduces operating methods using a teaching pendant TB-02.

Reference

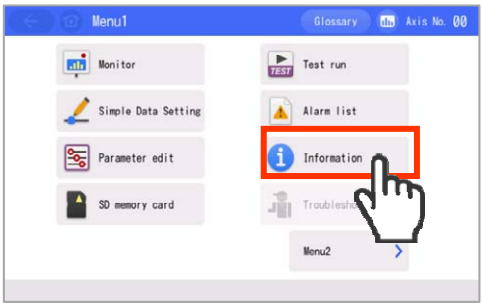
PC software operating method	PC software manual (ME0155)
Teaching pendant operating method	Teaching pendant manual (ME0355)
Data setter operation method	Data setter manual (ME0375)

Switching to maintenance information window

1 Touch "Information" on the Menu 1 screen.

Action

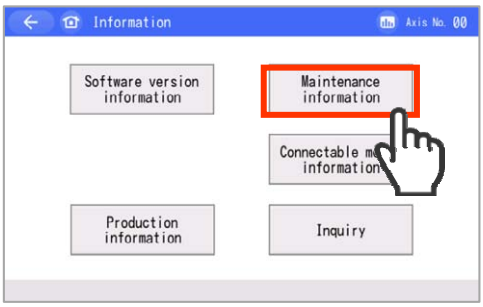
The screen will switch to the Information window.
If the TP operation mode is not Monitor mode, a confirmation window will appear for switching to Monitor mode.

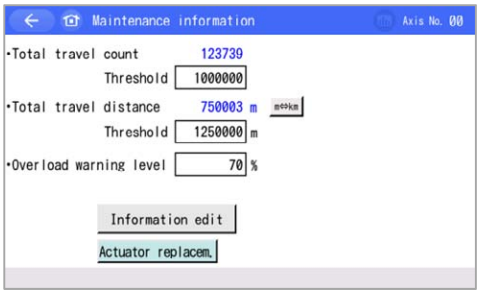


2 Touch "Maintenance information" on the Information screen.

Action

The maintenance information window opens.



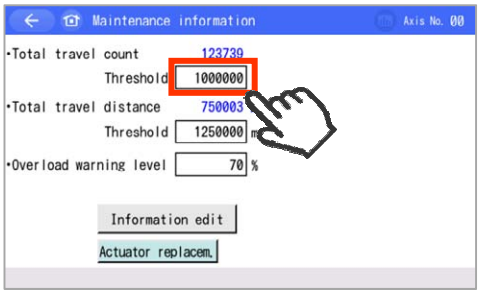


Basic operation

1 To set the target value,
touch the field of the relevant item.

Action

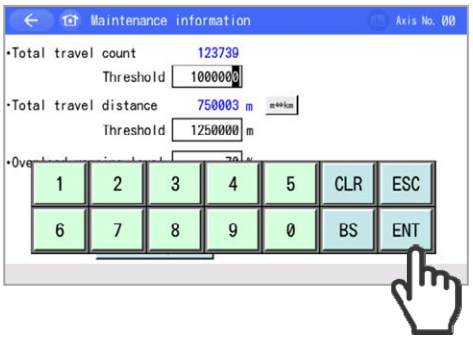
The set value will blink and
Ten Key window will open.



2 Enter the value with the Ten Key pad
and touch the [ENT] key.

Action

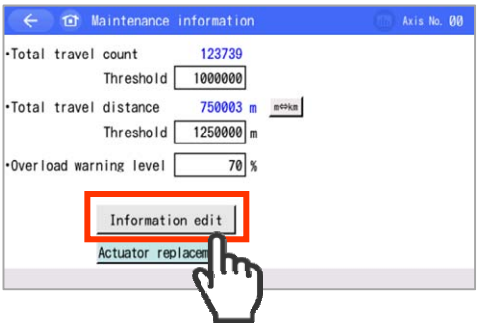
The target value will change.
If you touch [ESC],
the target value will not be changed and
the original window will return.



3 Touch the [Information Edit] button.

Action

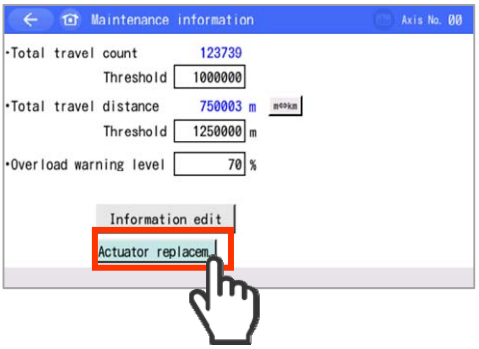
A confirmation message
for rebooting the controller will be displayed.
The setting change will take effect
after rebooting.



4 If the actuator has been replaced,
touch the "Actuator replacement" button.

Action

"Total travel count" and
"Total travel distance" will be
cleared to "0".



ELECYLINDER

Chapter 6

Parameters

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6.1 Precautions regarding parameters

Parameter data should be set/adjusted appropriately according to the application requirements. Because they significantly influence operation, incorrect settings may lead to mis-operation.

When making a change, back up the data before the change so the settings can be recovered. Back up the data after making changes as well.
This will be required for investigating causes of failure or when the ELECYLINDER is replaced.

Caution

- Understand the control methods in advance if making a change or performing a setting in accordance with the system and application.
  Contact IAI if anything is unclear.

6.2 How to change parameters

A teaching pendant or PC software can be used to change parameters. This manual introduces operating methods using a teaching pendant TB-02.

Reference

PC software operating method	PC software manual (ME0155)
Teaching pendant operating method	Teaching pendant manual (ME0355)
Data setter operation method	Data setter manual (ME0375)

Edit parameters window

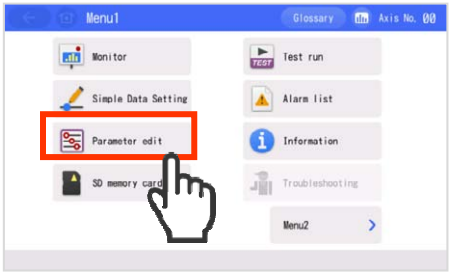
1 Touch Parameter edit on the Menu 1 screen.

Action

The screen will switch to the Edit parameters window.

If the TP operation mode is not Monitor mode, a confirmation window will appear for switching to Monitor mode.

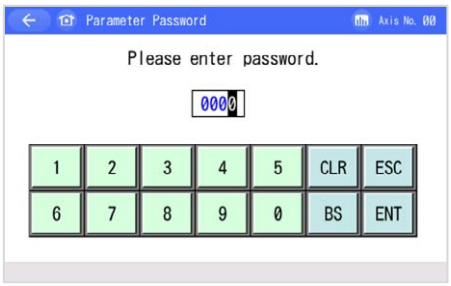
Also, if the parameter edit password is set to a value other than "0000", the password input screen will be displayed.



2 If the parameter edit password is set to a value other than "0000", enter the password and press the [ENT] key on the touch panel.

Action

The Edit parameters window will open.



Reference

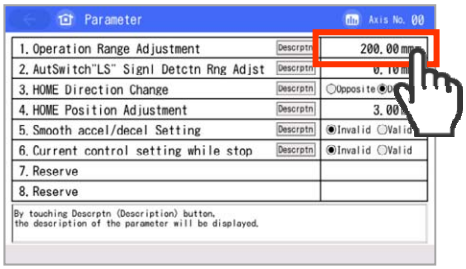
The parameter edit password is set to "0000" at shipping.
Refer to the Teaching pendant manual (ME0355) / Data setter manual (ME0375) for information about changing the password.

Basic operation

1 If setting parameters numerically, touch the set value button.

Action

The set value will blink and Ten Key window will open.



2 Enter the value with the Ten Key pad and touch the [ENT] key.

Action

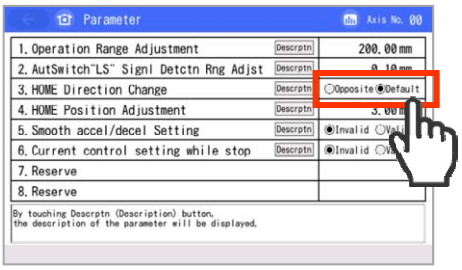
The parameter will be changed.

However, if you touch [ESC], the parameter will not be changed and the edit window will return.

3 If setting parameters with radio buttons, touch the radio buttons.

Action

The parameter will be changed.



4 When all parameter changes are complete, touch the Home button.

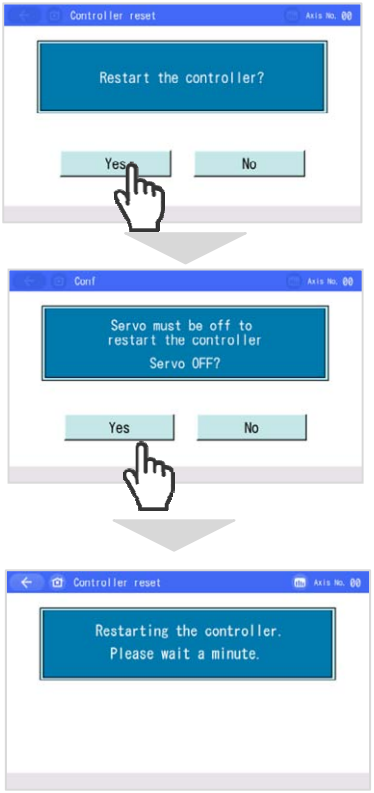
Action

If parameters have been changed, the "Restart the controller?" screen will be displayed.

5 Touch the [Yes] button.

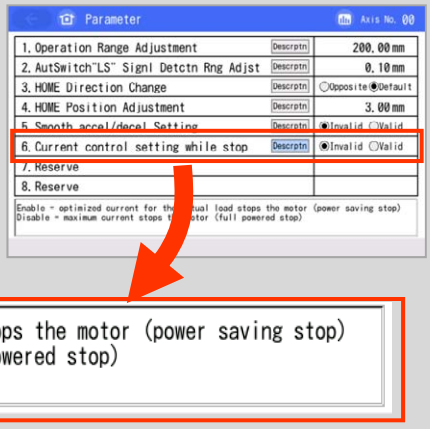
Action

The controller will restart, enabling parameter changes. However, if you touch [No], the reboot will be canceled and the Edit parameters window will return.



Reference

Touching the explanation button displays a description of each parameter at the bottom of the screen.



Caution

- Simply changing the parameters alone is not sufficient to enable the changes.
- After making changes, the power must be turned off and on or a software reset performed.
  After the ELECYLINDER restarts, the parameter changes will be enabled.
- Do not attempt to turn OFF the power while writing the parameters.
  This may damage the controller.

6.3 Parameter list

No.	Category	Name	Symbol	Unit	Input range	Default setting at shipping	Reference Page
1	A	Operation range adjustment	LIMM	mm	0.01 to 9999.69	Maximum stroke	6-6
2	A	Auto switch "LS" signal detection range adjustment	INP	mm	0.01 to 9999.99	0.10	6-7
3	C	Home return direction change	ORG	–	Reverse, forward	According to ELECYLINDER specifications	6-8
4	B	Home position adjustment	OFST	mm	0.01 to 9999.99	According to ELECYLINDER specifications	6-9
5	A	Smooth accel/decel setting	MOD0	–	Disabled, enabled	Disabled	6-10
6	A	Current control setting at stop	SMOD	–	Disabled, Powerful stop Enabled, Energy-saving stop	Disabled	6-11
7	A	Wireless function setting	RWOF	–	Disabled, enabled	Enabled	6-12
8	A	Power-saving setting	BUEN	–	Disabled, enabled	Disabled	6-13

The categories in the table below indicate whether parameters should be set or not. There are 3 categories, as follows.
Not displayed on PC compatible software/teaching pendant screen.

A: Check or change the settings based on the usage method.
B: Use as set at shipping, as a rule.
C: Set at shipping in accordance with ELECYLINDER specifications.
Normally, setting is not required.

Caution

No. 1/3/4 default factory settings differ according to ELECYLINDER specifications.
No. 7 Wireless function setting parameter is not displayed on ELECYLINDERs without wireless circuit boards (no WL, WL2 in the Option model number).

6.4 Parameter function descriptions

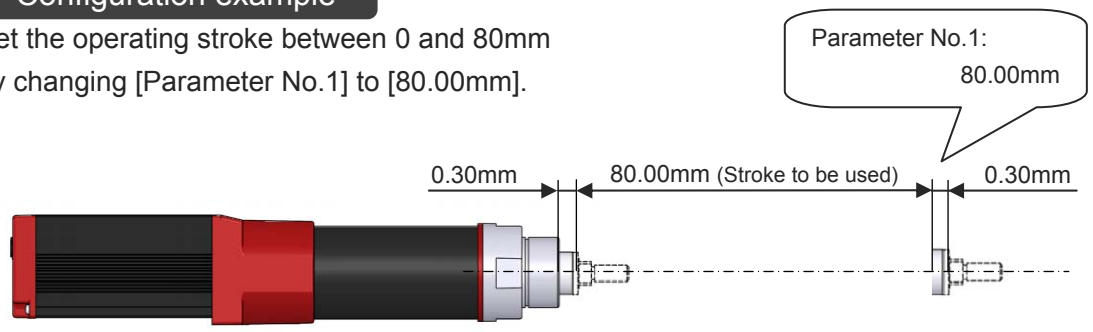
Parameter No.1: Operation range adjustment

No.	Category	Name	Symbol	Unit	Input range	Default setting at shipping
1	A	Operation range adjustment	LIMM	mm	0.01 to 9999.69	Maximum stroke

- The ELECYLINDER operation range can be adjusted to suit your system.
- The minimum setting unit is 0.01mm.
- Set to your desired stroke length.
  The controller automatically adds 0.30mm and controls/monitors the operation range.

Configuration example

Set the operating stroke between 0 and 80mm by changing [Parameter No.1] to [80.00mm].



Caution

- Set within the ELECYLINDER movable range.
  Setting to a value that exceeds the maximum stroke will result in collision with the forward side mechanical stopper.
- This may damage the ELECYLINDER, workpiece or peripheral devices.

Parameter No.2: Auto switch "LS" signal detection range adjustment

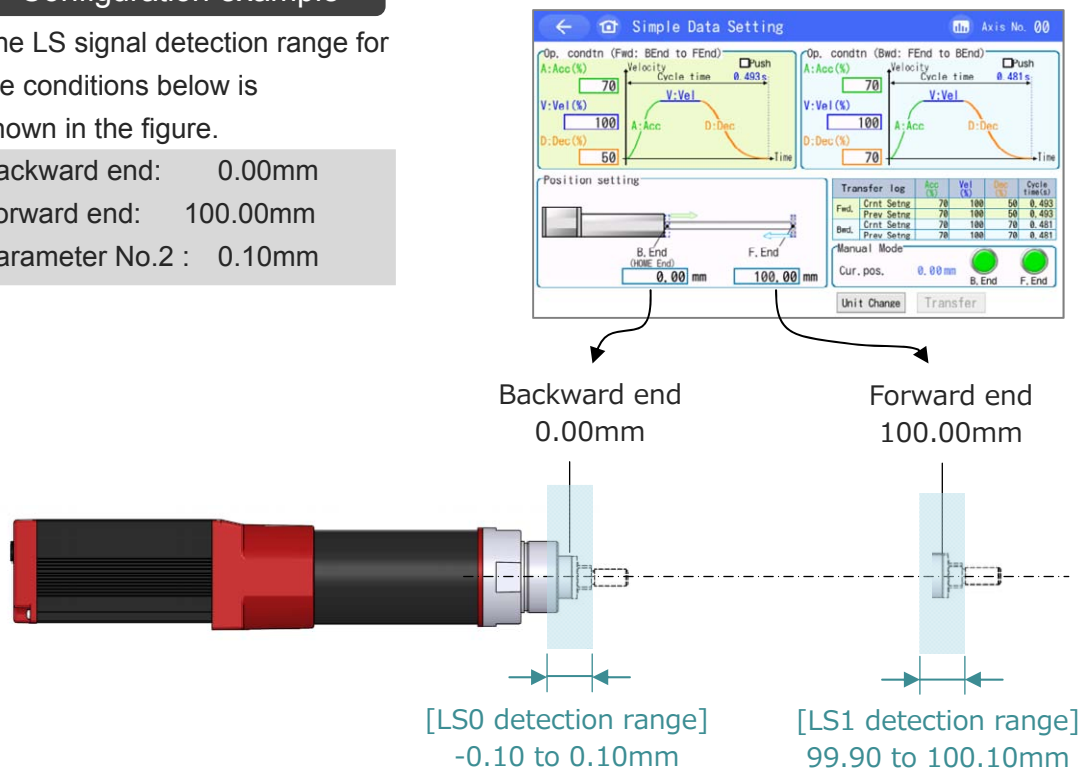
No.	Category	Name	Symbol	Unit	Input range	Default setting at shipping
2	A	Auto switch "LS" signal detection	INP	mm	0.01 to 9999.99	0.10

- Sets the backward complete/forward complete ON trigger range relative to the backward end/forward end.
- When the ELECYLINDER enters the detection range, the backward complete or forward complete signal turns ON.
- The minimum setting unit is 0.01mm.

Configuration example

The LS signal detection range for the conditions below is shown in the figure.

Backward end: 0.00mm
Forward end: 100.00mm
Parameter No.2 : 0.10mm



Caution

A value smaller than the minimum resolution cannot be set.
Minimum resolution [mm/p] = ball screw lead [mm/r] ÷ 800 [p/r]

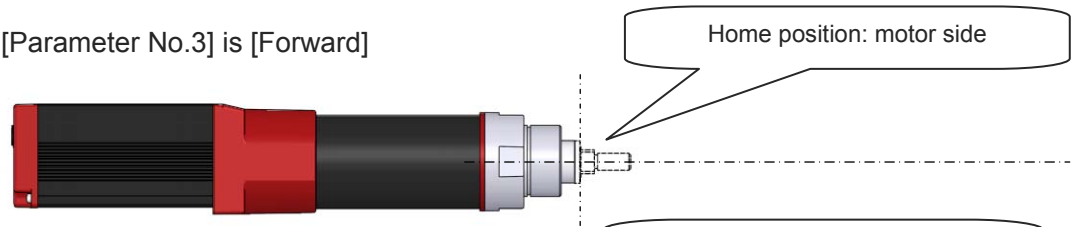
Parameter No.3: Change home return direction

No.	Category	Name	Symbol	Unit	Input range	Default setting at shipping
3	C	Home return direction change	ORG	–	Reverse, forward	According to ELECYLINDER specifications

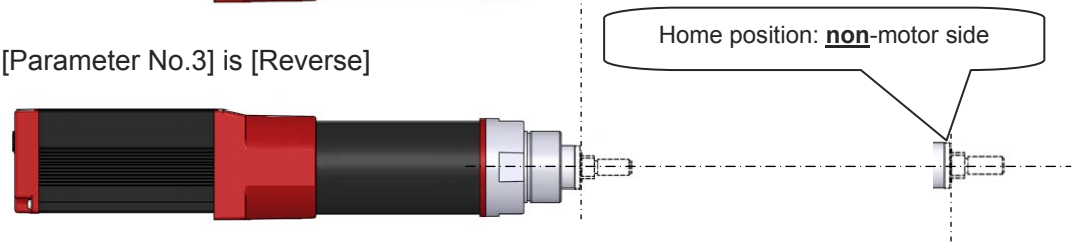
- The home return operation direction can be selected.
- To set the opposite direction, switch to the opposite setting value.
  ("Forward" → "Reverse" or "Reverse" → "Forward")
- For standard specification, the motor side is home.

Configuration example

If [Parameter No.3] is [Forward]



If [Parameter No.3] is [Reverse]



Caution

- Changing the home return direction reverses the operation direction.
- After changing this parameter, always perform home return reset (absolute reset).
- Even if the operation direction is reversed, check that the moving parts do not interfere with any other objects.
  If the moving parts collide, they may damage the ELECYLINDER, workpiece or peripheral devices.
- Changing the home return direction after purchasing will cause a mismatch with the ELECYLINDER model number. Make sure to change parameters again if the controller or body is replaced.

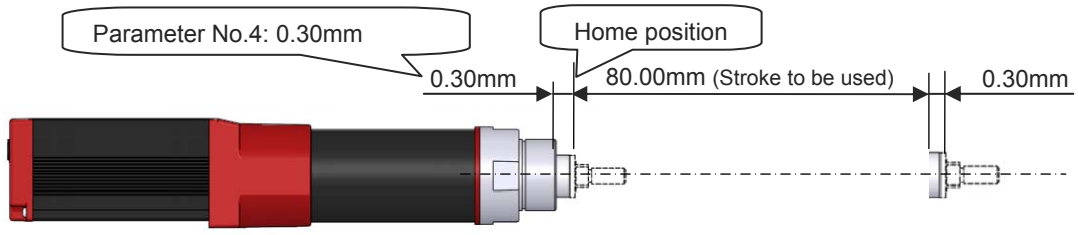
Parameter No.4: Home position adjustment

No.	Category	Name	Symbol	Unit	Input range	Default setting at shipping
4	B	Home position adjustment	OFST	mm	0.01 to 9999.99	According to ELECYLINDER specifications

- Sets the distance between the home side mechanical stopper and the home position.
- The minimum setting unit is 0.01mm.
- Adjustment with this parameter is possible in the following situations.
  (1) To match the ELECYLINDER home position and the mechanical home position after assembly into equipment.
  (2) To adjust the new home position upon reversing the default home return direction after purchase.
  (3) To eliminate a slight deviation from the previous home position generated after replacing the ELECYLINDER.

Configuration example

If [Parameter No.4] is [0.30mm],
the relationship between mechanical stopper and home position is as follows.



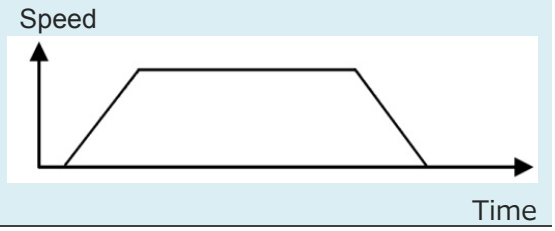
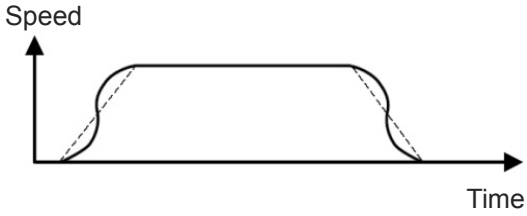
Caution

- If adjusting Parameter No.4, simultaneously adjust Parameter No.1.
  Operation range adjustment with parameter No.1 uses the home position as reference.
- Do not set Parameter No.4 to a value smaller than the default setting at shipping.
  This may result in abnormal home return operation, alarm triggering or abnormal operation. If the value must be set small, please contact IAI.
- After changing this parameter, always perform home return reset (absolute reset).

