ROSIER Mécatronique

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GB

RoboCylinder with Built-in Controller

ERC3 Series

green automation

ROBO CYLINDER

For further Improvement of
Production Efficiency

New model series added!

Cleanroom Type Simple Dustproof Type

Controller-integrated Actuator

Features of ERC3

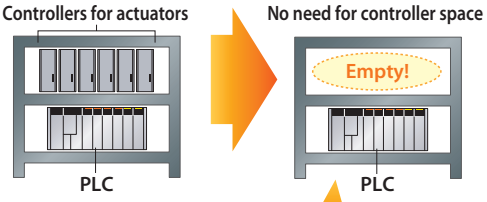
1. Space-saving and wire-saving, because no space is needed to install a controller

Conventional system

ERC3 series

All you need is the actuator, because a controller is built in.

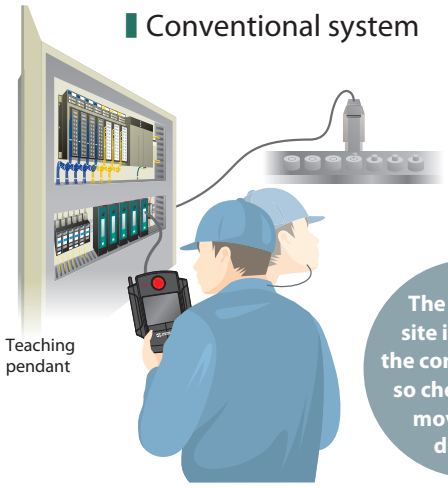
The space-saving design lets you effectively utilize your facility.



No space is needed to install controllers, so the control panel can be made smaller.

2. Since a controller is built into the actuator, teaching can be performed near the actuator

Conventional system

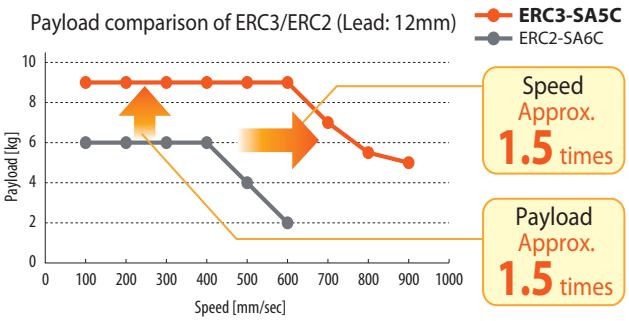


The teaching site is far from the control panel, so checking the movement is difficult.

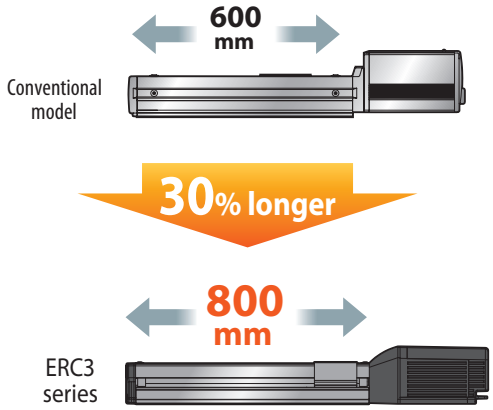
ERC3 series

Detailed adjustment can be made while checking the movement close by.

3. The high-output driver boosts the payload to approx. 1.5 times and maximum speed also to 1.5 times compared to a conventional model



4. The maximum standard stroke has been extended



Finding the Right Model from the Purpose of Use

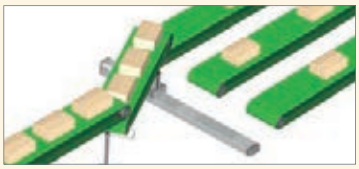
Model Selection Guide

Select the right model in the ERC3 series by referring to the diagram of use conditions provided below.

What is the required operation?

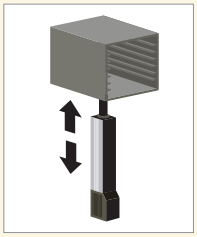
Transporting (without guide)

- Move work parts in horizontal or vertical direction without using a guide mechanism



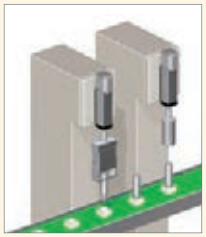
Transporting (with guide)

- Move up and down a system having a guide mechanism



Pushing/ press-fitting

- Push and hold work parts
- Press-fit work parts



Slider type / Rod type

What is the required force?

Slider type		Rod type			
Work part weighing 20kg or less (horizontal) or 12kg or less (vertical) (*)	Work part weighing 45kg or less (horizontal) or 22kg or less (vertical) (*)	Work part weighing 18kg or less (vertical) (*)	Work part weighing 25kg or less (vertical) (*)	Push force of 370 N or less	Push force of 1094 N or less

This is the optimal RoboCylinder!

SA5C	SA7C	RA4C	RA6C

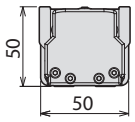
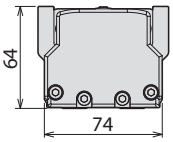
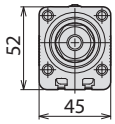
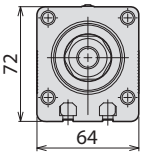
(*) When the high-output setting is enabled.

Meeting Wide-ranging Applications

Actuator Product Lineup

The product lineup of the controller-integrated actuator series ERC3 is shown below.

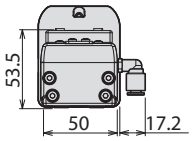
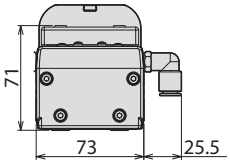
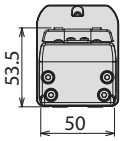
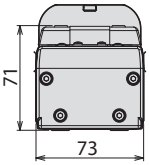
Standard type [ERC3]

Type	Slider type		Rod type	
	SA5C	SA7C	RA4C	RA6C
External view				
Section view (mm)				
Stroke (mm)	50~800		50~300	
Ball screw lead (mm)	3 / 6 / 12 / 20	4 / 8 / 16 / 24	3 / 6 / 12 / 20	4 / 8 / 16 / 24
Maximum speed*1 (mm/s)	225 / 450 / 900 / 1120	210 / 490 / 980 / 1200	225 / 450 / 700 / 800	210 / 420 / 700 / 800
Maximum payload*2 (kg) Horizontal	20 / 18 / 9 / 6.5	45 / 40 / 35 / 17	40 / 40 / 25 / 6	70 / 55 / 40 / 13
Maximum payload*2 (kg) Vertical	12 / 6 / 2.5 / 1	22 / 14 / 6 / 3	18 / 12 / 4.5 / 1.5	25 / 17.5 / 8 / 3
Page	P.11	P.13	P.15	P.17

(Notes) The above values are all based on operating each unit at an acceleration/deceleration of 0.3 G with the high-output setting enabled.

*1 The maximum speed may not be reached when the stroke is shorter. Also note that the longer the stroke, the lower the maximum speed becomes in order to avoid reaching a dangerous speed. For details, refer to the specification page of each model.

*2 The maximum payload is based on operation at the rated acceleration. The higher the acceleration, the lower the maximum payload becomes. For details, refer to the table of payloads by acceleration on P.28.

	Cleanroom type [ERC3CR]				Simple dustproof type (stainless sheet spec.) [ERC3D]			
Type	Slider type							
	SA5C		SA7C		SA5C		SA7C	
External view								
Section view (mm)								
Stroke (mm)	50~800				50~800			
Ball screw lead (mm)	3	6	12	20	4	8	16	24	3	6	12	20	4	8	16	24
Maximum speed*1 (mm/s)	225	450	900	1120	210	490	980	1200	225	450	900	1120	210	490	980	1200
Maximum payload*2 (kg) Horizontal	20	18	9	6.5	45	40	35	17	20	18	9	6.5	45	40	35	17
Maximum payload*2 (kg) Vertical	12	6	2.5	1	22	14	6	3	12	6	2.5	1	22	14	6	3
Page	P.19		P.21		P.23		P.25	

(Notes) The above values are all based on operating each unit at an acceleration/deceleration of 0.3 G with the high-output setting enabled.

*1 The maximum speed may not be reached when the stroke is shorter. Also note that the longer the stroke, the lower the maximum speed becomes in order to avoid reaching a dangerous speed. For details, refer to the specification page of each model.

*2 The maximum payload is based on operation at the rated acceleration. The higher the acceleration, the lower the maximum payload becomes. For details, refer to the table of payloads by acceleration on P.28.

Supporting PIO & Puls-train Method

Built-in Controller

Controller Type

CON type	• Up to 16 positioning points

Operation Modes

Positioner mode	Normal operation (Move the actuator by specifying position numbers through a PLC, etc.)
Pulse-train control mode	Move the actuator using pulse signals from a host controller.

I/O Type

PIO type	NPN	NPN specification
	PNP	PNP specification

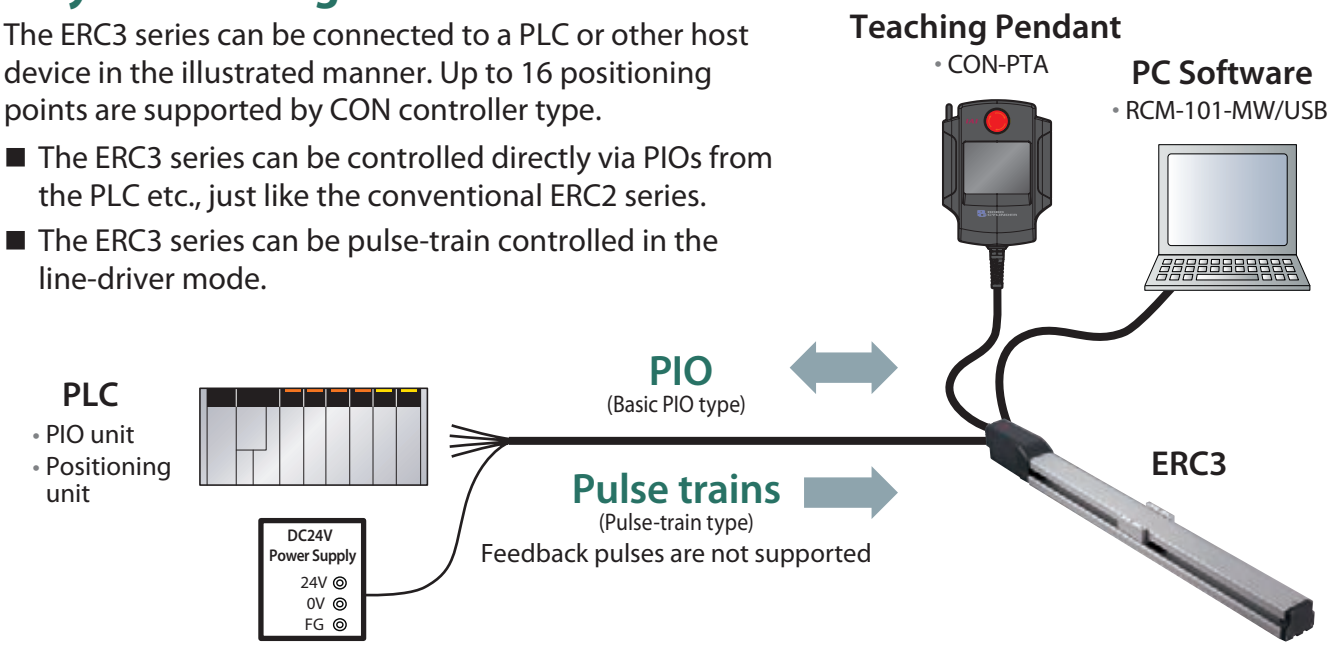
ERC3 Controller Type and Supported Tools

Controller type	Operation mode	I/O type		Model number (I/O type)	Teaching pendant	PC software		Remarks
					CON-PTA	RCM-101-MW	RCM-101-USB	
CON type	Positioner mode	PIO	NPN	NP	○	○	○	Basic type
			PNP	PN	○	○	○	
	Pulse-train control mode	NPN		PLN	○	○	○	When pulse-train control is used
		PNP		PLP	○	○	○	

System Configuration

The ERC3 series can be connected to a PLC or other host device in the illustrated manner. Up to 16 positioning points are supported by CON controller type.

- The ERC3 series can be controlled directly via PIOs from the PLC etc., just like the conventional ERC2 series.
- The ERC3 series can be pulse-train controlled in the line-driver mode.

