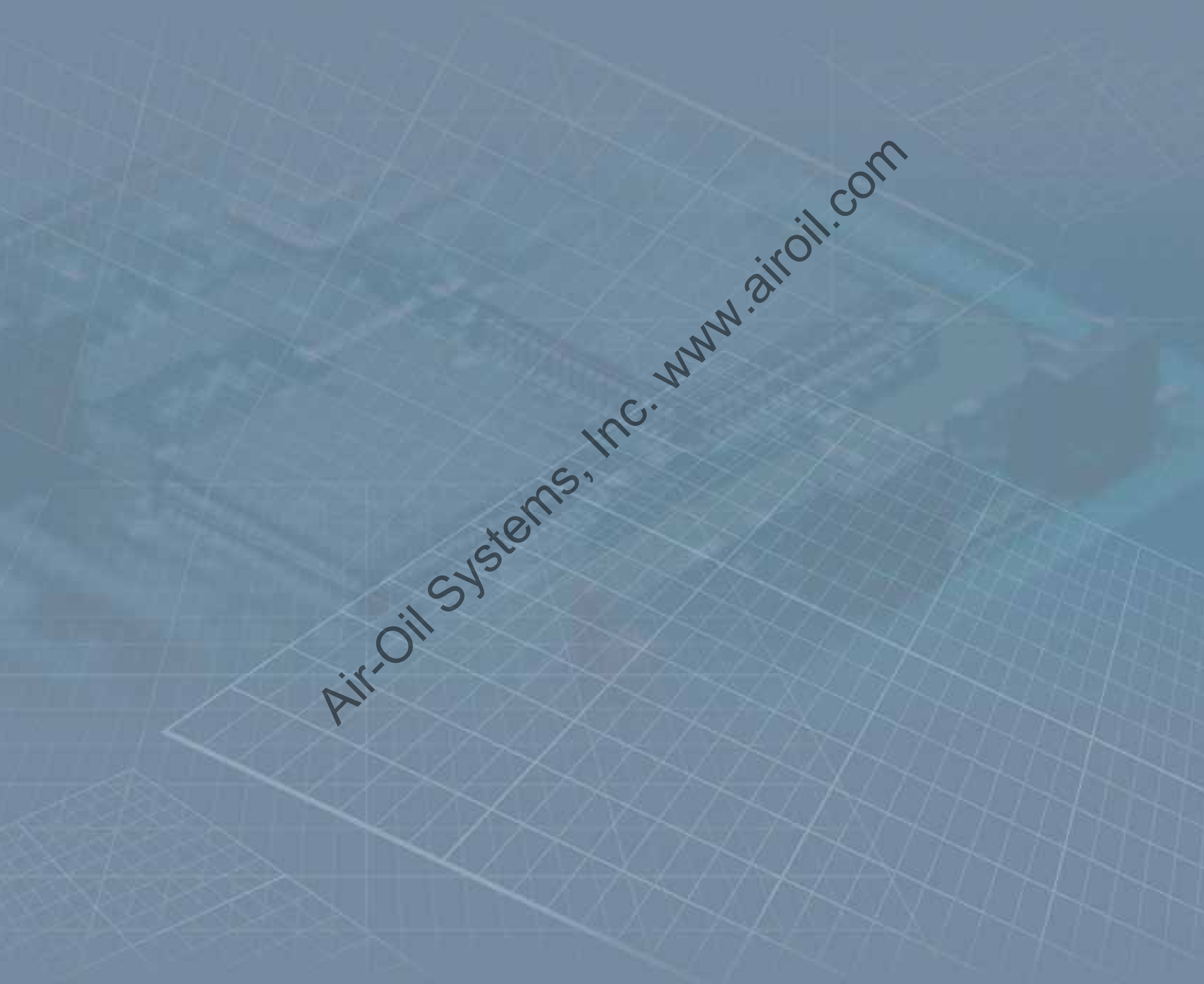
Technical Reference/Information



Considerations when Switching from Air Cylinders

Air Cylinder and ROBO Cylinder

Air cylinders are devices used to push and grasp objects by means of supplying and releasing compressed air. Air cylinders are used widely in all industries, mainly for transfer equipment, assembly systems, various automation systems, etc.
Air cylinders generally have diameters of between 4mm and 320mm, and their lengths (strokes) can also be set in fine steps. There are several tens to hundreds of thousands of different air cylinder products, which makes it easy to select optimal models for a variety of applications. However, since product lines are overly complex, many with identical specs, it can be difficult to select the best model for your specifications.
For this reason, there are many cases where air cylinders are selected largely out of past experience and familiarity.
ROBO Cylinders are easy-to-use electric cylinders offering a variety of functions not achievable with air cylinders. The ROBO Cylinder product family makes it easy for you to select the model that best suits the needs of your application. However, the controls and configuration possibilities of ROBO Cylinders are completely different from air cylinders.
This section explains some of the key points to consider when switching from air cylinders to ROBO Cylinders.

Overview of Switching

The following explains the differences in the basic items to be checked when selecting ROBO Cylinders and air cylinders.
Since both are linear motion actuators, there are some common matters that must be taken into consideration. However, the different configurations and controls described above result in different designations for adjustments and check items between the two. A comparison of these various items is shown at right.

[Air Cylinders]
- Thrust (Diameter)
- Mechanical stopper selection
- Absorber selection
- Wiring diameter
- Installation space

→

[ROBO Cylinders]
- Load capacity
- Maximum speed
- Acceleration
- Deceleration, Positioning accuracy
- Installation space

The above diagram shows that the two have different mechanical viewpoints to consider.

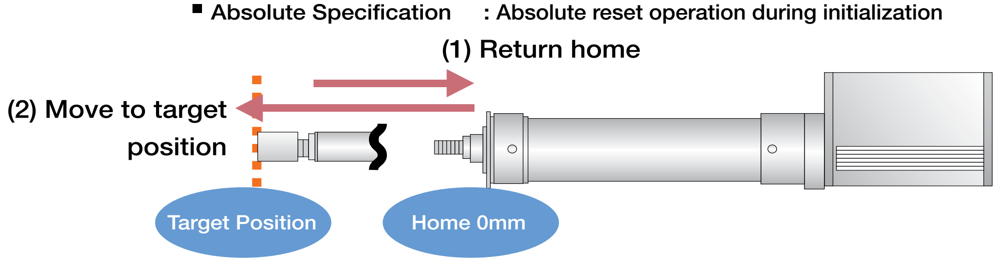
Installation Space

ROBO Cylinders are driven by a motor. Compared with air cylinders, simply from a size perspective, the ROBO Cylinder requires more attention paid to space requirements for installation.

Home Return

Unlike air cylinders, ROBO Cylinder operation is based on a "coordinates" concept. A home return operation is necessary at the beginning of operation because operations are controlled in movement quantities that are always referenced against a home point (0 point).
Specifically, in the case of incremental specifications, bear in mind that a pushing operation to the actuator stroke end will be performed as the initial operation when the power is turned ON.

- Incremental Specification: Return home operation after power is turned ON
- Absolute Specification : Absolute reset operation during initialization



Critical Rotating Speed

The ball screw inevitably deflects due to bending and its own deadweight. The ROBO Cylinder operates at high speeds causing the ball screw to rotate faster, and as the rotations increase the screw deflection also increases until the rotating axis is ultimately damaged. Hazardous rotational speeds that may damage the rotary axis are referred to as “critical speeds”, “whirling speeds” or “whipping speeds”.
Ball screw type ROBO Cylinders operate linearly as the ball screw is rotated with the end of the ball screw supported by a bearing. Although the maximum speed is specified for each ROBO Cylinder in accordance with the actuator type, some models with certain strokes have their maximum speed set in consideration of the aforementioned critical rotating speeds.

General Purpose (Types, Modes, Parameters)

ROBO Cylinders offer the “air-cylinder specification (or air cylinder mode)” that allows the ROBO Cylinder to be used just like an air cylinder. When using these, it is possible to operate the actuator by simple ON/OFF control by an external signal in exactly the same way as an air cylinder. This type or mode may be sufficient in the case of a simple swap-out, but a variety of types and parameters have been introduced for customers who desire higher value-added uses.
Feel free to contact our Customer Center (Toll free for Western U.S. 800-736-1712, Central U.S. 800-944-0333, and Eastern U.S. 888-354-9470) to discuss features to match your use conditions and needs when the equipment is actually installed.

Maintenance

The key maintenance points of air cylinders and ROBO Cylinders are compared.
Air cylinders require periodic maintenance performed according to the frequency and conditions of use. Although air cylinders offer a certain level of flexibility in that minor damage or malfunction can be ignored by means of increasing the source air pressure and moving the cylinder with a greater force, ignoring maintenance will inevitably shorten the service life of the air cylinder.
On the other hand, ROBO Cylinders have a more complex structure and use a greater number of parts and are therefore seen as requiring cumbersome maintenance work. This is wrong. ROBO Cylinders are clearly easier to use and offer longer life than air cylinders. Of course, ROBO Cylinders also require lubrication of sliding parts just as air cylinders do. However, ROBO Cylinders are equipped with a lubrication unit (AQ Seal) for ball screw and the sliding parts of the guides. This ensures a long maintenance-free period (5,000 km of traveled distance, or three years). After 5,000km or travel or 3 years, greasing every 6 months to 1 year as instructed in the Operating Manual will vastly prolong the service life of the product.
In addition, absolute type controllers are currently equipped with a position retention battery. Since this is a consumable part, it must be periodically replaced (for periods that vary with the product).

[Primary Maintenance Tasks]

[Air Cylinders]
- Lubricating sliding parts
- Replacing gasket
- Draining
- Replacing absorber

[ROBO Cylinders]
- Lubricating ball screw and guide (after AQ seals have worn out)
- Replacing battery (absolute encoder types only)

Operation

Air cylinders are generally operated with the use of a direction control valve to determine the direction of reciprocating motion, as well as a flow control valve (speed controller) to determine the speed. Immediately after their system is started up, many users operate the air cylinder at low speed by restricting the flow control valve.
The same procedure is also recommended for ROBO Cylinders after the system is started up. With ROBO Cylinders, “speed setting” replaces the flow control valve. Operate your ROBO Cylinder at speeds where safety is ensured, and then change to the desired speed after safety is confirmed.

Service Life and Moment

One of the main factors related to an actuator's service life is the "load rating".
There are two types of load rating: A static load is the weight of a load that leaves a small amount of indentation when the load is applied. A dynamic load is the weight of a load that maintains a constant survival probably of the guide when the load is applied while moving a constant distant.
Guide manufacturers rate dynamic load values to maintain a 90% survival rate at a travel distance of 50km. However, when taking account the speed of movement and work rate, the actual travel distance needs to be 5,000 to 10,000km.
While the life of a guide is sufficiently long for radial loads, it is actually the moment load that is offset from the guide center that is most problematic to its service life.
The service life for IAI actuators as documented in this catalog shows the allowable dynamic moment based on a 5,000 or 10,000km service life.

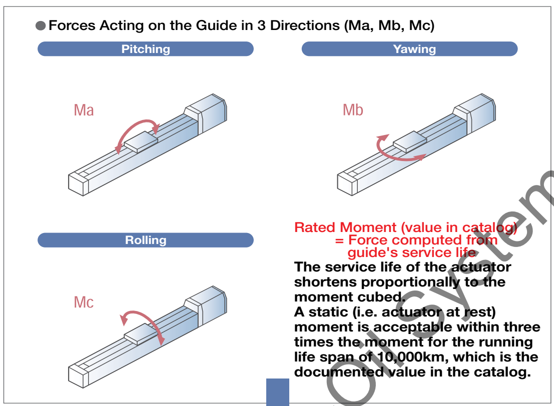
IAI uses the following equation calculate the service life:
(for 10,000km service life)

$$L_{10}=\left(\frac{C_{IA}}{P}\right)^3 \cdot 10{,}000\text{km}$$

L_{10} : Service life (90% Survival Probability)
C_{IA} : Allowable Dynamic Moment in IAI Catalog
P : Moment used

Allowable Dynamic Moment

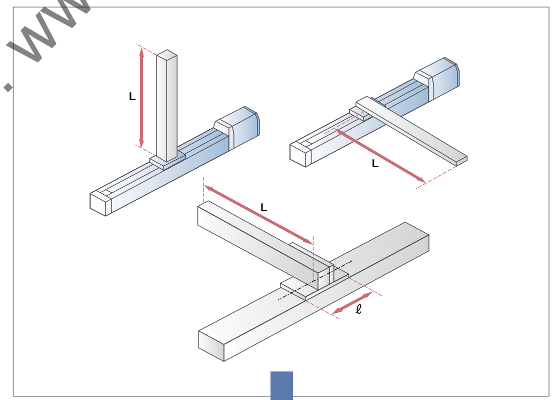
The allowable dynamic moment is the maximum offset load exerted on the slider, calculated from the guide service life. The direction in which force is exerted on the guide is categorized into 3 directions - Ma (pitch), Mb (yaw), Mc (roll) - the tolerance for each of which are set for each actuator. Applying a moment exceeding the allowable value will reduce the service life of the actuator. Use an auxiliary guide when working within or in excess of these tolerances.



The allowable dynamic moment is calculated from the service life of the guide.

Overhang load length

An overhang load length is specified for a slider-type actuator to indicate the length of overhang (offset) from the actuator.
When the length of an object mounted to the slider actuator exceeds this length, it will generate vibration and increase the settling time. So, pay attention to the allowable overhang length as well as the allowable dynamic moment.



The allowable overhang load length is determined by the slider length.

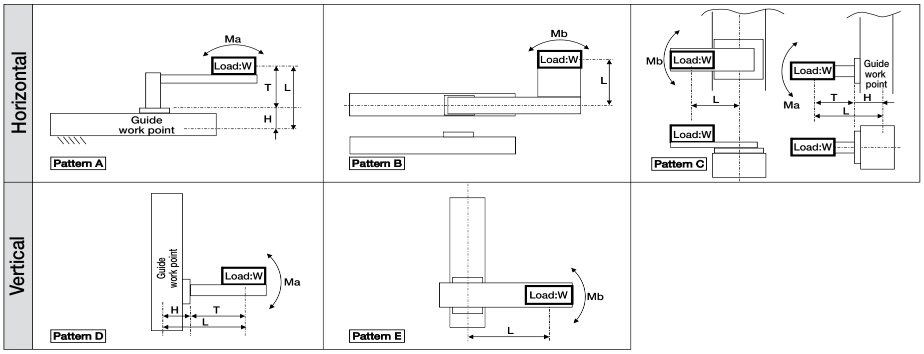
An overhang that exceeds the allowable overhang length will generate vibration and increase settling time.

L/ℓ = 5 or less
* Between 3 to 4 for a camera-equipped measuring machine.

- For example:
  - L/ℓ = 1.2 Mechanical machine
  - L/ℓ = 3 Measuring machine
  - L/ℓ = 5 Robot

How to calculate allowable dynamic moment

M2 (N•m) = W (kg) × L (mm) × a (G) × 9.8/1000



W : Load
L : Distance from work point to the center of gravity of payload (L=T+H)
T : Distance from top surface of slider to the center of gravity of payload
H : Distance from guide work point to the top surface of slider
a : Specified acceleration

Allowable Dynamic Moment and Allowable Static Moment

There are two types of moment that can be applied to the the guide: the allowable dynamic moment and the allowable static moment.
The allowable dynamic moment is calculated from the travel life (when flaking occurs) when moved with the moment load applied.
In contrast, the static moment is calculated from the load that causes permanent deformation to the steel ball or its rolling surface (i.e. rated static moment), taking into account the rigidity and deformity of the base.

[Allowable Dynamic Moment]

IAI's catalog contains the allowable dynamic moments based on a load coefficient of 1.2 and 10,000km or 5,000km.
This value is different from the so-called basic rated dynamic moment, which is based on a 50km travel life.
To calculate the basic rated dynamic moment for a 50km travel life, use the following equation.

$$\boxed{M_{50}=f_w \times M_S \div \left(\frac{50}{S}\right)^{\frac{1}{3}}} \quad \bullet\bullet\bullet\bullet \text{ Equation 1}$$

M_S : Allowable dynamic moment at an assumed travel distance (catalog value)
S : IAI catalog assumed travel life (5,000km or 10,000km)
f_w : Load coefficient (=1.2)
M_{50} : Basic rated dynamic moment (50km travel life)

The allowable dynamic moments mentioned in the catalog (10,000km or 5,000km life) are based on a load coefficient fw=1.2. To calculate the service life of a guide with a different load coefficient, use Table 1 below to determine the load coefficient that matches your requirements.

Table 1: Load Coefficients

Operation and Load Requirements	Load Coefficient fw
Slow operation with light vibration/shock (1500mm/s or less, 0.3G or less)	1.0~1.5
Moderate vibration/shock, abrupt braking and accelerating (2500mm/s or less, 1.0G or less)	1.5~2.0
Operation with abrupt acceleration/deceleration with heavy vibration/shock (2500mm/s or faster, 1.0G or faster)	2.0~3.5

$$L_{10}=\left(\frac{C_{IA}}{P} \cdot \frac{1.2}{f_w}\right)^3 \times S \quad \bullet\bullet\bullet\bullet \text{ Equation (2)}$$

L_{10} : Service life (90% Survival Probability)
C_{IA} : Allowable dynamic moment in IAI Catalog (5,000km or 10,000km)
P : Moment used (≤ CIA)
S : IAI catalog assumed travel life (5,000km or 10,000km)
f_w : Load coefficient (from Table 1)

[Allowable Static Moment]

The maximum moment that can be applied to a slider at rest.
These values are calculated by taking the basic rated static moment of the slider and multiplying with the safety rate that takes into consideration any effects from the rigidity and deformity of the base.
Therefore, if a moment load is applied to the slider at rest, keep the moment within this allowable static moment. However, use caution to avoid adding any unexpected shock load from any inertia that reacts on the load.

[Basic Rated Static Moment]

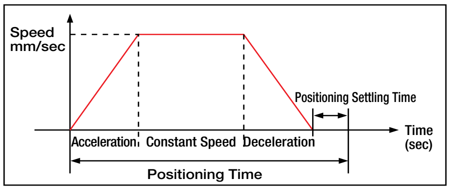
The basic rated static moment is the moment value at which the sum of the permanent deformation at the center of contact between the rolling body (steel ball) and the rolling surface (rail) is 0.0001 times the diameter of the rolling body.
These values are simply calculated strictly from the permanent deformation done to the steel ball and its rolling surface. However, the actual moment value is restricted by the rigidity and deformation of the base. Hence, the allowable static moment the actual moment that can be applied statically, taking into account those factors.

Technical Information

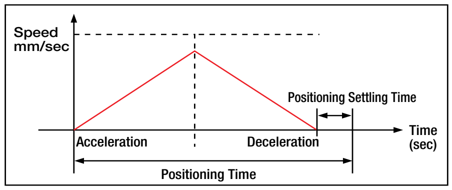
How to calculate positioning time

The actuator positioning time can be found from an equation.
Depending on the distance to be moved and the amount of acceleration/deceleration to be applied, the positioning operation can follow one of two patterns, shown below:

A Trapezoidal Pattern



B Triangular Pattern



First confirm the movement pattern as trapezoidal or triangular, then calculate the positioning time using the respective equation.

Confirming the Movement Pattern

Whether a movement pattern is trapezoidal or triangular can be determined by whether the peak speed reached after accelerating over a distance at a specified rate is greater than or less than the specified speed.

$$\text{Peak speed (Vmax)} = \sqrt{\text{Distance travelled (Smm)} \times \text{Specified acceleration}}$$

$$= \sqrt{\text{Smm} \times 9{,}800\text{mm/sec}^2 \times \text{Acceleration setting (G)}}$$

If Vmax > V: Trapezoidal pattern

If Vmax < V: Triangular pattern, where Vmax is the peak speed reached and V is the speed that was specified.

Method of Calculating the Positioning Time

A Trapezoidal Pattern

$$\text{Positioning Time (T)} = \frac{\text{Distance (mm)}}{\text{Speed (mm/sec)}} + \frac{\text{Speed (mm/sec)}}{\text{Accel. (mm/sec}^2\text{)}} + \text{Positioning Settling Time}$$

B Triangular Pattern

$$\text{Positioning Time} = 2\sqrt{\frac{\text{Distance (mm)}}{\text{Accel. (mm/sec}^2\text{)}}} + \text{Positioning Settling Time}$$

$$\text{Accel. Time} = \frac{\text{Speed* (mm/sec)}}{\text{Accel. (mm/sec}^2\text{)}}$$

$$\text{Distance Accelerated} = \frac{\text{Accel. (mm/sec}^2\text{)} \times \text{(Accel. Time (sec))}^2}{2}$$

* Here, "Speed" refers to the specified speed in the trapezoid pattern, and the peak speed in the triangle pattern.

Note

- The acceleration is calculated by the following: Acceleration setting in the controller (G)×9,800mm/sec². If the acceleration setting in the controller is 0.3G, then 0.3×9,800mm/sec² = 2,940mm/sec².
- The positioning settling time is the time required to determine the completion of movement to the target position, typically around 0.15sec for ball screw types and 0.2sec for belt types.

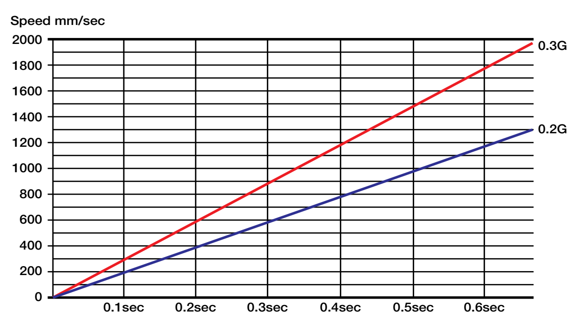
Positioning time (sec)

Accel. Setting	Specified Speed (mm/sec)	Distance Moved (mm)																		
		10	20	30	40	50	100	150	200	250	300	350	400	450	500	600	1000	1100	1300	1400
0.3G	100	0.13	0.23	0.33	0.43	0.53	1.03	1.53	2.03	2.53	3.03	3.53	4.03	4.53	5.03	6.03	10.03	11.03	13.03	14.03
	200	0.12	0.17	0.22	0.27	0.32	0.57	0.82	1.07	1.32	1.57	1.82	2.07	2.32	2.57	3.07	5.07	5.57	6.57	7.07
	300	0.12	0.16	0.2	0.24	0.27	0.44	0.6	0.77	0.94	1.1	1.27	1.44	1.6	1.77	2.1	3.44	3.77	4.44	4.77
	400	0.12	0.16	0.2	0.23	0.26	0.39	0.51	0.64	0.76	0.89	1.01	1.14	1.26	1.39	1.64	2.64	2.89	3.39	3.64
	500	0.12	0.16	0.2	0.23	0.26	0.37	0.47	0.57	0.67	0.77	0.87	0.97	1.07	1.17	1.37	2.17	2.37	2.77	2.97
	600	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.54	0.62	0.7	0.79	0.87	0.95	1.04	1.2	1.87	2.04	2.37	2.54
	700	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.6	0.67	0.74	0.81	0.88	0.95	1.1	1.67	1.81	2.1	2.24
	800	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.65	0.71	0.77	0.83	0.9	1.02	1.52	1.65	1.9	2.02
	900	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.64	0.7	0.75	0.81	0.86	0.97	1.42	1.53	1.75	1.86
	1000	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.64	0.69	0.74	0.79	0.84	0.94	1.34	1.44	1.64	1.74
	1750	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.64	0.69	0.74	0.78	0.82	0.9	1.17	1.37	1.56	1.65
	2000	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.64	0.69	0.74	0.78	0.82	0.9	1.17	1.22	1.33	1.48

Note: Does not include the positioning settling time (0.15sec for ball screw, and 0.2sec for belt).

Triangular Pattern

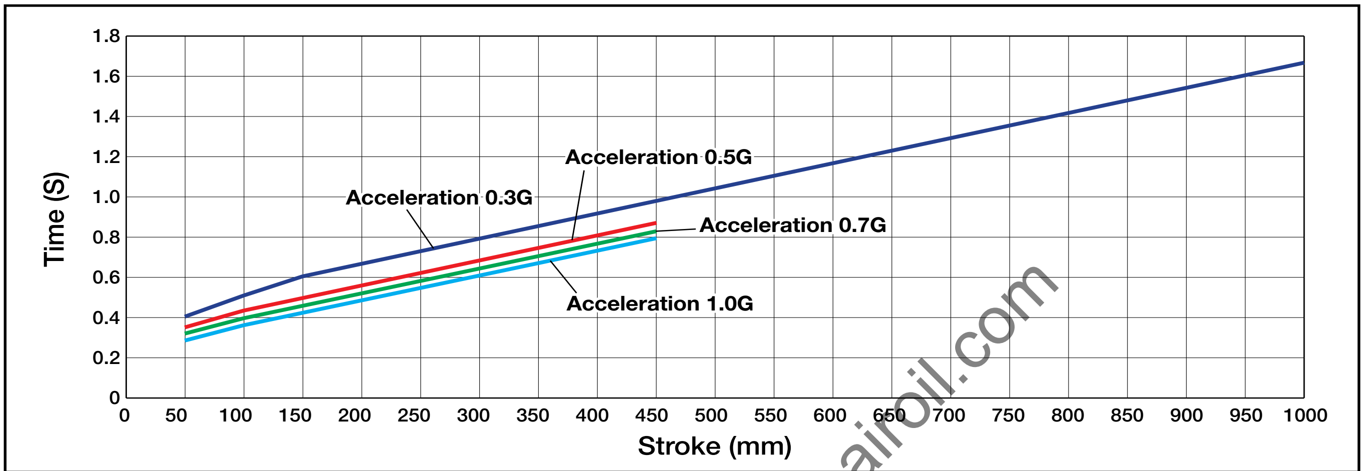
Acceleration time



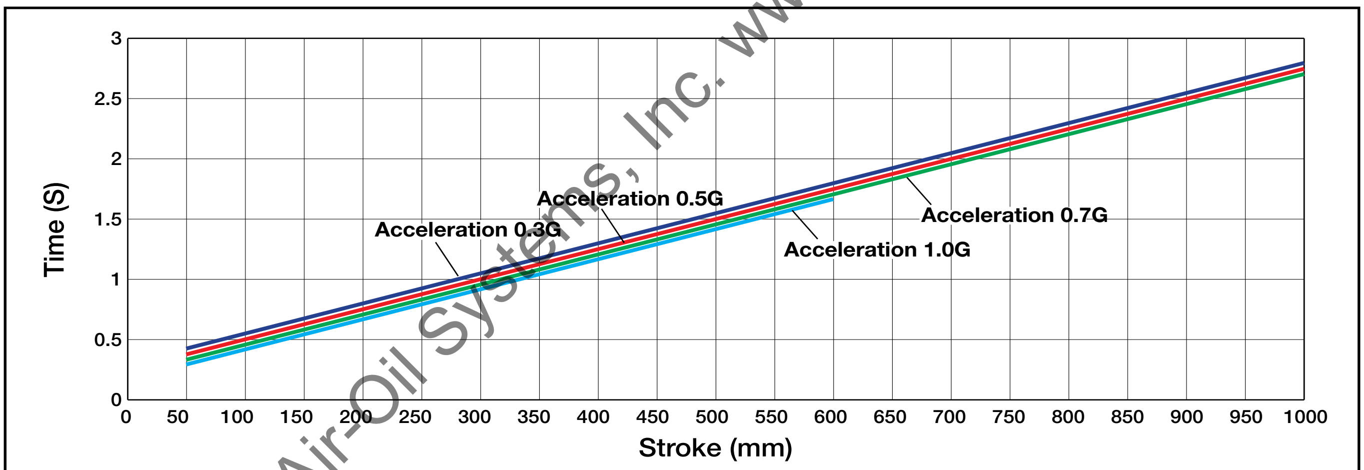
Reference Chart of Movement Time per Speed/Acceleration

The charts below show the estimated time required for the movement per speed/acceleration. Please use it as a reference for cycle time.
(Note) Stroke indicates the one-sided and unidirectional movement distance. For RCP2, RCP3 and ERC2, please note that the maximum speed varies depending on load capacity.

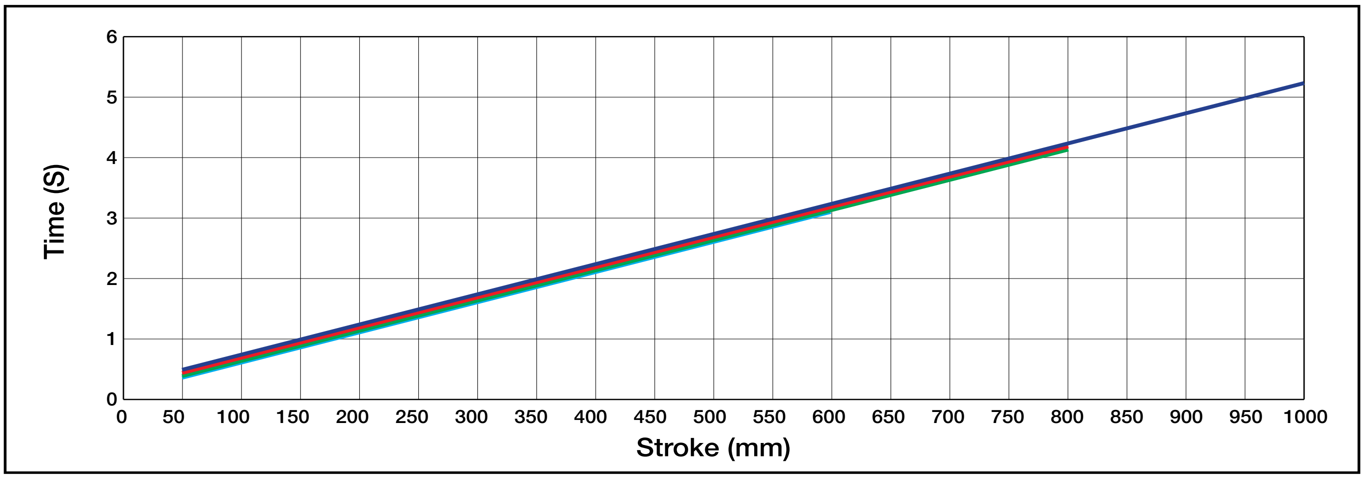
Speed 800mm/s



Speed 400mm/s



Speed 200mm/s



Information on special orders

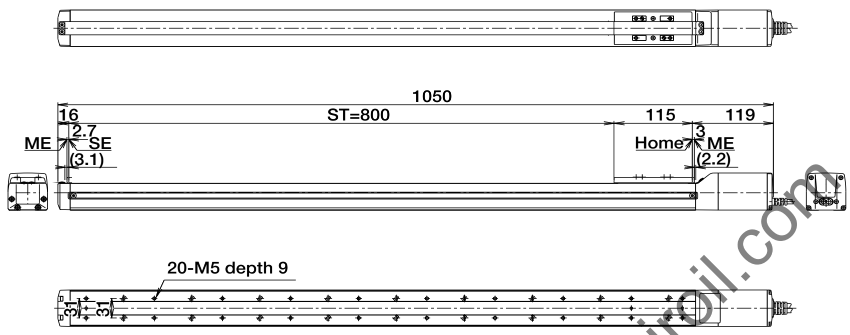
If you don't find your desired product in this catalog,
feel free to contact us, as we are able to fill special orders.
Some typical special orders are shown below for your reference.

Caution:

Special order is not always available for all the models. Please feel free to contact us for details.

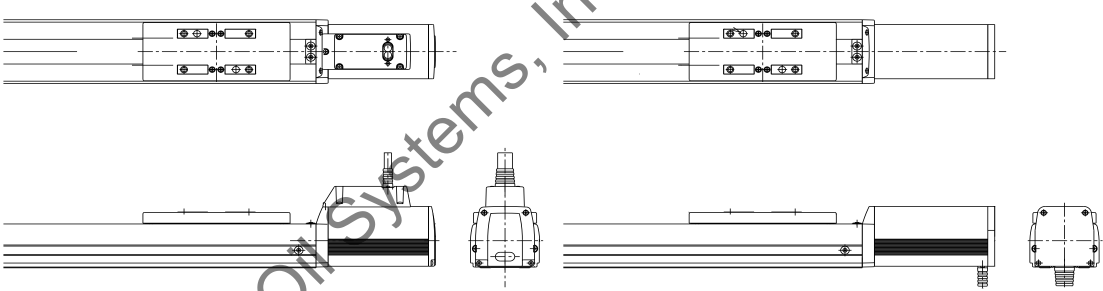
Special Stroke

Ex.) RCP2-SA6 800 Stroke (Non-standard stroke)



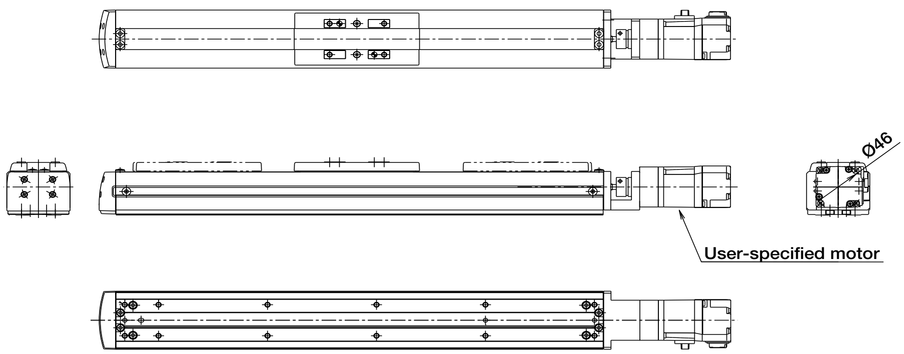
Cable Outlet Directional Changes

Ex.) Actuator cable outlet top/bottom



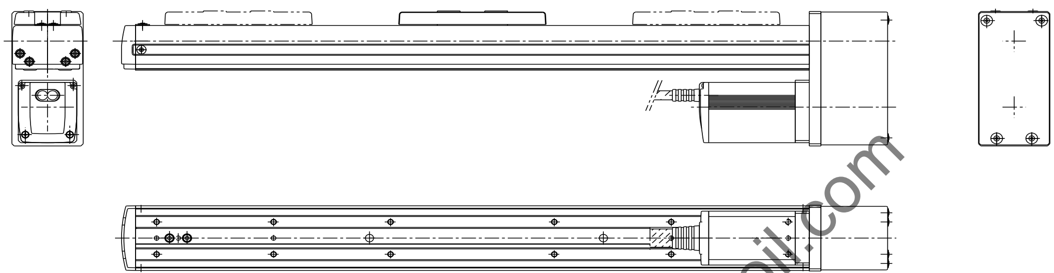
Special Motor

Ex.) Mount Customer-Specified Motor Specification



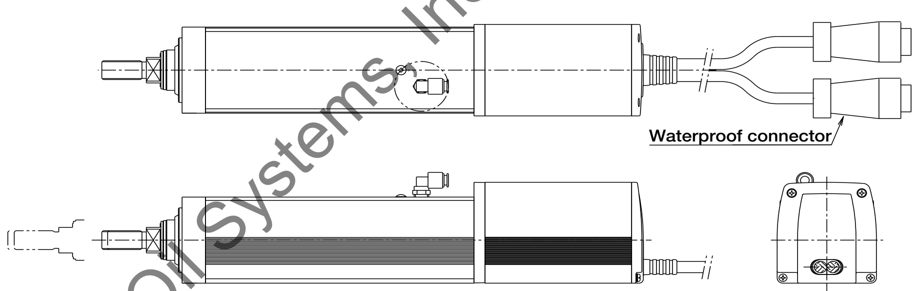
Side-Mount Motor Orientation

Ex.) Side-Mount Motor to the Bottom



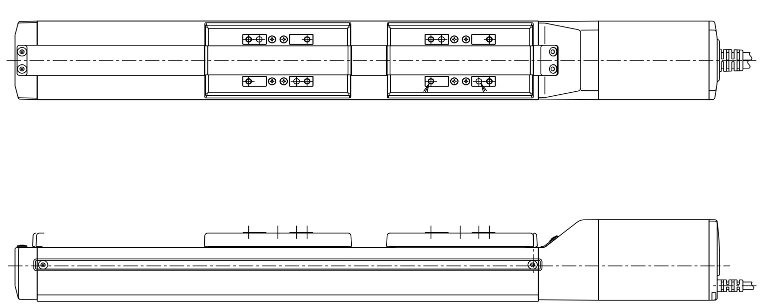
Special Connector

Ex.) Change motor-encoder connector to waterproof connector



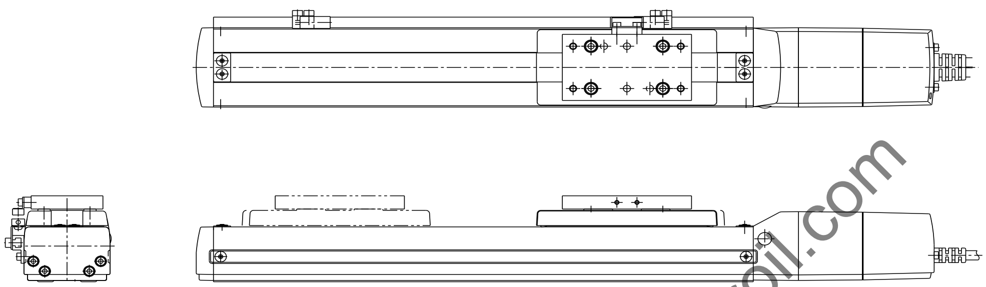
Special Slider

Double Slider Specification (Add non-driven slider)



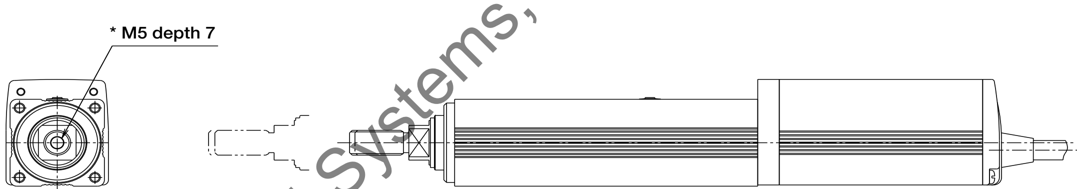
Sensor Specifications

Ex.) Sensor Mounting Specifications



Lead-End Tapped Hole Processing

Ex.) Add a tapped hole to the lead-end of the rod in a rod type



Other

- Special Ball Screw Lead
- Raydent Treated Ball Screw
- ESD (Electrostatic Discharge) Specification
- Assembly Unit

Correlation Table by RoHS Order/CE Mark/UL Listed Models

◎ : Standard / ○ : Option
△ : Special order / × : Not available

Product Family	Series Name	Type, Model		RoHS Compliance	CE Mark Compliance	UL Compliance
ROBO Cylinder Actuators	ERC2	Slider	SA6/SA7	◎	◎	
		Rod	RA6/RA7	◎	◎	
	RCP3	Slider	SA3C/SA4C/SA5C/SA6C	◎		
		Table	TA5C/TA6C/TA7C	◎		
	RCL	Rod	RA1L/RA2L/RA3L	◎		
	RCP2	Slider (Coupled)	SA5C/SA6C/SA7C/SS7C/SS8C	○		
		Slider (Side-Mounted Motor)	SA5R/SA6R/SA7R/SS7R/SS8R			
		Rod	RA3C/RA4C/RA6C	○		
		Belt	BA6/BA7/BA6U/BA7U	○		
		Ultra-Mini	RA2C	○		
		Gripper	GRLS/GRSS/GRS/GRM	○		
			GR3L/GR3S			
		Rotary	RTBS/RTB/RTBB/RTBSL/RTBBL	○		
			RTCS/RTC/RTCB/RTCSL/RTCBL			
		High-Thrust	RA10C	○		
		High-Speed Ball Screw	HS8C/HS8R	○		
		Cleanroom (RCP2CR)	SA5C/SA6C/SA7C/SS7C/SS8C	○		
		Dustproof/Splash-Proof (RCP2W Rod)	RA4C/RA6C	○		
		Waterproof (RCP2W Slider)	SA16C	○		
		Absolute	–	○		
	RCA2	Slider	SA3C/SA4C/SA5C/SA6C	◎		
		Table	TA5C/TA6C/TA7C	◎		
	RCA	Slider (Coupled)	SA4C/SA5C/SA6C	◎		
		Slider (Direct-Coupled Motor)	SA4D/SA5D/SA6D/SS4D/SS5D/SS6D			
		Slider (Side-Mounted Motor)	SA4R/SA5R/SA6R			
		Rod	RA3C/RA3D/RA3R	◎		
			RA4C/RA4D/RA4R			
		Arm	A4R/A5R/A6R	◎		
		Cleanroom (RCACR)	SA4C/SA5C/SA6C	◎		
		Cleanroom (RCACR)	SA5D/SA6D			
		Dustproof/Splash-proof (Rod)	RCAW-RA3C/RA3D/RA3R	◎		
			RCAW-RA4C/RA4D/RA4R			
		Absolute	All Models	◎		
	RCS2	Slider (Coupled)	SA4C/SA5C/SA6C/SA7C/SS7C/SS8C	○		
		Slider (Direct-Coupled Motor)	SA4D/SA5D/SA6D			
		Slider (Side-Mounted Motor)	SA4R/SA5R/SA6R/SA7R/SS7R/SS8R			
		Rod	RA4C/RA5C	○		
			RA4D/RA7AD/RA7BD			
			RA4R/RA5R			
		Flat	F5	○		
		Gripper	GR8	○		
		Rotary	RT6/RT6R/RT7R	○		
		Arm	A4R/A5R/A6R	○		
		Cleanroom (RCS2CR)	SA4C/SA5C/SA6C/SA7C/SS7C/SS8C	○		
			SA5D/SA6D			
		Ultra-High Thrust	RA13R	◎		
		Absolute	All Models	○		
	ERC	Slider	SA6/SA7	○		
		Rod	RA54/RA64	○		
	RCP	Slider (Side-Mounted Motor)	SA5/SA6/SS/SM	×		
			SSR/SMR			
		Rod	RS/RM	×		
	RCS	Slider (Side-Mounted Motor)	SA4/SA5/SA6/SS/SM	×		
			SSR/SMR			
		Rod	RA/RB	×		
		Flat	F	×		
		Gripper	G	×		
		Rotary	R10/R20/R30	×		
		Absolute	–	×		

Correlation Table by RoHS Order/CE Mark/UL Listed Models

◎ : Standard / ○ : Option
△ : Special order / × : Not available

Product Family	Series Name	Type, Model		RoHS Compliance	CE Mark Compliance	UL Compliance
Single-Axis	IS	Standard	S/M/L/T	×		
	ISA	Standard	S/M/L/W	○		
	ISWA	Dustproof/Splash-proof	S/M/L	×		
	ISPWA	Dustproof/Splash-proof	S/M/L	×		
	ISD	Standard	S/M/L/W	×		
	ISDA	Standard	S/M/L	○		
	ISP	Standard	S/M/L/W	×		
	ISPA	Standard	S/M/L/W	○		
	ISPD	Standard	S/M/L	×		
	ISDACR	Cleanroom				
	ISPDACR	Cleanroom	S/M/L/W	○		
	NS	Standard	LXMS/LXMM/LXMXS	◎		
			LZMS/LZMM	◎		
	IF	Standard	SA/MA	○		
	FS	Standard	N/W/L/H	○		
	DS	Slider	SA4/SA5/SA6	×		
		Arm	A4/A5/A6	×		
		Cleanroom	–	×		
		Absolute	–	×		
	SS	Standard	S/M	×		
	SSCR	Cleanroom	–	×		
	RS	–	–	○		
Cartesian Robots	ICSA	–	–	○		
	ICSPA					
SCARA	IH	–	–	×		
	IX	Standard	120/150/180	○		
			250/350	○	○	
			500/600	○	○	
			700/800	○	○	
		Cleanroom	250/350/500/600/700/800	○	○	
		Dustproof/Splash-proof		○	○	
		Suspended, High-Thrust, Wall-Mounted	–	○	○	
Linear	LS	Small/Large	S/L	×		
	LSA	Small	H	○		
		Medium	N	○		
		Large	W	○		
		Shaft	S	○		
		Flat	L	○		
Table-top	TT	Old	TT-300	×		
		New	TT-A2/A3/C2/C3	○	◎	
Other	TX	–	–	○		
	Motor	ISAC	200W/400W	○		
	Unit	ISAC High-Rigidity (T1)	60W(RS)/100W/150W	○		
ROBO Cylinder Controllers	PCON	Standard	C/CG	◎	◎	◎
		High-Thrust	CF	◎	◎	◎
		Compact	CY/SE/PL/PO	◎	◎	◎
	ACON	Standard	C/CG	◎	◎	◎
		Compact	CY/SE/PL/PO	◎	◎	◎
	SCON	–	–	◎	◎	
	PSEL	–	–	◎	◎	
	ASEL	–	–	◎	◎	
	SSEL	–	–	△	◎	
	ROBONET	GatewayR Unit	RGW-DV/RGW-CC	◎	◎	◎
			RGW-PR/RGW-SIO			
		Controller Unit	RACON/RPCON-	◎	◎	◎
		Simple Absolute R Unit	RABU	◎	◎	◎
		Extension Unit	REXT	◎	◎	◎
	RCP2	Standard	C/CG	○	◎	◎
		High-Thrust	CF	○	◎	◎
		Absolute	–	○	◎	◎
	RCS	100V/200V	C	×		
		24V (General)		×		
		24V (Economy)	E	×		
		EU	–	×	◎	
		CC-Link (256-point)	–	×		
		DeviceNet	–	×		
		ProfiBus	–	×		

◎ : Standard / ○: Option
△ : Special order / × : Not available

Product Family	Series Name	Type, Model		RoHS Compliance	CE Mark Compliance	UL Compliance
Controllers for Single-Axis/ Cartesian/ SCARA	E-Con	Standard	–	×		
		EU	–	×	◎	
		CC-Link (256-point)	–	×		
		DeviceNet	–	×		
		ProfiBus	–	×		
		Absolute	–	×		
	P-Driver	–	–	×		
	TX	TX-C1	–	○		
	XSEL-J/K	Small	J	△		
		General	K	△		
		Global	KT	△		
		CE	KE/KET	△	◎	
		SCARA	JX/KX	△		
		General Extension SIO	IA-105-X-MW-A/B/C	○		
	XSEL-P/Q	Standard	P	△	◎	
		Global	Q	△	◎	
		SCARA	PX/QX	△	◎	
	XSEL Option	CC-Link (256-point)	IA-NT-3206/4-CC256	○		
		CC-Link (16-point)	IA-NT-3204-CC16	○		
		DeviceNet	IA-NT-3206/4-DV	○		
		ProfiBus	IA-NT-3206/4-PR	○		
		EtherNet	IA-NT-3206/4-ET	○		
		Extension PIO	IA-103-X-32/16	○		
		Multi-Point I/O	IA-IO-3204/5-NP/PN	○		
	DS-S-C1	Standard	–	×		
		EU	–	×		
	SEL-E/G	Standard	–	×		
		EU	–	×		
	SEL-F	–	–	×		
	IH	–	–	×		
Table-top	TT (Controller Section)	Old	–	×		
		New	–	○	◎	
Teaching Pendant	New RC Types	CON-T	–	◎	◎	
		Safety Category Compliant	CON-TG	◎	◎	◎
	RCP2	Standard (with Deadman Switch)	RCA-T/TD	×		
	ERC		RCM-T/TD			
	RCS	Simple	RCA-ES	△		
	E-Con		RCM-E			
	RC	Data Setting Unit	RCA-PS	△		
			RCM-P			
	RCP2	JOG Switch	RCB-J	△		
	ERC					
	New SEL	Standard	SEL-T	◎	◎	
		Safety Category Compliant	SEL-TD/TG	◎	◎	◎
	XSEL	Standard (with Deadman Switch)	IA-T-X(IA-T-XD)	×		
	DS	DS-S-T1	–	×		
	E/G, F	NE-T-SS	–	×		
	IH	IA-T-IH	–	×		
	TX	TX-JB	–	○		
Touch Panel	–	RCM-PM-01	–	◎		
Simple Absolute Unit	PCON, ACON	PCON-ABU	–	◎	◎	
		ACON-ABU				
DC24V Power Supply	–	PS-241/PS-242	–	○		
Gateway Unit	RCM-GW	DV	RCM-GW-DV	○	◎	
		CC	RCM-GW-CC	○	◎	
Regenerative Resistance Unit	E-Con	REU-1	–	○		
	PDR					
	XSEL					
	SCON	REU-2	–	○		
	SSEL					
	XSEL-P/Q					
Absolute Battery	HAB	IA-HAB	–	×		
	RCP	AB-2	–	×		
	RCP2	AB-4	–	○		
	RCS	AB-1	–	×		◎
	XSEL-J/K	IA-XAB	–	○		◎
	XSEL-P/Q	AB-5	–	○		◎

Correlation Table by RoHS Order/CE Mark/UL Listed Models

◎ : Standard / ○ : Option
△ : Special order / × : Not available

Product Family	Series Name	Type, Model		RoHS Compliance	CE Mark Compliance	UL Compliance
Brake Box	E/G	1-Axis AC	H-109-□A	×		
		1-Axis DC	H-109-□D	×		
		2-Axis AC	H-110-□A	×		
		2-Axis DC	H-110-□DH-500	×		
		Coil	H-500	×		
	GDS	1-Axis	H-401	×		
		2-Axis	H-402	×		
	XSEL-J/K	IA-110-X-0	–	○		
PIO Terminal Block	–	–	RCB-TU-PIO-A/B	○		
SIO Converter	–	–	RCB-TU-SIO-A/B	○		
RS232 Converter	RCS	New	RCB-CV-MW	○		
Unit	ERC	Old	RCA-ADP-MW	×		
Multi-Point I/O Board Terminal Block	XSEL-K	TU-MA96(-P)	–	○		
Filter Box	E-Con	PFB-1	–	×		
Pulse Converter	PDR	AK-04	–	◎		
I/O Extension Box	E/G	H-107-4	–	×		
M/PG Cable	RCP3	Motor-Encoder Integrated Cable	CB-PCS-MPA	◎		○
	RCP/RCP2	Motor Cable	CB-RCP2-MA	◎		○
		Encoder cable	CB-RCP2-PB CB-RFA-PA	◎		○
			CB-RCP2-PA- * * -RB CB-RFA-PA- * * -RB	◎		○
	RCA2	Motor-Encoder Integrated Cable	CB-ACS-MPA	◎		○
	RCA	Motor Cable	CB-ACS-MA	◎		○
		Encoder cable	CB-ACS-PA	◎		○
			CB-ACS-PA- * * -RB	◎		○
	RCS2	Motor Cable	CB-RCC-MA	◎		
			CB-RCC-MA- * * -RB	◎		
		Encoder cable	CB-RCS2-PA	◎		
			CB-RCBC-PA	◎		
			CB-RCBC-PA- * * -RB	◎		
	XSEL	Motor Cable	CB-X-MA	◎		
		Encoder cable	CB-X-PA	◎		
			CB-X1-PA/PLA	◎		
			CB-X2-PA/PLA	◎		
			CB-X1-PA- * * -WC	◎		
		Limit Switch Cable	CB-X-LC	◎		
	TX	Motor Cable	CB-TX-ML050-RB	◎		
Other	RC	PC software	RCM-101-MW	◎		
			RCM-101-USB	◎		
		External Communication Cable	CB-RCA-SIO020	◎		
		RS232C Converter Cable	RCB-CV-MW	◎		
		USB Cable	CB-SEL-USB010	◎		
		USB Conversion Adapter	CB-CV-USB	◎		
		Link Cable	CB-RCB-CTL002	◎		
	SCON	Pulse Train Control Cable	CB-SC-PIOS	◎		
	XSEL	PC software	IA-101-X-MW	○		
		(Cable + EMG BOX)	IA-101-XA-MW	○		
			IA-101-X-USB	◎		
			IA-101-X-USBMW	○		
			EMG SW BOX	○		
		Insulating Cable (Standalone)	CB-ST-E1MW050	◎		
			CB-ST-A1MW050	◎		
			CB-SEL-USB010	◎		
		USB Conversion Adapter	IA-CV-USB	◎		
		I/O Flat Cable	CB-X-PIO	◎		
	TX	Connection Cable	CB-TX-P1MW020	○		

SuperSEL Language

Our PSEL/ASEL/SSEL/XSEL controllers control actuator operation and communications, etc. using programs that have been prepared using the SuperSEL language.