Parameter No.5: Smooth accel/decel setting

No.	Category	Name	Symbol	Unit	Input range	Default setting at shipping
5	A	Smooth accel/decel setting	MOD0	–	Disabled, enabled	Disabled

- The movement waveform for ELECYLINDER operation can be selected.
- When [Enabled], accel/decel operation becomes smoother (less abrupt). This softens the shocks of acceleration/deceleration without delaying the operation time.
- If [Disabled], the above functionality is not enabled.

Setting	Acceleration/deceleration pattern	Operation waveform image
Disabled	Trapezoid	
Enabled	S-motion	

Caution

- For operation in which the acceleration time or deceleration time exceeds 2 seconds, do not [Enable] smooth accel/decel settings.
  Normal operation will not be possible.
- Avoid momentary stops during acceleration or deceleration operation.
  Sudden changes (acceleration) will occur, which may be dangerous.

Parameter No.6: Current control setting at stop

No.	Category	Name	Symbol	Unit	Input range	Default setting at shipping
6	A	Current control setting at stop	SMOD	–	Disabled: Powerful stop Enabled: Energy-saving stop	Disabled

- The control method for ELECYLINDER stop can be selected.
- If [Disabled], a constant current value will be transmitted to the motor, stopping it. This limits fine vibration when stopping, bringing the unit to a complete stop.
- If [Enabled], a current appropriate to the load will be transmitted to the motor, stopping it. This limits the amount of power consumed while stopping.
- If abnormal noise or vibration occurs during a gradual stop, setting to [Enabled] may fix the issue. Moreover, setting to [Enabled] can also fix issues in which the command position cannot quite be attained.

Caution

If [Disabled], even if a pulse deviation within ±2 from the target position remains, movement towards the target position will not continue.

If [Enabled], if a pulse deviation of ±1 or more from the target position remains, movement towards the target position will continue.

Parameter No.7: Wireless function setting

No.	Category	Name	Symbol	Unit	Input range	Default setting at shipping
7	A	Wireless function setting	RWOF	–	Disabled, Enabled	Enabled

- Either Enabled or Disabled can be selected for the ELECYLINDER wireless function.
- When [Enabled] is selected, wireless communication between the ELECYLINDER and the data setting device is possible.
- When [Disabled] is selected, wireless communication between the ELECYLINDER and the data setting device is not possible. There is no transmission or reception of wireless communication radio waves.

Caution

This parameter is not displayed on ELECYLINDERs without wireless circuit boards (no WL, WL2 in the Option model number).

Parameter No.8: Power-saving setting

No.	Category	Name	Symbol	Unit	Input range	Default setting at shipping
8	A	Power-saving setting	BUEN	–	Disabled, enabled	Disabled

- Either Enabled or Disabled can be selected for the ELECYLINDER power-saving setting.
- When "Enabled," the power capacity can be reduced up to 40% compared to "Disabled" mode, but the maximum speed, maximum acceleration/deceleration, and payload decrease in comparison.
  Refer to "Lead and Payload (Power-saving: Enabled)", "Stroke and Max Speed (Power-saving: Enabled)", and "Payload by Speed/Acceleration (Power-saving: Enabled)" on pages 1-8, 1-9, 1-14, 1-15, 1-20, 1-21, 1-26, 1-27, 1-32, 1-33, 1-37, 1-38, 1-42, 1-43, 1-47, 1-48, 1-55, 1-56, 1-60, and 1-61.
- When "Disabled," the maximum speed, maximum acceleration/deceleration, and payload increase compared to "Enabled" mode.
  Refer to "Lead and Payload (Power-saving: Disabled)", "Stroke and Max Speed (Power-saving: Disabled)", and "Payload by Speed/Acceleration (Power-saving: Disabled)" on pages 1-6, 1-7, 1-12, 1-13, 1-18, 1-19, 1-24, 1-25, 1-30, 1-31, 1-35, 1-36, 1-40, 1-41, 1-45, 1-46, 1-53, 1-54, 1-58, and 1-59.

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Chapter 7

Troubleshooting

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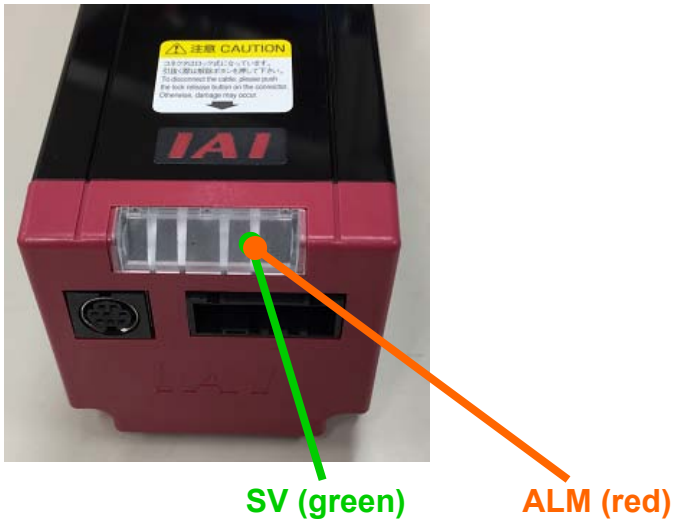
7.1 Troubleshooting confirmations

If a problem occurs, check the following points first in order to ensure quick recovery and prevent recurrence of the problem.

(1) Check status indicator LED (SV/ALM LED)

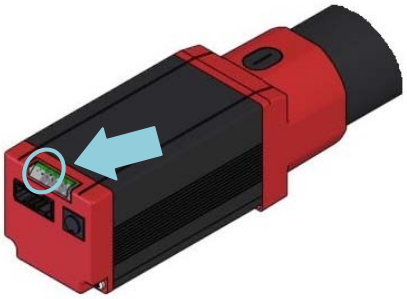
◯: Light ON
✕: Light OFF
★: Blinking

SV/ALM LED (Right side as seen from the motor side)		Operation status	* ALM signal output status
SV (green)	ALM (red)		
✕	✕	Power OFF, Servo OFF	OFF
✕	◯	Alarm generated, Stop switch ON (When using teaching pendant)	OFF
◯	✕	Power ON, Servo ON	ON
★ Green 500ms ⇔ Red 500ms alternate blinking in 1 Hz cycle		Maintenance warning generated (When the travel count or the travel distance has exceeded the set value, or when overload warning is generated)	ON
◯ (both green & red ON)		Initializing when power comes ON	OFF

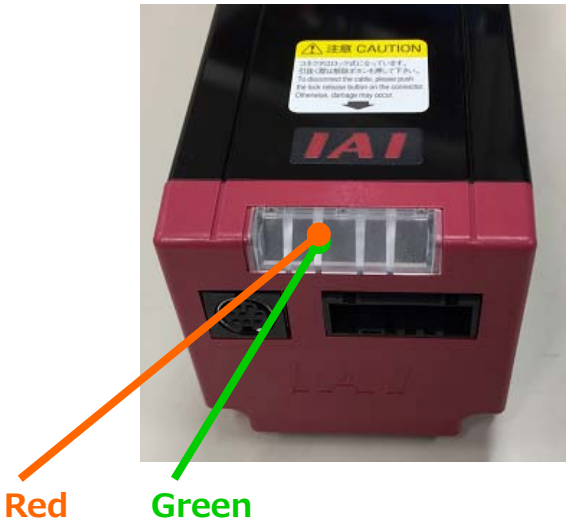


(2) Check status indicator LED (wireless status LED)

○: Light ON
×: Light OFF
★: Blinking



Wireless status LED (Left side as seen from the motor side)		Wireless status
Green	Red	
×	×	Wireless hardware initializing Wireless not connected (transmitting monitor data) Connecting from wired teaching pendant
×	★ ON 200ms/ OFF 200ms alternate blinking	Wireless hardware error
★ ON 150ms/ OFF 150ms alternate blinking	×	Connecting through wireless



(3) Check for abnormality in the master device (PLC, etc.)

(4) Check the voltage of the main power supply (24VDC)

Check for momentary power failure, voltage drop, power failure, etc.

(5) Confirm the generated alarm

Check the alarm information with the teaching tool.

(6) Check the connectors for disconnection or incomplete connection

(7) Check the cables for connection error, disconnection or snagging

Cut off the main power supply of the equipment (to avoid electric shock) and remove the cables around the measurement point (to avoid conductivity through the surrounding circuit) before checking the conductivity.

(8) Check the I/O signals

Use the master device and ELECYLINDER teaching tool to check for inconsistency or abnormality in the input/output signal status of the two units.

(9) Check the noise elimination measures (grounding, connection of noise suppressor, etc.)

(10) Check the events leading to the occurrence of the problem, as well as the operating conditions at the time of occurrence

(11) Analyze the cause

(12) Countermeasures

Caution

- When troubleshooting, exclude normally functioning parts from the targets to narrow down the causes.
- First, check (1) to (10) so that countermeasures can be taken swiftly.

7.2 Troubleshooting diagnosis

Based on the status of the problem occurring, proceed with the diagnosis as follows.

[When no alarm is generated]

Abnormal conditions can be roughly divided into the following two types.
For details and countermeasures, see "7.3 Troubleshooting with no alarm generated".

- **Operation failure**
- **Abnormal or unstable operation**

If the issue is not resolved after checking and taking countermeasures, contact IAI.

[When an alarm is generated]

The alarm groups and warnings are as follows.
For details and countermeasures, see "7.4 Troubleshooting by alarm groups".

Alarm group	Content	Main content and typical countermeasures	
A	Overload alarm	[Content] [Countermeasure]	Moving parts stopped abnormally. Make sure that there are no obstructions or obstacles.
B	Motor error alarm	[Content] [Countermeasure]	Motor abnormality occurred. Replace the motor or controller.
C	Controller error alarm	[Content] [Countermeasure]	Controller abnormality occurred. Replace the controller.
D	Controller-encoder abnormality alarm	[Content] [Countermeasure]	An abnormality occurred between the controller and encoder. Turn the power off and then on again. If the unit still does not recover, replace the motor or controller.
E	Power supply voltage/Power supply capacity error alarm	[Content] [Countermeasure]	Controller abnormality occurred. Check the power supply voltage for any abnormality.

Alarm level	Content	Main content and typical countermeasures	
Warning	Maintenance warning	[Content] [Countermeasure]	The "maintenance period" has come to an end. Perform maintenance for the unit.

7.3 Troubleshooting with no alarm generated

Operation failure

[Condition 1] SV/ALM LEDs do not light up

No.	Possible cause	Confirmation/countermeasure
1	The specified power is not supplied.	● Make sure that normal voltage is secured and wiring processing is correct. ● Also, be sure to check for disconnection or partial disconnection in connectors and wiring. → For details, refer to "3.4/3.5 Wiring connections".
2	The unit is switched to servo OFF with the teaching tool.	Turn ON the servo with PC software or teaching pendant.
3	Controller breakdown	●Replace the controller cover assembly. → For details, refer to " Controller replacement (page 8-20)". ●If the unit still does not recover, contact IAI.

[Condition 2] SV/ALM LEDs light up red

No.	Possible cause	Confirmation/countermeasure
1	Alarm generated.	●Connect the teaching tool. ●Upon checking the alarm code, resolve the cause. → For details, refer to "7.4 Troubleshooting by alarm groups".
2	The stop switch of the teaching pendant is being pressed. 	Release the stop switch.

[Condition 3] The unit does not operate even when a command is sent from a master device such as a PLC

No.	Possible cause	Confirmation/countermeasure
1	I/O signal communication is not established	● Check the input/output status of the I/O signal with the monitoring function of the teaching tool. (both the master device and the ELECYLINDER) ● Make sure the I/O signal voltage is normal. ● Check whether the length of the I/O signal cable is within 10m, and whether the wire diameter is thinner than the applicable value. ● Make sure the wiring processing is correct. → For details, refer to "3.4/3.5 Wiring connections".
2	Disconnection of power I/O cable, disconnection or contact failure of power I/O connector	● Check whether the cable is disconnected/partially disconnected. ● Make sure that the connector and cable are not pulled out. → For details, refer to "3.4/3.5 Wiring connections".
3	Movement command issued to stopping position → When stopping at "Forward end", check the ladder sequence by sending a "Forward" command etc.	Check the ladder sequence and the setting of the forward end/backward end.
4	Edge signals are input to "Forward" and "Backward".	Check the ladder sequence and input level signals.

* For details on I/O signals, refer to "4.4 I/O signals".

Abnormal or unstable operation

[Situation 1] Home return completes in the middle of home return operation

During home return operation, the ELECYLINDER moves until it hits the mechanical end, then reverses and stops at home. When the load is excessive or the unit hits interference, it may determine that the mechanical end has been reached, without actually having done so.

No.	Possible cause	Confirmation/countermeasure
1	A load exceeding the maximum payload is applied.	Reduce the load.
2	A moving part is hitting interference while moving.	Remove the interfering object.
3	The body or guide is twisted due to the fixing method of the ELECYLINDER.	● Loosen the fixing bolt and check whether the moving part moves smoothly. ● If it does, check whether the mounting surface is distorted. ● Re-mount according to the mounting method described in the instruction manual. → For details, refer to "2.3/2.4 Installation method".
4	The sliding resistance of the ELECYLINDER is excessive.	Contact IAI.

[Situation 2] The movement is complete, but the LS signal is not output

No.	Possible cause	Confirmation/countermeasure
1	The detection range of the LS signal is set below the minimum resolution.	Adjust Parameter No. 2 "Auto switch 'LS' signal detection range adjustment" appropriately. → For details, refer to "6.4 Parameter function descriptions"

[Situation 3] Shock or vibration is observed in acceleration/deceleration

No.	Possible cause	Confirmation/countermeasure
1	● Acceleration/deceleration setting is too high. ● A load susceptible to acceleration and deceleration is mounted. ● The ELECYLINDER is mounted on equipment with a structure susceptible to acceleration and deceleration.	● Lower the acceleration/deceleration setting. ● Enable Parameter No. 5 "Smooth accel/decel setting" and check its effect. → For details, refer to "6.4 Parameter function descriptions".
2	Load inertia is excessive.	Lower the deceleration and suppress overshoot.

[Situation 4] The unit vibrates slightly while stopped

No.	Possible cause	Confirmation/countermeasure
1	●A load susceptible to vibration is mounted. ●The ELECYLINDER is mounted on a frame with a structure susceptible to vibration.	●Lower the acceleration/deceleration setting. ●If Parameter No. 6 "Current control setting at stop" is disabled, enable it and check its effect. → For details, refer to "6.4 Parameter function descriptions".

7.4 Troubleshooting by alarm groups

Alarms are classified into "alarms" and "warnings" depending on the content.
"Alarms" are grouped into 5 types.

Alarm level	SV/ALM LED	* ALM signal	Situation when generated	Clearing method
Alarm	Red ON	OFF	Servo OFF after gradual stop	Cleared by resetting the alarm. If it cannot be cleared by resetting the alarm, turn off the power, then turn it on again.
Warning	Red/green alternate blinking	ON	Continued operation	● Maintenance Warnings 1/2 (Total travel count/Total travel distance) are cleared by updating the set values in the maintenance information window. ● Maintenance Warning 3 (Overload warning) is cleared by resetting the alarm.

Caution

- Clear alarms only after investigating and resolving the cause.
- If the same alarm recurs after clearance, it is highly probable that the cause of the alarm has not been resolved.
- If the cause of the alarm cannot be resolved or the alarm cannot be cleared after resolving the cause, contact IAI.

Alarm group A: Overload alarm

Moving parts of ELECYLINDER stopped abnormally while moving to the target position.

No.	Cause	Countermeasure
1	Operation may not be possible due to contact with or snagging on external obstacles.	Remove any external obstacles or other external loads.
2	The ELECYLINDER may be being used under conditions exceeding the specifications described in the catalog.	Check the specification values such as payload, acceleration/deceleration and speed, and adjust them appropriately.
3	Causes may include foreign matter, brake failure or motor failure.	Visually check for the depletion of grease on the ball screw/guide inside the ELECYLINDER, intrusion of foreign matter, etc. If this is the case, clean the inside of the ELECYLINDER and replenish the grease. Remove the motor and check the sliding movement of the ELECYLINDER body. If there is no abnormality in the sliding motion, there is a possibility of motor or brake failure. Replacement of the motor is recommended.
4	The base may have been distorted when mounting the ELECYLINDER, increasing the sliding resistance of the guide.	The ELECYLINDER mounting surface should be a machined surface or a plane with similar accuracy, with flatness within 0.05mm/m. Refer to the recommended tightening torque of the bolts for base fixing in "2.3/2.4 Installation method".
5	The peak power capacity of the 24V power supply is less than 4.2A.	Use a power supply with peak current of 4.2 A or higher (per axis).
6	If the diameter of the power wire is less than AWG18 (thin), the peak current may not flow due to increased resistance value or contact failure at the connection terminal.	Make sure that the wiring for power supply use is AWG18 and that there is no looseness, contact failure, disconnection or the like at the connection terminal/connector etc.
7	The deceleration distance was insufficient and the calculation result of the arrival position exceeded the operation range of the ELECYLINDER due to the "next movement command" being issued too soon during operation with "Smooth accel/decel setting" enabled.	Adjust the timing of the "next movement command" so that the command will be given after the first movement is completed.
8	24V power was turned ON while the moving parts of the ELECYLINDER were immobilized or pressed against the mechanical stopper.	Resolve the state of immobilization. If the unit is pressed against the mechanical stopper, move it at least 5mm away, then turn on the power again.

Alarm group B: Motor abnormality alarm

Motor abnormality occurred.

No.	Cause	Countermeasure
1	The internal temperature of the motor may be too high.	Improve the surrounding environment of the motor so that the ambient temperature is 40 °C or less. If the abnormality is resolved upon turning the power back on after the ambient temperature is lowered, the internal temperature may have been excessive. [Countermeasure examples] Remove the heat source/turn OFF the heat source/install a fan/install a temperature shield/improve thermal conductivity of the base/install a heat dissipation fin, etc.
2	The ELECYLINDER may be being used under conditions exceeding the specifications described in the catalog.	Check the specification values such as payload, acceleration/deceleration and speed, and adjust them appropriately.
3	If this alarm recurs after performing the inspection above and improving the power supply environment, it is highly likely that the motor has failed.	Replacement of the motor is required. Customers may not replace the motor by themselves. Contact IAI.

Alarm group C: Controller abnormality alarm

Controller abnormality occurred.

No.	Cause	Countermeasure
1	The controller is affected by the noise of a peripheral device and cannot operate normally.	Shut down the power supply of the peripheral device and operate only with the ELECYLINDER, then check to see whether this alarm persists. If it does not, there is a possibility that the ELECYLINDER is affected by the noise from the peripheral device. Reconsider the noise countermeasures (grounding, power line wiring, electrostatic shielding, etc.) for the peripheral device.
2	If this alarm recurs after performing the inspection above and improving the power supply environment, it is highly likely that the controller has failed.	Replace the controller cover assembly. → For details, refer to " Controller replacement (page 8-20)".

Alarm group D: Controller-encoder abnormality alarm

An abnormality occurred between the controller and encoder.

No.	Cause	Countermeasure
1	If a similar alarm persists after turning the power supply back on, it is likely that a contact failure has occurred at the connector of the cable that connects the controller and motor.	After shutting off the power supply, remove the cable connector and firmly re-insert it all the way. If this does not improve the situation, the cable may be disconnected, in which case the connection cable should be replaced.
2	The specifications of the replaced controller and the motor may not match. [Example] An incremental-type motor and battery-less absolute spec controller have been combined by mistake	Cut off the power supply and make sure that the specifications of the replaced motor and controller are both "battery-less absolute specification" or "incremental specification". → For details, refer to " Controller replacement (page 8-20)".
3	The communication between the controller and encoder is affected by the noise of a peripheral device and cannot operate normally.	Shut down the power supply of the peripheral device and operate only with the ELECYLINDER, then check to see whether this alarm persists. If it does not, there is a possibility that the ELECYLINDER is affected by the noise from the peripheral device. Reconsider the noise countermeasures (grounding protection, power line wiring, electrostatic shielding, etc.) for the peripheral device.
4	If this alarm recurs after performing the inspection above and improving the power supply environment, it is highly likely that the motor or controller has failed.	Replace the motor or controller cover assembly. Customers may not replace the motor by themselves. Contact IAI. → For details, refer to " Controller replacement (page 8-20)".

Alarm group E: Supply voltage/power capacity abnormality alarm

An abnormality occurred in the power supply voltage and capacity supplied to the rear of the ELECYLINDER.

No.	Cause	Countermeasure
1	The ELECYLINDER may be being used under conditions exceeding the specifications described in the catalog.	Check the specification values such as payload, acceleration/deceleration and speed, and adjust them appropriately.
2	The power supply voltage has been detected outside the range of 21.6V to 26.4V.	[Countermeasure 1] Inspect with a tester to see whether the power supply voltage is in the range of 21.6 V to 26.4 V. If it is out of range, the 24VDC power supply voltage has insufficient capacity. Refer to our catalog for the required capacity and improve the power supply environment. [Countermeasure 2] Check whether the length of the power I/O cable is within 10m, and whether the wire diameter is smaller than the applicable value. Make sure the wiring processing is correct. → For details, refer to "3.4/3.5 Wiring connections".
3	If this alarm recurs after performing the inspection above and improving the power supply environment, it is highly likely that the controller has failed.	Replace the controller cover assembly. → For details, refer to " **Controller replacement** (page 8-20)".

Warning: Maintenance warning 1

This is an alert that the target value of the "total travel count" set by the customer has been reached.

No.	Content	Countermeasure
1	For safe use and long service life of the ELECYLINDER, periodic lubrication is recommended. * To disable this warning, change the target value to 0.	[Countermeasure 1] Perform maintenance and inspection such as greasing. → For details, refer to "8.5 Greasing method". [Countermeasure 2] When updating this function, be sure to set the target value to a value larger than the current value.

* For setting, refer to "5.2 Maintenance information" and "5.3 Setting maintenance information".

Warning: Maintenance warning 2

This is an alert that the target value of the "total travel distance" set by the customer has been reached.

No.	Content	Countermeasure
1	For safe use and long service life of the ELECYLINDER, periodic lubrication is recommended. * To disable this warning, change the target value to 0.	[Countermeasure 1] Perform maintenance and inspection such as greasing. → For details, refer to "8.5 Greasing method". [Countermeasure 2] When updating this function, be sure to set the target value to a value larger than the current value.

* For setting, refer to "5.2 Maintenance information" and "5.3 Setting maintenance information".

Warning: Maintenance warning 3

This is an alert that the target value of the "overload warning level" set by the customer has been reached.

No.	Content	Causes and countermeasures
1	Before the ELECYLINDER stops operation due to the "overload alarm", follow the troubleshooting procedure and conduct visual inspection and maintenance. * To disable this warning, change the "overload warning level" in "Maintenance Information" to 100%.	[Causes] The warning may be caused by the depletion of grease on the ball screw/guide inside the ELECYLINDER, intrusion of foreign matter, brake failure, motor failure, contact with peripheral equipment, etc. [Countermeasure 1] Visually check for the depletion of grease on the ball screw/guide inside the ELECYLINDER, intrusion of foreign matter, etc. If this is the case, clean the inside of the ELECYLINDER and replenish the grease. For details, refer to "8.4 Cleaning" and "8.5 Greasing method". [Countermeasure 2] Remove the motor and check the sliding movement of the ELECYLINDER body. If there is no abnormality in the sliding motion, there is a possibility of motor or brake failure. Replacement of the motor is recommended. Customers may not replace the motor by themselves. Contact IAI.

