

ELECYLINDER®

Products designed for use in secondary
battery production processes
Wide Slider

EC-WS10□B/WS10□BR
EC-WS12□B/WS12□BR

Instruction Manual

First Edition ME3843-1A



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Refer to [ELECYLINDER Electricity Section Instruction Manual (ME3816)] provided separately regarding electricity/control such as the electrical specifications, wiring, connection, parameters and control system and troubleshooting.

Please Read Before Use

Thank you for purchasing our product.

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

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

Please download the user's manual from our website.

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

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

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

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

[Important]

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

ELECYLINDER Instruction Manual Configuration

Product name	Instruction manual name	Control number
ELECYLINDER	Instruction Manual (this document)	ME3843
ELECYLINDER	Electricity Section Instruction Manual	ME3816
ELECYLINDER	3 Position Mode Specification Instruction Manual	ME3837
RCON System	Instruction Manual	ME0384
RSEL System	Instruction Manual	ME0392
REC System	Instruction Manual	ME0394
XSEL2	Instruction Manual	ME0478
PC Teaching Software	IA-OS First Step Guide * Refer to the guidance feature stored in IA-OS for how to operate	ME0391
PC Teaching Software for XSEL	A-101-X-MW/IA-101-X-USBMW Instruction Manual	ME0154
Touch Panel Teaching Pendant TB-02/02D	Applicable for Position Controller Instruction Manual	ME0355
	Applicable for Program Controller Instruction Manual	ME0356
Touch Panel Teaching Pendant TB-03 Wireless link	Applicable for ELECYLINDER Instruction Manual	ME0375
Touch Panel Teaching Pendant TB-03 Wired link	Applicable for Position Controller Instruction Manual	ME0376
	Applicable for Program Controller Instruction Manual	ME0377
Remote Digital Speed Controller/ Digital Speed Controller Teaching	Digital Speed Controller Instruction Manual	ME3818

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Safety Guide

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

Safety Precautions for Our Products

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

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

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

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

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

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

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

Alert Indication

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

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

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.

Item	Cautions for use	Problems or breakdowns which may occur if the allowable range is exceeded
Speed and acceleration/deceleration	Use within the allowable range	May lead to abnormal noise, vibration, breakdown, or shortened product life.
Allowable load moment	Use within the allowable range (Static/dynamic)	May lead to abnormal noise, vibration, breakdown, or shortened product life. In extreme cases, flaking may occur on the guide or ball screw.
Overhang load length		Mounting a load with an overhang length greater than the allowable values may lead to vibration or abnormal noise.

5. 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.

6. Do not attempt to have sliders collide with an obstacle at high speed.

This may damage other mechanical parts.

7. About Handling of Stainless Steel Sheet

There is a stainless steel sheet put on the driving portion in the slider type. Do not happen to hit it with a tool or attempt to push strongly with hand. It may deform the sheet.

8. The diagram showing the relation between the pressing force and the current limit shows the reference of the lower limit of the pressing force at each current limit. Even if the current limit is the same, the pressing force may exceed the lower limit by up to around 40% due to difference of individual product.

Especially when the current limit is 30% or below, the pressing force may exceed the lower limit by 40% or more.

9. The "Must be 100 or more" indicated in the External Dimensions is intended to enable wiring without excessive force applied to the cable.

Must be 100 mm or more cable linearity.

International Standard Compliance

The ELECYLINDER complies with overseas standards marked with ○.

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

CE Marking			UL Standard
RoHS3 Directive	EMC Directive	RE Directive (Note1)	
○	○	○	×

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 model nameplate.

RoHS3 Directive (2011/65/EU + (EU)2015/863) 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. Contact our sales site if necessary.

(Note 1) RE Directive applies to ELECYLINDERS with WL (wireless communication specification) or WL2 (Wireless axis operation specification) in model name options.

Certificates and self-declarations regarding the wireless function are handled under the model name below for the wireless circuit board.

MODEL : IABL3826, IABL3827

MODEL: EC-WS10MB-300-5-WA-WL2
S/N: A12345600 DATE: 02/03/2026
IN: DC24V MADE IN JAPAN

IAI Corporation



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: IABL3827

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 to 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 être 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=2018DJ0331
- 申请公司名 : IAI 株式会社
- 机型名 : IABL3827
- 制造国 : 日本 (Made in Japan)
- 进口企业名 : IAI (Shanghai) Co., Ltd.

【 한국／KOREA 】

- 식별 부호 : R-CRM-IAI-IABL3827
- 제조사명 : 주식회사 IAI
- 모델명 : IABL3827
- 제조국 : 일본(Made in Japan)
- 수입업자명 : IA KOREA Corp.

해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다

【ประเทศไทย / Thailand 】

- ผู้ผลิต : IAI CORPORATION.
- ชื่อโมเดล : IABL3827
- ประเทศผู้ผลิต : ญี่ปุ่น (Made in Japan)
- ผู้นำเข้า : IAI Robot (Thailand) Co., Ltd.

【México / Mexico】

- Número de Certificación : IFT : RCPIATB19-1956
- Nombre de la Empresa Solicitante : IAI Corporation
- Nombre del Modelo : IABL3827
- País de Fabricación : Japón (Hecho en Japón)
- Nombre de la Empresa Importadora : IAI America, Inc.

Precautions for Axis Operation with Wireless Connection

Touch Panel Teaching Pendant TB-03 (V2.30 or later) and Remote Digital Speed Controller (TBD-1WL) 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.

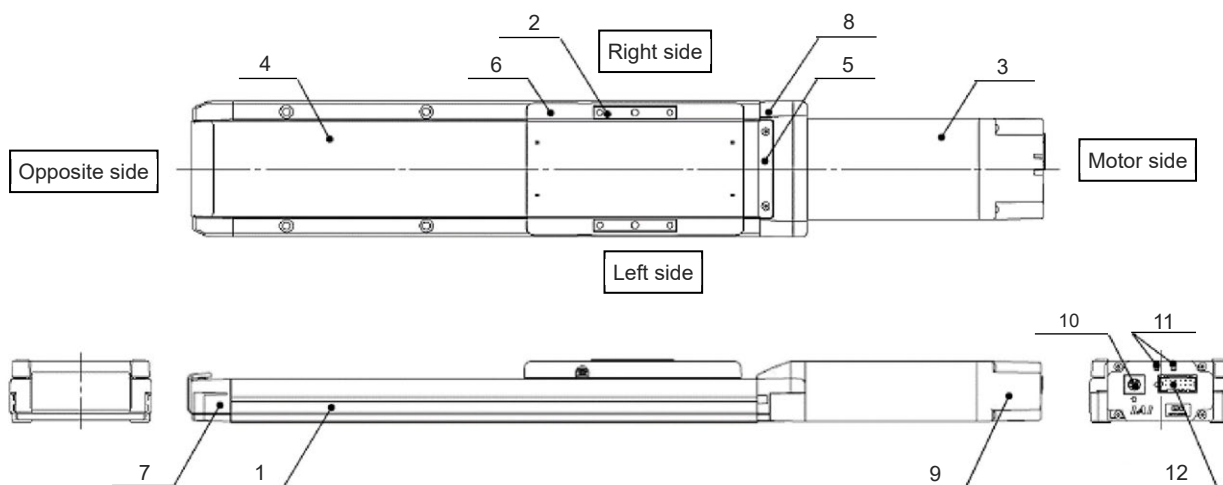
- The stop switch on Touch Panel Teaching Pendant TB-03 will not function during wireless connection. Prepare a device / circuit to stop the operation when emergency stop is required.
- For axis operation with wireless connection, operation testing (movement to forward and backward ends, jog operation, 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.

Motor straight type (EC-WS□□B)

■EC-WS10□B/WS12□B

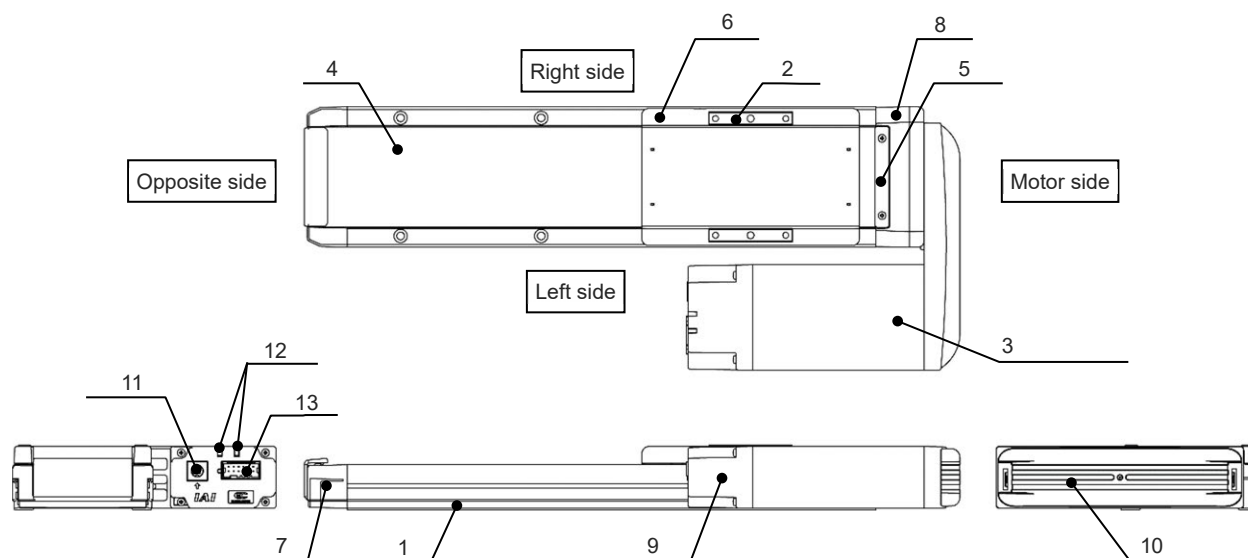


[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	Black Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Motor cover	Aluminum Alloy	Black Anodizing Treatment
4	Stainless steel sheet	Stainless Steel	—
5	Sheet retainer	Aluminum Alloy	—
6	Slider cover	Plastic	—
7	Front cover	Plastic	—
8	Rear cover	Plastic	—
9	Controller cover	Plastic	—
10	Teaching port	—	—
11	Status indicator LED	—	—
12	Power & I/O connector	—	—

Motor reversed type (EC-WS□□BR)

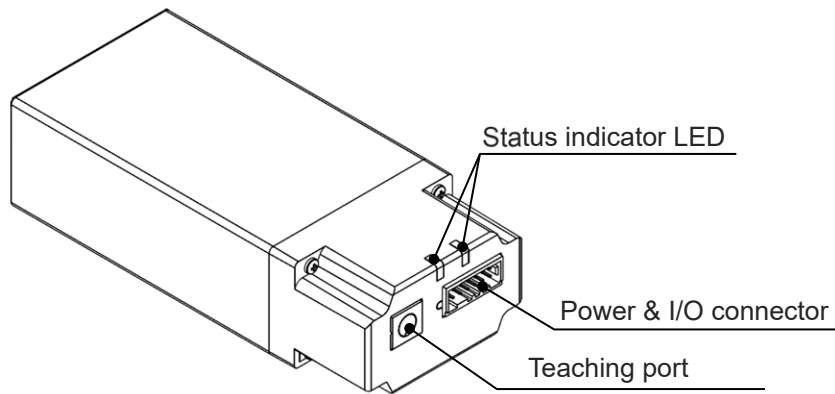
■EC-WS10□BR/WS12□BR



[Main Component Materials]

No.	Name	Materials	Surface Treatment
1	Base	Aluminum Alloy	Black Anodizing Treatment
2	Slider	Aluminum Alloy	White Anodizing Treatment
3	Motor cover	Aluminum Alloy	Black Anodizing Treatment
4	Stainless steel sheet	Stainless Steel	—
5	Sheet retainer	Aluminum Alloy	—
6	Slider cover	Plastic	—
7	Front cover	Plastic	—
8	Rear cover	Plastic	—
9	Controller cover	Plastic	—
10	Pulley cover	Plastic	—
11	Teaching port	—	—
12	Status indicator LED	—	—
13	Power & I/O connector	—	—

Motor (built in controller)



[Teaching port]

This connector is for the connection of a teaching pendant or PC Teaching Software. When connecting, remove the cap.

[Status indicator LED]

The LED on the right side as seen from the end cover side shows the servo ON/OFF status and alarm status, and the LED on the left side as seen from the end cover side displays the wireless status.

Refer to [3.6 Troubleshooting confirmations].

[Power & I/O connector]

This connector connects power and I/O wiring.

ELECYLINDER

Chapter 1

Specifications

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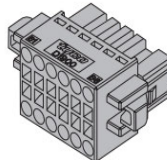
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1.1 Checking the product

1.1.1 Components

The following table shows the product configuration for the standard specification.

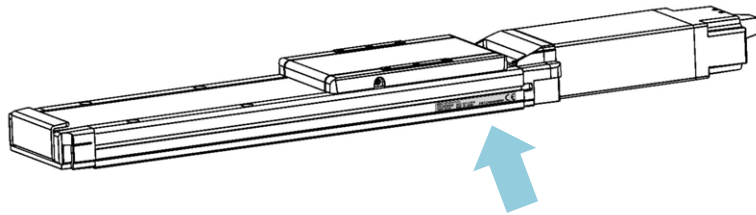
See the packing list for the details of the enclosed components. In the unlikely case that any model number errors or missing parts come to light, contact your local IAI distributor.

Body	
<u>ELECYLINDER Quantity: 1</u> 	
Accessories	
<u>Power & I/O Cable</u> <u>Quantity: 1</u> 	<u>Power & I/O Connector</u> <u>Quantity: 1</u> 
Components included as selected in the model number	
Accessories	
<u>Protective Cap</u> <u>Quantity: 1</u> 	<u>Safety Guide</u> <u>Quantity: 1</u> 

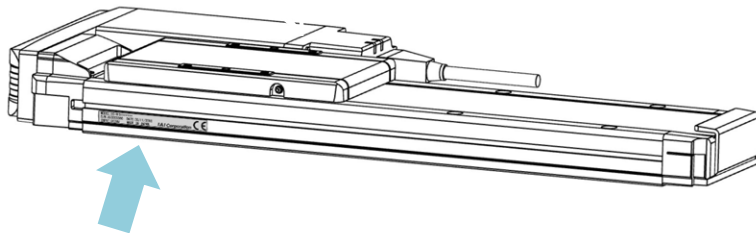
1.1.2 How to read the model nameplate

Model number	→	MODEL: EC-WS10MB-300-5-WA-WL2	IAI Corporation 
Serial number	→	S/N: A12345600 DATE: 02/03/2026	
		IN: DC24V MADE IN JAPAN	

[Motor straight type nameplate position]



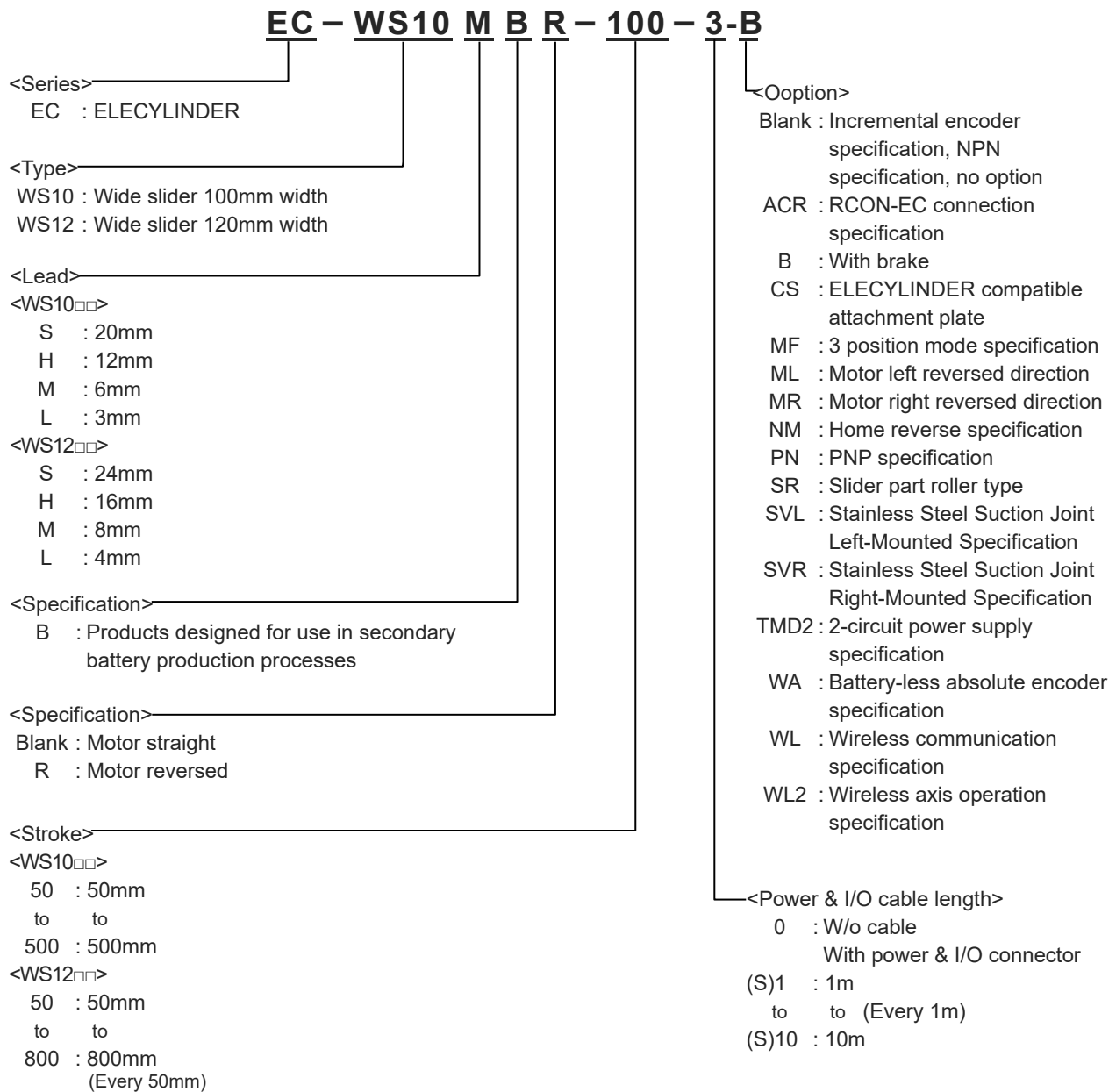
[Motor reversed type nameplate position]



1.1.3 How to read the model number

It is a list of the model codes.

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



1.2 Mechanical specifications: EC-WS10□B

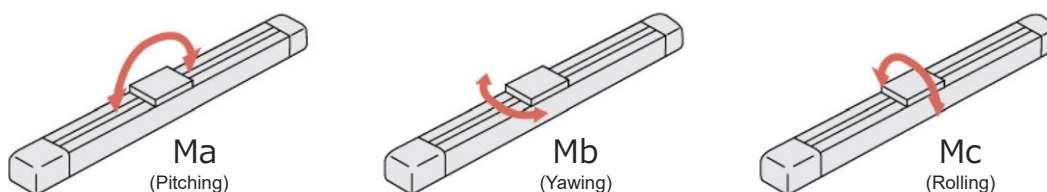
1.2.1 Actuator Specifications

Item		Content
Drive system		Ball screw $\Phi 10\text{mm}$, rolled C10
Positioning repeatability		Lead 3/6/12: $\pm 0.02\text{mm}$, Lead 20: $\pm 0.03\text{mm}$
Lost motion		0.1mm or less
Linear guide		Linear Infinite Circulation System
Static allowable moment (Note 1)		Ma direction: $172\text{N}\cdot\text{m}$, Mb direction: $172\text{N}\cdot\text{m}$, Mc direction: $436\text{N}\cdot\text{m}$
Dynamic allowable moment (Note 1, 2)		Ma direction: $44\text{N}\cdot\text{m}$, Mb direction: $44\text{N}\cdot\text{m}$, Mc direction: $113\text{N}\cdot\text{m}$
Brake (option)	Specification	Non-excitation activating electromagnetic brake
	Holding force	Lead 20: — Lead 12: — Lead 6: 3kgf Lead 3: 5kgf
Ambient operating temperature/humidity		10 to 40°C , 85%RH or less (Non-condensing)
Degree of protection		IP20
Vibration and impact resistance		4.9m/s^2
Motor type		Pulse motor ($\square 35$) (Current Amperage: 4.2A max.)
Encoder type		Incremental / Battery-less absolute
Encoder pulse count		800pulse/rev

Note 1 Even if the load goes moment and the load overhang length are in the allowable ranges, abnormal vibration or noise may occur because of influence of the way of installing the main body or transported object or the stiffness of the overhang installation beams. Revise the conditions for operation in such cases.

Note 2 For reference rated life of 5,000km. The running life differs according to operation conditions and mounting status.

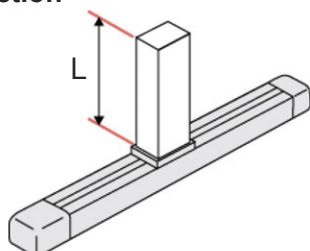
Moment direction



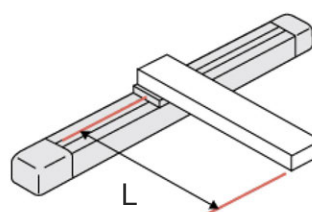
Load Overhang Length (L)

It is a reference for offset that enables an actuator to operate smoothly when a workpiece or bracket is offset from the actuator slider.

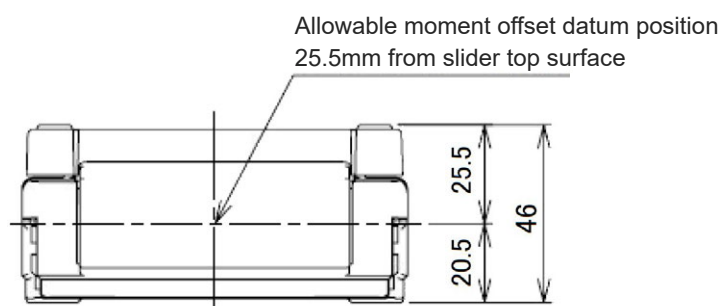
Ma direction



Mb/Mc direction



- Reference for Load Overhang Length (L = 400mm or less)

Allowable moment offset datum position**Caution**

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

1.2.2 Lead and Maximum payload**Energy-Saving Setting: Disabled**

Model number	Lead [mm]	Maximum payload		Maximum pressing force [N]
		Horizontal [kg]	Vertical [kg]	
EC-WS10SB	20	3	—	34
EC-WS10HB	12	10.5	—	57
EC-WS10MB	6	17.5	3	114
EC-WS10LB	3	31	5	228

Energy-Saving Setting: Enabled

Model number	Lead [mm]	Maximum payload		Maximum pressing force [N]
		Horizontal [kg]	Vertical [kg]	
EC-WS10SB	20	3	—	34
EC-WS10HB	12	10.5	—	57
EC-WS10MB	6	17.5	3	114
EC-WS10LB	3	28	5	228

1.2.3 Stroke and Max. Speed



Caution

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

Energy-Saving Setting: Disabled

Max. Speed [mm/s]

Lead [mm]	50 to 200mm (Every 50mm)	250mm	300mm	350mm	400mm	450mm	500mm
20	900			800	700	600	480
12	640		560	480	400	320	280
6	320<220>		270<220>	210	180	140	120
3	160<110>		135<110>	110	80	70	60

< > represents vertical operation.

