IAI
Quality and Innovation

# EleCylinder EC-S2/RR2

www.iai-automation.com

NEW!

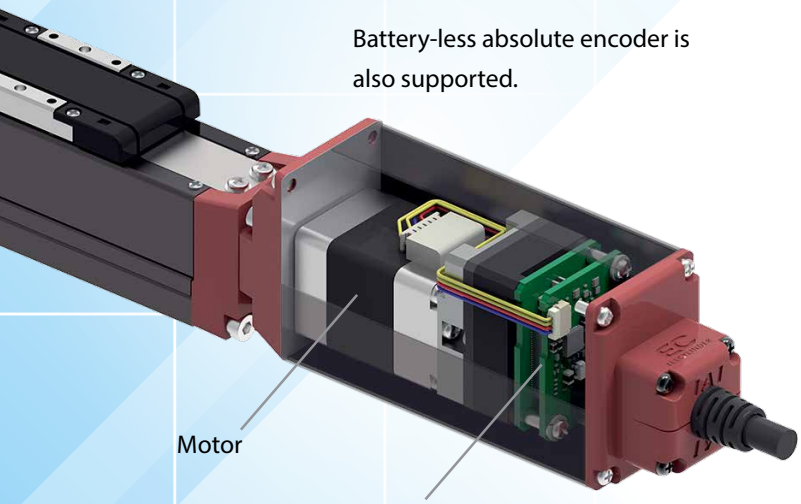
# Ultra-compact


Actual size

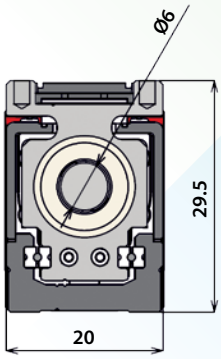
# ELECYLINDER®

## Built-in controller

Battery-less absolute encoder is also supported.




## Max speed 300mm/s




**<Slider/Radial Cylinder>**

Built-in linear guide manufactured in-house

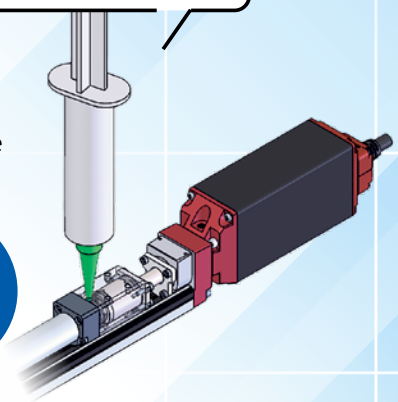
φ6 ball circulating type screw keeps speed from decreasing even at maximum stroke 300mm.

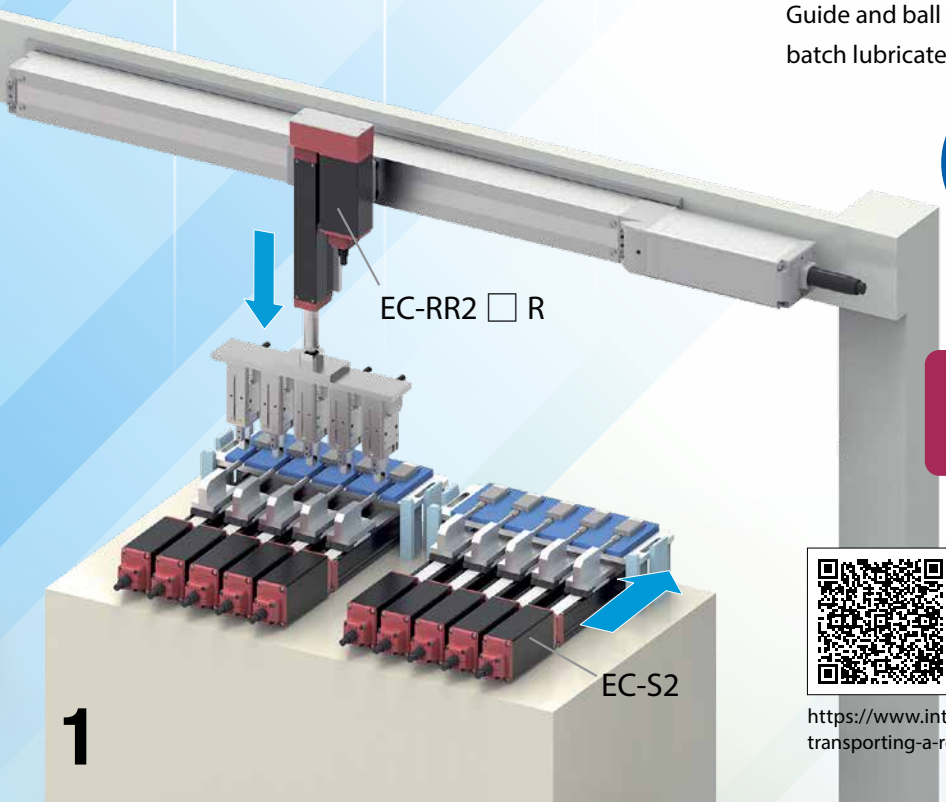
## Simple grease lubrication!

**<Radial Cylinder>**

Guide and ball screw can be batch lubricated.

Patent pending






## Application example

**Resin gear transport and press-fit to motor**

In this process, gears are press-fitted to the small motor set on the resin pallet.

Video here

https://www.intelligentactuator.com/application-example-2024-ec-transporting-a-resin-gear-and-press-fitting/

## Model Specification Items

**ELECYLINDER®**

EC – [Type] [Lead] ([Motor coupling method]) - [Stroke] - [Actuator cable length] - [Power-I/O cable length] - ([Options])

Series

**Type**

| | |
|---|---|
| S2 | Slider type<br>Base width 20mm |
| RR2 | Radial cylinder<br>Base width 20mm |

**Lead**

| | |
|---|---|
| H | Lead 6mm |
| M | Lead 4mm |
| L | Lead 2mm |

**Motor coupling method**

| | |
|---|---|
| Left blank | Coupled motor specification |
| R | Side-mounted motor specification |

**Stroke**

| | |
|---|---|
| 25 | 25mm |
| ~ | (every 25mm) |
| 100 | 100mm |
| ~ | (every 50mm) |
| 300 | 300mm |

**Actuator cable length**

| | |
|---|---|
| 1 | 1m |
| ~ | (every 1m) |
| 10 | 10m |

(Note) When connecting via the interface box, 9m is the maximum available.

| | |
|---|---|
| 0 | No cable<br>Power / I/O connector included* |
| (S)1 | 1m |
| ~ | (every 1m) |
| (S)9 | 9m |

(S): Cable with 4-way connector
* When selecting RCON-EC connection specification (ACR), select "0."
Power-I/O connector is not included.
(Note) Make sure that the total length along with the actuator cable is 10m or less.

**Power-I/O cable length**

**Options**

| | |
|---|---|
| Left blank | Incremental encoder specification, NPN specification (connection via interface box), no option |
| ACR | RCON-EC connection specification*1 |
| B | With brake |
| CJB | Cable exit direction (bottom) |
| CJL | Cable exit direction (left)*2 |
| CJO | Cable exit direction (outside)*3 |
| CJR | Cable exit direction (right)*2 |
| CJT | Cable exit direction (top) |
| FT | Foot bracket |
| G5 | Designated grease specification |
| ML | Motor side-mounted to left *4 |
| MR | Motor side-mounted to right *4 |
| MOB | Motor mounting direction (bottom)*5 |
| MOL | Motor mounting direction (left)*5 |
| MOR | Motor mounting direction (right)*5 |
| MOT | Motor mounting direction (top)*5 |
| NM | Non-motor end specification |
| PN | PNP specification (connection via interface box)*1 |
| SR | Slider roller specification |
| TMD2 | Split motor and controller power supply specification *1 |
| WA | Battery-less absolute encoder specification |
| WL | Wireless communication specification (connection via interface box)*6 |
| WL2 | Wireless axis operation specification (connection via interface box)*6 |

*1 If "ACR" is selected, "PN" and "TMD2" options cannot be selected (I/O for the "ACR" option is NPN only; compatible with split motor and controller power supply as standard)
*2 Available only with straight motor specification
*3 Available only with side-mounted motor specification
*4 Please be sure to select a code if selecting the side-mounted motor specification
*5 Please be sure to select a code if selecting the straight motor specification
*6 Selectable when RCON-EC connection specification "ACR" has not been selected (For wireless communication, purchase an interface box and cable separately)

## Specification Tables

Slider

| Type | Model | Lead Model | Lead mm | Stroke (mm) and max speed (mm/s) *Length of band = Stroke; *Numbers in band = Maximum speed by stroke<br>25 / 50 / 75 / 100 / 150 / 200 / 250 / 300 | Max. payload (kg) Horizontal | Max. payload (kg) Vertical | Reference Page |
|---|---|---|---|---|---|---|---|
| Coupled motor | S2 | H- | 6 | 300 | 0.75 | 0.5 | 5 |
| | | M- | 4 | 200 | 1.5 | 0.75 | |
| | | L- | 2 | 100 | 3 | 1.5 | |
| Side-mounted motor | S2 □ R | H- | 6 | 300 | 0.75 | 0.5 | 9 |
| | | M- | 4 | 200 | 1.5 | 0.75 | |
| | | L- | 2 | 100 | 3 | 1.5 | |

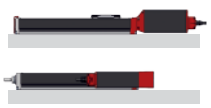
Radial cylinder

| Type | Model | Lead Model | Lead mm | Stroke (mm) and max speed (mm/s) *Length of band = Stroke; *Numbers in band = Maximum speed by stroke<br>25 / 50 / 75 / 100 / 150 / 200 / 250 / 300 | Max. push force (N) | Max. payload (kg) Horizontal | Max. payload (kg) Vertical | Reference Page |
|---|---|---|---|---|---|---|---|---|
| Coupled motor | RR2 | H- | 6 | 300 / 240 / 165 | 15 | 1 | 0.325 | 13 |
| | | M- | 4 | 200 / 160 / 110 | 23 | 2 | 0.625 | |
| | | L- | 2 | 100 / 80 / 55 | 47 | 4 | 1.25 | |
| Side-mounted motor | RR2 □ R | H- | 6 | 300 / 240 / 165 | 15 | 1 | 0.325 | 17 |
| | | M- | 4 | 200 / 160 / 110 | 23 | 2 | 0.625 | |
| | | L- | 2 | 100 / 80 / 55 | 47 | 4 | 1.25 | |

## Automatic Servo OFF Function

The automatic servo OFF function can be set with the PC teaching software (IA-OS) or teaching pendant (TB-02/03).
When the automatic servo OFF function is set, the servo will turn OFF automatically after positioning complete, after stopping, or after a certain amount of time (lag time).
The servo automatically turns ON when the next movement command is input, executing positioning operation.
Because there is no holding current when stopped, power consumption can be reduced.

## Mounting Orientation

| | | Mounting orientation | | | |
|---|---|---|---|---|---|
| | |  |  |  |  |
| **Series** | **Type** | **Table mounted** | **Vertical mounting (*1)** | **Side mounted** | **Invert mounted** |
| EC | S2/S2□R | ○ | ○ | △ (*2) | △ (*2) |
| | RR2/RR2□R | ○ | ○ | ○ | ○ |

*1 For vertical mounting, motor top installation is recommended.
*2 While side and ceiling mount orientations are possible, this may cause slack or misalignment in the stainless steel sheet.
Continued use in these orientations can cause the stainless steel sheet to break. Inspect it daily and adjust the sheet if any slack or misalignment is found.

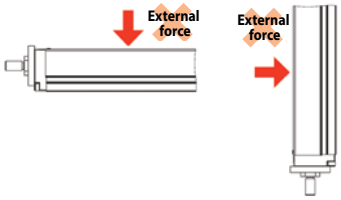
## Precautions for Installation

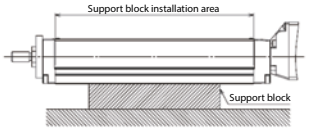
<Sliders/Radial Cylinders>

- Keep the body installation surface and workpiece mounting surface accuracy within 0.05mm/m.
  Poor accuracy will increase the sliding resistance of the slider and may cause a malfunction.
- The body bottom base mounting surface and left side (viewed from the motor opposite side) are the reference surfaces for slider running accuracy.
  When running accuracy is required, mount with these surfaces as reference.

<Radial Cylinders>

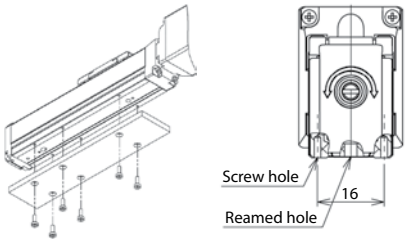
- Do not allow external force to be applied to the body.
  (Do not apply radial load or moment load.)
- When applying radial load or moment load to the rod, secure the entire base mounting surface.
- When installing with the front bracket screw holes, support the body by installing a support block for the base mounting surface.
  If using a support block, it is recommended either to use an optional foot bracket or to keep the block (aluminum alloy, etc.) close against the body. The installation position should be on the frame motor side.
- A support block is strongly recommended in order to avoid vibration generated due to the installation environment, which may lead to abnormal operation or damage to parts.



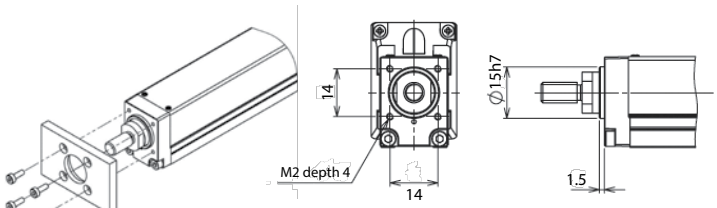




## Mounting Method

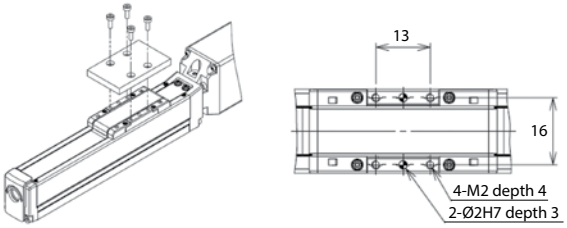
- Using the base bottom surface screw hole
  (Sliders/Radial Cylinders)



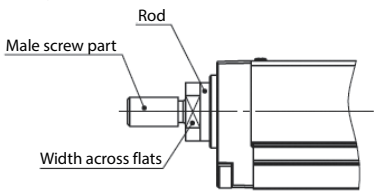

- Using the front bracket screw hole
  (Radial Cylinders)




- Mounting the payload
  (Sliders)

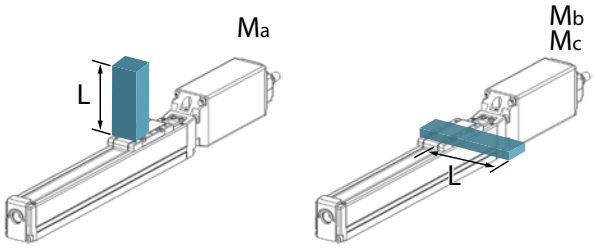



(Radial Cylinders)



## Overhang Load Length

This is the approximate offset at which the actuator can operate smoothly even when the workpiece or bracket is offset from the slider. Vibration or other factors could cause failure if the approximate length is greatly exceeded. Use the product within the guideline length.



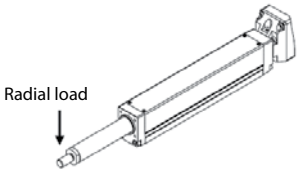

## Radial Load Acting on the Rod

Radial cylinders have a linear guide built into the body, so that radial and moment loads can be applied to the rod.
The allowable radial and moment loads must meet the following three conditions.

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

| Type | Rod tip static allowable radial load | Rod tip dynamic allowable radial load (*1) |
|---|---|---|
| RR2 □ (R) | 20N | 10N |

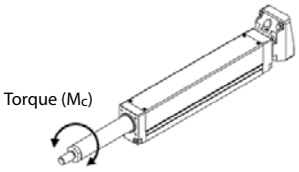
(*1) Value at a standard rated operation life of 5,000km.




**2. The torque ($M_C$) acting on the rod must not exceed the allowable value.**

| Type | Rod tip static Allowable torque | Rod tip dynamic allowable torque (*2) |
|---|---|---|
| RR2 □ (R) | 1.5N·m | 1.5N·m |

(*2) Value at a standard rated operation life of 5,000km.




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

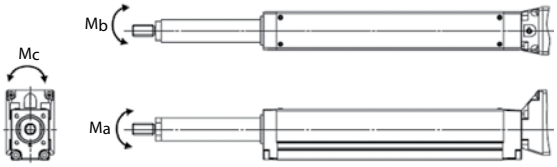
The uniform load is obtained by the following formula.