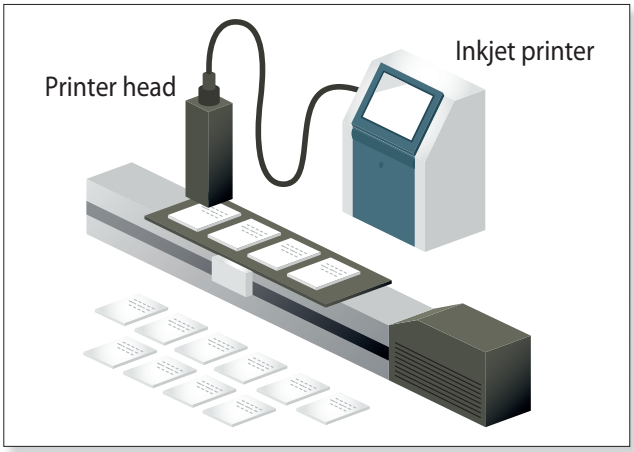


Useful in Various Situations

Application Examples

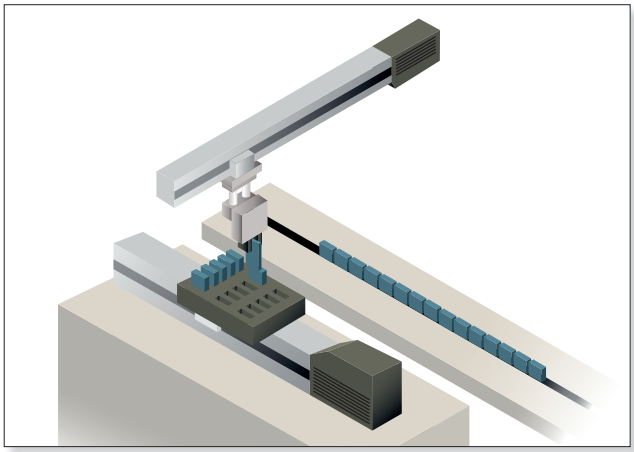
Slider type

Inkjet printer system



This system prints on components using an inkjet printer. The ERC3 is used to move components. Since the ERC3 can operate at a constant speed, stable printing quality can be achieved.

Component palletizing system



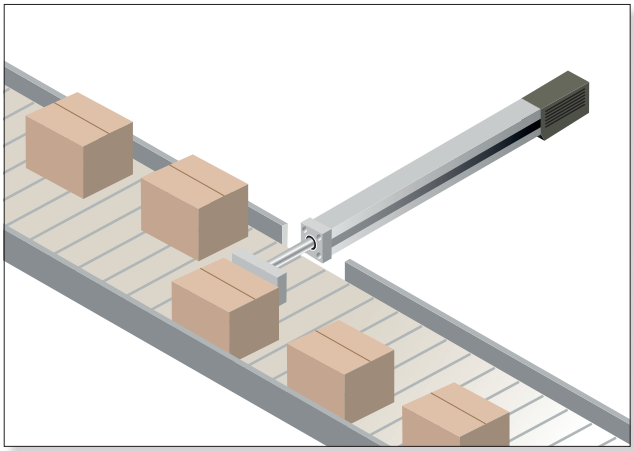
This ERC3-based system palletizes automobile components. Two axes are arranged separately to pick components and place them onto the pallet. The takt time can be reduced by performing approach and return at high speed and placement at low speed.

Rod type

Product life testing system

This ERC3-based system conducts life testing on electronic equipment. The push speed and force can be changed according to the product.

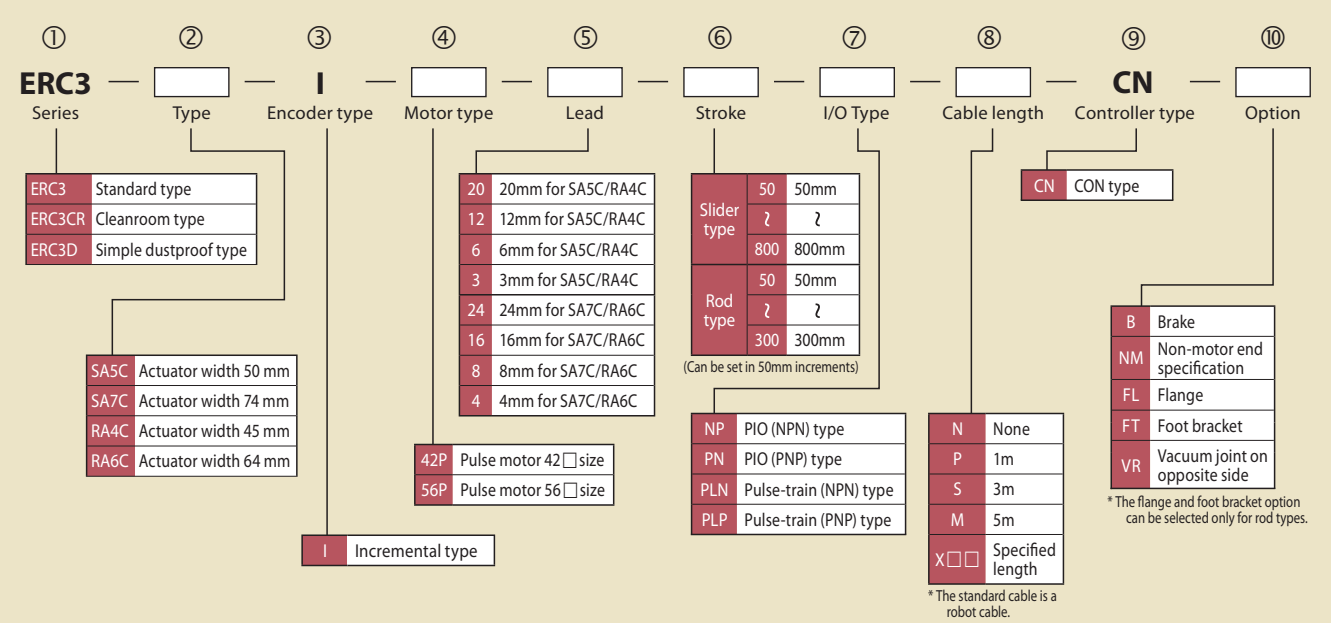
Work part alignment system



Cardboard boxes transported on the conveyor are pushed to one side and aligned.

Explanation of the Model Specification Items

The model number consists of the items specified below.
For the description of each item, refer to the applicable explanation provided below. Since the available selections (for lead, stroke, etc.) vary depending on the type, check the details on the page where each type is explained.



Explanation of items

① Series

Name of each series.

② Type

The ERC3 series consists of the following four types of actuators.

Type	Actuator width
SA5C	50mm
SA7C	74mm
RA4C	45mm
RA6C	64mm

③ Encoder type

Encoder equipped in the actuator.

I: Incremental type	Since the slider's position data is lost once the power is turned off, home return must be performed every time the power is turned on.

④ Motor type

Wattage of the motor installed in the actuator.
Since the ERC3 series is driven by a pulse motor, the motor size (42P = 42 frame size motor) is indicated instead of the wattage.

⑤ Lead

Lead of the ball screw (distance travelled by the slider as the ball screw makes one rotation).

⑥ Stroke

Stroke (range of operation) of the actuator (unit: mm).

⑦ I/OType

Type of connectable controllers. With the ERC3 series having a built-in controller, the I/O (input/output signal) type is indicated.

⑧ Cable length

Length of the cable that connects the ERC3 series with the host system or peripheral devices.

⑨ Controller type

One controller type is available.

CN: CON type	Maximum 16 positioning points are supported.

⑩ Option

Options installed on the actuator.
Refer to P. 8 for details.
*If multiple options are selected, enter them in an alphabetic order. (Example: B-FL-NM)

Actuator Options

Brake
Model number: **B**

Applicable models All models

Description A mechanism to hold the slider in place when the actuator is used vertically, so that it will not drop and damage the work part, etc., when the power or servo is turned off.

Non-motor end specification
Model number: **NM**

Applicable models All models

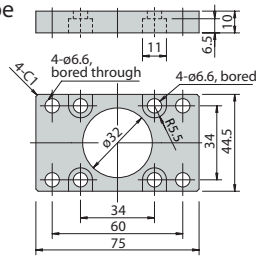
Description Select this option if you want to change the home position of the actuator slider or rod from the normal position (motor side) to the front side.

Flange
Model number: **FL**

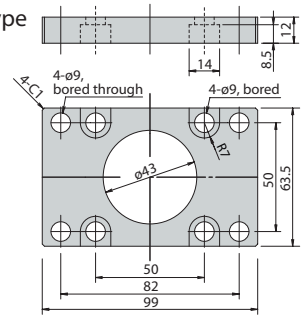
Applicable models ERC3-RA4C/RA6C

Description A bracket used to secure a rod actuator from the actuator side. The flange can be purchased separately later on.

ERC3-RA4C type



ERC3-RA6C type

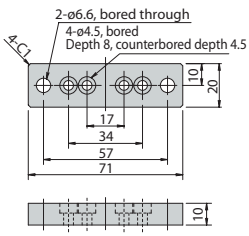


Foot bracket
Model number: **FT**

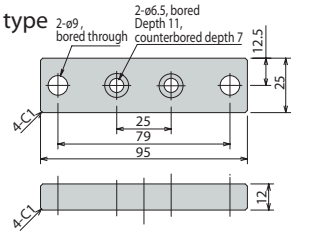
Applicable models ERC3-RA4C/RA6C

Description This bracket is used to affix the rod type with bolts from above the actuator. The bracket can be purchased separately later on.

ERC3-RA4C type



ERC3-RA6C type



Vacuum joint on opposite side
Model number: **VR**

Applicable models ERC3CR-SA5C/SA7C

Description Under the standard specification, the vacuum joint is installed on the left side of the actuator as viewed from the motor. When this option is selected, the position of this joint is moved to the right side (opposite side).

Explanations of/Cautionary Notes on Items Specified in Catalog

1. Speed

"Speed" refers to the set speed at which to move the actuator slider (or rod).
After accelerating from the stationary state and reaching the set speed, the slider continues to move at that speed until immediately before the target position (specified position) and then decelerates to a stop.

<Caution>

❶ The pulse motors used in the ERC3 series change their maximum speed depending on the transported mass. When selecting your model, refer to "Correlation diagrams of speed vs. payload" (on the page featuring each model).

❷ Regardless of whether the stroke is short or long, the set speed may not be reached if the travel distance is short.

❸ The longer the stroke, the lower the maximum speed becomes in order to avoid reaching a dangerous speed.
For details, refer to the "Stroke vs. Maximum Speed" table on the page featuring each model.

❹ When calculating the travel time, consider not only the travel time at the set speed, but also the acceleration, deceleration and settling times.

2. Acceleration/Deceleration

"Acceleration" refers to the rate of change in speed until the stationary actuator reaches the set speed.
"Deceleration" refers to the rate of change in speed until the actuator traveling at the set speed comes to a stop.
Both are specified in "G" in programs (0.3 G = 2940 mm/sec^2).

<Caution>

❶ The greater the value of acceleration (deceleration), the faster the actuator accelerates (decelerates) and consequently the travel time becomes shorter.
Note, however, that an excessively higher acceleration (deceleration) is a cause of error and malfunction.

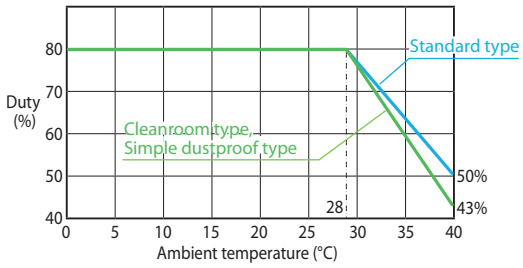
❷ The rated acceleration (deceleration) is 0.3 G.
Although the upper limit of acceleration (deceleration) is 1 G (or 0.5 G in a vertical application), increasing the value of acceleration/deceleration reduces the payload.

3. Duty

With the ERC3 series, the duty is limited according to the ambient temperature to prevent the motor unit from generating heat. Operate the actuator at a duty ratio not exceeding the allowable value shown in the graph below.

<Caution>

The duty limits shown below assume that the high-output setting of the controller is enabled. If the high-output setting is disabled, the payload and maximum speed become lower, but the actuator can be used at a duty of 100%. Refer to the operation manual for information on how to change the high-output setting.