* For setting, refer to "5.2 Maintenance information" and "5.3 Setting maintenance information".

ELECYLINDER

Chapter 8

Maintenance and Inspection

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8.1 Precautions for maintenance and inspection work

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

Warning

- Do not climb on or put anything on the ELECYLINDER.
  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 or rod may fall, possibly injuring the operator or people nearby and damaging the ELECYLINDER, workpiece or equipment.

Caution

- Check that the power to the ELECYLINDER 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.

Caution

- Never use fluorine-based grease.
  Mixing with lithium-based grease not only reduces the performance of the grease, it may even cause damage to the actuator.
- The grease film may run out if the actuator performs return operation continuously over a distance of 30mm or less. As a guideline, every 5,000 to 10,000 cycles, have approximately 5 cycles of return operation over a
  50mm distance or more to regenerate the oil film.
- The ball screw or guide may be damaged if the oil film runs out.

Notice

- First, be sure to wipe off the old grease, and then supply new grease.
- The degradation speed of grease may differ depending on the operating environment (temperature, humidity and ambient atmosphere).
  It is recommended to shorten the grease supply period if the actuator is used under poor environmental conditions such as high temperatures, high humidity or dusty atmospheres.
- Also, it is recommended to improve the environmental conditions in case the grease changes color notably due to poor operating conditions.
- Base oil may separate from the grease due to the mounting orientation or operating conditions.
  Base oil may also leak from the inside of the ELECYLINDER to the exterior through gaps.
  Check visually for oil drips when supplying grease.
- An ELECYLINDER stored for 6 months or more may suffer from grease degradation.
  Supply grease before the start of use.
  → For details, refer to "8.5 Greasing method".

8.2 Inspection items and schedule

Follow the maintenance inspection schedule below.
It is assumed that the equipment is operating 8 hours per day.
If the equipment is running continuously night and day or otherwise running at a high operating rate, inspect more often.

Slider type
High rigidity slider type (EC-S□□AH), High rigidity slider type (EC-S□□H)

*Stainless steel sheet life guideline: 5,000km

Inspection period	External inspection	Internal inspection	Greasing	
			Ball screw	Guide
Start of work inspection	○	–	–	–
1-month inspection	○	–	–	–
3-month inspection	–	–	○	○
3-month inspection on	–	–	Grease supply timing (Guideline) dependent	
6-month inspection	○	○		
Every 6 months thereafter	○	○		

Rod type

Inspection period	External inspection	Greasing	
		Rod sliding surface	Frame interior
Start of work inspection	○	○	–
1-month inspection	○	–	–
3-month inspection	○	○	○
3-month inspection on	○	Every 3 months	Grease supply timing (Guideline) dependent
6-month inspection	○	–	
Every 6 months thereafter	○	–	

Radial cylinder type
High rigidity radial cylinder type (EC-RR□□AH), High rigidity radial cylinder type (EC-RR□□H)

Inspection period	External inspection	Internal inspection	Greasing		
			Ball screw	Guide	Rod sliding surface
Start of work inspection	○	–	–	–	○
1-month inspection	○	–	–	–	–
3-month inspection	○	–	○	○	○
3-month inspection on	○	–	Depends on greasing timing (guideline)		Every 3 months
6-month inspection	○	○			–
Every 6 months thereafter	○	○			–

Grease supply timing (Guideline)

Maximum operating speed [mm/s]	Grease supply timing (Guideline)	
	Operation distance	Months
0 to 750 or less	1,250km	12 months
Over 750 to 860	2,500km	

8.3 Visual inspection items

Refer to "8.5 Greasing method" for detailed information about the greasing method.
Refer to "8.6 How to replace components" for detailed information about specific component replacement and adjustment methods.

External visual inspection

S : Slider type, High rigidity slider type (EC-S□□AH),
High rigidity slider type (EC-S□□H)

R : Rod type

RR : Radial cylinder type,
High rigidity radial cylinder type (EC-RR□□AH),
High rigidity radial cylinder type (EC-RR□□H)

S	R	RR	Inspection items	Maintenance work
○	○	○	Is abnormal noise or vibration generated?	Refer to "7.3 Troubleshooting with no alarm generated" for help.
○	○	○	Are ELECYLINDER 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 rod sliding surface grease not lubricating well?	Wipe away the old grease, then replenish with new grease.
–	○	○	Is there foreign matter or dust adhered to the rod sliding surface?	Clean the rod sliding surface, then replenish with new 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.

Refer to "8.5 Greasing method" for detailed information about the greasing method.
Refer to "8.6 How to replace components" for detailed information about specific component replacement and adjustment methods.

Internal visual inspection

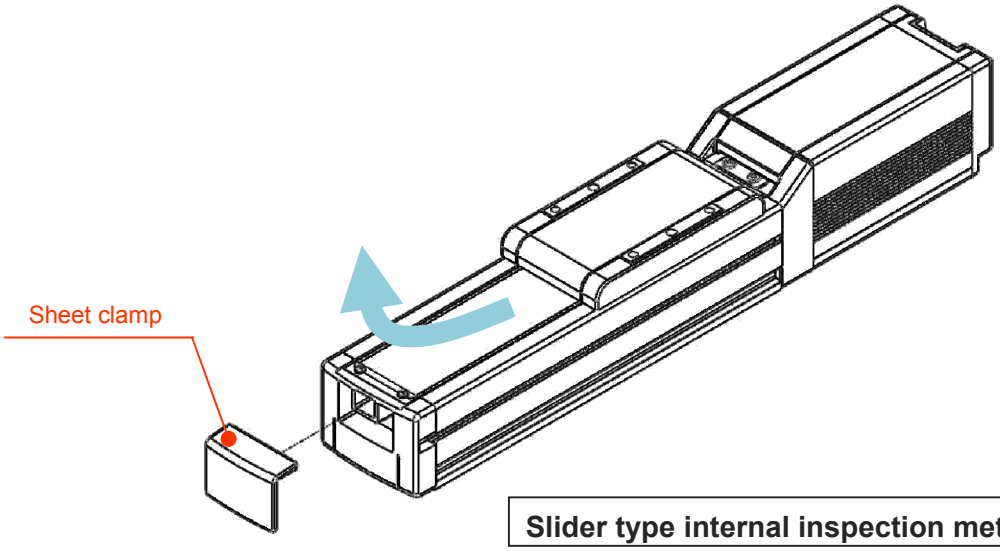
S : Slider type, High rigidity slider type (EC-S□□AH),
High rigidity slider type (EC-S□□H)

R : Rod type

RR : Radial cylinder type,
High rigidity radial cylinder type (EC-RR□□AH),
High rigidity radial cylinder type (EC-RR□□H)

S	R	RR	Inspection items	Maintenance work
○	–	○	Is play or dust generated?	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. (Replenishment only for rod type)
○	–	○	Is dust or foreign matter adhered to the ball screw or guide?	Replenish with new grease after cleaning.

(1) Remove the sheet clamp.
(2) Fold back the stainless steel sheet and inspect the interior.
(3) Return the stainless steel sheet to normal and secure with sheet clamps.

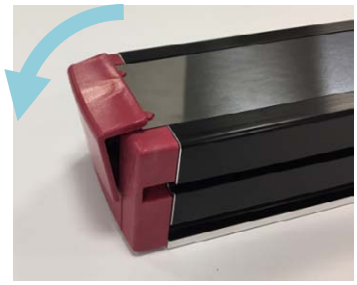


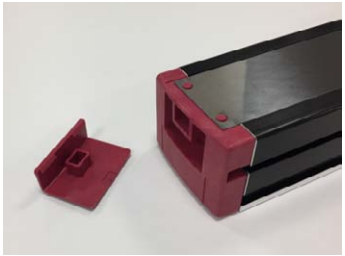
Slider type internal inspection method

[How to remove the sheet clamps]

Grab a "sheet clamp" and pull.
It has a hooked part, so lift and turn slightly while pulling to make it easier to remove.

To mount, slightly lift the hook part and press in.





8.4 Cleaning

External cleaning

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

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 gaps.
- Do not use petroleum-based solvents, neutral detergent or alcohol.

8.5 Greasing method

Slider type
High rigidity slider type (EC-S□□AH), High rigidity slider type (EC-S□□H)

[1] Grease used: Use an equivalent product

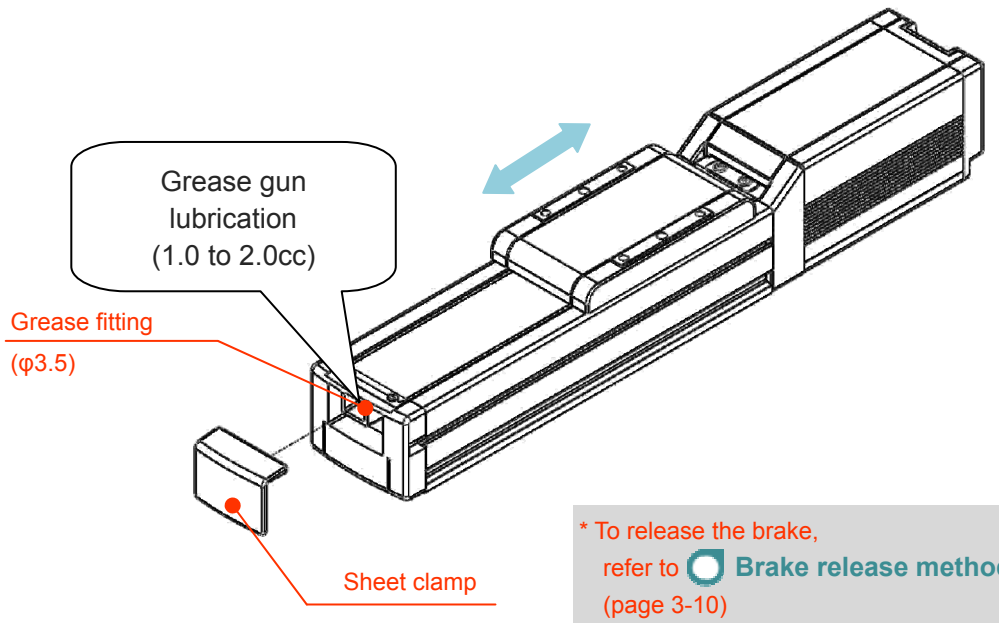
Application location	**During maintenance** (recommended product)	Default (reference)
Ball screw	Kyodo Yushi Multemp LRL No.3	Kyodo Yushi Multemp LRL No.3
Guide		

Caution

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

(2) Greasing method: Ball screw/guide (supply to both through grease fitting)

(1) Remove the sheet clamp. (Refer to page 8-7 for the removal method)
(2) Move the slider to the non-motor side.
(3) Lubricate using a grease gun through the grease fitting (φ3.5).
(4) Move the slider full-stroke to apply the grease thoroughly.



* To release the brake,
refer to **Brake release method**
(page 3-10)

Slider type greasing method

Caution

- Supplying too much grease may increase sliding resistance.
  This may increase motor load and result in decreased performance.
- If the grease enters your eye, immediately see a specialist physician for appropriate care.
- After finishing the grease replenishment, wash your hands carefully with water and soap to rinse the grease off.

Rod type

[1] Grease used: Use an equivalent product

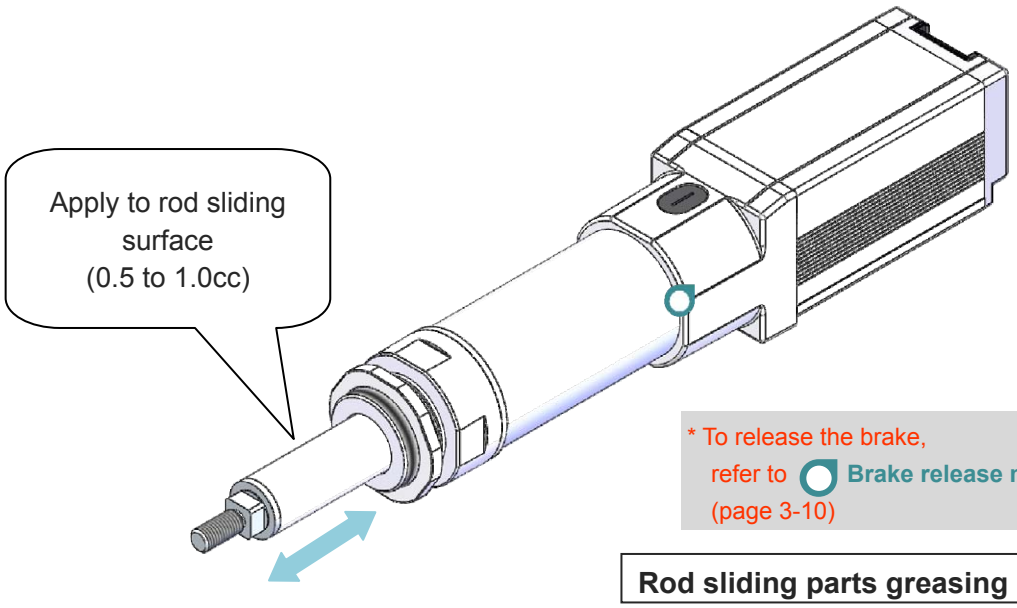
Application location	**During maintenance** (recommended product)	Default (reference)
Rod sliding surface	Kyodo Yushi Multemp LRL No.3	Kyodo Yushi Multemp LRL No.3
Ball screw	Wako Chemical Spray Grease No.A161	
Rotation stopper		

Caution

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

[2] Greasing method: Rod sliding parts

(1) Pull the rod towards the non-motor side.
(2) Clean the rod sliding surface and apply the grease by hand.
(3) Move the rod full-stroke to apply the grease thoroughly.

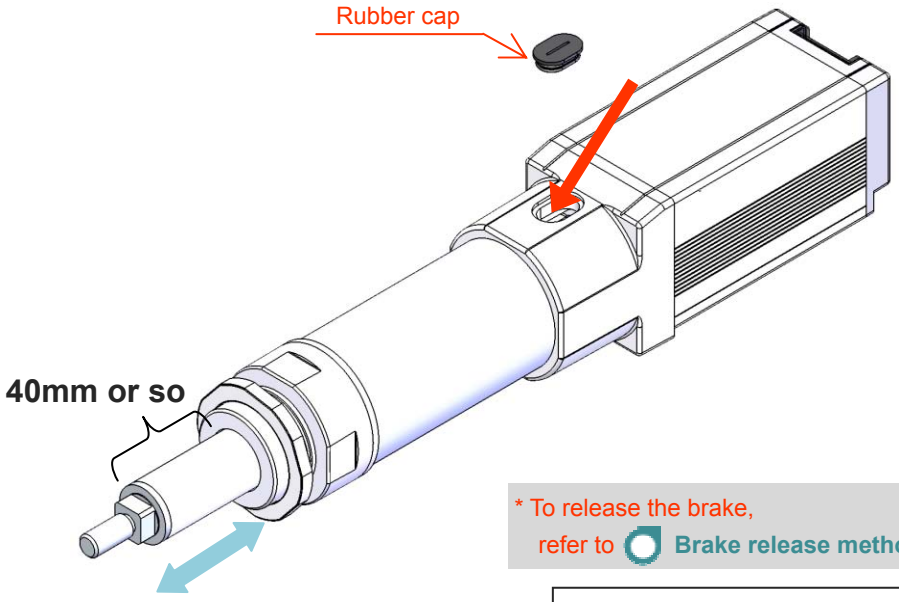


* To release the brake, refer to Brake release method (page 3-10)

Rod sliding parts greasing method

[3] Greasing method: Frame interior (ball screw, rotation stop)

(1) Pull the rod approximately 40mm towards the non-motor side.
(2) Remove the rubber cap of the grease port.
(3) Insert the tip of the spray grease into the grease port and inject it for one second.
(4) Move the rod full-stroke to apply the grease thoroughly.



* To release the brake,
refer to Brake release method (page 3-10)

Rod internal parts greasing method

Caution

- Limit the time per spray of spray grease to 1 second or less.
  Supplying too much grease may increase sliding resistance.
  This may increase motor load and result in decreased performance.
- If the grease enters your eye, immediately see a specialist physician for appropriate care.
- After finishing the grease replenishment, wash your hands carefully with water and soap to rinse the grease off.

Radial cylinder type

[1] Grease used: Use an equivalent product

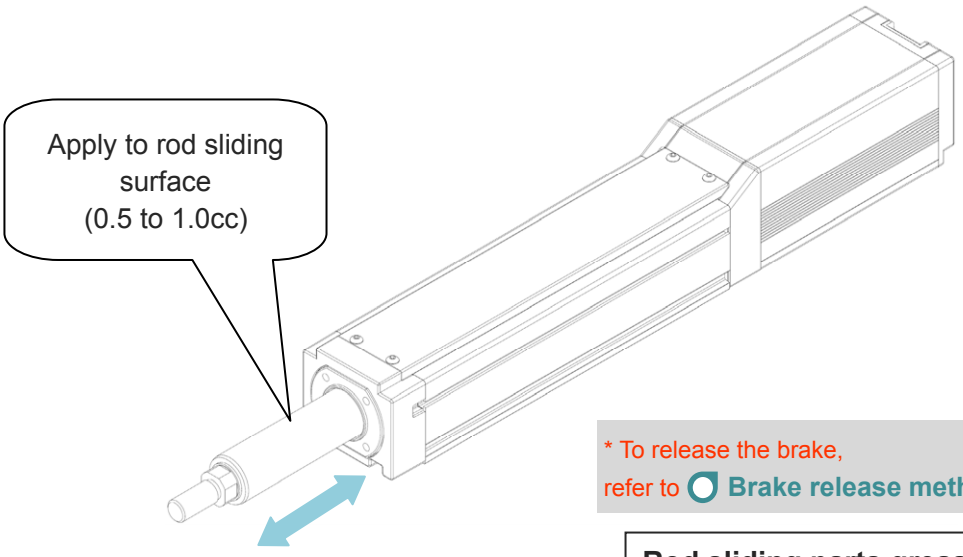
Application location	During maintenance (recommended product)	Default (reference)
Rod sliding surface	Kyodo Yushi Multemp LRL No.3	Kyodo Yushi Multemp LRL No.3
Ball screw		
Guide		

Caution

- Never use fluorine-based grease.
- Mixing with lithium-based grease not only reduces the performance of the grease, it may even cause damage to the ELECYLINDER.

[2] Greasing method: Rod sliding parts

(1) Pull the rod towards the non-motor side.
(2) Clean the rod sliding surface and apply the grease by hand.
(3) Move the rod full-stroke to apply the grease thoroughly.

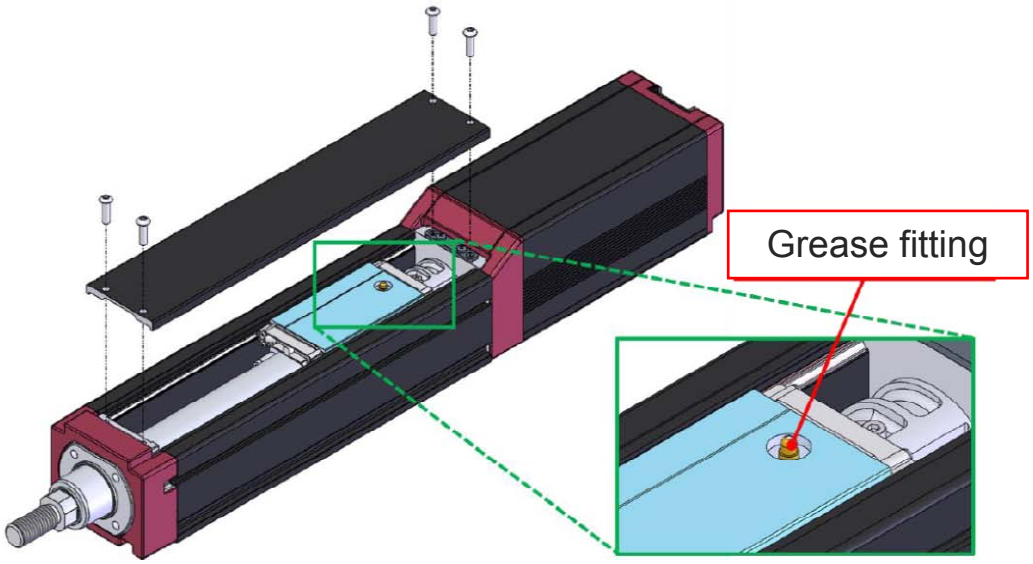


* To release the brake,
refer to Brake release method (page 3-10)

Rod sliding parts greasing method

[3] Greasing method: Ball screw/guide (supply to both through grease fitting)

(1) Remove the hex socket button bolts (4 pcs) fixing the frame cover, and then remove the frame cover itself.
(2) Using a grease gun, supply grease through the grease fitting (φ3.5) on top of the nut holder.
(3) Move the nut holder throughout the full stroke to apply the grease thoroughly.
(4) Mount the frame cover on the base and fix it with hex socket button bolts (4 pcs) (tightening torque: 1.91N·m).



* To release the brake,
refer to Brake release method (page 3-10)

Radial Cylinder type greasing method

Caution

- Supplying too much grease may increase sliding resistance.
  This may increase motor load and result in decreased performance.
- If the grease enters your eye, immediately see a specialist physician for appropriate care.
- After finishing the grease replenishment, wash your hands carefully with water and soap to rinse the grease off.

High rigidity radial cylinder type (EC-RR□□AH), High rigidity radial cylinder type (EC-RR□□H)

[1] Grease used: Use an equivalent product

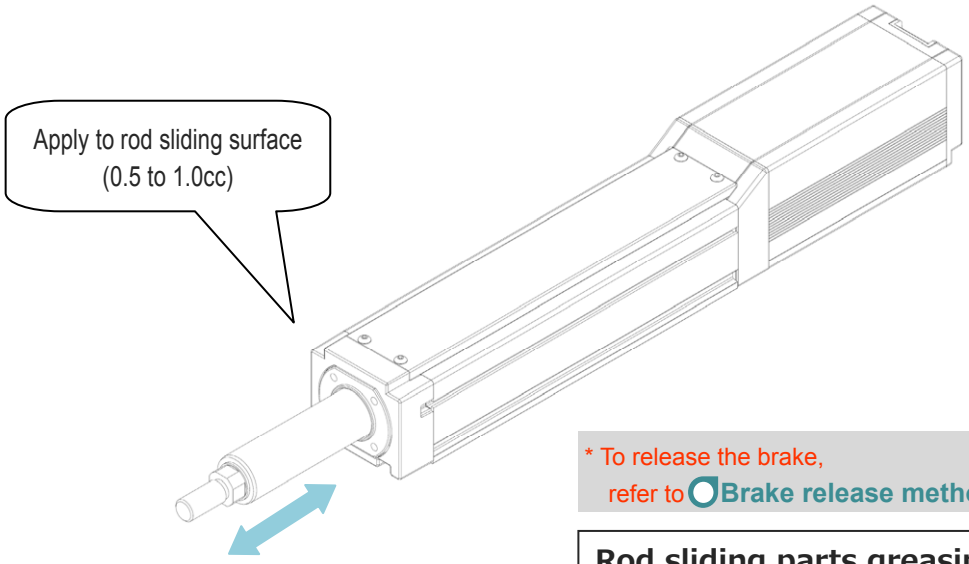
Application location	**During maintenance** (recommended product)	Default (reference)
Rod sliding surface	Kyodo Yushi/Multemp LRL No.3	Kyodo Yushi/Multemp LRL No.3
Ball screw		
Guide		

Caution

- Never use fluorine-based grease.
- Mixing with lithium-based grease not only reduces the performance of the grease, it may even cause damage to the ELECYLINDER.

