IAI
Quality and Innovation

RCP3/RCA2 Actuator
Table Type
First Step Guide Seventh Edition

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.

⚠ Warning : Operation of this equipment requires detailed installation and operation instructions which are provided on the CD/DVD Manual included in the box this device was packaged in. It should be retained with this device at all times.
A hard copy of Manual can be requested by contacting your nearest IAI Sales Office listed at the back cover of the Instruction Manual or on the First Step Guide.

Product Check

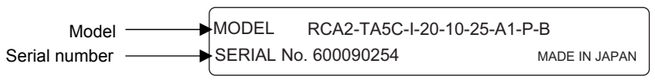
This product is comprised of the following parts if it is of standard configuration.
If you find any fault in the contained model or any missing parts, contact us or our distributor.

1. Parts (The option is excluded.)

No.	Part Name	Model	Remarks
1	Actuator Main Body	Refer to “How to read the model plate”, “How to read the model No.”	
Accessories			
2	Motor · Encoder Cable*1		
3	Home Position Marking Sticker		Enclosed to TA3C, TA4C, TA5C, TA6C, TA7C TA3R, TA4R, TA5R, TA6R, TA7R
4	First Step Guide		
5	Instruction Manual (CD/DVD)		
6	Safety Guide		

*1 Enclosed Motor · Encoder Cable differ depending on the applied controller.
Please refer to [Wiring] for the applicable cables.

2. How to read the model plate



3. How to read the model No.

3.1 RCP3 Actuator

RCP3-TA5C-I-35P-10-25-P1-P-B-**

<Series>
<Type>
Motor Coupling Type
TA3C [Thin and Small Type ROBO Cylinder]
TA4C [Thin and Small Type ROBO Cylinder]
TA5C
TA6C
TA7C
Motor Reversing Type
TA3R [Thin and Small Type ROBO Cylinder]
TA4R [Thin and Small Type ROBO Cylinder]
TA5R
TA6R
TA7R
<Encoder type>
I : Incremental
<Motor Type>
20P (20 □Size) : TA3C, TA3R
28P (28 □Size) : TA4C, TA4R
35P (35 □Size) : TA5C, TA5R
42P (42 □Size) : TA6C, TA6R, TA7C, TA7R
<Lead>
TA3C, TA3R 2/4/6
TA4C, TA4R 2/4/6
TA5C, TA5R 2.5/5/10
TA6C, TA6R 3/6/12
TA7C, TA7R 3/6/12
<Stroke>
<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
<Option>
B : Equipped with the Brake
CJT : Cable exit direction changed (to top side)
CJR : Cable exit direction changed (to right side)
CJL : Cable exit direction changed (to left side)
CJB : Cable exit direction changed (to bottom side)
CJO : Cable exit direction changed (to end side)
NM : Reversed-Home Type
Identification for IAI use only*1

*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 (CD/DVD) for specification details.]

3.2 RCA2 Actuator

RCA2-TA5C-I-20-10-25-A1-P-B-**

<Series>
<Type>
Motor Unit Type
Motor Coupling Type
TA4C [Thin and Small Type ROBO Cylinder]
TA5C
TA6C
TA7C
Motor Reversing Type
TA4R [Thin and Small Type ROBO Cylinder]
TA5R
TA6R
TA7R
Total Length Short Type
Compact Type
TCA3NA [Thin and Small Type ROBO Cylinder]
TCA4NA [Thin and Small Type ROBO Cylinder]
TCA3N [Thin and Small Type ROBO Cylinder]
TCA4N [Thin and Small Type ROBO Cylinder]
Wide Type
TWA3NA [Thin and Small Type ROBO Cylinder]
TWA4NA [Thin and Small Type ROBO Cylinder]
TWA3N [Thin and Small Type ROBO Cylinder]
TWA4N [Thin and Small Type ROBO Cylinder]
Flat Type
TFA3NA [Thin and Small Type ROBO Cylinder]
TFA4NA [Thin and Small Type ROBO Cylinder]
TFA3N [Thin and Small Type ROBO Cylinder]
TFA4N [Thin and Small Type ROBO Cylinder]
<Encoder type>
I : Incremental
<Motor Type>
10(10W) : TCA3NA, TWA3NA, TFA3NA, TCA3N, TWA3N, TFA3N
20(20W) : TCA4NA, TWA4NA, TFA4NA, TCA4N, TWA4N, TFA4N, TA5C, TA5R, TA6C, TA6R
30(30W) : TA7C, TA7R
<Lead>
TA3C, TA3R 2/4/6 — TCA3NA, TWA3NA, TFA3NA — TCA4NA, TWA4NA, TFA4NA
TA4C, TA4R 2/4/6 — TCA3N, TWA3N, TFA3N (Lead Screw) 1S/2S/4S — TCA4N, TWA4N, TFA4N (Lead Screw) 2S/4S/6S
TA5C, TA5R 2.5/5/10 — TCA3NA, TWA3NA, TFA3NA — TCA4NA, TWA4NA, TFA4NA
TA6C, TA6R 3/6/12 — TCA3N, TWA3N, TFA3N (Ball Screw) 1/2/4 — TCA4N, TWA4N, TFA4N (Ball Screw) 2/4/6
TA7C, TA7R 3/6/12
<Stroke>
<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
<Option>
B : Equipped with the Brake
CJT : Cable exit direction changed (to top side)
CJR : Cable exit direction changed (to right side)
CJL : Cable exit direction changed (to left side)
CJB : Cable exit direction changed (to bottom side)
CJO : Cable exit direction changed (to end side)
K2 : Connector Cable exit direction changed
LA : Power Saving Type
NM : Reversed-Home Type (Except for TCA*, TWA* and TFA*)
BG : Ball Guide Type (Note) The model codes for the option BG (ball guide type) are to be those with old codes such as TC3N.
Identification for IAI use only*1

