



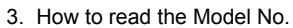
Thank you for purchasing our product.  
Make sure to read the Safety Guide and detailed Instruction Manual (CD/DVD) included with the product in addition to this First Step Guide to ensure correct use.  
This Instruction Manual is original.

- 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.

This product is comprised of the following parts if it is of standard configuration.  
If you find any fault in the contained model or any missing parts, contact us or our distributor.

No.	Part Name	Model	Remarks
1	Actuator Main Body	Refer to "How to read the model plate", "How to read the model No."	
Accessories			
2	Motor · Encoder Cable <sup>1)</sup>		
3	First Step Guide		
4	Instruction Manual (CD/DVD)		
5	Safety Guide		

## 2. How to read the model plate



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

<Series> Identification for IAI use only\*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), 20SP (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 : PMEC  
PSEP

<Stroke>

[Refer to the catalog or Instruction Manual (CD/DVD) for specification details.]

**RCA2-RN3N-I-10-4-30-A1-P-FL-\*\*-\*\***

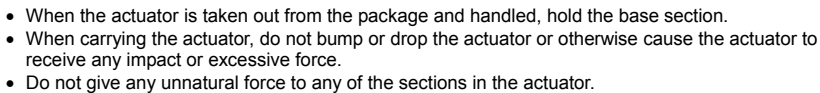
- <Series> Identification for IAI use only<sup>\*</sup>
- <Type>
  - [Thin and Small Type ROBO Cylinder]
  - Slim Type
  - (Motor Coupling Type)
  - RA2AC
  - (Motor Reversing Type)
  - RA2AR
  - Total Length Short Type
  - (Fixed Nut Setup Type)
  - RN3NA, RN4NA
  - RN3N, RN4N
  - Total Length Short Type
  - (Tapped Hole Setup Type)
  - RP3NA, RP4NA
  - RP3N, RP4N
  - Single Guide Type
  - GS3NA, GS4NA
  - GS3N, GS4N
  - Double Guide Type
  - GD3NA, GD4NA
  - GD3N, GD4N
  - Slide Unit Type
  - SD3NA, SD4NA
  - SD3N, SD4N
- <Option>
  - K2 : Connector Cable exit direction changed
  - LA : Power Saving Type
- <Cable length>
  - N : None
  - P : 1m
  - S : 3m
  - M : 5m
  - X□□ : Specified Length
- <Applicable Controller>
  - A1 : ASEL
  - ACON-C/CG
  - ACON-CY
  - ACON-SE
  - ACON-PL/PO
  - A3 : AMEC
  - ASEP
- <Stroke>
- <Lead>
  - RN3NA, RP3NA, RN4NA, RP4NA, GS3NA, GD3NA, GS4NA, GD4NA, SD3NA, SD4NA
  - RN3N, RP3N, GS3N, RN4N, RP4N, GS4N, GD3N, SD3N, GD4N, SD4N
  - (Lead Screw)
  - 1S/2S/4S
  - 2S/4S/6S
- <Encoder type>
  - I : Incremental
- <Motor Type>
  - 5 (5W) : RA2AC, RA2AR
  - 10 (10W) : RN3NA, RP3NA, GS3NA, GD3NA, SD3NA, RN3N, RP3N, GS3N, GD3N, SD3N
  - 20 (20W) : RN4NA, RP4NA, GS4NA, GD4NA, SD4NA, RN4N, RP4N, GS4N, GD4N, SD4N

[Refer to the catalog or Instruction Manual (CD/DVD) for specification details.]

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

- Take the greatest care in transporting the product, not to bump or drop it.
- 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.



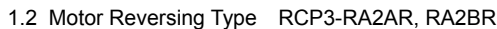
An environment that satisfies the following conditions is required during installation. Generally speaking, it should be an environment where a worker can work without any protective gear.

- 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.
- 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.)
- 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.