[2] Greasing method: Rod sliding parts

(1) Pull the rod towards the non-motor side.
(2) Clean the rod sliding surface and apply the grease by hand.
(3) Move the rod full-stroke to apply the grease thoroughly.

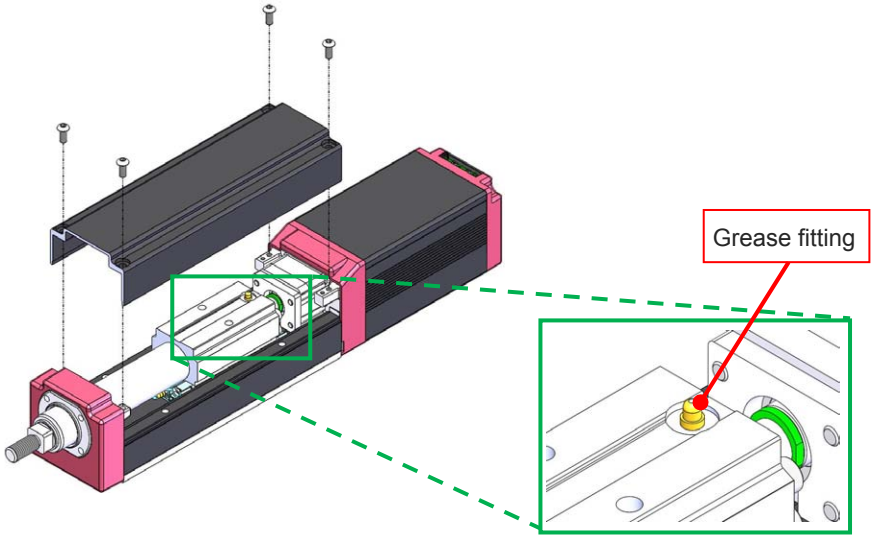


* To release the brake, refer to Brake release method (page 3-10)

Rod sliding parts greasing method

(3) Greasing method: Ball screw/guide (supply to both through grease fitting)

(1) Remove the hex socket button bolts (4 pcs) fixing the frame cover, and then remove the frame cover itself.
(2) Using a grease gun, supply grease through the grease fitting (φ3.5) on top of the nut holder.
(3) Move the nut holder throughout the full stroke to apply the grease thoroughly.
(4) Mount the frame cover on the base and fix it with hex socket button bolts (4 pcs) (tightening torque: 1.91N·m).



* To release the brake,
refer to Brake release method (page 3-10)

High rigidity radial cylinder type (EC-RR□□AH) and High rigidity radial cylinder type (EC-RR□□H) greasing method

Caution

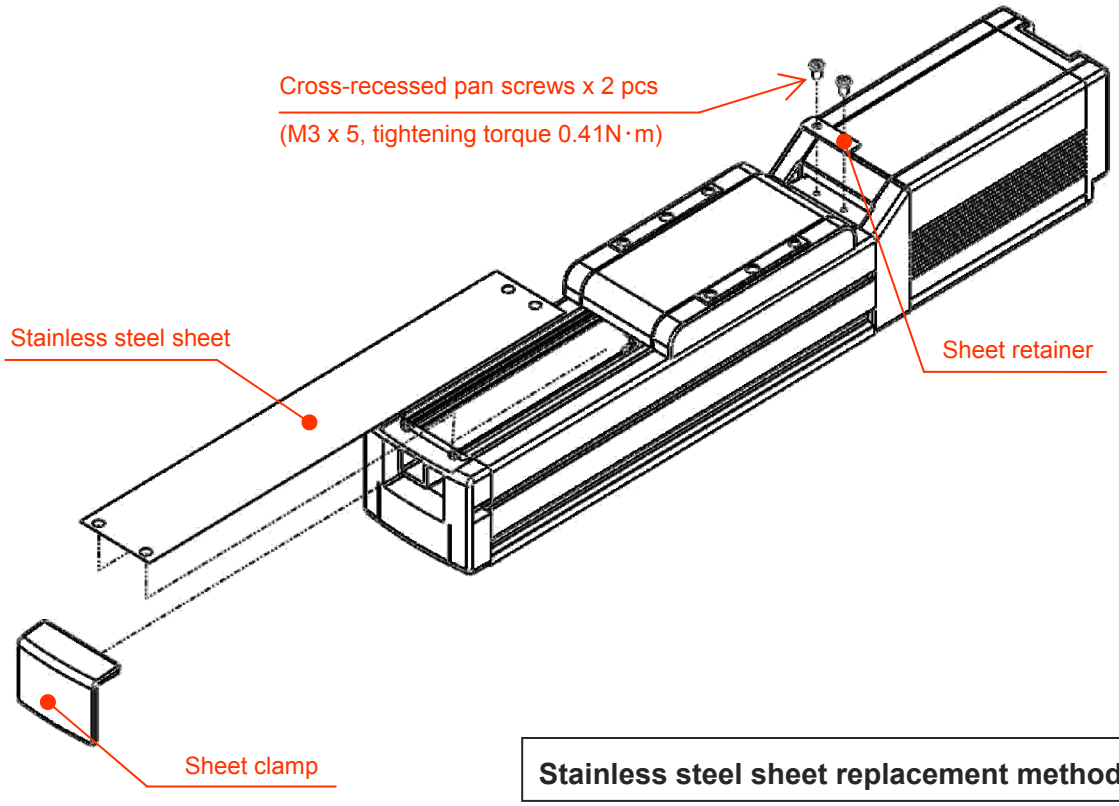
- Supplying too much grease may increase sliding resistance. This may increase motor load and result in decreased performance.
- If the grease enters your eye, immediately see a specialist physician for appropriate care.
- After finishing the grease replenishment, wash your hands carefully with water and soap to rinse the grease off.

8.6 How to replace components

Stainless steel sheet replacement/adjustment

[EC-S6/S7]

(1) Remove the sheet clamp. (Refer to page 8-7 for the removal method)
(2) Loosen the screws and remove the sheet retainer.
(3) Pull out the old stainless steel sheet.
(4) Insert a new stainless steel sheet using the reverse procedure.
It should be inserted along the slider internal guide.
(5) Mount the sheet retainer.
(6) Secure with sheet clamp.

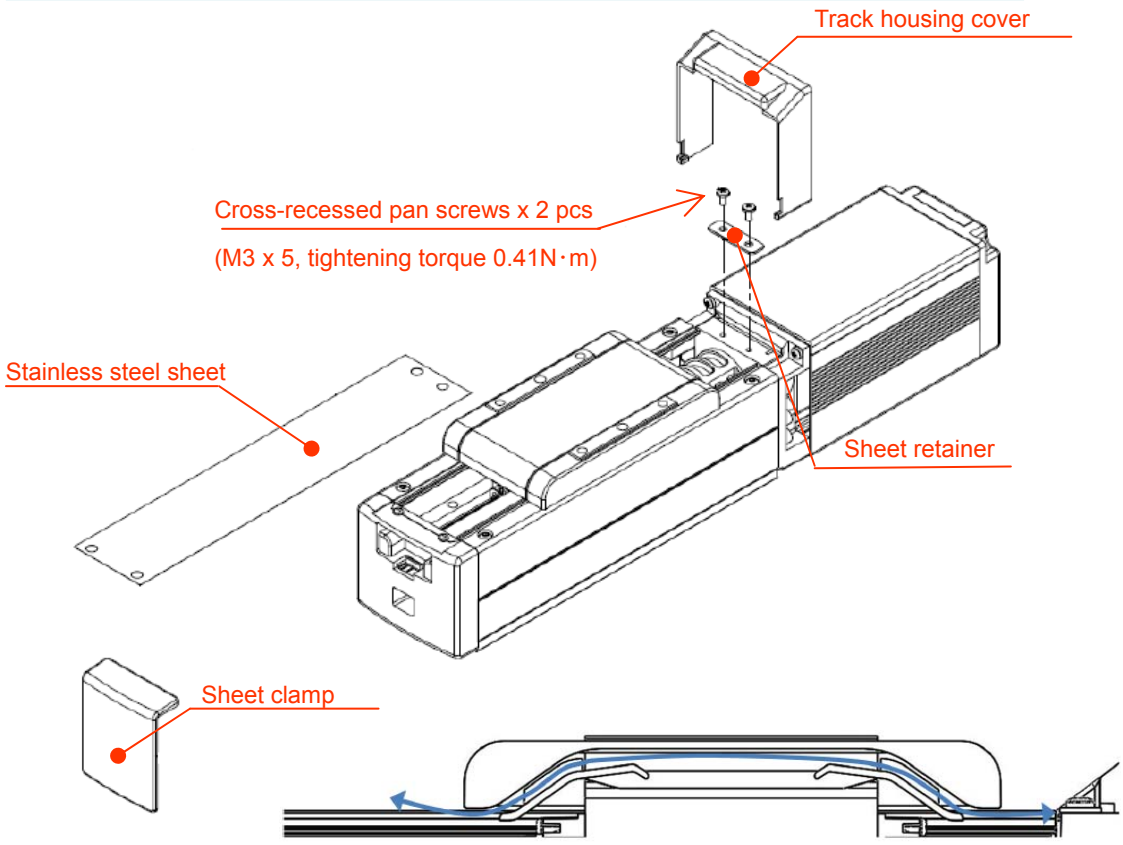


Stainless steel sheet replacement method

Body model	Stainless steel sheet model
EC-S6	ST-EC-S6-*** (stroke)
EC-S7	ST-EC-S7-*** (stroke)

[EC-S6□AH/S7□AH, EC-S6□H/S7□H]

(1) Remove the sheet clamp and the track housing cover.
(2) Loosen the screws and remove the sheet retainer.
(3) Pull out the old stainless steel sheet.
(4) Insert a new stainless steel sheet using the reverse procedure.
It should be inserted along the slider internal guide.
(5) Mount the sheet retainer.
(6) Secure the sheet clamp and the track housing cover.



Internal structure

Stainless steel sheet replacement method

Body model	Stainless steel sheet model
EC-S6□AH EC-S6□H	ST-ECH-S6-*** (stroke)
EC-S7□AH EC-S7□H	ST-ECH-S7-*** (stroke)

Caution

- Make sure that there is no misalignment or slack in the stainless steel sheet. This may lead to damage to the stainless steel sheet.
- When installing the sheet clamp, do not apply excessive force to the stainless steel sheet.

Notice

- 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.
- Stainless steel sheet replacement can be performed by the customer. However, if you have any concerns regarding the work, we recommend that you bring the unit to IAI or have one of our technicians come to your site to perform the replacement.

Controller replacement (motor cover assembly replacement)

[EC-S6/S7/R6/R7/RR6/RR7]

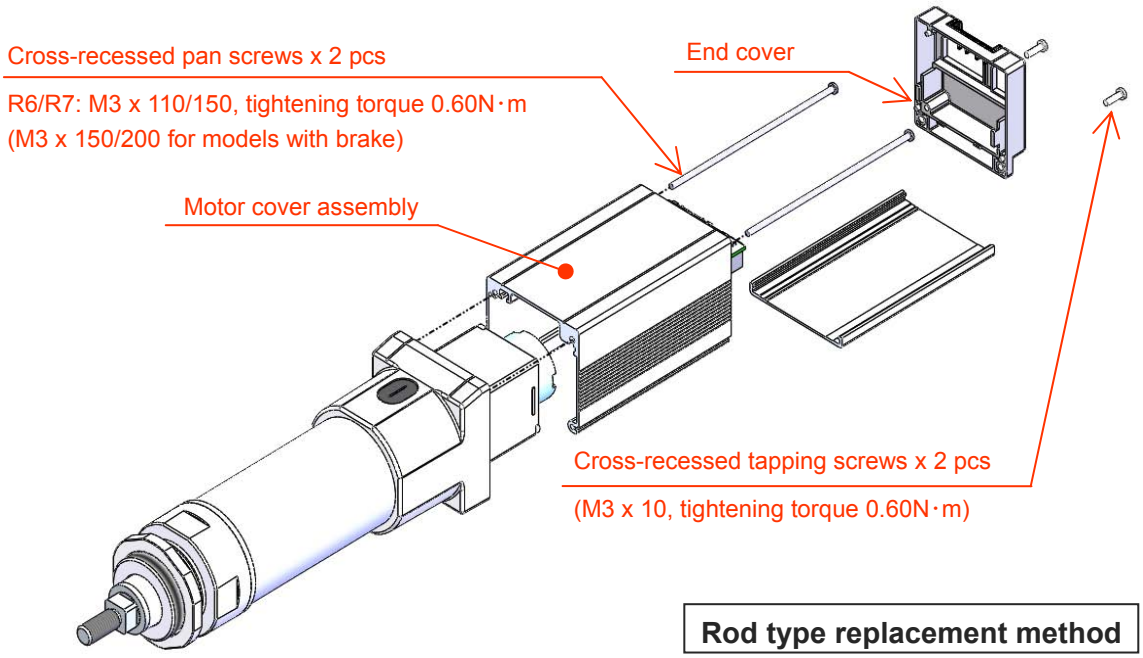
(1) Loosen the screws and remove the end cover.

(2) Loosen the screws to remove the wiring/connectors, then remove the used motor cover assembly.

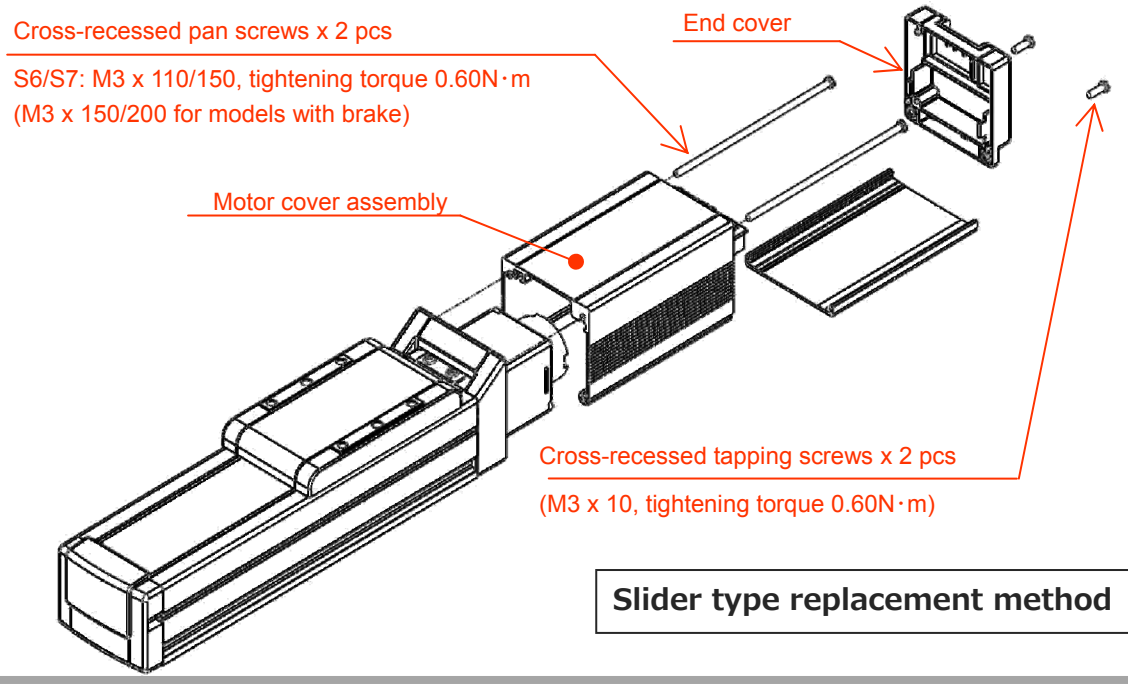
→ Refer to "Precautions for connectors/wiring" on page 8-23.

(3) Mount the wiring/connectors to the new motor cover assembly and return it to the original state.

(4) Mount the end cover.



Rod type replacement method



Slider type replacement method

[EC-S6□AH/S7□AH, EC-S6□H/S7□H]

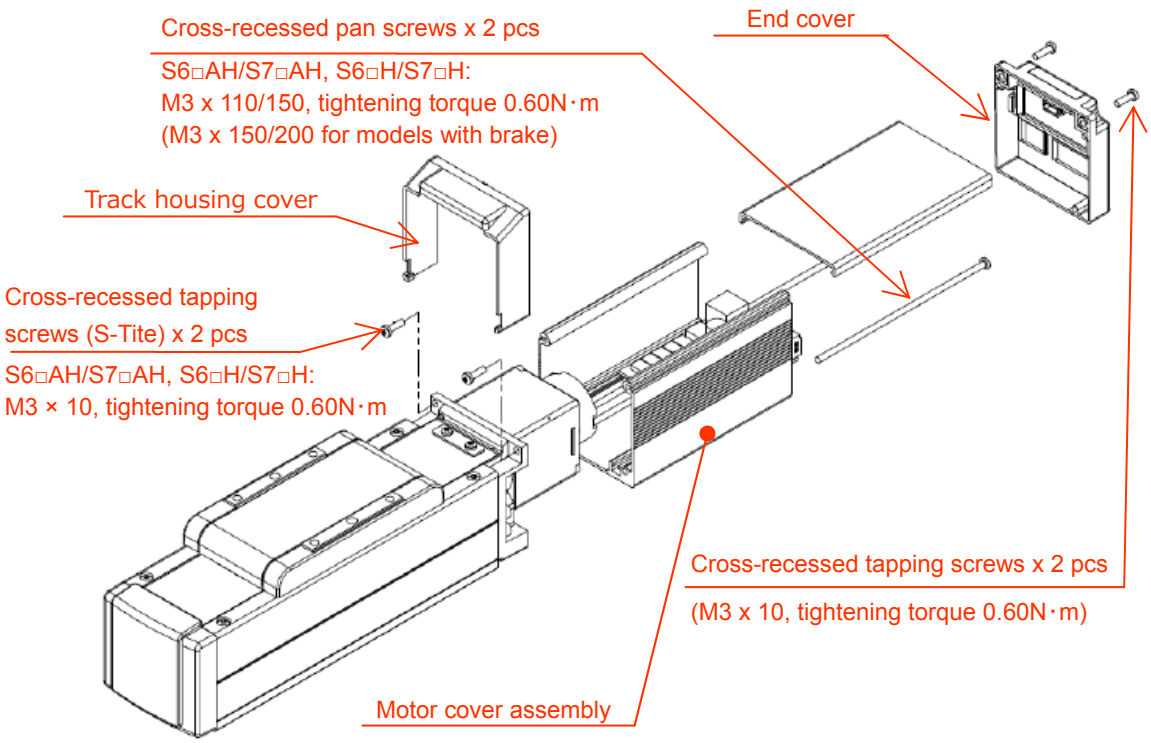
(1) Loosen the screws and remove the end cover.

(2) Remove the track housing cover, loosen the screws to remove the wiring/connectors, then remove the used motor cover assembly.

→ Refer to "Precautions for connectors/wiring" on page 8-23.

(3) Mount the wiring/connectors to the new motor cover assembly and return it to the original state.

(4) Mount the end cover.



High rigidity slider type replacement method

[EC-RR6□AH/RR7□AH, EC-RR6□H/RR7□H]

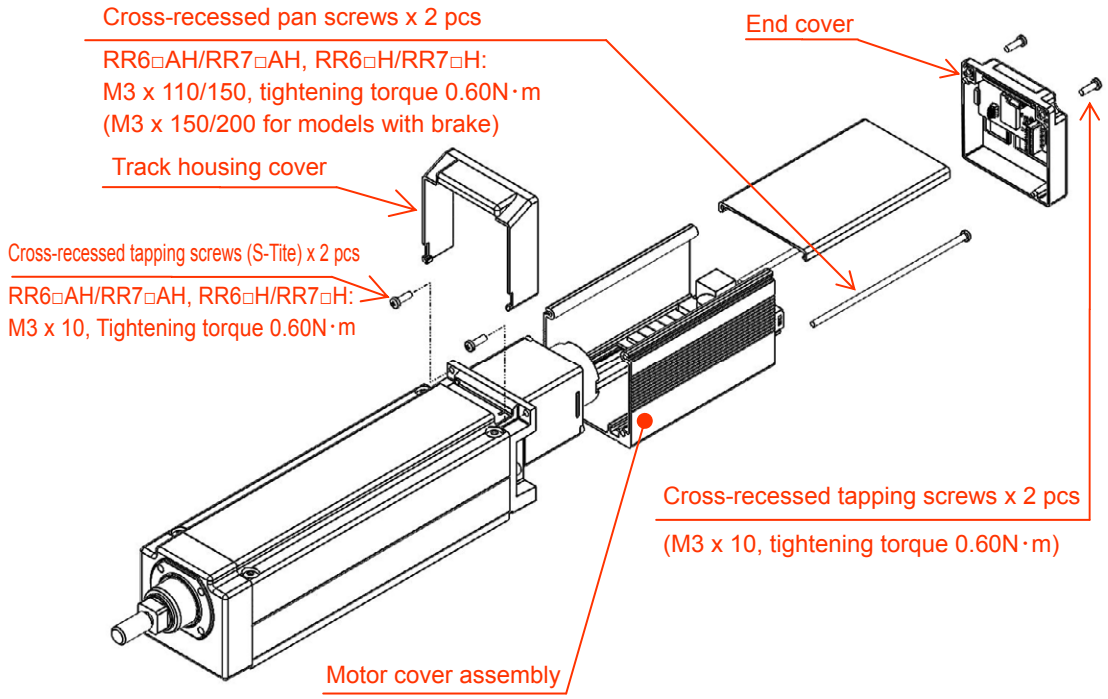
(1) Loosen the screws and remove the end cover.

(2) Remove the track housing cover, loosen the screws to remove the wiring/connectors, then remove the used motor cover assembly.

→ Refer to "Precautions for connectors/wiring" on page 8-23.

