

Simple-to-use ELECYLINDER with In-line Controller
Micro Cylinder Rod & Table Type

Simple-to-use ELECYLINDER with In-line Controller
Micro Cylinder Vertical & Flat 2-Finger Gripper Type

EC R1/T2
EC GRB/GRC4



Micro Cylinder

ELECYLINDER

New Look

Smallest in the industry!

Micro Cylinder



High thrust

High quality

High precision

Built-in motor encoder

Rolled ball screw mounted

Ø2.5



Diameter
40% smaller
than 1-cent coin

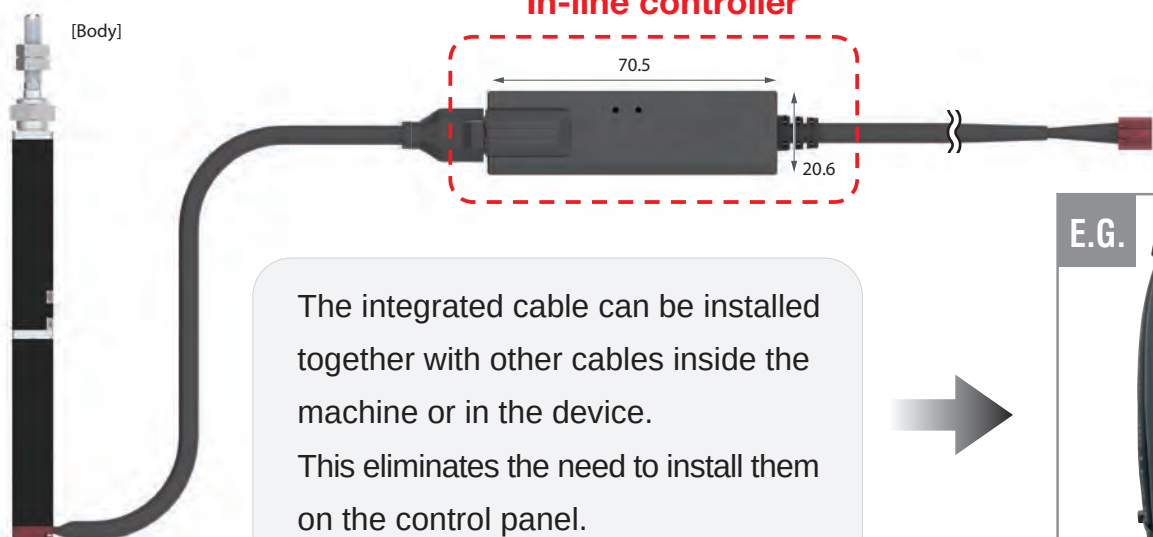


Actual
size

1cm x 1cm

Further

Space-saving with ultra-compact controller



E.G.



Higher spec. compared to conventional models

Rod Type

Running life 20 million cycles



NEW >>>

Vertical
payload

4-fold



Table Type

Maximum thrust 25N



NEW >>>

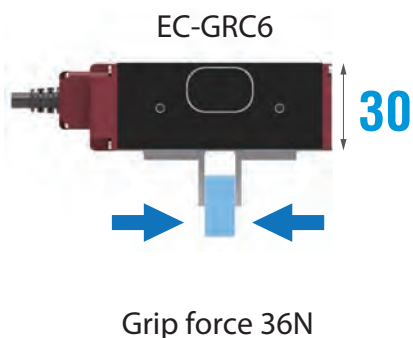
Volume
ratio

1/3



Gripper Type

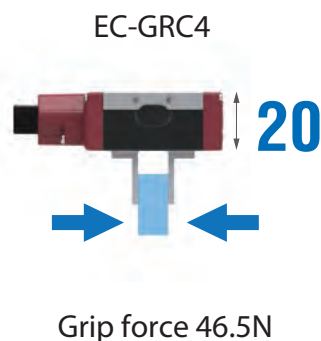
Maximum grip force 46.5N



NEW >>>

Height

2/3



Model Specification Items

EC — **Type** — **Ball screw lead** — **Motor mounting method** — **Stroke** — **Actuator cable length** — **Power · I/O cable length** — **Options**

Type

R1	Rod type Body width 10mm
T2	Table type Table width 27.5mm
GRB4	Vertical gripper Height 40mm
GRC4	Flat gripper Body width 40mm

Ball screw lead

<R1 / T2>

L	Lead 0.5mm (lead screw)
M	Lead 1mm
H	Lead 2mm

<GRB4 / GRC4>

M	Lead 0.75mm (lead screw)
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Motor mounting method

Blank	Straight motor specification
R *	Side-mounted motor specification

* Only selectable for rod type

Stroke

10 / 20 / 30 * (R1)	10mm / 20mm / 30mm
20 / 30 / 40 / 50 (T2)	20mm / 30mm / 40mm / 50mm
8 / 16 / 32 (GRB4/GRC4)	8mm / 16mm / 32mm

* For the side-mounted motor specification, only 30mm can be selected.

Actuator cable length

0	No cable
1~9	1m ~ 9m

(Every 1m)
(Note) When connecting via the interface box, 8m is the maximum.
When selecting an actuator pigtail cable length of 2m (AC2), 7m is the maximum.

Power · I/O cable length

0	No cable Power-I/O connector included *
(S)1	1m
(S)9	9m

(Every 1m)
(S): Cable with 4-way connector
* When selecting RCON-EC connection specification (ACR), select "0."
Power-I/O cable and power-I/O connector are not included.
(Note) Make sure that the total length along with the actuator cable, the in-line controller cable and the actuator pigtail cable is 10.4m or less.

Options

Blank	Incremental encoder specif., NPN specif. (connection via interface box), no option	NCC	No in-line controller *2
AC05	Actuator pigtail cable length 0.5m	NM	Non-motor end specification
AC1	Actuator pigtail cable length 1.0m	PN	PNP specification (connection via interface box) *1
AC2	Actuator pigtail cable length 2.0m	TMD2	2-circuit power supply specification (connection via interface box) *1
ACR	RCON-EC connection specification *1	WL	Wireless communication specification (connection via interface box) *3
MF	3 position mode specification	WL2	Wireless axis operation specification (connection via interface box) *3

*1 If "ACR" is selected, "PN" and "TMD2" options cannot be selected.
(I/O for the "ACR" option is NPN only; compatible with 2-circuit power supply as standard)
*2 Other options cannot be selected at the same time.
*3 Selectable when RCON-EC connection specification "ACR" has not been selected.
(For wireless communication purchase interface box and cable separately)

Specification Tables

Rod

Type		Lead		Stroke (mm) and max. speed (mm/s)			Max. push force (N)	Max. payload (kg)		Reference Page
		Model	mm	* Length of band = Stroke * Numbers in band = Max. speed by stroke						
				10	20	30				
Rod	R1	H-	2	195	275	300	4.2	1	0.4	P.9
		M-	1	139	148	150	8.5	2	0.8	
		L-	0.5	75			10	1.5	0.6	
	R1□R	H-	2			164	6.2	1.5	0.6	P.13
		M-	1			82	12.5	3	1.2	
		L-	0.5			41	14.5	2.5	0.9	

Table

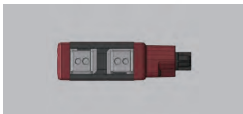
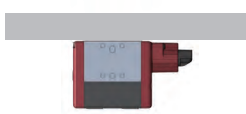
Type		Lead		Stroke (mm) and max. speed (mm/s)				Max. push force (N)	Max. payload (kg)		Reference Page
		Model	mm	* Length of band = Stroke * Numbers in band = Max. speed by stroke							
				20	30	40	50				
Table	T2	H-	2	97				10.7	1.8	0.8	P.17
		M-	1	48				21.5	3.5	1.5	
		L-	0.5	24				25	3	1.4	

Gripper

Type		Lead		Stroke (mm) and max. speed (mm/s)			Max. grip force (both sides) N	Reference Page
		Model	mm	* Length of band = Stroke * Numbers in band = Max. speed by stroke				
				8	16	32		
Vertical gripper	GRB4	M-	0.75	13			46.5	P.21
Flat gripper	GRC4	M-	0.75	13			46.5	P.25

Mounting Orientation

Actuator mounting orientation

Series	Type	Mounting orientation			
		Horizontal table mount	Vertical mount	Horizontal side mount	Horizontal ceiling mount
EC	R1				
	R1□R				
	T2				
	GRB4/GRC4				

Item	Type		
	R1/R1□R	T2	GRB4/GRC4
Flatness required for body installation surface/workpiece mounting surface	0.05mm/m or below (*)		
Coaxiality required for tip bracket mounting hole and body mounting hole	ø0.05mm or less (*)	—	—
Parallelism required for guide bracket and body mounting surface or plate	0.02mm or less (*)	—	—

(Note) When values above are not followed, the sliding resistance will increase and may cause a malfunction.

(*) Refer to "Precautions on Mounting" for details.

Precautions on Mounting (R1/R1□R type only)

A detent is built inside the main unit. Do not apply an external force (radial load, torque load) to the body.

If an external force is applied, an external guide must be used together.

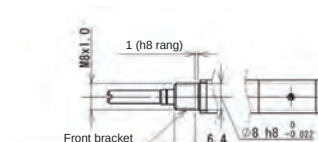
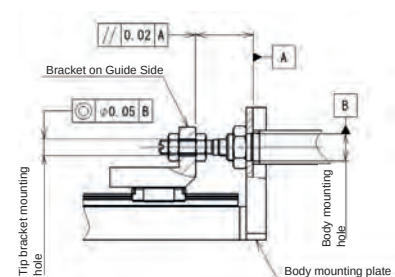
[Notes on use with external guides]

When using an external guide, parallel misalignment (in the horizontal and vertical planes) between the actuator and the external guide could result in a malfunction, premature wear, or premature damage to the actuator.

When mounting a guide, align the center of the actuator parallel to the guide. Following adjustment, make sure that the sliding resistance is constant over the entire stroke.

Sliding resistance can be confirmed by checking that the value for current shown by the electrical current monitor function on the controller is at the specified value.

A fitting section is provided at the base of the front bracket mounting screw (M8 × 1.0). Use it for positioning the actuator.

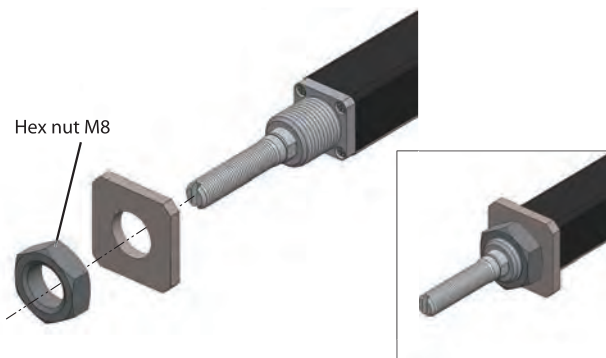


Mounting Method

Mount according to the mounting method for the applicable type.

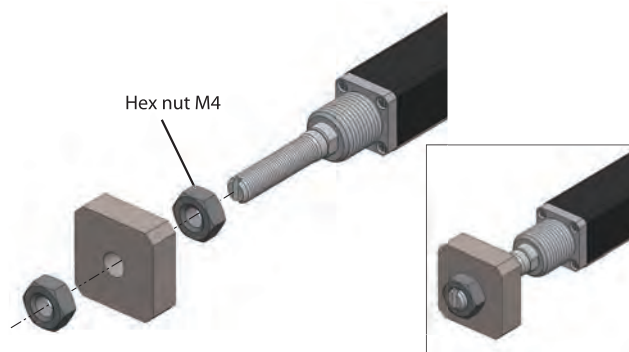
Rod type (R1/R1□R)

● Body mounting



Dimensions of male thread	Tightening torque
M8 × 1.0 Effective thread length 6.4mm	2.6N·m

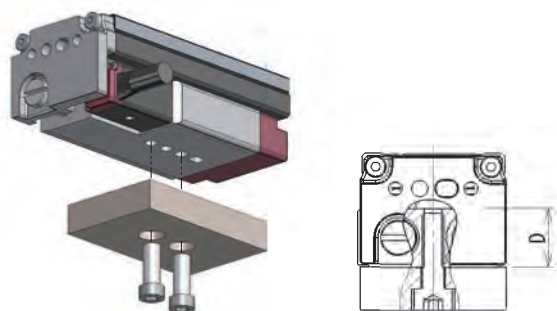
● Attachment of transported object



Dimensions of male thread	Tightening torque
M4 × 0.7 Effective thread length 15mm	2.0N·m

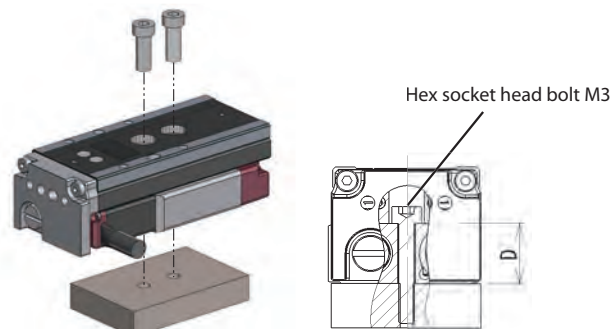
Table type (T2)

● Body mounting (when using body frame bottom mounting holes)



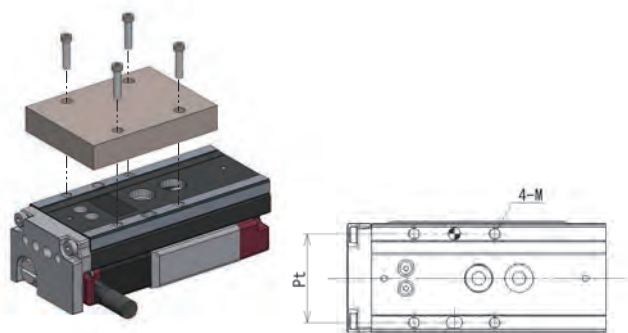
Screw holes	D (mm)
M4	10.8

(when holding frame from top)



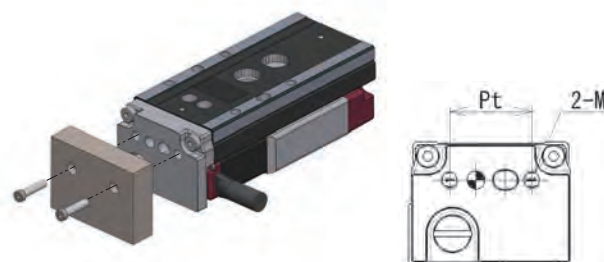
Screw holes	D (mm)
Hole diameter 3.3 (M4 threaded through hole) Hex socket head bolt M3	10.8

● Mounting on the table



Pt (mm)	M (mm)
22	M3 depth 3

● Mounting on the front plate



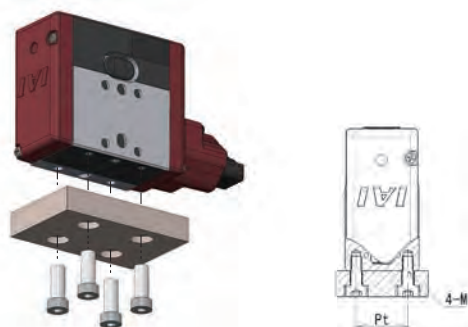
Pt (mm)	M (mm)
14	M3 depth 6

Mounting Method

Gripper type (GRB4/GRC4)

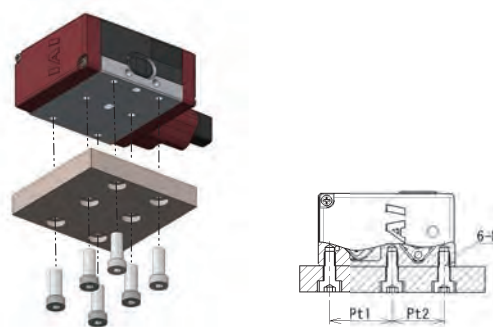
● Body mounting

(GRB4; when using body frame bottom mounting holes)



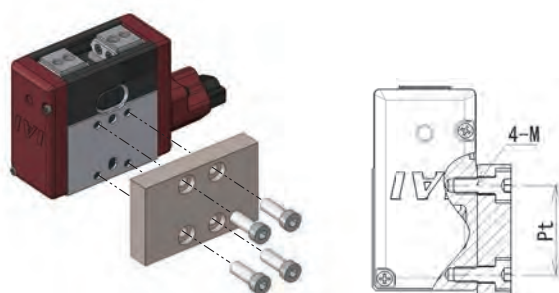
Pt (mm)	M (mm)
14	M3 depth 4

(GRC4; when using body frame bottom mounting holes)



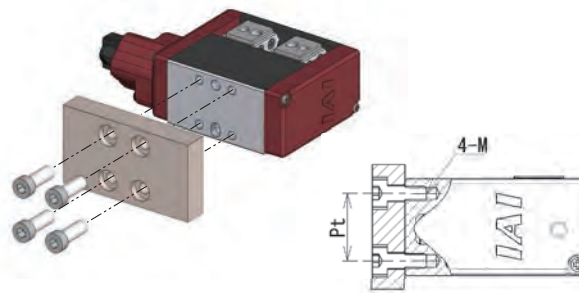
Pt1 (mm)	Pt2 (mm)	M (mm)
17	14	M3 depth 4

(GRB4; when using body frame side mounting holes)



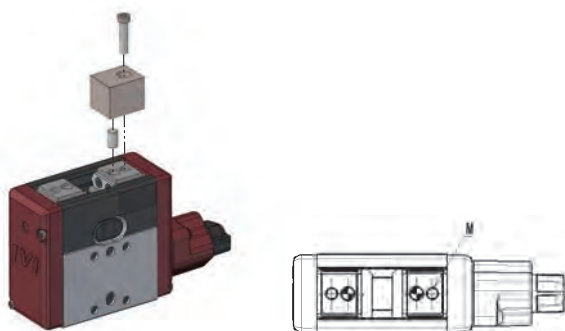
Pt (mm)	M (mm)
17	M3 depth 4.5

(GRC4; when using body frame side mounting holes)



Pt (mm)	M (mm)
13.5	M3 depth 4

● Finger attachment mounting



M (mm)
M3 depth 4

* For details regarding the position and dimensions, see "Dimensions" on P. 19/20.