*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 (CD/DVD) for specification details.]

Precautions in Handling

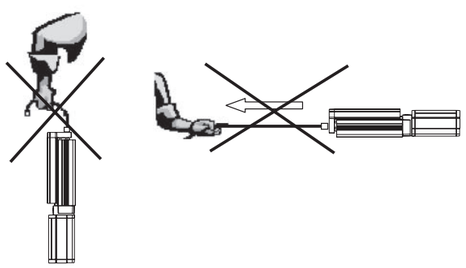
Handle it with great care, and keep to the following instructions. Failure to do so may cause damage to the product.

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 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

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 and Preservation Environment

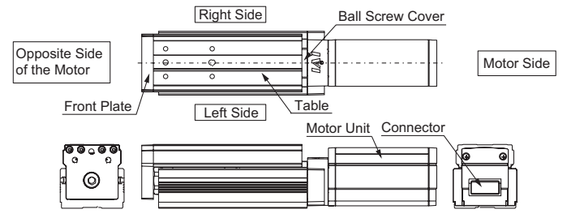
The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no condensation forms. Unless specially specified, moisture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

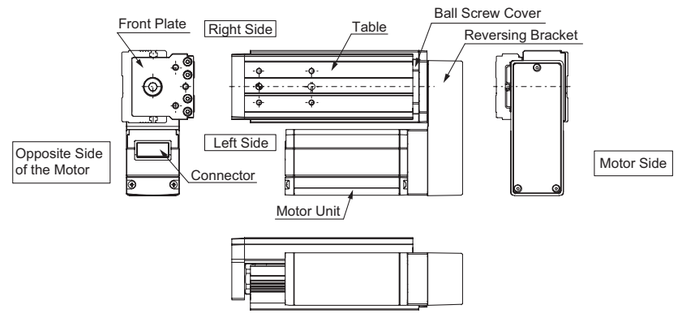
1.1 Motor Coupling Type

RCP3-TA3C, TA4C, TA5C, TA6C, TA7C
RCA2-TA4C, TA5C, TA6C, TA7C



1.2 Motor Reversing Type

RCP3-TA3R, TA4R, TA5R, TA6R, TA7R
RCA2-TA4R, TA5R, TA6R, TA7R

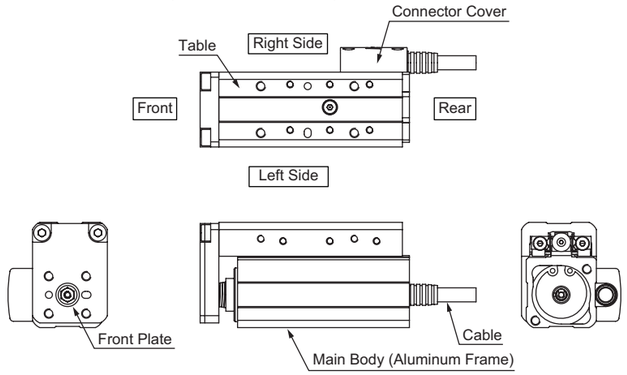


* Connector position in the figure above is that with no ejection direction change.

