



## Rod Type

## First Step Guide    Eleventh Edition

This Instruction Manual is original.



URL:[www.iai-robot.co.jp/data\\_dl/CAD\\_MANUAL](http://www.iai-robot.co.jp/data_dl/CAD_MANUAL)

If you need a bound copy of the instruction manual, order it from the nearest sales office listed in the First Step Guide or at the end of the instruction manual. It will be provided for a fee.

- Using or copying all or part of this Instruction Manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

## Product Check

If you find any fault in the contained model or any missing parts, contact us or our distributor.

| No.         | Part Name                      | Model                                                               | Quantity | Remarks |
|-------------|--------------------------------|---------------------------------------------------------------------|----------|---------|
| 1           | Actuator Main Body             | Refer to "How to read the model plate", "How to read the model No." | 1        |         |
| Accessories |                                |                                                                     |          |         |
| 2           | Motor · Encoder Cable (Note 1) |                                                                     | 1        |         |
| 3           | Safety Guide                   | M0194                                                               | 1        |         |

Please refer to [Wiring] for the applicable cables.

Model —————▶ MODEL RCP3-RA2AC-I-20P-1-50-P1-P  
Serial number —————▶ SERIAL No. 600090255

MADE IN JAPAN

### 3.1 RCP3 Actuator

**RCP3-RA2AC-I-20P-1-5-P1-P-B-\*\***

**<Series>**  
Identification for IAI use only (Note 1)

**<Type>**  
[Thin and Small Type ROBO Cylinder]  
Motor Coupling Type  
RA2AC  
RA2BC  
Motor Reversing Type  
RA2AR  
RA2BR

**<Encoder type>**  
I : Incremental

**<Motor Type>**  
20P (20 □Size): RA2AC, RA2BC, RA2AR, RA2BR

**<Lead>**  
RA2AC, RA2AR  
1/2/4  
1S/2S/4S  
RA2BC, RA2BR  
1/2/4/6  
2S/4S/6S

**<Option>**  
B : Equipped with the Brake  
ML : Motor Exiting from Left Side  
(Applicable to Motor Reversing Type)  
MR : Motor Exiting from Right Side  
(Applicable to Motor Reversing Type)  
NM : Reversed Home Specification

**<Cable length>**  
N : None  
P : 1m  
S : 3m  
M : 5m  
X□ : Specified Length

**<Applicable Controller>**  
P1: PSEL  
PCON-C/CG  
PCON-CY  
PCON-SE  
PCON-PL/PO  
P3: PCON-CB/CGB  
PCON-CYB/PLB/POB  
PCON-CA  
PMEC  
PSEP  
MSEP, MCON, MSEL  
RCON-PC  
RCM-P6PC

**<Stroke>**

Note 1 This may be displayed for the manufacturing reason.  
(This is not to indicate the manufacturing model code.)

Note 1 This may be displayed for the manufacturing reason.  
(This is not to indicate the manufacturing model code.)

[Refer to the catalog or Instruction Manual for specification details.]

RCA2-RN3NA-I-10-4-30-A1-P-LA-\*\*

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>&lt;Series name&gt;</p> <p>Standard type RCA2</p> <p>Cleanroom type RCA2CR</p> <p>Dust-proof and Splash proof type RCA2W</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                    | <p>&lt;Identification for IAI use only (Note 1)&gt;</p> <p>&lt;Option&gt;</p> <p>B : Brake-equipped</p> <p>CNS: Small Connector Type (Note 3)</p> <p>K1 : Connector cable exit on left side</p> <p>K2 : Connector cable exit on front side</p> <p>K3 : Connector cable exit on right side</p> <p>LA : Low power consumption type</p> <p>ML : Motor left reversing type</p> <p>MR : Motor right reversing type</p> <p>MT : Motor top reversing type</p> <p>NM : Reversed-home specification</p> <p>VL : L-shaped type vacuum joint</p> <p>WP : IP52 applicable type (Note 2)</p> |
| <p>&lt;Type&gt;</p> <p>Slim types</p> <p>RA2AC (Motor coupling types)</p> <p>RA2AR (Motor reversing types)</p> <p>Short types</p> <p>(Nut affixing types)</p> <p>RN3NA, RN4NA</p> <p>RN3NB (RCA2CR/W)</p> <p>RN4NB (RCA2CR/W)</p> <p>RN3N, RN4N</p> <p>Short types</p> <p>(Tapped-hole mounting types)</p> <p>RP3NA, RP4NA</p> <p>RP3NB (RCA2CR/W)</p> <p>RP4NB (RCA2CR/W)</p> <p>RP3N, RP4N</p> <p>Single guide types</p> <p>GS3NA, GS4NA</p> <p>GS3NB (RCA2CR/W)</p> <p>GS4NB (RCA2CR/W)</p> <p>GS3N, GS4N</p> <p>Double guide types</p> <p>GD3NA, GD4NA</p> <p>GD3NB (RCA2CR/W)</p> <p>GD4NB (RCA2CR/W)</p> <p>GD3N, GD4N</p> <p>Slide unit types</p> <p>SD3NA, SD4NA</p> <p>SD3NB (RCA2CR/W)</p> <p>SD4NB (RCA2CR/W)</p> <p>SD3N, SD4N</p> | <p>&lt;Cable length&gt;</p> <p>N : None</p> <p>P : 1m</p> <p>S : 3m</p> <p>M : 5m</p> <p>X□□: Specified length</p> | <p>&lt;Applicable controller&gt;</p> <p>A1 : ASEL, ACON-C/CG , ACON-CY, ACON-SE, ACON-PL/PO</p> <p>A3 : ACON-CYB, ACON-PLB/POB, MCON AMEC, ASEP, MSEP</p> <p>A5 : ACON-CB/CGB, ACON-CA</p> <p>A6 : RCON-AC, RCM-P6AC</p>                                                                                                                                                                                                                                                                                                                                                        |
| <p>&lt;Encoder type&gt;</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>&lt;Lead&gt;</p> <p>RA2AC, RA2AR</p> <p>1/2/4</p> <p>RN3NA, RP3NA, GS3NA, GD3NA, SD3NA,</p>                     | <p>&lt;Stroke&gt;</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

