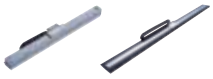
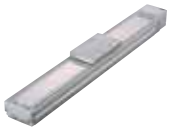
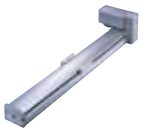
ROBO Cylinder® vs. Single-Axis Robot

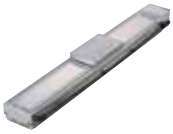
Please refer to the table below for the "ROBO Cylinder" and "Single-Axis Robot" categories.

Category	Listed Catalog	Feature	Models	Specifications			
				Horizontal payload (kg)	Max. speed (mm/s)	Positioning repeatablity (mm)	Max. stroke (mm)
ROBO Cylinders	**ROBO Cylinder General Catalog** 	Ideal small electric cylinders for replacing air cylinders.	Mini ROBO Cylinders 	~20	~380	±0.02~	~288
			ROBO Cylinders 	~80	~1800	±0.01~	~1200
Single-Axis Robots	**Individual product catalogs**	Medium to large size electric actuators featured in high speed, high precision, high rigidity, and heavy payload applications.	Single-Axis Robots 	~150	~2500	±0.005~	~3000
			Linear Servo Actuators 	~120	~2500	±0.005~	~4155

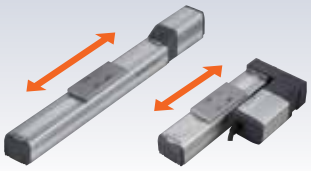
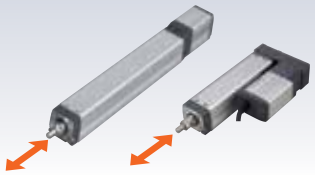
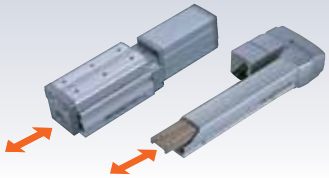
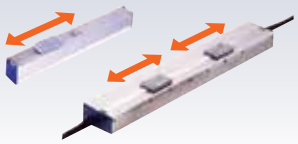
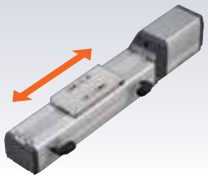
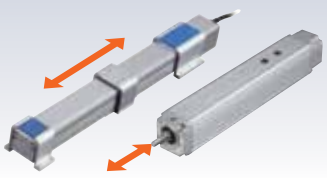
* There are no models that satisfy both the horizontal payload and maximum speed in the above specifications.

IAI Robots/Actuators NOT listed in this catalog

Single-Axis Robots	Dustproof Single-Axis Robots	Belt Single-Axis Robots	Rotational Single-Axis Robots	Shaft Linear Servo	Large Linear Servo
ISB/ISPB	ISDB/ISPDB	IF	RS	LSA	LSA
					

Cleanroom Single-Axis Robots	Cleanroom SCARA Robots	Splash-Proof SCARA Robots	Ultra-Compact/Compact SCARA	Cartesian Robots	Tabletop Robots
ISDBCR	IX-NNC	IX-NNW	IX-NNN	ICSA3/ICSPA3	TT-A2/A3
					

ROBO Cylinder® Products Overview

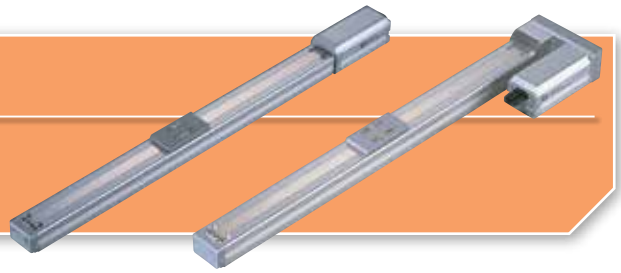
Type	Form	Applications/Features	See Page
Slider Type		■ Move an object in the horizontal direction ■ Move over a long distance	P.1
Rod Type		■ Move an object in the vertical direction ■ Move an object with chucks, etc. ■ Hold a work part while pressing it against something ■ Press-fit a work part	P.145
Table Type/ Arm Type/ Flat Type		■ Move an object in the vertical direction ■ When a moment load is applied	P.301
Gripper Type/ Rotary Type		■ Grip and lift a work part ■ Centering ■ Change the direction of a work part ■ Perform fine positioning for indexing	P.371
Linear Servo Type		■ Want to transfer a light object at high speed	P.417
Cleanroom Type		■ Used in a cleanroom running a liquid crystal or semiconductor production line, etc.	P.443
Dustproof/ Splash-Proof		■ Used with an automobile or food manufacturing system or in other location subject to dust and water splashes	P.493
Controllers		■ Wide-ranging models are available, from the ultra-simple type that can be operated under the same control used for solenoid valves, to the network-ready high-functional type; select one that best suits your specific application.	P.523

PRODUCT INDEX①

Product Overview

SLIDER TYPE

▶P. 1



▶ Pulse Motor Type — RCP□ series

▶ Pulse Motor Controller-Integrated Type — ERC□ series

▶ Servo Motor Type (24V) RCA□ series

▶ Servo Motor Type (100/200V) RCS□ series

CONTINUED ON THE NEXT PAGE

PRODUCT INDEX②

Rod Type

▶P. 145

▶ Pulse Motor Type — RCP□ series

▶ Pulse Motor Controller-Integrated Type — ERC□ series

▶ DC Motor Type — RCD□ series

▶ Servo Motor Type (24V) — RCA□ series

CONTINUED ON THE NEXT PAGE

PRODUCT INDEX③

Table Type

▶P.301

▶ Pulse Motor Type — RCP□ series

RCP3

▶ Servo Motor Type (24V) — RCA□ series

RCA2

RCA

▶ Servo Motor Type (100/200V) — RCS□ series

RCS2

RCS2

Gripper Type

▶P.371

▶ Pulse Motor Type — RCP2 series

RCP2

RCP2

High-gripping force type NEW	116mm width	RCP2-GRHM	383
	131mm width	RCP2-GRHB	385
Small lever type (3-finger)	62mm width	RCP2-GR3LS	387
Medium lever type (3-finger)	80mm width	RCP2-GR3LM	389
Small slide type (3-finger)	62mm width	RCP2-GR3SS	391
Medium slide type (3-finger)	80mm width	RCP2-GR3SM	393

▶ Servo Motor Type (100/200V) RCS□ series

RCS2

Long stroke type (2-finger)	104~284mm width	RCS2-GR8	395

Rotary Type

▶P.397

▶ Pulse Motor Type RCP□ series

RCP2

Small vertical type	45mm width	RCP2-RTBS/RTBSL	397
Small flat type	72mm width	RCP2-RTCS/RTCSL	399
Medium vertical type	50mm width	RCP2-RTB/RTBL	401
Medium flat type	88mm width	RCP2-RTC/RTCL	403
Large vertical type	76mm width	RCP2-RTBB/RTBBL	405
Large flat type	124mm width	RCP2-RTCB/RTCBL	407

▶ Servo Motor Type (100/200V) RCS□ series

RCS2

Hollow motor type NEW	85mm width	RCS2-RTC8L/RTC8HL	409
	99mm width	RCS2-RTC10L	411
	123mm width	RCS2-RTC12L	413
Straight motor type	64mm width	RCS2-RT6	415

Linear Servo Type

▶P.417

▶ Slider Type RCL series

RCL

Mini slim type	20mm width	RCL-SA1L	419
	24mm width	RCL-SA2L	421
	28mm width	RCL-SA3L	423
Mini long stroke type	40mm width	RCL-SA4L	425
	48mm width	RCL-SA5L	429
	58mm width	RCL-SA6L	433
Mini multi-slider type	40mm width	RCL-SM4L	427
	48mm width	RCL-SM5L	431
	58mm width	RCL-SM6L	435

▶ Rod Type RCL series

RCL

Mini slim type	ø16mm	RCL-RA1L	437
	ø20mm	RCL-RA2L	439
	ø25mm	RCL-RA3L	441

CONTINUED ON THE NEXT PAGE

PRODUCT INDEX④

Cleanroom Type

▶P. 443

▶ Pulse Motor Type — ERC3CR series / RCP□ CR series

▶ Servo Motor Type (24V) — RCACR series

▶ Servo Motor Type (100/200V) — RCS2CR series

Splash-Proof Type

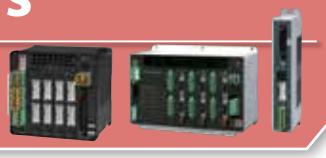
▶P. 493

▶ Pulse Motor Type — RCP□ series

▶ Servo Motor Type (24V) — RCAW series

▶ Servo Motor Type (100/200V) — RCS2W series

Controllers



▶P. 523

▶ Position Controllers

▶ Program Controllers

▶ Options

Technical References

Technical Data for Selection

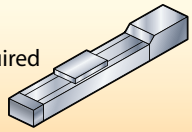
Information

Model Selection

Follow the procedure below to select your ROBO Cylinder.

1 Select an Actuator

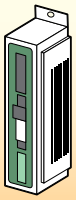
First, select an actuator. To select a model, choose a product that meets the required specifications such as the weight of the object you want to move with the actuator, distance to be moved, moving speed, and so on. Wide-ranging variations are available, each suitable for a different use environment, shape, etc.



Pre-12

2 Select a Controller

Once the actuator is decided, the next step is to select a controller to move the actuator. Controllers that can be used are limited depending on the type of actuator. You can select a controller of a desired I/O type, field network-ready model, etc.



P527

3 Select Options

To set up the controller to move the actuator, you need the PC software or teaching pendant as the setting tool. A 24-V power supply may also become necessary.

PC Software Teaching

Teaching Pendant

24-V Power Supply

Refer to the option items on the pages explaining each controller.

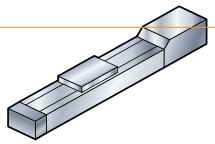
P717

4 Check "Notes on Specifications in this Catalog"

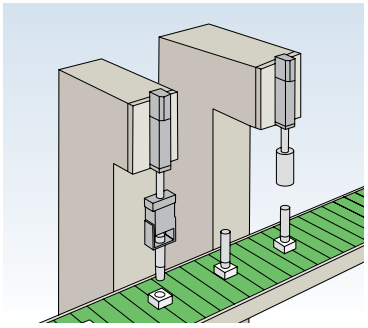
This section describes the items that require careful attention among those specified in the catalog. Check these items when comparing the specifications of different models.

Pre-39

1 Select an Actuator



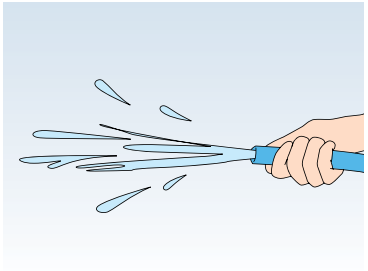
STEP 1
Check the environment



Used in a normal environment

To STEP 2

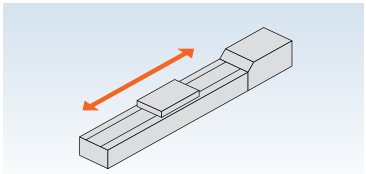
Used in a cleanroom, etc.



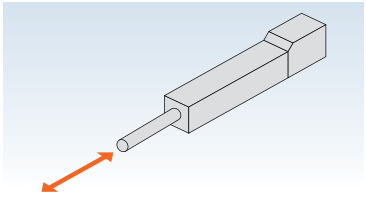
Used in an adverse environment subject to powder dust, water droplets, etc.

To STEP 4

STEP 2
Check the shape



Slider type



Rod type

To STEP 3

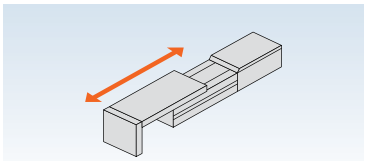
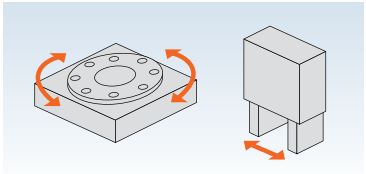


Table Type/
Arm Type/
Flat Type



Gripper Type/
Rotary Type

To STEP 4

Model Selection

STEP 3 Select a Motor Type

Motor type	Series name	Feature
Pulse Motor	RCP4 RCP3 RCP2	● The pulse motor produces high output at low speed. Suitable for push operation. ● The pulse motor is also suitable for measurement applications using a camera, etc., for its excellent stop & hold capability. ● Demonstrates higher performance than the 24-V servo motor if combined with Power CON 150 (PCON-CA). ● Less expensive than the servo motor.
	ERC3 ERC2	Controller-integrated Type ● The built-in controller design requires no space for a control panel.
Servo Motor 24V	RCA2 RCA	● Unlike the pulse motor, the 24-V servo motor boasts excellent high-speed performance and the payload does not change due to the speed. ● Less noisy than the pulse motor.
Linear Servo Motor	RCL	● Maximum acceleration/deceleration of 2G ● Maximum horizontal payload of 3.2 kg ● Compact linear servo actuator, ideal for moving a light object with a short cycle time.
Servo Motor 100V/200V	RCS3 RCS2	● Largest of the ROBO Cylinder series, these types offer high rigidity and high performance. ● Maximum horizontal payload of 80 kg. ● Maximum speed of 1800 mm/sec.
DC Brushless Motor	RCD	● Ultra-compact size with cross-section dimensions of □12mm. ● 3 strokes of 10mm, 20mm and 30mm to choose from. ● Motorized cylinder ideal for replacing a small air cylinder.

Normal Environment

Slider Type

RCP4 Series → Pre-17

RCP3 Series → Pre-17

RCP2 Series → Pre-17

RCP4 Series → Pre-17

RCP3 Series → Pre-17
RCP2 Series → Pre-17

ERC3 Series → Pre-17

ERC2 Series → Pre-17

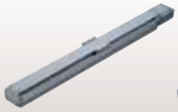
RCA2 Series → Pre-17

RCA Series → Pre-17

RCA2 Series → Pre-17

RCA Series → Pre-17

RCL Series → Pre-28

RCS3 Series → Pre-17

RCS3 Series → Pre-17

RCS2 Series → Pre-17


Rod Type

RCP4 Series → Pre-20

RCP3 Series → Pre-20

RCP2 Series → Pre-20

RCP4 Series → Pre-20

RCP3 Series → Pre-20

RCP2 Series → Pre-20

ERC3 Series → Pre-20

ERC2 Series → Pre-20

ERC2 Series → Pre-20

RCA2 Series → Pre-20

RCA Series → Pre-20

RCA2 Series → Pre-20

RCA Series → Pre-20

RCL Series → Pre-28

RCS2 Series → Pre-20

RCS2 Series → Pre-20

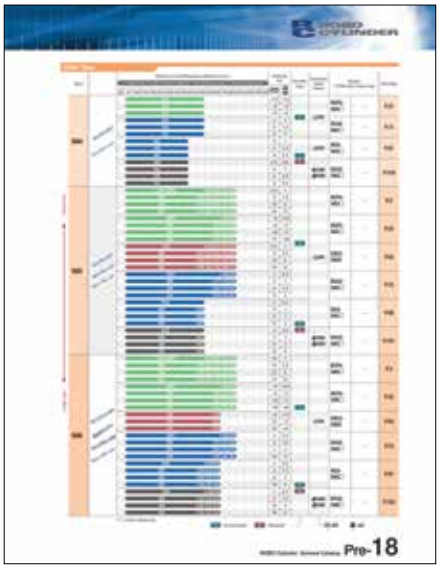
RCD Series → Pre-20


To STEP 4

Model Selection

STEP 4
Select a Model from the SPEC List

Select a model meeting the requirements of STEPS 1 to 3 from the SPEC list provided on Pre-17 to Pre-34.



Normal Environment

Cleanroom Type

Dustproof/Splash-Proof Type

STEP 5
Check the Detailed Specifications on Individual Model Pages

(Refer to "How to Read the Catalog" on Pre-35.)

From the SPEC list, move to the pages explaining each model and check the details to see if the selected model meets the required specifications.
Also select a controller according to the actuator.

*For the check items, refer to "How to Read the Catalog" on Pre-35.