The duration of one cycle shall be assumed as follows:

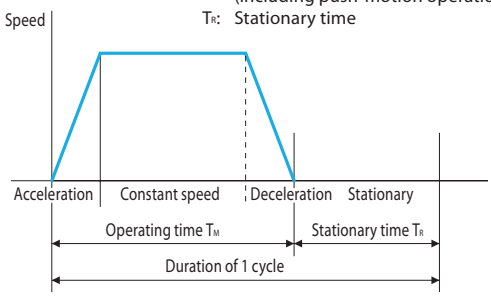
Model	Duration of 1 cycle (T_M + T_R)
SA5C/RA4C	15 minutes or less
SA7C/RA6C	10 minutes or less

Notes:
Do not operate the actuator at a duty ratio exceeding the allowable value.
If the actuator is operated at a duty ratio exceeding the allowable value, the life of the capacitor used in the controller will become shorter.

[Duty ratio]
"Duty ratio" refers to the utilization ratio indicated by a percentage of the time during which the actuator operates in one cycle.

$$D=\frac{T_M}{T_M+T_R}\times 100(\%)$$

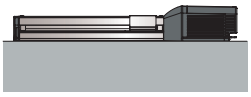
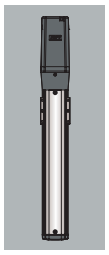
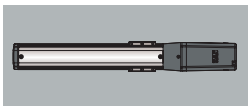
D: Duty
T_M: Operating time (including push-motion operation)
T_R: Stationary time



4. Installation

Refer to the table below for the installation orientation of each model.

○: Can be installed △: Only with daily inspection

Installation orientation / Type	Horizontal, flat	Vertical (Note 1)	Laid on side	Ceiling mount
				
Standard slider type (Screw cover specification) (SA5C, SA7C)	○	○	○ (Note 2)	○
Simple dustproof slider type (Stainless sheet specification) (SA5C, SA7C)	○	○	△ (Note 3)	△ (Note 3)
Cleanroom slider type (SA5C, SA7C)	○	○	△ (Note 3)	△ (Note 3)
Standard rod type (RA4C, RA6C)	○	○	○	○

(Note 1) When installing the actuator vertically, bring the motor to the top whenever possible. If the actuator is mounted with the motor at the bottom, problems won't occur during normal operation, but if the actuator is stopped for a prolonged period of time, grease may separate depending on the ambient environment (especially when the ambient temperature is high), in which case base oil may flow into the motor unit and could cause problems on rare occasions.

(Note 2) If the actuator is installed on its side, it becomes more vulnerable to entry of foreign matters into the actuator or scattering of grease on the guide and ball screw from openings on the exposed side.

(Note 3) The simple dustproof slider type (stainless sheet specification) or cleanroom slider type SA5C/SA7C can be installed sideways or hung from the ceiling, but the actuator must be inspected daily. This is because when the actuator is laid on its side or mounted from the ceiling, the stainless sheet may become loose or shift.
If the actuator is used continuously in this condition, the stainless sheet may fracture or develop other problems.
Inspect your actuator daily and if the stainless sheet is found loose or shifted, adjust the installation of the stainless sheet.

ERC3-SA5C

● Standard Slider Type
● Actuator Width 50mm

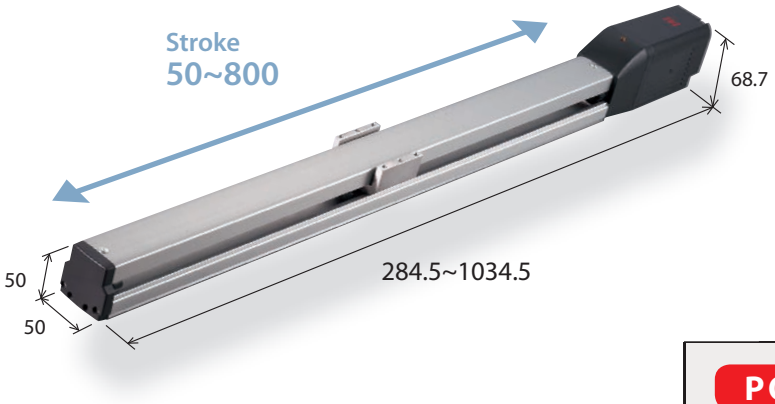
■ Model Specification Items

ERC3 — SA5C — I — 42P — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder type	Motor type	Lead	Stroke	I/O type	Cable length	Controller type	Option
ERC3	SA5C	I: Incremental specification	42□: Pulse motor	20: 20mm 12: 12mm 6: 6mm 3: 3mm	50:50mm ~ 800:800mm (Can be set in 50mm increments)	NP: PIO (NPN) type PN: PIO (PNP) type PLN: Pulse-train (NPN) type PLP: Pulse-train (PNP) type	N: None P: 1m S: 3 m M: 5m X□□: Specified length	CN: CON type	B: Brake NM: Non-motor end specification

*Refer to P.7 for the description of items constituting the model number.

CE RoHS



Unit: mm

POINT Notes on selection

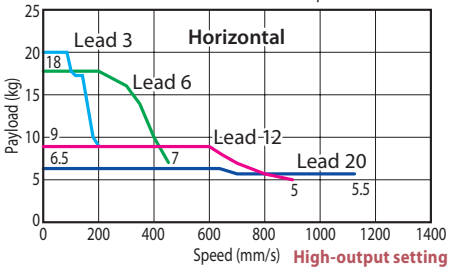
If the high-output setting is enabled (factory default), the duty must be limited. (Refer to P.9.) If the high-output setting is disabled, the payload and maximum speed become lower, but the actuator can be used at a duty of 100%. Refer to the operation manual for information on how to change the high-output setting. Refer to P.28 for the payload at each speed/acceleration when the high-output setting is enabled.
Refer to P.29 for the specifications that apply when the high-output setting is disabled.

For other cautionary items, refer to "Explanations of/Cautionary Notes on Items Specified in Catalog (P.9)."

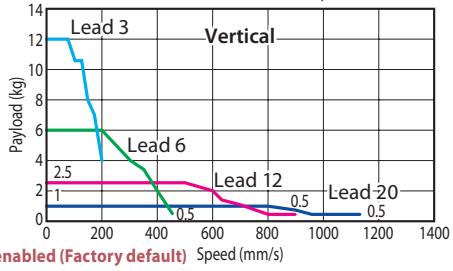
■ Correlation diagrams of Speed and Payload

With the ERC3 series, due to the characteristics of the pulse motor, payload decreases as the speed increases. Use the chart below to confirm that the desired speed and payload requirements are met.

The values below are based on operation at 0.3 G.



The values below are based on operation at 0.3 G.



High-output setting enabled (Factory default)

Actuator Specifications (High-output Setting Enabled)

■ Leads and Payloads

(Note 1) Take caution that the maximum payload decreases as the speed increases.

Model number	Lead (mm)	Maximum payload (Note 1) Horizontal (kg)	Maximum payload (Note 1) Vertical (kg)	Stroke (mm)
ERC3-SA5C-I-42P-20-①-②-③-④	20	6.5	1	50~800 (every 50mm)
ERC3-SA5C-I-42P-12-①-②-③-④	12	9	2.5	
ERC3-SA5C-I-42P-6-①-②-③-④	6	18	6	
ERC3-SA5C-I-42P-3-①-②-③-④	3	20	12	

Legend ① Stroke ② I/O type ③ Cable length ④ Option

■ Stroke and Maximum Speed by Lead

Lead \ Stroke	50~450 (every 50mm)	500 (mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
20	1120		1115	935	795	680	585	510
12	900	805	665	560	475	405	350	300
6	450	400	330	280	235	200	175	150
3	225	200	165	140	115	100	85	75

(Unit: mm/s)

Cable length

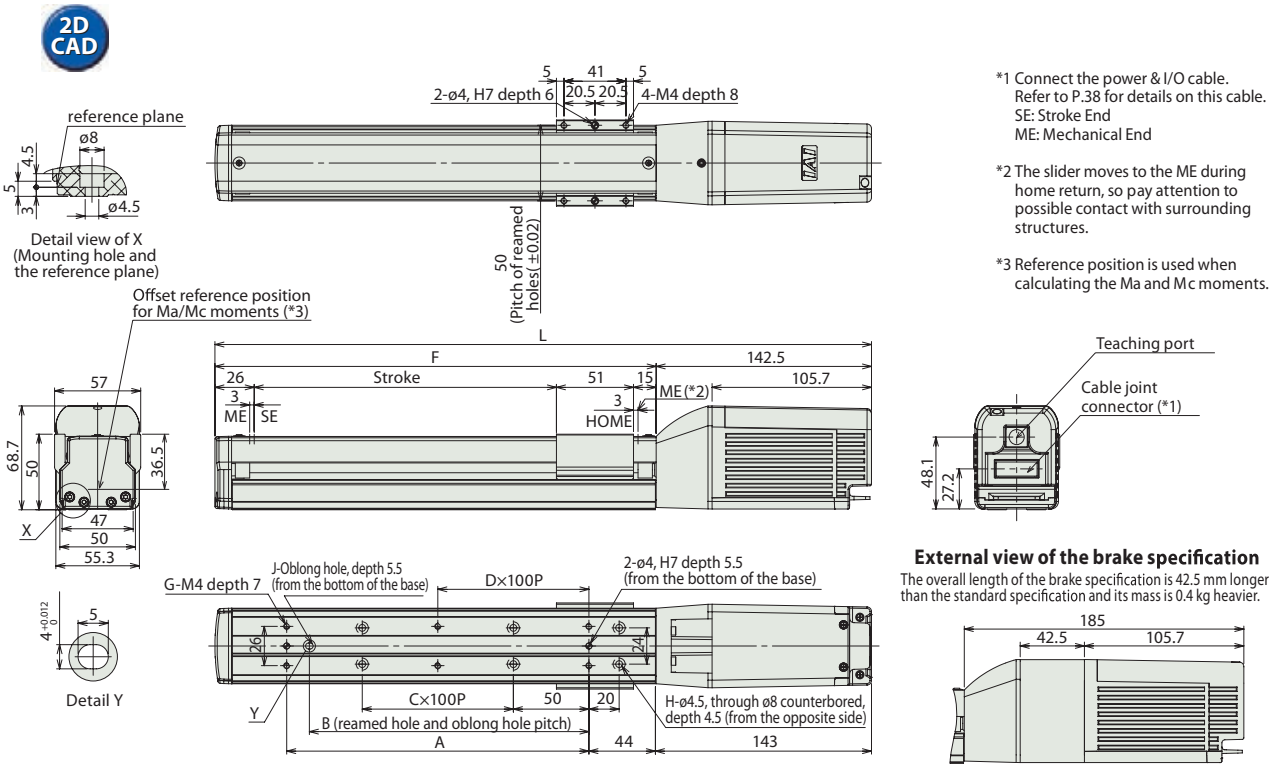
Type	Cable symbol
Standard type (Robot cable)	P (1m)
	S (3m)
	M (5m)
Special length	X06 (6m) ~ X10 (10m)

*Refer to P. 38 for maintenance cable.

Options

Name	Option code	See page
Brake	B	→P8
Non-motor end specification	NM	→P8

Dimensional Drawings



*1 Connect the power & I/O cable. Refer to P.38 for details on this cable.
SE: Stroke End
ME: Mechanical End

*2 The slider moves to the ME during home return, so pay attention to possible contact with surrounding structures.

*3 Reference position is used when calculating the Ma and Mc moments.

External view of the brake specification

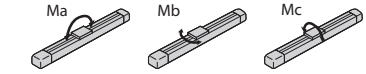
The overall length of the brake specification is 42.5 mm longer than the standard specification and its mass is 0.4 kg heavier.

Actuator specificaton

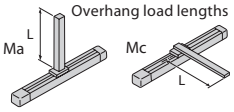
Item	Description
Drive system	Ball screw ø10 mm, rolled C10
Positioning repeatability (*1)	± 0.02 mm [± 0.03 mm]
Lost motion	0.1 mm or less
Static allowable load moment	Ma: 29.4 N•m, Mb: 42.0 N•m, Mc: 60.5 N•m
Dynamic allowable load moment (*2)	Ma: 8.5 N•m, Mb: 12.2 N•m, Mc: 17.5 N•m
Overhang load lengths	150 mm or less in Ma direction, 150 mm or less in Mb and Mc directions
Ambient operation temperature, humidity	0 to 40°C, 85% RH or less (Non-condensing)

(*1) The specification in [ ] applies when the lead is 20 mm.
(*2) Based on 5000 km of traveling life.