Energy-Saving Setting: Enabled

Max. Speed [mm/s]

Lead [mm]	50 to 200mm (Every 50mm)	250mm	300mm	350mm	400mm	450mm	500mm
20	800				700	600	480
12	560			480	400	320	280
6	320<220>		270<220>	210	180	140	120
3	135<110>			110	80	70	60

< > represents vertical operation.

1.2.4 Payload by Speed/Acceleration



Caution

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.
It may cause to generate vibration, malfunction or shorten the product life.
- In case the Air cylinder compatible attachment plate (option) on the slider side is mounted, the payload in the table should be reduced by 1kg.

Energy-Saving Setting: Disabled

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

Input in percentage [%] is to be set with 1G for Lead 20 and 12 and 0.5G for Lead 6 and 0.3G for Lead 3 as 100%.

(Note) “—” represent operation not available.

Lead 20					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	3	2.5	2	1.5	—	—
320	3	2.5	2	1.5	—	—
480	3	2.5	2	1.5	—	—
600	3	2.5	2	1.5	—	—
700	3	1	1	0.5	—	—
800	1	0.5	—	—	—	—
900	—	0.5	—	—	—	—

Lead 12					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	10.5	7.5	6.5	4	—	—
160	10.5	7.5	6.5	4	—	—
280	10.5	7.5	6.5	4	—	—
320	10.5	7	5.5	3.5	—	—
400	8.5	3.5	2.5	1.5	—	—
480	3.5	2	—	—	—	—
560	3	1.5	—	—	—	—
640	2	1.5	—	—	—	—

Lead 6					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	17.5	14	—	—	3	2.5
140	17.5	14	—	—	3	2.5
180	17.5	14	—	—	3	2.5
220	17.5	8.5	—	—	3	2.5
270	7	5	—	—	—	—
320	5	3	—	—	—	—

Lead 3					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	31	—	—	—	5	—
60	31	—	—	—	5	—
80	31	—	—	—	5	—
110	28	—	—	—	5	—
135	13	—	—	—	—	—
160	10.5	—	—	—	—	—

Energy-Saving Setting: Enabled

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

Input in percentage [%] is to be set with 1G for Lead 20 and 12 and 0.5G for Lead 6 and 0.3G for Lead 3 as 100%.

(Note) “—” represent operation not available.

Lead 20		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	3	2	—
320	3	2	—
480	3	2	—
600	3	1.5	—
700	3	0.5	—
800	1	—	—

Lead 12		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	10.5	5	—
160	10.5	5	—
280	9	4	—
320	7.5	3.5	—
400	5.5	2.5	—
480	3.5	1.5	—
560	2	—	—

Lead 6		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	17.5	—	3
140	17.5	—	3
180	14	—	3
220	10.5	—	2
270	7	—	—
320	3	—	—

Lead 3		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	28	—	5
60	28	—	5
80	28	—	5
110	24.5	—	3
135	13	—	—

1.2.5 Correlation of pressing force and current limit value



Caution

- The relation of the current value and the pressing force is a guideline at speed of 20mm/s for Lead 3, 6 and 12 and 25mm/s for Lead 20.

There is some variance in the actual pressing force. The variance increases when the current value is low.

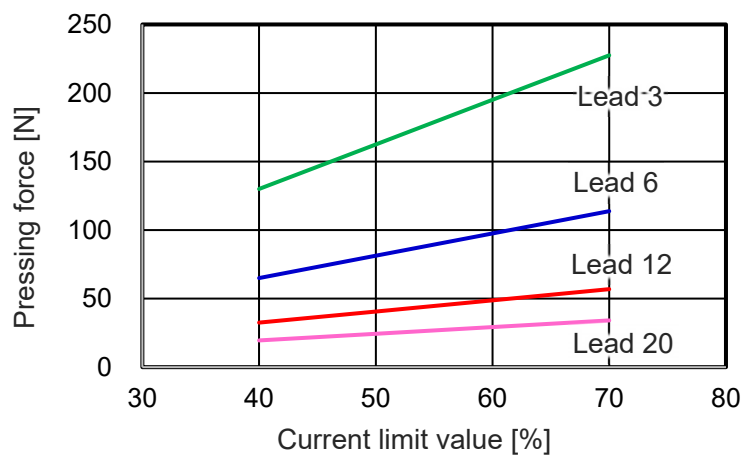
- Set the current limit value in 40 to 70% range.
- When the approach speed up to the pressing start position is 20mm/s or less for Lead 3, 6 and 12, and 25mm/s or less for Lead 20, pressing operation will take place at approach speed.

When the pressing speed is lower than 20mm/s for Lead 3, 6 and 12 and lower than 25mm/s for Lead 20, the pressing force shown in the graph (reference) should not be able to gain. Confirm in advance that there is no problem in the pressing force.

- Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type.

For the offset datum position [1.2.1 Actuator Specifications].

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



1.3 Mechanical specifications: EC-WS10□BR

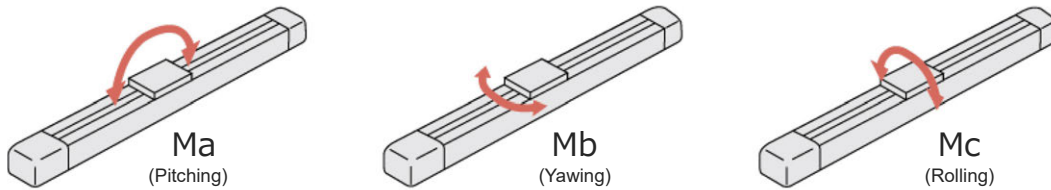
1.3.1 Actuator Specifications

Item		Content
Drive system		Ball screw $\Phi 10\text{mm}$, rolled C10
Positioning repeatability		Lead 3/6/12: $\pm 0.02\text{mm}$, Lead 20: $\pm 0.03\text{mm}$
Lost motion		0.1mm or less
Linear guide		Linear Infinite Circulation System
Static allowable moment (Note 1)		Ma direction: $172\text{N}\cdot\text{m}$, Mb direction: $172\text{N}\cdot\text{m}$, Mc direction: $436\text{N}\cdot\text{m}$
Dynamic allowable moment (Note 1, 2)		Ma direction: $44.7\text{N}\cdot\text{m}$, Mb direction: $44.7\text{N}\cdot\text{m}$, Mc direction: $113\text{N}\cdot\text{m}$
Brake (option)	Specification	Non-excitation activating electromagnetic brake
	Holding force	Lead 20: — Lead 12: — Lead 6: 3kgf Lead 3: 5kgf
Ambient operating temperature/humidity		10 to 40°C , 85%RH or less (Non-condensing)
Degree of protection		IP20
Vibration and impact resistance		4.9m/s^2
Motor type		Pulse motor ($\square 35$) (Current Amperage: 4.2A max.)
Encoder type		Incremental / Battery-less absolute
Encoder pulse count		800pulse/rev

Note 1 Even if the load goes moment and the load overhang length are in the allowable ranges, abnormal vibration or noise may occur because of influence of the way of installing the main body or transported object or the stiffness of the overhang installation beams. Revise the conditions for operation in such cases.

Note 2 For reference rated life of 5,000km. The running life differs according to operation conditions and mounting status.

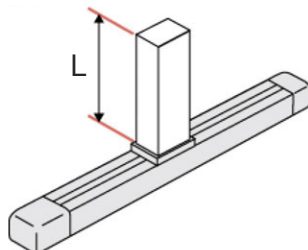
Moment direction



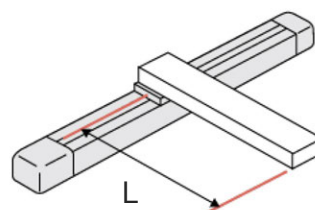
Load Overhang Length (L)

It is a reference for offset that enables an actuator to operate smoothly when a workpiece or bracket is offset from the actuator slider.

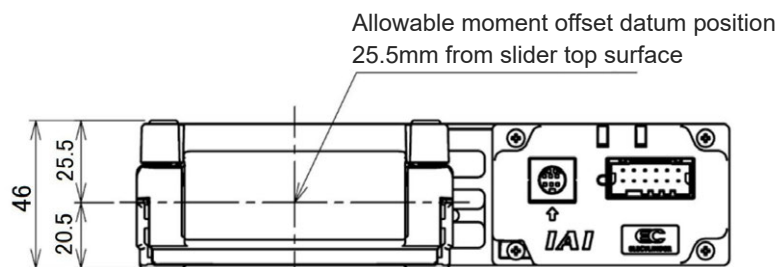
Ma direction



Mb/Mc direction



- Reference for Load Overhang Length (L = 400mm or less)

Allowable moment offset datum position**Caution**

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

1.3.2 Lead and Maximum payload**Energy-Saving Setting: Disabled**

Model number	Lead [mm]	Maximum payload		Maximum pressing force [N]
		Horizontal [kg]	Vertical [kg]	
EC-WS10SBR	20	3	—	34
EC-WS10HBR	12	10.5	—	57
EC-WS10MBR	6	17.5	3	114
EC-WS10LBR	3	31	5	228

Energy-Saving Setting: Enabled

Model number	Lead [mm]	Maximum payload		Maximum pressing force [N]
		Horizontal [kg]	Vertical [kg]	
EC-WS10SBR	20	3	—	34
EC-WS10HBR	12	10.5	—	57
EC-WS10MBR	6	17.5	3	114
EC-WS10LBR	3	28	5	228

1.3.3 Stroke and Max. Speed



Caution

- The maximum speed may not be achieved when the stroke or movement distance is short or when acceleration/deceleration is set low.
- Setting the lower less than speed the minimum speed may cause such concerns of generating abnormal noise or making the speed unstable.
- The lowest velocity should be 35mm/s for Lead 20, Lead 12, 8mm/s for Lead 6 and 4mm/s for Lead 3.

Energy-Saving Setting: Disabled

Max. Speed [mm/s]

Lead [mm]	50 to 200mm (Every 50mm)	250mm	300mm	350mm	400mm	450mm	500mm
20	900			800	700	600	480
12	640		560	480	400	320	280
6	320<220>		270<220>	210	180	140	120
3	135<110>			110	80	70	60

< > represents vertical operation.

Energy-Saving Setting: Enabled

Max. Speed [mm/s]

Lead [mm]	50 to 200mm (Every 50mm)	250mm	300mm	350mm	400mm	450mm	500mm
20	700					600	480
12	560			480	400	320	280
6	320<220>		270<220>	210	180	140	120
3	135<110>			110	80	70	60

< > represents vertical operation.

1.3.4 Payload by Speed/Acceleration



Caution

- Do not attempt to configure settings for acceleration/deceleration above the allowable values.
It may cause to generate vibration, malfunction or shorten the product life.
- In case the Air cylinder compatible attachment plate (option) on the slider side is mounted, the payload in the table should be reduced by 1kg.

Energy-Saving Setting: Disabled

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

Input in percentage [%] is to be set with 1G for Lead 20 and 12 and 0.5G for Lead 6 and 0.3G for Lead 3 as 100%.

(Note) “—” represent operation not available.

Lead20					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	3	2.5	2	1.5	—	—
320	3	2.5	2	1.5	—	—
480	3	2.5	2	1.5	—	—
600	3	2.5	2	1.5	—	—
700	3	1	1	0.5	—	—
800	1	0.5	—	—	—	—
900	—	0.5	—	—	—	—

Lead12					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	10.5	7.5	6.5	4	—	—
160	10.5	7.5	6.5	4	—	—
280	10.5	7.5	6.5	4	—	—
320	10.5	7	5.5	3.5	—	—
400	8.5	3.5	2.5	1.5	—	—
480	3.5	2	—	—	—	—
560	3	1.5	—	—	—	—
640	1.5	0.5	—	—	—	—

Lead6					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	17.5	14	—	—	3	2.5
140	17.5	14	—	—	3	2.5
180	17.5	14	—	—	3	2.5
220	17.5	8.5	—	—	3	2.5
270	7	5	—	—	—	—
320	5	3	—	—	—	—

Lead3					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	31	—	—	—	5	—
60	31	—	—	—	5	—
80	31	—	—	—	5	—
110	28	—	—	—	2	—
135	7	—	—	—	—	—

Energy-Saving Setting: Enabled

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

Input in percentage [%] is to be set with 1G for Lead 20 and 12 and 0.5G for Lead 6 and 0.3G for Lead 3 as 100%.

(Note) “—” represent operation not available.

Lead20		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	3	2	—
320	3	2	—
480	3	2	—
600	3	1.5	—
700	0.5	—	—

Lead12		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	10.5	5	—
160	10.5	5	—
280	9	4	—
320	7.5	3.5	—
400	5.5	2.5	—
480	3.5	1.5	—
560	1.5	—	—

Lead6		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	17.5	—	3
140	17.5	—	3
180	14	—	3
220	10.5	—	2
270	7	—	—
320	3	—	—

Lead3		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	28	—	5
60	28	—	5
80	28	—	5
110	24.5	—	2
135	7	—	—

1.3.5 Correlation of pressing force and current limit value



Caution

- The relation of the current value and the pressing force is a guideline at speed of 20mm/s for Lead 3, 6 and 35mm/s for Lead 12, 20.

There is some variance in the actual pressing force. The variance increases when the current value is low.

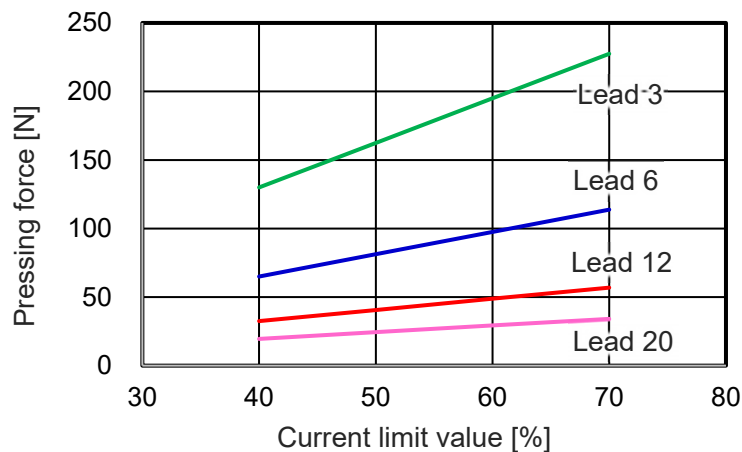
- Set the current limit value in 40 to 70% range.
- When the approach speed up to the pressing start position is 20mm/s or less for Lead 3 and 6, 35mm/s or less for Lead 12, 20, pressing operation will take place at approach speed.

When the pressing speed is lower than 20mm/s for Lead 3 and 6 and lower than 35mm/s for Lead 12 and 20, the pressing force shown in the graph (reference) should not be able to gain. Confirm in advance that there is no problem in the pressing force.

- Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type.

For the offset datum position [1.3.1 Actuator Specifications].

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



1.4 Mechanical specifications: EC-WS12□B

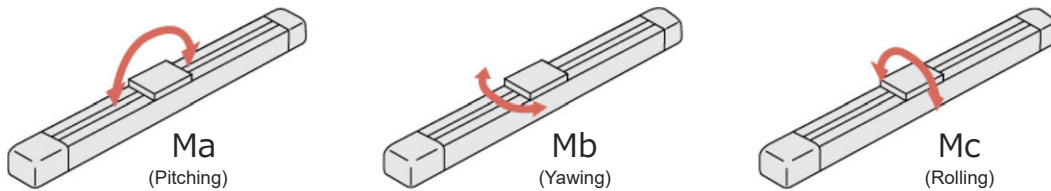
1.4.1 Actuator Specifications

Item		Content
Drive system		Ball screw $\Phi 12\text{mm}$, rolled C10
Positioning repeatability		Lead 4/8/16: $\pm 0.02\text{mm}$, Lead 24: $\pm 0.03\text{mm}$
Lost motion		0.1mm or less
Linear guide		Linear Infinite Circulation System
Static allowable moment (Note 1)		Ma direction: $328\text{N}\cdot\text{m}$, Mb direction: $328\text{N}\cdot\text{m}$, Mc direction: $751\text{N}\cdot\text{m}$
Dynamic allowable moment (Note 1, 2)		Ma direction: $77\text{N}\cdot\text{m}$, Mb direction: $77\text{N}\cdot\text{m}$, Mc direction: $176\text{N}\cdot\text{m}$
Brake (option)	Specification	Non-excitation activating electromagnetic brake
	Holding force	Lead 24: — Lead 16: — Lead 8: 5.5kgf Lead 4: 9.5kgf
Ambient operating temperature/humidity		10 to 40°C , 85%RH or less (Non-condensing)
Degree of protection		IP20
Vibration and impact resistance		4.9m/s^2
Motor type		Pulse motor (□42) (Current Amperage: 4.2A max.)
Encoder type		Incremental / Battery-less absolute
Encoder pulse count		800pulse/rev

Note 1 Even if the load goes moment and the load overhang length are in the allowable ranges, abnormal vibration or noise may occur because of influence of the way of installing the main body or transported object or the stiffness of the overhang installation beams. Revise the conditions for operation in such cases.

Note 2 For reference rated life of 5,000km. The running life differs according to operation conditions and mounting status.

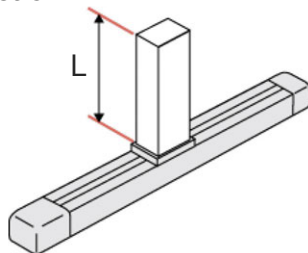
Moment direction



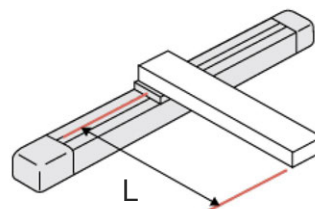
Load Overhang Length (L)

It is a reference for offset that enables an actuator to operate smoothly when a workpiece or bracket is offset from the actuator slider.

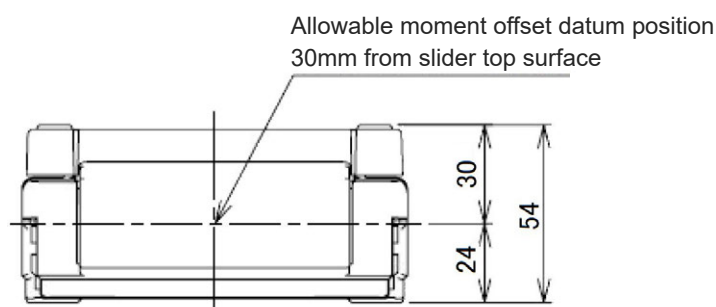
Ma direction



Mb/Mc direction



- Reference for Load Overhang Length ($L = 500\text{mm}$ or less)

Allowable moment offset datum position**Caution**

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

1.4.2 Lead and Maximum payload**Energy-Saving Setting: Disabled**

Model number	Lead [mm]	Maximum payload		Maximum pressing force [N]
		Horizontal [kg]	Vertical [kg]	
EC-WS12SB	24	7	—	—
EC-WS12HB	16	14	—	84
EC-WS12MB	8	28	5.5	168
EC-WS12LB	4	43.5	9.5	337

Energy-Saving Setting: Enabled

Model number	Lead [mm]	Maximum payload		Maximum pressing force [N]
		Horizontal [kg]	Vertical [kg]	
EC-WS12SB	24	5.5	—	—
EC-WS12HB	16	10.5	—	84
EC-WS12MB	8	21	5	168
EC-WS12LB	4	35	9	337

1.4.3 Stroke and Max. Speed



Caution

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

Energy-Saving Setting: Disabled

Max. Speed [mm/s]

Lead [mm]	50 to 250mm (Every 50mm)	300 mm	350 mm	400 mm	450 mm	500 mm	550 mm	600 mm	650 mm	700 mm	750 mm	800 mm
24	900					800	700	580	500	460	400	360
16	640			580	500	420	360	320	280	240	220	200
8	360		280	250	220	190	170	150	130	110	90	85
4	180		140	125	110	95	85	75	65	55	50	45

< > represents vertical operation.

Energy-Saving Setting: Enabled

Max. Speed [mm/s]

Lead [mm]	50 to 250mm (Every 50mm)	300 mm	350 mm	400 mm	450 mm	500 mm	550 mm	600 mm	650 mm	700 mm	750 mm	800 mm
24	800						700	580	500	460	400	360
16	640			580	500	420	360	320	280	240	220	200
8	320<280>		280	250	220	190	170	150	130	110	90	85
4	160		140	125	110	95	85	75	65	55	50	45

< > represents vertical operation.

1.4.4 Payload by Speed/Acceleration



Caution

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

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

- In case the Air cylinder compatible attachment plate (option) on the slider side is mounted, the payload in the table should be reduced by 1kg.

Energy-Saving Setting: Disabled

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

For percentage [%], input 1G is set as 100%.

(Note) “—” represent operation not available.

Lead 24					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	7	5.5	4	3	—	—
360	7	5.5	4	3	—	—
460	7	5.5	4	2.5	—	—
500	7	5	4	2.5	—	—
580	7	4.5	3	2	—	—
640	7	4	3	1.5	—	—
700	6.5	3.5	2.5	1.5	—	—
800	5	3	2	1	—	—
900	4	2	1.5	—	—	—

Lead 16					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	14	10	6.5	5	—	—
280	14	10	6.5	5	—	—
320	14	10	6.5	4	—	—
360	14	10	6	4	—	—
420	14	8.5	5	3.5	—	—
460	12.5	7.5	4.5	3	—	—
500	11	7	4	3	—	—
580	9	5.5	3	2	—	—
640	7.5	4	2.5	1.5	—	—

Lead 8					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	28	21	—	—	5.5	5
140	28	21	—	—	5.5	5
160	28	21	—	—	5.5	5
190	28	21	—	—	5.5	5
220	28	17.5	—	—	5	4
250	24.5	14	—	—	4	3.5
280	21	11	—	—	3.5	3
320	15.5	8.5	—	—	3	2
360	10.5	6.5	—	—	2	1.5

Lead 4					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	43.5	—	—	—	9.5	—
65	43.5	—	—	—	9.5	—
75	43.5	—	—	—	9.5	—
95	43.5	—	—	—	9.5	—
110	43.5	—	—	—	9.5	—
125	38.5	—	—	—	9.5	—
140	35	—	—	—	7.5	—
160	29.5	—	—	—	6.5	—
180	24.5	—	—	—	5	—

Energy-Saving Setting: Enabled

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

For percentage [%], input 1G is set as 100%.

(Note) “–” represent operation not available.