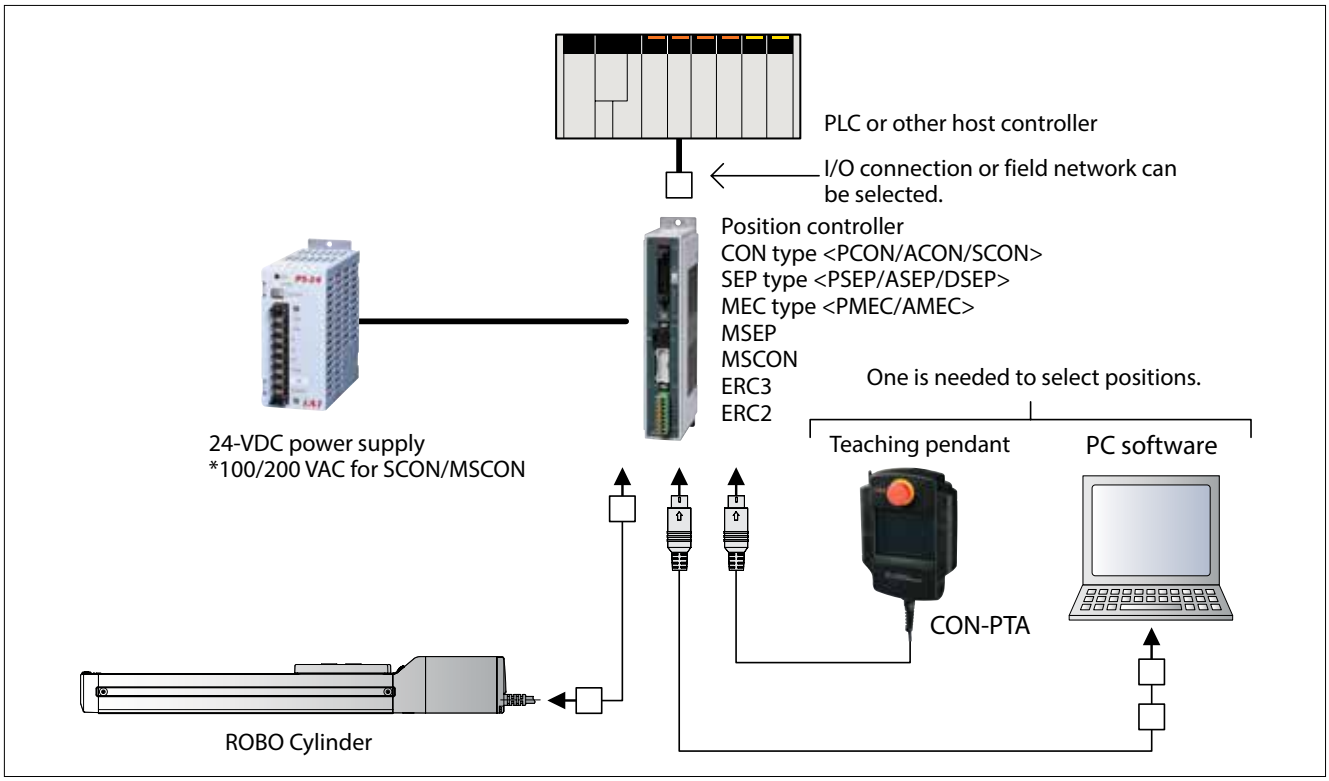
- Basic SPEC
  - Stroke • Speed • Payload
- Allowable overhang length
- Allowable moment
- Cables
- Options

Make a Decision

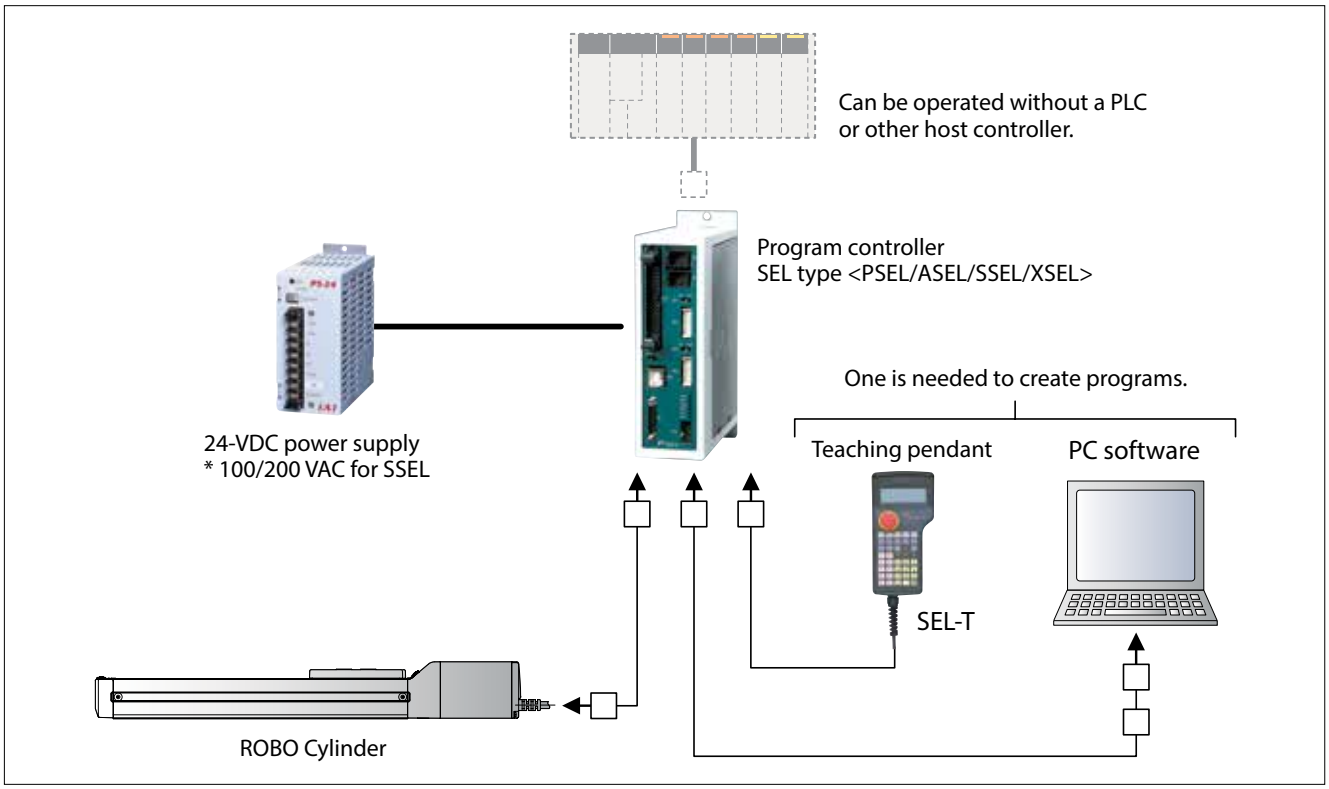
Select a Controller

(Go to P. 527.)

Basic Configuration of Positioner Type



Basic Configuration of Program Type



Model Selection

Check Specifications

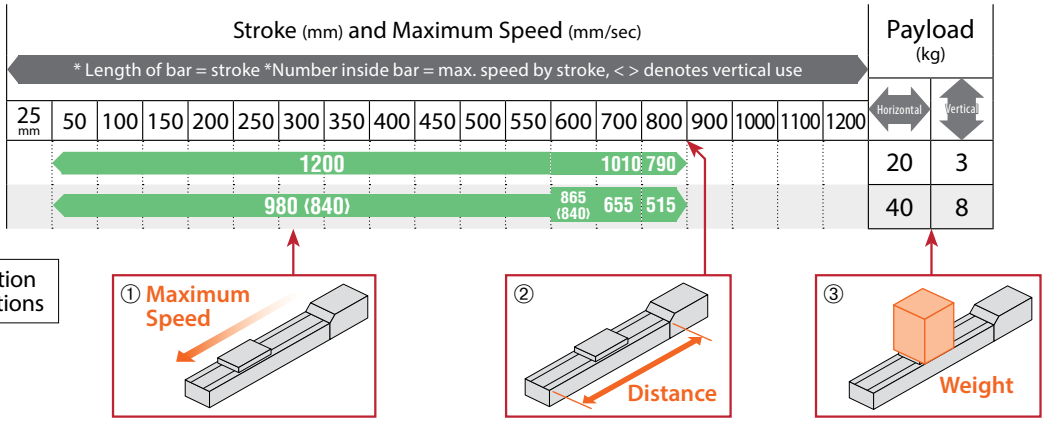
Slider Type

The slider type is used for transporting and positioning work parts. When selecting a slider-type model, note that the specifications are different when used **horizontally** versus **vertically**.

[Selection Conditions for Positioning Operation]

Select a model that meets your conditions of use ([1] maximum speed, [2] distance, [3] weight) from the SPEC list provided below.

[Example]



<Notes on the Table> (1) The featured models are arranged by size, starting from the smallest one. Larger models are listed later in the list.
(2) Each motor type is indicated by a different color.
(Green: Pulse motor , Blue: 24-V servo , Gray: 200-V servo motor , Red: Controller-integrated type)
(3) With the pulse motor specification, the payload varies depending on the speed. Check the actual SPEC by referring to the correlation diagram of speed vs. payload provided on the page featuring each model.

<Notice> If the work part being transported is significantly overhanging from the actuator, the service life of the guide needs to be considered separately from the actuator's specifications. See "About Service Life and Moment" on page A-5 for details.

Slider Type

	Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Payload (kg) Horizontal	Payload (kg) Vertical	Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
Small size	SA2		180 200	0.25	–	I	⊖24V	RCP3-SA2A□	–	P.15
			100	0.5	–					
			50	1	–					
			180 280 300	0.25	–			RCP3-SA2B□	–	P.17
			180 200	0.5	–					
			100	1	–					
			180 200	0.5	0.25			RCA2-SA2A□	–	P.67
			100	1	0.5					
			50	2	1					
Large size	SA3		300	1	0.5	I	⊖24V	RCP3-SA3□	–	P.19
			200	2	1					
			100	3	1.5					
			300	1	0.5			RCA2-SA3□	–	P.69
			200	2	1					
			100	3	1.5					

I =Incremental A =Absolute ⊖ =DC ≈ =AC

Slider Type

Small size

Large size

Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Payload (kg) Horizontal	Payload (kg) Vertical	Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
SA4		500	~7.5	~1.5	I	⊖24V	RCP3-SA4□	—	P.21
		250	~9	~4					
		125	~11	~8					
		500	2	1			RCA2-SA4□	—	P.71
		250	4	1.5					
		125	6	3					
		665	4	1		⊖24V	RCA-SA4□	—	P.87
		330	6	2.5					
		165	8	4.5	I				
		1060	2.5	0.6	A		RCS2-SA4□	—	P.119
		665	4	1		⊜100V ⊜200V			
		330	6	2.5					
		165	8	4.5					
SA5		1440 (1280) 1225 1045 785 610	6.5	1			RCP4-SA5□	—	P.3
		900 795 665 570 425 330	9	2.5					
		450 395 335 285 215 165	18	6					
		225 195 165 140 105 80	20	12					
		1000 790 610	~4	~0.5			RCP3-SA5□	—	P.23
		600 570 425 330	~6	~2					
		300 285 210 165	~10	~5					
		150 140 105 80	19	~10					
		1120 1115 935 680 510	6.5	1	I		ERC3-SA5C	—	P.55
		900 805 665 560 405 300	9	2.5		⊖24V			
		450 400 330 280 200 150	18	6					
		225 200 165 140 100 75	20	12					
		1000 790 610	2	0.5			RCA2-SA5□	—	P.73
		600 570 425 330	3	1					
		300 285 210 165	6	1.5					
		150 140 105 80	9	3					
		1300	2	0.5			RCA-SA5□	—	P.89
		800 760	4	1					
		400 380	8	2					
		200 190	12	4	I				
		1300	2	0.5	A		RCS2-SA5□	—	P.121
		800 760	4	1		⊜100V ⊜200V			
		400 380	8	2					
		200 190	12	4					
SA6		1440 (1280) 1230 1045 785 615	10	1			RCP4-SA6□	—	P.5
		900 795 670 570 430 335	15	2.5					
		450 395 335 285 215 165	25	6					
		225 195 165 140 105 80	25	12					
		1000 790 610	~4	~0.5			RCP3-SA6□	—	P.25
		600 570 425 330	~6	~2					
		300 285 210 165	~10	~5					
		150 140 105 80	~19	~10	I				
		600 515	~6	~1.5		⊖24V	ERC2-SA6C	—	P.63
		300 255	12	~3					
		150 125	12	~6					
		1000 790 610	3	0.5			RCA2-SA6□	—	P.75
		600 570 425 330	4	1.5					
		300 285 210 165	7	2					
		150 140 105 80	10	4					
		1300 1160 990	2	0.5			RCA-SA6□	—	P.91
		800 760 640 540	6	1.5					
		400 380 320 270	12	3					
		200 190 160 135	18	6	I				
		1300 1160 990	2	0.5	A		RCS2-SA6□	—	P.123
		800 760 640 540	6	1.5		⊜100V ⊜200V			
		400 380 320 270	12	3					
		200 190 160 135	18	6					

* < > is for vertical use

I =Incremental A =Absolute ⊖=DC ⊜=AC

Model Selection

Slider Type

Small size ↕ Large size

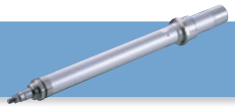
Type	Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Payload (kg) Horizontal	Payload (kg) Vertical	Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
SA7	1200 1010 790	20	3			RCP4-SA7□	—	P.7
	980 (840) 865 (840) 655 515	40	8					
	490 430 325 255	45	16					
	245 (210) 215 (210) 160 125	45	25					
	1200 975 745	17	3	I	⊖24V	ERC3-SA7C	—	P.57
	980 (840) 880 (840) 645 495	35	6					
	490 440 320 245	40	14					
	210 160 120	45	22					
	450 (400)	~10	~2.5			ERC2-SA7C	—	P.65
	250	~20	~5					
	125	20	~10					
	1200 960 720	8	1.4		≂100V	RCS2-SA7□	—	P.125
	800 640 480	12	3	I				
	400 320 240	25	6	A	≂200V			
	200 160 120	40	12					
SS7	600 470	~30	~4			RCP2-SS7□	—	P.39
	300 230	~30	~8	I	⊖24V			
	150 115	~30	~12					
	600 470	15	4	I	≂100V	RCS2-SS7□	—	P.127
	300 230	30	8	A	≂200V			
SS8	1800 1610 1260 1010 830 690	8	2			RCS3-SA8□ (100W)	—	P.111
	1200 1070 840 670 550 460	20	4					
	600 530 410 340 270 230	40	8					
	300 260 200 170 135 110	80	16	I	≂100V			
	1800 1610 1260 1010 830 690	12	3	A	≂200V	RCS3-SA8□ (150W)	—	
	1200 1070 840 670 550 460	30	6					
	600 530 410 340 270 230	60	12					
	1200 (750) 1000 (750) 800 (750)	~20	~3			RCP2-HS8□	—	P.43
	666 (600) 625 (600) 515	~40	~5	I	⊖24V	RCP2-SS8□	—	P.41
	333 (300) 310 (300) 255	~50	~12					
	165 (150) 155 (150) 125	~55	~20					
	1800 1460 1155 935 775	8	2			RCS3-SS8□ (100W)	—	P.113
	1200 970 770 625 515	20	4					
	600 485 385 310 255	40	8					
	300 240 190 150 125	80	16	I	≂100V			
	1800 1460 1155 935 775	12	3	A	≂200V	RCS3-SS8□ (150W)	—	
	1200 970 770 625 515	30	6					
	600 485 385 310 255	60	12					
BA6/BA7	1000	~4	–	I	⊖24V	RCP2-BA6	—	P.51
	1500	~8	–			RCP2-BA7	—	P.53

* < > is for vertical use

I =Incremental A =Absolute ⊖ =DC ≂ =AC

Check Specifications

Rod Type



For the rod type, the criteria for selection are different, depending on whether it will be used for **positioning operation** or for **push operation**.

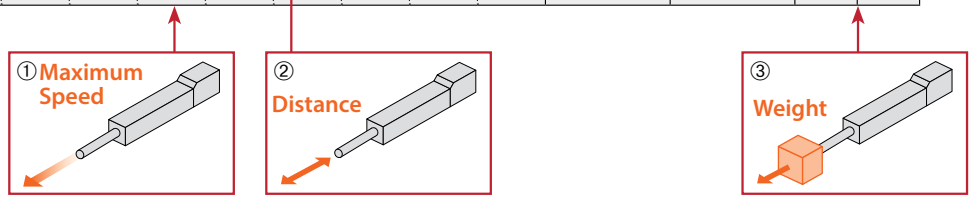
[Selection Conditions for Positioning Operation]

Select a model that meets your conditions of use ([1] maximum speed, [2] distance, [3] weight) from the SPEC list provided below.

[Example]

Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use									Rated Thrust	Maximum Push Force	Payload (kg)	
25mm	30	50	75	100	150	200	250	300	(N)	(N)	Horizontal	Vertical
180		200							–	23.1~35.7	1	0.325
100		100							–	46.2~70.6	2	0.625

Selection Conditions



[Push Operation]

Select a model that meets your conditions of use ([1] distance, [2] push force) from the SPEC list provided below.

[Example]

Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use									Rated Thrust	Maximum Push Force	Payload (kg)	
25mm	30	50	75	100	150	200	250	300	(N)	(N)	Horizontal	Vertical
180		200							–	23.1~35.7	1	0.325
100		100							–	46.2~70.6	2	0.625

Selection Conditions

Refer to page A-71 for the details of the push operation.

<Notes on the Table> (1) The featured models are arranged by size, starting from the smallest one. Larger models are listed later in the list.
(2) Each motor type is indicated by a different color.
(Orange: DC servo motor , Green: Pulse motor , Blue: 24-V servo , Gray: 200-V servo motor , Red: Controller-integrated type)
(3) With the pulse motor specification, the payload varies depending on the speed. Check the actual SPEC by referring to the correlation diagram of speed vs. payload provided on the page featuring each model.