The SuperSEL language is the simplest of the numerous robotic languages.
SuperSEL adeptly solves the difficult question of “realizing a high level of control with a simple language.”

SuperSEL has a step-wise structure in which commands are entered in operation sequence, which are then executed in sequence from step 1, making it extremely easy to understand, even for a novice.

The SuperSEL language has two types of data: “program data,” which runs commands to move the various axes and commands to performed external communications, and “position data,” which records the positions to which the various axes are moved.

Program data can be entered as up to 9,999 command steps, which can be divided into 128 programs.
Position data can be registered for up to 20,000 positions, with 3 axes worth of position data for each position.
(These maximum values are different depending on each controller, for details please refer to the catalog page for each controller.)

When each of the axes is moved, the motion command in the program data designates the number of position data, and it is moved to the position registered in the position data.

● Program Data

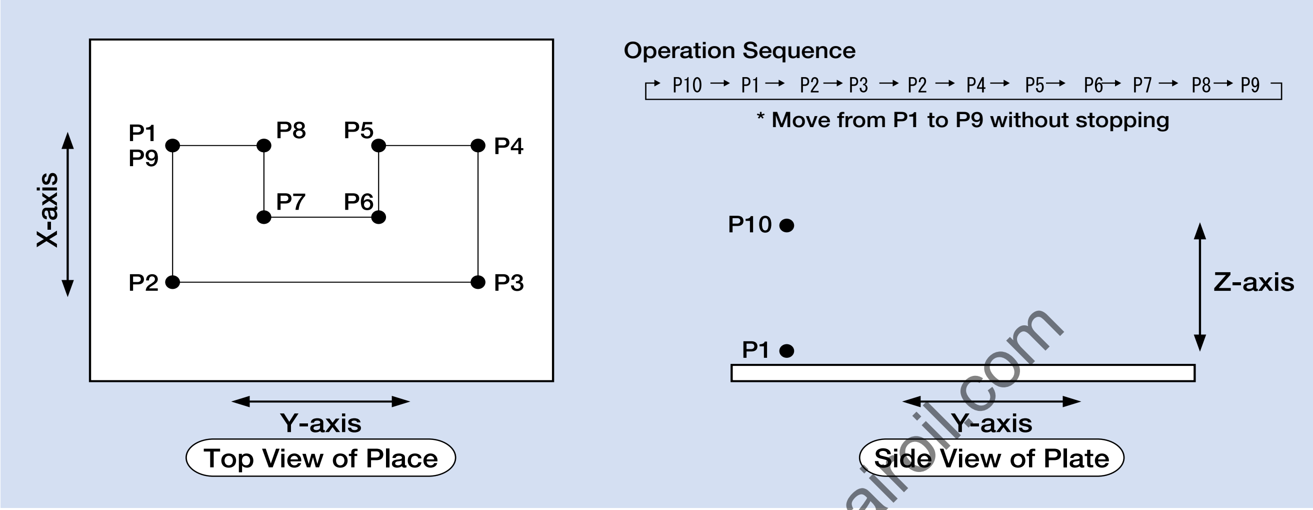
No.	B	E	N	Cnd	Cmnd	Operand 1	Operand 2
1					HOME	100	
2					HOME	11	
3					VEL	200	
4					WTON	1	
5					MOVL	1	
6					BTON	301	
7					WTON	2	
8					BTOF	301	
9					MOVL	2	
10					BTON	302	

● Position Data

No.	Axis1	Axis2	Axis3
1	10.000	150.000	50.000
2	20.000	140.000	50.000
3	30.000	150.000	50.000
4	40.000	140.000	50.000
5	40.000	110.000	50.000
6	30.000	100.000	50.000

Operation Summary

Apply sealant to a plate along the path shown in the figure below.
Continuous movement is performed along a path from position 1 to position 9, without stopping.



Position Data

	X-axis	Y-axis	Z-axis
P1	10	150	50
P2	40	150	50
P3	40	70	50
P4	10	70	50
P5	10	90	50
P6	20	90	50
P7	20	130	50
P8	10	130	50
P9	10	150	50
P10	10	150	0

Program

Step	Extension Condition	Input Condition	Command	Operation 1	Operation 2	Output Condition	Comment
1			HOME	100			Homing on Z-axis only
2			HOME	11			Homing on XY axes
3			VEL	100			Set speed to 100mm/sec
4			ACC	0.3			Set acceleration to 0.3G
5			TAG	1			Destination of GOTO1 in step 11
6			WTON	16			Stop until input 16 from the start button
7			MOVP	10			Move to space above Position 1 (i.e. Position 10)
8			MOVP	1			Move (down) to Position 1
9			PATH	2			With position 1 as base point, move continuously to position 9
10			MOVP	10	9		Move to space above Position 1 (i.e. Position 10)
11			GOTO	1			Jump to TAG1

Explanation of Terms

(This terminology is related to IAI products, and so the definitions are more limited than usual.)

10,000km service life

Around 10,000 hours are guaranteed for actual use in the field. When considering the speed, work ratio, etc, this translates to a distance of 5,000 to 10,000km. While the life of a guide is sufficiently long for radial loads, it is the uneven loads due to moment loads that are problematic to its service life.
For this reason, the 10,000km service life is established by specifying the rated dynamic load moment that can guarantee 10,000km of travel distance.

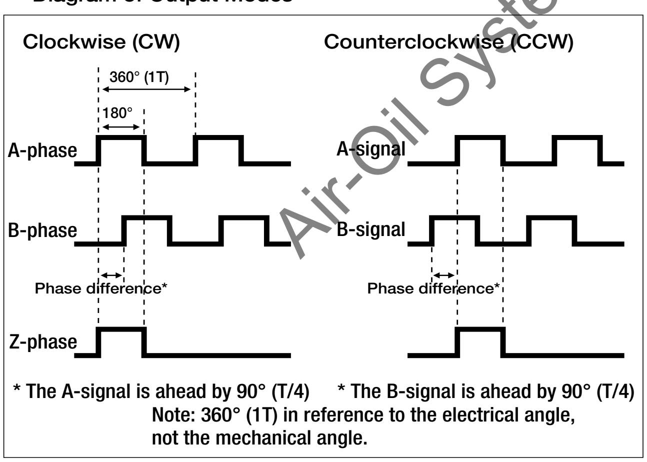
50km service life

A way of expressing the allowable load capacity, submitted by the guide manufacturer. This is the value at which the probability of the guide not breaking (i.e. survival probability) when used with this allowable radial load (basic dynamic rated load) is 90%.
Calculating the actual distance of travel, considering the motion velocity and work rate, etc, an actual industrial equipment, it is necessary to ensure 5,000km to 10,000km of travel. From that viewpoint, this data is difficult to understand and difficult to utilize.

A-phase (signal) output / B-phase (signal) output

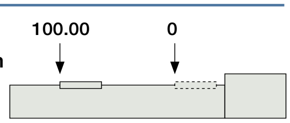
The direction of rotation (CW or CCW) of the axis is determined from the phase difference between the A-phase and the B-phase of the incremental encoder output, as shown in the diagram below.
In a clockwise rotation, the A-phase is ahead of the B-phase.

■ Diagram of Output Modes



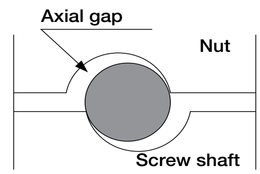
Absolute positioning accuracy

When positioning is performed to an arbitrary target point specified in coordinate values, the difference between the coordinate values and the actual measured values.



Backlash

As shown in the figure on the right, there is a gap between the nut and the ball (steel ball) and the screw shaft. Even if the screw shaft moves, the nut will not move the extent of the gap. The mechanical play in the direction of this slider movement is called the backlash. The measurement method used is to feed the slider, then use the reading for the slight amount of movement time shown on a test indicator as a standard. Also, in that condition, without using the feed device, move the slider in the same direction with a fixed load, then without the load. Then find the difference between the standard value and the time when the load was removed. This measurement is conducted at the midpoint of the distance of movement and at points nearly at the two ends. The maximum value obtained among the values is used as the measurement value.



Bellows

A cover to prevent the infiltration of dust or debris from outside.

Brake

Primarily used for the vertical axis to prevent the slider from dropping when the servo is turned off. The brake activates when the power is turned off.

C10

One of the grades of a ball screw. The lower the number, the higher the precision.
Grade C10 has a typical movement error of ±0.21mm for a 300mm stroke.

CCW (Counterclockwise rotation)

Abbreviation for counterclockwise rotation.
It describes a rotation to the left, as viewed from above, i.e. opposite of the rotation of a clock's hands.

Explanation of Terms

Cleanliness

Class 100 and Class 10, etc. are units for expressing cleanliness. Class 10 (0.1μm) indicates an environment in which there are fewer than 10 pieces of debris 0.1μm or smaller per cubic foot.

Coupling

A component used as a joint to join a shaft to another shaft.
e.g. The joint between the ball screw and the motor.

Creep sensor

An optional sensor to allow high-speed homing operation.

Critical speed

Ball screw resonation with slider speed (No. of ball screw rotations). The maximum physical speed limit that can be utilized.

CW (Clockwise rotation)

Abbreviation for clockwise rotation.
It describes a rotation to the right, as viewed from above, i.e. same as the rotation of a clock's hands.

Cycle time

The time taken by one process.

Dispenser

A device that controls the flow rate of a liquid. This is integrated into devices for applying adhesives, sealants, etc.

Duty

Indicates the work ratio in the equipment industry. (e.g. The time that the actuator operates in one cycle.)

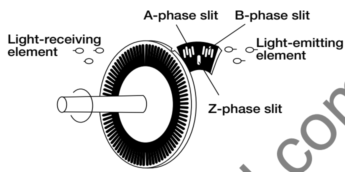
Dynamic brake

A brake that uses the motor's regenerative energy.

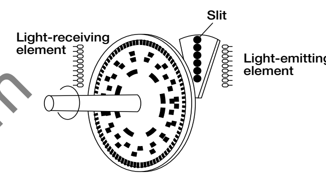
Encoder

A device for recognizing the RPM and the direction of a rotation by shining a light onto a disc with slits, and using a sensor to detect whether the light is ON or OFF as the disc is rotated. (i.e. a device that converts rotation into pulses.) The controller uses this signal from the encoder to determine the position and speed of the slider.

■ Incremental



■ Absolute



An incremental encoder
detects the rotational angle and the RPM of the axis from the number of output pulses. To detect the rotational angle and the RPM, a counter is needed to cumulatively add the number of output pulses. An incremental encoder allows you to electrically increase the resolution by using the rise and fall points on the pulse waveform to double or quadruple the pulse generation frequency.

An absolute encoder
detects the rotation angle of the axis from the state of the rotation slit, enabling you to know the absolute position at all times, even when the rotating slit is at rest. Consequently, the rotational position of the axis can always be checked even without a counter.
In addition, since the home position of the input rotation axis is determined at the time it is assembled into the machine, the number of rotations from home can always be accurately expressed, even when turning the power ON during startup or after a power outage or an emergency stop.

Excess voltage

Voltage applied to motor that exceeds regulation value when commanded speed is too fast.

External operation mode

This is the operation mode started by a start signal from an external device (PLC, etc.). This is also called automatic operation.

Flexible hose

Tube for SCARA Robot MPG cable that the user passes wiring through.

Gain

The numeric value of an adjustment of the controller's reaction (response) when controlling the servo motor. Generally, the higher the gain the faster the response, and the lower it is the slower the response.

Gantry

A type of two-axis (X and Y) assembly in which a support guide is mounted to support the Y-axis, so that heavier objects can be carried on the Y-axis.

Grease

High-viscosity oil applied to contact surfaces to make the guide and the ball screw move smoothly.

Greasing

Injection or application of grease to sliding parts.

Guide

A mechanism for guiding (supporting) the slider of the actuator. A bearing mechanism that supports linear motions.

Guide module

An axis in a two-shaft assembly that is used in parallel with the X-shaft to support the end of the Y-shaft when the Y-shaft overhang is long. Typical models include the FS-12WO and FS-12NO.

Home

Reference point for actuator operation. The pulse counts are determined and recorded for all positions the actuator moves to / from home.

Home accuracy

The amount of variation among the positions when home return is performed (if home varies, all positions vary).

Key slotted

A rotary shaft or mounting component is machined with a slot for key mounting.
(Key: One means of preventing positional slip in the rotation direction of the rotary axis and the mounting component)

Lead

The lead of the feed screw is the distance moved after the motor (hence the feed screw) has rotated one turn.

Understanding lead value

The lead value changes the actuator speed and thrust.

- Speed: With an IS AC servo motor, the rated rpm is 3,000rpm. In other words, this is 50 revolutions per second. In this case, with a 20mm screw lead,
  the speed is 50 revolutions/s×20mm/revolution = 1,000mm/s.
- Thrust: If the lead is large, then the thrust is small; and vice-versa.

Load capacity (Payload)

The weight of objects that can be moved by the actuator's slider or rod.

Lost Motion [mm]

First, for one position, run with positioning straight in front and then measure that position. Next, make a movement in the same direction by issuing a command. Then, issue the same command for movement in a negative direction from the position. Conduct positioning in the negative direction and measure that position. Again, issue a command for a movement in the negative direction, and issue the same command for a positioning movement straight ahead from that position. Then measure that position.
Using this method, repeat measurement in positive and negative directions, seven times each. Conduct positioning for each and obtain the deviation from the average value for each stop position. Determine the position for the center of the movements in these measurements and positions nearly at both ends. The measurement value will be the maximum value among those obtained. (Complies with JIS B6201)

Mechanical end

Position where actuator slider comes to mechanical stop. Mechanical stopper. (Example: Urethane rubber)

Offline

A state in which the PC software is started without the RS232 cable connected to the controller.

Explanation of Terms

Offset

To shift from a position.

Online mode

The state in which the PC software is started with the RS232 cable connected to the controller.

Open collector output

A system with no overload resistance in the voltage output circuit, that outputs signals by sinking the load current. Since this circuit can turn the load current ON/OFF regardless of voltage potential to which the current is connected, it is useful for switching an external load and is widely used as a relay or ramp circuit or the like for switching external loads, etc.

Open loop system

A type of control system. This system only outputs commands and does not take feedback.

A typical example of this is the stepping motor. Since it does not compare each actual value against the commanded value, even if a loss of synchronization (i.e signal error) occurs, the controller would not be able to correct it.

Operation

Operation.

Overhang

The state in which the object that is mounted onto the actuator extends out to the front/rear, left/right, or above/below the axis of movement.

Overload check

A check for overload. (One of the protection functions)

Override

A setting for the percentage with respect to the running speed. (e.g. If VEL is set to 100mm/sec, an override setting of 30 will yield 30mm/sec)

Pitch error [pitch deviation or lead deviation]

Due to problems in the manufacturing, such as the heat treatment process used, the deviations of the ball screws, which are a key mechanical element of the actuator, are not always small when inspected closely. A JIS rating is used to indicate the qualitative accuracy of these items.

These items made for the market must meet tolerance values set as Class C10.

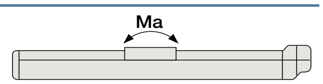
The accuracy required to meet the C10 standard is to be within a margin of error of ±0.21mm for every 300mm of length. Generally the screw pitch error deviation accumulates in a plus or minus direction. One method of improving these items is to grind them in a finishing process.

[e.g.] When positioning 300mm from home:

The machine accepts a set position of 300 ±0.21. Supposing that the actual stop position is 300.21, if this position is repeatable and maintained at 300.21 ± 0.02 using a JIS6201-compliant method, then the repeatability standard for accuracy is met.

Pitching

Forward-backward motion along the axis of the slider's movement. (Direction of Ma)



PLC

Abbreviation for Programmable Logic Controller.

(Also referred to as sequencers or programmable controllers).

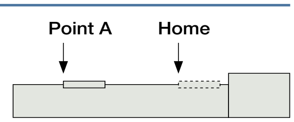
These are controllers that can be programmed to control production facilities and equipment.

Positioning band

The span within which a positioning operation is deemed as complete with respect to the target point. This is specified by a parameter. (PEND BAND)

Positioning repeatability

The variation in stop position accuracy for repeated positioning toward the same point.



Positioning settling time

The gap between the actual movement time and the ideal calculated value for movement. (Positioning operation time; processing time for internal controller operations.) The broader meaning includes the time for convergence of the mechanical swing.

Radial load

Load up to down in a direction 90° to horizontal slider.

Regenerative energy

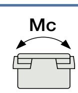
Energy, generated by the motor's rotation. When the motor decelerates, this energy returns to the motor's driver (controller). This energy is called regenerative energy.

Regenerative resistance

The resistance that discharges the regenerative current.
The regenerative resistance required for IAI's controllers is noted in the respective page of each controller.

Rolling

An angular movement around the axis of the slider's movement. (Mc direction)



SCARA

SCARA is an acronym for Selective Compliance Assembly Robot Arm, and refers to a robot that maintains compliance (tracking) in a specific direction (horizontal) only, and is highly rigid in the vertical direction.

Screw type

The types of screws for converting rotary motion of a motor to linear motion are summarized on the right.
IAI's single-axis robots and electric cylinders use rolled ball screws as a standard feature.

		Characteristics
Ball screw	Polished	Screws are polished for good precision, but expensive
	Rolled	Since the screws are rolled, they can be mass produced
Lead screw		Cheap, but poor precision and short life. Also not suitable for high-speed operation.

SEL language

The name of IAI's proprietary programming language, derived from an acronym for SHIMIZUKIDEN ECOLOGY LANGUAGE.

Semi-closed loop system

A system for controlling the position information or velocity information sent from the encoder with constant feedback to the controller.

Servo-free (servo OFF)

The state in which the motor power is OFF. The slider can be moved freely.

Servo-lock (servo ON)

The state in which, opposite to the above, the motor power is turned ON. The slider is continually held at a determined position.

Slider mounting weight [kg]

The maximum mounting weight of the slider when operating normally, without major distortion in the velocity waveform or current waveform, when operated at the specified acceleration/deceleration factor (factory settings).

Software limit

A limit in the software beyond which a given set stroke will not advance.

Stainless sheet

A dust-proof sheet used in ISD, DS, RC, etc. slider types.

Stepper motor (Pulse motor)

A motor that performs angular positioning in proportion to an input pulse signal by means of open loop control.

Thrust load

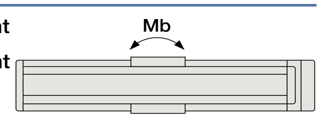
The load exerted in the axial direction.

Work rate

The ratio between the time during which the actuator is operating and the time during which it is stopped. This is also called duty.

Yawing

Motion at an angle in a left-right direction along slider movement axis. (Mb direction)



Along with pitching, laser angle measurement system is used for measurement, and the reading is the indication of maximum difference.

Z-phase

The phase (signal) that detects the incremental encoder reference point, used to detect the home position during homing operation.
Searching for the Z-phase signal for the reference during homing is called the "Z-phase search".

Options Available per Model

			Option Symbol																
			Cable Exit Direction									Brake				No Brake Box*	With Cover	Flange Bracket	Front Flange
			A1	A2	A3	CJT	CJR	CJL	CJB	CJO	K2	B	BE	BL	BR	BN	CO	FB	FL
Slider Type	RCP3	SA2□C																	
		SA3/4/5/6C				●	●	●	●			●							
		SA2□R																	
		SA3/4/5/6R				●			●	●		●							
	RCP2	SA5/6/7C											●	●	●				
		SS7/SS8/HS8C										●							
		SA5/6/7R										●							
		SS7/SS8/HS8R										●							
		BA6/7																	
	RCA2	SA3/4/5/6C				●	●	●	●			●							
		SA3/4/5/6R				●			●	●		●							
	RCA	SA4C										●							
		SA5/6C										●							
		SA4D											●	●	●				
		SA5/6D											●	●	●				
		SA4R										●							
		SA5/6R										●							
	RCS2	SA4C										●							
		SA5/6C										●							
		SA7C											●	●	●				
		SS7/8C										●							
		SA4D											●	●	●				
		SA5/6D											●	●	●				
		SA4R										●							
		SA5/6R										●							
		SA7R										●							
		SS7/8R										●							
Rod Type	RCP3	RA2□C										●							
		RA2□R										●							
	RCP2	RA2C																	●
		RA3C																	●
		RA4/6C										●							●
		RA10C	●	●	●							●							●
		SRA4R										●							●
	RCA2	RN/RP/GS/GD□N									●								
		SD□N																	
	RCA	RA3/4C										●							●
		RA3/4D																	●
		RA3/4R										●							●
		SRA4R										●							●
	RCS2	RA4C										●							●
		RA5C		●								●							●
		RA4D																	●
		SRA7BD	●	●	●							●							●
		RA4R										●							●
		RA5R		●								●							●
		RA13R										●				●			●
Table/ Arm/Flat Type	RCP3	TA3C										●							
		TA4/5/6/7C				●	●	●	●			●							
		TA3R										●							
		TA4/5/6/7R				●			●	●		●							
	RCA2	TC/TW/TF□N									●								
		TA4/5/6/7C				●	●	●	●			●							
		TA4/5/6/7R				●			●	●		●							
	RCA	A4/5/6R										●							
	RCS2	A4/5/6R										●							
		F5D										●							
Gripper Type	RCP2	GR□□/GR3□□																●	
Rotary Type	RCP2	RT□□																	
		RT□□L																	
	RCS2	RT6/RT6R/RT7R																	
Linear Servo Type	RCL	SA4/5/6L																	
		RA1/2/3L										●				●			
Cleanroom Type	RCP2CR	SA4/5/6C											●	●	●				
		SS7/SS8/HS8C										●							
	RCACR	SA4C										●							
		SA5/6C										●							
		SA5/6D											●	●	●				
	RCS2CR	SA4C										●							
		SA5/6C										●							
		SA7C											●	●	●				
		SS7/8C										●							
		SA5/6D											●	●	●				
Splash-Proof	RCP2W	SA16C															●		
		RA4/6C										●							●
		RA10C	●	●	●							●							●
	RCAW	RA3/4C										●							●
		RA3/4D																	●
		RA3/4R										●							●
	RCS2W	RA4C										●							●
		RA4D																	●
		RA4R										●							●

* Spare part order only

	Option Symbol																								
	Rear Flange	Foot	Foot (Right, Left)	High Acceleration/ Deceleration	Home Sensor	Limit Switch	Power Saving	No Cover	Reversed-home	Knuckle Joint	Clevis	Side-Mounted Motor Orientation				Rod Extension	Rear Mounting Plate	Shaft Adapter	Shaft Bracket	Slider Roller	Slider Spacer	Table Adapter	Front Trunnion	Rear Trunnion	Vacuum Joint On Opposite Side
	FLR	FT	FT□	HA	HS	L	LA	NCO	NM	NJ	QR	MB	ML	MR	MT	RE	RP	SA	SB	SR	SS	TA	TRF	TRR	VR
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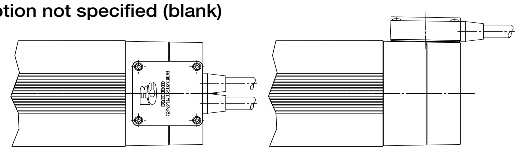
Cable exit direction

■ Models A1, A2, and A3

Applicable models	RCP2 / RCP2W-RA10C RCS2-RA5C / RA5R / SRA7BD
Description	Specify this option when you wish to change the direction from which the actuator cable is taken out.

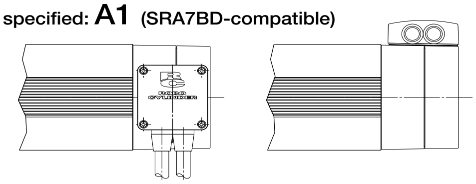
Actuator cable taken out from motor side (standard)

■ Option not specified (blank)



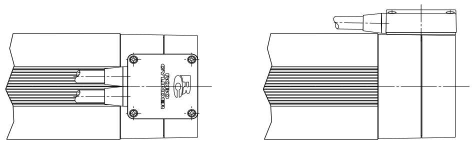
Actuator cable taken out from left

■ Option specified: A1 (SRA7BD-compatible)



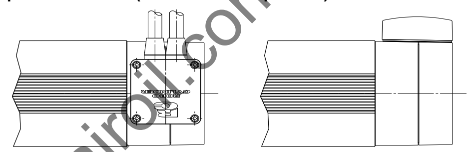
Actuator cable taken out from rod side

■ Option specified: A2 (RA5C/RA5R/SRA7BD-compatible)



Actuator cable taken out from right

■ Option specified: A3 (SRA7BD-compatible)



Brake

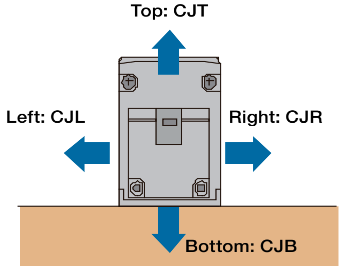
■ Models B, BE, BL and BR

Applicable models	All slider-type models (excluding RCP3-SA2A□ / SA2B□ and RCP2-BA6 / BA7) All rod-type models (excluding RCP2-RA2C / RA3C, RCA2-RN□N, RP□N, GS□N, GD□N, SD□N and RCA / RCS2 built-in types) All table-type models (excluding TC□N, TW□N and TF□N) All arm-type and flat-type models (the arm type is a standard feature) Linear Servo Rod type All cleanroom type models Dust-proof / Splash-proof type (excluding RCP2W-SA16C, RCAW-RA3 / 4D and RCS2W-RA4D)
Description	A retention mechanism used on an actuator positioned vertically to prevent the slider from dropping and damaging the part, etc., when the power or servo is turned off.

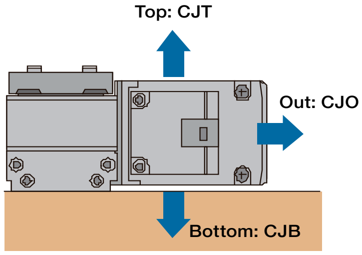
Cable exit direction

■ Models CJT, CJR, CJL, CJB and CJO

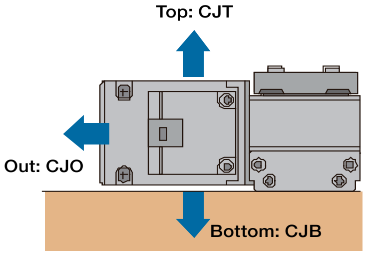
Applicable models	RCP3 (RCA2)-SA3C / SA4C / SA5C / SA6C / SA3R / SA4R / SA5R / SA6R RCP3 (RCA2)-TA4C / TA5C / TA6C / TA7C / TA4R / TA5R / TA6R / TA7R
Description	The direction of the motor-encoder cable mounted on the actuator can be changed vertically or horizontally.



Straight Type



Side-Mounted Motor Type
Mounted on left side (ML)



Side-Mounted Motor Type
Mounted on right side (MR)

Actuator cover

■ Models CO

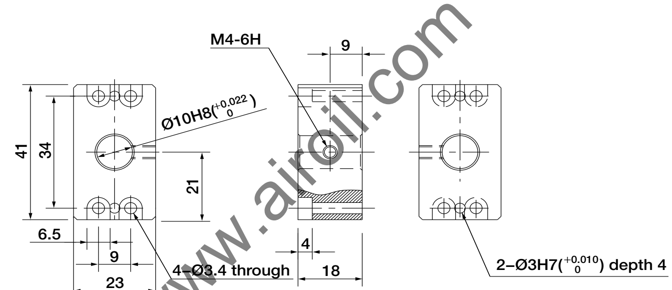
Applicable models	RCP2W-SA16
Description	This cover protects the guide area and slider area on the waterproof slider type.

Flange bracket

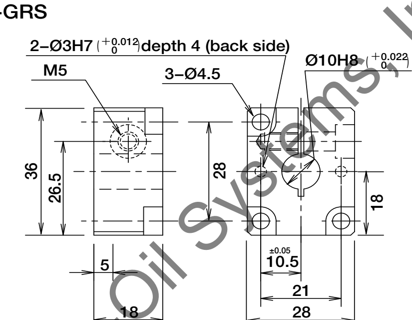
■ Models FB

Applicable models	RCP2-GRSS / GRLS / GRS / GRM / GR3LS / GR3LM / GR3SS / GR3SM
Description	A bracket for affixing the gripper body.

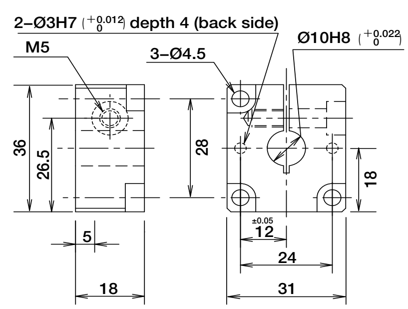
GRSS/GRLS type
Unit model RCP2-FB-GRSS



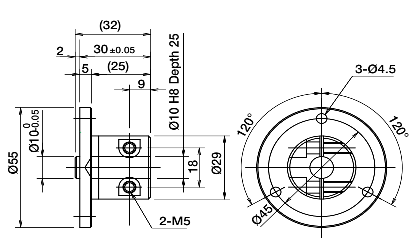
GRS type
Unit model RCP2-FB-GRS



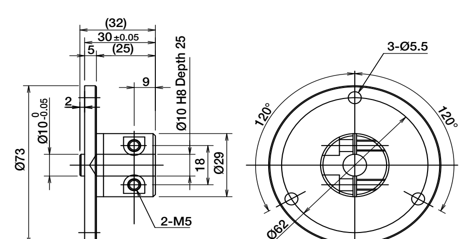
GRM type
Unit model RCP2-FB-GRM



GR3LS/GR3SS type
Unit model RCP2-FB-GR3S



GR3LM/GR3SM type
Unit model RCP2-FB-GR3M

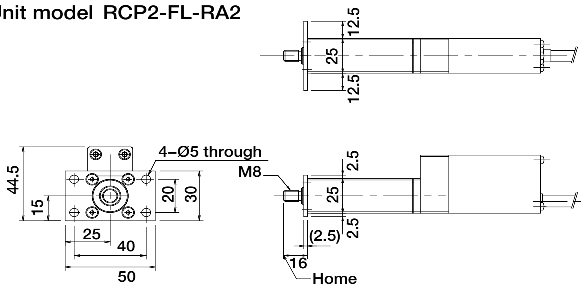


Front flange

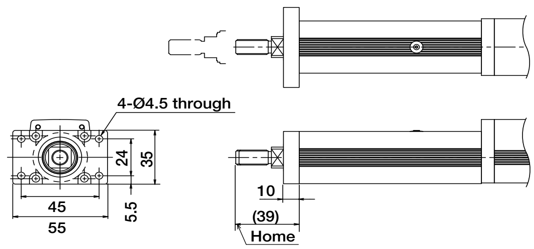
■ Models FL

Applicable models	All rod type models (excluding RCP3 and RCA2)
Description	A bracket for affixing the actuator using bolts from the actuator side.

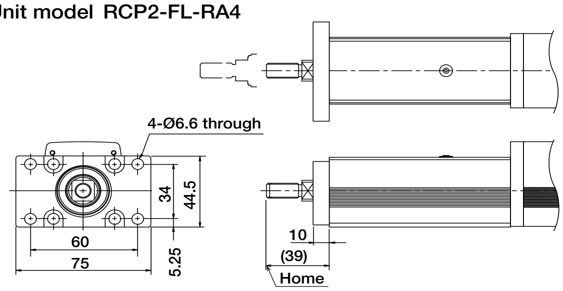
RCP2-RA2C
Unit model RCP2-FL-RA2



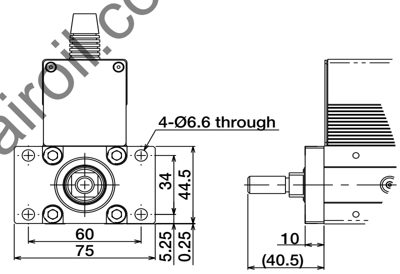
RCP2-RA3C
Unit model RCP2-FL-RA3



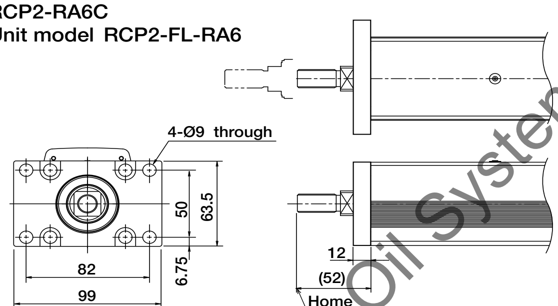
RCP2-RA4C
Unit model RCP2-FL-RA4



RCP2/RCA-SRA4R
Unit model RCP2-FL-SRA4

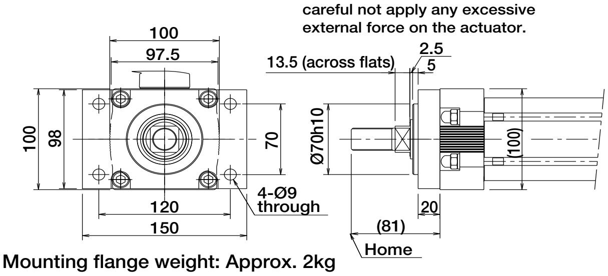


RCP2-RA6C
Unit model RCP2-FL-RA6



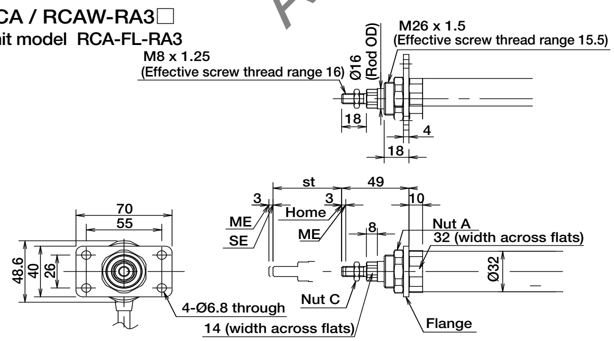
RCP2 / RCP2W-RA10C
Unit model RCP2-FL-RA10

* When using in horizontal setting, be careful not apply any excessive external force on the actuator.

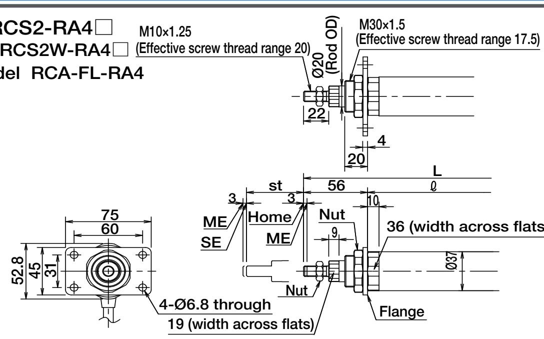


Mounting flange weight: Approx. 2kg

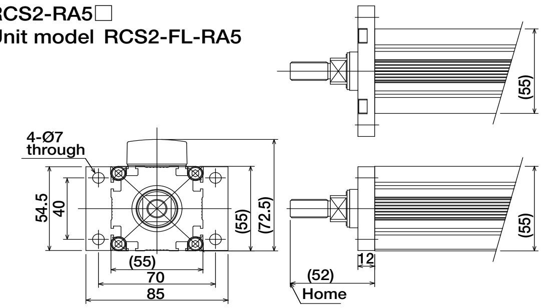
RCA / RCAW-RA3□
Unit model RCA-FL-RA3



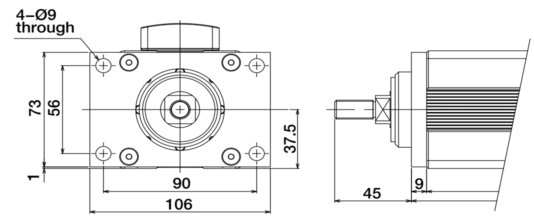
RCA / RCS2-RA4□
RCAW / RCS2W-RA4□
Unit model RCA-FL-RA4



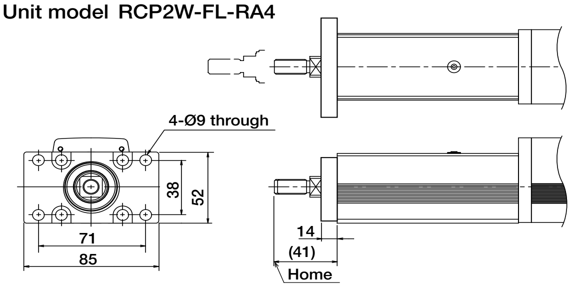
RCS2-RA5□
Unit model RCS2-FL-RA5



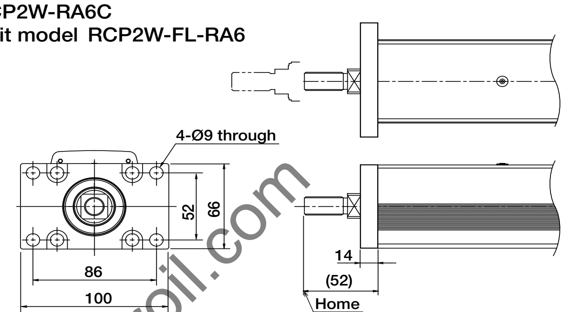
RCS2-SRA7BD
Unit model RCS2-FL-SRA7



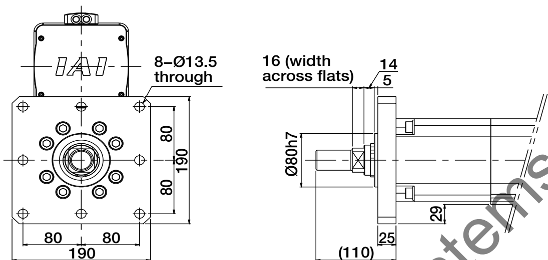
RCP2W-RA4C
Unit model RCP2W-FL-RA4



RCP2W-RA6C
Unit model RCP2W-FL-RA6



RCS2-RA13R
Unit model RCS2-FL-RA13

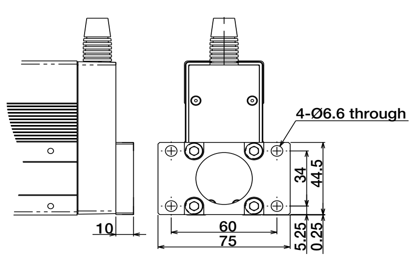


Rear flange

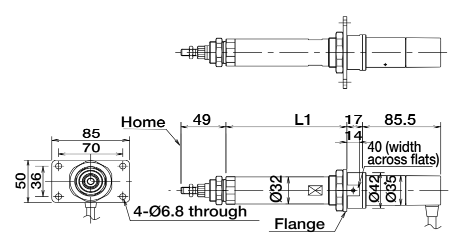
■ Models FLR

Applicable models	RCP2-SRA4R RCA (RCAW)-RA3C / RA3D / RA3R / RA4C / RA4D / RA4R / SRA4R RCS2 (RCS2W)-RA4C / RA4D / RA4R
Description	A bracket to fix a rod-type actuator on the rear (motor side).

RCP2/RCA-SRA4R
Unit model RCP2-FL-SRA4

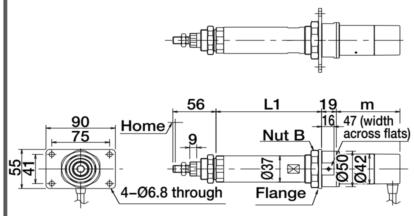


RCA / RCAW-RA3C and RA3D
Unit model RCA-FLR-RA3



st	L1
50	132
100	182
150	232
200	282

RCA / RCAW-RA4C and RA4D
RCS2 / RCS2W-RA4C / RA4D
Unit model RCA-FLR-RA4



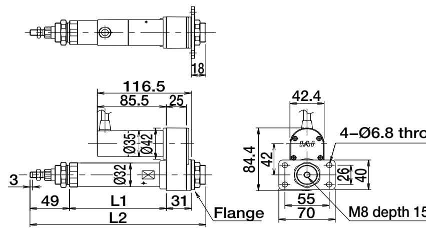
st	L1
50	137
100	187
150	237
200	287
250	337
300	487

m dimension

		m	
		20w	30w
RCA	Increm.	67.5	82.5
	Absol.	80.5	95.5
RCS2	Increm/Absol.	80.5	95.5

RCA / RCAW-RA3R
Unit model RCA-FL-RA3

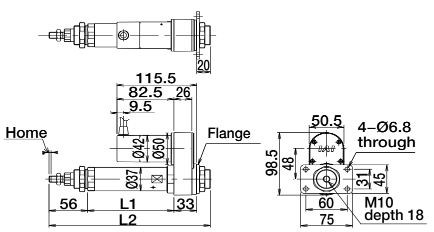
* On the side-mounted motor type, the same flanges can be used on the front and rear.



st	L1	L2
50	120	218
100	170	268
150	220	318
200	270	368

RCA / RCAW-RA4R
RCS2 / RCS2W-RA4R
Unit model RCA-FL-RA4

* On the side-mounted motor type, the same flanges can be used on the front and rear.



st	L1	L2
50	125	234
100	175	284
150	225	334
200	275	384
250	325	434
300	375	484

Foot

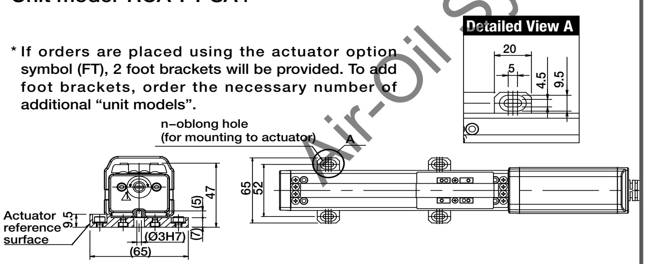
■ Models FT

* See the mounting pitch dimensions on the actuator drawing for mounting pitch dimensions between foot brackets.