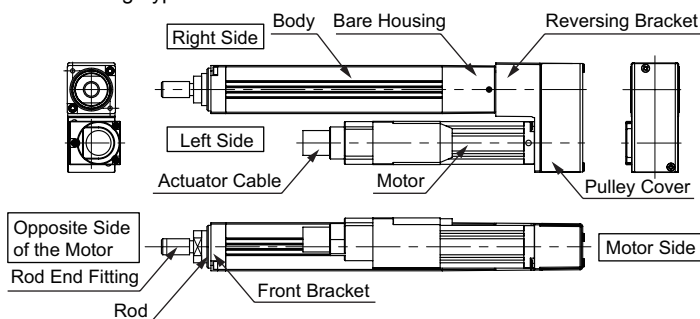
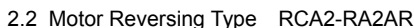
The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no condensation forms. Unless specially specified, moisture 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.

1.1 Motor Coupling Type RCP3-RA2AC, RA2BC



2.1 Motor Coupling Type RCA2-RA2AC



### 3.1 Fixed Nut Setup Type

The diagram illustrates the Motor Assembly from two perspectives. The top view shows the 'Motor Side' (right) and the 'Opposite Side of the Motor' (left). The 'Right Side' label points to the motor housing, and the 'Left Side' label points to the opposite side. The bottom view shows the 'Motor End Fitting' (left) and the 'Main Body (Aluminum Frame)' (right). The 'Connector Cover' and 'Cable' are also labeled.

The diagram illustrates the Motor Mounting Bracket assembly. It features a central **Main Body (Aluminum Frame)** with a **Guide bracket** attached to its left side. The assembly is shown from two perspectives: the **Right Side** and the **Left Side**. The **Motor Side** is indicated on the right, showing the **Connector Cover** and the **Cable** connection. The **Opposite Side of the Motor** is indicated on the left. The diagram also shows the **Motor** and **Motor Mounting Bracket** components.

This diagram illustrates the motor assembly with the cable connected. Labels include: Cable, Right Side, Connector Cover, Opposite Side of the Motor, Left Side, and Motor Side. It shows the cable entering the motor housing from the right side, with a connector cover. The motor housing is labeled 'Opposite Side of the Motor' and 'Left Side'. The motor itself is labeled 'Motor Side'.

Technical drawing of a 1/2" x 12" x 12" 303 stainless steel rod end. The drawing shows a side view of the rod with various dimensions. Key dimensions include a 14mm diameter at the end, a 21.5mm length for the B-M2 thread, a 15mm length for the rod end, and a total length of 12 inches. The rod is labeled 'A x 25'.

Diagram illustrating the assembly of the Main Body Set Plate and Main Body. The Main Body Set Plate is shown with a central hole and a smaller hole. The Main Body is shown with a blue cable. A Nut is shown being inserted into the smaller hole of the Main Body Set Plate.

This diagram illustrates the assembly of the End Fitting Mounting Hole. It shows a cross-section of a metal block with a hole. A blue component, labeled 'End Fitting', is inserted into the hole. A 'Main Body Set Plate' is positioned over the top of the block. A 'Main Body Mounting Hole' is shown in the set plate, with a bolt passing through it and the end fitting. A 'Detent' is shown on the side of the end fitting, which fits into a corresponding hole in the main body. The 'End Fitting Mounting Hole' is the hole in the end fitting that the bolt passes through.

Technical drawing of a bracket assembly. The drawing shows a side view of a bracket with a vertical plate and a horizontal arm. Dimensions include a width of 4 to 7, a thickness of  $\pm 0.3$ , and a hole diameter of  $\pm 0.5$ . Components labeled include a Plain Washer, M5 Nut, Bracket on the Guide Side, M5, C0.5, and End Fitting.

Technical drawing of a bracket assembly. The drawing shows a side view of the bracket with the following dimensions and components:

- Bracket on the Guide Side:** The main vertical component.
- End Fitting:** The horizontal component at the end of the bracket.
- M5 Nut:** The nut used to secure the end fitting.
- Plain Washer:** The washer used to secure the end fitting.
- Dimensions:**
  - 4 to 7 (Overall length of the bracket)
  - ø5.5 (Inner diameter of the bracket)
  - ø9.5 (Outer diameter of the bracket)
  - 1.5 (Distance from the end fitting to the center of the bracket)
  - 1 (Distance from the end fitting to the center of the bracket)

Technical drawing of a bracket assembly. The drawing shows a side view of a bracket with a vertical plate and a horizontal arm. The vertical plate has a width of 5 to 9 units. The horizontal arm has a thickness of 6.4 units. The bracket is secured with an M6 nut and a plain washer on the left side. On the right side, there is an end fitting secured with an M6 nut and a C0.5 washer. A bracket on the guide side is also indicated.