Lead 24		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	5.5	3.5	—
360	5.5	3.5	—
460	5.5	2.5	—
500	5	2.5	—
580	4.5	2	—
640	3.5	1.5	—
700	3	0.5	—
800	1	—	—

Lead 16		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	10.5	5	—
280	10.5	5	—
320	10.5	5	—
360	9	4	—
420	7.5	3.5	—
460	7	3	—
500	5.5	1.5	—
580	3.5	0.5	—
640	2	—	—

Lead 8		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	21	—	5
140	21	—	5
160	21	—	5
190	17.5	—	4
220	14	—	3
250	11	—	2
280	8.5	—	1
320	5.5	—	—

Lead 4		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	35	—	9
65	35	—	9
75	35	—	9
95	35	—	7
110	28	—	5
125	22.5	—	4
140	17.5	—	2.5
160	10.5	—	1

1.4.5 Correlation of pressing force and current limit value



Caution

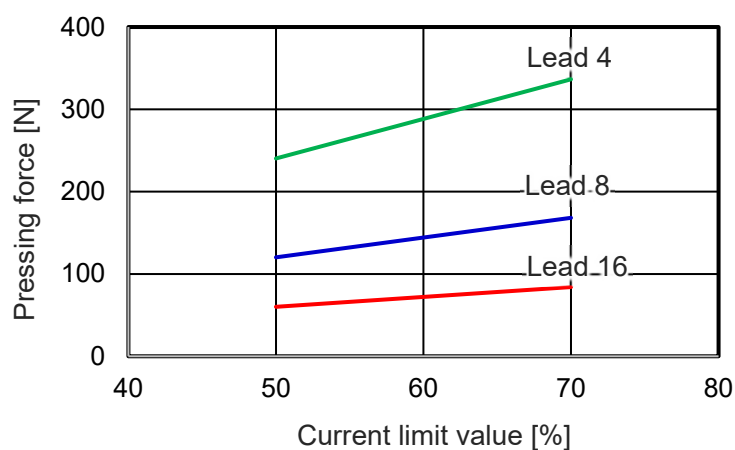
- Lead 24 is not capable of pressing.
- The relation of the current value and the pressing force is a guideline at speed of 20mm/s. There is some variance in the actual pressing force. The variance increases when the current value is low.
- Set the current limit value in 50 to 70% range.
- When the approach speed up to the pressing start position is 20mm/s or less, pressing operation will take place at approach speed.

When the pressing speed is less than 20mm/s, it may not satisfy the pressing force shown in the graph (reference). Confirm in advance that there is no problem in the pressing force.

- Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type.

For the offset datum position [1.4.1 Actuator Specifications].

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



1.5 Mechanical specifications: EC-WS12□BR

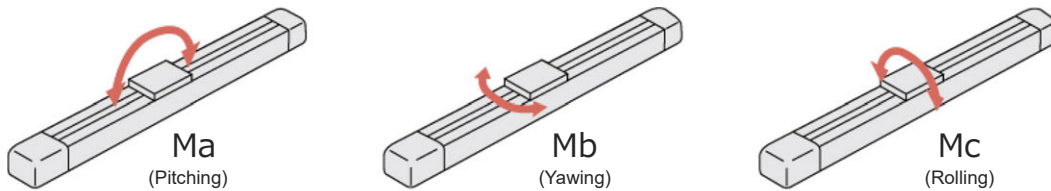
1.5.1 Actuator Specifications

Item		Content
Drive system		Ball screw $\phi 12\text{mm}$, rolled C10
Positioning repeatability		Lead 4/8/16: $\pm 0.02\text{mm}$, Lead 24: $\pm 0.03\text{mm}$
Lost motion		0.1mm or less
Linear guide		Linear Infinite Circulation System
Static allowable moment (Note 1)		Ma direction: $328\text{N}\cdot\text{m}$, Mb direction: $328\text{N}\cdot\text{m}$, Mc direction: $751\text{N}\cdot\text{m}$
Dynamic allowable moment (Note 1, 2)		Ma direction: $77.0\text{N}\cdot\text{m}$, Mb direction: $77.0\text{N}\cdot\text{m}$, Mc direction: $176\text{N}\cdot\text{m}$
Brake (option)	Specification	Non-excitation activating electromagnetic brake
	Holding force	Lead 24: — Lead 16: — Lead 8: 5.5kgf Lead 4: 9.5kgf
Ambient operating temperature/humidity		10 to 40°C , 85%RH or less (Non-condensing)
Degree of protection		IP20
Vibration and impact resistance		4.9m/s^2
Motor type		Pulse motor (□42) (Current Amperage: 4.2A max.)
Encoder type		Incremental / Battery-less absolute
Encoder pulse count		800pulse/rev

Note 1 Even if the load goes moment and the load overhang length are in the allowable ranges, abnormal vibration or noise may occur because of influence of the way of installing the main body or transported object or the stiffness of the overhang installation beams. Revise the conditions for operation in such cases.

Note 2 For reference rated life of 5,000km. The running life differs according to operation conditions and mounting status.

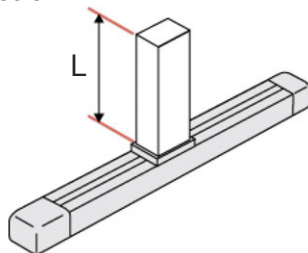
Moment direction



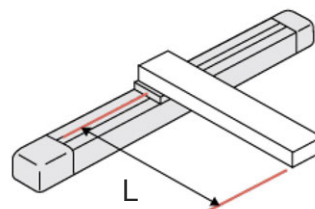
Load Overhang Length (L)

It is a reference for offset that enables an actuator to operate smoothly when a workpiece or bracket is offset from the actuator slider.

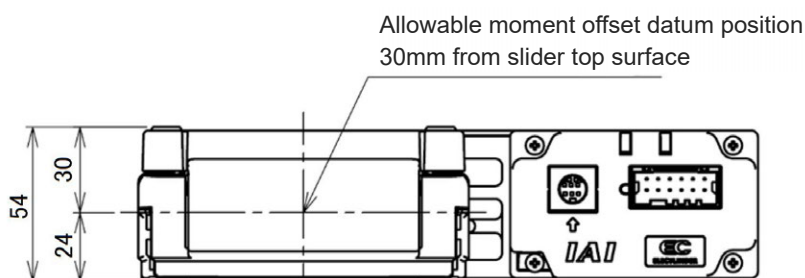
Ma direction



Mb/Mc direction



- Reference for Load Overhang Length ($L = 500\text{mm}$ or less)

Allowable moment offset datum position**Caution**

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

1.5.2 Lead and Maximum payload**Energy-Saving Setting: Disabled**

Model number	Lead [mm]	Maximum payload		Maximum pressing force [N]
		Horizontal [kg]	Vertical [kg]	
EC-WS12SBR	24	7	—	—
EC-WS12HBR	16	14	—	72
EC-WS12MBR	8	28	5.5	144
EC-WS12LBR	4	43.5	9.5	288

Energy-Saving Setting: Enabled

Model number	Lead [mm]	Maximum payload		Maximum pressing force [N]
		Horizontal [kg]	Vertical [kg]	
EC-WS12SBR	24	5.5	—	—
EC-WS12HBR	16	10.5	—	72
EC-WS12MBR	8	21	5	144
EC-WS12LBR	4	35	9	288

1.5.3 Stroke and Max. Speed



Caution

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

Energy-Saving Setting: Disabled

Max. Speed [mm/s]

Lead [mm]	50 to 250mm (Every 50mm)	300 mm	350 mm	400 mm	450 mm	500 mm	550 mm	600 mm	650 mm	700 mm	750 mm	800 mm
24	900					800	700	580	500	460	400	360
16	640			580	500	420	360	320	280	240	220	200
8	360<280>		280	250	220	190	170	150	130	110	90	85
4	180<140>		140	125	110	95	85	75	65	55	50	45

< > represents vertical operation.

Energy-Saving Setting: Enabled

Max. Speed [mm/s]

Lead [mm]	50 to 250mm (Every 50mm)	300 mm	350 mm	400 mm	450 mm	500 mm	550 mm	600 mm	650 mm	700 mm	750 mm	800 mm
24	800						700	580	500	460	400	360
16	640			580	500	420	360	320	280	240	220	200
8	320<280>		280	250	220	190	170	150	130	110	90	85
4	160<140>		140	125	110	95	85	75	65	55	50	45

< > represents vertical operation.

1.5.4 Payload by Speed/Acceleration



Caution

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

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

- In case the Air cylinder compatible attachment plate (option) on the slider side is mounted, the payload in the table should be reduced by 1kg.

Energy-Saving Setting: Disabled

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

Input in percentage [%] is to be set with 1G for Lead 24 and 16 and 0.5G for Lead 8 and 0.3G for Lead 3 as 100%.

(Note) “—” represent operation not available.

Lead 24					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	7	5.5	4	2.5	—	—
360	7	5.5	4	2.5	—	—
460	7	5.5	4	2.5	—	—
500	7	5	4	2.5	—	—
580	7	4.5	3	2	—	—
640	7	4	3	1.5	—	—
700	6.5	3.5	2.5	1.5	—	—
800	5	3	2	1	—	—
900	4	2	1.5	—	—	—

Lead 16					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	14	10	6.5	5	—	—
280	14	10	6.5	5	—	—
320	14	10	6.5	4	—	—
360	14	10	6	4	—	—
420	14	8.5	5	3.5	—	—
460	12.5	7.5	4.5	3	—	—
500	11	7	4	3	—	—
580	9	5.5	3	2	—	—
640	7.5	4	2.5	1.5	—	—

Lead 8					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	28	21	—	—	5.5	5
140	28	21	—	—	5.5	5
160	28	21	—	—	5.5	5
190	28	21	—	—	5.5	5
220	28	17.5	—	—	5	4
250	24.5	14	—	—	3	2
280	21	11	—	—	2	1.5
320	15.5	8.5	—	—	—	—
360	10.5	6.5	—	—	—	—

Lead 4					Payload [kg]	
Orientation	Horizontal				Vertical	
Speed [mm/s]	Acceleration [G]					
	0.3	0.5	0.7	1	0.3	0.5
0	43.5	—	—	—	9.5	—
65	43.5	—	—	—	9.5	—
75	43.5	—	—	—	9.5	—
95	43.5	—	—	—	9.5	—
110	43.5	—	—	—	9.5	—
125	38.5	—	—	—	7.5	—
140	35	—	—	—	3.5	—
160	29.5	—	—	—	—	—
180	24.5	—	—	—	—	—

Energy-Saving Setting: Enabled

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

Input in percentage [%] is to be set with 1G for Lead 24 and 16 and 0.5G for Lead 8 and 0.3G for Lead 3 as 100%.

(Note) “—” represent operation not available.

Lead 24		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	5.5	3.5	—
360	5.5	3.5	—
460	5.5	2.5	—
500	5	2.5	—
580	4.5	2	—
640	3.5	1.5	—
700	3	0.5	—
800	1	—	—

Lead 16		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	10.5	5	—
280	10.5	5	—
320	10.5	5	—
360	9	4	—
420	7.5	3.5	—
460	7	3	—
500	5.5	1.5	—
580	3	0.5	—
640	1.5	—	—

Lead 8		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	21	—	5
140	21	—	5
160	21	—	5
190	17.5	—	4
220	14	—	3
250	11	—	2
280	8.5	—	1
320	5.5	—	—

Lead 4		Payload [kg]	
Orientation	Horizontal		Vertical
Speed [mm/s]	Acceleration [G]		
	0.3	0.7	0.3
0	35	—	9
65	35	—	9
75	35	—	9
95	35	—	7
110	28	—	5
125	22.5	—	4
140	17.5	—	2.5
160	10.5	—	—

1.5.5 Correlation of pressing force and current limit value



Caution

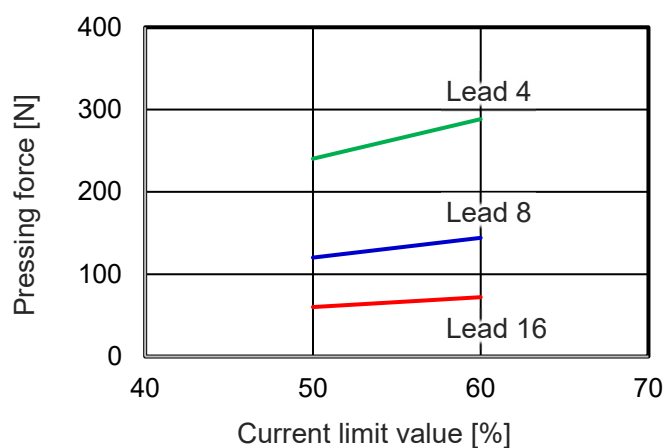
- Lead 24 is not capable of pressing.
- The relation of the current value and the pressing force is a guideline at speed of 20mm/s. There is some variance in the actual pressing force. The variance increases when the current value is low.
- Set the current limit value in 50 to 60% range.
- When the approach speed up to the pressing start position is 20mm/s or less, pressing operation will take place at approach speed.

When the pressing speed is less than 20mm/s, it may not satisfy the pressing force shown in the graph (reference). Confirm in advance that there is no problem in the pressing force.

- Calculate the recoil moment generated by the pressing force when performing pressing operation with the slider type.

For the offset datum position [1.5.1 Actuator Specifications].

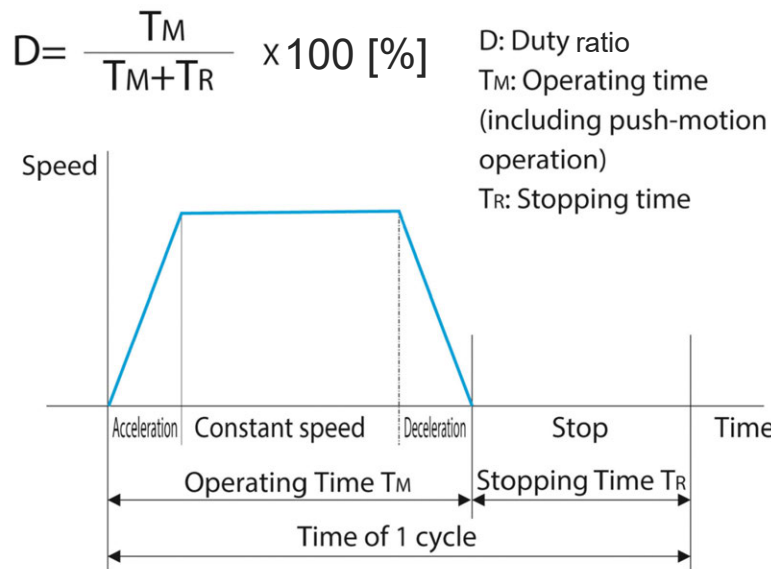
Configure the current limit value to ensure that the recoil moment does not exceed the (Ma/Mb) dynamic allowable moment.



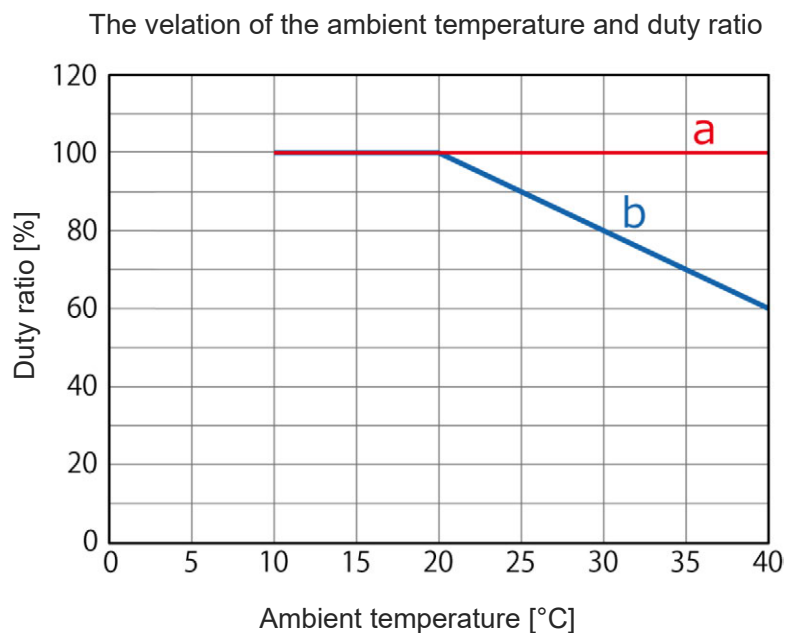
1.6 Duty ratio

1.6 Duty ratio

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



There is a limitation to the duty ratio depending on models as the graph below shows. Use so that the duty ratio falls within the specified conditions based on ambient temperature.



a	—	EC-WS10□B/WS10□BR
b	—	EC-WS12□B/WS12□BR

1.7 Options

1.7.1 RCON-EC connection specification (Model: ACR)

It is an option to be selected when connection is established in the field network via R-unit.

- * By selecting this option, because the power supply gets 2 circuits and the input and output specification gets fixed at NPN, it cannot be used in parallel with TMD2 and PN options.

1.7.2 With brake (Model: B)

It is a feature to retain a slider from moving when the power or servo gets turned off. This option is necessary when an actuator is installed in the vertical orientation.

1.7.3 Air cylinder compatible attachment plate (Model: CS)

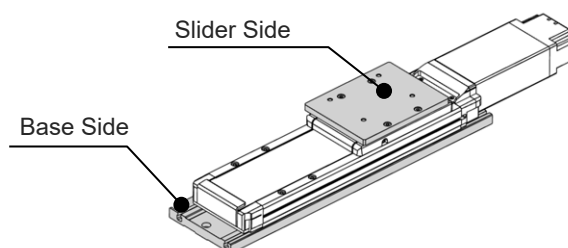
It is a plate to make a compatibility in installation of some models of the rod-less air cylinder. By applying the plate on the slider end and the base end, the height and position of the slider on each air cylinder can be adjusted.

- * As it is not installed on delivery, it requires the user to install it.

(Note 1) The payload should decrease by 1 kg when CS is selected.

(Note 2) It is not available for vertical orientation, horizontally oriented wall mount and ceiling mount.

For how to install, refer to [2.3.5 [2] When Using Air Cylinder Compatible Attachment Plate]



1.7.4 3 position mode specification (Model: MF)

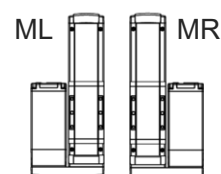
This is an option that enables 3-point positioning (intermediate stop).

For details, refer to the separate volume [an instruction manual of ELECYLINDER 3 position mode specification (ME3837)].

1.7.5 Motor reversed direction (Model: ML, MR)

The orientation to reverse a motor should be indicated in the motor reversed type.

Viewing from the rear side, reversing on the left is ML and reversing on the right is MR.



1.7.6 Home reverse specification (Model: NM)

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

1.7.7 PNP specification (Model: PN)

I/O input/output specifications are NPN specification as standard.

Specifying this option changes the unit to PNP specification.

* It cannot be selected together with ACR Option.

1.7.8 Stainless Steel Suction Joint Mounted Specification (Model: SVL, SVR)

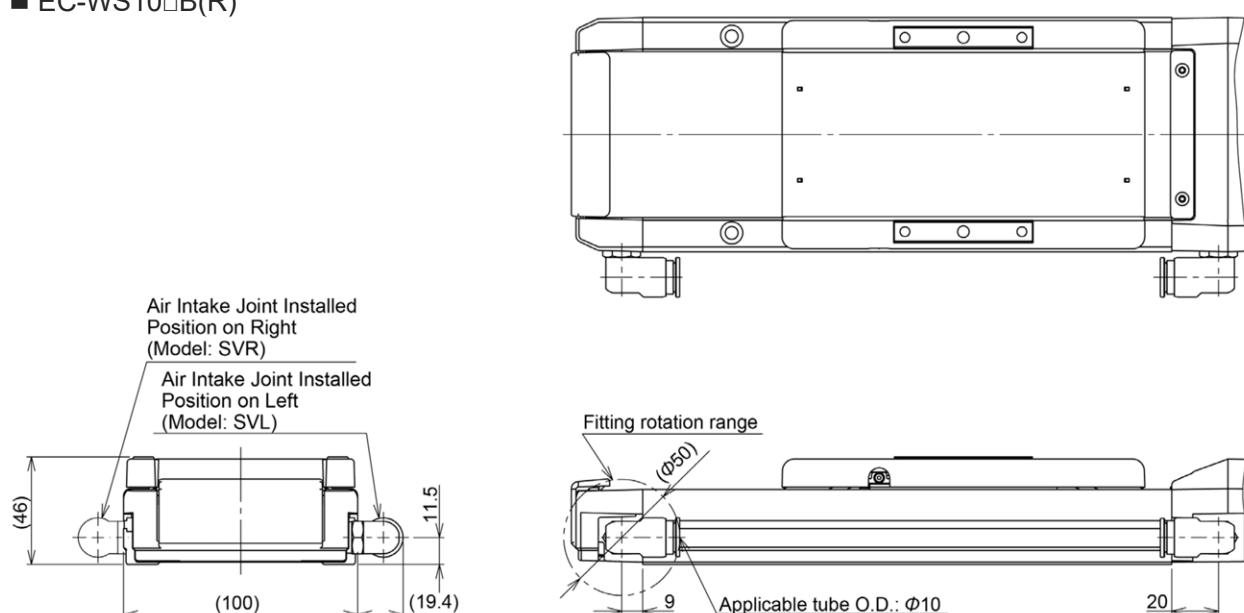
Mount the stainless steel suction joint for air intake on the side of the base.

When viewed from the motor side, install the SVL on the left side of the main unit and the SVR on the right side.

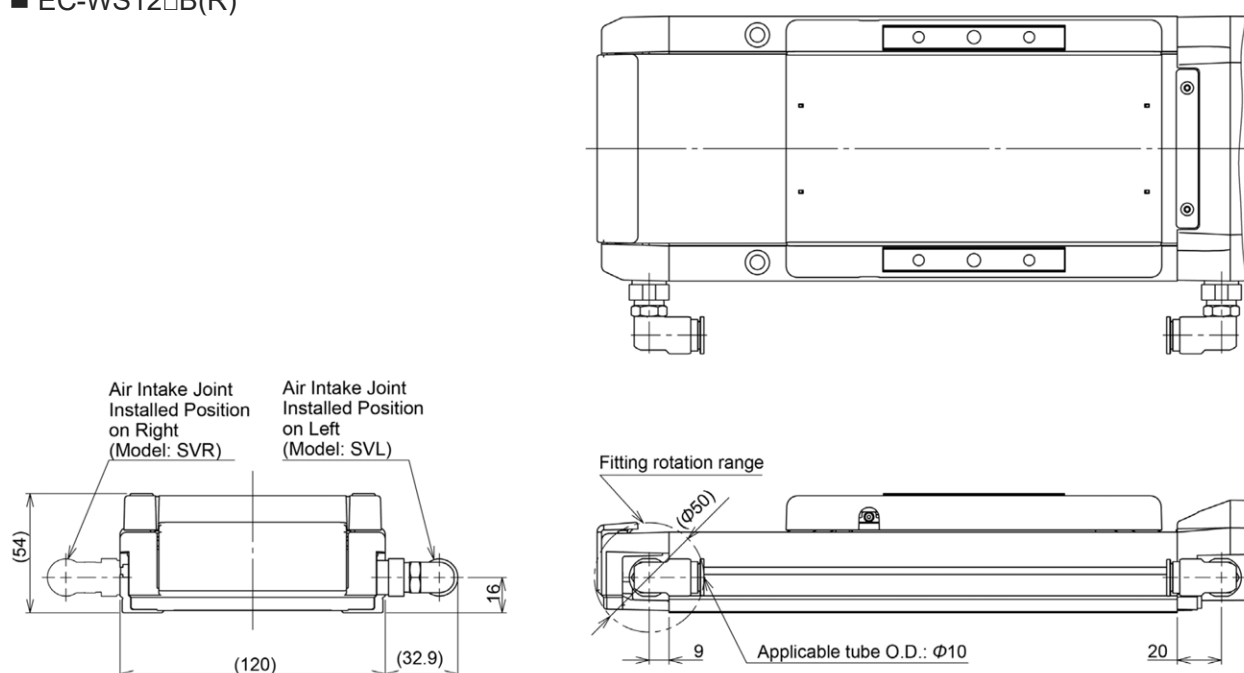
For the motor reversed specification, the joint installation position can be selected only on the side opposite to the motor reversed direction.