Applicable models	Slider Type RCA (RCACR)-SA4C / SA5C / SA6C / SA4D / SA5D / SA6D RCS2 (RCS2CR)-SA4C / SA5C / SA6C All rod-type models (excluding RCA2-RN□N / RP□N / GS□N / GD□N / SD□N)
Description	A bracket for affixing the actuator using bolts from the top side. With a slider type subject to large moment load, install foot brackets at all mounting holes in the actuator. If the number of foot brackets is not sufficient, the actuator may deflect, resulting in a shorter service life.

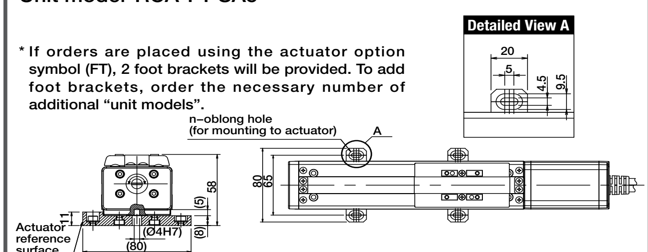
RCA / RCACR-SA4C RCS2 / RCS2CR-SA4C
Unit model RCA-FT-SA4

* If orders are placed using the actuator option symbol (FT), 2 foot brackets will be provided. To add foot brackets, order the necessary number of additional "unit models".



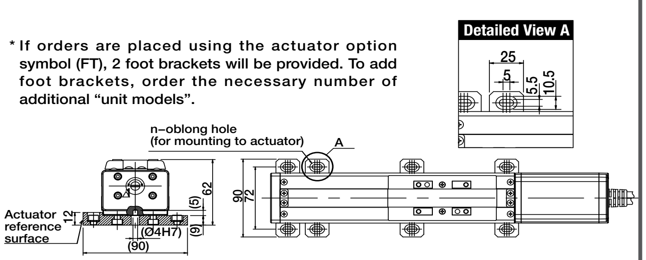
RCA / RCACR-SA5C RCS2 / RCS2CR-SA5C
Unit model RCA-FT-SA5

* If orders are placed using the actuator option symbol (FT), 2 foot brackets will be provided. To add foot brackets, order the necessary number of additional "unit models".

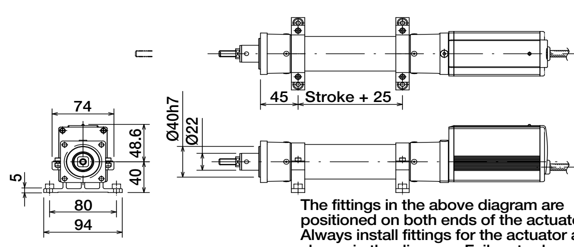


RCA / RCACR-SA6C RCS2 / RCS2CR-SA6C
Unit model RCA-FT-SA6

* If orders are placed using the actuator option symbol (FT), 2 foot brackets will be provided. To add foot brackets, order the necessary number of additional "unit models".



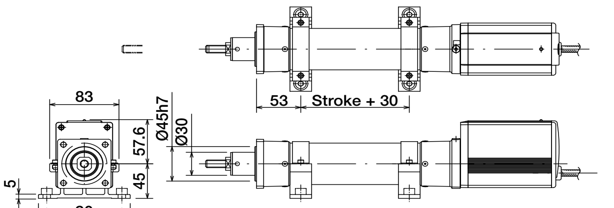
ERC2-RA6C / RGS6C / RGD6C
Unit model ERC2-FT-RA6



* Mounting bolt (M6) is not provided.

The fittings in the above diagram are positioned on both ends of the actuator. Always install fittings for the actuator as shown in the diagram. Failure to do so may cause the actuator to become misaligned.

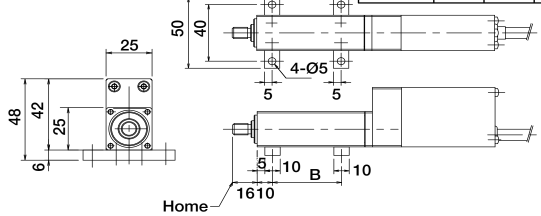
ERC2-RA7C / RGS7C / RGD7C
Unit model ERC2-FT-RA7



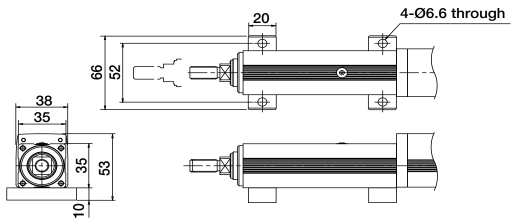
The fittings in the above diagram are positioned on both ends of the actuator. Always install fittings for the actuator as shown in the diagram. Failure to do so may cause the actuator to become misaligned.

RCP2-RA2C
Unit model RCP2-FT-RA2

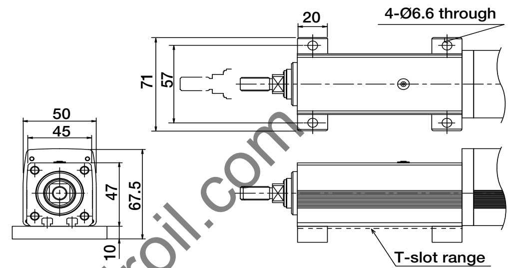
Length \ Stroke	25	50	75	100
B	45	70	95	120



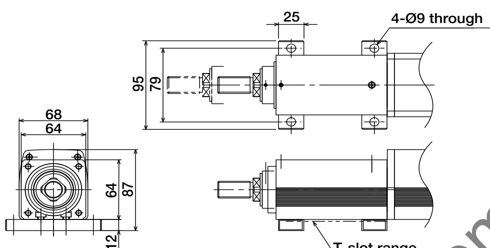
RCP2-RA3C / RGD3C
Unit model RCP2-FT-RA3



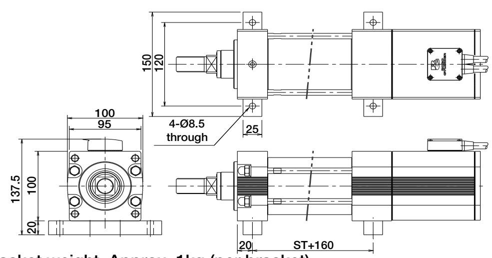
RCP2-RA4C / RGS4C / RGD4C / RCP2W-RA4C
Unit model RCP2-FT-RA4



RCP2-RA6C / RGS6C / RGD6C / RCP2W-RA6C
Unit model RCP2-FT-RA6

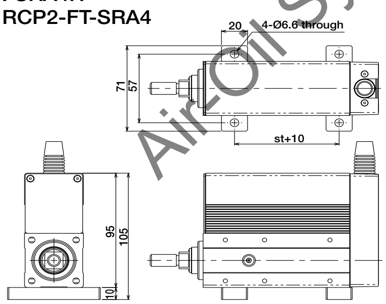


RCP2-RA10C / RCP2W-RA10C
Unit model RCP2-FT-RA10

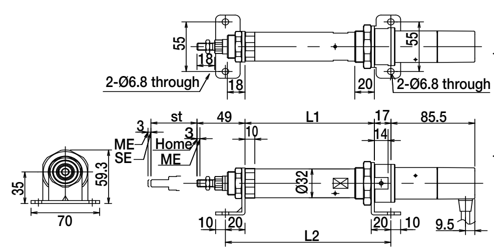


Foot bracket weight: Approx. 1kg (per bracket)

RCP2 / RCA-SRA4R
Unit model RCP2-FT-SRA4



RCA-RA3C / RGS3C / RGD3C
Unit model RCA-FT-RA3



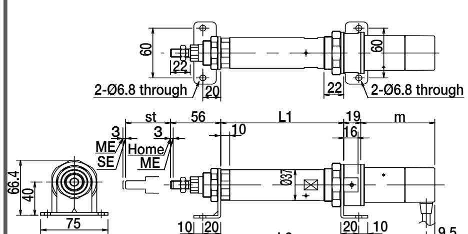
<RA3C>

st	L1	L2
50	132	168.8
100	182	218.8
150	232	268.8
200	282	318.8

<RGS3C/RGD3C>

st	L1	L2
50	140	176.8
100	190	226.8
150	240	276.8
200	290	326.8

RCA (RCS2)-RA4C / RGS4C / RGD4C
Unit model RCA-FT-RA4



<RA4C>

st	L1	L2
50	137	173.8
100	187	223.8
150	237	273.8
200	287	323.8
250	337	373.8
300	487	423.8

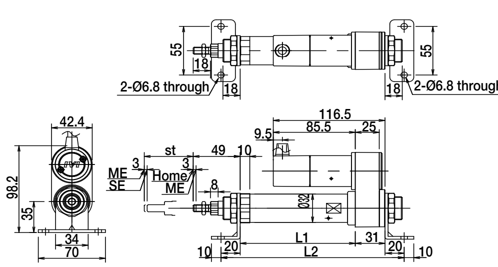
<RGS4C/RGD4C>

st	L1	L2
50	145	181.8
100	195	231.8
150	245	281.8
200	295	331.8
250	345	381.8
300	495	431.8

m dimension

		m	
		20w	30w
RCA	Incremental	67.5	82.5
	Absolute	80.5	95.5
RCS2	Incrt/Abst	80.5	95.5

RCA / RA3R / RGS3R / RGD3R
Unit model RCA-FT-RA3R



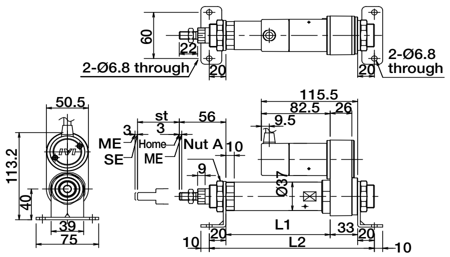
<RA3R>

st	L1	L2
50	120	191
100	170	241
150	220	291
200	270	341

<RGS3R/RGD3R>

st	L1	L2
50	128	199
100	178	249
150	228	299
200	278	349

RCA (RCS2)-RA4R / RGS4R / RGD4R
Unit model RCA-FT-RA4R



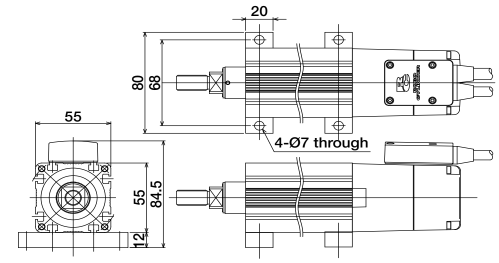
<RA4R>

st	L1	L2
50	125	198
100	175	248
150	225	298
200	275	348
250	325	398
300	375	448

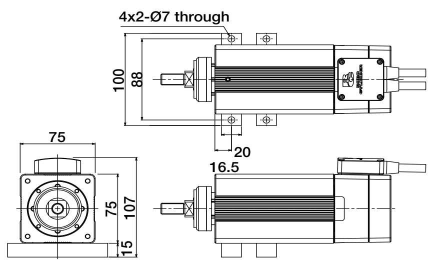
<RGS4R/RGD4R>

st	L1	L2
50	133	206
100	183	256
150	233	306
200	283	356
250	333	406
300	383	456

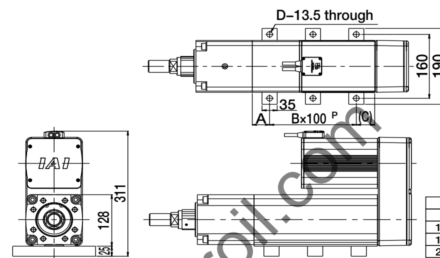
RCS2-RA5C / RA5R / RGS5C / RGD5C
Unit model RCS2-FT-RA5



RCS2-SRA7BD
Unit model RCS2-FT-SRA7



RCS2-RA13R
Unit model RCS2-FT-RA13



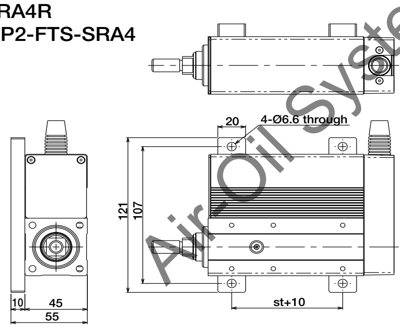
st	A	B	C	D
50	40	2	42.5	6
100	65	2	67.5	6
150	40	3	42.5	8
200	65	3	67.5	8

Foot (Mounted on right side face/left side face)

■Models FT2(Mounted on right side face)
FT4(Mounted on right side face)

Applicable models	RCP2 (RCA)-SRA4R
Description	A bracket for affixing the actuator using bolts from the top side. RCP2(RCA)-SRA4R can be mounted on the side face also.

RCP2 / RCA-SRA4R
Unit model RCP2-FTS-SRA4



Guide mounting direction (for single-guide type only)

■ Models GS2, GS3 and GS4

Applicable models	RCP2 (RCA)-SRGS4R RCS2-RGS5C / SRA7BD
Description	For the single-guide model, the mounting position of the rod can be selected from the right (GS2), bottom (GS3), or left side (GS4).

High acceleration/deceleration

■ Models HA

Applicable models	RCA-SA4C / SA5C / SA6C / RA3C / RA4C RCS2-SA4C / SA5C / SA6C / SA7C / RA4C / RA5C
Description	Option to increase to 1G the standard acceleration rate of 0.3G. An actuator with 1G of acceleration can be operated with the same load capacity as the 0.3G unit. The controller settings are different from the standard specification, so when operating with high acceleration, the controller also needs to be set to the high acceleration specification.

Home check sensor

■ Models HS

Applicable models	Slider Type	RCA (RCACR)-SA4C / SA5C / SA6C, RCS2 (RCS2CR)-SA4C / SA5C / SA6C RCA-SA4R / SA5R / SA6R and RCS2-SA4R / SA5R / SA6R
	Rod Type	RCA-RA3C / RA3D / RA3R / RA4C / RA4D / RA4R and RCS2-RA4C / RA4D / RA4R
Description	When an actuator is instructed to return home, this sensor checks to make sure that the slider moves to the home position. * This cannot be used with the reversed-home specification for rod types.	

Connector cable exit direction

■ Models K2

Applicable models	RCA2-RN□N / RP□N / GS□N / GD□N / TC□N / TW□N / TF□N
Description	Connector cable outlet direction can be changed from the front to the rear.

Limit switch

■ Models L

Applicable models	Rotary Type RCS2-RT6 / RT6R / RT7R
Description	When home return is performed, the home will be determined after the actuator reverses following contact with the mechanical end. This optional sensor is used to detect this reversing.(However, with the rotary type, all models will have the standard settings.)

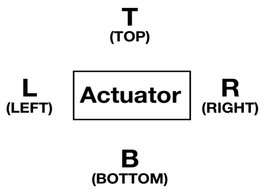
Low power compatible

■ Models LA

Applicable models	RCA / RCA2 / RCACR / RCA Series, all models
Description	This option decreases the power capacity of the controller. With the standard specification and high-speed acceleration specification, the maximum is 5.1A, but if the low-power specification is selected, the maximum decreases to 3.4A. (The maximum values differ for some models, so see the power capacities of the ACON/ ASEL controllers for details.)

Side-Mounted Motor Orientation

■ Models MB, ML, MR and MT



Applicable models	All side-mounted motor type models
Description	These abbreviations specify the motor reversing direction of the motor reversing type. Viewed from the motor side, downward reversing is MB (arm type only), leftward reversing is ML (all models), rightward reversing is MR (all models), and upward reversing is MT (limited to RCS2-RA13R). The arm type is MB, but for other models, ML is standard. (MT has different criteria for RCS2-RA13R.)

No cover

■ Models NCO

Applicable models	RCP3 (RCA2)-SA3C / SA4C / SA5C / SA6C / SA3R / SA4R / SA5R / SA6R
Description	By removing the cover from the actuator, the cost reduction can be achieved and the maintainability can be enhanced.

Reversed-home specification

■ Models NM

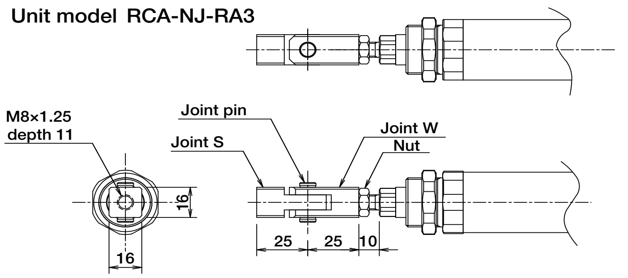
Applicable models	All slider-type models All rod-type, table-type, arm-type, and flat-type models (* excluding RCP2-RA2C / SRA4R / RA10C, RCA2-RN / RP / GS / GD / SD / TC / TW / TF□N, RCA-SRA4R and RCS2-RA5C / RA5R / SRA7BD / RA13R)
Description	The normal home position is set by the slider and rod on the motor side, but there is the option for the home position to be on the other side to accomodate variations in device layout, etc. (Note: Home position settings are factory settings. Changes to these settings after the product is delivered will require shipping the product back to IAI for re-setting.)

Knuckle joint

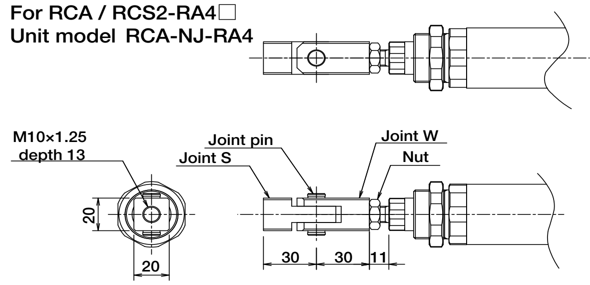
■ Models NJ

Applicable models	Rod Type RCA-RA3C / RA3D / RA3R / RA4C / RA4D / RA4R RCS2-RA4C / RA4D / RA4R
Description	Clevis or trunnion fittings give rotational freedom of movement for the ends of the actuator rods.

For RCA-RA3□
Unit model RCA-NJ-RA3



For RCA / RCS2-RA4□
Unit model RCA-NJ-RA4



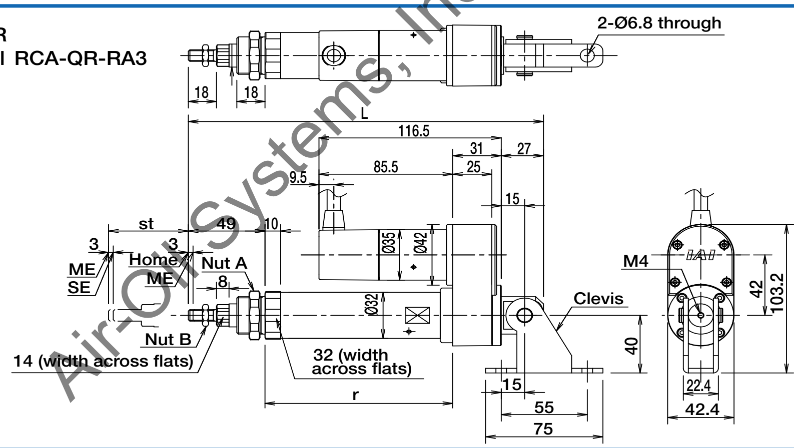
Clevis

■ Models QR

Applicable models	Rod Type RCA-RA3R / RA4R RCS2-RA4R
Description	A bracket for aligning the cylinder movement when the load installed at the tip of the rod moves in a direction different from the rod.

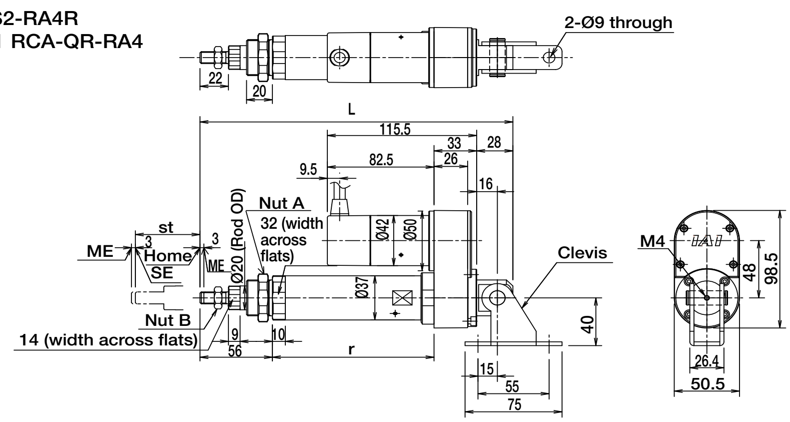
Caution If the rod is to be moved with a clevis bracket attached to it, use a guide type or install an external guide to prevent the rod from receiving any load other than from its moving direction.

RCA-RA3R
Unit model RCA-QR-RA3



st	ℓ	L
50	120	227
100	170	277
150	220	327
200	270	377

RCA / RCS2-RA4R
Unit model RCA-QR-RA4



st	ℓ	L
50	125	242
100	175	292
150	225	342
200	275	392
250	325	442
300	375	492

Rod end extension specification

■ Models RE

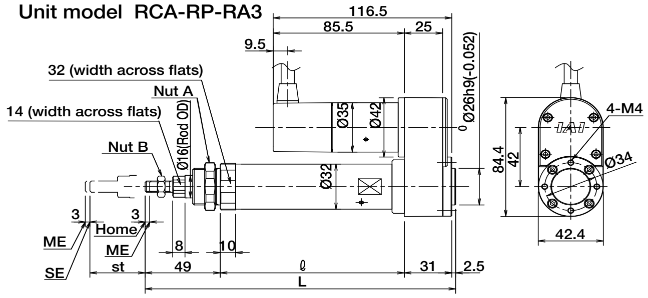
Applicable models	RCS2-SRA7BD
Description	An adapter for extending the rod end so that the distance between the mounting hole and the rod end can be the same as that of RCS2-RA7BD.

Rear mounting plate

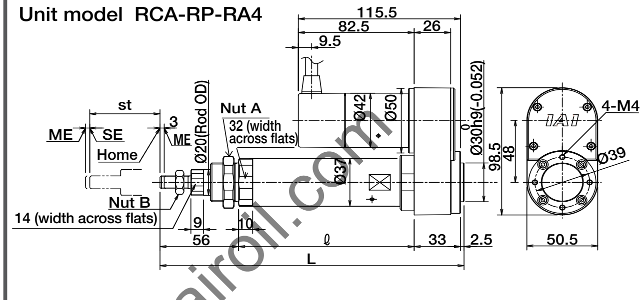
■ Models RP

Applicable models	Motor reversing rod types RCA-RA3R / RA4R and RCS2-RA4R
Description	A bracket (plate) for affixing the back of a motor-reversing rod type (RA3R/RA4R) to the system.

For RCA-RA3R
Unit model RCA-RP-RA3



For RCA / RCS2-RA4R
Unit model RCA-RP-RA4

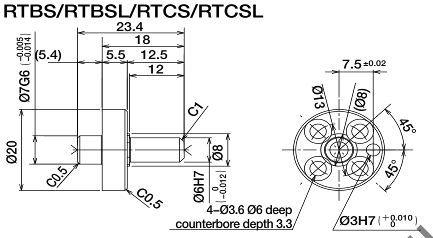


Shaft adapter

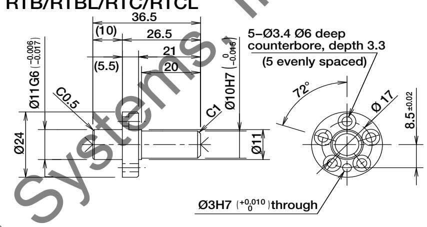
■ Models SA

Applicable models	All rotary type models
Description	An adapter for installing a jig, etc., onto the rotating part of a rotary type.

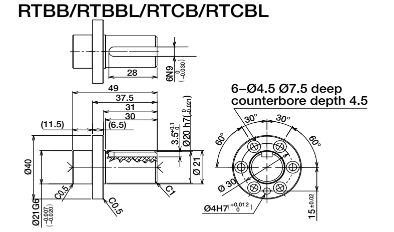
RTBS/RTBSL/RTCS/RTCSL



RTB/RTBL/RTC/RTCL

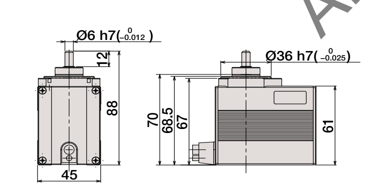


RTBB/RTBBL/RTCB/RTCBL



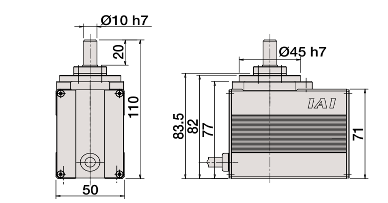
Combined w/ RCP2-RTBS/RTBSL

Configuration: RCP2-SA-RTS
(Weight: 0.02kg)



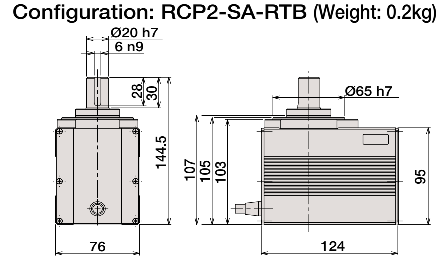
Combined w/ RCP2-RTB/RTBL

Configuration: RCP2-SA-RT
(Weight: 0.04kg)



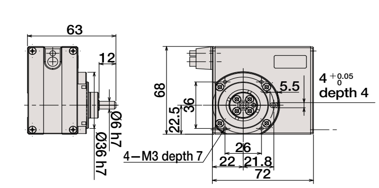
Combined w/ RCP2-RTBB/RTBBL

Configuration: RCP2-SA-RTB (Weight: 0.2kg)



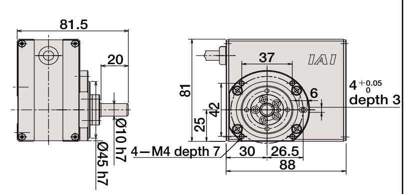
Combined w/ RCP2-RTCS/RTCSL

Configuration: RCP2-SA-RTS
(Weight: 0.02kg)



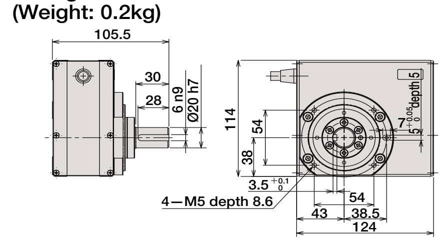
Combined w/ RCP2-RTC/RTCL

Configuration: RCP2-SA-RT
(Weight: 0.04kg)



Combined w/ RCP2-RTCB/RTCBL

Configuration: RCP2-SA-RTB
(Weight: 0.2kg)

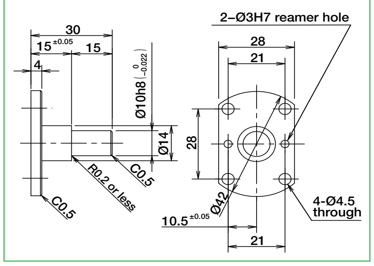


Shaft bracket

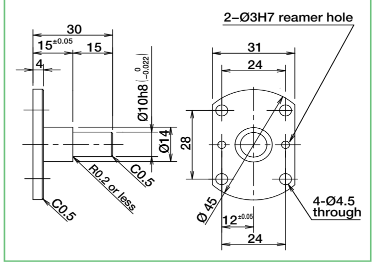
■ Models SB

Applicable models	Gripper Type	RCP2-GRS / GRM / GR3LS GR3LM / GR3SS / GR3SM
Description	This bracket is for mounting the gripper unit.	

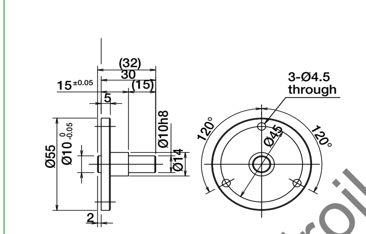
Unit model for RCP2-GRS: RCP2-SB-GRS



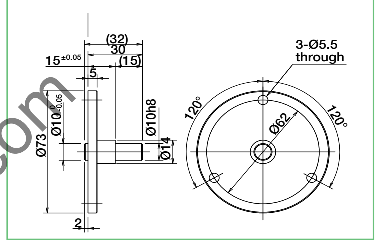
Unit model for RCP2-GRM: RCP2-SB-GRM



Unit model for GR3LS/GR3SS: RCP2-SB-GR3S



Unit model for GR3LM/GR3SM: RCP2-SB-GR3M



Slider roller specification

■ Models SR

Applicable models	Slider type	RCA-SA4□/SA5□/SA6□ RCS2-SA4□/SA5□/SA6□/SA7□/SS7□/SS8□
Description	This changes the structure of the standard slider type that is similar to those found in cleanroom types.	

Slider spacer

■ Models SS

Applicable models	Slider Type	RCA-SA4C / SA4R RCS2-SA4C / SA4R
Description	A spacer for raising the top face of the slider on the SA4 type to above the motor. This spacer is not required for non-SA4 types because the top face of the slider is above the motor on these actuators.	

For RCA / RCS2-SA4□
Unit model RCA-SS-SA4

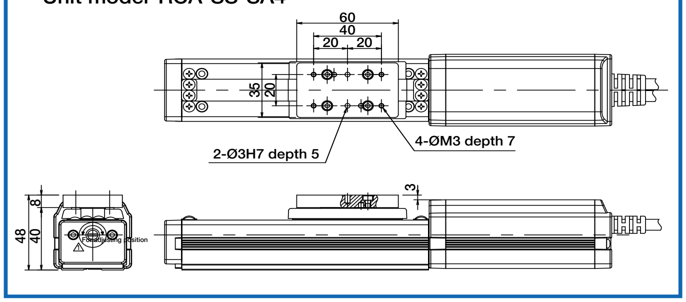
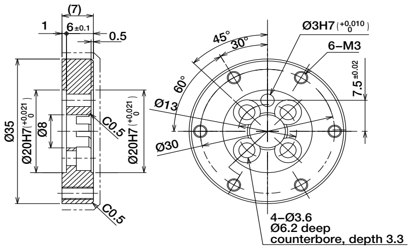


Table adapter

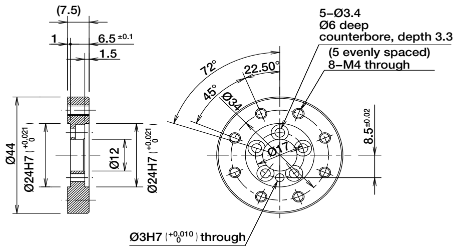
■ Models TA

Applicable models	All rotary type models
Description	An adapter for installing a jig, etc., onto the rotating part of a rotary type.

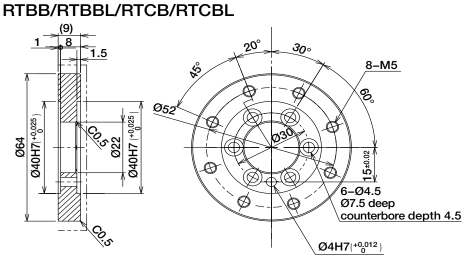
RTBS/RTBSL/RTCS/RTCSL



RTB/RTBL/RTC/RTCL

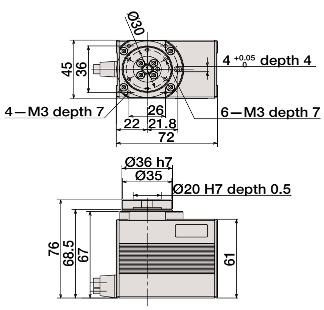


RTBB/RTBBL/RTCB/RTCBL



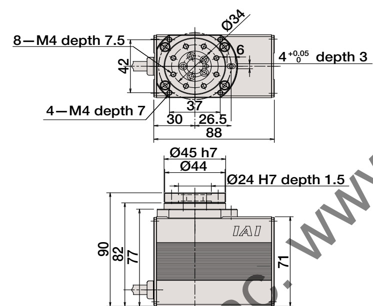
Combined w/ RCP2-RTBS/RTBSL

Configuration: RCP2-TA-RTS
(Weight: 0.02kg)



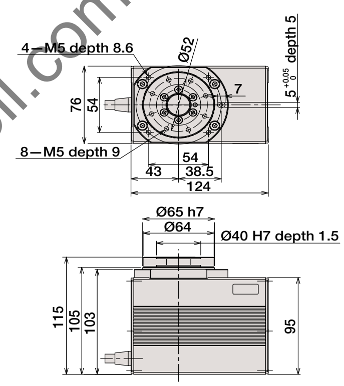
Combined w/ RCP2-RTB/RTBL

Configuration: RCP2-TA-RT
(Weight: 0.03kg)



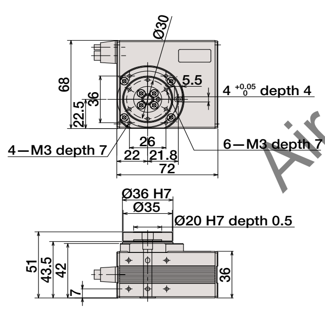
Combined w/ RCP2-RTBB/RTBBL

Configuration: RCP2-TA-RTB
(Weight: 0.06kg)



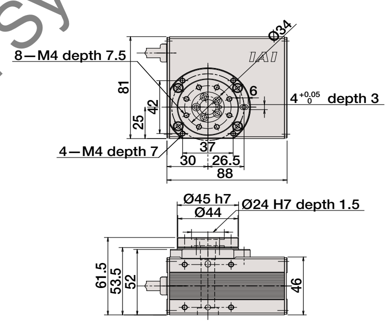
Combined w/ RCP2-RTCS/RTCSL

Configuration: RCP2-TA-RTS
(Weight: 0.02kg)



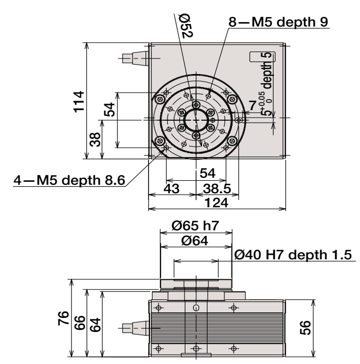
Combined w/ RCP2-RTC/RTCL

Configuration: RCP2-TA-RT
(Weight: 0.03kg)



Combined w/ RCP2-RTCB/RTCBL

Configuration: RCP2-TA-RTB
(Weight: 0.06kg)



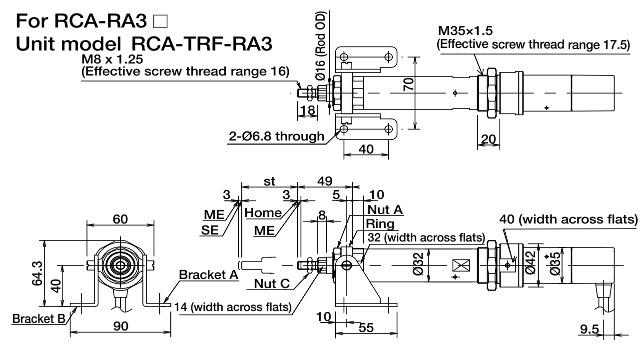
Front trunnion

■ Models TRF

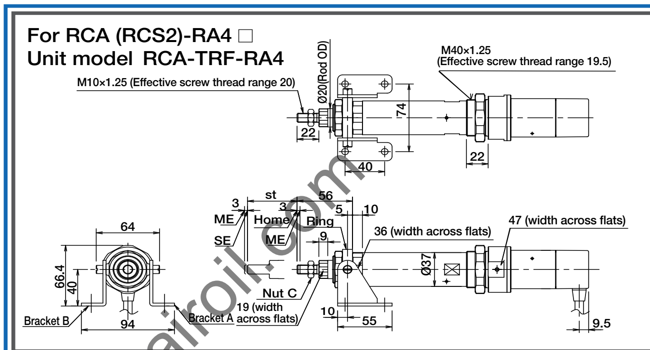
Applicable models	Rod Type RCA-RA3C / RA3D / RA3R / RA4C / RA4D / RA4R RCS2-RA4C / RA4D / RA4R
Description	A bracket for aligning the cylinder movement when the load installed at the tip of the rod moves in a direction different from the rod.

Caution If a rod is moved with a trunnion bracket mounted to it, use a guide type or install an external guide so no load is applied to the rod in a direction other than the proper direction the rod travels.

For RCA-RA3 □
Unit model RCA-TRF-RA3



For RCA (RCS2)-RA4 □
Unit model RCA-TRF-RA4



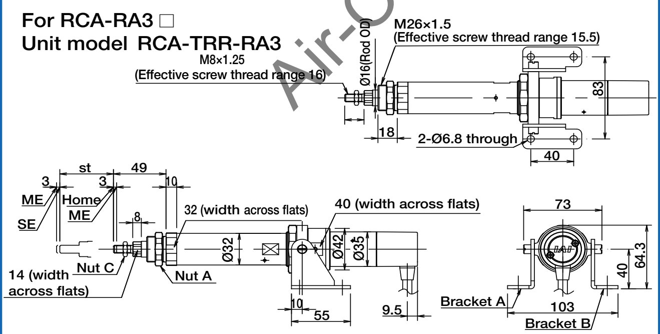
Rear trunnion

■ Models TRR

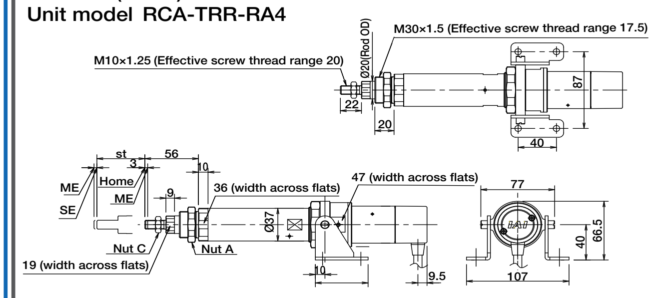
Applicable models	Rod Type RCA-RA3C / RA3D / RA4C / RA4D RCS2-RA4C / RA4D
Description	A bracket for aligning the cylinder movement when the load installed at the tip of the rod moves in a direction different from the rod.

Caution If a rod is moved with a trunnion bracket mounted to it, use a guide type or install an external guide so no load is applied to the rod in a direction other than the proper direction the rod travels.

For RCA-RA3 □
Unit model RCA-TRR-RA3



For RCA (RCS2)-RA4 □
Unit model RCA-TRR-RA4



Vacuum joint mounted on opposite side

■ Models VR

Applicable models	All cleanroom type models
Description	Looking from the motor side, the standard position for the vacuum joint is on the left side of the actuator, but this option allows users to change the position to the opposite side (right side).

Table of Actuator-Controller Connection Cable Models

This table shows the models of cables connecting the actuator of the vertical axis and the controller of the horizontal axis.
For the details of cabling, cable size, etc., see the applicable page shown beneath the model number.

Connection Actuator		Cable Type	Connection Controller			
			PMEC PSEP	**AMEC ASEP**	**PCON PSEL**	
RCP3 (All Models) **RCP2-GRSS/GRLS/GRST** **RCP2-SRA4R/SRGS4R/SRGD4R**		Motor-Encoder Integrated Cable	Model CB-APSEP-MPA□□□ See page 485 for details.	Unavailable	Model CB-PCS-MPA□□□ See page 534 for details.	
RCP2 **RCP2CR** **RCP2W**	Any model other than those below	Motor Cable	Motor-Encoder Integrated Cable (The standard robot cable) Model CB-APSEP-MPA□□□ See page 485 for details.	Unavailable	Model CB-RCP2-MA□□□ See page 533 for details.	
		Encoder Cable		Unavailable	Model CB-RCP2-PB□□□ See page 533 for details.	
		Encoder Robot Cable		Unavailable	Model CB-RCP2-PB□□□-RB See page 533 for details.	
	RTBS RTBSL RTCS RTCSL	Motor Cable	Motor-Encoder Integrated Cable (The standard robot cable) Model CB-RPSEP-MPA□□□ See page 486 for details.	Unavailable	Motor-Encoder Integrated Cable (The standard robot cable) Model CB-PCS-MPA□□□ See page 534 for details.	
		Encoder Cable		Unavailable		
		Encoder Robot Cable		Unavailable		
	HS8C HS8R SA16C RA10C	Motor Cable	Unavailable	Unavailable	Unavailable	
		Encoder Cable	Unavailable	Unavailable	Unavailable	
		Encoder Robot Cable	Unavailable	Unavailable	Unavailable	
RCA2(All Models) **RCA-SRA4R/SRGS4R/SRGD4R**		Motor-Encoder Integrated Cable	Unavailable	Model CB-APSEP-MPA□□□ See page 485 for details.	Unavailable	
RCA **RCACR** **RCAW**		Motor Cable	Unavailable	Motor-Encoder Integrated Cable (The standard robot cable) Model CB-ASEP-MPA□□□ See page 485 for details.	Unavailable	
		Encoder Cable	Unavailable		Unavailable	
		Encoder Robot Cable	Unavailable		Unavailable	
RCS2 **RCS2CR** **RCS2W** (Note) **RCS2-RT□/RA13R** is a dedicated cable. See page 556 for details.		Motor Cable	Unavailable	Unavailable	Unavailable	
		Encoder Cable	Unavailable	Unavailable	Unavailable	
		Motor Robot Cable	Unavailable	Unavailable	Unavailable	
		Encoder Robot Cable	Unavailable	Unavailable	Unavailable	
RCL		Motor-Encoder Integrated Cable	Unavailable	Model CB-APSEP-MPA□□□ See page 485 for details.	Unavailable	

Connection Controller				
PCON-CF	ACON ASEL	SCON SSEL	XSEL J/K	XSEL P/Q
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Model CB-RCP2-MA□□□ See page 533 for details.	Unavailable	Unavailable	Unavailable	Unavailable
Model CB-RFA-PA□□□ See page 534 for details.	Unavailable	Unavailable	Unavailable	Unavailable
Model CB-RFA-PA□□□-RB See page 534 for details.	Unavailable	Unavailable	Unavailable	Unavailable
Unavailable	Model CB-ACS-MPA□□□ See page 544 for details.	Unavailable	Unavailable	Unavailable
Unavailable	Model CB-ACS-MA□□□ See page 543 for details.	Unavailable	Unavailable	Unavailable
Unavailable	Model CB-ACS-PA□□□ See page 544 for details.	Unavailable	Unavailable	Unavailable
Unavailable	Model CB-ACS-PA□□□-RB See page 544 for details.	Unavailable	Unavailable	Unavailable
Unavailable	Unavailable	Model CB-RCC-MA□□□ See page 556 for details.	Model CB-RCC-MA□□□ See page 599 for details.	Model CB-RCC-MA□□□ See page 599 for details.
Unavailable	Unavailable	Model CB-RCS2-PA□□□ See page 556 for details.	Model CB-RCBC-PA□□□ See page 599 for details.	Model CB-RCS2-PA□□□ See page 599 for details.
Unavailable	Unavailable	Model CB-RCC-MA□□□-RB See page 556 for details.	Model CB-RCC-MA□□□-RB See page 599 for details.	Model CB-RCC-MA□□□-RB See page 599 for details.
Unavailable	Unavailable	Model CB-X3-PA□□□ See page 556 for details.	Model CB-RCBC-PA□□□-RB See page 599 for details.	Model CB-X3-PA□□□ See page 599 for details.
Unavailable	Model CB-ACS-MPA□□□ See page 544 for details.	Unavailable	Unavailable	Unavailable

Table of Replacement Stainless Sheet Models

Series	Type			Stainless Sheet Model
RCP3 RCA2	SA3C	SA3R		ST-3A3-(Stroke)
	SA4C	SA4R		ST-3A4-(Stroke)
	SA5C	SA5R		ST-3A5-(Stroke)
	SA6C	SA6R		ST-3A6-(Stroke)
RCP2	SA5C	SA5R		ST-2A5-(Stroke)
	SA6C	SA6R		ST-2A6-(Stroke)
	SA7C	SA7R		ST-2A7-(Stroke)
	SS7C	SS7R		ST-SS1-(Stroke)
	SS8C	SS8R		ST-SM1-(Stroke)
	HS8C	HS8R		ST-SM1-(Stroke)
RCA	SA4C	SA4D	SA4R	ST-SA4-(Stroke)
	SA5C	SA5D	SA5R	ST-SA5-(Stroke)
	SA6C	SA6D	SA6R	ST-SA6-(Stroke)
	SS4D			ST-SS4-(Stroke)
	SS5D			ST-SS5-(Stroke)
	SS6D			ST-SS6-(Stroke)
RCS2	SA4C	SA4D	SA4R	ST-SA4-(Stroke)
	SA5C	SA5D	SA5R	ST-SA5-(Stroke)
	SA6C	SA6D	SA6R	ST-SA6-(Stroke)
	SA7C		SA7R	ST-SA7-(Stroke)
	SS7C		SS7R	ST-SS1-(Stroke)
	SS8C		SS8R	ST-SM1-(Stroke)
RCP2CR	SA5C			ST-2A5-(Stroke)
	SA6C			ST-2A6-(Stroke)
	SA7C			ST-2A7-(Stroke)
	SS7C			ST-SS2-(Stroke)
	SS8C			ST-SM2-(Stroke)
	HS8C			ST-SM2-(Stroke)
RCACR	SA4C			ST-SA4-(Stroke)
	SA5C	SA5D		ST-SA5-(Stroke)
	SA6C	SA6D		ST-SA6-(Stroke)
RCS2CR	SA4C			ST-SA4-(Stroke)
	SA5C	SA5D		ST-SA5-(Stroke)
	SA6C	SA6D		ST-SA6-(Stroke)
	SA7C			ST-SA7-(Stroke)
	SS7C			ST-SS2-(Stroke)
	SS8C			ST-SM2-(Stroke)