<Encoder type>  
I: Incremental

|                           |                                                                                                            |                                                                                                                               |
|---------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>&lt;Motor type&gt;</b> |                                                                                                            | RN3NA, RP3NA, GS3NA, GD3NA, SD3NA,<br>RN3NB, RP3NB, GS3NB, GD3NB, SD3NB,<br>RN3N, RP3N, GS3N, GD3N, SD3N (Ball screw)<br>1/24 |
| 5 (5W)                    | : RA2AC, RA2AR                                                                                             |                                                                                                                               |
| 10 (10W)                  | : RN3NA, RP3NA, GS3NA, GD3NA, SD3NA,<br>RN3NB, RP3NB, GS3NB, GD3NB, SD3NB,<br>RN3N, RP3N, GS3N, GD3N, SD3N | RN4NA, RP4NA, GS4NA, GD4NA, SD4NA,<br>RN4N, RP4N, GS4N, GD4N, SD4N (Lead screw)<br>2S/4S/6S                                   |
| 20 (20W)                  | : RN4NA, RP4NA, GS4NA, GD4NA, SD4NA,<br>RN4NB, RP4NB, GS4NB, GD4NB, SD4NB,<br>RN4N, RP4N, GS4N, GD4N, SD4N | RN4NA, RP4NA, GS4NA, GD4NA, SD4NA,<br>RN4NB, RP4NB, GS4NB, GD4NB, SD4NB,<br>RN4N, RP4N, GS4N, GD4N, SD4N                      |

Note 2 As RCA2W-RN3NB, RN4NB, RP3NB, RP4NB, GS3NB, GS4NB, GD3NB, GD4NB, SD3NB and SD4NB are applicable for IP52, it is not necessary to indicate Option WP.

Note 3 It is available for setting only when applicable controller A3, A5 or A6 is selected.

[Refer to the catalog or Instruction Manual for specification details.]



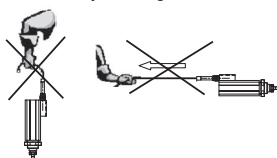
**Caution :** If it is necessary to change the orientation of cable ejection of the connector after the product has already been delivered, please contact IAI.  
In case that you change the orientation of cable ejection by your own, we will not be able to guarantee the product as there is a concern of malfunction due to a reason such as pinching of wire inside the motor unit.

## Precautions in Handling

Handle it with great care, and keep to the following instructions. Failure to do so may cause damage to the product.

- When setting down the packed actuator keep it horizontal.
- Do not step on the package.
- Do not place any heavy article on top of the package that may deform the package.

Do not transport the actuator by holding the cable or move it by pulling the cable.



- When the actuator is taken out from the package and handled, hold the base section.
- When carrying the actuator, do not bump or drop the actuator or otherwise cause the actuator to receive any impact or excessive force.
- Do not give any unnatural force to any of the sections in the actuator.

## Installation Environment, Storage Environment

Generally speaking, it should be an environment where a worker can work without any protective gear.

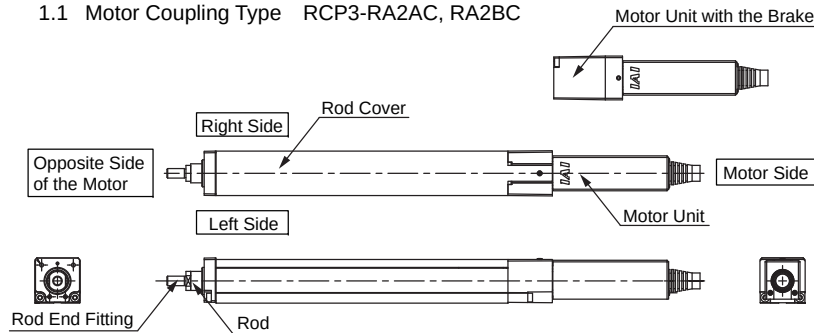
- There should be no direct sunlight
- Any radiant heat from a large heat source such as heat treatment furnace should not be directed at the machine main body.
- The ambient temperature should be 0 to 40°C.
- The relative humidity should be 85% or less. There should not be dew condensation.
- The product possesses dust proof and splash proof performances of a protection structure of IP52. (Dust and Splash proof type: Models with B at the end of model code)
- It possesses the dust-proof performance of IP50 protection structure. (Dust-proof type: Models with A at the end of model code)
- There should not be corrosive gas or flammable gas.
- It should be a normal assembling work environment where there is not too much dust. (For RA2A□ or RA2B□, when it is used under the condition where dust hangs in the air, the life is remarkably shortened.) (excludes dust for Dust-proof type)
- Oil mist or cutting liquid should not be directed at the machine.
- Chemical liquid should not be splashed on it.
- An impact or vibration should not be transmitted to it.
- There should not be strong electromagnetic waves, ultraviolet rays or radiation.
- The working space required for maintenance or inspection should be secured.