Model Selection

Rod Type

Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Rated Thrust	Maximum Push Force	Payload (kg)		Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
		10mm / 20 / 30	(N)	(N)	Horizontal	Vertical					
RA1		300	4.2	2.6~5.98	0.7	0.3	I	⊖24V	RCD-RA1D	–	P.195

Rod Type

Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Rated Thrust	Maximum Push Force	Payload (kg)		Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
		25mm / 30 / 50 / 75 / 100 / 150 / 200 / 250 / 300	(N)	(N)	Horizontal	Vertical					
RA2		180 200	–	23.1~35.7	1	0.325			RCP3-RA2A□ (High thrust/Ball screw)	–	P.155
		100 100	–	46.2~70.6	2	0.625					
		50 50	–	92.4~142.9	4	1.25					
		180 200	–	12.6~20.9	0.5	0.2			RCP3-RA2A□ (Standard/Ball screw)	–	
		100 100	–	25.2~42.0	1	0.375					
		50 50	–	50.4~82.8	2	0.75					
		180 200	–	6.6~16.1	0.25	0.125			RCP3-RA2A□ (Standard/Lead screw)	–	
		100 100	–	13.2~28.3	0.5	0.25					
		50 50	–	26.4~39.5	1	0.5					
		180 280 300	–	15.4~24.1	1	0.325			RCP3-RA2B□ (High thrust/Ball screw)	–	P.157
		180 200	–	23.1~35.7	2	0.625					
		100 100	–	46.2~70.6	4	1.25	I	⊖24V			
		50 50	–	92.4~142.9	8	2.5					
		180 280 300	–	6.3~14.3	0.5	0.2			RCP3-RA2B□ (Standard/Ball screw)	–	
		180 200	–	12.6~20.9	1	0.375					
		100 100	–	25.2~42.0	2	0.75					
		50 50	–	50.4~82.8	4	1.5					
		180 280 300	–	4.4~11.9	0.25	0.125			RCP3-RA2B□ (Standard/Lead screw)	–	
		180 200	–	6.6~16.1	0.5	0.25					
		100 100	–	13.2~28.3	1	0.5					
		25 25	–	100	7	2.5			RCP2-RA2C	–	P.163
		180 200	21.4	–	0.5	0.25			RCA2-RA2A□	–	P.197
		100 100	42.3	–	1	0.5					
		50 50	85.5	–	2	1					
RN3		200	42.7	–	0.75	0.25			RCA2-RN3NA (Ball screw)	–	P.201
		100	85.5	–	1.5	0.5					
		50	170.9	–	3	1					
		200	25.1	–	0.25	0.125			RCA2-RN3NA (Lead screw)	–	
		100	50.3	–	0.5	0.25					
		50	100.5	–	1	0.5					
RN4		(220) 270 300	33.8	–	2	0.5	I	⊖24V	RCA2-RN4NA (Ball screw)	–	P.203
		200	50.7	–	3	0.75					
		100	101.5	–	6	1.5					
		220 300	19.9	–	0.25	0.125			RCA2-RN4NA (Lead screw)	–	
		200	29.8	–	0.5	0.25					
		100	59.7	–	1	0.5					
RN5		280 (230) 380 (330)	89	–	5	1.5	I	⇄100V ⇄200V	RCS2-RN5N	–	P.259
		250 (230) 250	178	–	10	3					
		125	356	–	20	6					
RP3		200	42.7	–	0.75	0.25			RCA2-RP3NA (Ball screw)	–	P.205
		100	85.5	–	1.5	0.5					
		50	170.9	–	3	1					
		200	25.1	–	0.25	0.125			RCA2-RP3NA (Lead screw)	–	
		100	50.3	–	0.5	0.25					
		50	100.5	–	1	0.5					
RP4		(220) 270 300	33.8	–	2	0.5	I	⊖24V	RCA2-RP4NA (Ball screw)	–	P.207
		200	50.7	–	3	0.75					
		100	101.5	–	6	1.5					
		220 300	19.9	–	0.25	0.125			RCA2-RP4NA (Lead screw)	–	
		200	29.8	–	0.5	0.25					
		100	59.7	–	1	0.5					
RP5		280 (230) 380 (330)	89	–	5	1.5	I	⇄100V ⇄200V	RCS2-RP5N	–	P.261
		250 (230) 250	178	–	10	3					
		125	356	–	20	6					

Small size

Large size

* < > is for vertical use

I =Incremental A =Absolute ⊖=DC ⇄=AC

Rod Type

Small size

Large size

Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use										Rated Thrust	Maximum Push Force	Payload (kg)		Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
		25mm	30	50	75	100	150	200	250	300		(N)	(N)	Horizontal	Vertical					
GS3			200									42.7	–	0.75	0.25	I	24V	RCA2-GS3NA (Ball screw)	–	P.209
			100									85.5	–	1.5	.0.5					
			50									170.9	–	3	1					
			200									25.1	–	0.25	0.125			RCA2-GS3NA (Lead screw)	–	
			100									50.3	–	0.5	0.25					
			50									100.5	–	1	0.5					
GS4		〈220〉	270	300								33.8	–	2	0.5			RCA2-GS4NA (Ball screw)	–	P.211
			200									50.7	–	3	0.75					
			100									101.5	–	6	1.5					
			220	300								19.9	–	0.25	0.125			RCA2-GS4NA (Lead screw)	–	
			200									29.8	–	0.5	0.25					
			100									59.7	–	1	0.5					
GS5				280 〈230〉	380 〈330〉							89	–	5	1.5	I	100V 200V	RCS2-GS5N	–	P.263
				250 〈230〉	250							178	–	10	3					
				125								356	–	20	6					
GD3			200									42.7	–	0.75	0.25	I	24V	RCA2-GD3NA (Ball screw)	–	P.213
			100									85.5	–	1.5	.0.5					
			50									170.9	–	3	1					
			200									25.1	–	0.25	0.125			RCA2-GD3NA (Lead screw)	–	
			100									50.3	–	0.5	0.25					
			50									100.5	–	1	0.5					
GD4		〈220〉	270	300								33.8	–	2	0.5			RCA2-GD4NA (Ball screw)	–	P.215
			200									50.7	–	3	0.75					
			100									101.5	–	6	1.5					
			220	300								19.9	–	0.25	0.125			RCA2-GD4NA (Lead screw)	–	
			200									29.8	–	0.5	0.25					
			100									59.7	–	1	0.5					
GD5				280 〈230〉	380 〈330〉							89	–	5	1.5	I	100V 200V	RCS2-GD5N	–	P.265
				250 〈230〉	250							178	–	10	3					
				125								356	–	20	6					
SD3		200		200								42.7	–	0.75	0.25	I	24V	RCA2-SD3NA (Ball screw)	–	P.217
		100		100								85.5	–	1.5	0.5					
		50		50								170.9	–	3	1					
		200		200								25.1	–	0.25	0.125			RCA2-SD3NA (Lead screw)	–	
		100		100								50.3	–	0.5	0.25					
		50		50								100.5	–	1	0.5					
SD4		240	〈200〉	300								33.8	–	2	0.5			RCA2-SD4NA (Ball screw)	–	P.219
		200		200								50.7	–	3	0.75					
		100		100								101.5	–	6	1.5					
		200		300								19.9	–	0.25	0.125			RCA2-SD4NA (Lead screw)	–	
		200		200								29.8	–	0.5	0.25					
		100		100								59.7	–	1	0.5					
SD5				280 〈230〉	380 〈330〉							89	–	5	1.5	I	100V 200V	RCS2-SD5N	–	P.267
				250 〈230〉	250							178	–	10	3					
				125								356	–	20	6					

* < > is for vertical use

I =Incremental A =Absolute

⎓ =DC ∿ =AC

Model Selection

Rod Type

Small size

Large size

Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Rated Thrust (N)	Maximum Push Force (N)	Payload (kg) Horizontal	Payload (kg) Vertical	Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
RA3		25 mm: 187	–	73.5	~15	~6	I	⊖24V	RCP2-RA3C	–	P.165
		25 mm: 114	–	156.8	~30	~10					
		50: 500	36.2	–	4	1.5					
		100: 250	72.4	–	9	3	I	⊖24V	RCA-RA3C	–	P.221
		150: 125	144.8	–	18	6.5					
RA4		200: 800	–	56	6	1.5					
		250: 700 695 485	–	93	25	4.5	I	⊖24V	ERC3-RA4C	–	P.179
		300: 450 345 240	–	185	40	12					
		400: 225 170 120	–	370	40	18					
		200: 600	18.9	–	3	1			RCA-RA4C (20W)	–	P.223
		250: 300	37.7	–	6	2					
		300: 150	75.4	–	12	4		⊖24V			
		200: 600	28.3	–	4	1.5			RCA-RA4C (30W)	–	
		250: 300	56.6	–	9	3					
		300: 150	113.1	–	18	6.5	I				
		200: 600	18.9	–	3	1	A		RCS2-RA4C (20W)	–	P.269
		250: 300	37.7	–	6	2					
		300: 150	75.4	–	12	4		≂100V			
		200: 600	28.3	–	4	1.5		≂200V	RCS2-RA4C (30W)	–	
		250: 300	56.6	–	9	3					
		300: 150	113.1	–	18	6.5					
SRA4		250: 250	–	112	~25	~9	I	⊖24V	RCP2-SRA4R	–	P.173
		125: 125	–	224	~35	~15					
		250: 250	41	–	9	3	I	⊖24V	RCA-SRA4R	–	P.233
		125: 125	81	–	18	6.5					
RA5		200: 800	–	56	6	1.5					
		250: 700	–	93	25	4	I	⊖24V	RCP4-RA5□	–	P.147
		300: 450	–	185	40	10					
		350: 225	–	370	60	20					
		200: 800 755	63.8	–	12	2			RCS2-RA5C (60W)	–	P.271
		250: 400 377	127.5	–	25	5					
		300: 200 188	255.1	–	50	11.5	I	≂100V			
		200: 800 755	105.8	–	15	3.5	A	≂200V	RCS2-RA5C (100W)	–	
		250: 400 377	212.7	–	30	9					
		300: 200 188	424.3	–	60	18					
RA6		300: 800 〈600〉	–	182	20	3					
		350: 700 〈560〉	–	273	50	8					
		400: 420	–	547	60	18			RCP4-RA6□	–	P.149
		450: 210	–	1094	80	28					
		300: 800 〈600〉	–	182	13	3					
		350: 700 〈560〉	–	273	40	8	I	⊖24V	ERC3-RA6C	–	P.181
		400: 420 400	–	547	55	17.5					
		450: 210 〈175〉 200 (175)	–	1094	70	25					
		300: 600 500	–	78	~25	~4.5			ERC2-RA6C	–	P.183
		350: 300 250	–	157	~40	~12					
		400: 150 125	–	304	40	~18					

* < > is for vertical use

I =Incremental A =Absolute

⊖ =DC ≂ =AC

Rod Type

	Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Rated Thrust (N)	Maximum Push Force (N)	Payload (kg) Horizontal	Payload (kg) Vertical	Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
Small size	RA7		25 mm: 450 〈400〉 / 50: 450 〈400〉 / 100: 450 〈400〉 / 150: 450 〈400〉 / 200: 450 〈400〉 / 250: 250 〈200〉 / 300: 250 〈200〉 / 400: 250 〈200〉 / 500: 125 / 600: 125 / 700: 125 / 800: 125	–	220	~40	~5	I	⎓24V	ERC2-RA7C	–	P.185
				–	441	~50	~17.5					
				–	873	~55	~25					
	SRA7		800	63	–	5	2			RCS2-SRA7BD (60W)	–	P.275
			400	127	–	10	5					
			200	254	–	20	10					
			800	103	–	10	3.5			RCS2-SRA7BD (100W)	–	
			400	207	–	22	9	I	~100V ~200V			
			200	414	–	40	19.5					
			800	157	–	15	6.5			RCS2-SRA7BD (150W)	–	
			400	314	–	35	14.5					
			200	628	–	55	22.5					
	RA8		300	–	1000	60	40	I	⎓24V	RCP2-RA8□	–	P.167
			150	–	2000	100	70					
Large size	RA10		250 〈167〉	–	1500	80	80			RCP2-RA10□	–	P.171
			125	–	3000	150	100	I	⎓24V			
			63	–	6000	300	150					
	RA13		85 120 125	5106	9800	400	200	I	~100V	RCS2-RA13R	–	P.281
			62	10211	19600	500	300	A	~200V			

* < > is for vertical use

I =Incremental A =Absolute ⎓=DC ~=AC

Model Selection

Check Specifications

Table Type

Similar to the rod type, the table type can be used for **positioning operation** and **push operation**. The rod type is recommended for pushing motions, as it exerts stronger force and has more variety.

[Selection Conditions for Positioning Operation]

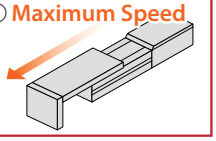
Select a model that meets your conditions of use ([1] maximum speed, [2] distance, [3] weight) from the SPEC list provided below.

[Example]

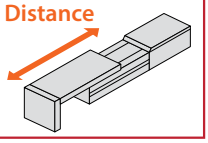
Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use									Rated Thrust	Maximum Push Force	Payload (kg)	
25mm	30	50	75	100	150	200	250	300	(N)	(N)	Horizontal	Vertical
	200								42.7	–	0.75	0.25
	100								85.5	–	1.5	0.5

Selection Conditions

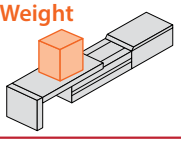
① Maximum Speed



② Distance



③ Weight



<Notes on the Table>
(1) The featured models are arranged by size, starting from the smallest one. Larger models are listed later in the list.
(2) Each motor type is indicated by a different color.
(Green: Pulse motor , Blue: 24-V servo , Gray: 200-V servo motor)
(3) With the pulse motor specification, the payload varies depending on the speed. Check the actual SPEC by referring to the correlation diagram of speed vs. payload provided on the page featuring each model.

Table Type

	Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Rated Thrust	Maximum Push Force	Payload (kg)		Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
			25mm 30 50 75 100 150 200 250 300	(N)	(N)	Horizontal	Vertical					
Small size	TCA3		200	42.7	–	0.75	0.25	I	⊖24V	RCA2-TCA3NA (Ball screw)	–	P.323
			100	85.5	–	1.5	0.5					
			50	170.9	–	3	1					
			200	25.1	–	0.25	0.125			RCA2-TCA3NA (Lead screw)	–	
			100	50.3	–	0.5	0.25					
			50	100.5	–	1	0.5					
	TCA4		〈220〉 270 300	33.8	–	2	0.5			RCA2-TCA4NA (Ball screw)	–	P.325
			200	50.7	–	3	0.75					
			100	101.5	–	6	1.5					
			220 300	19.9	–	0.25	0.125			RCA2-TCA4NA (Lead screw)	–	
			200	29.8	–	0.5	0.25					
			100	59.7	–	1	0.5					
Large size	TCA5		280 (230) 380 (330)	89	–	5	1.5	I	⊖100V ⊖200V	RCS2-TCA5N	–	P.351
			250 (230) 250	178	–	10	3					
			125	356	–	20	6					

* < > is for vertical use

I =Incremental A =Absolute ⊖ =DC ⊖ =AC

Table Type

Small size

Large size

Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Rated Thrust	Maximum Push Force	Payload (kg)		Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
		25mm 30 50 75 100 150 200 250 300	(N)	(N)	Horizontal	Vertical					
TWA3		200	42.7	–	0.75	0.25	I	24V	RCA2-TWA3NA (Ball screw)	–	P.327
		100	85.5	–	1.5	0.5					
		50	170.9	–	3	1					
		200	25.1	–	0.25	0.125			RCA2-TWA3NA (Lead screw)	–	
		100	50.3	–	0.5	0.25					
		50	100.5	–	1	0.5					
TWA4		〈220〉 270 300	33.8	–	2	0.5			RCA2-TWA4NA (Ball screw)	–	P.329
		200	50.7	–	3	0.75					
		100	101.5	–	6	1.5					
		220 300	19.9	–	0.25	0.125			RCA2-TWA4NA (Lead screw)	–	
		200	29.8	–	0.5	0.25					
		100	59.7	–	1	0.5					
TWA5		280 〈230〉 380 〈330〉	89	–	5	1.5	I	100V 200V	RCS2-TWA5N	–	P.353
		250 〈230〉 250	178	–	10	3					
		125	356	–	20	6					
TFA3		200	42.7	–	0.75	0.25	I	24V	RCA2-TFA3NA (Ball screw)	–	P.331
		100	85.5	–	1.5	.0.5					
		50	170.9	–	3	1					
		200	25.1	–	0.25	0.125			RCA2-TFA3NA (Lead screw)	–	
		100	50.3	–	0.5	0.25					
		50	100.5	–	1	0.5					
TFA4		〈220〉 270 300	33.8	–	2	0.5			RCA2-TFA4NA (Ball screw)	–	P.333
		200	50.7	–	3	0.75					
		100	101.5	–	6	1.5					
		220 300	19.9	–	0.25	0.125			RCA2-TFA4NA (Lead screw)	–	
		200	29.8	–	0.5	0.25					
		100	59.7	–	1	0.5					
TFA5		280 〈230〉 380 〈330〉	89	–	5	1.5	I	100V 200V	RCS2-TFA5N	–	P.355
		250 〈230〉 250	178	–	10	3					
		125	356	–	20	6					
TA3		300 〈200〉	–	15	~0.7	~0.3			RCP3-TA3□	–	P.303
		200 〈133〉	–	22	~1.4	~0.6					
		100 〈67〉	–	45	~2	~1					
TA4		300	–	25	~1	~0.5	I	24V	RCP3-TA4□	–	P.305
		200	–	37	~2	~1					
		100	–	75	~3	~1.5					
		300	28	–	1	0.5			RCA2-TA4□	–	P.335
		200	43	–	2	1					
		100	85	–	3	1.5					
TA5		465 〈400〉	–	34	~2	~1			RCP3-TA5□	–	P.307
		250	–	68	~4	~1.5					
		125	–	136	~6	~3					
		465 〈400〉	34	–	2	1			RCA2-TA5□	–	P.337
		250	68	–	3.5	2					
		125	137	–	5	3					
TA6		560 〈500〉	–	60	~4	~1			RCP3-TA6□	–	P.309
		300	–	110	~6	~2					
		150	–	189	~8	~4					
		560 〈500〉	17	–	2	0.5			RCA2-TA6□	–	P.339
		300	34	–	4	1.5					
		150	68	–	6	3					
TA7		600 〈580〉	–	60	~6	~1			RCP3-TA7□	–	P.311
		300	–	110	~8	~2					
		150	–	189	~10	~4					
		600 〈580〉	26	–	4	1			RCA2-TA7□	–	P.341
		300	53	–	6	2.5					
		150	105	–	8	4					

* < > is for vertical use

I =Incremental A =Absolute

⊖ =DC ~ =AC

Model Selection

Arm Type/Flat Type

	Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Rated Thrust	Maximum Push Force	Payload (kg)		Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
			25mm 30 50 75 100 150 200 250 300	(N)	(N)	Horizontal	Vertical					
Small size	A4R		330	39.2	–	–	2.5	I	24V	RCA-A4R	–	P.357
			165	78.4	–	–	4.5					
			330	39.2	–	–	2.5	A	100V 200V	RCS2-A4R	–	P.363
			165	78.4	–	–	4.5					
	A5R		400	33.3	–	–	2	I	24V	RCA-A5R	–	P.359
			200	65.7	–	–	4					
			400	33.3	–	–	2	A	100V 200V	RCS2-A5R	–	P.365
			200	65.7	–	–	4					
	A6R		400	48.4	–	–	3	I	24V	RCA-A6R	–	P.361
			200	96.8	–	–	6					
			400	48.4	–	–	3	A	100V 200V	RCS2-A6R	–	P.367
			200	96.8	–	–	6					
Large size	F5D		800	63.8	–	–	2			RCS2-F5D (60W)	–	P.369
			400	127.5	–	–	5					
			200	255.1	–	–	11.5	I	100V 200V			
			800	105.8	–	–	3.5	A		RCS2-F5D (100W)	–	
			400	212.7	–	–	9					
			200	424.3	–	–	18					

I =Incremental A =Absolute =DC =AC

Check Specifications

Linear Servo Type

The linear servo type is available as a slider type for **positioning operation**, or as a rod type for **push operation**. See below for the selection criteria.