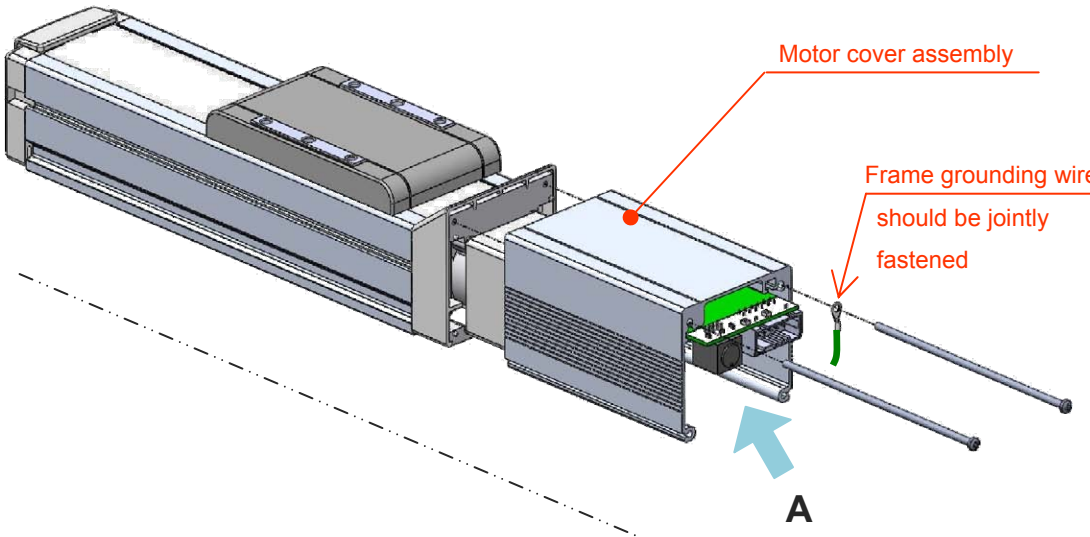
(3) Mount the wiring/connectors to the new motor cover assembly and return it to the original state.

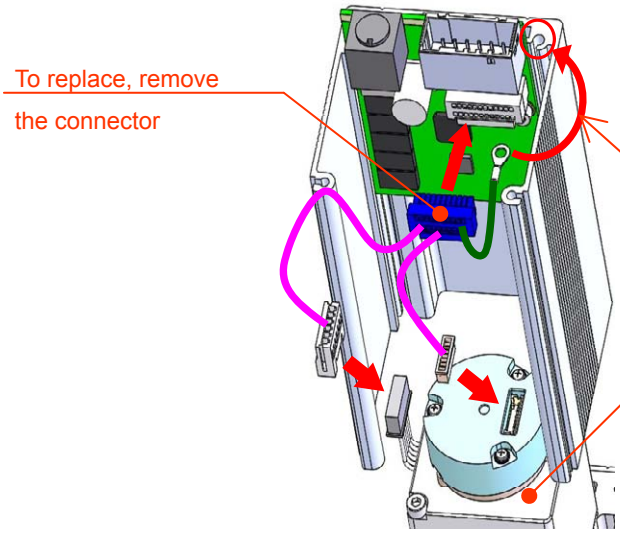
(4) Mount the end cover.



High rigidity radial cylinder type replacement method

Precautions for connectors/wiring





Motor cover assembly interior
(A arrow view)

* Before pulling off the motor cover assembly, make sure to remove the connector

* Be careful not to snag the cables

Body model	Motor cover assembly model
EC-S6/R6/RR6	MWB-EC-SR6(-B)(-P)(-WL2)
EC-S7/R7/RR7	MWB-EC-SR7(-B)(-P)(-WL2)
EC-S6□AH/RR6□AH EC-S6□H/RR6□H	MWB-ECH-SRR6(-B)(-P)(-WL2)
EC-S7□AH/RR7□AH EC-S7□H/RR7□H	MWB-ECH-SRR7(-B)(-P)(-WL2)

B: Specification with brake, P: PNP specification, WL2: Wireless axis operation specification

Wireless communication circuit board replacement(End cover assembly replacement)

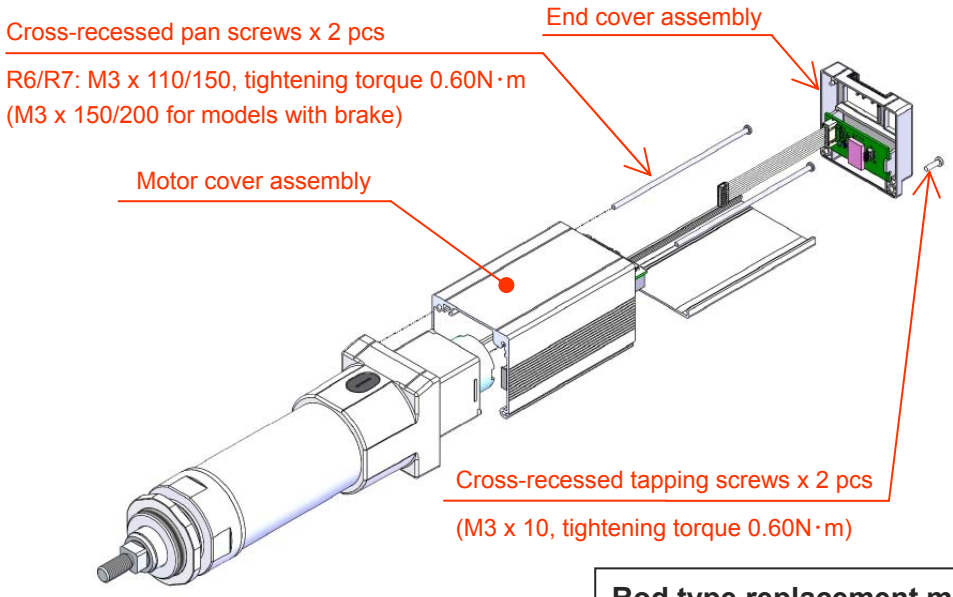
[EC-S6/S7/R6/R7/RR6/RR7]

(1) Loosen the screws, then remove the old end cover assembly.

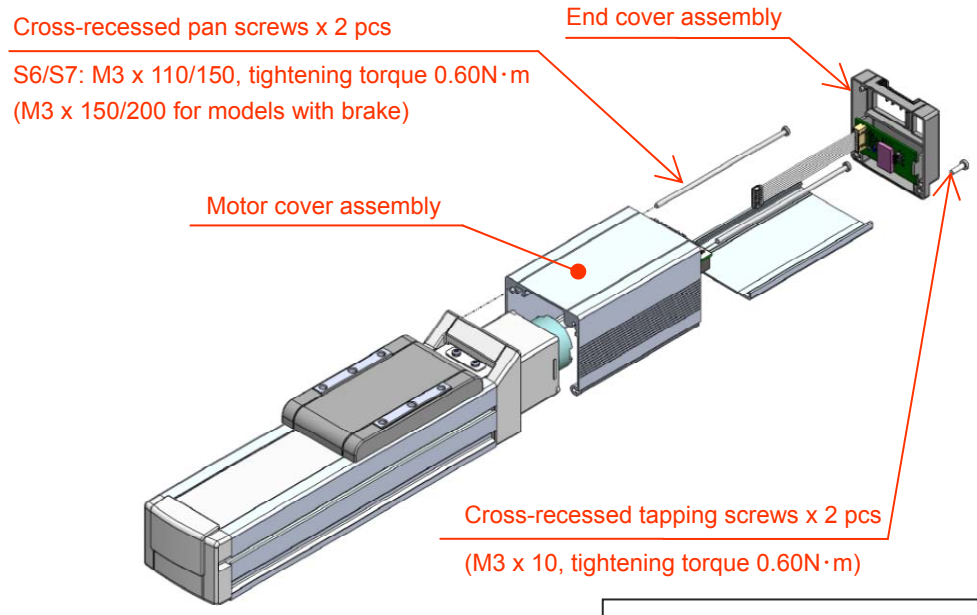
(2) Loosen the screws, then dislodge the motor cover assembly.
Keep the cable connected to the motor cover assembly connected.

(3) Remove the cable connector for the old end cover assembly from the controller circuit board inside the motor cover assembly.

→ For the connector location, refer to "Notes on connectors/wiring" (page 8-28).



Rod type replacement method



Slider type replacement method

(4) Attach the cable connector for the new end cover assembly to the controller circuit board inside the motor cover assembly.

→ For the connector location, refer to "Notes on connectors/wiring" (page 8-28).

(5) Mount the motor cover assembly.

(6) Mount the new end cover assembly.

[EC-S6□AH/S7□AH, EC-S6□H/S7□H]

(1) Loosen the screws, then remove the old end cover assembly.

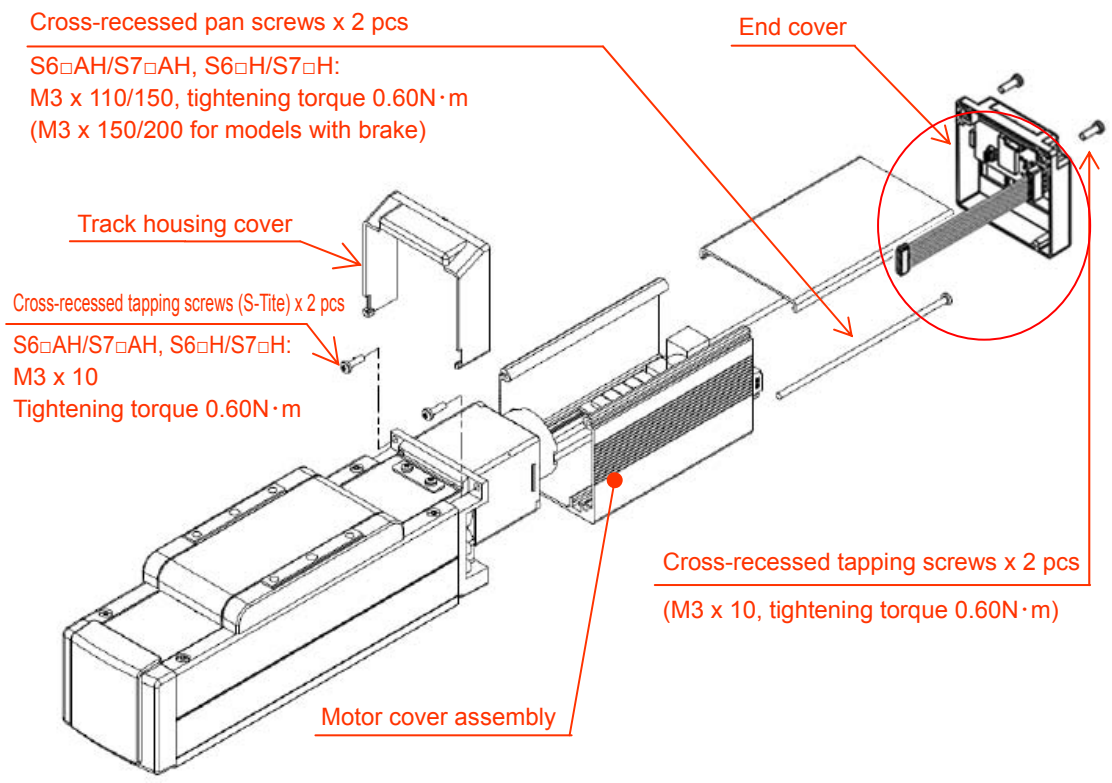
(2) Loosen the screws, then dislodge the motor cover assembly.
Keep the cable connected to the motor cover assembly connected.

(3) Remove the cable connector for the old end cover assembly from the controller circuit board inside the motor cover assembly.
→ For the connector location, refer to "Notes on connectors/wiring" (page 8-28).

(4) Attach the cable connector for the new end cover assembly to the controller circuit board inside the motor cover assembly.
→ For the connector location, refer to "Notes on connectors/wiring" below (page 8-28).

(5) Mount the motor cover assembly.

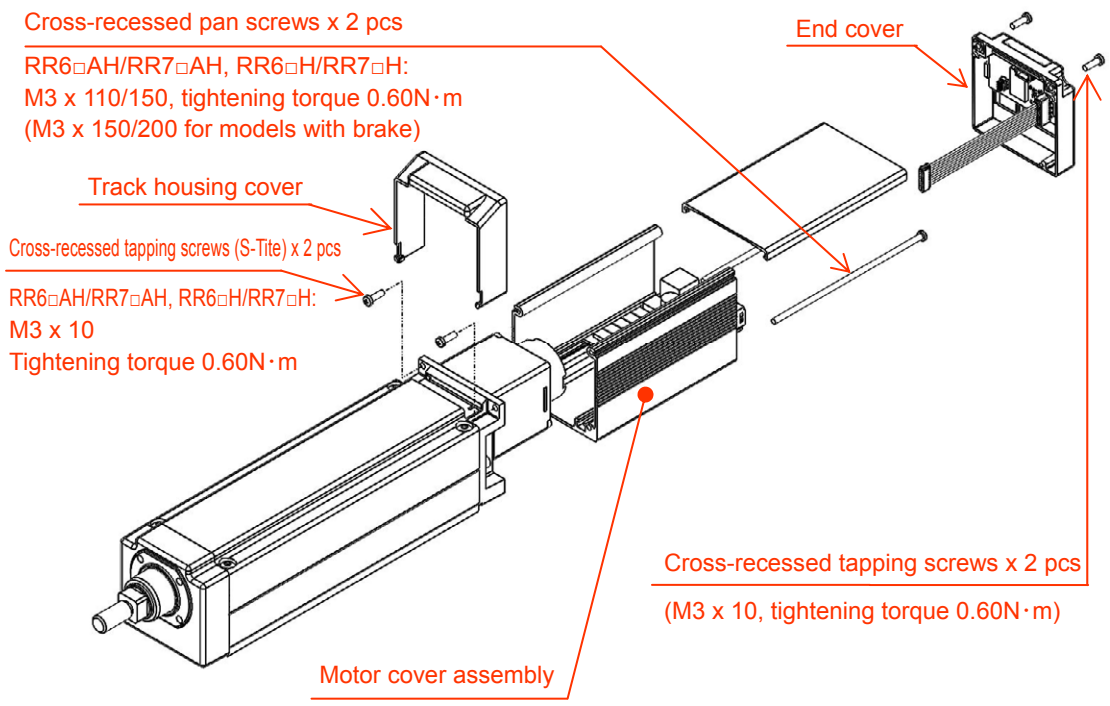
(6) Mount the new end cover assembly.



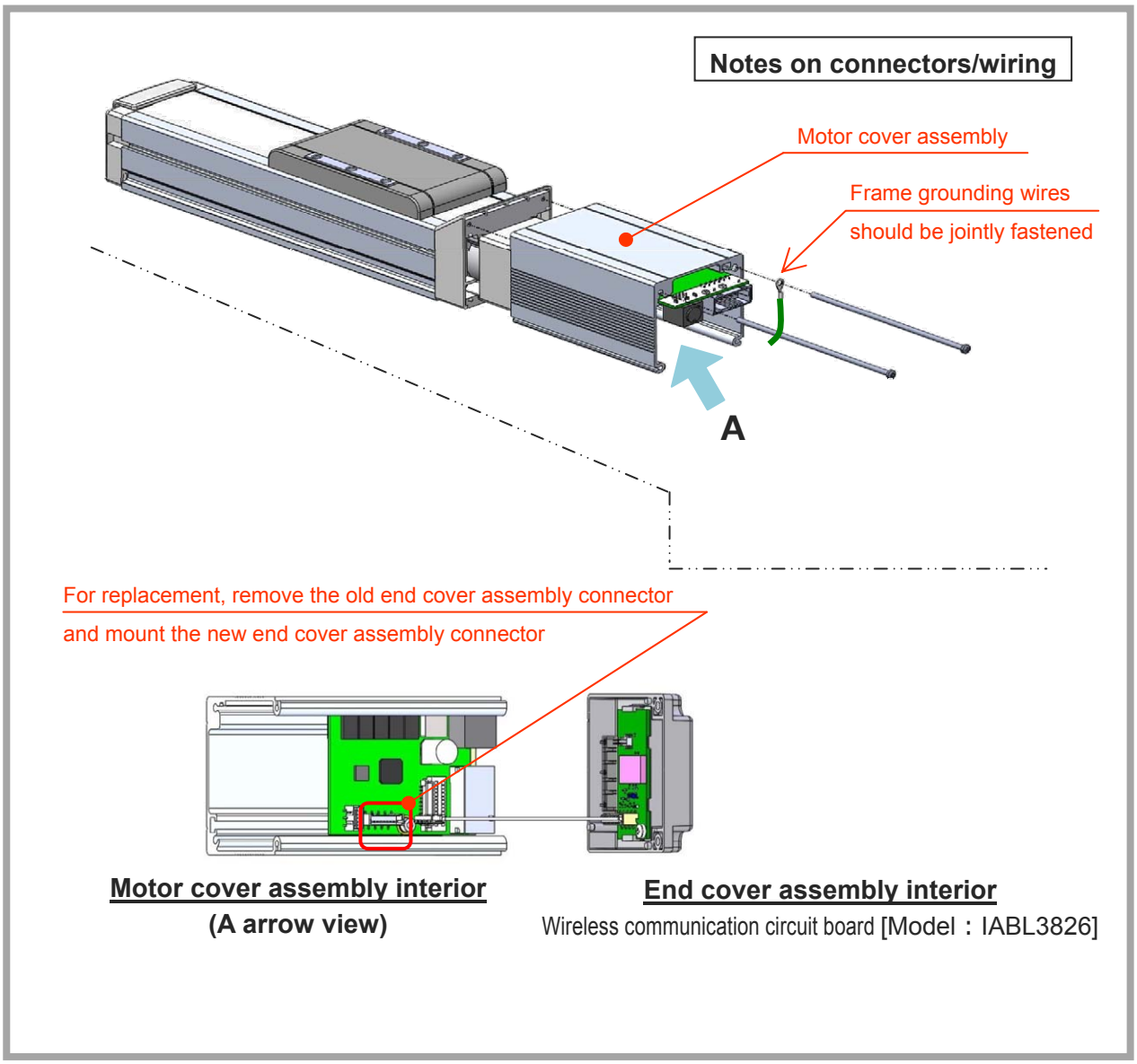
High rigidity slider type replacement method

[EC-RR6□AH/RR7□AH, EC-RR6□H/RR7□H]

(1) Loosen the screws, then remove the old end cover assembly.
(2) Loosen the screws, then dislodge the motor cover assembly.
Keep the cable connected to the motor cover assembly connected.
(3) Remove the cable connector for the old end cover assembly from the controller circuit board inside the motor cover assembly.
→ For the connector location, refer to "Notes on connectors/wiring" (page 8-28).
(4) Attach the cable connector for the new end cover assembly to the controller circuit board inside the motor cover assembly.
→ For the connector location, refer to "Notes on connectors/wiring" below (page 8-28).
(5) Mount the motor cover assembly.
(6) Mount the new end cover assembly.



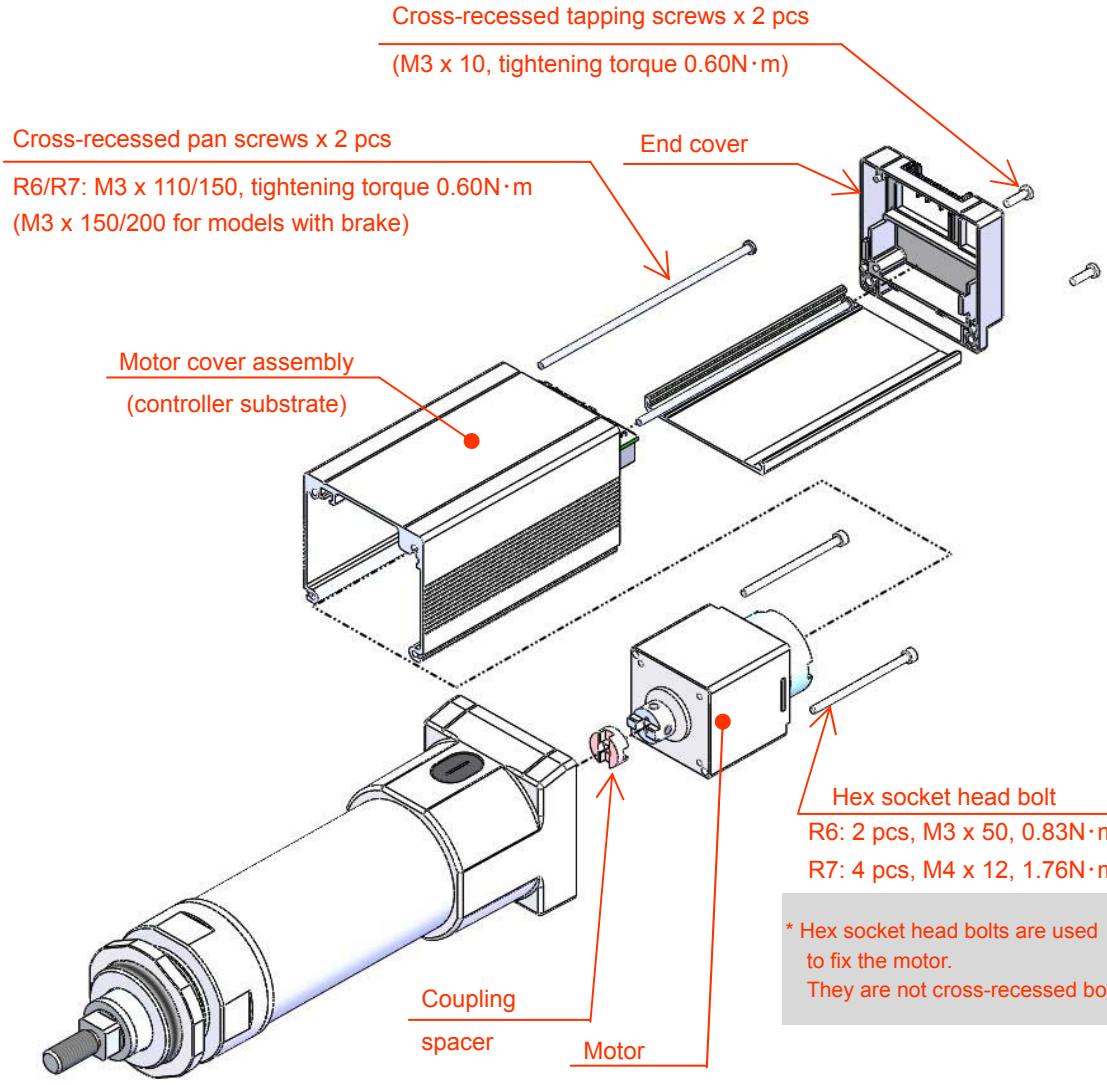
High rigidity radial cylinder type replacement method