Uniform load = $M_a \cdot K_a + M_b \cdot K_b + M_c \cdot K_c$

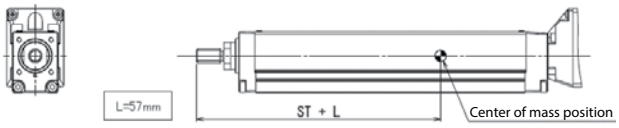
| Type | Static allowable uniform load | Dynamic allowable uniform load (*3) | Uniform load coefficient | | |
|---|---|---|---|---|---|
| | | | Ka | Kb | Kc |
| RR2 □ (R) | 570N | 550N | 297/m | 208/m | 186/m |

(*3) Value at a standard rated operation life of 5,000km.

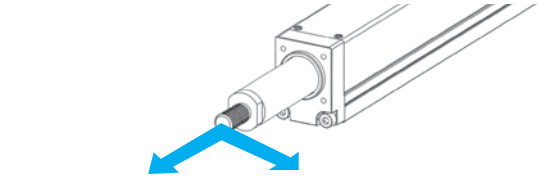
### Ma, Mb, Mc: Moment load




### Moment offset reference position




(Caution) Ensure that the radial load applied to the rod does not exceed the allowable offset amount and allowable overhang distance.




| Type | Allowable offset amount | Allowable overhang distance |
|---|---|---|
| RR2 □ (R) | 50mm | 50mm |

·Operating conditions should be moderated if abnormal vibration or noise is observed, even if the radial load and torque are within allowable values.
· The center mass location of the attached object should not exceed 1/2 the offset amount or overhang distance.

# EC-S2

Simple Dust-proof | Coupled Motor | Body Width 20 mm | 24V Stepper Motor

## Model Specification Items

| EC | - | S2 | | - | | - | | - | | - | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Series | - | Type | Lead | - | Stroke | - | Actuator cable length | - | Power · I/O cable length | - | Options |
| | | | H 6mm<br>M 4mm<br>L 2mm | | 25 ~ 100: 25mm ~ 100mm (every 25mm)<br>100 ~ 300: 100mm ~ 300mm (every 50mm) | | See Actuator Cable Length table below | | See Power · I/O Cable Length table below | | See Options table below |

*NPN specification is standard. PNP option is available.

(Note) The photo above is for motor installed on top (MOT).

CE RoHS 10

Horizontal | Vertical | Side | Ceiling

**Selection Notes**

(1) "Main Specifications" displays the payload's maximum value. Please refer to "Table of Payload by Speed/Acceleration" for more details.
(2) If performing push-motion operations, refer to the "Correlation Diagrams between Push Force and Current Limit." The push forces listed are only reference values. Please refer to P. 25 for applicable notes.
(3) Pay close attention to the mounting orientation. Please refer to P. 3 for details.
(4) Reference value of the overhang load length is under 50mm in the Ma, Mb, and Mc directions. Please refer to the explanation on P. 4 for the overhang load length.
(5) The center mass location of the attached object should be less than 1/2 of the overhang distance. Operating conditions should be moderated if abnormal vibration or noise is observed, even if the overhang distance and load moment are within allowable values.

## By Stroke

| Stroke (mm) | EC-S2 | |
|---|---|---|
| | RCON-EC connection specification (Note 1) | NPN/PNP specification (Note 2) |
| **25** | ✓ | ✓ |
| **50** | ✓ | ✓ |
| **75** | ✓ | ✓ |
| **100** | ✓ | ✓ |
| **150** | ✓ | ✓ |
| **200** | ✓ | ✓ |
| **250** | ✓ | ✓ |
| **300** | ✓ | ✓ |

(Note 1) Be sure to select "ACR" as the option.
(Note 2) Interface box and conversion cable are included.

## Options * Please check the Options reference pages to confirm each option.

| Name | Option code | Reference page |
|---|---|---|
| RCON-EC connection specification (Note 3) (Note 5) | **ACR** | 21 |
| Brake | **B** | 21 |
| Cable exit direction (bottom) | **CJB** | 21 |
| Cable exit direction (left) | **CJL** | 21 |
| Cable exit direction (right) | **CJR** | 21 |
| Cable exit direction (top) | **CJT** | 21 |
| Foot bracket | **FT** | 21 |
| Designated grease specification | **G5** | 21 |
| Motor mounting direction (bottom) (Note 4) | **MOB** | 22 |
| Motor mounting direction (left) (Note 4) | **MOL** | 22 |
| Motor mounting direction (right) (Note 4) | **MOR** | 22 |
| Motor mounting direction (up) (Note 4) | **MOT** | 22 |
| Non-motor end specification | **NM** | 22 |
| PNP specification (Note 3) | **PN** | 22 |
| Slider roller part specification | **SR** | 22 |
| Split motor and controller power supply specification (Note 3) | **TMD2** | 22 |
| Battery-less absolute encoder specification | **WA** | 22 |
| Wireless communication specification (Note 5) | **WL** | 22 |
| Wireless axis operation specification (Note 5) | **WL2** | 22 |

(Note 3) If the RCON-EC connection specification (ACR) is selected, the PNP specification (PN) and split motor and controller power supply specification (TMD2) cannot be selected. Also, interface box and conversion cable are not included.
(Note 4) Be sure to fill in one of the symbols for the Option field in the Model Specification Items.
(Note 5) If the RCON-EC connection specification (ACR) is selected, the wireless communication specification (WL) and wireless axis operation specification (WL2) cannot be selected. For wireless communication with RCON-EC connection (WL), purchase the separately sold optional interface box, conversion cable, and power · I/O cable. Please refer to P. 26 for details. Please contact our sales department for the wireless axis operation specification (WL2).

## Options Sold Separately for ACR option

| Name | Model | Reference page |
|---|---|---|
| Interface box conversion cable | CB-CVN-BJ002 | 30 |
| RCON-EC connection specification power · I/O cable (Standard connector cable) | CB-REC-PWBIO□□□-RB | 30 |
| RCON-EC connection specification power · I/O cable (4-way connector cable) | CB-REC2-PWBIO□□□-RB | 30 |
| RCON-EC connection specification Interface box for split motor and controller power supply (Wireless specification) | ECW-CVNWL-CB-ACR | 30 |

(Note) The power · I/O cable is a robot cable.
Indicate the cable length in □□□. (for example, 010 = 1m)

## Actuator Cable Length

| Cable code | Cable length |
|---|---|
| **1 ~ 3** | 1 ~ 3m |
| **4 ~ 5** | 4 ~ 5m |
| **6 ~ 10** | 6 ~ 10m (Note 6) |

(Note 6) When connecting via the interface box, 9m is the maximum available.
(Note) Make sure that the total length along with the power · I/O cable is 10m or less.
(Note) Robot cable.

## Power · I/O Cable Length

### Standard connector cable

| Cable code | Cable length | User wiring specification (flying leads) |
|---|---|---|
| | | CB-EC-PWBIO□□□-RB supplied |
| **0** | Without cable | ✓ (Note 7) |
| **1 ~ 3** | 1 ~ 3m | ✓ |
| **4 ~ 5** | 4 ~ 5m | ✓ |
| **6 ~ 9** | 6 ~ 9m | ✓ |

(Note 7) Only terminal block connector is included. When selecting RCON-EC connection specification (ACR) option, select "0." Terminal block connector is not included. Please refer to P. 29 for details.
(Note) Robot cable.

### 4-way connector cable

| Cable code | Cable length | User wiring specification (flying leads) |
|---|---|---|
| | | CB-EC2-PWBIO□□□-RB supplied |
| **S1 ~ S3** | 1 ~ 3m | ✓ |
| **S4 ~ S5** | 4 ~ 5m | ✓ |
| **S6 ~ S9** | 6 ~ 9m | ✓ |

(Note) Robot cable.

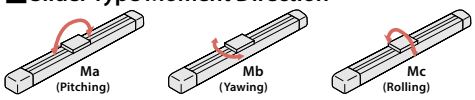
## Main Specifications

| Item | | | Description | | |
|---|---|---|---|---|---|
| Lead | | Ball screw lead (mm) | 6 | 4 | 2 |
| Horizontal | Payload | Max. payload (kg) | 0.75 | 1.5 | 3 |
| | Speed / acceleration/ deceleration | Max. speed (mm/s) | 300 | 200 | 100 |
| | | Min. speed (mm/s) | 8 | 5 | 3 |
| | | Rated acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| | | Max. acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| Vertical | Payload | Max. payload (kg) | 0.5 | 0.75 | 1.5 |
| | Speed / acceleration/ deceleration | Max. speed (mm/s) | 300 | 200 | 100 |
| | | Min. speed (mm/s) | 8 | 5 | 3 |
| | | Rated acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| | | Max. acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| Push | | Max. push force (N) | 15 | 23 | 47 |
| | | Max. push speed (mm/s) | 20 | 20 | 5 |
| Brake | | Brake specification | Non-excitation actuating solenoid brake | | |
| | | Brake holding force (kgf) | 0.5 | 0.75 | 1.5 |
| Stroke | | Min. stroke (mm) | 25 | 25 | 25 |
| | | Max. stroke (mm) | 300 | 300 | 300 |
| | | Stroke pitch (mm) 25 ~ 100ST) | 25 | 25 | 25 |
| | | Stroke pitch (mm) 100 ~ 300ST) | 50 | 50 | 50 |

| Item | Description |
|---|---|
| Drive system | Ball screw ϕ6mm rolled C10 |
| Positioning repeatability | ±0.02mm |
| Lost motion | - (notation not available due to 2-point positioning function) |
| Base | Dedicated aluminum extruded material (A6063SS-T6 equivalent), black alumite treatment |
| Linear guide | Linear motion infinite circulating type |
| Allowable static moment | Ma: 1.43 N·m |
| | Mb: 2.04N·m |
| | Mc: 2.29N·m |
| Allowable dynamic moment (Note 8) | Ma: 0.50 N·m |
| | Mb: 0.72 N·m |
| | Mc: 0.81 N·m |
| Ambient operating temperature, humidity | 0 ~ 40°C, 85%RH or less (no condensation) |
| Ingress protection | IP20 |
| Vibration & shock resistance | 4.9m/s$^2$ |
| Overseas standards | CE marking, RoHS directive |
| Motor type | Stepper motor (□20) (Power capacity: Max. 1.1A) |
| Encoder type | Incremental/battery-less absolute |
| Number of encoder pulses | 16384 pulse/rev |

(Note 8) Based on the standard rated operation life of 5,000km. Operation life varies according to operating and mounting conditions. Please contact IAI for more details operational life.

### Slider Type Moment Direction




## Table of Payload by Speed/Acceleration

### Standard grease specification The unit for payload is kg.

**Lead 6**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 0.75 | 0.5 |
| 50 | 0.75 | 0.5 |
| 100 | 0.75 | 0.5 |
| 150 | 0.75 | 0.5 |
| 200 | 0.75 | 0.5 |
| 250 | 0.75 | 0.5 |
| 300 | 0.75 | 0.5 |

**Lead 4**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 1.5 | 0.75 |
| 50 | 1.5 | 0.75 |
| 100 | 1.5 | 0.75 |
| 150 | 1.5 | 0.75 |
| 200 | 1.5 | 0.75 |

**Lead 2**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 3 | 1.5 |
| 25 | 3 | 1.5 |
| 50 | 3 | 1.5 |
| 75 | 3 | 1.5 |
| 100 | 3 | 1.5 |

For environmental temperatures of 5°C or lower, use at the following speeds or below.
·Lead 6: 250mm/s or lower
·Lead 4: 150mm/s or lower
·Lead 2: 75mm/s or lower

### Food grade grease specification The unit for payload is kg.

**Lead 6**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 0.75 | 0.5 |
| 50 | 0.75 | 0.5 |
| 100 | 0.75 | 0.5 |
| 150 | 0.75 | 0.5 |
| 200 | 0.75 | 0.5 |
| 250 | 0.75 | 0.5 |
| 300 | 0.75 | 0.5 |

**Lead 4**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 1.5 | 0.75 |
| 50 | 1.5 | 0.75 |
| 100 | 1.5 | 0.75 |
| 150 | 1.5 | 0.75 |
| 200 | 1.5 | 0.5 |

**Lead 2**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 3 | 1.5 |
| 25 | 3 | 1.5 |
| 50 | 3 | 1 |
| 75 | 3 | 1 |
| 100 | 3 | 1 |

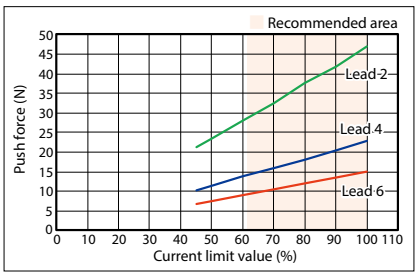
For environmental temperatures of 15°C or lower, use at the following speeds or below.
·Lead 6: 250mm/s or lower
·Lead 4: 150mm/s or lower
·Lead 2: 75mm/s or lower

## Stroke and Max. Speed

| Lead (mm) | 25 to 100 (every 25mm) | 100 to 300 (every 50mm) |
|---|---|---|
| 6 | 300 | |
| 4 | 200 | |
| 2 | 100 | |

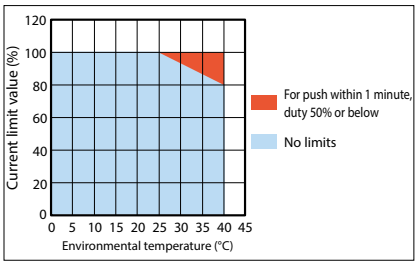
(Unit: mm/s)

## Correlation Diagrams between Push Force and Current Limit




### Cautions for push-motion operation

For high-thrust push-motion operation in high-temperature environments, use within the limit values in the graph.

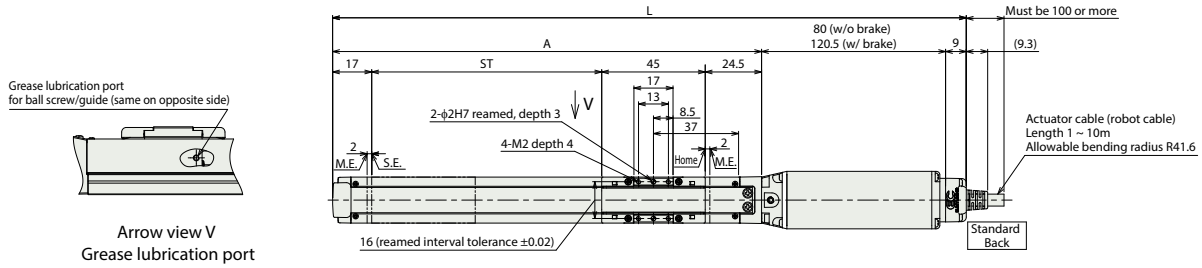


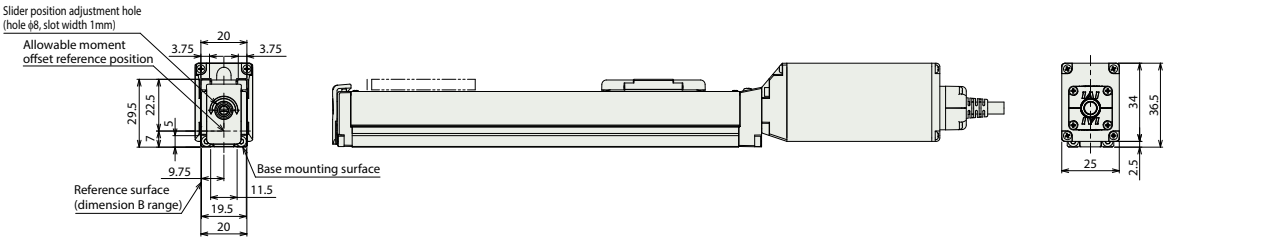
## Dimensions

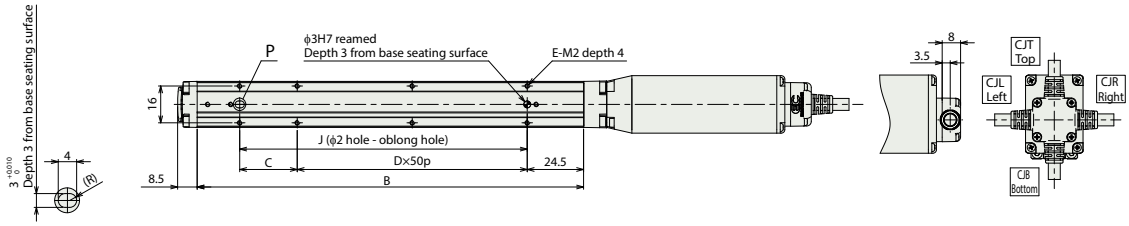
CAD drawings can be downloaded from our website.
**www.intelligentactuator.com**

(Note) When the slider is returning to its home position, please be careful of interference from surrounding objects, as it will travel until it reaches the M.E.
(Note) Fix the cable so that its base does not move.
The cable can be disconnected and replaced. (Connected with connector inside cable box)
The cable exit direction (option) can be changed by changing the cable box direction.
(Note) The figures below are for motor installed on top (MOT).