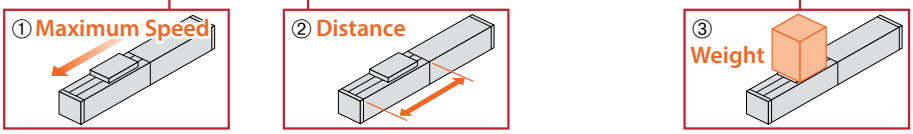
[Selection Conditions for Positioning Operation]

Select a model that meets your conditions of use ([1] maximum speed, [2] distance, [3] weight) from the SPEC list provided below.

[Example]

Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use								Rated Thrust	Maximum Push Force	Payload (kg)	
25mm	30	40	48	64	100	200	300	(N)	(N)	Horizontal	Vertical
		420						2	–	0.5	–
			460					4	–	1	–

Selection Conditions



[Push Operation]

Select a model that meets your conditions of use ([1] distance, [2] push force) from the SPEC list provided below.

[Example]

Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use								Rated Thrust	Maximum Push Force	Payload (kg)	
25mm	30	40	48	64	100	200	300	(N)	(N)	Horizontal	Vertical
300								2.5	2	0.5	0.1
	340							5	4	1	0.2

Selection Conditions

Refer to page A-71 for the details of the push operation.

<Notes on the Table> (1) The featured models are arranged by size, starting from the smallest one. Larger models are listed later in the list.

Linear Servo Type

	Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use 25mm / 30 / 40 / 48 / 64 / 100 / 200 / 300	Rated Thrust (N)	Maximum Push Force (N)	Payload (kg) Horizontal	Payload (kg) Vertical	Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
Small size	SA1L		420	2	–	0.5	–			RCL-SA1L	–	P.419
	SA2L		460	4	–	1	–			RCL-SA2L	–	P.421
	SA3L		600	8	–	2	–			RCL-SA3L	–	P.423
	SA4L		1200	2.5	–	0.8	–			RCL-SA4L	–	P.425
	SA5L		1400	5	–	1.6	–			RCL-SA5L	–	P.429
	SA6L		1600	10	–	3.2	–	I	⊖24V	RCL-SA6L	–	P.433
	SM4L		1200	2.5	–	0.8	–			RCL-SM4L	–	P.427
	SM5L		1400	5	–	1.6	–			RCL-SM5L	–	P.431
	SM6L		1600	10	–	3.2	–			RCL-SM6L	–	P.435
Large size	RA1L		300	2.5	10	0.5	0.1			RCL-RA1L	–	P.437
	RA2L		340	5	18	1	0.2			RCL-RA2L	–	P.439
	RA3L		450	10	30	2	0.4			RCL-RA3L	–	P.441

I =Incremental A =Absolute ⊖=DC ≈=AC

Model Selection

Check Specifications

Gripper type

The gripper type is used for gripping and centering work parts. Gripping is done by a **pushing operation**, and centering is done by a **positioning operation**.

[Push Operation]

Select a model that meets your conditions of use ([1] distance, [2] grip force) from the SPEC list provided below.

[Example]

Stroke (mm) and Maximum Speed (mm/sec)												Maximum Grip Force
8mm	10mm	14mm	20mm	32mm	40mm	60mm	100mm	120mm	200mm	19deg.	180deg.	(N)
78												14
											600	6.4

Selection Conditions

① Distance

② Grip force (Push force)

Refer to page A-71 for the details of the push operation.

[Selection Conditions for Positioning Operation]

Select a model that meets your conditions of use ([1] maximum speed, [2] distance) from the SPEC list provided below.

[Example]

Stroke (mm) and Maximum Speed (mm/sec)												Maximum Grip Force
8mm	10mm	14mm	20mm	32mm	40mm	60mm	100mm	120mm	200mm	19deg.	180deg.	(N)
78												14
											600	6.4

Selection Conditions

① Maximum speed

② Distance

<Notes on the Table> (1) Each motor type is indicated by a different color. (Green: Pulse motor , Gray: 200-V servo motor)

Gripper Type

	Type		Stroke (mm) and Maximum Speed (mm/sec)												Maximum Grip Force	Encoder Type	Controller Input Power	Model * ☐denotes motor size		See Page
			8mm	10mm	14mm	20mm	32mm	40mm	60mm	100mm	120mm	200mm	19deg.	180deg.	(N)					
Small size	GRSS		78												14			RCP2-GRSS	–	P.373
	GRLS													600	6.4			RCP2-GRLS	–	P.375
	GRS			33.3											21			RCP2-GRS	–	P.377
	GRM				36.7										80		⊖24V	RCP2-GRM	–	P.379
	GRST							75							20			RCP2-GRST	–	P.381
								34							40					
	GRHM						100								125	I		RCP2-GRHM	–	P.383
	GRHB							100							200			RCP2-GRHB	–	P.385
	GR8					(60cpm)									45.1		≂100V ≂200V	RCS2-GR8	–	P.395
Large size	GR3LS												200		18			RCP2-GR3LS	–	P.387
	GR3LM												200		51		⊖24V	RCP2-GR3LM	–	P.389
	GR3SS			40											22			RCP2-GR3SS	–	P.391
	GR3SM				50										102			RCP2-GR3SM	–	P.393

I =Incremental A =Absolute ⊖=DC ≂=AC

Check Specifications

Rotary Type

For the rotary type, a model is selected for its positioning operation generated by the rotating part.

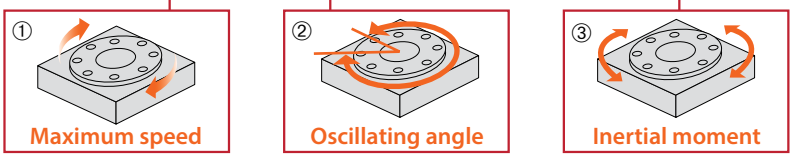
[Selection Conditions for Positioning Operation]

Select a model that meets your conditions of use ([1] maximum speed, [2] oscillating angle, [3] inertial moment) from the SPEC list provided below.

[Example]

Oscillating Angle (mm) and Maximum Speed (mm/sec)			Maximum Torque	Allowable Inertial Moment
300deg.	330	360	(N)	kg•m²
	400		0.24	0.0023
	266		0.36	0.0035

Selection Conditions



<**Notes on the Table**> (1) Each motor type is indicated by a different color. (Green: Pulse motor , Gray: 200-V servo motor)

Rotary Type

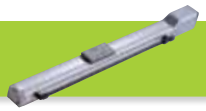
	Type		Oscillating Angle (mm) and Maximum Speed (mm/sec) 300deg.	330	360	Maximum Torque (N)	Allowable Inertial Moment kg•m²	Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
Small size	RTBS			400		0.24	0.0023			RCP2-RTBS	–	P.397
				266		0.36	0.0035					
	RTBSL				400	0.24	0.0023			RCP2-RTBSL	–	
					266	0.36	0.0035					
	RTCS			400		0.24	0.0023			RCP2-RTCS	–	P.399
				266		0.36	0.0035					
	RTCSL				400	0.24	0.0023			RCP2-RTCSL	–	
					266	0.36	0.0035					
	RTB			600		1.1	0.01			RCP2-RTB	–	P.401
				400		1.7	0.015					
	RTBL				600	1.1	0.01			RCP2-RTBL	–	
					400	1.7	0.015					
	RTC			600		1.1	0.01	I	⊖24V	RCP2-RTC	–	P.403
				400		1.7	0.015					
	RTCL				600	1.1	0.01			RCP2-RTCL	–	
					400	1.7	0.015					
	RTBB			600		3	0.02			RCP2-RTBB	–	P.405
				400		4.6	0.03					
	RTBBL				600	3	0.02			RCP2-RTBBL	–	
					400	4.6	0.03					
	RTCB			600		3	0.02			RCP2-RTCB	–	P.407
				400		4.6	0.03					
	RTCBL				600	3	0.02			RCP2-RTCBL	–	
					400	4.6	0.03					
Large size	RTC8L				750	0.55	0.011			RCS2-RTC8L	–	P.409
	RTC8HL				1200	0.53	0.01			RCS2-RTC8HL	–	P.409
					750	0.85	0.017					
	RTC10L				1200	1.7	0.033	I A	⊜100V	RCS2-RTC10L	–	P.411
					750	2.8	0.054					
	RTC12L				800	5.2	0.1		⊜200V	RCS2-RTC12L	–	P.413
					600	8.6	0.17					
	RT6		500			2.4	0.025	I		RCS2-RT6	–	P.415

I =Incremental A =Absolute ⊖=DC ⊜=AC

Model Selection

Check Specifications

Cleanroom Type



The cleanroom type is used for transporting and positioning work parts. When selecting a cleanroom type model, note that the specifications are different when used **horizontally** versus **vertically**.

[Selection Conditions for Positioning Operation]

Select a model that meets your conditions of use ([1] maximum speed, [2] distance, [3] weight) from the SPEC list provided below.

[Example]

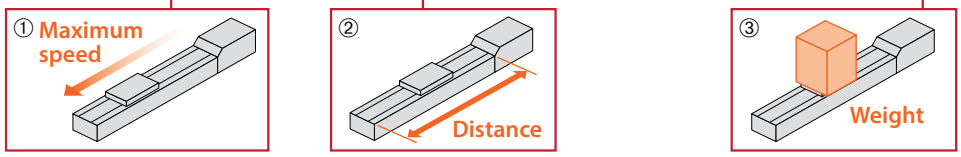
Stroke (mm) and Maximum Speed (mm/sec)

* Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use

25mm	50	100	150	200	250	300	350	400	450	500	550	600	700	800	900	1000	1100
	665																
	330																

Payload (kg)	
Horizontal	Vertical
4	1
6	2.5

Selection Conditions



<Notes on the Table> (1) The featured models are arranged by size, starting from the smallest one. Larger models are listed later in the list.
(2) Each motor type is indicated by a different color.
(Green: Pulse motor , Blue: 24-V servo , Gray: 200-V servo motor , Red: Controller-integrated type)
(3) With the pulse motor specification, the payload varies depending on the speed. Check the actual SPEC by referring to the correlation diagram of speed vs. payload provided on the page featuring each model.

<Note: > If the work part being transported is significantly overhanging from the actuator, the service life of the guide needs to be considered separately from the actuator's specifications. See "About Service Life and Moment" on page A-5 for details.

Cleanroom Type

Small size ↔ Large size

Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Payload (kg) Horizontal	Payload (kg) Vertical	Encoder Type	Controller Input Power	Model * ☐denotes motor size		See Page
SA4		665 (25mm–400mm)	4	1	I / A	⊖24V	RCACR-SA4C	–	P.465
		330 (25mm–400mm)	6	2.5					
		165 (25mm–400mm)	8	4.5					
		665 (25mm–400mm)	4	1	I / A	⊖100V ⊜200V	RCS2CR-SA4C	–	P.479
		330 (25mm–400mm)	6	2.5					
		165 (25mm–400mm)	8	4.5					

* < > is for vertical use

I =Incremental A =Absolute ⊖ =DC ⊜ =AC

Cleanroom Type

Small size ↑ Large size ↓

Type	Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Payload (kg) Horizontal	Payload (kg) Vertical	Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
SA5	25mm 50 100 150 200 250 300 350 400 450 500 550 600 700 800 900 1000 1100							
	1440 〈1280〉 1225 1045 785 610	6.5	1			RCP4CR-SA5□	–	P.449
	900 795 665 570 425 330	9	2.5					
	450 395 335 285 215 165	18	6					
	225 195 165 140 105 80	20	12					
	1120 1045 785 610	6.5	1	I				
	900 795 665 570 425 330	9	2.5		⊖24V	ERC3CR-SA5C	–	P.445
	450 395 335 285 215 165	18	6					
	225 195 165 140 105 80	20	12					
	1300 〈800〉 760	2	0.5					
	800 760	4	1					
	400 380	8	2			RCACR-SA5C	–	P.467
	200 190	12	4	I				
	1300 〈800〉 760	2	0.5	A				
	800 760	4	1		⊜100V			
	400 380	8	2		⊜200V	RCS2CR-SA5C	–	P.481
	200 190	12	4					
SA6	1440 〈1280〉 1230 1045 785 615	10	1					
	900 795 670 570 430 335	15	2.5			RCP4CR-SA6□	–	P.451
	450 395 335 285 215 165	25	6	I				
	225 195 165 140 105 80	25	12					
	1300 〈800〉 1160 (800) 990 (800)	3	0.5		⊖24V			
	800 760 640 540	6	1.5			RCACR-SA6C	–	P.469
	400 380 320 270	12	3					
	200 190 160 135	18	6	I				
	1300 〈800〉 1160 (800) 990 (800)	3	0.5	A				
	800 760 640 540	6	1.5		⊜100V	RCS2CR-SA6C	–	P.483
	400 380 320 270	12	3		⊜200V			
	200 190 160 135	18	6					
SA7	1200 1010 790	20	3					
	980 〈840〉 865 (840) 655 515	40	8			RCP4CR-SA7□	–	P.453
	490 430 325 255	45	16					
	245 〈210〉 215 (210) 160 125	45	25	I	⊖24V			
	1200 1010 790	17	3					
	980 〈840〉 865 (840) 655 515	35	6			ERC3CR-SA7C	–	P.447
	490 430 325 255	40	14					
	210 160 125	45	22					
	800 640 480	12	3	I	⊜100V			
	400 320 240	25	6	A	⊜200V	RCS2CR-SA7C	–	P.485
	200 160 120	40	12					
SA8	1800 1510 1190 960 790 660	8	2					
	1200 1010 790 640 530 440	20	4					
	600 500 390 320 260 220	40	8			RCS3CR-SA8C (100W)	–	P.475
	300 250 190 160 130 110	80	16	I	⊜100V			
	1800 1510 1190 960 790 660	12	3	A	⊜200V			
	1200 1010 790 640 530 440	30	6			RCS3CR-SA8C (150W)	–	
	600 500 390 320 260 220	60	12					
SS7	600 470	~30	~4					
	300 230	~30	~8	I	⊖24V	RCP2CR-SS7C	–	P.455
	150 115	~30	~12					
	600 470	15	4	I	⊜100V	RCS2CR-SS7C	–	P.487
	300 230	30	8	A	⊜200V			
SS8	1200 〈750〉 1000 (750) 800 (750)	~20	~3			RCP2CR-HS8C	–	P.459
	666 〈500〉 625 (500) 515 (500)	~40	~5	I	⊖24V	RCP2CR-SS8C	–	P.457
	333 〈300〉 310 (300) 255	~50	~12					
	165 〈150〉 155 (150) 125	~55	~20					
	1800 1460 1155 935 775	8	2					
	1200 970 770 625 515	20	4					
	600 485 385 310 255	40	8	I	⊜100V	RCS3CR-SS8C (100W)	–	P.477
	300 240 190 150 125	80	16	A	⊜200V			
	1800 1460 1155 935 775	12	3					
	1200 970 770 625 515	30	6			RCS3CR-SS8C (150W)	–	
	600 485 385 310 255	60	12					

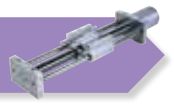
* < > is for vertical use

I =Incremental A =Absolute ⊖ =DC ⊜ =AC

Model Selection

Check Specifications

Dustproof/Splash-Proof Type



The criteria for selecting the dustproof/splash-proof type are different depending on whether it will be used for **positioning operation** or **push operation**.

[Selection Conditions for Positioning Operation]

Select a model that meets your conditions of use ([1] maximum speed, [2] distance, [3] weight) from the SPEC list provided below.

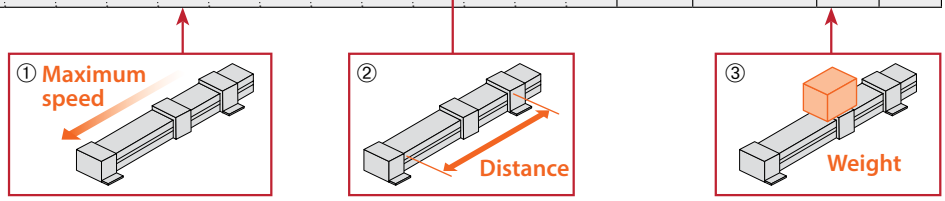
[Example]

Stroke (mm) and Maximum Speed (mm/sec)

* Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use

50mm	100	150	200	250	300	350	400	450	500	550	600	650	700	Rated Thrust (N)	Maximum Push Force (N)	Payload (kg) Horizontal	Payload (kg) Vertical
	330													–	66.9	5	–
	165													–	147.9	10	–

Selection Conditions



[Push Operation]

Select a model that meets your conditions of use ([1] distance, [2] push force) from the SPEC list provided below.

[Example]

Stroke (mm) and Maximum Speed (mm/sec)

* Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use

50mm	100	150	200	250	300	350	400	450	500	550	600	650	700	Rated Thrust (N)	Maximum Push Force (N)	Payload (kg) Horizontal	Payload (kg) Vertical
500	560 〈500〉													–	93	20	3
	360													–	185	40	8

Selection Conditions

Refer to page A-71 for the details of the push operation.