-ML-SVR, -MR-SVL

■ EC-WS10□B(R)



■ EC-WS12□B(R)



1.7.9 2-circuit power supply specification (Model: TMD2)

It is an option equipped with the operation stop input of an actuator.

Select this option when it is required to cut off only the drive power source of an actuator.

* It cannot be selected together with ACR Option.

1.7.10 Battery-less absolute encoder specification (Model: WA)

The standard specification is for incremental encoder.

By indicating this option, the battery-less absolute encoder should be equipped.

1.7.11 Wireless communication specification (Model: WL)

It is an option to get applicable to the wireless communication. By indicating this option, wireless communication with the teaching pendant TB-03 gets available.

Adjustment of start point, end point and AVD is available in wireless network.

Certificates and self-declarations regarding the wireless function are handled under the model name below for the wireless circuit board.

Model name: IABL3827

1.7.12 Wireless axis operation specification (Model: WL2)

By indicating WL2, trial run for axis movement (to forward end, backward end, JOG and inching) should be conducted as well as operation available in wireless communication (adjustment of start point, end point and AVD) in WL. However, it is not a feature to perform 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: IABL3827

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

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.

[Handling after unpacking]

- Carry the slider type by its base part.
- 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-15 to 17.

Take out the option parts tray, pull out actuators in each cardboard inside, and open up the cardboards to take out the actuators.

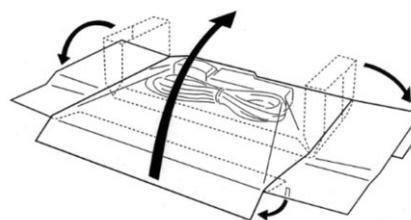


Reference

These packaging materials can be recycled as cardboard.

As cardboard and urethane film (recyclable thermoplastic resin) are joined with heat sealing, not using adhesive, the film can be easily peeled by spreading.

This means they can be recycled as cardboard when disposed of, reducing industrial waste cost burdens.



[Handling when assembled into machinery (system)]

- Secure sliders 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)

2.2.1 Installation environment

In general, it is an environmental that an operator can work without protection gear.

Avoid the following locations for installation.

- Where the unit receives radiant heat from strong heat sources such as heat treatment furnaces
- Where the ambient temperature exceeds the range of 10 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

Provide sufficient work space for the following maintenance and inspection.

- Space to insert the teaching tool connector
- Space to replenish grease
- Space for replacement work of components such as a motor or controller

For details, refer to [Chapter 4 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

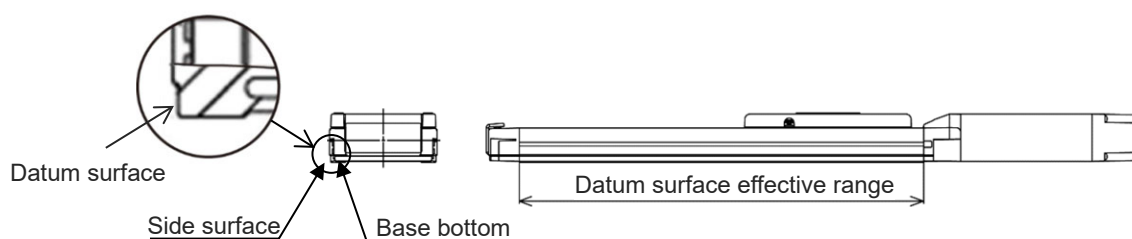
2.2.2 Storage/preservation environment

- 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.
Refer to [2.3.2 Mounting orientation] for the installation in the horizontal installation.

2.3 Installation method

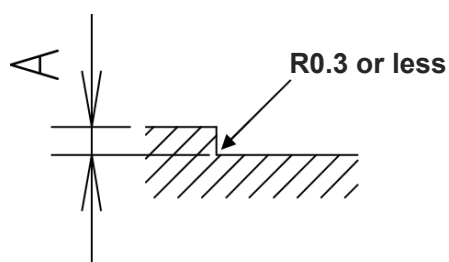
2.3.1 Installation surface

- The surface that the main unit is to be installed should be a machined flat surface or a face with equivalent accuracy, and its flatness should satisfy 0.05mm/m or less.
- 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 datum surfaces for slider running accuracy.
Use these surfaces as the datum surfaces for mounting when running accuracy is required.



(When viewed from the opposite side of the motor,
the left side surface is the datum surface)

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



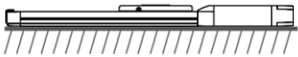
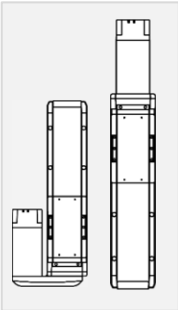
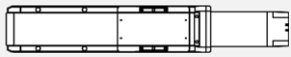
A dimension

3 to 5mm

2.3.2 Mounting orientation

○: Available for Installation

△: Confirm in [2.3.3 Precautions regarding stainless steel sheet] for use.

			
Horizontal installation	Vertical installation	Horizontal lateral installation	Horizontal ceiling mount installation
○	○	△	△



Caution

- The posture of installation using the air cylinder compatible attachment plate (option model code: CS) should only be in the standard horizontal orientation. Installation in other postures is not available.
- For installation in vertical orientation, it is recommended to have the motor installed on top.
- If the motor is installed on the top, cap the teaching port.
Clogging with foreign matter may lead to a breakdown.

2.3.3 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.

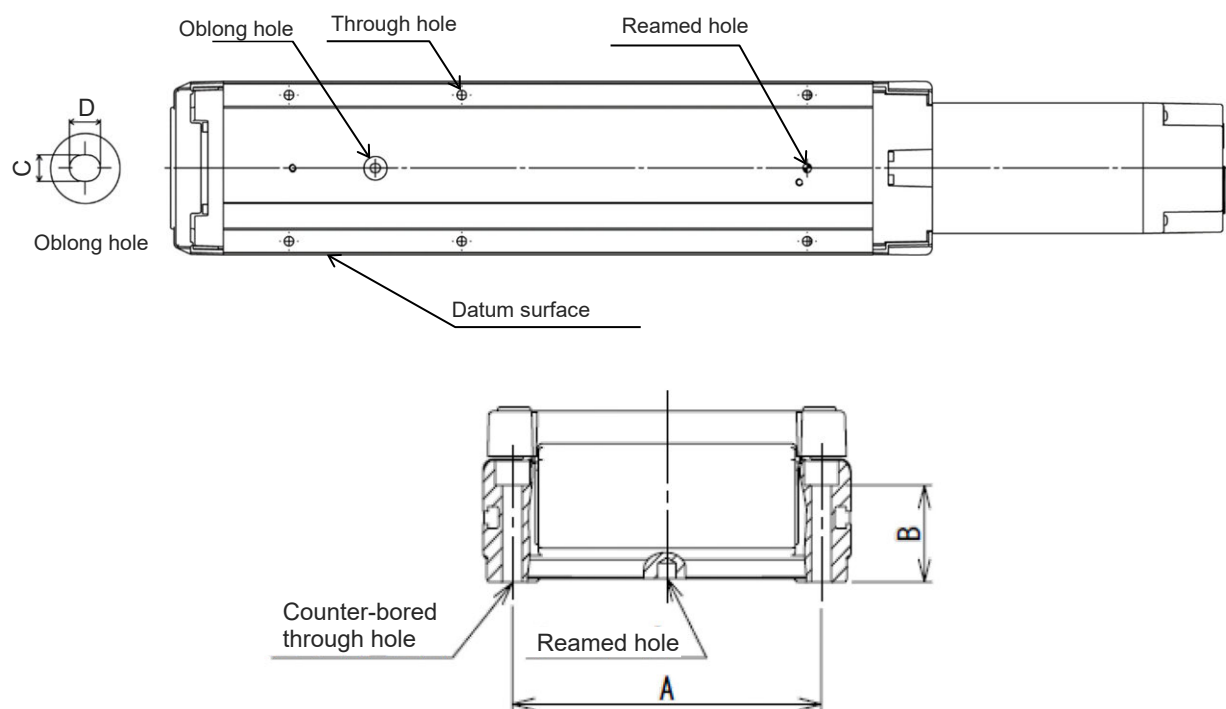
2.3.4 Fixing bolt

- It is necessary that you prepare the screws to hold the base bottom or foot bracket to the installation surface by your own.
- Use a high-tensile bolt with its specification ISO-10.9 or higher.
- 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.

Fixing bolt	For iron non-fastening surface	For aluminum non-fastening surface
M5	7.3N·m	3.4N·m
M6	12.3N·m	5.4N·m
M8	30.0N·m	11.5N·m

2.3.5 Body mounting

There are a reamed hole and an oblong hole for the positioning pins on the bottom of the actuator. 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.



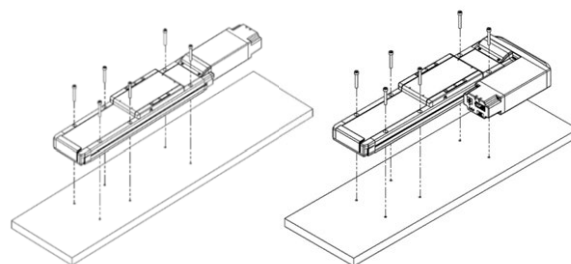
Type	Counter-bored through hole diameter	A [mm]	B [mm]	Reamed hole	Oblong hole
WS10□B WS10□BR	Φ5.5 Through Φ9.5 Counterbore Depth 6.5	84	25.5	Φ5H7 depth 5	C:5 ^{+0.012} ₀ D:6 depth 5
WS12□B WS12□BR	Φ6.6 Through Φ11 Counterbore Depth 6.5	103	30	Φ6H7 depth 6	C:6 ^{+0.012} ₀ D:7 depth 6

* The depths of reamed hole and oblong hole are described as those from the base seating surface

[1] When using base through holes

Affix the actuator using the through holes on the base.

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



[2] When Using Air Cylinder Compatible Attachment Plate

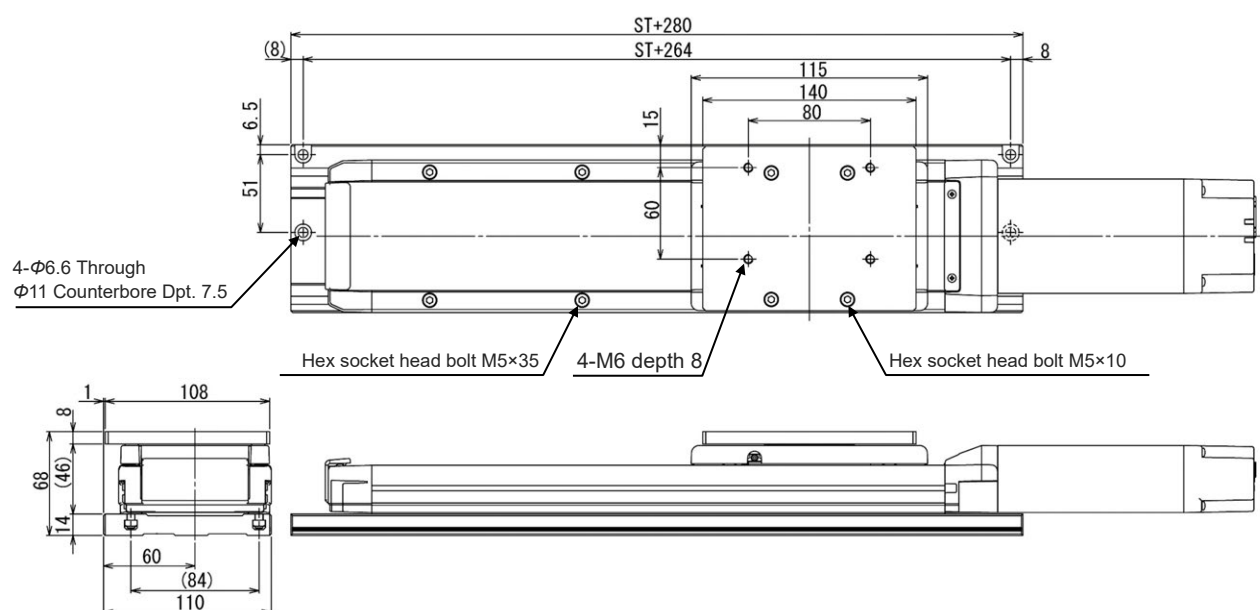
An actuator should be fixed using the air cylinder compatible attachment plate (option).

◆ WS10□B/WS10□BR

Model Code of Individual Unit

Base Side : EC-CSB-WS10- (Stroke) (Material: Aluminum)

Slider Side : EC-CSS-WS10 (Material: Carbon Steel, Nickel Plating)



Accessories Other Than Plates

- Hex socket head bolt (for Slider Attachment): M5 × 10 (4pcs)
- Parallel Pin: $\Phi 5 \times 8$, Class B, h7 (2pcs)
- Hex socket head bolt (for Base Attachment): M5 × 35 (Quantity described in table below)
- Square Nut: $\square 8 \times 4$ M5 (Quantity described in table below)

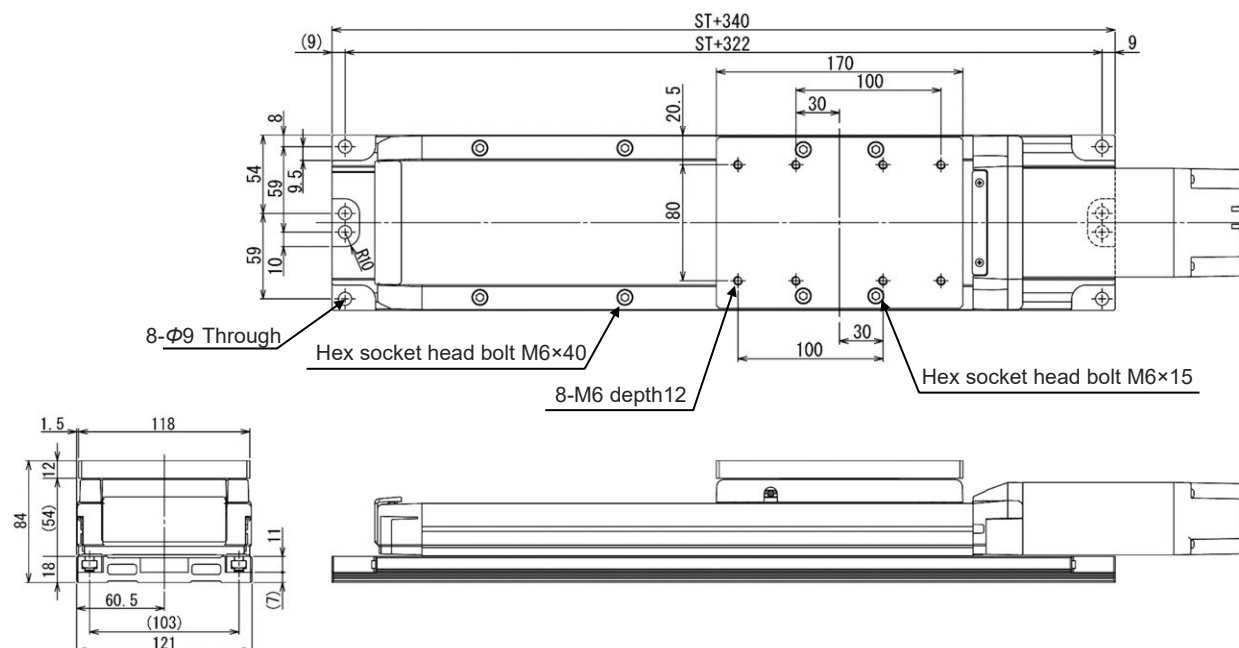
Stroke [mm]	50 to 100	150 to 300	350 to 500
Quantity	4pcs	6pcs	8pcs

◆ WS12□B/WS12□BR

Model Code of Individual Unit

Base Side : EC-CSB-WS12- (Stroke) (Material: Aluminum)

Slider Side : EC-CSS-WS12 (Material: Aluminum)



Accessories Other Than Plates

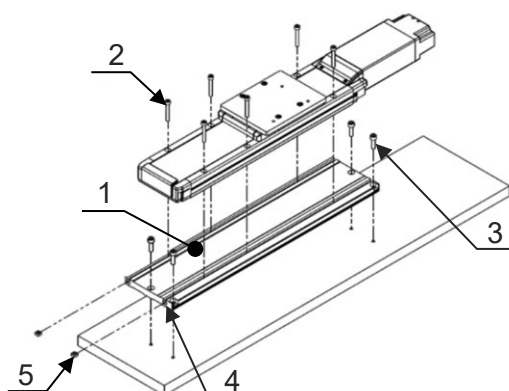
- Hex socket head bolt (for Slider Attachment): M6 × 15 (4pcs)
- Parallel Pin: φ6 × 10, Class B, h7 (2pcs)
- Hex socket head bolt (for Base Attachment): M6 × 40 (Quantity described in table below)
- Square Nut: □10 × 5 M6 (Quantity described in table below)

Stroke [mm]	50 to 100	150 to 300	350 to 500	550 to 700	750 to 800
Quantity	4pcs	6pcs	8pcs	10pcs	12pcs

◆ How to Mount

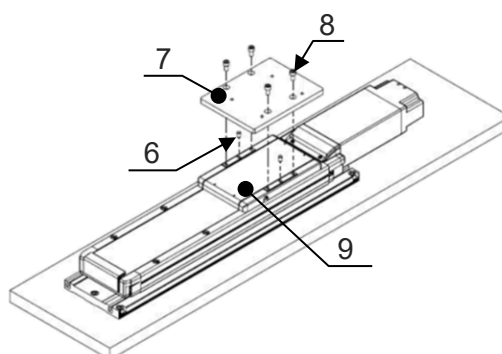
● Base Side

1. Attach the air cylinder compatible attachment plate (on base side) with the hex socket head bolts (4pcs).
2. Insert the square nuts to the T-shaped slots to attach the air cylinder with the hex socket head bolts.



● Slider Side

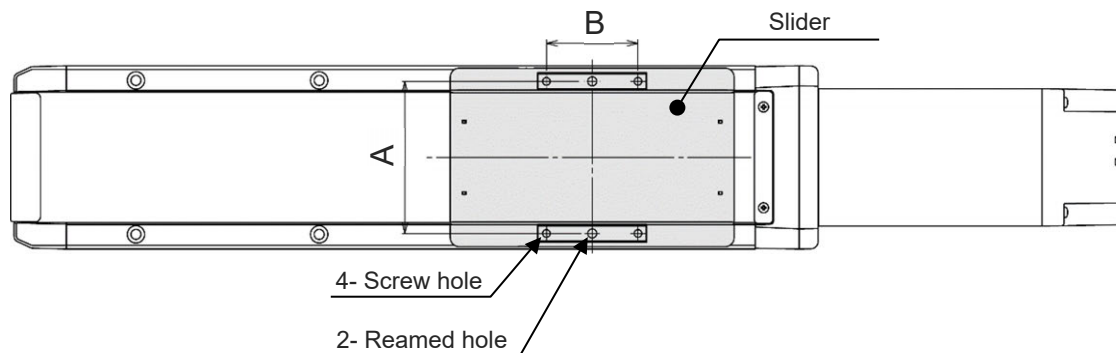
1. Put the positioning pins on the slider.
2. Attach the air cylinder compatible attachment plate (on slider side) with the hex socket head bolts (4pcs).



No.	Type	Part Name	Size	Quantity	Tightening Torque
1	Common	Air Cylinder Compatible Attachment Plate (on Base Side)	—	1	—
2	WS10□B	Hex socket head bolt (enclosed)	M5×35	—	3.4N·m
	WS12□B		M6×40	—	5.4N·m
3	WS10□B	Hex socket head bolt	M6	4	5.4N·m
	WS12□B		M8	4	11.5N·m
4	Common	T-shaped Slot	—	2	—
5	WS10□B	Square Nut (enclosed)	8×4 M5	—	—
	WS12□B		10×5 M6	—	—
6	Common	Positioning Pin (enclosed)	Φ6×10 Class B, h7	2	—
7	Common	Air Cylinder Compatible Attachment Plate (on Slider Side)	—	1	—
8	WS10□B	Hex socket head bolt (enclosed)	M5×35	4	3.4N·m
	WS12□B		M6×40	4	5.4N·m
9	Common	Slider (enclosed)	—	1	—

2.3.6 Mounting transported objects

- Use the tapped mounting holes on the top surface of the slider to fix transported objects.
- 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.



Type	A [mm]	B [mm]	Screw hole	Reamed hole
WS10□B WS10□BR	83	50	M5 depth 13	Φ5H7 depth 5
WS12□B WS12□BR	101	50	M6 depth 16.5	Φ6H7 depth 6

* 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.
- Use a high-tensile bolt with its specification ISO-10.9 or higher.

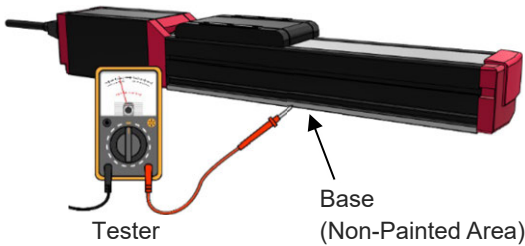
2.4 Wiring for Frame Grounding

The air cylinder is equipped with the built-in controller circuit board.

The frame grounding line on the controller is connected to the main unit of the ELECYLINDER and should be grounded through the attachment surface of the ELECYLINDER.

Measure the conductivity on the fixing screw and the ground surface to make sure the grounding is established.