When mounting a jig on the finger section, it is recommended to position it at two points, the locating pin and the side surface of the finger, to improve mounting accuracy and repeatability.

Selection process

Step 1

Check the required grip force and allowable workpiece mass



Step 2

Check the gripping point distance



Step 3

Check external force applied to fingers

Step 1 Check the required grip force and allowable workpiece mass

When gripping the workpiece with frictional grip force, calculate the required grip force as follows.

(1) For normal transfer

F: Grip force (N): Total value of each finger's push force
m: Workpiece mass (kg)
μ: Static friction coefficient between finger attachment and workpiece
g: Gravitational acceleration (= 9.8m/s²)
W: Weight [N] = mg

- Conditions under which workpiece will not fall when gripped statically

$$F\mu > mg \quad F > \frac{mg}{\mu}$$

- In case of the safety factor of 2, the required grip force for transfer is

$$F > \frac{mg}{\mu} \times 2 \text{ (safety factor)}$$

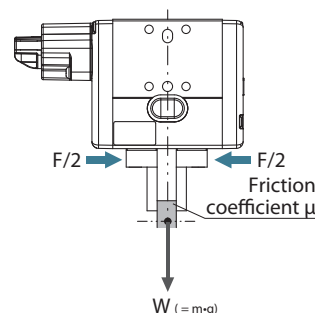
* A typical safety factor is 2 - 5 (guideline)

- At friction coefficient μ 0.1 to 0.2

$$F > \frac{mg}{0.1 \sim 0.2} \times 2 = (10 \sim 20) \times mg$$

For normal workpiece transfer (guideline)

Required grip force **F** ▶ At least 10 to 20x the workpiece mass (**W**)
 Max. allowable mass **W** ▶ At most 1/10 to 1/20 the grip force



(2) When high acceleration/deceleration or impact force is applied during transfer of the workpiece

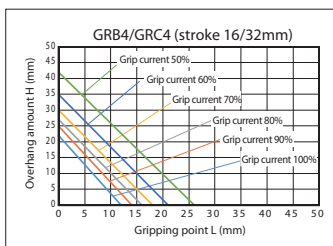
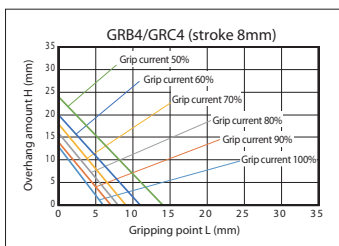
In addition to gravity, even stronger inertial force is applied to the workpiece

In such cases, select a model with an even higher safety factor (guideline: 5 to 10).

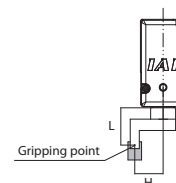
Step 2 Check the gripping point distance

The distance (L, H) from the finger attachment surface to the gripping point should be within the range shown in the graph of "Check of gripping point distance" on each product specification page.

Attempting to use the gripper outside of the limited range will cause excessive moments on the sliding part of the finger and internal mechanisms, which will decrease operation life.



<Distance to gripping point>



Even with the gripping point distance within the limit range, keep the finger attachments as small and lightweight as possible.

A longer or heavier finger may cause performance deterioration or damage the internal guides due to inertial force and bending moment during opening and closing.

Step 3 Check external force applied to fingers

(1) Allowable vertical load

Check that the vertical load applied to each finger does not exceed the allowable value.

(2) Allowable load moment

Calculate M_a and M_c with L and M_b with H . Check that the moment applied to each finger does not exceed the maximum allowable load moment.

- Allowable external force with moment load applied to each finger

$$\text{Allowable vertical load } F \text{ (N)} > \frac{\text{Maximum allowable load moment (N}\cdot\text{m)}}{L \text{ or } H \text{ (mm)} \times 10^{-3}}$$

Calculate the allowable vertical load F (N) for both L and H .

Check that the external force applied to the finger does not exceed the calculated allowable vertical load F (N) (the smaller value of L and H).

Model	Stroke (mm)	Allowable vertical load F (N)	Maximum allowable load moment (N·m)		
			M_a	M_b	M_c
EC-GRB4	8	63	0.218	0.312	1.130
EC-GRC4	16/32	84	0.368	0.525	1.510

1. The allowable value above is a static value. 2. Indicates the allowable value for one finger.

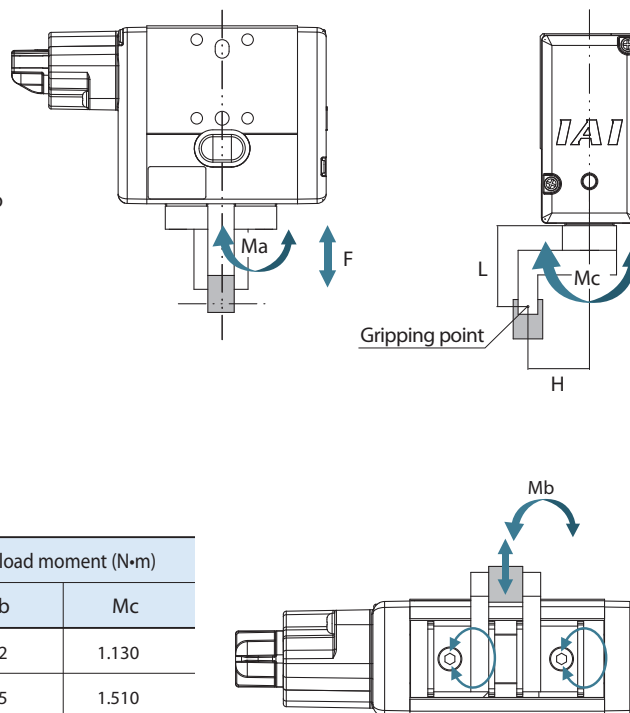
*When calculating the external force, please make sure to take into consideration all of the causes of force on the fingers, including: finger weight, workpiece weight, inertial forces due to acceleration/deceleration while in motion, and centrifugal forces if the gripper is being rotated.

*The load point above indicates the position where the load is applied to the finger.

The position varies depending on the load type.

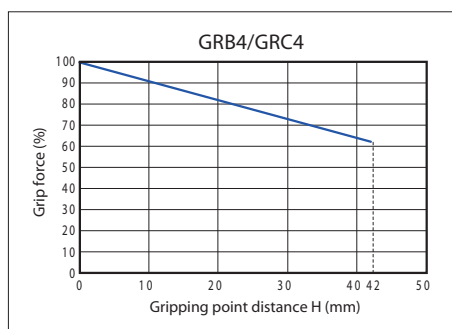
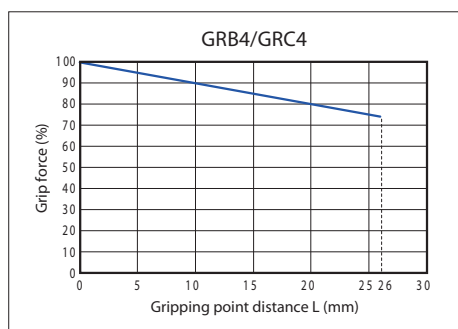
- Load due to grip force: Gripping point
- Load due to gravity: Center of mass
- Inertial force when moving or centrifugal force when rotating: Center of mass

Load moment is the total value calculated for each load type.



Guidelines for Gripping Point Distance and Grip Force

1. Graphs show grip force of gripping point distance when maximum grip force is set to 100%.
2. Gripping point distance indicates to the distance (L or H) from the finger attachment mounting surface to the gripping point.
3. Grip force may vary due to individual differences. Consider this as a guideline.

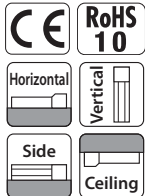


EC-R1



Model Specification Items

EC	R1					
Series	Type	Lead	Stroke	Actuator cable length	Power / I/O cable length	Options
		H 2mm	10 10mm	See actuator cable length below	See power / I/O cable length below	See options below
		M 1mm	20 20mm			
		L 0.5mm	30 30mm			



- (1) An in-line controller is required to operate. If the option (NCC) is not selected, an in-line controller is included. See page 26 for more information of in-line controller.
- (2) The maximum speed changes with the stroke. Please check the maximum speed of the desired stroke in "Table of Stroke and Maximum Speed".
- (3) Ball screw specification falls when servo is turned off during vertical installation. If you need to hold the stop position, choose a sliding screw specification with a self-lock.
- (4) The value of the horizontal payload assumes that there is an external guide. Do not apply external force to the rod in a direction other than the moving direction.
- (5) If performing push-motion operations, refer to the "Correlation between Push Force and Current Limit" diagram. The push forces listed are only reference values. Please refer to page 29 for details.
- (6) Pay close attention to the installation orientation. Please refer to P. 4 for details.
- (7) There are three connection methods for connecting EC and PLC. Please refer to page 28 for details.
- (8) For connecting to the e-wiring system please refer to page 33.

Actuator Cable Length

Cable code	Cable length
1 ~ 3	1 ~ 3m
4 ~ 5	4 ~ 5m
6 ~ 9	6 ~ 9m (Note 1)

- (Note 1) When connecting via interface box 2, the maximum length of 8m is selected. When selecting the AC2 option (pigtail cable length of 2m), 7m is the maximum.
- (Note) Make sure that the total length along with the power / I/O cable is 9m or less. When selecting the AC2 option, 8m is the maximum.
- (Note) Robot cable is standard.

Power / I/O Cable Length

Standard Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
0	Without cable	Terminal block supplied (Note 1)
1 ~ 3	1 ~ 3m	CB-EC-PWBIO□□□-RB supplied
4 ~ 5	4 ~ 5m	
6 ~ 7	6 ~ 7m	
8 ~ 9	8 ~ 9m	

- (Note 1) Only terminal block connector is included. When selecting RCON-EC connection specification (ACR) as an option, select "0". Terminal block connector is not included. For details please refer to P. 33.
- (Note) Robot cable is standard.

4-way Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
S1 ~ S3	1 ~ 3m	CB-EC2-PWBIO□□□-RB supplied
S4 ~ S5	4 ~ 5m	
S6 ~ S7	6 ~ 7m	
S8 ~ S9	8 ~ 9m	

- (Note) Robot cable is standard.

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

Name	Option code	Reference page
Actuator pigtail cable length: 0.5m	AC05	25
Actuator pigtail cable length: 1m	AC1	25
Actuator pigtail cable length: 2m	AC2	25
RCON-EC connection specification (Note 1) (Note 3)	ACR	25
3 position mode specification	MF	25
No in-line controller (Note 2)	NCC	25
Non-motor end specification	NM	25
PNP specification (Note 1)	PN	25
Split motor and controller power supply spec. (Note 1)	TMD2	25
Wireless communication specification (Note 3)	WL	25
Wireless axis operation specification (Note 3)	WL2	25

- (Note 1) 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 2 and conversion cable are not included.
- (Note 2) Only the option of actuator pigtail cable length (AC05, AC1, AC2) can be selected simultaneously.
- (Note 3) 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 2, conversion cable, and power / I/O cable. For details please refer to P 28. Please contact our sales department for the wireless axis operation specification (WL2).

Separately Sold Options

Name	Model	Reference page
RCON-EC connection specification power / I/O cable (standard connector cable)	CB-REC-PWBIO□□□-RB	37
RCON-EC connection specification power / I/O cable (4-way connector cable)	CB-REC2-PWBIO□□□-RB	37
RCON-EC connection spec. interface box 2 for split motor and controller power supply (wireless specification)	ECW-CVNW-L-CB-ACR	26

- (Note) The power / I/O cable is a robot cable. Please indicate the cable length in □□□. (Ex.: 010 = 1m)

Main Specifications

		Item	Description		
Lead	Horizontal	Thread lead (mm)	2	1	0.5
		Max. payload (kg)	1	2	1.5
		Max. speed (mm/s)	300	150	75
		Min. speed (mm/s)	3	2	1
		Rated acceleration/deceleration (G)	0.5	0.3	0.1
Vertical	Speed/acceleration/deceleration	Max. acceleration/deceleration (G)	0.5	0.3	0.1
		Max. payload (kg)	0.4	0.8	0.6
		Max. speed (mm/s)	300	150	75
		Min. speed (mm/s)	3	2	1
		Rated acceleration/deceleration (G)	0.5	0.3	0.1
Push	Stroke	Max. acceleration/deceleration (G)	0.5	0.3	0.1
		Max. push force (N)	4.2	8.5	10.0
		Max. push speed (mm/s)	10	10	5
Stroke	Stroke	Min. stroke (mm)	10	10	10
		Max. stroke (mm)	30	30	30
		Stroke pitch (mm)	10	10	10

	Item	Description
Ball screw specification	Driving system	Ball screw, ø2.5mm, rolled C10
	Positioning repeatability	±0.02mm
	Lost motion	0.1mm or less
	Service life (Note)	20 million cycles (horizontal and vertical)
Lead screw specification	Driving system	Lead screw, ø2.5mm
	Positioning repeatability	±0.05mm
	Lost motion	0.15mm or less
	Service life (Note)	10 million cycles horizontal, 5 million cyles vertical
Operating temperature, humidity		0 ~ 40°C, 85%RH or less (non-condensing)
Degree of protection		IP20
Vibration & shock resistance		4.9m/s ²
Overseas standards		CE marking, RoHS directive
Motor type		Brushless DC motor (ø9.2) (Power capacity: max. 1.1A)
Encoder type		Incremental
Number of encoder pulses		800 pulse/rev
—		—

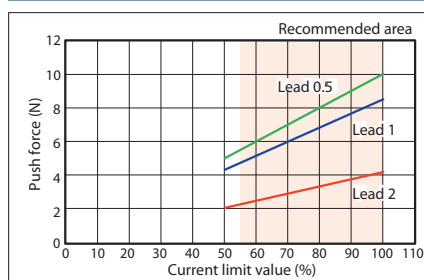
(Note) Operation life varies according to operating and mounting conditions.

Stroke and Maximum Speed

Lead (mm)	10 (mm)	20 (mm)	30 (mm)
2	195	275	300
1	139	148	150
0.5		75	

(Unit: mm/s)

Correlation between Push Force and Current Limit



Dimensions

CAD drawings can be downloaded from our website.
www.elecylinder.de

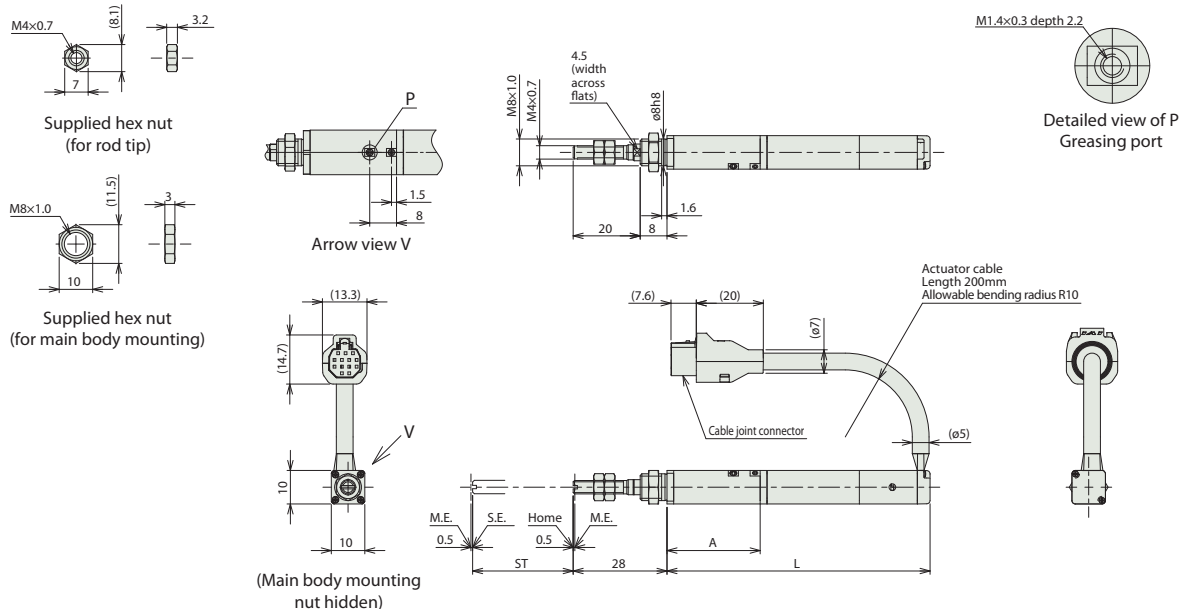


(Note) When returning to the home position, the rod will move to the M.E. Be careful of interference with surrounding objects.

(Note) The orientation of the parallel flats cannot be changed.

(Note) Fix the cable so that its base does not move.

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



Dimensions by stroke

Stroke	10	20	30
L	78.5	88.5	98.5
A	27.8	37.8	47.8

Mass by stroke

Stroke	10	20	30
Mass (g)			
Ball screw specification	38	40	43
Lead screw specification	36	38	41

Applicable controllers

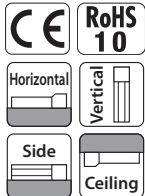
(Note) EC Series products are equipped with a built-in controller. Please refer to P. 31 for details on built-in controllers.