[illegible]

Type	Tightening Torque
RN3NA, RN3N (Lead Screw, Ball Screw)	3.1N·m
RN4NA, RN4N (Lead Screw, Ball Screw)	5.2N·m

Type	Lead	Bracket on the Guide Side	L
RN3NA, RN3N (Lead Screw, Ball Screw)	1	Without Back Facing	25.0±0.1
		With Back Facing	24.0±0.1
	2, 4	Without Back Facing	25.3±0.1
		With Back Facing	24.3±0.1
RN4NA, RN4N (Lead Screw, Ball Screw)	1	Without Back Facing	27.0±0.1
		With Back Facing	26.0±0.1
	2, 4, 6	Without Back Facing	27.3±0.1
		With Back Facing	26.3±0.1

Type	L
RN3NA, RN3N (Lead Screw, Ball Screw)	φ34
RN4NA, RN4N (Lead Screw, Ball Screw)	φ30.8

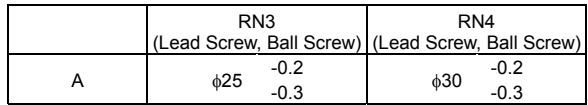
Type	M	Width across Flats	Max. Tightening Torque
RN3NA, RN3N (Lead Screw, Ball Screw)	M20×1.0	29	49.4
RN4NA, RN4N (Lead Screw, Ball Screw)	M24×1.0	32	76.8

Technical drawing of a rectangular plate with the following specifications:

- Overall dimensions: 100mm (width) x 50mm (height).
- Central hole:  $\phi 20$  or 24H8.
- Four corner holes:  $\phi 4.5$  Drilled (In the case of M4).
- Two side holes: 2 - Reamed Hole.

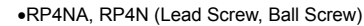
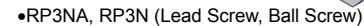


In the case that the actuator is attached from the rear side, preparing the rear side set plate where the round column is a little bit projected as shown in the figure would facilitate positioning.



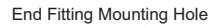
#### 4.1 Main Body Attachment

- Attach the main body set plate using the main body tapped hole.
- Attach the main body to the main-body set-plate using the nut on the rod in the main body.

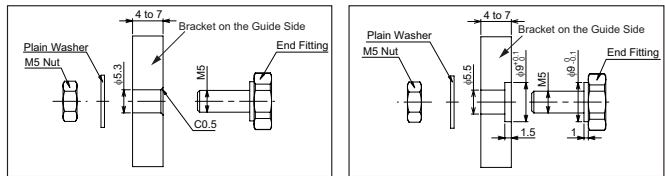


## 4.2 Attachment of the Detent

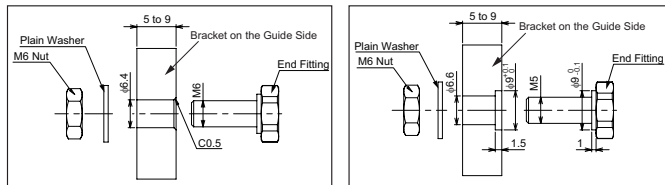
### Main Body Set Plate



- (1) The coaxial level for the main body mounting-hole on the main-body set-plate and end fitting mounting-hole in the bracket on the guide side, should be within the range of  $\pm 0.05$ . Also, the flatness should be within the range of  $\pm 0.02$ .
- (2) Turn the rod end fitting by hand and bring out the screw shaft to the front.
- (3) Fix the rod end fitting on the guide side. When it is fixed, confirm that the "L" size is complied and align the marking seal on the rear side with the shaft cut-out groove.  
Keep this condition; hold the diagonal flats on the end fitting bolt head, using a spanner, etc, to fix the bracket on the guide side.