The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no condensation forms. Unless specially specified, moisture absorber protection is not included in the package when the machine is delivered. In the case that the machine is to be stored and preserved in an environment where condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.

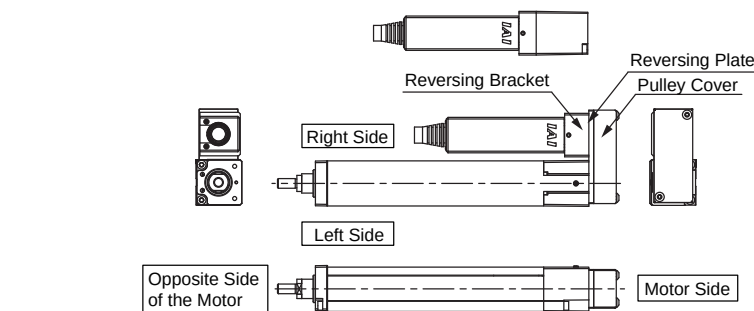
In the storage and preservation for up to 1 month, it can endure in the temperature at 60°C at maximum. For the storage and preservation longer than that, keep the temperature at 50°C at maximum.

## External Dimensions

1.1 Motor Coupling Type RCP3-RA2AC, RA2BC

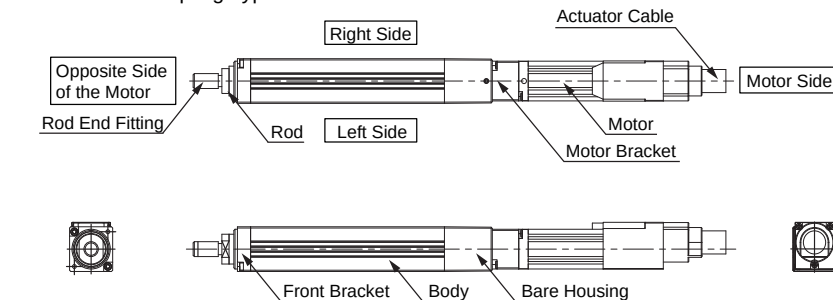


1.2 Motor Reversing Type RCP3-RA2AR, RA2BR

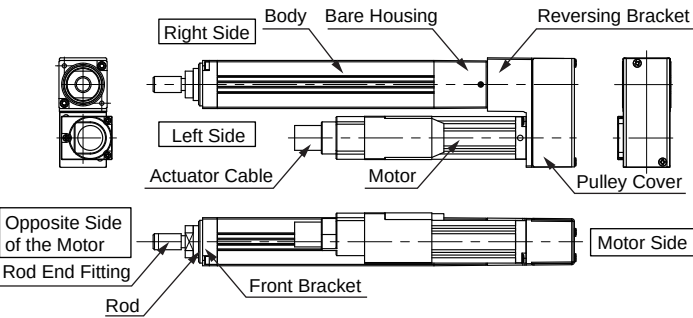


[Refer to the catalog or Instruction Manual for the details such as the appearance]

2.1 Motor Coupling Type RCA2-RA2AC



2.2 Motor Reversing Type RCA2-RA2AR



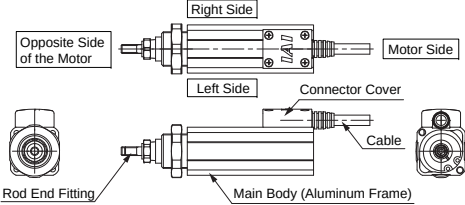
[Refer to the catalog or Instruction Manual for the details such as the appearance]

3. Total Length Short Type

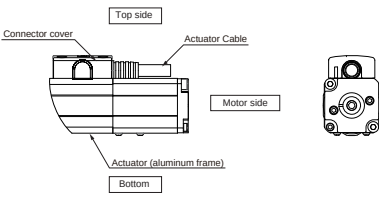
3.1 Fixed Nut Setup Type

RCA2-RN3NA, RN3N (Lead Screw, Ball Screw), RN4NA, RN4N (Lead Screw, Ball Screw)

· Without Brake



· Brake-equipped

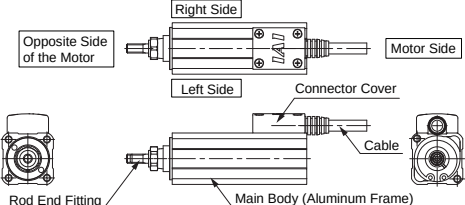


[Refer to the catalog or Instruction Manual for the details such as the appearance]

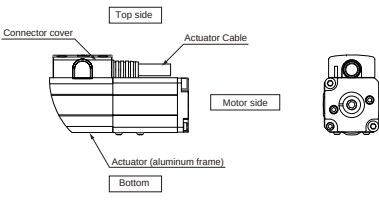
3.2 Tapped Hole Setup Type

RCA2-RP3NA, RP3N (Lead Screw, Ball Screw), RP4NA, RP4N (Lead Screw, Ball Screw)

