



ROBO Cylinder RCA2 Actuator Table Type

Operating Manual

Ninth Edition

Motor unit types	Motor coupling types	[Slim Small ROBO Cylinder] TA4C
		TA5C, TA6C, TA7C
	Motor reversing types	[Slim Small ROBO Cylinder] TA4R
		TA5R, TA6R, TA7R
[Slim Small ROBO Cylinders] Short types	Compact types	TCA3NA, TCA4NA, TCA3N, TCA4N
	Wide types	TWA3NA, TWA4NA, TWA3N, TWA4N
	Flat types	TFA3NA, TFA4NA, TFA3N, TFA4N

Please Read Before Use

Thank you for purchasing our product.

This Operating Manual describes all necessary information to operate this product safely such as the operation procedure, structure and maintenance procedure.

Before operation, read this manual carefully and fully understand it to operate this product safely. The enclosed CD/DVD in this product package includes the Operating Manual for this product.

For the operation of this product, print out the necessary sections in the Operating Manual or display them using the personal computer.

After reading through this manual, keep this Operating Manual at hand so that the operator of this product can read it whenever necessary.

[Important]

- This Operating Manual is original.
- The product cannot be operated in any way unless expressly specified in this Operating Manual. IAI shall assume no responsibility for the outcome of any operation not specified herein.
- Information contained in this Operating Manual is subject to change without notice for the purpose of product improvement.
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CE Marking

If a compliance with the CE Marking is required, please follow Overseas Standards Compliance Manual (ME0287) that is provided separately.

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Safety Guide

“Safety Guide” has been written to use the machine safely and so prevent personal injury or property damage beforehand. Make sure to read it before the operation of this product.

Safety Precautions for Our Products

The common safety precautions for the use of any of our robots in each operation.

No.	Operation Description	Description
1	Model Selection	<ul style="list-style-type: none">• This product has not been planned and designed for the application where high level of safety is required, so the guarantee of the protection of human life is impossible. Accordingly, do not use it in any of the following applications.<ol style="list-style-type: none">1) Medical equipment used to maintain, control or otherwise affect human life or physical health.2) Mechanisms and machinery designed for the purpose of moving or transporting people (For vehicle, railway facility or air navigation facility)3) Important safety parts of machinery (Safety device, etc.)• Do not use the product outside the specifications. Failure to do so may considerably shorten the life of the product.• Do not use it in any of the following environments.<ol style="list-style-type: none">1) Location where there is any inflammable gas, inflammable object or explosive2) Place with potential exposure to radiation3) Location with the ambient temperature or relative humidity exceeding the specification range4) Location where radiant heat is added from direct sunlight or other large heat source5) Location where condensation occurs due to abrupt temperature changes6) Location where there is any corrosive gas (sulfuric acid or hydrochloric acid)7) Location exposed to significant amount of dust, salt or iron powder8) Location subject to direct vibration or impact• For an actuator used in vertical orientation, select a model which is equipped with a brake. If selecting a model with no brake, the moving part may drop when the power is turned OFF and may cause an accident such as an injury or damage on the work piece.

No.	Operation Description	Description
2	Transportation	<ul style="list-style-type: none"> • When carrying a heavy object, do the work with two or more persons or utilize equipment such as crane. • When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. • When in transportation, consider well about the positions to hold, weight and weight balance and pay special attention to the carried object so it would not get hit or dropped. • Transport it using an appropriate transportation measure. The actuators available for transportation with a crane have eyebolts attached or there are tapped holes to attach bolts. Follow the instructions in the operation manual for each model. • Do not step or sit on the package. • Do not put any heavy thing that can deform the package, on it. • When using a crane capable of 1t or more of weight, have an operator who has qualifications for crane operation and sling work. • When using a crane or equivalent equipments, make sure not to hang a load that weighs more than the equipment's capability limit. • Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength. • Do not get on the load that is hung on a crane. • Do not leave a load hung up with a crane. • Do not stand under the load that is hung up with a crane.
3	Storage and Preservation	<ul style="list-style-type: none"> • The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation. • Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.
4	Installation and Start	<p>(1) Installation of Robot Main Body and Controller, etc.</p> <ul style="list-style-type: none"> • Make sure to securely hold and fix the product (including the work part). A fall, drop or abnormal motion of the product may cause a damage or injury. Also, be equipped for a fall-over or drop due to an act of God such as earthquake. • Do not get on or put anything on the product. Failure to do so may cause an accidental fall, injury or damage to the product due to a drop of anything, malfunction of the product, performance degradation, or shortening of its life. • When using the product in any of the places specified below, provide a sufficient shield. <ol style="list-style-type: none"> 1) Location where electric noise is generated 2) Location where high electrical or magnetic field is present 3) Location with the mains or power lines passing nearby 4) Location where the product may come in contact with water, oil or chemical droplets

No.	Operation Description	Description
4	Installation and Start	<p>(2) Cable Wiring</p> <ul style="list-style-type: none"> • Use our company's genuine cables for connecting between the actuator and controller, and for the teaching tool. • Do not scratch on the cable. Do not bend it forcibly. Do not pull it. Do not coil it around. Do not insert it. Do not put any heavy thing on it. Failure to do so may cause a fire, electric shock or malfunction due to leakage or continuity error. • Perform the wiring for the product, after turning OFF the power to the unit, so that there is no wiring error. • When the direct current power (+24V) is connected, take the great care of the directions of positive and negative poles. If the connection direction is not correct, it might cause a fire, product breakdown or malfunction. • Connect the cable connector securely so that there is no disconnection or looseness. Failure to do so may cause a fire, electric shock or malfunction of the product. • Never cut and/or reconnect the cables supplied with the product for the purpose of extending or shortening the cable length. Failure to do so may cause the product to malfunction or cause fire. <p>(3) Grounding</p> <ul style="list-style-type: none"> • The grounding operation should be performed to prevent an electric shock or electrostatic charge, enhance the noise-resistance ability and control the unnecessary electromagnetic radiation. • For the ground terminal on the AC power cable of the controller and the grounding plate in the control panel, make sure to use a twisted pair cable with wire thickness 0.5mm^2 (AWG20 or equivalent) or more for grounding work. For security grounding, it is necessary to select an appropriate wire thickness suitable for the load. Perform wiring that satisfies the specifications (electrical equipment technical standards). • Perform Class D Grounding (former Class 3 Grounding with ground resistance 100Ω or below).





No.	Operation Description	Description
4	Installation and Start	<p>(4) Safety Measures</p> <ul style="list-style-type: none"> • When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. • When the product is under operation or in the ready mode, take the safety measures (such as the installation of safety and protection fence) so that nobody can enter the area within the robot's movable range. When the robot under operation is touched, it may result in death or serious injury. • Make sure to install the emergency stop circuit so that the unit can be stopped immediately in an emergency during the unit operation. • Take the safety measure not to start up the unit only with the power turning ON. Failure to do so may start up the machine suddenly and cause an injury or damage to the product. • Take the safety measure not to start up the machine only with the emergency stop cancellation or recovery after the power failure. Failure to do so may result in an electric shock or injury due to unexpected power input. • When the installation or adjustment operation is to be performed, give clear warnings such as "Under Operation; Do not turn ON the power!" etc. Sudden power input may cause an electric shock or injury. • Take the measure so that the work part is not dropped in power failure or emergency stop. • Wear protection gloves, goggle or safety shoes, as necessary, to secure safety. • Do not insert a finger or object in the openings in the product. Failure to do so may cause an injury, electric shock, damage to the product or fire. • When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity.
5	Teaching	<ul style="list-style-type: none"> • When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. • Perform the teaching operation from outside the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the "Stipulations for the Operation" and make sure that all the workers acknowledge and understand them well. • When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. • When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. • Place a sign "Under Operation" at the position easy to see. • When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. <p>* Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.</p>

No.	Operation Description	Description
6	Trial Operation	<ul style="list-style-type: none"> • When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. • After the teaching or programming operation, perform the check operation one step by one step and then shift to the automatic operation. • When the check operation is to be performed inside the safety protection fence, perform the check operation using the previously specified work procedure like the teaching operation. • Make sure to perform the programmed operation check at the safety speed. Failure to do so may result in an accident due to unexpected motion caused by a program error, etc. • Do not touch the terminal block or any of the various setting switches in the power ON mode. Failure to do so may result in an electric shock or malfunction.
7	Automatic Operation	<ul style="list-style-type: none"> • Check before starting the automatic operation or rebooting after operation stop that there is nobody in the safety protection fence. • Before starting automatic operation, make sure that all peripheral equipment is in an automatic-operation-ready state and there is no alarm indication. • Make sure to operate automatic operation start from outside of the safety protection fence. • In the case that there is any abnormal heating, smoke, offensive smell, or abnormal noise in the product, immediately stop the machine and turn OFF the power switch. Failure to do so may result in a fire or damage to the product. • When a power failure occurs, turn OFF the power switch. Failure to do so may cause an injury or damage to the product, due to a sudden motion of the product in the recovery operation from the power failure.

No.	Operation Description	Description
8	Maintenance and Inspection	<ul style="list-style-type: none"> • When the work is carried out with 2 or more persons, make it clear who is to be the leader and who to be the follower(s) and communicate well with each other to ensure the safety of the workers. • Perform the work out of the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the "Stipulations for the Operation" and make sure that all the workers acknowledge and understand them well. • When the work is to be performed inside the safety protection fence, basically turn OFF the power switch. • When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. • When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. • Place a sign "Under Operation" at the position easy to see. • For the grease for the guide or ball screw, use appropriate grease according to the Operation Manual for each model. • Do not perform the dielectric strength test. Failure to do so may result in a damage to the product. • When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. • The slider or rod may get misaligned OFF the stop position if the servo is turned OFF. Be careful not to get injured or damaged due to an unnecessary operation. • Pay attention not to lose the cover or untightened screws, and make sure to put the product back to the original condition after maintenance and inspection works. <p>Use in incomplete condition may cause damage to the product or an injury.</p> <p>* Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.</p>
9	Modification and Dismantle	<ul style="list-style-type: none"> • Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.
10	Disposal	<ul style="list-style-type: none"> • When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste. • When removing the actuator for disposal, pay attention to drop of components when detaching screws. • Do not put the product in a fire when disposing of it. <p>The product may burst or generate toxic gases.</p>
11	Other	<ul style="list-style-type: none"> • Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. • See Overseas Specifications Compliance Manual to check whether complies if necessary. • For the handling of actuators and controllers, follow the dedicated operation manual of each unit to ensure the safety.

Alert Indication

The safety precautions are divided into “Danger”, “Warning”, “Caution” and “Notice” according to the warning level, as follows, and described in the Operation Manual for each model.

Level	Degree of Danger and Damage	Symbol
Danger	This indicates an imminently hazardous situation which, if the product is not handled correctly, will result in death or serious injury.	 Danger
Warning	This indicates a potentially hazardous situation which, if the product is not handled correctly, could result in death or serious injury.	 Warning
Caution	This indicates a potentially hazardous situation which, if the product is not handled correctly, may result in minor injury or property damage.	 Caution
Notice	This indicates lower possibility for the injury, but should be kept to use this product properly.	 Notice

Handling Precautions

1. Do Not Set Speed and Acceleration/Deceleration Higher Than the Rated Values.

Do not set speed and acceleration/deceleration higher than the rated values. It causes vibration, failure, or shortening of life. If acceleration/deceleration higher than the rated value is set, creeping phenomenon or coupling slide may occur.

2. The Allowable Load Moment Must be Within the Tolerance.

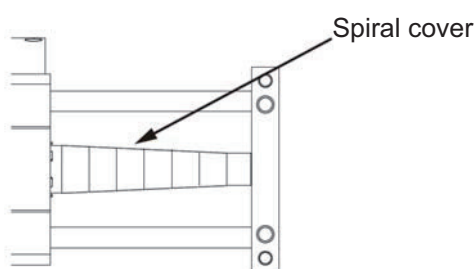
The allowable load moment must be within the tolerance value. If a load exceeding the allowable load moment is applied, the life may be shortened. If an extreme load is applied, flaking may occur.

3. Oil Film of Grease May Run Out If Short-distance Reciprocating Operation is Performed.

When performing continuous reciprocating operation of a distance of 30 mm or shorter, oil film of grease may run out. To recover oil film, perform approximately five cycles of a distance of 50 mm or longer, every 5,000 to 10,000 cycles, as a guideline

4. Handling of Spiral Cover

The spiral covers used on short types (TC3N, TC4N, TW3N, TW4N, TF3N, TF4N) are each made of a thin sheet rolled into a spiral form. Exercise caution not to bump the spiral sheet or press it strongly with fingers, because the spiral sheet may deform.



5. Make sure to attach the actuator properly by following this operation manual.

Using the product with the actuator not being certainly retained or affixed may cause abnormal noise, vibration, malfunction or shorten the product life.

6. Transportation

6.1 Handling a Single Actuator

Please adhere to the following when handling a single actuator.

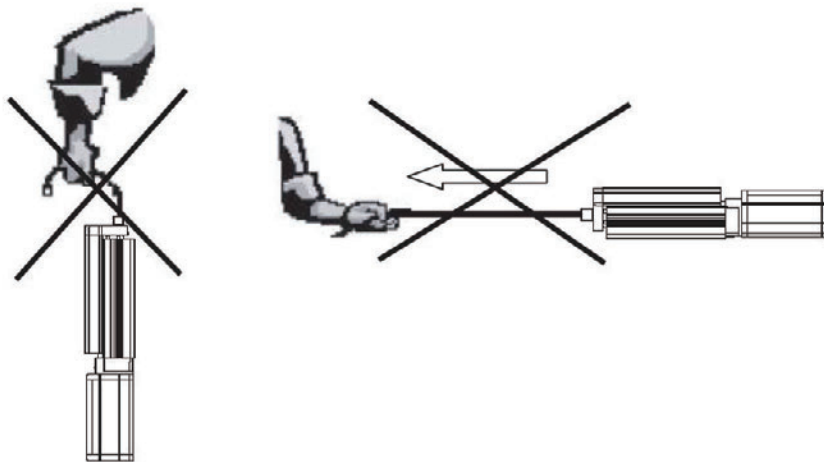
6.1.1 Handling the Packed Unit

Unless otherwise specified, the actuator is shipped with each axis packaged separately.

- Do not damage or drop. The package is not applied with any special treatment that enables it to resist an impact caused by a drop or crash.
- Transport a heavy package with at least more than two operators. Consider an appropriate method for transportation.
- Keep the unit in horizontal orientation when placing it on the ground or transporting. Follow the instruction if there is any for the packaging condition.
- Do not step or sit on the package.
- Do not put any load that may cause a deformation or breakage of the package.

6.1.2 Handling the Actuator After Unpacking

- Do not carry an actuator by a cable or attempt to move it by pulling the cable.



- Hold the body base when transporting the actuator.
- Be careful not to bump the actuator into anything when moving it.
- Do not apply an excessive force to each part of the actuator. In particular, prevent the motor unit and rear bracket from receiving an unnecessary force.

Supplement) For the names of each part of the actuator, refer to 1, “Part Names”.

6.2 Handling the Actuator Assembly

- When carrying the actuator, exercise caution not to bump it against nearby objects or structures.
- Secure the sliders to prevent sudden movement during transport.
- If any end of the actuator is overhanging, secure it properly to avoid significant movement due to external vibration.
- When transporting the assembly without the ends of the actuators fastened, do not subject the assembly to an impact of 0.3 G or more.
- When suspending the mechanical equipment (system) with ropes, avoid applying force to actuator, connector box, etc. Also, avoid the cables being pinched or caused an excessive deformation.

1. Part Names

The names of the actuator parts are indicated below.

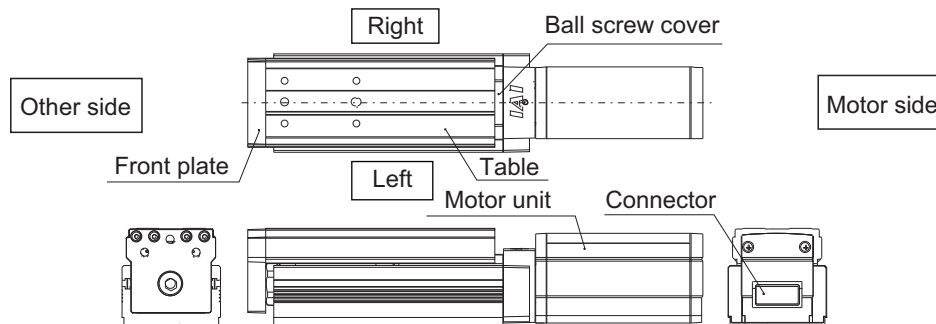
In this manual, the right and left are determined by viewing the actuator from the top and from the motor side.

Also, the front side means the side opposite from the motor.

1.1 Motor Unit Types

1.1.1 Motor coupling types

RCA2-TA4C, TA5C, TA6C, TA7C

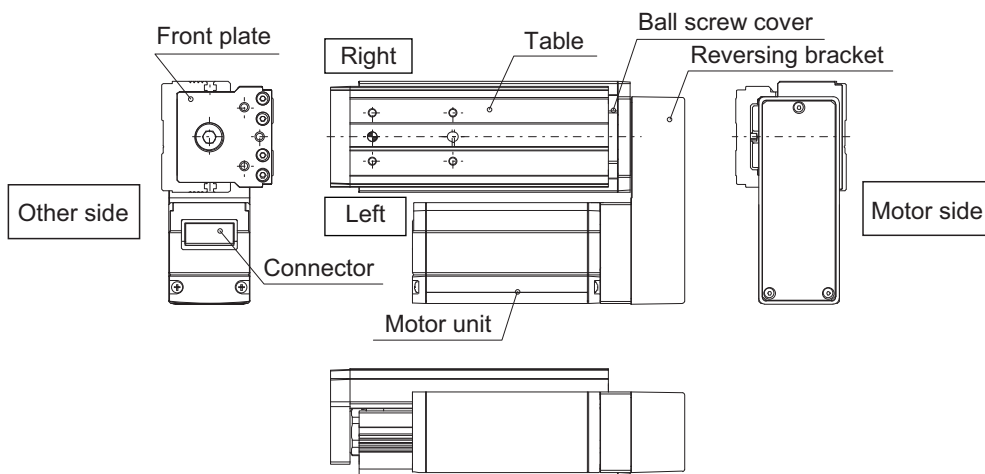


* Refer to 2, "External Dimensions" for details.

* The connector position shown above is for when cable exit direction is not changed.

1.1.2 Motor reversing types

RCA2-TA4R, TA5R, TA6R, TA7R (AC Servo Motor)



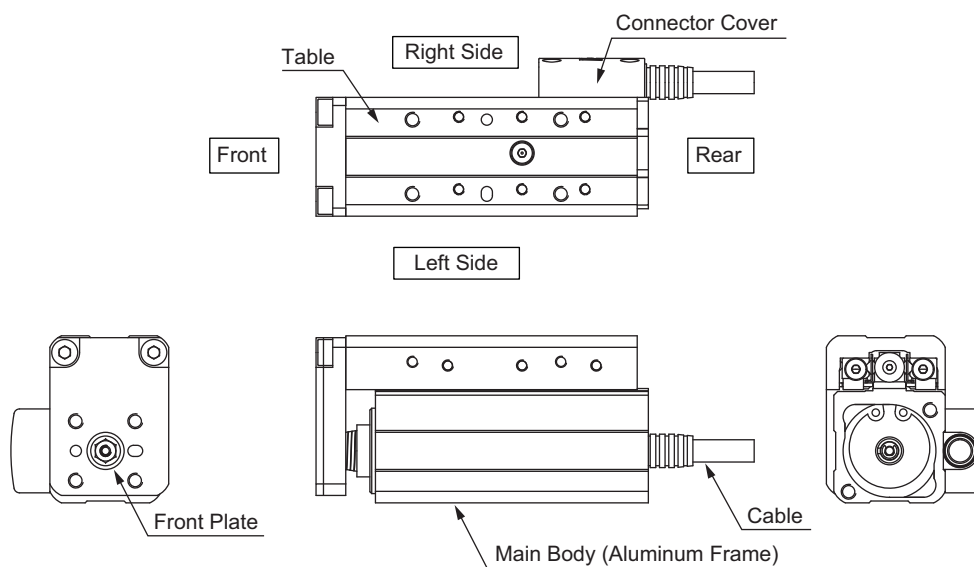
* Refer to 2, "External Dimensions" for details.

Caution: When the table has moved away from its home position, there is a gap between the table and the motor unit. Keep hands clear of gap.

1.2 Short Types

1.2.1 Compact types

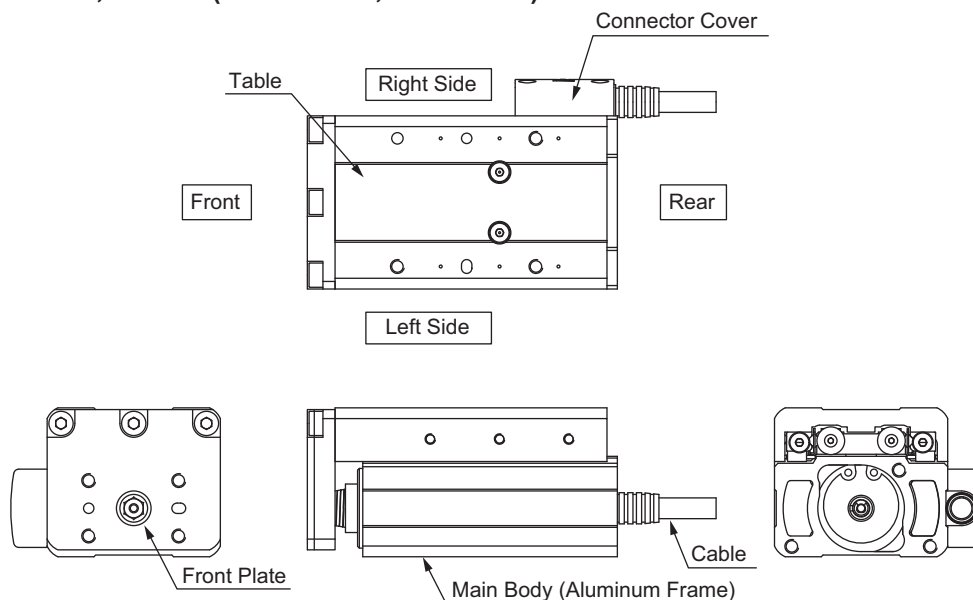
RCA2-TCA3NA, TCA3N (Slide screw, Ball screw),
TCA4NA, TCA4N (Slide screw, Ball screw)



* Refer to 2, "External Dimensions" for details.

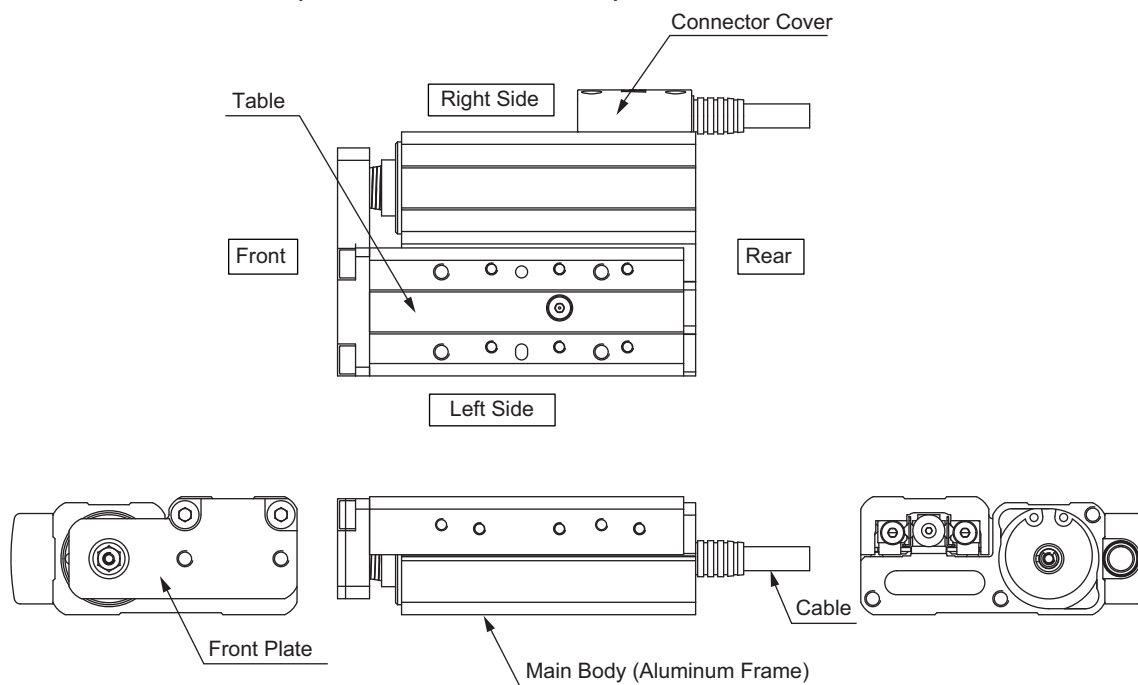
1.2.2 Wide types

RCA2-TWA3NA, TWA3N (Slide screw, Ball screw),
TWA4NA, TWA4N (Slide screw, Ball screw)



* Refer to 2, "External Dimensions" for details.

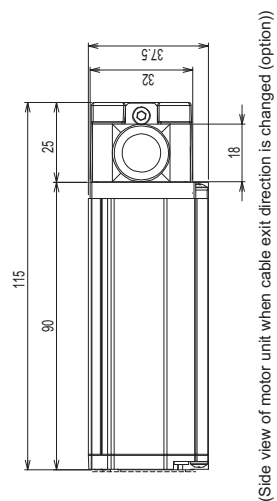
1.2.3 Flat types RCA2-TFA3NA, TFA3N (Slide screw, Ball screw), TFA4NA, TFA4N (Slide screw, Ball screw)



* Refer to 2, "External Dimensions" for details.

2.1 RCA2-TA4C

ST	L		A	B	C	D	E	F	G	H	J	Weight [kg]	
	Without brake	With brake										Without brake	With brake
20	214.5	259	89	97	122.5	90.5	1	30.5	1	4	6	0.8	1.0
30	224.5	269	99	107	123.5	100.5	1	40.5	1	4	6	0.8	1.0
40	234.5	279	109	117	142.5	110.5	1	50.5	1	4	6	0.8	1.0
50	244.5	289	119	127	142.5	120.5	1	60.5	1	4	6	0.9	1.1
60	254.5	299	129	137	162.5	130.5	2	20.5	2	6	8	0.9	1.1
70	264.5	309	139	147	172.5	140.5	2	30.5	2	6	8	0.9	1.1
80	274.5	319	149	157	182.5	150.5	2	40.5	2	6	8	1.0	1.2
90	284.5	329	159	167	192.5	160.5	2	50.5	2	6	8	1.0	1.2
900	294.5	339	169	177	202.5	170.5	2	60.5	2	6	8	1.0	1.2



ST	L		A	B	C	D	E	F	G	H	J	Weight [kg]	
	Without brake	With brake										Without brake	With brake
25	244	284.5	103	113	135.5	103	1	43	1	4	6	1.2	1.5
25	244	284.5	103	113	135.5	103	1	43	1	4	6	1.2	1.5
25	209	309.5	128	138	160.5	128	1	68	1	4	6	1.4	1.7
35	254	334.5	153	163	185.5	153	2	43	2	6	8	1.5	1.8
45	274	354.5	173	183	205.5	173	2	43	2	6	8	1.5	1.8
75	294	374.5	193	203	225.5	193	2	43	2	6	8	1.7	2.0

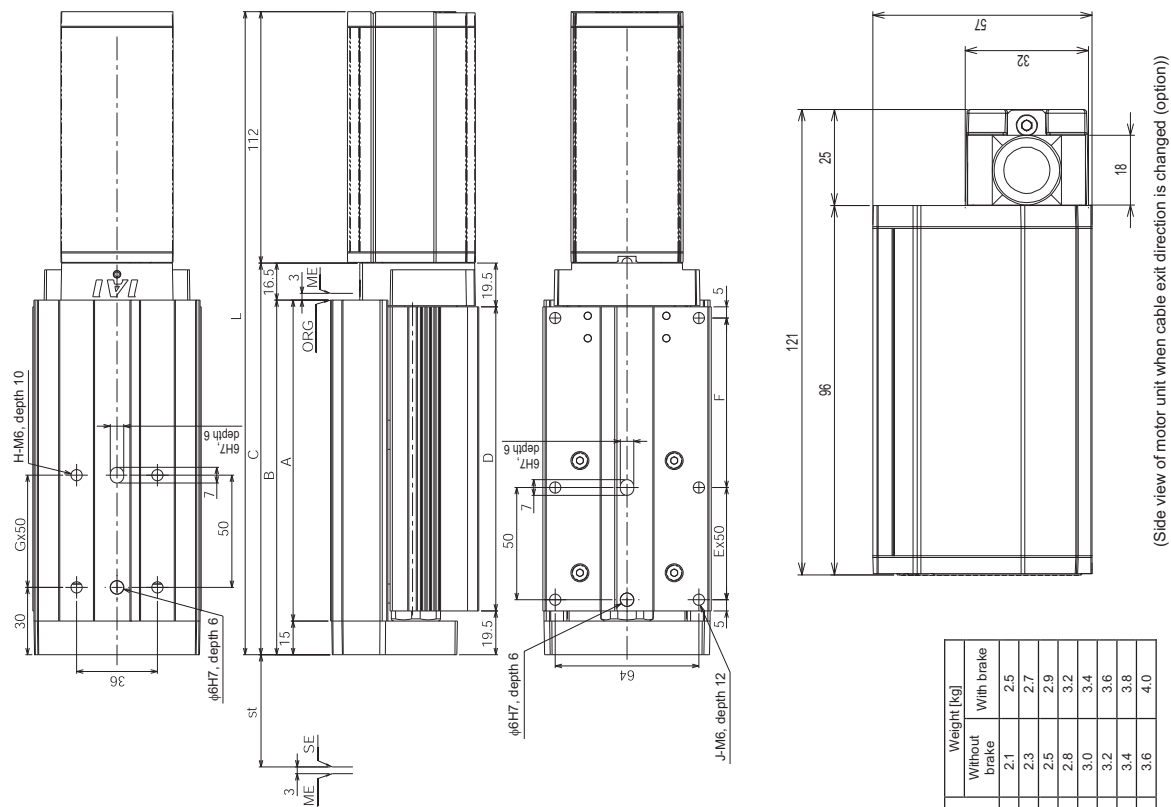
[illegible]

Detail view of T-groove (2:1)

ST	L		A	B	C	D	E	F	G	H	J	Weight [kg]	
	Without brake	With brake										Without brake	With brake
20	244.5	284	108	121	147.5	110.5	1	50.5	1	4	6	1.8	2.2
25	269.5	3.9	133	146	172.5	135.5	1	75.5	1	4	6	2.0	2.4
30	294.5	334	158	171	197.5	160.5	2	50.5	2	6	8	2.2	2.6
35	319.5	359	183	196	222.5	185.5	2	75.5	2	6	8	2.4	2.8
40	344.5	384	208	221	247.5	210.5	3	50.5	3	8	10	2.6	3.0
45	369.5	409	233	246	272.5	235.5	3	75.5	3	8	10	2.8	3.2
50	394.5	434	258	271	297.5	260.5	4	50.5	4	10	12	3.0	3.4

(Side view of motor unit when cable exit direction is changed (option))

2.4 RCA2-TA7C



(Side view of motor unit when cable exit direction is changed (option))