Table of RCP3/RCA2 Replacement Motor Unit Models

Series	Type	Cable Outlet Direction Change Option	Motor Unit Model	
			No Brake	Brake-Equipped
RCP3	SA2AC	None	RCP3-MU00A	–
	SA2BC	None	RCP3-MU00A	–
	SA3C	None	RCP3-MU1A	RCP3-MU1A-B
		Upward	RCP3-MU1A-CJT	RCP3-MU1A-B-CJT
		Rightward	RCP3-MU1A-CJR	RCP3-MU1A-B-CJR
		Leftward	RCP3-MU1A-CJL	RCP3-MU1A-B-CJL
		Downward	RCP3-MU1A-CJB	RCP3-MU1A-B-CJB
	SA4C	None	RCP3-MU2A	RCP3-MU2A-B
		Upward	RCP3-MU2A-CJT	RCP3-MU2A-B-CJT
		Rightward	RCP3-MU2A-CJR	RCP3-MU2A-B-CJR
		Leftward	RCP3-MU2A-CJL	RCP3-MU2A-B-CJL
		Downward	RCP3-MU2A-CJB	RCP3-MU2A-B-CJB
	SA5C	None	RCP3-MU3A	RCP3-MU3A-B
		Upward	RCP3-MU3A-CJT	RCP3-MU3A-B-CJT
		Rightward	RCP3-MU3A-CJR	RCP3-MU3A-B-CJR
		Leftward	RCP3-MU3A-CJL	RCP3-MU3A-B-CJL
		Downward	RCP3-MU3A-CJB	RCP3-MU3A-B-CJB
	SA6C	None	RCP3-MU3A	RCP3-MU3A-B
		Upward	RCP3-MU3A-CJT	RCP3-MU3A-B-CJT
		Rightward	RCP3-MU3A-CJR	RCP3-MU3A-B-CJR
		Leftward	RCP3-MU3A-CJL	RCP3-MU3A-B-CJL
		Downward	RCP3-MU3A-CJB	RCP3-MU3A-B-CJB
	SA2AR	None	RCP3-MU00B	–
	SA2BR	None	RCP3-MU00B	–
	SA3R	None	RCP3-MU1B	RCP3-MU1B-B
		Upward	RCP3-MU1B-CJT	RCP3-MU1B-B-CJT
		Outward	RCP3-MU1B-CJO	RCP3-MU1B-B-CJO
		Downward	RCP3-MU1B-CJB	RCP3-MU1B-B-CJB
	SA4R	None	RCP3-MU2B	RCP3-MU2B-B
		Upward	RCP3-MU2B-CJT	RCP3-MU2B-B-CJT
		Outward	RCP3-MU2B-CJO	RCP3-MU2B-B-CJO
		Downward	RCP3-MU2B-CJB	RCP3-MU2B-B-CJB
	SA5R	None	RCP3-MU3B	RCP3-MU3B-B
		Upward	RCP3-MU3B-CJT	RCP3-MU3B-B-CJT
		Outward	RCP3-MU3B-CJO	RCP3-MU3B-B-CJO
		Downward	RCP3-MU3B-CJB	RCP3-MU3B-B-CJB
	SA6R	None	RCP3-MU3B	RCP3-MU3B-B
		Upward	RCP3-MU3B-CJT	RCP3-MU3B-B-CJT
		Outward	RCP3-MU3B-CJO	RCP3-MU3B-B-CJO
		Downward	RCP3-MU3B-CJB	RCP3-MU3B-B-CJB
	RA2AC	None	RCP3-MU00A	RCP3-MU00A-B
	RA2BC	None	RCP3-MU00A	RCP3-MU00A-B
	RA2AR	None	RCP3-MU00B	RCP3-MU00B-B
	RA2BR	None	RCP3-MU00B	RCP3-MU00B-B
	TA3C	None	RCP3-MU0A	RCP3-MU0A-B
	TA4C	None	RCP3-MU1A	RCP3-MU1A-B
		Upward	RCP3-MU1A-CJT	RCP3-MU1A-B-CJT
		Rightward	RCP3-MU1A-CJR	RCP3-MU1A-B-CJR
		Leftward	RCP3-MU1A-CJL	RCP3-MU1A-B-CJL
		Downward	RCP3-MU1A-CJB	RCP3-MU1A-B-CJB

Table of RCP3/RCA2 Replacement Motor Unit Models

Series	Type	Cable Outlet Direction Change Option	Motor Unit Model	
			No Brake	Brake-Equipped
RCP3	TA5C	None	RCP3-MU2A	RCP3-MU2A-B
		Upward	RCP3-MU2A-CJT	RCP3-MU2A-B-CJT
		Rightward	RCP3-MU2A-CJR	RCP3-MU2A-B-CJR
		Leftward	RCP3-MU2A-CJL	RCP3-MU2A-B-CJL
		Downward	RCP3-MU2A-CJB	RCP3-MU2A-B-CJB
	TA6C	None	RCP3-MU3A	RCP3-MU3A-B
		Upward	RCP3-MU3A-CJT	RCP3-MU3A-B-CJT
		Rightward	RCP3-MU3A-CJR	RCP3-MU3A-B-CJR
		Leftward	RCP3-MU3A-CJL	RCP3-MU3A-B-CJL
		Downward	RCP3-MU3A-CJB	RCP3-MU3A-B-CJB
	TA7C	None	RCP3-MU3A	RCP3-MU3A-B
		Upward	RCP3-MU3A-CJT	RCP3-MU3A-B-CJT
		Rightward	RCP3-MU3A-CJR	RCP3-MU3A-B-CJR
		Leftward	RCP3-MU3A-CJL	RCP3-MU3A-B-CJL
		Downward	RCP3-MU3A-CJB	RCP3-MU3A-B-CJB
	TA3R	None	RCP3-MU0B	RCP3-MU0B-B
	TA4R	None	RCP3-MU1B	RCP3-MU1B-B
		Upward	RCP3-MU1B-CJT	RCP3-MU1B-B-CJT
		Outward	RCP3-MU1B-CJO	RCP3-MU1B-B-CJO
		Downward	RCP3-MU1B-CJB	RCP3-MU1B-B-CJB
	TA5R	None	RCP3-MU2B	RCP3-MU2B-B
		Upward	RCP3-MU2B-CJT	RCP3-MU2B-B-CJT
		Outward	RCP3-MU2B-CJO	RCP3-MU2B-B-CJO
		Downward	RCP3-MU2B-CJB	RCP3-MU2B-B-CJB
	TA6R	None	RCP3-MU3B	RCP3-MU3B-B
		Upward	RCP3-MU3B-CJT	RCP3-MU3B-B-CJT
		Outward	RCP3-MU3B-CJO	RCP3-MU3B-B-CJO
		Downward	RCP3-MU3B-CJB	RCP3-MU3B-B-CJB
	TA7R	None	RCP3-MU3B	RCP3-MU3B-B
		Upward	RCP3-MU3B-CJT	RCP3-MU3B-B-CJT
		Outward	RCP3-MU3B-CJO	RCP3-MU3B-B-CJO
		Downward	RCP3-MU3B-CJB	RCP3-MU3B-B-CJB
RCA2	SA3C	None	RCA2-MU1A	RCA2-MU1A-B
		Upward	RCA2-MU1A-CJT	RCA2-MU1A-B-CJT
		Rightward	RCA2-MU1A-CJR	RCA2-MU1A-B-CJR
		Leftward	RCA2-MU1A-CJL	RCA2-MU1A-B-CJL
		Downward	RCA2-MU1A-CJB	RCA2-MU1A-B-CJB
	SA4C	None	RCA2-MU2A	RCA2-MU2A-B
		Upward	RCA2-MU2A-CJT	RCA2-MU2A-B-CJT
		Rightward	RCA2-MU2A-CJR	RCA2-MU2A-B-CJR
		Leftward	RCA2-MU2A-CJL	RCA2-MU2A-B-CJL
		Downward	RCA2-MU2A-CJB	RCA2-MU2A-B-CJB
	SA5C	None	RCA2-MU3A	RCA2-MU3A-B
		Upward	RCA2-MU3A-CJT	RCA2-MU3A-B-CJT
		Rightward	RCA2-MU3A-CJR	RCA2-MU3A-B-CJR
		Leftward	RCA2-MU3A-CJL	RCA2-MU3A-B-CJL
		Downward	RCA2-MU3A-CJB	RCA2-MU3A-B-CJB
	SA6C	None	RCA2-MU3A	RCA2-MU3A-B
		Upward	RCA2-MU3A-CJT	RCA2-MU3A-B-CJT
		Rightward	RCA2-MU3A-CJR	RCA2-MU3A-B-CJR
		Leftward	RCA2-MU3A-CJL	RCA2-MU3A-B-CJL
		Downward	RCA2-MU3A-CJB	RCA2-MU3A-B-CJB

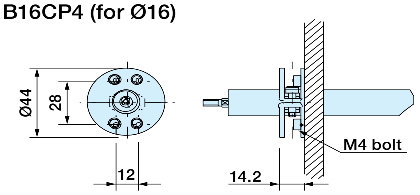
Series	Type	Cable Outlet Direction Change Option	Motor Unit Model	
			No Brake	Brake-Equipped
RCA2	SA3R	None	RCA2-MU1B	RCA2-MU1B-B
		Upward	RCA2-MU1B-CJT	RCA2-MU1B-B-CJT
		Outward	RCA2-MU1B-CJO	RCA2-MU1B-B-CJO
		Downward	RCA2-MU1B-CJB	RCA2-MU1B-B-CJB
	SA4R	None	RCA2-MU2B	RCA2-MU2B-B
		Upward	RCA2-MU2B-CJT	RCA2-MU2B-B-CJT
		Outward	RCA2-MU2B-CJO	RCA2-MU2B-B-CJO
		Downward	RCA2-MU2B-CJB	RCA2-MU2B-B-CJB
	SA5R	None	RCA2-MU3B	RCA2-MU3B-B
		Upward	RCA2-MU3B-CJT	RCA2-MU3B-B-CJT
		Outward	RCA2-MU3B-CJO	RCA2-MU3B-B-CJO
		Downward	RCA2-MU3B-CJB	RCA2-MU3B-B-CJB
	SA6R	None	RCA2-MU3B	RCA2-MU3B-B
		Upward	RCA2-MU3B-CJT	RCA2-MU3B-B-CJT
		Outward	RCA2-MU3B-CJO	RCA2-MU3B-B-CJO
		Downward	RCA2-MU3B-CJB	RCA2-MU3B-B-CJB
	TA3C	None	RCA2-MU0A	RCA2-MU0A-B
	TA4C	None	RCA2-MU1A	RCA2-MU1A-B
		Upward	RCA2-MU1A-CJT	RCA2-MU1A-B-CJT
		Rightward	RCA2-MU1A-CJR	RCA2-MU1A-B-CJR
		Leftward	RCA2-MU1A-CJL	RCA2-MU1A-B-CJL
		Downward	RCA2-MU1A-CJB	RCA2-MU1A-B-CJB
	TA5C	None	RCA2-MU2A	RCA2-MU2A-B
		Upward	RCA2-MU2A-CJT	RCA2-MU2A-B-CJT
		Rightward	RCA2-MU2A-CJR	RCA2-MU2A-B-CJR
		Leftward	RCA2-MU2A-CJL	RCA2-MU2A-B-CJL
		Downward	RCA2-MU2A-CJB	RCA2-MU2A-B-CJB
	TA6C	None	RCA2-MU3A	RCA2-MU3A-B
		Upward	RCA2-MU3A-CJT	RCA2-MU3A-B-CJT
		Rightward	RCA2-MU3A-CJR	RCA2-MU3A-B-CJR
		Leftward	RCA2-MU3A-CJL	RCA2-MU3A-B-CJL
		Downward	RCA2-MU3A-CJB	RCA2-MU3A-B-CJB
	TA7C	None	RCA2-MU3A	RCA2-MU3A-B
		Upward	RCA2-MU3A-CJT	RCA2-MU3A-B-CJT
		Rightward	RCA2-MU3A-CJR	RCA2-MU3A-B-CJR
		Leftward	RCA2-MU3A-CJL	RCA2-MU3A-B-CJL
		Downward	RCA2-MU3A-CJB	RCA2-MU3A-B-CJB
	TA3R	None	RCA2-MU0B	RCA2-MU0B-B
	TA4R	None	RCA2-MU1B	RCA2-MU1B-B
		Upward	RCA2-MU1B-CJT	RCA2-MU1B-B-CJT
		Outward	RCA2-MU1B-CJO	RCA2-MU1B-B-CJO
		Downward	RCA2-MU1B-CJB	RCA2-MU1B-B-CJB
	TA5R	None	RCA2-MU2B	RCA2-MU2B-B
		Upward	RCA2-MU2B-CJT	RCA2-MU2B-B-CJT
		Outward	RCA2-MU2B-CJO	RCA2-MU2B-B-CJO
		Downward	RCA2-MU2B-CJB	RCA2-MU2B-B-CJB
	TA6R	None	RCA2-MU3B	RCA2-MU3B-B
		Upward	RCA2-MU3B-CJT	RCA2-MU3B-B-CJT
		Outward	RCA2-MU3B-CJO	RCA2-MU3B-B-CJO
		Downward	RCA2-MU3B-CJB	RCA2-MU3B-B-CJB
	TA7R	None	RCA2-MU3B	RCA2-MU3B-B
		Upward	RCA2-MU3B-CJT	RCA2-MU3B-B-CJT
		Outward	RCA2-MU3B-CJO	RCA2-MU3B-B-CJO
		Downward	RCA2-MU3B-CJB	RCA2-MU3B-B-CJB

How To Mount an RCL Mini Rod Slim Type To The Actuator

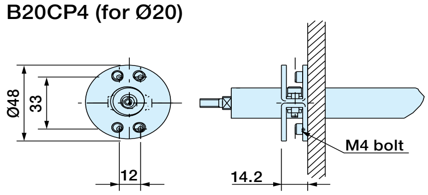
Mount the RCL mini rod slim type using a commercial bracket as shown below.
For details concerning the bracket, please refer to the manufacturer.

● Shaft Bracket (Iwata Mfg. Co., Ltd.)

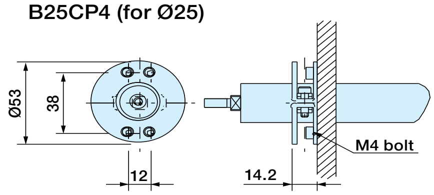
B16CP4 (for Ø16)



B20CP4 (for Ø20)

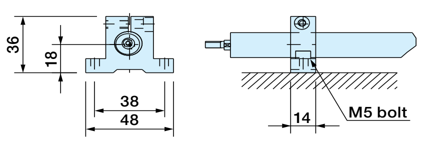


B25CP4 (for Ø25)

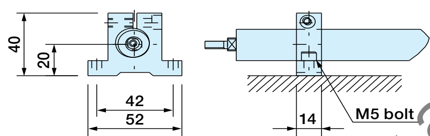


● Maru-Pijon (Miyoshi Pijon Co., Ltd).

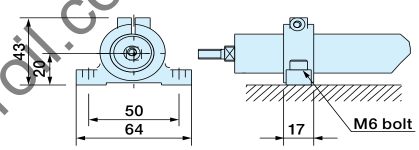
PN600 (for Ø16)



PQ600 (for Ø20)



PH600 (for Ø25)



Note:	When clamping the main pipe, do not exceed the tightening torque documented in the instructions manual. If the tightening torque for securing the main pipe is too strong, the pipe may become deformed or defective, and may cause a malfunction.

MEMO

Selection Standard (Speed vs. Load Capacity Graph)

ERC2 Series | Slider Type

Select horizontal or vertical use

From the device cycle time, select speed type

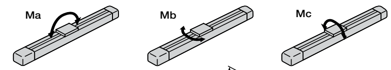
Use the graphs below to select a model for your purpose

Cautionary Notes

- When using a slider type, if the overhang from the center of the object mounted on the slider is large, please consider the moment load and the overhang load length.

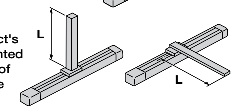
Moment Load

Please ensure the moment loads are within the specified range for Ma, Mb, and Mc.

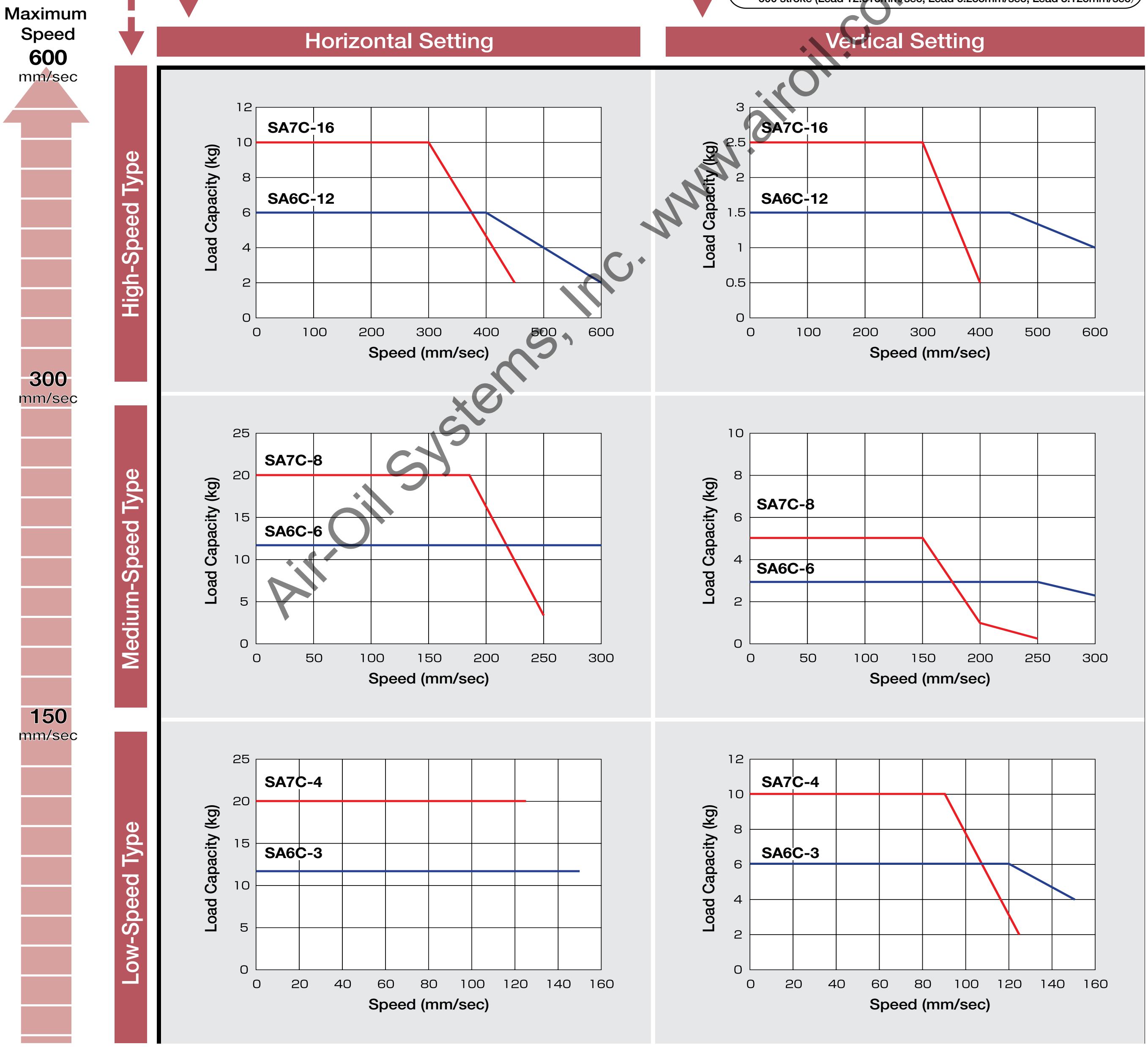


Overhang Load Length

The value when the mounted object's center of gravity is L/2. If the mounted object overhangs in the direction of Ma, Mb, or Mc, make sure that the length is within range.



- The maximum speed for the SA6 type's 600 strokes is limited by the relation to the critical number of rotations.
  600 stroke (Lead 12:515mm/sec, Lead 6:255mm/sec, Lead 3:125mm/sec)



Note: In the graph above, the number after the type is the lead number.

ERC2 Series Rod type standard model

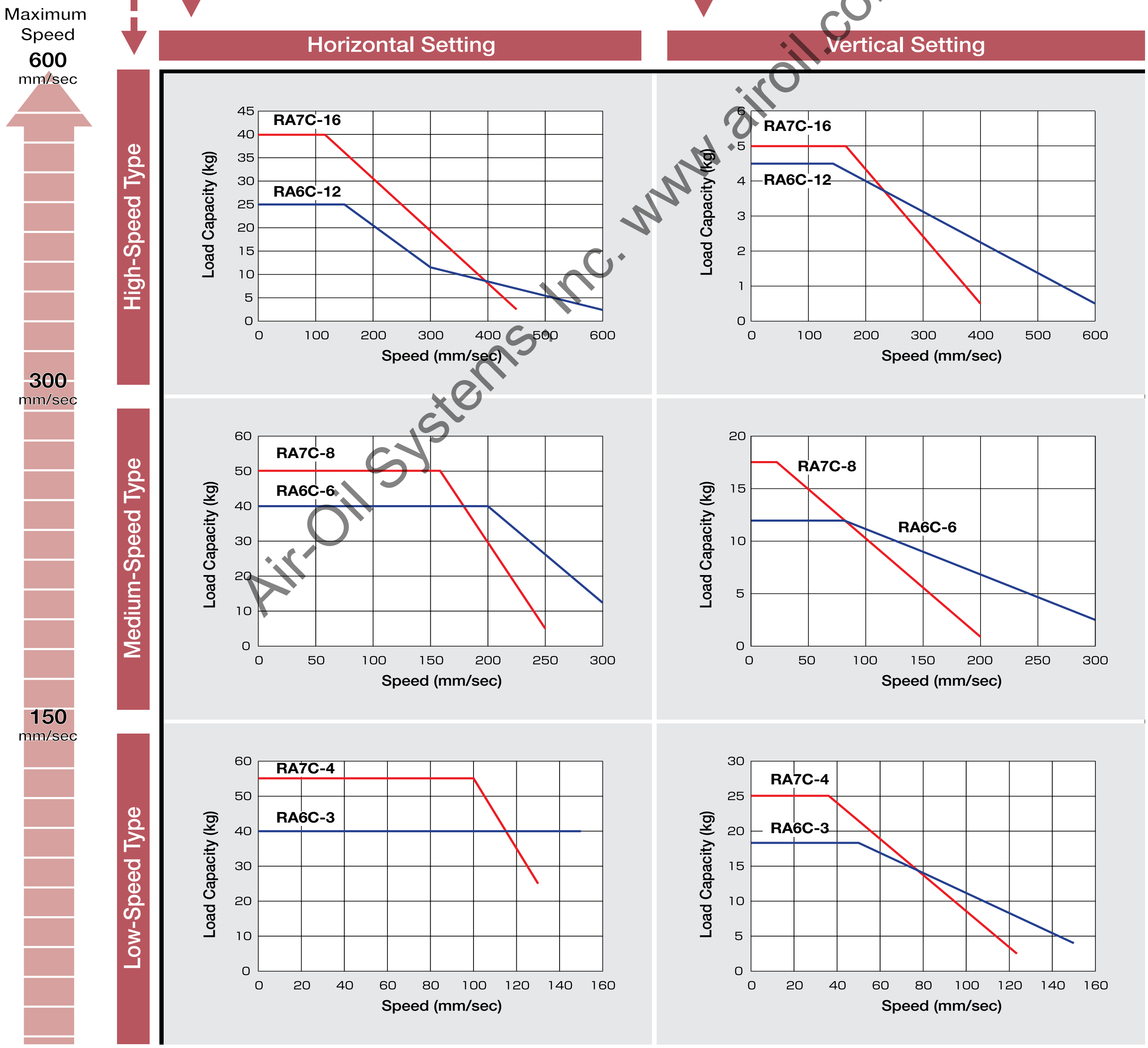
Select horizontal or vertical use

From the device cycle time, select speed type

Use the graphs below to select a model for your purpose

Cautionary Notes

- Absolutely no external force is considered for the rod type, other than that coming from the direction of the rod's advance. Please use a high-rigidity model or add a guide if an external force is applied at a right angle to the rod and in the direction of the rotation.
- The graphs below for the horizontal setting show the values when an external guide is used.
- The maximum speed for the SA6 type's 300 strokes is limited by the relation to the critical number of rotations. 300 stroke (Lead 12:500mm/sec, Lead 6:250mm/sec, Lead 3:125mm/sec)



Note: In the graph above, the number after the type is the lead number.

Selection Standard (Speed vs. Load Capacity Graph)

RCP3 Series Slider Type

Select horizontal or vertical use

From the device cycle time, select speed type

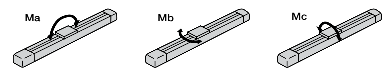
Use the graphs below to select a model for your purpose

Cautionary Notes

When using a slider type, if the overhang from the center of the object mounted on the slider is large, please consider the moment load and the overhang load length.

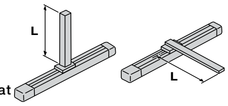
Moment load

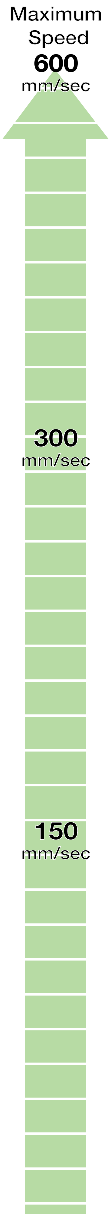
Please ensure the moment loads are within the specified range for Ma, Mb, and Mc.



Overhang Load Length

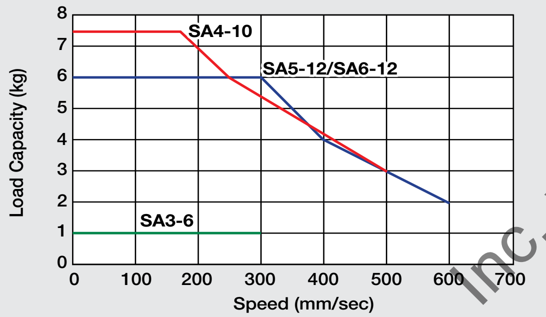
The value when the mounted object's center of gravity is L/2. If the mounted object overhangs in the direction of Ma, Mb, or Mc, make sure that the length is within range.

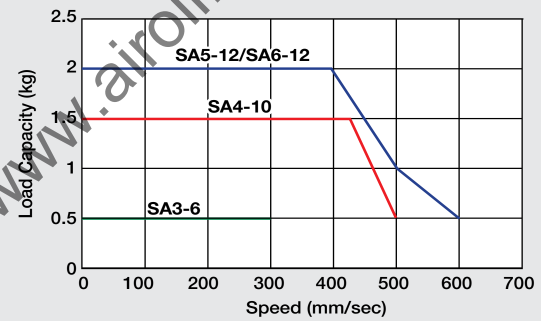




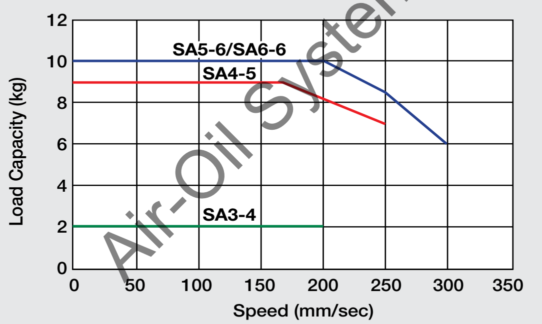
Horizontal Setting | Vertical Setting

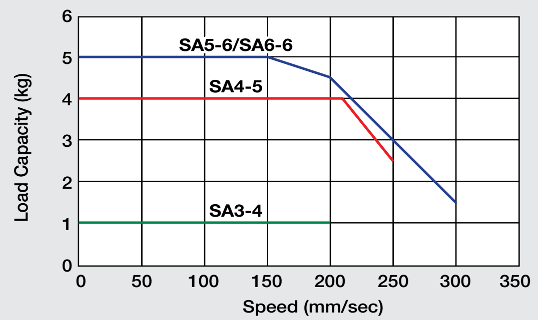
High-Speed Type



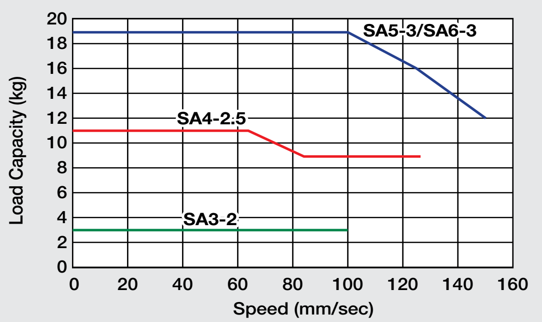


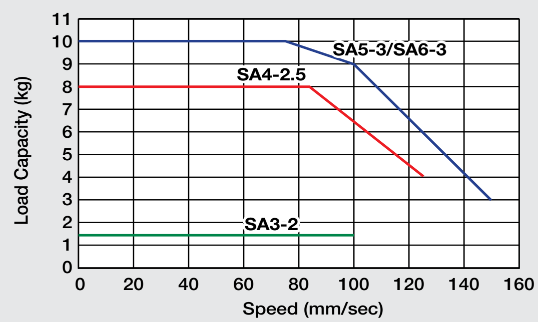
Medium-Speed Type





Low-Speed Type





Note: In the graph above, the number after the type is the lead number.

Table of Load Capacity per Speed/Acceleration

For RCP3-SA4C/SA5C/SA6C, the acceleration can be increased up to 0.7G.
However, please note that load capacity decreases as the speed and acceleration increase, as shown below.

[RCP3-SA4C]

<table>
<tr><th rowspan="3"></th><th rowspan="3">Speed (mm/s)</th><th colspan="4">Horizontal Operation</th><th colspan="3">Vertical Operation</th></tr>
<tr><th colspan="4">Acceleration</th><th colspan="3">Acceleration</th></tr>
<tr><th>0.2G</th><th>0.3G</th><th>0.5G</th><th>0.7G</th><th>0.1G</th><th>0.2G</th><th>0.3G</th></tr>
<tr><td rowspan="7">High-Speed Type (Lead 10)</td><td>0</td><td rowspan="3">9</td><td rowspan="3">7.5</td><td rowspan="3">6.5</td><td rowspan="3">5.5</td><td rowspan="6">1.5</td><td rowspan="6">1.5</td><td rowspan="6">1.5</td></tr>
<tr><td>83</td></tr>
<tr><td>167</td></tr>
<tr><td>250</td><td>7</td><td>6</td><td>5</td><td>4</td></tr>
<tr><td>333</td><td>6</td><td>5</td><td>4</td><td>3</td></tr>
<tr><td>417</td><td>5</td><td>4</td><td>3</td><td>2</td></tr>
<tr><td>500</td><td>4</td><td>3</td><td>2</td><td>1</td><td>1</td><td>0.5</td><td>0.5</td></tr>
<tr><td rowspan="7">Medium-Speed Type (Lead 5)</td><td>0</td><td rowspan="5">10</td><td rowspan="5">9</td><td rowspan="5">8</td><td rowspan="5">7</td><td rowspan="6">4</td><td rowspan="6">4</td><td rowspan="6">4</td></tr>
<tr><td>42</td></tr>
<tr><td>83</td></tr>
<tr><td>125</td></tr>
<tr><td>167</td></tr>
<tr><td>208</td><td>9</td><td>8</td><td>7</td><td>6</td></tr>
<tr><td>250</td><td>8</td><td>7</td><td>6</td><td>5</td><td>3</td><td>2.5</td><td>2</td></tr>
<tr><td rowspan="7">Low-Speed Type (Lead 2.5)</td><td>0</td><td rowspan="4">11</td><td rowspan="4">10</td><td rowspan="4">9</td><td rowspan="4">8</td><td rowspan="6">8</td><td rowspan="5">8</td><td rowspan="5">8</td></tr>
<tr><td>21</td></tr>
<tr><td>42</td></tr>
<tr><td>63</td></tr>
<tr><td>83</td><td rowspan="3">9</td><td rowspan="3">8</td><td rowspan="3">7</td><td rowspan="3">6</td></tr>
<tr><td>104</td><td>6</td><td>6</td></tr>
<tr><td>125</td><td>5</td><td>4</td><td>4</td></tr>
</table>

[RCP3-SA5C/SA6C]

<table>
<tr><th rowspan="3"></th><th rowspan="3">Speed (mm/s)</th><th colspan="4">Horizontal Operation</th><th colspan="3">Vertical Operation</th></tr>
<tr><th colspan="4">Acceleration</th><th colspan="3">Acceleration</th></tr>
<tr><th>0.2G</th><th>0.3G</th><th>0.5G</th><th>0.7G</th><th>0.1G</th><th>0.2G</th><th>0.3G</th></tr>
<tr><td rowspan="7">High-Speed Type (Lead 12)</td><td>0</td><td rowspan="3">8</td><td rowspan="4">6</td><td rowspan="4">4</td><td rowspan="4">3</td><td rowspan="5">2</td><td rowspan="5">2</td><td rowspan="5">2</td></tr>
<tr><td>100</td></tr>
<tr><td>200</td></tr>
<tr><td>300</td><td>6</td></tr>
<tr><td>400</td><td>5</td><td>4</td><td>3</td><td>2.5</td></tr>
<tr><td>500</td><td>4</td><td>3</td><td>2</td><td>1.5</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>600</td><td>3</td><td>2</td><td>1</td><td>0.5</td><td>0.5</td><td>0.5</td><td>0.5</td></tr>
<tr><td rowspan="7">Medium-Speed Type (Lead 6)</td><td>0</td><td rowspan="5">12</td><td rowspan="5">10</td><td rowspan="5">8</td><td rowspan="5">6</td><td rowspan="5">5</td><td rowspan="4">5</td><td rowspan="4">5</td></tr>
<tr><td>50</td></tr>
<tr><td>100</td></tr>
<tr><td>150</td></tr>
<tr><td>200</td><td>4.5</td><td>3.5</td></tr>
<tr><td>250</td><td>10</td><td>8.5</td><td>6</td><td>4.5</td><td>3.5</td><td>3</td><td>2</td></tr>
<tr><td>300</td><td>7</td><td>6</td><td>3</td><td>1</td><td>2</td><td>1.5</td><td>0.5</td></tr>
<tr><td rowspan="7">Low-Speed Type (Lead 3)</td><td>0</td><td rowspan="5">19</td><td rowspan="5">14</td><td rowspan="5">9</td><td rowspan="5">7</td><td rowspan="5">10</td><td rowspan="4">10</td><td rowspan="4">10</td></tr>
<tr><td>25</td></tr>
<tr><td>50</td></tr>
<tr><td>75</td></tr>
<tr><td>100</td><td>9</td><td>8</td></tr>
<tr><td>125</td><td>16</td><td>11</td><td>7</td><td>5</td><td>7</td><td>6</td><td>5</td></tr>
<tr><td>150</td><td>12</td><td>8</td><td>5</td><td>3</td><td>4</td><td>3</td><td>2</td></tr>
</table>

Selection Standard (Speed vs. Load Capacity Graph)

RCP3 Series Table Type

Select horizontal or vertical use

From the device cycle time, select speed type

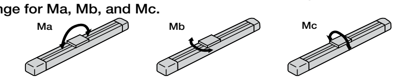
Use the graphs below to select a model for your purpose

Cautionary Notes

When using a slider type, if the overhang from the center of the object mounted on the slider is large, please consider the moment load and the overhang load length.

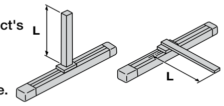
Moment load

Please ensure the moment loads are within the specified range for Ma, Mb, and Mc.



Overhang Load Length

The value when the mounted object's center of gravity is L/2. If the mounted object overhangs in the direction of Ma, Mb, or Mc, make sure that the length is within range.



Maximum Speed

600 mm/sec

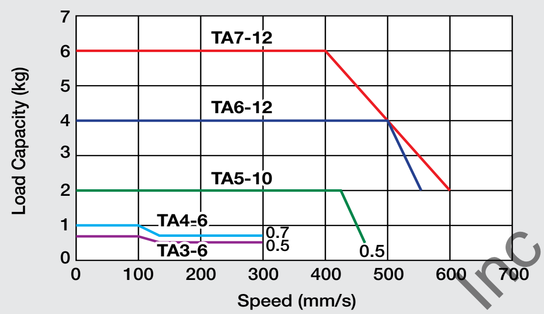
300 mm/sec

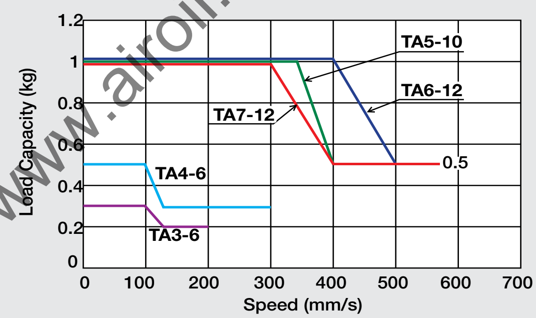
150 mm/sec

Horizontal Setting

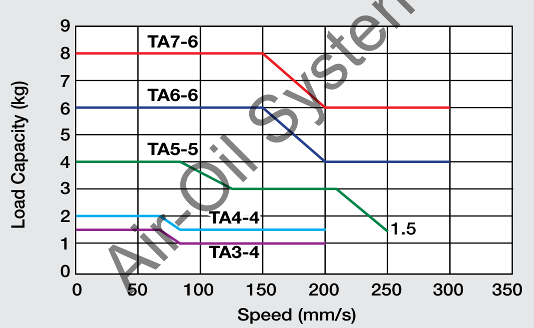
Vertical Setting

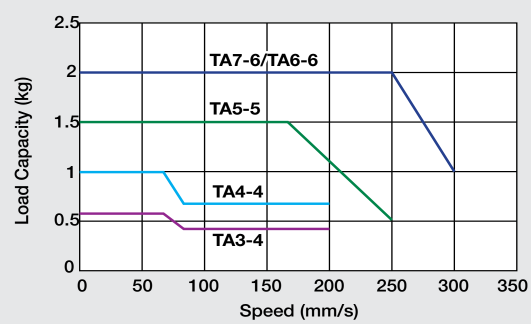
High-Speed Type



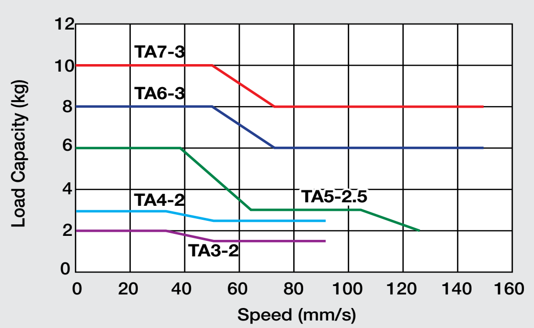


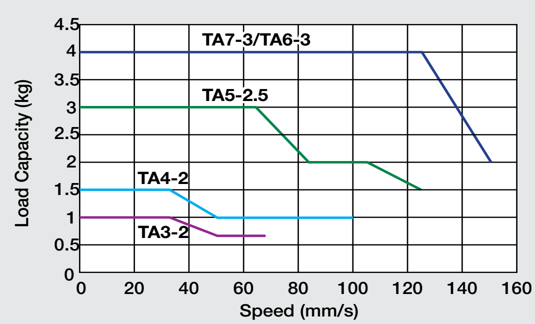
Medium-Speed Type





Low-Speed Type





Note: In the graph above, the number after the type is the lead number.

RCP2 Series Slider type (Motor straight type)

Select horizontal or vertical use

From the device cycle time, select speed type

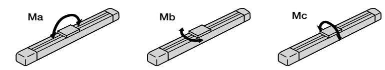
Use the graphs below to select a model for your purpose

Cautionary Notes

When using a slider type, if the overhang from the center of the object mounted on the slider is large, please consider the moment load and the overhang load length.

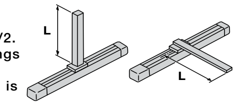
Moment load

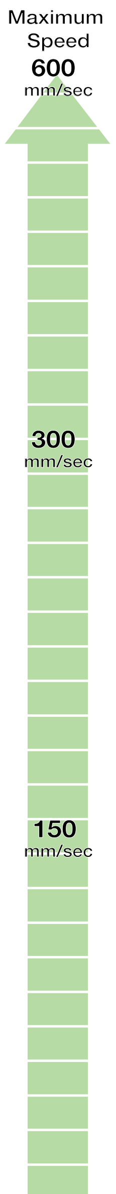
Please ensure the moment loads are within the specified range for Ma, Mb, and Mc.



Overhang Load Length

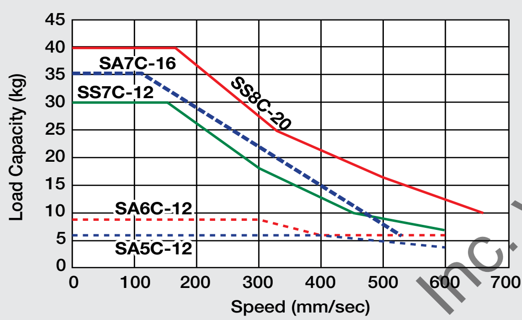
The value when the mounted object's center of gravity is L/2. If the mounted object overhangs in the direction of Ma, Mb, or Mc, make sure that the length is within range.

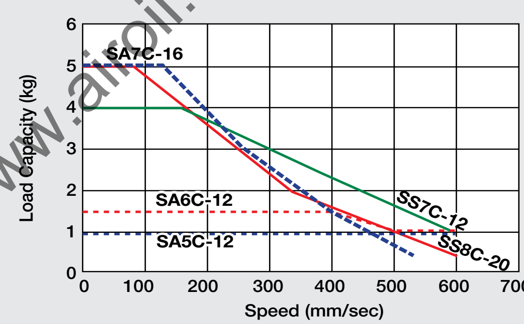




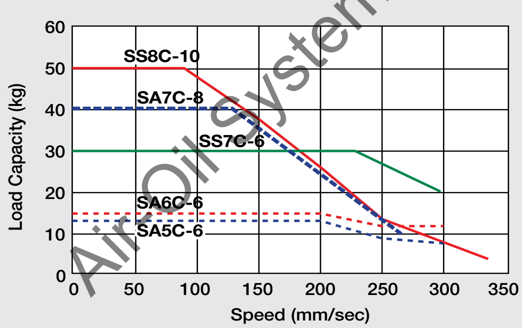
Horizontal Setting | Vertical Setting

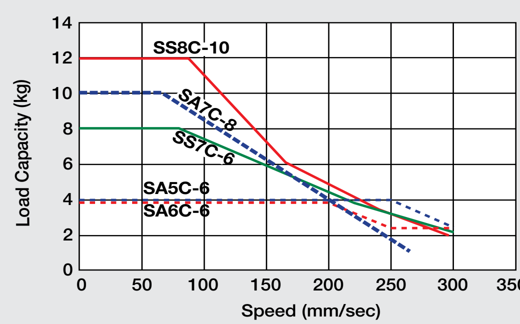
High-Speed Type



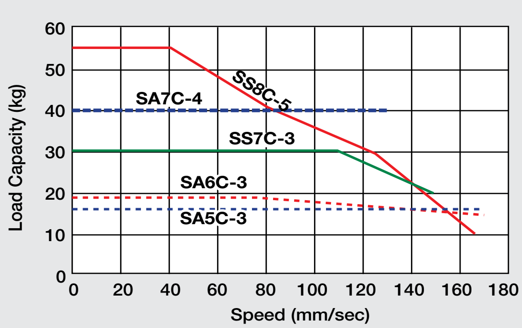


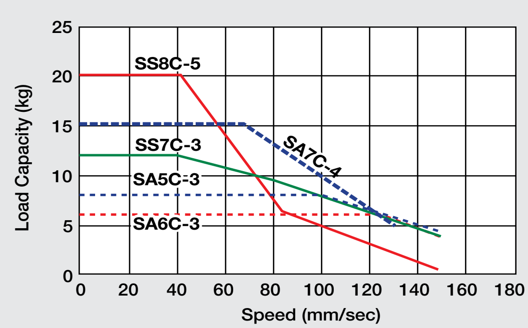
Medium-Speed Type





Low-Speed Type





Note: In the graph above, the number after the type is the lead number.

Table of Load Capacity per Speed/Acceleration

For RCP2-SA5C/SA6C, the acceleration can be increased up to 0.7G.
However, please note that load capacity decreases as the speed and acceleration increase, as shown below.