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

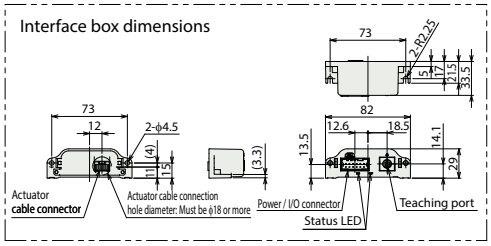



Detailed view of P
Base oblong hole details

Cable exit direction (option)



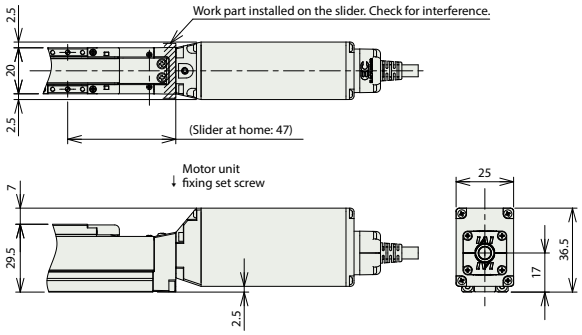

## Dimensions by Stroke

| Stroke | | 25 | 50 | 75 | 100 | 150 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|---|
| L | Without brake | 200.5 | 225.5 | 250.5 | 275.5 | 325.5 | 375.5 | 425.5 | 475.5 |
| | With brake | 241 | 266 | 291 | 316 | 366 | 416 | 466 | 516 |
| A | | 111.5 | 136.5 | 161.5 | 186.5 | 236.5 | 286.5 | 336.5 | 386.5 |
| B | | 93 | 118 | 143 | 168 | 218 | 268 | 318 | 368 |
| C | | 0 | 25 | 0 | 25 | 25 | 25 | 25 | 25 |
| D | | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 6 |
| E | | 4 | 6 | 6 | 8 | 10 | 12 | 14 | 16 |
| J | | 50 | 75 | 100 | 125 | 175 | 225 | 275 | 325 |

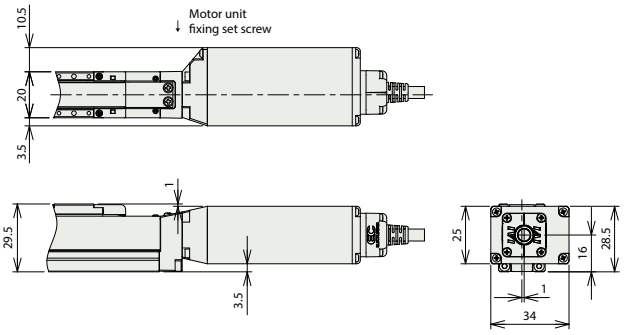
## Mass by Stroke

| Stroke | | 25 | 50 | 75 | 100 | 150 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|---|
| Mass (kg) | Without brake | 0.31 | 0.32 | 0.34 | 0.35 | 0.39 | 0.42 | 0.45 | 0.48 |
| | With brake | 0.39 | 0.40 | 0.42 | 0.43 | 0.46 | 0.50 | 0.53 | 0.56 |

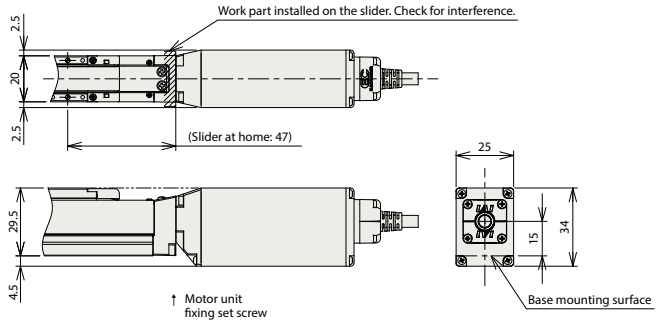
## ■ Motor mounting direction (option)



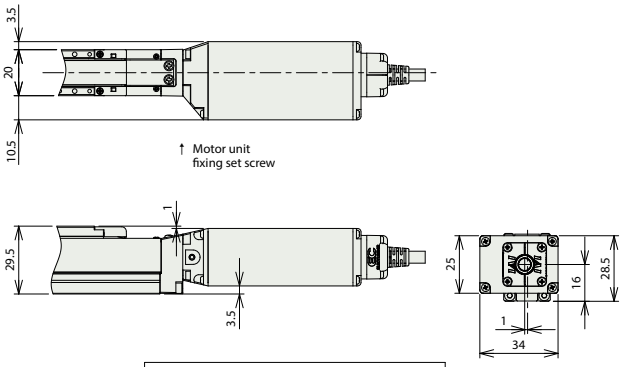

Motor mounting direction (top): MOT




Motor mounting direction (right): MOR




Motor mounting direction (bottom): MOB




Motor mounting direction (left): MOL

## Applicable Controllers

(Note) EC Series products are equipped with a built-in controller. Please refer to P. 27 for details on built-in controllers.

# EC-S2□R

Simple Dust-proof | Side-mounted Motor | Body Width 20 mm | 24V Stepper Motor

## Model Specification Items

EC - S2 [ ] R - [ ] - [ ] - [ ] - [ ]

| Series | Type | Lead | | Specifications | |
|---|---|---|---|---|---|
| EC | S2 | H | 6mm | R | Side-mounted motor |
| | | M | 4mm | | |
| | | L | 2mm | | |

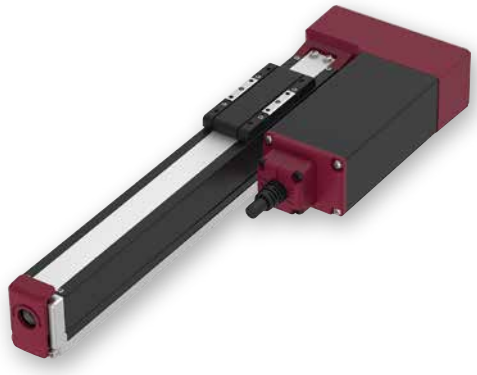
| Stroke | |
|---|---|
| 25 ~ 100 | 25mm ~ 100mm (every 25mm) |
| 100 ~ 300 | 100mm ~ 300mm (every 50mm) |

**Actuator cable length**: See Actuator Cable Length table below

**Power · I/O cable length**: See Power · I/O Cable Length table below

**Options**: See Options table below

*NPN specification is standard. PNP option is available.



(Note) The photo above is motor side-mounted to left (ML).

CE RoHS 10

Horizontal | Vertical | Side | Ceiling

**Selection Notes**

(1) "Main Specifications" displays the payload's maximum value. Please refer to "Table of Payload by Speed/Acceleration" for more details.

(2) If performing push-motion operations, refer to the "Correlation Diagrams between Push Force and Current Limit." The push forces listed are only reference values. Please refer to P. 25 for applicable notes.

(3) Pay close attention to the mounting orientation. Please refer to P. 3 for details.

(4) Reference value of the overhang load length is under 50mm in the Ma, Mb, and Mc directions. Please refer to the explanation on P. 4 for the overhang load length.

(5) The center mass location of the attached object should be less than 1/2 of the overhang distance. Operating conditions should be moderated if abnormal vibration or noise is observed, even if the overhang distance and load moment are within allowable values.

## By Stroke

| Stroke (mm) | EC-S2□R | |
|---|---|---|
| | RCON-EC connection specification (Note 1) | NPN/PNP specification (Note 2) |
| **25** | ✓ | ✓ |
| **50** | ✓ | ✓ |
| **75** | ✓ | ✓ |
| **100** | ✓ | ✓ |
| **150** | ✓ | ✓ |
| **200** | ✓ | ✓ |
| **250** | ✓ | ✓ |
| **300** | ✓ | ✓ |

(Note 1) Be sure to select "ACR" as the option.
(Note 2) Interface box and conversion cable are included.

## Options * Please check the Options reference pages to confirm each option.

| Name | Option code | Reference page |
|---|---|---|
| RCON-EC connection specification (Note 3) (Note 5) | **ACR** | 21 |
| Brake | **B** | 21 |
| Cable exit direction (bottom) | **CJB** | 21 |
| Cable exit direction (outside) | **CJO** | 21 |
| Cable exit direction (top) | **CJT** | 21 |
| Foot bracket | **FT** | 21 |
| Designated grease specification | **G5** | 21 |
| Motor side-mounted to left (Note 4) | **ML** | 21 |
| Motor side-mounted to right (Note 4) | **MR** | 21 |
| Non-motor end specification | **NM** | 22 |
| PNP specification (Note 3) | **PN** | 22 |
| Slider roller part specification | **SR** | 22 |
| Split motor and controller power supply specification (Note 3) | **TMD2** | 22 |
| Battery-less absolute encoder specification | **WA** | 22 |
| Wireless communication specification (Note 5) | **WL** | 22 |
| Wireless axis operation specification (Note 5) | **WL2** | 22 |

(Note 3) If the RCON-EC connection specification (ACR) is selected, the PNP specification (PN) and split motor and controller power supply specification (TMD2) cannot be selected. Also, interface box and conversion cable are not included.
(Note 4) Be sure to fill in one of the symbols for the Option field in the Model Specification Items.
(Note 5) If the RCON-EC connection specification (ACR) is selected, the wireless communication specification (WL) and wireless axis operation specification (WL2) cannot be selected. For wireless communication with RCON-EC connection (WL), purchase the separately sold optional interface box, conversion cable, and power · I/O cable. Please refer to P. 26 for details. Please contact our sales department for the wireless axis operation specification (WL2).

## Options Sold Separately for ACR option

| Name | Model | Reference page |
|---|---|---|
| Interface box conversion cable | CB-CVN-BJ002 | 30 |
| RCON-EC connection specification power · I/O cable (Standard connector cable) | CB-REC-PWBIO□□□-RB | 30 |
| RCON-EC connection specification power · I/O cable (4-way connector cable) | CB-REC2-PWBIO□□□-RB | 30 |
| RCON-EC connection specification Interface box for split motor and controller power supply (Wireless specification) | ECW-CVNWL-CB-ACR | 30 |

(Note) The power · I/O cable is a robot cable.
Indicate the cable length in □□□. (for example, 010 = 1m)

## Actuator Cable Length

| Cable code | Cable length |
|---|---|
| **1 ~ 3** | 1 ~ 3m |
| **4 ~ 5** | 4 ~ 5m |
| **6 ~ 10** | 6 ~ 10m (Note 6) |

(Note 6) When connecting via the interface box, 9m is the maximum available.
(Note) Make sure that the total length along with the power · I/O cable is 10m or less.
(Note) Robot cable.

## Power · I/O Cable Length

### Standard connector cable

| Cable code | Cable length | User wiring specification (flying leads) |
|---|---|---|
| | | CB-EC-PWBIO□□□-RB supplied |
| **0** | Without cable | ✓ (Note 7) |
| **1 ~ 3** | 1 ~ 3m | ✓ |
| **4 ~ 5** | 4 ~ 5m | ✓ |
| **6 ~ 9** | 6 ~ 9m | ✓ |

(Note 7) Only terminal block connector is included. When selecting RCON-EC connection specification (ACR) option, select "0." Terminal block connector is not included. Please refer to P. 29 for details.
(Note) Robot cable.

### 4-way connector cable

| Cable code | Cable length | User wiring specification (flying leads) |
|---|---|---|
| | | CB-EC2-PWBIO□□□-RB supplied |
| **S1 ~ S3** | 1 ~ 3m | ✓ |
| **S4 ~ S5** | 4 ~ 5m | ✓ |
| **S6 ~ S9** | 6 ~ 9m | ✓ |

(Note) Robot cable.

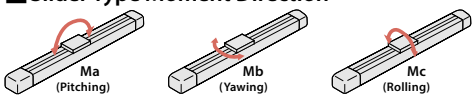
## Main Specifications

| Item | | | Description | | |
|---|---|---|---|---|---|
| Lead | | Ball screw lead (mm) | 6 | 4 | 2 |
| Horizontal | Payload | Max. payload (kg) | 0.75 | 1.5 | 3 |
| | Speed / acceleration/ deceleration | Max. speed (mm/s) | 300 | 200 | 100 |
| | | Min. speed (mm/s) | 8 | 5 | 3 |
| | | Rated acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| | | Max. acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| Vertical | Payload | Max. payload (kg) | 0.5 | 0.75 | 1.5 |
| | Speed / acceleration/ deceleration | Max. speed (mm/s) | 300 | 200 | 100 |
| | | Min. speed (mm/s) | 8 | 5 | 3 |
| | | Rated acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| | | Max. acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| Push | | Max. push force (N) | 15 | 23 | 47 |
| | | Max. push speed (mm/s) | 20 | 20 | 5 |
| Brake | | Brake specification | Non-excitation actuating solenoid brake | | |
| | | Brake holding force (kgf) | 0.5 | 0.75 | 1.5 |
| Stroke | | Min. stroke (mm) | 25 | 25 | 25 |
| | | Max. stroke (mm) | 300 | 300 | 300 |
| | | Stroke pitch (mm) 25 ~ 100ST) | 25 | 25 | 25 |
| | | Stroke pitch (mm) 100 ~ 300ST) | 50 | 50 | 50 |

| Item | Description |
|---|---|
| Drive system | Ball screw ϕ6mm rolled C10 |
| Positioning repeatability | ±0.02mm |
| Lost motion | - (notation not available due to 2-point positioning function) |
| Base | Dedicated aluminum extruded material (A6063SS-T6 equivalent), black alumite treatment |
| Linear guide | Linear motion infinite circulating type |
| Allowable static moment | Ma: 1.43 N·m |
| | Mb: 2.04N·m |
| | Mc: 2.29N·m |
| Allowable dynamic moment (Note 8) | Ma: 0.50 N·m |
| | Mb: 0.72 N·m |
| | Mc: 0.81 N·m |
| Ambient operating temperature, humidity | 0 ~ 40°C, 85%RH or less (no condensation) |
| Ingress protection | IP20 |
| Vibration & shock resistance | 4.9m/s² |
| Overseas standards | CE marking, RoHS directive |
| Motor type | Stepper motor (□20) (Power capacity: Max. 1.1A) |
| Encoder type | Incremental/battery-less absolute |
| Number of encoder pulses | 16384 pulse/rev |

(Note 8) Based on the standard rated operation life of 5,000km. Operation life varies according to operating and mounting conditions. Please contact IAI for more details operational life.

### Slider Type Moment Direction




## Table of Payload by Speed/Acceleration

### Standard grease specification The unit for payload is kg.

**Lead 6**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 0.75 | 0.5 |
| 50 | 0.75 | 0.5 |
| 100 | 0.75 | 0.5 |
| 150 | 0.75 | 0.5 |
| 200 | 0.75 | 0.5 |
| 250 | 0.75 | 0.5 |
| 300 | 0.75 | 0.5 |

**Lead 4**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 1.5 | 0.75 |
| 50 | 1.5 | 0.75 |
| 100 | 1.5 | 0.75 |
| 150 | 1.5 | 0.75 |
| 200 | 1.5 | 0.75 |

**Lead 2**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 3 | 1.5 |
| 25 | 3 | 1.5 |
| 50 | 3 | 1.5 |
| 75 | 3 | 1.5 |
| 100 | 3 | 1.5 |

For environmental temperatures of 5°C or lower, use at the following speeds or below.
·Lead 6: 250mm/s or lower
·Lead 4: 150mm/s or lower
·Lead 2: 75mm/s or lower

### Food grade grease specification The unit for payload is kg.

**Lead 6**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 0.75 | 0.5 |
| 50 | 0.75 | 0.5 |
| 100 | 0.75 | 0.5 |
| 150 | 0.75 | 0.5 |
| 200 | 0.75 | 0.5 |
| 250 | 0.75 | 0.5 |
| 300 | 0.75 | 0.5 |

**Lead 4**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 1.5 | 0.75 |
| 50 | 1.5 | 0.75 |
| 100 | 1.5 | 0.75 |
| 150 | 1.5 | 0.75 |
| 200 | 1.5 | 0.5 |

**Lead 2**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed (mm/s) | Acceleration (G) | |
| | 0.3 | 0.3 |
| 0 | 3 | 1.5 |
| 25 | 3 | 1.5 |
| 50 | 3 | 1 |
| 75 | 3 | 1 |
| 100 | 3 | 1 |

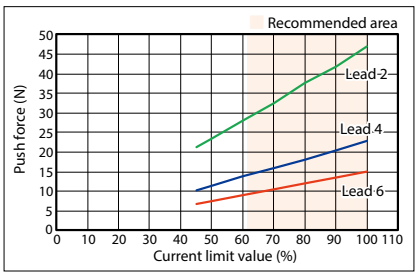
For environmental temperatures of 15°C or lower, use at the following speeds or below.
·Lead 6: 250mm/s or lower
·Lead 4: 50mm/s or lower
·Lead 2: 50mm/s or lower

## Stroke and Max. Speed

| Lead (mm) | 25 to 100 (every 25mm) | 100 to 300 (every 50mm) |
|---|---|---|
| 6 | 300 | |
| 4 | 200 | |
| 2 | 100 | |

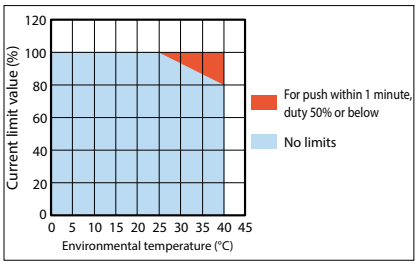
(Unit: mm/s)

## Correlation Diagrams between Push Force and Current Limit




### Cautions for push-motion operation

For high-thrust push-motion operation in high-temperature environments, use within the limit values in the graph.