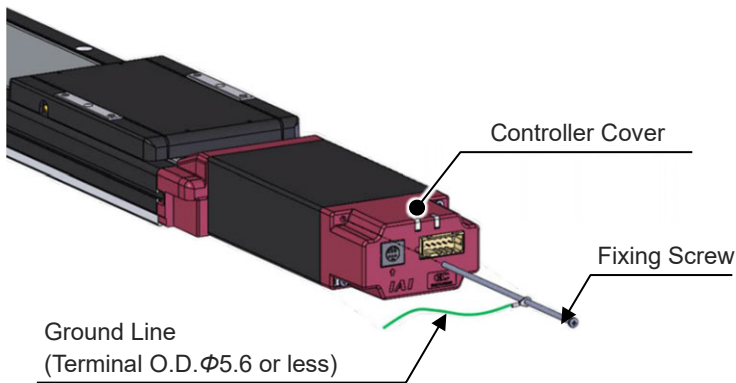
Conductivity can be checked at a point where there is no paint on the base bottom.



[When Grounding not Conducted at Attachment Surface]

Connect the ground line to one of the screws (4pcs) on the controller cover to perform grounding.

Check again for the conductivity.



Type		Fixing Screw	Part Name	Tightening Torque
WS10□B WS10□BR	W/o Brake	M3 × 140	Cross-recessed pan head machine screw	0.41N·m
	With Brake	M3 × 170		
WS12□B WS12□BR	W/o Brake	M3 × 120	Cross-recessed pan head machine screw	0.41N·m
	With Brake	M3 × 160		

ELECYLINDER

Chapter 3

Electrical and Controls

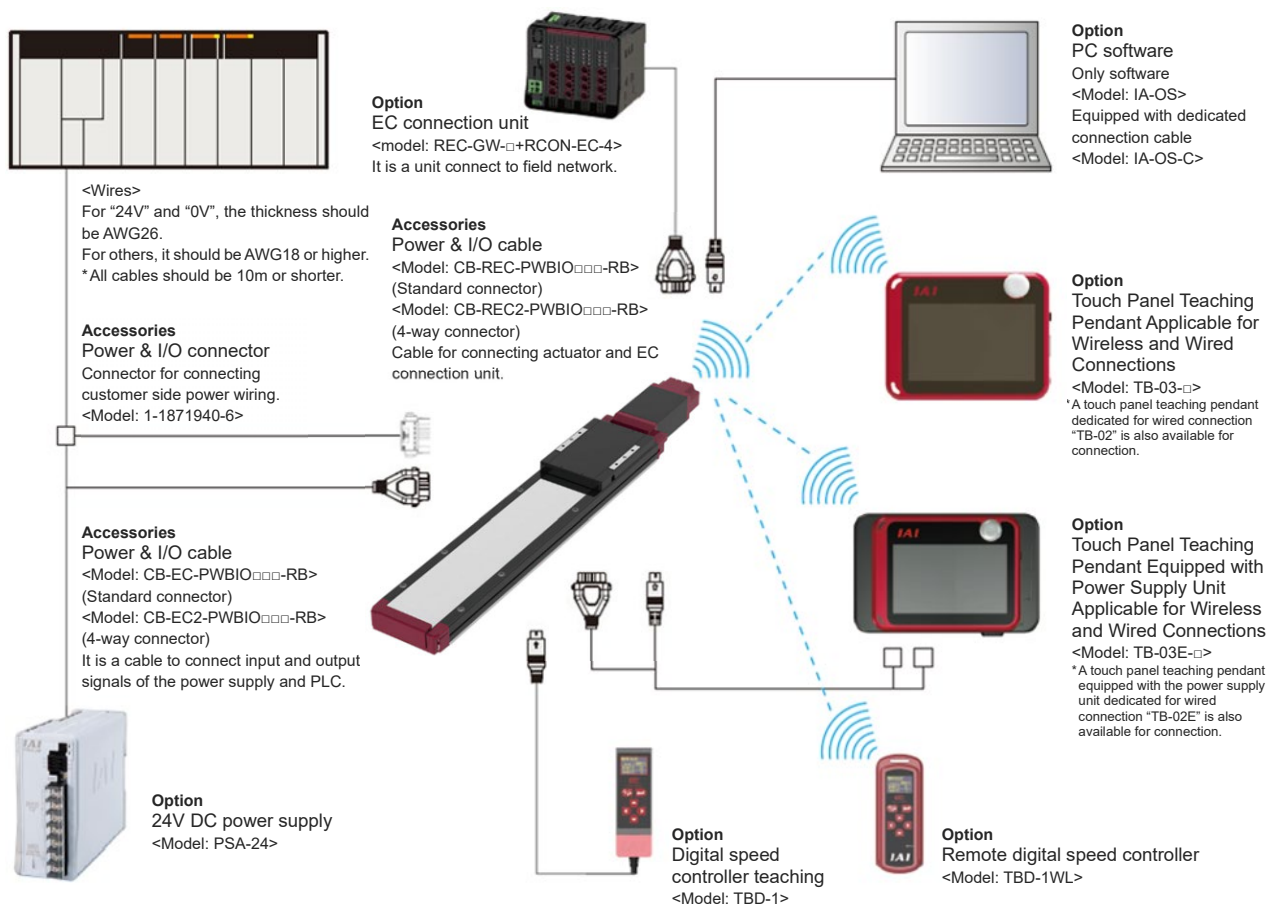
3.1	System configuration	3-1
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3.1 System configuration

Reference

- For electric / control details such as electrical specification, wiring, connection, parameters and how to control, and also how to treat errors, refer to [ELECYLINDER Electric Section Instruction Manual (ME3816)] provided separately.

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.

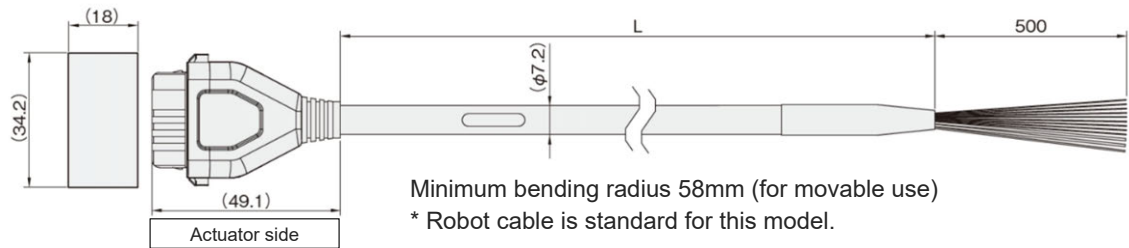
This manual introduces an example using a PLC connected as the master device.

3.2 Cable and Connector

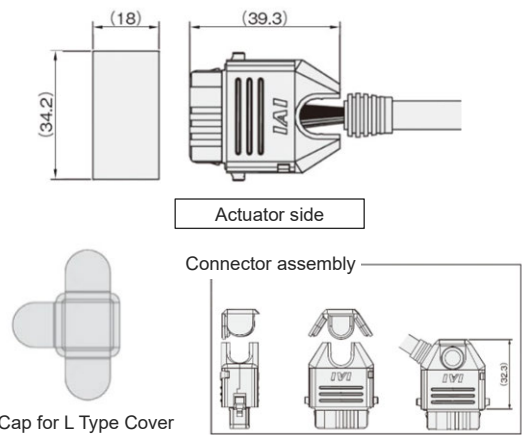
3.2.1 Power & I/O Cable

- ◆ Model CB-EC-PWBIO□□□-RB (Standard connector)
CB-EC2-PWBIO□□□-RB (4-way connector)

●Standard connector



● 4-way Connector

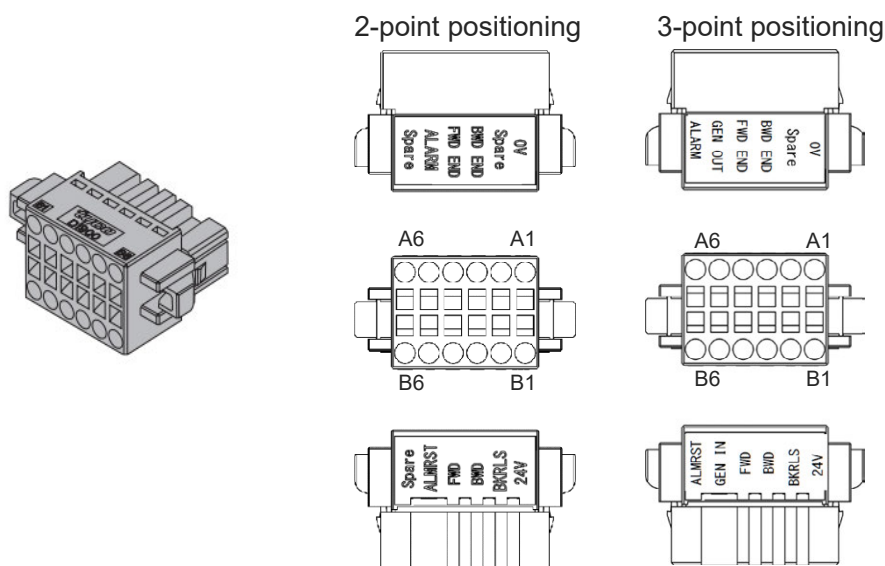


Color	Signal name		Pin No.
	2-point positioning	3-point positioning	
Black (AWG18)	0V	0V	A1
Red (AWG18)	24V	24V	B1
Light blue (AWG22)	(Reserve) ^(Note 1)	(Reserve) ^(Note 1)	A2
Orange (AWG26)	ST0	ST0	B3
Yellow (AWG26)	ST1	ST1	B4
Green (AWG26)	RES	(Reserve)	B5
Pink (AWG26)	(Reserve)	RES	B6
Blue (AWG26)	LS0/PE0	LS0/PE0	A3
Purple (AWG26)	LS1/PE1	LS1/PE1	A4
Gray (AWG26)	*ALM	LS2	A5
White (AWG26)	(Reserve)	*ALM	A6
Brown (AWG26)	BKRLS	BKRLS	B2

Note 1 24V (control) when 2-circuit power supply specification (TMD2) are selected.
(Note) Cable in light green and light gray not in us.
(Already cut inside shrink tube)

- The wiring on the opposite side of the connector has not been processed.
- The cable length (L) is available from 1m to 9m. Specify the length in increments of 1m.
- Sample model number: Cable length 3m → CB-EC(2)-PWBIO030-RB

3.2.2 Power & I/O Connector



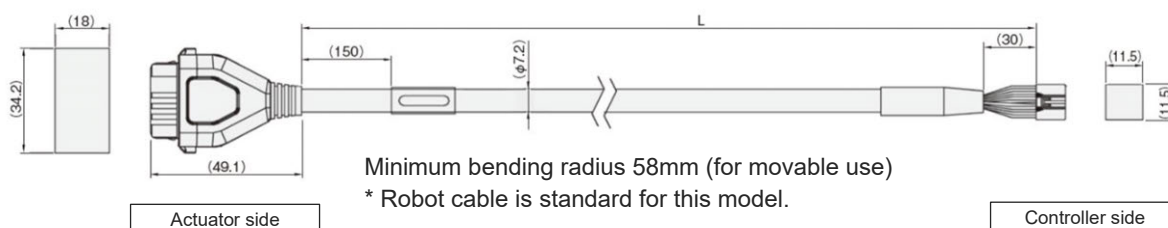
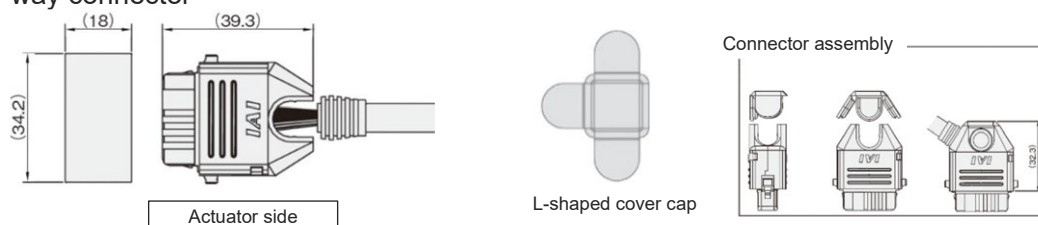
Name	Model	Quantity
Power & I/O connector	1-1871940-6 (Tyco Electronics)	1

Pin No.	Signal name		Function
A1	0V		Ground
A2	Spare (CP: 2-circuit power supply specification)		Spare (24V for control power supply when power supply 2-system specification)
A3	BWD END		Backward completion (Pressing complete 0 when pressing operation)
A4	FWD END		Forward completion (Pressing complete 1 when pressing operation)
A5	2-point positioning	Alarm	Alarm output
	3-point positioning	General OUT	Intermediate position completion
A6	2-point positioning	Spare	Spare
	3-point positioning	Alarm	Alarm output
B1	24V (MP: 2-circuit power supply specification)		24V power supply (24V for motor power supply when power supply 2-system specification)
B2	BKRLS		Brake release input
B3	BWD (Note 1)		Backward command
B4	FWD (Note 1)		Forward command
B5	2-point positioning	ALMRST	Alarm release signal input
	3-point positioning	General IN	Spare
B6	2-point positioning	Spare	Spare
	3-point positioning	ALMRST	Alarm release signal input

Note 1: B4 should not be used and B3 should be the forward/backward command in the single solenoid system.

3.2.3 RCON-EC connection specification / Power & I/O Cable

◆ **Model** **CB-REC-PWBIO□□□-RB (Standard connector)**
CB-REC2-PWBIO□□□-RB (4-way connector)

● **Standard connector**● **4-way connector**

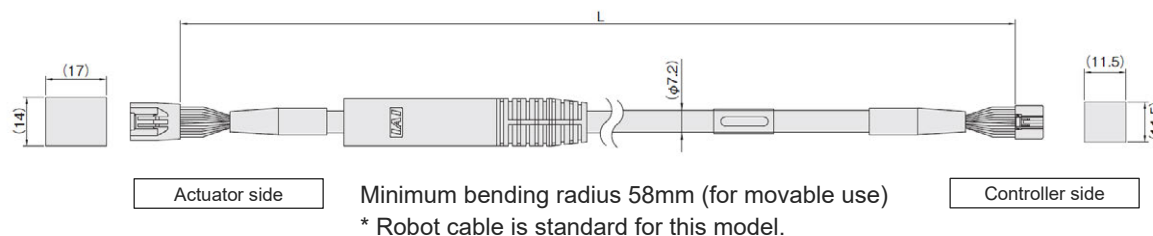
Color	Signal name	Pin No.	Pin No.	Signal name	Color
Black (AWG18)	0V	A1	2	0V	Black (AWG18)
Red (AWG18)	24V (MP)	B1	1	24V (MP)	Red (AWG18)
Light blue (AWG22)	24V (CP)	A2	12	24V (CP)	Light blue (AWG22)
Orange (AWG26)	IN0	B3	7	OUT0	Orange (AWG26)
Yellow (AWG26)	IN1	B4	8	OUT1	Yellow (AWG26)
Green (AWG26)	IN2	B5	9	OUT2	Green (AWG26)
Yellow green (AWG26)	SD+	B6	6	SD+	Yellow green (AWG26)
Light gray (AWG26)	SD-	A6	10	SD-	Light gray (AWG26)
Blue (AWG26)	OUT0	A3	3	IN0	Blue (AWG26)
Purple (AWG26)	OUT1	A4	4	IN1	Purple (AWG26)
Gray (AWG26)	OUT2	A5	5	IN2	Gray (AWG26)
Brown (AWG26)	BKRLS	B2	11	BKRLS	Brown (AWG26)
			13	FG	Green (AWG26)

- The wiring on the opposite side of the connector has not been processed.
- The cable length (L) is available from 1m to 9m. Specify the length in increments of 1m.
- Sample model number: Cable length 3m → CB-REC(2)-PWBIO030-RB

3.2.4 Relay Extension Cable for RCON-EC Connection

It is to be used when extending a power & I/O cable in the RCON-EC connection specification.

◆ Model CB-REC-PWBIO□□□-RB-JY



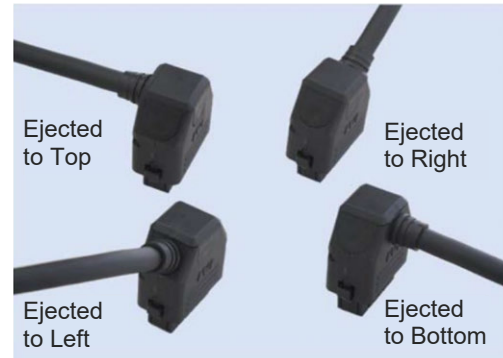
Color	Signal name	Pin No.		Pin No.	Signal name	Color
Black (AWG18)	0V	2		2	0V	Black (AWG18)
Red (AWG18)	24V (MP)	1		1	24V (MP)	Red (AWG18)
Light blue (AWG22)	24V (CP)	12		12	24V (CP)	Light blue (AWG22)
Orange (AWG26)	OUT0	7		7	OUT0	Orange (AWG26)
Yellow (AWG26)	OUT1	8		8	OUT1	Yellow (AWG26)
Green (AWG26)	OUT2	9		9	OUT2	Green (AWG26)
Light green (AWG26)	SD+	6		6	SD+	Light green (AWG26)
Light gray (AWG26)	SD-	10		10	SD-	Light gray (AWG26)
Blue (AWG26)	IN0	3		3	IN0	Blue (AWG26)
Purple (AWG26)	IN1	4		4	IN1	Purple (AWG26)
Gray (AWG26)	IN2	5		5	IN2	Gray (AWG26)
Brown (AWG26)	BKRLS	11		11	BKRLS	Brown (AWG26)
Green (AWG26)	FG	13		13	FG	Green (AWG26)

- The unit of 1m is the standard (1 to 9m). 0.5m is also in the standard.
Any length halfway out of above should be the special specification.
- Sample model number: Cable length 3m → CB-REC-PWBIO030-RB-JY

(Note) Select the length of cables to make the total of the power & I/O cable in the RCON-EC connection specification and the relay extension cable above at 10m or less.

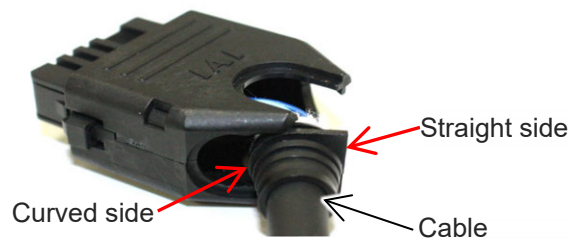
■ About 4-way Connector

It is a cable capable to change the orientation of the connector in four ways.



Follow the process bellow to build up the connector in the orientation of your demand.

1. Insert the cable by sliding it from the curved side of the cable-end to your desire direction.



2. Be sure to check that the cable is settled firmly and insert two tabs of the cover along the slits of socket.



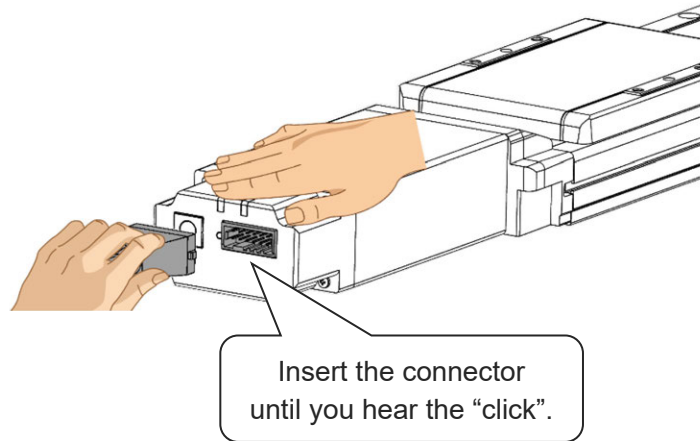
3. Then, push the last tab to the socket.



3.2.5 Power & I/O cable connection

Connect the power & I/O cable.

Have the convex on the connector facing down, insert the connector till it makes a “click” noise.



Caution

- The connector must be inserted in a given direction.
Align the arrow marks on the connectors and insert until it clicks into place.
- Take appropriate care to prevent unused wiring in the loose wire end on the cable from shorting out other wires by protecting them with insulation tape.

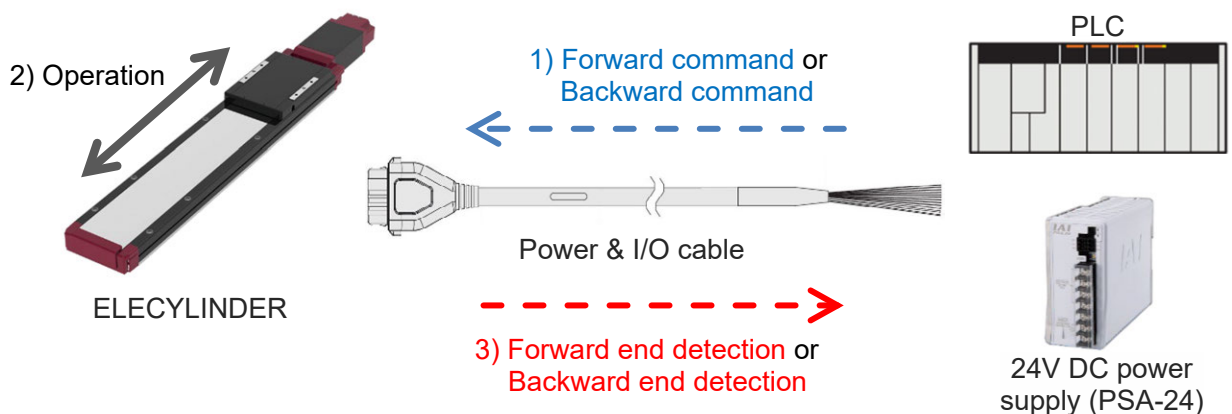
3.3 Basic operation

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. Shown below is an image when connecting ELECYLINDER with PLC as the host device. For details of control systems, refer to [ELECYLINDER Electricity Section Instruction Manual (ME3816)] provided separately and [3 position mode specification Instruction Manual (ME3837)].

- Image of Connecting PLC and ELECYLINDER (movement between 2 points)
 - 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)



3.4 Teaching tool

The following teaching tools should be used for setup and operation of ELECYLINDER.

◆ Digital Speed Controller Teaching / Remote digital speed controller



Digital Speed Controller
Teaching (Wired)
TBD-1



Remote digital speed
controller (Wireless)
TBD-1WL

Refer to [Digital Speed Controller / Digital Speed Controller Teaching / Remote Speed Controller (ME3818)] for how to use them.

◆ Touch Panel Teaching Pendant



TB-03 (Wireless / wired)



TB-02 (Wired)

Refer to [ELECYLINDER Applicable Teaching Pendant TB-03 (Wireless: ME0375 / Wired: ME0376)] or [ELECYLINDER Applicable Teaching Pendant TB-02 (ME0355)] for how to use them.