EC-R1□R



Model Specification Items

EC	R1		R	30			
Series	Type	Lead	Specifications	Stroke	Actuator cable length	Power / I/O cable length	Options
		H 2mm	R Side-mounted motor	30 30mm	See actuator cable length below	See power / I/O cable length below	See options below
		M 1mm					
		L 0.5mm					



- (1) An in-line controller is required to operate. If the option (NCC) is not selected, an in-line controller is included. See page 26 for more information of in-line controller.
- (2) Ball screw specification falls when servo is turned off during vertical installation. If you need to hold the stop position, choose a sliding screw specification with a self-lock.
- (3) The value of the horizontal payload assumes that there is an external guide. Do not apply external force to the rod in a direction other than the moving direction.
- (4) If performing push-motion operations, refer to the "Correlation between Push Force and Current Limit" diagram. The push forces listed are only reference values. Please refer to page 29 for details.
- (5) Pay close attention to the installation orientation. Please refer to P. 4 for details.
- (6) There are three connection methods for connecting EC and PLC. Please refer to page 28 for details.
- (7) For connecting to the e-wiring system please refer to page 33.

Actuator Cable Length

Cable code	Cable length
1 ~ 3	1 ~ 3m
4 ~ 5	4 ~ 5m
6 ~ 9	6 ~ 9m (Note 1)

- (Note 1) When connecting via interface box 2, the maximum length of 8m is selected. When selecting the AC2 option (pigtail cable length of 2m), 7m is the maximum.
- (Note) Make sure that the total length along with the power / I/O cable is 9m or less. When selecting the AC2 option, 8m is the maximum.
- (Note) Robot cable is standard.

Power / I/O Cable Length

Standard Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
0	Without cable	Terminal block supplied (Note 1)
1 ~ 3	1 ~ 3m	CB-EC-PWBIO□□□-RB supplied
4 ~ 5	4 ~ 5m	
6 ~ 7	6 ~ 7m	
8 ~ 9	8 ~ 9m	

- (Note 1) Only terminal block connector is included. When selecting RCON-EC connection specification (ACR) as an option, select "0". Terminal block connector is not included. For details please refer to P. 33.
- (Note) Robot cable is standard.

4-way Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
S1 ~ S3	1 ~ 3m	CB-EC2-PWBIO□□□-RB supplied
S4 ~ S5	4 ~ 5m	
S6 ~ S7	6 ~ 7m	
S8 ~ S9	8 ~ 9m	

- (Note) Robot cable is standard.

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

Name	Option code	Reference page
Actuator pigtail cable length: 0.5m	AC05	25
Actuator pigtail cable length: 1m	AC1	25
Actuator pigtail cable length: 2m	AC2	25
RCON-EC connection specification (Note 1) (Note 3)	ACR	25
3 position mode specification	MF	25
No in-line controller (Note 2)	NCC	25
Non-motor end specification	NM	25
PNP specification (Note 1)	PN	25
Split motor and controller power supply spec. (Note 1)	TMD2	25
Wireless communication specification (Note 3)	WL	25
Wireless axis operation specification (Note 3)	WL2	25

- (Note 1) 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 2 and conversion cable are not included.
- (Note 2) Only the option of actuator pigtail cable length (AC05, AC1, AC2) can be selected simultaneously.
- (Note 3) 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 2, conversion cable, and power / I/O cable. For details please refer to P. 28. Please contact our sales department for the wireless axis operation specification (WL2).

Separately Sold Options

Name	Model	Reference page
RCON-EC connection specification power / I/O cable (standard connector cable)	CB-REC-PWBIO□□□-RB	37
RCON-EC connection specification power / I/O cable (4-way connector cable)	CB-REC2-PWBIO□□□-RB	37
RCON-EC connection spec. interface box 2 for split motor and controller power supply (wireless specification)	ECW-CVNW-L-CB-ACR	26

- (Note) The power / I/O cable is a robot cable. Please indicate the cable length in □□□. (Ex.: 010 = 1m)

Main Specifications

		Item	Description		
Lead		Thread lead (mm)	2	1	0.5
		Gear reduction ratio	1.83	1.83	1.83
Horizontal	Payload	Max. payload (kg)	1.5	3	2.5
		Max. speed (mm/s)	164	82	41
	Speed/acceleration/deceleration	Min. speed (mm/s)	2	1	1
		Rated acceleration/deceleration (G)	0.3	0.1	0.1
		Max. acceleration/deceleration (G)	0.3	0.1	0.1
Vertical	Payload	Max. payload (kg)	0.6	1.2	0.9
		Max. speed (mm/s)	164	82	41
	Speed/acceleration/deceleration	Min. speed (mm/s)	2	1	1
		Rated acceleration/deceleration (G)	0.3	0.1	0.1
		Max. acceleration/deceleration (G)	0.3	0.1	0.1
Push		Max. push force (N)	6.2	12.5	14.5
		Max. push speed (mm/s)	10	10	5
Stroke (mm)			30	30	30

	Item	Description
Ball screw specification	Driving system	Ball screw, ø2.5mm, rolled C10
	Positioning repeatability	±0.02mm
	Lost motion	0.1mm or less
	Service life (Note)	20 million cycles (horizontal and vertical)
Lead screw specification	Driving system	Lead screw, ø2.5mm
	Positioning repeatability	±0.05mm
	Lost motion	0.15mm or less
	Service life (Note)	10 million cycles horizontal, 5 million cycles vertical
Operating temperature, humidity		0 ~ 40°C, 85%RH or less (non-condensing)
Degree of protection		IP20
Vibration & shock resistance		4.9m/s ²
Overseas standards		CE marking, RoHS directive
Motor type		Brushless DC motor (ø9.2) (Power capacity: max. 1.1A)
Encoder type		Incremental
Number of encoder pulses		800 pulse/rev
—		—

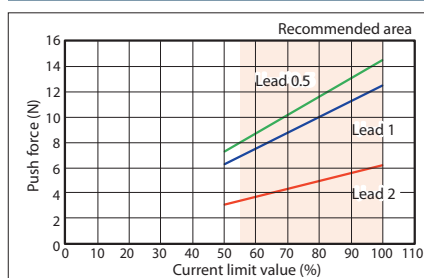
(Note) Operation life varies according to operating and mounting conditions.

Stroke and Maximum Speed

Lead (mm)	Reduction ratio	30 (mm)
2	1.83	164
1	1.83	82
0.5	1.83	41

(Unit: mm/s)

Correlation between Push Force and Current Limit



Dimensions

CAD drawings can be downloaded from our website.

www.elecylinder.de

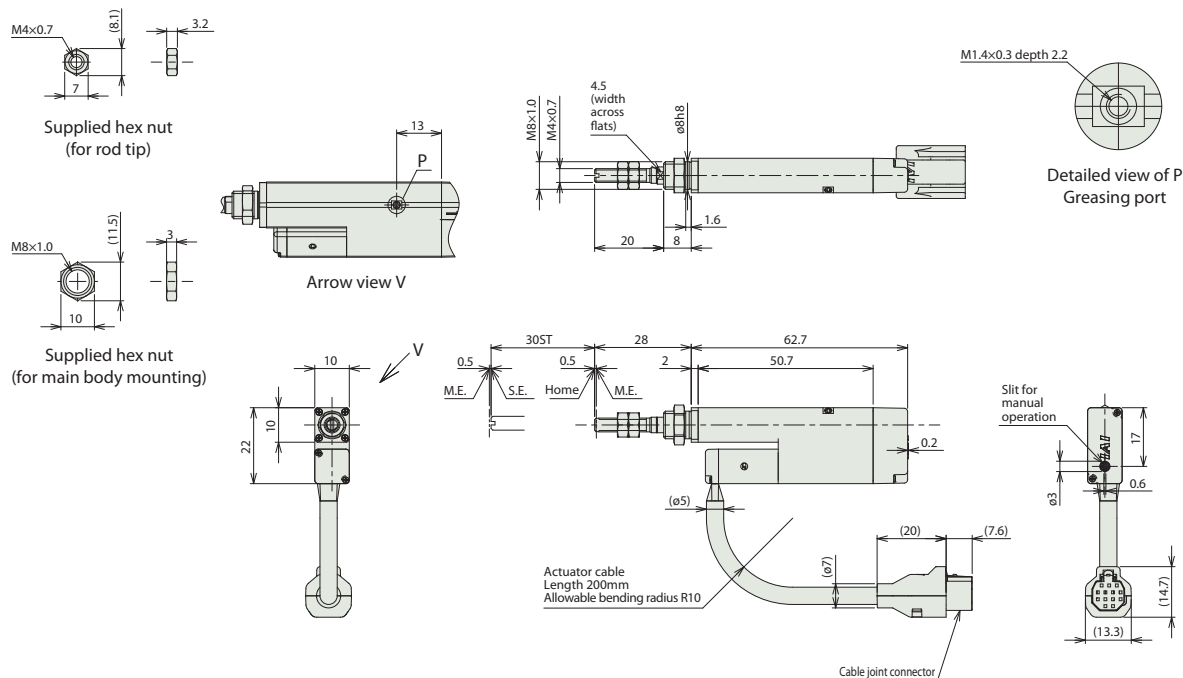


(Note) When returning to the home position, the rod will move to the M.E. Be careful of interference with surrounding objects.

(Note) The orientation of the parallel flats cannot be changed.

(Note) Fix the cable so that its base does not move.

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



■ **Mass by stroke**

Stroke		30
Mass (g)	Ball screw specification	50
	Lead screw specification	48

Applicable controllers

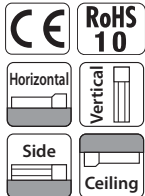
(Note) EC Series products are equipped with a built-in controller. Please refer to P. 31 for details on built-in controllers.

EC-T2



Model Specification Items

EC	T2					
Series	Type	Lead	Stroke	Actuator cable length	Power / I/O cable length	Options
		H 2mm	20 20mm	See actuator cable length below	See power / I/O cable length below	See options below
		M 1mm	30 30mm			
		L 0.5mm	40 40mm			
			50 50mm			



- (1) An in-line controller is required to operate. If the option (NCC) is not selected, an in-line controller is included. See page 26 for more information of in-line controller.
- (2) Ball screw specification falls when servo is turned off during vertical installation. If you need to hold the stop position, choose a sliding screw specification with a self-lock.
- (3) If performing push-motion operations, refer to the "Correlation between Push Force and Current Limit" diagram. The push forces listed are only reference values. Please refer to page 29 for details.
- (4) The reference values of the overhang load length are 50mm or less in the Ma/Mb/Mc directions. Please refer to P. 30 for details.
- (5) There are three connection methods for connecting EC and PLC. Please refer to page 28 for details.
- (6) For connecting to the e-wiring system please refer to page 33.

Actuator Cable Length

Cable code	Cable length
1 ~ 3	1 ~ 3m
4 ~ 5	4 ~ 5m
6 ~ 9	6 ~ 9m (Note 1)

- (Note 1) When connecting via interface box 2, the maximum length of 8m is selected. When selecting the AC2 option (pigtail cable length of 2m), 7m is the maximum.
- (Note) Make sure that the total length along with the power / I/O cable is 9m or less. When selecting the AC2 option, 8m is the maximum.
- (Note) Robot cable is standard.

Power / I/O Cable Length

Standard Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
0	Without cable	Terminal block supplied (Note 1)
1 ~ 3	1 ~ 3m	CB-EC-PWBIO□□□-RB supplied
4 ~ 5	4 ~ 5m	
6 ~ 7	6 ~ 7m	
8 ~ 9	8 ~ 9m	

- (Note 1) Only terminal block connector is included. When selecting RCON-EC connection specification (ACR) as an option, select "0". Terminal block connector is not included. For details please refer to P. 33.
- (Note) Robot cable is standard.

4-way Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
S1 ~ S3	1 ~ 3m	CB-EC2-PWBIO□□□-RB supplied
S4 ~ S5	4 ~ 5m	
S6 ~ S7	6 ~ 7m	
S8 ~ S9	8 ~ 9m	

- (Note) Robot cable is standard.

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

Name	Option code	Reference page
Actuator pigtail cable length: 0.5m	AC05	25
Actuator pigtail cable length: 1m	AC1	25
Actuator pigtail cable length: 2m	AC2	25
RCON-EC connection specification (Note 1) (Note 3)	ACR	25
3 position mode specification	MF	25
No in-line controller (Note 2)	NCC	25
Non-motor end specification	NM	25
PNP specification (Note 1)	PN	25
Split motor and controller power supply spec. (Note 1)	TMD2	25
Wireless communication specification (Note 3)	WL	25
Wireless axis operation specification (Note 3)	WL2	25

- (Note 1) 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 2 and conversion cable are not included.
- (Note 2) Only the option of actuator pigtail cable length (AC05, AC1, AC2) can be selected simultaneously.
- (Note 3) 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 2, conversion cable, and power / I/O cable. For details please refer to P. 28. Please contact our sales department for the wireless axis operation specification (WL2).

Separately Sold Options

Name	Model	Reference page
RCON-EC connection specification power / I/O cable (standard connector cable)	CB-REC-PWBIO□□□-RB	37
RCON-EC connection specification power / I/O cable (4-way connector cable)	CB-REC2-PWBIO□□□-RB	37
RCON-EC connection spec. interface box 2 for split motor and controller power supply (wireless specification)	ECW-CVNW-L-CB-ACR	26

- (Note) The power / I/O cable is a robot cable. Please indicate the cable length in □□□. (Ex.: 010 = 1m)

Main Specifications

		Item	Description		
Lead		Thread lead (mm)	2	1	0.5
		Gear reduction ratio	3.10	3.10	3.10
Horizontal	Payload	Max. payload (kg)	1.8	3.5	3
		Max. speed (mm/s)	97	48	24
	Speed/ acceleration/ deceleration	Min. speed (mm/s)	1	1	1
		Rated acceleration/deceleration (G)	0.1	0.1	0.1
		Max. acceleration/deceleration (G)	0.1	0.1	0.1
		Max. acceleration/deceleration (G)	0.1	0.1	0.1
Vertical	Payload	Max. payload (kg)	0.8	1.5	1.4
		Max. speed (mm/s)	97	48	24
	Speed/ acceleration/ deceleration	Min. speed (mm/s)	1	1	1
		Rated acceleration/deceleration (G)	0.1	0.1	0.1
		Max. acceleration/deceleration (G)	0.1	0.1	0.1
		Max. acceleration/deceleration (G)	0.1	0.1	0.1
Push		Max. push force (N)	10.7	21.5	25.0
		Max. push speed (mm/s)	10	10	5
		Min. stroke (mm)	20	20	20
Stroke (mm)		Max. stroke (mm)	50	50	50
		Stroke pitch (mm)	10	10	10

	Item	Description
Ball screw specification	Driving system	Ball screw, ø2.5mm, rolled C10
	Positioning repeatability	±0.02mm
	Lost motion	0.1mm or less
	Service life (Note 1)	20 million cycles (horizontal and vertical)
Lead screw specification	Driving system	Lead screw, ø2.5mm
	Positioning repeatability	±0.05mm
	Lost motion	0.15mm or less
	Service life (Note 1)	10 million cycles horizontal, 5 million cycles vertical
Linear guide		Linear motion infinite circulating type
Static allowable moment		Ma: 1.81 N·m
		Mb: 2.58 N·m
		Mc: 4.34 N·m
Dynamic allowable moment (Note 2)		Ma: 0.691 N·m
		Mb: 0.987 N·m
		Mc: 1.66 N·m
Operating temperature, humidity		0 ~ 40°C, 85%RH or less (non-condensing)
Degree of protection		IP20
Vibration & shock resistance		4.9m/s ²
Overseas standards		CE marking, RoHS directive
Motor type		Brushless DC motor (ø9.2) (Power capacity: max. 1.1A)
Encoder type		Incremental
Number of encoder pulses		800 pulse/rev

(Note 1) Operation life varies according to operating and mounting conditions.

(Note 2) Based on the standard rated operation life of 2000km. Operation life varies according to operating and mounting conditions. Please refer to EC Catalog V10 P. 33 for details on service life.