Allowable load moment directions



Overhang load lengths



■Dimensions and Mass by Stroke

Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	284.5	334.5	384.5	434.5	484.5	534.5	584.5	634.5	684.5	734.5	784.5	834.5	884.5	934.5	984.5	1034.5
A	73	100	100	200	200	300	300	400	400	500	500	600	600	700	700	800
B	0	85	85	185	185	285	285	385	385	485	485	585	585	685	685	785
C	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7
D	0	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7
F	142	192	242	292	342	392	442	492	542	592	642	692	742	792	842	892
G	4	4	4	6	6	8	8	10	10	12	12	14	14	16	16	18
H	4	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18
J	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mass (kg)	1.4	1.5	1.6	1.7	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.7	2.8	2.9	3.0	3.1

Controllers (Built into the Actuator)

I/O type

With the ERC3 series, one of the following types of built-in controllers can be selected depending on the external input/output (I/O) type. Select the type that meets your purpose.

Name	External view	Model number	Features	Maximum number of positioning points	Input power	Power supply capacity	Reference page
PIO type (NPN specification)		ERC3-SA5C-I-42P-□-□-NP-□-□	Simple I/O control type with NPN inputs/outputs (often used overseas) accommodating up to 16 positioning points	16	DC24V	High-output setting enabled: 3.5A rated 4.2A max. High-output setting disabled: 2.2A	→P30
PIO type (PNP specification)		ERC3-SA5C-I-42P-□-□-PN-□-□	Simple I/O control type with PNP inputs/outputs accommodating up to 16 positioning points	16			
Pulse-train type (NPN specification)		ERC3-SA5C-I-42P-□-□-PLN-□-□	Pulse-train input type supporting the NPN specification	–			
Pulse-train type (PNP specification)		ERC3-SA5C-I-42P-□-□-PLP-□-□	Pulse-train input type supporting the PNP specification	–			

ERC3-SA7C

● Standard Slider Type
● Actuator Width 74mm

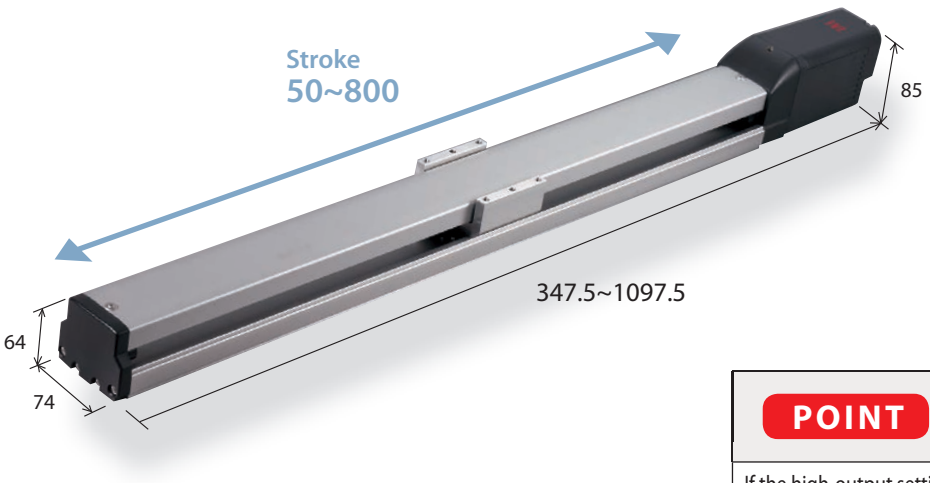
■ Model Specification Items

ERC3 – SA7C – I – 56P – □ – □ – □ – □ – □ – □ – □

Series	Type	Encoder type	Motor type	Lead	Stroke	I/O type	Cable length	Controller type	Option
		I: Incremental specification	56□Pulse motor	24 : 24mm 16 : 12mm 8 : 8mm 4 : 4mm	50:50mm ~ 800:800mm (Can be set in 50mm increments)	NP: PIO (NPN) type PN: PIO (PNP) type PLN: Pulse-train (NPN) type PLP: Pulse-train (PNP) type	N: None P: 1m S: 3 m M: 5m X□□: Specified length	CN: CON type	B : Brake NM : Non-motor end specification

*Refer to P.7 for the description of items constituting the model number.

CE RoHS

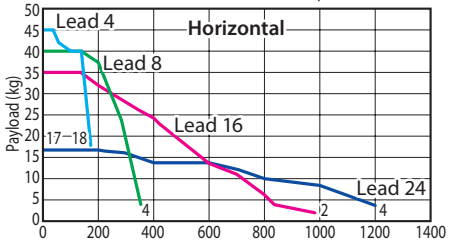


Unit: mm

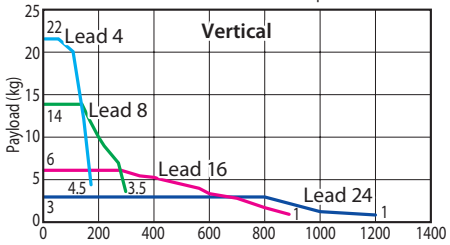
■ Correlation diagrams of Speed and Payload

With the ERC3 series, due to the characteristics of the pulse motor, payload decreases as the speed increases. Use the chart below to confirm that the desired speed and payload requirements are met.

The values below are based on operation at 0.3 G.



The values below are based on operation at 0.3 G.



High-output setting enabled (Factory default)

POINT **Notes on selection**

If the high-output setting is enabled (factory default), the duty must be limited. (Refer to P.9.) If the high-output setting is disabled, the payload and maximum speed become lower, but the actuator can be used at a duty of 100%. Refer to the operation manual for information on how to change the high-output setting. Refer to P.28 for the payload at each speed/acceleration when the high-output setting is enabled.
Refer to P.29 for the specifications that apply when the high-output setting is disabled.

For other cautionary items, refer to "Explanations of/Cautionary Notes on Items Specified in Catalog (P.9)."

Actuator Specifications (High-output Setting Enabled)

■ Leads and Payloads

(Note 1) Take caution that the maximum payload decreases as the speed increases.

Model number	Lead (mm)	Maximum payload (Note 1) Horizontal (kg)	Maximum payload (Note 1) Vertical (kg)	Stroke (mm)
ERC3-SA7C-I-56P-24-①-②-③-④	24	17	3	50~800 (every 50mm)
ERC3-SA7C-I-56P-16-①-②-③-④	16	35	6	
ERC3-SA7C-I-56P-8-①-②-③-④	8	40	14	
ERC3 -SA7C-I-56P-4-①-②-③-④	4	45	22	

Legend ① Stroke ② I/O type ③ Cable length ④ Option

■ Stroke and Maximum Speed by Lead

Lead \ Stroke	50~550 (every 50mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
24	1200		1130	975	850	745
16	980 <840>	880 <840>	750	645	565	495
8	490	440	375	320	280	245
4	210		185	160	140	120

The value inside < > indicates vertical usage. (Unit: mm/s)

Cable length

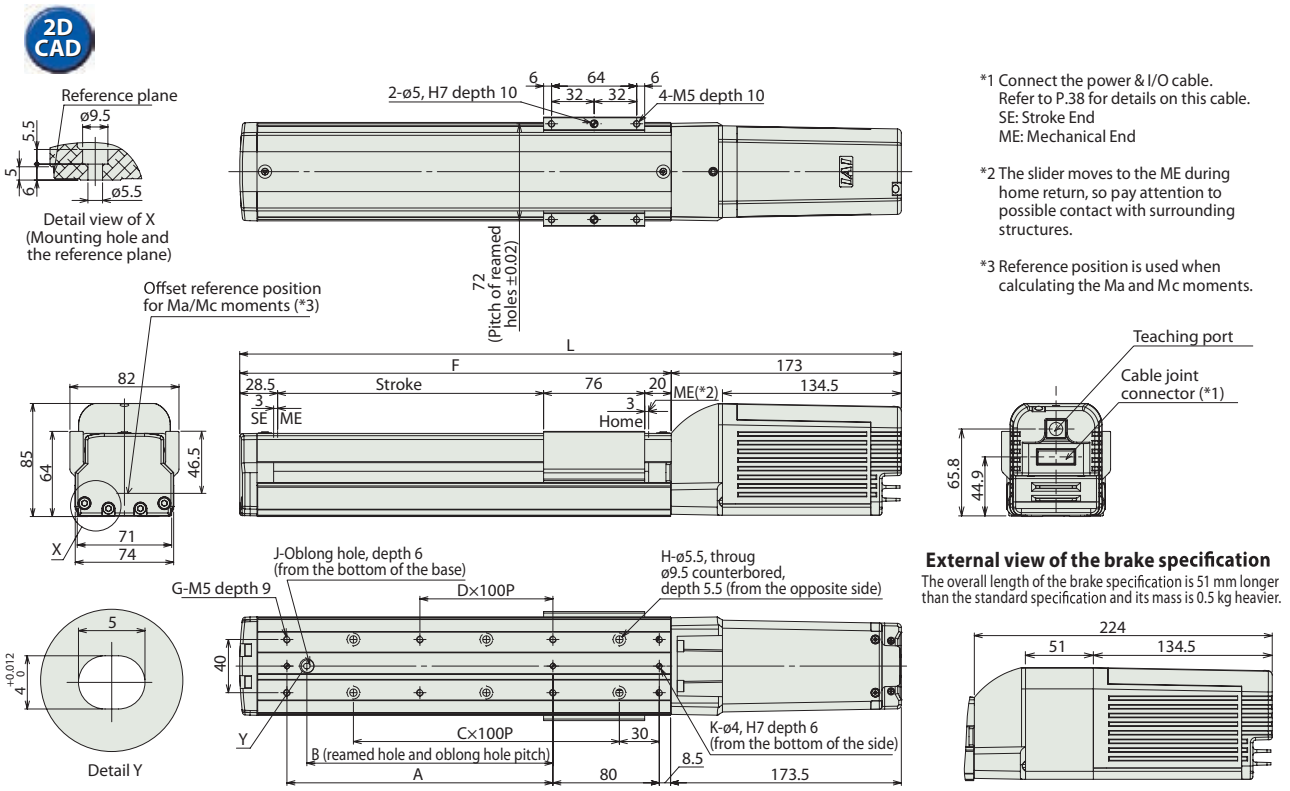
Type	Cable symbol
Standard type (Robot cable)	P (1m)
	S (3m)
	M (5m)
Special length	X06 (6m) ~ X10 (10m)

*Refer to P. 38 for maintenance cable.

Options

Name	Option code	See page
Brake	B	→P8
Non-motor end specification	NM	→P8

Dimensional Drawings



External view of the brake specification

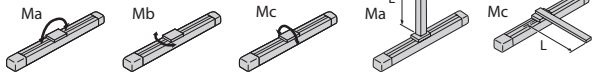
The overall length of the brake specification is 51 mm longer than the standard specification and its mass is 0.5 kg heavier.

Actuator specificaton

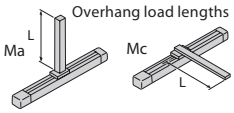
Item	Description
Drive system	Ball screw ø12 mm, rolled C10
Positioning repeatability (*1)	± 0.02 mm [± 0.03 mm]
Lost motion	0.1 mm or less
Static allowable load moment	Ma: 70.0 N•m, Mb: 100.0 N•m, Mc: 159.5 N•m
Dynamic allowable load moment (*2)	Ma: 17.7 N•m, Mb: 25.2 N•m, Mc: 40.3 N•m
Overhang load lengths	150 mm or less in Ma direction, 150 mm or less in Mb and Mc directions
Ambient operation temperature, humidity	0 to 40˚C, 85% RH or less (Non-condensing)

(*1) The specification in [ ] applies when the lead is 24 mm.
(*2) Based on 5000 km of traveling life.

Allowable load moment directions



Overhang load lengths



■Dimensions and Mass by Stroke

Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	347.5	397.5	447.5	497.5	547.5	597.5	647.5	697.5	747.5	797.5	847.5	897.5	947.5	997.5	1047.5	1097.5
A	0	100	100	200	200	300	300	400	400	500	500	600	600	700	700	800
B	0	85	85	185	185	285	285	385	385	485	485	585	585	685	685	785
C	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
D	0	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7
F	174.5	224.5	274.5	324.5	374.5	424.5	474.5	524.5	574.5	624.5	674.5	724.5	774.5	824.5	874.5	924.5
G	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18	20
H	4	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18
J	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
K	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mass (kg)	3.2	3.4	3.6	3.8	4.0	4.3	4.5	4.7	4.9	5.1	5.4	5.6	5.8	6.0	6.2	6.5

Controllers (Built into the Actuator)

I/O type

With the ERC3 series, one of the following types of built-in controllers can be selected depending on the external input/output (I/O) type. Select the type that meets your purpose.