2. Total Length Short Type

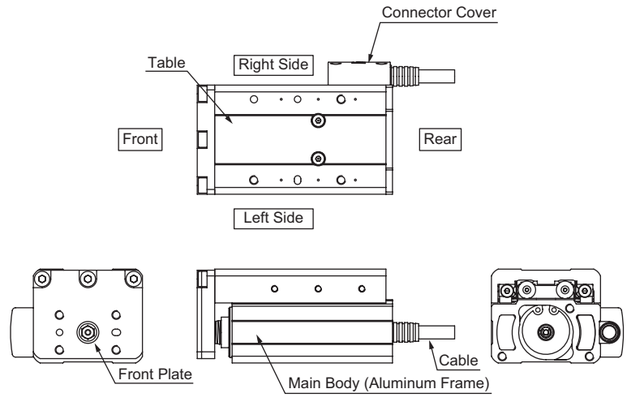
2.1 Compact Type

RCA2-TCA3NA, TCA3N (Lead Screw, Ball Screw), TCA4NA, TCA4N (Lead Screw, Ball Screw)



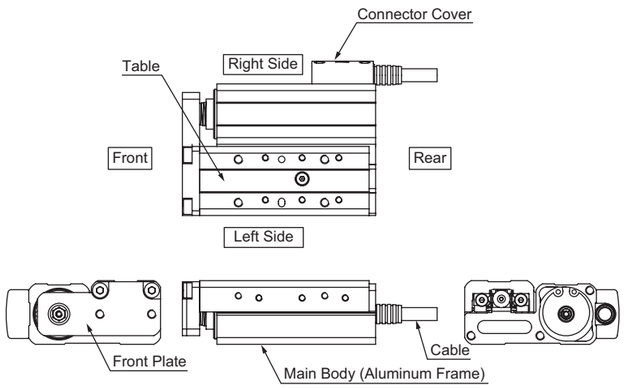
2.2 Wide Type

RCA2-TWA3NA, TWA3N (Lead Screw, Ball Screw), TWA4NA, TWA4N (Lead Screw, Ball Screw)



2.3 Flat Type

RCA2-TFA3NA, TFA3N (Lead Screw, Ball Screw), TFA4NA, TFA4N (Lead Screw, Ball Screw)



Attachment

1. Motor Unit Type

RCP3-TA3C, TA4C, TA5C, TA6C, TA7C, TA3R, TA4R, TA5R, TA6R, TA7R

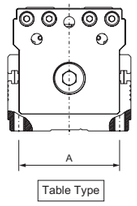
RCA2-TA4C, TA5C, TA6C, TA7C, TA4R, TA5R, TA6R, TA7R

1.1 Installing the Actuator

Fix it using the tapped hole on the rear side.

Description of the Set Screws

- For the base male set screw, use a hexagon socket head cap screw.
- For the bolt to be used, a high-tensile bolt complying with ISO-10.9 or more is recommended.
- The length of thread engagement should be 1.8 times more than the nominal diameter, and pay attention not to stick the screw out inside the actuator.

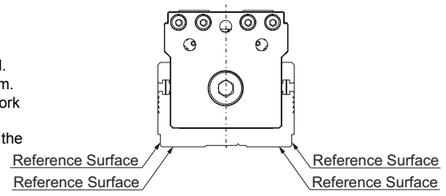


Model	Tap Size and Max. Screw Depth	Bolt to be used	Tightening Torque		A(mm)	Reamed Hole(mm)
			In the case that steel is used for the bolt seating surface:	In the case that aluminum is used for the bolt seating surface:		
TA3	M3 Depth 5	M3	1.54N·m(0.16kgf·m)	0.83N·m(0.085kgf·m)	28	Depth 3.5 from the ϕ3H7 Base Surface
TA4	M4 Depth 7.5	M4	3.59N·m(0.37kgf·m)	1.76N·m(0.18kgf·m)	31	Depth 4.5 from the ϕ4H7 Base Surface
TA5	M5 Depth 10	M5	7.27N·m(0.74kgf·m)	3.42N·m(0.35kgf·m)	45	Depth 5 from the ϕ5H7 Base Surface
TA6	M5 Depth 10	M5	7.27N·m(0.74kgf·m)	3.42N·m(0.35kgf·m)	55	Depth 5 from the ϕ5H7 Base Surface
TA7	M6 Depth 12	M6	12.34N·m(1.26kgf·m)	5.36N·m(0.55kgf·m)	64	Depth 6 from the ϕ6H7 Base Surface

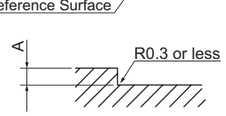
⚠ Note : Take care in selecting the bolt. Using a bolt with inappropriate length may cause damage to the tapped hole, insufficient attachment strength of the actuator or interference with the driving section, which may result in degradation of accuracy, damage or unexpected accident.

1.2 Attachment Surface

- The base has to have a structure with sufficient rigidity to prevent oscillation.
- 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 ±0.05mm/m.
- Secure the space where maintenance work can be performed.
- This surface is used as the reference for the actuator base side and lower side slider running. In the case that the running accuracy is required, attach the actuator using this surface as the reference.