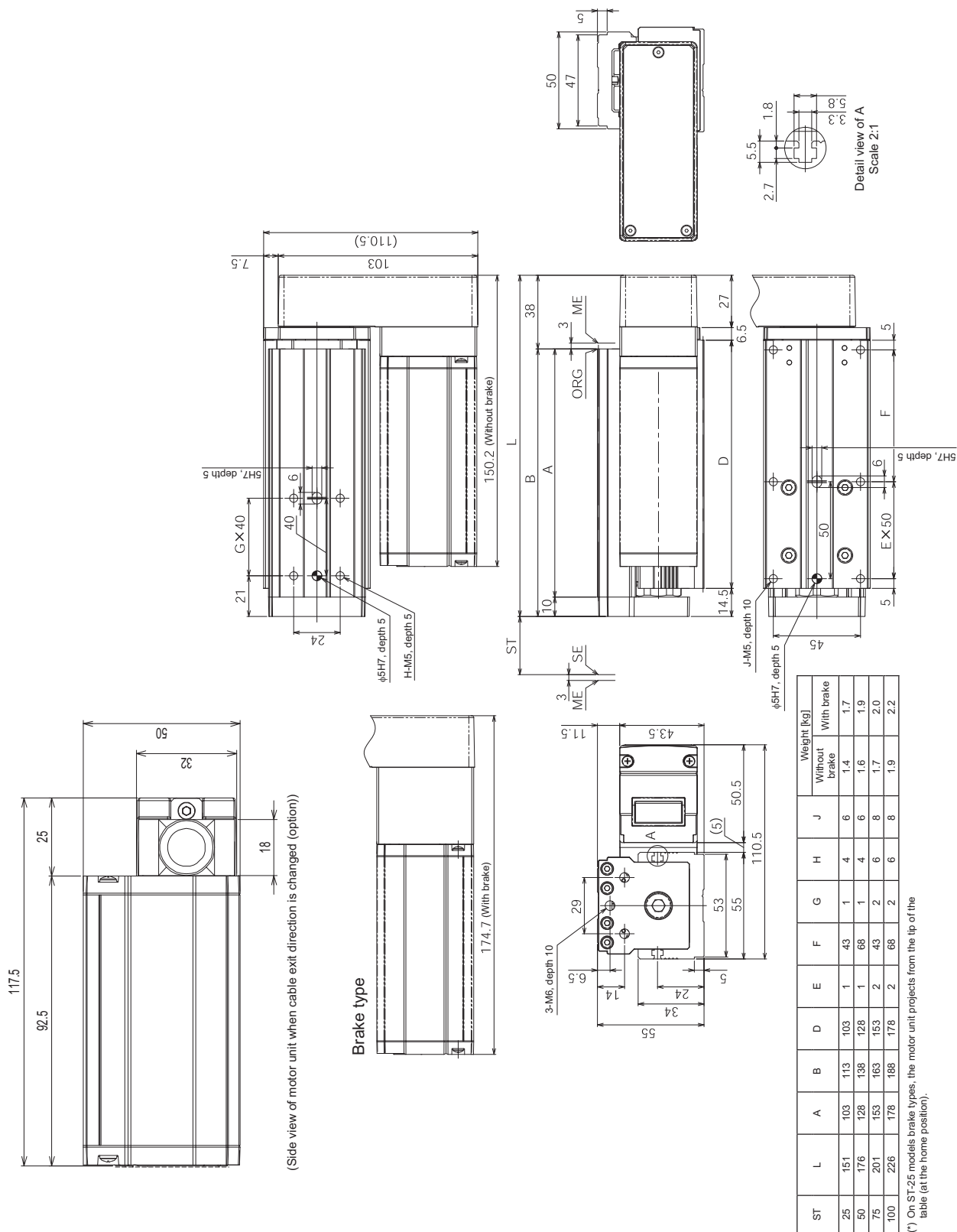
ST	L		A	B	C	D	E	F	G	H	J	Weight [kg]	
	Without brake	With brake										Without brake	With brake
25	261.5	301	118	133	149.5	110.5	1	50.5	1	4	6	2.1	2.5
50	286.5	328	143	158	174.5	135.5	1	75.5	1	4	6	2.3	2.7
75	311.5	351	168	183	199.5	160.5	2	50.5	2	6	8	2.5	2.9
100	336.5	376	193	208	224.5	185.5	2	75.5	2	6	8	2.8	3.2
125	361.5	401	218	233	249.5	210.5	3	50.5	3	8	10	3.0	3.4
150	386.5	426	243	258	274.5	235.5	3	75.5	3	8	10	3.2	3.6
175	411.5	451	268	283	299.5	260.5	4	50.5	4	10	12	3.4	3.8
200	436.5	476	293	308	324.5	285.5	4	75.5	4	10	12	3.6	4.0

[illegible]

ST	L	A	B	D	E	F	G	H	J	Weight [kg]	
										Without brake	With brake
20	129	89	97	90.5	1	30.5	1	4	6	0.8	1.0
30	139	98	107	100.5	1	40.5	1	4	6	0.9	1.1
40	149	109	117	110.5	1	50.5	1	4	6	0.9	1.1
50	159	119	127	120.5	1	60.5	1	4	6	0.9	1.1
60	169	129	137	130.5	2	20.5	2	6	8	1.0	1.2
70	179	139	147	140.5	2	30.5	2	6	8	1.0	1.2
80	189	149	157	150.5	2	40.5	2	6	8	1.0	1.2
90	199	159	167	160.5	2	50.5	2	6	8	1.1	1.3
100	209	169	177	170.5	2	60.5	2	6	8	1.1	1.3

(Side view of motor unit when cable exit direction is changed (option))

2.6 RCA2-TA5R, Reversing to Left (Right)



Technical drawing of the ST-25 motor unit, showing side and detail views with dimensions and a table of specifications.

Side View Dimensions:

- Overall length: 121
- Motor unit length: 96
- Motor unit width: 25
- Motor unit height: 18
- Motor unit depth: 57
- Motor unit width (with brake): 32
- Motor unit depth (with brake): 164.2

Detail View Dimensions:

- Motor unit length: 126
- Motor unit width: 7.5
- Motor unit depth: 5
- Motor unit width (with brake): 139.7
- Motor unit depth (with brake): 13
- Motor unit width (without brake): 40.5
- Motor unit depth (without brake): 3
- Motor unit width (with brake): 17.5
- Motor unit depth (with brake): 6.5
- Motor unit width (without brake): 27
- Motor unit depth (without brake): 3
- Motor unit width (with brake): 5
- Motor unit depth (with brake): 5
- Motor unit width (without brake): 5
- Motor unit depth (without brake): 5
- Motor unit width (with brake): 5
- Motor unit depth (with brake): 5
- Motor unit width (without brake): 5
- Motor unit depth (without brake): 5

Table of Specifications:

ST	L	A	B	D	E	F	G	H	J	Weight [kg]	
										Without brake	With brake
25	161.5	108	121	110.5	1	50.5	1	4	6	2.1	2.5
50	186.5	133	146	135.5	1	75.5	1	4	6	2.3	2.7
75	211.5	158	171	160.5	2	50.5	2	6	8	2.5	2.9
100	236.5	183	196	185.5	2	75.5	2	6	8	2.7	3.1
125	261.5	208	221	210.5	3	50.5	3	8	10	2.9	3.3
150	286.5	233	246	235.5	3	75.5	3	8	10	3.1	3.5

Notes:

- *) On ST-25 models brake types, the motor unit projects from the tip of the table (at the home position).

*) On ST-25 models brake types, the motor unit projects from the tip of the table (at the home position).

[illegible]

(*) On ST-25 models brake type, the motor unit projects from the tip of the table (at the home position).

ST	L	A	B	Weight [kg]
30	89.5	86.5	73.5	0.37
50	109.5	106.5	93.5	0.44

(Note) Only 30mm is available for the stroke of Slide Screw TCA3N Type.

Equipped with Gauge Slippage Protection Function

ST	L	A	B	Weight [kg]
30	98	95	80	0.48
50	118	115	100	0.60

(Note) Only 30mm is available for the stroke of Slide Screw TCA4N Type.

Equipped with Gauge Slippage Protection Function

ST	L	A	B	Weight [kg]
30	89.5	86.5	73.5	0.52
50	109.5	106.5	93.5	0.58

(Note) Only 30mm is available for the stroke of Slide Screw TWA3N Type.

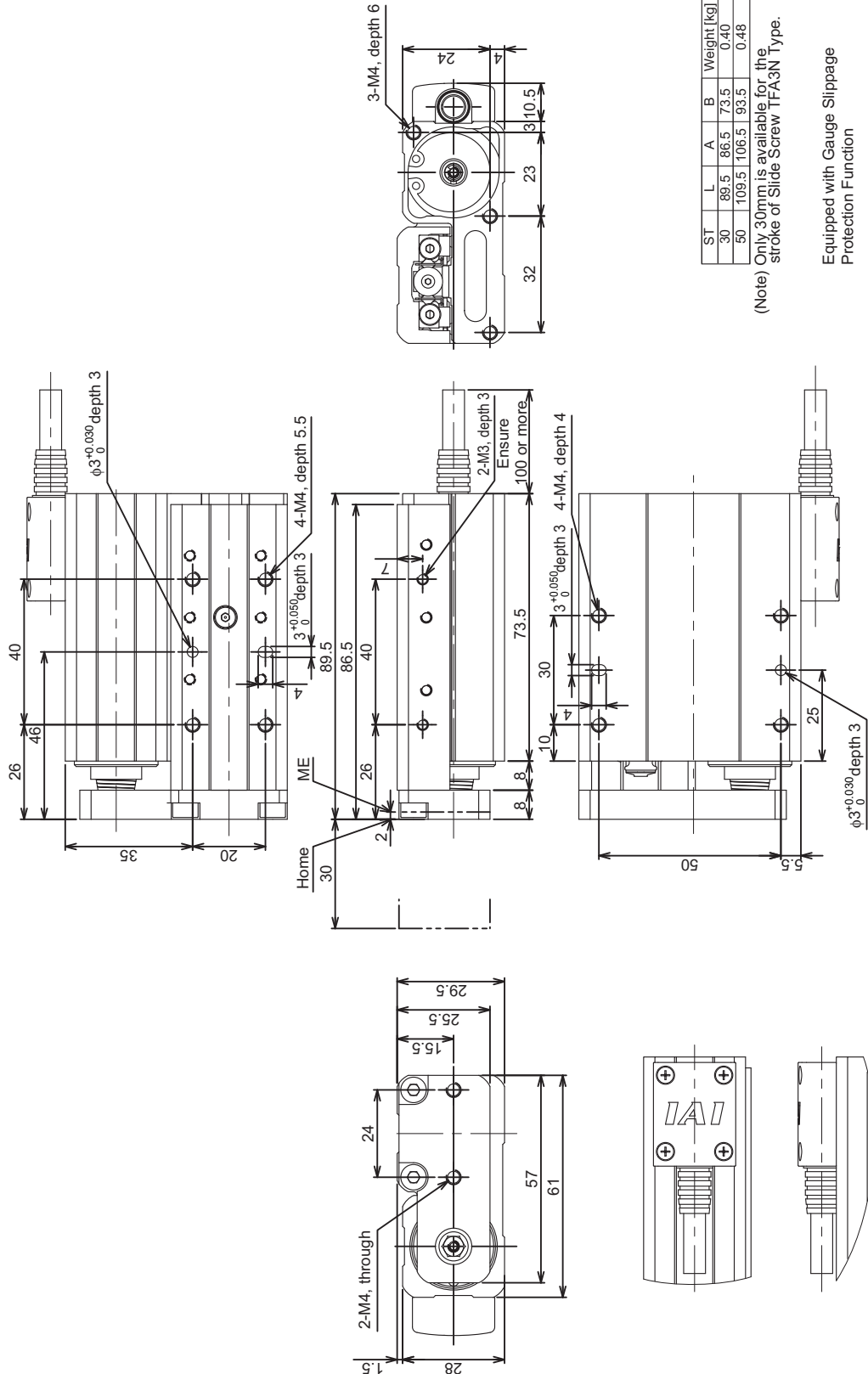
Equipped with Gauge Slippage Protection Function

ST	L	A	B	Weight [kg]
30	98	95	80	0.65
50	118	115	100	0.77

(Note) Only 30mm is available for the stroke of Slide Screw TWA4N Type.

Equipped with Gauge Slippage Protection Function

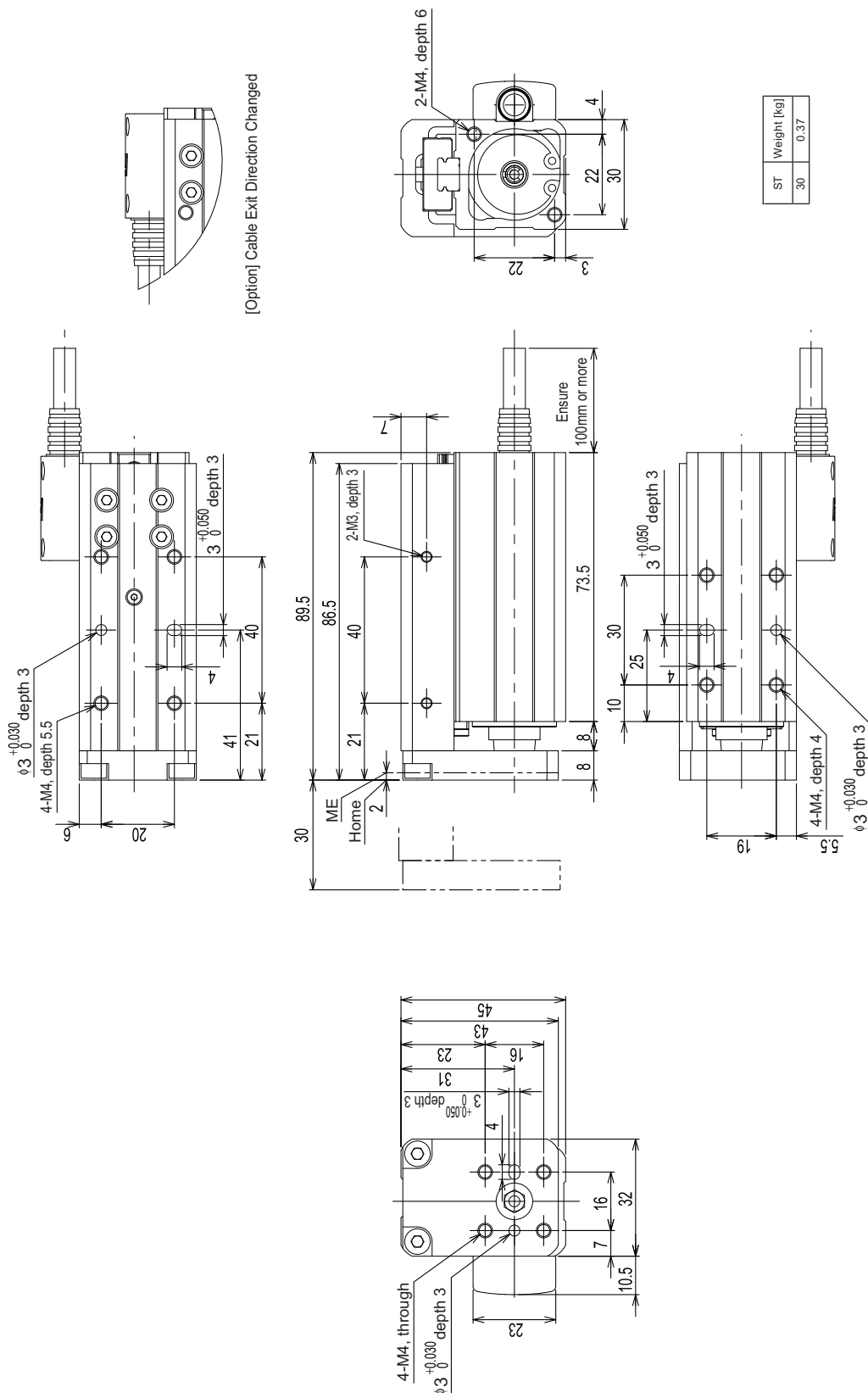
2.13 RCA2-TFA3NA, RCA2-TFA3N (Slide screw, Ball screw)



ST	L	A	B	Weight [kg]
30	98	95	80	0.60
50	118	115	100	0.72

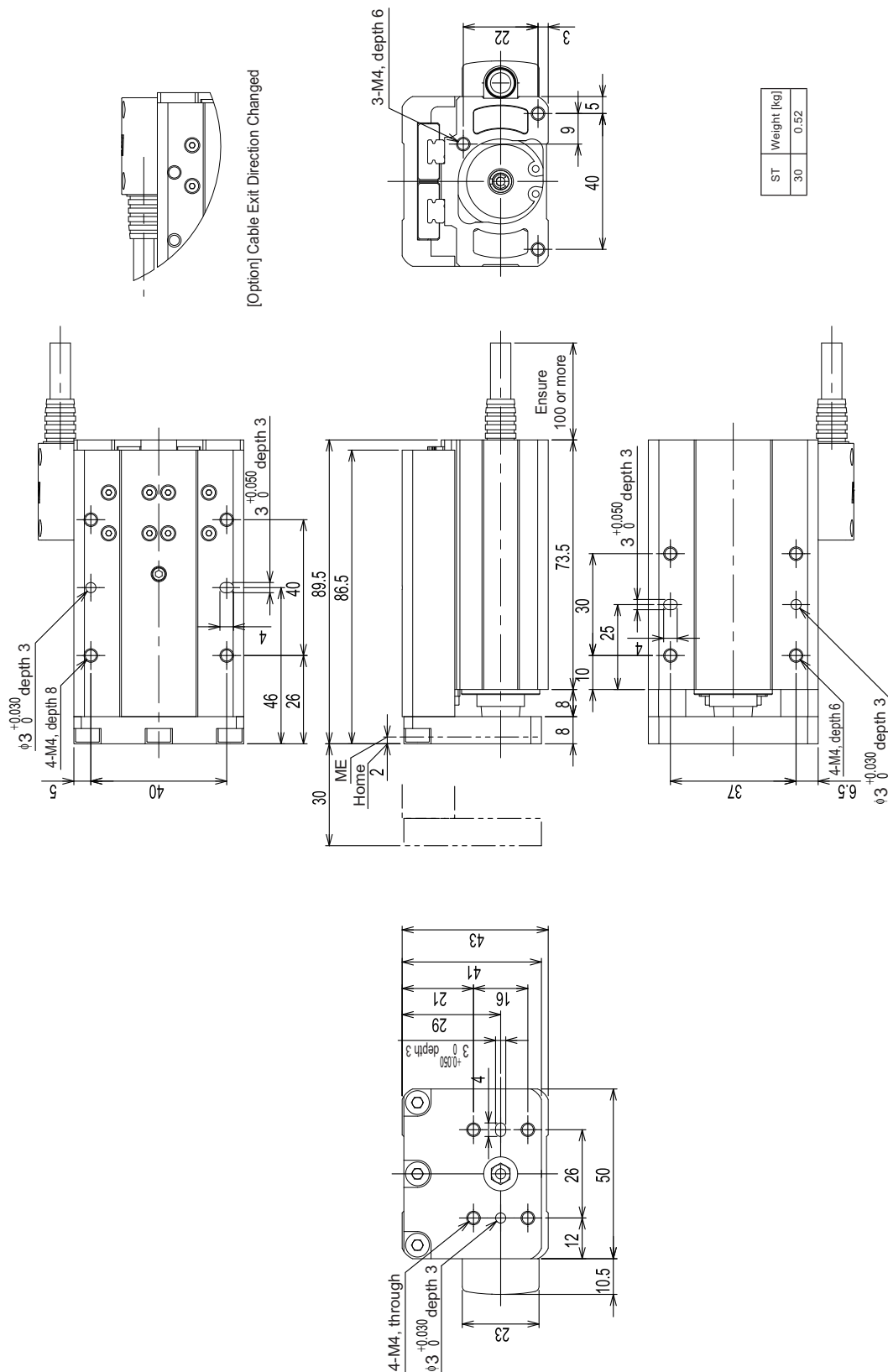
(Note) Only 30mm is available for the stroke of Slide Screw TFA4N Type.

Equipped with Gauge Slippage Protection Function

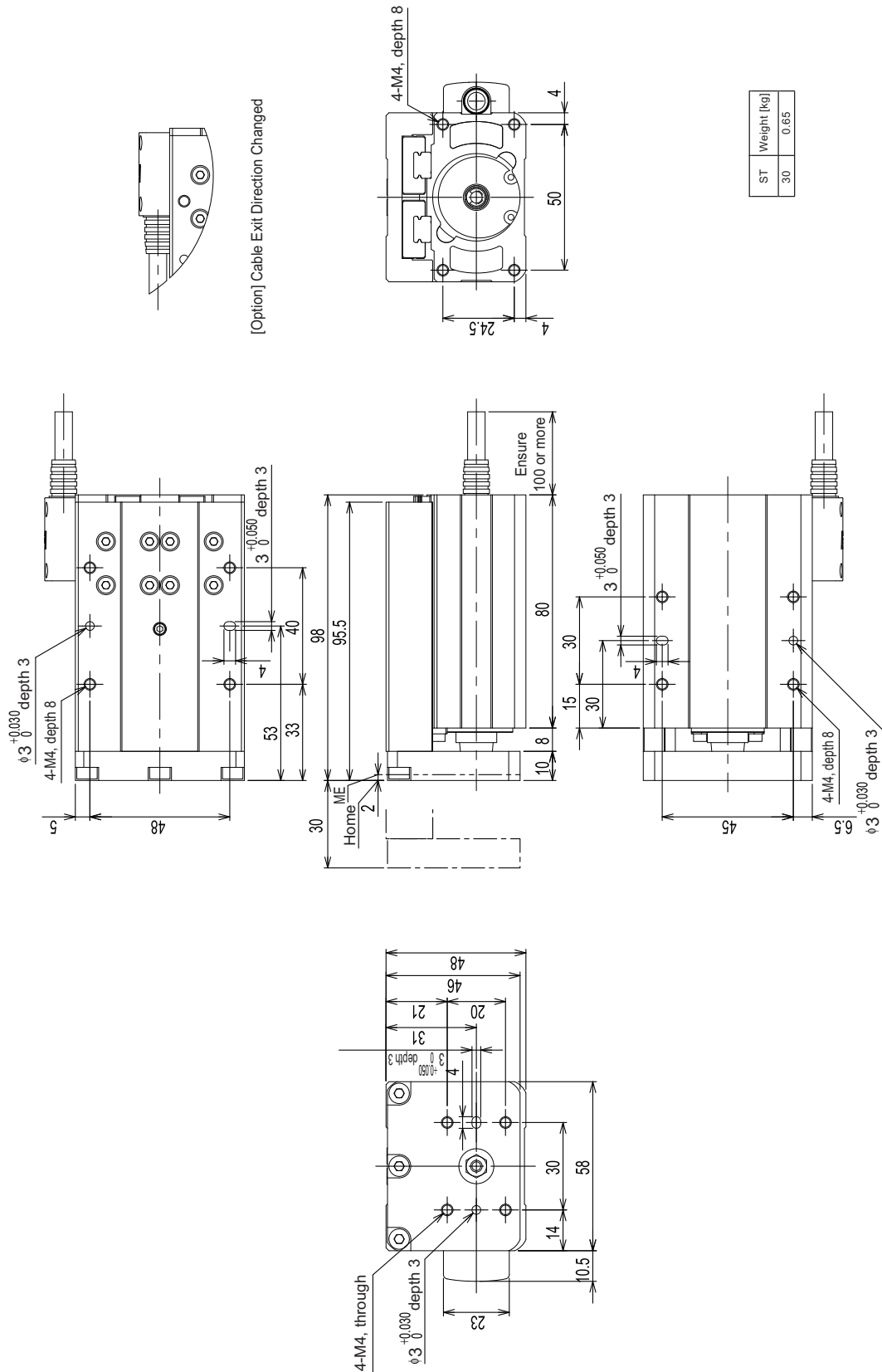


2. External Dimensions

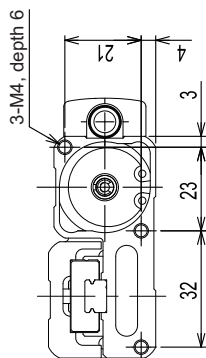




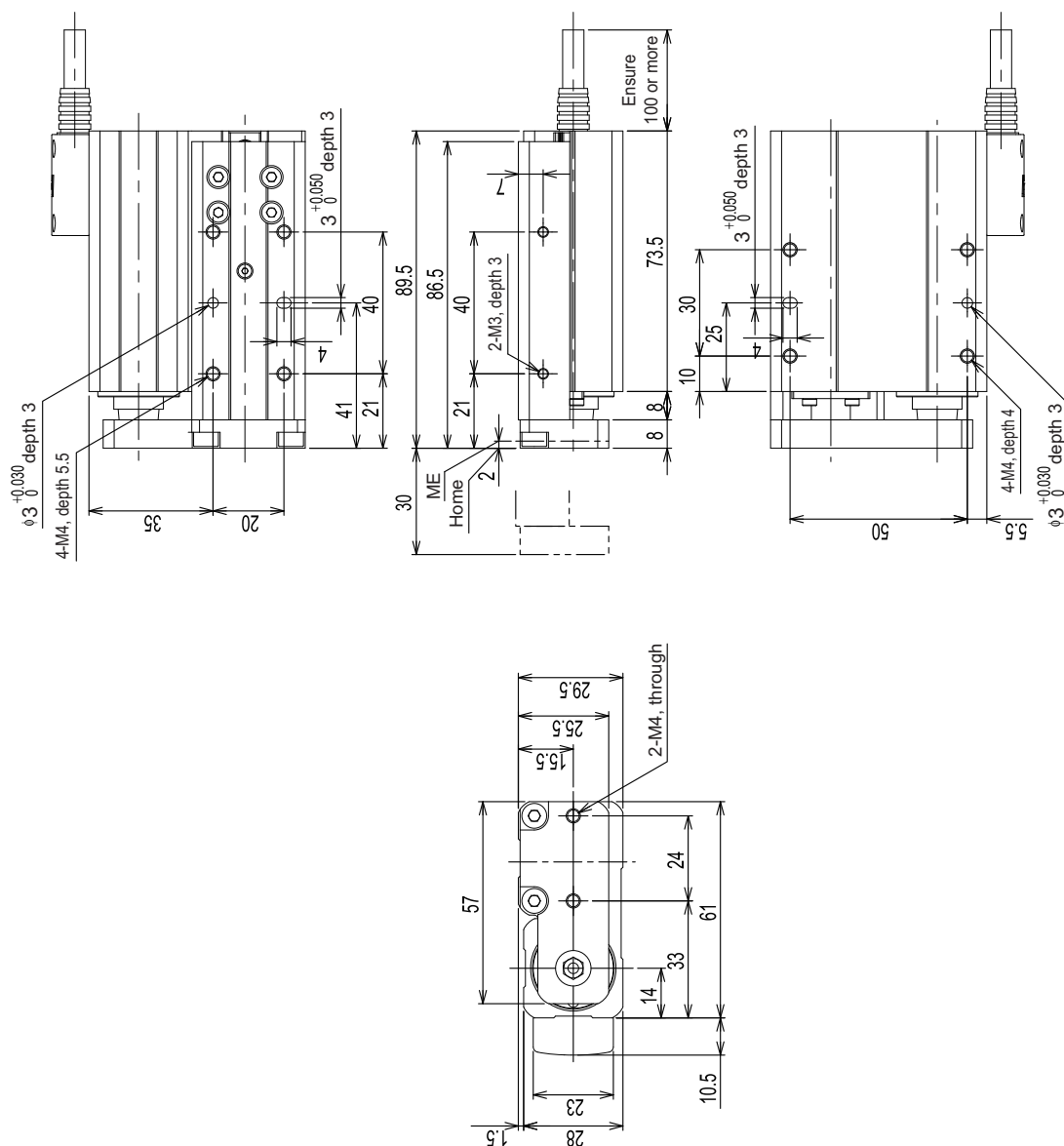
2.18 RCA2-TW4N (Slide screw), TW4N (Ball screw) Ball Guide Type (Option: Model Code BG)



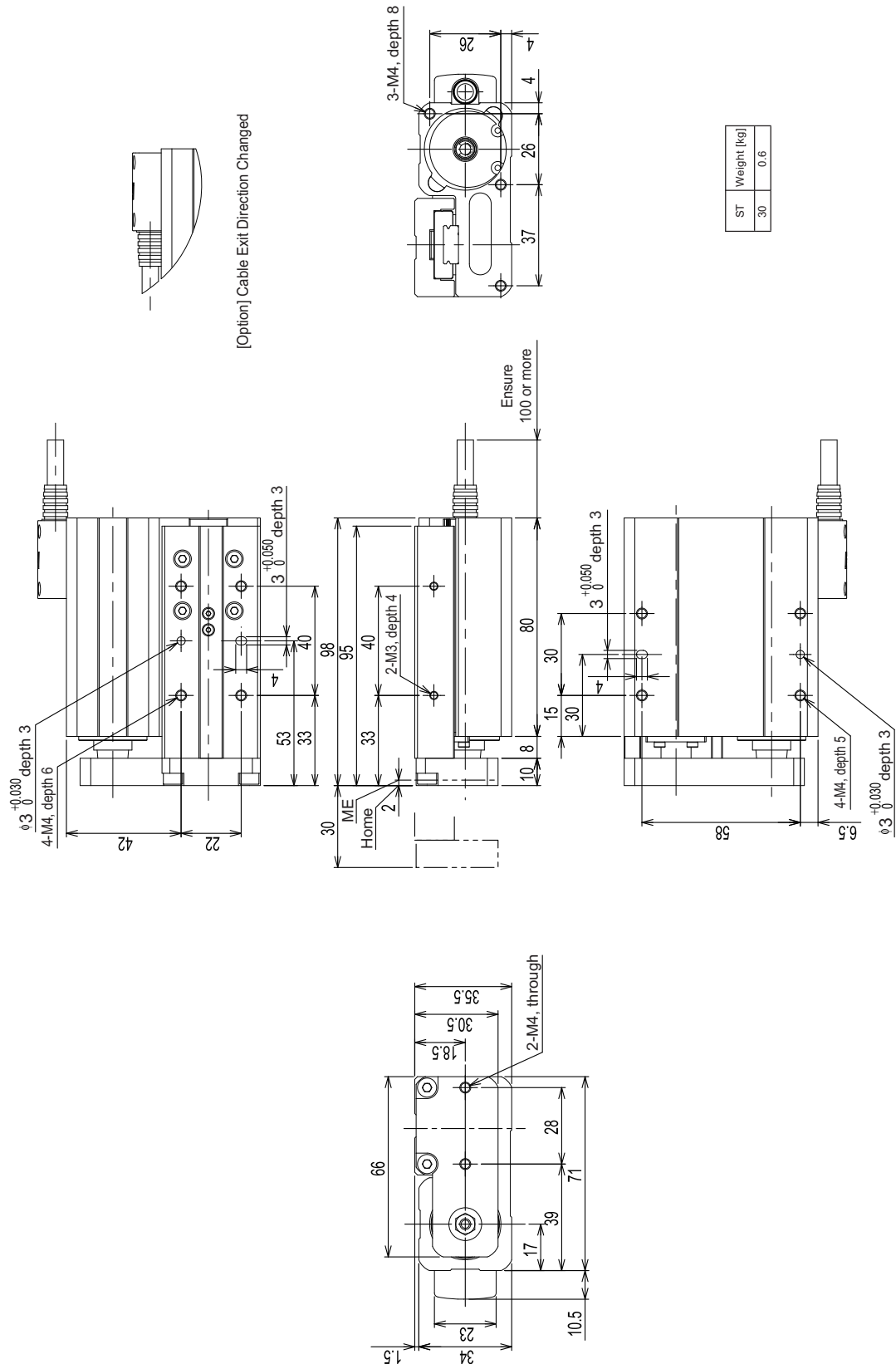
[Option] Cable Exit Direction Changed



ST	Weight [kg]
30	0 4



2.20 RCA2-TF4N (Slide screw), TF4N (Ball screw) Ball Guide Type (Option: Model Code BG)

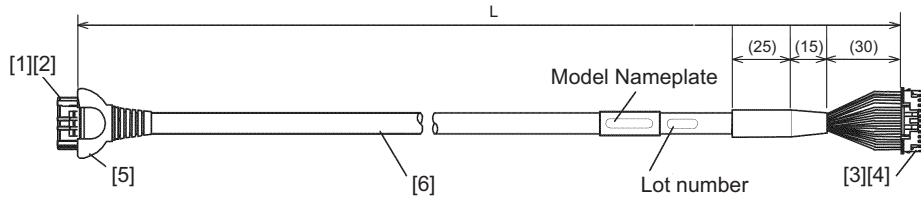


3. Cable Drawings

3.1 ASEP Controller Cables

Motor/encoder cable
(CB-APSEP-MPA***)