Name	External view	Model number	Features	Maximum number of positioning points	Input power	Power supply capacity	Reference page
PIO type (NPN specification)		ERC3-SA7C-I-56P-□-□-NP-□-□	Simple I/O control type with NPN inputs/outputs (often used overseas) accommodating up to 16 positioning points	16	DC24V	High-output setting enabled: 3.5A rated 4.2A max. High-output setting disabled: 2.2A	→P30
PIO type (PNP specification)		ERC3-SA7C-I-56P-□-□-PN-□-□	Simple I/O control type with PNP inputs/outputs accommodating up to 16 positioning points	16			
Pulse-train type (NPN specification)		ERC3-SA7C-I-56P-□-□-PLN-□-□	Pulse-train input type supporting the NPN specification	–			
Pulse-train type (PNP specification)		ERC3-SA7C-I-56P-□-□-PLP-□-□	Pulse-train input type supporting the PNP specification	–			

ERC3-RA4C

● Standard Rod Type
● Actuator Width 45mm

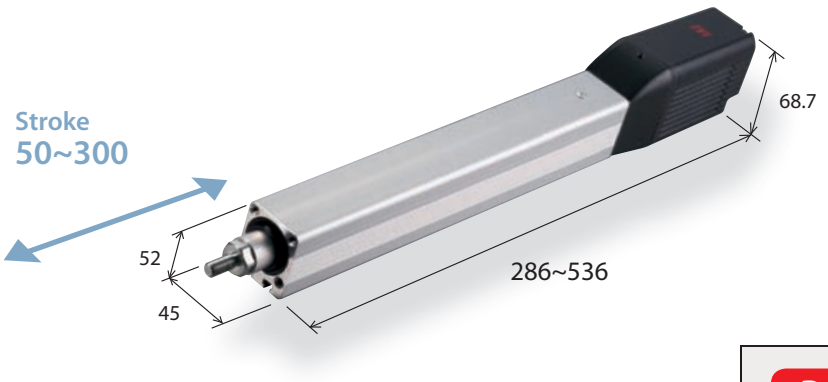
■ Model Specification Items

ERC3 — RA4C — I — 42P — ☐ — ☐ — ☐ — ☐ — ☐ — ☐ — ☐

Series	Type	Encoder type	Motor type	Lead	Stroke	I/O type	Cable length	Controller type	Option
		I: Incremental specification	42☐Pulse motor	20: 20mm 12: 12mm 6: 6mm 3: 3mm	50:50mm ~ 300:300mm (Can be set in 50mm increments)	NP: PIO (NPN) type PN: PIO (PNP) type PLN: Pulse-train (NPN) type PLP: Pulse-train (PNP) type	N: None P: 1m S: 3 m M: 5m X☐☐: Specified length	CN: CON type	B : Brake NM : Non-motor end specification FL : Flange FT : Foot bracket

*Refer to P.7 for the description of items constituting the model number.

CE RoHS

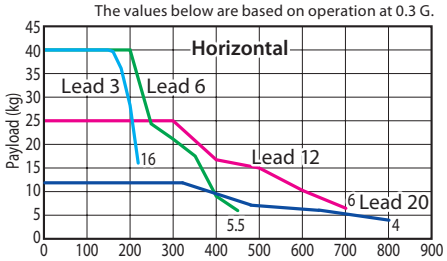


Unit: mm

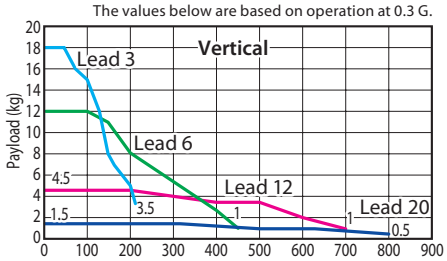
■ Correlation diagrams of Speed and Payload

With the ERC3 series, due to the characteristics of the pulse motor, payload decreases as the speed increases. Use the chart below to confirm that the desired speed and payload requirements are met.

The values below are based on operation at 0.3 G.



The values below are based on operation at 0.3 G.



High-output setting enabled (Factory default)

POINT **Notes on selection**

If the high-output setting is enabled (factory default), the duty must be limited. (Refer to P.9.) If the high-output setting is disabled, the payload and maximum speed become lower, but the actuator can be used at a duty of 100%. Refer to the operation manual for information on how to change the high-output setting. Refer to P.28 for the payload at each speed/acceleration when the high-output setting is enabled.
Refer to P.29 for the specifications that apply when the high-output setting is disabled.

For other cautionary items, refer to "Explanations of/Cautionary Notes on Items Specified in Catalog (P.9)."

Actuator Specifications (High-output Setting Enabled)

■ Leads and Payloads

(Note 1) Take caution that the maximum payload decreases as the speed increases.

Model number	Lead (mm)	Maximum payload (Note 1) Horizontal (kg)	Maximum payload (Note 1) Vertical (kg)	Maximum push force (N)	Stroke (mm)
ERC3-RA4C-I-42P-20-①-②-③-④	20	12	2	56	50~300 (every 50mm)
ERC3-RA4C-I-42P-12-①-②-③-④	12	25	4.5	93	
ERC3-RA4C-I-42P-6-①-②-③-④	6	40	12	185	
ERC3-RA4C-I-42P-3-①-②-③-④	3	40	18	370	

Legend ① Stroke ② I/O type ③ Cable length ④ Option

■ Stroke and Maximum Speed

Lead \ Stroke	50~200 (every 50mm)	250 (mm)	300 (mm)
20	800		
12	700	695	485
6	450	345	240
3	225	170	120

(Unit: mm/s)

Cable length

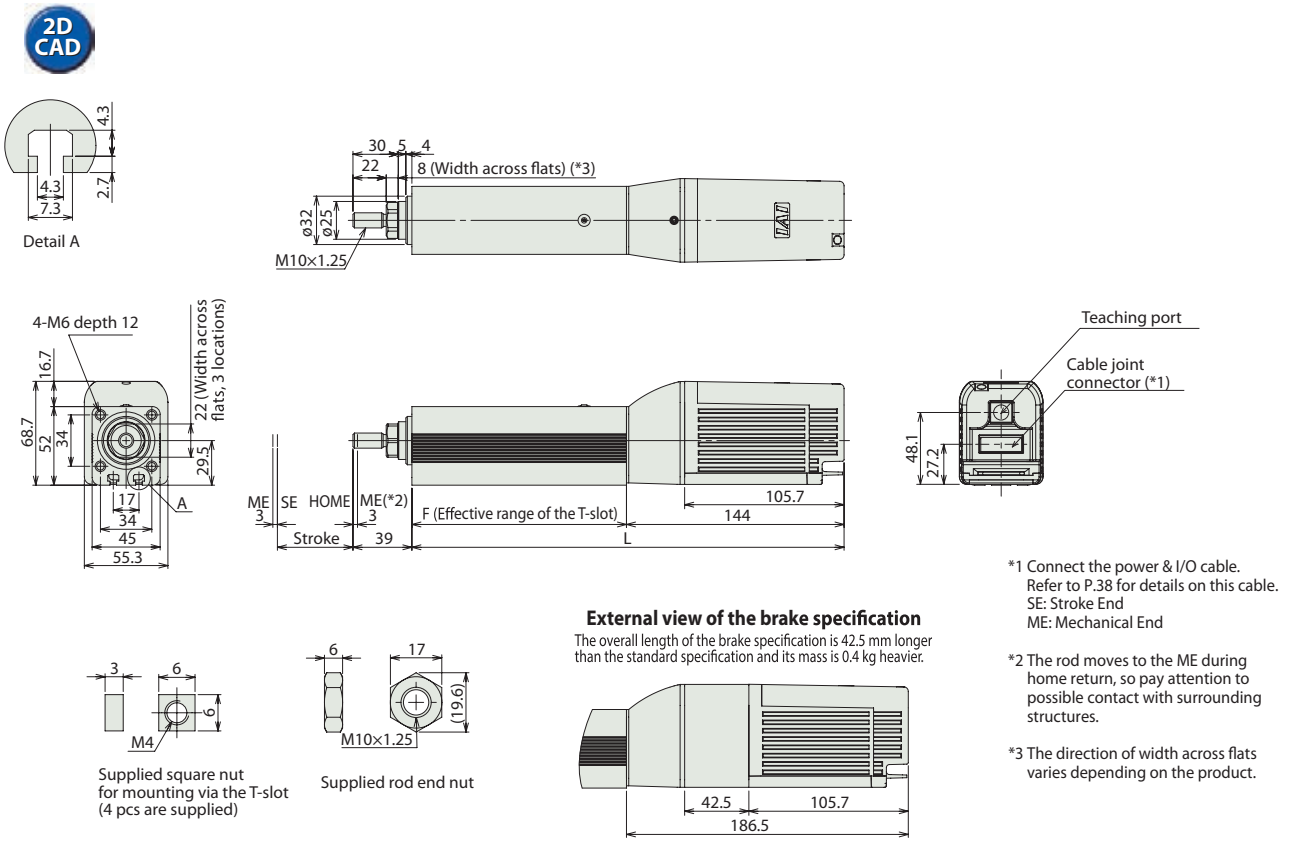
Type	Cable symbol
Standard type (Robot cable)	P (1m)
	S (3m)
	M (5m)
Special length	X06 (6m) ~ X10 (10m)

*Refer to P. 38 for maintenance cable.

Options

Name	Option code	See page
Brake	B	→P8
Non-motor end specification	NM	→P8
Flange	FL	→P8
Foot bracket	FT	→P8

Dimensional Drawings



*1 Connect the power & I/O cable. Refer to P.38 for details on this cable.
SE: Stroke End
ME: Mechanical End

*2 The rod moves to the ME during home return, so pay attention to possible contact with surrounding structures.

*3 The direction of width across flats varies depending on the product.

Actuator specificaton

Item	Description
Drive system	Ball screw ø10 mm, rolled C10
Positioning repeatability (*1)	± 0.02 mm [± 0.03 mm]
Lost motion (*1)	0.1 mm or less [0.2 mm or less]
Rod diameter	ø25 mm
Rod non-rotation precision	±1.5 degrees
Ambient operating temperature, humidity	0 to 40˚C, 85% RH or less (Non-condensing)

(*1) The specification in [ ] applies when the lead is 20 mm.

■Dimensions and Mass by Stroke

Stroke	50	100	150	200	250	300
L	286	336	386	436	486	536
F	142	192	242	292	342	392
Mass (kg)	1.4	1.7	2.0	2.3	2.6	2.9

Controllers (Built into the Actuator)

I/O type

With the ERC3 series, one of the following types of built-in controllers can be selected depending on the external input/output (I/O) type. Select the type that meets your purpose.

Name	External view	Model number	Features	Maximum number of positioning points	Input power	Power supply capacity	Reference page
PIO type (NPN specification)		ERC3-RA4C-I-42P-☐-☐-NP-☐-☐	Simple I/O control type with NPN inputs/outputs (often used overseas) accommodating up to 16 positioning points	16	DC24V	High-output setting enabled: 3.5A rated 4.2A max. High-output setting disabled: 2.2A	→P30
PIO type (PNP specification)		ERC3-RA4C-I-42P-☐-☐-PN-☐-☐	Simple I/O control type with PNP inputs/outputs accommodating up to 16 positioning points	16			
Pulse-train type (NPN specification)		ERC3-RA4C-I-42P-☐-☐-PLN-☐-☐	Pulse-train input type supporting the NPN specification	–			
Pulse-train type (PNP specification)		ERC3-RA4C-I-42P-☐-☐-PLP-☐-☐	Pulse-train input type supporting the PNP specification	–			

ERC3-RA6C

● Standard Rod Type
● Actuator Width 64mm

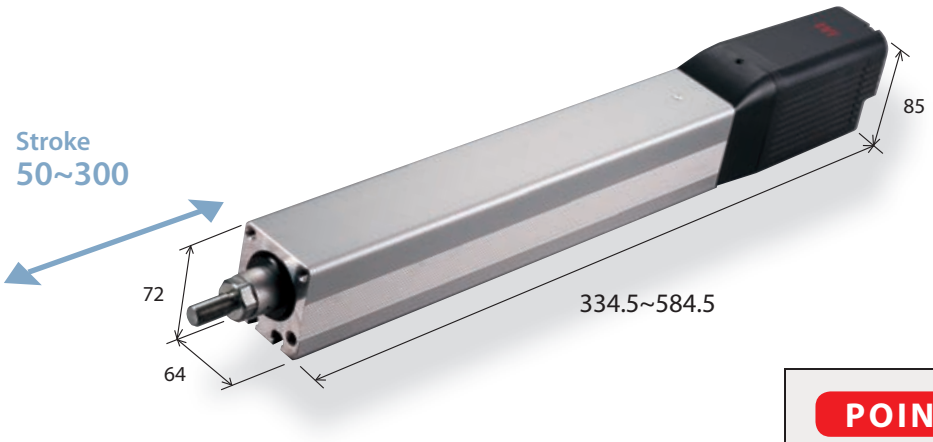
■ Model Specification Items

ERC3 – RA6C – I – 56P – □ – □ – □ – □ – □ – □ – □

ERC3	RA6C	I	56P	□	□	□	□	□	□	□
Series	Type	Encoder type	Motor type	Lead	Stroke	I/O type	Cable length	Controller type	Option	
		I: Incremental specification	56□Pulse motor	24: 24mm 16: 16mm 8: 8mm 4: 4mm	50:50mm ~ 300:300mm (Can be set in 50mm increments)	NP: PIO (NPN) type PN: PIO (PNP) type PLN: Pulse-train (NPN) type PLP: Pulse-train (PNP) type	N: None P: 1m S: 3 m M: 5m X□□: Specified length	CN: CON type	B : Brake NM : Non-motor end specification FL : Flange FT : Foot bracket	

*Refer to P.7 for the description of items constituting the model number.