Table type moment direction

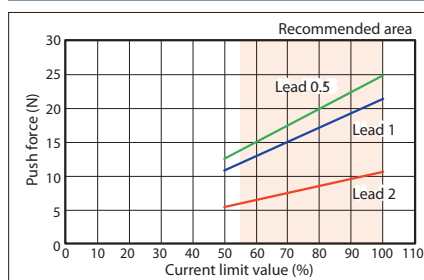


Stroke and Maximum Speed

Lead (mm)	Reduction ratio	20 (mm)	30 (mm)	40 (mm)	50 (mm)
2	3.10	97			
1	3.10	48			
0.5	3.10	24			

(Unit: mm/s)

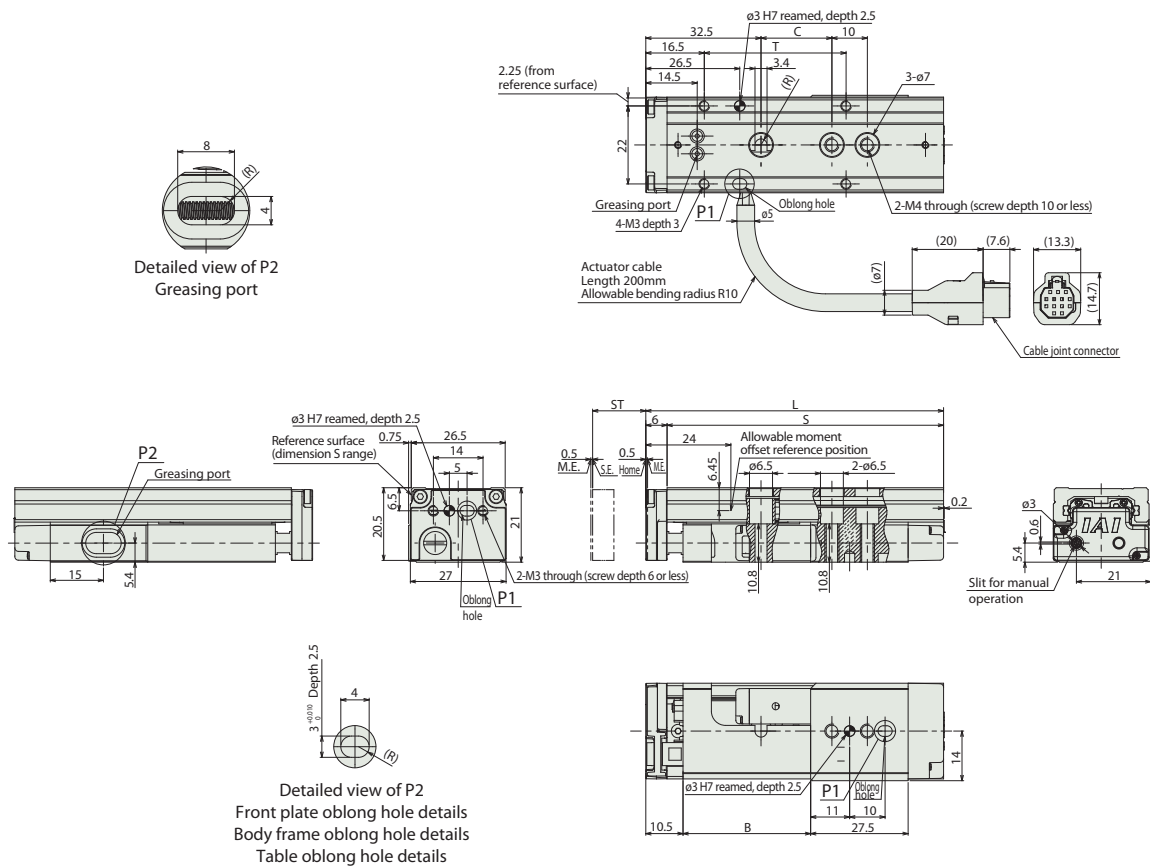
Correlation between Push Force and Current Limit



■ 40 stroke, 50 stroke

(Note) When returning to the home position, the table will move to the M.E. Be careful of interference with surrounding objects.
(Note) Fix the cable so that its base does not move.

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



■ Dimensions by stroke

Stroke	20	30	40	50
L	64	74	84	94
B	43.5	53.5	36	46
C	32.5	42.5	20	30
T	20	30	40	50
S	58	68	78	88

■ Mass by stroke

Stroke		20	30	40	50
Mass (g)	Ball screw specification	85	95	107	118
	Lead screw specification	83	83	105	116

Applicable controllers

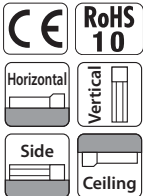
(Note) EC Series products are equipped with a built-in controller. Please refer to P. 31 for details on built-in controllers.

EC-GRB4

Micro	Vertical 2-Finger Gripper	Slider Type	Body Width 30 mm	24v Brushless DC Motor
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Model Specification Items

EC	GRB4					
Series	Type	Lead	Stroke	Actuator cable length	Power / I/O cable length	Options
		M Lead screw 0.75mm	8 8mm 16 16mm 32 32mm	See actuator cable length below	See power / I/O cable length below	See options below



- (1) An in-line controller is required to operate. If the option (NCC) is not selected, an in-line controller is included. See page 26 for more information of in-line controller.
- (2) The maximum opening/closing speed in the Main Specifications represents the operation speed for one side. The relative operation speed is twice the value.
- (3) The maximum grip force in the Main Specifications is the total of the grip force of both fingers when the gripping point distance and overhang distance are both 0. For the workpiece weight which can actually be moved, refer to the "Check of Gripping Point Distance".
- (4) When gripping the workpiece, be sure to use push-motion operation.
- (5) The workpiece grip force will be maintained via self-lock even during power cutoff. To release the workpiece being gripped during a power cutoff, turn the open/close screw on the side, or remove the finger attachment to release the workpiece.
- (6) For connecting to the e-wiring system please refer to page 33.

Actuator Cable Length

Cable code	Cable length
1 ~ 3	1 ~ 3m
4 ~ 5	4 ~ 5m
6 ~ 9	6 ~ 9m (Note 1)

- (Note 1) When connecting via interface box 2, the maximum length of 8m is selected.
When selecting the AC2 option (pigtail cable length of 2m), 7m is the maximum.
(Note) Make sure that the total length along with the power / I/O cable is 9m or less.
When selecting the AC2 option, 8m is the maximum.
(Note) Robot cable is standard.

Power / I/O Cable Length

Standard Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
0	Without cable	Terminal block supplied (Note 1)
1 ~ 3	1 ~ 3m	CB-EC-PWBIO□□□-RB supplied
4 ~ 5	4 ~ 5m	
6 ~ 7	6 ~ 7m	
8 ~ 9	8 ~ 9m	

- (Note 1) Only terminal block connector is included. When selecting RCON-EC connection specification (ACR) as an option, select "0". Terminal block connector is not included.
For details please refer to P. 33.
(Note) Robot cable is standard.

4-way Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
S1 ~ S3	1 ~ 3m	CB-EC2-PWBIO□□□-RB supplied
S4 ~ S5	4 ~ 5m	
S6 ~ S7	6 ~ 7m	
S8 ~ S9	8 ~ 9m	

- (Note) Robot cable is standard.

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

Name	Option code	Reference page
Actuator pigtail cable length: 0.5m	AC05	25
Actuator pigtail cable length: 1m	AC1	25
Actuator pigtail cable length: 2m	AC2	25
RCON-EC connection specification (Note 1) (Note 3)	ACR	25
3 position mode specification	MF	25
No in-line controller (Note 2)	NCC	25
Non-motor end specification	NM	25
PNP specification (Note 1)	PN	25
Split motor and controller power supply spec. (Note 1)	TMD2	25
Wireless communication specification (Note 3)	WL	25
Wireless axis operation specification (Note 3)	WL2	25

- (Note 1) 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 2 and conversion cable are not included.
(Note 2) Only the option of actuator pigtail cable length (AC05, AC1, AC2) can be selected simultaneously.
(Note 3) 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 2, conversion cable, and power / I/O cable. For details please refer to P 28.
Please contact our sales department for the wireless axis operation specification (WL2).

Separately Sold Options

Name	Model	Reference page
RCON-EC connection specification power / I/O cable (standard connector cable)	CB-REC-PWBIO□□□-RB	37
RCON-EC connection specification power / I/O cable (4-way connector cable)	CB-REC2-PWBIO□□□-RB	37
RCON-EC connection spec. interface box 2 for split motor and controller power supply (wireless specification)	ECW-CVNW-L-CB-ACR	26

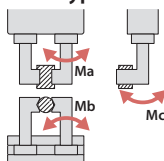
- (Note) The power / I/O cable is a robot cable.
Please indicate the cable length in □□□. (Ex.: 010 = 1m)

Main Specifications

Item	Description
Lead	Thread lead (mm) 0.75
Grip operation	Max. grip force (N) (both sides) 46.5
	Max. speed during grip operation (mm/s) (one side) 5
	Max. speed (mm/s) (one side) 13
Approach operation	Min. speed (mm/s) (one side) 1
	Rated acceleration/deceleration (G) (one side) 0.1
	Max. acceleration/deceleration (G) (one side) 0.1
Stroke (one side)	Min. stroke (mm) (one side) 4
	Max. stroke (mm) (one side) 16

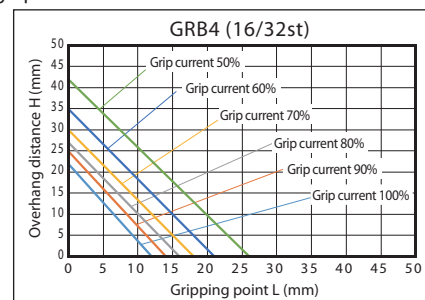
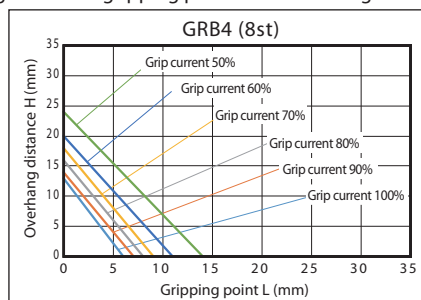
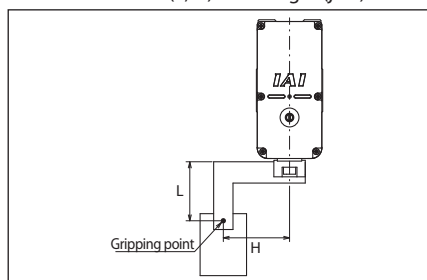
Item	Description
Driving system	Left/right lead screw, $\varnothing 4\text{mm}$
Positioning repeatability	$\pm 0.05\text{mm}$
Lost motion	0.15mm or less
Backlash (both sides)	0.15mm or less
Linear guide	Limited guide
Allowable static moment	Ma: $<8\text{st}> 0.218\text{N}\cdot\text{m}$ / $<16/32\text{st}> 0.368\text{N}\cdot\text{m}$ Mb: $<8\text{st}> 0.312\text{N}\cdot\text{m}$ / $<16/32\text{st}> 0.525\text{N}\cdot\text{m}$ Mc: $<8\text{st}> 1.130\text{N}\cdot\text{m}$ / $<16/32\text{st}> 1.510\text{N}\cdot\text{m}$
Allowable horizontal load	$<8\text{st}> 63\text{N}$ / $<16/32\text{st}> 84\text{N}$
Operating temperature, humidity	0 ~ 40°C, 85%RH or less (non-condensing)
Degree of protection	IP20
Vibration & shock resistance	4.9m/s ²
Overseas standards	CE marking, RoHS directive
Motor type	Brushless DC motor ($\varnothing 9.2$) (Power capacity: max. 1.1A)
Encoder type	Incremental
Number of encoder pulses	800 pulse/rev

Slide type moment direction



Check of Gripping Point Distance

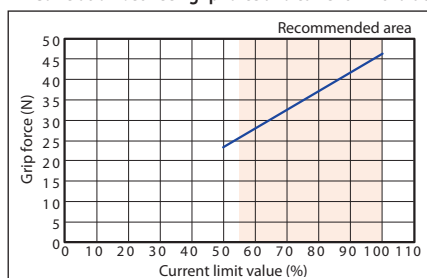
Use with distance (L, H) from finger (jaw) mounting surface to gripping point within the range in the graph.



(Note) Use outside of the limited range will cause excessive moment on the finger sliding part and internal mechanisms, negatively affecting operation life.

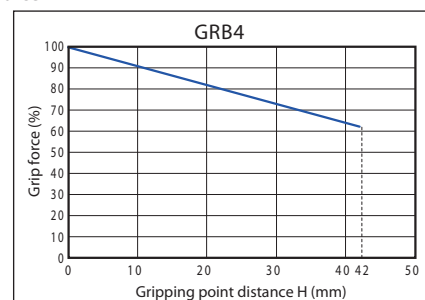
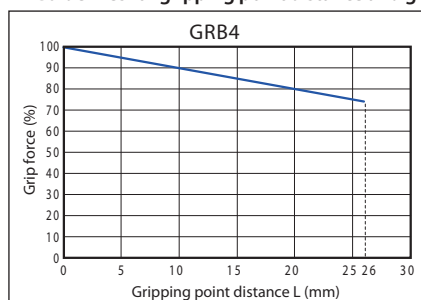
Grip Force

Correlation between grip force and current limit value



(Note) Total value of both fingers when gripping point distance (L, H) is 0.
(Note) Guideline values. There is variation of 0 to 60%. In particular, current limit values set outside the recommended range (colored part of the graph) are more likely to lead to variation.
(Note) For gripping (pushing), the speed is fixed at 5mm/s.

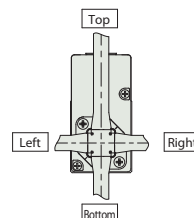
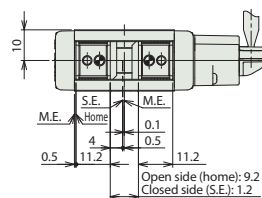
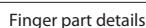
Guidelines for gripping point distance and grip force



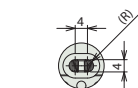
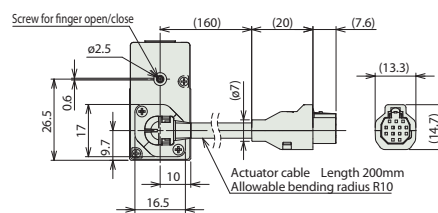
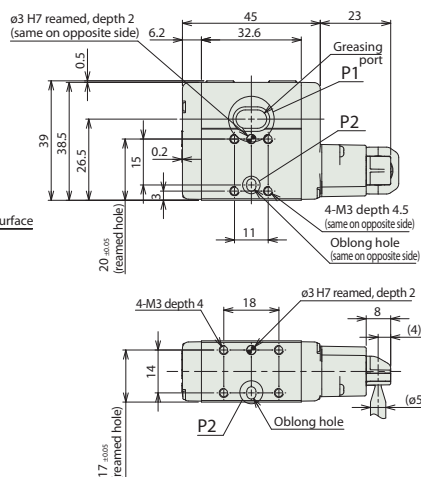
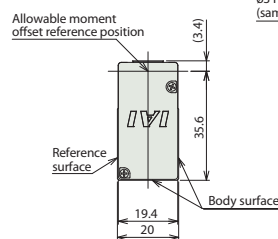
(Note) Shows grip force of overhang position when maximum grip force is set to 100%. The results may differ due to the rigidity of the finger attachment used.

■ 8 stroke

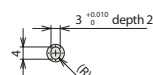
ST: Stroke
M.E: Mechanical end
S.E: Stroke end



Cable exit direction (rotating)



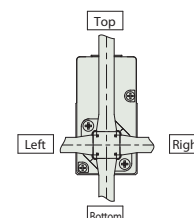
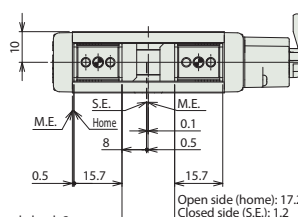
Detailed view of P1
Greasing port



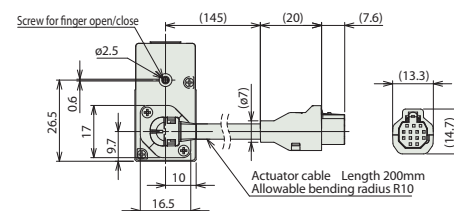
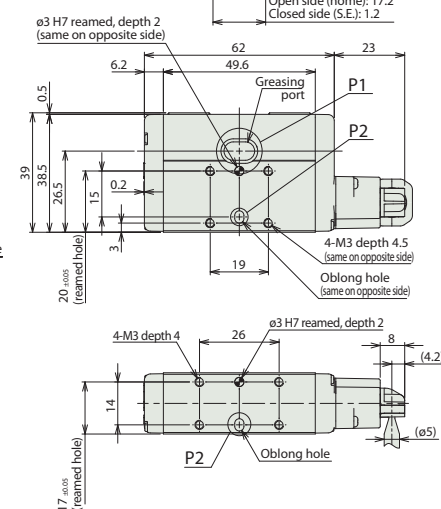
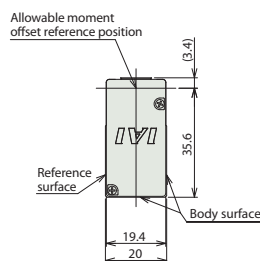
Detailed view of P2
Reference surface oblong hole details
Body surface oblong hole details

■ 16 stroke

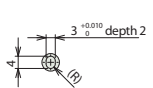
ST: Stroke
M.E: Mechanical end
S.E: Stroke end



Cable exit direction (rotating)



Detailed view of P1
Greasing port

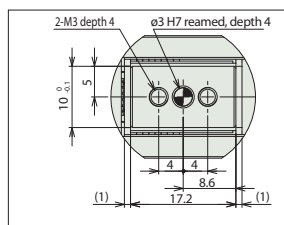


Detailed view of P2
Reference surface oblong hole details
Body surface oblong hole details

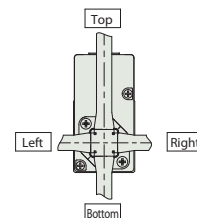
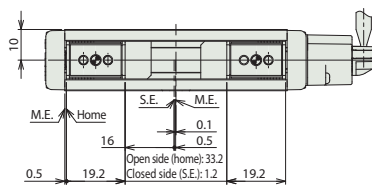
■ 32 stroke

(Note) Fix the cable so that its base does not move. The cable ejection direction can be changed by changing the orientation of the cable box.
 (Note) Consider five times as a reference for changing the cable ejection direction.

