



Thin and Small Type ROBO Cylinder Micro Slider and Micro Cylinder First Step Guide Second Edition

Thank you for purchasing our product.

Make sure to read the detailed Operation Manual (CD) included with the product in addition to this First Step Guide to ensure correct use.

* Using or copying all or a part of this Operation Manual without permission is prohibited.

Product Check

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.

1. Parts (The option is excluded.)

No.	Part Name	Model	Remarks
1	Actuator Main Body	[Refer to “4. How to read the model plate”, “5. How to read the model No.”]	
Accessories			
2	First Step Guide		
3	Operation Manual (CD)		
4	Safety Guide		

2. Controller and Teaching Tool

Controller / Teaching	ASEL Controller	ACON-C/CG/CF Controller	ACON-CY Controller	ACON-SE Controller	ACON-PL/PO Controller	ASEP Controller
PC Software RCM-101MW/RCM-101-USB	○	○	○	○	○	
Teaching pendant CON-T/TG	○	○	○	○	○	
Touch panel teaching tool specially for PSEP/ASEP SEP-PT						○
Simplified Teaching Pendant RCM-E	○	○	○	○	○	
Data setter RCM-P	○	○	○	○	○	
Touch Panel Indicator RCM-PM-01 RCM-PM-01	○	○	○	○	○	

3. Operation manuals related to this product, which are contained in the CD.

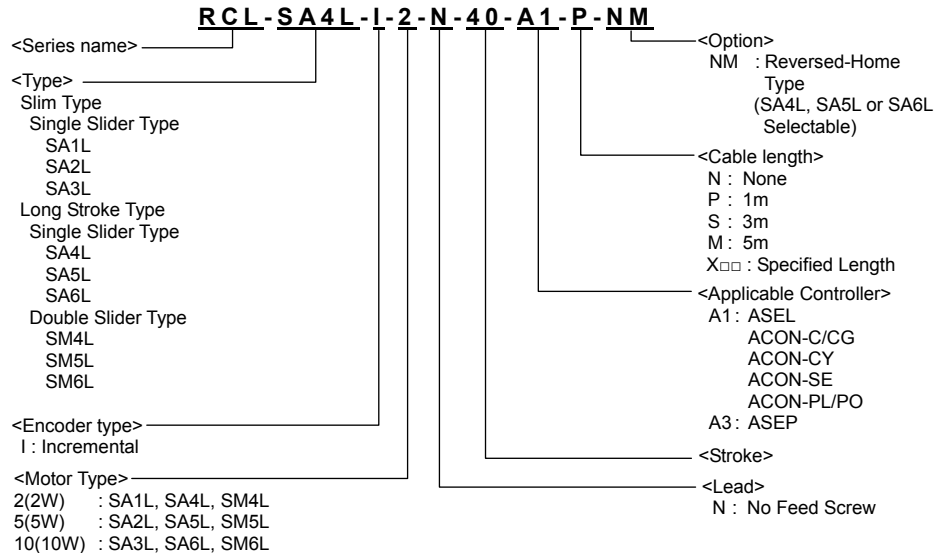
No.	Name	Manual No.
1	Micro Slider Operation Manual	ME3666
2	Micro Cylinder Operation Manual	ME0192
3	ASEL Controller Operation Manual	ME0165
4	ACON-C/CG Controller Operation Manual	ME0176
5	ACON-CY Controller Operation Manual	ME0167
6	ACON-SE Controller Operation Manual	ME0171
7	ACON-PL/PO Controller Operation Manual	ME0166
8	ASEP/PSEP Controller Operation Manual	ME0216
9	PC Software RCM-101MW/RCM-101-USB Operation Manual	ME0155
10	Teaching pendant CON-T/TG Operation Manual	ME0178
11	Touch panel teaching tool specially for PSEP/ASEP SEP-PT Operation Manual	ME0217
12	Simplified Teaching Pendant RCM-E Operation Manual	ME0174
13	Data setter RCM-P Operation Manual	ME0175
14	Touch Panel Indicator RCM-PM-01 Operation Manual	ME0182

4. How to read the model plate

Model → MODEL RCL-SA1L-I-2-40-A1-P
Serial number → SERIAL No. 600090257 MADE IN JAPAN