Type	Tightening Torque
RP3NA, RP3N (Lead Screw, Ball Screw)	3.1N·m
RP4NA, RP4N (Lead Screw, Ball Screw)	5.2N·m



Type	Lead	Bracket on the Guide Side	L
RP3NA, RP3N (Lead Screw, Ball Screw)	1	Without Back Facing	11.5±0.1mm
RP4NA, RP4N (Lead Screw, Ball Screw)		With Back Facing	10.5±0.1mm
RP3NA, RP3N (Lead Screw, Ball Screw)	2, 4, 6	Without Back Facing	11.8±0.1mm
RP4NA, RP4N (Lead Screw, Ball Screw)		With Back Facing	10.8±0.1mm



Prepare the flange shaped plate and attach the main body from the rear side.

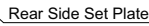
- Attach the actuator onto the flange using the M4 countersunk screw and the tapped hole in the main body.
- Set the main body set plate onto the flange using the screws.  
In the case that positioning is required, insert the pilot pin.



### Actuator Main Body Attachment to the Flange

Technical drawing of a rectangular plate with a central circular hole and eight surrounding holes. The central hole is labeled  $\phi 23$  or 25H8. The eight surrounding holes are arranged in a 3x3 grid with the center missing. The outer holes are labeled 4- $\phi 4.5$  and 2-Reamed Hole. A note indicates Countersinking in the case of countersunk head screw and 4- $\phi 4.5$  Drilled (In the case of M4:).

In the case that the actuator is attached from the rear side, preparing the rear side set plate where the round column is a little bit projected as shown in the figure would facilitate positioning.



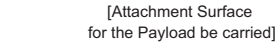
	RP3 (Lead Screw, Ball Screw)	RP4 (Lead Screw, Ball Screw)
A	$\phi 25$ -0.2 -0.3	$\phi 30$ -0.2 -0.3

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

For the surface to which the actuator main body is attached, a machined surface or flat one with equivalent accuracy should be used.


- GS3NA, GS3N (Lead Screw, Ball Screw)

Four surfaces of the main body have the structure available for actuator setup. Anything to be carried can be attached on only one surface of the main body.

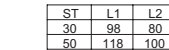


ST	L1	L2
30	89.5	73.5
50	109.5	93.5

(Note) Only 30 is prepared for the stroke of the lead screw GS3N type.

 **Note :** The tapped hole in the attachment section is partly a through hole. Never use the screw longer than the screw effective length. Failure to do so may cause damage to inner mechanism or electrical component.

Four surfaces of the main body have the structure available for actuator setup. Anything to be carried can be attached on only one surface of the main body.



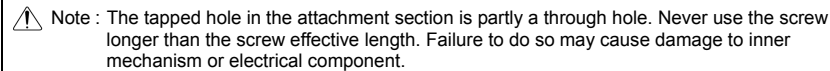
(Note) Only 30 is prepared for the stroke of the lead screw GS4N type.

 **Note :** The tapped hole in the attachment section is partly a through hole. Never use the screw longer than the screw effective length. Failure to do so may cause damage to inner mechanism or electrical component.

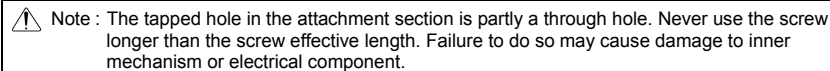
GD3NA, GD3N (Lead Screw, Ball Screw), GD4NA, GD4N (Lead Screw, Ball Screw)

- Because the screw effective depth varies depending on the machine type and attachment surface, determine the screw length to be used referring to the figure.
- Each attachment surface has a round hole for the pilot pin and slot, use them when necessary.

Four surfaces of the main body have the structure available for actuator setup. Anything to be carried can be attached on only one surface of the main body.



Four surfaces of the main body have the structure available for actuator setup. Anything to be carried can be attached on only one surface of the main body.



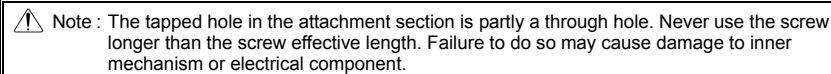
## SD3NA, SD3N (Lead Screw, Ball Screw), SD4NA, SD4N (Lead Screw, Ball Screw)

- Because the screw effective depth varies depending on the machine type and attachment surface, determine the screw length to be used referring to the figure.
- Each attachment surface has a round hole for the pilot pin and slot, use them when necessary.