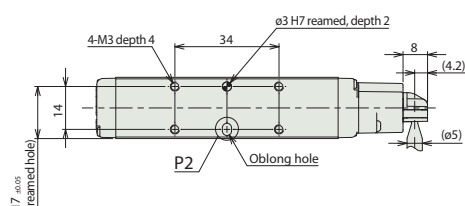
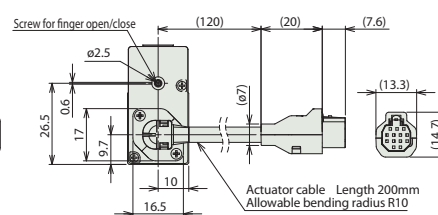
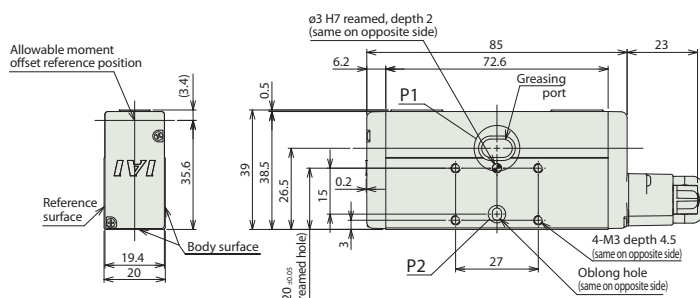
ST: Stroke
 M.E: Mechanical end
 S.E: Stroke end



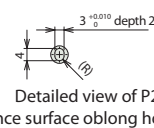
Finger part details



Cable exit direction (rotating)



Detailed view of P1
Greasing port



Detailed view of P2
Reference surface oblong hole details
Body surface oblong hole details

■ Mass

Stroke	8	16	32
Mass (g)	81	103	127

Applicable controllers

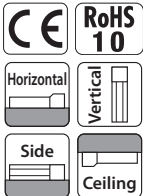
(Note) EC Series products are equipped with a built-in controller. Please refer to P. 31 for details on built-in controllers.

EC-GRC4

Micro	Flat 2-Finger Gripper	Slider Type	Body Width 40 mm	24 v Brushless DC Motor
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Model Specification Items

EC	GRC4					
Series	Type	Lead	Stroke	Actuator cable length	Power / I/O cable length	Options
		M Lead screw 0.75mm	8 8mm 16 16mm 32 32mm	See actuator cable length below	See power / I/O cable length below	See options below



- (1) An in-line controller is required to operate. If the option (NCC) is not selected, an in-line controller is included. See page 26 for more information of in-line controller.
- (2) The maximum opening/closing speed in the Main Specifications represents the operation speed for one side. The relative operation speed is twice the value.
- (3) The maximum grip force in the Main Specifications is the total of the grip force of both fingers when the gripping point distance and overhang distance are both 0. For the workpiece weight which can actually be moved, refer to the "Check of Gripping Point Distance".
- (4) When gripping the workpiece, be sure to use push-motion operation.
- (5) The workpiece grip force will be maintained via self-lock even during power cutoff. To release the workpiece being gripped during a power cutoff, turn the open/close screw on the side, or remove the finger attachment to release the workpiece.
- (6) For connecting to the e-wiring system please refer to page 33.

Actuator Cable Length

Cable code	Cable length
1 ~ 3	1 ~ 3m
4 ~ 5	4 ~ 5m
6 ~ 9	6 ~ 9m (Note 1)

- (Note 1) When connecting via interface box 2, the maximum length of 8m is selected.
When selecting the AC2 option (pigtail cable length of 2m), 7m is the maximum.
(Note) Make sure that the total length along with the power / I/O cable is 9m or less.
When selecting the AC2 option, 8m is the maximum.
(Note) Robot cable is standard.

Power / I/O Cable Length

Standard Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
0	Without cable	Terminal block supplied (Note 1)
1 ~ 3	1 ~ 3m	CB-EC-PWBIO□□□-RB supplied
4 ~ 5	4 ~ 5m	
6 ~ 7	6 ~ 7m	
8 ~ 9	8 ~ 9m	

- (Note 1) Only terminal block connector is included. When selecting RCON-EC connection specification (ACR) as an option, select "0". Terminal block connector is not included.
For details please refer to P. 33.
(Note) Robot cable is standard.

4-way Connector Cable

Cable code	Cable length	User wiring specification (flying leads)
S1 ~ S3	1 ~ 3m	CB-EC2-PWBIO□□□-RB supplied
S4 ~ S5	4 ~ 5m	
S6 ~ S7	6 ~ 7m	
S8 ~ S9	8 ~ 9m	

- (Note) Robot cable is standard.

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

Name	Option code	Reference page
Actuator pigtail cable length: 0.5m	AC05	25
Actuator pigtail cable length: 1m	AC1	25
Actuator pigtail cable length: 2m	AC2	25
RCON-EC connection specification (Note 1) (Note 3)	ACR	25
3 position mode specification	MF	25
No in-line controller (Note 2)	NCC	25
Non-motor end specification	NM	25
PNP specification (Note 1)	PN	25
Split motor and controller power supply spec. (Note 1)	TMD2	25
Wireless communication specification (Note 3)	WL	25
Wireless axis operation specification (Note 3)	WL2	25

- (Note 1) 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 2 and conversion cable are not included.
(Note 2) Only the option of actuator pigtail cable length (AC05, AC1, AC2) can be selected simultaneously.
(Note 3) 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 2, conversion cable, and power / I/O cable. For details please refer to P. 28.
Please contact our sales department for the wireless axis operation specification (WL2).

Separately Sold Options

Name	Model	Reference page
RCON-EC connection specification power / I/O cable (standard connector cable)	CB-REC-PWBIO□□□-RB	37
RCON-EC connection specification power / I/O cable (4-way connector cable)	CB-REC2-PWBIO□□□-RB	37
RCON-EC connection spec. interface box 2 for split motor and controller power supply (wireless specification)	ECW-CVNW-L-CB-ACR	26

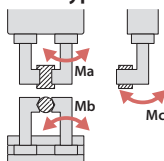
- (Note) The power / I/O cable is a robot cable.
Please indicate the cable length in □□□. (Ex.: 010 = 1m)

Main Specifications

Item	Description
Lead	Thread lead (mm) 0.75
Grip operation	Max. grip force (N) (both sides) 46.5
	Max. speed during grip operation (mm/s) (one side) 5
	Max. speed (mm/s) (one side) 13
Approach operation	Min. speed (mm/s) (one side) 1
	Rated acceleration/deceleration (G) (one side) 0.1
	Max. acceleration/deceleration (G) (one side) 0.1
Stroke (one side)	Min. stroke (mm) (one side) 4
	Max. stroke (mm) (one side) 16

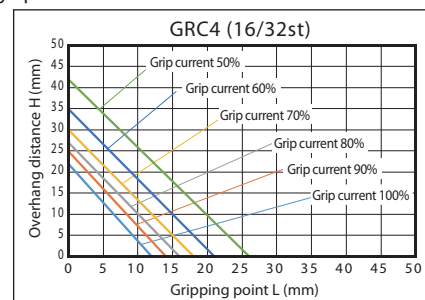
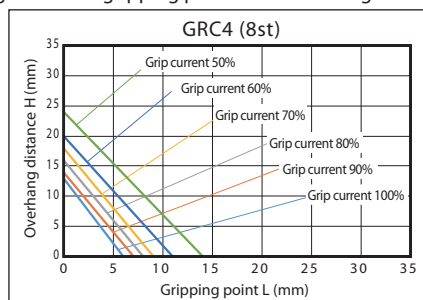
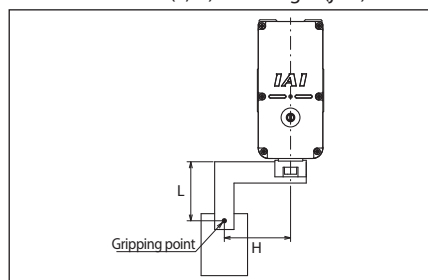
Item	Description
Driving system	Left/right lead screw, $\varnothing 4\text{mm}$
Positioning repeatability	$\pm 0.05\text{mm}$
Lost motion	0.15mm or less
Backlash (both sides)	0.15mm or less
Linear guide	Limited guide
Allowable static moment	Ma: $<8\text{st}> 0.218\text{N}\cdot\text{m}$ / $<16/32\text{st}> 0.368\text{N}\cdot\text{m}$ Mb: $<8\text{st}> 0.312\text{N}\cdot\text{m}$ / $<16/32\text{st}> 0.525\text{N}\cdot\text{m}$ Mc: $<8\text{st}> 1.130\text{N}\cdot\text{m}$ / $<16/32\text{st}> 1.510\text{N}\cdot\text{m}$
Allowable horizontal load	$<8\text{st}> 63\text{N}$ / $<16/32\text{st}> 84\text{N}$
Operating temperature, humidity	0 ~ 40°C, 85%RH or less (non-condensing)
Degree of protection	IP20
Vibration & shock resistance	4.9m/s ²
Overseas standards	CE marking, RoHS directive
Motor type	Brushless DC motor ($\varnothing 9.2$) (Power capacity: max. 1.1A)
Encoder type	Incremental
Number of encoder pulses	800 pulse/rev

Slide type moment direction



Check of Gripping Point Distance

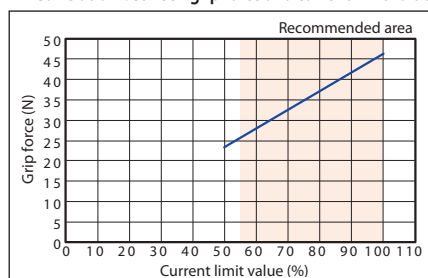
Use with distance (L, H) from finger (jaw) mounting surface to gripping point within the range in the graph.



(Note) Use outside of the limited range will cause excessive moment on the finger sliding part and internal mechanisms, negatively affecting operation life.

Grip Force

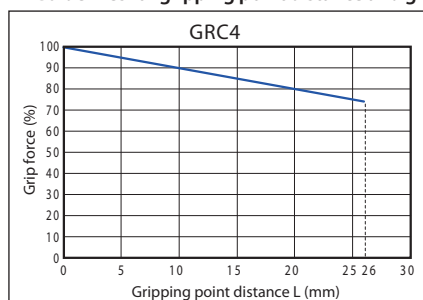
Correlation between grip force and current limit value



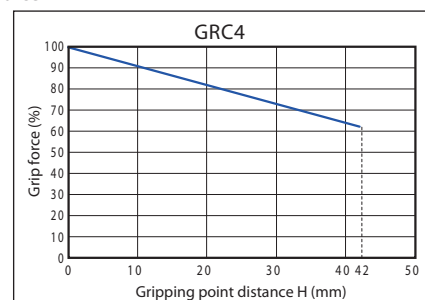
(Note) Total value of both fingers when gripping point distance (L, H) is 0.
(Note) Guideline values. There is variation of 0 to 60%. In particular, current limit values set outside the recommended range (colored part of the graph) are more likely to lead to variation.

(Note) For gripping (pushing), the speed is fixed at 5mm/s.

Guidelines for gripping point distance and grip force



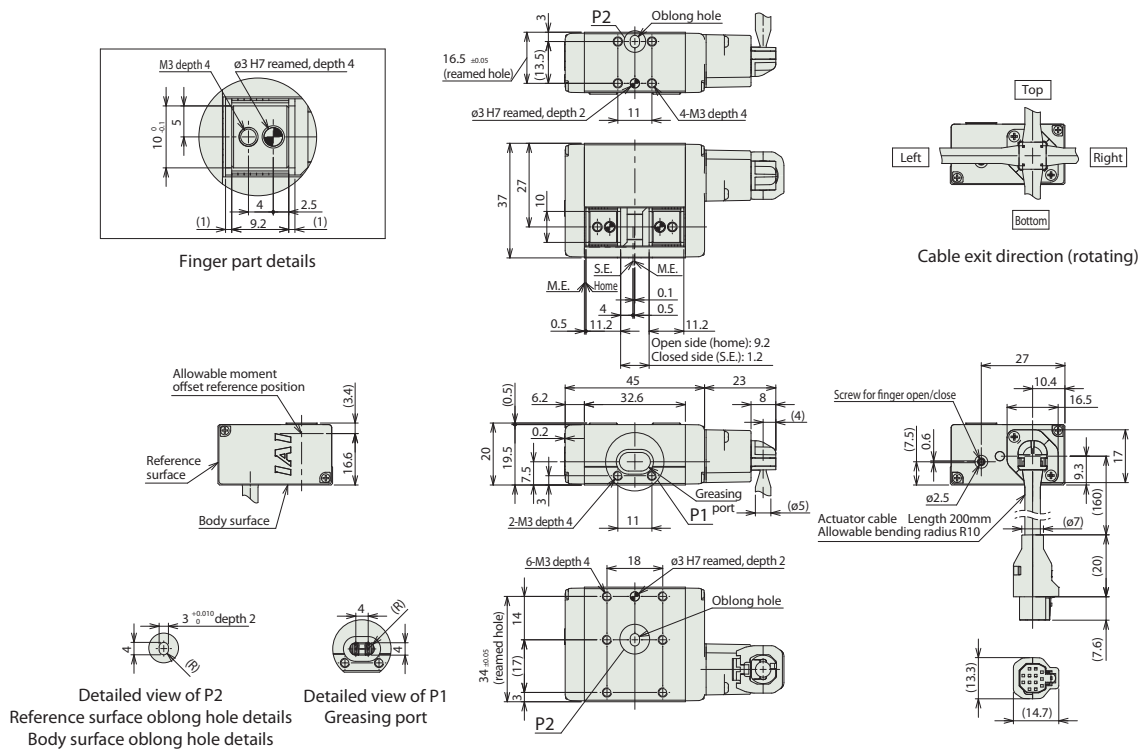
(Note) Shows grip force of overhang position when maximum grip force is set to 100%. The results may differ due to the rigidity of the finger attachment used.



■ 8 stroke

(Note) Fix the cable so that its base does not move. The cable ejection direction can be changed by changing the orientation of the cable box.
(Note) Consider five times as a reference for changing the cable ejection direction.

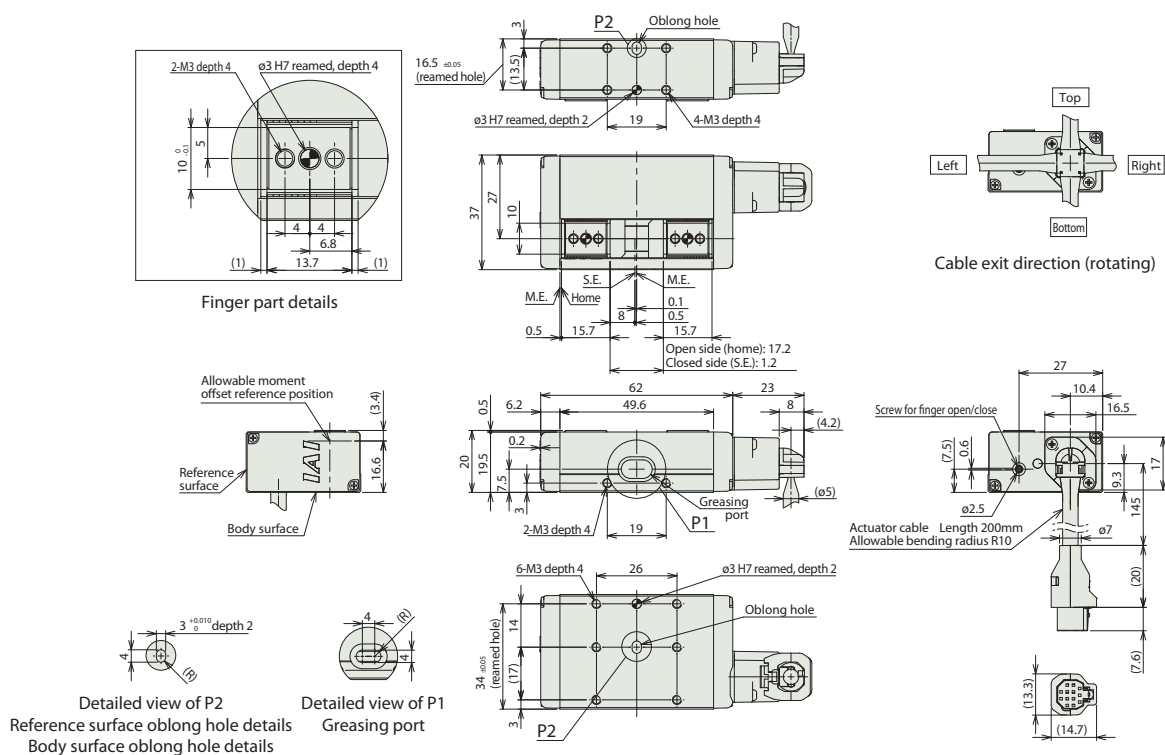
ST: Stroke
M.E: Mechanical end
S.E: Stroke end



■ 16 stroke

(Note) Fix the cable so that its base does not move. The cable ejection direction can be changed by changing the orientation of the cable box.
(Note) Consider five times as a reference for changing the cable ejection direction.