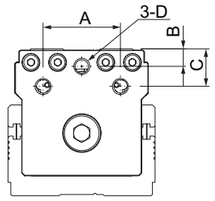
Refer to the following figure for the processing when the actuator is attached to the base using the base reference surface.



Size A(mm)
2 to 4 or less

1.3 Attachment of the payload to be carried

- Fix the payload to be carried using the tapped hole on the front plate or on the table upper surface.
- For the male set screw, use a hexagon socket head cap screw.
- For the bolt to be used, a high-tensile bolt complying with ISO-10.9 or more is recommended.
- There are the two reamed holes on the upper surface of the table. In the case that the reproducibility for the attachment and removal is required, use these reamed holes. Also, in the case that fine adjustment for squareness is required, select one of these reamed holes to be used and adjust.
- Refer to the follow table for the screw depth and reamed hole depth.



In the case that the screw is screwed in the hole to the depth more than the value in the following table, it might cause a damage to the tapped hole or insufficient attachment strength of the object to be carried, which may result in degradation of accuracy or unexpected accident.

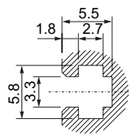
Model	A	B	C	D	Set Screw	
					Screw Nominal Diameter	Tightening Torque
TA3	24	5	10	M4 Depth 6	M4	1.76N·m(0.18kgf·m)
TA4	29	5	13	M5 Depth 6	M5	3.42N·m(0.35kgf·m)
TA5	29	6.5	14	M6 Depth 10	M6	5.36N·m(0.55kgf·m)
TA6	35	7	18	M6 Depth 13	M6	5.36N·m(0.55kgf·m)
TA7	44	6.5	21.5	M8 Depth 15	M8	11.48N·m(1.17kgf·m)

1.4 T-Groove

A T-groove is provided on the side of the main body of TA5C, 6C, 7C, 5R, 6R or 7R to attach the external equipment (for M3). Use the groove freely for the sensor attachment or fixing of wires, when necessary.

The dimensions of the groove are described as follows.

- For the nut used for the T-groove, a square nut is recommended, but a hexagon nut can also be used.
- When it is attached, take care in selecting the bolt length so that the end of the bolt does not touch the bottom section of the T-groove.



2. Total Length Short Type

2.1 Main Body Attachment

Fix it using the tapped hole on the rear side.

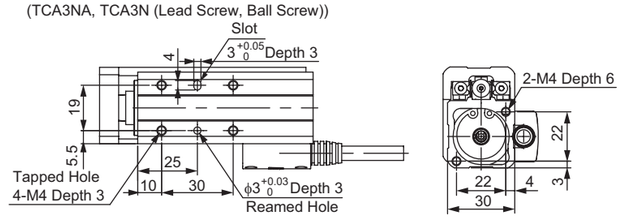
Description of the Set Screws

- For the base male set screw, use a hexagon socket head cap screw.
- For the bolt to be used, a high-tensile bolt complying with ISO-10.9 or more is recommended.

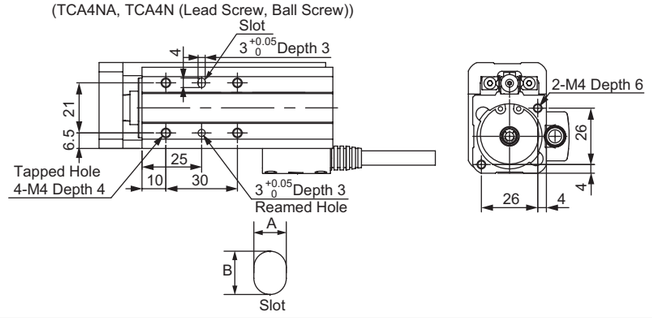
2.1.1 Compact Type

RCA2-TCA3NA, TCA3N (Lead Screw, Ball Screw), TCA4NA, TCA4N (Lead Screw, Ball Screw)

(TCA3NA, TCA3N (Lead Screw, Ball Screw))



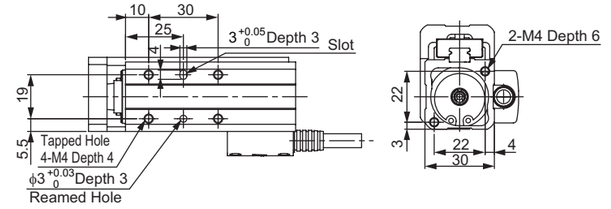
(TCA4NA, TCA4N (Lead Screw, Ball Screw))