· Without Brake



· Brake-equipped

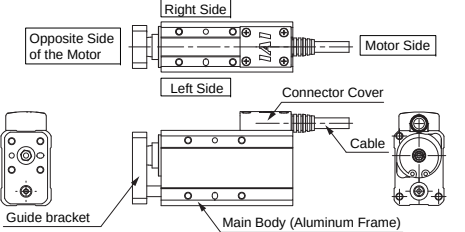


[Refer to the catalog or Instruction Manual for the details such as the appearance]

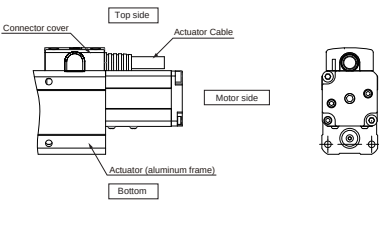
3.3 Single Guide Type

RCA2-GS3NA, GS3N (Lead Screw, Ball Screw), GS4NA, GS4N (Lead Screw, Ball Screw)

· Without Brake



· Brake-equipped

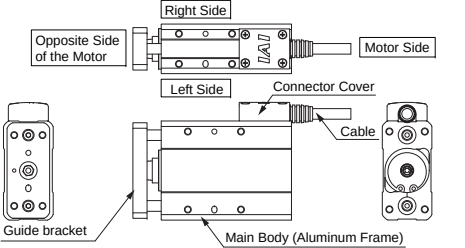


[Refer to the catalog or Instruction Manual for the details such as the appearance]

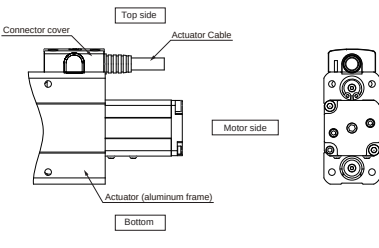
3.4 Double Guide Type

RCA2-GD3NA, GD3N (Lead Screw, Ball Screw), GD4NA, GD4N (Lead Screw, Ball Screw)

· Without Brake



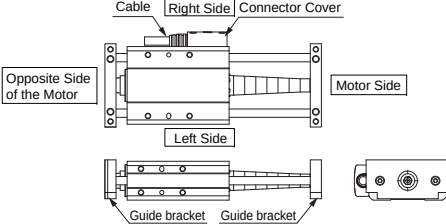
· Brake-equipped



[Refer to the catalog or Instruction Manual for the details such as the appearance]

3.5 Slide Unit Type

RCA2-SD3NA, SD3N (Lead Screw, Ball Screw), SD4NA, SD4N (Lead Screw, Ball Screw)

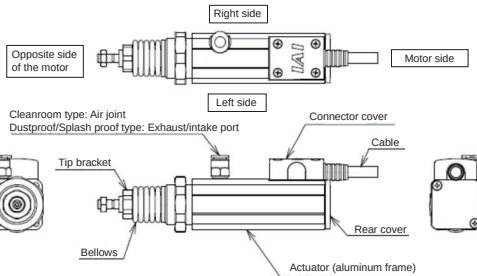


[Refer to the catalog or Instruction Manual for the details such as the appearance]

3.6 Cleanroom Type, Dust-proof Type Short Types (Nut Affixing Types)

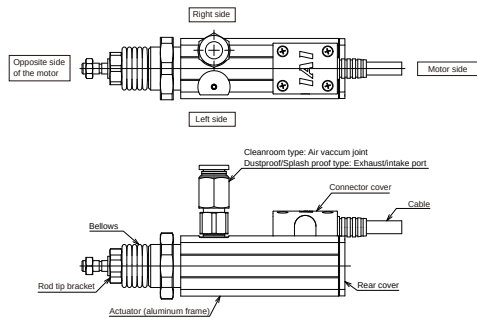
RCA2CR, RCA2W-RN3NB (Ball screw), RN4NB (Ball screw)

· Without Brake



RCA2CR, RCA2W-RN3NA (Ball screw), RN4NA (Ball screw)

· Without Brake

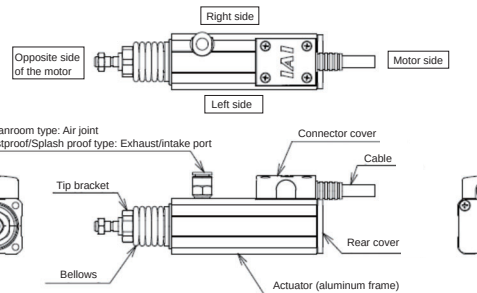


[Refer to the catalog or Instruction Manual for the details such as the appearance]

3.7 Cleanroom Type, Dust-proof Type Short Types (Tapped-hole Mounting Types)

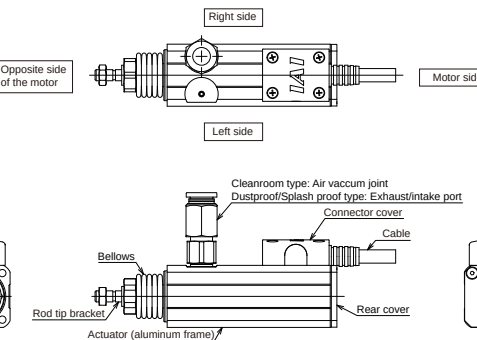
RCA2CR, RCA2W-RP3NB (Ball screw), RP4NB (Ball screw)