<Notes on the Table> (1) The featured models are arranged by size, starting from the smallest one. Larger models are listed later in the list.
(2) Each motor type is indicated by a different color.
(Green: Pulse motor , Blue: 24-V servo , Gray: 200-V servo motor)
(3) With the pulse motor specification, the payload varies depending on the speed. Check the actual SPEC by referring to the correlation diagram of speed vs. payload provided on the page featuring each model.

Dustproof/Splash-Proof Type

Type		Stroke (mm) and Maximum Speed (mm/sec) * Length of bar = stroke *Number inside bar = max. speed by stroke, < > denotes vertical use	Rated Thrust (N)	Maximum Push Force (N)	Payload (kg) Horizontal	Payload (kg) Vertical	Encoder Type	Controller Input Power	Model * □denotes motor size		See Page
		50 mm / 100 / 150 / 200 / 250 / 300 / 350 / 400 / 450 / 500 / 550 / 600 / 650 / 700									
SA5		330	–	66.9	5	–			RCP4W-SA5C	–	P.495
		165	–	147.9	10	–					
SA6		400	–	82.8	7.5	–	I	⊖24V	RCP4W-SA6C	–	P.497
		200	–	179.5	15	–					
SA7		530	–	161.9	10	–			RCP4W-SA7C	–	P.499
		265	–	337.9	20	–					
SA16		180	–	N/A	~25	–	I	⊖24V	RCP2W-SA16C	–	P.505
		133	–	N/A	~35	–					
RA6		500 / 560 〈500〉	–	93	20	3			RCP4W-RA6C	–	P.501
		360	–	185	40	8					
		180	–	370	50	16					
RA7		500 / 560 〈400〉	–	219	40	7	I	⊖24V	RCP4W-RA7C	–	P.503
		340	–	437	50	15					
		170	–	875	70	25					
RA4		450 〈250〉 / 450 (250) / 350 (250)	–	150	~25	~4.5			RCP2W-RA4C	–	P.507
		190 / 190 / 175	–	284	~40	~12					
		125 〈115〉 / 115 / 85	–	358	40	~19					
RA6		320 〈265〉	–	240	~40	~5			RCP2W-RA6C	–	P.509
		200	–	470	50	~17.5					
		100	–	800	55	~26					
RA10		250 〈167〉	–	1500	~80	~80	I	⊖24V	RCP2W-RA10C	–	P.511
		125	–	3000	150	~100					
		63	–	6000	300	~150					
RA3		500	36.2	–	4	1.5			RCAW-RA3□	–	P.517
		250	72.4	–	9	3					
		125	144.8	–	18	6.5					
RA4		600	18.9	–	3	1			RCAW-RA4□ (20W)	–	P.519
		300	37.7	–	6	2					
		150	75.4	–	12	4		⊖24V			
		600	28.3	–	4	1.5			RCAW-RA4□ (30W)	–	
		300	56.6	–	9	3					
		150	113.1	–	18	6.5	I				
		600	18.9	–	3	1	A		RCS2W-RA4□ (20W)	–	P.521
		300	37.7	–	6	2					
		150	75.4	–	12	4		⊜100V ⊜200V			
		600	28.3	–	4	1.5			RCS2W-RA4□ (30W)	–	
		300	56.6	–	9	3					
		150	113.1	–	18	6.5					

* < > is for vertical use

I =Incremental A =Absolute ⊖ =DC ⊜ =AC

Model Selection

How to Read the Catalog

* Refer to Pre-37 and 38 for the detailed explanation of each item.

1. Check the Basic SPEC
   - Stroke
   - Payload
   - Speed
2.
3.
4. Check the Allowable Overhang Length and Allowable Moment

Model description

CE Mark/RoHS compliance

1 Correlation diagram of speed vs. payload

Notes on Selection

2 Stroke vs. maximum speed

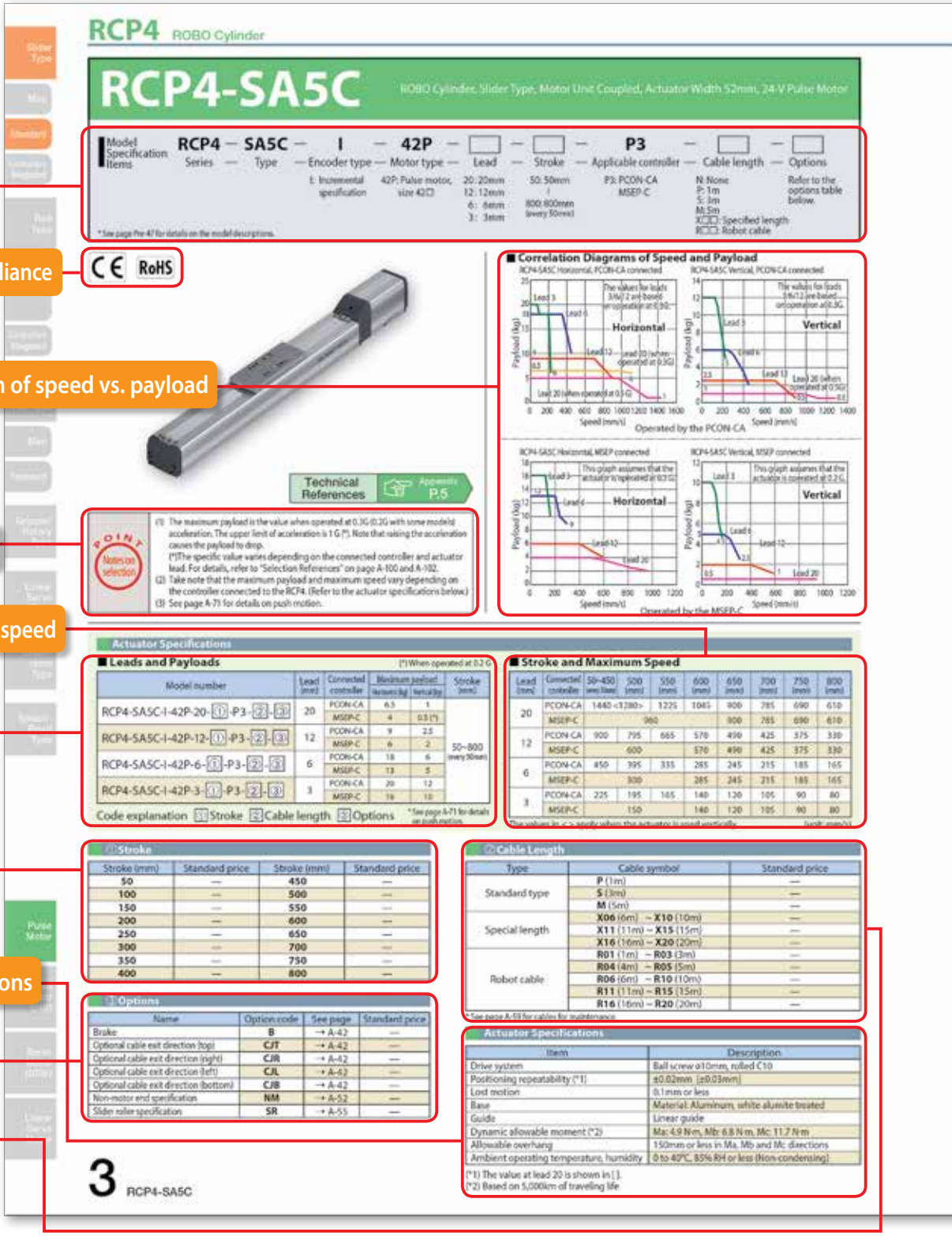
3 Lead vs. payload

Strokes

4 Actuator specifications

5 Options

6 Cables



5 Check the Cables and Options ▶ 7 Check the Dimensions ▶ 8 Check the Controller

RCP4 ROBO Cylinder

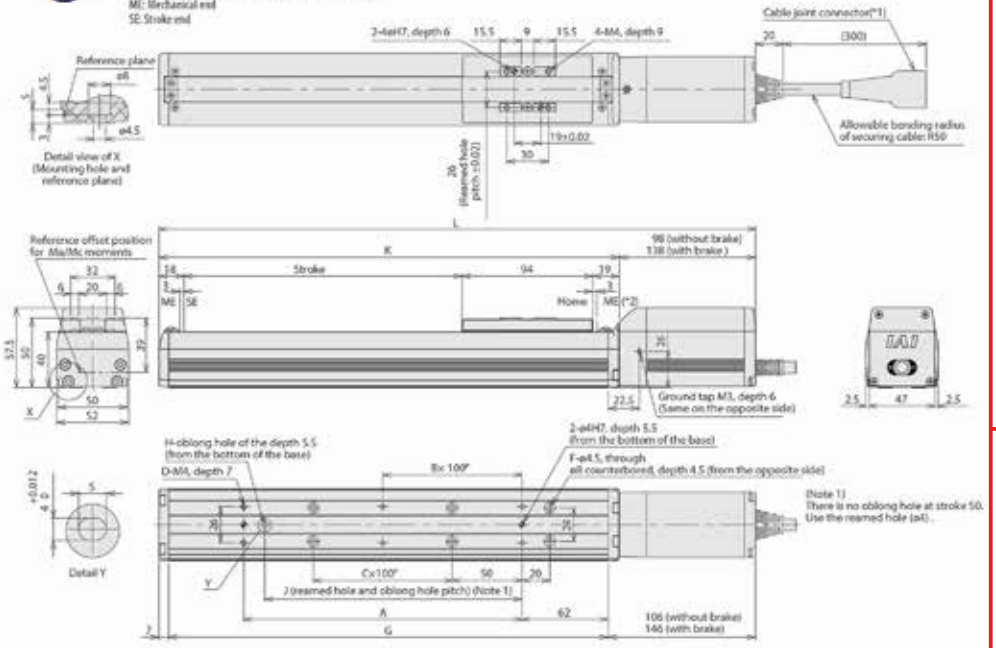
Dimensional Drawings

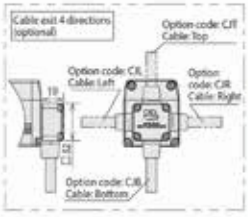
CAD drawings can be downloaded from the website. www.intelligentactuator.com

For Special Orders — Appendix P.15

2D CAD

*1 Connect the motor and encoder cables. * See page A-59 for details on cables.
*2 During home return, be careful to avoid interference from peripheral objects because the slider travels until the mechanical end.
ME: Mechanical end
SE: Stroke end





Dimensions and Mass by Stroke

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	Without brake	279	329	379	429	479	529	579	629	679	729	779	829	879	929	979	1029
	With brake	319	369	419	469	519	569	619	669	719	769	819	869	919	969	1019	1069
A		73	100	100	200	200	300	300	400	400	500	500	600	600	700	700	800
B		0	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7
C		0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7
D		4	4	4	6	6	8	8	10	10	12	12	14	14	16	16	18
F		4	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18
G		166	216	266	316	366	416	466	516	566	616	666	716	766	816	866	916
H		0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
J		0	85	85	185	185	285	285	385	385	485	485	585	585	685	685	785
K		181	231	281	331	381	431	481	531	581	631	681	731	781	831	881	931
Mass (kg)	Without brake	1.5	1.6	1.8	1.9	2.1	2.2	2.4	2.5	2.6	2.8	2.9	3.1	3.2	3.4	3.5	3.7
	With brake	1.7	1.9	2.0	2.1	2.3	2.4	2.6	2.7	2.9	3.0	3.2	3.3	3.5	3.6	3.7	3.9

External dimensions 7

Applicable Controllers

RCP4 series actuators can be operated with the controllers indicated below. Select the type according to your intended application.

Name	External view	Model number	Features	Maximum number of positioning points	Input power	Power supply capacity	Standard price	Reference page
Positioner type High-output specification		PCON-CA-42PI-①-2-0	Equipped with a high-output driver PIO control supported	512 points	DC24V	Refer to P618	—	→ P607
Pulse-train type High-output specification		PCON-CA-42PI-PL-□-2-0	Equipped with a high-output driver Pulse-train input supported	—			—	
Field network type High-output specification		PCON-CA-42PI-Ⓝ-0-0	Equipped with a high-output driver Field network supported	768 points			—	
Solenoid valve multi-axis type PIO specification		MSEP-C-Ⓐ-⋯-①-2-0	Positioner type based on PIO control, allowing up to 8 axes to be connected	3 points		Refer to P572	—	→ P563
Solenoid valve multi-axis type Network specification		MSEP-C-Ⓐ-⋯-Ⓝ-0-0	Field network-ready positioner type, allowing up to 8 axes to be connected	256 points			—	

* ① indicates I/O type (NP/PN). * Ⓐ indicates number of axis (1 to 8). * Ⓝ indicates field network specification symbol. * □ indicates N (NPN specification) or P (PNP specification) symbol.

Controller 8

IAI RCP4-SA5C 4

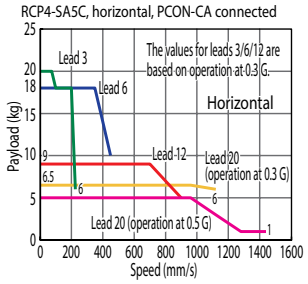
Explanation of Items in This Catalog

Check the Basic SPEC

1 Correlation Diagram of Speed vs. Payload

With pulse motor models (RCP4, RCP3, RCP2, ERC3 and ERC2), the maximum speed varies depending on the payload.
Refer to the correlation diagram of speed vs. payload to check if the model selected from the SPEC list meets the required speed and payload.
Also note that the specification values of the RCP4 series are different depending on whether the high-output controller (PCON-CA) or non-high-output controller (MSEP) is used.

■ Diagram of Speed vs. Payload



2 Stroke vs. Maximum Speed

The longer the stroke, the lower the maximum speed becomes to prevent the ball screw from reaching the dangerous number of revolutions.
Refer to the table of stroke vs. maximum speed to check if the selected model meets the required maximum speed.

* Take note that, if the travel distance is short, the maximum speed may not be reached.

■**Stroke and Maximum Speed**

The values in < > apply when the actuator is used vertically.

(unit: mm/s)

Lead (mm)	Stroke / Controller	55~450 (50mm)	500 (mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
20	PCON-CA	1440<1280>		1225	1045	900	785	690	610
	MSEP-C	960				900	785	690	610
12	PCON-CA	900	795	665	570	490	425	375	330
	MSEP-C	600			570	490	425	375	330
6	PCON-CA	450	395	335	285	245	215	185	165
	MSEP-C	300			285	245	215	185	165
3	PCON-CA	225	195	165	140	120	105	90	80
	MSEP-C	150			140	120	105	90	80

3 Lead vs. Payload

The lead indicates the feed range per one revolution of the ball screw or lead screw.
The greater the value of lead, the higher the speed becomes, but the payload decreases.
The smaller the value of lead, on the other hand, the greater the payload becomes, but the maximum speed decreases.

■**Lead vs. Payload**

Model number	Lead (mm)	Connected controller	Maximum payload Horizontal (kg)	Maximum payload Vertical (kg)	Stroke (mm)
RCP4-SA5C-I-42P-20-①-P3-②-③	20	PCON-CA	6.5	1	50~800 (in 50mm increments)
		MSEP-C	4	0.5 (*)	
RCP4-SA5C-I-42P-12-①-P3-②-③	12	PCON-CA	9	2.5	
		MSEP-C	6	2	
RCP4-SA5C-I-42P-6-①-P3-②-③	6	PCON-CA	18	6	
		MSEP-C	13	5	
RCP4-SA5C-I-42P-3-①-P3-②-③	3	PCON-CA	20	12	
		MSEP-C	16	10	

Explanation of symbols ① Stroke ② Cable length ③ Option(s)

(*) The value is based on 0.2 G of acceleration.

2. Check the Allowable Overhang Length and Allowable Moment

4 Actuator Specifications

When selecting an actuator, you must check not only the operating performance, but also the rigidity and life of the actuator. Check the following items in the actuator specification table.
(For the detailed explanation of each item, refer to the glossary of terms at the end.)

Actuator Specifications

Item	Description
Drive method	Ball screw, ø10mm, rolled, C10
Positioning repeatability (*1)	±0.02mm [±0.03mm]
Lost motion	0.1mm or less
Base	Material: Aluminum with white alumite treatment
Guide	Linear guide
Dynamic allowable moment (*2)	4.9 N•m in Ma direction, 6.8 N•m in Mb direction, 11.7 N•m in Mc direction
Allowable overhang length	150mm or less in Ma direction, 150mm or less in Mb/Mc directions
Ambient operating temperature, humidity	0 to 40°C, 85% RH or less (non-condensing)

(*1) The value in [ ] assumes a lead of 20. (*2) Based on a traveling life of 5,000 km.

• Drive method

Different drive methods are available, such as the ball screw type, lead screw type and belt type, depending on the model.

Drive method	Features
Ball screw	High accuracy, long life
Lead screw	Low cost, low noise
Belt	The maximum speed does not drop at long strokes.

• Positioning repeatability

While the positioning repeatability of the ball screw specification is normally 0.02mm, it worsens to ±0.03mm on models with larger screw leads. With the belt specification, the positioning repeatability is considered ±0.1 mm in consideration of the belt elongation, etc.

• Dynamic allowable moment

Take note that using the actuator at moments beyond its dynamic allowable moment will significantly shorten the life of the actuator. Check the actual moments that will generate in your specific application according to the calculation methods explained on page A-5 of this catalog.

• Overhang load length

Take note that using the actuator at overhang load lengths beyond the specified value may cause abnormal noise or vibration to generate.

3. Check the Cables and Options

5 Options

The options selectable for the model (actuator) on each page are indicated.
For the description of each option, refer to the reference page specified in the table.