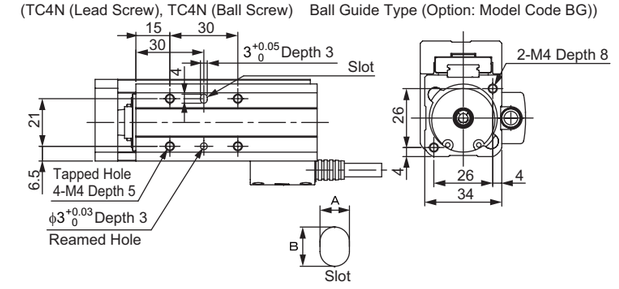
Model	Tap Size and Max. Screw Depth	Bolt to be used	Tightening Torque		Slot	Reamed Hole(mm)
			In the case that steel is used for the bolt seating surface:	In the case that aluminum is used for the bolt seating surface:		
TCA3NA, TCA3N (Lead Screw, Ball Screw)	M4 Depth 3	M4	3.59N·m(0.37kgf·m)	1.76N·m(0.18kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3
TCA4NA, TCA4N (Lead Screw, Ball Screw)	M4 Depth 4	M4	3.59N·m(0.74kgf·m)	1.76N·m(0.35kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3

⚠ 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.

(TC3N (Lead Screw) Ball Guide Type (Option: Model Code BG))



(TC4N (Lead Screw), TC4N (Ball Screw) Ball Guide Type (Option: Model Code BG))

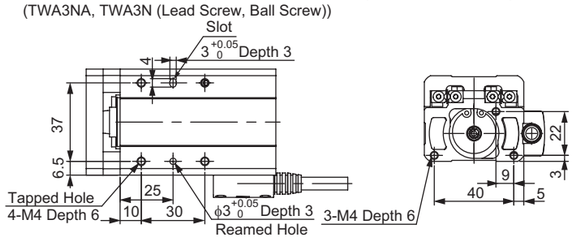


Model	Tap Size and Max. Screw Depth	Bolt to be used	Tightening Torque		Slot	Reamed Hole(mm)
			In the case that steel is used for the bolt seating surface:	In the case that aluminum is used for the bolt seating surface:		
TC3N (Lead Screw)	M4 Depth 3	M4	3.59N·m(0.37kgf·m)	1.76N·m(0.18kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3
TC4N (Lead Screw, Ball Screw)	M4 Depth 4	M4	3.59N·m(0.74kgf·m)	1.76N·m(0.35kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3

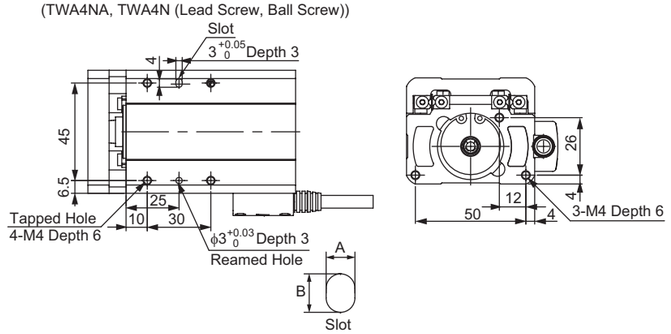
2.1.2 Wide Type

RCA2-TWA3NA, TWA3N (Lead Screw, Ball Screw), TWA4NA, TWA4N (Lead Screw, Ball Screw)

(TWA3NA, TWA3N (Lead Screw, Ball Screw))



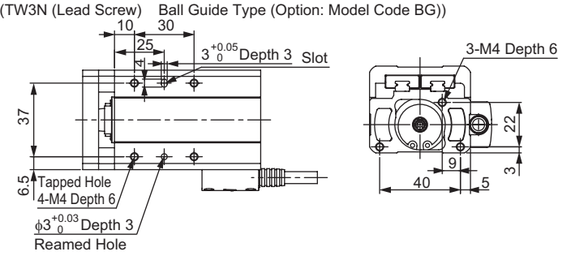
(TWA4NA, TWA4N (Lead Screw, Ball Screw))



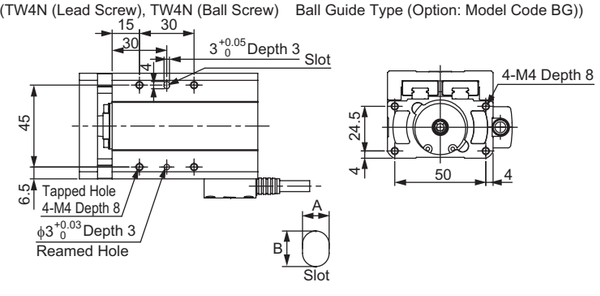
Model	Tap Size and Max. Screw Depth	Bolt to be used	Tightening Torque		Slot	Reamed Hole(mm)
			In the case that steel is used for the bolt seating surface:	In the case that aluminum is used for the bolt seating surface:		
TWA3NA, TWA3N (Lead Screw, Ball Screw)	M4 Depth 6	M4	3.59N·m(0.37kgf·m)	1.76N·m(0.18kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3
TWA4NA, TWA4N (Lead Screw, Ball Screw)	M4 Depth 6	M4	3.59N·m(0.74kgf·m)	1.76N·m(0.35kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3

⚠ 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.