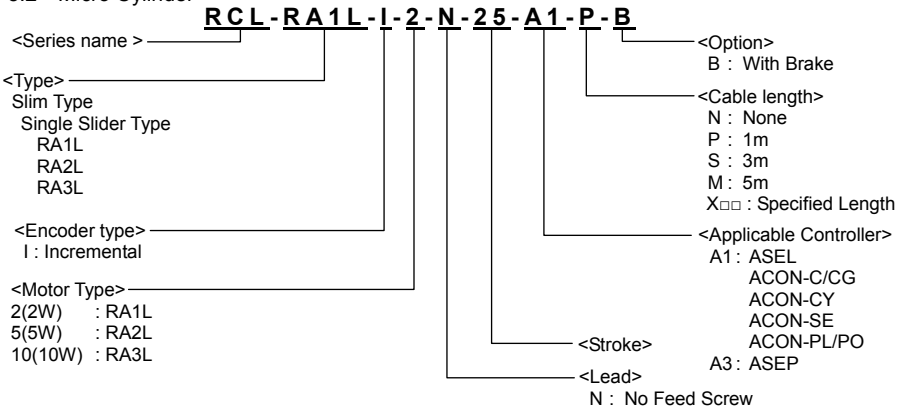
5. How to read the Model No.

5.1 Micro Slider



[Refer to the catalog or Operation Manual (CD) for specification details.]

5.2 Micro Cylinder



[Refer to the catalog or Operation Manual (CD) for specification details.]

Precautions in Handling

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

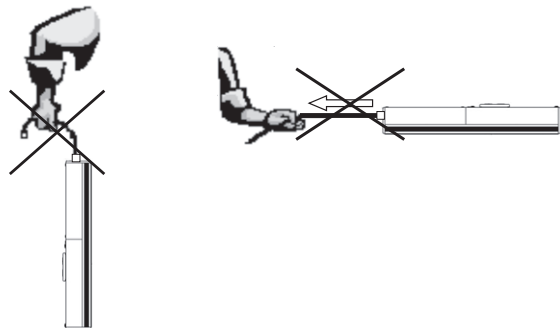
1. Handling of the Packed Product

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.

2. Handling of the Unpacked Product

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



- When the stainless sheet is attached, never hold the stainless sheet 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. Take care not to give any force to the stainless sheet.

Installation Environment, Storage Environment

1. Installation Environment

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.
- 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.

2. Storage Environment

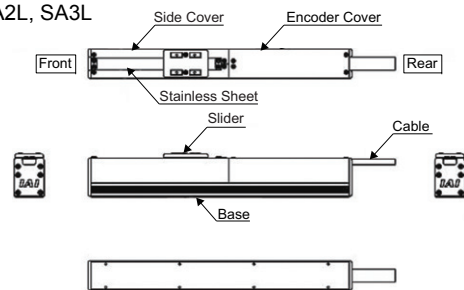
- The storage environment should comply with the standards same as those for the installation environment. In particular when the machine is to be stored for a long time: pay close attention to environmental conditions so that no dew condensation forms. Unless specially specified, moisture absorbency protection is not included in the package when the machine is delivered. In the case that the machine is to be stored in an environment where dew condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.
- For storage temperature, the machine withstands temperatures up to 60°C for a short time, but in the case of the storage period of 1 month or more, control the temperature to 50°C or less.