③Option

Name	Option code	Reference page	Standard price
Brake	**B**	→ A-42	—
Changed direction for cable exit (top)	**CJT**	→ A-42	—
Changed direction for cable exit (right)	**CJR**	→ A-42	—
Changed direction for cable exit (left)	**CJL**	→ A-42	—
Changed direction for cable exit (bottom)	**CJB**	→ A-42	—
Non-motor end specification	**NM**	→ A-52	—
Slider roller specification	**SR**	→ A-55	—

6 Cables

The types of cables for connecting the model (actuator) on each page with its controller are indicated.
Note that the actuator price does not include the cable price.

④Cable length

Type	Cable code	Standard price
Standard type	**P** (1m)	—
	S (3m)	—
	M (5m)	—
Special length	**X06** (6m) ~ **X10** (10m)	—
	X06 (6m) ~ **X15** (10m)	—
	X06 (6m) ~ **X20** (10m)	—
Robot cable	**X06** (6m) ~ **R03** (10m)	—
	X06 (6m) ~ **R05** (10m)	—
	X06 (6m) ~ **R10** (10m)	—
	X06 (6m) ~ **R15** (10m)	—
	X06 (6m) ~ **R20** (10m)	—

4. Check the Dimensions

7 External Dimensions

The external dimensions of featured models are specified.
The position of the actuator slider (rod, table, etc.) corresponds to the position at which home return ends.

Shown in the top left-hand corner of the drawing is the symbol indicating whether or not 2D CAD/3D CAD data is available. (CAD data can be downloaded from IAI's website.)

5. Check the Controller

8 Applicable Controller

The controllers that can be connected (operated) with the model (actuator) on each page are indicated.
For the details of each controller, refer to the reference page.

6. Explanation of Other Items

● Model description
Model number to be specified when ordering the model (actuator) on each page.

● CE Mark/RoHS compliance
This mark is displayed when the model (actuator) on each page is compliant with the CE Mark or RoHS Directive.
* Refer to page A-17 for the details of the CE Mark and RoHS Directives.

● Notes on selection
The conditions and cautionary items that apply when using the model (actuator) on each page are indicated. Be sure to check these items before using the actuator.

ROBO Cylinder Series Cautionary Notes

■Notes on Specifications in this Catalog (All Models)

INDEX

1. Speed

This refers to the set speed when moving the slider (or rod, arm, output axis) of the actuator.

The slider accelerates from rest to the specified speed, and continues to move at that speed until it decelerates to a stop at the specified target position.

<Note>

❶ For models equipped with a pulse motor (ERC3, ERC2, RCP4, RCP3 and RCP2), the maximum speed changes with the weight of the load being transported. When selecting an actuator, refer to the "Speed vs. Payload" (on each product page).

❷ If the axis has a short stroke, or if it has a long stroke but the travel distance is short, the specified speed may not be reached.

❸ As the stroke becomes longer, the maximum speed decreases, due to hazardous RPMs. For details, see "■ Stroke vs. Maximum Speed" on each product page.

❹ For the RCP2 high-speed slider type (HS8C/HS8R) and belt type, vibration and/or resonance may occur when operated at low speeds. Therefore, use these models at 100mm/s or faster.

❺ For position controllers (PMEC/AMEC/PSEP/ASEP/DSEP/PCON-☐/ACON-☐/SCON-☐/MSEP/MSCON), a minimum speed is set for each actuator. See the instructions manual for each controller.

❻ When calculating the time travelled, take into account the time taken to accelerate, decelerate, and settle, as opposed to only the time travelled at the specific speed.

2. Acceleration/Deceleration

Acceleration is the rate of change in speed from rest until a specified speed is reached.

Deceleration is the rate of change in speed from the specified speed to a state of rest.

Both are specified in "G" in programs (0.3G = 2940 mm/sec^2).

* For rotary type, 0.3G = 2940 degrees/sec^2

<Note>

❶ Increasing the acceleration (deceleration) speeds up acceleration (deceleration), shortening the travel time. However, caution should be exercised, as excessively high acceleration/deceleration may cause an error or a malfunction.

❷ The rated acceleration (deceleration) is 0.3G (0.2G, if the lead is 2.5, 3, or 4, or if used vertically). With the exception of the high-acceleration/deceleration model, use the actuators at or below the rated acceleration.

❸ For models such as RCS2-SRA7 and RCS2-RA13R, use the actuator at or below the acceleration (deceleration) mentioned in "Notes on Selection" on the respective product page.

3. Duty

The duty indicates the utilization ratio of the actuator (time during which the actuator is operating within one cycle). An overload error may generate if the duty is too high for the load applied to the actuator or the actuator speed or acceleration. Be sure to use the actuator at duties within an appropriate range according to the applicable conditions.

$$\text{Duty} = \frac{\text{Operating time}}{\text{Operating time} + \text{Stopped time}} \quad \%$$

<Pulse motor>

The pulse motor specification can be operated at a duty of 100%.

Applicable models: RCP2 (CR) (W), RCP3, RCP4, ERC2, ERC3 *1

*1: With the ERC3, the duty is limited to suppress heat generation from the motor when the output setting is high.
Refer to page A-95 for details.

<AC servo motor>

The duty of the AC servo motor is limited according to the operating conditions.

Refer to page A-95 for the duty calculation method for the servo motor.

4. Lead Screw

When using a lead screw type actuator (RCP3-SA2☐☐/RA2☐☐ and RCA2-☐☐3NA/☐☐4NA), note the following:

<Note>

❶ This type is suited for applications with low frequency of use. (As a point of reference, one motion per 10 seconds, 24 hours per day, 240 days per year = approximately 5 years)

❷ This is suited for applications in which the payload and load requirements are low. (1 kg or less).

❸ Use for applications that do not require a positioning repeatability smaller than ±0.05 mm.

❹ Set up in a place that allows for easy maintenance.

■Notes on Specifications in this Catalog (All Models)

5. Home

The home is the reference point from which the actuator determines the target position.
Note that if the home becomes misaligned, the target position also shifts by the same amount.

<Note>

❶ Home return must be performed for actuators with an incremental encoder upon power-on.

❷ During home return, the slider (rod, table) moves to the actuator's mechanical end, and then reverses. Therefore, watch for any interference with its surroundings.

❸ By default, the home is on the motor-side (i.e. the open side on the gripper type, or the left side on the rotary type (looking down at the output shaft.) Optionally, the home can be moved to the opposite side (front side). To change the home direction after the actuator has been delivered, it must be sent back to IAI for adjustment.

❹ Models without the option code "NM" do not support the non-motor end specification.

6. Encoder Type (Incremental/Absolute/Simple Absolute)

There are two types of encoders that can be used in an actuator, "incremental" and "absolute" encoders.

Incremental encoder . . When an incremental encoder is powered off, its coordinate data is erased. Therefore, home return is necessary each time it is powered back on.

Absolute encoder . . . . . When an absolute encoder is powered off, it uses a battery to store its coordinate data. Therefore, home return is not necessary when it is powered back on. However, note that it cannot be operated once the battery for storing data runs out.

<Note>

In addition to the above two types of encoders, there is the "simple absolute" type, which is an incremental encoder with a dedicated simple absolute unit connected to the actuator's controller, for storing its coordinate data. This eliminates the need for home return upon power-on.

Note that the simple absolute actuators (encoders) fall under the incremental type and not the absolute type.

7. Encoder Pulse Number

The pulse number of the encoder varies depending on the actuator. See the table below for the pulse number of each actuator.

Series	Type	Encoder Pulse Number
RCP4 RCP3 RCP2	ALL MODELS	800
RCA2	RN□N/RP□N/GS□N/ GD□N/SD□N/TC□N/ TW□N/TF□N	1048
	ALL OTHER MODELS	800

Series	Type	Encoder Pulse Number
RCA	ALL MODELS	800
RCL	SA1L/RA1L	715
	SA2L/RA2L	855
	SA3L/RA3L	1145
RCS3 RCS2	SRA7BD	3072
	ALL OTHER MODELS	16384

8. Motor

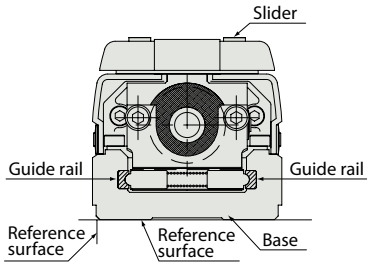
Different motors are used depending on the series.

- ERC3(CR)/ERC2(CR)/RCP4(CR)/RCP3/RCP2(CR): Pulse motor
- RCD: DC brushless motor
- RCA(CR)/RCA2: Servo motor (24V)
- RCS3/RCS2(CR): Servo motor (200V)

Pulse motors and 24V servo motors may exhibit slight vibration when the motor is running while the servo is on.

9. Actuator Body Precision

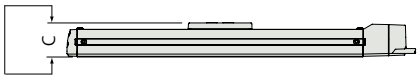
Below are the measures of precision for the body of the slider type ROBO Cylinder. Moreover, the side and bottom surfaces of the actuator's base provide references for the run of the slider, and hence can be used as a guide to ensure parallel mounting of the actuator.



* Parallelism does not apply to RCP2W-SA16C, due to its sliding guide.

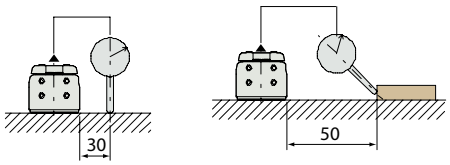
Parallelism: Base Underside & Load Surface (Top Side)

ERC3/ERC2: Within ±0.2mm/m
RCP4/RCP3/RCP2/RCA2/RCA/RCS3/RCS2: Within ±0.1mm/m



Parallelism When Mounted onto a Frame (Fixed onto a Smooth Surface*1)

ERC3/ERC2: Within ±0.2mm/m
RCP4/RCP3/RCP2/RCA2/RCA/RCS3/RCS2: Within ±0.1mm/m



Condition: The above values were measured at 20°C.
*1: 0.05mm or less deviation from flatness.

10. Rod Type (Rod End Vibration)

The standard rod-type actuators do not take into account any vibration or load resistance (The non-rotational accuracy values documented in the actuator specifications are initial values, and the backlash will increase with operation). If the rod vibrates or if the non-rotational accuracy fluctuates, or if a there is a force being applied from any direction other than the actuator's linear movement, use the guide-equipped actuator type, or use an external guide.

11. Vertical Setup and Use

When using the actuator in a vertical setup, add the optional brake to prevent the slider (or rod) from falling and breaking the machine when the power is turned off or an emergency stop is activated.
However, when mounting a brake-equipped ROBO Cylinder, be aware that the slider (or rod) will not move unless it is connected to the controller and the brake is released.

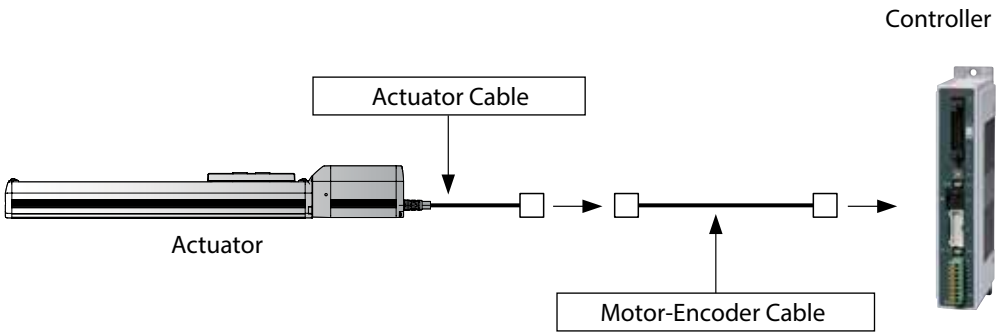
12. Moving the Slider Manually

For ball screws with a low (1, 2.5, 3, 4) lead, the actuator's slider cannot be moved by hand, even if the power and/or servo is off, due to high sliding resistance. To move the slider on a low-lead actuator, use the teaching pendant or the JOG function of the computer software.

■Notes on Specifications in this Catalog (All Models)

13. Actuator Cable/Motor-Encoder Cable

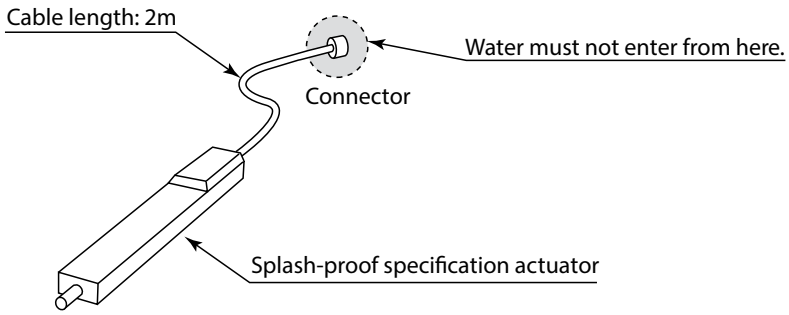
The actuator cable is the cable that extends from the rear of the actuator's motor.
Secure the actuator cable in place so that it does not move, as any force exerted on the actuator cable may cause a malfunction.



The motor-encoder cable is the cable that connects the actuator and the controller. Depending on the actuator type, some models use a motor-encoder cable that is split into a separate motor cable and an encoder cable, and other models use an integrated motor-encoder cable. Moreover, there are two different specifications of this cable: The standard cable specification and the robot cable specification, which has an outstanding flex resistance.
To use in a cable track, be sure to use the robot cable, using caution not to bend beyond the minimum bend radius R for the cable. (The minimum bend radius R is specified for each cable on the respective pages.)
To check the cable type for each model, see "Table of Actuator-Controller Connection Cable Types" on page A-59.

14. About the Splash-Proof Actuator

Although the scope of protective construction of the splash-proof type includes the cable, the connector at the end of the actuator cable is not splash proof. Therefore, secure the end of the actuator cable in a place that is not prone to water spills.



15. CE Compliance

While the 24-V actuators (RCP4□/RCP3/RCP2□/ERC2/RCA2/RCA/RCD) are CE-compliant based on their standard specification, the 200-V actuators (RCS3□/RCS2□) using a non-standard motor require a special option to ensure compliance. (If the CE option is specified for a 200-V actuator, the safety precaution label will be attached on the actuator.)

For the CE-compliant controllers, refer to "RoHS/CE Mark/UL Standard Compliance Table" on page A-18. Since some actuators cannot be made CE-compliant, also check "RoHS/CE Mark/UL Standard Compliance Table" to see if the desired model is CE-compliant.

16. Service Life

The service life of the actuator is directly related to the service life of the components that make up the actuator (guide, ball screw, motor, etc.). Moreover, the service life for these components changes significantly depending on the usage requirements.

For example, each guide has an allowable load moment (see page A-5). If the guide is hypothetically used at half the moment of the allowable moment, its service life is eight times more than the specified service life. If used conservatively, it can be used for 10 years or more. Therefore, when selecting a model, it is recommended that you select a model with more head room.

17. Warranty

The warranty period expires upon elapse of one of the following periods, whichever occurs first.

- 18 months after shipment from IAI factory in Japan
- 12 months after delivery to the location specified
- 2,500 hours after start of operation

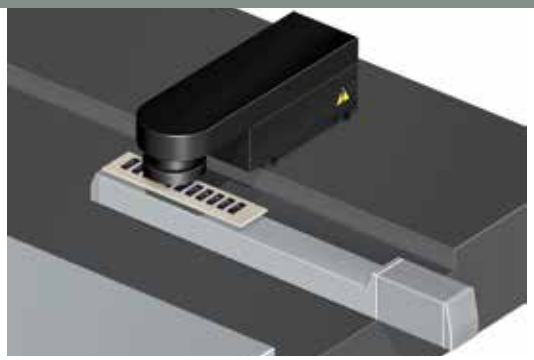
IAI will repair free of charge any actuator defects due to craftsmanship or material that may occur during the above warranty period despite use under appropriate conditions. Note, however, that defects resulting from handling or use in any condition or environment not specified in the catalog, operation manual are excluded from the scope of warranty. The warranty covers only the actuator delivered by IAI, and any secondary losses arising from a failure of the delivered product is excluded from the scope of warranty.

The defective actuator must be sent in for repair.

Application Examples

Marking Machine

Pitch feed

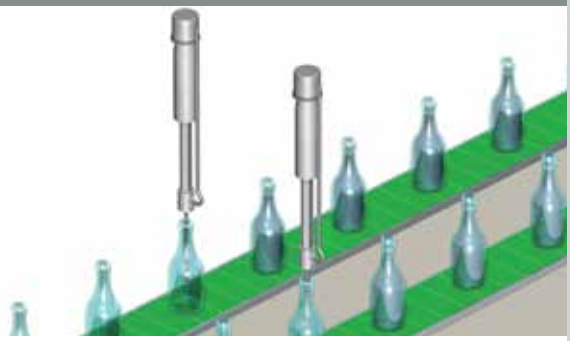


Use ROBO Cylinder in "pitch feed" mode to feed the work parts in a laser marking process.

Actuator	ERC3-SA5 (P55)	Controller	Built-in (P577)

Liquid Injector

Positioning

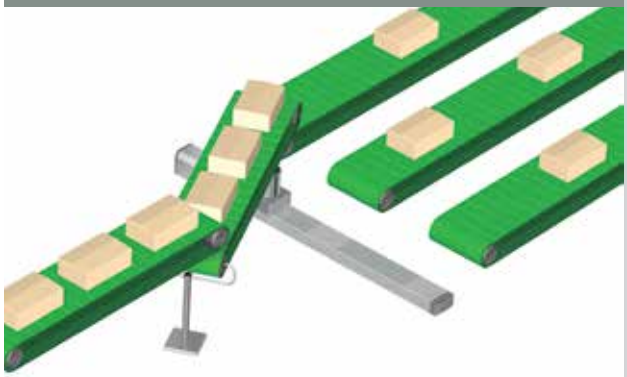


In this equipment, a nozzle is inserted into a shampoo container, and is raised as the shampoo is injected. Speed adjustments are controlled by pulse trains.