◆ IA-OS (PC Software)



IA-OS

Install to PC

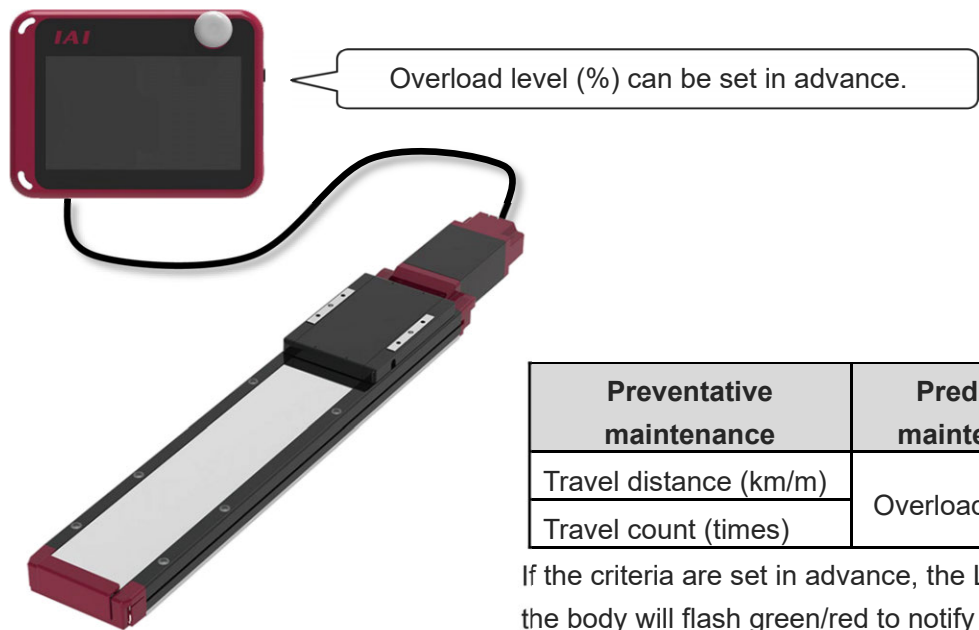


Refer to the IA-OS First Step Guide (ME0391) for how to install, and the help window in IA-OS for how to use.

3.5 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	Predictive maintenance
Travel distance (km/m)	Overload warning
Travel count (times)	

If the criteria are set in advance, the LED built into the body will flash green/red to notify that the maintenance period is up.

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.

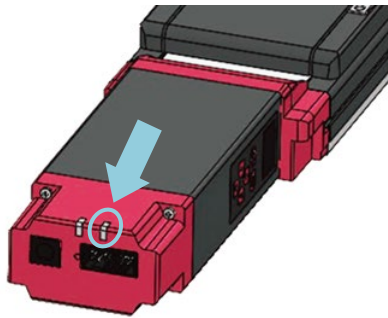
Reference

- For how to set up / use the preventive maintenance and predictive maintenance features, refer to [ELECYLINDER Electric Section Instruction Manual (ME3816)] provided separately.

3.6 Troubleshooting confirmations

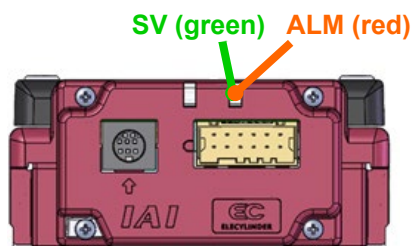
If a problem occurs, check the following points first in order to ensure quick recovery and prevent recurrence of the problem.

(1) Check status indicator LED (SV/ALM LED) of the ELECYLINDER body

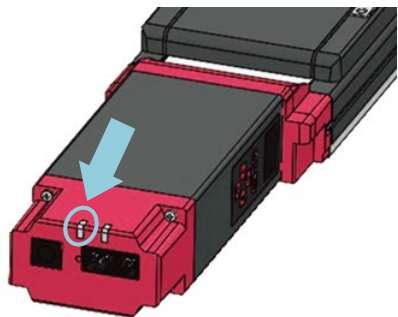


○: Light ON ×: Light OFF ★: Blinking

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
		Servo OFF	ON
×	○	Alarm generated	OFF
		Stop switch ON (When using teaching tool)	ON
○	×	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

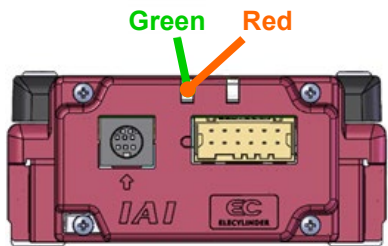


(2) Check status indicator LED (wireless status LED) of the ELECYLINDER body



○: Light ON ×: Light OFF ★: Blinking

Wireless status LED (Left side as seen from the motor side)		Motor power status
Green	Red	
×	×	Wireless hardware initializing Wireless not connected (transmitting monitor data) Connecting from wired teaching pendant
×	★ (ON 200ms/ OFF 200ms alternate blinkig)	Wireless hardware error
★ (ON 150ms/ OFF 150ms alternate blinkig)	×	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.

Reference

- For how to diagnose troubles and details / how to treat with a generated alarm, refer to [ELECYLINDER Electric Section Instruction Manual (ME3816)] provided separately.
- For details / how to treat with a generated alarm, it can be checked also in the help window in IA-OS or touch panel teaching tool.

ELECYLINDER

Chapter 4

Maintenance and Inspection

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4.1 Precautions for maintenance and inspection work

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



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 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.



Notice

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

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

- It is recommended to improve the environment when the grease color changes in use in a bad environment.
- 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.

Wipe it off in case of any dripping.

- An ELECYLINDER stored for 6 months or more may suffer from grease degradation. Supply grease before the start of use. Refer to [4.4 Grease supply].

4.2 Inspection

Follow the maintenance inspection schedule below.

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

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

Refer to [4.4 Grease supply] for detailed information about the greasing method.

Refer to [4.5 Component replacement] for detailed information about specific component replacement and adjustment methods.

4.2.1 Inspection items and schedule

*Stainless steel sheet life guideline: 5,000km

Inspection period	External inspection	Internal inspection	Grease supply	
			Ball screw	Guide
Start of work inspection	○	-	-	-
1-month inspection	○	-	-	-
3-months inspection	-	-	○	○
3-months after starting operation	-	-	Grease supply timing (Guideline) dependent	
6-months inspection	○	○		
Every 6 months thereafter	○	○		



Caution

- 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 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.

4.2.2 Grease supply timing (Guideline)

Maximum operating speed [mm/s]	Grease supply timing (Guideline)	
	Operation distance	Months
0 to 750 or less	1,250km	6 months
Over 750 to 1440	2,500km	



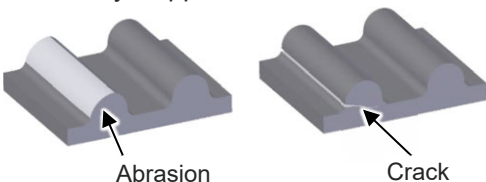
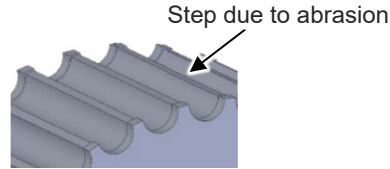
Caution

- An ELECYLINDER stored for 6 months or more may suffer from grease degradation. Supply grease before the start of use.
- 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.
- The ball screw or guide may be damaged if the oil film runs out.
- It is recommended to improve the environment when the grease color changes in use in a bad environment.

4.2.3 External visual inspection

Inspection items	Maintenance work
Is abnormal noise or vibration generated?	Refer to [ELECTRICITY Section Instruction Manual (ME3816) Troubleshooting] for help.
Are ELECTRICITY mounting bolts loose?	Tighten them further. Refer to the tightening torque described in [Chapter 2 Installation].
Is the cable scratched?	Replace if the damage is severe.
Is the connector loose?	Re-insert correctly.
Is grease dripping out? (especially if vertically mounted)	Clean up any drips. Replenish the grease.
Is the stainless steel sheet scratched?	Replace the stainless steel sheet.
Is the stainless steel sheet misaligned or slack?	Adjust the alignment and hang.

4.2.4 Internal visual inspection

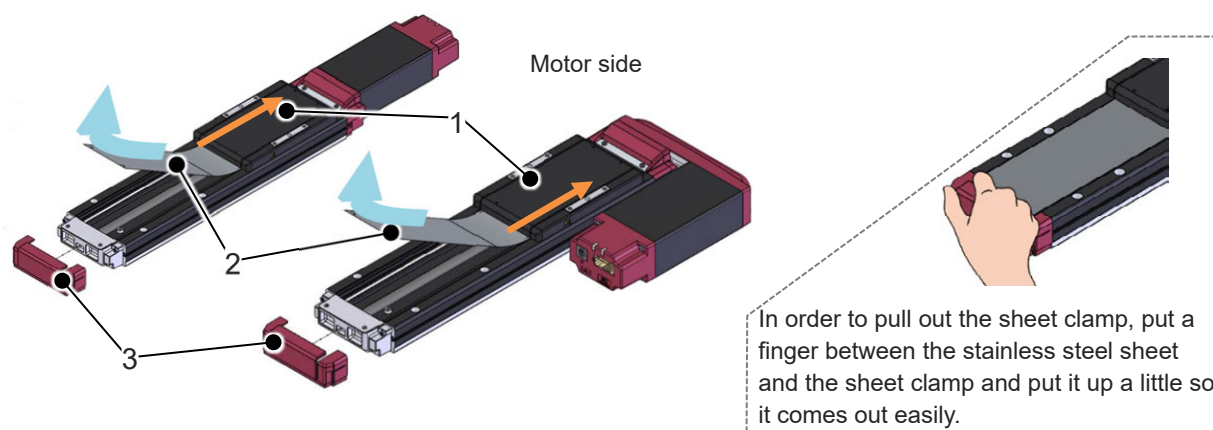
Inspection items	Maintenance work
Is play or dust generated?	The ball screw guide may be damaged. Contact IAI.
Has foreign matter penetrated inside?	Remove the foreign matter, clean, and inspect the interior for any damage.
Is the ball screw or guide grease not lubricating well? (Even if the grease is brown, lubrication is adequate if the running surface is shiny)	Wipe away the old grease, then replenish with new grease.
Is dust or foreign matter adhered to the ball screw or guide?	Replenish with new grease after cleaning.
Is the belt significantly worn out on the teeth area? Is there any crack on the teeth area? Is there any chipped tooth? 	Replace the belt in case any of those stated on the left is found. Refer to [4.5.6 Timing belt replacement in 4.5 Component replacement]. Applicable Models: Motor reversed type
Is the belt hardened, softened or deformed (shrunk or expanded)? 	Replace the belt in case any of those stated on the left is found. Refer to [4.5.6 Timing belt replacement in 4.5 Component replacement]. Applicable Models: Motor reversed type
Is there any significant abrasion on pulley teeth? 	When abnormality stated on the left is found: Consult with IAI. Applicable Models: Motor reversed type
Is there any significant abrasion, crack or chipping on the slider roller (optional model code: SR)?	Have the slider roller replaced. Refer to [4.5.3 Slider roller (Option Model: SR) replacement in 4.5 Component replacement]. Applicable Models: Slider roller specification (option)

[1] Internal inspection method

**Caution**

- Pay attention on the stainless steel sheet so that it would be bent forcefully or get damaged.
- Pull the stainless steel sheet so the condition would not change from the initial installed condition.
Any change in the condition of installation may cause the stainless steel sheet positioned extremely on one end or may impact the product life.
- They may be a risk of getting hurt on the edge of the stainless steel sheet. Use a glove or equivalent during work.

1. Move the slider to the motor side.
2. Remove the front cover.
3. Fold back the stainless steel sheet and inspect the interior.
4. Return the stainless steel sheet to normal and secure with sheet clamps.



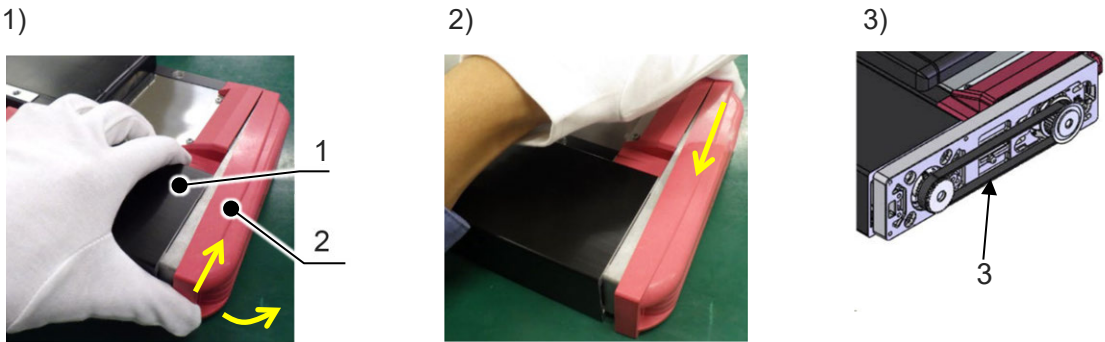
No.	Type	Part Name	Size	Quantity	Tightening torque
1	Common	Slider	—	1	—
2		Stainless steel sheet	—	1	—
3		Front cover	—	1	—

[2] How to have timing belt inspection on reversed type (EC-WS10□BR/WS12□BR)

- 1. Take off the pulley cover.
- 2. Inspect the timing belt.
- 3. Put the pulley cover back on.

[How to remove the pulley cover]

While pushing in the side of the pulley cover on the motor cover side, slide it towards the rear end and pull the pulley cover towards the motor end and it will come off.
(It is easy to take off the pulley cover if you hang your index finger on the motor cover and push in the side of the pulley cover with your thumb.)



No.	Type	Part Name	Size	Quantity	Tightening torque
1	Common	Motor cover	—	1	—
2		Pully cover	—	1	—
3		Timing belt	—	1	—

4.3 Cleaning

4.3.1 External cleaning

- Clean exterior surfaces as necessary.
- Use a soft cloth to wipe away dirt and buildup.
- Do not blow too hard with compressed air, as it may cause dust to get in through 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.

4.3.2 Internal cleaning

- Use a soft cloth to wipe away dirt and buildup.
- Do not blow too hard with compressed air, as it may cause dust to get in through gaps.
- Do not use petroleum-based solvents, neutral detergent or alcohol.

4.4 Grease supply

4.4.1 Grease used

Type	Grease Supply Point	Grease
WS10□B(R) WS12□B(R)	Ball screw Guide	IAI Corporation IAGR-LDP01-400
	Coupling	NOK Co., Ltd NOXLUB TL1013 (Lithium Based Grease)



Caution

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

4.4.2 Greasing method



Caution

- Do not apply grease during operation.
- When using a PC teaching for work, prepare the emergency stop button (emergency stop circuit) near you before starting the work.
- Too much grease applied on may increase the sliding resistance, which could result in increase of load on a motor and may drop the performance.
Also, excess grease on a ball screw may splash and dirt its peripheral.
- It is recommended to wear gloves during work as you may get scratch on the edge of a stainless steel sheet.
- If the grease enters your eye, immediately see a specialist physician for appropriate care.
- After supplying grease, wash your hands well with soap.

[1] Preparation

- Protection Tool (Rubber Gloves, etc.)
- Grease
- Grease Supply Tool

Prepare tools that suits to the grease nipple diameter ($\Phi 3.5$).

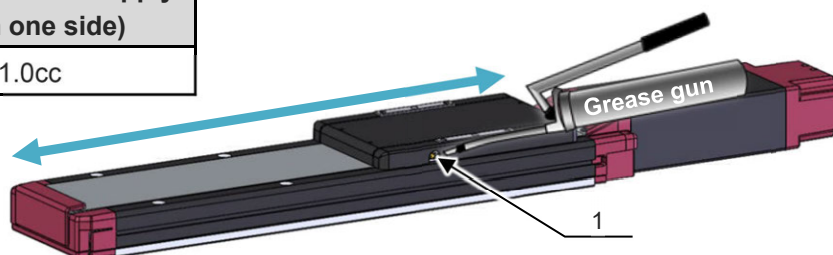
Equipment Reference Grease gun: CH-400 (Yamada)

Nozzle: NZ3 (NSK)

[2] Supply procedure

1. Supply grease on the grease nipple on the slider side using a grease gun.
Supplying grease on grease nipples should supply grease on both of the guides and ball screw.
Make sure to supply grease evenly at both of the right and left nipples.
2. Move the slider full-stroke to apply the grease thoroughly.

Reference for Grease Supply Volume (on one side)
0.5 to 1.0cc

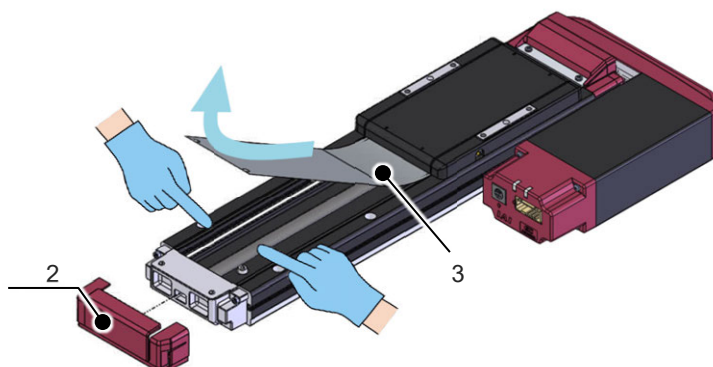


* To release the brake, refer to [ELECYLINDER Electricity Section Instruction Manual (ME3816)]

◆ EC-WS10BR 50 Stroke, with brake

As the grease nipple gets overlapped by the motor cover and it makes difficult to supply grease at the grease nipple, peel the stainless steel sheet and supply grease on the linear guide and ball screw.

Move the slider in the full stroke range after supplying grease so the grease spreads evenly.
For how to take off the stainless steel sheet, refer to [4.2.4 [1] Internal inspection method]

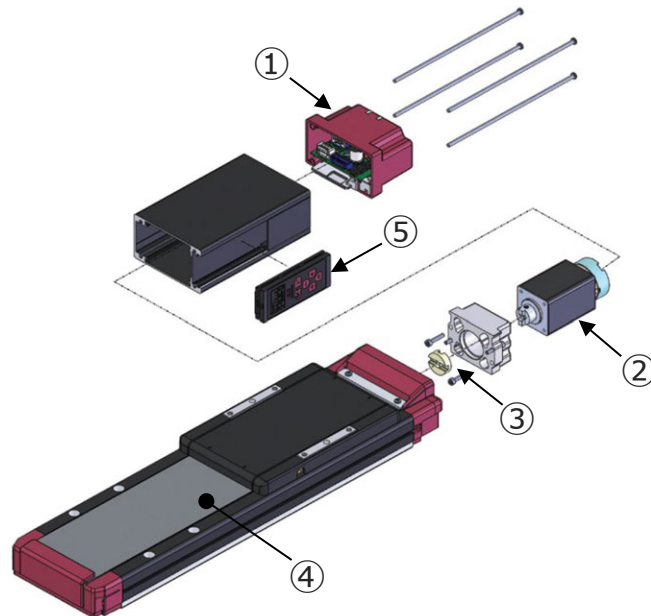


No.	Type	Part Name	Size	Quantity	Tightening torque
1	Common	Grease fitting (Same on Opposite Side)	φ3.5	1	—
2		Front cover	—	1	—
3		Stainless steel sheet	—	1	—

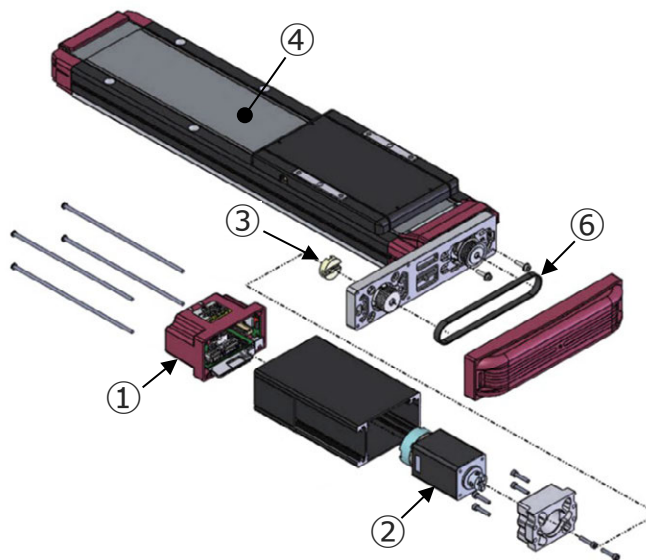
4.5 Component replacement

4.5.1 List of parts for replacement

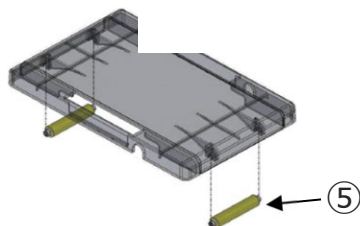
◆ WS10□B, WS12□B



◆ WS10□BR, WS12□BR



◆ Common Parts



① Controller cover assembly

Type	I/O	Standard Model	Option Model			
			RCON-EC connection specification*	2-circuit power supply specification*	3 position mode specification	Wireless Application
WS10□B WS10□BR	NPN	CCA-EC-WS10	ACR (I/O is only NPN)	TMD2	MF	WL (Wireless communication type) / WL2 (Wireless axis operation specification)
	PNP	CCA-EC-WS10-P				
WS12□B WS12□BR	NPN	CCA-EC-WS12				
	PNP	CCA-EC-WS12-P				

* ACR and TMD2 cannot be selected together.

② Motor unit

Type	Encoder	Brake	Model
WS10□B WS10□BR	Incremental	No	EC-MUSRR4
		Yes	EC-MUSRR4-B
	Battery-less absolute	No	EC-MUSRR4-WA
		Yes	EC-MUSRR4-WA-B
WS12□B WS12□BR	Incremental	No	EC-MUSR6
		Yes	EC-MUSR6-B
	Battery-less absolute	No	EC-MUSR6-WA
		Yes	EC-MUSR6-WA-B

③ Coupling spacer

Type	Model
WS10□B, WS10□BR WS12□B, WS12□BR	CPG-EC-SR6

④ Stainless steel sheet

*○○○ is the stroke

Type	Model
WS10□B, WS10□BR	ST-6WA10-○○○
WS12□B, WS12□BR	ST-EC-WS12-○○○

⑤ Slider roller assembly

Type	Model
WS10□B, WS10□BR WS12□B, WS12□BR	EC-SR-WS1012

⑥ Timing belt

Type	Model
WS10□BR, WS12□BR	TB-EC-WS10R12R

4.5.2 Stainless steel sheet replacement/adjustment



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.
- Pay attention on the stainless steel sheet so that it would be bent forcefully or get damaged.
- Pull the stainless steel sheet so the condition would not change from the initial installed condition.
Any change in the condition of installation may cause the stainless steel sheet positioned extremely on one end or may impact the product life.
- When installing the sheet clamp, do not apply excessive force to the stainless steel sheet.
- They may be a risk of getting hurt on the edge of the stainless steel sheet. Use a globe or equivalent during work.
- 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.