CE RoHS

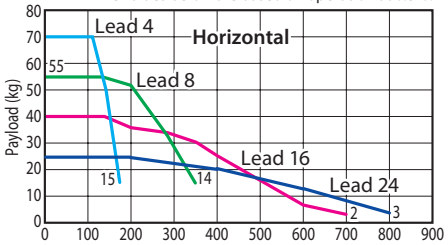


Unit: mm

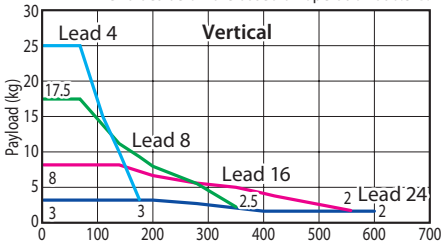
■ Correlation diagrams of Speed and Payload

With the ERC3 series, due to the characteristics of the pulse motor, payload decreases as the speed increases. Use the chart below to confirm that the desired speed and payload requirements are met.

The values below are based on operation at 0.3 G.



The values below are based on operation at 0.3 G.



High-output setting enabled (Factory default)

POINT **Notes on selection**

If the high-output setting is enabled (factory default), the duty must be limited. (Refer to P.9.) If the high-output setting is disabled, the payload and maximum speed become lower, but the actuator can be used at a duty of 100%. Refer to the operation manual for information on how to change the high-output setting. Refer to P.28 for the payload at each speed/acceleration when the high-output setting is enabled.
Refer to P.29 for the specifications that apply when the high-output setting is disabled.

For other cautionary items, refer to "Explanations of/Cautionary Notes on Items Specified in Catalog (P.9)."

Actuator Specifications (High-output Setting Enabled)

■ Leads and Payloads

(Note 1) Take caution that the maximum payload decreases as the speed increases.

Model number	Lead (mm)	Maximum payload (Note 1) Horizontal (kg)	Maximum payload (Note 1) Vertical (kg)	Maximum push force (N)	Stroke (mm)
ERC3-RA6C-I-56P-24-①-②-③-④	24	25	3	182	50~300 (every 50mm)
ERC3-RA6C-I-56P-16-①-②-③-④	16	45	8	273	
ERC3-RA6C-I-56P-8-①-②-③-④	8	60	17.5	547	
ERC3-RA6C-I-56P-4-①-②-③-④	4	70	25	1094	

Legend ① Stroke ② I/O type ③ Cable length ④ Option

■ Stroke and Maximum Speed

Lead \ Stroke	50~250 (every 50mm)	300 (mm)
24	800 <600>	
16	700 <560>	
8	420	400
4	210 <175>	210 <175>

The value inside < > indicates vertical usage. (Unit: mm/s)

Cable length

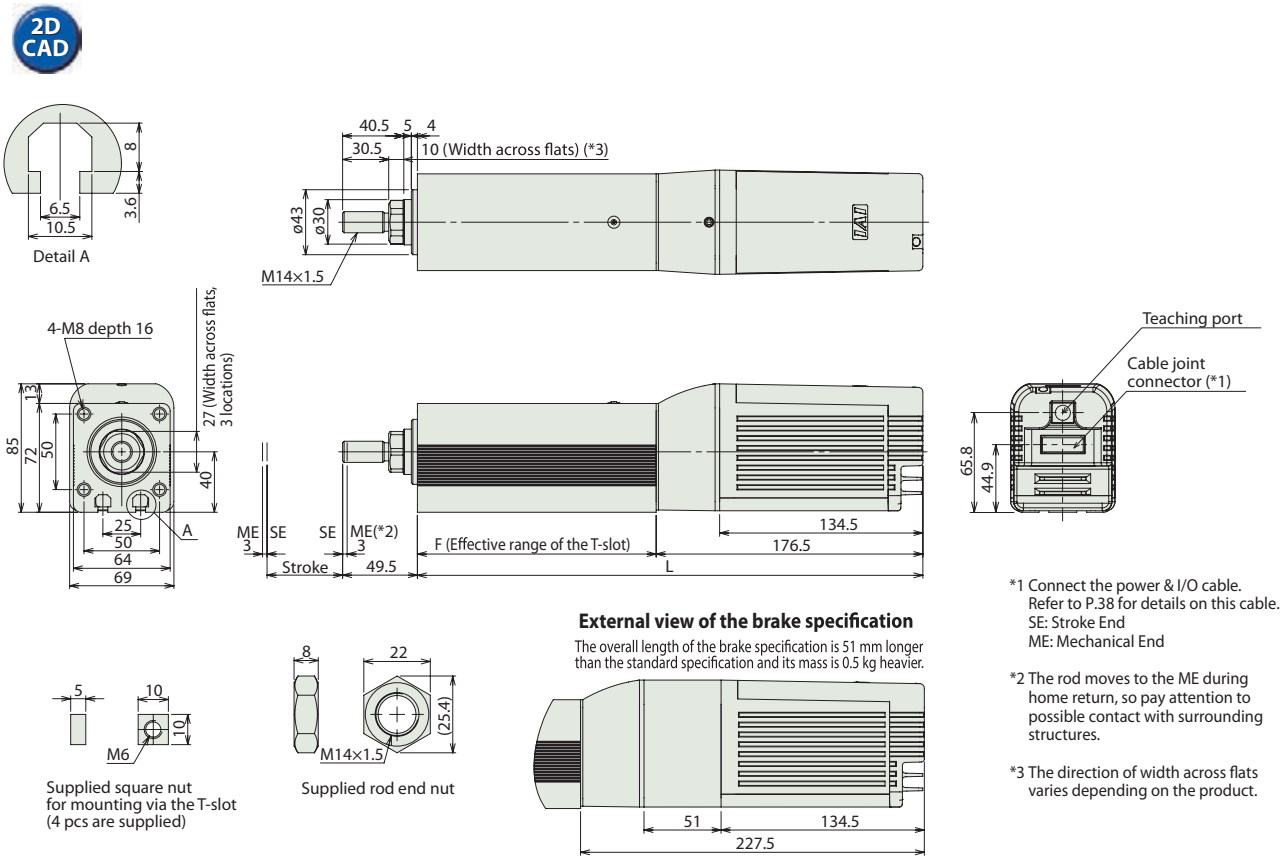
Type	Cable symbol
Standard type (Robot cable)	P (1m)
	S (3m)
	M (5m)
Special length	X06 (6m) ~ X10 (10m)

*Refer to P. 38 for maintenance cable.

Options

Name	Option code	See page
Brake	B	→P8
Non-motor end specification	NM	→P8
Flange	FL	→P8
Foot bracket	FT	→P8

Dimensional Drawings



*1 Connect the power & I/O cable. Refer to P.38 for details on this cable.
SE: Stroke End
ME: Mechanical End

*2 The rod moves to the ME during home return, so pay attention to possible contact with surrounding structures.

*3 The direction of width across flats varies depending on the product.

Actuator specificaton

Item	Description
Drive system	Ball screw ø12 mm, rolled C10
Positioning repeatability (*1)	± 0.02 mm [± 0.03 mm]
Lost motion (*1)	0.1 mm or less [0.2 mm or less]
Rod diameter	ø30 mm
Rod non-rotation precision	±1.0 degrees
Ambient operating temperature, humidity	0 to 40˚C, 85% RH or less (Non-condensing)

(*1) The specification in [ ] applies when the lead is 24 mm.

■Dimensions and Mass by Stroke

Stroke	50	100	150	200	250	300
L	334.5	384.5	434.5	484.5	534.5	584.5
F	158	208	258	308	358	408
Mass (kg)	3.9	4.4	4.9	5.4	5.9	6.4

Controllers (Built into the Actuator)

I/O type

With the ERC3 series, one of the following types of built-in controllers can be selected depending on the external input/output (I/O) type. Select the type that meets your purpose.

Name	External view	Model number	Features	Maximum number of positioning points	Input power	Power supply capacity	Reference page
PIO type (NPN specification)		ERC3-RA6C-I-56P-□-□-NP-□-□	Simple I/O control type with NPN inputs/outputs (often used overseas) accommodating up to 16 positioning points	16	DC24V	High-output setting enabled: 3.5A rated 4.2A max. High-output setting disabled: 2.2A	→P30
PIO type (PNP specification)		ERC3-RA6C-I-56P-□-□-PN-□-□	Simple I/O control type with PNP inputs/outputs accommodating up to 16 positioning points	16			
Pulse-train type (NPN specification)		ERC3-RA6C-I-56P-□-□-PLN-□-□	Pulse-train input type supporting the NPN specification	–			
Pulse-train type (PNP specification)		ERC3-RA6C-I-56P-□-□-PLP-□-□	Pulse-train input type supporting the PNP specification	–			

ERC3CR-SA5C

● Cleanroom Slider Type
● Actuator Width 50mm

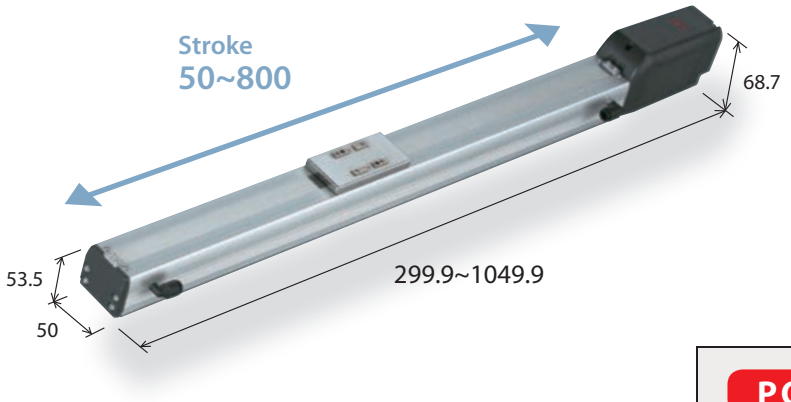
■ Model Specification Items

ERC3CR — SA5C — I — 42P — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder type	Motor type	Lead	Stroke	I/O type	Cable length	Controller type	Option
		I: Incremental specification	42□Pulse motor	20: 20mm 12: 12mm 6: 6mm 3: 3mm	50:50mm ~ 800:800mm (Can be set in 50mm increments)	NP: PIO (NPN) type PN: PIO (PNP) type PLN: Pulse-train (NPN) type PLP: Pulse-train (PNP) type	N: None P: 1m S: 3 m M: 5m X□□: Specified length	CN: CON type	B : Brake NM : Non-motor end specification VR: Vacuum joint on opposite side

*Refer to P.7 for the description of items constituting the model number.

CE RoHS

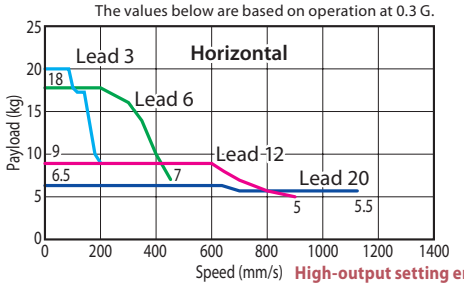


Unit: mm

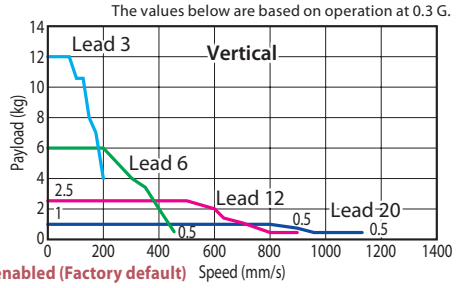
■ Correlation diagrams of Speed and Payload

With the ERC3 series, due to the characteristics of the pulse motor, payload decreases as the speed increases. Use the chart below to confirm that the desired speed and payload requirements are met.