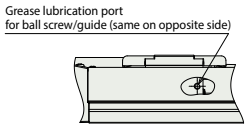


## Dimensions

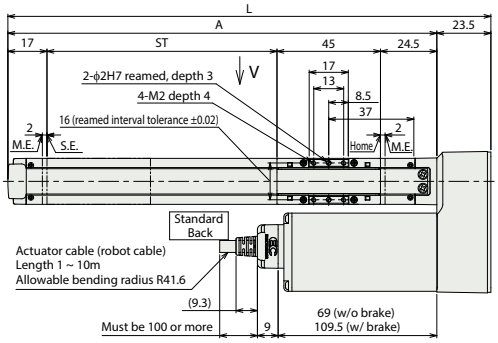
CAD drawings can be downloaded from our website.
www.iai-automation.com

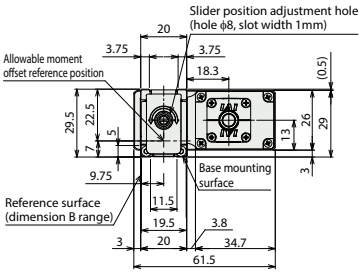
(Note) When the slider is returning to its home position, please be careful of interference from surrounding objects, as it will travel until it reaches the M.E.
(Note) Fix the cable so that its base does not move.
The cable can be disconnected and replaced. (Connected with connector inside cable box)
The cable exit direction (option) can be changed by changing the cable box direction.
(Note) The figure below is the motor side-mounted to left (ML).

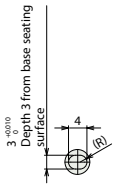
ST: Stroke
M.E: Mechanical end
S.E: Stroke end



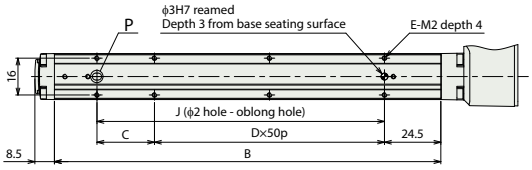

Arrow view V
Grease lubrication port

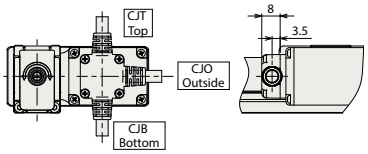


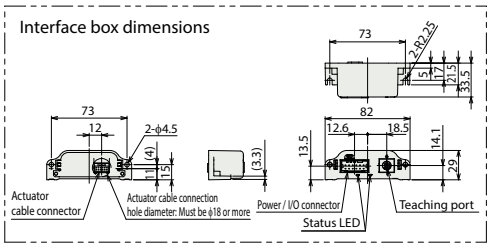




Detailed view of P
Base oblong hole details




Cable exit direction (option)




## Dimensions by Stroke

| Stroke | 25 | 50 | 75 | 100 | 150 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|
| L | 135 | 160 | 185 | 210 | 260 | 310 | 360 | 410 |
| A | 111.5 | 136.5 | 161.5 | 186.5 | 236.5 | 286.5 | 336.5 | 386.5 |
| B | 93 | 118 | 143 | 168 | 218 | 268 | 318 | 368 |
| C | 0 | 25 | 0 | 25 | 25 | 25 | 25 | 25 |
| D | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 6 |
| E | 4 | 6 | 6 | 8 | 10 | 12 | 14 | 16 |
| J | 50 | 75 | 100 | 125 | 175 | 225 | 275 | 325 |

## Mass by Stroke

| Stroke | | 25 | 50 | 75 | 100 | 150 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|---|
| Mass (kg) | Without brake | 0.35 | 0.36 | 0.38 | 0.40 | 0.43 | 0.46 | 0.49 | 0.52 |
| | With brake | 0.42 | 0.44 | 0.46 | 0.47 | 0.50 | 0.54 | 0.57 | 0.60 |

## Applicable Controllers

(Note) EC Series products are equipped with a built-in controller. Please refer to P. 27 for details on built-in controllers.

# EC-RR2

Coupled Motor | Body Width 20 mm | 24V Stepper Motor

## Model Specification Items

EC - RR2 - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

| Series | Type | Lead | Stroke | Actuator cable length | Power · I/O cable length | Options |
|---|---|---|---|---|---|---|
| EC | RR2 | H 6mm<br>M 4mm<br>L 2mm | 25 ~ 100: 25mm ~ 100mm (every 25mm)<br>100 ~ 300: 100mm ~ 300mm (every 50mm) | See Actuator Cable Length table below | See Power · I/O Cable Length table below | See Options table below |

*NPN specification is standard. PNP option is available.

(Note) The photo above is for motor installed on top (MOT).

CE RoHS 10

Radial Load Specification
**Radial Cylinder®**

Horizontal | Vertical | Side | Ceiling

**Selection Notes**

(1) The maximum speed varies depending on the stroke. Be sure to check the maximum speed of the desired stroke in "Stroke and Max. Speed."
(2) "Main Specifications" displays the payload's maximum value. Please refer to "Table of Payload by Speed/Acceleration" for more details.
(3) Radial cylinders are equipped with a built-in guide. Please refer to P. 4 for details on the radial load applied to rods.
(4) The value of the horizontal payload assumes that there is an external guide.
(5) If performing push-motion operations, refer to the "Correlation Diagrams between Push Force and Current Limit." The push forces listed are only reference values.
(6) Pay close attention to the mounting orientation. Please refer to P. 3 for details.

## By Stroke

| Stroke (mm) | EC-RR2 | |
|---|---|---|
| | RCON-EC connection specification (Note 1) | NPN/PNP specification (Note 2) |
| **25** | ✓ | ✓ |
| **50** | ✓ | ✓ |
| **75** | ✓ | ✓ |
| **100** | ✓ | ✓ |
| **150** | ✓ | ✓ |
| **200** | ✓ | ✓ |
| **250** | ✓ | ✓ |
| **300** | ✓ | ✓ |

(Note 1) Be sure to select "ACR" as the option.
(Note 2) Interface box and conversion cable are included.

## Options * Please check the Options reference pages to confirm each option.

| Name | Option code | Reference page |
|---|---|---|
| RCON-EC connection specification (Note 3) (Note 5) | **ACR** | 21 |
| Brake | **B** | 21 |
| Cable exit direction (bottom) | **CJB** | 21 |
| Cable exit direction (left) | **CJL** | 21 |
| Cable exit direction (right) | **CJR** | 21 |
| Cable exit direction (top) | **CJT** | 21 |
| Foot bracket | **FT** | 21 |
| Designated grease specification | **G5** | 21 |
| Motor mounting direction (bottom) (Note 4) | **MOB** | 22 |
| Motor mounting direction (left) (Note 4) | **MOL** | 22 |
| Motor mounting direction (right) (Note 4) | **MOR** | 22 |
| Motor mounting direction (up) (Note 4) | **MOT** | 22 |
| Non-motor end specification | **NM** | 22 |
| PNP specification (Note 3) | **PN** | 22 |
| Split motor and controller power supply specification (Note 3) | **TMD2** | 22 |
| Battery-less absolute encoder specification | **WA** | 22 |
| Wireless communication specification (Note 5) | **WL** | 22 |
| Wireless axis operation specification (Note 5) | **WL2** | 22 |

(Note 3) If the RCON-EC connection specification (ACR) is selected, the PNP specification (PN) and split motor and controller power supply specification (TMD2) cannot be selected. Also, interface box and conversion cable are not included.
(Note 4) Be sure to fill in one of the symbols for the Option field in the Model Specification Items.
(Note 5) If the RCON-EC connection specification (ACR) is selected, the wireless communication specification (WL) and wireless axis operation specification (WL2) cannot be selected. For wireless communication with RCON-EC connection (WL), purchase the separately sold optional interface box, conversion cable, and power · I/O cable. Please refer to P. 26 for details. Please contact our sales department for the wireless axis operation specification (WL2).

## Options Sold Separately for ACR option

| Name | Model | Reference page |
|---|---|---|
| Interface box conversion cable | CB-CVN-BJ002 | 30 |
| RCON-EC connection specification power · I/O cable (Standard connector cable) | CB-REC-PWBIO□□□-RB | 30 |
| RCON-EC connection specification power · I/O cable (4-way connector cable) | CB-REC2-PWBIO□□□-RB | 30 |
| RCON-EC connection specification Interface box for split motor and controller power supply (Wireless specification) | ECW-CVNWL-CB-ACR | 30 |

(Note) The power · I/O cable is a robot cable.
Indicate the cable length in □□□. (for example, 010 = 1m)

## Actuator Cable Length

| Cable code | Cable length |
|---|---|
| **1 ~ 3** | 1 ~ 3m |
| **4 ~ 5** | 4 ~ 5m |
| **6 ~ 10** | 6 ~ 10m (Note 6) |

(Note 6) When connecting via the interface box, 9m is the maximum available.
(Note) Make sure that the total length along with the power · I/O cable is 10m or less.
(Note) Robot cable.

## Power · I/O Cable Length

### Standard connector cable

| Cable code | Cable length | User wiring specification (flying leads) |
|---|---|---|
| | | CB-EC-PWBIO□□□-RB supplied |
| **0** | Without cable | ✓ (Note 7) |
| **1 ~ 3** | 1 ~ 3m | ✓ |
| **4 ~ 5** | 4 ~ 5m | ✓ |
| **6 ~ 9** | 6 ~ 9m | ✓ |

(Note 7) Only terminal block connector is included. When selecting RCON-EC connection specification (ACR) option, select "0." Terminal block connector is not included. Please refer to P. 29 for details.
(Note) Robot cable.

### 4-way connector cable

| Cable code | Cable length | User wiring specification (flying leads) |
|---|---|---|
| | | CB-EC2-PWBIO□□□-RB supplied |
| **S1 ~ S3** | 1 ~ 3m | ✓ |
| **S4 ~ S5** | 4 ~ 5m | ✓ |
| **S6 ~ S9** | 6 ~ 9m | ✓ |

(Note) Robot cable.

## Main Specifications

| Item | | | Description | | |
|---|---|---|---|---|---|
| Lead | | Ball screw lead (mm) | 6 | 4 | 2 |
| Horizontal | Payload | Max. payload (kg) | 1 | 2 | 4 |
| | Speed / acceleration/ deceleration | Max. speed (mm/s) | 300 | 200 | 100 |
| | | Min. speed (mm/s) | 8 | 5 | 3 |
| | | Rated acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| | | Max. acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| Vertical | Payload | Max. payload (kg) | 0.325 | 0.625 | 1.25 |
| | Speed / acceleration/ deceleration | Max. speed (mm/s) | 300 | 200 | 100 |
| | | Min. speed (mm/s) | 8 | 5 | 3 |
| | | Rated acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| | | Max. acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| Push | | Max. push force (N) | 15 | 23 | 47 |
| | | Max. push speed (mm/s) | 20 | 20 | 5 |
| Brake | | Brake specification | Non-excitation actuating solenoid brake | | |
| | | Brake holding force (kgf) | 0.325 | 0.625 | 1.25 |
| Stroke | | Min. stroke (mm) | 25 | 25 | 25 |
| | | Max. stroke (mm) | 300 | 300 | 300 |
| | | Stroke pitch (mm) 25 ~ 100ST | 25 | 25 | 25 |
| | | Stroke pitch (mm) 100 ~ 300ST | 50 | 50 | 50 |

| Item | Description |
|---|---|
| Drive system | Ball screw ϕ6mm rolled C10 |
| Positioning repeatability | ±0.02mm |
| Lost motion | - (notation not available due to 2-point positioning function) |
| Linear guide | Linear motion infinite circulating type |
| Rod | ϕ12mm Material: Aluminum, white alumite treatment |
| Rod non-rotation precision (Note 8) | 0° |
| Ambient operating temperature, humidity | 0 ~ 40°C, 85%RH or less (no condensation) |
| Ingress protection | IP20 |
| Vibration & shock resistance | 4.9m/s² |
| Overseas standards | CE marking, RoHS directive |
| Motor type | Stepper motor (□20) (Power capacity: Max. 1.1A) |
| Encoder type | Incremental/battery-less absolute |
| Number of encoder pulses | 16384 pulse/rev |

(Note 8) Displacement angle in the rod rotational direction when no load is applied.

## Table of Payload by Speed/Acceleration

### Standard grease specification The unit for payload is kg.

**Lead 6**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 1 | 0.325 |
| 50 | 1 | 0.325 |
| 100 | 1 | 0.325 |
| 150 | 1 | 0.325 |
| 200 | 1 | 0.325 |
| 250 | 1 | 0.325 |
| 300 | 1 | 0.325 |

**Lead 4**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 2 | 0.625 |
| 50 | 2 | 0.625 |
| 100 | 2 | 0.625 |
| 150 | 2 | 0.625 |
| 200 | 2 | 0.625 |

**Lead 2**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 4 | 1.25 |
| 25 | 4 | 1.25 |
| 50 | 4 | 1.25 |
| 75 | 4 | 1.25 |
| 100 | 4 | 1.25 |

For environmental temperatures of 5°C or lower, use at the following speeds or below.
·Lead 6: 250mm/s or lower
·Lead 4: 150mm/s or lower
·Lead 2: 75mm/s or lower

### Food grade grease specification The unit for payload is kg.

**Lead 6**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 1 | 0.325 |
| 50 | 1 | 0.325 |
| 100 | 1 | 0.325 |
| 150 | 1 | 0.325 |
| 200 | 1 | 0.325 |
| 250 | 1 | 0.325 |
| 300 | 1 | 0.325 |

**Lead 4**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 2 | 0.625 |
| 50 | 2 | 0.625 |
| 100 | 2 | 0.625 |
| 150 | 2 | 0.5 |
| 200 | 2 | 0.5 |

**Lead 2**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 4 | 1.25 |
| 25 | 4 | 1.25 |
| 50 | 4 | 1.25 |
| 75 | 4 | 1 |
| 100 | 4 | 1 |

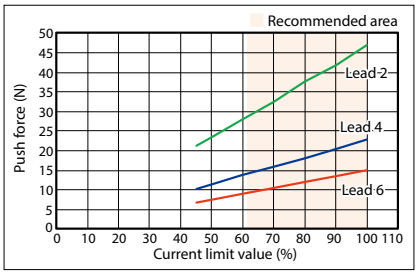
For environmental temperatures of 15°C or lower, use at the following speeds or below.
·Lead 6: 200mm/s or lower
·Lead 4: 100mm/s or lower
·Lead 2: 75mm/s or lower

## Stroke and Max. Speed

| Lead (mm) | 25 to 100 (every 25mm) | 100 to 200 (every 50mm) | 250 (mm) | 300 (mm) |
|---|---|---|---|---|
| 6 | 300 | | 240 | 165 |
| 4 | 200 | | 160 | 110 |
| 2 | 100 | | 80 | 55 |

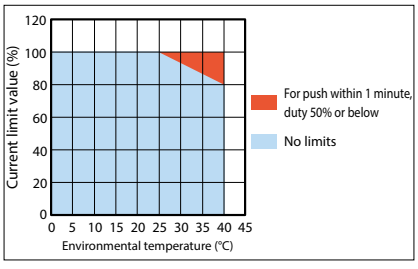
(Unit: mm/s)

## Correlation Diagrams between Push Force and Current Limit

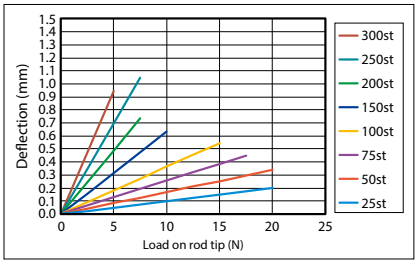



### Cautions for push-motion operation

For high-thrust push-motion operation in high-temperature environments, use within the limit values in the graph.