External Dimensions

1. Micro Slider

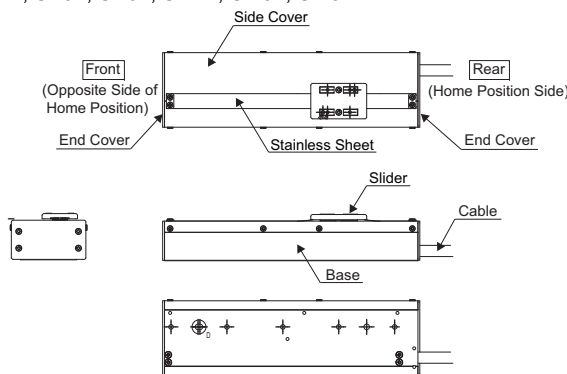
1.1 Slim Type

RCL-SA1L, SA2L, SA3L



1.2 Long Stroke Type

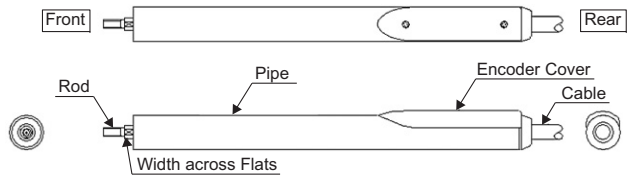
RCL-SA4L, SA5L, SA6L, SM4L, SM5L, SM6L



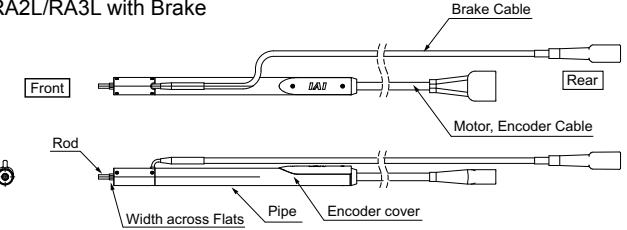
Refer to the Operation Manual (CD) for the dimensions and external shape.

2. Micro Cylinder

Slim Type
RA1L/RA2L/RA3L without Brake



RA1L/RA2L/RA3L with Brake



Refer to the Operation Manual (CD) for the dimensions and external shape.

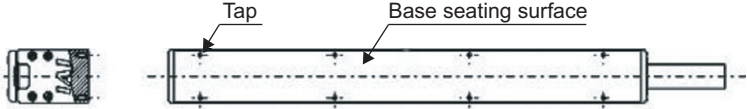
Attachment

1. Micro Slider

1.1 Main Body Attachment

For the surface to which the actuator is attached, a machined surface or flat one with equivalent accuracy should be used. The flatness should be within $\pm 0.05\text{mm/m}$. Fix it using the tapped hole on the base rear surface. Refer to the outline drawing for the details of dimensions.

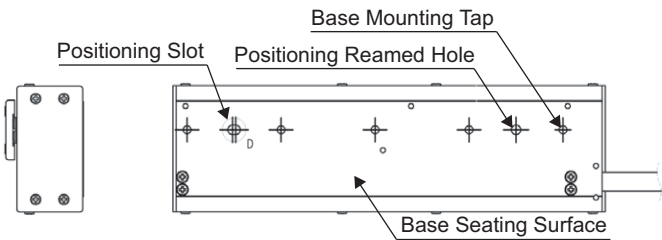
1.1.1 Slim Type
RCL-SA1L, SA2L, SA3L



Type	Tapped Hole Diameter	Screw Effective Depth	Recommended Tightening Torque	
			(Seating surface: Steel)	(Seating surface: Aluminum)
SA1L	M2	4mm	42.4N·cm (4.32kgf·cm)	25.4N·cm (2.59kgf·cm)
SA2L				
SA3L	M3		154N·cm (15.8kgf·cm)	83N·cm (8.47kgf·cm)

⚠ Note : Use the bolt with the length appropriate for the screw effective depth. In the case that inappropriate bolt is used, it may cause a damage to the tapped hole or insufficient attachment force.

1.1.2 Long Stroke Type
RCL-SA4L, SA5L, SA6L, SM4L, SM5L, SM6L



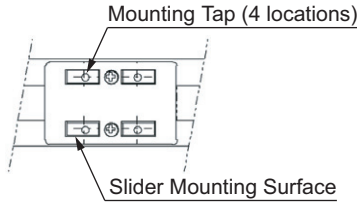
Type	Tapped Hole Diameter	Tap Effective Depth	Recommended Tightening Torque		Reamed Hole Diameter	Reamer Effective Depth
			(Seating surface: Steel)	(Seating surface: Aluminum)		
SA4L	M3	5mm	154N·cm (15.8kgf·cm)	83N·cm (8.47kgf·cm)	φ3H7	4mm
SM4L						
SA5L	M4		359N·cm (36.7kgf·cm)	176N·cm (18kgf·cm)	φ4H7	
SM5L						
SA6L						
SM6L						

⚠ Note : Use the bolt with the length appropriate for the screw effective depth. In the case that inappropriate bolt is used, it may cause a damage to the tapped hole or insufficient attachment force.