[RCP2-SA5C]

<table>
<tr><th rowspan="3"></th><th rowspan="3">Speed (mm/s)</th><th colspan="4">Horizontal Operation</th><th colspan="3">Vertical Operation</th></tr>
<tr><th colspan="4">Acceleration</th><th colspan="3">Acceleration</th></tr>
<tr><th>0.2G</th><th>0.3G</th><th>0.5G</th><th>0.7G</th><th>0.1G</th><th>0.2G</th><th>0.3G</th></tr>
<tr><td rowspan="7">High-Speed Type (Lead 12)</td><td>0</td><td rowspan="5">8</td><td rowspan="5">6</td><td rowspan="4">5.5</td><td rowspan="4">5</td><td rowspan="7">1</td><td rowspan="7">1</td><td rowspan="6">1</td></tr>
<tr><td>100</td></tr>
<tr><td>200</td></tr>
<tr><td>300</td></tr>
<tr><td>400</td><td>4</td><td>3.5</td></tr>
<tr><td>500</td><td>7</td><td>5</td><td>2</td><td rowspan="2">1.5</td></tr>
<tr><td>600</td><td>4</td><td>4</td><td>2</td><td>0.5</td></tr>
<tr><td rowspan="7">Medium-Speed Type (Lead 6)</td><td>0</td><td rowspan="7">13</td><td rowspan="5">13</td><td rowspan="5">13</td><td rowspan="5">12</td><td rowspan="6">4</td><td rowspan="6">4</td><td rowspan="5">4</td></tr>
<tr><td>50</td></tr>
<tr><td>100</td></tr>
<tr><td>150</td></tr>
<tr><td>200</td></tr>
<tr><td>250</td><td>9</td><td>8</td><td>7</td><td>3</td></tr>
<tr><td>300</td><td>8</td><td>5</td><td>4</td><td>2.5</td><td>2.5</td><td>1.5</td></tr>
<tr><td rowspan="7">Low-Speed Type (Lead 3)</td><td>0</td><td rowspan="7">16</td><td rowspan="5">16</td><td rowspan="4">16</td><td rowspan="3">16</td><td rowspan="5">8</td><td rowspan="5">8</td><td rowspan="5">8</td></tr>
<tr><td>25</td></tr>
<tr><td>50</td></tr>
<tr><td>75</td><td>14</td></tr>
<tr><td>100</td><td>14</td><td>12</td></tr>
<tr><td>125</td><td>13</td><td>11</td><td>10</td><td>6</td><td>5.5</td><td>5</td></tr>
<tr><td>150</td><td>10</td><td>9</td><td>8</td><td>5</td><td>4.5</td><td>1.5</td></tr>
</table>

[RCP2-SA6C]

<table>
<tr><th rowspan="3"></th><th rowspan="3">Speed (mm/s)</th><th colspan="4">Horizontal Operation</th><th colspan="3">Vertical Operation</th></tr>
<tr><th colspan="4">Acceleration</th><th colspan="3">Acceleration</th></tr>
<tr><th>0.2G</th><th>0.3G</th><th>0.5G</th><th>0.7G</th><th>0.1G</th><th>0.2G</th><th>0.3G</th></tr>
<tr><td rowspan="7">High-Speed Type (Lead 12)</td><td>0</td><td rowspan="4">8.5</td><td rowspan="4">8.5</td><td rowspan="4">7</td><td rowspan="4">6</td><td rowspan="6">1.5</td><td rowspan="5">1.5</td><td rowspan="4">1.5</td></tr>
<tr><td>100</td></tr>
<tr><td>200</td></tr>
<tr><td>300</td></tr>
<tr><td>400</td><td rowspan="3">6</td><td rowspan="3">6</td><td>4</td><td>3</td><td rowspan="3">0.5</td></tr>
<tr><td>500</td><td>3</td><td>2</td><td rowspan="2">1</td></tr>
<tr><td>600</td><td>2</td><td>1</td><td>1</td></tr>
<tr><td rowspan="7">Medium-Speed Type (Lead 6)</td><td>0</td><td rowspan="5">16</td><td rowspan="5">15</td><td rowspan="5">12</td><td rowspan="5">10</td><td rowspan="4">4</td><td rowspan="4">4</td><td rowspan="4">4</td></tr>
<tr><td>50</td></tr>
<tr><td>100</td></tr>
<tr><td>150</td></tr>
<tr><td>200</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>250</td><td>15</td><td rowspan="2">12</td><td>8</td><td>6</td><td rowspan="2">2.5</td><td rowspan="2">2.5</td><td>2</td></tr>
<tr><td>300</td><td>13</td><td>4</td><td>3</td><td>1</td></tr>
<tr><td rowspan="7">Low-Speed Type (Lead 3)</td><td>0</td><td rowspan="4">19</td><td rowspan="4">19</td><td rowspan="4">19</td><td rowspan="4">19</td><td rowspan="6">6</td><td rowspan="6">6</td><td rowspan="6">6</td></tr>
<tr><td>25</td></tr>
<tr><td>50</td></tr>
<tr><td>75</td></tr>
<tr><td>100</td><td>17</td><td>15</td><td>12</td><td>11</td></tr>
<tr><td>125</td><td>16</td><td>14</td><td>11</td><td>10</td></tr>
<tr><td>150</td><td>15</td><td>13</td><td>10</td><td>9</td><td>4</td><td>4</td><td>2</td></tr>
</table>

RCP2 Series — Slider type (Side-mounted motor type)

Select horizontal or vertical use

From the device cycle time, select speed type

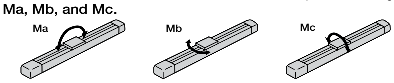
Use the graphs below to select a model for your purpose

Cautionary Notes

When using a slider type, if the overhang from the center of the object mounted on the slider is large, please consider the moment load and the overhang load length.

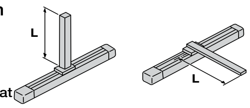
Moment load

Please ensure the moment loads are within the specified range for Ma, Mb, and Mc.

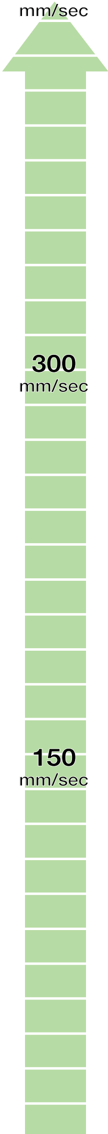


Overhang Load Length

The value when the mounted object's center of gravity is L/2. If the mounted object overhangs in the direction of Ma, Mb, or Mc, make sure that the length is within range.

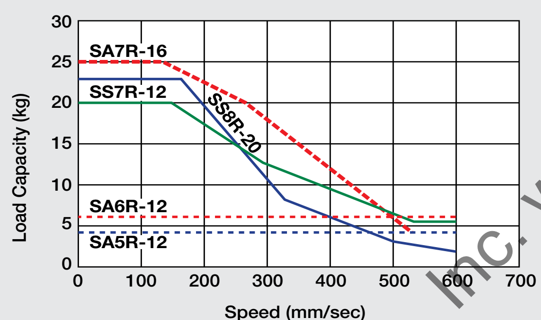


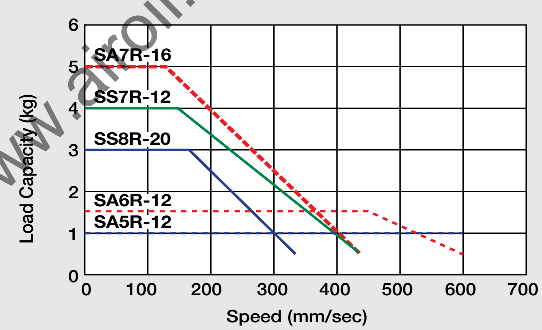
Maximum Speed



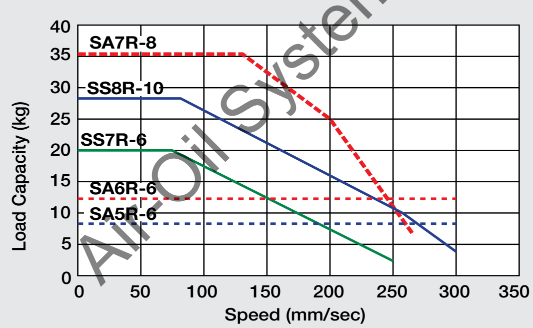
Horizontal Setting / Vertical Setting

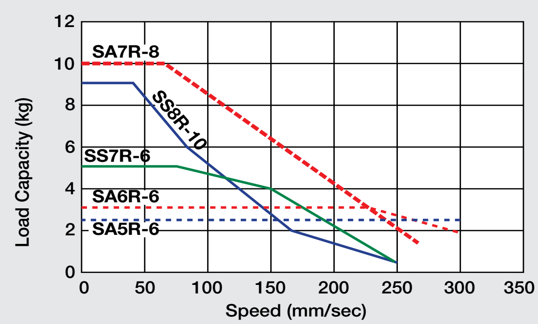
High-Speed Type



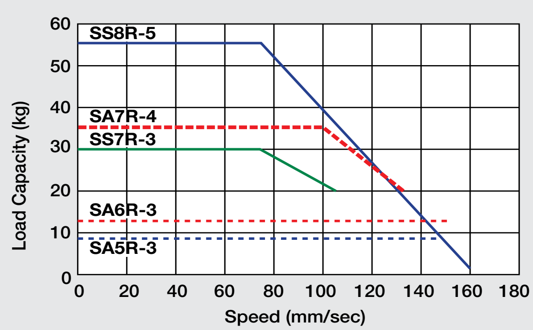


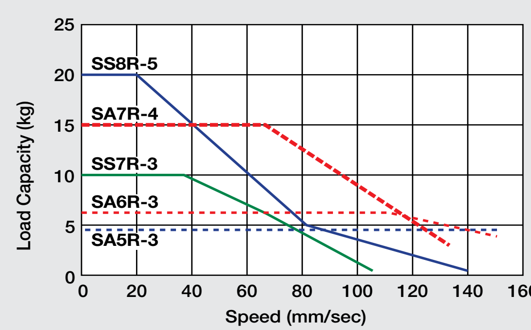
Medium-Speed Type





Low-Speed Type





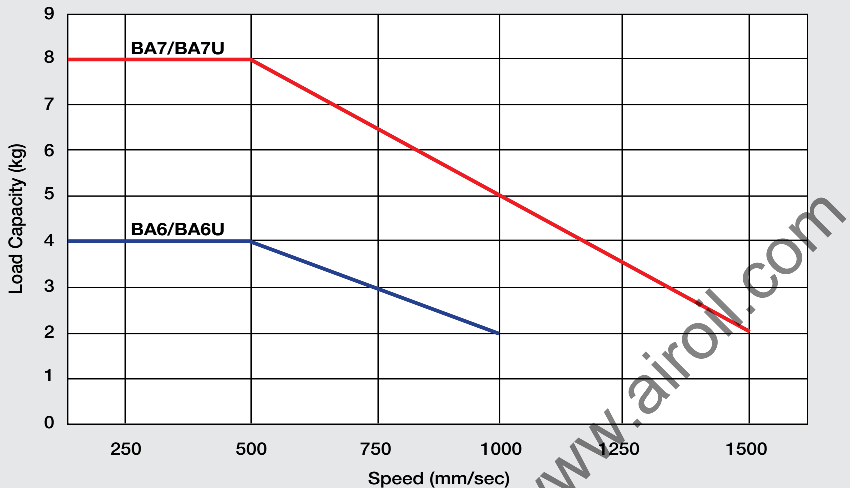
Note: In the graph above, the number after the type is the lead number.

Selection Standard (Speed vs. Load Capacity Graph)

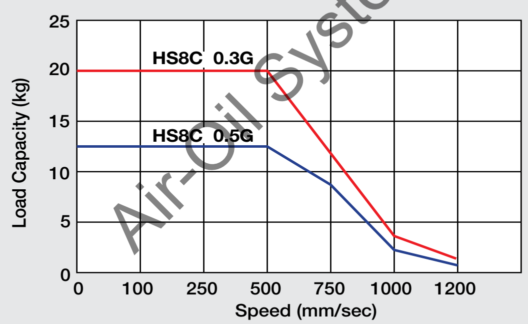
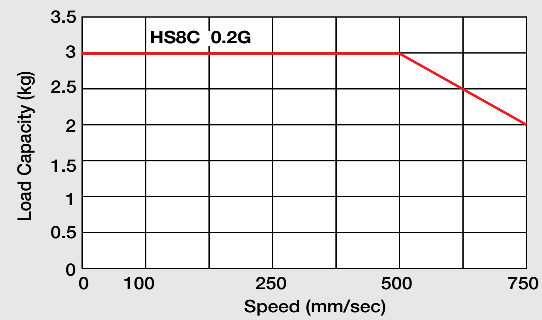
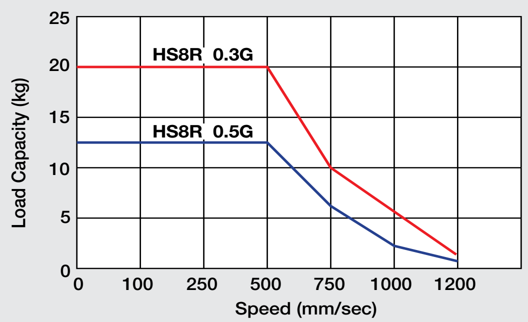
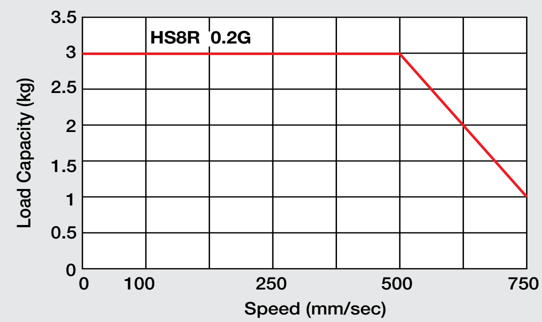
RCP2 Series | Slider belt type

Use the graphs below to select the model for your purpose.

Horizontal Setting



RCP2 Series | Slider high-speed ball-screw type

	Horizontal Setting	Vertical Setting
RCP2-HS8C		
RCP2-HS8R		

RCP2 Series Rod standard type

Select horizontal or vertical use

From the device cycle time, select speed type

Use the graphs below to select a model for your purpose

Cautionary Notes

- Absolutely no external force is considered for the rod type, other than that coming from the direction of the rod's advance.
  Please use a high-rigidity model or add a guide if an external force is applied at a right angle to the rod and in the direction of the rotation.

Maximum Speed

500 mm/sec

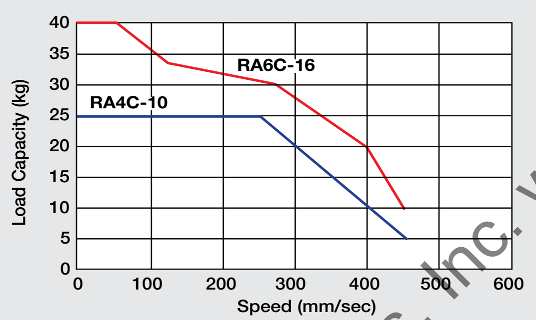
250 mm/sec

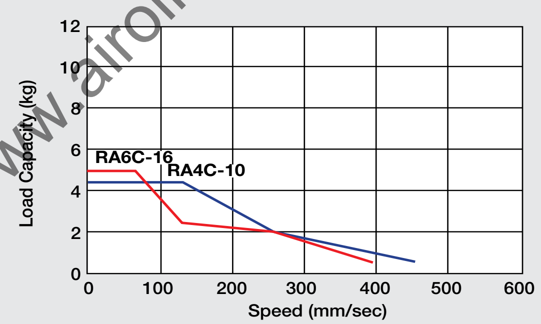
125 mm/sec

Horizontal Setting (Note 1)

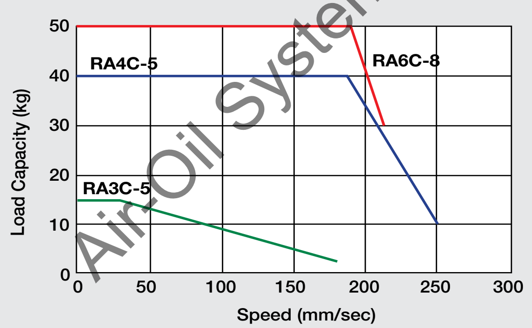
Vertical Setting

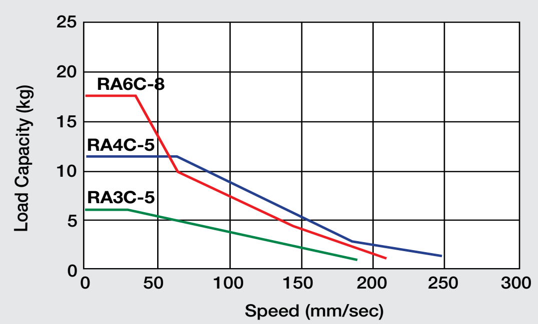
High-Speed Type



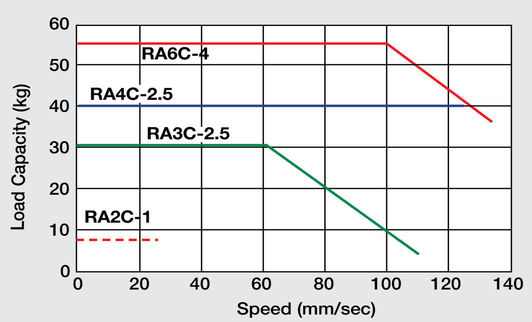


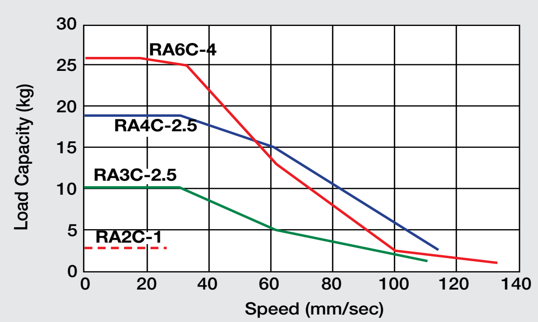
Medium-Speed Type





Low-Speed Type





Note: In the graph above, the number after the type is the lead number.
Note 1: This is the number in the case of horizontal specification, when an external guide is attached.

Selection Standard (Speed vs. Load Capacity Graph)

RCP2 Series Single guide type

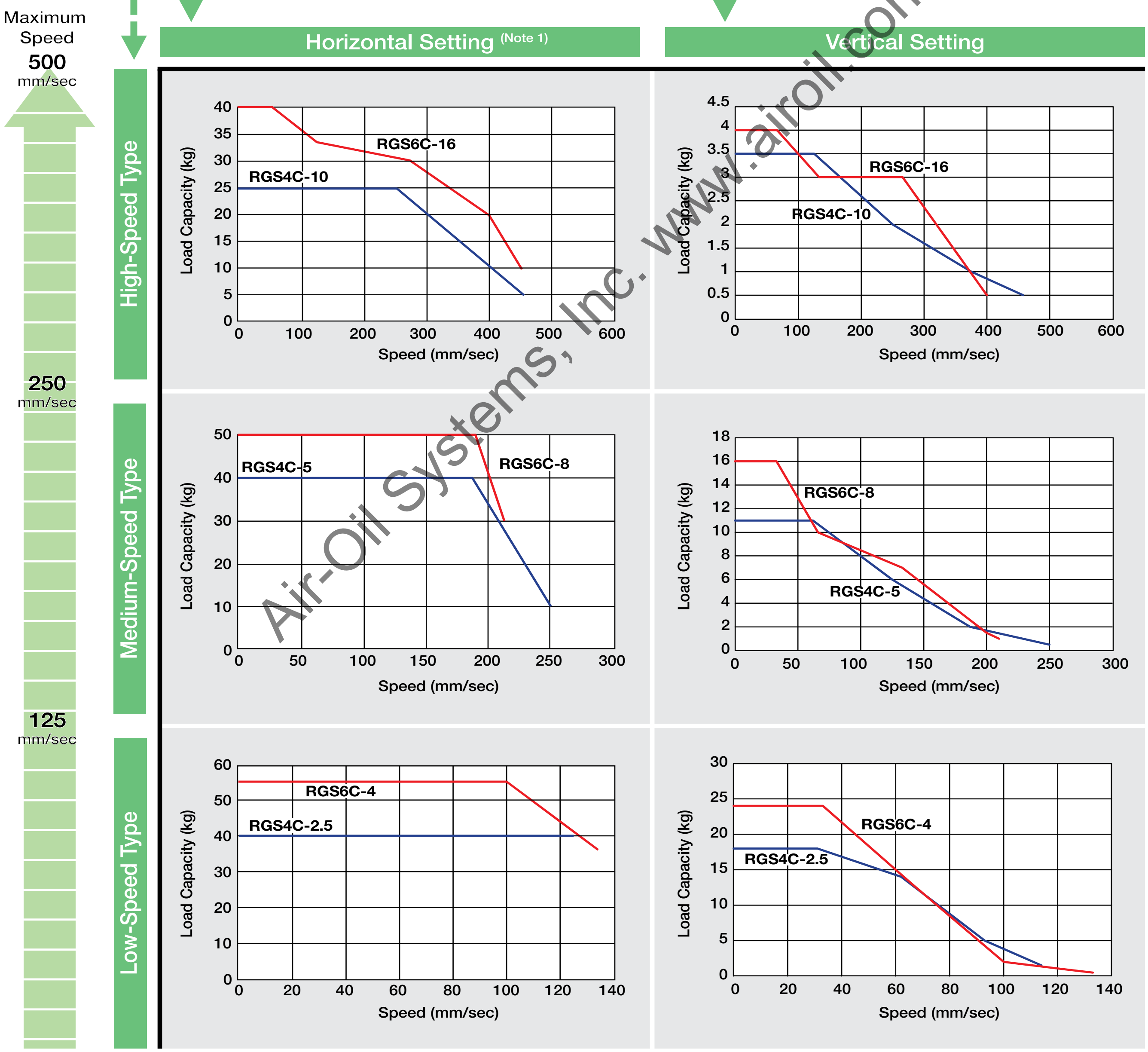
Select horizontal or vertical use

From the device time cycle, select speed type

Use the graphs below to select the model for your purpose.

Cautionary Notes

- The graphs below for the horizontal setting show the values when an external guide is used.



Note: In the graph above, the number after the type is the lead number.
Note 1: This is the number in the case of horizontal specification, when an external guide is attached.

RCP2 Series Double guide type

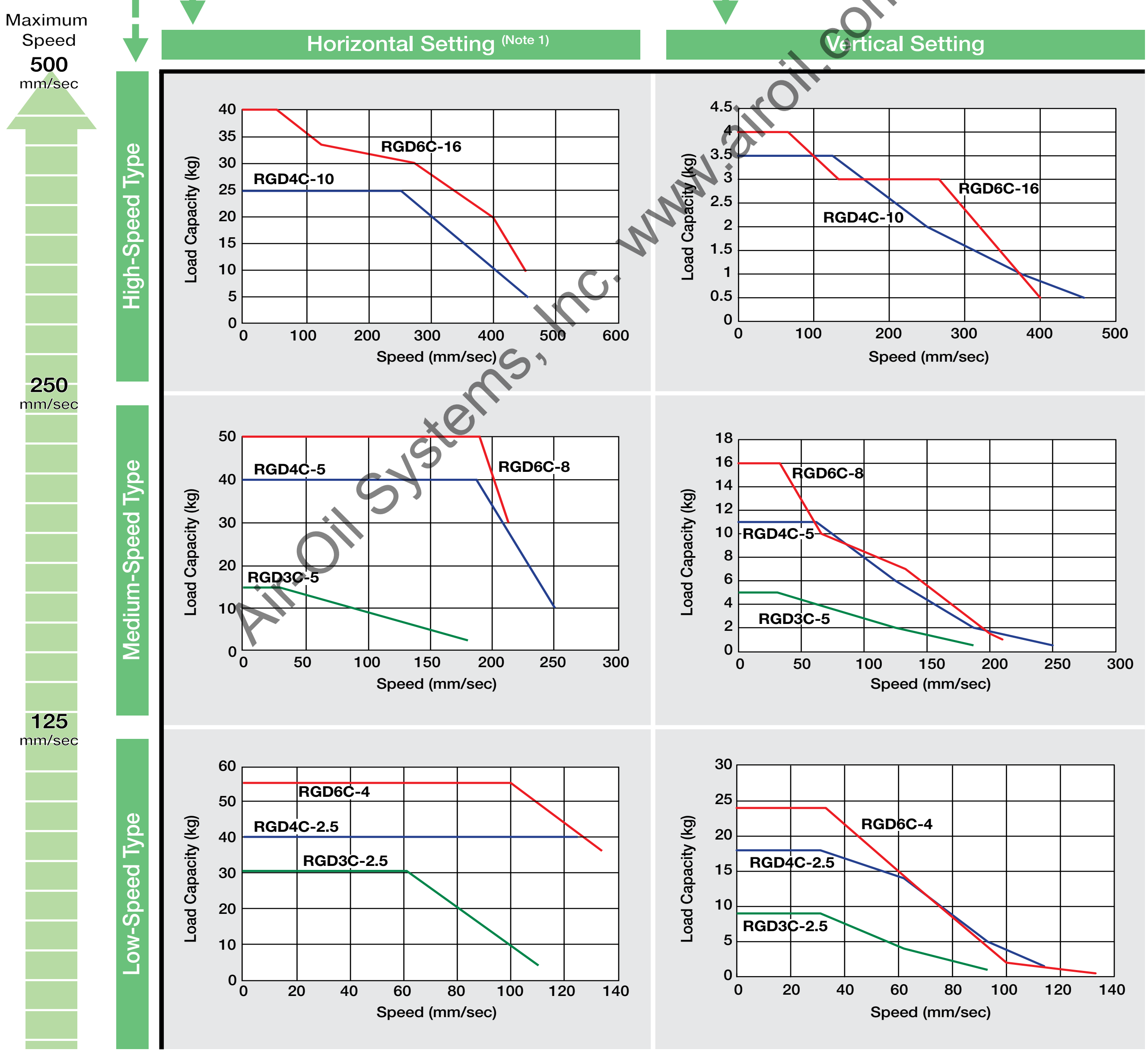
Select horizontal or vertical use

From the device time cycle, select speed type

Use the graphs below to select the model for your purpose.

Cautionary Notes

- The graphs below for the horizontal setting show the values when an external guide is used.



Note: In the graph above, the number after the type is the lead number.
Note 1: This is the number in the case of horizontal specification, when an external guide is attached.

Selection Standard (Speed vs. Load Capacity Graph)

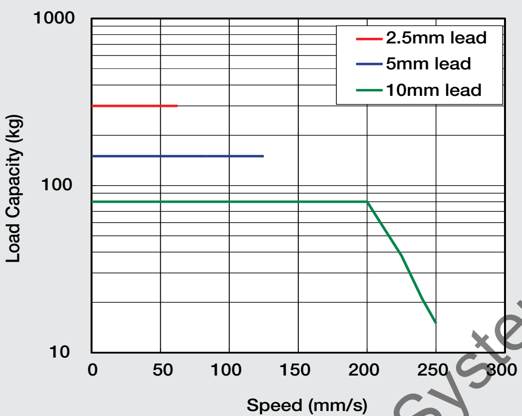
RCP2 Series High-thrust type

Cautionary Notes

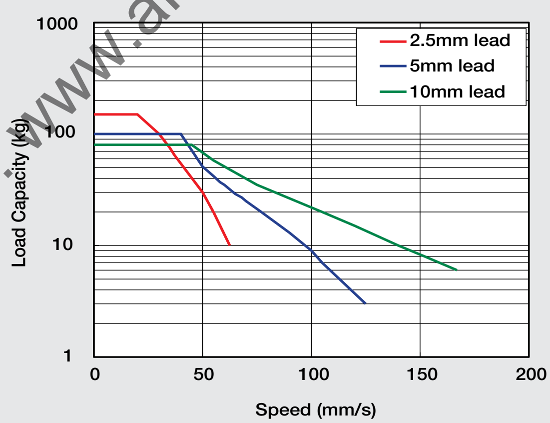
- Absolutely no external force is considered for the rod type, other than that coming from the direction of the rod's advance.
  Please add a guide if an external force is applied at a right angle to the rod and in the direction of the rotation.
- The graphs below for the horizontal setting shows the values when an external guide.

Use the graphs below to select the model for your purpose.

Horizontal Setting



Vertical Setting



Note: In the graph above, the number after the type is the lead number.

RCP2CR Series Slider type

Select horizontal or vertical use

From the device cycle time, select speed type

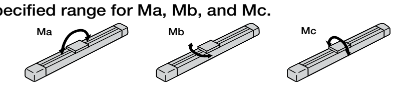
Use the graphs below to select a model for your purpose

Cautionary Notes

When using a slider type, if the overhang from the center of the object mounted on the slider is large, please consider the moment load and the overhang load length.

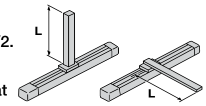
Moment load

Please ensure the moment loads are within the specified range for Ma, Mb, and Mc.



Overhang Load Length

The value when the mounted object's center of gravity is L/2. If the mounted object overhangs in the direction of Ma, Mb, or Mc, make sure that the length is within range.

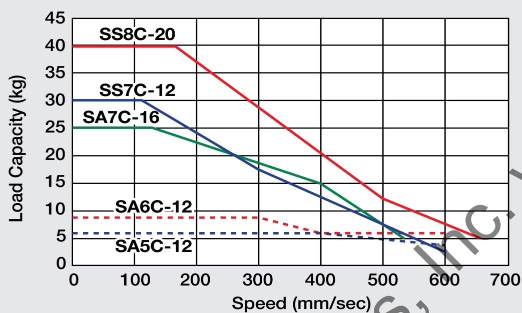
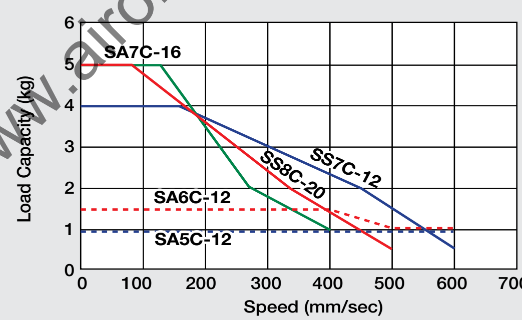
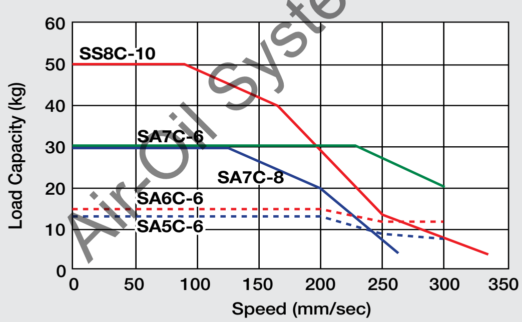
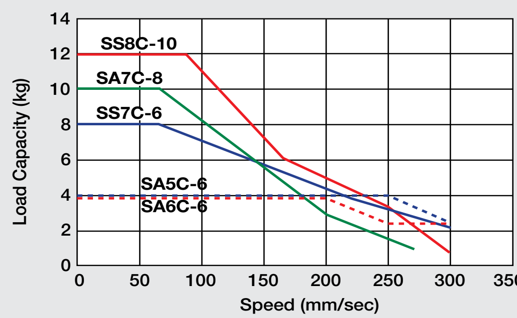
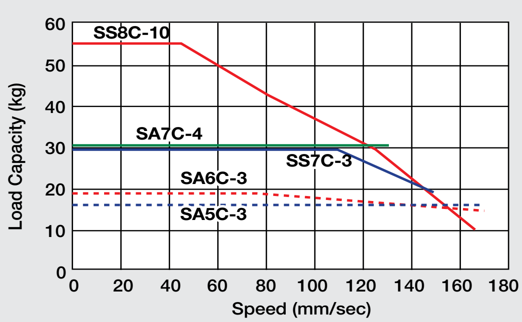
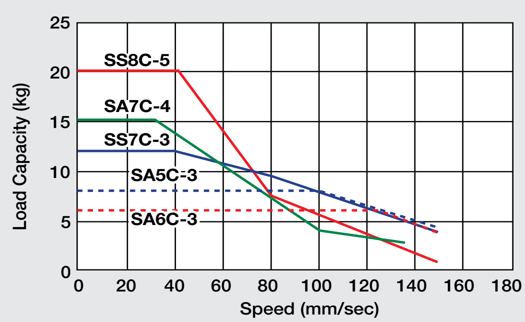


Maximum Speed

600 mm/sec

300 mm/sec

150 mm/sec

	Horizontal Setting	Vertical Setting
High-Speed Type		
Medium-Speed Type		
Low-Speed Type		

Note: In the graph above, the number after the type is the lead number.

Selection Standard (Speed vs. Load Capacity Graph)

RCP2W Series | Rod type

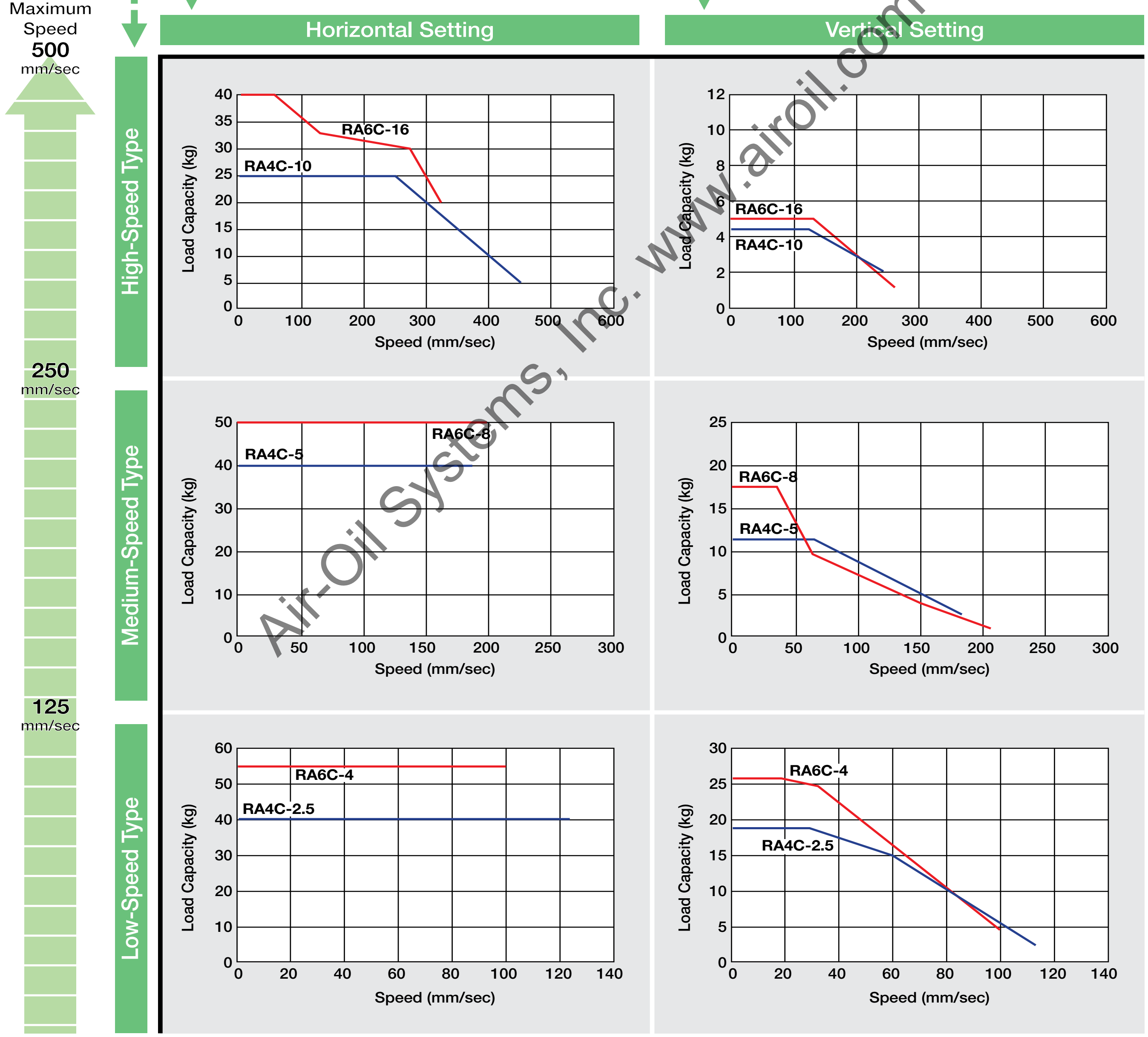
Select horizontal or vertical use

From the device cycle time, select speed type

Use the graphs below to select a model for your purpose

Cautionary Notes

- Absolutely no external force is considered for the rod type, other than that coming from the direction of the rod's advance. Please use a high-rigidity model or add a guide if an external force is applied at a right angle to the rod and in the direction of the rotation.



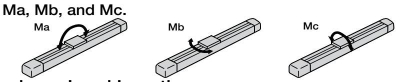
RCP2W Series Slider type, Waterproof type

Use the graphs below to select a model for your purpose

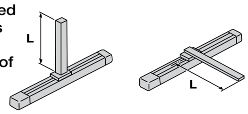
Cautionary Notes

When using a slider type, if the overhang from the center of the object mounted on the slider is large, please consider the moment load and the overhang load length.

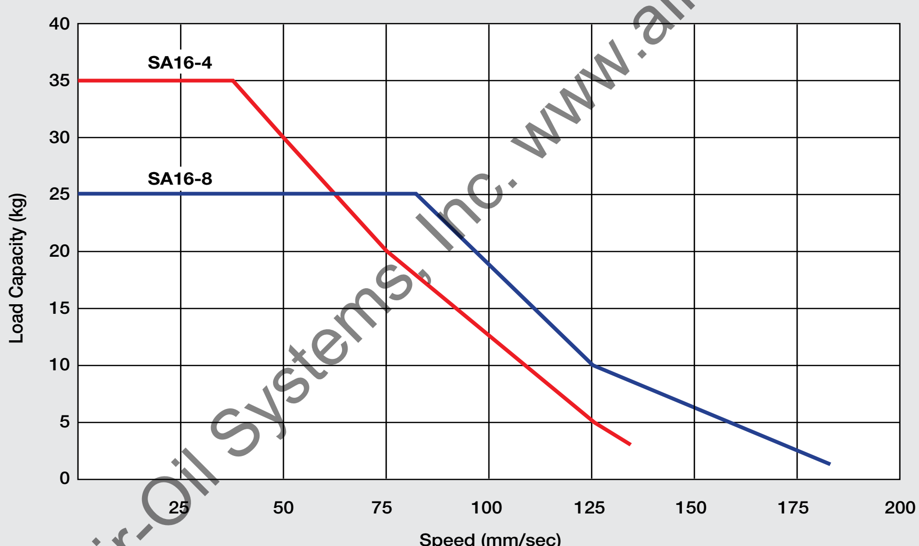
Moment load
Please ensure the moment loads are within the specified range for Ma, Mb, and Mc.



Overhang Load Length
The value when the mounted object's center of gravity is L/2. If the mounted object overhangs in the direction of Ma, Mb, or Mc, make sure that the length is within range.



Horizontal Setting

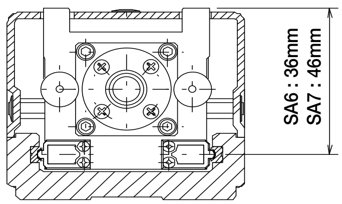


Note: RCP2W-SA16 has no brake setting, which means vertical use cannot be handled.
Note: In the graph above, the number after the type is the lead number.

Selection Guide (Push Force and Electric Current Limitation Correlation Graph)

ERC2 Series | Slider type

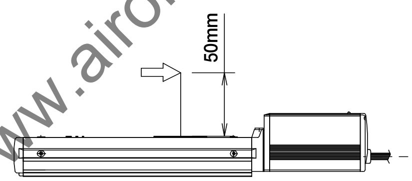
When using slider type for pressing operation, limit pressing current to prevent anti-moment generated by push force from exceeding 80% of the catalog spec rating for moment (Ma, Mb).
To calculate moment, use the guide moment action position shown in the figure below, and consider the amount of offset at the push force action position.
Be aware that, if excess force above the rated moment is applied, the guide can be damaged and its use life can be shortened. Therefore, carefully set the current with safety in mind.



Moment operation position

Caution:
Note: The movement speed during pressing is fixed at 20mm/s.

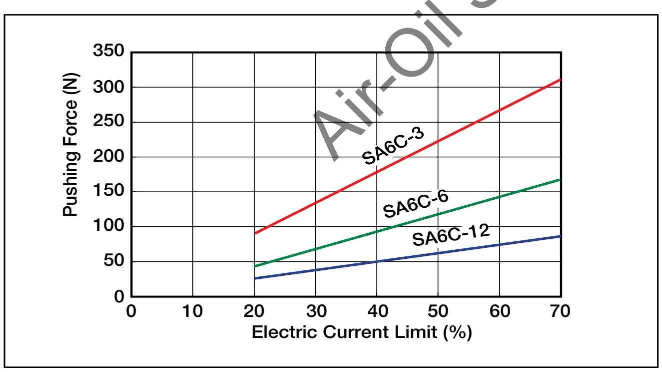
Example of calculation:
With this type, at the position shown in the figure at the right, when there is 100N of pressing
the moment received by the guide is Ma = (46 + 50) x 100
= 9600 (N•m)
= 9.6 (N•m).
The SA7 rated moment is Ma = 13.8 (N•m)
and 13.8 x 0.8 = 11.04 > 9.6, which means it is OK.
Also, when pressing generates moment Mb, use the overhang calculation to similarly confirm that the moment is within 80% of the rated moment.



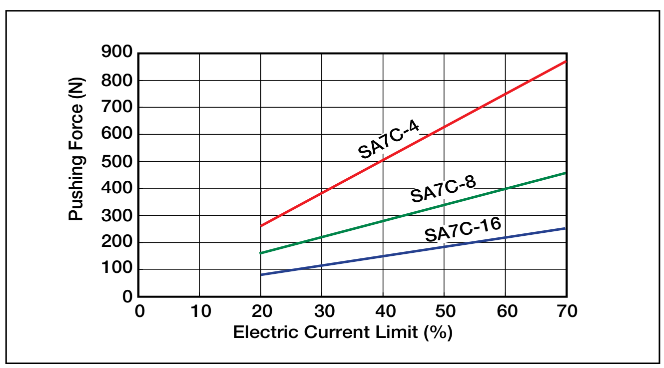
Push force and current limit correlation graph

* In the table below, standard figures are shown. Actual figures will differ slightly.

SA6C type



SA7C type

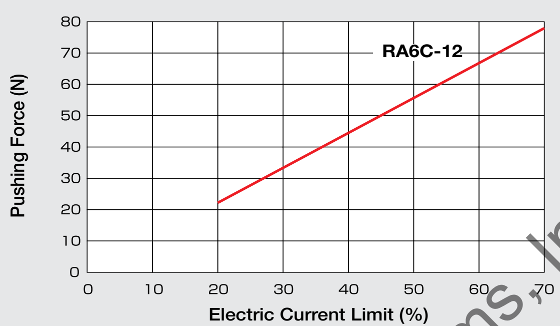
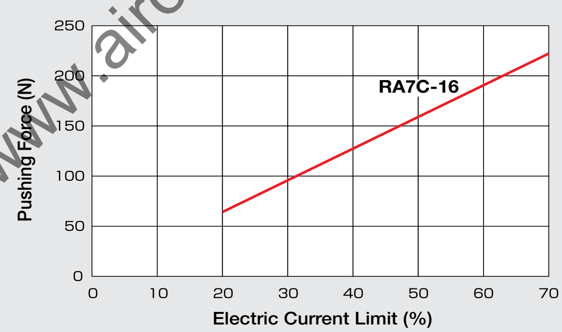
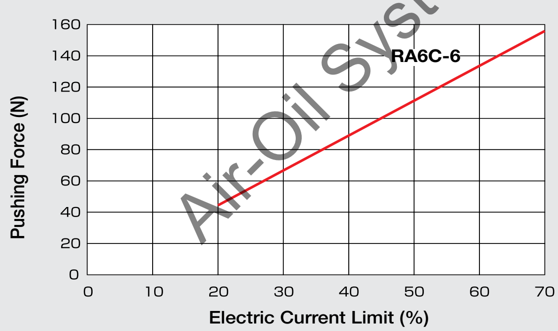
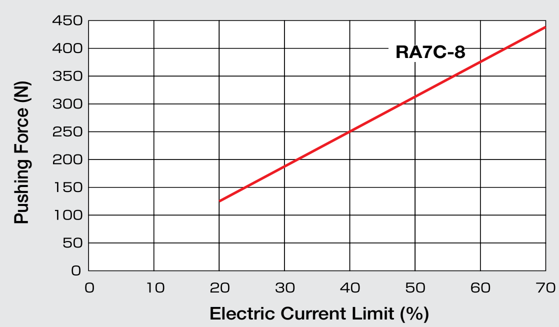
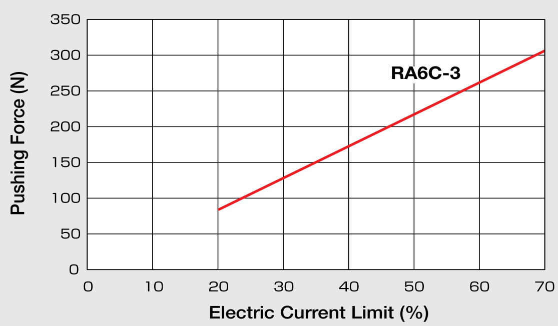
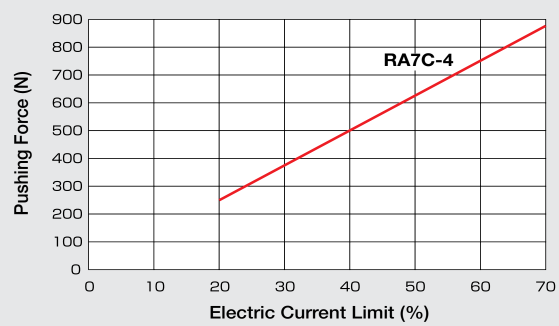


ERC2 Series | Rod Type

The push force during pressing operation can be freely changed by changing the controller current limit value.
The maximum push force changes according to the type of device, so please select the push force you need from the table below.

Caution for Use

- The push force and current limit correlation figures are given as standard. Actual figures will slightly differ.
- When the current limit is less than 20%, the push force may vary. Therefore use a current limitation that is 20% or higher.
- Movement speed during pressing operation is fixed at 20mm/s.

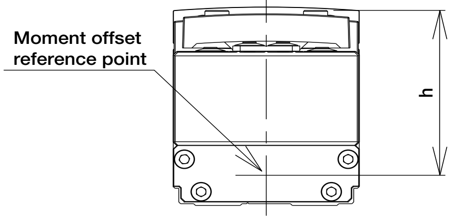
	RA6C Type	RA7C Type
High-Speed Type		
Medium-Speed Type		
Low-Speed Type		

Note: In the graph above, the number after the type is the lead number.

Selection Guide (Push Force and Electric Current Limitation Correlation Graph)

RCP3 Series | Slider Type

When using the slider type for the pressing operation, limit the pressing current to prevent anti-moment generated by push force from exceeding 80% of catalog spec rating for moment (Ma, Mb).
To calculate moment, use the guide moment action position shown in the figure below, and consider the amount of offset at the push force action position.
Be aware that, if excess force above the rated moment is applied, the guide can be damaged and its use life can be shortened. Therefore, carefully set the current with safety in mind.

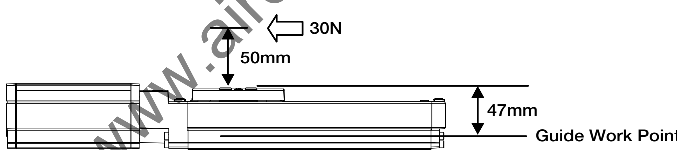


SA3C: h = 29.5mm
SA4C: h = 36.5mm
SA5C: h = 43.5mm
SA6C: h = 47.0mm

When using slider type for the pressing operation, use setting to ensure that anti-moment generated by push force does not exceed **80% of catalog spec moment tolerance**.

Example of calculations:
When executing 30N pressing with RCP-3SA6C (Lead 12) type, and performing pressing at 30N,
the moment received by the guide is Ma = (47 + 50) x 30
= 2910 (N•mm)
= 2.91 (N•m).