· Without Brake



RCA2CR, RCA2W-RP3NA (Ball screw), RP4NA (Ball screw)

· Without Brake

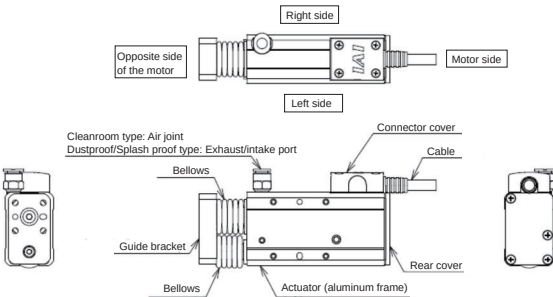


[Refer to the catalog or Instruction Manual for the details such as the appearance]

3.8 Cleanroom Type, Dust-proof Type Single Guide Types

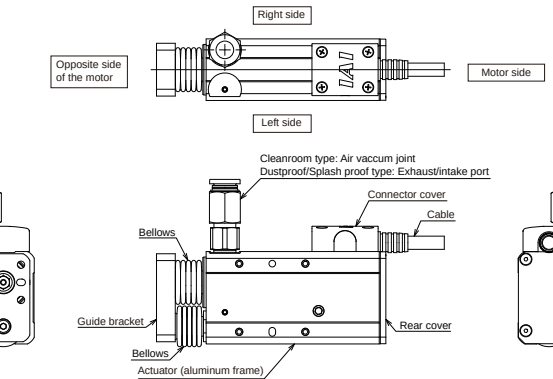
RCA2CR, RCA2W-GS3NB (Ball screw), GS4NB (Ball screw)

· Without Brake



RCA2CR, RCA2W-GS3NA (Ball screw), GS4NA (Ball screw)

· Without Brake

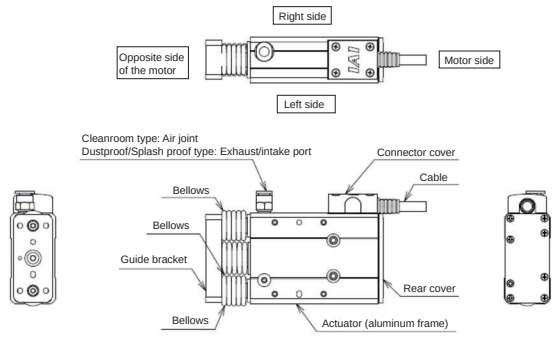


[Refer to the catalog or Instruction Manual for the details such as the appearance]

3.9 Cleanroom Type, Dust-proof Type Double Guide Types

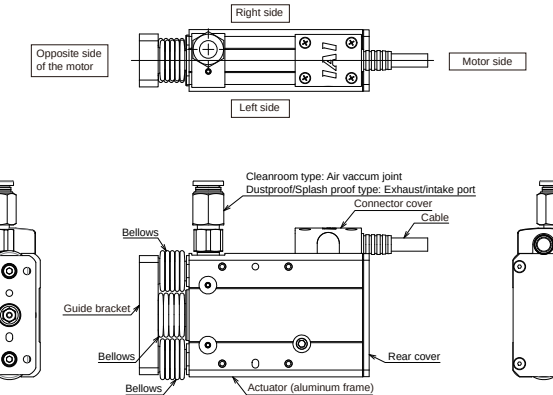
RCA2CR, RCA2W-GD3NB (Ball screw), GD4NB (Ball screw)

· Without Brake



RCA2CR, RCA2W-GD3NA (Ball screw), GD4NA (Ball screw)

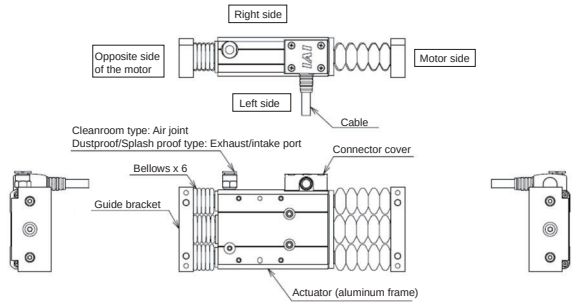
· Without Brake



[Refer to the catalog or Instruction Manual for the details such as the appearance]

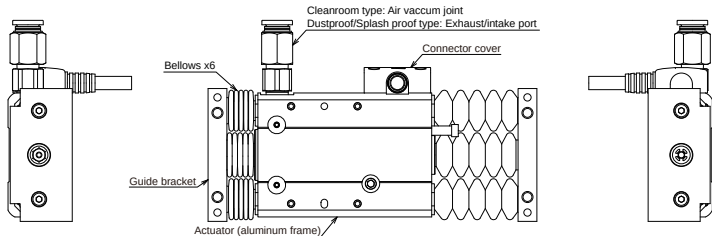
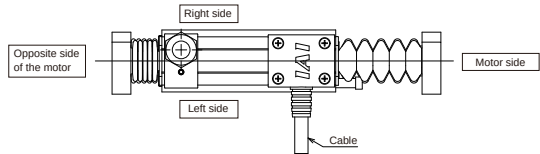
3.10 Cleanroom Type, Dust-proof Type Slide Unit Types  
RCA2CR, RCA2W-SD3NB (Ball screw), SD4NB (Ball screw)