*** indicates the cable length (L). Up to 10 m can be specified.
Example) 080 = 8 m



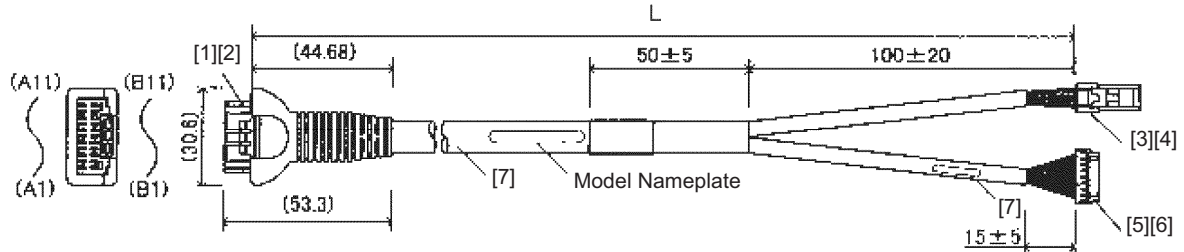
No.	Item	Model number	Manufacturer
1	Housing	D-1100D 1-1827863-1 (black, 2.0-mm pitch, 22 poles)	AMP
2	Contact	D-1 1827570-2 (AWG 22 to 18, 1.08 to 1.6 φ)	
3	Housing	PADP-24V-1-S (white, 2.0-mm pitch, 24 poles)	JST
4	Contact	SPND-001T-C0.5 (AWG 26 to 22, 1.0 to 1.5 φ)	
5	Coupler cover	TMS-4ZB008	TATSUTA ELECTRIC WIRE & CABLE
6	ZUL2854-OHFRPCVSW	25AWG x 6P + 25AWG x 2C + 22AWG x 6C, TS08V0350	TATSUTA ELECTRIC WIRE & CABLE

Terminal number on actuator side	Wiring diagram [PCON] (ACON)	Terminal number on controller side
A1	Black [φ A] (U)	1
B1	White [VMM] (V)	2
A2	Brown [φ / A] (W)	5
B2	Green [φ B] (-)	3
A3	Yellow [VMM] (-)	4
B3	Red [φ / B] (-)	6
A4	Orange [LS+] (BK+)	7
B4	Gray [LS-] (BK-)	8
A6	White [-] (A+)	11
B6	Yellow [-] (A-)	12
[1] A7	Red [A+] (B+)	[3] 13
B7	Green [A-] (B-)	14
A8	Black [B+] (Z+)	15
B8	Brown [B-] (Z-)	16
A5	Black (identification tape) [BK+] (LS+)	9
B5	Brown (identification tape) [BK-] (LS-)	10
A9	Green (identification tape) [GND _{LS}] (GND _{LS})	20
B9	Red (identification tape) [VPS] (VPS)	18
A10	White (identification tape) [VCC] (VCC)	17
B10	Yellow (ID tape) [GND] (GND)	19
A11	NC	21
B11	Shield [FG] (FG)	24
	NC	22
	NC	23

3.2 ACON, ASEL Controller Cables

RCA2 Integrated motor/encoder cable
(CB-ACS-MPA***)

*** indicates the cable length (L). Up to 10 m can be specified.
Example) 080 = 8 m

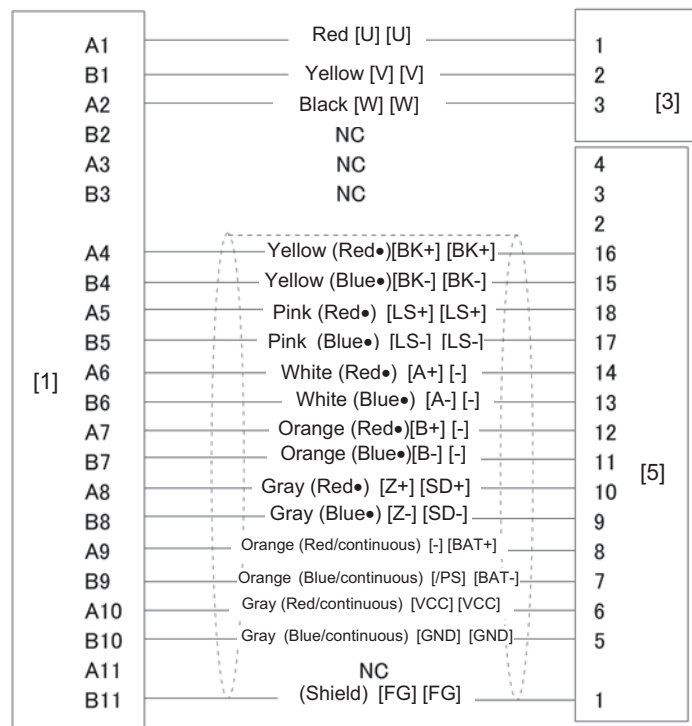


No.	Item	Model number	Manufacturer
[1]	Receptacle housing	D-1100D 1-1827863-1	AMP
[2]	Receptacle contact	D-1 1827570-2	AMP
[3]	Socket	DF1E-3S-2.5C	Hirose
[4]	Socket contact	DF1E-2022SCF	Hirose
[5]	Housing	PHDR-18VR	JST
[6]	Contact	SPHD-001T-P0.5	JST
[7]	UL2854-VVSWKA	TS06V1200 (25AWG x 7P + 22AWG x 6C)	TATSUTA ELECTRIC WIRE & CABLE

Terminal number
on actuator side

Wiring diagram
[ABZ][Serial]

Terminal number
on controller side



4. Options

4.1 Optional Connector Cable Exit Direction

In the standard specification, the cable exit direction is opposite to the rod and guide bracket.

If it is desired to pull out the cable on the front plate side according to the device layout, etc., the cable can be pulled out from the opposite direction by using the option (model number: K2).

4.2 Power-saving Function

This option reduces the maximum current of the controller compared to actuator of the standard specification. The maximum current varies depending on the model.

Please refer to the power supply capacity in the catalog or each operation manual of ACON, ASEL, ASEP, or AMEC controller. The model number is indicated as HS.

4.3 Brake Type

The brake is a mechanism designed to prevent the table from dropping when the power or servo is turned off on an actuator of motor unit (TA**) type used vertically.

Use the brake to prevent the installed load, etc., from being damaged due to the falling table.

4.4 Reversed-home Specification

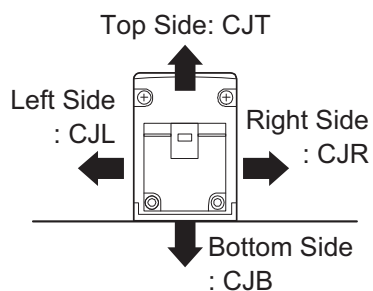
On motor unit types (TA**), the standard home position is on the motor side. However, you can specify an option to reverse the home direction if it is desirable due to the layout of the system, etc.

(Note) Since the home position is adjusted at the factory before shipment, you must return your actuator to IAI for adjustment if you wish to change the home direction after the delivery of your actuator.

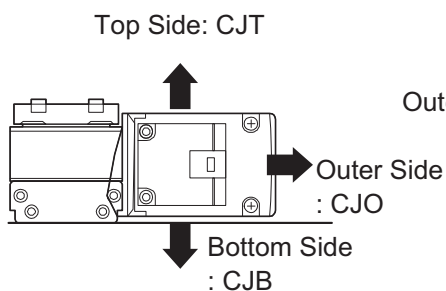
4.5 Cable Exit Direction Changed

In case of the motor unit type (TA**), the cable exit direction is changed when a change to the cable exit direction is made.

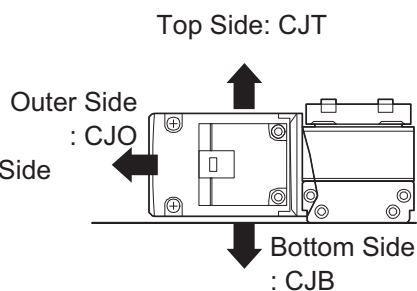
There are 5 ways to change the direction, which are top side (model code: CJT), right side (model code: CJR), left side (model code: CJL), bottom side (model code: CJB) and outer side (model code: CJO).



Straight Type



Motor Reversing Type
Reversing Direction: Left Side (ML)



Motor Reversing Type
Reversing Direction: Left Side (MR)

5. Checking after Unpacking

After unpacking, check the condition of the product and also check the included items.

5.1 Included Items

No.	Item	Model number	Remarks
1	Actuator	Refer to “How to Read Model Nameplate” and “How to Read Model Number.”	
Accessories			
2	RCA integrated motor/encoder cable	CB-APSEP-MPA-□□□: ASEP type CB-ACS-MPA-□□□: ACON, ASEL type	
3	Home mark sticker		Supplied with TA4C, TA5C, TA6C, TA7C, TA4R, TA5R, TA6R, and TA7R
4	First Step Guide		
5	Operating Manual (CD/DVD)		
6	Safety Guide		

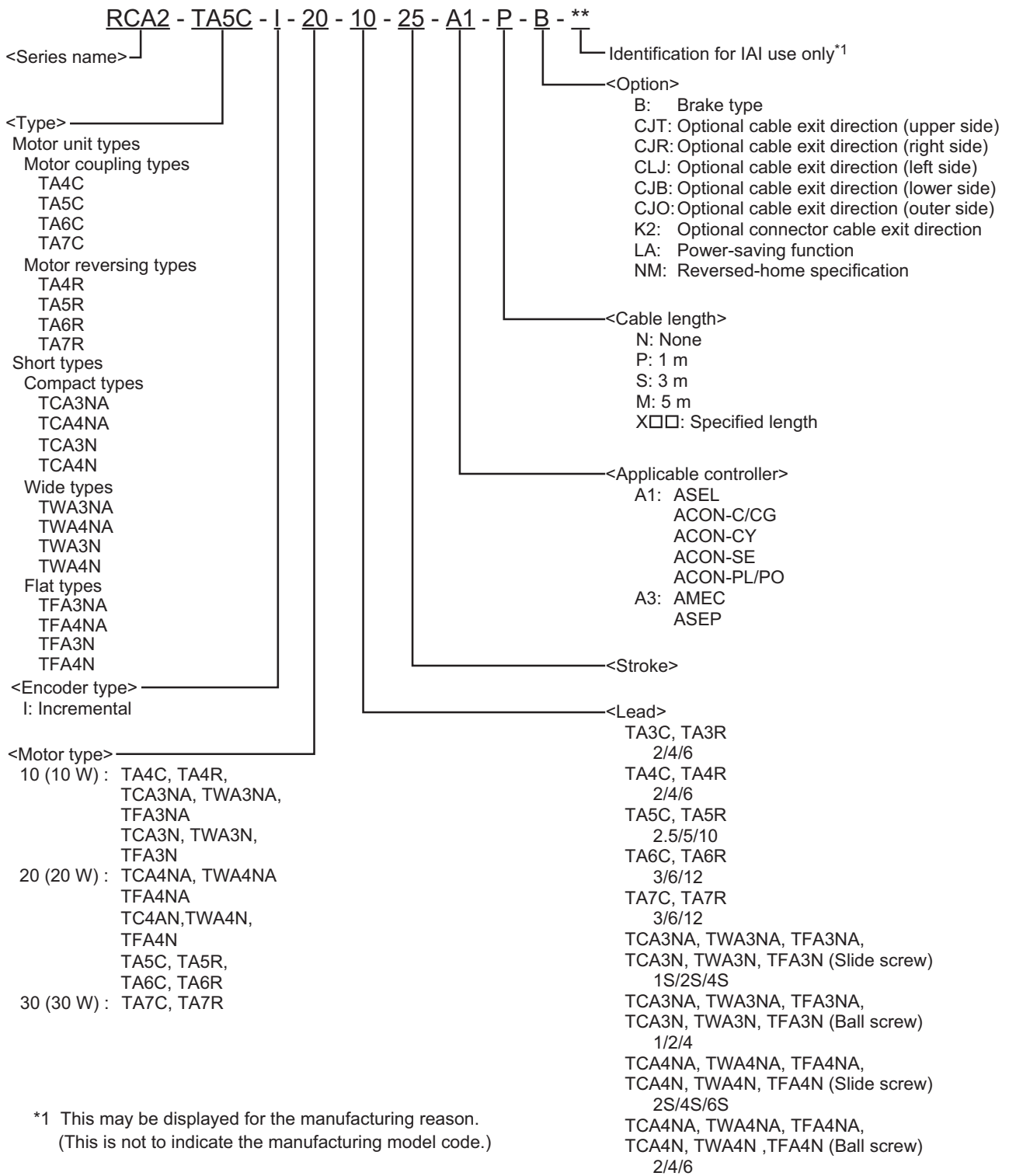
5.2 Operation Manuals Relating to This Product

No.	Name	Control No.
1	Operation Manual for ASEL Controller	ME0165
2	Operation Manual for ACON-C/CG/CF Controller	ME0176
3	Operation Manual for ACON-CY Controller	ME0167
4	Operation Manual for ACON-SE Controller	ME0171
5	Operation Manual for ACON-PL/PO Controller	ME0166
6	Operation Manual for MEC Controller	ME0245
7	Operation Manual for ASEP/PSEP Controller	ME0216
8	Operation Manual for PC Software IA-101-X-MX/IA-101-X-USBMW	ME0154
9	Operation Manual for PC Software RCM-101MW/RCM-101-USB	ME0155
10	Operation Manual for MEC PC Software	ME0248
11	Operation Manual for Teaching Pendant SEL-T/TD	ME0184
12	Operation Manual for Teaching Pendant CON-T/TG	ME0178
13	Operation Manual for Touch Panel Teaching Pendant CON-PT/PD/PG	ME0227
14	Operation Manual for Touch Panel Teaching Pendant SEP-PT	ME0217
15	Operation Manual for Simple Teaching Pendant RCM-E	ME0174
16	Operation Manual for Data Setter RCM-P	ME0175
17	Operation Manual for Touch Panel Display RCM-PM-01	ME0182

5.3 How to Read Model Nameplate

Model	→	MODEL RCA2-TA5C-I-20-10-25-A1-P-B
Serial number	→	SERIAL No. 600090254
		MADE IN JAPAN

5.4 How to Read Model



6. Specifications

(1) Max. speed

The maximum speed for this ROBO Cylinder is limited due to the sympathetic vibration of the ball screw shaft and the limitation of motor rotation speed.

Do not exceed the maximum speed shown in the table below.

Strokes and maximum speed limits (Unit: mm/s)

Model name	Motor type	Lead [mm]	Stroke [mm]								
			20	30	40	50	60	70	80	90	100
TA4	10W	2	100								
		4	200								
		6	300								

(Note) The maximum speed may not be reached depending on the acceleration/deceleration setting.

Strokes and maximum speed limits (Unit: mm/s)

Model name	Motor type	Lead [mm]	Stroke [mm]			
			25	50	75	100
TA5	20W	2.5	125			
		5	250			
		10	465 <400>			

(Note) The maximum speed may not be reached depending on the acceleration/deceleration setting.
Values in < > are for when mounted vertically.

Strokes and maximum speed limits (Unit: mm/s)

Model name	Motor type	Lead [mm]	Stroke [mm]					
			25	50	75	100	125	150
TA6	20W	3	150					
		6	300					
		12	560 <500>					

(Note) The maximum speed may not be reached depending on the acceleration/deceleration setting.
Values in < > are for when mounted vertically.

Strokes and maximum speed limits (Unit: mm/s)

Model name	Motor type	Lead [mm]	Stroke [mm]							
			25	50	75	100	125	150	175	200
TA7	30W	3	150							
		6	300							
		12	600 <580>							

(Note) The maximum speed may not be reached depending on the acceleration/deceleration setting.
Values in < > are for when mounted vertically.


Strokes and maximum speed limits (Unit: mm/s)

Model name	Motor type	Lead [mm]	Stroke [mm]	
			30	50
TCA3NA (Lead screw)	10W	1	50	-
		2	100	-
		4	200	-
TCA3NA (Ball screw)	10W	1	50	50
		2	100	100
		4	200	200
TCA4NA (Lead screw)	20W	2	100	-
		4	200	-
		6	220	-
TCA4NA (Ball screw)	20W	2	100	100
		4	200	200
		6	270 <220>	300
TWA3NA (Lead screw)	10W	1	50	-
		2	100	-
		4	200	-
TWA3NA (Ball screw)	10W	1	50	50
		2	100	100
		4	200	200
TWA4NA (Lead screw)	20W	2	100	-
		4	200	-
		6	220	-
TWA4NA (Ball screw)	20W	2	100	100
		4	200	200
		6	270 <220>	300
TFA3NA (Lead screw)	10W	1	50	-
		2	100	-
		4	200	-
TFA3NA (Ball screw)	10W	1	50	50
		2	100	100
		4	200	200

Strokes and maximum speed limits (Unit: mm/s)

Model name	Motor type	Lead [mm]	Stroke [mm]	
			30	50
TFA4NA (Lead screw)	20W	2	100	-
		4	200	-
		6	220	-
TFA4NA (Ball screw)	20W	2	100	100
		4	200	200
		6	270 <220>	300

(Note) Values in < > are for when mounted vertically.

 Note : Do not set a speed or acceleration/deceleration exceeding the applicable rating. Doing so may result in vibration, failure or shorter life.
Setting the acceleration/deceleration exceeding the applicable rating may also cause creep.


Strokes and maximum speed limits (Unit: mm/s)

Model name	Motor type	Lead [mm]	Stroke [mm]
			30
TCA3N TC3N (Option BG) (Lead screw)	10W	1	50
		2	100
		4	200
TCA3N (Ball screw)	10W	1	50
		2	100
		4	200
TCA4N TC4N (Option BG) (Lead screw)	20W	2	100
		4	200
		6	220
TCA4N TC4N (Option BG) (Ball screw)	20W	2	100
		4	200
		6	270 <220>
TWA3N TW3N (Option BG) (Lead screw)	10W	1	50
		2	100
		4	200
TWA3N (Ball screw)	10W	1	50
		2	100
		4	200
TWA4N TW4N (Option BG) (Lead screw)	20W	2	100
		4	200
		6	220
TWA4N TW4N (Option BG) (Ball screw)	20W	2	100
		4	200
		6	270 <220>

Strokes and maximum speed limits (Unit: mm/s)

Model name	Motor type	Lead [mm]	Stroke [mm]
			30
TFA3N TF3N (Option BG) (Lead screw)	10W	1	50
		2	100
		4	200
TFA3N (Ball screw)	10W	1	50
		2	100
		4	200
TFA4N TF4N (Option BG) (Lead screw)	20W	2	100
		4	200
		6	220
TFA4N TF4N (Option BG) (Ball screw)	20W	2	100
		4	200
		6	270 <220>

(Note) Values in < > are for when mounted vertically.

 Note : Do not set a speed or acceleration/deceleration exceeding the applicable rating. Doing so may result in vibration, failure or shorter life.
Setting the acceleration/deceleration exceeding the applicable rating may also cause creep.

(2) Acceleration and load capacity

Model name	Motor type	Lead [mm]	Rated acceleration [G]		Load capacity [kg]
TA4	10W	2	Horizontal	0.2	3
			Vertical	0.2	1.5
		4	Horizontal	0.3	2
			Vertical	0.2	1
		6	Horizontal	0.3	1
			Vertical	0.2	0.5
TA5	20W	2.5	Horizontal	0.2	5
			Vertical	0.2	3
		5	Horizontal	0.3	3.5
			Vertical	0.2	2
		10	Horizontal	0.3	2
			Vertical	0.2	1
TA6	20W	3	Horizontal	0.2	6
			Vertical	0.2	3
		6	Horizontal	0.3	4
			Vertical	0.2	1.5
		12	Horizontal	0.3	2
			Vertical	0.2	0.5
TA7	30W	3	Horizontal	0.2	8
			Vertical	0.2	4
		6	Horizontal	0.3	6
			Vertical	0.2	2.5
		12	Horizontal	0.3	4
			Vertical	0.2	1

(Note) Maximum speed may not be reached on all strokes.

The maximum speed for the long stroke type actuator is less than what is shown in the table.

[Refer to (1) Max. speed]

Model name	Motor type	Lead [mm]	Rated acceleration [G]		Load capacity [kg]
TCA3NA TCA3N TC3N (Option BG) (Lead screw)	10W	1	Horizontal	0.2	1
			Vertical	0.2	0.5
		2	Horizontal	0.2	0.5
			Vertical	0.2	0.25
		4	Horizontal	0.2	0.25
			Vertical	0.2	0.125
TCA3NA TCA3N (Ball screw)	10W	1	Horizontal	0.2	3
			Vertical	0.2	1
		2	Horizontal	0.3	1.5
			Vertical	0.2	0.5
		4	Horizontal	0.3	0.75
			Vertical	0.2	0.25
TCA4NA TCA4N TC4N (Option BG) (Lead screw)	20W	2	Horizontal	0.2	1
			Vertical	0.2	0.5
		4	Horizontal	0.2	0.5
			Vertical	0.2	0.25
		6	Horizontal	0.2	0.25
			Vertical	0.2	0.125
TCA4NA TCA4N TC4N (Option BG) (Ball screw)	20W	2	Horizontal	0.2	6
			Vertical	0.2	1.5
		4	Horizontal	0.3	3
			Vertical	0.2	0.75
		6	Horizontal	0.3	2
			Vertical	0.2	0.5
TWA3NA TWA3N TW3N (Option BG) (Lead screw)	10W	1	Horizontal	0.2	1
			Vertical	0.2	0.5
		2	Horizontal	0.2	0.5
			Vertical	0.2	0.25
		4	Horizontal	0.2	0.25
			Vertical	0.2	0.125
TWA3NA TWA3N (Ball screw)	10W	1	Horizontal	0.2	3
			Vertical	0.2	1
		2	Horizontal	0.3	1.5
			Vertical	0.2	0.5
		4	Horizontal	0.3	0.75
			Vertical	0.2	0.25

(Note) Maximum speed may not be reached on all strokes.

The maximum speed for the long stroke type actuator is less than what is shown in the table.

[Refer to (1) Max. speed]

Model name	Motor type	Lead [mm]	Rated acceleration [G]		Load capacity [kg]
TWA4NA TWA4N TW4N (Option BG) (Lead screw)	20W	2	Horizontal	0.2	1
			Vertical	0.2	0.5
		4	Horizontal	0.2	0.5
			Vertical	0.2	0.25
		6	Horizontal	0.2	0.25
			Vertical	0.2	0.125
TWA4NA TWA4N TW4N (Option BG) (Ball screw)	20W	2	Horizontal	0.2	6
			Vertical	0.2	1.5
		4	Horizontal	0.3	3
			Vertical	0.2	0.75
		6	Horizontal	0.3	2
			Vertical	0.2	0.5
TFA3NA TFA3N TF3N (Option BG) (Lead screw)	10W	1	Horizontal	0.2	1
			Vertical	0.2	0.5
		2	Horizontal	0.2	0.5
			Vertical	0.2	0.25
		4	Horizontal	0.2	0.25
			Vertical	0.2	0.125
TFA3NA TFA3N (Ball screw)	10W	1	Horizontal	0.2	3
			Vertical	0.2	1
		2	Horizontal	0.3	1.5
			Vertical	0.2	0.5
		4	Horizontal	0.3	0.75
			Vertical	0.2	0.25
TFA4NA TFA4N TF4N (Option BG) (Lead screw)	20W	2	Horizontal	0.2	1
			Vertical	0.2	0.5
		4	Horizontal	0.2	0.5
			Vertical	0.2	0.25
		6	Horizontal	0.2	0.25
			Vertical	0.2	0.125
TFA4NA TFA4N TF4N (Option BG) (Ball screw)	20W	2	Horizontal	0.2	6
			Vertical	0.2	1.5
		4	Horizontal	0.3	3
			Vertical	0.2	0.75
		6	Horizontal	0.3	2
			Vertical	0.2	0.5

(Note) Maximum speed may not be reached on all strokes.

The maximum speed for the long stroke type actuator is less than what is shown in the table.

[Refer to (1) Max. speed]

(3) Rated thrust

Model name	Motor type	Lead [mm]	Rated thrust [N]
TA4	10W	2	85
		4	43
		6	28
TA5	20W	2.5	137
		5	68
		10	34
TA6	20W	3	68
		6	34
		12	17
TA7	30W	3	105
		6	53
		12	26
TCA3NA TCA3N TC3N (Option BG) (Lead screw)	10W	1	100.5
		2	50.3
		4	25.1
TCA3NA TCA3N (Ball screw)	10W	1	170.9
		2	85.5
		4	42.7
TCA4NA TCA4N TC4N (Option BG) (Lead screw)	20W	2	59.7
		4	29.8
		6	19.9
TCA4NA TCA4N TC4N (Option BG) (Ball screw)	20W	2	101.5
		4	50.7
		6	33.8
TWA3NA TWA3N TW3N (Option BG) (Lead screw)	10W	1	100.5
		2	50.3
		4	25.1
TWA3NA TWA3N (Ball screw)	10W	1	170.9
		2	85.5
		4	42.7

Model name	Motor type	Lead [mm]	Rated thrust [N]
TWA4NA TWA4N TW4N (Option BG) (Lead screw)	20W	2	59.7
		4	29.8
		6	19.9
TWA4NA TWA4N TW4N (Option BG) (Ball screw)	20W	2	101.5
		4	50.7
		6	33.8
TFA3NA TFA3N TF3N (Option BG) (Lead screw)	10W	1	100.5
		2	50.3
		4	25.1
TFA3NA TFA3N (Ball screw)	10W	1	170.9
		2	85.5
		4	42.7
TFA4NA TFA4N TF4N (Option BG) (Lead screw)	20W	2	59.7
		4	29.8
		6	19.9
TFA4NA TFA4N TF4N (Option BG) (Ball screw)	20W	2	101.5
		4	50.7
		6	33.8

(4) Drive system

Model name	Motor type	Lead [mm]	No. of encoder pulses* ¹	Drive system	
TA4	10W	2	800	Ball screw φ6mm	Rolled C10
		4			
		6			
TA5	20W	2.5		Ball screw φ8mm	Rolled C10
		5			
		10			
TA6	20W	3		Ball screw φ10mm	Rolled C10
		6			
		12			
TA7	20W	3		Ball screw φ10mm	Rolled C10
		6			
		12			
TCA3NA TCA3N TC3N (Option BG) (Lead screw)	10W	1	1048	Lead screw φ4mm	Rolled C10
		2			
		4			
TCA3NA TCA3N (Ball screw)	10W	1		Ball screw φ4mm	Rolled C10
		2			
		4			
TCA4NA TCA4N TC4N (Option BG) (Lead screw)	20W	2		Lead screw φ6mm	Rolled C10
		4			
		6			
TCA4NA TCA4N TC4N (Option BG) (Ball screw)	20W	2		Ball screw φ6mm	Rolled C10
		4			
		6			
TWA3NA TWA3N TW3N (Option BG) (Lead screw)	10W	1		Lead screw φ4mm	Rolled C10
		2			
		4			
TWA3NA TWA3N (Ball screw)	10W	1		Ball screw φ4mm	Rolled C10
		2			
		4			

*1 Number of pulses input to the controller.

Model name	Motor type	Lead [mm]	No. of encoder pulses ^{*1}	Drive system	
TWA4NA TWA4N TW4N (Option BG) (Lead screw)	20W	2 4 6	1048	Lead screw φ6mm	Rolled C10
TWA4NA TWA4N TW4N (Option BG) (Ball screw)	20W	2 4 6		Ball screw φ6mm	Rolled C10
TFA3NA TFA3N TF3N (Option BG) (Lead screw)	10W	1 2 4		Lead screw φ4mm	Rolled C10
TFA3NA TFA3N (Ball screw)	10W	1 2 4		Ball screw φ4mm	Rolled C10
TFA4NA TFA4N TF4N (Option BG) (Lead screw)	20W	2 4 6		Lead screw φ6mm	Rolled C10
TFA4NA TFA4N TF4N (Option BG) (Ball screw)	20W	2 4 6		Ball screw φ6mm	Rolled C10

^{*1} Number of pulses input to the controller.

(5) Common

Item	Specifications	
	Lead screw	Ball screw
Positioning repeatability ^{*1}	±0.05mm	±0.02mm
Lost motion ^{*1}	0.1mm or less	0.3mm or less
Base	Material : Aluminum with special anodizing treatment	

^{*1} Initial Value

7. Operation

7.1 Operational Conditions for Positioning Operation

By following the procedures below, check whether the operation is available.

[1] Usage conditions

Check the operational conditions [1] to [6].

[1] Load installation orientation (horizontal, upright, vertical)

[2] Stroke L (mm)

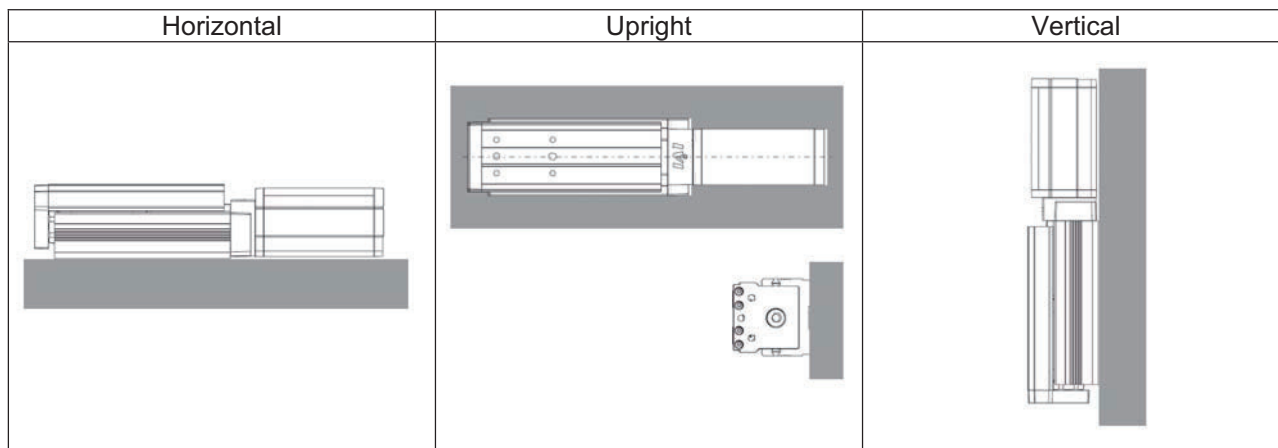
[3] Maximum speed V (mm/s)

[4] Acceleration a (G)

[5] Loading capacity W (kg)

[6] Overhang T (mm): Distance from the end face of the table to the center of gravity of the load

Installation orientation Fig. 1



[2] Stroke, maximum speed, acceleration

Check whether the operation is available by [2] stroke, [3] maximum speed and [4] acceleration.