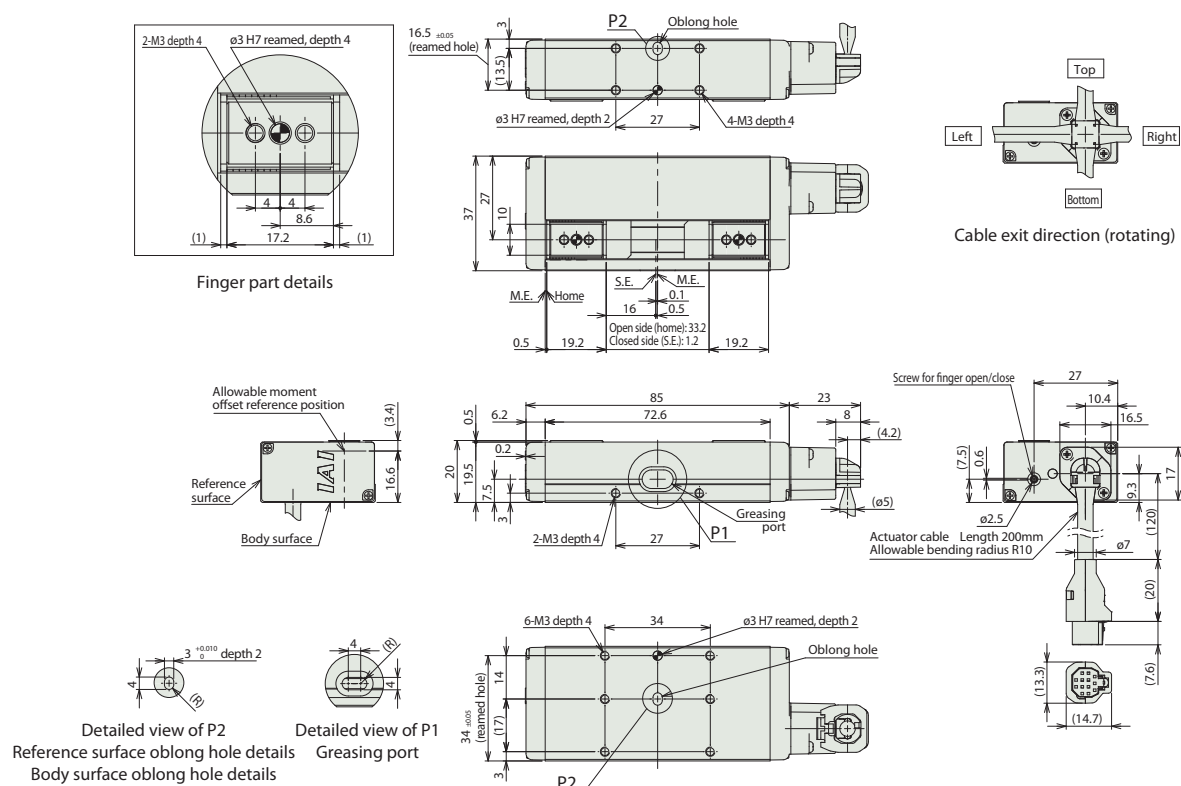
ST: Stroke
M.E: Mechanical end
S.E: Stroke end



■ 32 stroke

(Note) Fix the cable so that its base does not move. The cable ejection direction can be changed by changing the orientation of the cable box.
(Note) Consider five times as a reference for changing the cable ejection direction.

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



■ Mass

Stroke	8	16	32
Mass (g)	77	97	119

Applicable controllers

(Note) EC Series products are equipped with a built-in controller. Please refer to P. 31 for details on built-in controllers.

EleCylinder Series Options

Actuator pigtail cable length: 0.5 m / 1 m / 2m

Model **AC05/AC1/AC2**

Applicable models All models

Description Although the standard length of the actuator cable is 0.2m, it can be changed to 0.5m, 1m or 2 m as an option.
* Make sure that the total length of the actuator cable, relay extension cable, and power / I/O cable is 10m or less.

RCON-EC connection specification

Model **ACR**

Applicable models All models

Description This option should be selected to connect over an R-unit to a field network.
* Use directly linked to RCON-EC. When performing wireless communication, prepare a separate interface box 2, power supply, and I/O cable.

3 position mode specification

Model **MF**

Applicable models All models

Description This option enables 3-point positioning (intermediate stop).

No in-line controller

Model **NCC**

Applicable models All models

Description Inline controller is not included. Select if you want to purchase only the main unit.
(Note) Only "0" can be selected for the relay cable length and the power supply/I/O cable length.
The option can be selected only for actuator cable length AC05/AC1/AC2. Interface box 2 is not included.

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 selected with ACR option, which uses the 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.

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

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. 33 for more information on wiring.

Wireless communication specification * Cannot be selected with the ACR option.

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.
The start point, end point, and AVD can be adjusted via wireless communication.
When performing wireless communication via RCON-EC connection, separately arrange the interface box 2, power supply, and I/O cable.

Wireless axis operation specification * Cannot be selected with the ACR option.

Model **WL2**

Applicable models All models

Description Specifying WL2 allows for the product to operate wirelessly as with WL (start point, end point, and AVD adjustment), and to also perform axis travel operation tests (forward end/backward end movement, jog, and inching). However, this function is not meant to perform automatic operation.
Please refer to P. 118 of the EC Catalog V10 for precautions on axis operations using a wireless connection.
(Note) Customers cannot change WL to WL2, or WL2 to WL. Please contact IAI for this.
When performing wireless communication via RCON-EC connection, separately arrange the interface box 2, power supply, and I/O cable.

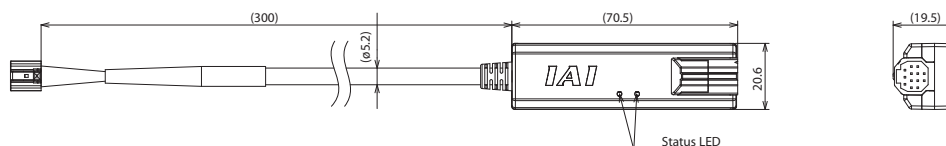
Standard accessories

Inline controller

Model EC-CCB-JY001 (-WL2)

Description It is the controller of the micro cylinder. In order for the micro cylinder to work, be sure to connect the inline controller. The cable is a robot cable.

<Dimensions>

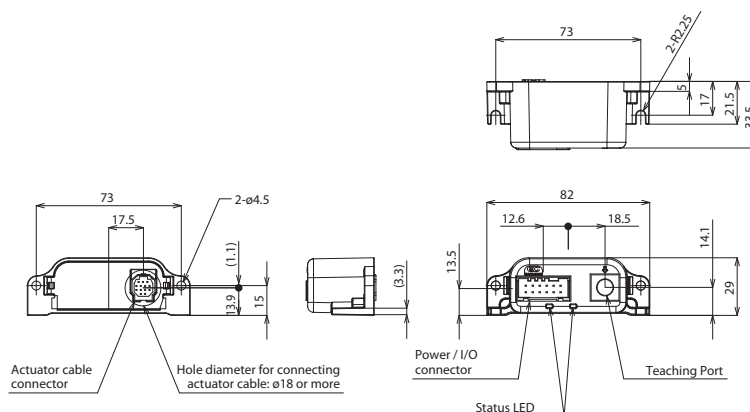


Interface box 2

Model EC-CVN□□/CVP□□ * Please refer to page 27 for details.

Description Required when connecting the micro cylinder directly to the PLC or to the EC connection unit and using wireless teaching.

<Dimensions>



Automatic Servo OFF Function

The "Auto servo OFF function" can be set by the PC software (IA-OS) or teaching pendant (TB-02/03). When the "Auto servo OFF function" is activated, the servo is automatically turned off after positioning complete, after stopping, or after a certain amount of time (lag time). The servo will be automatically turned on when the next movement command is input, executing positioning operation. Power consumption can be reduced, because there is no holding current while stopping.

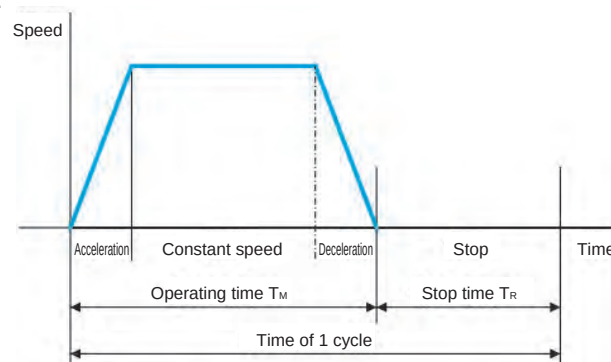
Duty ratio

The duty ratio is the operating rate shown as the actuator's operating time during one cycle, expressed as a percentage (%).

The EleCylinder Micro Cylinder can be operated at 100% of its duty ratio.

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

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



R1/T2
GRB4/GRC4



① Inline controller (accessories)

Type	Wireless	Model
R1/T2 GRB4/GRC4	No/WL	EC-CCB-JY001
	WL2	EC-CCB-JY001-WL2

(Note) Parameters and position data are set on the controller board and shipped.
Please inform us of the actuator type to replace the parts at the time of order.

②-1 Interface box 2

Type	Wireless	I/O	Model
R1/T2 GRB4/GRC4	No	NPN	EC-CVN-CB
		PNP	EC-CVP-CB
	WL/WL2	NPN	EC-CVNWL-CB
		PNP	EC-CVPWL-CB

②-2 Split motor and controller power supply interface box 2

Type	Wireless	I/O	Model
R1/T2 GRB4/GRC4	No	NPN	EC-CVN-CB-TMD2
		PNP	EC-CVP-CB-TMD2
	WL/WL2	NPN	EC-CVNWL-CB-TMD2
		PNP	EC-CVPWL-CB-TMD2

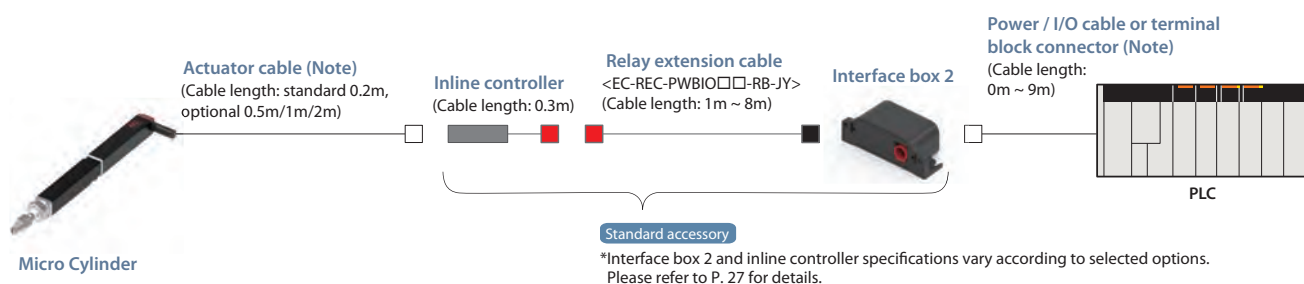
②-3 RCON-EC connection specif. split motor and controller power supply interface box 2

Type	Wireless	I/O	Model
R1/T2 GRB4/GRC4	WL/WL2	NPN/REC	EC-CVNWL-CB-ACR

Connection Pattern

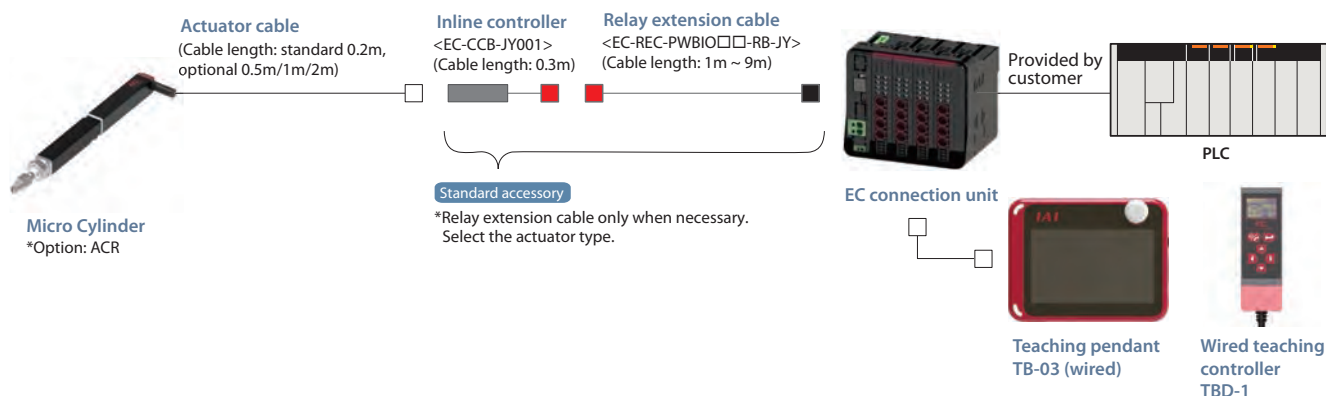
When connecting EleCylinder to a PLC, there are three possible connection methods.

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

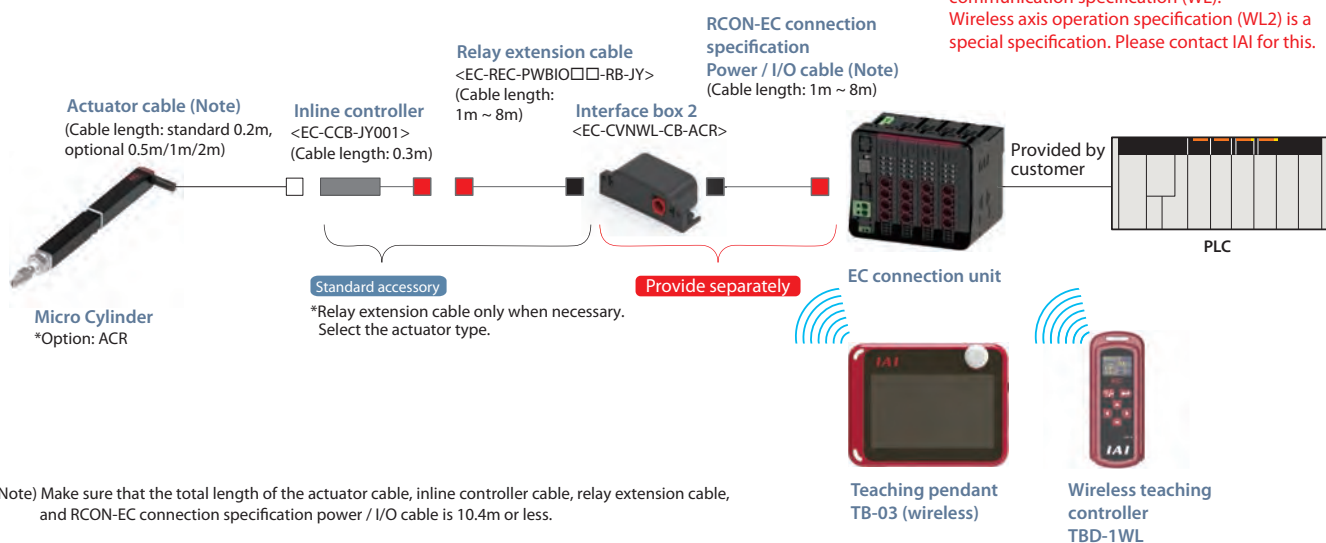


(Note) Make sure that the total length of the actuator cable, relay extension cable, and power / I/O cable (provided by the customer when using a terminal block connector) is 10 m or less.

2. Connection to PLC via an EC connection unit (RCON-EC connection specification) [Wired connection of the teaching pendant]



3. Connection to PLC via an EC connection unit (RCON-EC connection specification) [Wireless connection of the teaching pendant]



(Note) Make sure that the total length of the actuator cable, inline controller cable, relay extension cable, and RCON-EC connection specification power / I/O cable is 10.4m or less.

Push-Motion Operation

Push-motion operation is a function that keeps the rod or table pushed up against the workpiece, as with an air cylinder. Please check the usage instructions and precautions below prior to use.

Correlation between push force and current limit value is shown in the example below.

* The push force value is calculated from motor torque and mechanical efficiency. The push speed is 10 or 5mm/s.

[Push force adjustment]

- The push force during push-motion operation can be adjusted by changing the "Push force (%)" on EleCylinder.
- Check the push force for the applicable model in the "Correlation Diagram between Push Force and Current Limit" on the product specification page, and select a model that matches your conditions.

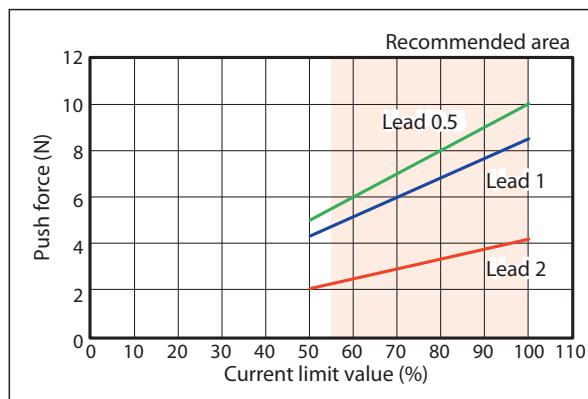
[Lead selection method]

- Select a lead with the desired push force in the recommended current limit value range (the colored area in the graph).

Lead 1 would be appropriate for the EC-R1 type shown in the figure to the right if a push force of 5N is desired. Selecting lead 0.5 would limit the adjustment range.

(Example)

Correlation Diagram between Push Force and Current Limit

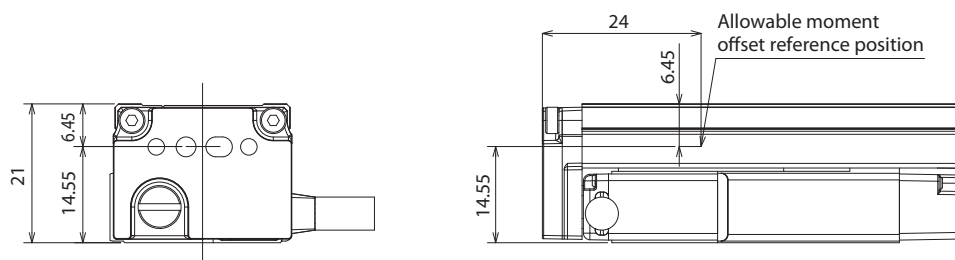


Caution

- The "Correlation Diagram between Push Force and Current Limit" show lower guidelines for push force for each current limit value.
- Individual differences in the motor and variations in mechanical efficiency may cause the push force lower limit to be 40% higher, even if the current limit value is the same. This is especially true when the current limit value is 30% or lower, and the push force lower limit could be exceeded by 40% or more.