· Without Brake



RCA2CR, RCA2W-SD3NA (Ball screw), SD4NA (Ball screw)

· Without Brake



[Refer to the catalog or Instruction Manual for the details such as the appearance]

## Attachment

Refer to the Instruction Manual for the attachments of the actuator and loads. Rod Type RN3N(A) (B), RN4N(A) (B), RP3N(A) (B) and RP4N(A) (B) are not equipped with anti-rotation feature. Prepare an anti-rotation tool and attach it following the instruction manual.

[Precautions for Attachments]

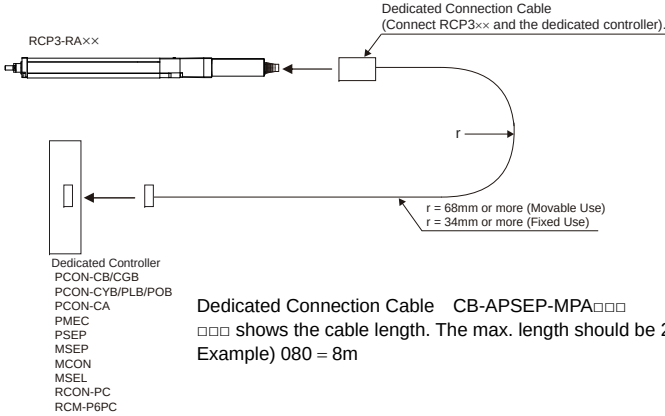
| No. | Item                   | Precautions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Attachment Surface     | <ul style="list-style-type: none"><li>Make sure the platform to install the RA2AC, RA2BC, RA2AR and RA2BR possesses enough stiffness so it would not generate vibration.</li><li>Make sure that the surface to install the actuator and that used as the datum are a well-finished machined surface or one that possesses an accuracy equivalent to it. For RA2AC, RA2BC, RA2AR and RA2BR, assure of 0.05mm/m max. for the flatness.</li><li>Secure the space where maintenance work can be performed.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                          |
| 2   | Bolts to be used       | <ul style="list-style-type: none"><li>For the bolts to be used, a high-tensile bolt complying with ISO-10.9 or more is recommended.</li><li>When using the tapped hole on actuators except for RN3N(A) (B), RN4N(A) (B), RP3N(A) (B) and RP4N(A) (B), make sure to use screws with the thread length less than the length of engagement.</li><li>The tapped holes on GS3N(A) (B), GS4N(A) (B), GD3N(A) (B), GD4N(A) (B), SD3N(A) (B) and SD4N(A) (B) are a through hole. Exercise precaution so the screw tips do not exceed the surface.</li><li>For the RA2AC, RA2BC, RA2AR and RA2BR mounting, use a bolt with the dimension of its effective mating length to the tapped hole size as stated below.<ul style="list-style-type: none"><li>When female screw is on steel → Thread length same as nominal diameter</li><li>If female screw hole in aluminum → Maximum screw-in depth</li></ul></li></ul> |
| 3   | Tightening Torque      | <ul style="list-style-type: none"><li>Please follow the specification values stated in the Instruction Manual for the tightening torque. Failure to do so may cause an operation problem.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 4   | Load Attachment to Rod | Please do not apply any external force from other than rod moving direction (radial load) to the rod. Any perpendicular or radial force to the rod may cause damage to the actuator or operation problem. Equip an actuator with a guide or an external guide if any external force from other direction than the rod moving direction is applied.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Wiring

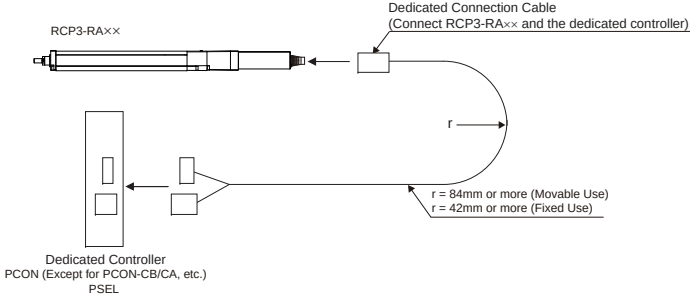
For the controller, only the dedicated controller manufactured by our company can be used.  
For the connection between the actuator and controller, use the attached dedicated connection cable.  
For the connection between the actuator and controller, use the attached dedicated connection cable.