Table 1 * The maximum speed assumes an acceleration of 0.2G or 0.3G.

Installation orientation	Model	Lead [mm]	Acceleration [G]	Max speed [mm/s]	Max stroke [mm]
Horizontal	TA4	2	0.2	100	100
		4	0.3	200	
		6	0.3	300	
	TA5	2.5	0.2	125	100
		5	0.3	250	
		10	0.3	465	
	TA6	3	0.2	150	150
		6	0.3	300	
		12	0.3	600	
	TA7	3	0.2	150	200
		6	0.3	300	
		12	0.3	600	
	TCA3NA TWA3NA TFA3NA TCA3N TWA3N TFA3N TC3N (Option BG) TW3N (Option BG) TF3N (Option BG) (Slide screw)	1	0.2	50	30
		2	0.2	100	
		4	0.2	200	
	TCA3NA TWA3NA TFA3NA TCA3N TWA3N TFA3N (Ball screw)	1	0.2	50	30
		2	0.3	100	
		4	0.3	200	
	TCA4NA TWA4NA TFA4NA TCA4N TWA4N TFA4N TC4N (Option BG) TW4N (Option BG) TF4N (Option BG) (Slide screw)	2	0.2	100	30
		4	0.2	200	
		6	0.2	220	

Installation orientation	Model	Lead [mm]	Acceleration [G]	Max speed [mm/s]	Max stroke [mm]
Horizontal	TCA4NA	2	0.2	100	30
	TWA4NA				
	TFA4NA				
	TCA4N				
Horizontal	TWA4N	4	0.3	200	30
	TFA4N				
	TC4N (Option BG)				
	TW4N (Option BG)				
Horizontal	TF4N (Option BG)	6	0.3	270	30
	(Ball screw)				
Vertical	TA4	2	0.2	100	100
		4	0.3	200	
		6	0.3	300	
	TA5	2.5	0.2	125	100
		5	0.2	250	
		10	0.2	400	
	TA6	3	0.2	150	150
		6	0.2	300	
		12	0.2	500	
	TA7	3	0.2	150	200
		6	0.2	300	
		12	0.2	580	
	TCA3NA	1	0.2	50	30
	TWA3NA	2	0.2	100	30
	TFA3NA	4	0.2	200	30
	TCA3N	1	0.2	50	30
	TWA3N	2	0.2	100	30
	TFA3N	4	0.2	200	30
	TC3N (Option BG)	1	0.2	50	30
	TW3N (Option BG)	2	0.2	100	30
	TF3N (Option BG)	4	0.2	200	30
	(Slide screw)	1	0.2	50	30
	(Ball screw)	2	0.2	100	30
	(Ball screw)	4	0.2	200	30

Installation orientation	Model	Lead [mm]	Acceleration [G]	Max speed [mm/s]	Max stroke [mm]
Vertical	TCA4NA TWA4NA TFA4NA	2	0.2	100	30
	TCA4N TWA4N TFA4N	4	0.2	200	
	TC4N (Option BG) TW4N (Option BG) TF4N (Option BG) (Slide screw)	6	0.2	220	
	TCA4NA TWA4NA TFA4NA	2	0.2	100	30
	TCA4N TWA4N TFA4N	4	0.2	200	
	TC4N (Option BG) TW4N (Option BG) TF4N (Option BG) (Ball screw)	6	0.2	220	
Horizontal	TCA3NA TWA3NA TFA3NA (Ball screw)	1	0.2	50	50
		2	0.2	100	
		4	0.2	200	
	TCA4NA TWA4NA TFA4NA (Ball screw)	2	0.2	100	50
		4	0.2	200	
		6	0.2	300	
Vertical	TCA3NA TWA3NA TFA3NA (Ball screw)	1	0.2	50	50
		2	0.3	100	
		4	0.3	200	
	TCA4NA TWA4NA TFA4NA (Ball screw)	2	0.2	100	50
		4	0.3	200	
		6	0.3	300	

How to decide: [2] Desired stroke ≤ model stroke

[3] Desired maximum speed ≤ maximum speed for selected stroke

[4] Desired acceleration ≤ 0.2G or 0.3G (Refer to Table 1)

[3] Maximum speed, loading capacity

Check whether the operation is available by [3] maximum speed and [5] loading capacity.

AC Servo motor (RCA2) (Graph 1)

How to decide: You can use any model that has a [3] maximum speed and [4] loading capacity that is within usage range in the graph.

[4] Moment

Check whether the operation is available by [2] moment, [4] acceleration, [5] loading capacity, and [6] overhang.

- Static moment (M1) calculation

Static moment equation

$M1 = W \times L \times 9.8/1000$ (Nm); L (mm): Distance from the operation point to load center of gravity

Stroke consideration: $L = T + Hn + \text{stroke}$ (Patterns A and B)

No stroke consideration: $L = T + Hn$ (Patterns C, D, and E)

Use Figure 2 and Table 2 to select an Hn measurement based on the installation orientation of the load.

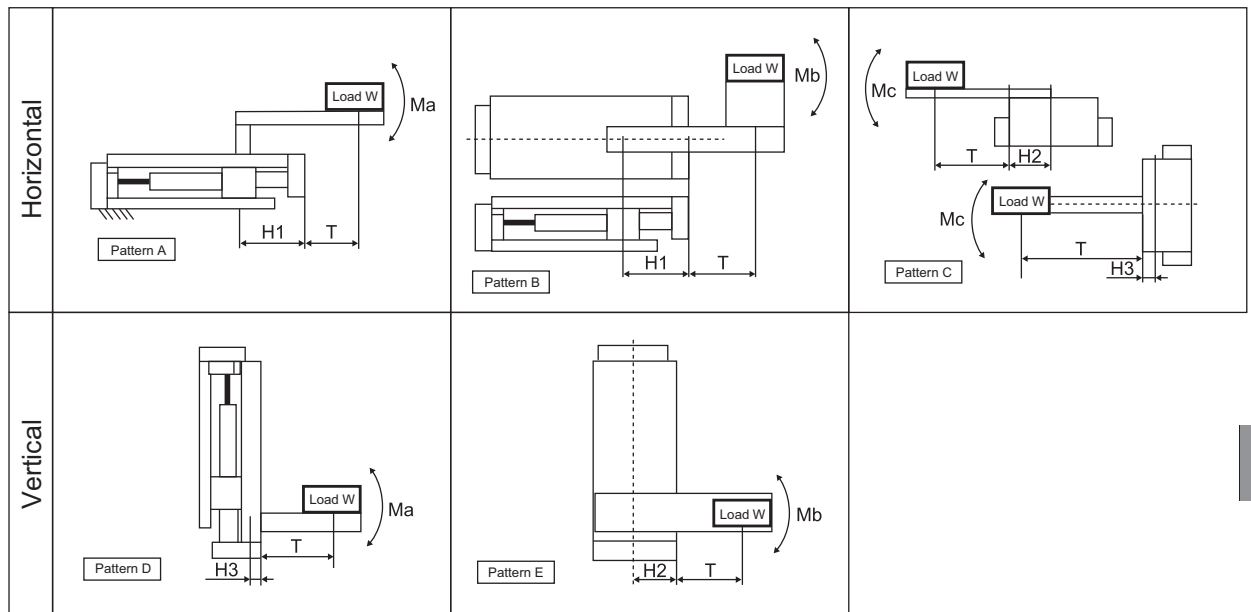
Table 2: Hn measurement (distance from the operation point to end of table)

	TA4	TA5	TA6	TA7
H1 (mm)	30	49	54.5	61.5
H2 (mm)	20	25	30	37
H3 (mm)	11.5	13.5	15.5	17.5

	TCA3NA, TFA3NA TCA3N, TFA3N (Slide screw) (Ball screw)	TWA3NA TWA3N (Slide screw) (Ball screw)	TCA4NA, TFA4NA TCA4N, TFA4N (Slide screw) (Ball screw)	TWA4NA TWA4N (Slide screw) (Ball screw)
H1 (mm)	64	64	66	66
H2 (mm)	16	25	18	29
H3 (mm)	9.5	10.5	9.5	11

Ball Guide Type (Option: Model Code BG)						
	TC3N, TF3N (Slide screw)	TW3N (Slide screw)	TC4N, TF4N (Slide screw)	TW4N (Slide screw)	TC4N, TF4N (Ball screw)	TW4N (Ball screw)
H1 (mm)	71.5	68	73.5	74.5	73.5	74.5
H2 (mm)	17	25	19	29	19	29
H3 (mm)	16	12.5	16	15.5	16	15.5

Static Moment Figure 2



- Dynamic moment (M2) calculation

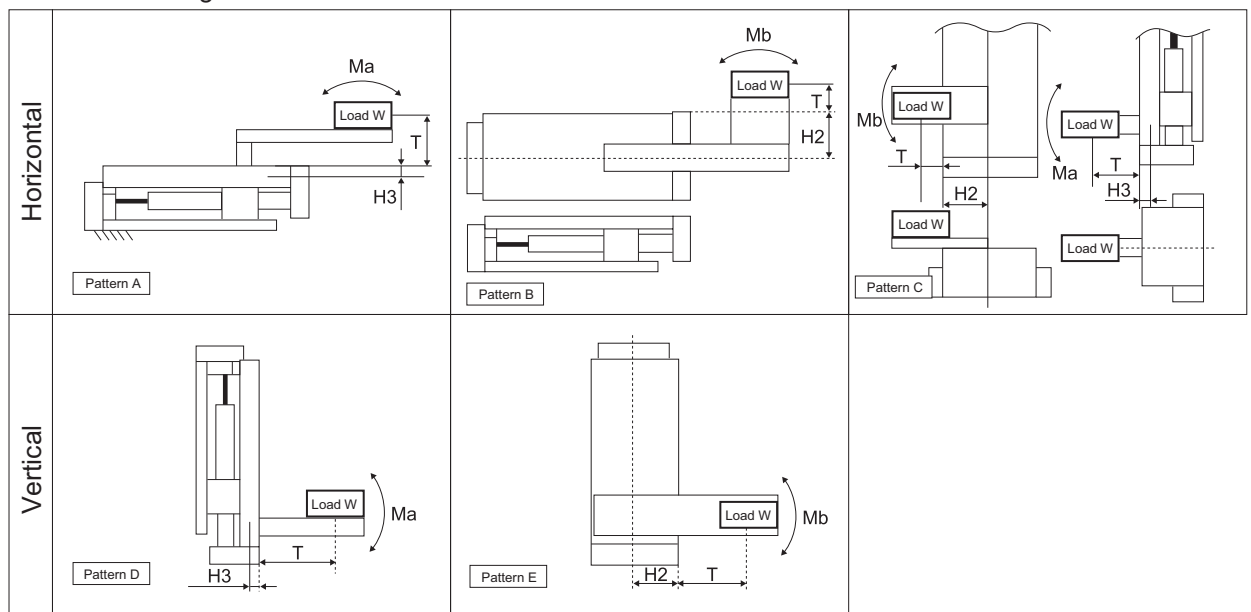
Dynamic moment equation

$$M2 = W \times L \times a \times 9.8/1000 \text{ (Nm)}$$

$$L = T + Hn$$

From Figure 3 and Table 2, select the Hn measurement based on the installation orientation of the load.

Dynamic moment Figure 3



- Generated moment (M) calculation

Generated moment equation

$$M = M1 + M2 \text{ (Nm)}$$

* Pattern C has different directions for the static moment and the dynamic moment, so set whichever is larger as M.

From Table 3, select an allowable moment based on the generated moment calculated above.

Table 3: Allowable moments

	TA4	TA5	TA6	TA7
Allowable moment: Ma (Nm)	4.2	6.57	7.26	9.91
Allowable moment: Mb (Nm)	6.0	9.32	10.30	14.13
Allowable moment: Mc (Nm)	8.2	14.32	18.25	28.65

	TCA3NA, TFA3NA TCA3N, TFA3N (Slide screw) (Ball screw)	TWA3NA TWA3N (Slide screw) (Ball screw)	TCA4NA, TFA4NA TCA4N, TFA4N (Slide screw) (Ball screw)	TWA4NA TWA4N (Slide screw) (Ball screw)
Allowable moment: Ma (Nm)	9.9	9.9	9.9	9.9
Allowable moment: Mb (Nm)	9.9	9.9	9.9	9.9
Allowable moment: Mc (Nm)	3.3	9.4	3.3	12.2

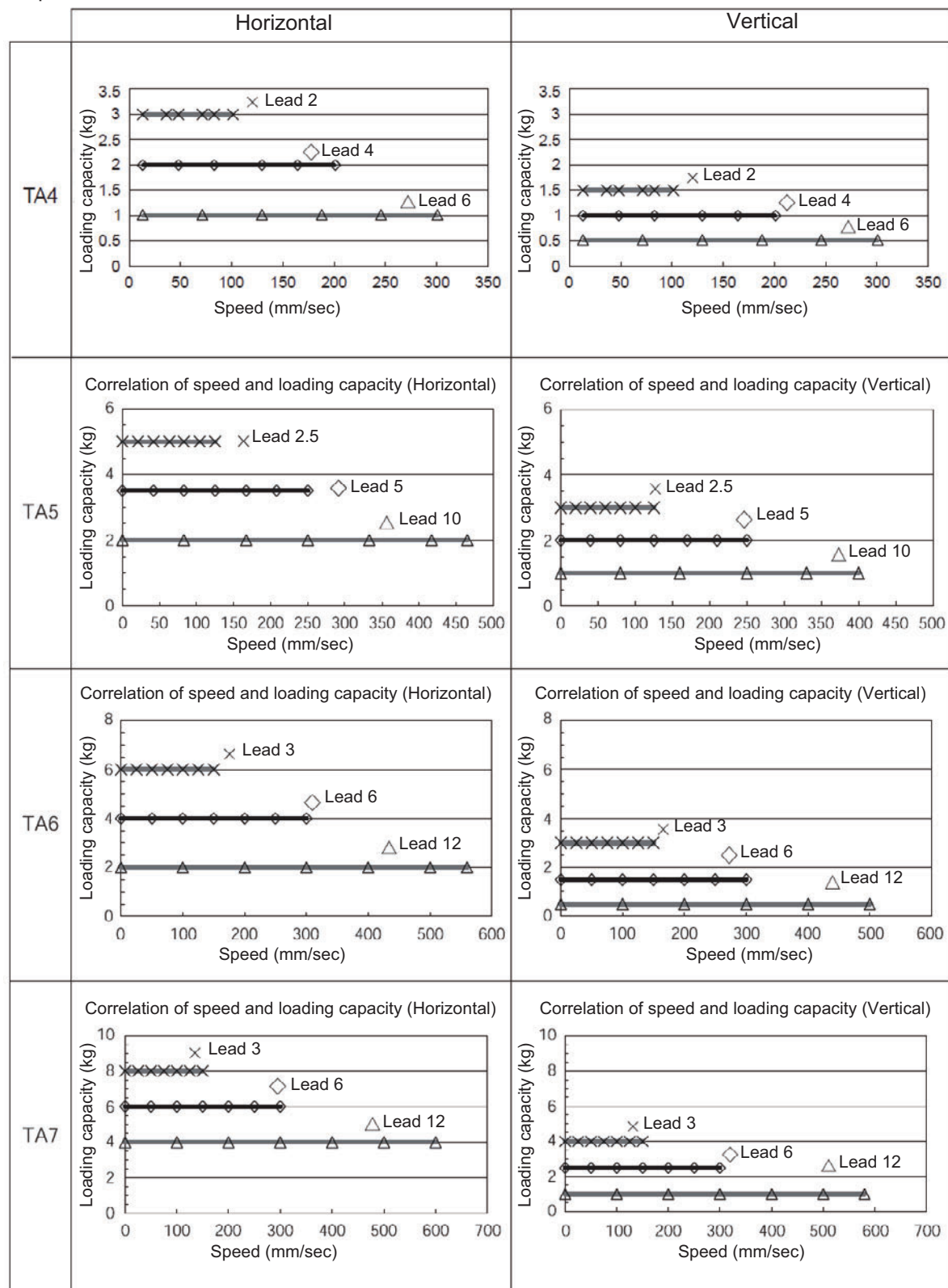
Ball Guide Type (Option: Model Code BG)						
	TC3N (Slide screw)	TF3N (Slide screw)	TW3N (Slide screw)	TC4N (Slide screw)	TF4N (Slide screw)	TW4N (Slide screw)
Allowable moment: Ma (Nm)	0.86	0.75	1.74	1.65	1.42	3.46
Allowable moment: Mb (Nm)	0.68	0.55	1.50	1.28	1.07	2.93
Allowable moment: Mc (Nm)	0.92	0.88	2.85	1.77	1.69	5.63

Ball Guide Type (Option: Model Code BG)			
	TC4N (Ball screw)	TF4N (Ball screw)	TW4N (Ball screw)
Allowable moment: Ma (Nm)	1.65	1.42	3.46
Allowable moment: Mb (Nm)	1.28	1.07	2.93
Allowable moment: Mc (Nm)	1.77	1.69	5.63

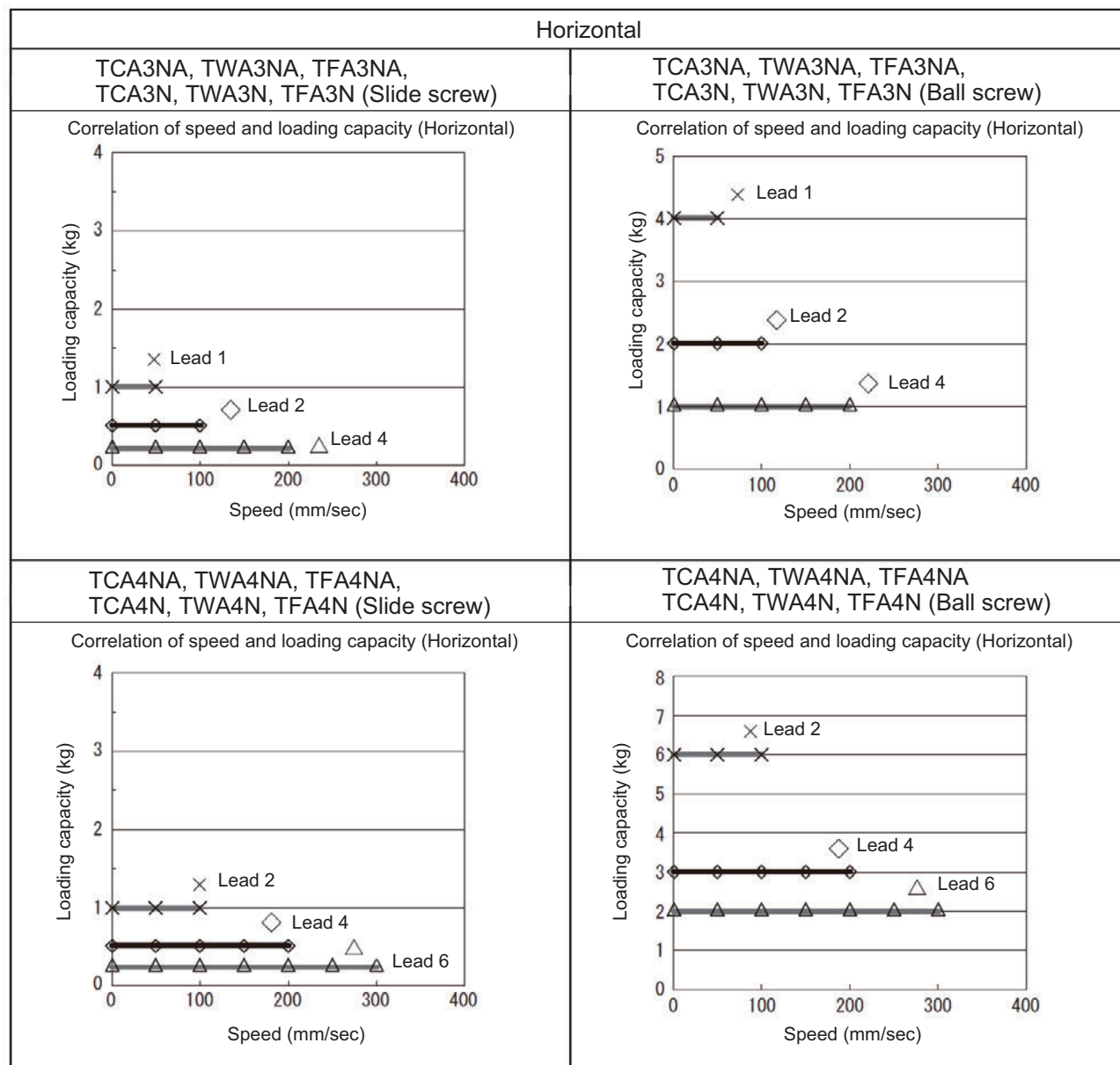
How to decide: You can use any model for which the generated moment (M) < allowable moment for all three of Ma, Mb, Mc.

Operation is available when all the items are below the specified values.

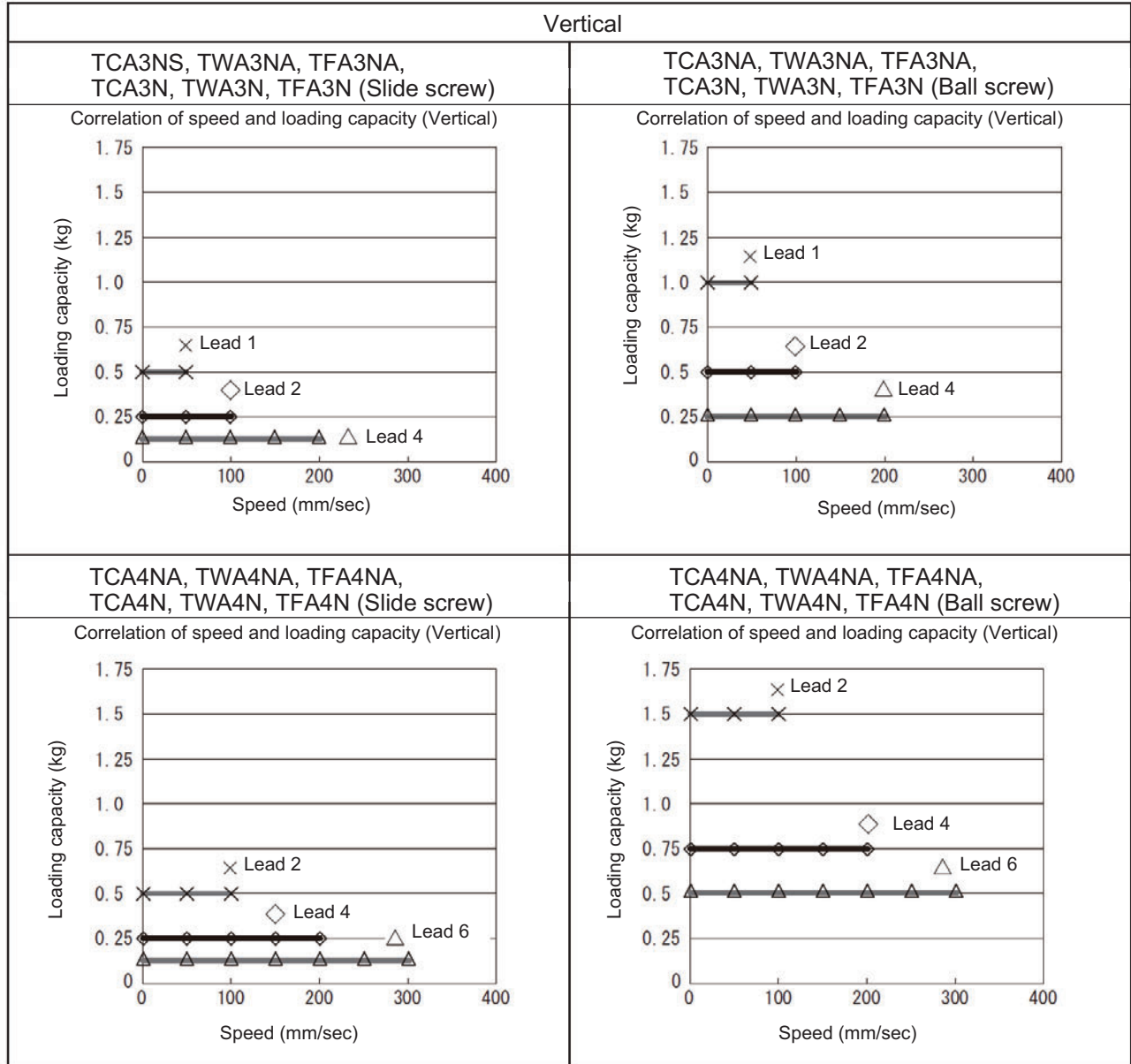
Graph 1 AC Servo Motor: RCA2



Graph 2 AC Servo Motor: RCA2
Short types (TCA***, TWA***, TFA***)



Graph 2 AC Servo Motor: RCA2
Short types (TCA***, TWA***, TFA***)



8. Installation Environment and Storage Environment

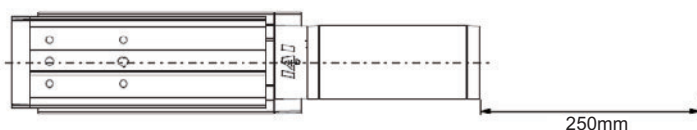
8.1 Installation Environment

Install the actuator in an environment meeting the following conditions:

- Not exposed to direct sunlight
- The machine does not receive radiated heat from large heat sources such as heat treatment furnaces.
- Surrounding air temperature of 0 to 40°C
- Humidity of 85% or below, non-condensing
- Not subject to corrosive or flammable gases
- Is a normal environment for assembly work where there is not much dust.
- Not subject to oil mist or cutting fluid
- Not subject to impact or vibration
- Not subject to significant electromagnetic waves, ultraviolet light or radiation
- This product is not designed to provide chemical resistance.

In general, the environment shall be one where the operator can work without wearing protective gears.

Open space required for maintenance inspection



8.2 Storage Environment

The storage environment should conform to the installation environment. Particularly when the actuator is stored for a long period of time, give consideration to prevent bedewing.

Unless specified, the actuator is shipped without any drying agent placed in the package. If the actuator is stored in an environment subject to bedewing, implement anti-bedewing measures over the entire package or directly on the actuator after unpacking.

The maximum storage temperature is 60°C for a short period. If the storage period exceeds 1 month, make sure the storage temperature dose not exceed 50°C.

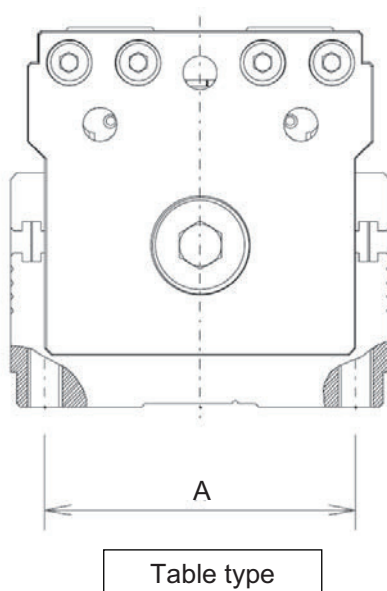
9. Installation

Install the main unit only on a machined surface, or other a surface that is highly flat. Also, the platform should have a structure stiff enough to install the unit so it would not generate vibration or other abnormality.

9.1 Installation of Actuator

9.1.1 Motor unit types TA4*, TA5*, TA6*, TA7*

This actuator contains installation tapped holes which allow it to be secured from the rear.
(Note that tapped hole size depends on model. Please see diagrams below and external dimensions.)
The actuator also contains reamed holes for use with positioning pins.



Model	Tap size and maximum screw-in depth	Applicable bolt	Tightening torque		A (mm)	Reamed hole (mm)
			Bolt bearing surface is steel	Bolt bearing surface is aluminum		
TA4*	M4, depth 7.5	M4	3.59 N-m (0.37 kgf-m)	1.76 N-m (0.18 kgf-m)	31	φ4H7, depth 4.5
TA5*	M5, depth 10	M5	7.27 N-m (0.74 kgf-m)	3.42 N-m (0.35 kgf-m)	45	φ5H7, depth 5
TA6*	M5, depth 10	M5	7.27 N-m (0.74 kgf-m)	3.42 N-m (0.35 kgf-m)	55	φ5H7, depth 5
TA7*	M6, depth 12	M6	12.34 N-m (1.26 kgf-m)	5.36 N-m (0.55 kgf-m)	64	φ6H7, depth 6

Tightening screws

- For the male threads for installing the base, use hexagonal socket head bolts.
- Use of high-tension bolts meeting at least ISO 10.9 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.



Caution: Exercise caution when selecting the bolt length. Use of bolts of inappropriate lengths may cause damage to tapped holes, insufficient mounting strength of the actuator and/or interference with driving parts, resulting in lower precision or unexpected accidents.

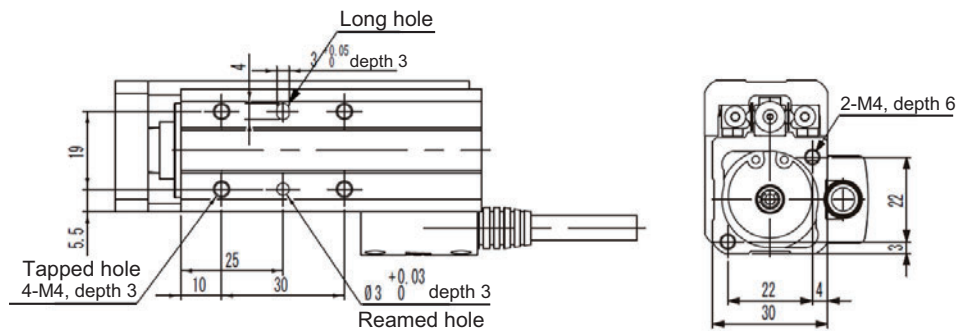
9.1.2 Short types

[1] TCA3NA, TCA3N (Slide screw, Ball screw), TCA4NA, TCA4N (Slide screw, Ball screw)

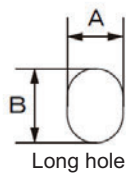
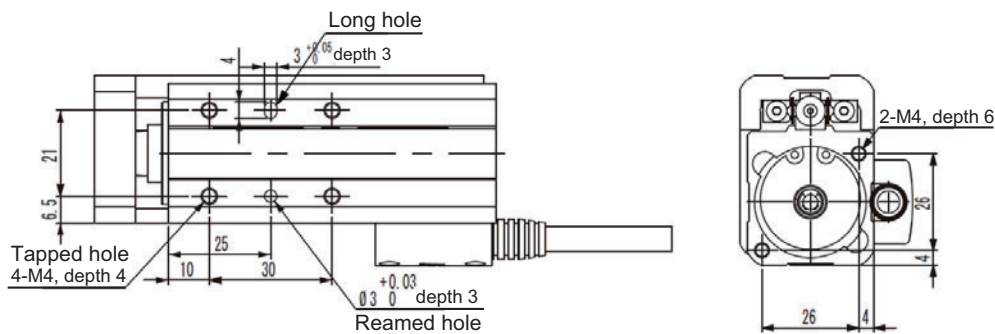
This actuator contains installation tapped holes which allow it to be secured from the rear.

The actuator also contains long holes and reamed holes for use with positioning pins.