## Rod Deflection (Reference Values)

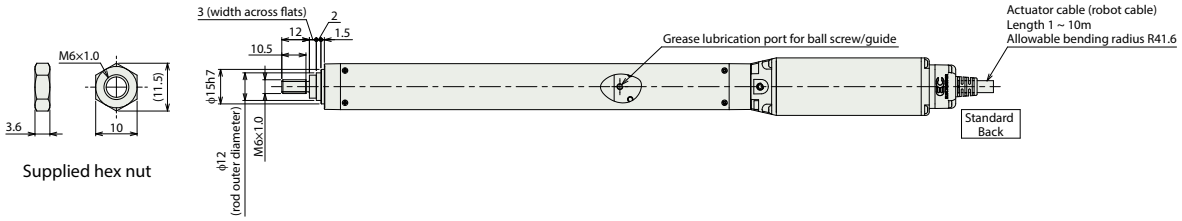


## Dimensions

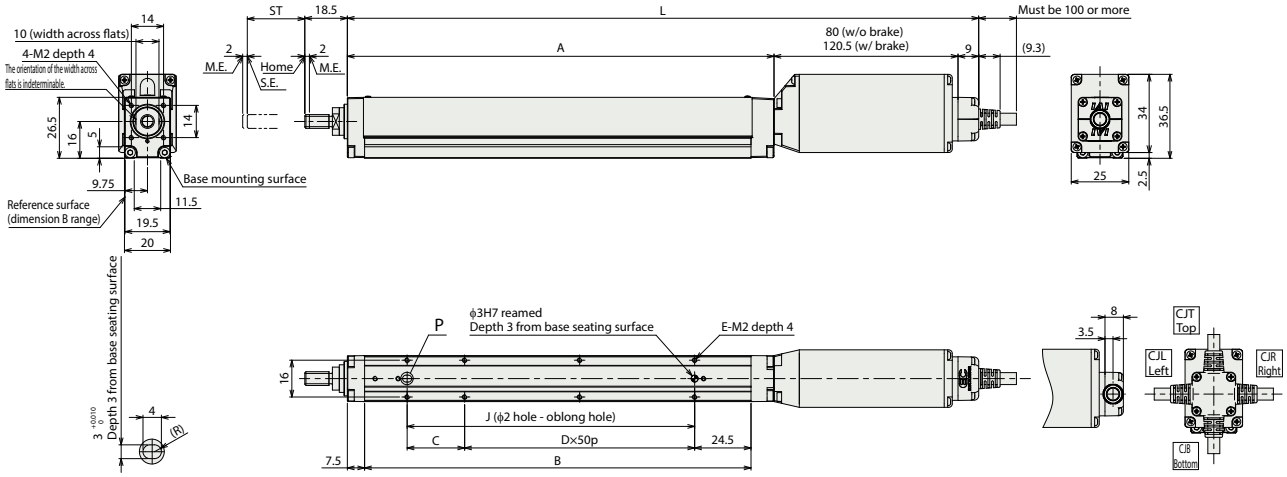
CAD drawings can be downloaded from our website.
www.iai-automation.com

(Note) When the rod is returning to its home position, please be mindful of possible interference from nearby objects, as it will travel until it reaches the M.E.
(Note) The figures below are for motor installed on top (MOT).
(Note) Fix the cable so that its base does not move.
The cable can be disconnected and replaced. (Connected with connector inside cable box)
The cable exit direction (option) can be changed by changing the cable box direction.
(Note) The width across flats direction cannot be changed.

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

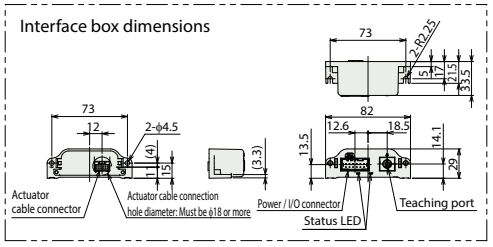



Supplied hex nut




Detailed view of P
Base oblong hole details

Cable exit direction (option)



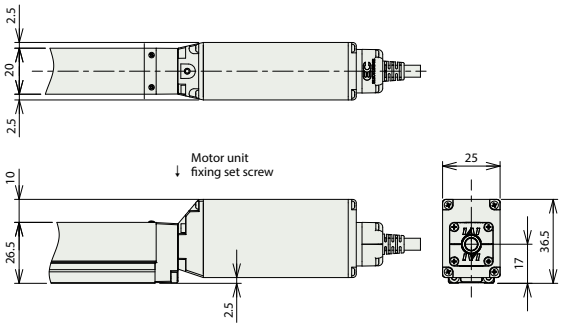

## Dimensions by Stroke

| Stroke | | 25 | 50 | 75 | 100 | 150 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|---|
| L | Without brake | 199.5 | 224.5 | 249.5 | 274.5 | 324.5 | 374.5 | 424.5 | 474.5 |
| | With brake | 240 | 265 | 290 | 315 | 365 | 415 | 465 | 515 |
| A | | 110.5 | 135.5 | 160.5 | 185.5 | 235.5 | 285.5 | 335.5 | 385.5 |
| B | | 93 | 118 | 143 | 168 | 218 | 268 | 318 | 368 |
| C | | 0 | 25 | 0 | 25 | 25 | 25 | 25 | 25 |
| D | | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 6 |
| E | | 4 | 6 | 6 | 8 | 10 | 12 | 14 | 16 |
| J | | 50 | 75 | 100 | 125 | 175 | 225 | 275 | 325 |

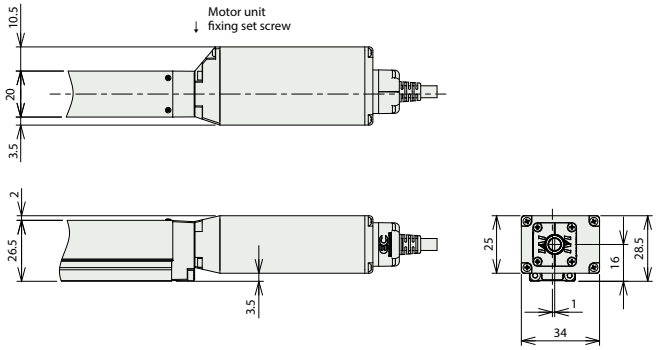
## Mass by Stroke

| Stroke | | 25 | 50 | 75 | 100 | 150 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|---|
| Mass (kg) | Without brake | 0.31 | 0.33 | 0.35 | 0.38 | 0.42 | 0.46 | 0.51 | 0.55 |
| | With brake | 0.39 | 0.41 | 0.43 | 0.45 | 0.50 | 0.54 | 0.58 | 0.63 |

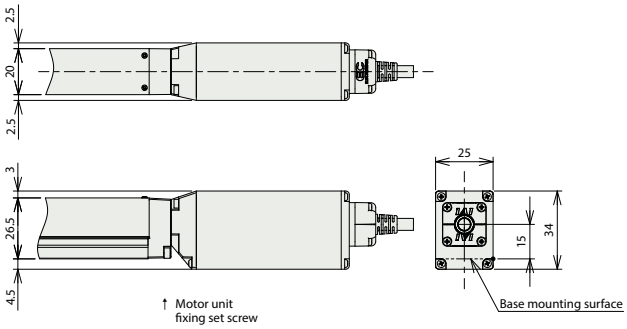
## ■ Motor mounting direction (option)



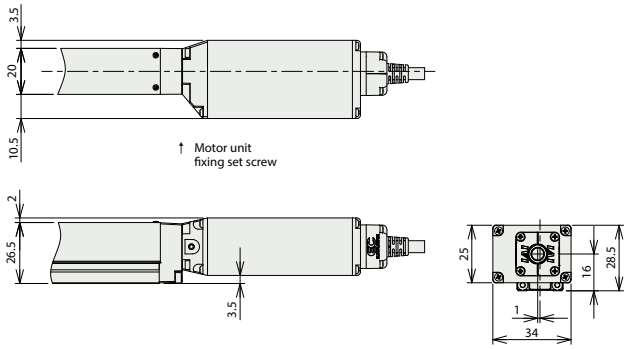

Motor mounting direction (top): MOT




Motor mounting direction (right): MOR




Motor mounting direction (bottom): MOB




Motor mounting direction (left): MOL

## Applicable Controllers

(Note) EC Series products are equipped with a built-in controller. Please refer to P. 27 for details on built-in controllers.

# EC-RR2□R

Side-mounted Motor | Body Width 20 mm | 24v Stepper Motor

## Model Specification Items

EC - RR2 [ ] R - [ ] - [ ] - [ ] - [ ] - [ ]

| Series | Type | Lead | Specifications |
|---|---|---|---|
| EC | RR2 | H 6mm<br>M 4mm<br>L 2mm | R Side-mounted motor |

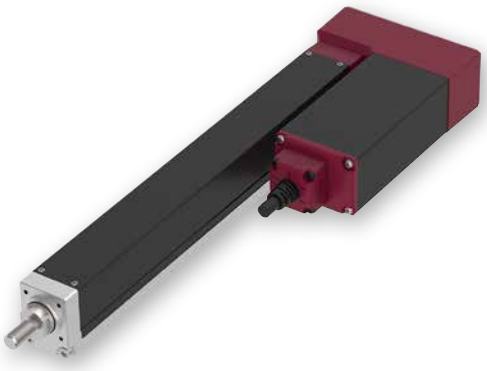
| Stroke | |
|---|---|
| 25 ~ 100 | 25mm ~ 100mm (every 25mm) |
| 100 ~ 300 | 100mm ~ 300mm (every 50mm) |

**Actuator cable length**: See Actuator Cable Length table below

**Power · I/O cable length**: See Power · I/O Cable Length table below

**Options**: See Options table below

*NPN specification is standard. PNP option is available.



(Note) The photo above is motor side-mounted to left (ML).

CE RoHS 10

Radial Load Specification
**Radial Cylinder®**

Horizontal | Vertical | Side | Ceiling

**Selection Notes**

(1) The maximum speed varies depending on the stroke. Be sure to check the maximum speed of the desired stroke in "Stroke and Max. Speed."

(2) "Main Specifications" displays the payload's maximum value. Please refer to "Table of Payload by Speed/Acceleration" for more details.

(3) Radial cylinders are equipped with a built-in guide. Please refer to P. 4 for details on the radial load applied to rods.

(4) The value of the horizontal payload assumes that there is an external guide.

(5) If performing push-motion operations, refer to the "Correlation Diagrams between Push Force and Current Limit." The push forces listed are only reference values.

(6) Pay close attention to the mounting orientation. Please refer to P. 3 for details.

## By Stroke

| Stroke (mm) | EC-RR2□R | |
|---|---|---|
| | RCON-EC connection specification (Note 1) | NPN/PNP specification (Note 2) |
| **25** | ✓ | ✓ |
| **50** | ✓ | ✓ |
| **75** | ✓ | ✓ |
| **100** | ✓ | ✓ |
| **150** | ✓ | ✓ |
| **200** | ✓ | ✓ |
| **250** | ✓ | ✓ |
| **300** | ✓ | ✓ |

(Note 1) Be sure to select "ACR" as the option.
(Note 2) Interface box and conversion cable are included.

## Options * Please check the Options reference pages to confirm each option.

| Name | Option code | Reference page |
|---|---|---|
| RCON-EC connection specification (Note 3) (Note 5) | **ACR** | 21 |
| Brake | **B** | 21 |
| Cable exit direction (bottom) | **CJB** | 21 |
| Cable exit direction (outside) | **CJO** | 21 |
| Cable exit direction (top) | **CJT** | 21 |
| Foot bracket | **FT** | 21 |
| Designated grease specification | **G5** | 21 |
| Motor side-mounted to left (Note 4) | **ML** | 21 |
| Motor side-mounted to right (Note 4) | **MR** | 21 |
| Non-motor end specification | **NM** | 22 |
| PNP specification (Note 3) | **PN** | 22 |
| Split motor and controller power supply specification (Note 3) | **TMD2** | 22 |
| Battery-less absolute encoder specification | **WA** | 22 |
| Wireless communication specification (Note 5) | **WL** | 22 |
| Wireless axis operation specification (Note 5) | **WL2** | 22 |

(Note 3) If the RCON-EC connection specification (ACR) is selected, the PNP specification (PN) and split motor and controller power supply specification (TMD2) cannot be selected. Also, interface box and conversion cable are not included.
(Note 4) Be sure to fill in one of the symbols for the Option field in the Model Specification Items.
(Note 5) If the RCON-EC connection specification (ACR) is selected, the wireless communication specification (WL) and wireless axis operation specification (WL2) cannot be selected. For wireless communication with RCON-EC connection (WL), purchase the separately sold optional interface box, conversion cable, and power · I/O cable. Please refer to P. 26 for details. Please contact our sales department for the wireless axis operation specification (WL2).

## Options Sold Separately for ACR option

| Name | Model | Reference page |
|---|---|---|
| Interface box conversion cable | CB-CVN-BJ002 | 30 |
| RCON-EC connection specification power · I/O cable (Standard connector cable) | CB-REC-PWBIO□□□-RB | 30 |
| RCON-EC connection specification power · I/O cable (4-way connector cable) | CB-REC2-PWBIO□□□-RB | 30 |
| RCON-EC connection specification Interface box for split motor and controller power supply (Wireless specification) | ECW-CVNWL-CB-ACR | 30 |

(Note) The power · I/O cable is a robot cable.
Indicate the cable length in □□□. (for example, 010 = 1m)

## Actuator Cable Length

| Cable code | Cable length |
|---|---|
| **1 ~ 3** | 1 ~ 3m |
| **4 ~ 5** | 4 ~ 5m |
| **6 ~ 10** | 6 ~ 10m (Note 6) |

(Note 6) When connecting via the interface box, 9m is the maximum available.
(Note) Make sure that the total length along with the power · I/O cable is 10m or less.
(Note) Robot cable.

## Power · I/O Cable Length

### Standard connector cable

| Cable code | Cable length | User wiring specification (flying leads) |
|---|---|---|
| | | CB-EC-PWBIO□□□-RB supplied |
| **0** | Without cable | ✓ (Note 7) |
| **1 ~ 3** | 1 ~ 3m | ✓ |
| **4 ~ 5** | 4 ~ 5m | ✓ |
| **6 ~ 9** | 6 ~ 9m | ✓ |

(Note 7) Only terminal block connector is included. When selecting RCON-EC connection specification (ACR) option, select "0." Terminal block connector is not included. Please refer to P. 29 for details.
(Note) Robot cable.

### 4-way connector cable

| Cable code | Cable length | User wiring specification (flying leads) |
|---|---|---|
| | | CB-EC2-PWBIO□□□-RB supplied |
| **S1 ~ S3** | 1 ~ 3m | ✓ |
| **S4 ~ S5** | 4 ~ 5m | ✓ |
| **S6 ~ S9** | 6 ~ 9m | ✓ |

(Note) Robot cable.

## Main Specifications

| Item | | | Description | | |
|---|---|---|---|---|---|
| Lead | | Ball screw lead (mm) | 6 | 4 | 2 |
| Horizontal | Payload | Max. payload (kg) | 1 | 2 | 4 |
| | Speed / acceleration/ deceleration | Max. speed (mm/s) | 300 | 200 | 100 |
| | | Min. speed (mm/s) | 8 | 5 | 3 |
| | | Rated acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| | | Max. acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| Vertical | Payload | Max. payload (kg) | 0.325 | 0.625 | 1.25 |
| | Speed / acceleration/ deceleration | Max. speed (mm/s) | 300 | 200 | 100 |
| | | Min. speed (mm/s) | 8 | 5 | 3 |
| | | Rated acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| | | Max. acceleration/deceleration (G) | 0.3 | 0.3 | 0.3 |
| Push | | Max. push force (N) | 15 | 23 | 47 |
| | | Max. push speed (mm/s) | 20 | 20 | 5 |
| Brake | | Brake specification | Non-excitation actuating solenoid brake | | |
| | | Brake holding force (kgf) | 0.325 | 0.625 | 1.25 |
| Stroke | | Min. stroke (mm) | 25 | 25 | 25 |
| | | Max. stroke (mm) | 300 | 300 | 300 |
| | | Stroke pitch (mm) 25 ~ 100ST) | 25 | 25 | 25 |
| | | Stroke pitch (mm) 100 ~ 300ST) | 50 | 50 | 50 |

| Item | Description |
|---|---|
| Drive system | Ball screw ϕ6mm rolled C10 |
| Positioning repeatability | ±0.02mm |
| Lost motion | - (notation not available due to 2-point positioning function) |
| Linear guide | Linear motion infinite circulating type |
| Rod | ϕ12mm Material: Aluminum, white alumite treatment |
| Rod non-rotation precision (Note 8) | 0° |
| Ambient operating temperature, humidity | 0 ~ 40°C, 85%RH or less (no condensation) |
| Ingress protection | IP20 |
| Vibration & shock resistance | 4.9m/s² |
| Overseas standards | CE marking, RoHS directive |
| Motor type | Stepper motor (□20) (Power capacity: Max. 1.1A) |
| Encoder type | Incremental/battery-less absolute |
| Number of encoder pulses | 16384 pulse/rev |

(Note 8) Displacement angle in the rod rotational direction when no load is applied.