1.2 Attachment of an object to be carried

1.2.1 Slim Type
RCL-SA1L, SA2L, SA3L

Attach the object to be carried using the tap located on the slider upper surface.

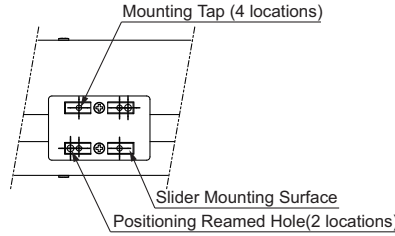


Type	Tapped Hole Diameter	Screw Effective Depth	Recommended Tightening Torque (Seating surface: Steel)	Screw Effective Depth (Seating surface: Aluminum)
SA1L	M2	3mm	42.4N·cm (4.32kgf·cm)	25.4N·cm (2.59kgf·cm)
SA2L		4mm		
SA3L	M3	5mm	154N·cm (15.8kgf·cm)	83N·cm (8.47kgf·cm)

⚠ Note : Use the bolt with the length appropriate for the screw effective depth. In the case that inappropriate bolt is used, it may cause a damage to the tapped hole or insufficient attachment force.

1.2.1 Long Stroke Type
RCL-SA4L, SA5L, SA6L, SM4L, SM5L, SM6L

Attach the object to be carried using the tap and reamed hole on the slider upper surface.



Type	Tapped Hole Diameter	Tap Effective Depth	Recommended Tightening Torque		Reamed Hole Diameter	Reamer Effective Depth
			(Seating surface: Steel)	(Seating surface: Aluminum)		
SA4L	M2	3mm	42.4N·cm (4.32kgf·cm)	25.4N·cm (2.59kgf·cm)	φ2H7	2mm
SM4L						
SA5L		4mm				2.5mm
SM5L						
SA6L	M3	5mm	154N·cm (15.8kgf·cm)	83N·cm (8.47kgf·cm)	φ3H7	3.5mm
SM6L						

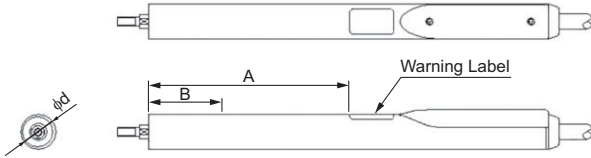
⚠ Note : Use the bolt with the length appropriate for the screw effective depth. In the case that inappropriate bolt is used, it may cause a damage to the tapped hole, insufficient attachment force or malfunction of the unit due to a contact of the object to be carried onto the cover on the machine main body.

2. Micro Cylinder

2.1 Installing the Actuator

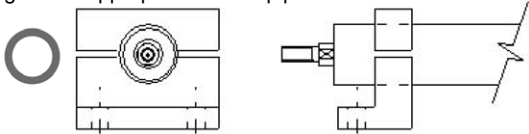
2.1.1 Mounting method

The main body shape is cylindrical. The main body can be attached to the hole-shaped section in the machine.

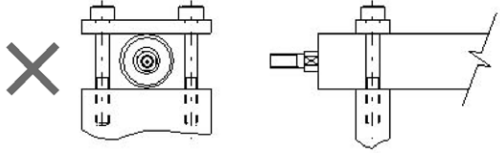


Model	Pipe Outer Diameter φd(Dimensional Tolerance)	Pipe Fixable Range A	Fixable Range using Set Screw B
RA1L	16(0/0.1)	90	30
RA2L	20(0/0.1)	115	40
RA3L	25(0/0.1)	164	55

Recommended Mounting Method
Clamp (Split Clamp) Type
Clamp it using a hole appropriate for the pipe.



Do not use a sheet or other shape other than a hole to clamp the actuator, because the pipe will deform.

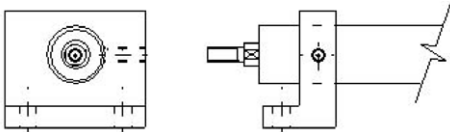


For the Pipe Clamping Force
Fasten the clamp bolt and fix the pipe with the minimum required tightening torque for holding the pipe.
The standards of the clamp force for holding the pipe are shown.
Do not clamp the pipe with the clamp force value exceeding the one shown in the table.
The force given to the pipe varies depending on the pipe shape, rigidity, clamp bolt size or tightening torque. Be careful.