(TCA3NA, TCA3N (Slide screw, Ball screw))

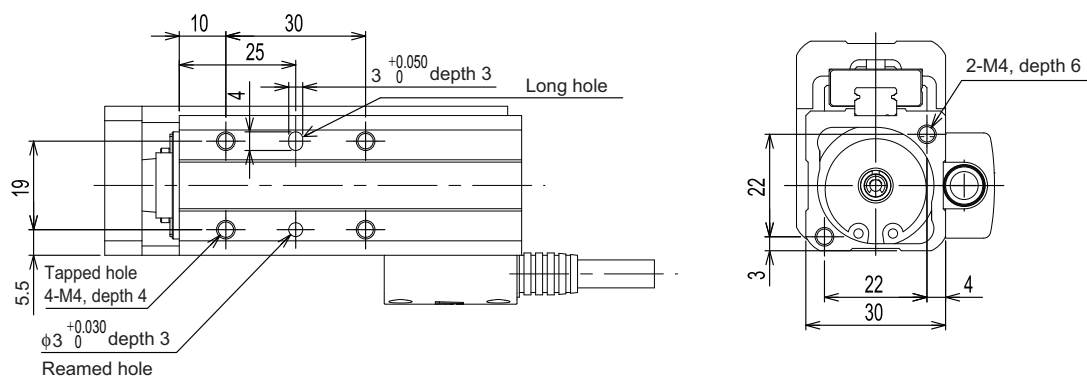


(TCA4NA, TCA4N (Slide screw, Ball screw))

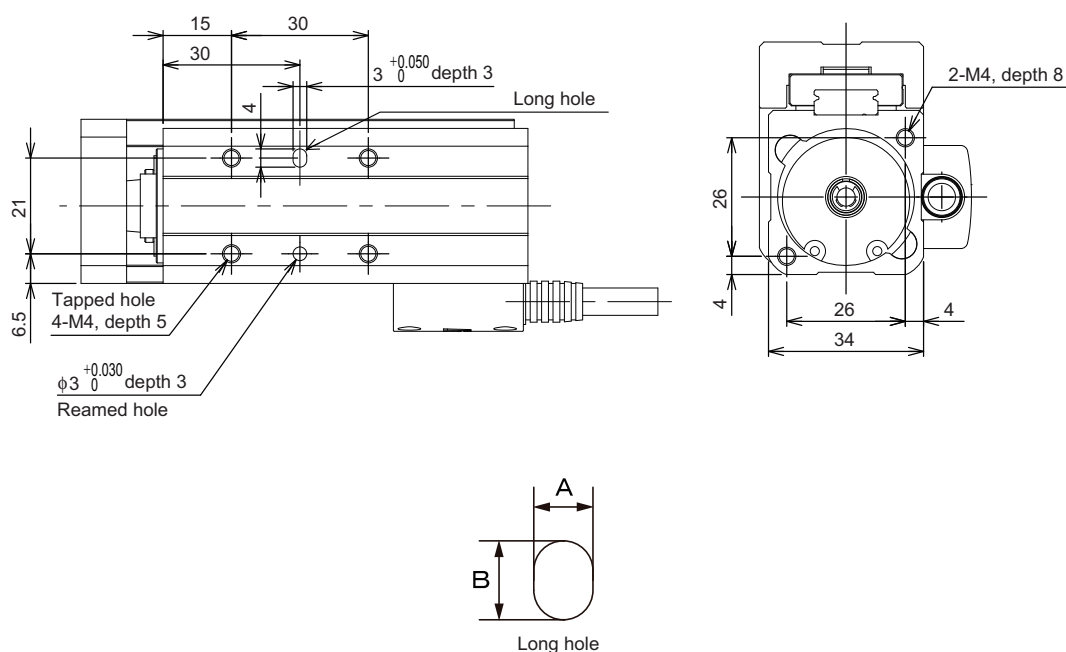


Model	Tap size and maximum screw-in depth	Applicable bolt	Tightening torque		Long hole	Reamed hole (mm)
			Bolt bearing surface is steel	Bolt bearing surface is aluminum		
TCA3NA TCA3N (Slide screw) (Ball screw)	M4, depth 3	M4	3.59 N-m (0.37 kgf-m)	1.76 N-m (0.18 kgf-m)	A: 3, B: 4, depth 3	φ3, depth 3
TCA4NA TCA4N (Slide screw) (Ball screw)	M4, depth 4	M4	3.59 N-m (0.74 kgf-m)	1.76 N-m (0.35 kgf-m)	A: 3, B: 4, depth 3	φ3, depth 3

(TC3N (Slide screw) Ball Guide Type (Option: Model Code BG))




(TC4N (Slide screw), TC4N (Ball screw) Ball Guide Type (Option: Model Code BG))



Model	Tap size and maximum screw-in depth	Applicable bolt	Tightening torque		Long hole	Reamed hole (mm)
			Bolt bearing surface is steel	Bolt bearing surface is aluminum		
TC3N (Slide screw)	M4, depth 3	M4	3.59 N-m (0.37 kgf-m)	1.76 N-m (0.18 kgf-m)	A: 3, B: 4, depth 3	φ3, depth 3
TC4N (Slide screw) TC4N (Ball screw)	M4, depth 4	M4	3.59 N-m (0.74 kgf-m)	1.76 N-m (0.35 kgf-m)	A: 3, B: 4, depth 3	φ3, depth 3

Tightening screws

- For the male threads for installing the base, use hexagonal socket head bolts.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.

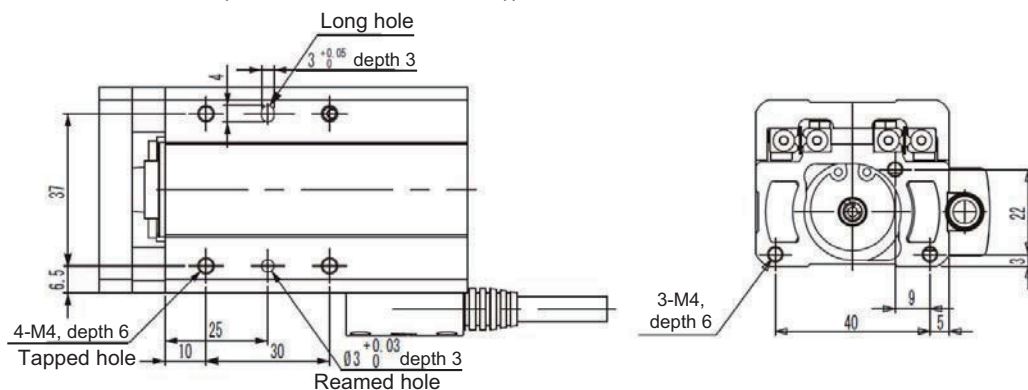
 **Caution:** The tap hole of the mounting part is a through hole. Never use a screw longer than the effective screw length. Internal mechanisms and electric components may be damaged.

[2] TWA3NA, TWA3N (Slide screw, Ball screw), TWA4NA, TWA4N (Slide screw, Ball screw)

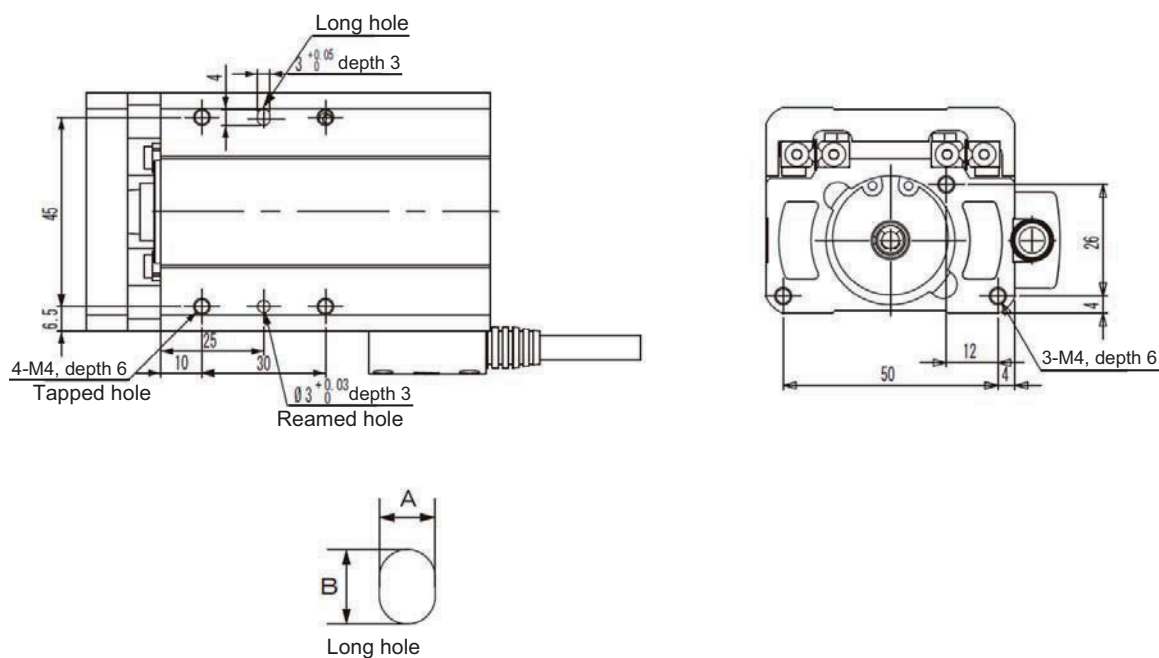
This actuator contains installation tapped holes which allow it to be secured from the rear.

The actuator also contains long holes and reamed holes for use with positioning pins.

(TWA3NA, TWA3N (Slide screw, Ball screw))

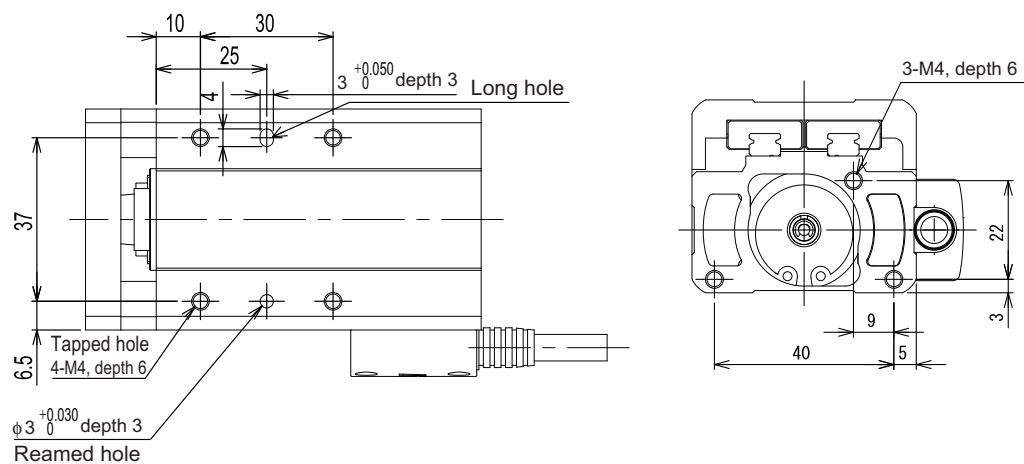


(TWA4NA, TWA4N (Slide screw, Ball screw))

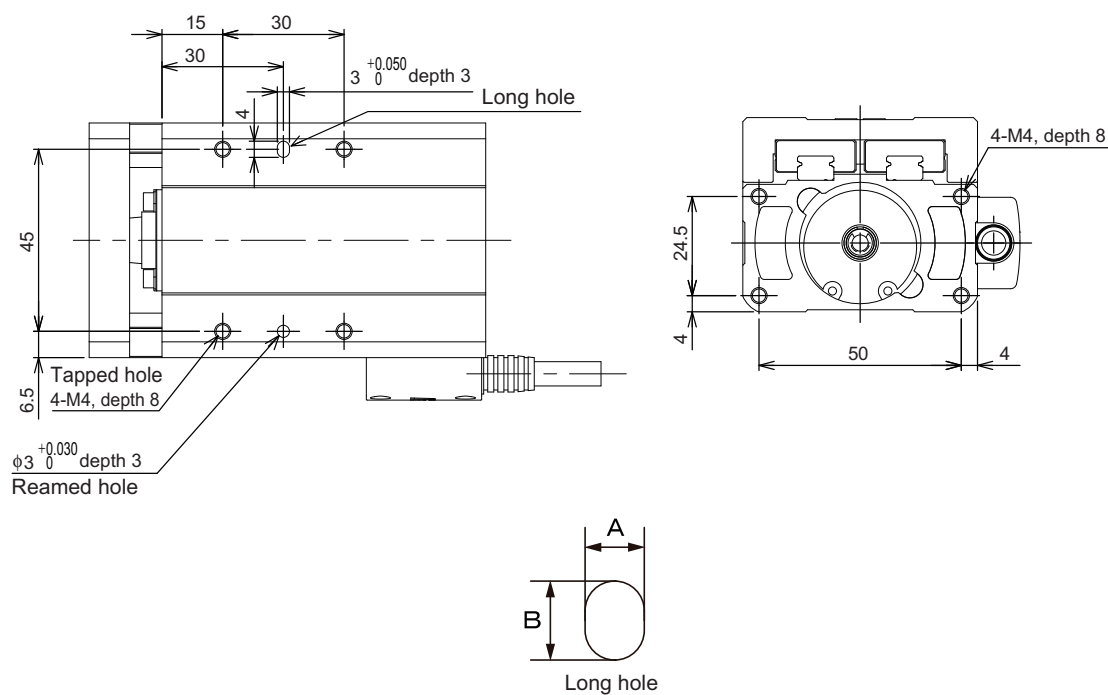


Model	Tap size and maximum screw-in depth	Applicable bolt	Tightening torque		Long hole	Reamed hole (mm)
			Bolt bearing surface is steel	Bolt bearing surface is aluminum		
TWA3NA TWA3N (Slide screw) (Ball screw)	M4, depth 6	M4	3.59 N-m (0.37 kgf-m)	1.76 N-m (0.18 kgf-m)	A: 3, B: 4, depth 3	Ø3, depth 3
TWA4NA TWA4N (Slide screw) (Ball screw)	M4, depth 6	M4	3.59 N-m (0.74 kgf-m)	1.76 N-m (0.35 kgf-m)	A: 3, B: 4, depth 3	Ø3, depth 3

(TW3N (Slide screw) Ball Guide Type (Option: Model Code BG))



(TW4N (Slide screw), TW4N (Ball screw) Ball Guide Type (Option: Model Code BG))



Model	Tap size and maximum screw-in depth	Applicable bolt	Tightening torque		Long hole	Reamed hole (mm)
			Bolt bearing surface is steel	Bolt bearing surface is aluminum		
TW3N (Slide screw)	M4, depth 6	M4	3.59 N-m (0.37 kgf-m)	1.76 N-m (0.18 kgf-m)	A: 3, B: 4, depth 3	$\phi 3$, depth 3
TW4N (Slide screw) TW4N (Ball screw)	M4, depth 6	M4	3.59 N-m (0.74 kgf-m)	1.76 N-m (0.35 kgf-m)	A: 3, B: 4, depth 3	$\phi 3$, depth 3

Tightening screws

- For the male threads for installing the base, use hexagonal socket head bolts.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.



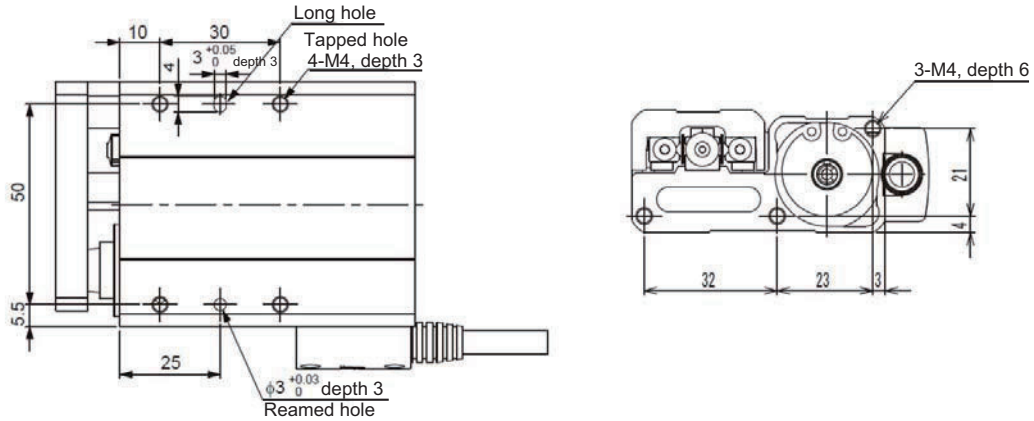
Caution: The tap hole of the mounting part is a through hole. Never use a screw longer than the effective screw length. Internal mechanisms and electric components may be damaged.

[3] TFA3NA, TFA3N (Slide screw, Ball screw), TFA4NA, TFA4N (Slide screw, Ball screw)

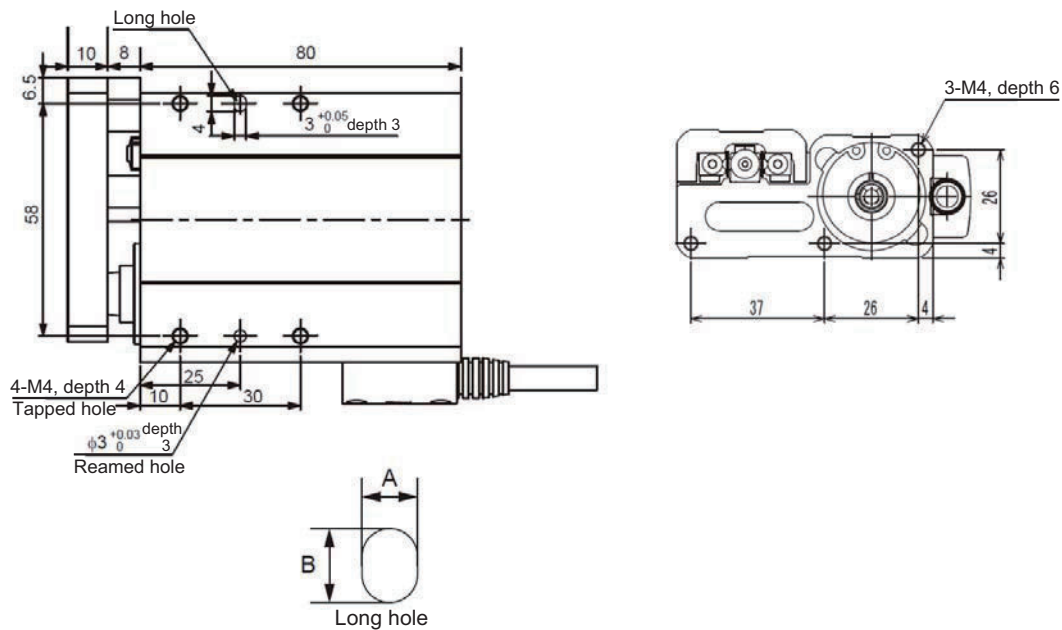
This actuator contains installation tapped holes which allow it to be secured from the rear.

The actuator also contains long holes and reamed holes for use with positioning pins.

(TFA3NA, TFA3N (Slide screw, Ball screw))

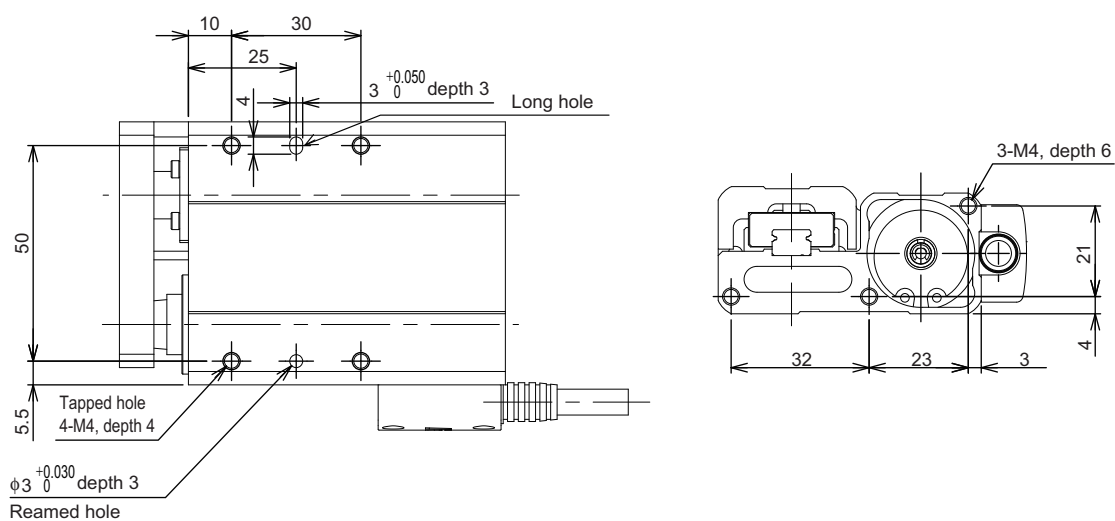


(TFA4NA, TFA4N (Slide screw, Ball screw))

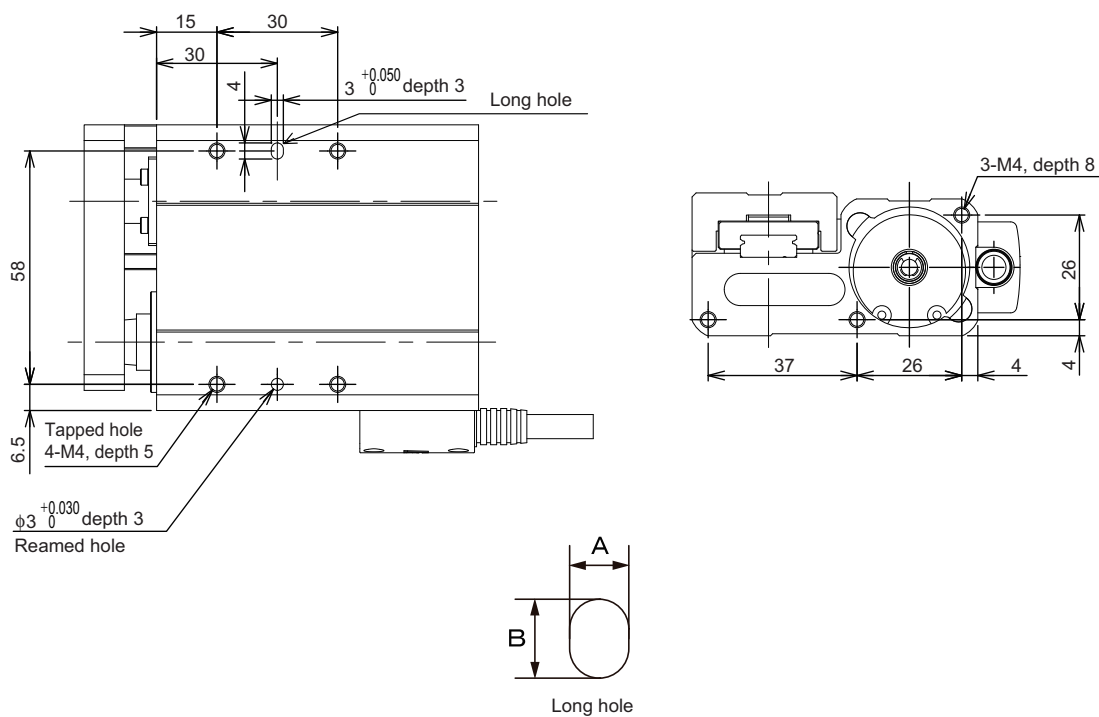


Model	Tap size and maximum screw-in depth	Applicable bolt	Tightening torque		Long hole	Reamed hole (mm)
			Bolt bearing surface is steel	Bolt bearing surface is aluminum		
TFA3NA TFA3N (Slide screw) (Ball screw)	M4, depth 3	M4	3.59 N-m (0.37 kgf-m)	1.76 N-m (0.18 kgf-m)	A: 3, B: 4, depth 3	φ3, depth 3
TFA4NA TFA4N (Slide screw) (Ball screw)	M4, depth 4	M4	3.59 N-m (0.74 kgf-m)	1.76 N-m (0.35 kgf-m)	A: 3, B: 4, depth 3	φ3, depth 3

(TF3N (Slide screw) Ball Guide Type (Option: Model Code BG))




(TF4N (Slide screw), TF4N (Ball screw) Ball Guide Type (Option: Model Code BG))



Model	Tap size and maximum screw-in depth	Applicable bolt	Tightening torque		Long hole	Reamed hole (mm)
			Bolt bearing surface is steel	Bolt bearing surface is aluminum		
TF3N (Slide screw)	M4, depth 3	M4	3.59 N-m (0.37 kgf-m)	1.76 N-m (0.18 kgf-m)	A: 3, B: 4, depth 3	φ3, depth 3
TF4N (Slide screw) TF4N (Ball screw)	M4, depth 4	M4	3.59 N-m (0.74 kgf-m)	1.76 N-m (0.35 kgf-m)	A: 3, B: 4, depth 3	φ3, depth 3

Tightening screws

- For the male threads for installing the base, use hexagonal socket head bolts.
- Use of high-tension bolts meeting at least ISO 10.9 is recommended.

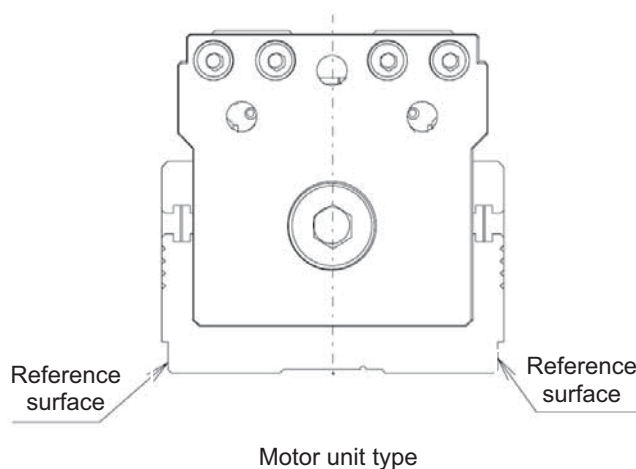
 **Caution:** The tap hole of the mounting part is a through hole. Never use a screw longer than the effective screw length. Internal mechanisms and electric components may be damaged.

9.2 Installation Surface

Motor unit types TA4*, TA5*, TA6*, TA7*

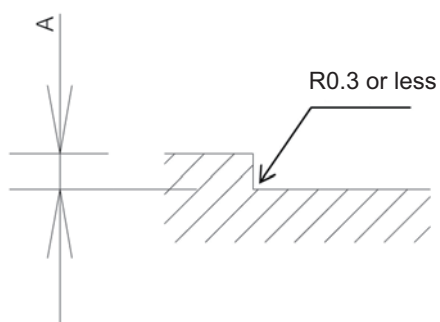
- Mount on a strong, rigid structure to prevent vibration.
- Install the main unit only on a machined surface, or other surface that is highly flat, within ± 0.05 mm/m.
- Provide adequate space around the device to allow for future maintenance.
- On the motor unit type (TA***) actuator, the side and bottom faces of the base provide reference surfaces for table's travel.

When it is necessary that the slider or table move in a highly precise fashion, please ensure that the device is installed at an orientation that is based on the position of these surfaces.



Caution: Because the side and bottom faces of the base provide reference surfaces for table travel as shown in the above diagram, conduct installation based on the position of this side when precision is required.

Follow the diagram below when installing the device using the reference surface.

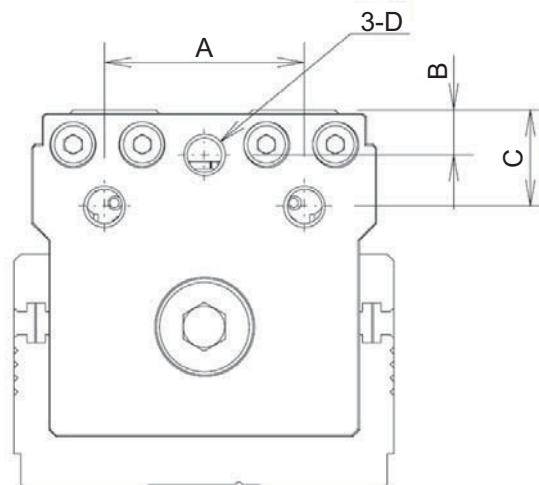


Model	Length of A (mm)
Motor unit type	2 to 4 or less

9.3 Installation of the Load

9.3.1 Motor unit types TA4*, TA5*, TA6*, TA7*

- Please attach the load to the device using the tapped holes in the front plate of the table type.
- There are also tapped holes and reamed holes in the top surface of the table. Please use these to attach the load.
- There are two reamed holes on the slider in the top surface of the table, so if you need to be able to secure and detach the load multiple times, please use these holes. Also, if you require precision in your attachment, such as a right angle, use one of the reamed holes to make fine adjustments.
- The process for attaching these to the main unit is similar to the installation process of the main unit. The mounting screws and tightening torque required are also similar to the installation process of the main unit. (Refer to 9.1.1.)
- For exact screw-in depth, please see the table below.
- Do not screw in screws deeper than indicated in the table below, as this can interfere with internal parts and damage the actuator.



Model	A	B	C	D
TA4*	29	5	13	M6, depth 10
TA5*	29	6.5	14	M6, depth 10
TA6*	35	7	18	M6, depth 13
TA7*	44	6.5	21.5	M8, depth 15

(TCA3NA, TCA3N (Slide screw, Ball screw))

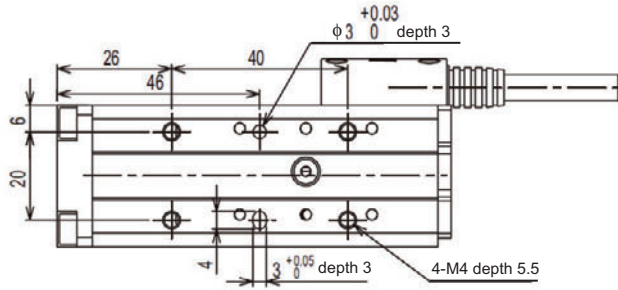


Table upper surface

(TCA4NA, TCA4N (Slide screw, Ball screw))

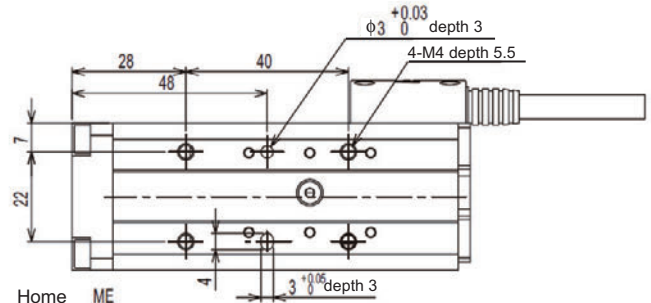
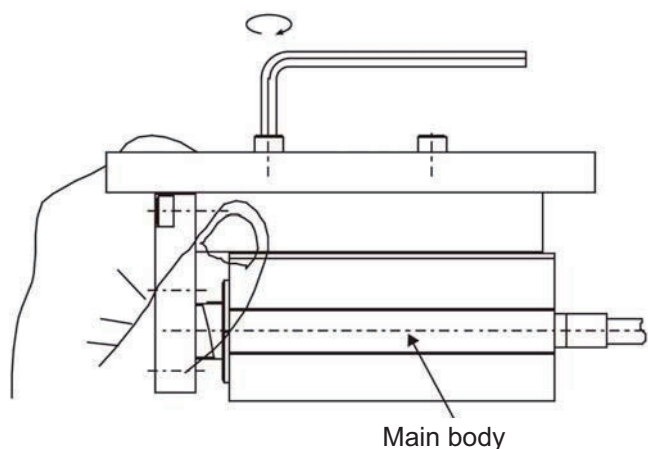


Table upper surface

- ⚠ Caution:
- A work part shall be mounted on a machined plane or a plane with equivalent precision, and the flatness shall be 0.01 mm/m or less. If sufficient flatness is not secured, the table is deformed when mounting and fixing a work part, causing malfunction. Flatness refers to the height difference between the maximum value (peak) and minimum value (trough) of surface distortion.
 - The length of screws used to mount a work part must be the effective screw depth described here or less. If a screw is screwed in more than the effective screw depth, the end may get into contact with the guide rail and the table may be deformed, causing malfunction.