(TW3N (Lead Screw) Ball Guide Type (Option: Model Code BG))



(TW4N (Lead Screw), TW4N (Ball Screw) Ball Guide Type (Option: Model Code BG))

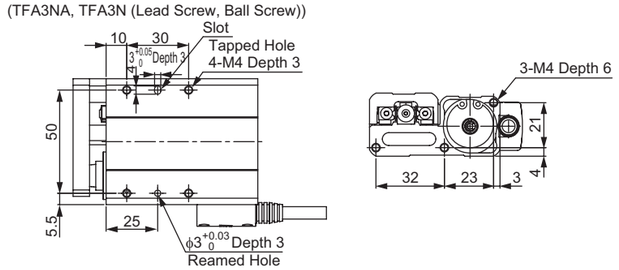


Model	Tap Size and Max. Screw Depth	Bolt to be used	Tightening Torque		Slot	Reamed Hole(mm)
			In the case that steel is used for the bolt seating surface:	In the case that aluminum is used for the bolt seating surface:		
TW3N (Lead Screw)	M4 Depth 6	M4	3.59N·m(0.37kgf·m)	1.76N·m(0.18kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3
TW4N (Lead Screw, Ball Screw)	M4 Depth 6	M4	3.59N·m(0.74kgf·m)	1.76N·m(0.35kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3

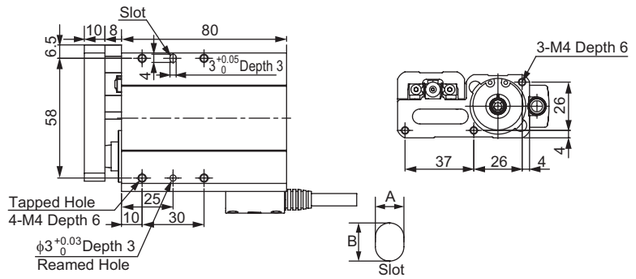
2.1.3 Flat Type

RCA2-TFA3NA, TFA3N (Lead Screw, Ball Screw), TFA4NA, TFA4N (Lead Screw, Ball Screw)

(TFA3NA, TFA3N (Lead Screw, Ball Screw))



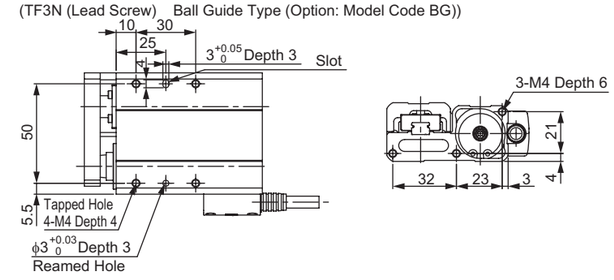
(TFA4NA, TFA4N (Lead Screw, Ball Screw))



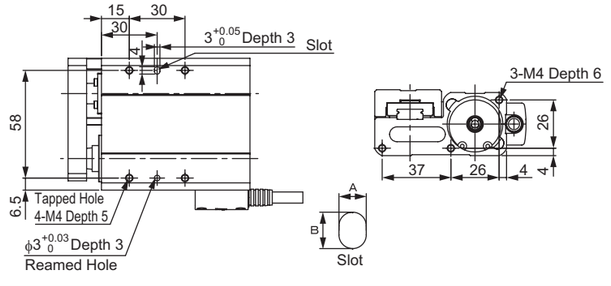
Model	Tap Size and Max. Screw Depth	Bolt to be used	Tightening Torque		Slot	Reamed Hole(mm)
			In the case that steel is used for the bolt seating surface:	In the case that aluminum is used for the bolt seating surface:		
TFA3NA, TFA3N (Lead Screw, Ball Screw)	M4 Depth 3	M4	3.59N·m(0.37kgf·m)	1.76N·m(0.18kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3
TFA4NA, TFA4N (Lead Screw, Ball Screw)	M4 Depth 4	M4	3.59N·m(0.74kgf·m)	1.76N·m(0.35kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3

⚠ 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.