### 1. RCP3 Actuator Connection

Motor Coupling Type RA2AC/RA2BC, Motor Reversing Type RA2AR/RA2BR  
[Connection to the PCON-CB/CGB/CYB/PLB/POB, PCON-CA, PMEC, PSEP, MSEP, MCON, MSEL, RCON-PC and RCM-P6PC controller]

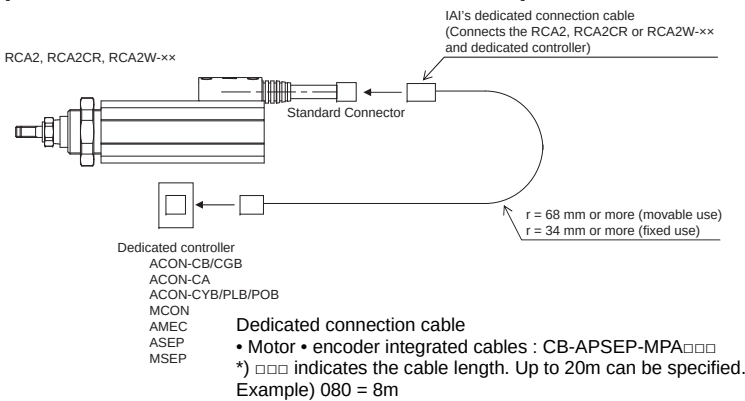


[Connection to the PCON (except for PCON-CB/CA, etc.), PSEL controller]

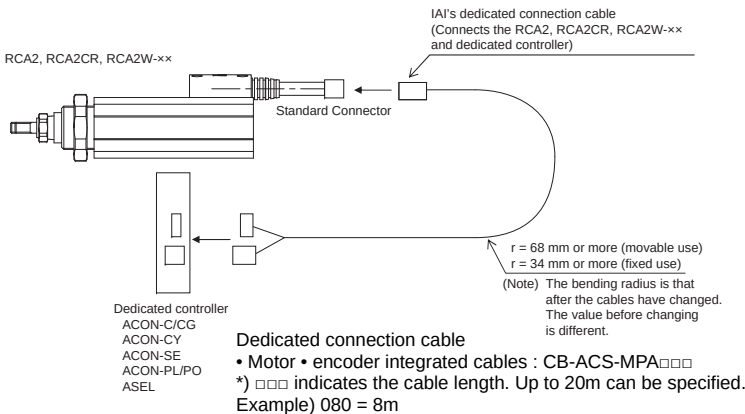


### 2. RCA2, RCA2CR, RCA2W Actuator Connection

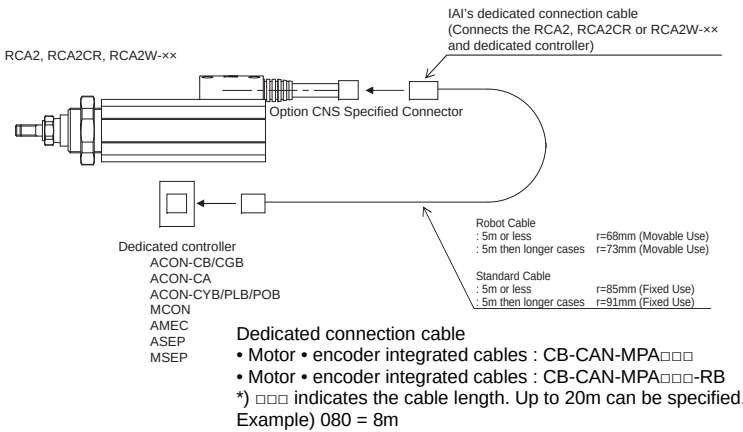
RN3N(A) (B)/RN4N(A) (B), RP3N(A) (B)/RP4N(A) (B), GS3N(A) (B)/GS4N(A) (B), GD3N(A) (B)/GD4N(A) (B), SD3N(A) (B)/SD4N(A) (B)  
[ACON-CB/CGB/CYB/PLB/POB, MCON, AMEC, ASEP, MSEP]



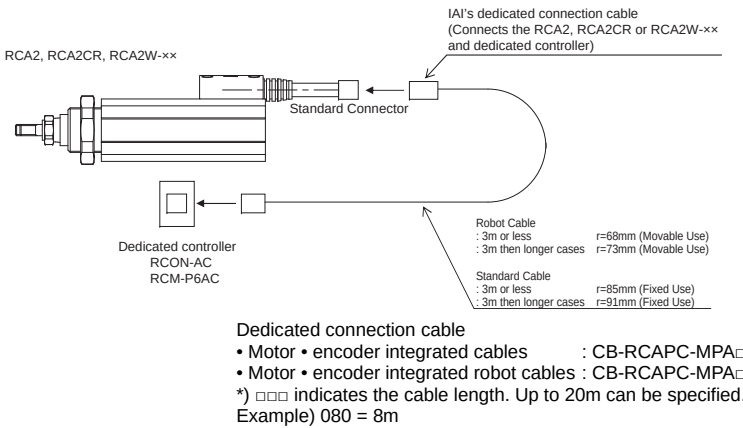
[ACON-C/CG, ACON-CY, ACON-SE, ACON-PL/PO, ASEL]



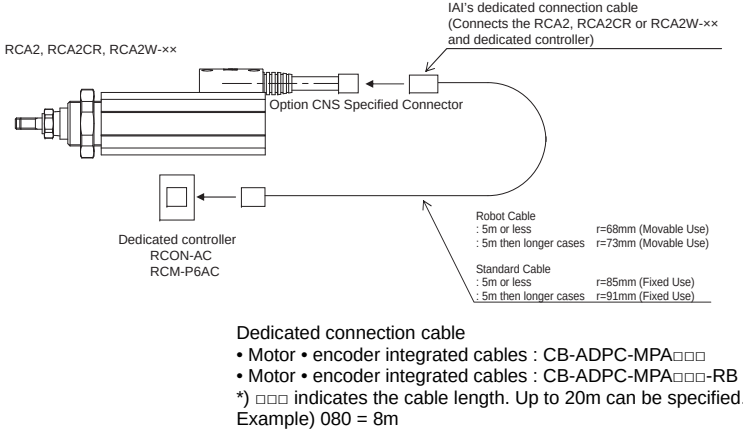
[ACON-CB/CGB, ACON-CA, ACON-CYB/PLB/POB, MCON, AMEC, ASEP, MSEP]