Actuator	RCA-RA3C (P221)	Controller	ACON-PL (P631)

Redirecting a Belt Conveyor

Positioning

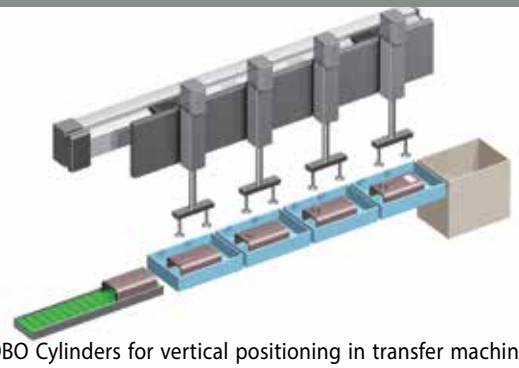


Work parts can be sorted at high speeds.

Actuator	RCS3-SS8C (P113)	Controller	SCON-CA (P643)

Parts Transfer Machine

Positioning

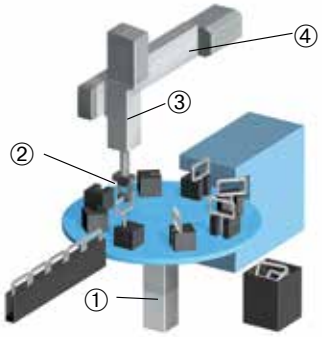


Use ROBO Cylinders for vertical positioning in transfer machines (for moving work parts to a different process line) to make production lines more compact.

Actuator	RCA-RA4C (P223)	Controller	ACON-CY (P631)

Parts Inspection Machine

Pitch feed

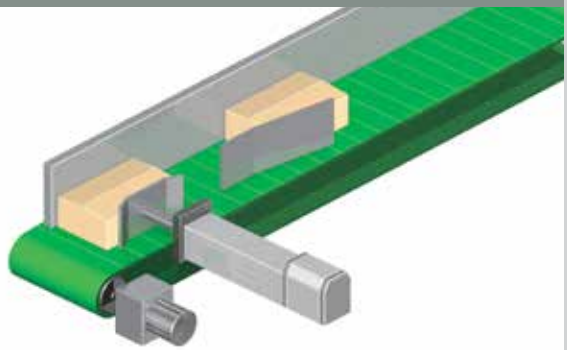


All horizontal/vertical movements, gripping, and rotating operations are driven by ROBO Cylinders. Moreover, controllers can be connected to a field network to reduce wiring.

Actuator	①RCS2-RT6 (P415) ②RCP2-GRM (P379) ③RCP4-RA6C (P149) ④RCP2-SS8C (P41)	Controller	PCON-SE (P623) SCON-CA (P643)

Aligning Work Parts

Pushing

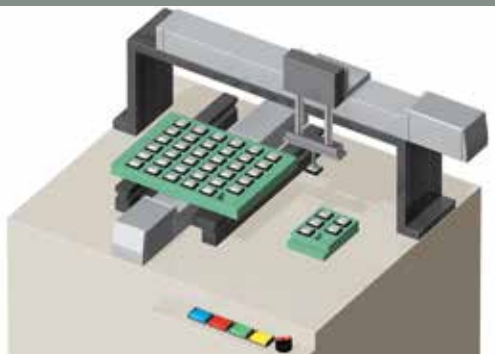


Work parts are aligned by using the push operation to push them against the wall.

Actuator	RCP4-RA5C (P147)	Controller	PCON-CA (P607)

Pick-and-Place Machine

Pitch feed Positioning

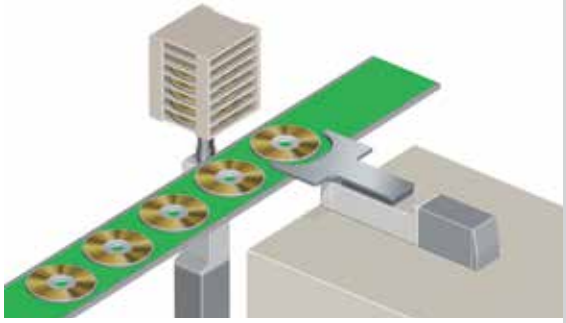


This low-cost pick-and-place machine uses ROBO Cylinders for the X and the Y axes.

Actuator	RCA-SA5C (P89) RCA2-GD4NA (P215)	Controller	ACON-C (P631) ASEP-C (P547)

Disc Stacker

Pitch feed Positioning

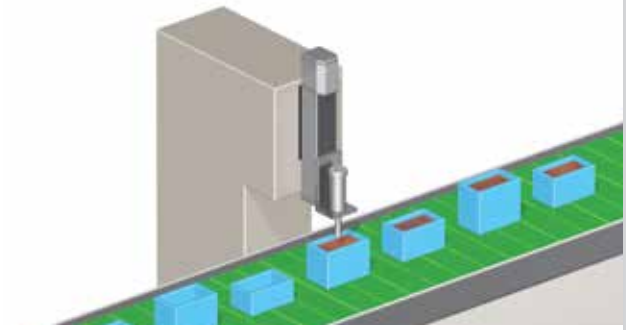


The raising and lowering of the stacker is done by ROBO Cylinder's "pitch feed" function, and the inserting of the discs into the stacker is done by the "acceleration/deceleration" function.

Actuator	RCP4-RA6C (P149) RCP4-SA6C (P5)	Controller	PCON-CA (P607)

Filling Machine

Positioning



A ROBO Cylinder is used to fill containers that are different in height. With the ability to control multiple positions, multi-product production can be supported.

Actuator	RCP3-TA5C (P307)	Controller	PCON-CA (P607)

Automotive Parts Inspection Machine

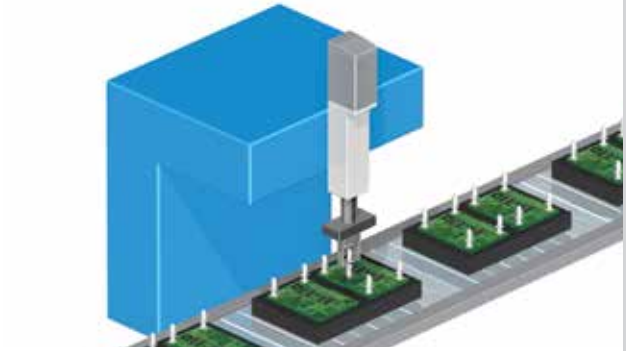
Positioning

Use ROBO Cylinders in a part inspection line. Drive multiple axes to position and inspect the work parts, and to sort out defects. All axes are controlled by a five-axis XSEL controller.

Actuator	RCS2-RA5C (P271)	Controller	XSEL-P (P695)

Spacer Insertion Machine

Pushing

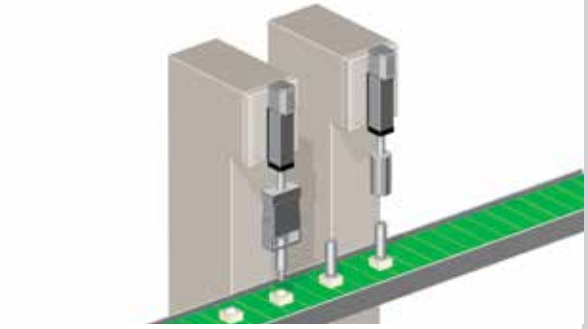


Use the ROBO Cylinder's push operation to insert spacers for printed circuit boards.

Actuator	RCP4-RA6C (P149) RCP2-GRSS (P373)	Controller	PCON-CA (P607) PSEP-C (P547)

Press-Fitting Machine

Positioning Pushing



Use ROBO Cylinders for press-fitting and assembling plastic parts. Assembling is done by the positioning of the ROBO Cylinders, while press-fitting is done by the push operation.

Actuator	RCP4-RA5C (P147) RCP2-RA10C (P171)	Controller	PCON-CA (P607) PCON-CFA (P607)

Description of Models

Each ROBO Cylinder model is defined by the items (codes) below.
See descriptions below for the meaning of each item. The range of selectable values for each item (e.g. lead, stroke, etc.) is different for each product type. See each type for details.

[Actuator] Description of Items

Series	–	Type	–	Encoder	–	Motor	–	Lead	–	Stroke	–	Compatible Controllers	–	Cable Length	–	Option
①		②		③		④		⑤		⑥		⑦		⑧		⑨

①Series	Indicates the name of the series.
②Type	Indicates the product type (slider, rod, etc.), material (aluminum, steel, etc.), actuator size (52 mm width, etc.), and motor connection method, using the convention below:

Type	Material / Form	Actuator width	Motor connection method
S (Slider) B (Belt) R (Rod) H (High-speed) T (Table) A (Arm) F (Flat) SR (Short rod)	A (Aluminum) S (Steel) GS (Single guide) GD (Double guide) SD (Slide unit) N (Nut mounting type) P (Tapped hole mounting type) C (Compact) W (Wide) F (Flat)	1 (12 width) 2 (22/25/28 width) 3 (30 width) 4 (40/42/45 width) 5 (52/54/55 width) 6 (58/64 width) 7 (60/68 width) 7A (width 75, rod 30) 7B (width 75, rod 35) 8 (80 width) 10 (100 width) 16 (158 width)	C (Coupled) D (Built-in) R (Side-mounted) U(Bottom-mounted) N (Hollow motor) L (Linear motor)

e.g. SA5C
Type: Slider
Material: Aluminum
Actuator width: 52mm
Motor: Coupled

* Gripper and rotary type ROBO Cylinders have their own naming convention.

③Encoder	Indicates whether the actuator is equipped with an absolute or incremental encoder.	
	A: Absolute	Since the current slider position is retained even after the power is turned off, home return is not required.
	I: Incremental	Since the position data for the slider becomes lost when the power is turned off, home return is required each time the power is turned on.
④Motor	Indicates the power output (W) of the motor used in the actuator. All ERC2 series products are labeled as "PM". For the RCP4/RCP3/RCP2/ERC3 series, which use a pulse motor, this code indicates the motor size instead of the power output (e.g. "20P" = 20mm frame size motor).	
⑤Lead	Indicates the ball screw lead (the distance the slider travels as the ball screw completes one revolution).	
⑥Stroke	Indicates the stroke (range of motion) of the actuator (in mm or degrees).	
⑦Compatible controllers (I/O type)	Indicates the type of controllers that can be connected. For the ERC3/ERC2 series, which has a built-in controller, this code indicates the type of I/O (input/output signals).	
⑧Cable length	Indicates the length of the motor-encoder cables, which connects the actuator and the controller.	
⑨Options	Indicates the options added to the actuator. (See Technical Reference on page A-37 for details.) *To select multiple options, specify them in alphabetical order (e.g. A3-B-FT) *When specifying a side-mounted motor type, make sure to include the code (ML or MR) to indicate on which side the motor is to be mounted.	

Each model of controller is defined by the items (codes) below.
See descriptions below for the meaning of each item.
Also note that the selection range for each item (I/O type, power-supply voltage, etc.) varies from one controller to another. Check the details on the page featuring each controller.

[Controller] Description of Items

■Single-axis type ‹PMEC, AMEC, PSEP, ASEP, DSEP, PCON, ACON, SCON›

Series	–	Type	–	Motor	–	Encoder	–	Option	–	I/O type	–	I/O cable length	–	Power-supply voltage	–	Other
①		②		④		⑤		⑥		⑦		⑧		⑨		⑩

■Multi-axis type ‹MSEP, MSCON, PSEL, ASEL, SSEL, XSEL›

Series	–	Type	–	Number of connected axes	–	Motor	–	Encoder	–	Option	–	I/O type	–	I/O cable length	–	Power-supply voltage voltage	–	Other
①		②		⑨		④		⑤		⑥		⑦		⑧		⑨		⑩

(④⑤⑥should be specified separately for each of all connected axes.)

①Series	Name of each controller series. Since the available series vary from one actuator to another, check the connectable controllers on the "Applicable Controllers" table on the page featuring each actuator.
②Type	The type varies depending on the function and connected actuator. Select a type matching your application by referring to the page featuring each controller.
③Number of connected axes	Number of actuator axes to be connected to the controller.
④Motor	Motor type of the actuator to be connected to the controller.
⑤Encoder	Encoder type of the actuator to be connected to the controller.
⑥Option	Option(s) of the actuator to be connected to the controller (such as high-acceleration/deceleration specification).
⑦I/O	Type of I/O signals to connect the controller and external equipment.
⑧I/O cable length	Length of the I/O cable to be supplied when the PIO specification is selected in ⑦above. If the field network specification is selected, the I/O cable is not supplied and therefore this field is automatically populated by "0."
⑨Power voltage	Type of the power to be supplied to the controller.
⑩Other	Whether or not the controller supports the simple absolute specification and whether the high-acceleration/payload specification is available, among others.

Perform Various Functions Through Easy Operations

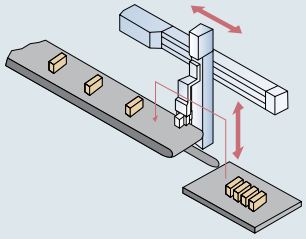
3 Types of Operation Patterns

Switch between three operation patterns depending on the equipment.

[Positioning Operation]

Objects attached to the slider axis and rod can be moved to be positioned with a positioning repeatability of ±0.02 mm.

<Application> Transporting work part, positioning camera

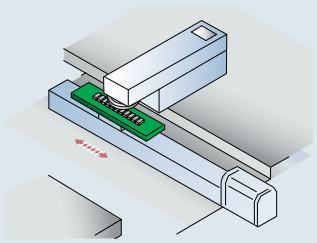


Used in a pick-and-place unit

[Pitch Feed Operation]

Instead of positioning by specifying coordinates from the home, the object is moved over a specified distance from the current position.

<Application> Raising/lowering stacker, moving pallet

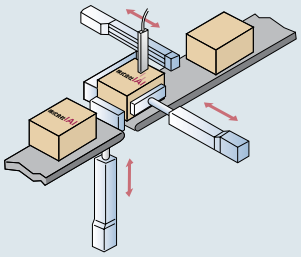


Used for sending work parts in a marking process

[Push Operation]

Similar to an air cylinder, a rod can be used to push on a work part continuously.

<Application> Press-fitting work part, clamping



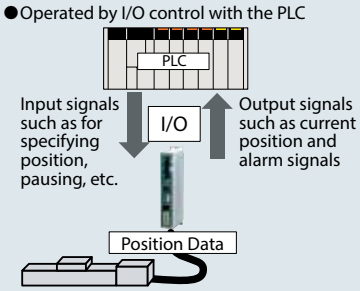
Used for pushing work parts

3 Methods of Positioning

Select from 3 types of I/O between the upper-level machine and the controller.

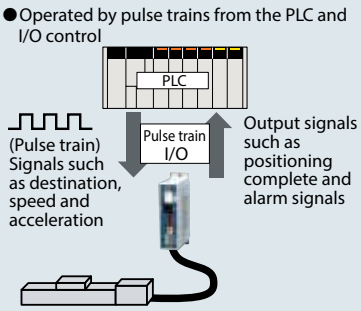
[Position Movement]

As with the solenoid valve, movement to preset positions is possible with just an ON/OFF signal.



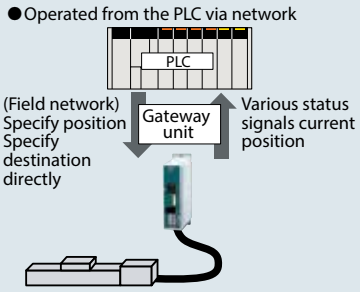
[Pulse Train Input]

The destination, speed and acceleration can be freely controlled without inputting the destination beforehand.



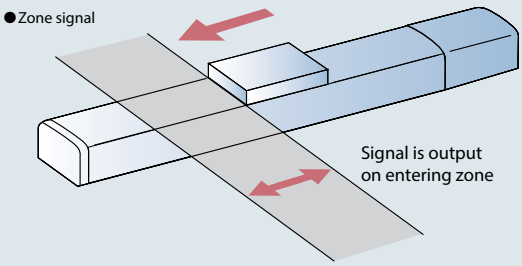
[Field Network]

Movement can be instructed via a network, such as DeviceNet and CC-Link. Work parts can be moved by specifying the position, or by directly specifying the coordinates.



No Sensor Necessary with Zone Signal

You can set any zone within the stroke, and when the slider enters the zone, the signal is output. This is effective for outputting signals at a specific position, such as in painting, for example, (up to 2 zones can be specified). In addition, as a new feature, P-Zone signals can be set per position. Although the output signal is the same, a zone range of up to 256 points can be set.

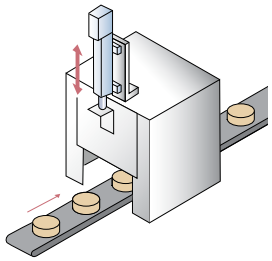


Positioning Operation

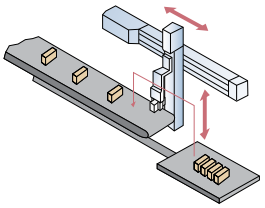
Objects attached to the slider axis and rod can be moved to be positioned with a positioning repeatability of ±0.01mm to ±0.1mm (*).

(*) Varies depending on a model.

■ Used for opening/closing a door

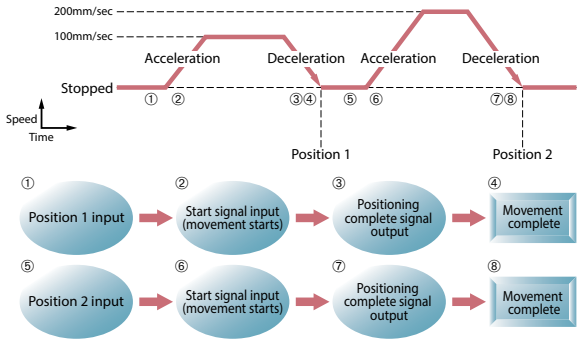


■ Used in a pick-and-place unit



Application: Transporting/moving work part, etc.