Pipe Clamping Force (Standard)	
Model	Clamping Force (Standard Value)
RA1L	1000[N] (100kg) or less
RA2L	1500[N] (150kg) or less
RA3L	2000[N] (200kg) or less

⚠ Note : In the case that the pipe clamping force is too large, the pipe may be deformed, which may in turn cause a malfunction or breakdown of pipe.

Other Mounting Method
(In the case of the set screw type)



When the setscrew method is used, the locations where the actuator contacts the screws deform significantly. To protect the internal parts, secure the actuator by observing "Allowable range for securing with setscrews B" shown in the table, "Dimensions of Actuator Installation Section" in 2.1, "Installing the Actuator."
Select a setscrew of a small diameter and secure the actuator by applying setscrews at multiple locations.
If larger setscrews are used to tighten the actuator, the pipe will receive a greater axial torque and deform more.

Set Screw Tightening Torque(Standard)	
Set Screw Size	Tightening Torque[N·m]
M2.5	0.18 or less
M3	0.32 or less

⚠ Note : In the case that the set screw is fastened too tight, the pipe may be deformed, which may in turn cause a malfunction or breakdown of pipe.

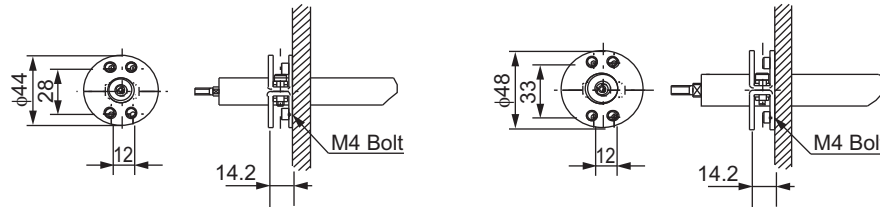
2.1.2 Mounting Bracket

For the mounting bracket, the following universal products are available.
For each bracket, contact the manufacturer directly.

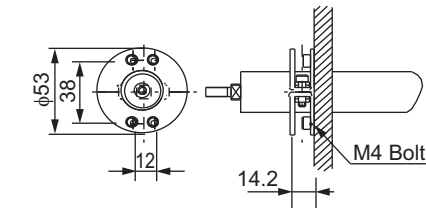
(1) Shaft Bracket
Maker : Iwata Mfg. Co., Ltd.

●RA1L
Model:B16CP4

●RA2L
Model:B20CP4

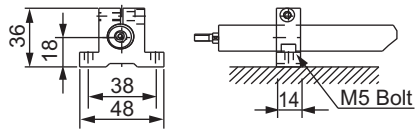


●RA3L
Model:B25CP4

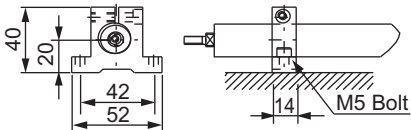


(2) Round Pijon
Maker : Miyoshi Pijon Co., Ltd.