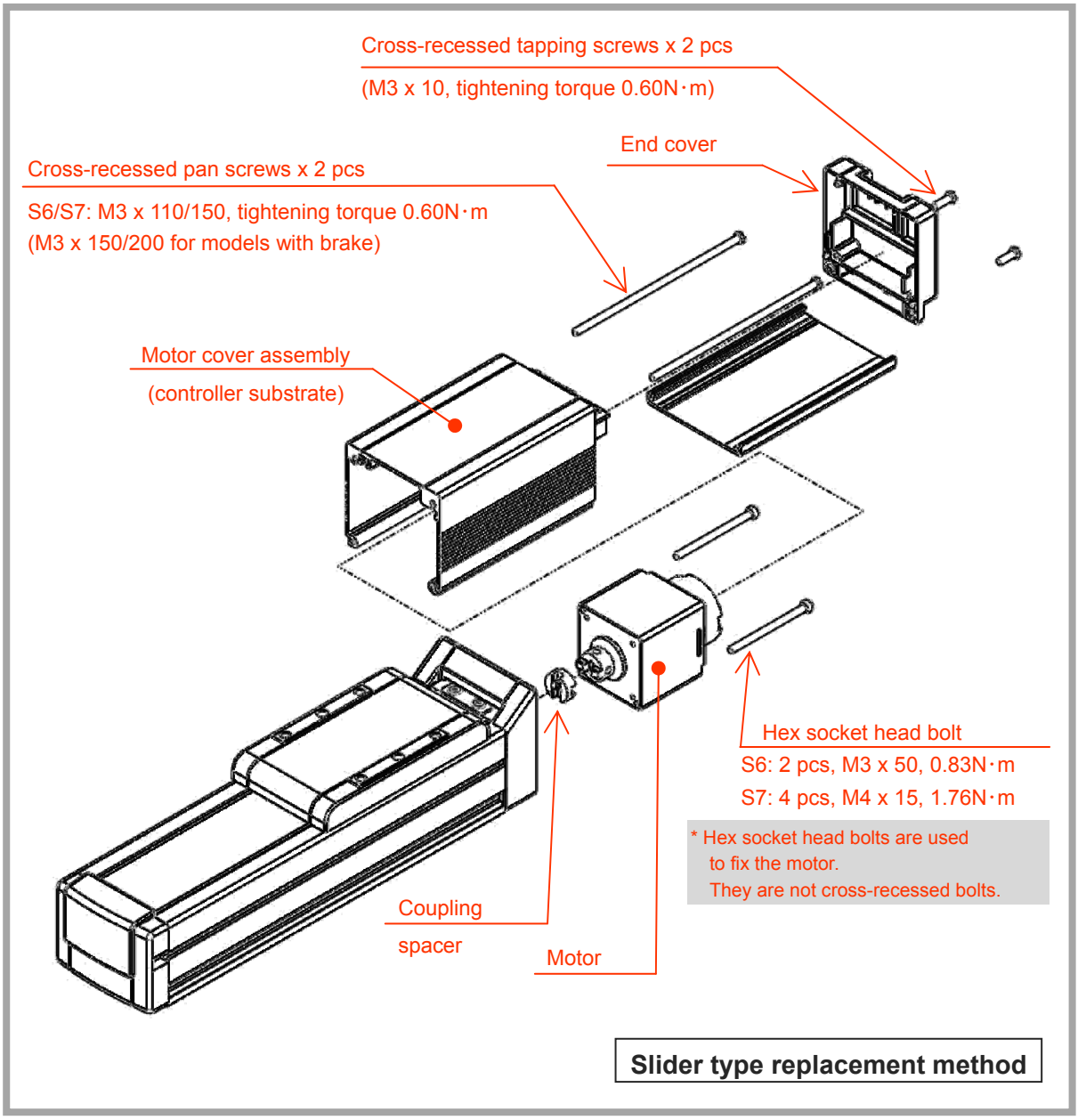
Body model	End cover assembly model number (with wireless communication circuit board cable)
EC-S6/R6/RR6	EWB-EC-SR6
EC-S7/R7/RR7	EWB-EC-SR7
EC-S6□AH/RR6□AH EC-S6□H/RR6□H	EWB-ECH-SRR6
EC-S7□AH/RR7□AH EC-S7□H/RR7□H	EWB-ECH-SRR7

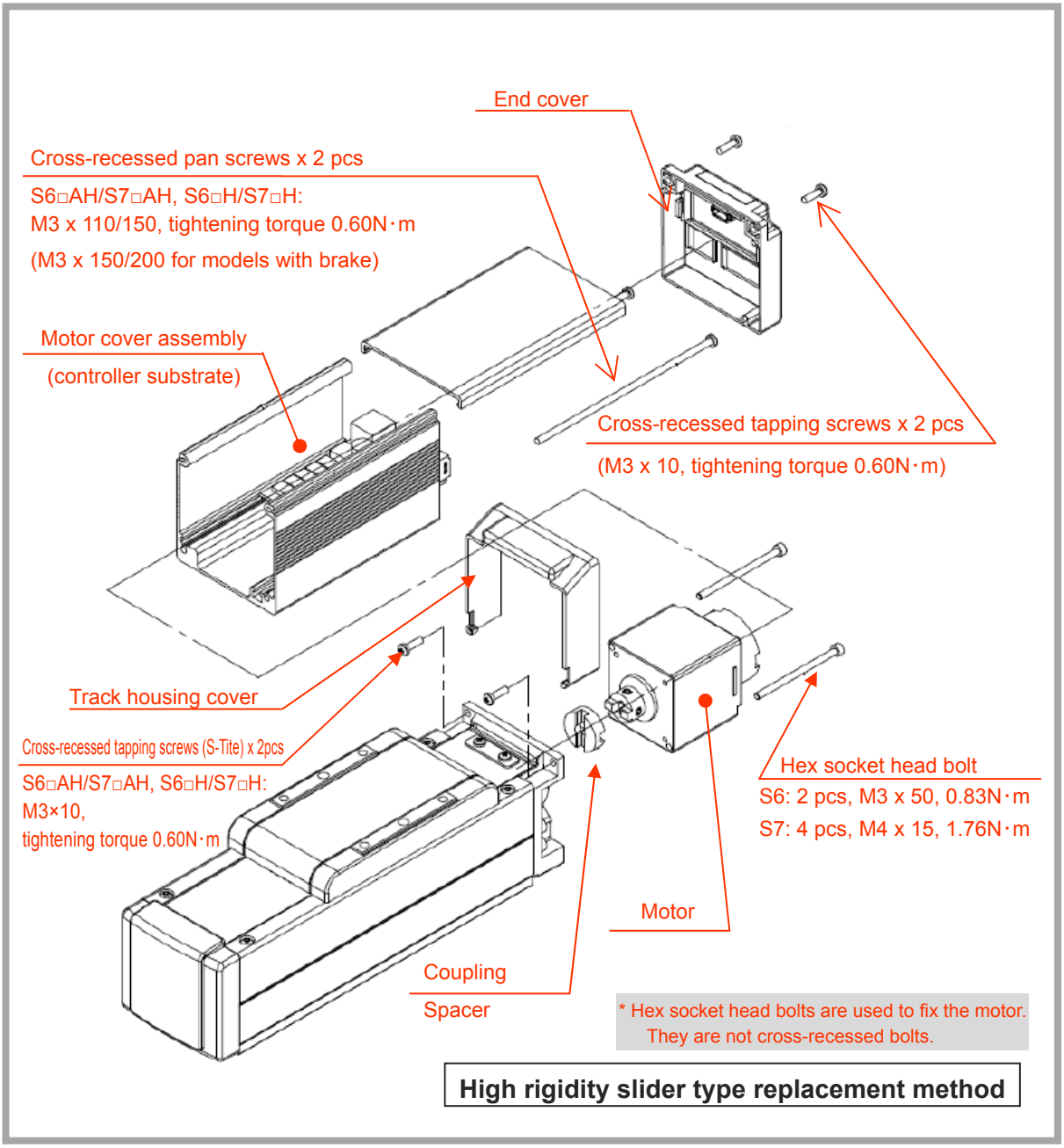
Motor replacement (including coupling spacer replacement)

(1) Loosen the screws and remove the end cover.
(2) Loosen the screws to remove the wiring/connectors, then remove the motor cover assembly.
→ Refer to "Precautions for connectors/wiring" on page 8-23.
(3) Remove the motor and coupling spacer.
(4) Mount the new motor and coupling spacer.
(5) Return the wiring, connectors and motor cover assembly to their original state.
(6) Attach the end cover.

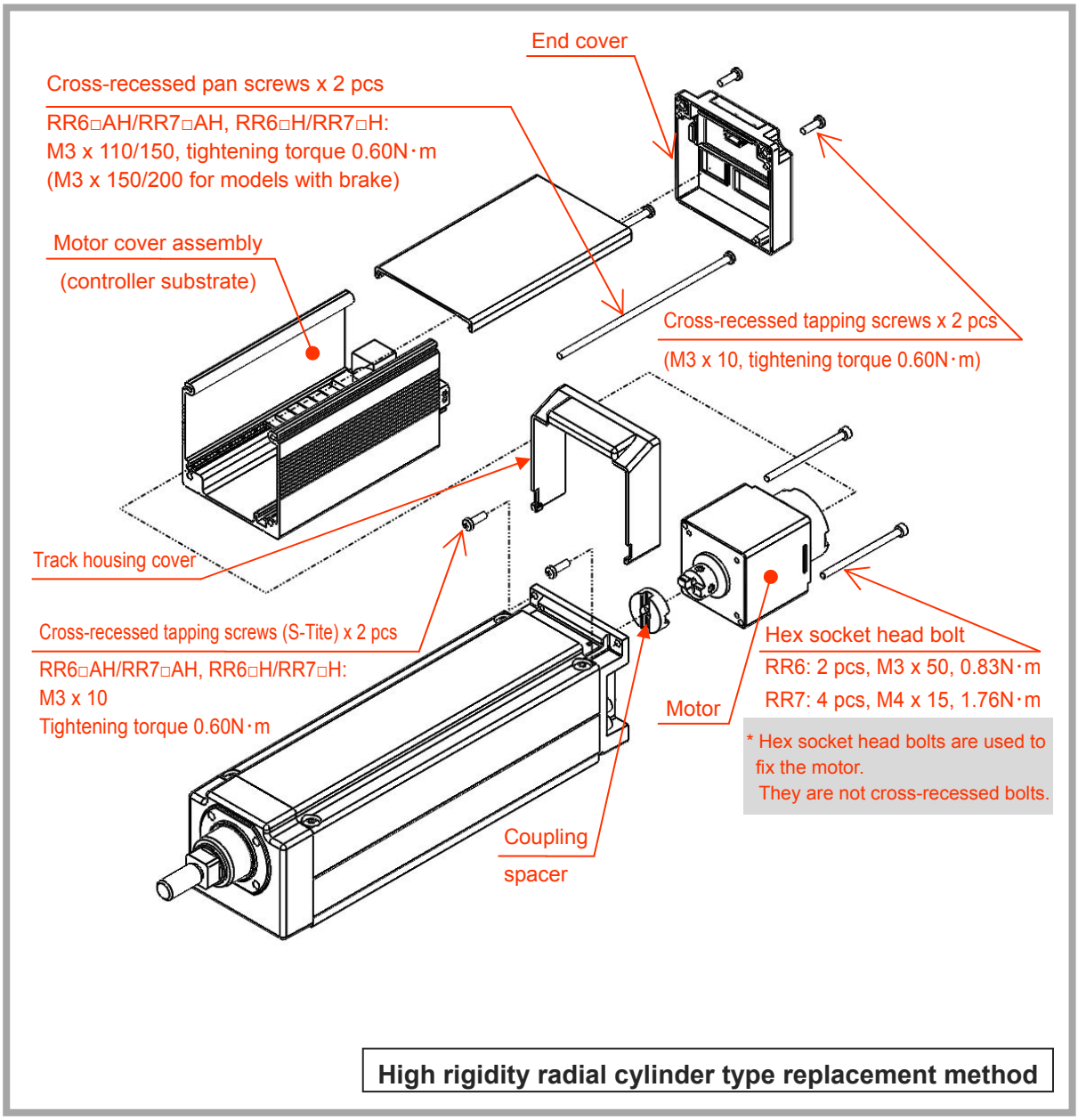


Rod type replacement method


Cross-recessed tapping screws x 2 pcs
(M3 x 10, tightening torque 0.60N·m)
End cover
Cross-recessed pan screws x 2 pcs
S6/S7: M3 x 110/150, tightening torque 0.60N·m
(M3 x 150/200 for models with brake)
Motor cover assembly
(controller substrate)
Hex socket head bolt
S6: 2 pcs, M3 x 50, 0.83N·m
S7: 4 pcs, M4 x 15, 1.76N·m
* Hex socket head bolts are used to fix the motor. They are not cross-recessed bolts.
Coupling
spacer
Motor
Slider type replacement method



High rigidity slider type replacement method



Body model	Motor unit model	Coupling spacer model
EC-S6/S6□AH/S6□H/ R6/RR6/RR6□AH/RR6□H	EC-MUSR6(-WA)(-B)	CPG-EC-SR6
EC-S7/S7□AH/S7□H	EC-MUS7(-WA)(-B)	CPG-EC-SR7
EC-R7/RR7/RR7□AH/RR7□H	EC-MUR7(-WA)(-B)	

WA: Battery-less absolute specification, B: Specification with brake

ELECYLINDER

Chapter 9

External Dimensions

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9.6 High rigidity radial cylinder type external dimensions (EC-RR□□AH) ·· 9-11
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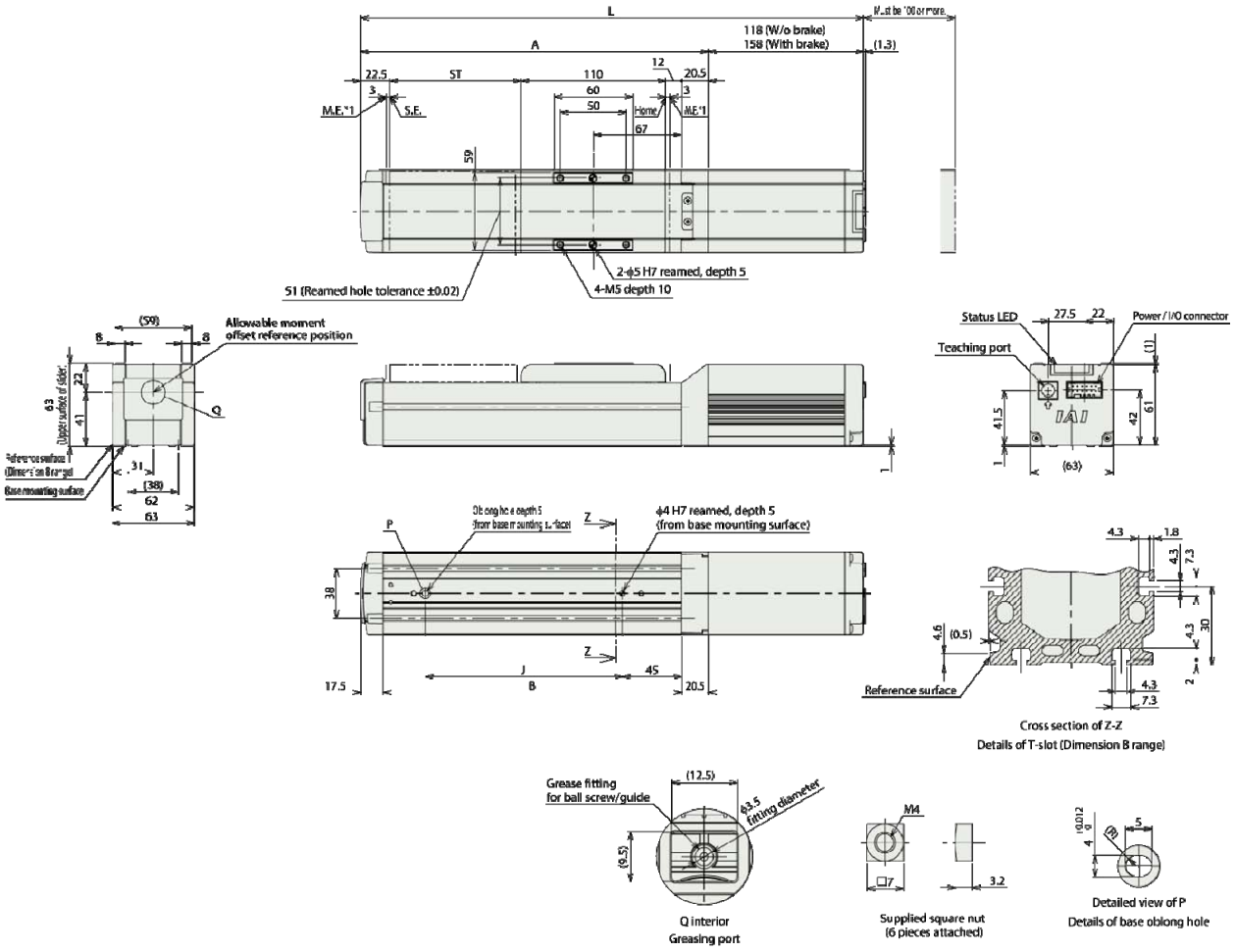
9.1 Slider type external dimensions

EC-S6

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



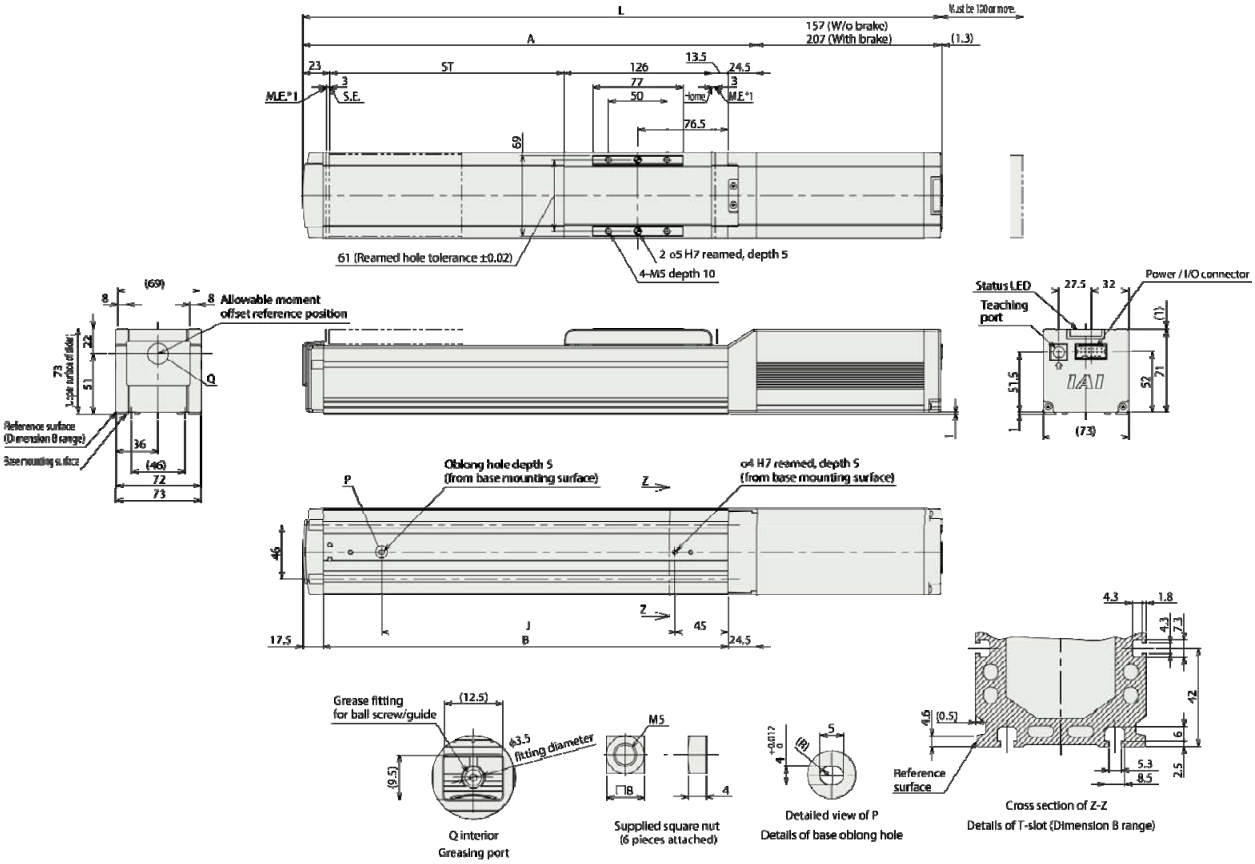
■ Dimensions and Mass by Stroke

Stroke		50	100	150	200	250	300	350	400
L	W/o Brake	333	383	433	483	533	583	633	683
	With Brake	373	423	473	523	573	623	673	723
A		215	265	315	365	415	465	515	565
B		177	227	277	327	377	427	477	527
Weight (kg)	W/o Brake	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2
	With Brake	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4

(Unit: mm)

EC-S7

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



■ Dimensions and Mass by Stroke

Stroke		50	100	150	200	250	300	350	400	450	500
L	W/o Brake	394	444	494	544	594	644	694	744	794	844
	With Brake	444	494	544	594	644	694	744	794	844	894
A		237	287	337	387	437	487	537	587	637	687
B		195	245	295	345	395	445	495	545	595	645
Weight (kg)	W/o Brake	3.4	3.6	3.9	4.2	4.4	4.7	5.0	5.2	5.5	5.8
	With Brake	3.8	4.1	4.4	4.6	4.9	5.2	5.4	5.7	6.0	6.2

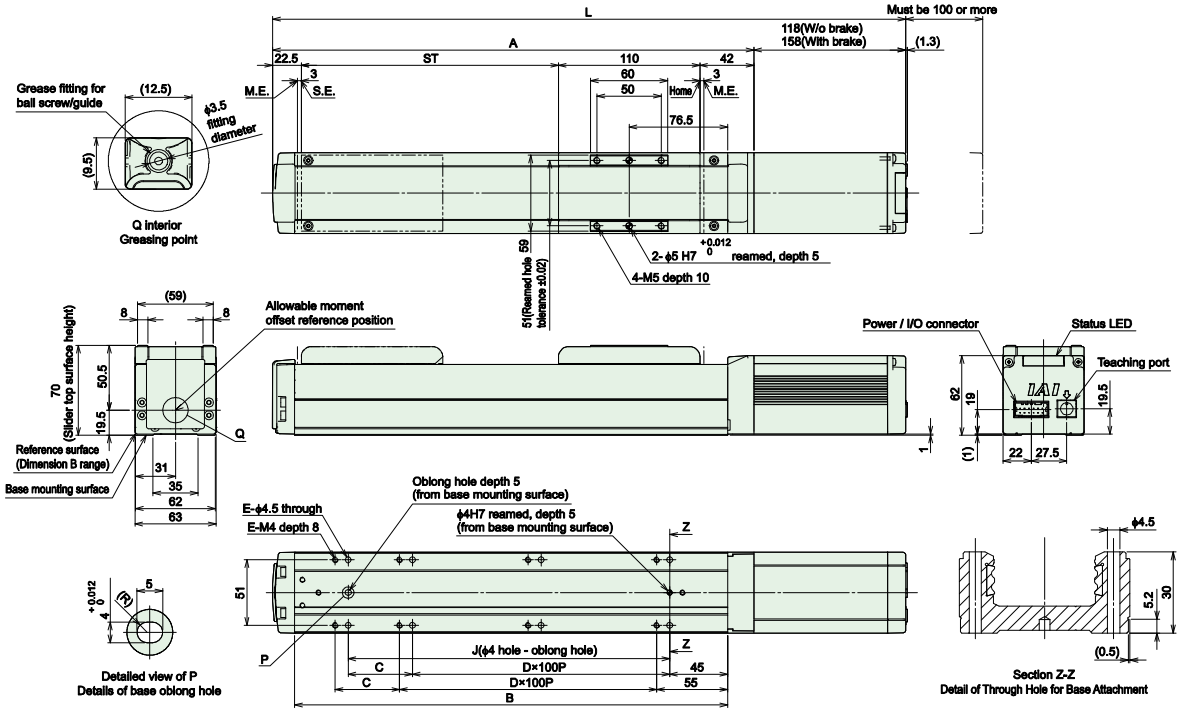
(Unit: mm)