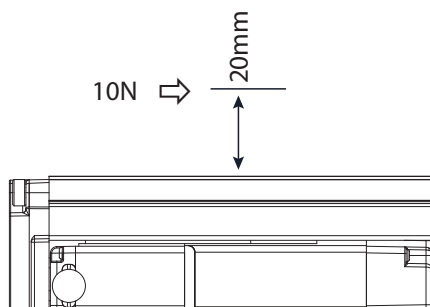
Notes on use of table type actuators for push-motion operation

When performing a push-motion operation using a table type actuator, be sure to limit the push current so that the reactive moment caused by the push force does not exceed the allowable dynamic moment (M_a , M_b) listed in the catalog. Refer to the figures below, which show the working point of the guide moment, for help with calculating the moment. This can be done by considering the offset of the push force working point. Note that if excessive force which exceeds the allowable dynamic moment is applied, it may damage the guide and shorten the actuator's operational life. 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-T2 type at the position shown in the figure at right, the moment applied to the guide is $M_a = (6.45 + 20) \times 10 = 364.5 \text{ (N-mm)} = 0.3645 \text{ (N-m)}$.



The allowable dynamic moment for EC-T2 is $M_a = 0.691 \text{ (N-m)}$ and pushing operation is acceptable as $0.691 > 0.3645$. If pushing would cause M_b moment, calculate likewise from the overhang and ensure that it is within range of the allowable dynamic moment.

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 table.

Vibration or other factors could cause failure if the approximate length is greatly exceeded. Use the product within the guideline length.

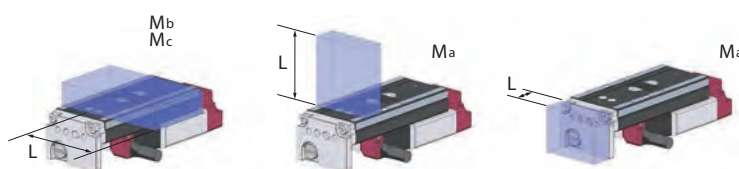


Table of Connectability for EleCylinder and Teaching Tools

■ For EleCylinder alone

○: Connection/operation possible

Teaching tool			Connection/ operation	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 EleCylinder is wireless specification ("WL" or "WL2" option)

*2 Trial operation is possible when connecting with WL2 specification, but not with WL specification

■ For EleCylinder connected to REC/RCON/RSEL (RCON-EC-4 connection)

Connection pattern

Ⓐ: Master unit SIO connection



Ⓑ: Wireless connection



* SIO connection to EleCylinder requires an interface box.

○: Connection/operation possible △: Connection possible/operation partially possible

Teaching tool			Connection pattern	Auto (during automatic operation)		Manual	
				Connection/operation	Priority level (simultaneous connection)	Connection/operation	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

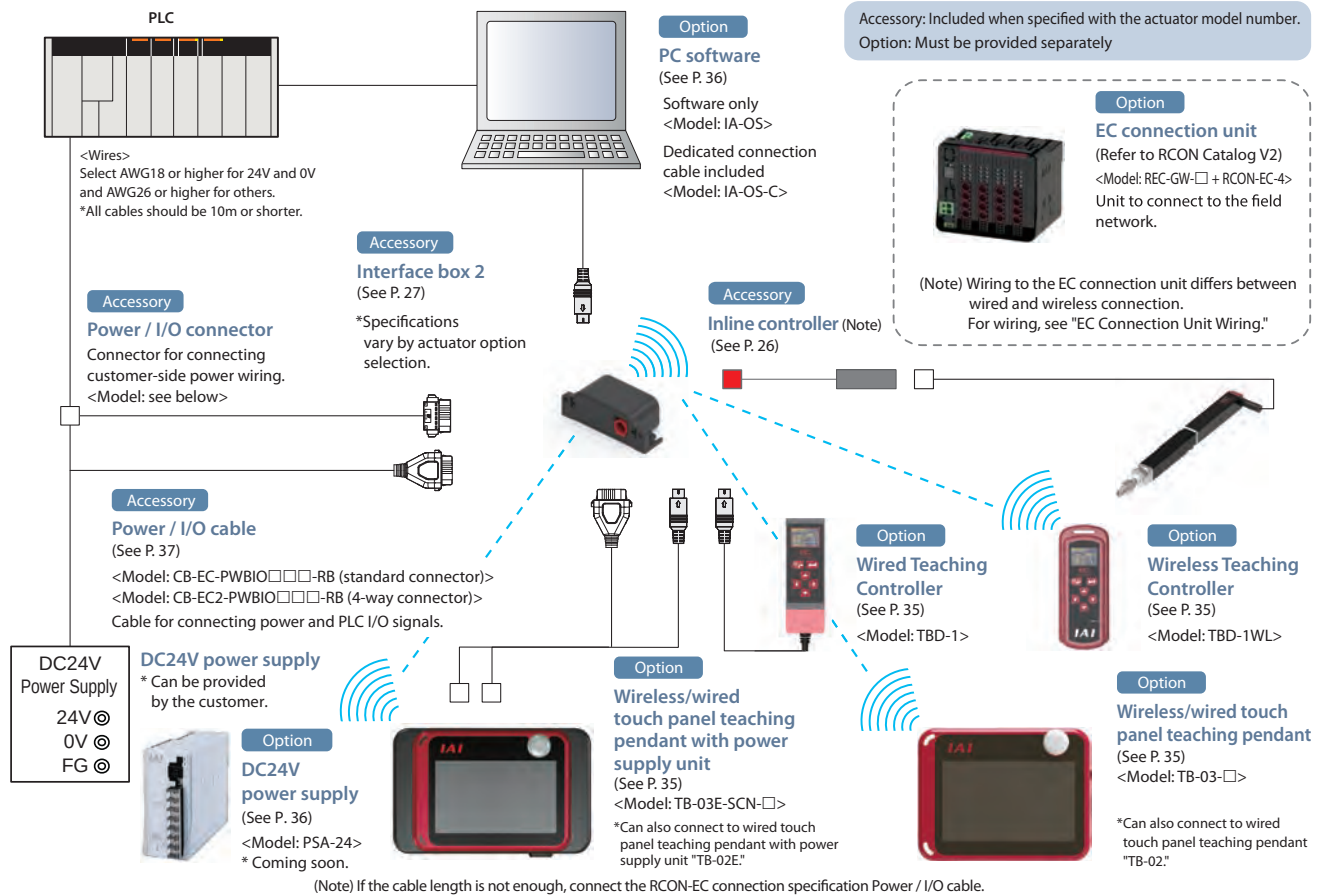
*1 Connectable only when EleCylinder is wireless specification ("WL" or "WL2" option)

*2 Trial operation is possible when connecting with WL2 specification, but not with WL specification

*3 Monitoring only (operation not possible)

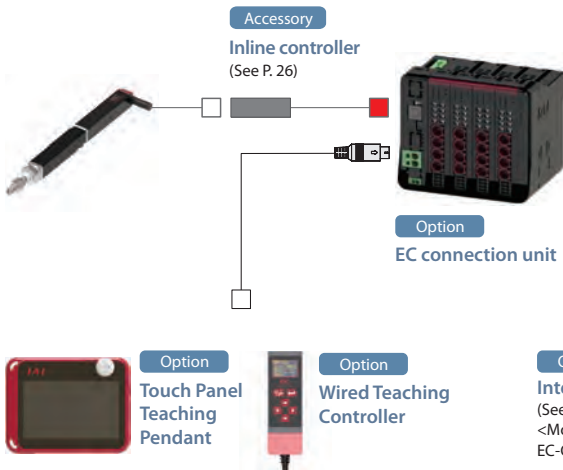
*4 Speed and acceleration/deceleration can be set; position editing and trial operation are not possible

System Configuration

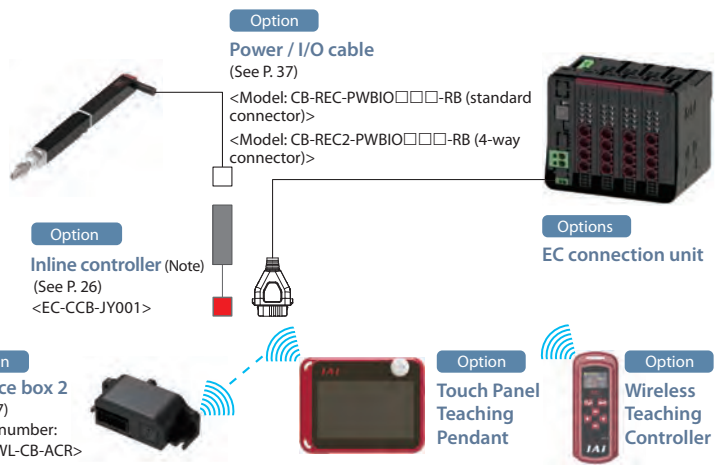


EC connection unit wiring

(For teaching pendant wired connection)



(For teaching pendant wireless connection)



(Note) If the cable length is not enough, connect the RCON-EC connection specification Power / I/O cable.

List of Accessories

■ Power / I/O Cables and Connectors

[Standard connector]

Product category		Accessory
Power / I/O cable length (specified in actuator model number)	RCON-EC connection specification (ACR)	
0	No	Power / I/O connector *
	Yes	—
1 ~ 9	No	Power / I/O cable (CB-EC-PWBIO□□□-RB)

[4-way connector] * Model code: 81702010-03-000-00 in case of TMD2 selection; otherwise 1-1871940-6-ENG. For MF selection, please include "MF" at the end of the model code.

Product category		Accessory
Power / I/O cable length (specified in actuator model number)	RCON-EC connection specification (ACR)	
S1 ~ S9	No	Power / I/O cable (CB-EC2-PWBIO□□□-RB)

Basic Controller Specifications (Inline Controller)

Specification item			Specification content
Number of controlled axes			1 axis
Power supply voltage			24VDC ±10%
Power capacity (Includes control power 0.3A)			Rated 0.7A, max. 1.1A (with RCON connected: rated 0.4A, max. 0.8A)
Generated heat (at duty ratio 100%)			2W
Inrush current (Note 1)			2.5A
Momentary power failure resistance			Max. 500μs
Motor size			ø9.2
Motor rated current			0.4A
Motor control system			Square-wave drive (DC)
Supported encoders			Incremental (800 pulse/rev)
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) *For MF option, "intermediate stop complete" is added for 4 points
		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	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 to 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
Degree of protection			IP20
Vibration & shock resistance			4.9m/s ²
Cooling method			Natural air cooling

(Note 1) 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.

<Precautions for inline controller>

- The controller section should be fixed to prevent excessive impact.
- Do not connect the actuator to interface box 2 or EC connection unit without an inline controller.

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.
For MF option specification, the solenoid valve method has to be changed to "3 positions".

I/O (Input/Output) Specifications

I/O		Input		Output	
Specifications		Input voltage	24VDC $\pm 10\%$	Load voltage	24VDC $\pm 10\%$
		Input current	5mA per circuit	Maximum load current	50mA/1 point
		ON/OFF voltage	ON voltage: Min. 18VDC 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 (option model: TMD2)
Power / I/O connector		0V A1 (Reserved) A2 Backward complete A3 Forward complete A4 Alarm output A5 (Reserved) A6 B1 24V B2 Brake release B3 Backward command (Note 1) B4 Forward command (Note 1) B5 Alarm clear B6 (reserved)	Drive power and control power are separate for the TMD2 specification. 0V A1 24V (Control) A2 Backward complete A3 Forward complete A4 Alarm output A5 (Reserved) A6 B1 24V (Drive) B2 Brake release B3 Backward command (Note 1) B4 Forward command (Note 1) B5 Alarm clear B6 (reserved)
I/O logic	NPN	0V 24V 0V Black A1 B1 Red 24V Brown B2 Brake release (Note 1) Backward command Orange B3 A3 Blue Backward complete (Note 1) Forward command Yellow B4 A4 Purple Forward complete Alarm clear Green B5 A5 Gray Alarm output	0V 24V 0V Black A1 B1 Red 24V (Drive) Brown B2 Brake release A2 Light blue 24V (Control) (Note 1) Backward command Orange B3 A3 Blue Backward complete (Note 1) Forward command Yellow B4 A4 Purple Forward complete Alarm clear Green B5 A5 Gray Alarm output
	PNP	24V 0V 24V Red B1 A1 Black 0V Brown B2 Brake release (Note 1) Backward command Orange B3 A3 Blue Backward complete (Note 1) Forward command Yellow B4 A4 Purple Forward complete Alarm clear Green B5 A5 Gray Alarm output	24V 0V 24V (Drive) Red B1 A1 Black 0V Brown B2 Brake release A2 Light blue 24V (Control) (Note 1) Backward command Orange B3 A3 Blue Backward complete (Note 1) Forward command Yellow B4 A4 Purple Forward complete Alarm clear Green B5 A5 Gray Alarm output

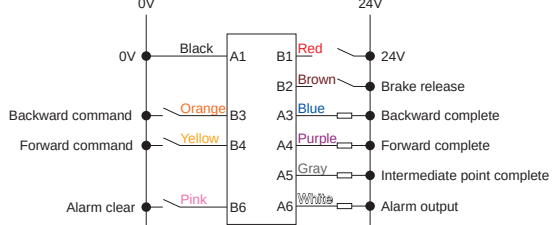
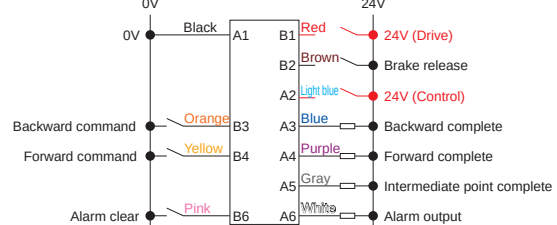
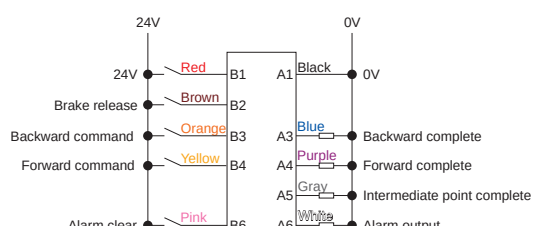
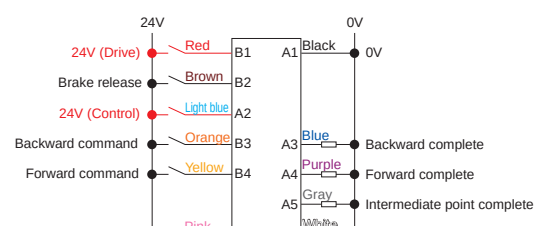
(Note 1) Switching to the single solenoid method will change B3 to "Forward/Backward command" and B4 to "Unused."

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	Forced brake release (*not supported for this product)
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).

I/O Signal Wiring Diagram [For 3 position mode specification (option model number: MF)]

I/O		Standard specification	Split motor and controller power supply specification (option model: TMD2)
Power · I/O connector		0V A1 (Reserved) A2 Backward complete A3 Forward complete A4 Intermediate point complete A5 Alarm output A6  B1 24V B2 Brake release (Note 2) B3 Backward command (Note 1) B4 Forward command (Note 1) B5 (reserved) B6 Alarm clear	Drive power and control power are separate for the TMD2 specification.  0V A1 24V (Control) A2 Backward complete A3 Forward complete A4 Intermediate point complete A5 Alarm output A6 B1 24V (Drive) B2 Brake release (Note 2) B3 Backward command (Note 1) B4 Forward command (Note 1) B5 (reserved) B6 Alarm clear
I/O logic	NPN		
	PNP		

(Note 1) Simultaneous input of B3 and B4 results in intermediate point travel.

(Note 2) The brake is automatically released simultaneously with servo ON. Wire only for manual forced brake release upon servo OFF.

I/O Signal Table [For 3 position mode specification (option model number: MF)]

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
B6	Alarm clear	RES	Alarm clear
A3	Backward complete	LS0/PE0	Backward complete/push complete
A4	Forward complete	LS1/PE1	Forward complete/push complete
A5	Intermediate point complete	LS2/PE2	Intermediate point complete
A6	Alarm clear	*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) Simultaneous input of B3 and B4 results in intermediate point travel.

(Note 2) B1 is 24V (Drive) and A2 is 24V (Control) for the split motor and controller power supply specification (TMD2).

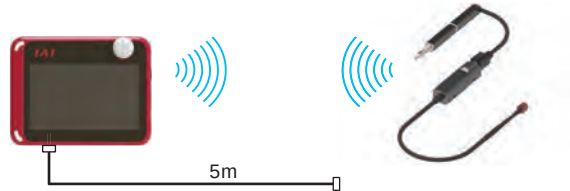
Options

Wireless/wired touch panel teaching pendant

- **Features** This teaching device supports wireless connections. Start point/end point/AVD (acceleration/velocity/deceleration) input and axis operation can be performed wirelessly.

- **Model** **TB-03-** ☐ Please contact IAI for the current supported versions.

- **Configuration** Wireless or wired connection



Specifications

Rated voltage	24VDC±10%
Power consumption	3.6W or less (150mA or less)
Ambient operating temperature	0 to 40°C (no condensation or freezing)
Ambient operating humidity	5-85% RH (no condensation or freezing)
Ingress protection	IPX0
Mass	Approx. 485g (body) + approx. 175g (battery)
Charging method	Wired connection with dedicated adapter/controller
Wireless connection	Bluetooth4.2 class2

Wireless teaching controller

- **Features** Start point/end point/AVD (acceleration/velocity/deceleration) input and jog operation can be easily performed from a distance. (EleCylinder with wireless option only)

- **Model** **TBD-1WL-** ☐

- **Configuration** Wireless connection



Specifications

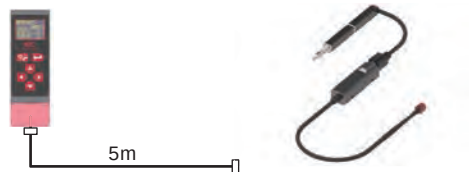
Power input voltage range	5.9VDC (5.7~6.3V) [supplied from dedicated AC adapter]
Ambient operating temperature	0 to 40°C (no condensation or freezing)
Ambient operating humidity	5-85% RH (no condensation or freezing)
Ingress protection	IPX0
Mass	Approx. 115g (including battery weight 55g)
Charging method	Dedicated adapter
Wireless connection	Bluetooth4.2 class2

Wired teaching controller

- **Features** Start point/end point/AVD (acceleration/velocity/deceleration) input and jog operation can be easily performed. Usable with all EleCylinder models thanks to connector connection.