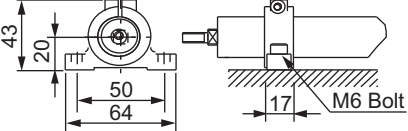
●RA1L
Model:PN600



●RA2L
Model:PO600

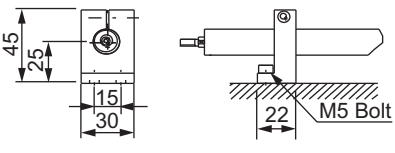


●RA3L
Model:PH600

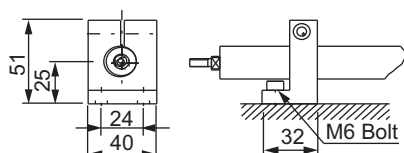


(3) Shaft Holder
Maker : Misumi

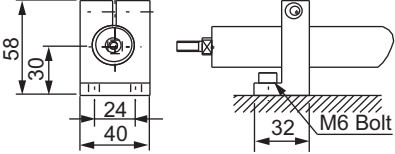
●RA1L
Model:SHKSBT16



●RA2L
Model:SHKSBT20



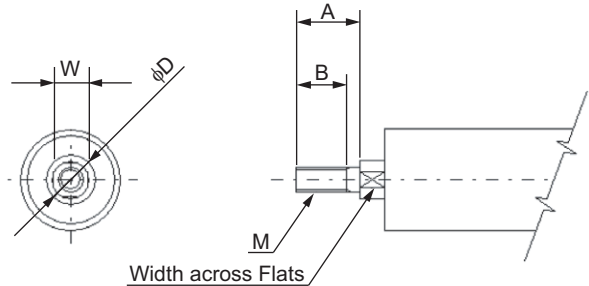
●RA3L
Model:SHKSBT25



⚠ Note :When clamping the actuator, strictly observe the specified tightening torque. Failure to do so may damage the actuator.

2.2 Install the load

- Install the load on the threaded part at the tip of the rod. Pay attention to the section of incomplete thread.
- When installing the load, fasten the nut while holding the width across flats with a spanner to prevent the rod from receiving torque. If an excessive torque applies to the torque, the interior parts will be damaged.
- The rod is made of aluminum. Fasten the supplied nut to the recommended tightening torque specified below. An excessive tightening torque will damage the thread.



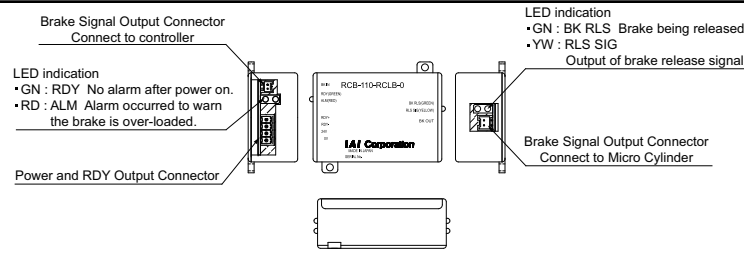
Dimensions of Load Installation Section

Model	M Screw Nominal Diameter	A	B Screw Effective Depth	φD Rod Diameter	W Width across Flats
RA1L	M4	10	8	6	5.5
RA2L	M5	12	10	8	7
RA3L	M6	14	12	10	8

Attached Nut Recommended Tightening Torque

Model	Attached Nut	Recommended Tightening Torque
RA1L	M4 Nut (One Type)	0.75N·m
RA2L	M5 Nut (One Type)	1.5N·m
RA3L	M6 Nut (One Type)	2.6N·m

Brake Connection Box RCB-110-RCLB-0



Item	Specification
Power-supply Voltage	DC24V±10%
Supply Current	MAX2.5A (Approx. 110ms when brake being released)
Weight	Approx. 35g

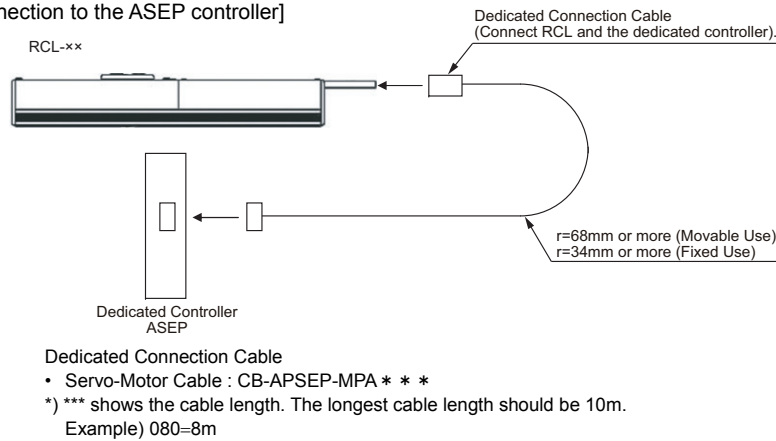
[Power and RDY Output Connector]