Operation Example



[Features]

- Capable of positioning up to 512 points.
- Set speed and acceleration/deceleration per position.
- The positioning complete signal can be output at any position ahead of the specified position, depending on the positioning band setting.
- Acceleration and deceleration can be set separately.
- Speed can be changed in transit without stopping.

Position Data Table

(set by the teaching pendant or PC software)

No.	Position (mm)	Speed (mm/sec)	Acceleration (G)	Deceleration (G)	Push (%)	Positioning band (mm)
1	100	100	0.3	0.3	0	10
2	200	200	0.3	0.3	0	20

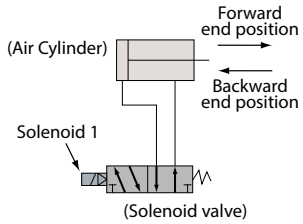
<PMEC, AMEC, PSEP, ASEP and DSEP can be operated with the same signals as the solenoid valve>

■Operating Method

PMEC, AMEC, PSEP, ASEP and DSEP can be operated with the same signals as the solenoid valve in air cylinders. There are two types of solenoid valves, the single solenoid and the double solenoid; and both are supported.

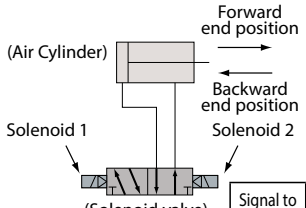
■For Air Cylinder Solenoid Valve

<Single Solenoid>



Signal to solenoid 1	Rod movement
ON	Forward end position
OFF	Backward end position

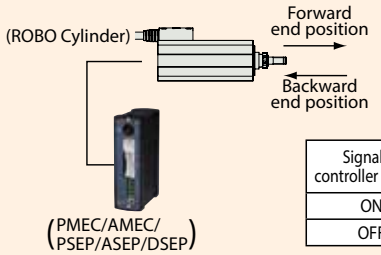
<Double Solenoid>



Signal to solenoid 1	Signal to solenoid 2	Rod movement
ON	OFF	Forward end position
OFF	ON	Backward end position

■For PMEC, AMEC, PSEP, ASEP and DSEP

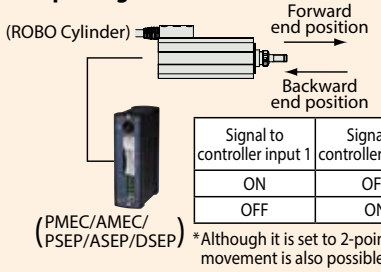
<Replacing Single Solenoid>



*Forward and backward positions can be freely set.

Signal to controller input 1	Rod movement
ON	Forward end position
OFF	Backward end position

<Replacing Double Solenoid>



Signal to controller input 1	Signal to controller input 0	Rod movement
ON	OFF	Forward end position
OFF	ON	Backward end position

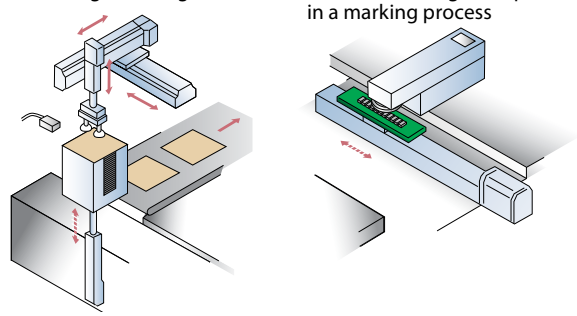
*Although it is set to 2-point movement by default, 3-point movement is also possible by switching the parameter.

Description of Functions

Pitch Feed Function (Incremental Function)

In addition to positioning by specifying coordinates from the home, the work part can be moved over a specified distance from the current position.

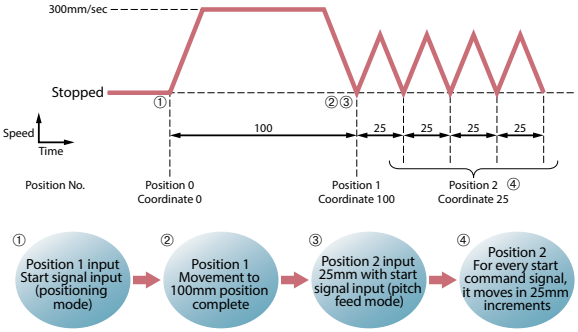
■ Raising/lowering stacker ■ Used for sending work parts in a marking process



Application: ● Raising/lowering stacker, moving pallet, etc.

Operation Example

Note PMEC/AMEC/PSEP/ASEP controllers have no pitch feed function.



[Features]

- Repeated movements with even spacing can be performed using one position data, instead of setting multiple positions.
- The pitch can be easily set in the position data table.

Position Data Table

(set by the teaching pendant or PC software)w

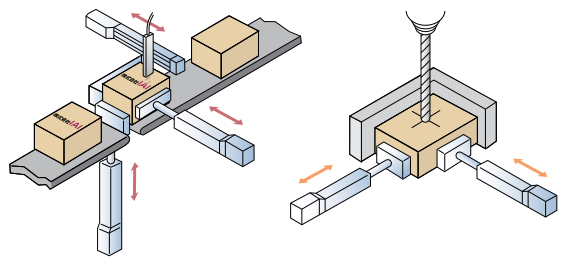
No.	Position (mm)	Speed (mm/sec)	Acceleration (G)	Deceleration (G)	Push (%)	Positioning band (mm)
1	100	300	0.3	0.3	0	0.1
2	=	25	300	0.3	0.3	0	0.1

(Teaching Pendant)
"=" is displayed in pitch feed mode.

Push Operation

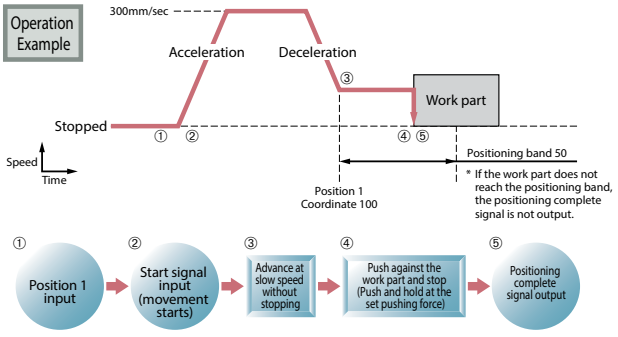
Similar to an air cylinder, a rod can be used to push on a work part continuously.

■ Pushing work parts ■ Holding work part in place



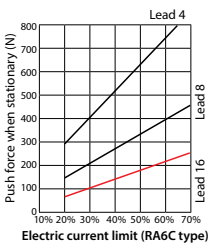
Application: ● Detecting work part, press-fitting, clamping, etc.

Operation Example



[Features]

- Since the positioning complete signal is output when the actuator pushes against the work part, you can use it with the zone signal to sort work parts.
- The force against the work part (push force) can be adjusted by changing the setting in the position data table.



Position Data Table

(set by the teaching pendant or PC software)w

No.	Position (mm)	Speed (mm/sec)	Acceleration (G)	Deceleration (G)	Push (%)	Positioning band (mm)
1	100	300	0.3	0.3	50	0.1

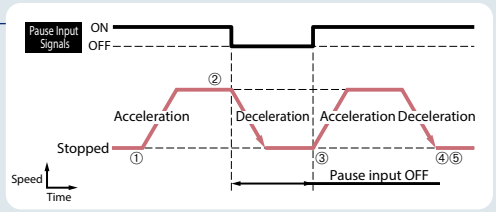
Note: The accuracy of the stationary push force is not guaranteed. Please use it only as a rough estimate. Please note that if the push force is too small, the push operation may not be completed properly due to sliding resistance.

Changing Speed During Movement

Since the speed can be changed from any position during the movement, the takt time can be effectively reduced through multi-tasking.

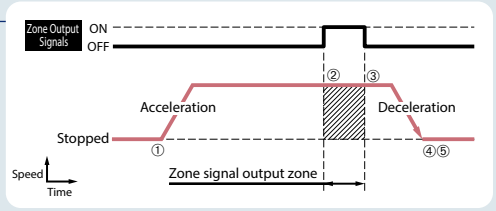
Pause Input

By setting an interlock (to prevent interference) with the peripherals, the slider slows down to a stop when the pause input is cut.
Once the pause input turns ON again, the remaining motion is resumed.



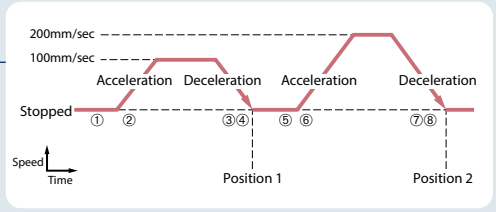
Zone Output

During movement, you can output a signal at an arbitrary position (whose range is set by a parameter). This can be used to set a danger zone or to reduce takt time.



Capable of Controlling Speed and Acceleration/Deceleration

Speed and acceleration/deceleration can be set for each position. By starting and stopping slowly and moving at a high-speed in between, the takt time can be effectively reduced.



Complete-Stop and Full-Servo Control Methods

In a pulse motor, you can use the complete-stop method to eliminate vibrations by increasing the current when stationary, or the full-servo method, in which the current is dropped to 1/2 to 1/4 of the complete-stop method to reduce power consumption.

Auto Servo OFF Method

After the positioning is complete, the servo can be turned OFF automatically after a fixed time has passed. Since no retention current is output, power consumption can be reduced. When the move command is received from the PLC, the servo turns ON and the movement starts.

Simple Absolute Unit

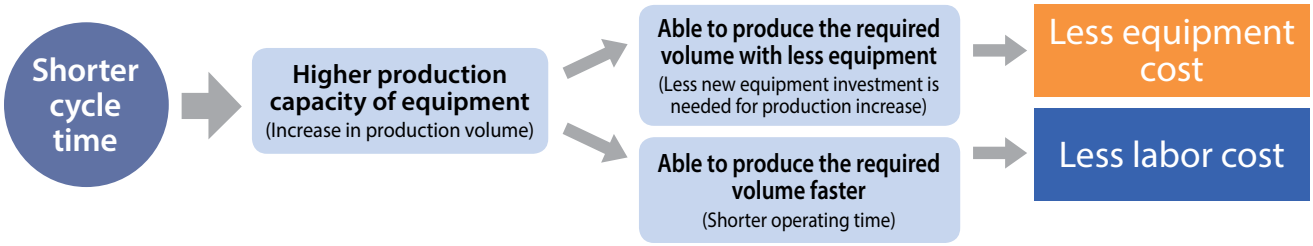
A simple absolute unit retains the data from the encoder while the power is OFF. When attaching to PCON, ACON, PSEL, and ROBONET, these controllers can be used as simple absolute units to eliminate the need for home return.

CT Effects of Motorized Actuators

The "CT Effects" refers to an increase in the production volume per unit time resulting from a shorter cycle time and reduced choco tei (frequent downtimes), which in turn is achieved by replacing the components of automated equipment from air cylinder-based ones to motorized actuator-based ones.
Higher unit production volume leads to various benefits, such as less equipment investment and less labor cost required for operating the equipment, etc.
(CT stands for "Cycle Time" and "Choco Tei.")

CT Effect 1 Shorter Cycle Time

A shorter cycle time of production equipment is expected to cut the equipment investment and labor cost, as illustrated below.



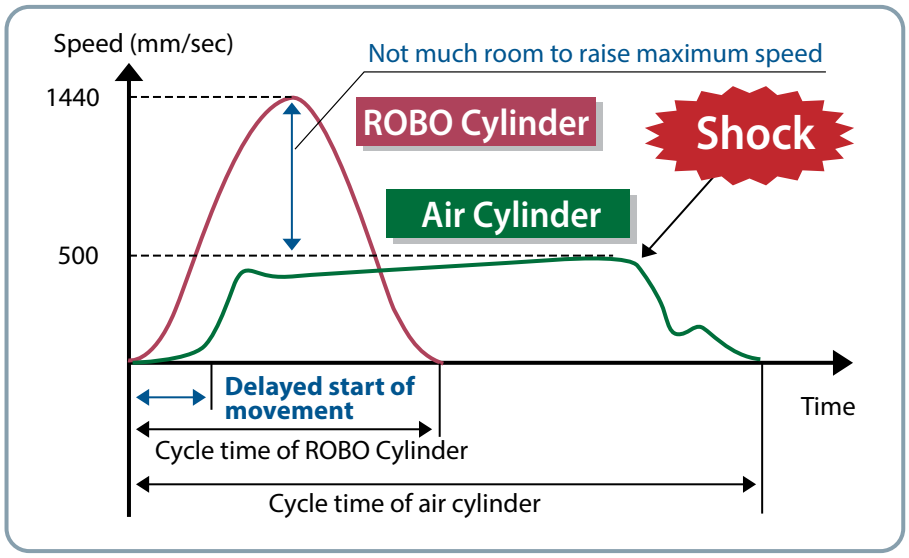
Why ROBO Cylinders Are Faster

(1) Delayed start of movement

Air cylinders are subject to a delay of approx. 0.1 sec at the start of movement. This delay corresponds to the time needed for the solenoid valve to open and air to travel through the pipe and enter the cylinder to raise the pressure.

(2) Not much room to raise maximum speed

With air cylinders, excessively raising the speed increases the shock at the end of stroke, potentially causing choco tei.
With ROBO Cylinders boasting smooth acceleration/deceleration, on the other hand, the maximum speed can be raised.

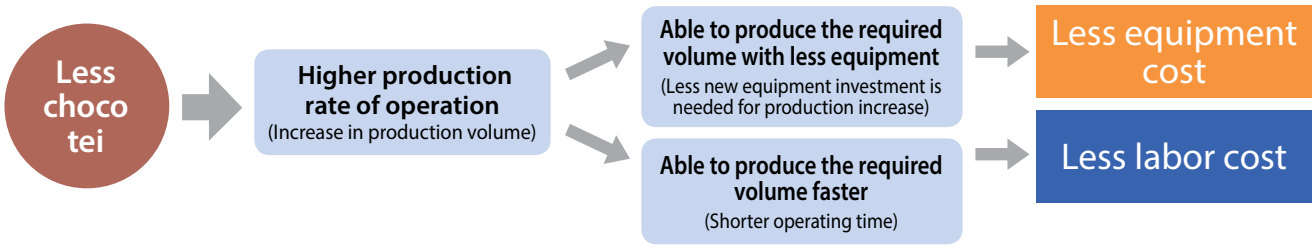


CT Effects

Shorter Cycle Time Less Choco Tei

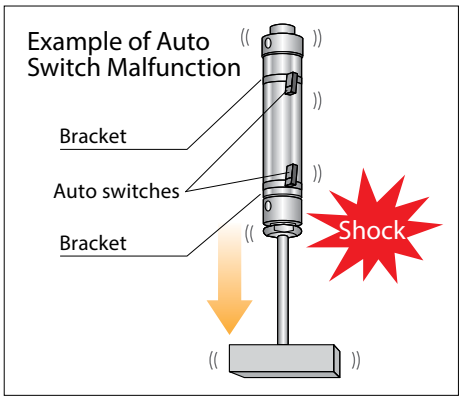
CT Effect 2 Less Choco Tei

By reducing the choco tei of production equipment, equipment investment and labor cost will likely drop, as illustrated below.

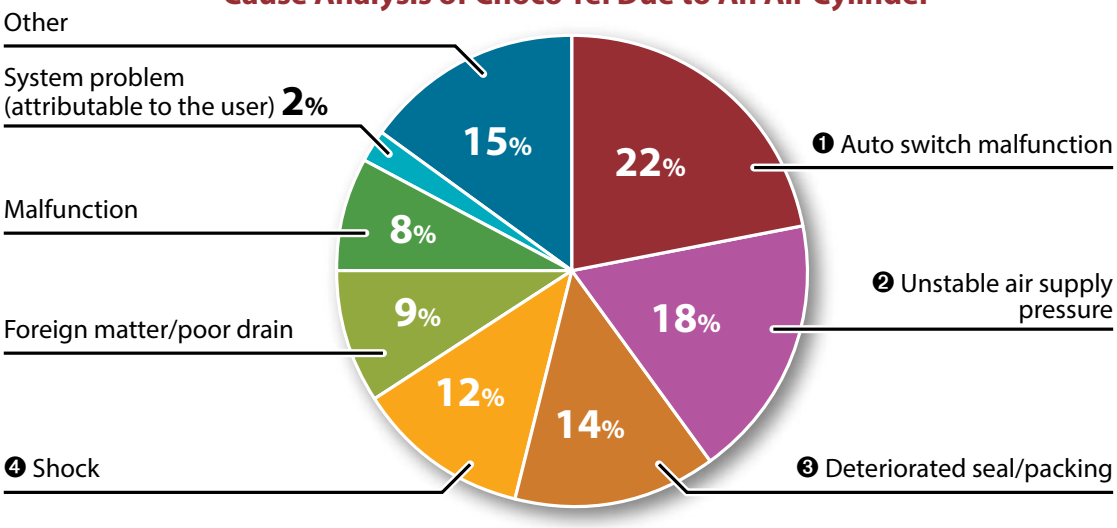


Causes of Choco Tei

"Choco tei" is a phenomenon accompanied by stopped or idling equipment due to a temporary problem.
Various factors can be considered when it comes to choco tei. An investigation into the causes of choco tei relating to an air cylinder found the following:
The auto switch is responsible for the largest number of choco tei. In particular, as shown in the figure on the right, the shock generating at the end of stroke of an air cylinder causes the auto switch brackets to gradually shift and eventually change the switch positions. When the auto switches shift and the operating timing of the system change, the equipment may stop.



Cause Analysis of Choco Tei Due to An Air Cylinder



<IAI's internal investigation results>