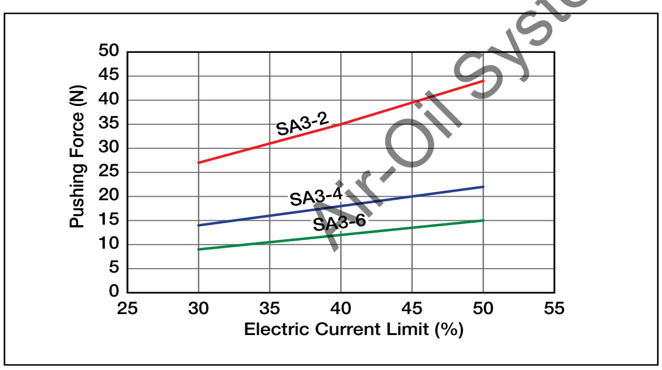
The SA6C allowable load moment (Ma) is 4.31(N•m), 80% of which is 3.448, which is greater than the actual moment load received by the guide (2.91). Therefore, it can be decided that this moment load can be used.



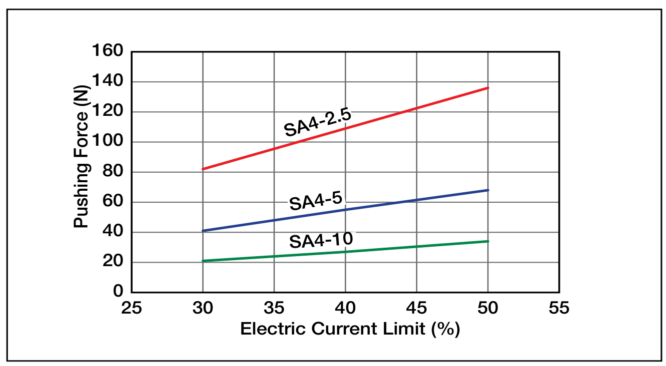
Push force and current limit correlation graph

* In the table below, standard figures are shown. Actual figures will differ slightly.

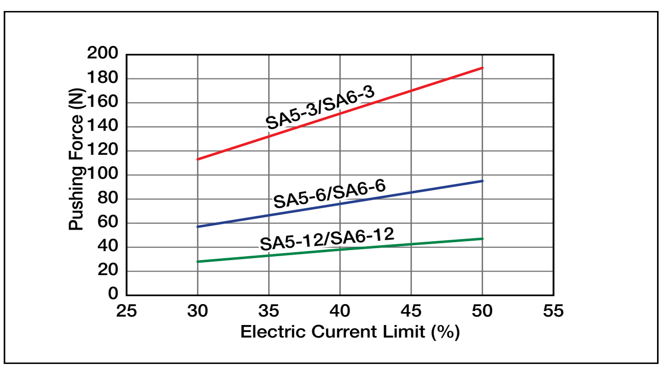
SA3C type



SA4C type

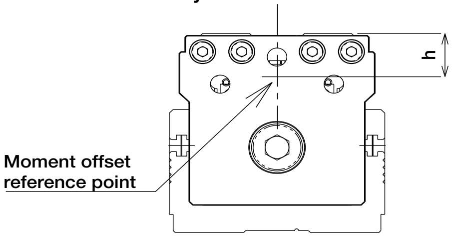


SA5C/SA6C type



RCP3 Series Table Type

When using a table type for the pressing operation, limit the pressing current to prevent anti-moment generated by the push force from exceeding 80% of the catalog spec rating for moment (Ma, Mb).
To calculate moment, use the guide moment action position shown in the figure below, and consider the amount of offset at the push force action position.
Be aware that, if excess force above the rated moment is applied, the guide can be damaged and its use life can be shortened. Therefore, carefully set current with safety in mind.

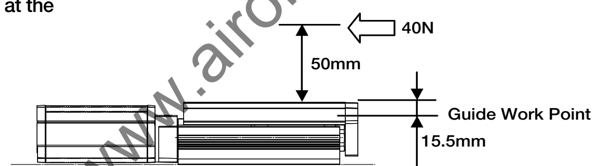


TA3□ : h = 10.5mm
TA4□ : h = 11.5mm
TA5□ : h = 13.5mm
TA6□ : h = 15.5mm
TA7□ : h = 17.5mm

When using a table type for the pressing operation, use setting to ensure that anti-moment generated by the push force does not exceed **80% of catalog spec moment tolerance**.

Example of calculations:
With the RCP3-TA6C (Lead 12) type, using the position shown in the figure at the right, and pressing at 40N,

the moment received by the guide is Ma = (15.5 + 50) x 40
= 2620 (N•mm)
= 2.62 (N•m).

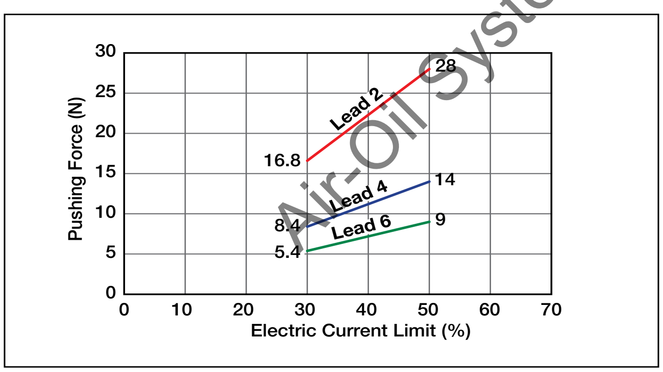


The TA6C allowable load moment (Ma) is 7.26(N•m),
80% of which is 5.968, which is greater than the actual moment load received by the guide (2.62). Therefore, it can be decided that this moment load can be used.

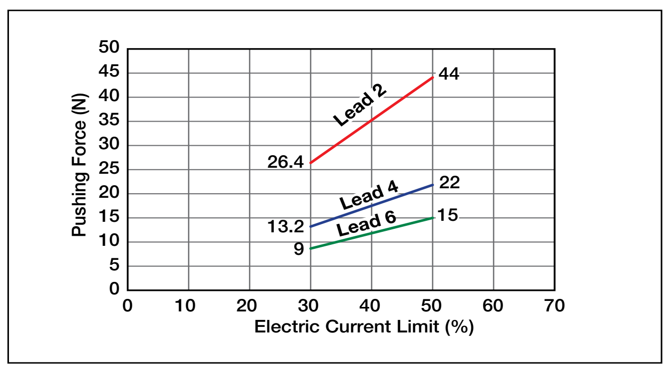
Push force and current limit correlation graph

* In the table below, standard figures are shown. Actual figures will differ slightly.

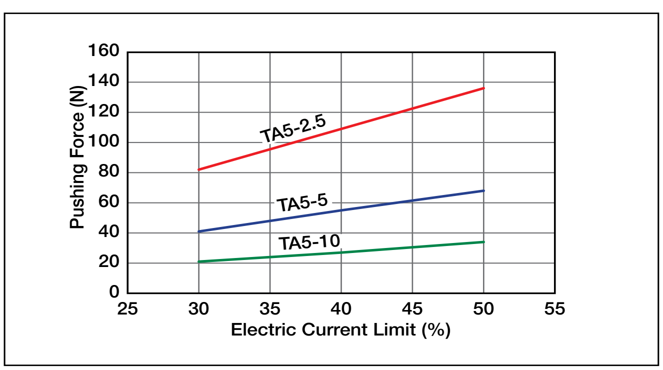
TA3C type



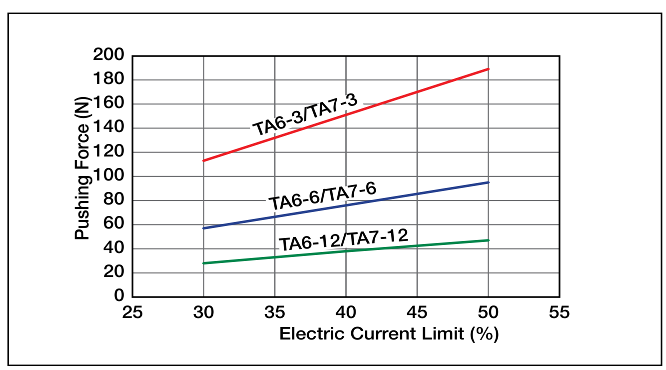
TA4C type



TA5C type



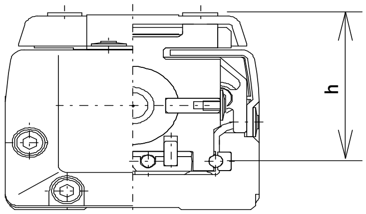
TA6C/TA7C type



Selection Guide (Push Force and Electric Current Limitation Correlation Graph)

RCP2 Series | Slider Type

When using the slider type for the pressing operation, limit the pressing current to prevent anti-moment generated by the push force from exceeding 80% of the catalog spec rating for moment (Ma, Mb).
To calculate moment, use the guide moment action position shown in the figure below, and consider the amount of offset at the push force action position.
Be aware that, if excess force above the rated moment is applied, the guide can be damaged and its use life can be shortened. Therefore, carefully set the current with safety in mind.

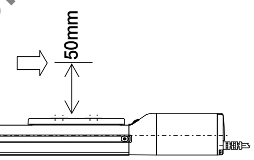


SA5C: h = 39mm
SA6C: h = 40mm
SA7C: h = 43mm
SS7C: h = 36mm
SS8C: h = 48mm

Caution:
- Pressing operations cannot be perfomed for Belt type (BA6/BA7).
- Note: The movement speed during pressing is fixed at 20mm/s.

Example of calculations:
With the RCP2-SS7C type, and using the position in the figure at right for 100N pressing,

the moment received by the guide is Ma = (36 + 50) x 100
= 8600 (N•mm)
= 8.6 (N•m).

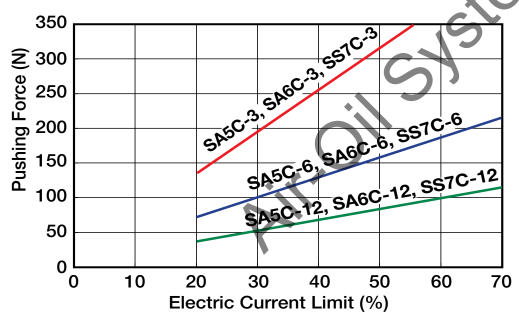


The SS rated moment is Ma = 14.7 (N•m)
and 14.7 x 0.8 = 11.76 > 8.6, which means it is OK.
Also, when pressing generates moment Mb, use the overhang calculation to similarly confirm that the moment is within 80% of the rated moment.

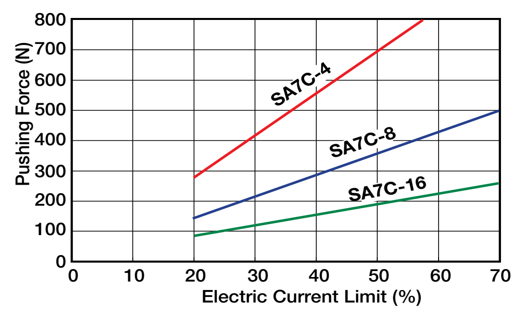
Push force and current limit correlation graph

* In the table below, standard figures are shown. Actual figures will differ slightly.

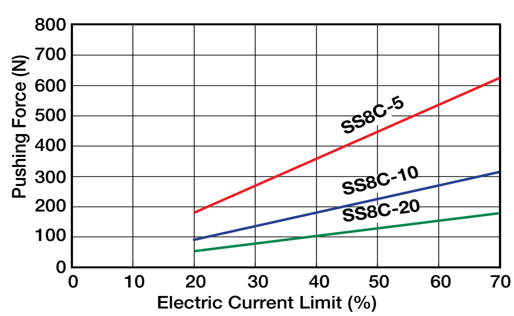
SA5C/SA6C/SS7C type



SA7C type



SS8C type



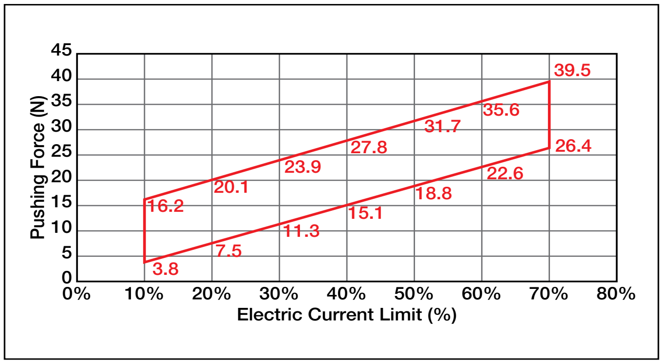
RCP3 Series | Mini rod type

*The specification value is shown within an area indicated by a red line.

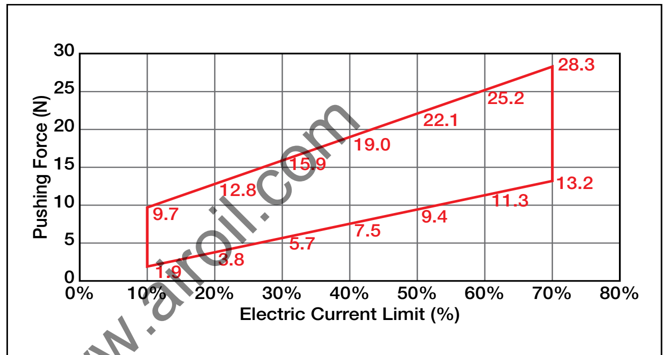
When performing a pressing operation, select a model which has desired push force within an area indicated by the red line in the graph below.
(The graph makes allowance for efficiency reduction due to change due to wear.

Caution:
Movement speed during pressing operation is fixed at 5mm/s.

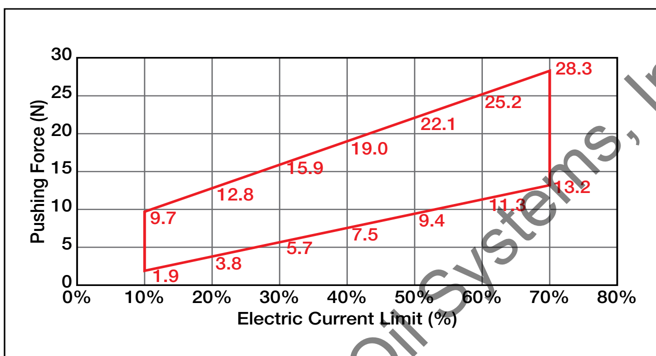
RA2AC/RA2AR Lead 1



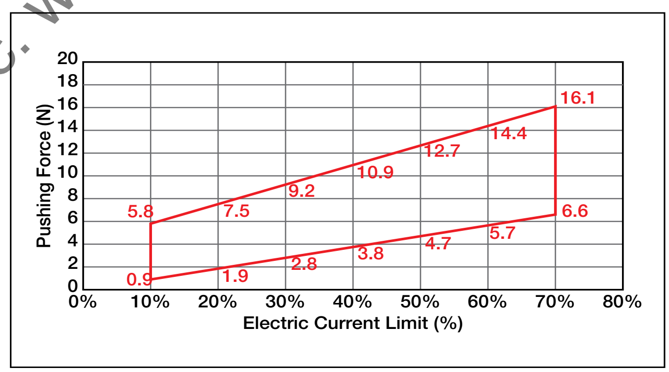
RA2BC/RA2BR Lead 2



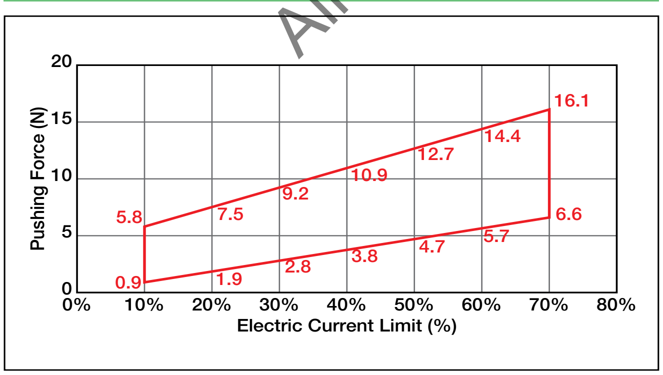
RA2AC/RA2AR Lead 2



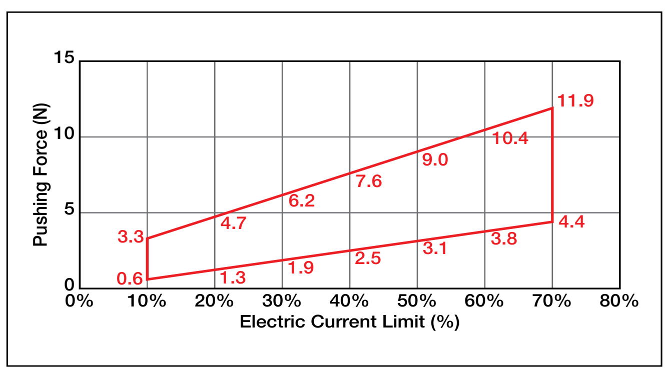
RA2BC/RA2BR Lead 4



RA2AC/RA2AR Lead 4



RA2BC/RA2BR Lead 6

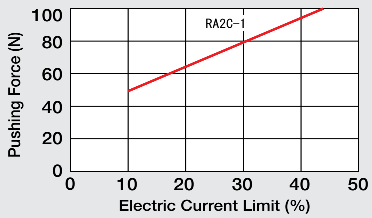


Selection Guide (Push Force and Electric Current Limitation Correlation Graph)

RCP2 Series Rod Type

The push force during the pressing operation can be freely changed by changing the controller current limit value.
The maximum push force changes according to the type of device, so please select the push force you need from the table below.

RA2C Type



*With the RA2C type, the maximum push force limit is set according to the stroke.

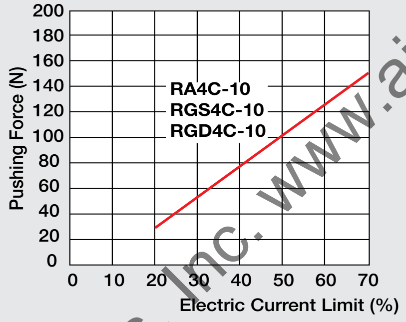
25•50 stroke	:	100N
75 stroke	:	70N
100 stroke	:	55N

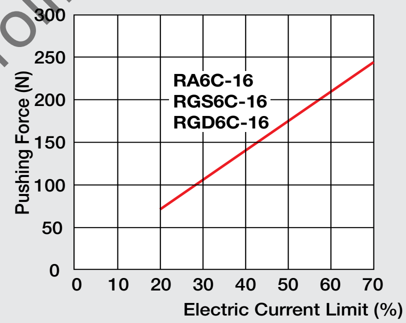
Caution for Use

- The push force and current limit correlation figures are given as standard. Actual figures will slightly differ.
- When the current limit is less than 20%, the push force may vary. Therefore use a current limitation that is 20% or higher.
- Movement speed during the pressing operation is fixed at 20mm/s. (3mm/s for RA2C only)

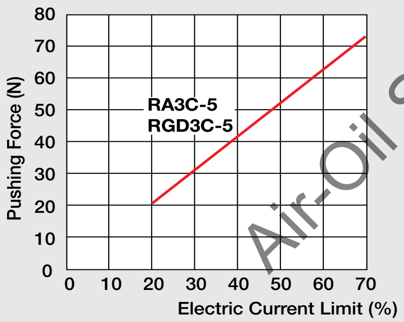
RA3C/RGD3C | RA4C/RGS4C/RGD4C/SRA4R | RA6C/RGS6C/RGD6C

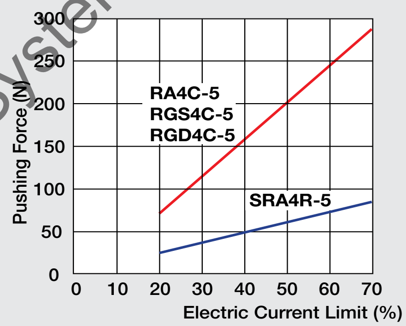
High-Speed Type

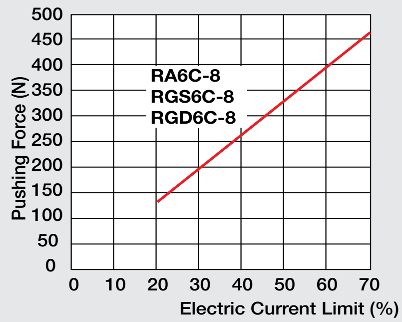




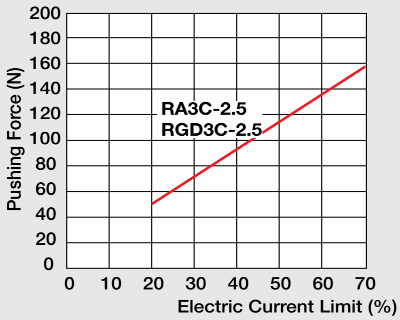
Medium-Speed Type

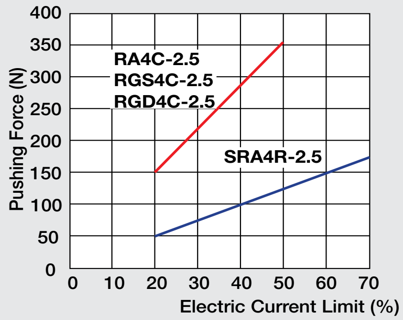


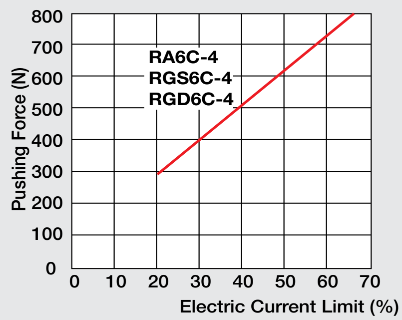




Low-Speed Type







Note: In the graph above, the number after the type is the lead number.

Selection Guide (Push Force and Electric Current Limitation Correlation Graph)

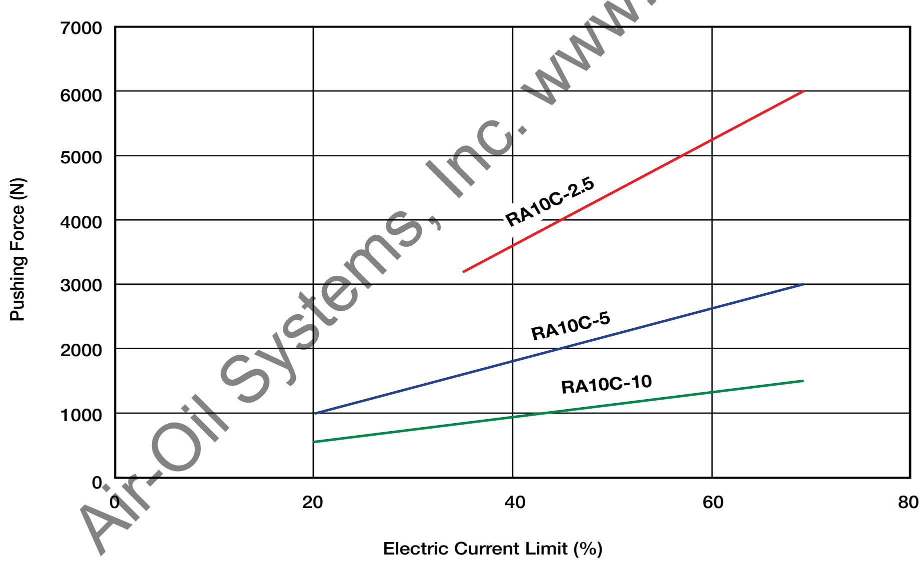
RCP2 Series | Rod Thrust type

The push force during the pressing operation can be freely changed by changing the controller current limit value.
The maximum push force changes according to the type of device, so please select the push force you need from the table below.

Caution for Use

- The push force and current limit correlation figures are given as standard. Actual figures will slightly differ.
- If the current limit is low, the push force may vary. Therefore, for Lead 10 and Lead 5, make the force 20% or more higher; 35% or higher for Lead 2.5.
- The movement speed in a pressing operation is fixed at 10mm/s. Note that in the graph below, 10mm/s was the speed in the pressing operation. So, if the speed changes, the push force will drop. (Consult with us if you need to change the pressing speed.)
- When the pressing speed has been performed with the moving speed 10mm/s or less before pressing is started, the pressing speed is the same as the moving speed.

RA10C Type



Note:
Use the standards in the table below for the maximum number of pressing operations for each type of lead, for maximum push force, and (each) 1-mm pressing movement.

Lead (Type)	2.5	5	10
Number of Pushes	1.4 million	25 million	157.6 million

* The maximum number of pushes will vary according to shock, vibration and other operating conditions.
The figures shown at left are for conditions with no shock or vibration.

Selection Guide (Push Force / Continuous Operation Thrust)

RCS2 Series　Rod Ultra-high thrust type

The following three conditions must be met when using this device.
Condition 1: The pushing time must be less than the time determined.
Condition 2: One cycle of continuous thrust must be less than the rated thrust for an ultra-high thrust actuator.
Condition 3: There must be one pushing operation in one cycle.

Selection Method

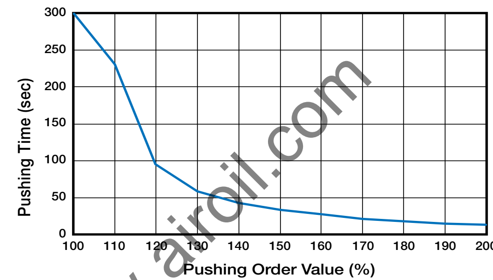
Condition 1. Pushing Time

The maximum pressing time for each pressing order must be determined as shown in the table below. The pressing time used must be less than the time indicated in the table below.
Actuator malfunction could result if the process is used without adhering to the table below.

Table 1

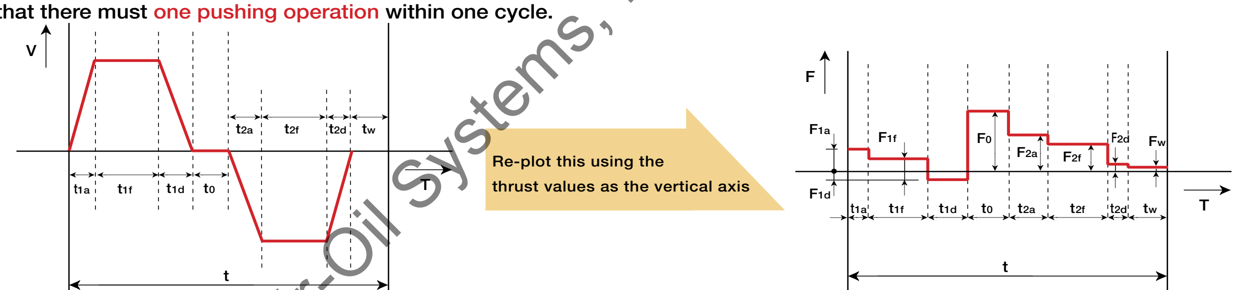
Pushing Order Value (%)	Maximum Pushing Time (sec)
70 or less	(Continuous pushing possible)
80~100	300
110	230
120	95
130	58
140	43
150	33
160	27
170	21
180	18
190	15
200	13

[Pushing Time]



Condition 2. Continuous Operation Thrust

Confirm that 1 cycle of continuous operation thrust Ft, based on a consideration of load and duty, is less than that of the rated thrust for a ultra-high-thrust actuator.
Note that there must one pushing operation within one cycle.



t : Operation duration per cycle (s)
t_{1a} : Acceleration duration1
t_{1f} : Constant speed duration1
t_{1d} : Deceleration duration1
t_o : Pushing duration
t_{2a} : Acceleration duration2
t_{2f} : Constant speed duration2
t_{2d} : Deceleration duration2
t_w : Waiting duration

F_{1a} : Thrust1 needed for acceleration
F_{1f} : Thrust1 needed for motion at constant speed
F_{1d} : Thrust1 needed for deceleration
F_o : Thrust needed for pushing
F_{2a} : Thrust2 needed for acceleration
F_{2f} : Thrust2 needed for motion at constant speed
F_{2d} : Thrust2 needed for deceleration
F_w : Thrust needed for waiting

Use the equation below to calculate the continuous operation thrust Ft for one cycle.

$$Ft = \sqrt{\frac{F_{1a}^2 \times t_{1a} + F_{1f}^2 \times t_{1f} + F_{1d}^2 \times t_{1d} + F_o^2 \times t_o + F_{2a}^2 \times t_{2a} + F_{2f}^2 \times t_{2f} + F_{2d}^2 \times t_{2d} + F_w^2 \times t_w}{t}}$$

* For horizontal use, it is not necessary to calculate the thrust needed for constant speed motion and for waiting.

- Since $F_{1a}/F_{2a}/F_{1d}/F_{2d}$ will change with the direction of motion, use the equations below.

Horizontal use (for both accel./decel.)	$F_{1a} = F_{1d} = F_{2a} = F_{2d} = (M+m) \times d$
Vertical use, downward acceleration	$F_{1a} = (M+m) \times 9.8 - (M+m) \times d$
Vertical use, constant downward speed	$F_{1f} = (M+m) \times 9.8 + \alpha$(*1)
Vertical use, downward deceleration	$F_{1d} = (M+m) \times 9.8 + (M+m) \times d$
Vertical use, upward acceleration	$F_{2a} = (M+m) \times 9.8 + (M+m) \times d$
Vertical use, constant upward motion	$F_{2f} = (M+m) \times 9.8 + \alpha$(*1)
Vertical use, upward deceleration	$F_{2d} = (M+m) \times 9.8 - (M+m) \cdot d$
Vertical use, waiting	$F_w = (M+m) \times 9.8$

M : Moveable weight (kg)
m : Loaded weight (kg)
d : Accel./decel. (m/s²)
α : Thrust (taking into account the travel resistance by the external guide.)

*1 If an external guide is attached, it is necessary to consider travel resistance.

Moveable weight for ultra-high thrust actuator: 9kg

● The method of calculating t□a, which is the acceleration duration, will vary for ① trapezoidal pattern vs. ② triangular patter movements.
Whether a movement pattern is trapezoidal or triangular can be determined by whether the peak speed reached after accelerating over a distance at a specified rate is greater than or less than the specified speed.

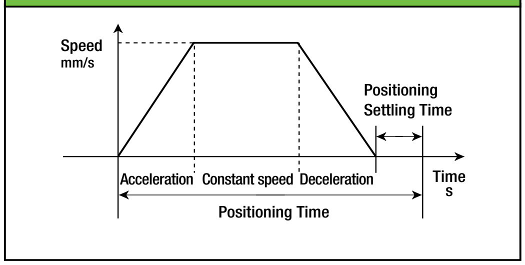
Peak Speed (Vmax)= $\sqrt{\text{Distance Moved (m)} \times \text{Set Acceleration (m/s}^2)}$

Set Speed < Peak Speed → ① Trapezoidal Pattern
Set Speed > Peak Speed → ② Triangular Pattern

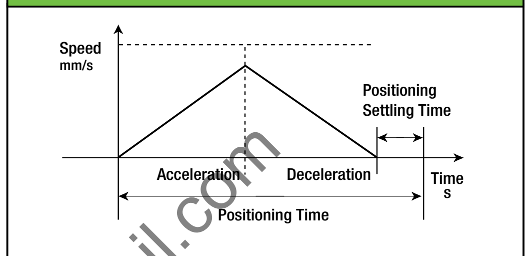
① For trapezoidal pattern,
t□a=Vs/a Vs : Set speed (m/s) a : Ordered acceleration (m/s²)

② For triangular pattern
t□a=Vt/a Vt : Peak speed (m/s) a : Ordered acceleration (m/s²)

① Trapezoidal Pattern



② Triangular Pattern



● t□f is the time taken to move at constant speed. You can calculate this time by computing the distance moved at constant speed.
t□f= Lc/V Lc : Distance moved at constant speed (m) V : Commanded acceleration (m/s)

* Distance moved at constant speed = total distance – accelerated distance – decelerated distance Accel./decel. distance = $V^2/2a$

● t□d is the deceleration time. This is the same as the acceleration time, if the magnitude of acceleration and deceleration are the same.
t□d=V/a V : Set speed (trapezoidal pattern) or Peak speed (triangular pattern)(m/s) a : Commanded deceleration (m/s²)

If the continuous operation thrust Ft by this method is less than the rated thrust, then operation is possible.

Rated thrust for ultra-high thrust actuator with 2.5 lead: 5100N	Rated thrust for ultra-high thrust actuator with 1.25 lead: 10200N

Operation is possible if both of the above operating conditions 1 and 2 are met.
If either condition cannot be met, make adjustments such as shortening the pushing operation time or decreasing the duty.

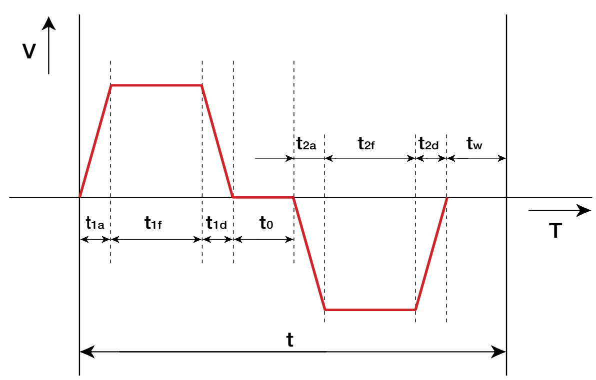
Sample Problem

■ Select an operation pattern by using the selection method described above.

Operating Conditions
- Model used : Ultra-high thrust actuator with 1.25 lead
- Mounting orientation : Vertical
- Speed : 62mm/s
- Acceleration : 0.098m/s² (0.01G, same value for deceleration.)
- Distance moved : 50mm
- Payload : 100kg
- Push order value : 200% (2000kgf)
- Pushing Time : 3 seconds
- Wait time : 2 seconds
- Push down 50mm, then raise 50mm, and finally wait 2 seconds. The conditions for downward and upward motions are identical.

Plotting the above operation yields the graph on the right.

1G = 9.8m/s²



Selection Guide (Push Force / Continuous Operation Thrust)

Using the selection method:

Condition 1. Confirm push operation time

By comparing our push time of 3 seconds with the maximum push time for a push order value of 200%, which is 13 seconds (see Table 1 on page A-71), it is clear that the pressing time is acceptable.

Condition 2. Calculate the continuous operation thrust

Substitute the above operational pattern to the previously mentioned equation for continuous operation thrust.

$$F_t = \sqrt{\frac{F_{1a}^2 \times t_{1a} + F_{1f}^2 \times t_{1f} + F_{1d}^2 \times t_{1d} + F_0^2 \times t_0 + F_{2a}^2 \times t_{2a} + F_{2f}^2 \times t_{2f} + F_{2d}^2 \times t_{2d} + F_w^2 \times t_w}{t}}$$

At this point, by looking at the motion pattern for t1a/t1d/t2a/t2d, the peak speed (Vmax) $=\sqrt{0.05 \times 0.098} \rightarrow 0.07$m/s, which is greater that the set speed, 62mm/s (0.06m/s). Hence this is a trapezoidal pattern.

Hence, $t_{1a}/t_{1d}/t_{2a}/t_{2d} = 0.062 \div 0.098 \rightarrow 0.63$s

Next, calculate t_{1f}/t_{2f}:
Distance moved at constant speed $= 0.05-\{(0.062 \times 0.062) \div (2 \times 0.098)\} \times 2 \rightarrow 0.011$m, so $t_{1f}/t_{2f} = 0.011 \div 0.062 \rightarrow 0.17$s.

Also, calculating the F1a/F1f/F1d/F2a/F2f/F2d from the equations yields the following:
$F_{1a} = F_{2d} = (9+100) \times 9.8-(9+100) \times 0.098 \rightarrow 1058$N
$F_{1d} = F_{2a} = (9+100) \times 9.8+(9+100) \times 0.098 \rightarrow 1079$N
$F_{1f} = F_{2f} = f_w = (9+100) \times 9.8 \rightarrow 1068$N

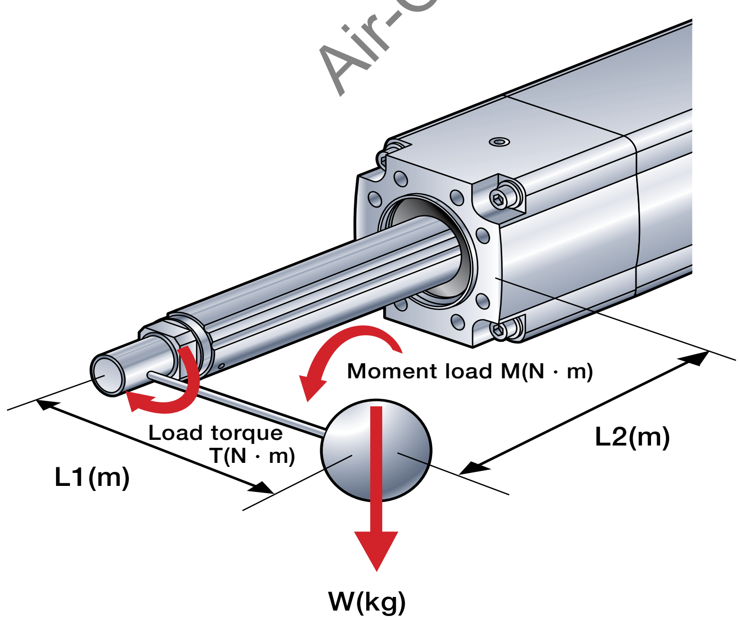
By substituting these values to the continuous operation thrust equation,

$$F_t = \sqrt{\{(1058 \times 1058) \times 0.63+(1068 \times 1068) \times 0.17+(1079 \times 1079) \times 0.63+(19600 \times 19600) \times 3+(1079 \times 1079) \times 0.63 +(1068 \times 1068) \times 0.17+(1058 \times 1058) \times 0.63+(1068 \times 1068) \times 2\} \div (0.63+0.17+0.63+3+0.63+0.17+0.63+2)} \rightarrow 12113\text{N}$$

Since this exceeds the rated thrust for the 2-ton ultra-thrust actuator, which is 10200N, operation with this pattern is not possible.

In response, let us increase the wait time. (i.e. decrease the duty)
Recalculating with tw=6.12s(t=12s) will change the thrust to F_t=9814N, making it operable.

Information on Moment Selection



The ultra-high thrust actuator can apply a load on the rod within the range of conditions calculated below.

M+T ≦ 120 (N · m)
Moment Load $M = Wg \times L_2$
Load Torque $T = Wg \times L_1$

* g = Gravitational acceleration 9.8
* L1 = Distance from the center of rod to the center of gravity of the work piece
* L2 = Distance from the actuator mounting surface to the center of gravity of the work piece + 0.07

If the above condition is not met, consider installing an external guide, or the like, so that the load is not exerted on the rod.

Selection Guide (Gripping Force)

RCP2 Series | Gripper Slide Type

Step 1 Check necessary gripping force and transportable work part weight

Step 2 Check distance to gripping point

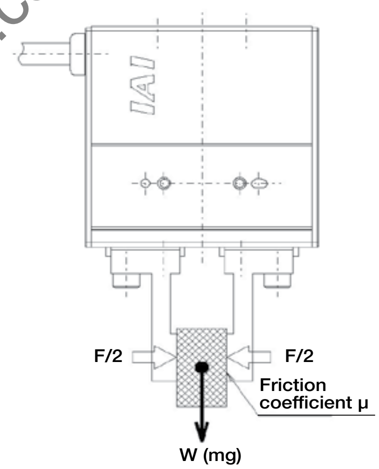
Step 3 Check external force applied to the finger attachment (claw)

Step 1 Check necessary gripping force and transportable work part weight

When gripping with frictional force, calculate the necessary gripping force as shown below.

(1) Normal transportation

F : Gripping force [N] ...... Sum of push forces
μ : Coefficient of static friction between the finger attachment and the work part
m : Work part weight [Kg]
g : Gravitational acceleration [= $9.8 m/s^2$]



A condition in which a work part does not drop when the work part is gripped statistically:

$$F\mu > W$$

$$F > \frac{mg}{\mu}$$

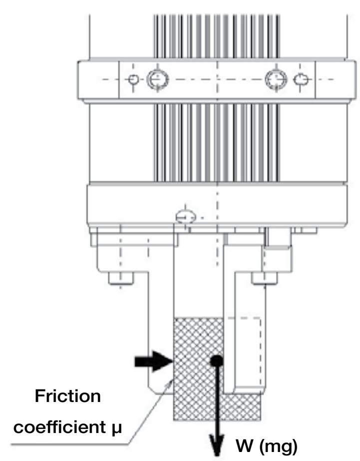
Necessary gripping force as the recommended safety factor of 2 in normal transportation:

$$F > \frac{mg}{\mu} \times 2 \text{ (safety factor)}$$

When the friction coefficient μ is between 0.1 and 0.2:

$$F > \frac{mg}{0.1\sim0.2} \times 2 = (10\sim20) \times mg$$

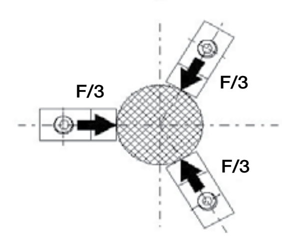
* As the Coefficient of static friction increases, the work part weight also increases.
Select a model which can achieve the gripping force of 10 to 20 times or more.



Normal work part transportation		
Necessary gripping force	→	10 to 20 times the work part weight or more
Transportable work part weight	→	One-tenth to one-twentieth or less of gripping force

(2) When remarkable acceleration, deceleration and/or impact occur at work part transportation

Stronger inertial force is applied to a work part by gravity.
In this case, consider the sufficient safety rate when selecting a model.



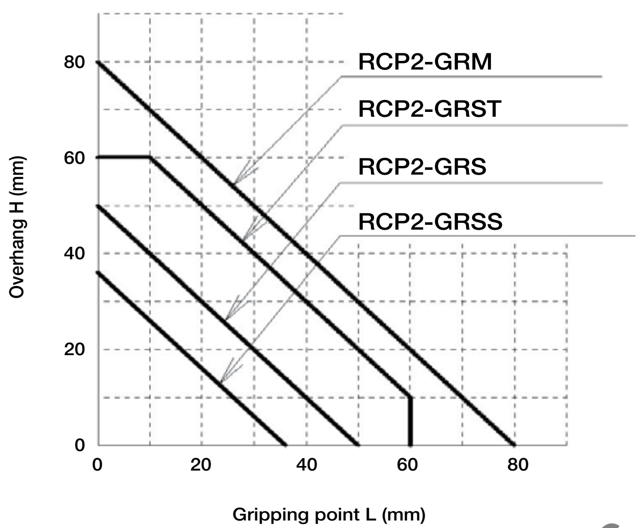
When remarkable acceleration, deceleration and/or impact occur		
Necessary gripping force	→	30 to 50 times the work part weight or more
Transportable work part weight	→	One-thirtieth to one-fiftieth or less of gripping force

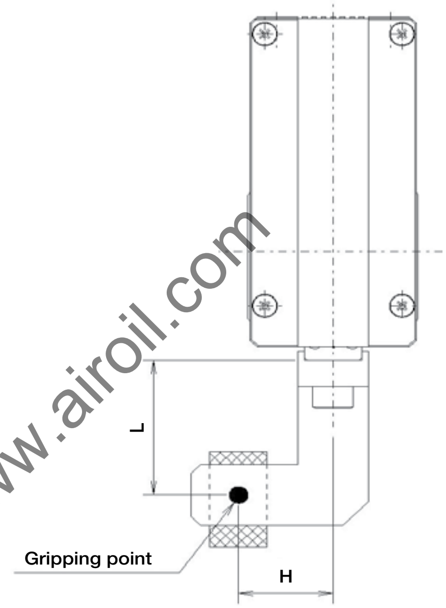
Selection Guide (Gripping Force)

Step 2 Distance between finger attachment (claw) to gripping point

Keep the distance (L, H) from the finger (claw) mounting surface to the gripping point within the following range. If such distance does not fall within such range, excessive moment applies to the finger sliding parts and internal mechanism and the service life may be affected.

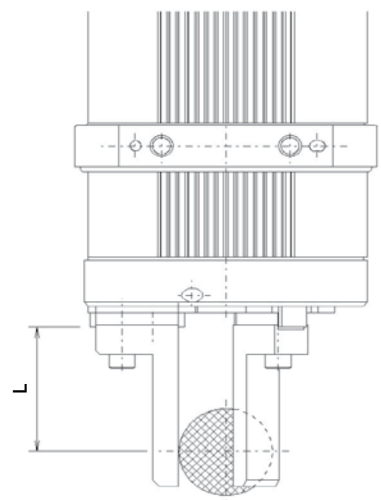
- **2-Finger gripper**





- **3-Finger gripper**

RCP2-GR3SS → L: 50mm or less
RCP2-GR3SM → L: 80mm or less

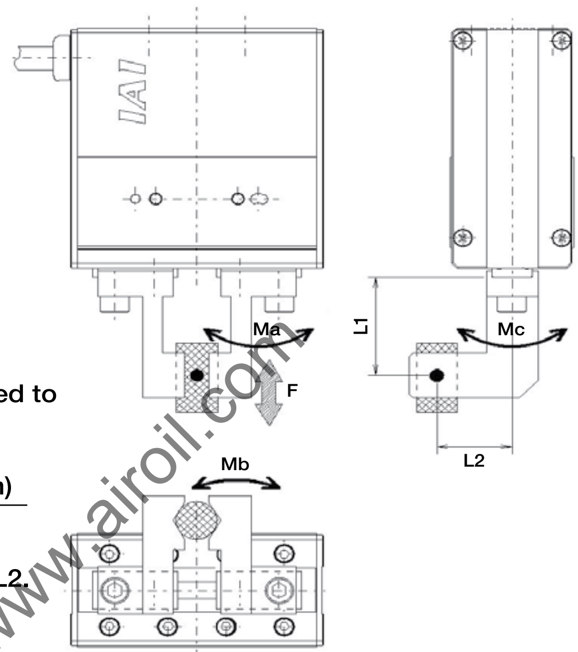


Keep the fingers mounted to the actuator as small and light as possible, even if the distance to the gripping point falls within a restricted range.
There are cases in which performance will be decreased or the guides will be adversely affected by inertial forces or bending moment if the finger is too long or too heavy.

Step 3 Checking external force applied to finger

(1) Allowable vertical load

Confirm that the vertical load applied to each finger is the allowable load or less.



(2) Allowable load moment

Calculate Ma and Mc using L1 and Mb using L2.
Confirm that the moment applied to each finger is the maximum allowable load moment or less.

Allowable external force when the moment load is applied to each claw:

$$\text{Allowable load F (N)} > \frac{\text{M (Maximum allowable moment (N•m)}}{\text{L (mm)} \times 10^{-3}}$$

Calculate the allowable load F (N) using both of L1 and L2.