The values below are based on operation at 0.3 G.



The values below are based on operation at 0.3 G.



High-output setting enabled (Factory default)

POINT Notes on selection

If the high-output setting is enabled (factory default), the duty must be limited. (Refer to P.9.) If the high-output setting is disabled, the payload and maximum speed become lower, but the actuator can be used at a duty of 100%. Refer to the operation manual for information on how to change the high-output setting. Refer to P.28 for the payload at each speed/acceleration when the high-output setting is enabled.
Refer to P.29 for the specifications that apply when the high-output setting is disabled.

For other cautionary items, refer to "Explanations of/Cautionary Notes on Items Specified in Catalog (P.9)."

Actuator Specifications (High-output Setting Enabled)

■ Leads and Payloads

(Note 1) Take caution that the maximum payload decreases as the speed increases.

Model number	Lead (mm)	Maximum payload (Note 1) Horizontal (kg)	Maximum payload (Note 1) Vertical (kg)	Stroke (mm)
ERC3CR-SA5C-I-42P-20-①-②-③-④	20	6.5	1	50~800 (every 50mm)
ERC3CR-SA5C-I-42P-12-①-②-③-④	12	9	2.5	
ERC3CR-SA5C-I-42P-6-①-②-③-④	6	18	6	
ERC3CR-SA5C-I-42P-3-①-②-③-④	3	20	12	

Legend ① Stroke ② I/O type ③ Cable length ④ Option

■ Stroke and Maximum Speed/Suction Amount by Lead

Lead \ Stroke	50~450 (every 50mm)	500 (mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)	Suction amount (Nl/min)
20	1120			1045	900	785	690	610	80
12	900	795	665	570	490	425	375	330	50
6	450	395	335	285	245	215	185	165	30
3	225	195	165	140	120	105	90	80	15

(Unit: mm/s)

Cable length

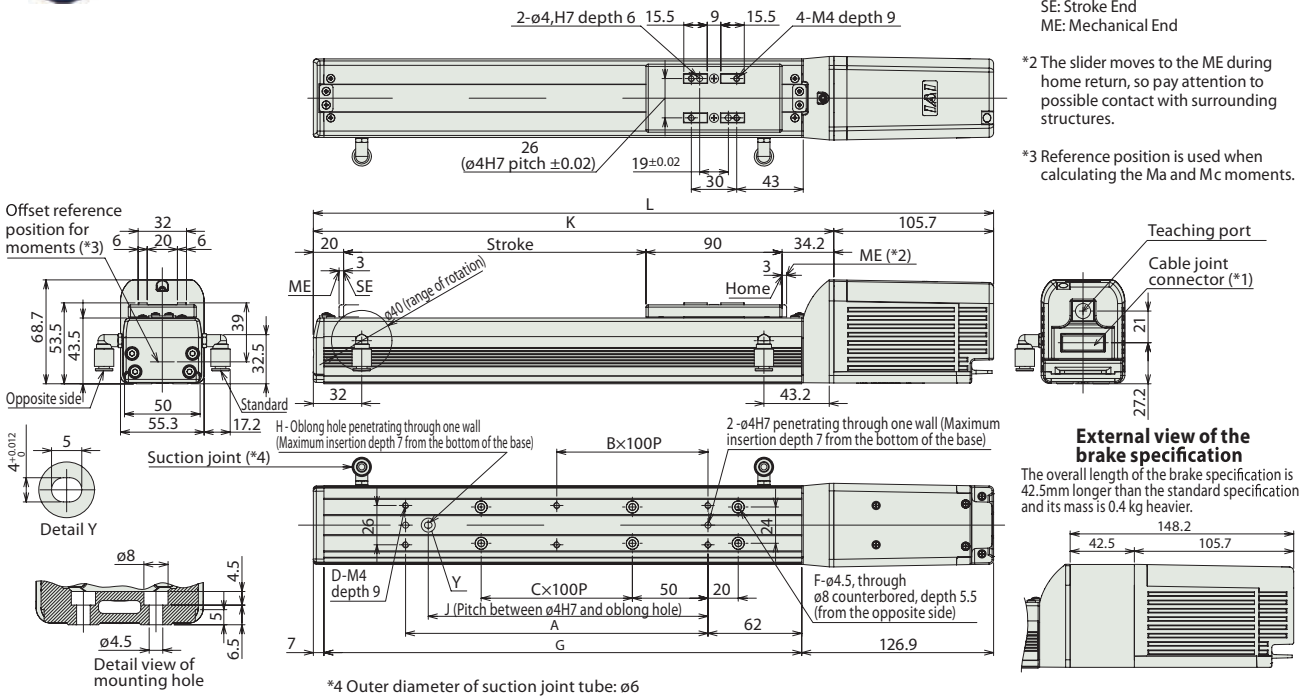
Type	Cable symbol
Standard type (Robot cable)	P (1m)
	S (3m)
	M (5m)
Special length	X06 (6m) ~ X10 (10m)

*Refer to P. 38 for maintenance cable.

Options

Name	Option code	See page
Brake	B	→P8
Non-motor end specification	NM	→P8
Vacuum joint on opposite side	VR	→P8

Dimensional Drawings



*4 Outer diameter of suction joint tube: ø6

*1 Connect the power & I/O cable. Refer to P.38 for details on this cable.
SE: Stroke End
ME: Mechanical End

*2 The slider moves to the ME during home return, so pay attention to possible contact with surrounding structures.

*3 Reference position is used when calculating the Ma and Mc moments.

External view of the brake specification

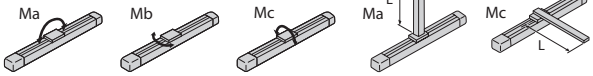
The overall length of the brake specification is 42.5mm longer than the standard specification and its mass is 0.4 kg heavier.

Actuator specificaton

Item	Description
Drive system	Ball screw ø10 mm, rolled C10
Positioning repeatability (*1)	± 0.02 mm [± 0.03 mm]
Lost motion	0.1 mm or less
Static allowable load moment	Ma: 18.6 N•m, Mb: 26.6 N•m, Mc: 47.5 N•m
Dynamic allowable load moment (*2)	Ma: 5.8 N•m, Mb: 8.3 N•m, Mc: 14.8 N•m
Overhang load lengths	150 mm or less in Ma direction, 150 mm or less in Mb and Mc directions
Ambient operation temperature, humidity	0 to 40˚C, 85% RH or less (Non-condensing)
Cleanliness class	ISO class 4 (US FED STD class 10)

(*1) The specification in [ ] applies when the lead is 20 mm.
(*2) Based on 5000 km of traveling life.

Allowable load moment directions



■Dimensions and Mass by Stroke

Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	299.9	349.9	399.9	449.9	499.9	549.9	599.9	649.9	699.9	749.9	799.9	849.9	899.9	949.9	999.9	1049.9
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	194.2	244.2	294.2	344.2	394.2	444.2	494.2	544.2	594.2	644.2	694.2	744.2	794.2	844.2	894.2	944.2
Mass (kg)	1.6	1.8	2.0	2.1	2.3	2.5	2.6	2.8	3.0	3.1	3.3	3.5	3.6	3.8	4.0	4.1

Controllers (Built into the Actuator)

I/O type

With the ERC3 series, one of the following types of built-in controllers can be selected depending on the external input/output (I/O) type. Select the type that meets your purpose.

Name	External view	Model number	Features	Maximum number of positioning points	Input power	Power supply capacity	Reference page
PIO type (NPN specification)		ERC3CR-SA5C-I-42P-□-□-NP-□-□	Simple I/O control type with NPN inputs/outputs (often used overseas) accommodating up to 16 positioning points	16	DC24V	High-output setting enabled: 3.5A rated 4.2A max. High-output setting disabled: 2.2A	→P30
PIO type (PNP specification)		ERC3CR-SA5C-I-42P-□-□-PN-□-□	Simple I/O control type with PNP inputs/outputs accommodating up to 16 positioning points	16			
Pulse-train type (NPN specification)		ERC3CR-SA5C-I-42P-□-□-PLN-□-□	Pulse-train input type supporting the NPN specification	–			
Pulse-train type (PNP specification)		ERC3CR-SA5C-I-42P-□-□-PLP-□-□	Pulse-train input type supporting the PNP specification	–			

ERC3CR-SA7C

● Cleanroom Slider Type
● Actuator Width 73mm

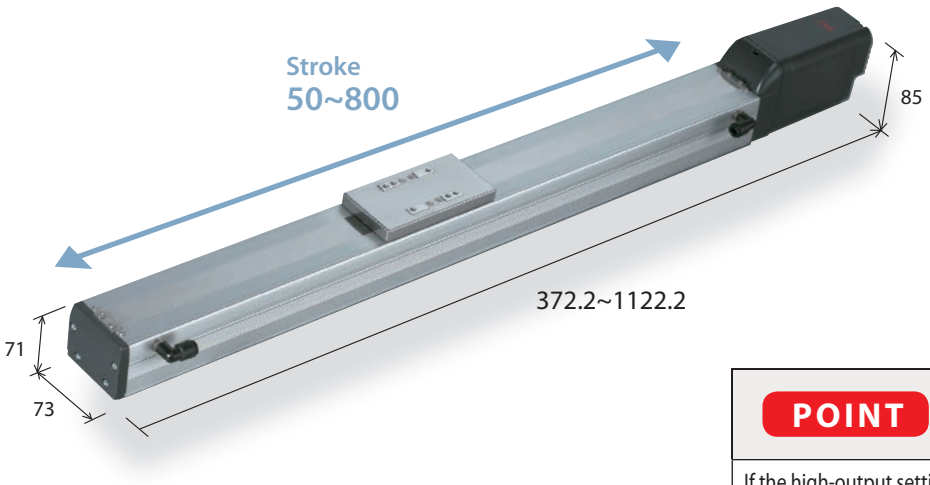
■ Model Specification Items

ERC3CR – SA7C – I – 56P – □ – □ – □ – □ – □ – □ – □

Series	Type	Encoder type	Motor type	Lead	Stroke	I/O type	Cable length	Controller type	Option
		I: Incremental specification	56□Pulse motor	24 : 24mm 16 : 16mm 8 : 8mm 4 : 4mm	50:50mm ~ 800:800mm (Can be set in 50mm increments)	NP: PIO (NPN) type PN: PIO (PNP) type PLN: Pulse-train (NPN) type PLP: Pulse-train (PNP) type	N: None P: 1m S: 3 m M: 5m X□□: Specified length	CN: CON type	B : Brake NM : Non-motor end specification VR: Vacuum joint on opposite side

*Refer to P.7 for the description of items constituting the model number.

CE RoHS



Unit: mm

POINT **Notes on selection**

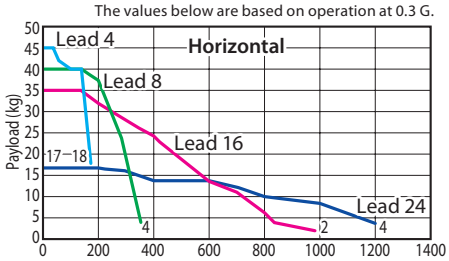
If the high-output setting is enabled (factory default), the duty must be limited. (Refer to P.9.) If the high-output setting is disabled, the payload and maximum speed become lower, but the actuator can be used at a duty of 100%. Refer to the operation manual for information on how to change the high-output setting. Refer to P.28 for the payload at each speed/acceleration when the high-output setting is enabled.
Refer to P.29 for the specifications that apply when the high-output setting is disabled.

For other cautionary items, refer to "Explanations of/Cautionary Notes on Items Specified in Catalog (P.9)."

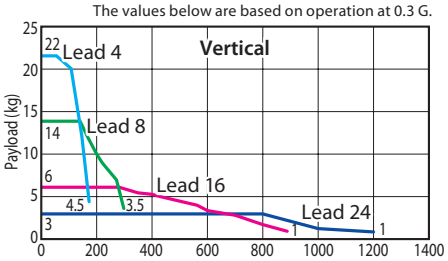
■ Correlation diagrams of Speed and Payload

With the ERC3 series, due to the characteristics of the pulse motor, payload decreases as the speed increases. Use the chart below to confirm that the desired speed and payload requirements are met.