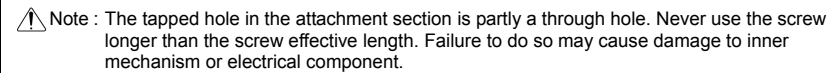
For the attachment of the slide unit type, there are two methods; installing the main body and installing the guide bracket.

Diagram illustrating a payload carrier system. The system consists of a central **Main Body** (a horizontal bar) supported by a **Guide Bracket** on the left and another **Guide Bracket** on the right. The **Main Body** is connected to the **Guide Brackets** via a series of vertical lines, suggesting a cable or chain mechanism. A **Payload to be carried** is shown resting on top of the **Main Body**. The **Guide Brackets** are mounted on wheels, and the entire system is shown on a ground surface. A double-headed arrow above the payload indicates horizontal movement.

Three surfaces of the main body have the structure available for actuator setup.

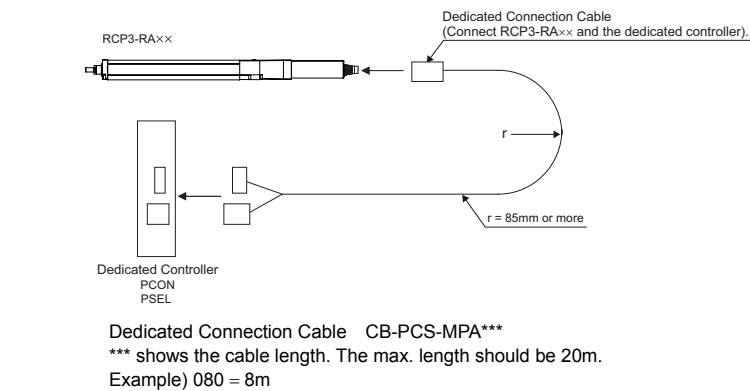


Three surfaces of the main body have the structure available for actuator setup.

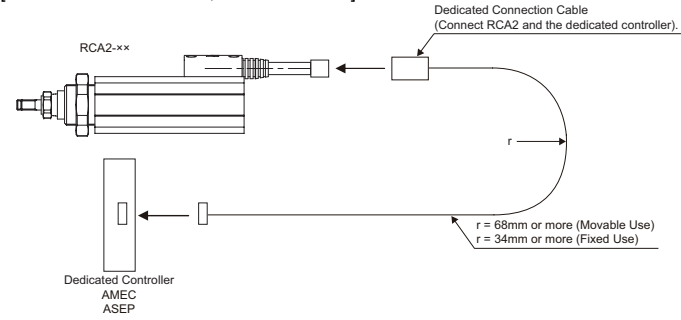


For the controller, only the dedicated controller manufactured by our company can be used.  
For the connection between the actuator and controller, use the attached dedicated connection cable.

Motor Coupling Type RA2AC/RA2BC, Motor Reversing Type RA2AR/RA2BR  
[Connection to the P MEC, PSEP controller]

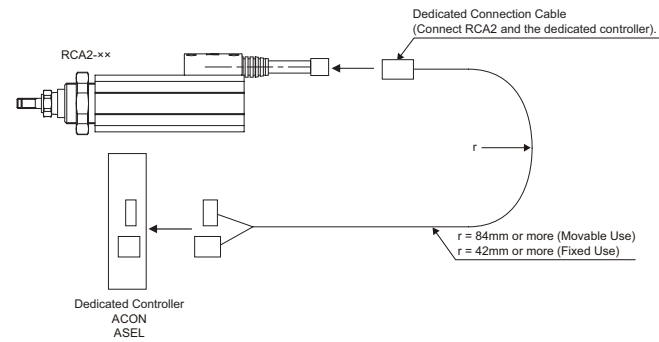


2. RCA2 Actuator Connection  
RN3N/RN4N, RP3N/RP4N, GS3N/GS4N, GD3N/GD4N, SD3N/SD4N  
[Connection to the AMEC, ASEP controller]