- **Model** **TBD-1**

- **Configuration** Wired connection



Specifications

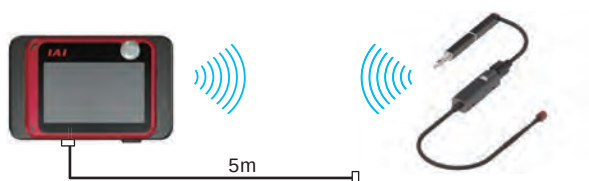
Rated voltage	24VDC ±10% [supplied from controller]
Power consumption	1.44W or less (60mA or less)
Ambient operating temperature	0 to 40°C (no condensation or freezing)
Ambient operating humidity	5-85% RH (no condensation or freezing)
Ingress protection	IP20
Mass	21g (body) + 184g (body integrated cable 5m)

Wired/wireless touch panel teaching pendant with power supply unit

- **Features** Because the TB-03 has a drive power supply unit, brake release, test runs, and data setting are possible even before electrical wiring work takes place.

- **Model** **TB-03E-** ☐ Please contact IAI for the current supported versions.

- **Configuration** Wireless or wired connection



Specifications

Rated input voltage	Single-phase 100~230VAC ±10%
Input current (Under rated I/O conditions in ambient temperature of 25°C)	1.4Atp.(115VAC) 0.6Atp.(230VAC)
Frequency range	50Hz ±5%
Power capacity (Under rated I/O conditions in ambient temperature of 25°C)	141VA (115VAC) 145VA (230VAC)
Output voltage	24VDC ±10%
Mass	Approx. 740g
Cooling method	Natural air cooling

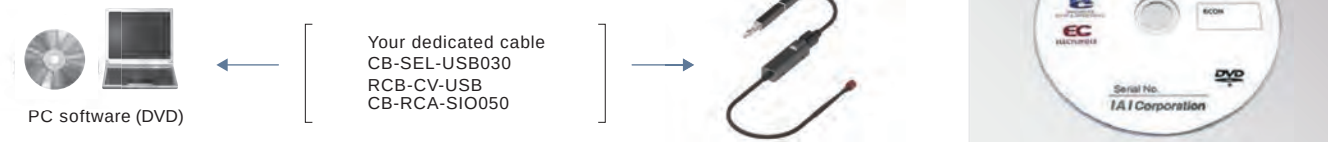
PC teaching software (Windows only)

- Features This start-up support software provides functions such as position teaching, trial operation, and monitoring. It provides a complete range of functions required to make adjustments, to help reduce start-up time.

- Model **IA-OS** (software only, for customers who already own a dedicated connection cable)

Please contact IAI for the current supported versions.

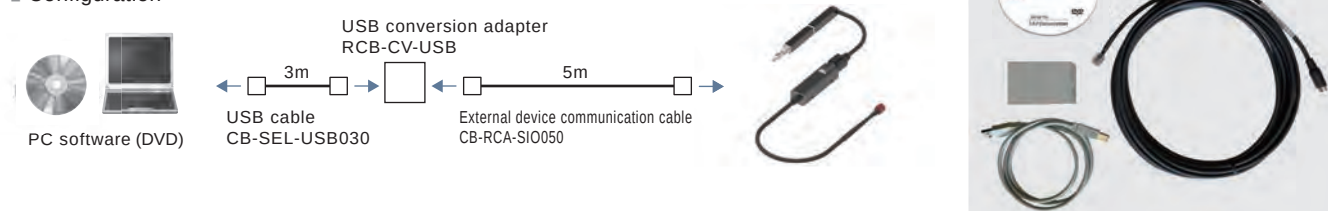
Configuration



- Model **IA-OS-C** (with an external device communication cable + USB conversion adapter + USB cable)

Please contact IAI for the current supported versions.

Configuration



24V power supply

- Model **PSA-24** (without fan) Coming soon

- Model **PSA-24L** (with fan) Coming soon



Specifications

Item	Specifications	
	115VAC input	230VAC input
Power input voltage range	100VAC ~ 230VAC $\pm 10\%$	
Input power supply current	3.9A or less	1.9A or less
Power capacity	Without fan: 250VA With fan: 390VA	Without fan: 280VA With fan: 380VA
Inrush current*1	Without fan: 17A (typ) With fan: 27.4A (typ)	Without fan: 34A (typ) With fan: 54.8A (typ)
Generated heat	33W (204W continuous rated) 54W (300W continuous rated)	23W (204W continuous rated) 37W (330W continuous rated)
Output voltage range*2	24V $\pm 10\%$	
Continuous rated output	Without fan: 8.5A (204W) With fan: 13.8A (330W)	
Peak output	17A (408W)	
Efficiency	86% or more	90% or more
Parallel connection*3	Up to 5 units	

*1 The pulse width of flowing inrush current is less than 5ms.

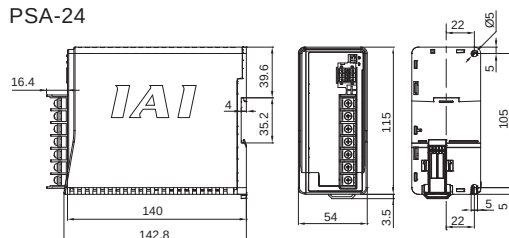
*2 In order to enable parallel operation, this power supply can vary the output voltage according to the load. The power supply unit is therefore for use with IAI controllers only.

*3 Parallel connection cannot be used under the following conditions.

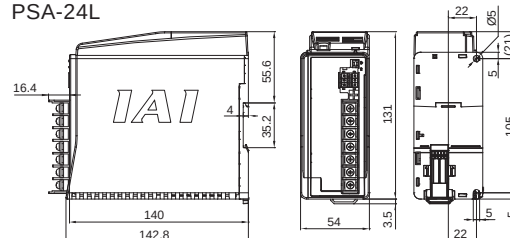
- Parallel connection of PSA-24 (specification without fan) and PSA-24L (specification with fan)
- Parallel connection with a power supply unit other than this power supply

External Dimensions

PSA-24



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)

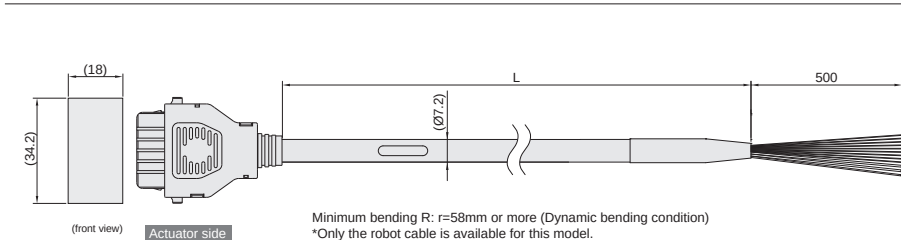
When placing an order for a replacement cable after purchasing a product, please use the model name shown below.

■ Table of Compatible Cables

Cable type	Cable model
Power · I/O cable (user-wired specification)	CB-EC-PWBIO□□□-RB
Power · I/O cable (user-wired specification, 4-way connector)	CB-EC2-PWBIO□□□-RB
Power · I/O cable (RCON-EC connection specification)	CB-REC-PWBIO□□□-RB
Power · I/O cable (RCON-EC connection specification, extension cable)	CB-REC-PWBIO□□□-RB-JY
Power · I/O cable (RCON-EC connection specification, 4-way connector)	CB-REC2-PWBIO□□□-RB

Model **CB-EC-PWBIO** □□□ -RB

*Please indicate the cable length (L) in □□□ .
1m ~ 10m supported (for example, 030 = 3m)



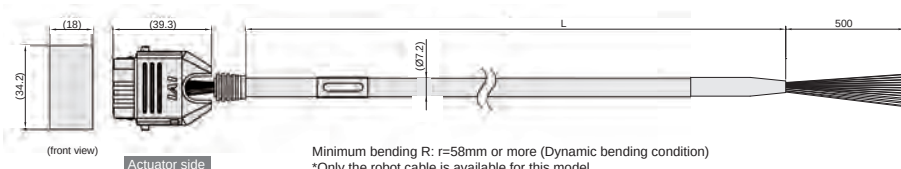
1-1871940-6

Color	Signal name	Pin No.
Black (AWG18)	0V	A1
Red (AWG18)	24V	B1
Light blue (AWG22)	Reserved (Note 1)	A2
Orange (AWG26)	IN0	B3
Yellow (AWG26)	IN1	B4
Green (AWG26)	IN2	B5
Pink (AWG26)	IN3	B6
Blue (AWG26)	OUT0	A3
Purple (AWG26)	OUT1	A4
Gray (AWG26)	OUT2	A5
White (AWG26)	OUT3	A6
Brown (AWG26)	BKRLS	B2

(Note 1) 24V (control) when split motor and controller power supply specification (TMD2) is selected.
(Note 2) Green/Yellow and light gray wires are not in use. (Already cut within contraction tube)

Model **CB-EC2-PWBIO** □□□ -RB

*Please indicate the cable length (L) in □□□ .
1m ~ 10m supported (for example, 030 = 3m)



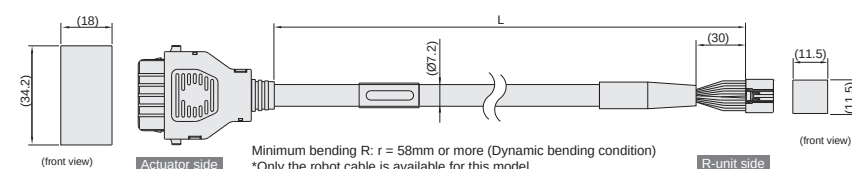
1-1871940-6

Color	Signal name	Pin No.
Black (AWG18)	0V	A1
Red (AWG18)	24V	B1
Light blue (AWG22)	Reserved (Note 1)	A2
Orange (AWG26)	IN0	B3
Yellow (AWG26)	IN1	B4
Green (AWG26)	IN2	B5
Pink (AWG26)	IN3	B6
Blue (AWG26)	OUT0	A3
Purple (AWG26)	OUT1	A4
Gray (AWG26)	OUT2	A5
White (AWG26)	OUT3	A6
Brown (AWG26)	BKRLS	B2

(Note 1) 24V (control) when split motor and controller power supply specification (TMD2) is selected.
(Note 2) Green/Yellow and light gray wires are not in use. (Already cut within contraction tube)

Model **CB-REC-PWBIO** □□□ -RB

*Please indicate the cable length (L) in □□□ .
1m ~ 9m supported (for example, 030 = 3m)



1-1871940-6

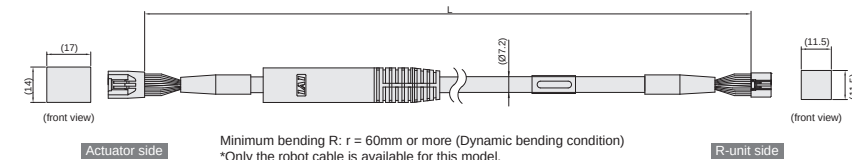
Color	Signal name	Pin No.
Black (AWG18)	0V	A1
Red (AWG18)	24V(MP)	B1
Light blue (AWG22)	24V(CP)	A2
Orange (AWG26)	IN0	B3
Yellow (AWG26)	IN1	B4
Green (AWG26)	IN2	B5
Green/Yellow (AWG26)	SD+	B6
Light gray (AWG26)	SD-	A6
Blue (AWG26)	OUT0	A3
Purple (AWG26)	OUT1	A4
Gray (AWG26)	OUT2	A5
Brown (AWG26)	BKRLS	B2

DF62E-13S-2.2C(18)

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

Model **CB-REC-PWBIO** □□□ -RB-JY

*Please indicate the cable length (L) in □□□ .
0.5m, 1m~10m supported (for example, 030 = 3m)



DF62B-13EP-2.2C(18)

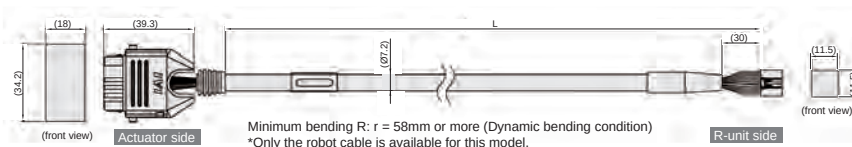
Color	Signal name	Pin No.
Black (AWG18)	0V	2
Red (AWG18)	24V(MP)	1
Light blue (AWG22)	24V(CP)	12
Orange (AWG26)	OUT0	7
Yellow (AWG26)	OUT1	8
Green (AWG26)	OUT2	9
Green/Yellow (AWG26)	SD+	6
Light gray (AWG26)	SD-	10
Blue (AWG26)	IN0	3
Purple (AWG26)	IN1	4
Gray (AWG26)	IN2	5
Brown (AWG26)	BKRLS	11
Green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

DF62E-13S-2.2C(18)

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

Model **CB-REC2-PWBIO** □□□ -RB

*Please indicate the cable length (L) in □□□ .
1m ~ 9m supported (for example, 030 = 3m)



1-1871940-6

Color	Signal name	Pin No.
Black (AWG18)	0V	A1
Red (AWG18)	24V(MP)	B1
Light blue (AWG22)	24V(CP)	A2
Orange (AWG26)	IN0	B3
Yellow (AWG26)	IN1	B4
Green (AWG26)	IN2	B5
Green/Yellow (AWG26)	SD+	B6
Light gray (AWG26)	SD-	A6
Blue (AWG26)	OUT0	A3
Purple (AWG26)	OUT1	A4
Gray (AWG26)	OUT2	A5
Brown (AWG26)	BKRLS	B2

DF62E-13S-2C(18)

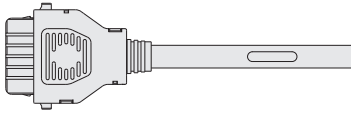
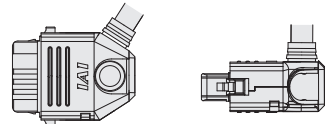
Pin No.	Signal name	Color
2	0V	Black (AWG22)
1	24V(MP)	Red (AWG22)
12	24V(CP)	Light blue (AWG22)
7	OUT0	Orange (AWG26)
8	OUT1	Yellow (AWG26)
9	OUT2	Green (AWG26)
6	SD+	Green/Yellow (AWG26)
10	SD-	Light gray (AWG26)
3	IN0	Blue (AWG26)
4	IN1	Purple (AWG26)
5	IN2	Gray (AWG26)
11	BKRLS	Brown (AWG26)
13	FG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

Maintenance Parts (Cables)

4-way connector cable

This cable allows the EleCylinder cable connector direction to be changed to any of 4 directions.
The cable management for the connector is the same as that of the power · I/O cable CB-EC-PWBIO□□□-RB / CB-REC-PWBIO□□□-RB.

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

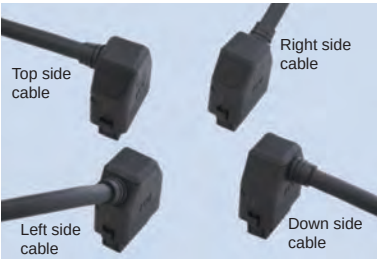
	Standard connector (actuator side)	4-way connector (actuator side)
External view		
User wiring specification	CB-EC-PWBIO□□□-RB	CB-EC2-PWBIO□□□-RB
RCON-EC connection specification	CB-REC-PWBIO□□□-RB	CB-REC2-PWBIO□□□-RB

■ How to Order

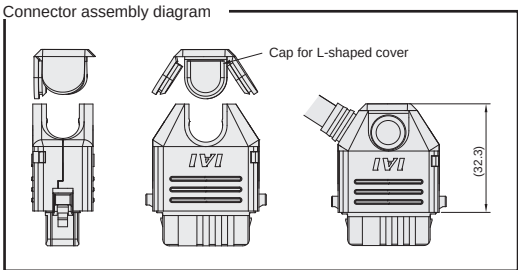
The cable length may be from 1m to 10m long.
The length can be specified in 1m units.

(Ex.) When ordering 4-way connector 3m/10m
Cable length 3m : CB-EC2-PWBIO030-RB
Cable length 10m : CB-EC2-PWBIO100-RB

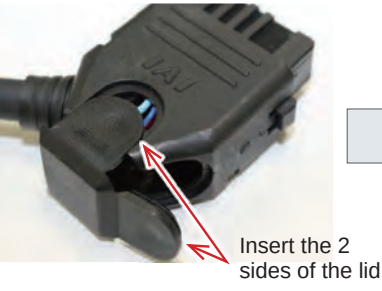
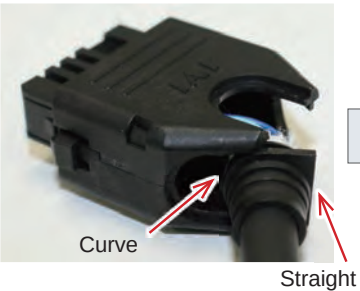
■ Assembly Method



Cable direction can be set to any of 4 directions



- ① Insert while sliding along the groove in the desired direction from the semi-cylindrical curved portion.
- ② Confirm that the cable has been firmly inserted, and then insert the 2 sides of the lid along the groove.
- ③ Finally, press the remaining side of the lid.



**EC EleCylinder Series
Micro Cylinder Type
Catalogue No. 0526-E**

The information contained in this catalog
is subject to change without notice for the
purpose of product improvement



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