## Table of Payload by Speed/Acceleration

### Standard grease specification The unit for payload is kg.

**Lead 6**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 1 | 0.325 |
| 50 | 1 | 0.325 |
| 100 | 1 | 0.325 |
| 150 | 1 | 0.325 |
| 200 | 1 | 0.325 |
| 250 | 1 | 0.325 |
| 300 | 1 | 0.325 |

**Lead 4**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 2 | 0.625 |
| 50 | 2 | 0.625 |
| 100 | 2 | 0.625 |
| 150 | 2 | 0.625 |
| 200 | 2 | 0.625 |

**Lead 2**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 4 | 1.25 |
| 25 | 4 | 1.25 |
| 50 | 4 | 1.25 |
| 75 | 4 | 1.25 |
| 100 | 4 | 1.25 |

For environmental temperatures of 5°C or lower, use at the following speeds or below.
·Lead 6: 250mm/s or lower
·Lead 4: 150mm/s or lower
·Lead 2: 75mm/s or lower

### Food grade grease specification The unit for payload is kg.

**Lead 6**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 1 | 0.325 |
| 50 | 1 | 0.325 |
| 100 | 1 | 0.325 |
| 150 | 1 | 0.325 |
| 200 | 1 | 0.325 |
| 250 | 1 | 0.325 |
| 300 | 1 | 0.325 |

**Lead 4**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 2 | 0.625 |
| 50 | 2 | 0.625 |
| 100 | 2 | 0.625 |
| 150 | 2 | 0.5 |
| 200 | 2 | 0.5 |

**Lead 2**

| Orientation | Horizontal | Vertical |
|---|---|---|
| Speed | Acceleration (G) | |
| (mm/s) | 0.3 | 0.3 |
| 0 | 4 | 1.25 |
| 25 | 4 | 1.25 |
| 50 | 4 | 1.25 |
| 75 | 4 | 1 |
| 100 | 4 | 1 |

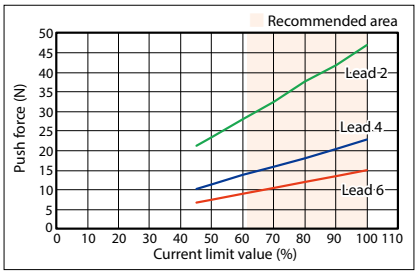
For environmental temperatures of 15°C or lower, use at the following speeds or below.
·Lead 6: 200mm/s or lower
·Lead 4: 100mm/s or lower
·Lead 2: 75mm/s or lower

## Stroke and Max. Speed

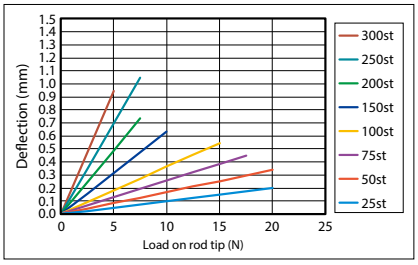
| Lead (mm) | 25 to 100 (every 25mm) | 100 to 200 (every 50mm) | 250 (mm) | 300 (mm) |
|---|---|---|---|---|
| 6 | 300 | | 240 | 165 |
| 4 | 200 | | 160 | 110 |
| 2 | 100 | | 80 | 55 |

(Unit: mm/s)

## Correlation Diagrams between Push Force and Current Limit

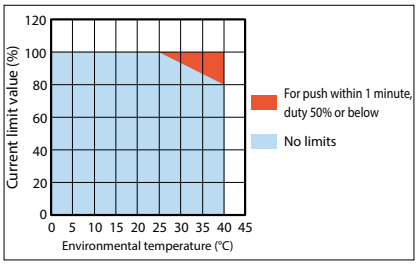



## Rod Deflection (Reference Values)




## Cautions for push-motion operation

For high-thrust push-motion operation in high-temperature environments, use within the limit values in the graph.

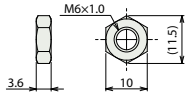


## Dimensions

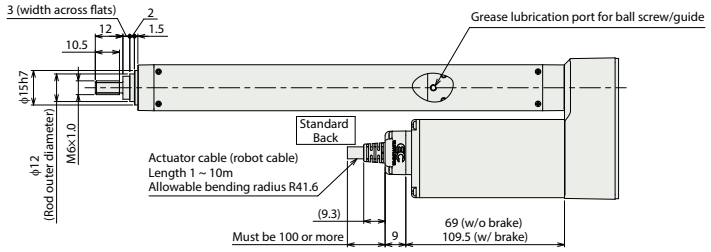
CAD drawings can be downloaded from our website.
www.iai-automation.com

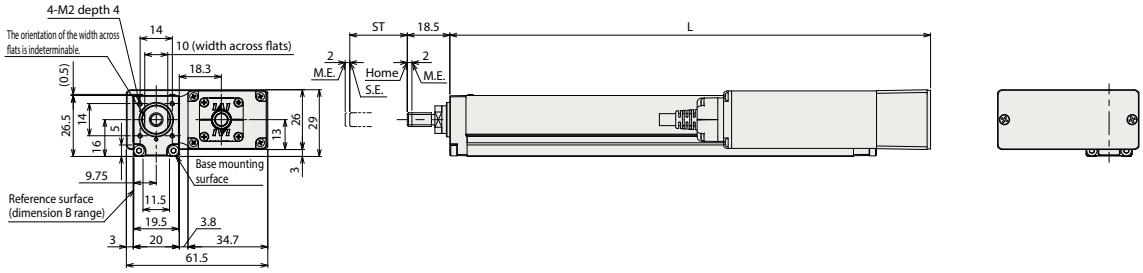
(Note) When the rod is returning to its home position, please be mindful of possible interference from nearby objects, as it will travel until it reaches the M.E.
(Note) The figure below is the motor side-mounted to left (ML).
(Note) Fix the cable so that its base does not move.
The cable can be disconnected and replaced. (Connected with connector inside cable box)
The cable exit direction (option) can be changed by changing the cable box direction.
(Note) The width across flats direction cannot be changed.

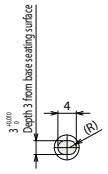
ST: Stroke
M.E: Mechanical end
S.E: Stroke end



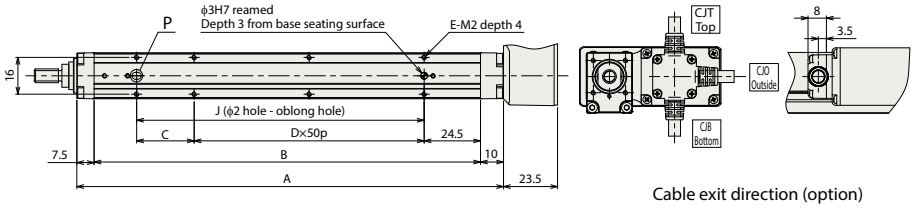

Supplied hex nut



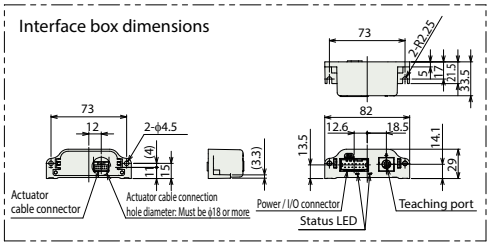




Detailed view of P
Base oblong hole details




Cable exit direction (option)




## Dimensions by Stroke

| Stroke | 25 | 50 | 75 | 100 | 150 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|
| L | 134 | 159 | 184 | 209 | 259 | 309 | 359 | 409 |
| A | 110.5 | 135.5 | 160.5 | 185.5 | 235.5 | 285.5 | 335.5 | 385.5 |
| B | 93 | 118 | 143 | 168 | 218 | 268 | 318 | 368 |
| C | 0 | 25 | 0 | 25 | 25 | 25 | 25 | 25 |
| D | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 6 |
| E | 4 | 6 | 6 | 8 | 10 | 12 | 14 | 16 |
| J | 50 | 75 | 100 | 125 | 175 | 225 | 275 | 325 |

## Mass by Stroke

| Stroke | | 25 | 50 | 75 | 100 | 150 | 200 | 250 | 300 |
|---|---|---|---|---|---|---|---|---|---|
| Mass (kg) | Without brake | 0.35 | 0.37 | 0.39 | 0.42 | 0.46 | 0.50 | 0.55 | 0.59 |
| | With brake | 0.43 | 0.45 | 0.47 | 0.49 | 0.54 | 0.58 | 0.62 | 0.67 |

## Applicable Controllers

(Note) EC Series products are equipped with a built-in controller. Please refer to P. 27 for details on built-in controllers.

# Options

## RCON-EC connection specification *Cannot be selected with the TMD2 and PN options (the ACR option includes the split motor and controller power supply specification)

Model **ACR** Applicable models **All models**

Description This option should be selected to connect over an R-unit to a field network.
*If this option is selected, the power supply must be a split motor and controller power supply and the input/output specification must be NPN. Therefore, it cannot be selected with the TMD2 or PN options.

## Brake

Model **B** Applicable models **All models**

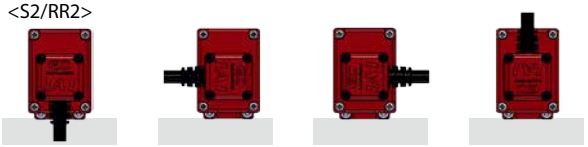
Description This mechanism stops the slider and rod from moving when the power or servo is turned off. This option is required when mounting the actuator vertically.

## Cable exit direction

Model **CJB / CJL / CJO / CJR / CJT** Applicable models **All models**

Description The mounting direction of the actuator cable installed on the actuator body can be changed among top/bottom/left/right.

<S2/RR2>



Bottom: CJB | Left: CJL | Right: CJR | Top: CJT

<S2□R/RR2□R>

Bottom: CJB | Outside: CJO | Top: CJT

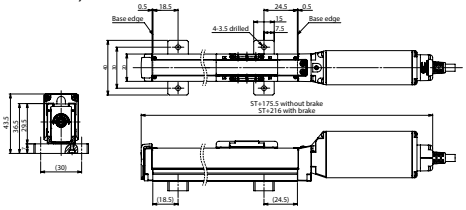
## Foot bracket

Model **FT** Applicable models **All models**

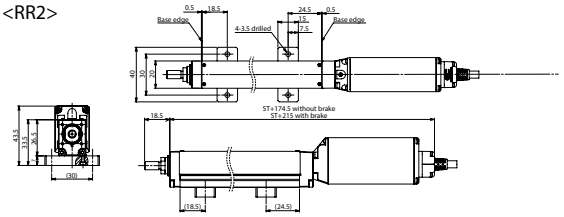
Description This bracket is used for mounting the actuator body from the top with bolts.
*Not assembled before shipment. Refer to the drawings for mounting instructions.

EC-S2/RR2, Individual model number: EC-FT-SRR2 (2-piece set)
(Material: Aluminum)

<S2>



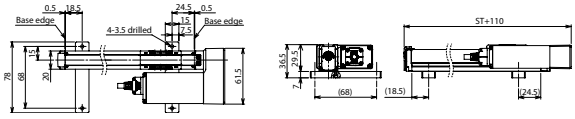

<RR2>



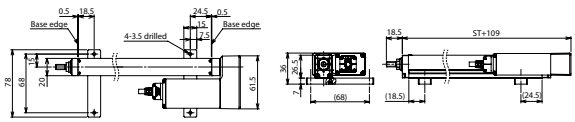

*Two hex socket bolts are included with each foot bracket.

EC-S2□R/RR2□R, Individual model number: EC-FT-SRR2R (2-piece set)
(Material: Aluminum)

<S2□R>




<RR2□R>




*Two hex socket bolts are included with each foot bracket.

## Designated grease specification

Model **G5** Applicable models **All models**

Description The grease applied to the actuator ball screw, linear guide, and rod sliding surface is changed to food grade grease (White Alcom grease).

## Motor side-mounted direction

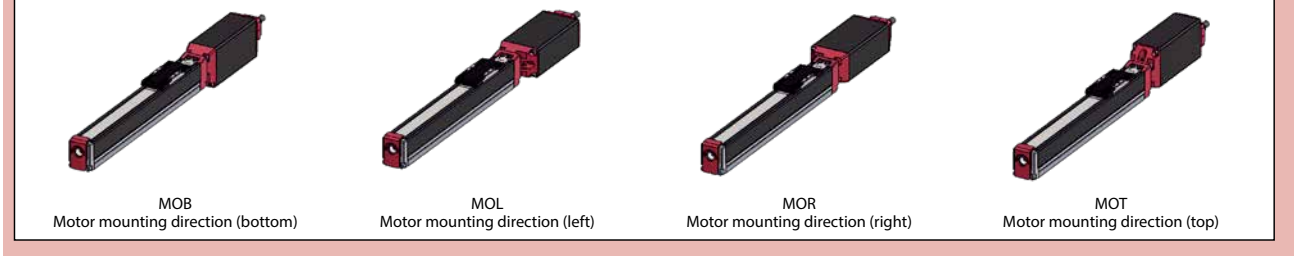
Model **ML/MR** Applicable models **EC-S2□R/RR2□R**

Description This code specifies the motor side-mounted direction.
Left side-mounted is ML (all models) and right side-mounted is MR (all models).* Be sure to enter a code in the model number.

## Motor mounting direction

Model **MOB / MOL / MOR / MOT** Applicable models **EC-S2/RR2**

Description One of four motor mounting directions can be selected: bottom, left, right, or top.
* Be sure to enter a code in the model number.



MOB
Motor mounting direction (bottom)

MOL
Motor mounting direction (left)

MOR
Motor mounting direction (right)

MOT
Motor mounting direction (top)

## Non-motor end specification

Model **NM** Applicable models **All models**

Description The home position is normally set to the motor side. This option is for setting the home position on the other side in order to accommodate variations in equipment layout, etc.

## PNP specification *Cannot be ordered simultaneously with the ACR option, which is NPN specification.

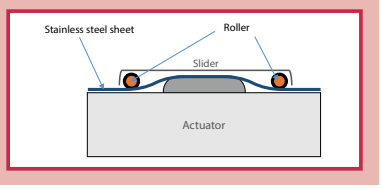
Model **PN** Applicable models **All models**

Description EC Series products provide NPN specification input/output for connecting external devices as standard.
Specifying this option changes input/output to the PNP specification.

## Slider roller part specification

Model **SR** Applicable models **EC-S2/S2□R**

Description The standard slider type slider structure is changed to the same roller structure as the cleanroom specification.




## Split motor and controller power supply specification * Cannot be selected with the ACR option (the RCON-EC connection specification is a split motor and controller power supply specification)

Model **TMD2** Applicable models **All models**

Description This option includes an actuator operation stop input. Select this option to allow shutting down the actuator drive power only.
Please refer to P. 29 for more information on wiring.

## Battery-less absolute encoder specification

Model **WA** Applicable models **All models**

Description The EC series offers incremental encoder specification as standard.
Specifying this option installs a built-in battery-less absolute encoder.

## Wireless communication specification

Model **WL** Applicable models **All models**

Description This option enables support for wireless communication. Specifying this option enables wireless communication with the TB-03 teaching pendant and Wireless Teaching Controller.
The start point, end point, and AVD can be adjusted via wireless communication.