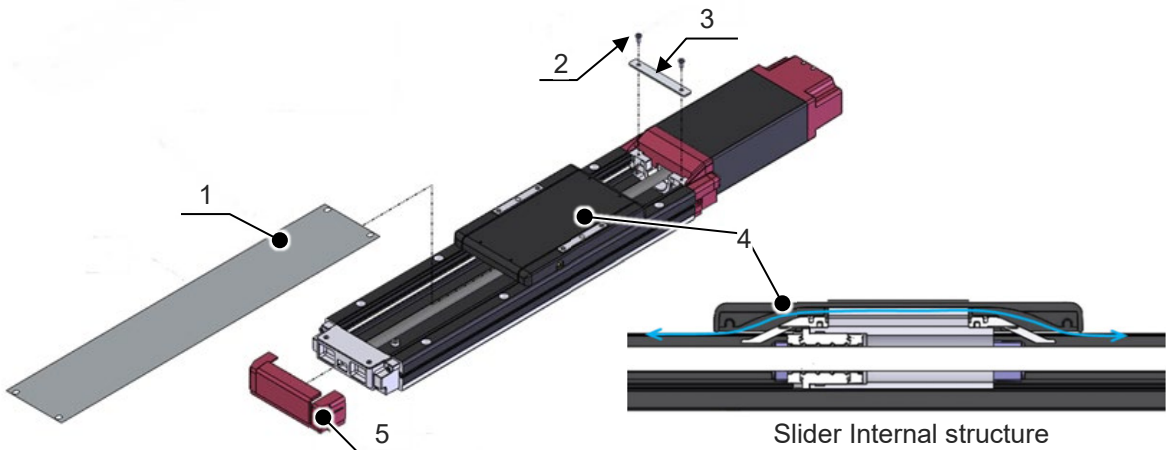
◆ Preparation

- Hexagon wrench (Parallel Faces 2mm)
- Protection Equipment (e.g. Cotton Work Gloves)
- Stainless steel sheet for replacement *○○○ is the stroke.

Type	Model
WS10□B, WS10□BR	ST-6WA10-○○○
WS12□B, WS12□BR	ST-EC-WS12-○○○

◆ Replacement procedure

- 1. Remove the front cover.
- 2. Remove the hex socket button head bolts (2pcs) and take off the sheet retainer.
- 3. Pull out the old stainless steel sheet.
- 4. Insert a stainless steel sheet for replacement along the guide inside the slider.
- 5. Mount the sheet retainer with hex socket button head bolts (2pcs).
- 6. Secure the front cover.



No.	Type	Part Name	Size	Quantity	Tightening torque
1	Common	Stainless steel sheet	—	1	—
2		Hex socket button head bolt	M3×6	2	0.73N·m
3		Sheet retainer	—	1	—
4		Slider	—	1	—
5		Front cover	—	1	—

4.5.3 Slider roller (Option Model: SR) replacement

◆ Preparation

- Protection Equipment (e.g. Cotton Work Gloves)
- Thin Plate (e.g. Scale)
- Slider roller assembly for replacement

Model
EC-SR-WS1012

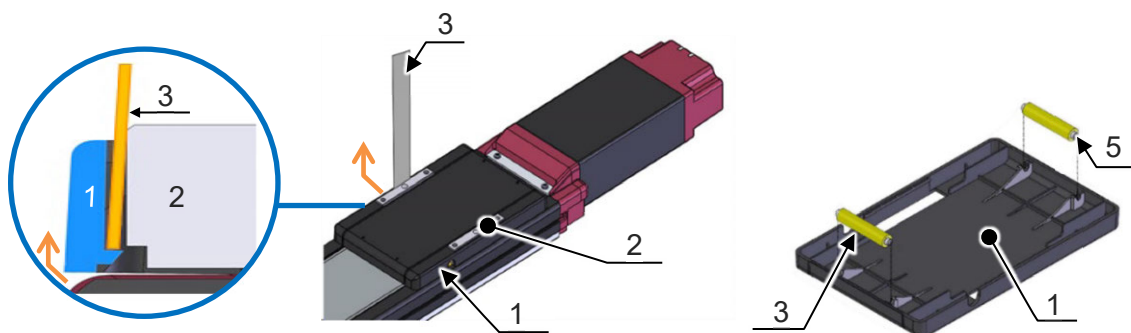


(Note) The slider roller assembly model codes are the codes for one piece each.

Place an order for quantity necessary for replacement. (Single slider: 2pcs, Double slider: 4pcs)

◆ Replacement procedure

1. Insert a thin plate such as a scale (with thickness around 0.5mm) between the slider and slider cover, and take off the slider cover while pulling it towards outside.
2. Pull Slider Roller Assembly at the center to take it off.
3. Push in the bearings on the sides of slider roller assembly for replacement with even force applied on them till it makes a “click” sound to set the assembly onto the slider cover.
4. Put the slider cover on the slider.



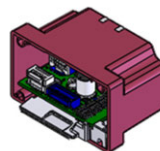
No.	Type	Part Name	Size	Quantity	Tightening torque
1	Common	Slider cover	—	1	—
2		Slider	—	1	—
3		Thin plate	With thickness around 0.5mm	1	—
4		Slider roller assembly	—	2 (Slider cover 1pc)	—
5		Bearing	—	—	—

4.5.4 Replacing Controller / Wireless Communication Circuit Board (Controller Cover Assembly)

In the replacement of the controller cover assembly, the controller circuit board and the wireless communication circuit board are to be replaced together.

◆ Preparation

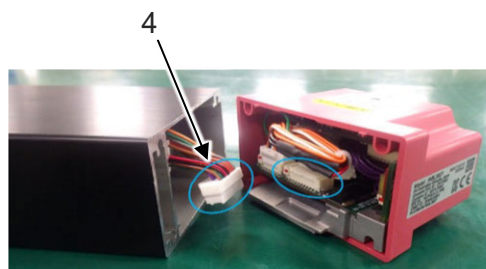
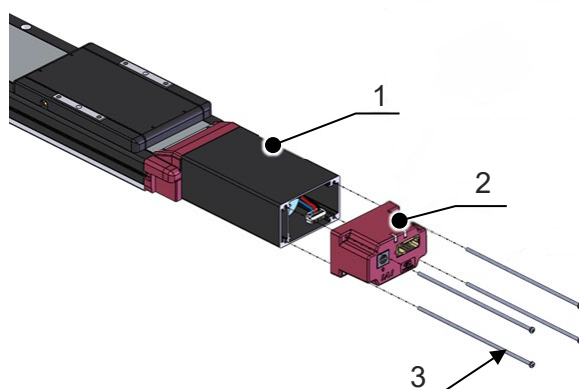
- Hexagon wrench (Parallel Faces 2mm)
- Protection Equipment (e.g. Cotton Work Gloves)
- Controller cover assembly for replacement



Type	I/O	Standard Model	Option Model			
			RCON-EC connection specification*	2-circuit power supply specification*	3 position mode specification	Wireless Application
WS10□B	NPN	CCA-EC-WS10	ACR (I/O is only NPN)	TMD2	MF	WL (Wireless communication type) / WL2 (Wireless axis operation specification)
WS10□BR	PNP	CCA-EC-WS10-P				
WS12□B	NPN	CCA-EC-WS12				
WS12□BR	PNP	CCA-EC-WS12-P				

◆ Replacement procedure

1. Remove the cross-recessed pan head machine screws (4pcs) and slide the controller cover assembly
* As a cable is connected, do not attempt to pull it forcefully.
2. Remove the cables connecting the motor and encoder to the controller circuit board on the controller cover assembly.
3. Connect the connectors on the cables to connect the motor and encoder to the controller circuit board on a replacement controller cover assembly.
4. Put on the controller cover assembly for replacement, and tighten up the cross-recessed pan head machine screws (4pcs).
* Pay attention not to have the cables pinched when putting the cover assembly back on.



No.	Type	Part Name		Size	Quantity	Tightening torque
1	Common	Motor cover		—	1	—
2	Common	Controller cover assembly		—	1	—
3	WS10□B	Cross-recessed pan head machine screw	W/o Brake	M3×140	4	0.41N·m
			With Brake	M3×170	4	
	WS12□B	Cross-recessed pan head machine screw	W/o Brake	M3×120	4	
			With Brake	M3×160	4	
4	Common	Connector on Motor / Encoder		—	1	—

4.5.5 Wireless communication circuit board replacement

Replacing of the wireless communication circuit board itself only is not available.

In the replacement of the controller cover assembly, the controller circuit board and the wireless communication circuit board are to be replaced together.

Refer to [4.5.4 Replacing Controller / Wireless Communication Circuit Board (Controller Cover Assembly)].

4.5.6 Timing belt replacement

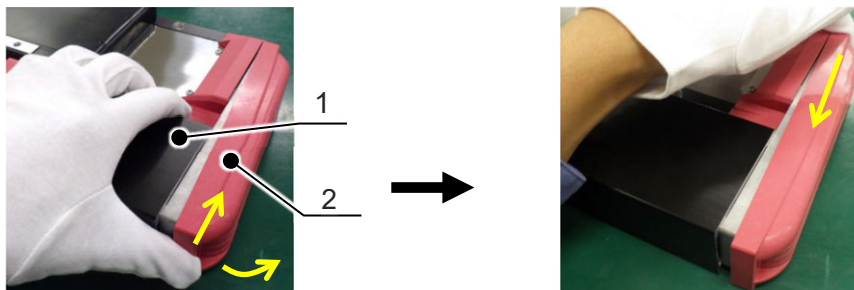
◆ Preparation

- Torque Wrench or Hex Wrench Parallel Faces: 2.5mm, 3mm, 4mm
- Hexagon wrench (Parallel Faces 2mm)
- Tension gauge
- Long string such as wire or zip ties
- Protection Equipment (e.g. Cotton Work Gloves)
- Timing belt for replacement

Type	Model
WS10□BR WS12□BR	TB-EC-WS10R12R

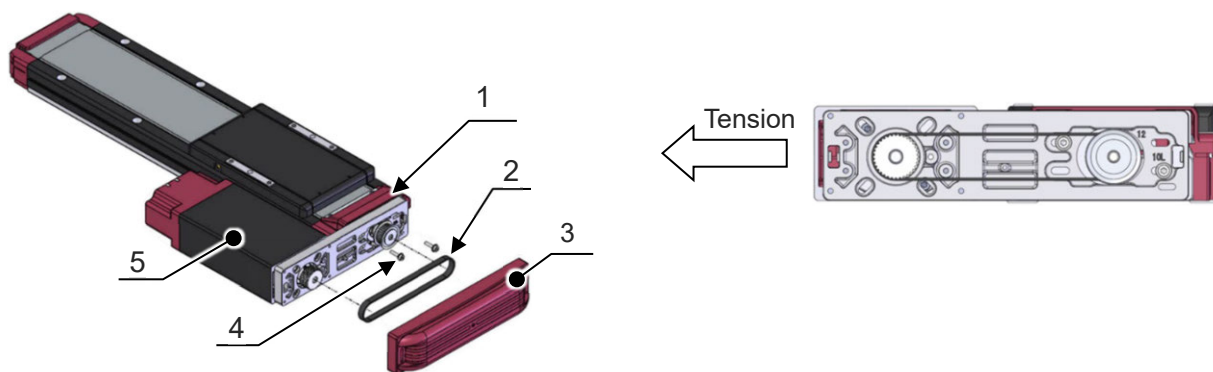
◆ Replacement procedure

1. While pushing in the side of the pulley cover on the motor cover side, slide it towards the rear end.
(It is easy to take off the pulley cover if you hang your index finger on the motor cover and push in the side of the pulley cover with your thumb.)
2. Pull the pulley cover towards the motor end to take it off.



No.	Type	Part Name	Size	Quantity	Tightening torque
1	Common	Motor cover	—	1	—
2		Pulley cover	—	1	—

3. Loosen the flanged hex socket set bolts (2pcs), slide the reverse bracket assembly and take off the timing belt.
4. Put on a timing belt for replacement.
5. Adjust the timing belt tension.
Hang such as a cable band on the motor cover and apply the specified load (tensile force) using a tension gauge.
6. With the specified load (tensile force) being applied, tighten up the flanged hex socket set bolt to affix the reversing bracket assembly.
7. Attach the pulley cover.



No.	Type	Part Name	Size	Quantity	Tightening torque/ Load (Tensile force)
1	Common	Reversing bracket assembly	—	1	—
2		Timing belt	—	1	20N~25N
3		Pulley cover	—	1	—
4		Flanged hex socket head bolt	M3×12	2	1.6N·m
5		Hex socket set screw	M4×5	1	1.7N·m

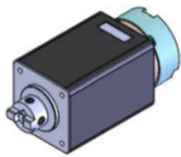
4.5.7 Motor unit replacement

◆ Preparation

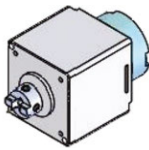
- Phillips screwdriver
- Torque Wrench or Hex Wrench Parallel Faces: 2mm, 2.5mm, 3mm
- Protection Equipment (e.g. Cotton Work Gloves)
- Motor unit for replacement

Type	Encoder	Brake	Model
WS10□B WS10□BR	Incremental	No	EC-MUSRR4
		Yes	EC-MUSRR4-B
	Battery-less absolute	No	EC-MUSRR4-WA
		Yes	EC-MUSRR4-WA-B
WS12□B WS12□BR	Incremental	No	EC-MUSR6
		Yes	EC-MUSR6-B
	Battery-less absolute	No	EC-MUSR6-WA
		Yes	EC-MUSR6-WA-B

Motor unit * The figure shows the no brake equipped type.



WS10□B(R)

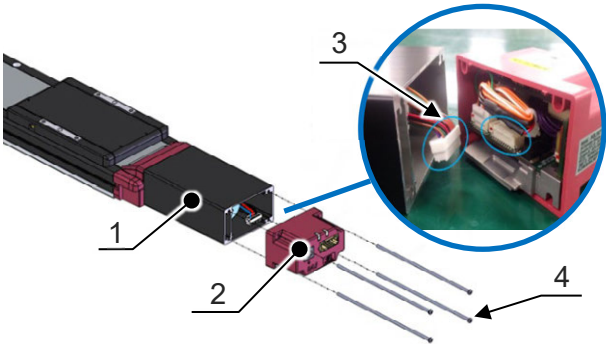


WS12□B(R)

◆ Replacement procedure

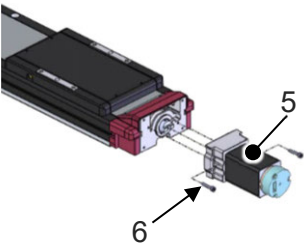
◆ EC-WS10□B/WS10□BR

1. Remove the cross-recessed pan head machine screws (4pcs), and slide the controller cover assembly.
* As a cable is connected, do not attempt to pull it forcefully.
2. Remove the cables connecting the motor and encoder to the controller circuit board on the controller cover assembly.
3. Take off the motor cover.

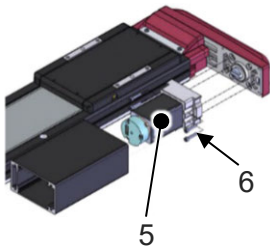


4. Remove the hex socket head bolts and take off the motor assembly.

EC-WS10□B

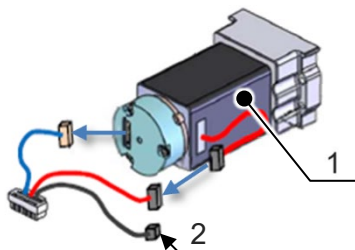


EC-WS10□BR

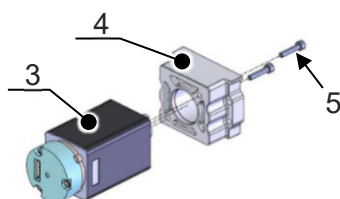


No.	Type	Part Name		Size	Quantity	Tightening torque
1	Common	Motor cover		—	1	—
2	Common	Controller cover assembly		—	1	—
3	Common	Connector on Motor / Encoder		—	1	—
4	Common	Cross-recessed pan head machine screw	W/o Brake	M3×140	4	0.41N·m
			With Brake	M3×170		
5	Common	Motor assembly		—	1	—
6	WS10□B	Hex socket head bolt		M3×15	2	0.89N·m
	WS10□BR				4	

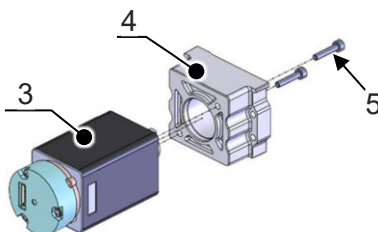
5. Take off the connector in the wiring of motor, encoder (and brake) on the removed motor assembly.



6. Take off the hex socket head bolts (2pcs) and take off the motor bracket and heat radiation sheet.



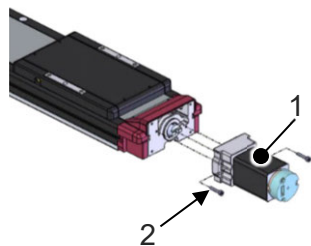
7. Join the wiring connector taken off in step 6. to the motor unit for replacement.
8. Attach the motor bracket taken off in step 7. to the motor unit for replacement with the hex socket head cap screws (2pcs).



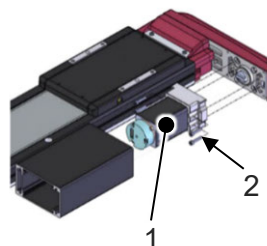
No.	Type	Part Name	Size	Quantity	Tightening torque
1	Common	Motor assembly	—	1	—
2		Connector for brake specification	—	1	—
3		Motor unit	—	1	—
4		Motor bracket	—	1	—
5		Hex socket head bolt	M3×15	2	0.89N·m

9. Attach the motor assembly with hex socket head bolts.

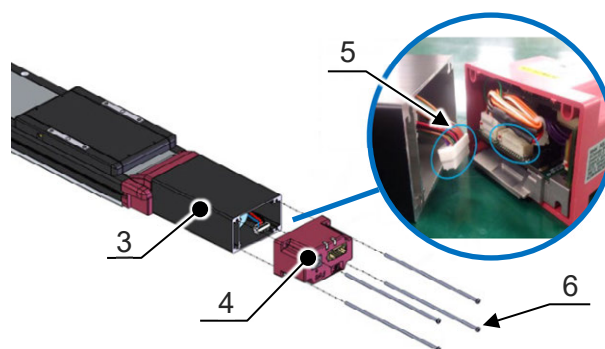
EC-WS10□B



EC-WS10□BR



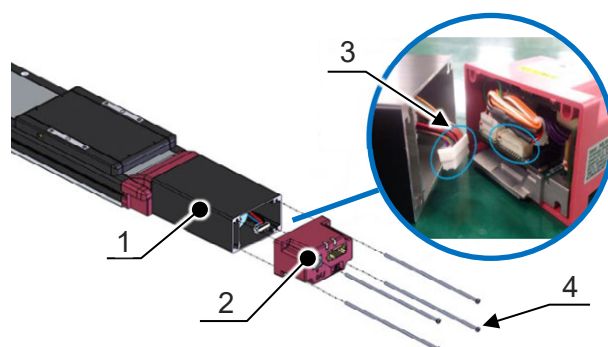
10. Put the motor cover on.
11. Plug in the connectors on the cables connecting the motor and encoder to the controller circuit board mounted on the controller cover assembly.
12. Attach the controller cover assembly, and tighten it up with the cross-recessed pan head machine screws (4pcs).
- * Pay attention not to have the cables pinched when putting the cover assembly back on.



No.	Type	Part Name		Size	Quantity	Tightening torque
1	Common	Motor assembly		—	1	—
2	WS10□B	Hex socket head bolt		M3×15	2	0.89N·m
	WS10□BR				4	
3	Common	Motor cover		—	1	—
4	Common	Controller cover assembly		—	1	—
5	Common	Connector on Motor / Encoder		—	1	—
6	Common	Cross-recessed pan head machine screw	W/o Brake	M3×140	4	0.41N·m
			With Brake	M3×170		

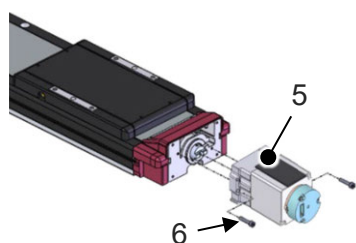
◆ EC-WS12□B/WS12□BR

1. Remove the cross-recessed pan head machine screws (4pcs), and slide the controller cover assembly.
* As a cable is connected, do not attempt to pull it forcefully.
2. Remove the cables connecting the motor and encoder to the controller circuit board on the controller cover assembly.
3. Take off the motor cover.

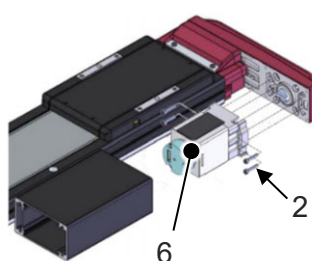


4. Remove the hex socket head bolts and take off the motor assembly.
* For with a brake, the motor bracket is not to be taken off.

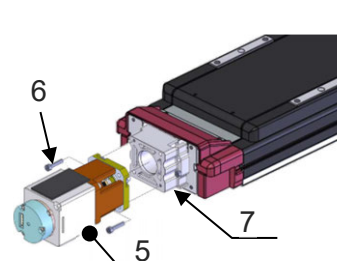
EC-WS12□B



EC-WS12□BR

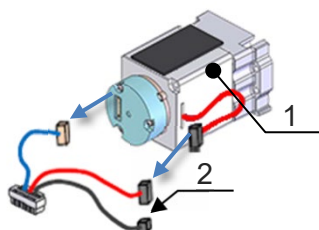


With brake



No.	Type	Part Name		Size	Quantity	Tightening torque
1	Common	Motor cover		—	1	—
2	Common	Controller cover assembly		—	1	—
3	Common	Connector on Motor / Encoder		—	1	—
4	Common	Cross-recessed pan head machine screw	W/o Brake	M3×120	4	0.41N·m
			With Brake	M3×160		
5	Common	Motor assembly		—	1	—
6	WS12□B	Hex socket head bolt		M3×15	2	0.89N·m
	WS12□BR				4	
7	Common	Motor bracket		—	1	—

5. Take off the connector in the wiring of motor, encoder (and brake) on the removed motor assembly.



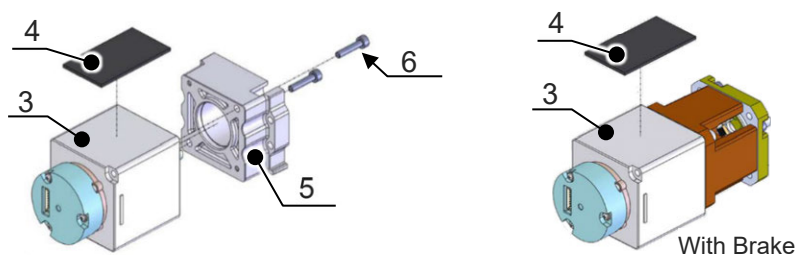
6. Take off the Hex socket head bolts (2pcs) and take the motor bracket and heat radiation sheet off.

* For with a brake, take only the heat radiation sheet off.

7. Join the wiring connector taken off in step 6. to the motor unit for replacement.

8. Attach the motor bracket taken off in step 7. to the motor unit for replacement with the hex socket head cap screws (2pcs), and then attach the heat radiation sheet.