[RCON-AC and RCM-P6AC]

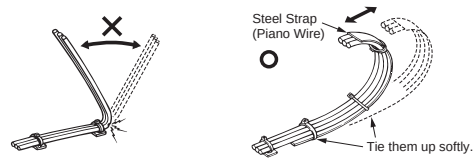


[RCON-AC and RCM-P6AC]

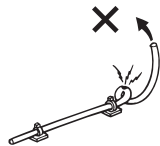


[Prohibited Items in the Cable Processing]

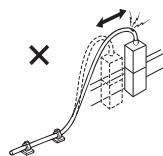
- Do not pull or bend forcibly the cable so as not to give any extra load or tension to the cable.
- Do not process the cable to extend or shortening by means of cutting out, combination or connecting with another cable.
- Do not let the cable flex at a single point.



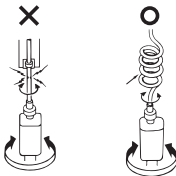
- Do not let the cable bend, kink or twist.



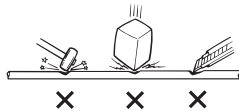
- Do not pull the cable with a strong force.



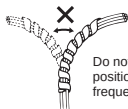
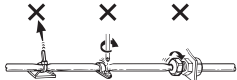
- Do not let the cable receive a turning force at a single point.



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

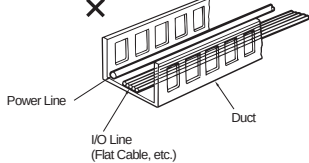


- When fixing the cable, provide a moderate slack and do not tension it too tight.

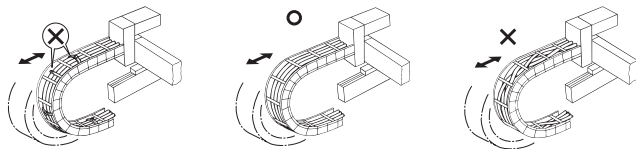


Do not use spiral tube in any position where cables are bent frequently.

- Separate the I/O line, communication line and power line from each other. Arrange so that such lines are independently routed in the duct.



- Follow the instructions below when using a cable carrier.
- If there is an indication to the cable for the space factor in a cable carrier, refer to the wiring instruction given by the supplier when storing the cable in the cable carrier.
  - Avoid the cables to get twined or twisted in the cable carrier, and also to have the cables move freely and do not tie them up. (Arrange the wiring so the cables are not to be pulled when bent.) Do not pile up cables. It may cause faster abrasion of the sheaths or cable breakage.



 Caution :

- When the cable is connected or disconnected, make sure to turn off the power to the controller. When the cable is connected or disconnected with the controller power turned ON, it might cause a malfunction of the actuator and result in a serious injury or damage to the machinery.
- When the connector connection is not correct, it would be dangerous because of a malfunction of the actuator. Make sure to confirm that the connector is connected correctly.



## IAI Corporation

Head Office: 1210 Iharacho Shimizu-KU Shizuoka City Shizuoka 424-0114, Japan  
TEL +81-54-364-5105 FAX +81-54-364-2589  
website: [www.iai-robot.co.jp/](http://www.iai-robot.co.jp/)

## IAI America, Inc.

Head Office: 2690 W. 237th Street, Torrance, CA 90505  
TEL +1-310-891-6015 FAX +1-310-891-0815  
Chicago Office: 110 East State Parkway, Schaumburg, IL 60173  
TEL +1-847-908-1400 FAX +1-847-908-1399  
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066  
TEL +1-678-354-9470 FAX +1-678-354-9471  
website: [www.intelligentactuator.com](http://www.intelligentactuator.com)

Technical Support available in Europe

## IAI Industrieroboter GmbH

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany  
TEL +49(0)6196-88950 FAX +49(0)6196-889524  
website: [www.iai-automation.com](http://www.iai-automation.com)

Technical Support available in Great Britain



Duttons Way, Shadsworth Business Park, Blackburn, Lancashire, BB1 2QR, United Kingdom  
TEL +44(0)1254-685900  
website: [www.lcautomation.com](http://www.lcautomation.com)

## IAI (Shanghai) Co., Ltd.

SHANGHAI JIAHUA BUSINESS CENTER A8-303, 808, Hongqiao Rd. Shanghai 200030, China  
TEL +86-21-6448-4753 FAX +86-21-6448-3992  
website: [www.iai-robot.com](http://www.iai-robot.com)

## IAI Robot (Thailand) Co., Ltd.

825 PhairojKijja Tower 7th Floor, Debaratana RD., Bangna-Nuea, Bangna, Bangkok 10260, Thailand  
TEL +66-2-361-4458 FAX +66-2-361-4456  
website: [www.iai-robot.co.th](http://www.iai-robot.co.th)