Confirm that the external force applied to finger is the calculated allowable load F (N) (L1 or L2, whichever is smaller) or less.

Model	Allowable vertical load F (N)	Maximum allowable load moment (N•m)		
		Ma	Mb	Mc
RCP2-GRSS	60	0.5	0.5	1.5
RCP2-GRS	253	6.3	6.3	7.0
RCP2-GRM	253	6.3	6.3	8.3
RCP2-GRST	275	2.93	2.93	5.0
RCP2-GR3SS	169	3.8	3.8	3.0
RCP2-GR3SM	253	6.3	6.3	5.7

1. The allowable value ky above shows a static value.
2. The allowable value per finger is shown.

* Finger weight and work part weight are also a part of the external force. Centrifugal force when the gripper rotated gripping a work part and inertial force due to acceleration or deceleration when moving are also the external force applied to the finger.

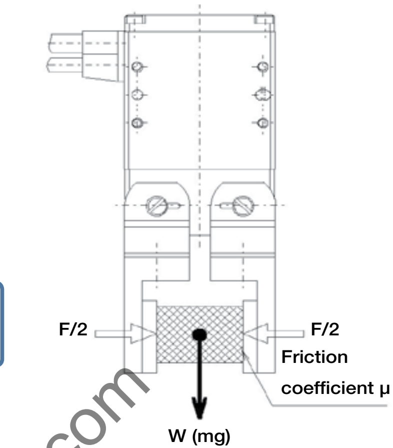
Selection Guide (Gripping Force)

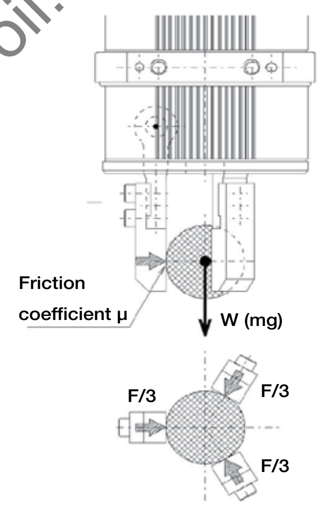
RCP2 Series Gripper Lever Type

Step 1 Check necessary gripping force and transportable work part weight

Step 2 Check moment of inertia of the finger attachment (claw)

Step 3 Check external force applied to the finger





Step 1 Check the necessary gripping force and transportable work part weight

Like Step 1 of Slide type, calculate the necessary gripping force and confirm that the gripping force meets conditions. Calculate it referring to “Paragraph 5.3 Adjustment of Gripping Force”, effective gripping force by gripping point.

Normal work transportation

Necessary gripping force → 10 to 20 times the work part weight or more

Transportable work part weight → One-tenth to one-twentieth or less of gripping force

When remarkable acceleration, deceleration and/or impact occur

Necessary gripping force → 30 to 50 times the work part weight or more

Transportable work part weight → One-thirtieth to one-fiftieth or less of gripping force

Step 2 Checking moment of inertia of the finger attachment (claw)

Confirm that all moments of inertia around the Z axis (fulcrum) of the finger attachment (claw) fall within an allowable area. Depending on the configuration and/or shape of the finger, divide it into several elements when calculating. For your reference, an example of calculation by dividing into two elements is shown below.

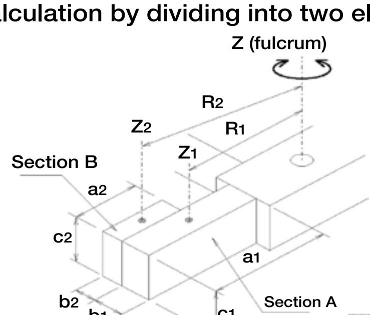
(1) Moment of inertia around Z_1 axis (the center of gravity of A) (section A)

m_1 : Weight of A [Kg]

a, b, c : Dimension of Section A [mm]

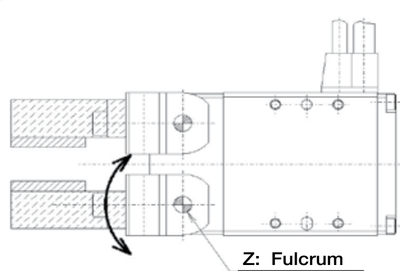
m_1 [Kg] $= a_1 \times b_1 \times c_1 \times$ specific gravity $\times 10^{-6}$

$$I_{Z1}\ [\mathrm{kg.m^2}] = \frac{m_1\,(a_1^2 + b_1^2)}{12} \times 10^{-6}$$



(2) Moment of inertia around the Z_2 axis (the center of gravity of B) (section B)

$$I_{Z2}\ [\mathrm{kg.m^2}] = \frac{m_2\,(a_1^2 + b_1^2)}{12} \times 10^{-6}$$



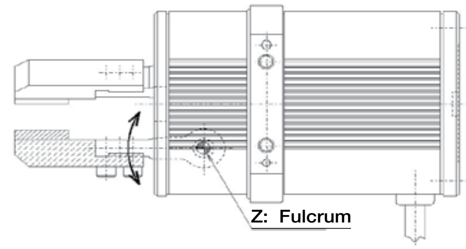
(3) All moments of inertia around the Z axis (fulcrum)

R_1 : Distance from the center of gravity of A to the finger opening/closing fulcrum [mm]

R_2 : Distance from the center of gravity of B to the finger opening/closing fulcrum [mm]

$I\,[\mathrm{kg{\bullet}m^2}] = (I_{Z1} + m_1 R_1^2) + (I_{Z2} + m_2 R_2^2)$

Model	Allowable moment of inertia [kg•m²]	Weight (Reference) [kg]
RCP2-GRLS	1.5×10^{-4}	0.07
RCP2-GR3LS	3.0×10^{-4}	0.15
RCP2-GR3LM	9.0×10^{-4}	0.5



Step 3 Checking external force applied to the finger

(1) Allowable load torque

Confirm that the load torque applied to the finger is the maximum allowable load torque or less.
The load torque is calculated by finger and work part weight as stated below.

m_1 : Work part weight

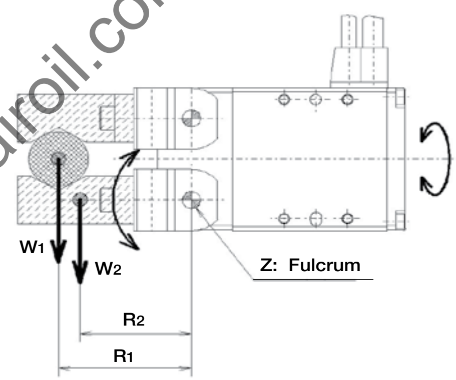
R_1 : Distance from the center of gravity of work part to the finger opening/closing fulcrum

m_2 : Claw weight

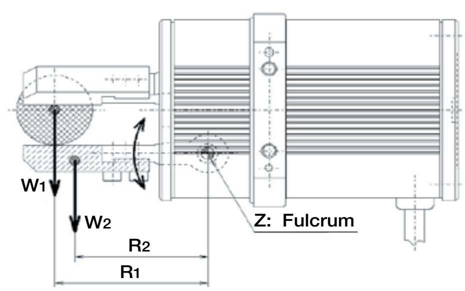
R_2 : Distance from the center of gravity of the claw to the finger opening/closing fulcrum

$T = (W_1 \times R_1) + (W_2 \times R_2) + (\text{other load torque})$

$\quad = (m_1 g \times R_1) + (m_2 g \times R_2) + (\text{other load torque})$



* Centrifugal force when the gripper rotated gripping a work part and inertial force due to acceleration or deceleration when moving horizontally are also the load torque applied to the finger. If applicable, confirm that the total torque including the torque above is the maximum allowable load torque or less.

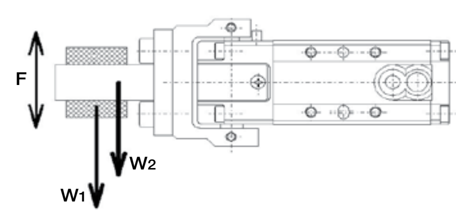


(2) Allowable thrust load

Confirm that the thrust load of finger opening/closing the axis is the allowable load or less.

$F = W_1 + W_2 + (\text{other thrust load})$

$\quad = m_1 g + m_2 g + (\text{other thrust load})$



Model	Maximum allowable load torque T [N•m]	Allowable thrust load F [N]
RCP2-GRLS	0.05	15
RCP2-GR3LS	0.15	–
RCP2-GR3LM	0.4	–

Rotary Type Technical Materials

Selection Guide

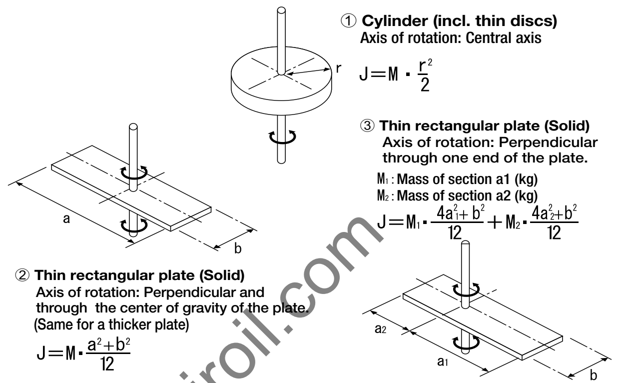
Check the following two points to confirm whether the ROBO Cylinder is compatible with your desired service conditions.

1 Inertial Moment

Inertial moment expresses the amount of inertia in a rotational motion, and corresponds to weight for linear motion.
The greater the inertial moment, the more difficult it is for that object to move and stop.
In other words, when choosing a rotary-type unit, a factor in that selection is whether or not it is possible to control the inertial moment of the object being rotated.
Inertial moment differs with the weight and shape of the object, but refer to the calculation formula in the typical example illustrated on the right.
The allowable inertial moment value for a ROBO Rotary is expressed as **load inertia.**
A ROBO Rotary can be used if the calculated inertial moment is less than its load inertia.

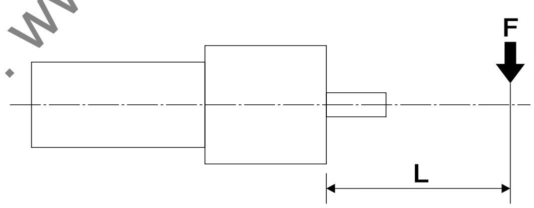
●Calculating the Moment of Inertia for Typical Shapes

J: Moment of inertia (kg•m^2) / M: Mass (kg) / r: Radius (m) / a, b: Length of sides (m



2 Load Moment

If the inertial moment is a controllable (electrical) guide, the load moment is a guide for the limit to forced (mechanical) use.
Using the actuator body end of the output shaft mounting base as the reference position for moment, check whether the load moment exerted on the output axis is within the load moment tolerances in the catalog.
Use in excess of the allowable load moment may cause damage and shortened service life.



Load Moment (N · m) = F (N) × L (m)

Precautions regarding range of motion and home-return

Please note that, when RCS2-RT6/RT6R/RT7R performs home-return, there are cases in which the direction or rotation in the return-home operation will differ depending on the stopping position of the axis.
In the RCS2-RT6/RT6R/RT7R home-return operation, the axis turns and the home-return sensor detects, and the home-return is completed at the position where the Z-phase is detected as inverted. At this time, the axis <u>rotates in the counter-clockwise direction</u> ①, seen from the direction of the axis, and rotation stops when the sensor detection is inverted ② and the Z-phase is detected ③. (See Figure 1)
However, <u>if the axis is detected by the sensor</u> when home-return begins, <u>it rotates in the clockwise direction from that position</u> ④ and stops when the Z-phase is detected ⑤.
(Figure 2)
The range of operation of the ROBO Rotary is 300 degress, but since there is no stopper, there are cases in which the range of operation is exceeded when the axis is manually turned with the servo OFF, etc.
Please note that there are cases where the sensor will be detected when the range of operation has been exceeded.

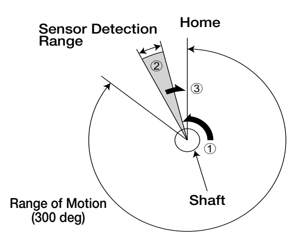


Figure 1

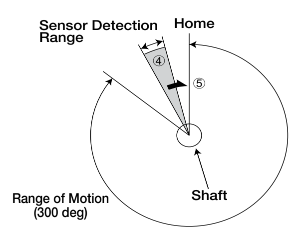


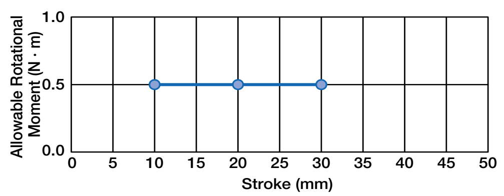
Figure 2

Guide-Equipped Type RCA2/ERC2/RCP2/RCA/RCS2

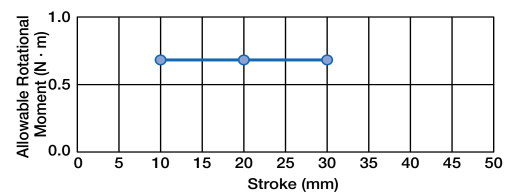
Allowable Rotating Torque

The allowable torque for each model is as shown below.
When rotational torque is exerted, use within the range of the values below. Further, single-guide types cannot be subjected to rotational torque.

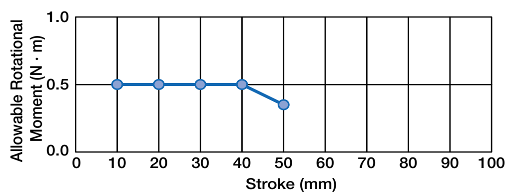
RCA2-GD3N Type



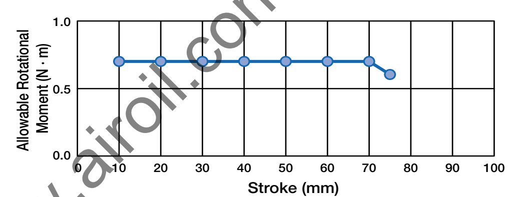
RCA2-GD4N Type



RCA2-SD3N Type

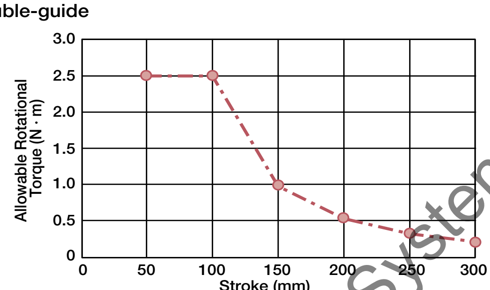


RCA2-SD4N Type



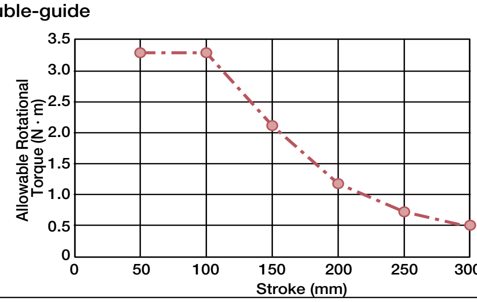
ERC2-RGD6C Type

■ Double-guide



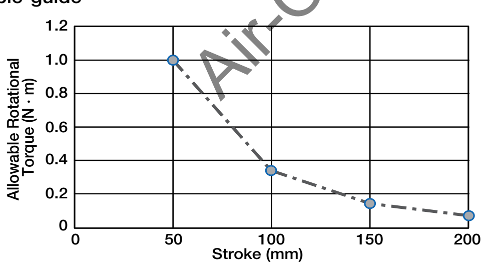
ERC2-RGD7C Type

■ Double-guide



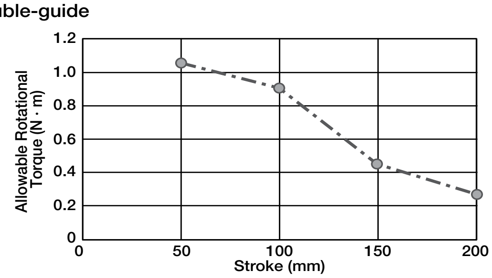
RCA / RCS2-RGD3☐ Type

■ Double-guide



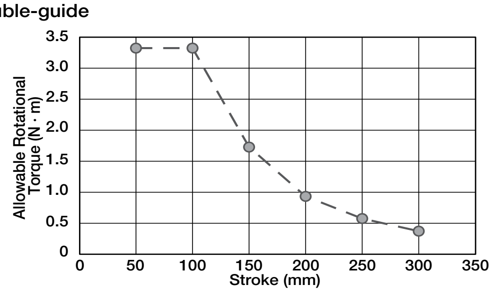
RCS2-RGD4☐ Type

■ Double-guide



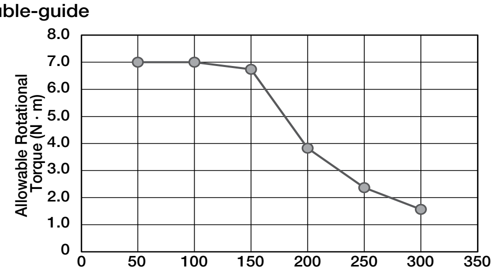
RCS2-RGD5C Type (Double-guide Specification)

■ Double-guide

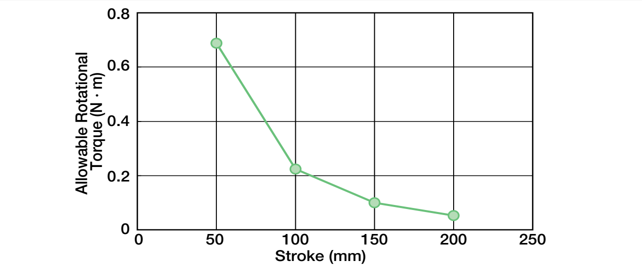


RCS2-SRGD7BD Type

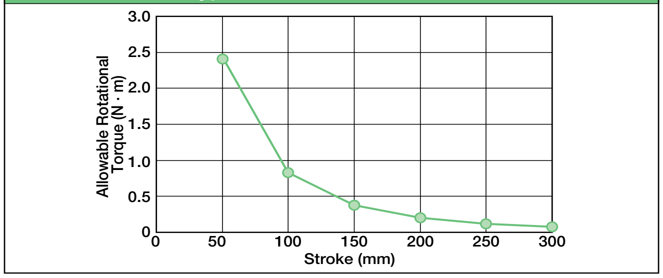
■ Double-guide



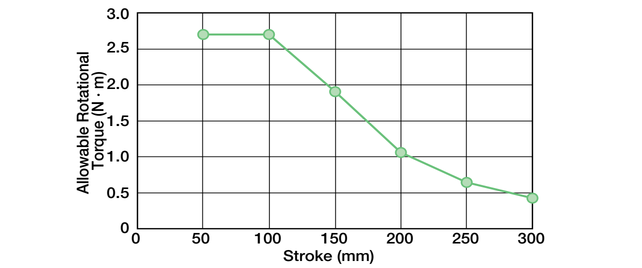
RCP2-RGD3C Type



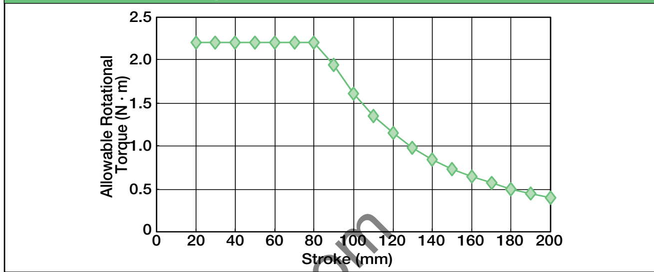
RCP2-RGD4C Type



RCP2-RGD6C Type



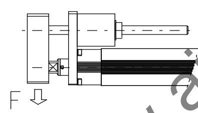
RCP2-SRGD4R Type



Relationship Between Allowable Load at Tip & Running Service Life

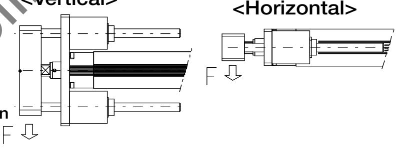
The greater the load at the guide tip, the shorter the running service life. Select the appropriate model, considering balance between load and service life.

■ Single-guide type



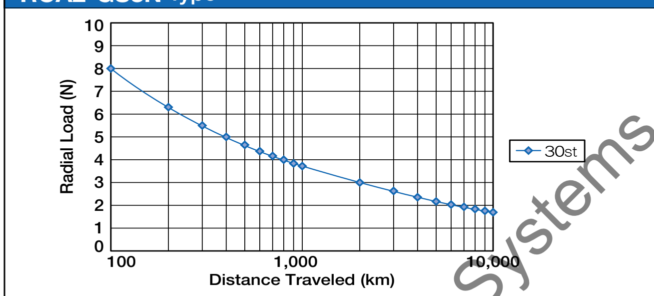
* The single-guide specification can only be used with vertical loads.

■ Double-guide type

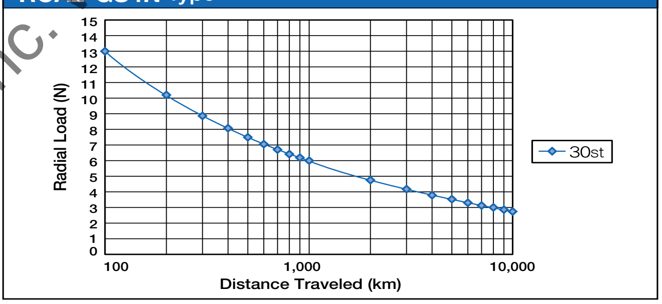


Single-guide

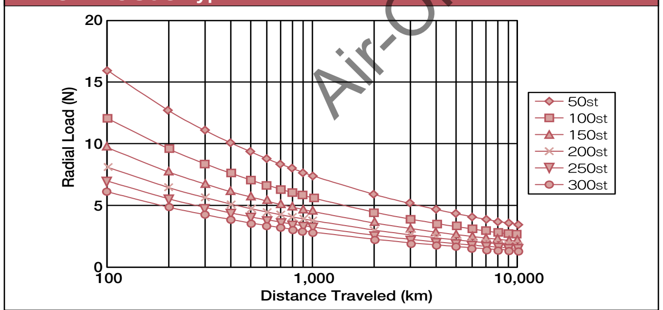
RCA2-GS3N Type



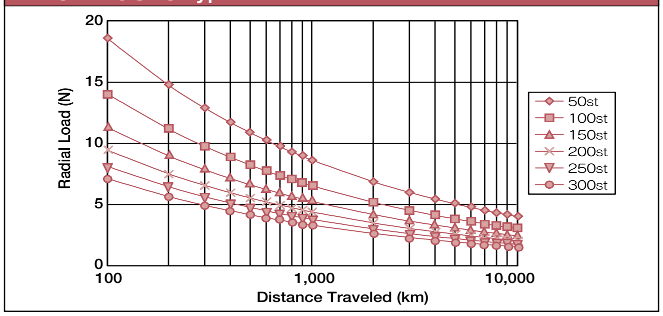
RCA2-GS4N Type



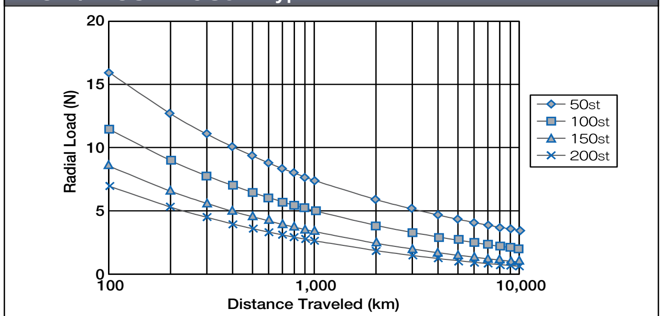
ERC2-RGS6C Type



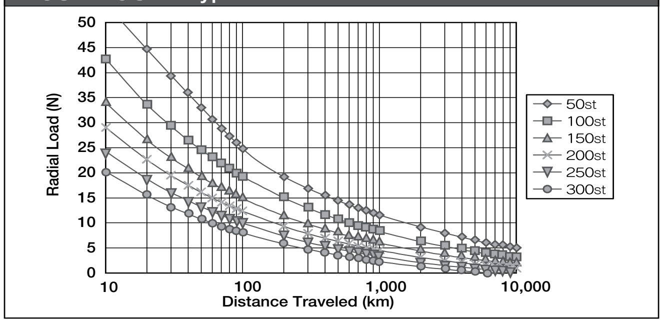
ERC2-RGS7C Type



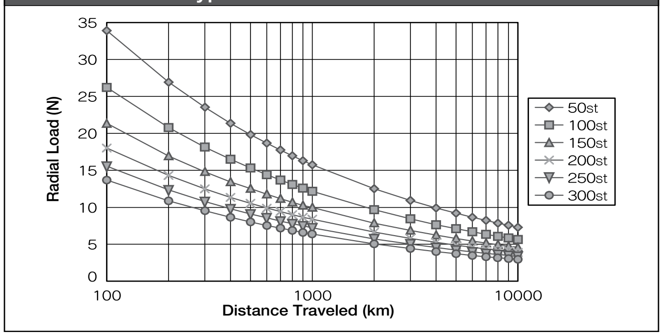
RCA / RCS2-RGS3□ Type



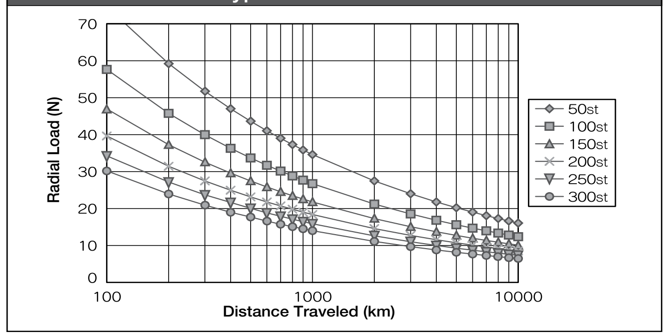
RCS2-RGS4□ Type



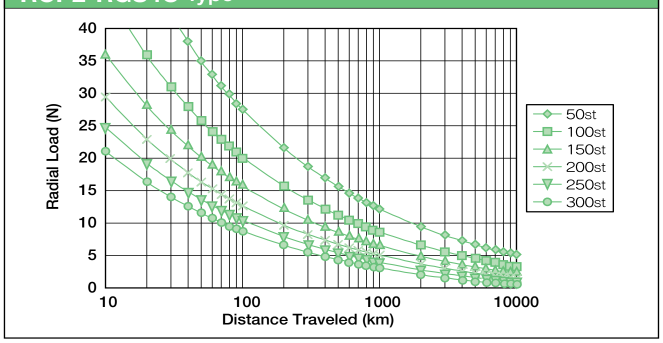
RCS2-RGS5C Type



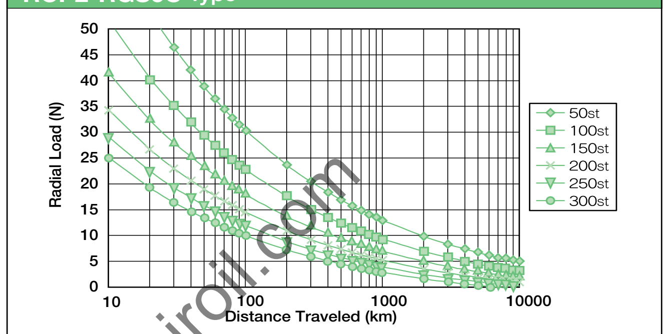
RCS2-SRGS7BD Type



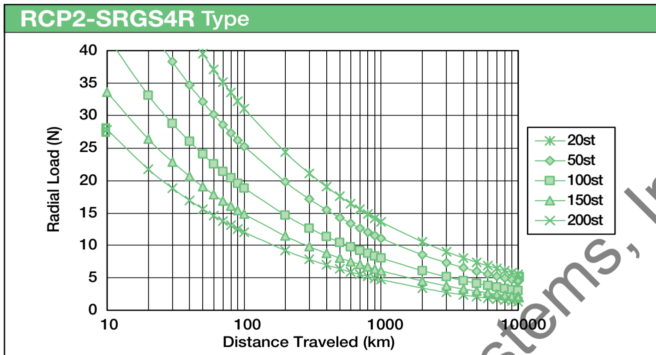
RCP2-RGS4C Type



RCP2-RGS6C Type

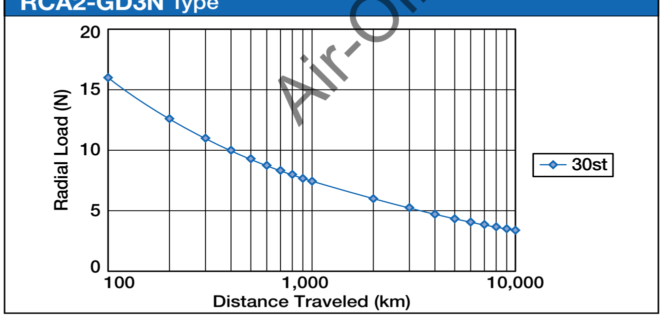


RCP2-SRGS4R Type

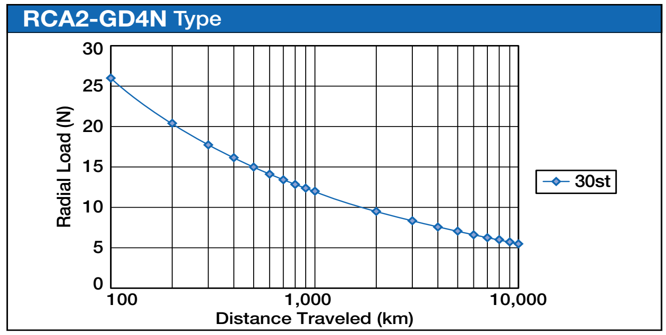


Double-guide

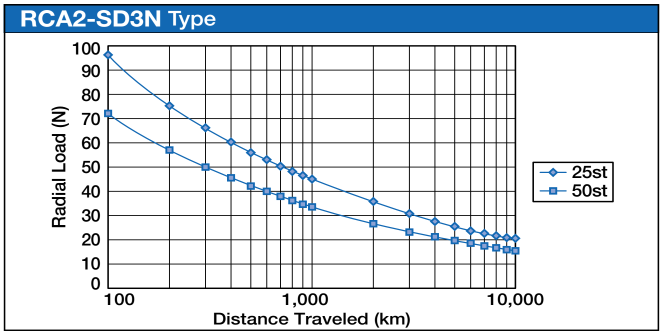
RCA2-GD3N Type



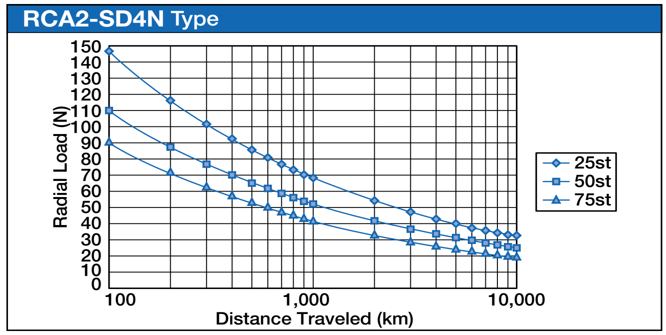
RCA2-GD4N Type



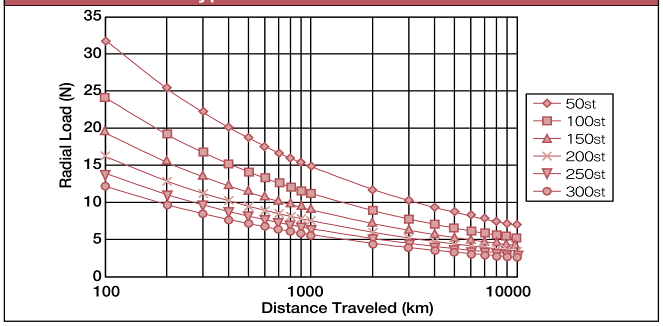
RCA2-SD3N Type



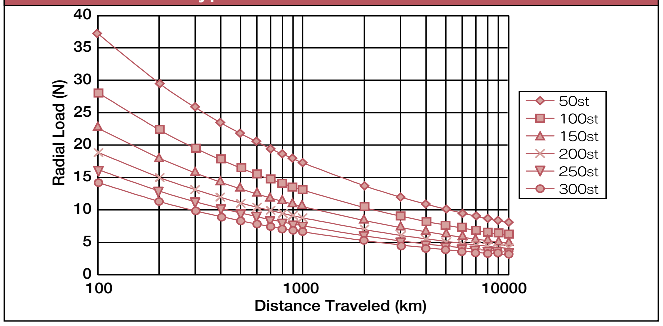
RCA2-SD4N Type



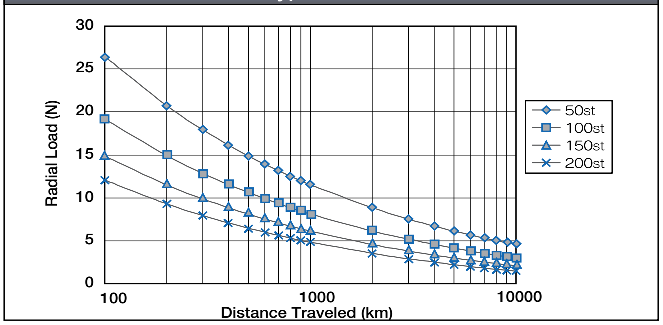
ERC2-RGD6C Type



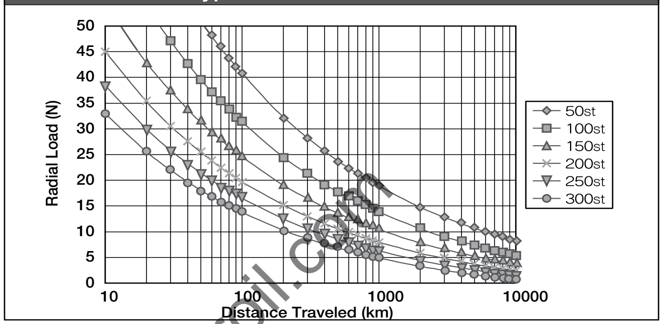
ERC2-RGD7C Type



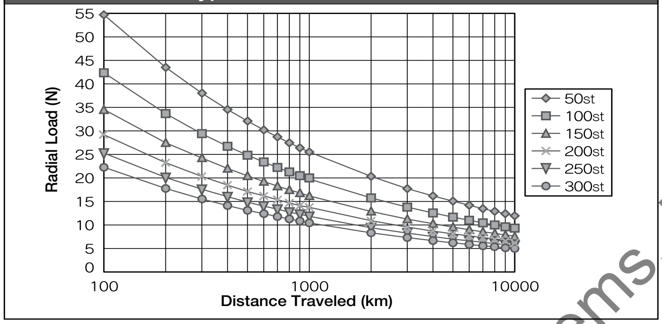
RCA / RCS2-RGD3☐ Type



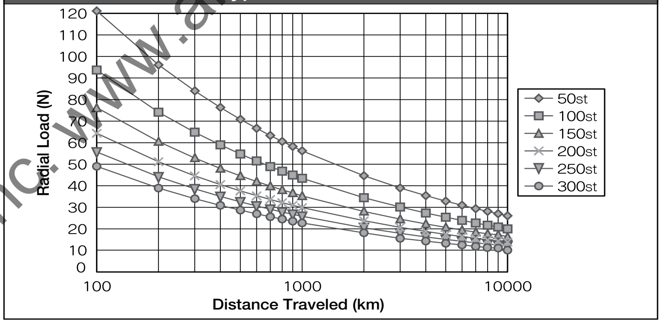
RCS2-RGD4☐ Type



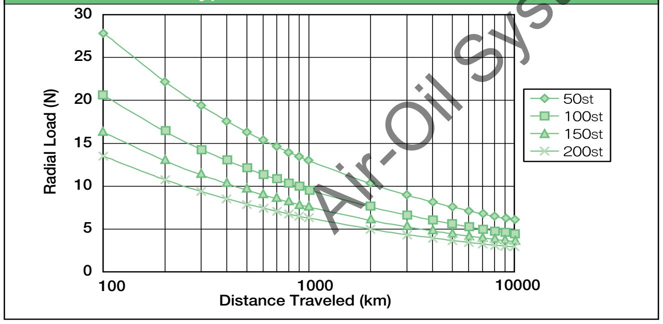
RCS2-RGD5C Type



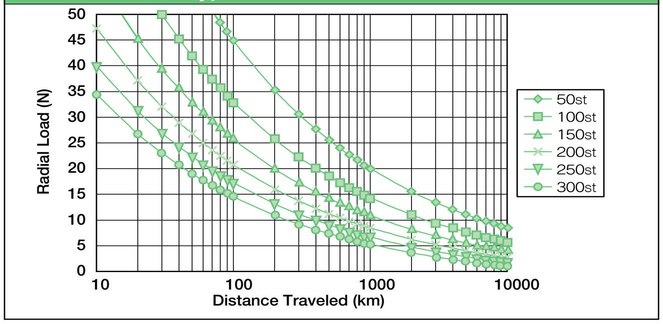
RCS2-SRGD7BD Type



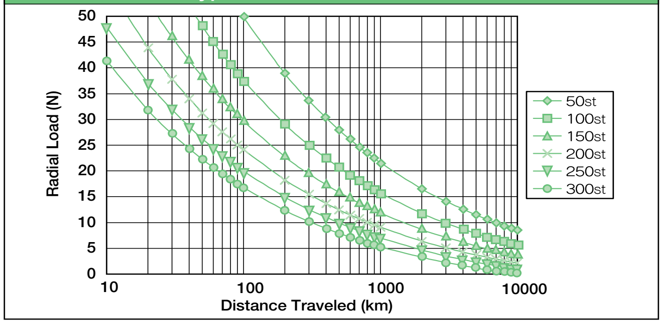
RCP2-RGD3C Type



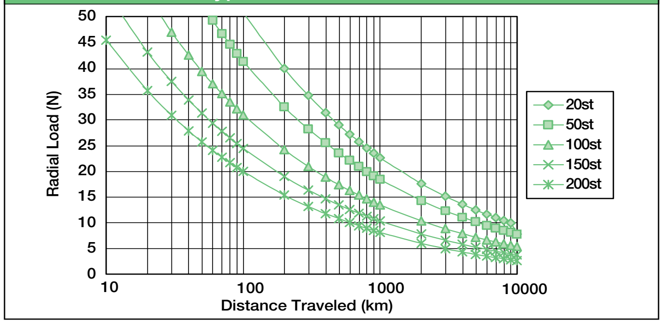
RCP2-RGD4C Type



RCP2-RGD6C Type



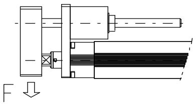
RCP2-SRGD4R Type



Radial Load & Tip Deflection

The graph below shows the correlation between the load exerted at the guide tip and the amount of deflection generated.

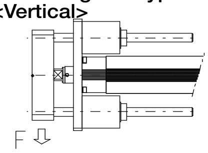
■ Single-guide type



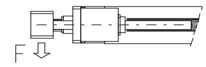
* The single-guide specification can only be used with vertical loads.