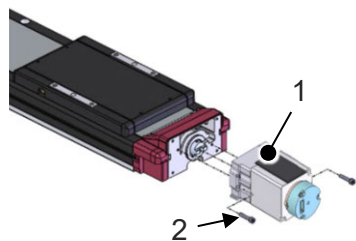
* For with a brake, attach only the heat radiation sheet.



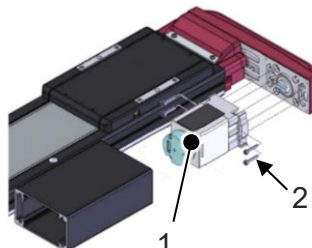
No.	Type	Part Name	Size	Quantity	Tightening torque
1	Common	Motor assembly	—	1	—
2		Connector for brake specification	—	1	—
3		Motor unit	—	1	—
4		Heat radiation sheet	—	1	—
5		Motor bracket	—	1	—
6		Hex socket head bolt	M3×15	2	0.89N·m

9. Attach the motor assembly with hex socket head bolts.
 * For with a brake, attach the motor unit to the motor bracket

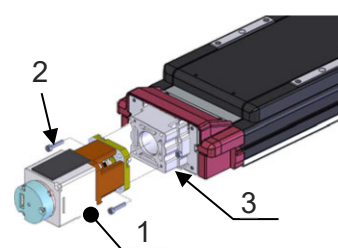
EC-WS12□B



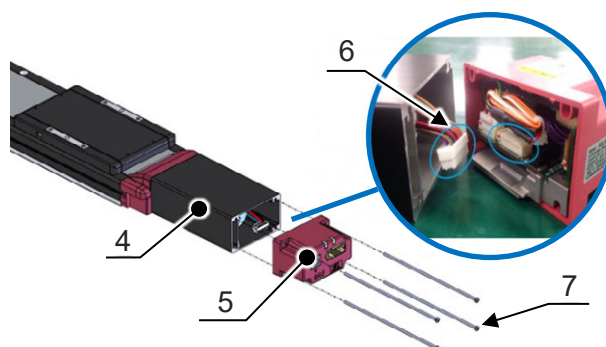
EC-WS12□BR



With Brake



10. Put the motor cover on.
11. Plug in the connectors on the cables connecting the motor and encoder to the controller circuit board mounted on the controller cover assembly.
12. Attach the controller cover assembly and tighten it up with the cross-recessed pan head machine screws (4pcs).
 * Pay attention not to have the cables pinched when putting the cover assembly back on.



No.	Type	Part Name		Size	Quantity	Tightening torque
1	Common	Motor assembly		—	1	—
2	WS12□B	Hex socket head bolt		M3×15	2	0.89N·m
	WS12□BR				4	
3	Common	Motor bracket		—	1	—
4	Common	Motor cover		—	1	—
5	Common	Controller cover assembly		—	1	—
6	Common	Connector on Motor / Encoder		—	1	—
7	Common	Cross-recessed pan head machine screw	W/o Brake	M3×120	4	0.41N·m
			With Brake	M3×160		

4.5.8 Coupling spacer replacement

◆ Preparation

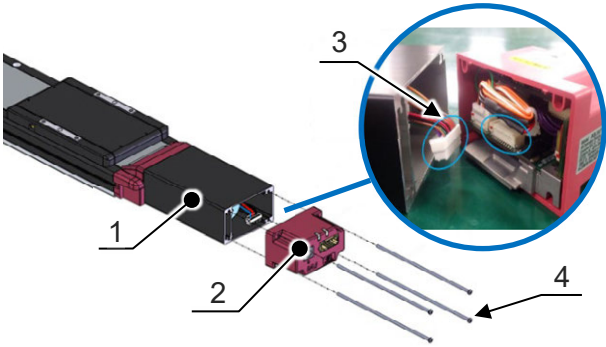
- Phillips screwdriver
- Torque Wrench or Hex Wrench Parallel Faces: 2mm, 2.5mm, 3mm
- Protection Equipment (e.g. Cotton Work Gloves)
- Grease (NOK NOXLUB TL1013 grease)
- Coupling spacer for replacement

Model
CPG-EC-SR6



◆ Replacement procedure

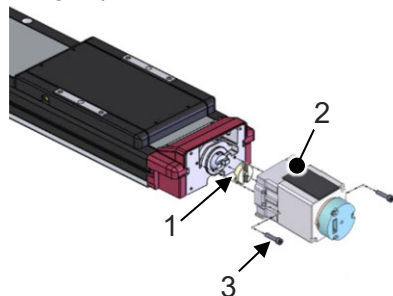
1. Remove the cross-recessed pan head machine screws (4pcs), and slide the controller cover assembly.
* As a cable is connected, do not attempt to pull it forcefully.
2. Remove the cables connecting the motor and encoder to the controller circuit board on the controller cover assembly.
3. Take off the motor cover.



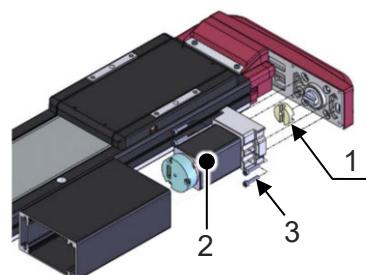
No.	Type	Part Name		Size	Quantity	Tightening torque
1	Common	Motor cover		—	1	—
2	Common	Controller cover assembly		—	1	—
3	Common	Connector on Motor / Encoder		—	1	—
4	WS10□B	Cross-recessed pan head machine screw	W/o Brake	M3×140	4	0.41N·m
			With Brake	M3×170		
	WS12□B		W/o Brake	M3×120		
			With Brake	M3×160		

4. Take off the hex socket head bolts and take the motor assembly off.
5. Take off the coupling spacer.
6. Apply grease on a coupling spacer for replacement for appropriate amount and put it.

EC-WS10□B/WS12□B

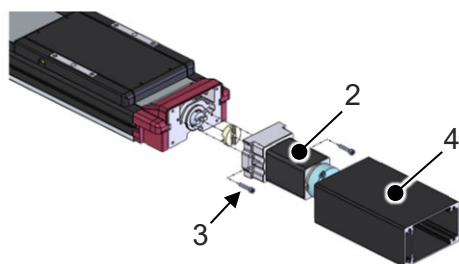


EC-WS10□BR/WS12□BR

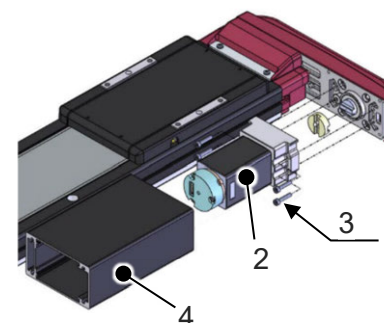


7. Mount the motor assembly and tighten it up with the Hex socket head bolt.
8. Put on the motor cover.

EC-WS10□B/WS12□B



EC-WS10□BR/WS12□BR

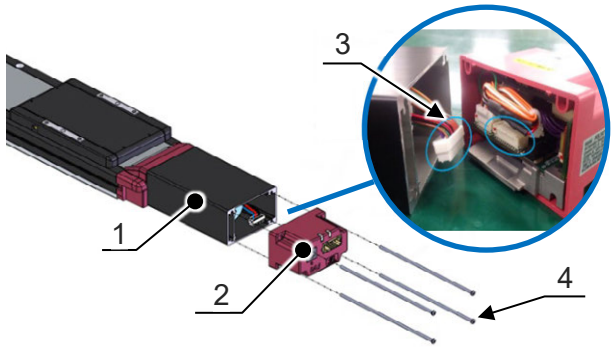


No.	Type	Part Name	Size	Quantity	Tightening torque
1	Common	Coupling spacer	—	1	—
2	Common	Motor assembly	—	1	—
3	WS10□B WS12□B	Hex socket head bolt	M3×15	2	0.89N·m
	WS10□BR WS12□BR			4	
4	Common	Motor cover	—	1	—

9. Plug in the connectors on the cables connecting the motor and encoder to the controller circuit board mounted on the controller cover assembly.

10. Put on the controller cover assembly, and tighten up the cross-recessed pan head machine screws (4pcs)

* Pay attention not to have the cables pinched when putting the cover assembly back on.



No.	Type	Part Name		Size	Quantity	Tightening torque
1	Common	Motor cover		—	1	—
2	Common	Controller cover assembly		—	1	—
3	Common	Connector on Motor / Encoder		—	1	—
4	WS10□B	Cross-recessed pan head machine screw	W/o Brake	M3×140	4	0.41N·m
			With Brake	M3×170		
	WS12□B		W/o Brake	M3×120		
			With Brake	M3×160		

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Chapter 5

External Dimensions

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5.1 Motor straight type (EC-WS□□B)

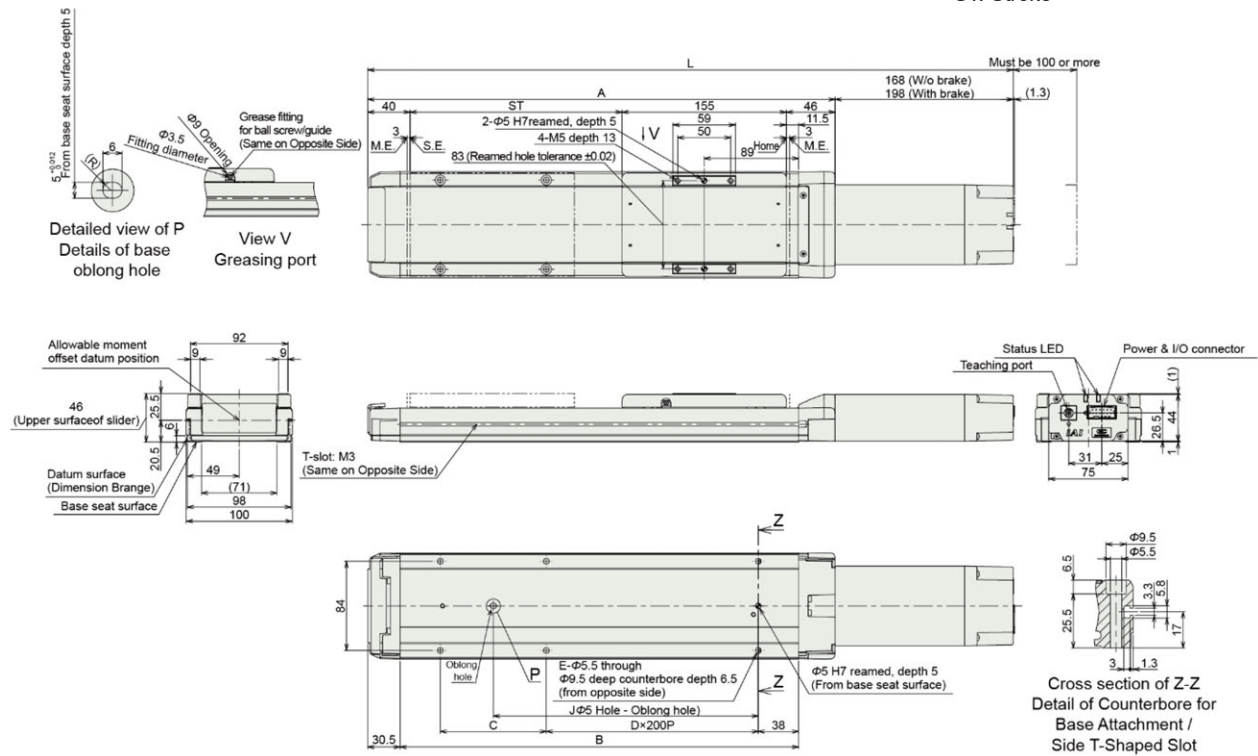
5.1.1 EC-WS10□B

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

M.E.: Mechanical end

S.E.: Stroke end

ST: Stroke



■ Dimensions by Stroke

Unit [mm]

Stroke		50	100	150	200	250	300	350	400	450	500
L	W/o Brake	459	509	559	609	659	709	759	809	859	909
	With Brake	489	539	589	639	689	739	789	839	889	939
A		291	341	391	441	491	541	591	641	691	741
B		226	276	326	376	426	476	526	576	626	676
C		150	200	50	100	150	200	50	100	150	200
D		0	0	1	1	1	1	2	2	2	2
E		4	4	6	6	6	6	8	8	8	8
J		100	150	200	250	300	350	400	450	500	550

■ Mass by Stroke

Stroke		50	100	150	200	250	300	350	400	450	500
Mass [kg]	W/o Brake	2.7	2.9	3.2	3.4	3.7	3.9	4.2	4.4	4.7	4.9
	With Brake	2.8	3.1	3.3	3.5	3.8	4.1	4.3	4.5	4.8	5.0

5.2 Motor reversed type (EC-WS□□BR)

5.2.1 EC-WS10□BR

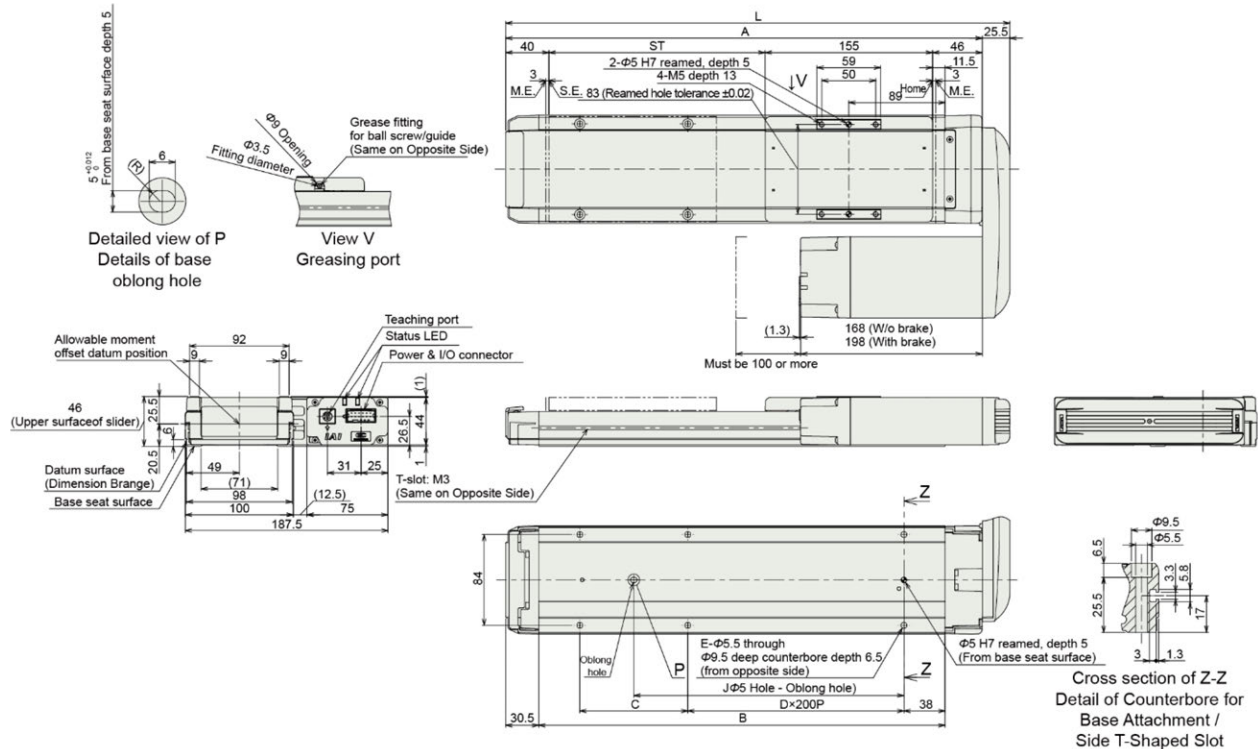
(Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.

(Note) The figure below shows the motor left reversed type (ML).

M.E.: Mechanical end

S.E.: Stroke end

ST: Stroke



■ Dimensions by Stroke

Unit [mm]

Stroke	50	100	150	200	250	300	350	400	450	500
L	316.5	366.5	416.5	466.5	516.5	566.5	616.5	666.5	716.5	766.5
A	291	341	391	441	491	541	591	641	691	741
B	226	276	326	376	426	476	526	576	626	676
C	150	200	50	100	150	200	50	100	150	200
D	0	0	1	1	1	1	2	2	2	2
E	4	4	6	6	6	6	8	8	8	8
J	100	150	200	250	300	350	400	450	500	550

■ Mass by Stroke

Stroke	50	100	150	200	250	300	350	400	450	500
Mass [kg]										
W/o Brake	2.9	3.1	3.4	3.7	3.9	4.1	4.4	4.6	4.9	5.1
With Brake	3.0	3.3	3.5	3.8	4.0	4.3	4.5	4.8	5.0	5.3

5.2 Motor reversed type (EC-WS□□BR)

5.2.2 EC-WS12□BR

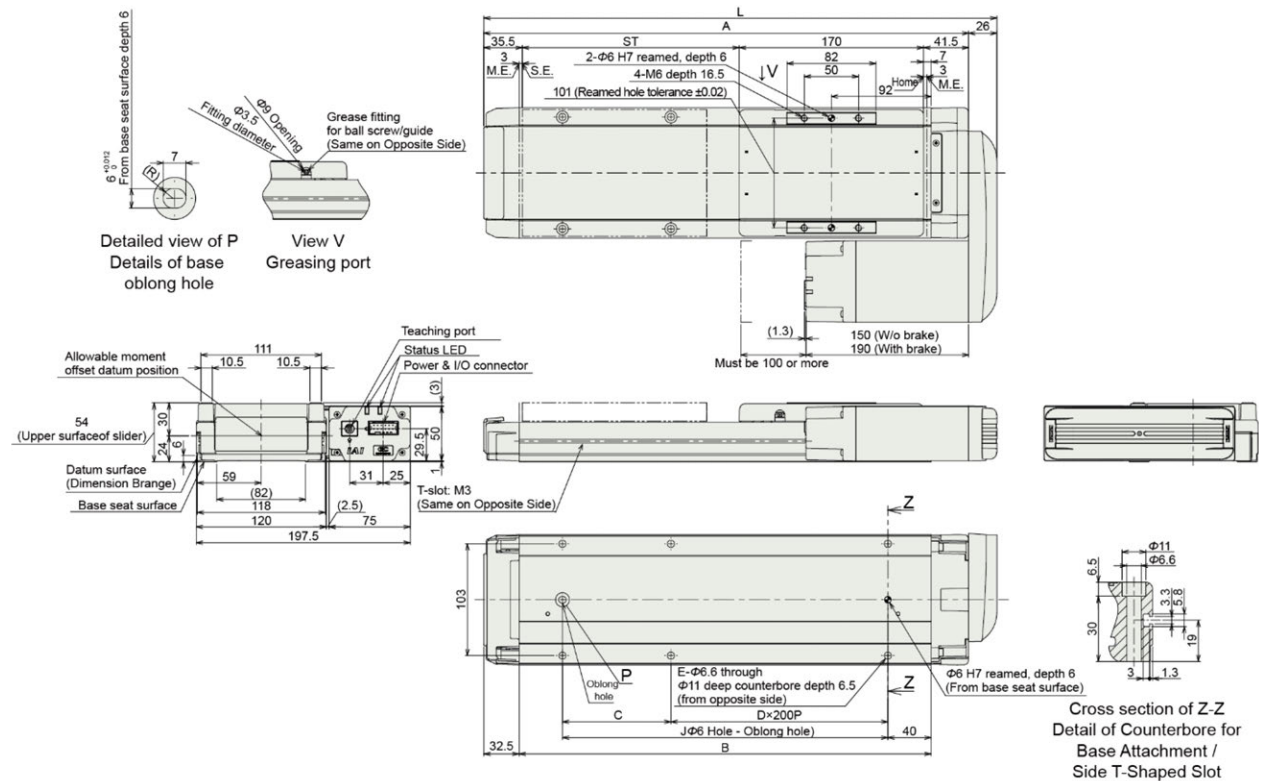
(Note) The slider should move to M.E. when the home-return operation gets performed. Pay attention to interference peripherals.

(Note) The figure below shows the motor left reversed type (ML).

M.E.: Mechanical end

S.E.: Stroke end

ST: Stroke



■ Dimensions by Stroke

Unit [mm]

Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	323	373	423	473	523	573	623	673	723	773	823	873	923	973	1023	1073
A	297	347	397	447	497	547	597	647	697	747	797	847	897	947	997	1047
B	230	280	330	380	430	480	530	580	630	680	730	780	830	880	930	980
C	150	200	50	100	150	200	50	100	150	200	50	100	150	200	50	100
D	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4
E	4	4	6	6	6	6	8	8	8	8	10	10	10	10	12	12
J	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900

■ Mass by Stroke

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Mass [kg]	W/o Brake	3.9	4.2	4.6	4.9	5.3	5.6	6.0	6.4	6.7	7.1	7.4	7.8	8.1	8.5	8.8	9.2
	With Brake	4.2	4.5	4.9	5.2	5.6	5.9	6.3	6.7	7	7.4	7.7	8.1	8.4	8.8	9.1	9.5

ELECYLINDER

Chapter 6

Life

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

6.1 Concept of life for slider type

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

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

Operation life can be calculated with the method shown below.

6.1.1 How to calculate operation life

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

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

L	: Operation life [km]
C _M	: Dynamic allowable moment [N·m]
M	: Moment acting [N·m]
5,000km	: Standard rated life of ELECYLINDER

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

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

L	: Operation life [km]	f _{ws}	: Standard load coefficient
C _M	: Dynamic allowable moment [N·m]	f _w	: Load coefficient
M	: Moment acting [N·m]	f _α	: Mounting coefficient
5,000km	: Standard rated life of ELECYLINDER		

For "Standard load coefficient f_{ws} ", "Load coefficient f_w " and "Mounting coefficient f_a ", refer to the contents below for configuration and selection.

[Standard load coefficient f_{ws}]

For ELECYLINDERS described in this manual, calculate with $f_{ws} = 1.2$.

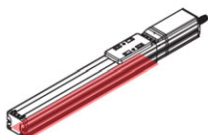
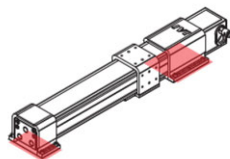
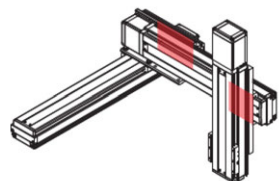
[Load coefficient f_w]

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

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

[Mounting coefficient f_a]

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

Mounting coefficient f_a	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-shaped slot and square nut provided on the mounting surface.

6.1.2 Relation between operation life and moment

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

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

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

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

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

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Chapter 7

Warranty

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7.1 Warranty period

Whichever of the following periods is shorter:

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

7.2 Scope of the warranty

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

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

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

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

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

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

7.3 Honoring the warranty

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

7.4 Limited liability

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

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

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

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

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

7.6 Other items excluded from warranty

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

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

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Revision history

Revision date	Revised content
2026.05	First Edition

Revision history



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