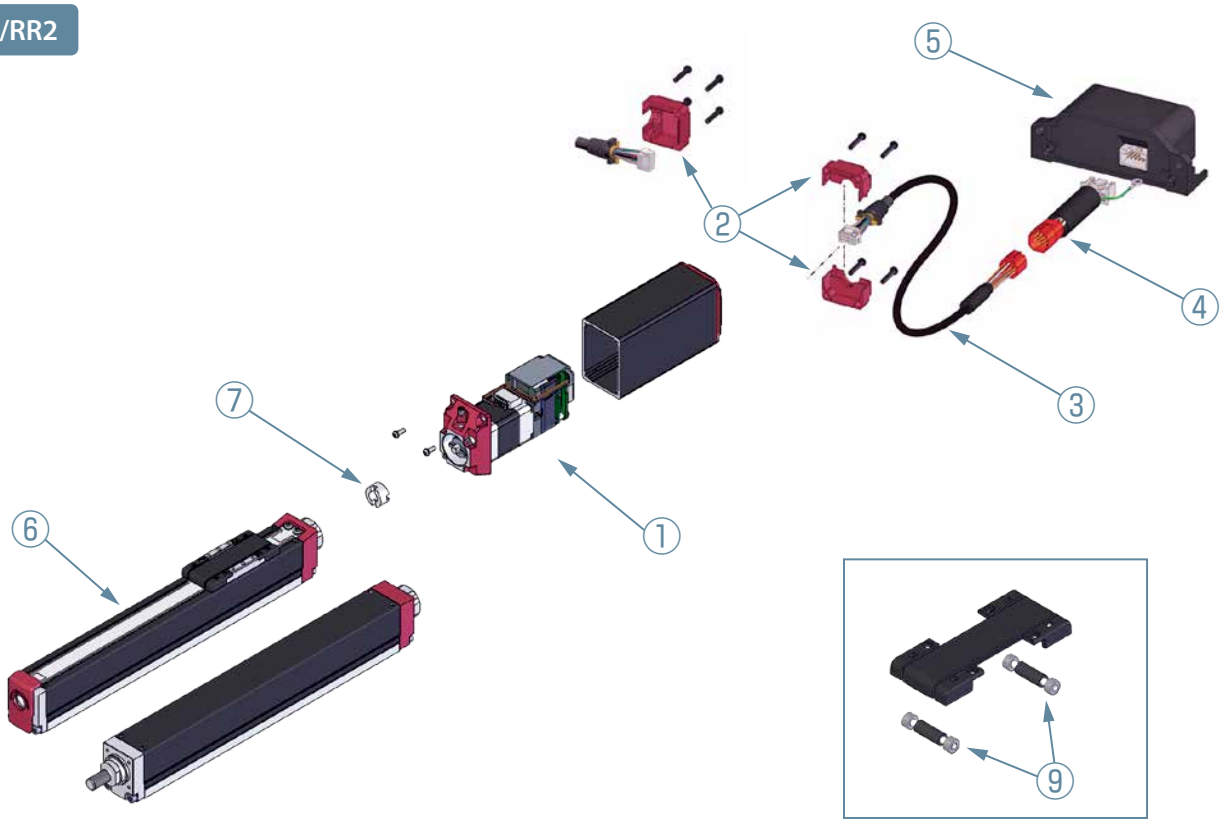
## Wireless axis operation specification

Model **WL2** Applicable models **All models**

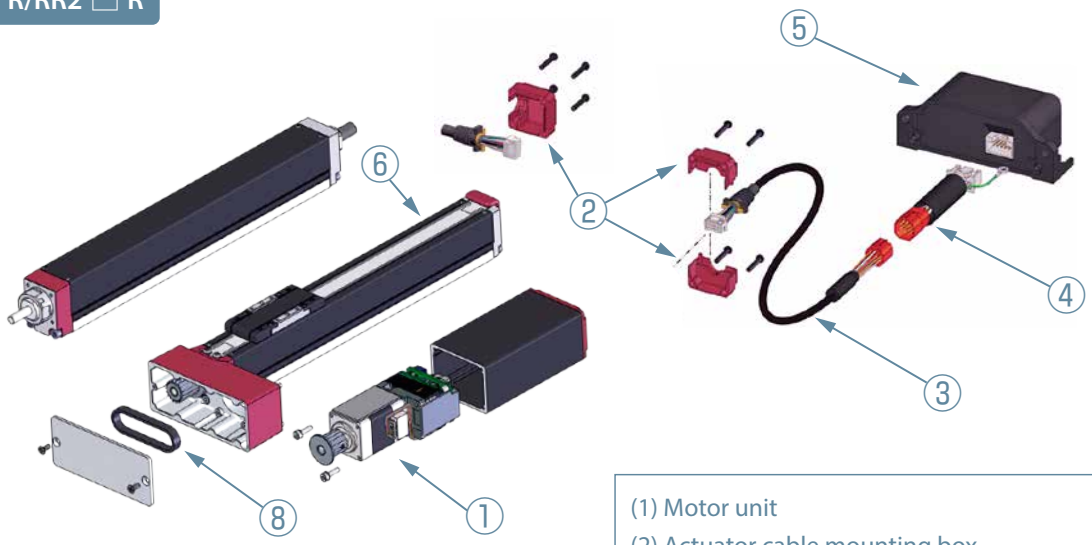
Description Specifying WL2 allows the product to operate wirelessly as with WL (start point, end point, and AVD adjustment), and also to perform axis travel operation tests (forward end/backward end movement, jog, and inching). However, this function is not meant to perform automatic operation. Please contact IAI for precautions on axis operations using a wireless connection. (Note) Customers cannot change WL to WL2, or WL2 to WL.

## Maintenance Parts

### S2/RR2




### S2 □ R/RR2 □ R




(1) Motor unit
(2) Actuator cable mounting box
(3) Actuator cable assembly
(4) Interface box conversion cable
(5) Interface box
(6) Stainless steel sheet
(7) Coupling spacer
(8) Timing belt
(9) Slider roller assembly

## Maintenance Part Model List

We recommend the maintenance parts search system!
Please contact us about the maintenance parts.
https://www.iai-automation.com/contact-form/

The numbers in the table correspond to the numbers in the schematics.
(Note) Mounting screws are not included with maintenance parts. Please contact our sales department before making any modifications.

### (1) Motor unit

| Type | Encoder | Brake | Model |
|---|---|---|---|
| S2<br>RR2 | Incremental | None | EC-MUSRR2 |
| | | Yes | EC-MUSRR2-B |
| | Battery-less absolute | None | EC-MUSRR2-WA |
| | | Yes | EC-MUSRR2-WA-B |
| S2 ☐ R<br>RR2 ☐ R | Incremental | None | EC-MUSRR2R |
| | | Yes | EC-MUSRR2R-B |
| | Battery-less absolute | None | EC-MUSRR2R-WA |
| | | Yes | EC-MUSRR2R-WA-B |

### (2) Actuator cable mounting box (Included parts: Screws)

| Type | Cable exit direction | Model |
|---|---|---|
| S2( ☐ R)<br>RR2( ☐ R) | Back | EC-CASBR-SLTGD3 |
| | Side | EC-CASBS-SLTGD3 |

### (3) Actuator cable assembly ( ○○○ indicates cable length)

| Type | Model |
|---|---|
| S2( ☐ R)<br>RR2( ☐ R) | CB-EC-SRR2-MPA ○○○ -AS |

*Please indicate the cable length (L) in ☐☐☐ , e.g. 080 = 8m

### (4) Interface box conversion cable

| Type | Model |
|---|---|
| S2( ☐ R)<br>RR2( ☐ R) | CB-CVN-BJ002 |

### (5)-1 Interface box

| Type | Wireless | I/O | Model |
|---|---|---|---|
| S2( ☐ R)<br>RR2( ☐ R) | No | NPN | ECW-CVN-CB |
| | | PNP | ECW-CVP-CB |
| | WL/WL2 | NPN | ECW-CVNWL-CB |
| | | PNP | ECW-CVPWL-CB |

### (5)-2 Split motor and controller power supply interface box

| Type | Wireless | I/O | Model |
|---|---|---|---|
| S2( ☐ R)<br>RR2( ☐ R) | No | NPN | ECW-CVN-CB-TMD2 |
| | | PNP | ECW-CVP-CB-TMD2 |
| | WL/WL2 | NPN | ECW-CVNWL-CB-TMD2 |
| | | PNP | ECW-CVPWL-CB-TMD2 |

### (5)-3 RCON-EC connection specification split motor and controller power supply interface box

| Type | Wireless | I/O | Model |
|---|---|---|---|
| S2( ☐ R)<br>RR2( ☐ R) | WL/WL2 | NPN/<br>REC | ECW-CVNWL-CB-ACR |

### (6) Stainless steel sheet ( ○○○ indicates stroke)

| Type | Model |
|---|---|
| S2( ☐ R) | ST-EC-S2- ○○○ |

*Please indicate the stroke in ☐☐☐ , e.g. 080 = 8m

### (7) Coupling spacer

| Type | Model |
|---|---|
| S2<br>RR2 | CPG-EC-SRR2 |

### (8) Timing belt

| Type | Model |
|---|---|
| S2 ☐ R<br>RR2 ☐ R | TB-EC-SRR2R |

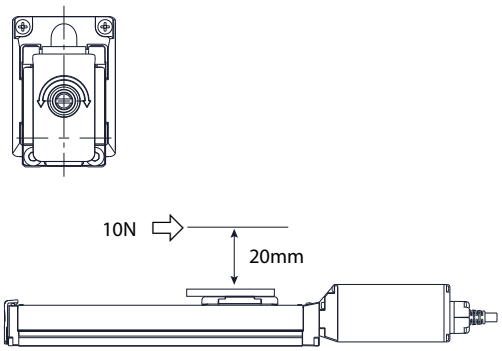
### (9) Slider roller assembly (1-piece unit)

| Type | Model |
|---|---|
| S2( ☐ R) | EC-SR-S2 |

## Push-Motion Operation

### Notes on use of slider type actuators for push-motion operation

When performing a push-motion operation using a slider type actuator, be sure to limit the push current so that the reactive moment caused by the push force does not exceed the dynamic allowable moment ($M_a$, $M_b$) listed in the catalog.
Please refer to the figure at right, which shows the working point of the guide moment, for help with calculating the moment. When doing so, take the offset amount of the push force working point into consideration.
Please note that if excessive force which exceeds the dynamic allowable moment is applied, it may damage the guide and shorten the actuator's operation life. Please keep this in mind and select a push current that is safely within its limits.




**Calculation example:**

When a 10N pushing operation is performed with the EC-S2 type at the position shown in the figure at top right, the moment applied to the guide is

$M_a = (22.5 + 20) \times 10 = 425$ (N·mm)
$= 0.425$ (N·m).

The allowable dynamic moment for EC-S2 is $M_a = 0.5$ (N·m), so the figure is acceptable as $0.425 < 0.5$.
If pushing would cause $M_b$ moment, calculate likewise from the overhang and ensure that it is within range of the dynamic allowable moment.

## List of Possible Connections for the ELECYLINDER and Teaching Tools

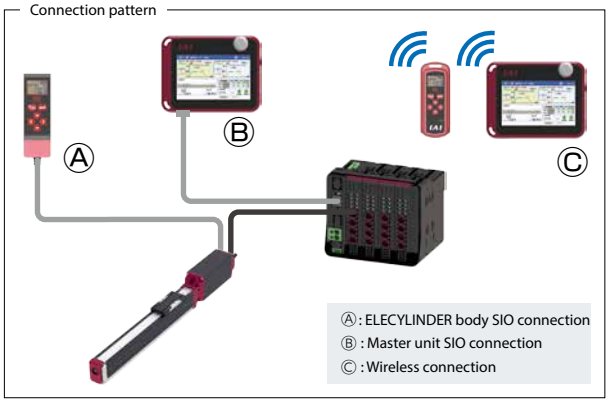
### For ELECYLINDER Alone

○: Connection/operation possible

| Teaching tool | | | Connection/ operation Y/N | Priority level (simultaneous connection) |
|---|---|---|---|---|
| Wired connection | TB-02/03 |  | ○ | 1 |
| | Wired Teaching Controller (TBD-1) |  | ○ | 1 |
| Wireless connection | TB-03 |  | ○ *1 *2 | 2 |
| | Wireless Teaching Controller (TBD-1WL) |  | ○ *1 *2 | 2 |

*1 Connectable only when the ELECYLINDER is wireless specification (options include "WL" or "WL2")
*2 Test run is possible when connecting to WL2 specification, but not with WL specification

### For ELECYLINDER Connected to REC/RCON/RSEL (RCON-EC-4 connection)




○: Connection/operation possible △: Connection possible/partial operation possible ×: Connection not possible

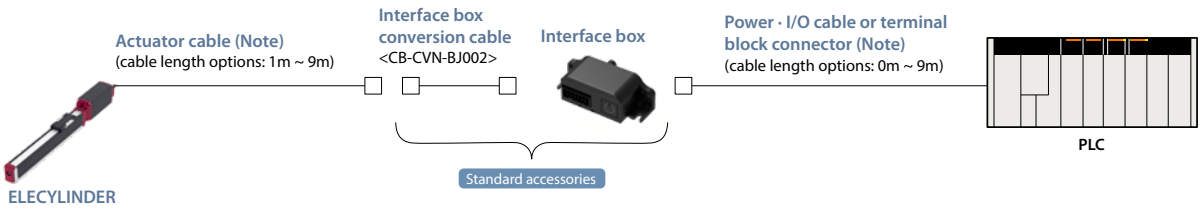
| Teaching tool | | | Connection pattern | Auto (operating on automatic) | | Manual | |
|---|---|---|---|---|---|---|---|
| | | | | Connection/operation Y/N | Priority level (simultaneous connection) | Connection/operation Y/N | Priority level (simultaneous connection) |
| Wired connection | TB-02/03 |  | Ⓐ | × | | × | |
| | | | Ⓑ | △ *3 | 1 | ○ | 1 |
| | Wired Teaching Controller (TBD-1) |  | Ⓐ | × | | × | |
| | | | Ⓑ | × | | × | |
| Wireless connection | TB-03 |  | Ⓒ | △ *1 *3 | 2 | ○ *1 *2 | 2 |
| | Wireless Teaching Controller (TBD-1WL) |  | Ⓒ | △ *1 *4 | 2 | ○ *1 *2 | 2 |

*1 Connectable only when the ELECYLINDER is wireless specification (options include "WL" or "WL2")
*2 Test run is possible when connecting to WL2 specification, but not with WL specification
*3 Monitoring only (operation not possible)
*4 Speed and acceleration/deceleration can be set and operated; position editing and test run are not possible

## Connection Methods

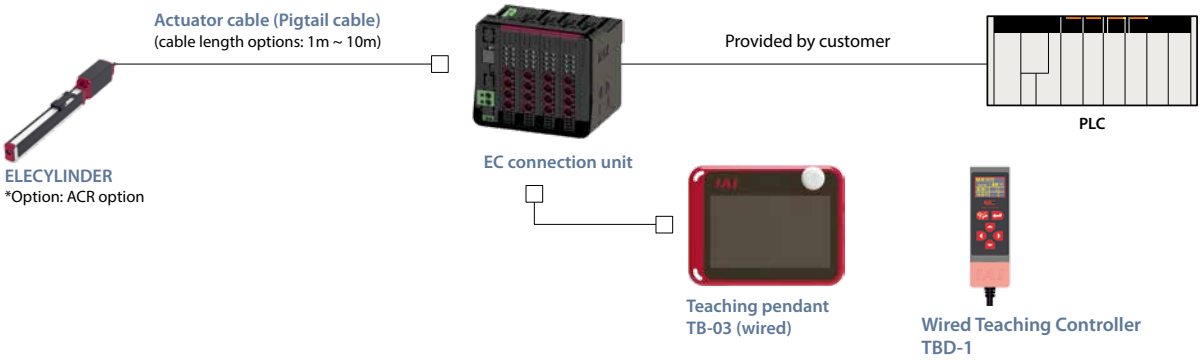
When connecting the ELECYLINDER to a PLC, there are three possible connection methods.

### 1. Direct connection to PLC (NPN/PNP specification)



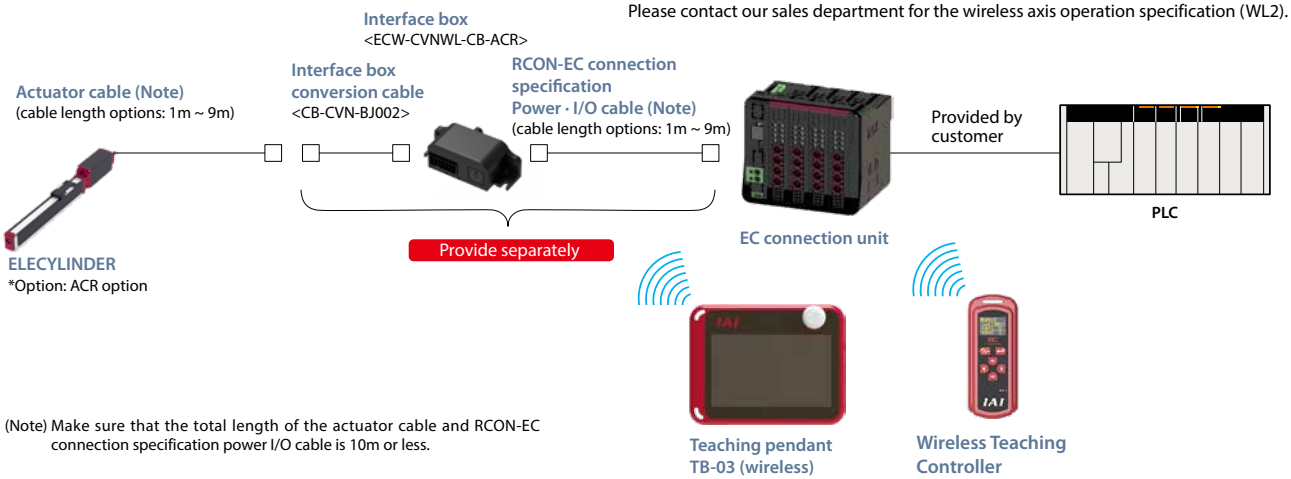

(Note) Make sure that the total length of the actuator cable and power · I/O cable (provided by the customer when using a terminal block connector) is 10 m or less.