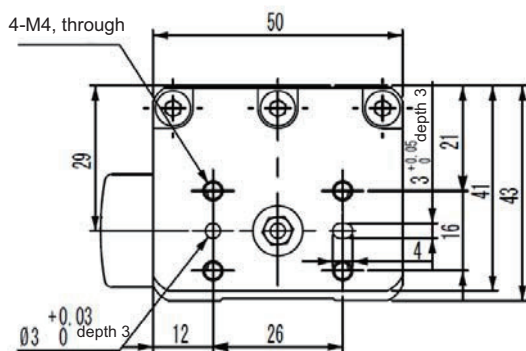
[2] TWA3NA, TWA3N (Slide screw, Ball screw), TWA4NA, TWA4N (Slide screw, Ball screw)

- Please attach the load to the device using the tapped holes in the front plate of the table type.
- There are also tapped holes and reamed holes in the top surface of the table. Please use these to attach the load.
- There is one reamed hole on the slider in the top surface of the table, so if you need to be able to secure and detach the load multiple times, please use this hole. Also, if you require precision in your attachment, such as a right angle, use one reamed hole to make fine adjustments.
- The process for attaching these to the main unit is similar to the installation process of the main unit. The mounting screws and tightening torque required are also similar to the installation process of the main unit. (Refer to 9.1.2.)
- Mount a work part by holding the table as shown in the figure. If you hold only the main body and tighten the work part, excessive moment is applied to the guide area and play may be generated.



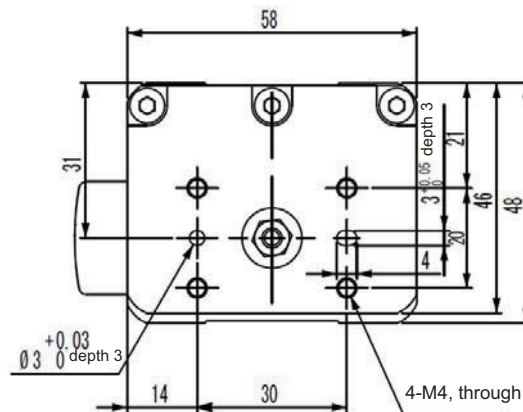
- Pay attention to the thread length, because the threaded holes on the front table are through holes.

(TWA3NA, TWA3N (Slide screw, Ball screw))



Front plate

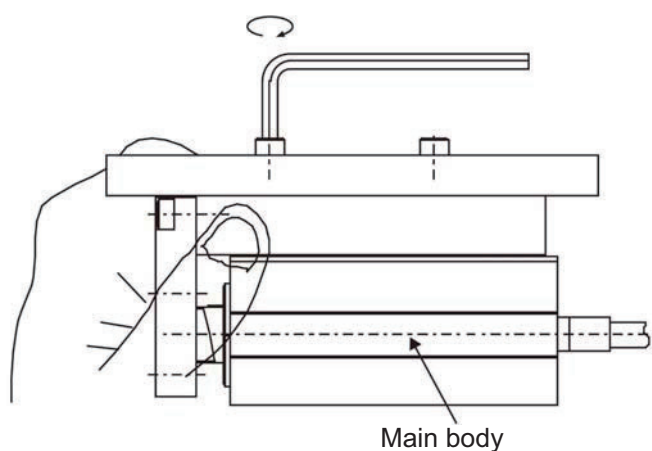
(TWA4NA, TWA4N (Slide screw, Ball screw))



Front plate

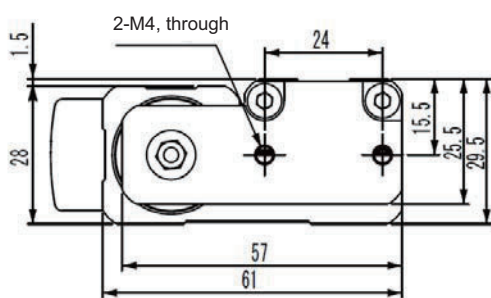
[3] TFA3NA, TFA3N (Slide screw, Ball screw), TFA4NA, TFA4N (Slide screw, Ball screw),

- Please attach the load to the device using the tapped holes in the front plate of the table type.
- There are also tapped holes and reamed holes in the top surface of the table. Please use these to attach the load.
- There is one reamed hole on the slider in the top surface of the table, so if you need to be able to secure and detach the load multiple times, please use this hole. Also, if you require precision in your attachment, such as a right angle, use one reamed hole to make fine adjustments.
- The process for attaching these to the main unit is similar to the installation process of the main unit. The mounting screws and tightening torque required are also similar to the installation process of the main unit. (Refer to 9.1.2.)
- Mount a work part by holding the table as shown in the figure. If you hold only the main body and tighten the work part, excessive moment is applied to the guide area and play may be generated.



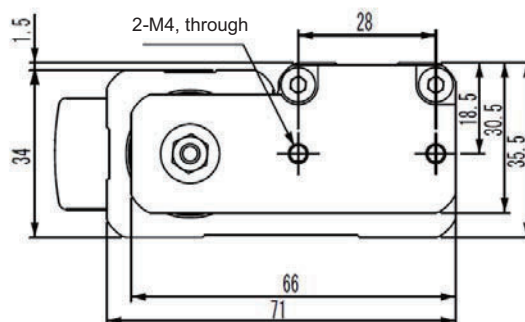
- Pay attention to the thread length, because the threaded holes on the front table are through holes.

(TFA3NA, TFA3N (Slide screw, Ball screw))



Front plate

(TFA4NA, TFA4N (Slide screw, Ball screw))



Front plate

(TFA3NA, TFA3N (Slide screw, Ball screw))

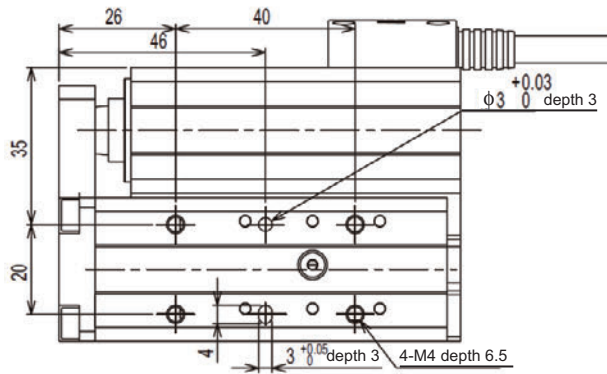


Table upper surface

(TFA4NA, TFA4N (Slide screw, Ball screw))

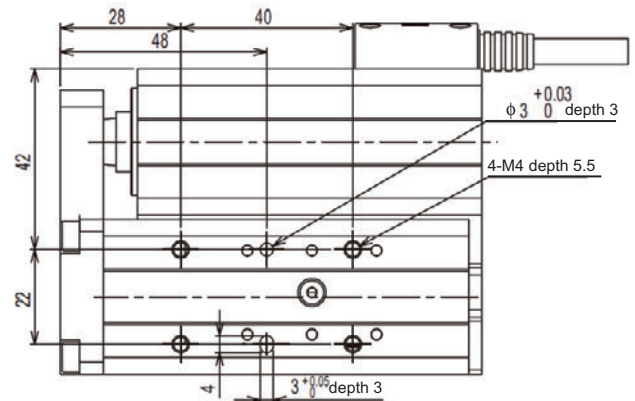


Table upper surface

- ⚠ Caution:
- A work part shall be mounted on a machined plane or a plane with equivalent precision, and the flatness shall be 0.01 mm/m or less. If sufficient flatness is not secured, the table is deformed when mounting and fixing a work part, causing malfunction. Flatness refers to the height difference between the maximum value (peak) and minimum value (trough) of surface distortion.
 - The length of screws used to mount a work part must be the effective screw depth described here or less. If a screw is screwed in more than the effective screw depth, the end may get into contact with the guide rail and the table may be deformed, causing malfunction.

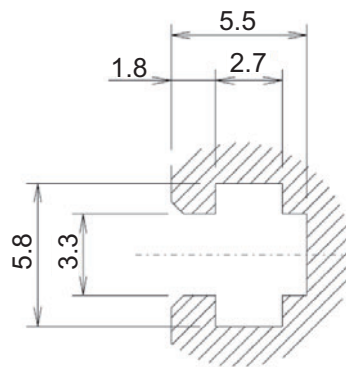
9.4 T Grooves

The main unit surface side of TA5C, 6C, 7C and TR type contains T grooves (M3 size) for attaching external devices.

These grooves are to be used for whatever needs may arise, such as installing sensors, fastening wiring, etc.

T groove measurements are shown below.

- A use of square nut is recommended for the T grooves, but a hex nut can also be used.
- Pay careful attention to the length so that the edge of the bolt won't contact the base of T grooves during installation.



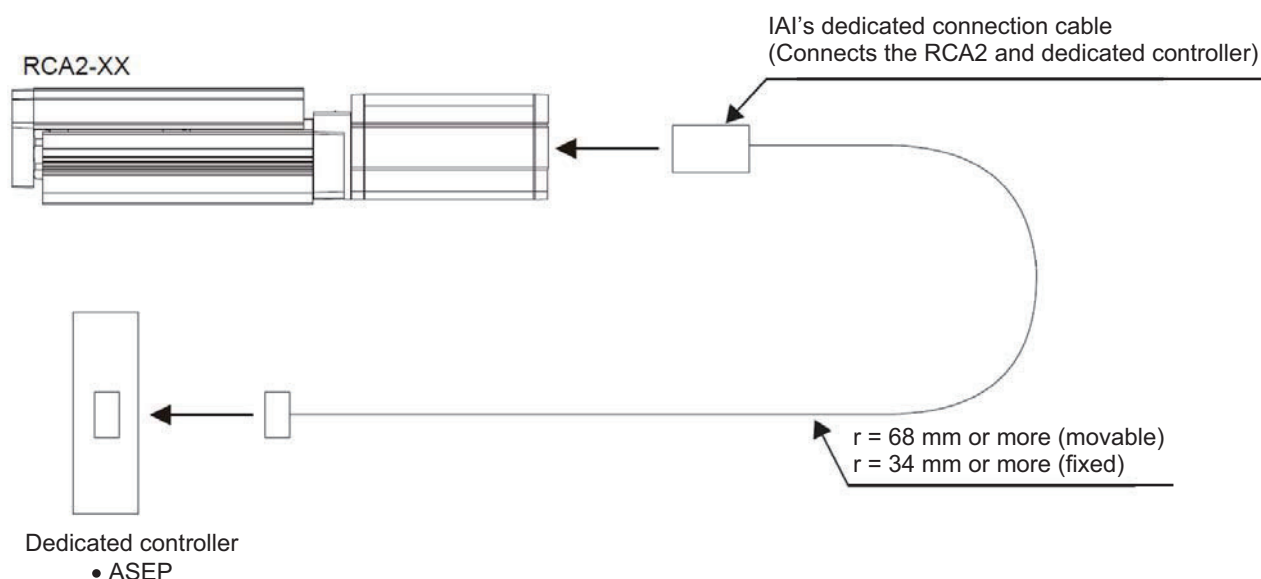
10. Connection with Controller

For the controller and the connection cable between the controller and RCA2 (this actuator), use IAI's dedicated controller and dedicated connection cable.

The following explains the wiring method based on single-axis use.

- In applications where the dedicated connection cable cannot be secured, make sure the cable does not deflect more than it would due to the dead weight, or use a self-supporting cable hose or increase the cable radius to minimize the load applied to the dedicated connection cable.
- Do not cut and extend, shorten or reconnect the dedicated connection cable.
- Do not pull or forcibly bend the dedicated connection cable.

If you wish to change the specification of the dedicated connection cable, consult IAI.

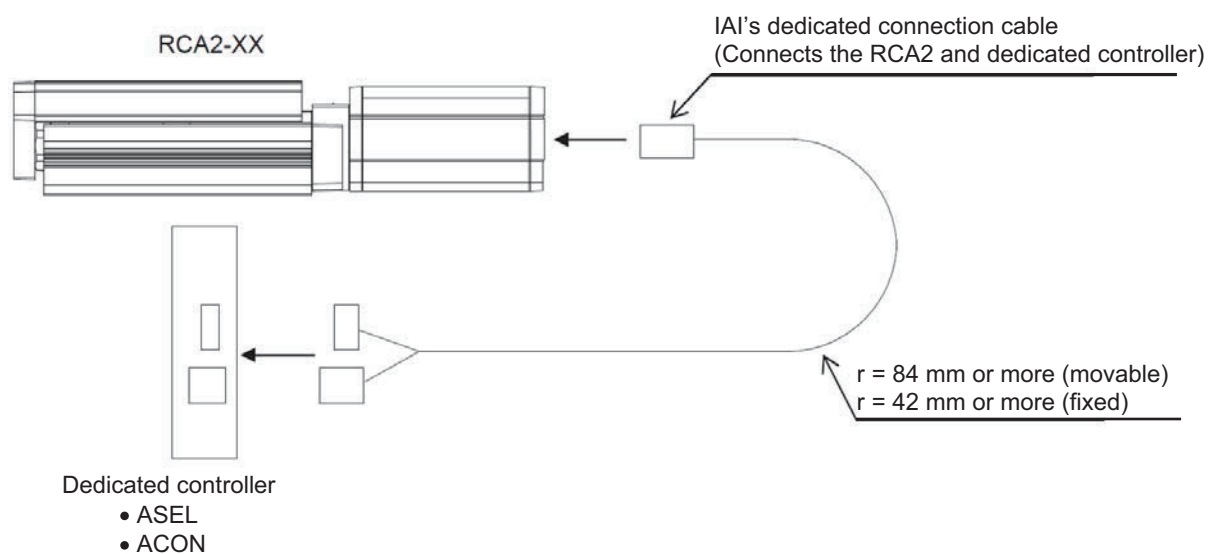


Dedicated connection cable

- Servo motor cable : CB-APSEP-MPA***

*) *** indicates the cable length. Up to 10 m can be specified.

Example) 080 = 8 m



Dedicated connection cable

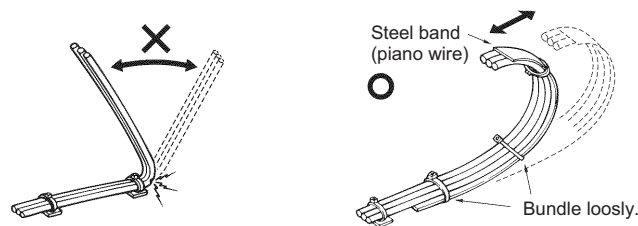
- Servo motor cable : CB-ACS-MPA***

*) *** indicates the cable length. Up to 10 m can be specified.

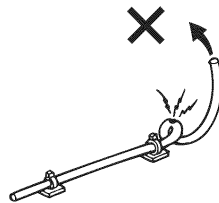
Example) 080 = 8 m

When building an application system using the actuator and controller, incorrect wiring or connection of each cable may cause broken wire, poor contact or other unexpected problem. The prohibited items relating to cable wiring are explained below.

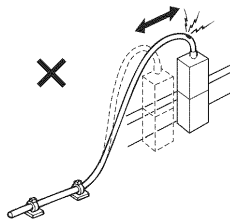
- Do not cut and reconnect the cable to extend or shorten the cable.
- If the cable cannot be secured, reduce the load on the cable by allowing it to deflect only by the weight of the cable or wire it in a self-standing cable hose, etc., having a large radius.
- Prevent the cable from bending at the same point.



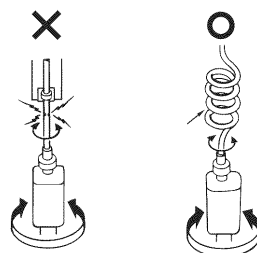
- Do not let the cable bend, kink or twist.



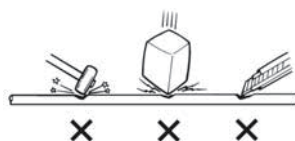
- Do not pull the cable with a strong force.



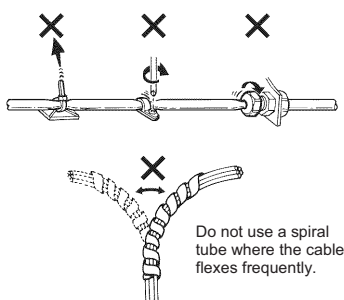
- Do not let the cable receive a turning force at a single point.



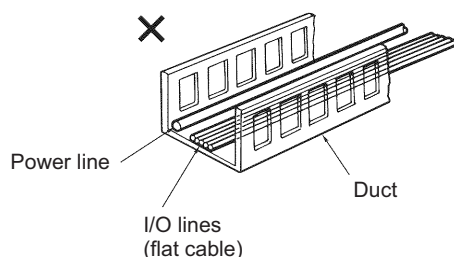
- Do not pinch, drop a heavy object onto or cut the cable.



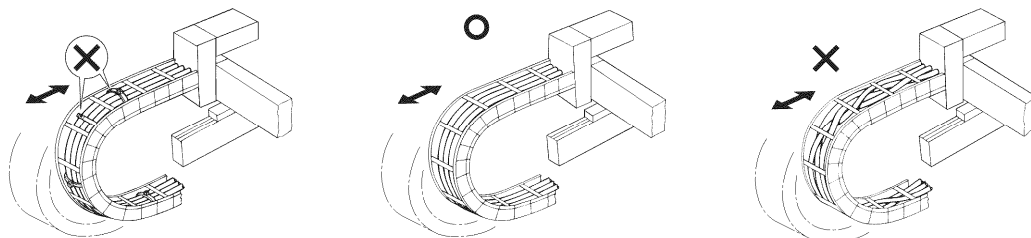
- When fixing the cable, provide a moderate slack and do not tension it too tight.



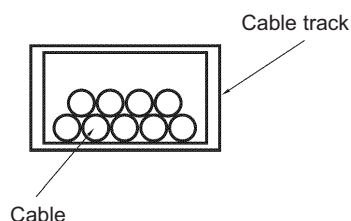
- Separate the I/O and communication lines from the power and drive lines. Do not wire them in the same duct.



- Pay attention to the following points when using a cable track.
- Do not let the cable get tangled or kinked in a cable track or flexible tube. When bundling the cable, keep a certain degree of flexibility (so that the cable will not become too taut when bent).



- Do not cause the cables to occupy more than 60% of the space in the cable track.



Warning

- When connecting and disconnecting cables, be sure to turn off the controller power. Connecting/disconnecting cables with power on may cause malfunctions of the actuator, critical accidents resulting in injury or death, or damage to the mechanical equipment.
- Insufficient connector connection is dangerous, as it may cause the actuator to malfunction. Be sure to confirm that the connector is connected properly.

11. Notes on Operation

11.1 Placing a Load on the Actuator

- Do not exceed the load ratings given in the specification table below.
- Be careful not to exceed the load moment, extension load length and maximum loading capacity for the table.
(Refer to the figures below and on the next page.)

- Allowable load moment Unit: N-m (kgf-m)

Motor unit type	Ma	Mb	Mc
TA4	4.2 (0.43)	6.0 (0.61)	8.2 (0.84)
TA5	6.57 (0.67)	9.32 (0.95)	14.32 (1.46)
TA6	7.26 (0.74)	10.3 (1.05)	18.25 (1.86)
TA7	9.91 (1.01)	14.13 (1.44)	28.65 (2.92)

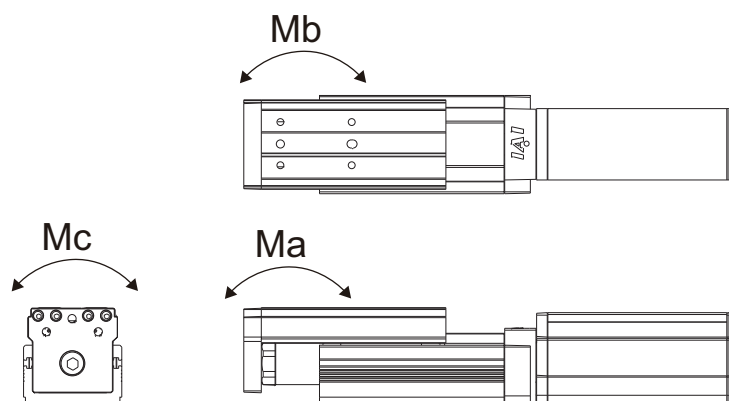
Short type	Ma	Mb	Mc
TCA3NA, TCA3N (Slide screw) TFA3NA, TFA3N (Slide screw) TCA3NA, TCA3N (Ball screw) TFA3NA, TFA3N (Ball screw) TCA4NA, TCA4N (Slide screw) TFA4NA, TFA4N (Slide screw) TCA4NA, TCA4N (Ball screw) TFA4NA, TFA4N (Ball screw)	9.9	9.9	3.3
TWA3NA, TWA3N (Slide screw) TWA3NA, TWA3NA (Ball screw)	9.9	9.9	9.4
TWA4NA, TWA4N (Slide screw) TWA4NA, TWA4N (Ball screw)	9.9	9.9	12.2

Short type		Ma	Mb	Mc
Ball Guide Type (Option: Model Code BG)	TC3N (Slide screw)	0.86	0.68	0.92
	TF3N (Slide screw)	0.75	0.55	0.88
	TW3N (Slide screw)	1.74	1.50	2.85
	TC4N (Slide screw)	1.65	1.28	1.77
	TC4N (Ball screw)			
	TF4N (Slide screw)	1.42	1.07	1.69
	TF4N (Ball screw)			
	TW4N (Slide screw)	3.46	2.93	5.63
	TW4N (Ball screw)			

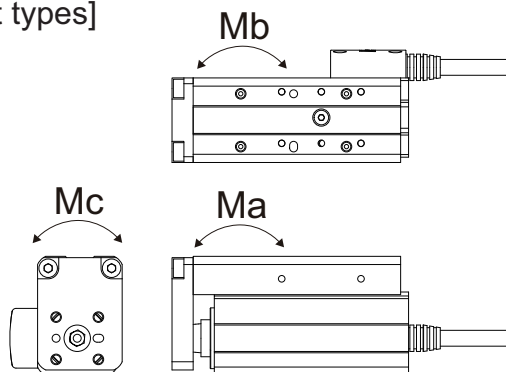
Motor unit type	Ma	Mb	Mc
TA5	25.5 (2.60)	36.5 (3.72)	56.1 (5.72)
TA6	29.4 (3.00)	42.0 (4.29)	74.1 (7.56)
TA7	42.6 (4.35)	60.8 (6.20)	123.2 (12.57)

On table types, be careful not to let the load applied to the front plate exceed the Ma moment.
When calculating the load moments, refer to 11.1.1, "Positioning the guide to calculate the load moment" shown below.

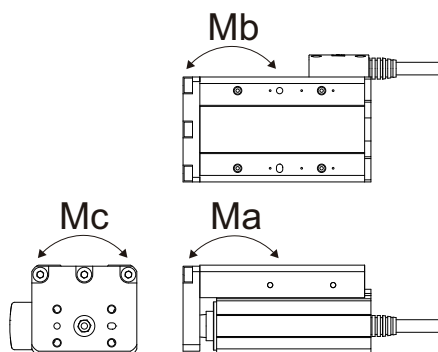
[Motor unit types]



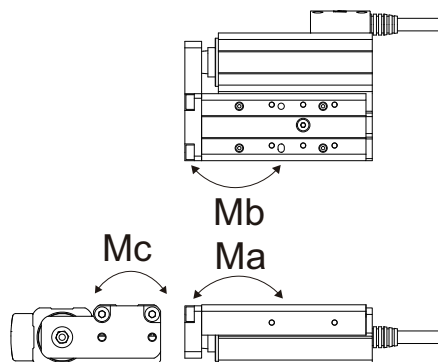
[Short compact types]



[Short wide types]



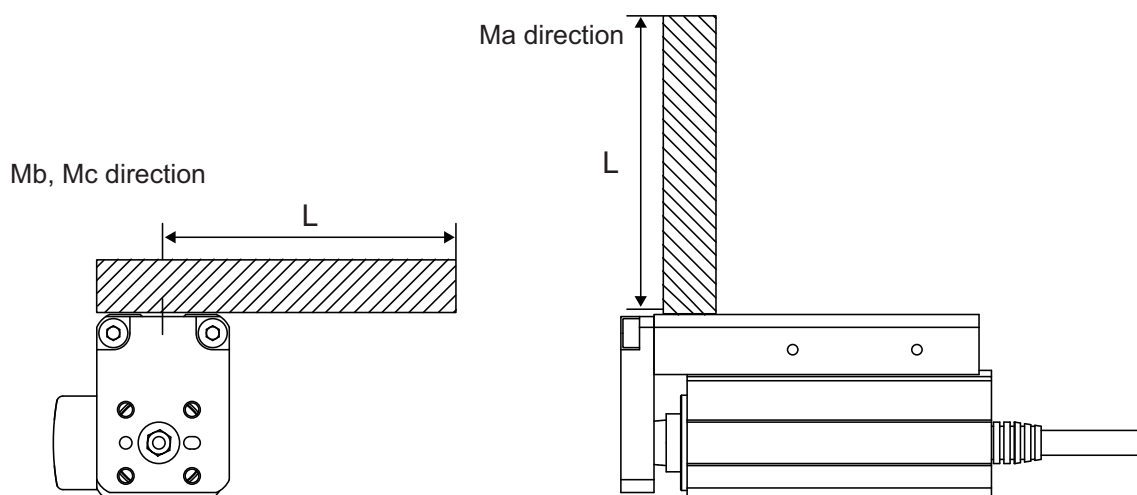
[Short flat types]



On motor unit types (TA**), keep the extension length to within the ranges of load moments. On short type (TC(A)***, TF(A)***, TW(A)***), keep the overhangs within the ranges shown in the table below.

Allowable extension length

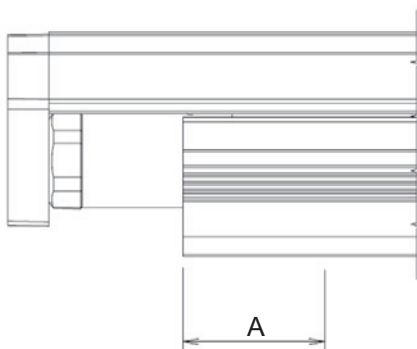
Short type	Ma	Mb	Mc
TCA*** TFA*** TWA***	100 mm or less	100 mm or less	100 mm or less



11.1.1 Positioning the guide to calculate the load moment

When calculating the load moment, please take the following operating positions into account. Please note that extension length may vary depending on the stroke of a particular table type.

[Motor unit types]



Ma moment operating position

Model	TA4	TA5	TA6	TA7
A (mm)	30.0	34.5	37	42

Caution: Excessive load moments may reduce the service life of the guide. Also, exceeding the extension load length may cause vibration as well as reduce the service life of the guide.

11.1.2 Thrust direction external force

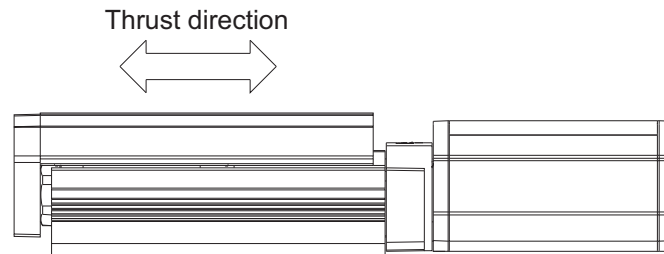
Do not to subject the actuator to external force or mechanical shock in the thrust direction in excess of allowable capacity.

Subjecting the actuator to levels of external force or mechanical shock above the allowable capacity may damage or destroy internal components.

Thrust direction external force capacity Unit: N (kgf)

TA5	160 (16.3)
TA6	220 (22.4)
TA7	220 (22.4)

[Motor unit types]



Please make sure to follow the following notes when thrusting the slider.

[Low-lead type slide screw]

The slider would not move with external force. Use the PC software or teaching pendant to move the slider with JOG operation.

Or, for those with a slit on the end of the shaft, twist the shaft with putting in a screwdriver to the slit to move the slider.

[Mid-lead and high-lead type slide screws]

Try to utilize JOG operation to move the slider with using the PC software or teaching pendant as much as possible. Or, for those with a slit on the end of the shaft, twist the shaft with putting in a screwdriver to the slit to move the slider.

[Low-lead type ball screw]

There are some models that the slider would not move with external force. Do not try to move it forcefully. Utilize JOG operation to move the slider with using the PC software or teaching pendant.



Caution: Do not try to move the slider forcefully when it is difficult.

For mid-lead and high-lead type slide screw models, avoid moving the slider directly with hand as much as possible.

Applying too much force to the slider may cause a malfunction of the actuator such as a broken nut.

11.2 Adjusting the Home Position

The actuator home position can be adjusted by changing parameter ^{*1}. In order to make adjustments, please do the following.

- [1] Verify the home position by performing a home return operation.
- [2] Move the actuator to the desired position, verify the distance between the old and new positions, and adjust the parameter accordingly. The parameter can be set to a positive value in the direction of movement. (It cannot be set to a negative value.)
- [3] Increasing the offset amount restricts the movement range by the amount of the increase. If you set an offset greater than 1 mm, please reset the stroke soft limit.

^{*1} ACON controller: No. 22, home return offset distance
ASEL controller: Parameter No. 12 for each axis, home preset value
ASEP controller: Parameter No. 16, home return offset distance

11.3 Changing the Home Position Direction

To change the home position direction after delivery, it is necessary to change the movement direction parameter. Please contact with IAI if you need to do this.

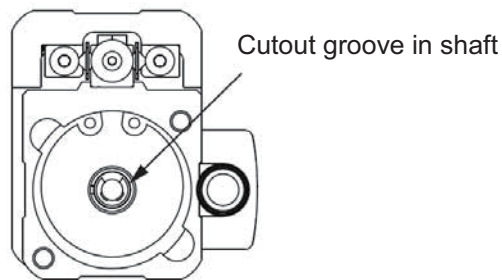


Warning:

The encoder serves not only to detect the actuator's position and the home position signal, it also plays a crucial role in phase switching for the AC servo power line, and is calibrated at a high level of precision for that purpose. Never touch the encoder in order to change the home position.

11.4 How to Move Table by Hand

On low-lead types with a lead of 1, 2, etc., the table is too heavy to slide and cannot be moved by hand. To move the table on these models, insert a screwdriver, etc., into the cutout groove provided in the shaft on the rear side and turn the groove.



12. Life

12.1 Life of Actuator Using Ball Screws

Refer to the following for the product life of the ball screw type actuator assuming it was operated under the condition of maximum transportable weight, maximum acceleration and deceleration.

Model		Product Life (Reference)
TA4, TA5, TA6, TA7		5000km
TCA3NA, TWA3NA, TFA3NA, TCA3N, TWA3N, TFA3N	Lead 1mm	3000km
TCA3NA, TWA3NA, TFA3NA, TCA3N, TWA3N, TFA3N	Lead 2mm, 4mm	5000km
TCA4NA, TWA4NA, TFA4NA, TCA4N, TWA4N, TFA4N, TC4N (Option BG), TW4N (Option BG), TF4N (Option BG)		5000km

12.2 Life of Actuator Using Slide-screws

The slide screw actuators adopt a slide screw and their nut wears over time.