9.2 High rigidity slider type external dimensions (EC-S□□AH)

EC-S6□AH

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

ST: Stroke



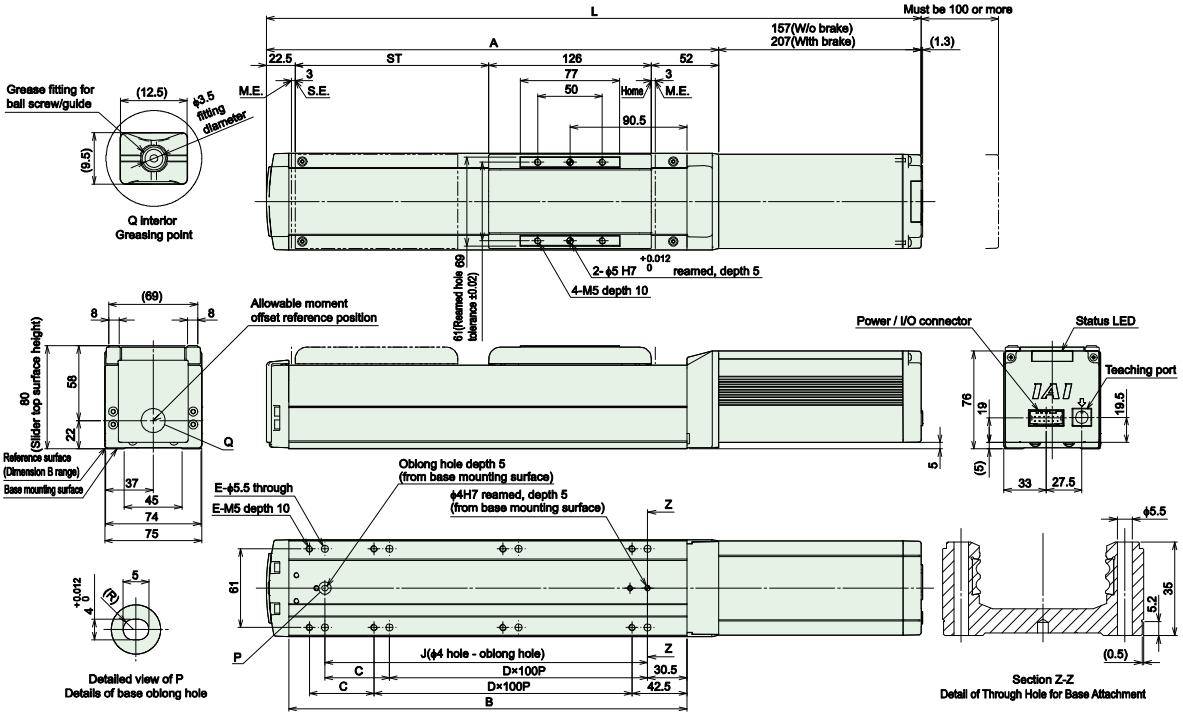
■ Dimensions and Mass by Stroke

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	W/o Brake	342.5	392.5	442.5	492.5	542.5	592.5	642.5	692.5	742.5	792.5	842.5	892.5	942.5	992.5	1042.5	1092.5
	With Brake	382.5	432.5	482.5	532.5	582.5	632.5	682.5	732.5	782.5	832.5	882.5	932.5	982.5	1032.5	1082.5	1132.5
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
Weight (kg)	W/o Brake	2	2.2	2.4	2.6	2.9	3.1	3.3	3.5	3.8	4	4.2	4.4	4.7	4.9	5.1	5.3
	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	5.2	5.4	5.6

(Unit: mm)

EC-S7□AH

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



■ Dimensions and Mass by Stroke

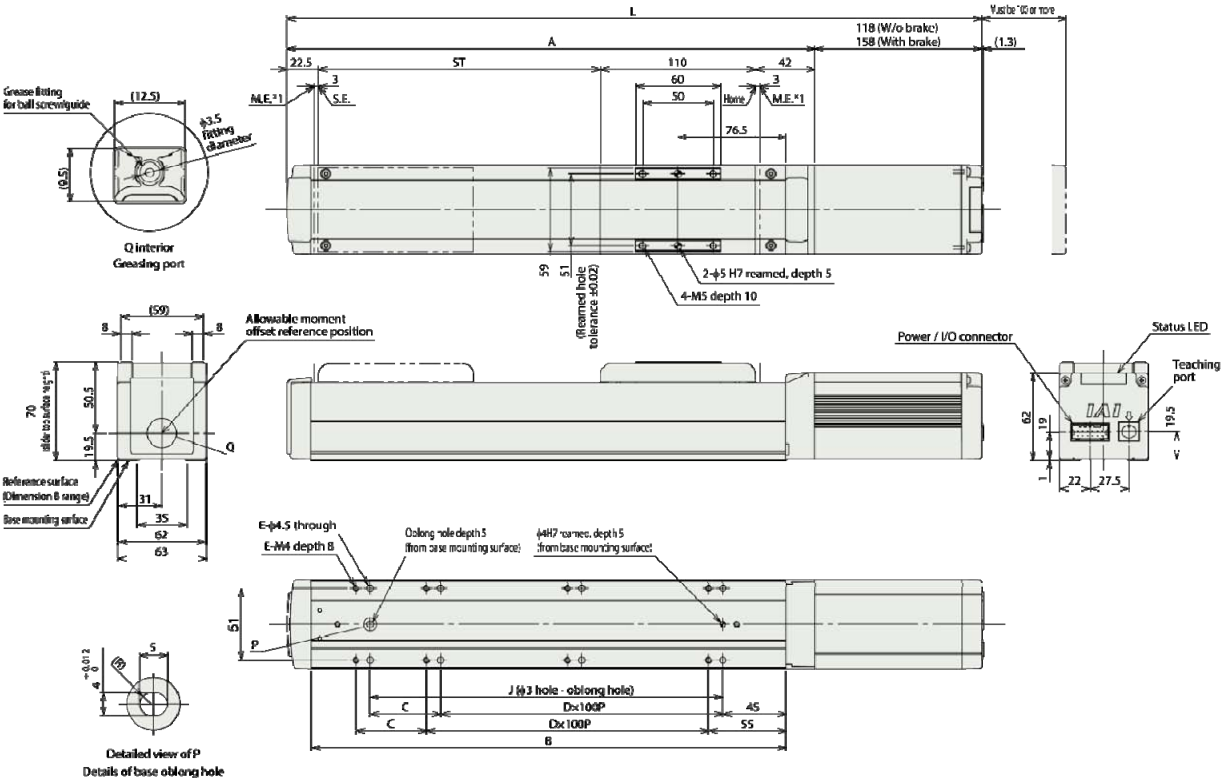
Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	W/o Brake	407.5	457.5	507.5	557.5	607.5	657.5	707.5	757.5	807.5	857.5	907.5	957.5	1007.5	1057.5	1107.5	1157.5
	With Brake	457.5	507.5	557.5	607.5	657.5	707.5	757.5	807.5	857.5	907.5	957.5	1007.5	1057.5	1107.5	1157.5	1207.5
A		250.5	300.5	350.5	400.5	450.5	500.5	550.5	600.5	650.5	700.5	750.5	800.5	850.5	900.5	950.5	1000.5
B		208.5	258.5	308.5	358.5	408.5	458.5	508.5	558.5	608.5	658.5	708.5	758.5	808.5	858.5	908.5	958.5
C		50	0	50	0	50	0	50	0	50	0	50	0	50	0	50	0
D		1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9
E		6	6	8	8	10	10	12	12	14	14	16	16	18	18	20	20
J		150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
Weight (kg)	W/o Brake	3.9	4.1	4.4	4.7	4.9	5.2	5.5	5.7	6	6.3	6.5	6.8	7.1	7.3	7.6	7.9
	With Brake	4.4	4.6	4.9	5.2	5.4	5.7	6	6.2	6.5	6.8	7	7.3	7.6	7.8	8.1	8.4

(Unit: mm)

9.3 High rigidity slider type external dimensions (EC-S□□H)

EC-S6□H

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



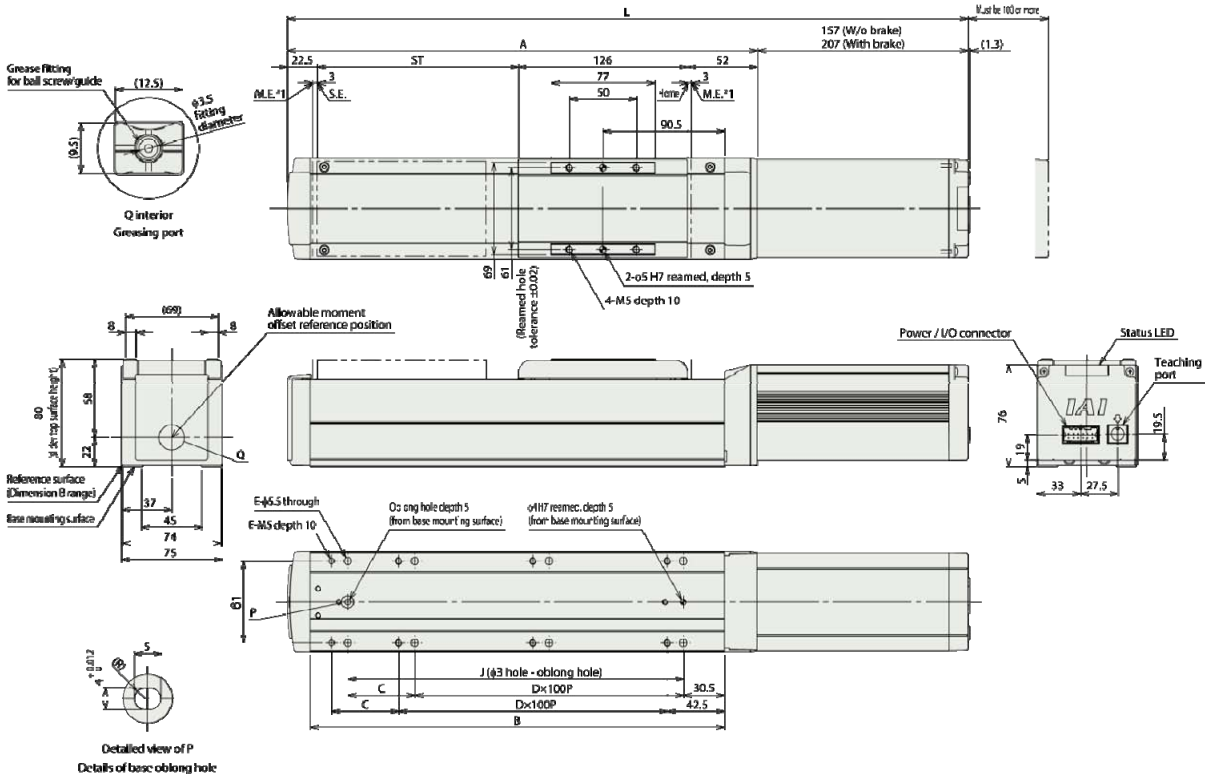
■Dimensions and Mass by Stroke

Stroke		50	100	150	200	250	300	350	400
L	W/o brake	342.5	392.5	442.5	492.5	542.5	592.5	642.5	692.5
	With brake	382.5	432.5	482.5	532.5	582.5	632.5	682.5	732.5
A		224.5	274.5	324.5	374.5	424.5	474.5	524.5	574.5
B		186.5	236.5	286.5	336.5	386.5	436.5	486.5	536.5
C		0	50	0	50	0	50	0	50
D		1	1	2	2	3	3	4	4
E		4	6	6	8	8	10	10	12
J		100	150	200	250	300	350	400	450
Weight (kg)	W/o brake	2.0	2.2	2.4	2.6	2.9	3.1	3.3	3.5
	With brake	2.3	2.5	2.7	2.9	3.2	3.4	3.6	3.8

(Unit: mm)

EC-S7□H

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



■Dimensions and Mass by Stroke

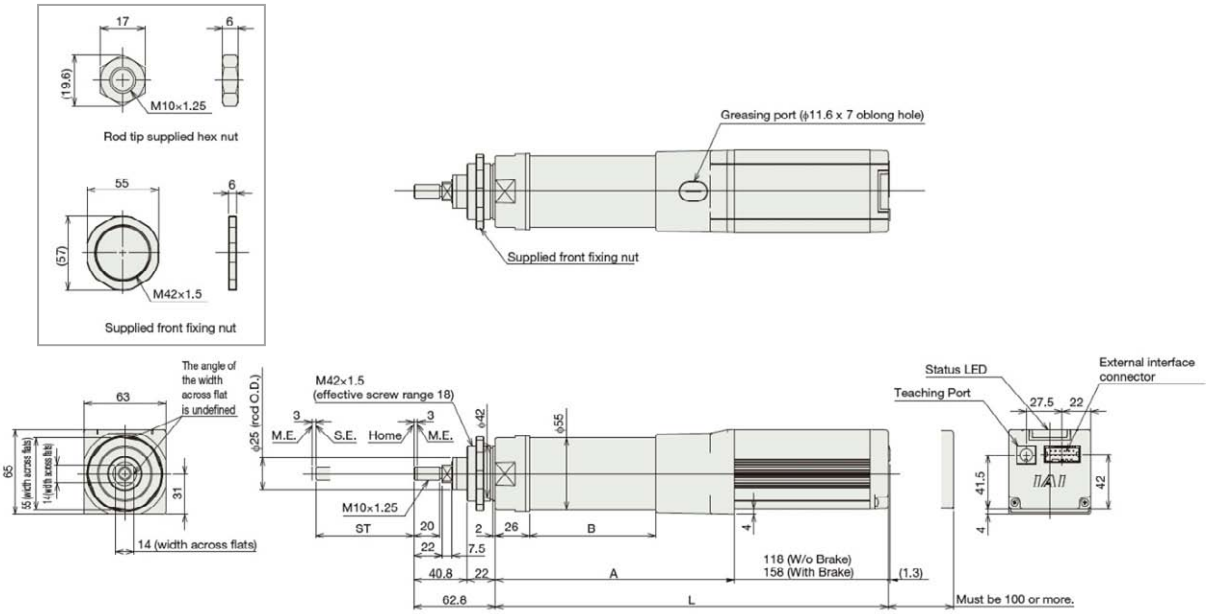
Stroke		50	100	150	200	250	300	350	400	450	500
L	W/o brake	407.5	457.5	507.5	557.5	607.5	657.5	707.5	757.5	807.5	857.5
	With brake	457.5	507.5	557.5	607.5	657.5	707.5	757.5	807.5	857.5	907.5
A		250.5	300.5	350.5	400.5	450.5	500.5	550.5	600.5	650.5	700.5
B		208.5	258.5	308.5	358.5	408.5	458.5	508.5	558.5	608.5	658.5
C		50	0	50	0	50	0	50	0	50	0
D		1	2	2	3	3	4	4	5	5	6
E		6	6	8	8	10	10	12	12	14	14
J		150	200	250	300	350	400	450	500	550	600
Weight (kg)	W/o brake	3.9	4.1	4.4	4.7	4.9	5.2	5.5	5.7	6	6.3
	With brake	4.4	4.6	4.9	5.2	5.4	5.7	6.0	6.2	6.5	6.8

(Unit: mm)

9.4 Rod type external dimensions

EC-R6

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



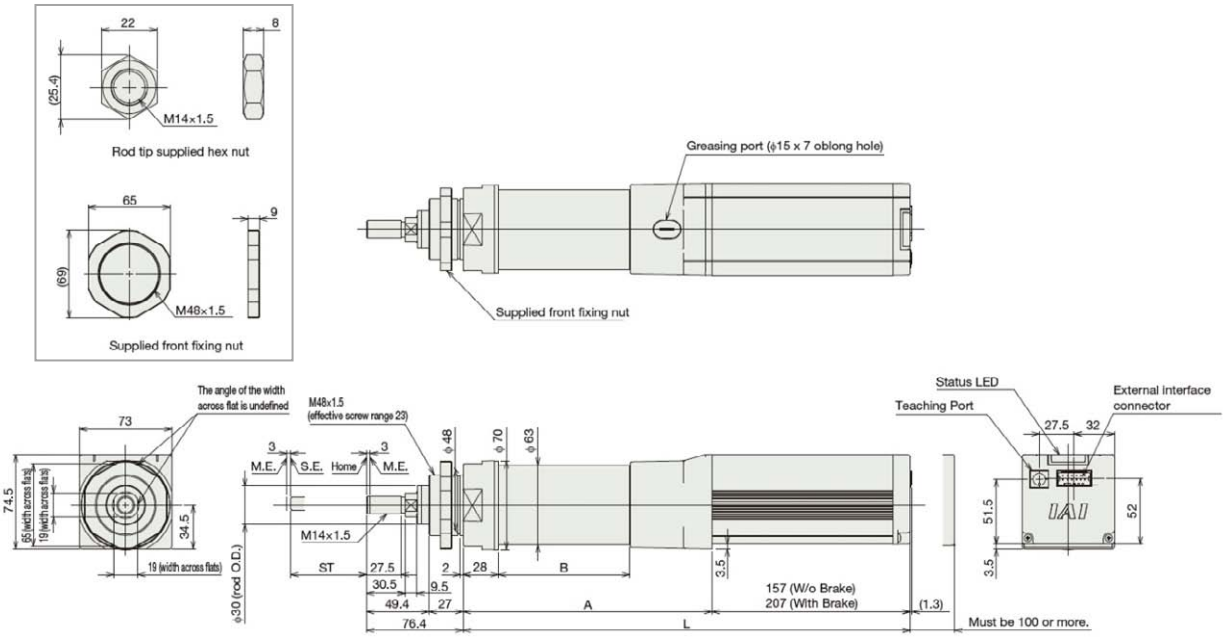
■ Dimensions and Mass by Stroke

Stroke		50	100	150	200	250	300
L	W/o Brake	301.5	351.5	401.5	451.5	501.5	551.5
	With Brake	341.5	391.5	441.5	491.5	541.5	591.5
A		183.5	233.5	283.5	333.5	383.5	433.5
B		97	147	197	247	297	347
Weight (kg)	W/o Brake	1.6	1.8	2.0	2.2	2.4	2.6
	With Brake	1.8	2.0	2.2	2.4	2.6	2.8

(Unit: mm)

EC-R7

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



■ Dimensions and Mass by Stroke

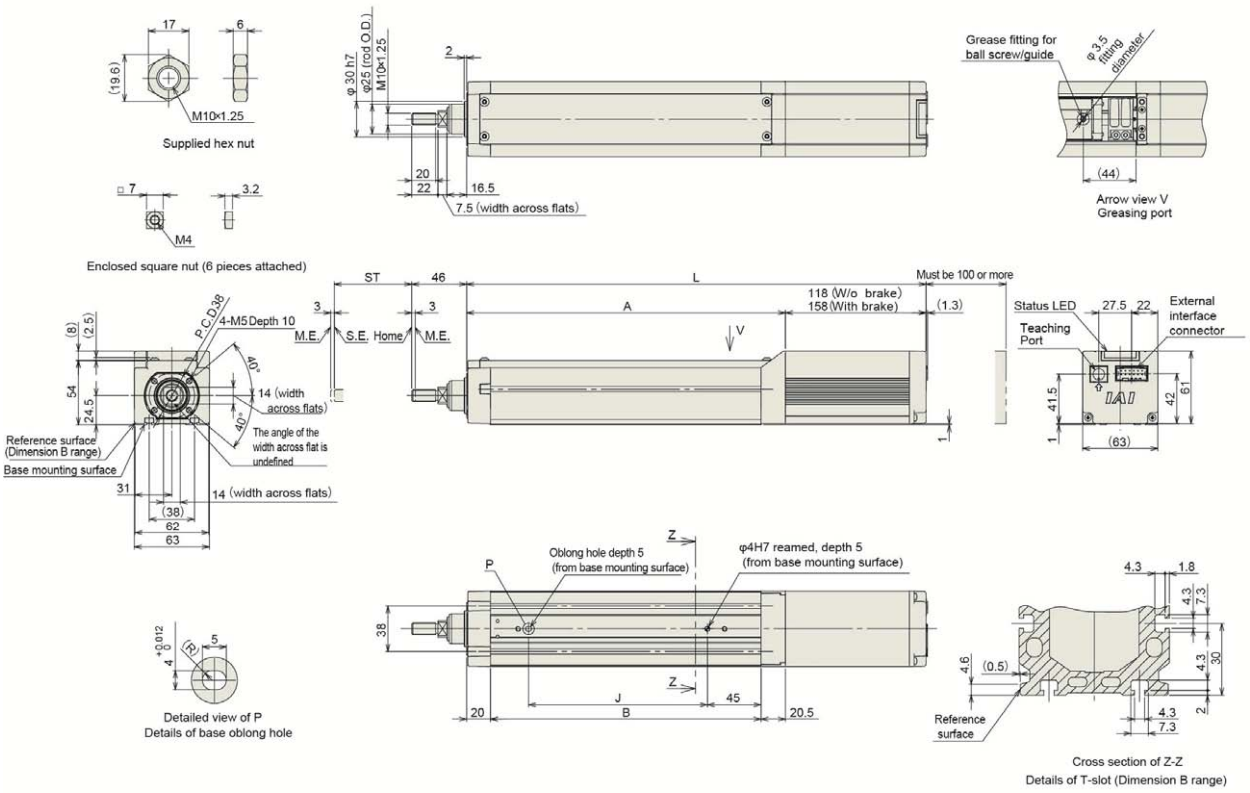
Stroke		50	100	150	200	250	300
L	W/o Brake	354	404	454	504	554	604
	With Brake	404	454	504	554	604	654
A		197	247	297	347	397	447
B		104	154	204	254	304	354
Weight (kg)	W/o Brake	3.3	3.5	3.7	3.9	4.1	4.3
	With Brake	3.5	3.7	3.9	4.1	4.3	4.5

(Unit: mm)