### 2. Connection to PLC through an EC connection unit (RCON-EC connection specification) [Wired connection to teaching pendant]



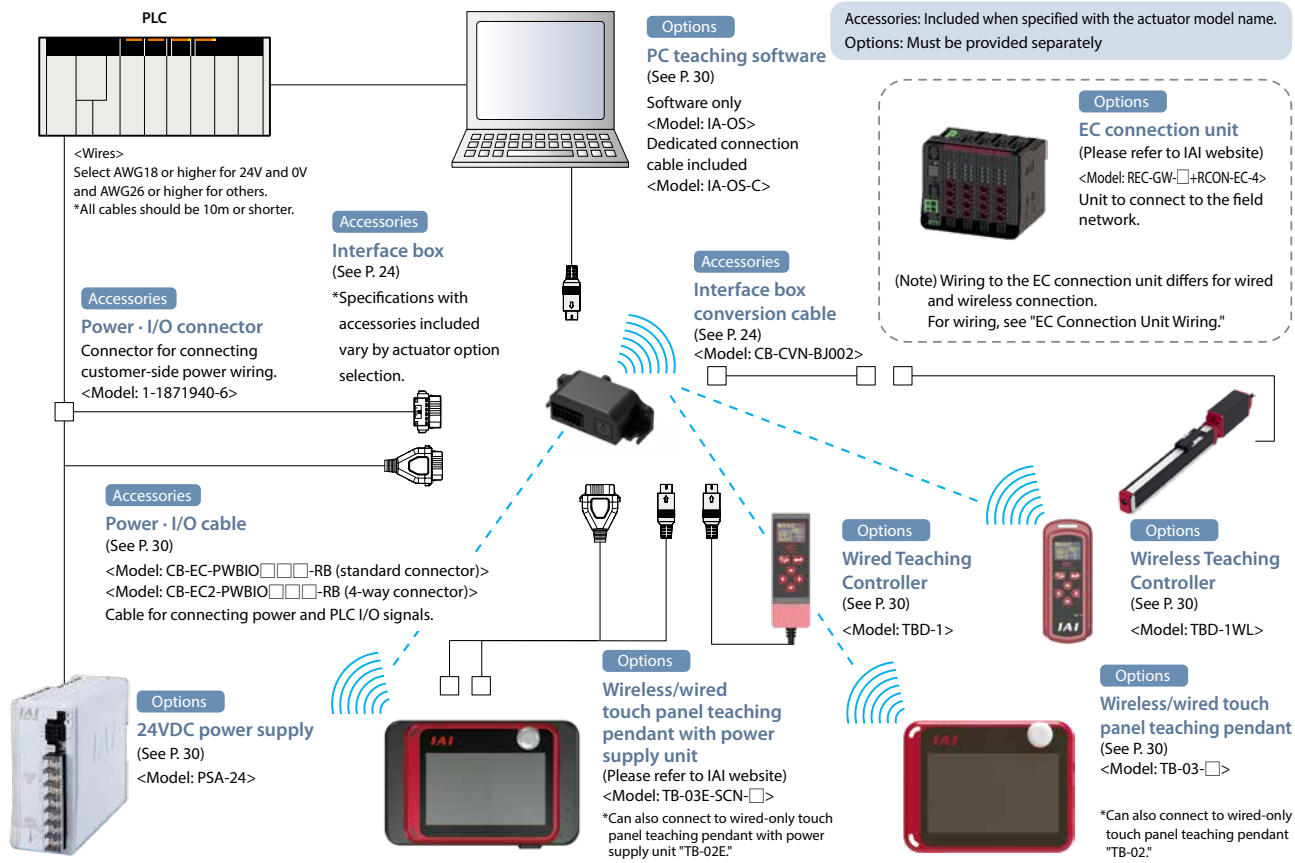

### 3. Connection to PLC through an EC connection unit (RCON-EC connection specification) [Wireless connection to teaching pendant]

The configuration below is with wireless communication specification (WL).
Please contact our sales department for the wireless axis operation specification (WL2).



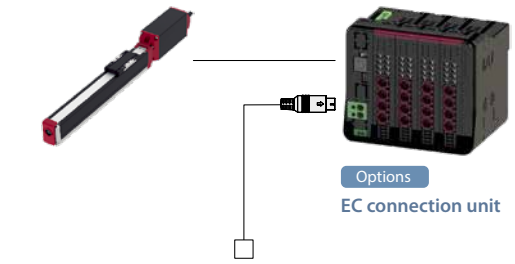

(Note) Make sure that the total length of the actuator cable and RCON-EC connection specification power I/O cable is 10m or less.

## System Configuration

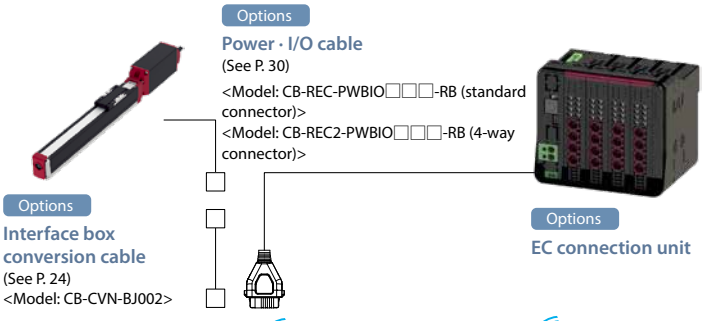



EC Connection Unit Wiring

(For teaching pendant wired connection)




(For teaching pendant wireless connection)





## List of Accessories

■ Power · I/O Cable, Connectors

[Standard connector]

| Product category | | Accessories |
|---|---|---|
| Power · I/O cable length (selected with actuator model) | RCON-EC connection specification (ACR) selection | |
| 0 | No | Power · I/O connector (1-1871940-6) |
| | Yes | — |
| 1 to 9 | No | Power · I/O cable (CB-EC-PWBIO□□□-RB) |

[Four-way connector]

| Product category | | Accessories |
|---|---|---|
| Power · I/O cable length (selected with actuator model) | RCON-EC connection specification (ACR) selection | |
| S1 ~ S9 | No | Power · I/O cable (CB-EC2-PWBIO□□□-RB) |

## Basic Controller Specifications

| Specification item | | | Specification content |
|---|---|---|---|
| Number of controlled axes | | | 1 axis |
| Power supply voltage | | | 24VDC ±10% |
| Power capacity (includes control power 0.3A) (Note 1) | S2/RR2 | | Rated 0.95A, max. 1.25A |
| Brake release power supply | | | 24VDC ±10%, 200mA (only for external brake release) |
| Generated heat (at duty ratio 100%) | S2/RR2 | | 3W |
| Inrush current (Note 2) | S2/RR2 | | 2A |
| Momentary power failure resistance | | | Max. 500μs |
| Motor size | | | □20 |
| Motor rated current | S2/RR2 | | 0.65A |
| Motor control system | | | Weak field-magnet vector control |
| Supported encoders | | | Incremental/battery-less absolute encoder |
| SIO | | | RS-485 1ch (Modbus protocol compliant) |
| PIO | Input specification | No. of inputs | 3 points (forward, backward, alarm clear) |
| | | Input voltage | 24VDC ±10% |
| | | Input current | 5mA per circuit |
| | | Leakage current | Max. 1mA/1 point |
| | | Isolation method | Non-isolated |
| | Output specification | No. of outputs | 3 points (forward complete, backward complete, alarm) |
| | | Output voltage | 24VDC ±10% |
| | | Output current | 50mA/1 point |
| | | Residual voltage | 2V or less |
| | | Isolation method | Non-isolated |
| Data setting, input method | | | PC teaching software, touch panel teaching pendant, Wireless Teaching Controller, Wired Teaching Controller |
| Data retention memory | | | Position and parameters are saved in non-volatile memory (no limit to number of rewrites) |
| LED display (Note 3) | Controller status display | | Servo ON (green light ON) / Alarm (red light ON) / Initializing when power comes ON (orange light ON) / Minor failure alarm (green/red alternately blinking) / Teaching mode: Stop from teaching (red light ON) / Servo OFF (light OFF) / Automatic servo OFF (green blinking) |
| | Wireless status display | | Initializing wireless hardware, without wireless connection, or connecting from TP board (light OFF) Connecting through wireless (green blinking) / Wireless hardware error (red blinking) / Initializing when power comes ON (orange light ON) |
| Predictive maintenance/preventative maintenance | | | When the number of movements or operation distance has exceeded the set value or an overload warning occurs, the LED (right side) blinks alternately green and red. *Only when configured in advance |
| Ambient operating temperature | | | 0 ~ 40°C |
| Ambient operating humidity | | | 5%RH ~ 85%RH (no condensation or freezing) |
| Operating ambience | | | No corrosive gas or excessive dust |
| Insulation resistance | | | 500VDC 10MΩ |
| Electric shock protection mechanism | | | Class 1 basic insulation |
| Cooling method | | | Natural air cooling |

(Note 1) When connecting to RCON-EC, control power 0.3A is subtracted from the value.
(Note 2) Inrush current flows for approximately 5ms after the power is input. (At 40°C) Inrush current value differs depending on the impedance on the power line.
(Note 3) The body does not have an LED display. Confirm with the interface box or EC connection unit.

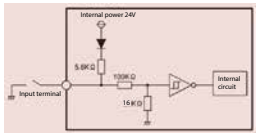
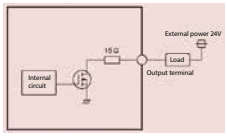
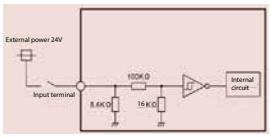
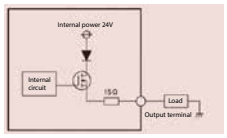
## Solenoid Valve Method

ELECYLINDER products normally use a double solenoid method.

Change parameter No. 9 ("solenoid valve type selection") to use the single solenoid method.

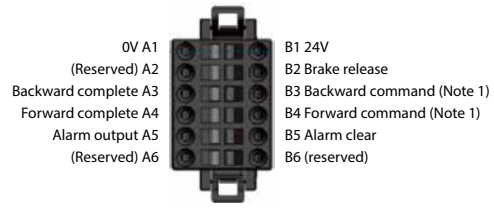
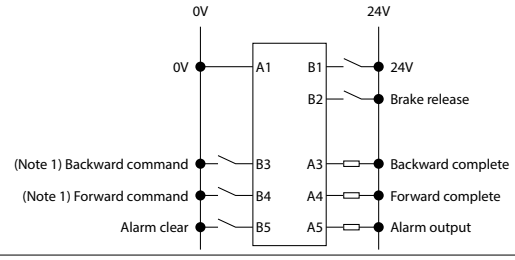
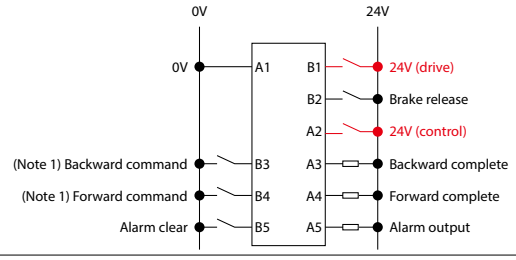
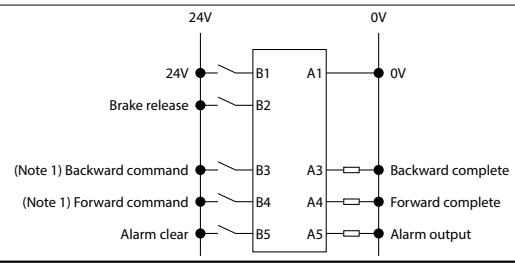
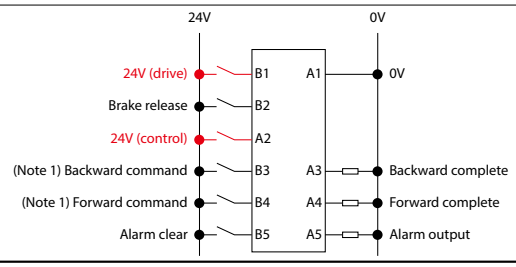
<Caution>
Operation cannot be performed using the single solenoid method when operating connected to RCON-EC.

## I/O (Input/Output) Specifications

| I/O | | Input | | Output | |
|---|---|---|---|---|---|
| Specifications | | Input voltage | 24VDC ±10% | Load voltage | 24VDC ±10% |
| | | Input current | 5mA per circuit | Maximum load current | 50mA/1 point |
| | | ON/OFF voltage | ON voltage: Min. 18VDC<br>OFF voltage: Max. 6VDC | Residual voltage | 2V or less |
| | | Leakage current | Max. 1mA/1 point | Leakage current | Max. 0.1mA/1 point |
| Isolation method | | Non-isolated from external circuit | | Non-isolated from external circuit | |
| I/O logic | NPN |  | |  | |
| | PNP |  | |  | |

(Note) Isolation method is non-isolated. When grounding an external device (such as a PLC) connected to ELECYLINDER, use the same ground as ELECYLINDER.

## I/O Signal Wiring Diagram

| I/O | | Standard specification | Split motor and controller power supply specification (TMD2) |
|---|---|---|---|
| Power / I/O connector | |  | Drive power and control power are separate for the TMD2 specification.<br>  |
| I/O logic | NPN |  |  |
| | PNP |  |  |

(Note 1) Switching to the single solenoid method will change B3 to "forward/backward command" and B4 to "unused."

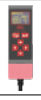
## I/O Signal Table

| Power · I/O connector pin assignment | | | |
|---|---|---|---|
| Pin No. | Connector nameplate name | Signal abbreviation | Function overview |
| B3 (Note 1) | Backward | ST0 | Backward command |
| B4 (Note 1) | Forward | ST1 | Forward command |
| B5 | Alarm clear | RES | Alarm clear |
| A3 | Backward complete | LS0/PE0 | Backward complete/push complete |
| A4 | Forward complete | LS1/PE1 | Forward complete/push complete |
| A5 | Alarm | *ALM | Alarm detection (b-contact) |
| B2 | Brake release | BKRLS | Brake forced release (for brake equipped specification) |
| B1 (Note 2) | 24V | 24V | 24V input |
| A1 | 0V | 0V | 0V input |
| A2 (Note 2) | (24V) | (24V) | 24V input |

(Note 1) Switching to the single solenoid method will change B3 to "forward/backward" and B4 to "unused." However, the power · I/O connector display will still read "B3: Backward" and "B4: Forward."
(Note 2) B1 is 24V (drive) and A2 is 24V (control) for the split motor and controller power supply specification (TMD2).

## Options

### Teaching pendant *For detailed specifications, please contact IAI.

| Name | Model | Image |
|---|---|---|
| Wireless Teaching Controller | TBD-1WL-□ |  |
| Wired Teaching Controller | TBD-1 |  |
| Wireless/wired touch panel teaching pendant | TB-03-□ |  |
| Wired/wireless touch panel teaching pendant with power supply unit | TB-03E-□ |  |

### PC teaching software *For detailed specifications, please contact IAI.

| Specification | Model | Image |
|---|---|---|
| Software only (no connection cable)<br>* Please purchase through your distributor and a download link will be sent to your valid email address. | IA-OS |  |
| With external device communication cable + USB conversion adapter + USB cable<br>* Please purchase through your distributor and a download link will be sent to your valid email address. | IA-OS-C |  |

### 24V power supply *For detailed specifications, please contact IAI.

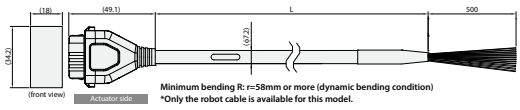
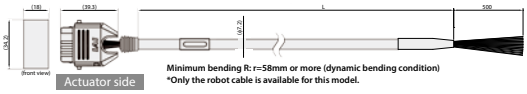
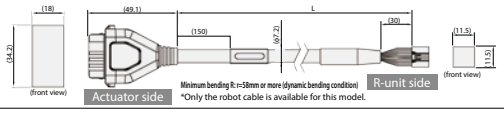
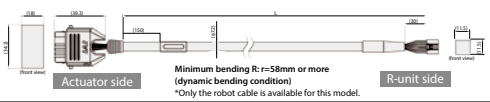
| Specification | Model | Image |
|---|---|---|
| Without fan | PSA-24 |  |
| With fan | PSA-24L | |

#### Power capacity calculation "Calculator" software

The calculator software is included in the IA-OS software.
Just input the model number of the ELECYLINDER to be connected to confirm sufficient units for 24V power.

## Maintenance Parts (Cables)

**When placing an order for a replacement cable after purchasing a product, please use the model name shown below.**

| Type | Model | External view |
|---|---|---|
| Power · I/O cable<br>(user-wired specification) | CB-EC-PWBIO□□□-RB |  |
| Power · I/O cable<br>(user-wired specification, four-way connector) | CB-EC2-PWBIO□□□-RB |  |
| Power · I/O cable<br>(RCON-EC connection specification) | CB-REC-PWBIO□□□-RB |  |
| Power · I/O cable<br>(RCON-EC connection specification, four-way connector) | CB-REC2-PWBIO□□□-RB |  |

*For assembly of the four-way connector, please contact IAI.

*Please indicate the cable length (L) in □□□, e.g. 050 = 5m

Catalog No. CE0410-1A (2024APR)

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