A reference for product life is presented based on the wear amount of the nut.

The positioning precision of this product, such as lost motion, will drop as the wear of the nut progresses.

(Slide screw actuators)

TCA3N (Slide screw), TCA4N (Slide screw), TWA3N (Slide screw), TWA4N (Slide screw), TFA3N (Slide screw), TFA4N (Slide screw)

(Reference product life of slide screw types)

Horizontal application 10 million back-and-forth operations

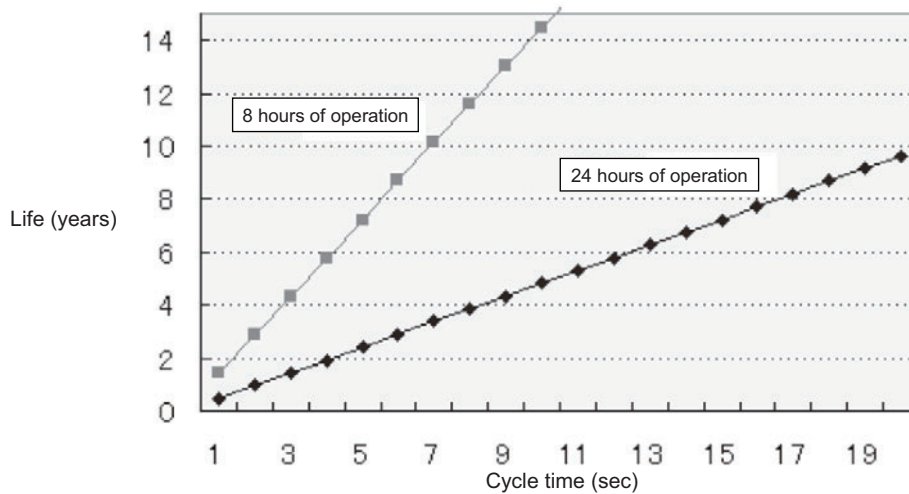
Vertical application 5 million back-and-forth operations

12.2.1 Relationship of Cycle Time and Product Life

(1) Horizontal application

The graph below shows the relationship between the cycle time for one back-and-forth operation and the life of the product in a horizontal application (product life: 10 million back-and-forth operations).

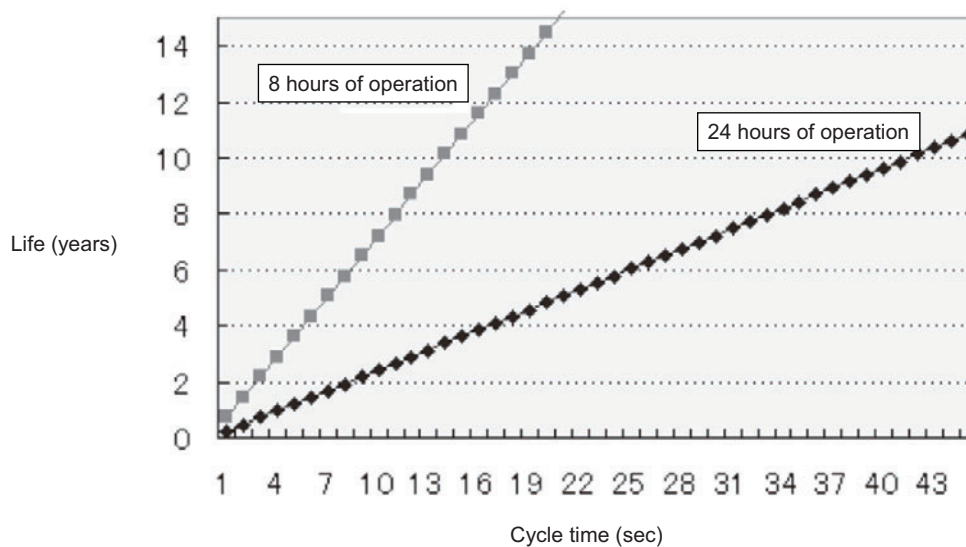
The lines based on 8 hours of operation and 24 hours operations a day, for 240 days a year, are shown. Use this graph as a reference when determining the product life.



(2) Vertical application

The graph below shows the relationship between the cycle time for one back-and-forth operation and the life of the product in a vertical application (product life: 5 million back-and-forth operations).

The lines based on 8 hours of operation and 24 hours operations a day, for 240 days a year, are shown. Use this graph as a reference when determining the product life.



13. Maintenance and Inspection

13.1 Inspection Items and Schedule

Perform maintenance and inspection at the schedule specified below.

This schedule assumes 8 hours of operation a day.

If the actuator is operated continuously day and night or at a higher utilization rate, shorten the inspection intervals according to the situation.

(Slide screw types)

	Visual inspection of exterior	Inspection of interior	Greasing
Startup inspection	○		
1 month after startup	○		
3 months after startup	○	○	
6 months after startup	○	○	○
Every 6 months thereafter	○	○	○

(Ball screw types)

	Visual inspection of exterior	Inspection of interior	Greasing
Startup inspection	○		
1 month after startup	○		
6 months after startup	○	○	
12 months after startup	○	○	○
Every 6 months thereafter	○		
Every 12 months	○	○	○

13.2 Visual Inspection of Exterior

In the visual inspection of exterior, check the following items.

Actuator	Loose actuator mounting bolts, other loose items, buildup
Cables	Scratches, connection at connectors
Spiral Cover	Scratches, dents, foreign object attached on cover
Overall	Abnormal noise, vibration

- If the actuator is fixed vertically, grease on the guide may drip depending on the environment. In this case, clean the dirtied areas and add grease.
- The spiral cover is a consumable part. Its life is 2,000,000 cycles of back and forth operation as a reference. Refer to 13.10 How to Replace Spiral Cover when replacing the spiral cover.

(Note) The life of the spiral cover varies due to the environment of use. Foreign object (dust, high-viscosity oil) attached on the surface could disturb the expansion and contraction operation, which leads to a shorter life. To obtain a longer life, clean the surface regularly.

13.3 Cleaning

- Clean exterior surfaces as necessary.
- Use a soft cloth to wipe away dirt and buildup.
- Do not blow too hard with compressed air as it may cause dust to get in through the gaps.
- Do not use oil-based solvents as they can harm lacquered and painted surfaces.
- To remove severe buildup, wipe gently with a soft cloth soaked in a neutral detergent or alcohol.

13.4 Internal Inspections

13.4.1 Motor unit types

Turn off the power, remove the ball screw cover, and inspect visually.
On motor reversing types, remove the reversing bracket and inspect visually.
When inspecting the interior, check the items specified below.

Main unit	Loose actuator mounting bolts, other loose items
Guide section	Lubrication, buildup
Belt (reversing types)	Belt wear and damage

Visually inspect the interior of the equipment. Check whether dust or other foreign matter has gotten inside and check the lubrication state.

The lubrication may have turned brown. This is not a problem as long as the travel surfaces shine as though they are wet.

If the grease is mixed with dust and does not have a shiny appearance, or if the grease has lost its efficacy due to prolonged use, then clean each section and reapply grease.

The procedure for internal inspections is outlined below. Refer to 13.7 for inspection and adjustment of the belt.

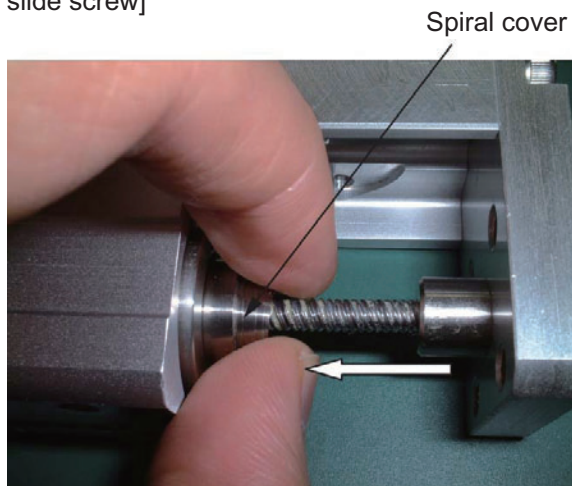
- [1] Move the table to the home position side.
- [2] Remove the ball screw cover.
- [3] Check the interior.
- [4] When you have completed the inspection, reassemble by doing the reverse of the above.

13.4.2 Short types

When inspecting the interior, check the items specified below.

Main unit	Loose bolts, other loose items
Slid screw/guide rail	Lubrication, buildup

[Internal inspection of slide screw]



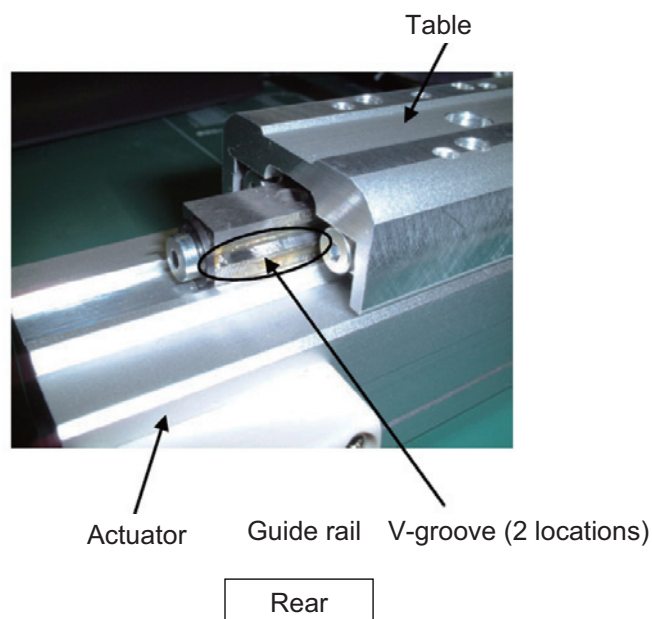
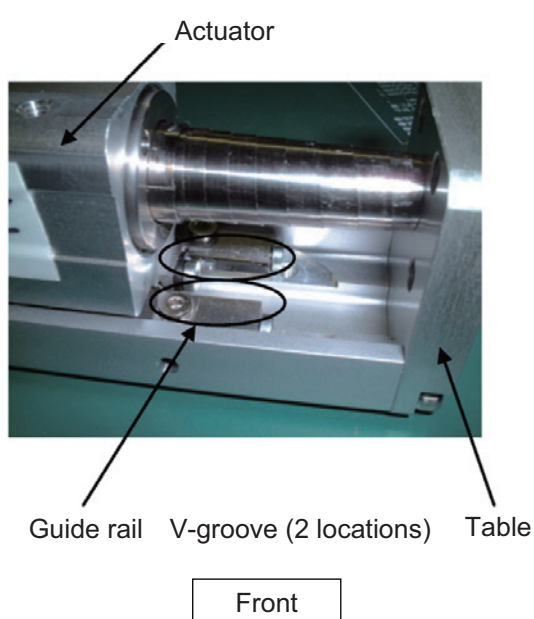
To check the slide screw or ball screw, turn off the power, extend the table, and pull the narrower end of the spiral cover toward the wider end (in the direction of the arrow) to expose the screw shaft and inspect the shaft visually.

If the lead is too small and the table does not move, insert a slotted screwdriver, etc., into the cutout groove provided in the shaft on the rear side and turn. [Refer to 11.4, "How to Move Table by Hand."]

Visually check the lubrication condition of the slide screw or ball screw.

Even when the grease is brown, the screw is lubricated properly as long as the traveling surface looks wet and shining. If the grease is mixed with dust and dirty or has no shiny appearance, or if the grease has lost its efficacy due to prolonged use, clean the applicable area and then replenish grease.

[Internal inspection of guide rail]



Turn off the power and pull out the table.

If the lead is too small to move the table, insert a screwdriver, etc., into the cutout groove provided in the shaft on the rear side and turn. [Refer to 11.4, "How to Move Table by Hand."]

Visually check the table and actuator's guide rail for lubrication condition.

Even when the grease is brown, the screw is lubricated properly as long as the traveling surface looks wet and shining. If the grease is mixed with dust and dirty or has no shiny appearance, or if the grease has lost its efficacy due to prolonged use, clean the applicable area and then replenish grease.

13.5 Internal Cleaning

- Use a soft cloth to wipe away dirt and buildup.
- Do not blow too hard with compressed air as it may cause dust to get in through the gaps.
- Do not use oil-based solvents, neutral detergent or alcohol..

13.6 Greasing

13.6.1 Applicable greases for guide

(1) Models other than Ball Guide Type

The grease initially used is lithium-based grease.

IAI uses the following grease in our plant.

Idemitsu Kosan	Daphne Eponex Grease No. 2
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Other companies also sell similar types of grease. For details, give the above grease name to the manufacturer you want to purchase from and ask what corresponding product they have available. Here are some examples of similar products.

Showa Shell Oil	Albania Grease No. 2
Mobil Oil	Mobilax 2

(2) Ball Guide Type (Option: Model Code BG)

The grease initially used is lithium-based grease.

IAI uses the following grease in our plant.

Kyodo Yushi Co., LTD.	Multemp PS No.2
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Warning:

Never use fluorine-based grease. Mixing fluorine-based grease with lithium-based grease not only reduces the performance of the grease, it may even cause damage to the actuator.

13.6.2 Applicable grease for ball screw

[Slide screw types]

All slide screw products have been shipped with synthetic poly- α olefin grease applied to the slide screw. IAI uses the following grease in our plant.

Location	Manufacturer	Model number
Slide screw	Sumico Lubricant Co., Ltd.	Sumitec 308

Equivalent greases are also available from other manufacturers, but exercise caution when selecting the grease because the life of the product may be affected.

⚠ Warning:

Never use anything other than synthetic poly- α olefin grease. Mixing poly- α grease with other grease not only reduces the performance of the grease, it may even cause damage to the actuator.

[Ball screw types]

The grease initially used is lithium-based grease.

IAI uses the following grease in our plant.

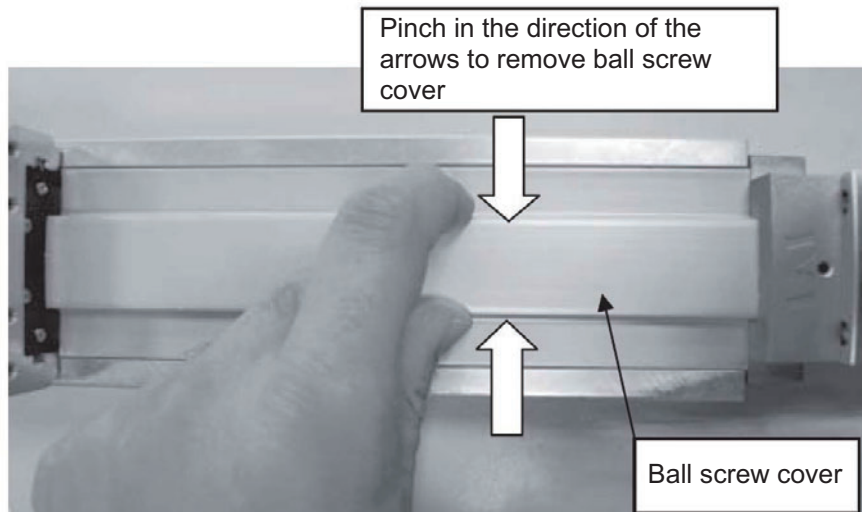
Motor unit types TA5C, TA6C, TA7C TA5R, TA6R, TA7R	Kyodo Yushi Co., LTD.	Multemp LRL 3
Motor unit types TA4C, TA4R Short types TCA3NA, TCA4NA, TWA3NA, TWA4NA, TFA3NA, TFA4NA, TCA3N, TCA4N, TWA3N, TWA4N, TFA3N, TFA4N	Idemitsu Kosan Co., Ltd.	Daphne Eponex Grease No. 2

⚠ Warning:

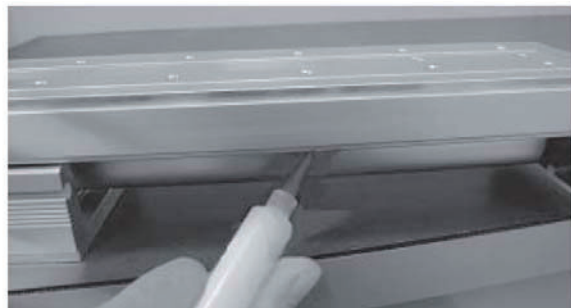
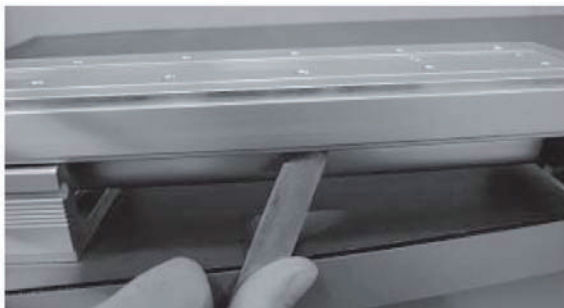
Never use fluorine-based grease. Mixing fluorine-based grease with lithium-based grease not only reduces the performance of the grease, it may even cause damage to the actuator.

13.6.3 How to apply grease

Pull the table all the way out before removing the ball screw cover.



- (1) For the guide section, apply the grease by moving the table back and forth and spreading it out, either by pushing a scraper between the table and base or by lubricating with a grease injector. Grease the guides on both sides. When complete, wipe away any excess grease.



- (2) To grease ball screws, first clean, then put some grease on your finger and apply while moving the table back and forth.
When finished, wipe off excess grease.



For the table type, put the ball screw cover back on.

Caution:

- When moving the slider or table back and forth by hand, be certain never to apply force in excess of the thrust direction external force capacity (refer to 11.1.2). (If the slider will not move, operate it using a jog function.)
- In case the grease got into your eye, immediately go to see the doctor to get an appropriate care.

After finishing the grease supply work, wash your hands carefully with water and soap to rinse the grease off.

Short types

[How to apply grease for ball screw]

- [1] Turn off the power and check the surface of the spiral cover for shavings, powder dust, etc. Use a waste cloth, etc., to wipe off shavings, powder dust, if any.
- [2] Pull the table and pull the narrower end of the spiral cover toward the wider end (in the direction of the arrow) to expose the screw shaft. If the lead is too small and the table does not move, insert a slotted screwdriver, etc., into the cutout groove provided in the shaft on the rear side and turn. [Refer to 11.4, "How to Move Table by Hand."]



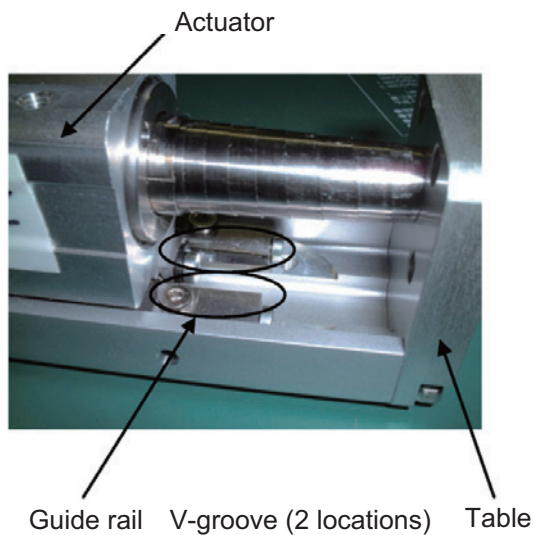
- [3] Wipe off grease attached to the slide screw or ball screw and then apply the specified grease.
- [4] Install the spiral cover in the original condition and move the table to spread the grease evenly.



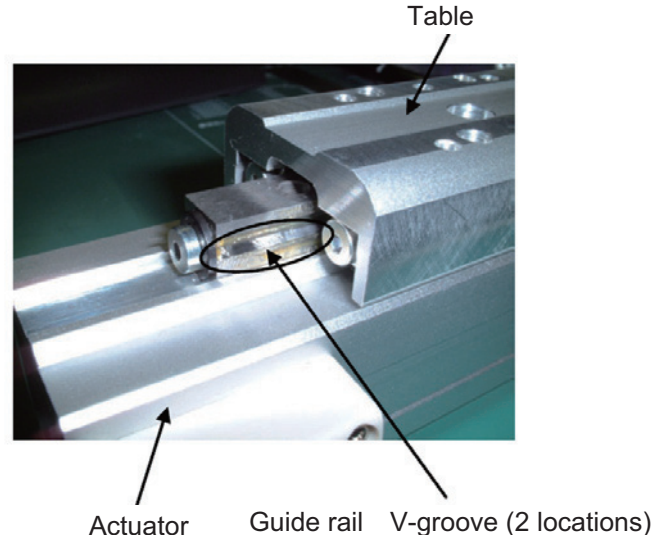
Caution: In case the grease got into your eye, immediately go to see the doctor to get an appropriate care.
After finishing the grease supply work, wash your hands carefully with water and soap to rinse the grease off.

[How to apply grease for guide rail]

- [1] Turn off the power and pull out the table.
If the lead is too small to move the table, insert a screwdriver, etc., into the cutout groove provided in the shaft on the rear side and turn. [Refer to 11.4, "How to Move Table by Hand."]



Front



Rear

- [2] Wipe off the grease attached to the V-groove in the guide rail and apply the specified grease.
[3] Move the table to spread the grease evenly.



Caution: In case the grease got into your eye, immediately go to see the doctor to get an appropriate care.
After finishing the grease supply work, wash your hands carefully with water and soap to rinse the grease off.

Short types Ball Guide Type (Option: Model Code BG)

[How to apply grease for guide rail]

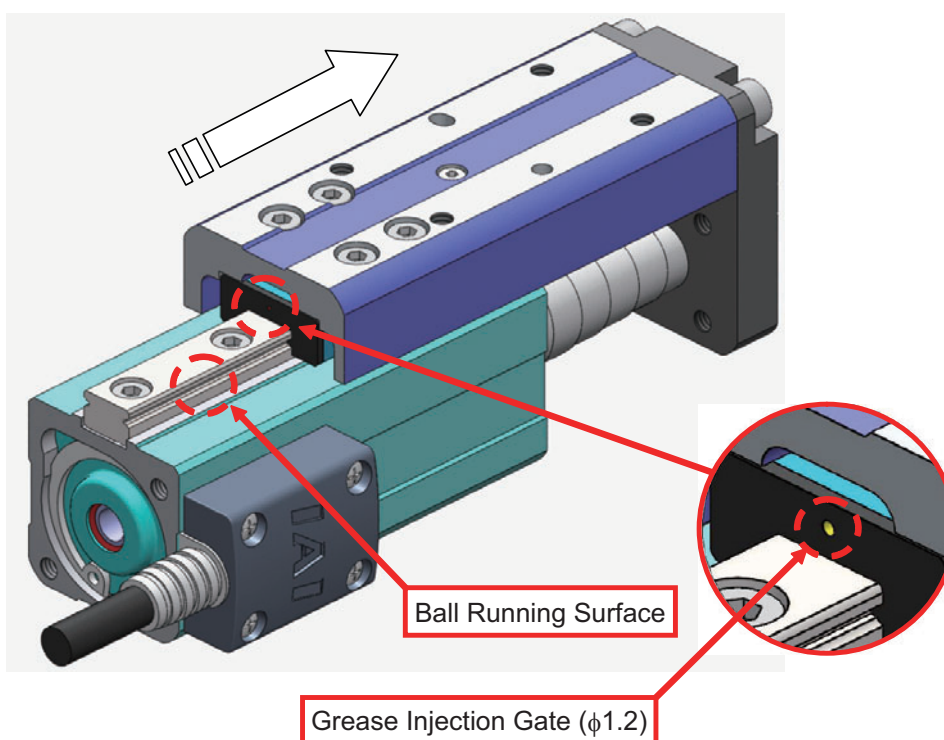
- 1) To apply grease, supply it from the grease injection gate ($\phi 1.2$) shown in the figure below with using an injector.

The following table shows the volumes of grease application for each model as a reference.

There is a tendency that the resistance in sliding operation increases after grease is supplied.

Remove excessive grease and then run the actuator back and forth for 10 to 20 times for a break-in.

Grease Apply Volume (1 block)	
TC3N	40mm ³
TF3N	40mm ³
TW3N	30mm ³
TC4N	45mm ³
TF4N	45mm ³
TW4N	50mm ³



Caution: The guide constructed in the Ball Guide Type is equipped with a built-in lubrication system, however, in a short distance travel, the lubricant may not get spread out evenly. Check the lubricant condition regularly, and supply grease if necessary.

Caution: In case the grease got into your eye, immediately go to see the doctor to get an appropriate care.
After finishing the grease supply work, wash your hands carefully with water and soap to rinse the grease off.

13.7 Belt

13.7.1 Inspection of Belt

Visually inspect the belt after removing the pulley cover.

Although the durability of the belt is affected significantly by the operating conditions, generally the belt has a flex life of several million times.

As a reference of when the belt should be actually replaced, replace the belt if any of the following conditions is observed:

- Significant wear of the teeth or end face of the belt
- Swelling of the belt due to attached oil, etc.
- Cracking or other damage to the belt teeth or back
- Breaking of the belt

13.7.2 Applicable Belt

Manufacturer: Bando Chemical Industries, Ltd.

Belt model (type)	Model
40S2M138R, 4-mm wide (clean rubber type)	TA4R
60S2M168R, 6-mm wide (clean rubber type)	TA5R
60S2M198R, 6-mm wide (clean rubber type)	TA6R
60S2M198R, 6-mm wide (clean rubber type)	TA7R

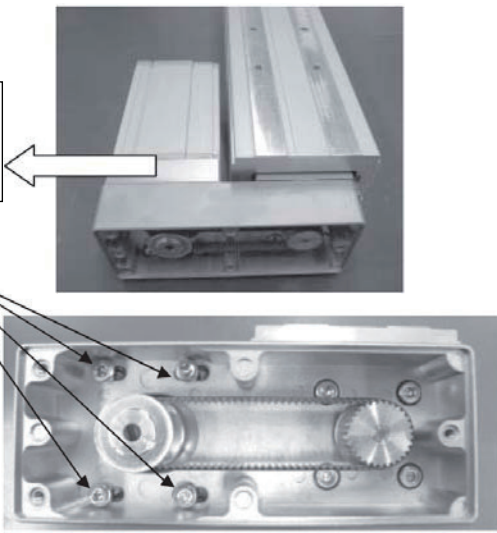
13.7.3 Adjustment of Belt Tension

Remove the pulley cover, loosen the tension adjustment bolts (4 locations), and move the motor to the left as shown below to tension the belt. After the adjustment is finished, tighten the tension adjustment bolts.

Tension

TA4R: 1.5 ± 0.1 kgf

TA5R/6R/7R: 2.5 ± 0.1 kgf



Tension adjustment bolt		
Model	Nominal thread size	Tightening torque
TA4R	M2.6	0.46 N-m (0.047 kgf-m)
TA5R	M3	0.83 N-m (0.085 kgf-m)
TA6R/TA7R	M4	1.76 N-m (0.18 kgf-m)

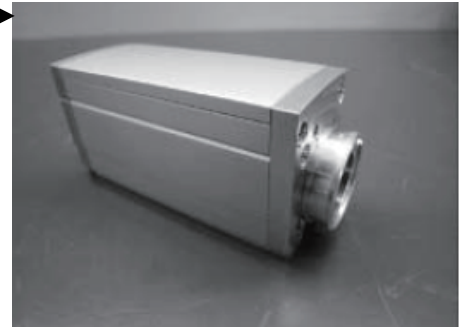
13.8 Motor Replacement (AC Servo Motor: RCA2)

* Refer to 13.9 for the reversing types.

[Items required for replacing the motor]

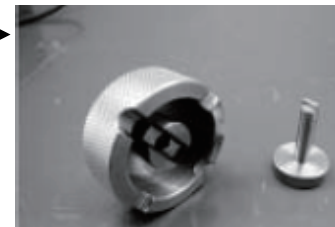
Replacement motor unit

Axis type			Model	
			Without brake	Brake type
RCA2 (brown encoder cable connector)	Table type	TA4C	RCA2-MU1A	RCA2-MU1A-B
		TA5C	RCA2-MU2A	RCA2-MU2A-B
		TA6C	RCA2-MU3A	RCA2-MU3A-B
		TA7C	RCA2-MU4A	RCA2-MU4A-B



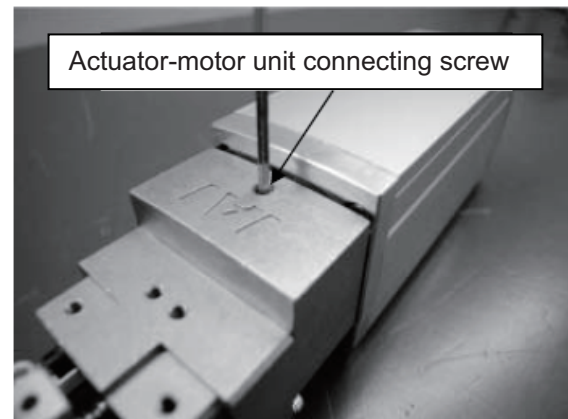
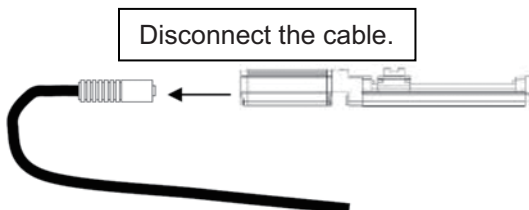
- Hex wrench set
- Special replacement jigs (Option)

Model	Applicable model
RCA2-JG-1	TA4
RCA2-JG-2	TA5
RCA2-JG-3	RCA2-SA5/SA6/TA6/TA7

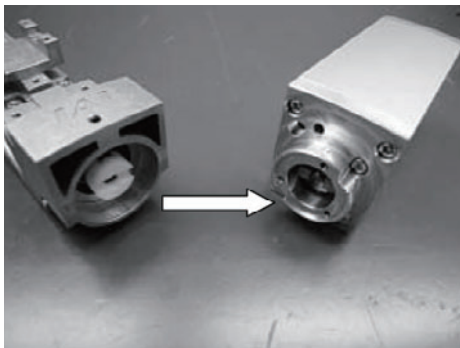


[Procedure]

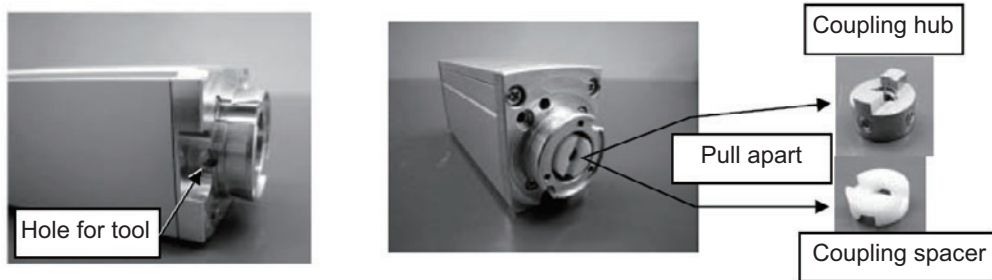
- [1] Disconnect the cable from the motor unit, then use a 2 mm hex wrench to remove the screw fastening the actuator unit and the motor unit.