Applicable wire : AWG24 to 16

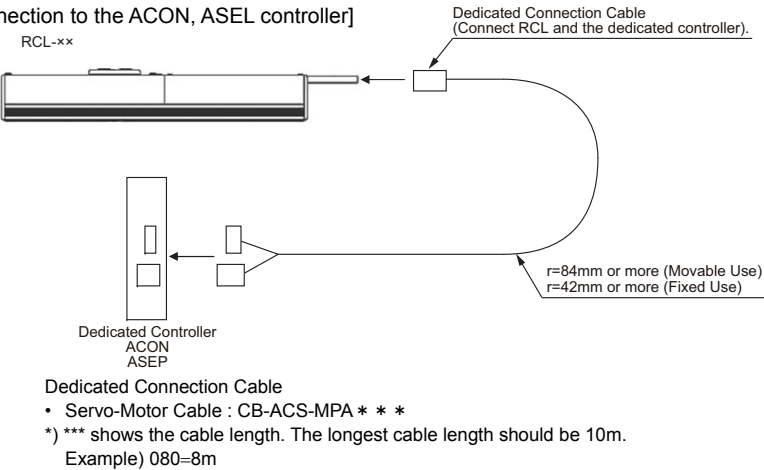
Pin No.	Symbol	Contents
1	RDY+	RDY contact
2	RDY-	Open at brake over-loaded alarm
3	+24V	DC+24V Power Input
4	0V	

Wiring

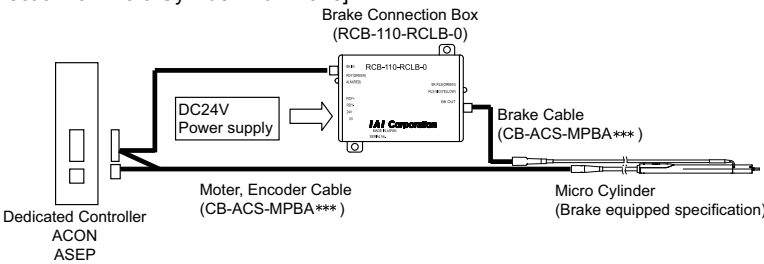
[Connection to the ASEP controller]



[Connection to the ACON, ASEL controller]



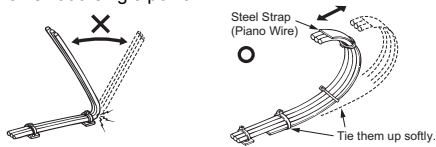
[Connection for Micro Cylinder with Brake]



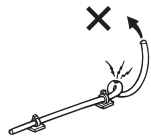
Connect and input +24V power supply to the brake connection box. When the brake is released, the current of 2.5A at the most may flow for approximately 110ms.

[Prohibited Items in the Cable Processing]

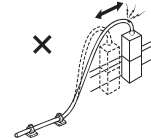
- Do not pull or bend forcibly the cable so as not to give any extra load or tension to the cable.
- Do not process the cable for extension or shortening by means of cutting out, combination or connecting with another cable.
- Do not let the cable flex at a single point.



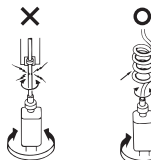
- Do not let the cable bend, kink or twist.



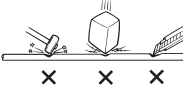
- Do not pull the cable with a strong force.



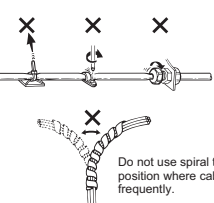
- Do not let the cable receive a turning force at a single point.



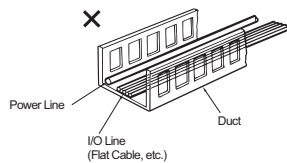
- Do not pinch, drop a heavy object onto or cut the cable.



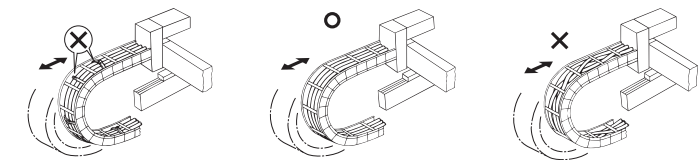
- When fixing the cable, provide a moderate slack and do not tension it too tight.



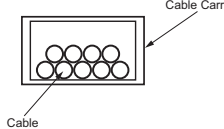
- Separate the I/O line, communication line and power line from each other. Arrange so that such lines are independently routed in the duct.



- 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.



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website: www.intelligentactuator.com

IAI Industrieroboter GmbH

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany
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Manual No.: ME3679-2A