Dedicated Connection Cable CB-APSEP-MPA\*\*\*  
\*\*\* shows the cable length. The max. length should be 20m.  
Example) 080 = 8m

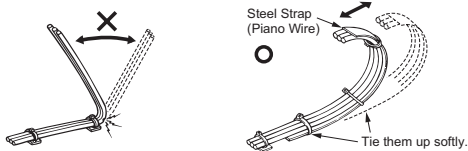
[Connection to the ACON, ASEL controller]



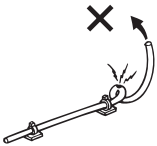
Dedicated Connection Cable CB-ACS-MPA\*\*\*  
\*\*\* shows the cable length. The max. length should be 20m.  
Example) 080 = 8m

[Prohibited Items in the Cable Processing]

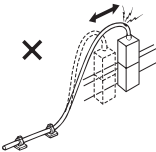
- Do not pull or bend forcibly the cable so as not to give any extra load or tension to the cable.
- Do not process the cable to extend or shortening by means of cutting out, combination or connecting with another cable.
- Do not let the cable flex at a single point.



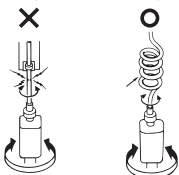
- Do not let the cable bend, kink or twist.



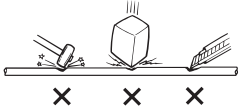
- Do not pull the cable with a strong force.



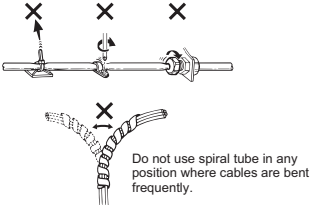
- Do not let the cable receive a turning force at a single point.



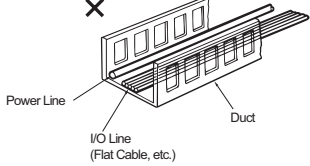
- Do not pinch, drop a heavy object onto or cut the cable.



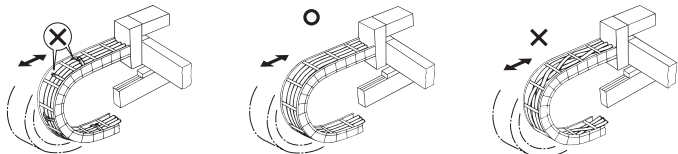
- When fixing the cable, provide a moderate slack and do not tension it too tight.



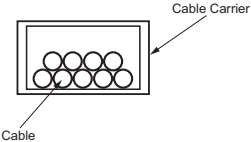
- Separate the I/O line, communication line and power line from each other. Arrange so that such lines are independently routed in the duct.



- Take care of the following items using the cable carrier.
- Arrange the wiring so that there is no entanglement or kink of the cables in the cable carrier or flexible tube, and do not bind the cables so that the cables are relatively free (Do not bend it at an angle of 90° or less).



- The occupied volume rate for the cables, etc., inside the cable carrier should be 60% or less.



**Note:**

- 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**  
Quality and Innovation

**IAI Corporation**

Head Office: 577-1 Obane Shimizu-KU Shizuoka City Shizuoka 424-0103, Japan  
TEL +81-54-364-5105 FAX +81-54-364-2589  
website: www.iai-robot.co.jp/

Technical Support available in USA, Europe and China

**IAI America, Inc.**

Head Office: 2690 W. 237th Street, Torrance, CA 90505  
TEL (310) 891-6015 FAX (310) 891-0815  
Chicago Office: 1261 Hamilton Parkway, Itasca, IL 60143  
TEL (630) 467-9900 FAX (630) 467-9912  
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066  
TEL (678) 354-9470 FAX (678) 354-9471  
website: www.intelligentactuator.com

**IAI Industrieroboter GmbH**

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany  
TEL 06196-88950 FAX 06196-889524

**IAI (Shanghai) Co., Ltd.**

SHANGHAI JIAHUA BUSINESS CENTER A8-303, 808, Hongqiao Rd. Shanghai 200030, China  
TEL 021-6448-4753 FAX 021-6448-3992  
website: www.iai-robot.com

Manual No.: ME3677-6A