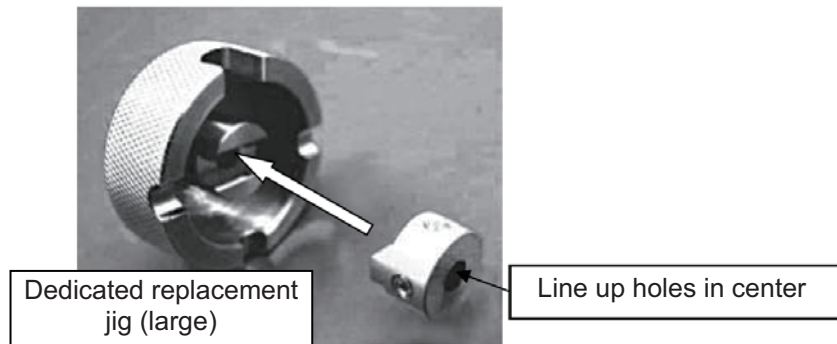
- [2] Detach the motor unit.



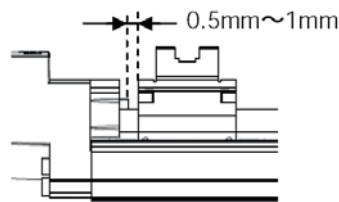
- [3] Take out the coupling hub and coupling spacer from the detached motor unit. Twist the coupling hub or coupling spacer on the motor side to align the screw holes with the hole for the tool to go through. Then remove two screws with a 2 mm hex wrench.
- * If there is only a coupling hub on the motor unit side, then there is a coupling spacer on the actuator side which can be removed by pulling.
 - * If both coupling hub and coupling spacer are present, pull them apart.
- (They should separate with a gentle pull.)



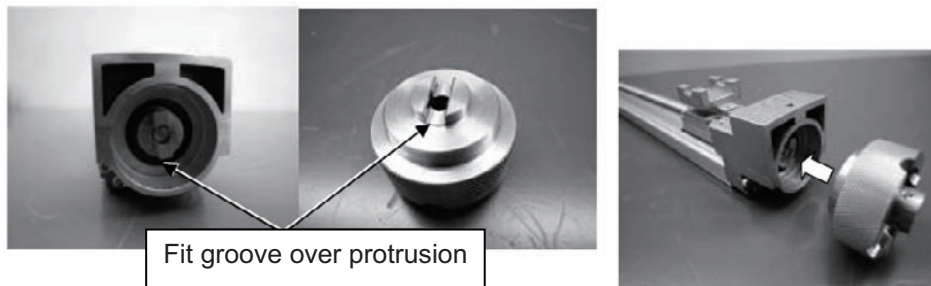
- [4] Fit the protruding part of the coupling hub into the groove of the dedicated replacement jig (large), and temporarily hold them together with two M3x3 Allen screws (tighten just enough so that the coupling hub does not fall off).



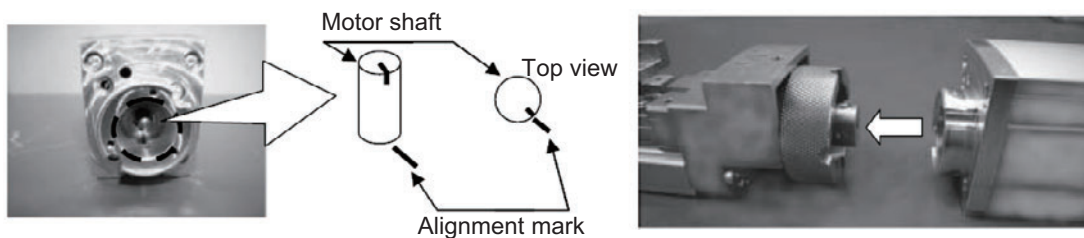
- [5] Turn the shaft to move the table about 0.5 mm to 1 mm from the mechanical end on the home position side.



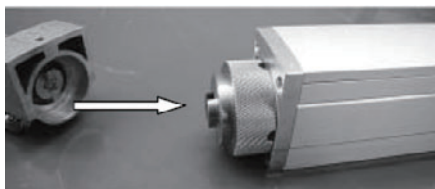
- [6] Fit the groove of the dedicated replacement jig (large) assembled in [4] over the protrusion of the actuator.



- [7] Align the marking on the motor shaft with the point indicated and insert the replacement motor unit into the actuator.



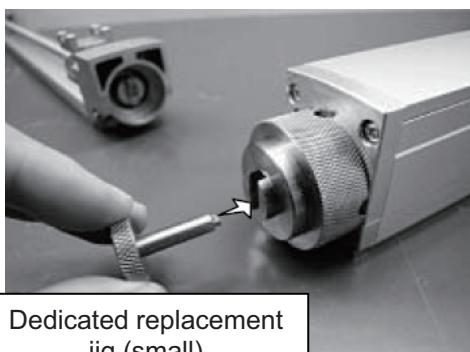
- [8] Take out the motor unit and the dedicated replacement jig (large). (Do not allow the jig (large) to turn.)



- [9] In order to keep the jig (large) from turning, draw a mark using a pen or marker.

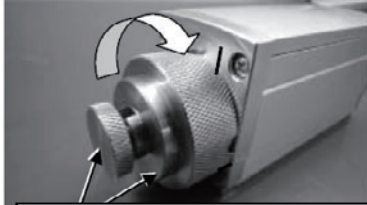


- [10] Insert the dedicated replacement jig (small) in such a way that its protrusion is aligned with the groove in the motor shaft.

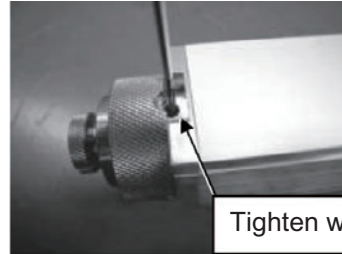


Dedicated replacement jig (small)

- [11] Turn the dedicated replacement jig (large) and the replacement jig (small) by the same amount. When the coupling fastening screws appear through the tool holes, tighten them with a 2 mm hex wrench. (There are two fastening screws.)

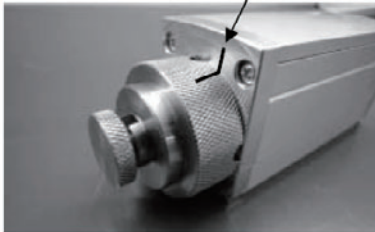


Rotate same amount to keep aligned

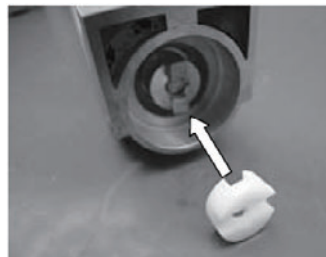


Tighten with hex wrench

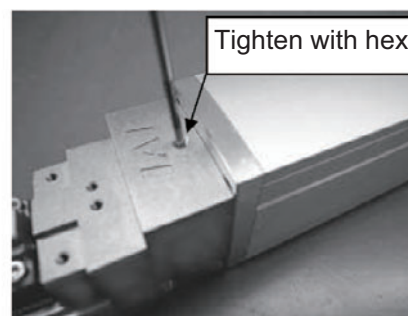
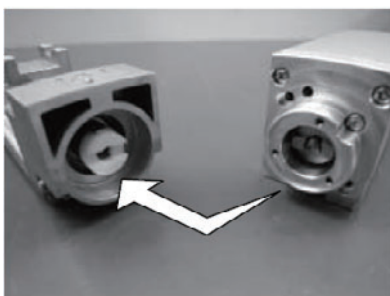
- [12] Align the marks made in [9]. After the marks are aligned, remove the dedicated replacement jig (large) and the dedicated replacement jig (small).



- [13] Apply the specified grease (TL101Y grease made by NOK) to the coupling spacer (front and rear), then install the coupling spacer on the actuator side.



- [14] Install the replacement motor unit on the actuator side, then tighten the fastening screws with a 2 mm hex wrench. (The actuator side groove and replacement motor unit protrusion should have been aligned in [12], but if not, align them here.)



Tighten with hex wrench

13.9 Replacement of Belt and Motor for Reversing Type (AC Servo Motor: RCA2)

[Items required for replacement]

- Replacement motor unit of reversing type

Axis Type			Model	
			Without Brake	With Brake
RCA2 (brown encoder cable connector)	Table type	TA4R	RCA2-MU1B	RCA2-MU1B-B
		TA5R	RCA2-MU2B	RCA2-MU2B-B
		TA6R	RCA2-MU3B	RCA2-MU3B-B
		TA7R	RCA2-MU4B	RCA2-MU4B-B



- Belt

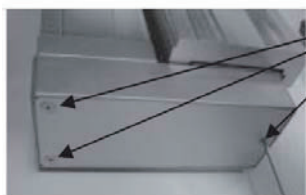
Manufacturer: Bando Chemical Industries, Ltd.

Belt model (type)	Model
40S2M138R, 4-mm wide (clean rubber type)	TA4R
60S2M168R, 6-mm wide (clean rubber type)	TA5R
60S2M198R, 6-mm wide (clean rubber type)	TA6R
60S2M198R, 6-mm wide (clean rubber type)	TA7R

- Tension gauge
- Hex wrench set

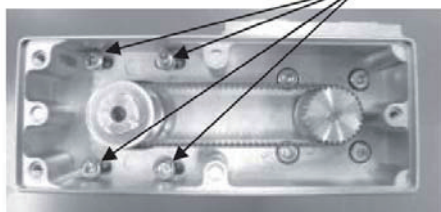
[Procedure]

- [1] Remove the pulley cover.
Remove the mounting screws (TA4R: 2 pcs, other: 3 pcs).



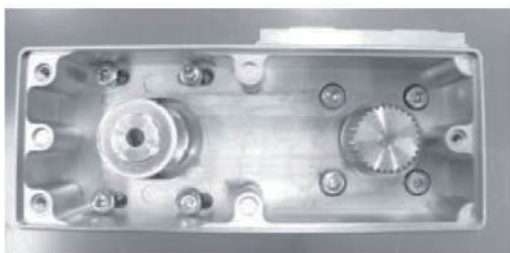
Mounting screw		
Model	Nominal thread size	Applicable Allen wrench
TA4R/TA5R	M2.5	1.5 mm across flats
TA7R/TA7R	M3	2 mm across flats

- [2] Loosen the tension adjustment bolts (4 pcs) and slacken the belt.

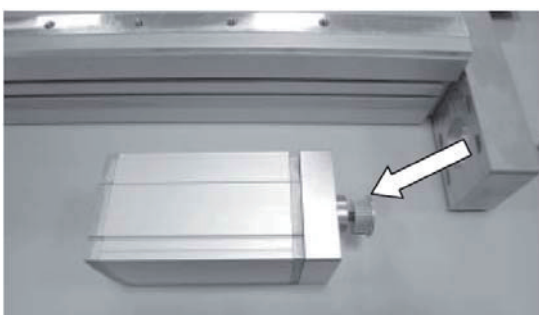


Tension adjustment bolt		
Model	Nominal thread size	Applicable Allen wrench
TA4R	M2.6	2 mm across flats
TA5R	M3	2.5 mm across flats
TA6R/TA7R	M4	3 mm across flats

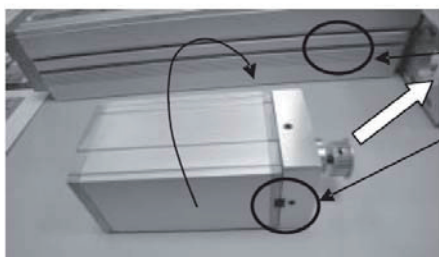
- [3] Remove the belt from the pulleys. When replacing the belt, proceed to step [7].



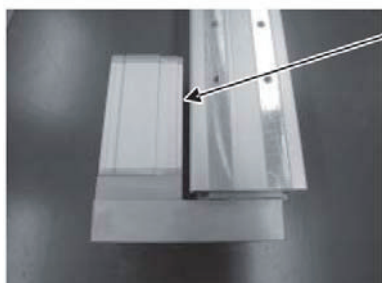
- [4] Remove the tension adjustment bolts and pull out the motor unit.



- [5] Install the replacement motor unit.
As shown below, install the motor unit so that its specified surface faces the actuator base.
Use the tension adjustment bolts to loosely secure the motor unit.

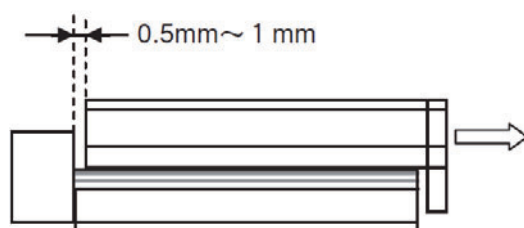


Install the motor unit by making sure the base surface of the actuator faces the motor unit surface having two holes.

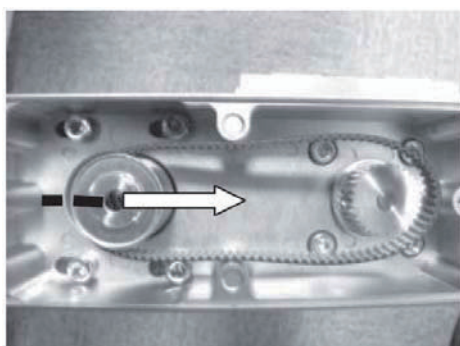


The surface with no gaps must face the motor unit surface having two holes.

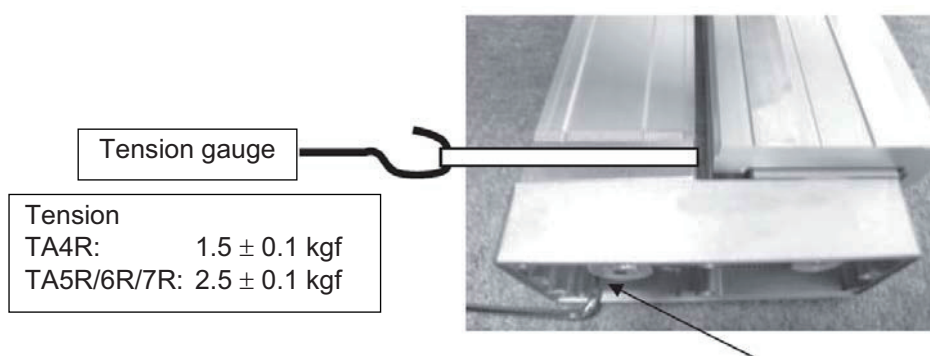
- [6] Move the table by 0.5 to 1 mm from the mechanical end on the home side.



- [7] Move the motor unit in the direction of the arrow shown below, and then install the belt. Align the motor unit with the countermark on the actuator. When replacing the belt, install the replacement belt.

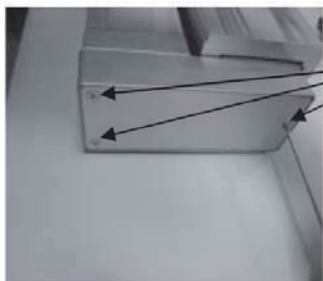


- [8] Pass around the base of the unit a strong string (or long tie band) that has been looped into a ring shape, and pull the ring with a tension gauge. After confirming that the tension gauge is indicating the specified tension, tighten the tension adjustment bolts uniformly.



Tension adjustment bolt		
Model	Nominal thread size	Applicable Allen wrench
TA5R	M3	0.83 N-m (0.085 kgf-m)
TA6R/TA7R	M4	1.76 N-m (0.18 kgf-m)

- [9] Install the pulley cover.



Mounting screws (TA4R: 2 pcs, other: 3 pcs)

- [10] Connect a PC or teaching pendant to the controller to perform a home return.
Check for displacement from the original home position and if the home position is displaced, correct the position using the following parameters:
 ACON parameter No. 22: Home return offset distance
 ASEL parameter No. 12: Home preset value
If the actuator is of absolute encoder specification, change the parameters and then perform a home return, followed by an absolute reset.

13.10 How to Replace Spiral Cover

[Required Item for Replacement]

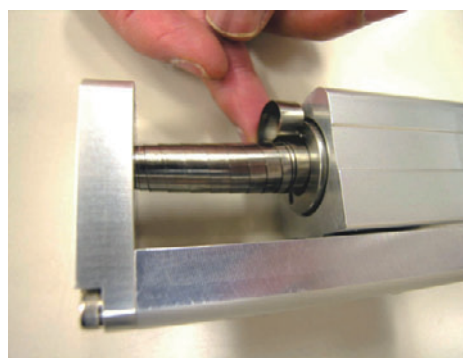
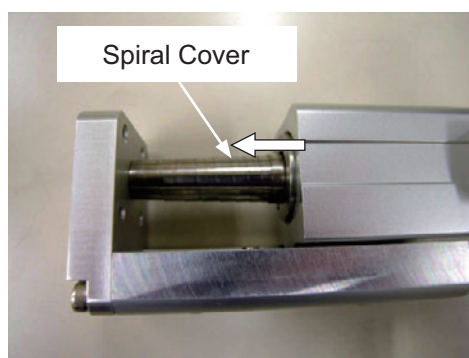
- New spiral cover for replacement

Model
RCA2-SPC-30

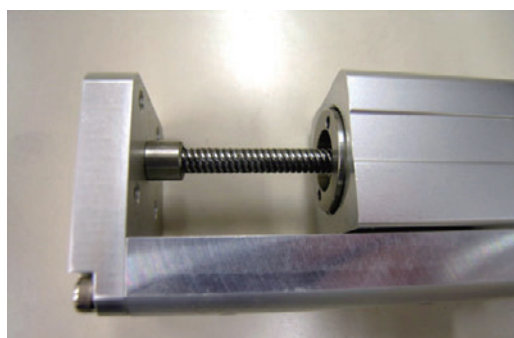
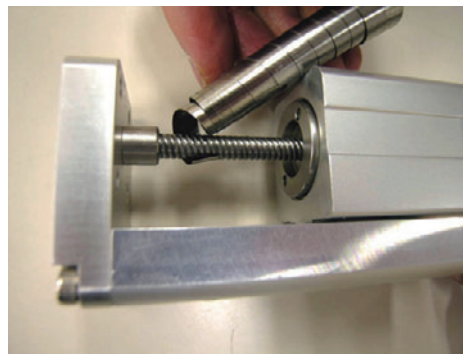
[Procedure]

- 1) Take off the spiral cover.

Pull out the root of the spiral cover and curl the end of the cover.



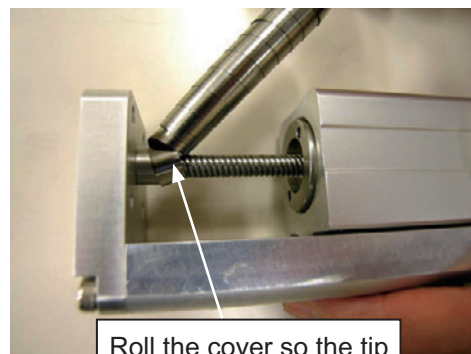
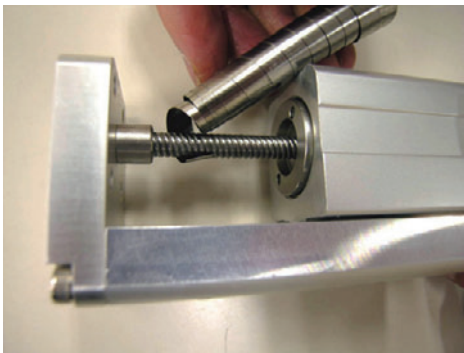
- 2) Roll up the spiral cover to take it off the shaft



- 3) Grab the new spiral cover for replacement and pull the thinner side of it to get its tip inside out.

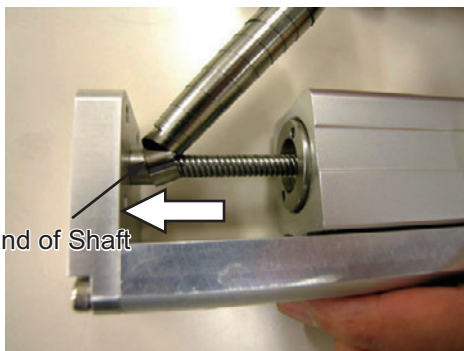


- 4) Attach the spiral cover to replace.
Hook the tip of the spiral cover that was pulled out to the shaft. After the tip is hooked, roll it around the shaft so the tip comes inside the cover.



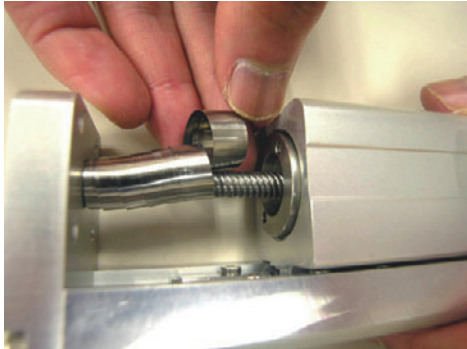
Roll the cover so the tip comes inside.

- 5) Push the cover towards the end of the shaft after winding the cover a little.

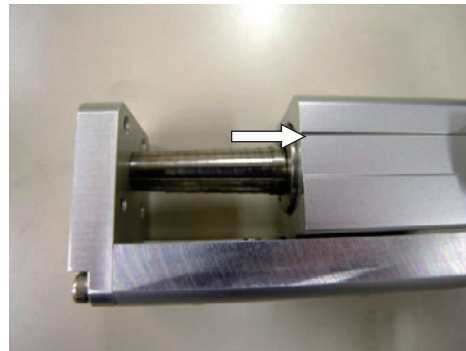
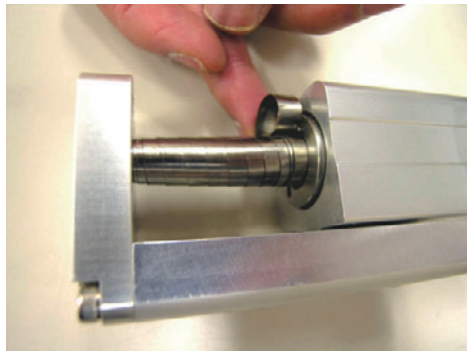


End of Shaft

6) Keep winding the spiral cover around the shaft.



7) Put the tip of the cover outside and push it into the groove on the actuator.



14. Warranty

14.1 Warranty Period

One of the following periods, whichever is shorter:

- 18 months after shipment from IAI
- 12 months after delivery to the specified location
- 1,500 hours of operation TCA3NA, TCA3N (Slide screw), TCA4NA, TCA4N (Slide screw), TWA3NA, TWA3N (Slide screw), TWA4NA, TWA4N (Slide screw), TFA3NA, TFA3N (Slide screw), TFA4NA, TFA4N (Slide screw)
- 2,500 hours of operation TA4C, TA5C, TA6C, TA7C, TA4R, TA5R, TA6R, TA7R, TCA3NA, TCA3N (Ball screw), TWA3NA, TWA3N (Ball screw), TFA3NA, TFA3N (Ball screw), TCA4NA, TCA4N (Ball screw), TWA4NA, TWA4N (Ball screw), TFA4NA, TFA4N (Ball screw)
Ball Guide Type (Option: model / BG)

14.2 Scope of Warranty

Our products are covered by warranty when all of the following conditions are met. Faulty products covered by warranty will be replaced or repaired free of charge:

- (1) The breakdown or problem in question pertains to our product as delivered by us or our authorized dealer.
- (2) The breakdown or problem in question occurred during the warranty period.
- (3) The breakdown or problem in question occurred while the product was in use for an appropriate purpose under the conditions and environment of use specified in the operation manual and catalog.
- (4) The breakdown or problem in question was caused by a specification defect or problem, or by the poor quality of our product.

Note that breakdowns due to any of the following reasons are excluded from the scope of warranty:

- [1] Anything other than our product
- [2] Modification or repair performed by a party other than us (unless we have approved such modification or repair)
- [3] Anything that could not be easily predicted with the level of science and technology available at the time of shipment from our company
- [4] A natural disaster, man-made disaster, incident or accident for which we are not liable
- [5] Natural fading of paint or other symptoms of aging
- [6] Wear, depletion or other expected result of use
- [7] Operation noise, vibration or other subjective sensation not affecting function or maintenance

Note that the warranty only covers our product as delivered and that any secondary loss arising from a breakdown of our product is excluded from the scope of warranty.

14.3 Honoring the Warranty

As a rule, the product must be brought to us for repair under warranty.

14.4 Limited Liability

- (1) We shall assume no liability for any special damage, consequential loss or passive loss such as a loss of expected profit arising from or in connection with our product.
- (2) We shall not be liable for any program or control method created by the customer to operate our product or for the result of such program or control method.

14.5 Conditions of Conformance with Applicable Standards/Regulations, Etc., and Applications

- (1) If our product is combined with another product or any system, device, etc., used by the customer, the customer must first check the applicable standards, regulations and/or rules. The customer is also responsible for confirming that such combination with our product conforms to the applicable standards, etc. In such a case we will not be liable for the conformance of our product with the applicable standards, etc.
- (2) Our product is for general industrial use. It is not intended or designed for the applications specified below, which require a high level of safety. Accordingly, as a rule our product cannot be used in these applications. Contact us if you must use our product for any of these applications:
 - [1] Medical equipment pertaining to maintenance or management of human life or health
 - [2] A mechanism or mechanical equipment intended to move or transport people (such as a vehicle, railway facility or aviation facility)
 - [3] Important safety parts of mechanical equipment (such as safety devices)
 - [4] Equipment used to handle cultural assets, art or other irreplaceable items
- (3) Contact us at the earliest opportunity if our product is to be used in any condition or environment that differs from what is specified in the catalog or operation manual.

14.6 Other Items Excluded from Warranty

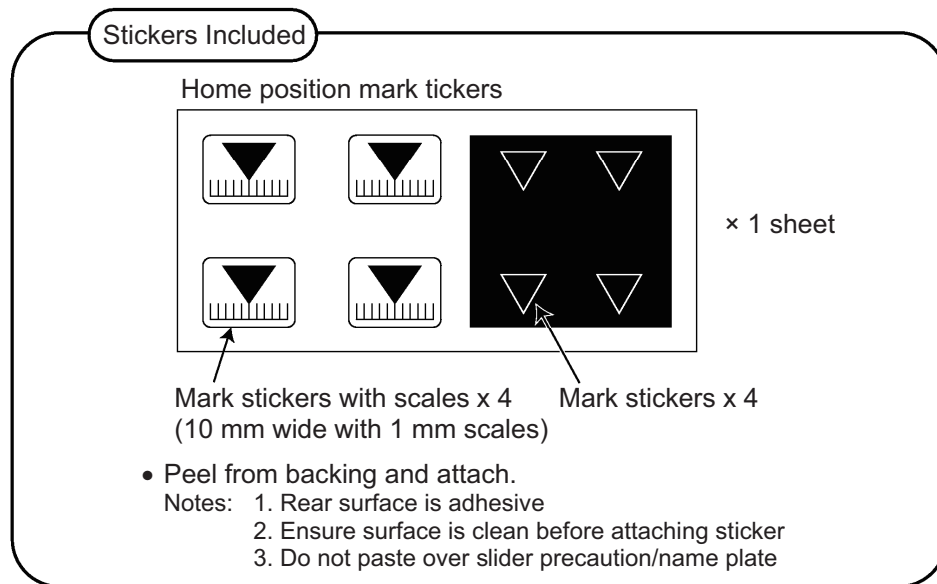
The price of the product delivered to you does not include expenses associated with programming, the dispatch of engineers, etc. Accordingly, a separate fee will be charged in the following cases even during the warranty period:

- [1] Guidance for installation/adjustment and witnessing of test operation
- [2] Maintenance and inspection
- [3] Technical guidance and education on operating/wiring methods, etc.
- [4] Technical guidance and education on programming and other items related to programs

Appendix

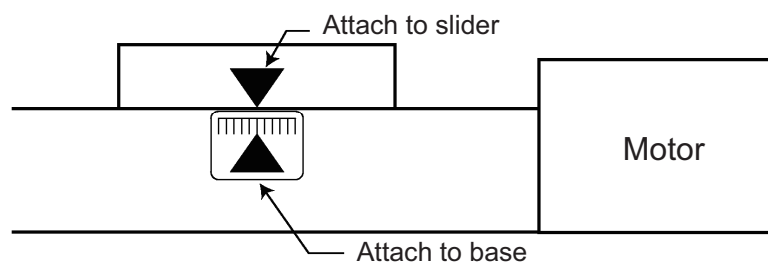
Using the home position marks

- ◆ As necessary, affix these marks to the product to mark the home position of the actuator.



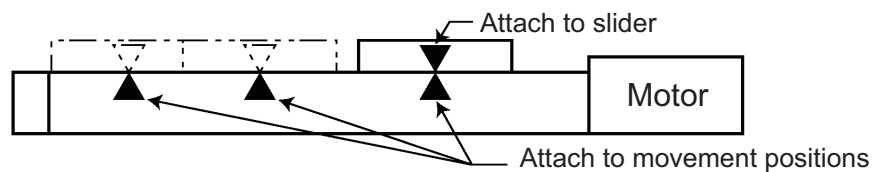
Example

[1] To mark the home position



- Attach both stickers when actuator is stopped in home position

[2] To show different movement positions



Change History

Revision Date	Description of Revision
May 2009	First edition
February 2011	Second edition <ul style="list-style-type: none"> • 11.1 Placing a Load on the Actuator; TA5, TA6 and TA7 static allowable moments added • 13.10 How to Replace Spiral Cover; new section added • Contents regarding change in cable exit direction (option) added
February 2011	Third edition <ul style="list-style-type: none"> • 5.4 How to Read Model; BG Ball Guide Type added to options • 2. External Dimensions; Ball Guide Type added • 7. Selection Conditions; Moment for Ball Guide Type added to [4] Moment • 9. Installation; Ball Guide Type added to 9.1.2 Short types • 11.1 Placing a Load on the Actuator; Dynamic allowable moment for Ball Guide Type added • 13.6.3 How to apply grease; Instruction for grease supply to the guide rails on Ball Guide Type added
April 2011	Fourth edition <ul style="list-style-type: none"> • Model names changed. Ball Guide Type excluded. • Appearance features changed <ul style="list-style-type: none"> • TC3N → TCA3N • TC4N → TCA4N • TW3N → TWA3N • TW4N → TWA4N • TF3N → TFA3N • TF4N → TFA4N
May 2011	Fifth edition <ul style="list-style-type: none"> • A page for CE Marking added
July 2011	Sixth edition <ul style="list-style-type: none"> • Added Handling Precautions on pages 7 to 8 • Contents changed in 5. Transportation in pages 8 to 9 • Added "1, Part Names" in page 11, "2, External Dimensions" on page 14, "5.4, How to Read Model Number" on page 38, "6, Specifications" on page 40, "7.1, Selection Conditions" on page 44, "11.1, Placing a Load on the Actuator" on page 78 and TCA3N (ball screw), and TWA3N (ball screw), and TFA3N (ball screw) to "14, Warranty" on page 110. • Page 87 Spiral Cover added to 13.2 Visual Inspection of Exterior • Contents changed in 14. Warranty in pages 116 to 117
March 2012	Seventh edition <ul style="list-style-type: none"> • Contents changed in Safety Guide <ul style="list-style-type: none"> • Caution notes added for when working with two or more persons • P.63 Note added to tell platform should have a structure with enough stiffness • P.64 Note changed to 1.8 times more of the nominal diameter for the length of thread engagement on aluminum
March 2012	Eighth edition <ul style="list-style-type: none"> • Model codes TCA3NA, TCA4NA, TWA3NA, TWA4NA, TFA3NA and TFA4NA are added.

Revision Date	Description of Revision
March 2012	<p>Ninth edition</p> <ul style="list-style-type: none">• Contents added and changed in Safety Guide on pages 1 to 7• Note “Make sure to attach the actuator properly by following this operation manual.” added in Caution in Handling in page 8• Weight added to appearance drawing in pages 14 to 33• Warning notes added such as in case the grease got into your eye, immediately go to see the doctor for an appropriate care in page 104 to 106



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