■ Double-guide type

<Vertical>

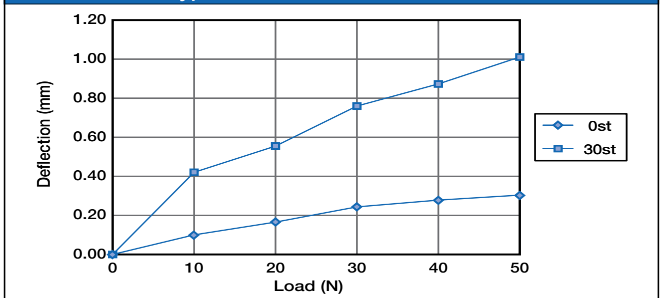


<Horizontal>

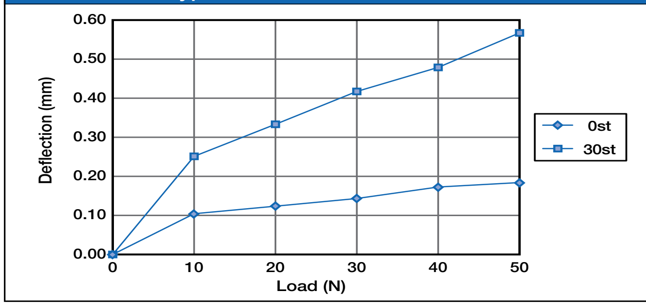


Single-guide

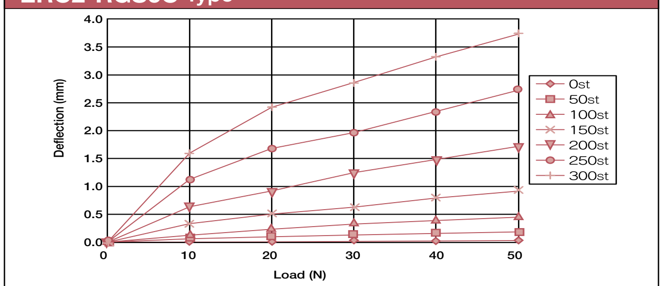
RCA2-GS3N Type



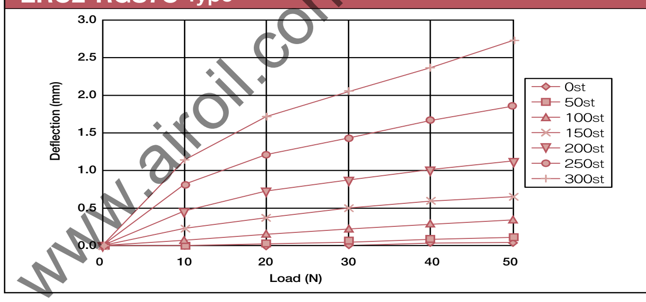
RCA2-GS4N Type



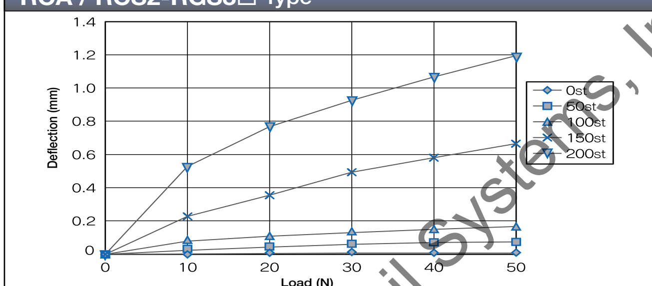
ERC2-RGS6C Type



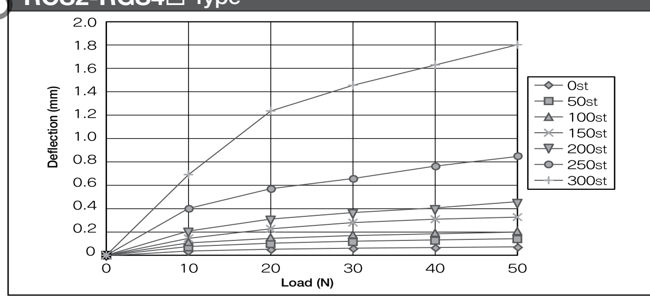
ERC2-RGS7C Type



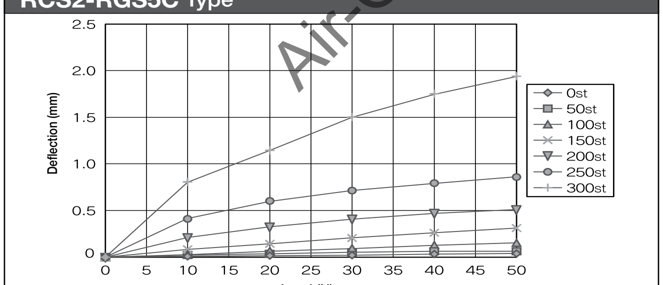
RCA / RCS2-RGS3☐ Type



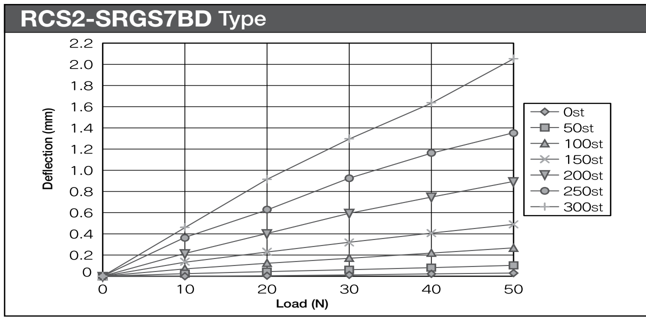
RCS2-RGS4☐ Type



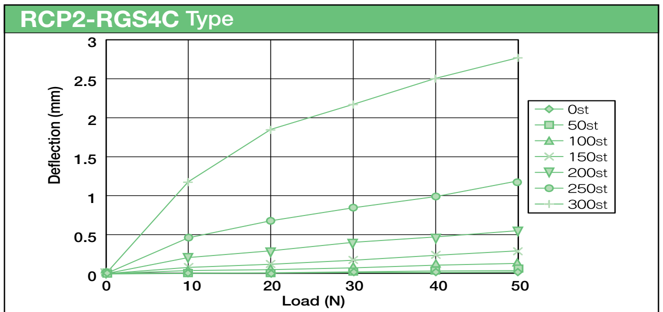
RCS2-RGS5C Type



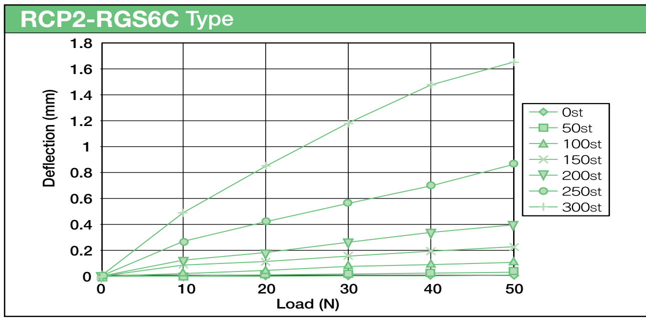
RCS2-SRGS7BD Type



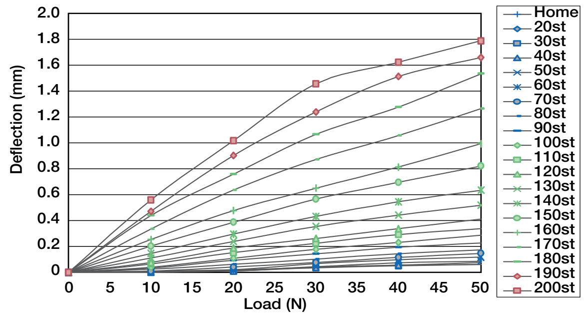
RCP2-RGS4C Type



RCP2-RGS6C Type



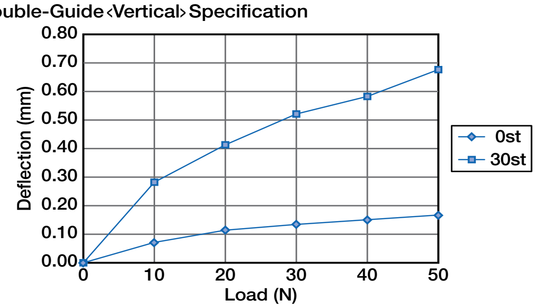
RCP2-SRGS4R Type



Double-guide

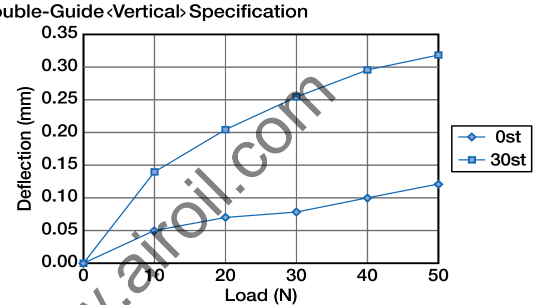
RCA2-GD3N Type

■Double-Guide‹Vertical›Specification



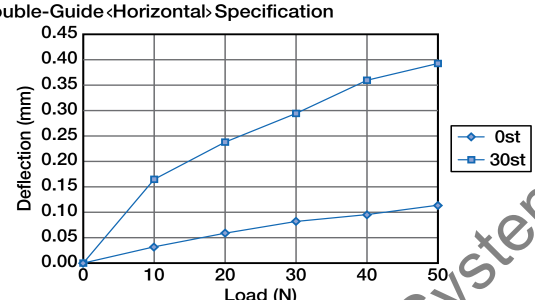
RCA2-GD4N Type

■Double-Guide‹Vertical›Specification



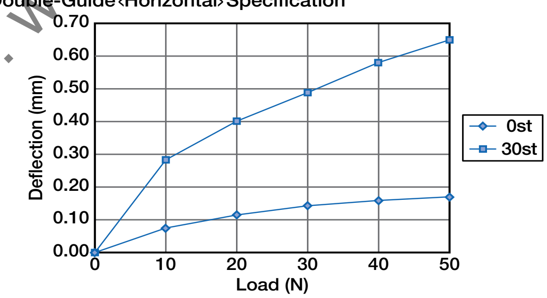
RCA2-GD3N Type

■Double-Guide‹Horizontal›Specification



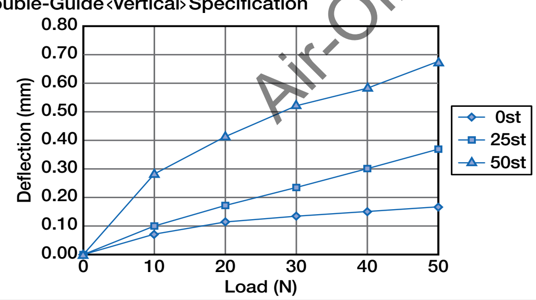
RCA2-GD4N Type

■Double-Guide‹Horizontal›Specification



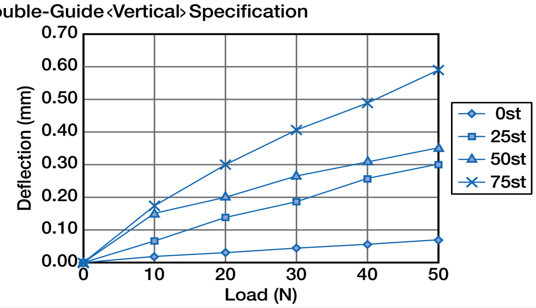
RCA2-SD3N Type

■Double-Guide‹Vertical›Specification



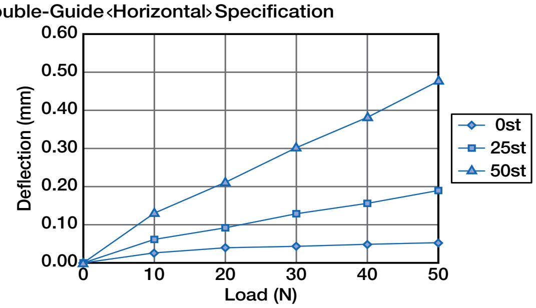
RCA2-SD4N Type

■Double-Guide‹Vertical›Specification



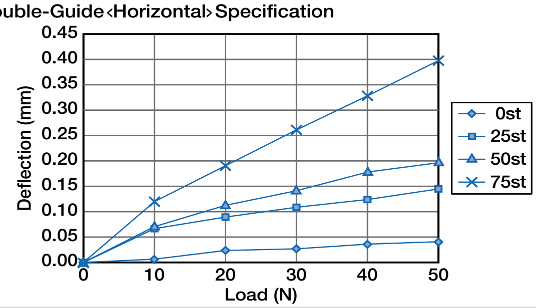
RCA2-SD3N Type

■Double-Guide‹Horizontal›Specification



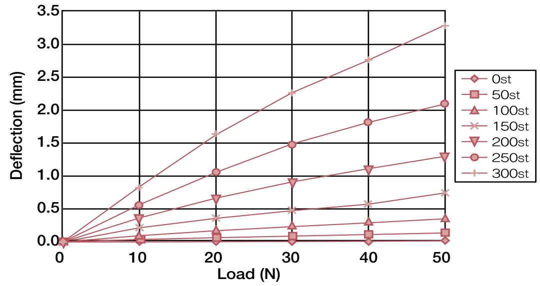
RCA2-SD4N Type

■Double-Guide‹Horizontal›Specification



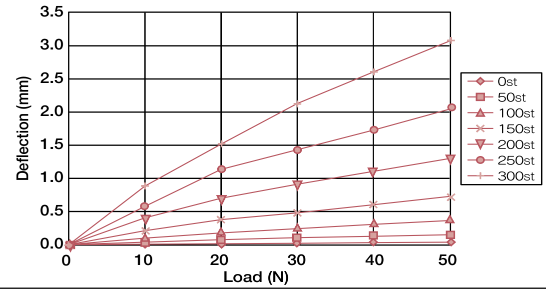
ERC2-RGD6C Type

■Double-Guide‹Horizontal›Specification



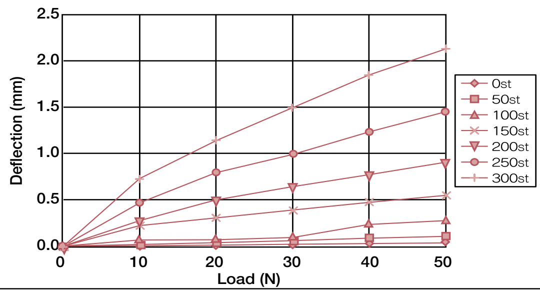
ERC2-RGD6C Type

■Double-Guide‹Vertical›Specification



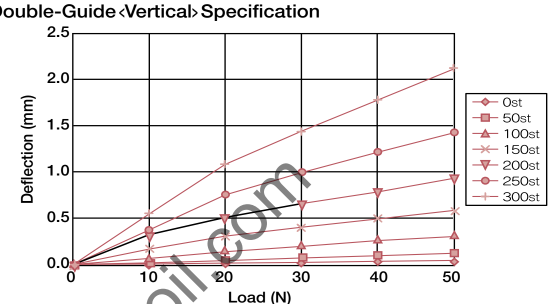
ERC2-RGD7C Type

■Double-Guide‹Horizontal›Specification



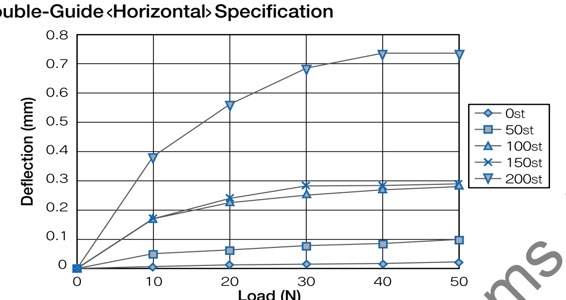
ERC2-RGD7C Type

■Double-Guide‹Vertical›Specification



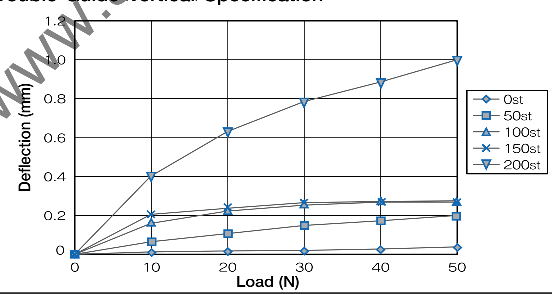
RCA / RCS-RGD3☐ Type

■Double-Guide‹Horizontal›Specification



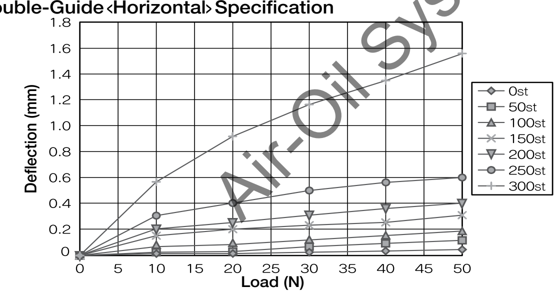
RCA / RCS-RGD3☐ Type

■Double-Guide‹Vertical›Specification



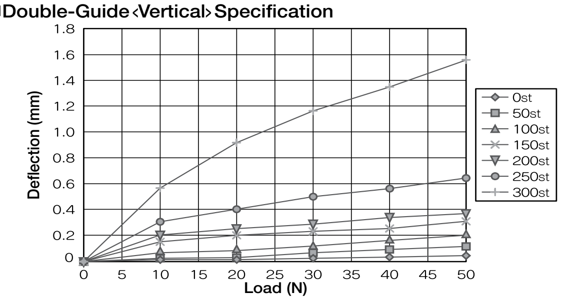
RCS2-RGD4☐ Type

■Double-Guide‹Horizontal›Specification



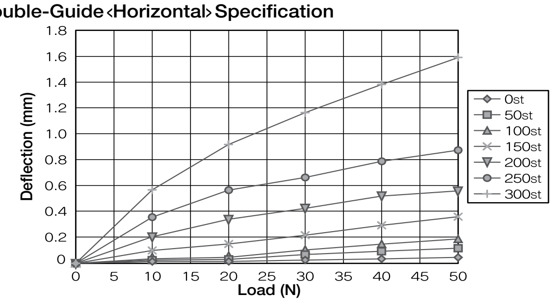
RCS2-RGD4☐ Type

■Double-Guide‹Vertical›Specification



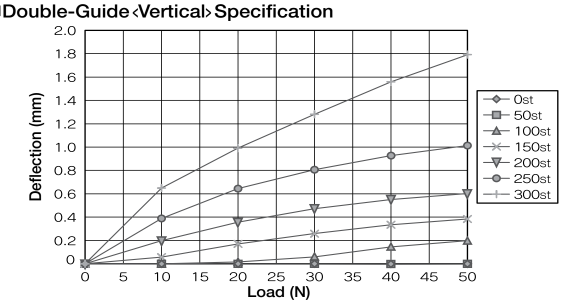
RCS2-RGD5C Type

■Double-Guide‹Horizontal›Specification



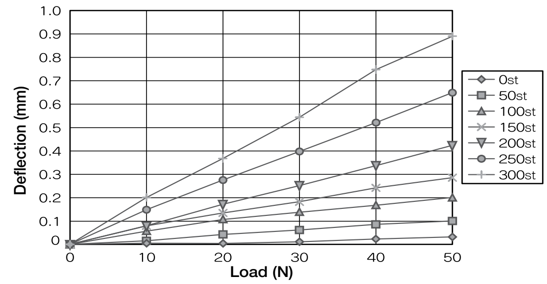
RCS2-RGD5C Type

■Double-Guide‹Vertical›Specification



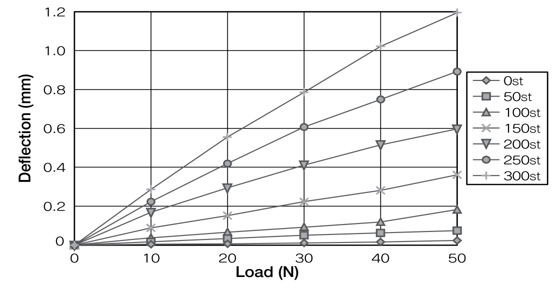
RCS2-SRGD7BD Type

■Double-Guide‹Horizontal›Specification



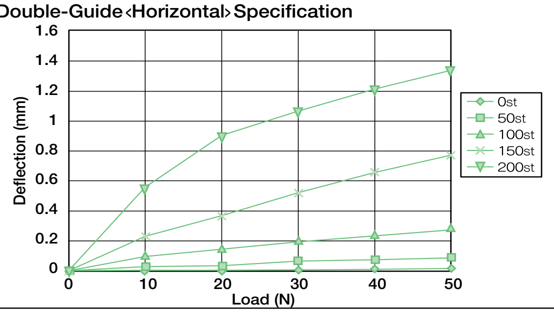
RCS2-SRGD7BD Type

■Double-Guide‹Vertical›Specification



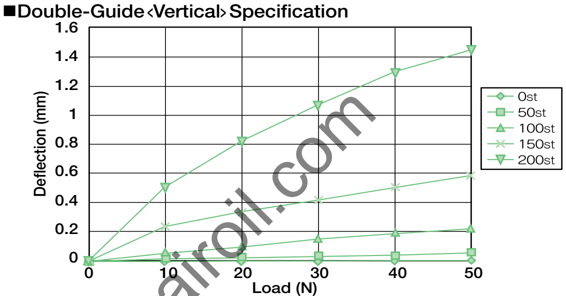
RCP2-RGD3C Type

■Double-Guide‹Horizontal›Specification



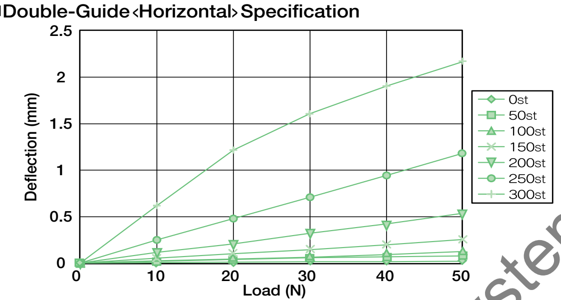
RCP2-RGD3C Type

■Double-Guide‹Vertical›Specification



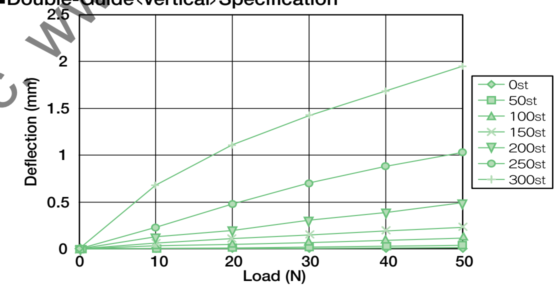
RCP2-RGD4C Type

■Double-Guide‹Horizontal›Specification



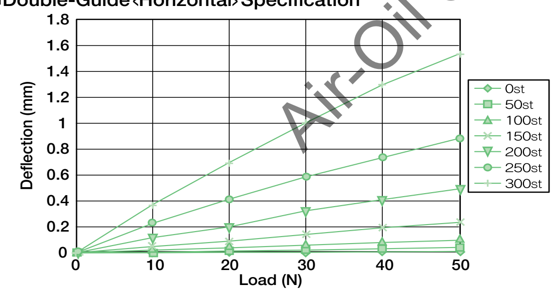
RCP2-RGD4C Type

■Double-Guide‹Vertical›Specification



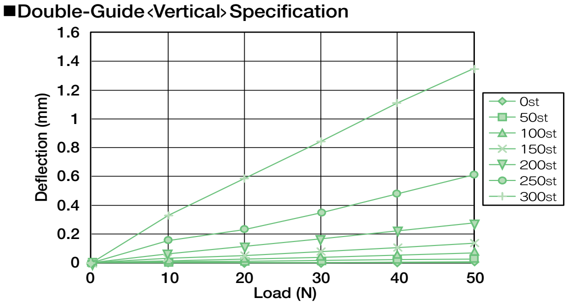
RCP2-RGD6C Type

■Double-Guide‹Horizontal›Specification



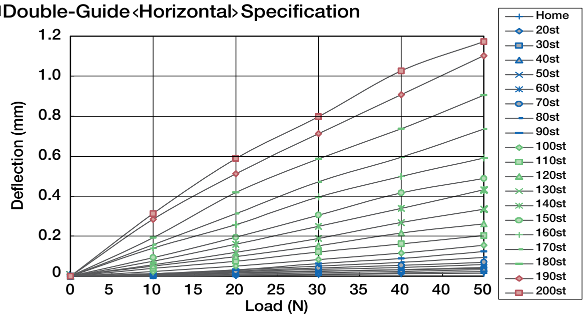
RCP2-RGD6C Type

■Double-Guide‹Vertical›Specification



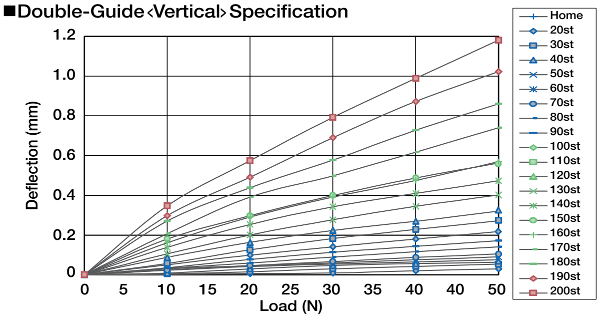
RCP2-SRGD4R Type

■Double-Guide‹Horizontal›Specification



RCP2-SRGD4R Type

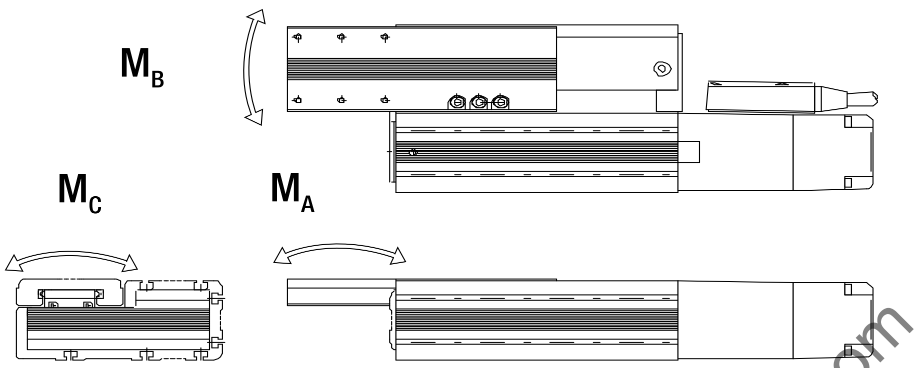
■Double-Guide‹Vertical›Specification



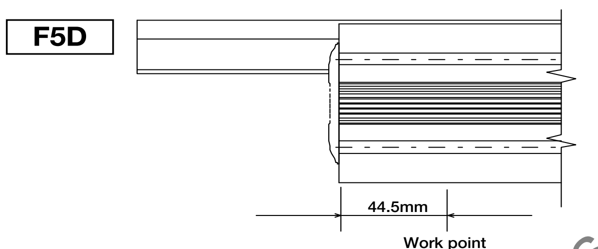
Flat Type F5D Technical Materials

Flat Type (F5D) Moment, load capacity

The direction of the moment in the flat type is as shown in the figure below.



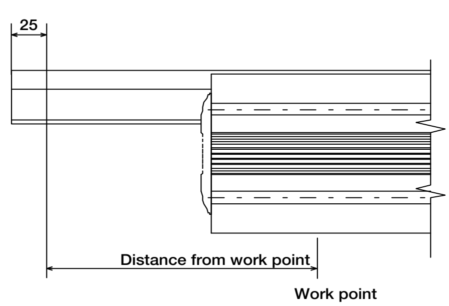
The points of moment application in the Ma and Mb directions are as shown below.



Be careful that the load exerted on the plate tip does not exceed the Ma moment when using a flat type horizontally.

Refer to the table below for the allowable tip loads calculated from the Ma moment for each stroke.

Stroke		50	100	150	200	250	300
F5D Type	Distance from point of action (m)	0.07	0.12	0.17	0.22	0.27	0.32
	N	64.3	37.5	26.5	20.5	16.7	14.1
	(kgf)	6.56	3.83	2.70	2.09	1.70	1.43



Previous Model Conversion Table [ERC, RCP2, RCP2CR, RCP2W]

Previous Product Model			→	New Product Model	Note
Series	Model	Model		Model	
ERC	RA54	ERC-RA54-I-PM-③-④-⑤	→	ERC2-RA6C-I-PM-③-④-NP-⑤	
	RA54GD	ERC-RA54GD-I-PM-③-④-⑤	→	ERC2-RGD6C-I-PM-③-④-NP-⑤	
	RA54GS	ERC-RA54GS-I-PM-③-④-⑤	→	ERC2-RGS6C-I-PM-③-④-NP-⑤	
	RA64	ERC-RA64-I-PM-③-④-⑤	→	ERC2-RA7C-I-PM-③-④-NP-⑤	
	RA64GD	ERC-RA64GD-I-PM-③-④-⑤	→	ERC2-RGD7C-I-PM-③-④-NP-⑤	
	RA64GS	ERC-RA64GS-I-PM-③-④-⑤	→	ERC2-RGS7C-I-PM-③-④-NP-⑤	
	SA6	ERC-SA6-I-PM-③-④-⑤	→	ERC2-SA6C-I-PM-③-④-NP-⑤	
	SA7	ERC-SA7-I-PM-③-④-⑤	→	ERC2-SA7C-I-PM-③-④-NP-⑤	
RCP2	BA6	RCP2-BA6-I-PM-54-④-P1-⑤	→	RCP2-BA6-I-42P-54-④-P1-⑤	
		RCP2-BA6-A-PM-54-④-P1-⑤	→	RCP2-BA6-I-42P-54-④-P1-⑤	For use with Simple Absolute unit
	BA6U	RCP2-BA6U-I-PM-54-④-P1-⑤	→	RCP2-BA6U-I-42P-54-④-P1-⑤	
		RCP2-BA6U-A-PM-54-④-P1-⑤	→	RCP2-BA6U-I-42P-54-④-P1-⑤	For use with Simple Absolute unit
	BA7	RCP2-BA7-I-PM-54-④-P1-⑤	→	RCP2-BA7-I-42P-54-④-P1-⑤	
		RCP2-BA7-A-PM-54-④-P1-⑤	→	RCP2-BA7-I-42P-54-④-P1-⑤	For use with Simple Absolute unit
	BA7U	RCP2-BA7U-I-PM-54-④-P1-⑤	→	RCP2-BA7U-I-42P-54-④-P1-⑤	
		RCP2-BA7U-A-PM-54-④-P1-⑤	→	RCP2-BA7U-I-42P-54-④-P1-⑤	For use with Simple Absolute unit
	GRS	RCP2-GRS-I-PM-1-10-P1-⑤	→	RCP2-GRS-I-20P-1-10-P1-⑤	
	GRM	RCP2-GRM-I-PM-1-14-P1-⑤	→	RCP2-GRM-I-28P-1-14-P1-⑤	
	GR3LS	RCP2-GR3LS-I-PM-30-1X-P1-⑤	→	RCP2-GR3LS-I-28P-30-19-P1-⑤	
	GR3LM	RCP2-GR3LM-I-PM-30-1X-P1-⑤	→	RCP2-GR3LM-I-42P-30-19-P1-⑤	
	GR3SS	RCP2-GR3SS-I-PM-30-10-P1-⑤	→	RCP2-GR3SS-I-28P-30-10-P1-⑤	
	GR3SM	RCP2-GR3SM-I-PM-30-14-P1-⑤	→	RCP2-GR3SM-I-42P-30-14-P1-⑤	
	HSM	RCP2-HSM-I-PM-30-④-P1-⑤	→	RCP2-HS8C-I-86P-③-④-P2-⑤	
	HSMR	RCP2-HSMR-I-PM-30-④-P1-⑤	→	RCP2-HS8R-I-86P-③-④-P2-⑤	
	RFA	RCP2-RFA-I-PM-③-④-P1-⑤	→	RCP2-RA10C-I-86P-③-④-P2-⑤	
	RFW	RCP2-RFW-I-PM-③-④-P1-⑤	→	RCP2W-RA10C-I-86P-③-④-P2-⑤	
	RMA	RCP2-RMA-I-PM-③-④-P1-⑤	→	RCP2-RA6C-I-56P-③-④-P1-⑤	
		RCP2-RMA-A-PM-③-④-P1-⑤	→	RCP2-RA6C-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
	RMGD	RCP2-RMGD-I-PM-③-④-P1-⑤	→	RCP2-RGD6C-I-56P-③-④-P1-⑤	
		RCP2-RMGD-A-PM-③-④-P1-⑤	→	RCP2-RGD6C-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
	RMGS	RCP2-RMGS-I-PM-③-④-P1-⑤	→	RCP2-RGS6C-I-56P-③-④-P1-⑤	
		RCP2-RMGS-A-PM-③-④-P1-⑤	→	RCP2-RGS6C-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
	RMW	RCP2-RMW-I-PM-③-④-P1-⑤	→	RCP2W-RA6C-I-56P-③-④-P1-⑤	
		RCP2-RMW-A-PM-③-④-P1-⑤	→	RCP2W-RA6C-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
	RPA	RCP2-RPA-I-PM-1-④-P1-⑤	→	RCP2-RA2C-I-20P-1-④-P1-⑤	
	RSA	RCP2-RSA-I-PM-③-④-P1-⑤	→	RCP2-RA4C-I-42P-③-④-P1-⑤	
		RCP2-RSA-A-PM-③-④-P1-⑤	→	RCP2-RA4C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	RSGD	RCP2-RSGD-I-PM-③-④-P1-⑤	→	RCP2-RGD4C-I-42P-③-④-P1-⑤	
		RCP2-RSGD-A-PM-③-④-P1-⑤	→	RCP2-RGD4C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	RSGS	RCP2-RSGS-I-PM-③-④-P1-⑤	→	RCP2-RGS4C-I-42P-③-④-P1-⑤	
		RCP2-RSGS-A-PM-③-④-P1-⑤	→	RCP2-RGS4C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit

* ③ is the lead, ④ is the stroke, and ⑤ is the cable length.

Previous Product Model				New Product Model	Note
Series	Model	Model		Model	
RCP2	RSW	RCP2-RSW-I-PM-③-④-P1-⑤	→	RCP2W-RA4C-I-42P-③-④-P1-⑤	
		RCP2-RSW-A-PM-③-④-P1-⑤	→	RCP2W-RA4C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	RTB	RCP2-RTB-I-PM-③-330-P1-⑤	→	RCP2-RTB-I-28P-③-330-P1-⑤	
	RTC	RCP2-RTC-I-PM-③-330-P1-⑤	→	RCP2-RTC-I-28P-③-330-P1-⑤	
	RXA	RCP2-RXA-I-PM-③-④-P1-⑤	→	RCP2-RA3C-I-28P-③-④-P1-⑤	
		RCP2-RXA-A-PM-③-④-P1-⑤	→	RCP2-RA3C-I-28P-③-④-P1-⑤	For use with Simple Absolute unit
	RXGD	RCP2-RXGD-I-PM-③-④-P1-⑤	→	RCP2-RGD3C-I-28P-③-④-P1-⑤	
		RCP2-RXGD-A-PM-③-④-P1-⑤	→	RCP2-RGD3C-I-28P-③-④-P1-⑤	For use with Simple Absolute unit
	SA5	RCP2-SA5-I-PM-③-④-P1-⑤	→	RCP2-SA5C-I-42P-③-④-P1-⑤	
		RCP2-SA5-A-PM-③-④-P1-⑤	→	RCP2-SA5C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	SA5R	RCP2-SA5R-I-PM-③-④-P1-⑤	→	RCP2-SA5R-I-42P-③-④-P1-⑤	
		RCP2-SA5R-A-PM-③-④-P1-⑤	→	RCP2-SA5R-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	SA6	RCP2-SA6-I-PM-③-④-P1-⑤	→	RCP2-SA6C-I-42P-③-④-P1-⑤	
		RCP2-SA6-A-PM-③-④-P1-⑤	→	RCP2-SA6C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	SA6R	RCP2-SA6R-I-PM-③-④-P1-⑤	→	RCP2-SA6R-I-42P-③-④-P1-⑤	
		RCP2-SA6R-A-PM-③-④-P1-⑤	→	RCP2-SA6R-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	SA7	RCP2-SA7-I-PM-③-④-P1-⑤	→	RCP2-SA7C-I-56P-③-④-P1-⑤	
		RCP2-SA7-A-PM-③-④-P1-⑤	→	RCP2-SA7C-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
	SA7R	RCP2-SA7R-I-PM-③-④-P1-⑤	→	RCP2-SA7R-I-56P-③-④-P1-⑤	
		RCP2-SA7R-A-PM-③-④-P1-⑤	→	RCP2-SA7R-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
	SS	RCP2-SS-I-PM-③-④-P1-⑤	→	RCP2-SS7C-I-42P-③-④-P1-⑤	
		RCP2-SS-A-PM-③-④-P1-⑤	→	RCP2-SS7C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	SSR	RCP2-SSR-I-PM-③-④-P1-⑤	→	RCP2-SS7R-I-42P-③-④-P1-⑤	
		RCP2-SSR-A-PM-③-④-P1-⑤	→	RCP2-SS7R-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	SM	RCP2-SM-I-PM-③-④-P1-⑤	→	RCP2-SS8C-I-56P-③-④-P1-⑤	
		RCP2-SM-A-PM-③-④-P1-⑤	→	RCP2-SS8C-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
	SMR	RCP2-SMR-I-PM-③-④-P1-⑤	→	RCP2-SS8R-I-56P-③-④-P1-⑤	
		RCP2-SMR-A-PM-③-④-P1-⑤	→	RCP2-SS8R-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
RCP2 CR	HSM	RCP2CR-HSM-I-PM-30-④-P1-⑤	→	RCP2CR-HS8C-I-86P-30-④-P2-⑤	
	SA5	RCP2CR-SA5-I-PM-③-④-P1-⑤	→	RCP2CR-SA5C-I-42P-③-④-P1-⑤	
		RCP2CR-SA5-A-PM-③-④-P1-⑤	→	RCP2CR-SA5C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	SA6	RCP2CR-SA6-I-PM-③-④-P1-⑤	→	RCP2CR-SA6C-I-42P-③-④-P1-⑤	
		RCP2CR-SA6-A-PM-③-④-P1-⑤	→	RCP2CR-SA6C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	SA7	RCP2CR-SA7-I-PM-③-④-P1-⑤	→	RCP2CR-SA7C-I-56P-③-④-P1-⑤	
		RCP2CR-SA7-A-PM-③-④-P1-⑤	→	RCP2CR-SA7C-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
	SS	RCP2CR-SS-I-PM-③-④-P1-⑤	→	RCP2CR-SS7C-I-42P-③-④-P1-⑤	
		RCP2CR-SS-A-PM-③-④-P1-⑤	→	RCP2CR-SS7C-I-42P-③-④-P1-⑤	For use with Simple Absolute unit
	SM	RCP2CR-SM-I-PM-③-④-P1-⑤	→	RCP2CR-SS8C-I-56P-③-④-P1-⑤	
		RCP2CR-SM-A-PM-③-④-P1-⑤	→	RCP2CR-SS8C-I-56P-③-④-P1-⑤	For use with Simple Absolute unit
RCP2W	SA16	RCP2W-SA16-I-PM-③-④-P1-⑤	→	RCP2W-SA16C-I-86P-③-④-P1-⑤	

* ③ is the lead, ④ is the stroke, and ⑤ is the cable length.

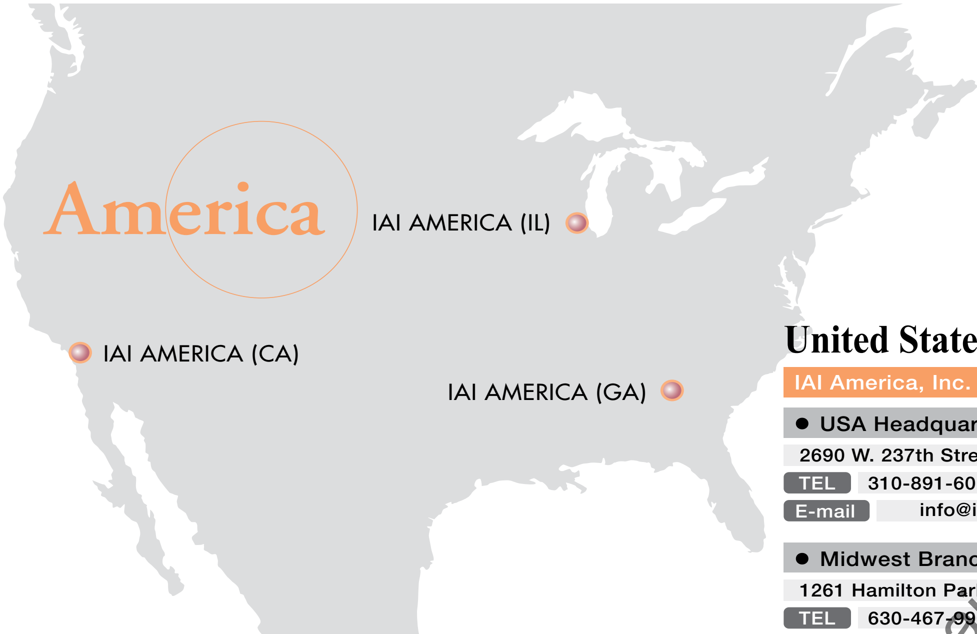
Previous Model Conversion Table [RCS]

Previous Product Model				New Product Model	Note
Series	Model	Model		Model	
RCS	F45	RCS-F45-①-30-H-④-⑤	→	N/A	
		RCS-F45-①-30-M-④-⑤	→	N/A	
		RCS-F45-①-30-L-④-⑤	→	N/A	
	F55	RCS-F55-①-②-H-④-⑤	→	RCS2-F5D-①-②-16-④-T2 (T1)-⑤	
		RCS-F55-①-②-M-④-⑤	→	RCS2-F5D-①-②-8-④-T2 (T1)-⑤	
		RCS-F55-①-②-L-④-⑤	→	RCS2-F5D-①-②-4-④-T2 (T1)-⑤	
	G20	RCS-G20-I-60-5-④-⑤	→	RCS2-GR8-I-60-5-④-T2 (T1)-⑤	
	RA35	RCS-RA35-I-20-GN-H-④-⑤	→	(RCA-RA3C-I-20-10-④-A1-⑤)	Not compatible
		RCS-RA35-I-20-GN-M-④-⑤	→	(RCA-RA3C-I-20-5-④-A1-⑤)	Not compatible
		RCS-RA35-I-20-GN-L-④-⑤	→	(RCA-RA3C-I-20-2.5-④-A1-⑤)	Not compatible
		RCS-RA35-I-20-GS-H-④-⑤	→	(RCA-RGS3C-I-20-10-④-A1-⑤)	Not compatible
		RCS-RA35-I-20-GS-M-④-⑤	→	(RCA-RGS3C-I-20-5-④-A1-⑤)	Not compatible
		RCS-RA35-I-20-GS-L-④-⑤	→	(RCA-RGS3C-I-20-2.5-④-A1-⑤)	Not compatible
		RCS-RA35-I-20-GD-H-④-⑤	→	(RCA-RGD3C-I-20-10-④-A1-⑤)	Not compatible
		RCS-RA35-I-20-GD-M-④-⑤	→	(RCA-RGD3C-I-20-5-④-A1-⑤)	Not compatible
		RCS-RA35-I-20-GD-L-④-⑤	→	(RCA-RGD3C-I-20-2.5-④-A1-⑤)	Not compatible
	RA35R	RCS-RA35R-I-20-GN-H-④-⑤	→	(RCA-RA3R-I-20-10-④-A1-⑤)	Not compatible
		RCS-RA35R-I-20-GN-M-④-⑤	→	(RCA-RA3R-I-20-5-④-A1-⑤)	Not compatible
		RCS-RA35R-I-20-GN-L-④-⑤	→	(RCA-RA3R-I-20-2.5-④-A1-⑤)	Not compatible
	RA45	RCS-RA45-①-30-GN-H-④-⑤	→	(RCA-RA4C-①-30-12-④-A1-⑤)	Not compatible
		RCS-RA45-①-30-GN-M-④-⑤	→	(RCA-RA4C-①-30-6-④-A1-⑤)	Not compatible
		RCS-RA45-①-30-GN-L-④-⑤	→	(RCA-RA4C-①-30-3-④-A1-⑤)	Not compatible
		RCS-RA45-①-30-GS-H-④-⑤	→	(RCA-RG3SC-①-30-12-④-A1-⑤)	Not compatible
		RCS-RA45-①-30-GS-M-④-⑤	→	(RCA-RG3SC-①-30-6-④-A1-⑤)	Not compatible
		RCS-RA45-①-30-GS-L-④-⑤	→	(RCA-RG3SC-①-30-3-④-A1-⑤)	Not compatible
		RCS-RA45-①-30-GD-H-④-⑤	→	(RCA-RGD4C-①-30-12-④-A1-⑤)	Not compatible
		RCS-RA45-①-30-GD-M-④-⑤	→	(RCA-RGD4C-①-30-6-④-A1-⑤)	Not compatible
		RCS-RA45-①-30-GD-L-④-⑤	→	(RCA-RGD4C-①-30-3-④-A1-⑤)	Not compatible
	RA45R	RCS-RA45R-①-30-GN-H-④-⑤	→	(RCA-RA4R-①-30-12-④-A1-⑤)	Not compatible
		RCS-RA45R-①-30-GN-M-④-⑤	→	(RCA-RA4R-①-30-6-④-A1-⑤)	Not compatible
		RCS-RA45R-①-30-GN-L-④-⑤	→	(RCA-RA4R-①-30-3-④-A1-⑤)	Not compatible
	RA55	RCS-RA55-①-②-GN-H-④-⑤	→	(RCS2-RA5C-①-②-16-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55-①-②-GN-M-④-⑤	→	(RCS2-RA5C-①-②-8-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55-①-②-GN-L-④-⑤	→	(RCS2-RA5C-①-②-4-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55-①-②-GS-H-④-⑤	→	(RCS2-RGS5C-①-②-16-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55-①-②-GS-M-④-⑤	→	(RCS2-RGS5C-①-②-8-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55-①-②-GS-L-④-⑤	→	(RCS2-RGS5C-①-②-4-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55-①-②-GD-H-④-⑤	→	(RCS2-RGD5C-①-②-16-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55-①-②-GD-M-④-⑤	→	(RCS2-RGD5C-①-②-8-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55-①-②-GD-L-④-⑤	→	(RCS2-RGD5C-①-②-4-④-T2 (T1)-⑤)	Not compatible
	RA55R	RCS-RA55R-①-60-GN-H-④-⑤	→	(RCS2-RA5R-①-60-16-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55R-①-60-GN-M-④-⑤	→	(RCS2-RA5R-①-60-8-④-T2 (T1)-⑤)	Not compatible
		RCS-RA55R-①-60-GN-L-④-⑤	→	(RCS2-RA5R-①-60-4-④-T2 (T1)-⑤)	Not compatible

* ① is the encoder type, ② is the motor type, ③ is the lead, ④ is the motor type, and ⑤ is the cable length.

Previous Product Model				New Product Model	Note
Series	Model	Model		Model	
RCS	RB7525	RCS-RB7525-I-60-☐-H-④-⑤	→	N/A	
		RCS-RB7525-I-60-☐-M-④-⑤	→	N/A	
	RB7530	RCS-RB7530-I-②-GN-H-④-⑤	→	RCS2-SRA7BD-I-②-12-④-T2 (T1)-⑤	
		RCS-RB7530-I-②-GN-M-④-⑤	→	RCS2-SRA7BD-I-②-6-④-T2 (T1)-⑤	
		RCS-RB7530-I-②-GN-L-④-⑤	→	RCS2-SRA7BD-I-②-3-④-T2 (T1)-⑤	
		RCS-RB7530-I-②-GS-H-④-⑤	→	RCS2-SRGS7BD-I-②-12-④-T2 (T1)-⑤	
		RCS-RB7530-I-②-GS-M-④-⑤	→	RCS2-SRGS7BD-I-②-6-④-T2 (T1)-⑤	
		RCS-RB7530-I-②-GS-L-④-⑤	→	RCS2-SRGS7BD-I-②-3-④-T2 (T1)-⑤	
		RCS-RB7530-I-②-GD-H-④-⑤	→	RCS2-SRGD7BD-I-②-12-④-T2 (T1)-⑤	
		RCS-RB7530-I-②-GD-M-④-⑤	→	RCS2-SRGD7BD-I-②-6-④-T2 (T1)-⑤	
		RCS-RB7530-I-②-GD-L-④-⑤	→	RCS2-SRGD7BD-I-②-3-④-T2 (T1)-⑤	
	RB7535	RCS-RB7535-I-②-GN-H-④-⑤	→	RCS2-SRA7BD-I-②-16-④-T2 (T1)-⑤	
		RCS-RB7535-I-②-GN-M-④-⑤	→	RCS2-SRA7BD-I-②-8-④-T2 (T1)-⑤	
		RCS-RB7535-I-②-GN-L-④-⑤	→	RCS2-SRA7BD-I-②-4-④-T2 (T1)-⑤	
		RCS-RB7535-I-②-GS-H-④-⑤	→	RCS2-SRGS7BD-I-②-16-④-T2 (T1)-⑤	
		RCS-RB7535-I-②-GS-M-④-⑤	→	RCS2-SRGS7BD-I-②-8-④-T2 (T1)-⑤	
		RCS-RB7535-I-②-GS-L-④-⑤	→	RCS2-SRGS7BD-I-②-4-④-T2 (T1)-⑤	
		RCS-RB7535-I-②-GD-H-④-⑤	→	RCS2-SRGD7BD-I-②-16-④-T2 (T1)-⑤	
		RCS-RB7535-I-②-GD-M-④-⑤	→	RCS2-SRGD7BD-I-②-8-④-T2 (T1)-⑤	
		RCS-RB7535-I-②-GD-L-④-⑤	→	RCS2-SRGD7BD-I-②-4-④-T2 (T1)-⑤	
	R10	RCS-R10-I-60-18-300-⑤	→	RCS2-RT6-I-60-18-300-T2 (T1)-⑤-L	
	R20	RCS-R20-I-60-18-300-⑤	→	RCS2-RT6R-I-60-18-300-T2 (T1)-⑤-L	
	R30	RCS-R30-I-60-4-300-⑤	→	RCS2-RT7R-I-60-4-300-T2 (T1)-⑤-L	
	SA4	RCS-SA4-①-20-H-④-⑤	→	RCA-SA4D-①-20-10-④-A1-⑤	
		RCS-SA4-①-20-M-④-⑤	→	RCA-SA4D-①-20-5-④-A1-⑤	
		RCS-SA4-①-20-L-④-⑤	→	RCA-SA4D-①-20-2.5-④-A1-⑤	
	SA5	RCS-SA5-①-20-H-④-⑤	→	RCA-SA5D-①-20-12-④-A1-⑤	
		RCS-SA5-①-20-M-④-⑤	→	RCA-SA5D-①-20-6-④-A1-⑤	
		RCS-SA5-①-20-L-④-⑤	→	RCA-SA5D-①-20-3-④-A1-⑤	
	SA6	RCS-SA6-①-20-H-④-⑤	→	RCA-SA6D-①-20-12-④-A1-⑤	
		RCS-SA6-①-20-M-④-⑤	→	RCA-SA6D-①-20-6-④-A1-⑤	
		RCS-SA6-①-20-L-④-⑤	→	RCA-SA6D-①-20-3-④-A1-⑤	
	SS	RCS-SS-①-60-H-④-⑤	→	RCS2-SS7C-①-60-12-④-T2 (T1)-⑤	
		RCS-SS-①-60-M-④-⑤	→	RCS2-SS7C-①-60-6-④-T2 (T1)-⑤	
	SSR	RCS-SSR-①-60-H-④-⑤	→	RCS2-SS7R-①-60-12-④-T2 (T1)-⑤	
		RCS-SSR-①-60-M-④-⑤	→	RCS2-SS7R-①-60-6-④-T2 (T1)-⑤	
	SM	RCS-SM-①-②-H-④-⑤	→	RCS2-SS8C-①-②-20-④-T2 (T1)-⑤	
		RCS-SM-①-②-M-④-⑤	→	RCS2-SS8C-①-②-10-④-T2 (T1)-⑤	
	SMR	RCS-SMR-①-②-H-④-⑤	→	RCS2-SS8R-①-②-20-④-T2 (T1)-⑤	
		RCS-SMR-①-②-M-④-⑤	→	RCS2-SS8R-①-②-10-④-T2 (T1)-⑤	

* ① is the encoder type, ② is the motor type, ③ is the lead, ④ is the motor type, and ⑤ is the cable length.



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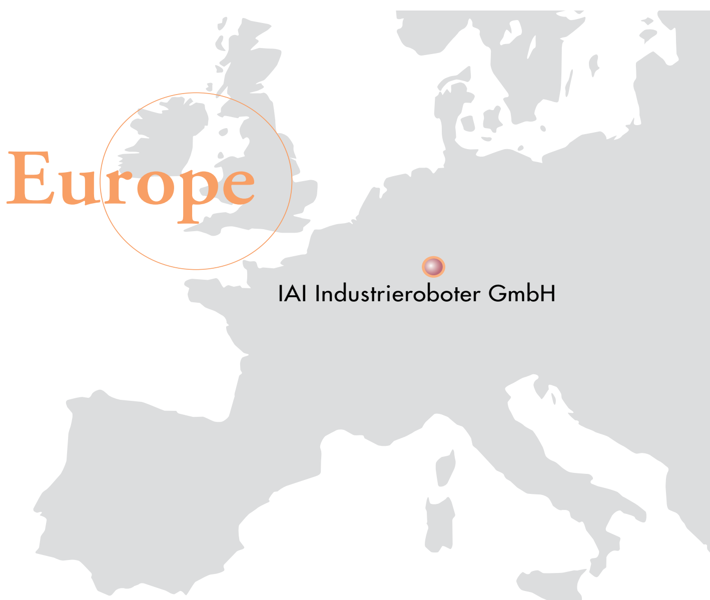

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