(TF3N (Lead Screw) Ball Guide Type (Option: Model Code BG))



(TF4N (Lead Screw), TF4N (Ball Screw) Ball Guide Type (Option: Model Code BG))



Model	Tap Size and Max. Screw Depth	Bolt to be used	Tightening Torque		Slot	Reamed Hole(mm)
			In the case that steel is used for the bolt seating surface:	In the case that aluminum is used for the bolt seating surface:		
TF3N (Lead Screw)	M4 Depth 3	M4	3.59N·m(0.37kgf·m)	1.76N·m(0.18kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3
TF4N (Lead Screw, Ball Screw)	M4 Depth 4	M4	3.59N·m(0.74kgf·m)	1.76N·m(0.35kgf·m)	A:3, B:4, Depth: 3	ϕ3 Depth 3

2.2 Attachment of an object to be carried

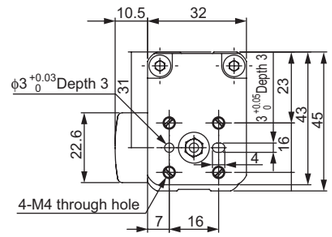
- Fix the object to be carried using the tapped hole on the front plate or on the table upper surface.
- For the male set screw, use a hexagon socket head cap screw.
- For the bolt to be used, a high-tensile bolt complying with ISO-10.9 or more is recommended.
- Attach it using the same procedure for the attachment of the main body.
- There are the two reamed holes on the upper surface of the table. In the case that the reproducibility for the attachment and removal is required, use these reamed holes. Also, in the case that fine adjustment for squareness is required, select one of these reamed holes to be used and adjust.
- Refer to the following figures for the screwing depth and reamed hole depth.

In the case that the screw is screwed in the hole to the depth more than the value in the following figures, it might cause a damage to the tapped hole or insufficient attachment strength of the object to be carried, which may result in degradation of accuracy or unexpected accident.

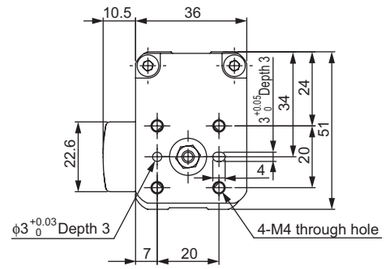
2.2.1 Compact Type

RCA2-TCA3NA, TCA3N (Lead Screw, Ball Screw), TCA4NA, TCA4N (Lead Screw, Ball Screw)

(TCA3NA, TCA3N (Lead Screw, Ball Screw))



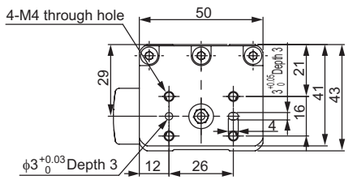
(TCA4NA, TCA4N (Lead Screw, Ball Screw))



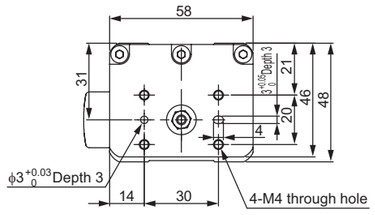
2.2.2 Wide Type

RCA2-TWA3NA, TWA3N (Lead Screw, Ball Screw), TWA4NA, TWA4N (Lead Screw, Ball Screw)

(TWA3NA, TWA3N (Lead Screw, Ball Screw))



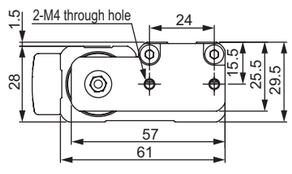
(TWA4NA, TWA4N (Lead Screw, Ball Screw))



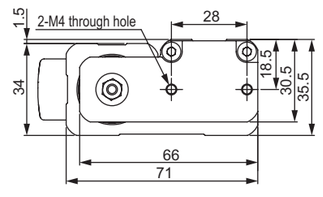
2.2.3 Flat Type

RCA2-TFA3NA, TFA3N (Lead Screw, Ball Screw), TFA4NA, TFA4N (Lead Screw, Ball Screw)

(TFA3NA, TFA3N (Lead Screw, Ball Screw))



(TFA4NA, TFA4N (Lead Screw, Ball Screw))