9.5 Radial cylinder r type external dimensions

EC-RR6

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



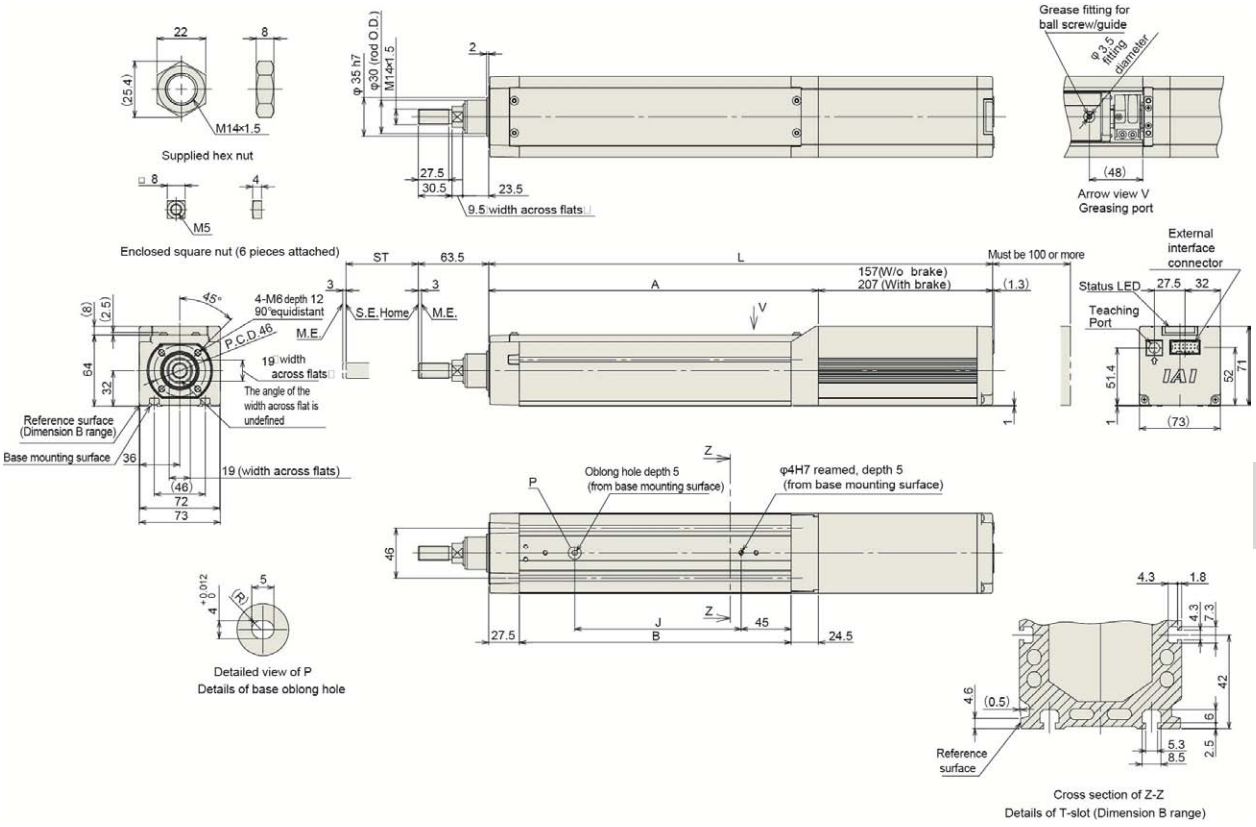
■Dimensions and Mass by Stroke

Stroke		65	115	165	215	265	315
L	W/o brake	335.5	385.5	435.5	485.5	535.5	585.5
	With brake	375.5	425.5	475.5	525.5	575.5	625.5
A		217.5	267.5	317.5	367.5	417.5	467.5
B		177	227	277	327	377	427
J		100	150	200	250	300	350
Weight (kg)	W/o brake	1.7	2.0	2.2	2.5	2.7	3.0
	With brake	1.9	2.2	2.4	2.7	3.0	3.2

(Unit: mm)

EC-RR7

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



■Dimensions and Mass by Stroke

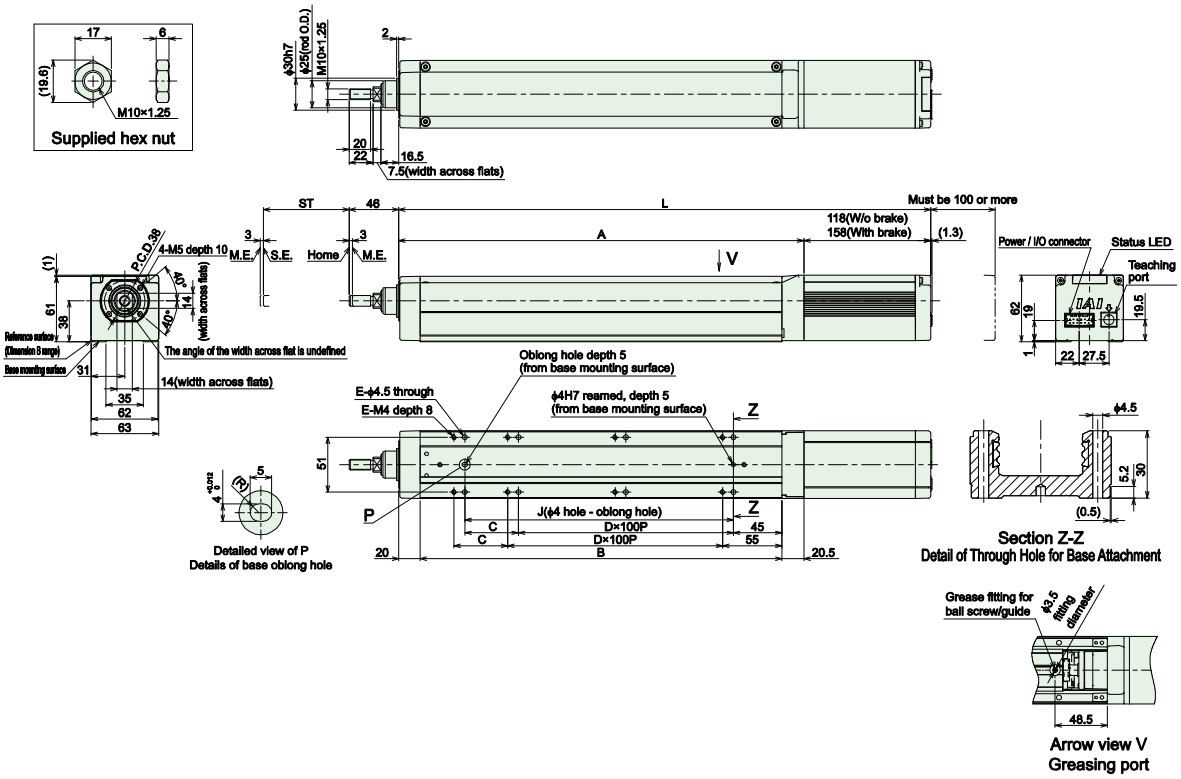
Stroke		65	115	165	215	265	315
L	W/o brake	404	454	504	554	604	654
	With brake	454	504	554	604	654	704
A		247	297	347	397	447	497
B		195	245	295	345	395	445
J		100	150	200	250	300	350
Weight (kg)	W/o brake	3.7	4.1	4.4	4.8	5.2	5.5
	With brake	4.3	4.6	5.0	5.3	5.7	6.1

(Unit: mm)

9.6 High rigidity radial cylinder type external dimensions (EC-RR□□AH)

EC-RR6□AH

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



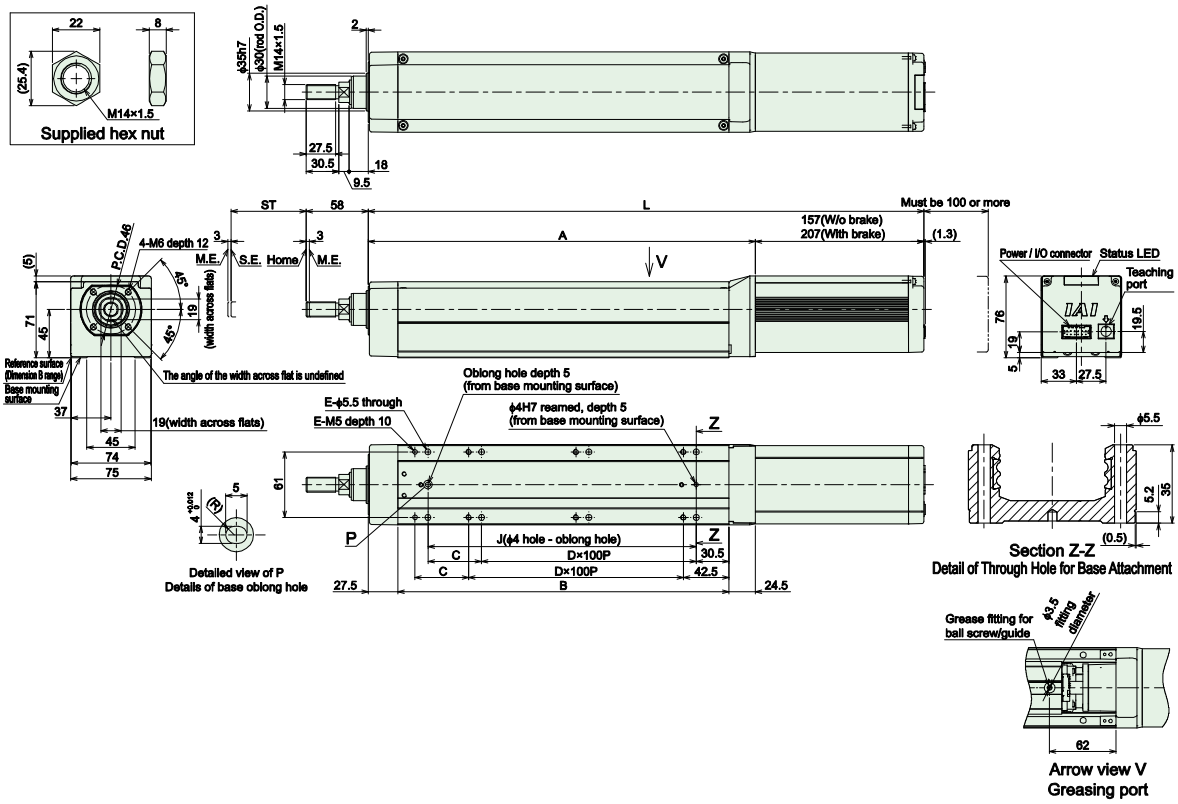
■ Dimensions and Mass by Stroke

Stroke		50	100	150	200	250	300	350	400
L	W/o Brake	345	395	445	495	545	595	645	695
	With Brake	385	435	485	535	585	635	685	735
A		227	277	327	377	427	477	527	577
B		186.5	236.5	286.5	336.5	386.5	436.5	486.5	536.5
C		0	50	0	50	0	50	0	50
D		1	1	2	2	3	3	4	4
E		4	6	6	8	8	10	10	12
J		100	150	200	250	300	350	400	450
Weight (kg)	W/o Brake	2	2.2	2.5	2.8	3	3.3	3.6	3.8
	With Brake	2.3	2.5	2.8	3.1	3.3	3.6	3.9	4.1

(Unit: mm)

EC-RR7□AH

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



■ Dimensions and Mass by Stroke

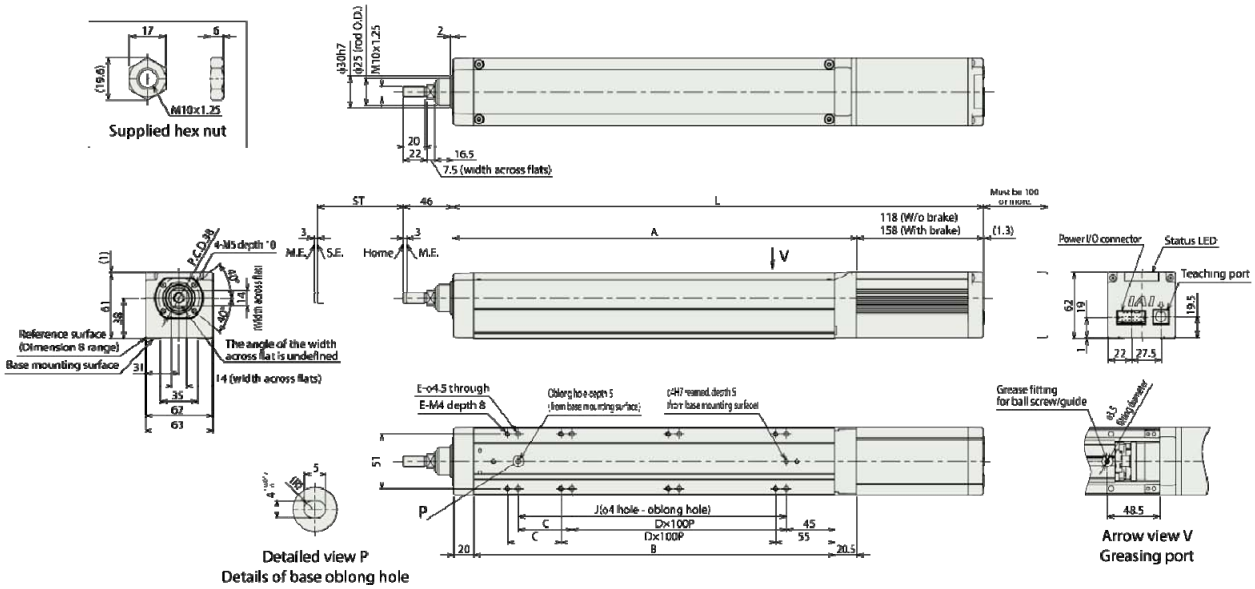
Stroke		50	100	150	200	250	300	350	400	450	500
L	W/o Brake	417.5	467.5	517.5	567.5	617.5	667.5	717.5	767.5	817.5	867.5
	With Brake	467.5	517.5	567.5	617.5	667.5	717.5	767.5	817.5	867.5	917.5
A		260.5	310.5	360.5	410.5	460.5	510.5	560.5	610.5	660.5	710.5
B		208.5	258.5	308.5	358.5	408.5	458.5	508.5	558.5	608.5	658.5
C		50	0	50	0	50	0	50	0	50	0
D		1	2	2	3	3	4	4	5	5	6
E		6	6	8	8	10	10	12	12	14	14
J		150	200	250	300	350	400	450	500	550	600
Weight (kg)	W/o Brake	4	4.4	4.7	5	5.4	5.7	6	6.4	6.7	7
	With Brake	4.5	4.9	5.2	5.5	5.9	6.2	6.5	6.9	7.2	7.5

(Unit: mm)

9.7 High rigidity radial cylinder type external dimensions (EC-RR□□H)

EC-RR6□H

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



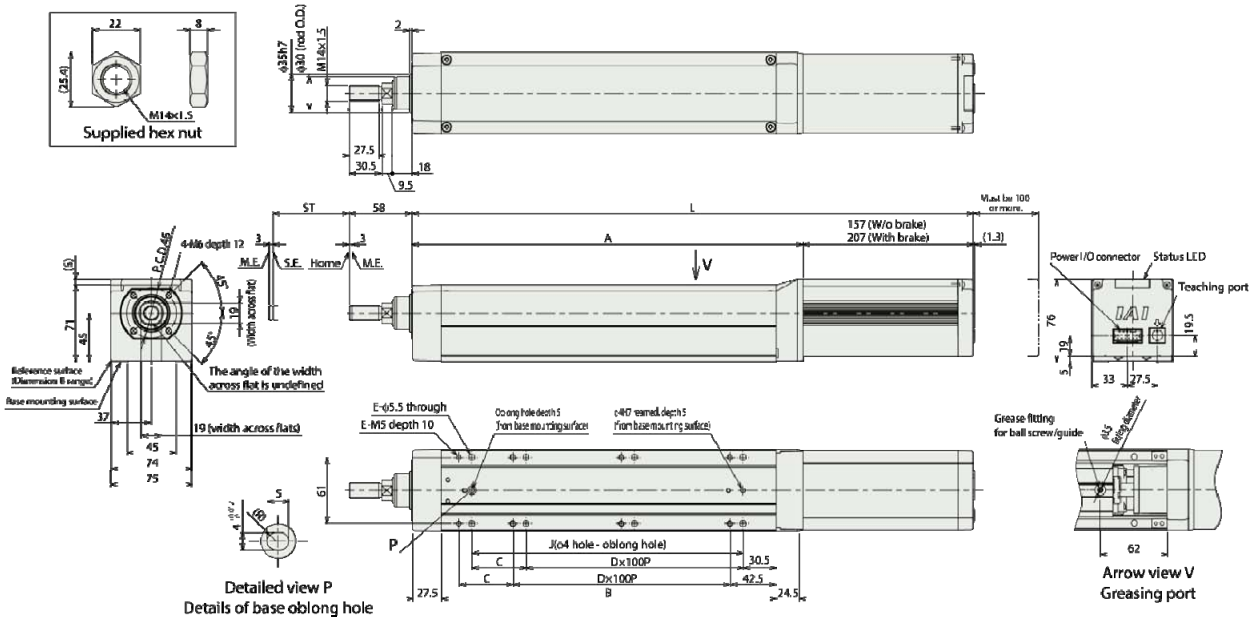
■ Dimensions and Mass by Stroke

Stroke		50	100	150	200	250	300
L	W/o Brake	345	395	445	495	545	595
	With Brake	385	435	485	535	585	635
A		227	277	327	377	427	477
B		186.5	236.5	286.5	336.5	386.5	436.5
C		0	50	0	50	0	50
D		1	1	2	2	3	3
E		4	6	6	8	8	10
J		100	150	200	250	300	350
Mass (kg)	W/o Brake	2	2.2	2.5	2.8	3	3.3
	With Brake	2.3	2.5	2.8	3.1	3.3	3.6

(Unit: mm)

EC-RR7□H

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



■ Dimensions and Mass by Stroke

Stroke		50	100	150	200	250	300
L	W/o Brake	417.5	467.5	517.5	567.5	617.5	667.5
	With Brake	467.5	517.5	567.5	617.5	667.5	717.5
A		260.5	310.5	360.5	410.5	460.5	510.5
B		208.5	258.5	308.5	358.5	408.5	458.5
C		50	0	50	0	50	0
D		1	2	2	3	3	4
E		6	6	8	8	10	10
J		150	200	250	300	350	400
Mass (kg)	W/o Brake	4	4.4	4.7	5	5.4	5.7
	With Brake	4.5	4.9	5.2	5.5	5.9	6.2

(Unit: mm)

ELECYLINDER

Chapter 10

Life

10.1 Concept of life for slider type ····· 10-1
How to calculate operation life ····· 10-1
Relation between operation life and moment ····· 10-3
10.2 Concept of life for rod type ····· 10-3
10.3 Concept of life for controller ····· 10-3

10.1 Concept of life for slider type

The mechanical life of the slider type, high rigidity slider type (EC-S□□AH) and high rigidity slider type (EC-S□□H) 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.

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 ELECYLINDER

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

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

L: Operation life (km)
C_M: Dynamic allowable moment (N·m)
M: Moment acting (N·m)
5,000km: Standard rated life of ELECYLINDER
fws: Standard load coefficient
fw: Load coefficient
fα: Mounting coefficient

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

[Standard load coefficient fws]

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

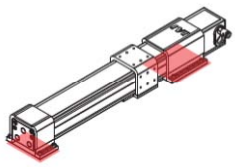
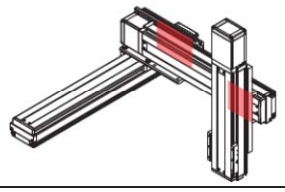
[Load coefficient fw]

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 fα]

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

Mounting coefficient fα	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 ELECYLINDER. Replace with ELECYLINDER 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 ELECYLINDER. "Fixing over the entire surface" is considered to be the case only when fixing with the T-slot and square nut provided on the mounting surface.

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.

10.2 Concept of life for rod type

The service life of the rod type, radial cylinder type, high rigidity radial cylinder type (EC-RR□□AH) and high rigidity radial cylinder type (EC-RR□□H) is about 5,000 km (guideline) when it is operated under maximum payload and acceleration/deceleration.

10.3 Concept of life for controller

The controller part affecting service life is as follows.

Target part	Life	Condition
Electrolytic capacitor	5 years	Ambient temperature 40°C Rated operation (operation within duty limits)

ELECYLINDER

Chapter 11

Warranty

11.1 Warranty period ····· 11-1
11.2 Scope of the warranty ····· 11-1
11.3 Honoring the warranty ····· 11-1
11.4 Limited liability ····· 11-2
11.5 Conformance with applicable standards/regulations, etc., and application conditions ····· 11-2
11.6 Other items excluded from warranty ····· 11-2

11.1 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

11.2 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:

(a) Anything other than our product

(b) Modification or repair performed by a party other than IAI (unless approved by IAI)

(c) Anything that could not be easily predicted with the level of science and technology available at the time of shipment from IAI

(d) Natural disaster, unnatural disaster, incident or accident for which we are not liable

(e) Natural fading of paint or other symptoms of aging

(f) Wear, depletion or other expected results of use

(g) 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.

11.3 Honoring the warranty

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

11.4 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.

11.5 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:
(a) Medical equipment used to maintain, control or otherwise affect human life or physical health
(b) Mechanisms and machinery designed for the purpose of moving or transporting people (vehicles, railway facilities, aviation facilities etc.)
(c) Machinery components essential for safety (safety devices etc.)
(d) 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.

11.6 Other items excluded from warranty

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

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

ELECYLINDER

Chapter 12

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12.2 Revision history

Revision date	Revised content
2017.04	First Edition
2017.04	Second Edition
2017.08	Edition 2B
	Pg.2-7 Changed the photograph
2017.09	Third Edition
	Added information about wireless communication
	Pg. Intro-12 Added Precautions for Handling Wireless Operation
	Pg. 7-2 Added information about wireless status LED
	Pg. 8-15, 8-16 Added Wireless communication circuit board replacement
2017.10	Edition 3B
	Pg.6-5, 6-12 Added Wireless function setting (Parameter No. 7)
2017.10	Edition 3C
	Pg.Intro-11, Intro-13 Added RE Directive to CE marking
2017.11	Edition 3D
	Corrected misdescription
	Pg.2-1 Corrected Precautions for transportation
2017.12	Edition 4A
	Added High rigidity slider type and Radial cylinder type
	Added Energy-saving specification
2018.02	Edition 4B
	Pg. 8-13 Added Rod sliding parts greasing method
	Pg. 8-19, 8-25
	Added Cross-recessed tapping screw dimensions and tightening torque
	Corrected misdescription
2018.04	Edition 5A
	Added High rigidity radial cylinder type
2018.05	Edition 5B
	Pg. 1-64 Corrected Static allowable uniform load
	EC-RR6□H: 4000N to 6700N
	EC-RR7□H: 5000N to 11400N
2018.06	Edition 5C
	Pg. 9-3, 9-4
	Added dimensions to the external dimensions for S6□H and S7□H
2018.09	Edition 5D
	Pg. 1-29 Correction made
	Offset reference position 50.5mm → 58.0mm

Revision date	Revised content
2018.10	Edition 6A • High rigidity slider type EC-S6□AH and EC-S7□AH added • High rigidity radial cylinder type EC-RR6□AH and EC-RR7□AH added • Wireless axis operation specification (model: WL2) added

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