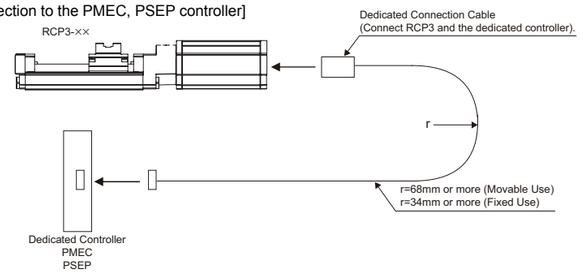
Wiring

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

1. RCP3 Actuator Connection

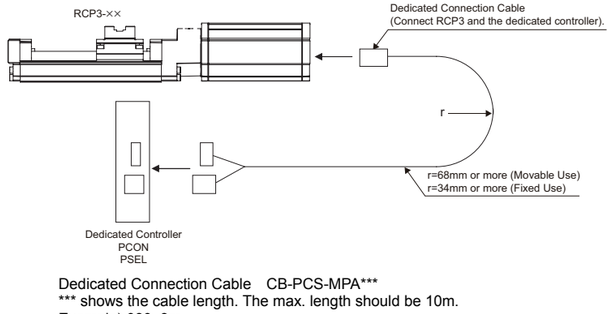
Motor Coupling Type SA3C/SA4C/SA5C/SA6C, Motor Reversing Type SA3R/SA4R/SA5R/SA6R

[Connection to the PMEC, PSEP controller]



Dedicated Connection Cable CB-APSEP-MPA***
*** shows the cable length. The max. length should be 10m.
Example) 080=8m

[Connection to the PCON, PSEL controller]

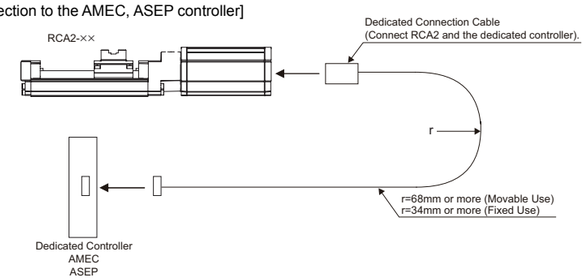


Dedicated Connection Cable CB-PCS-MPA***
*** shows the cable length. The max. length should be 10m.
Example) 080=8m

2. RCA2 Actuator Connection

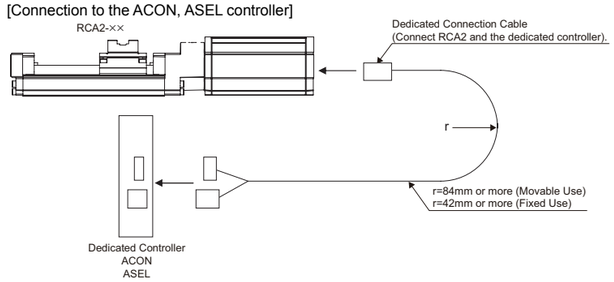
Motor Coupling Type SA3C/SA4C/SA5C/SA6C, Motor Reversing Type SA3R/SA4R/SA5R/SA6R

[Connection to the AMEC, ASEP controller]



Dedicated Connection Cable CB-APSEP-MPA***
*** shows the cable length. The max. length should be 10m.
Example) 080=8m

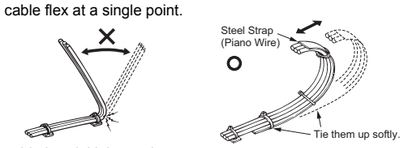
[Connection to the ACON, ASEL controller]



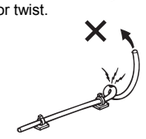
Dedicated Connection Cable CB-ACS-MPA***
*** shows the cable length. The max. length should be 10m.
Example) 080=8m

[Prohibited Items in the Cable Processing]

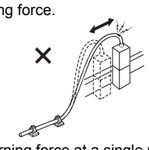
- Do not pull or bend forcibly the cable so as not to give any extra load or tension to the cable.
- Do not process the cable to extend or shortening by means of cutting out, combination or connecting with another cable.
- Do not let the cable flex at a single point.



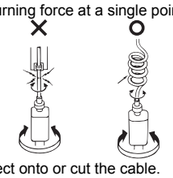
- Do not let the cable bend, kink or twist.



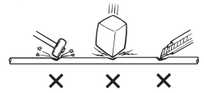
- Do not pull the cable with a strong force.



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

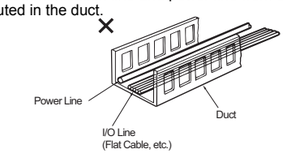


- Do not pinch, drop a heavy object onto or cut the cable.

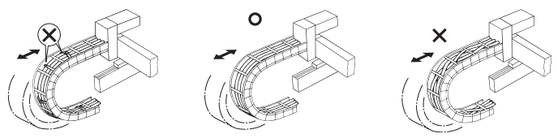


- When fixing the cable, provide a moderate slack and do not tension it too tight.

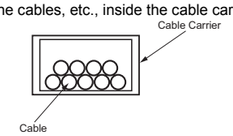
- Separate the I/O line, communication line and power line from each other. Arrange so that such lines are independently routed in the duct.



- 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.

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Manual No.: ME3676-7A