The values below are based on operation at 0.3 G.



The values below are based on operation at 0.3 G.



High-output setting enabled (Factory default)

Actuator Specifications (High-output Setting Enabled)

■ Leads and Payloads

(Note 1) Take caution that the maximum payload decreases as the speed increases.

Model number	Lead (mm)	Maximum payload (Note 1) Horizontal (kg)	Maximum payload (Note 1) Vertical (kg)	Stroke (mm)
ERC3CR-SA7C-I-56P-24-①-②-③-④	24	17	3	50~800 (every 50mm)
ERC3CR-SA7C-I-56P-16-①-②-③-④	16	35	6	
ERC3CR-SA7C-I-56P-8-①-②-③-④	8	40	14	
ERC3CR-SA7C-I-56P-4-①-②-③-④	4	45	22	

Legend ① Stroke ② I/O type ③ Cable length ④ Option

■ Stroke and Maximum Speed/Suction Amount by Lead

Lead \ Stroke	50~550 (every 50mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)	Suction amount (Nl/min)
24	1200		1155	1010	890	790	90
16	980 <840>	865 <840>	750	655	580	515	70
8	490	430	375	325	290	255	40
4	210		185	160	145	125	30

The value inside < > indicates vertical usage. (Unit: mm/s)

Cable length

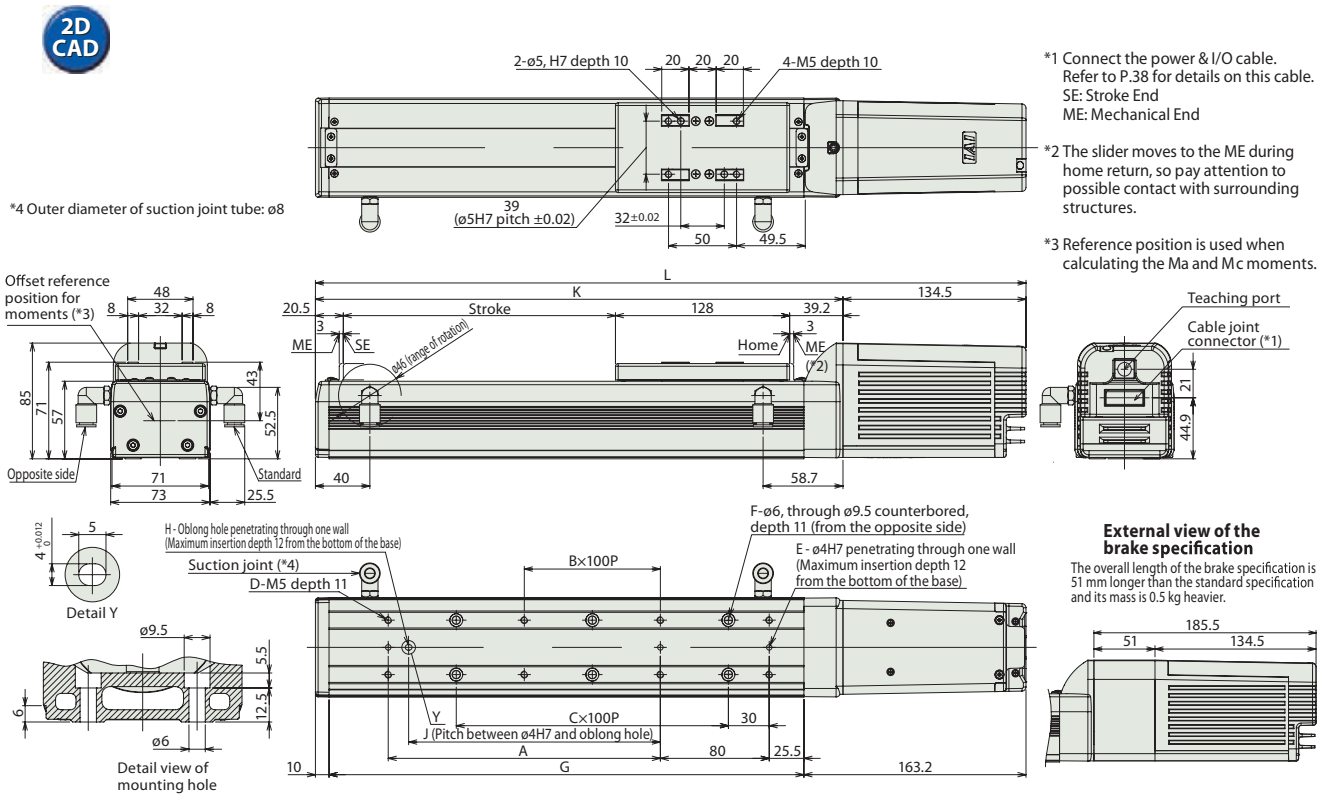
Type	Cable symbol
Standard type (Robot cable)	P (1m)
	S (3m)
	M (5m)
Special length	X06 (6m) ~ X10 (10m)

*Refer to P. 38 for maintenance cable.

Options

Name	Option code	See page
Brake	B	→P8
Non-motor end specification	NM	→P8
Vacuum joint on opposite side	VR	→P8

Dimensional Drawings

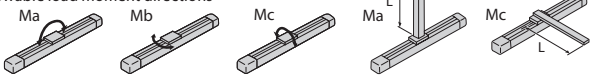


Actuator specificaton

Item	Description
Drive system	Ball screw ø12 mm, rolled C10
Positioning repeatability (*1)	± 0.02 mm [± 0.03 mm]
Lost motion	0.1 mm or less
Static allowable load moment	Ma: 50.4 N•m, Mb: 71.9 N•m, Mc: 138.0 N•m
Dynamic allowable load moment (*2)	Ma: 20.7 N•m, Mb: 29.6 N•m, Mc: 56.7 N•m
Overhang load lengths	230 mm or less in Ma direction, 230 mm or less in Mb and Mc directions
Ambient operation temperature, humidity	0 to 40°C, 85% RH or less (Non-condensing)
Cleanliness class	ISO class 4 (US FED STD class 10)

(*1) The specification in [ ] applies when the lead is 24 mm.
(*2) Based on 5000 km of traveling life.

Allowable load moment directions



■Dimensions and Mass by Stroke

Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	372.2	422.2	472.2	522.2	572.2	622.2	672.2	722.2	772.2	822.2	872.2	922.2	972.2	1022.2	1072.2	1122.2
A	0	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	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
D	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18	20
E	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
F	4	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18
G	199	249	299	349	399	449	499	549	599	649	699	749	799	849	899	949
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	237.7	287.7	337.7	387.7	437.7	487.7	537.7	587.7	637.7	687.7	737.7	787.7	837.7	887.7	937.7	987.7
Mass (kg)	3.6	3.9	4.1	4.4	4.7	4.9	5.2	5.5	5.7	6.0	6.3	6.5	6.8	7.1	7.3	7.6

Controllers (Built into the Actuator)

I/O type

With the ERC3 series, one of the following types of built-in controllers can be selected depending on the external input/output (I/O) type. Select the type that meets your purpose.

Name	External view	Model number	Features	Maximum number of positioning points	Input power	Power supply capacity	Reference page
PIO type (NPN specification)		ERC3CR-SA7C-I-56P-□-□-NP-□-□	Simple I/O control type with NPN inputs/outputs (often used overseas) accommodating up to 16 positioning points	16	DC24V	High-output setting enabled: 3.5A rated 4.2A max. High-output setting disabled: 2.2A	→P30
PIO type (PNP specification)		ERC3CR-SA7C-I-56P-□-□-PN-□-□	Simple I/O control type with PNP inputs/outputs accommodating up to 16 positioning points	16			
Pulse-train type (NPN specification)		ERC3CR-SA7C-I-56P-□-□-PLN-□-□	Pulse-train input type supporting the NPN specification	–			
Pulse-train type (PNP specification)		ERC3CR-SA7C-I-56P-□-□-PLP-□-□	Pulse-train input type supporting the PNP specification	–			

ERC3D-SA5C

● Simple Dustproof Slider Type
● Actuator Width 50mm

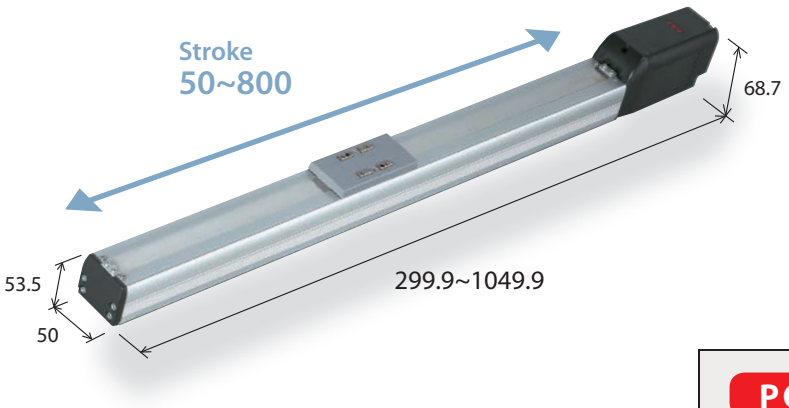
■ Model Specification Items

ERC3D – SA5C – I – 42P – □ – □ – □ – □ – □ – □ – □

Series	Type	Encoder type	Motor type	Lead	Stroke	I/O type	Cable length	Controller type	Option
		I: Incremental specification	42□Pulse motor	20: 20mm 12: 12mm 6: 6mm 3: 3mm	50:50mm ~ 800:800mm (Can be set in 50mm increments)	NP: PIO (NPN) type PN: PIO (PNP) type PLN: Pulse-train (NPN) type PLP: Pulse-train (PNP) type	N: None P: 1m S: 3 m M: 5m X□□: Specified length	CN: CON type	B : Brake NM : Non-motor end specification

*Refer to P.7 for the description of items constituting the model number.

CE RoHS



Unit: mm

POINT **Notes on selection**

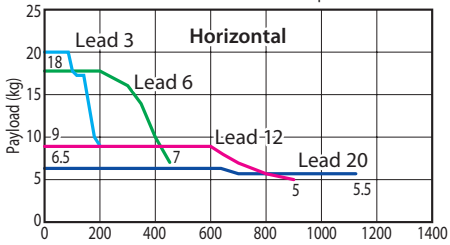
If the high-output setting is enabled (factory default), the duty must be limited. (Refer to P.9.) If the high-output setting is disabled, the payload and maximum speed become lower, but the actuator can be used at a duty of 100%. Refer to the operation manual for information on how to change the high-output setting. Refer to P.28 for the payload at each speed/acceleration when the high-output setting is enabled.
Refer to P.29 for the specifications that apply when the high-output setting is disabled.

For other cautionary items, refer to "Explanations of/Cautionary Notes on Items Specified in Catalog (P.9)."

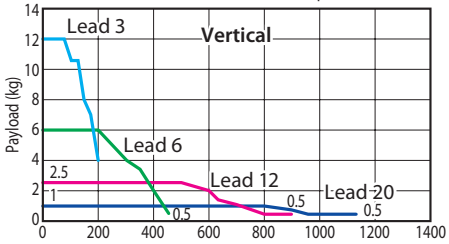
■ Correlation diagrams of Speed and Payload

With the ERC3 series, due to the characteristics of the pulse motor, payload decreases as the speed increases. Use the chart below to confirm that the desired speed and payload requirements are met.

The values below are based on operation at 0.3 G.



The values below are based on operation at 0.3 G.



High-output setting enabled (Factory default)

Actuator Specifications (High-output Setting Enabled)

■ Leads and Payloads

(Note 1) Take caution that the maximum payload decreases as the speed increases.

Model number	Lead (mm)	Maximum payload (Note 1) Horizontal (kg)	Maximum payload (Note 1) Vertical (kg)	Stroke (mm)
ERC3D-SA5C-I-42P-20-①-②-③-④	20	6.5	1	50~800 (every 50mm)
ERC3D-SA5C-I-42P-12-①-②-③-④	12	9	2.5	
ERC3D-SA5C-I-42P-6-①-②-③-④	6	18	6	
ERC3D-SA5C-I-42P-3-①-②-③-④	3	20	12	

Legend ① Stroke ② I/O type ③ Cable length ④ Option

■ Stroke and Maximum Speed by Lead

Lead \ Stroke	50~450 (every 50mm)	500 (mm)	550 (mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
20	1120			1045	900	785	690	610
12	900	795	665	570	490	425	375	330
6	450	395	335	285	245	215	185	165
3	225	195	165	140	120	105	90	80

(Unit: mm/s)

Cable length

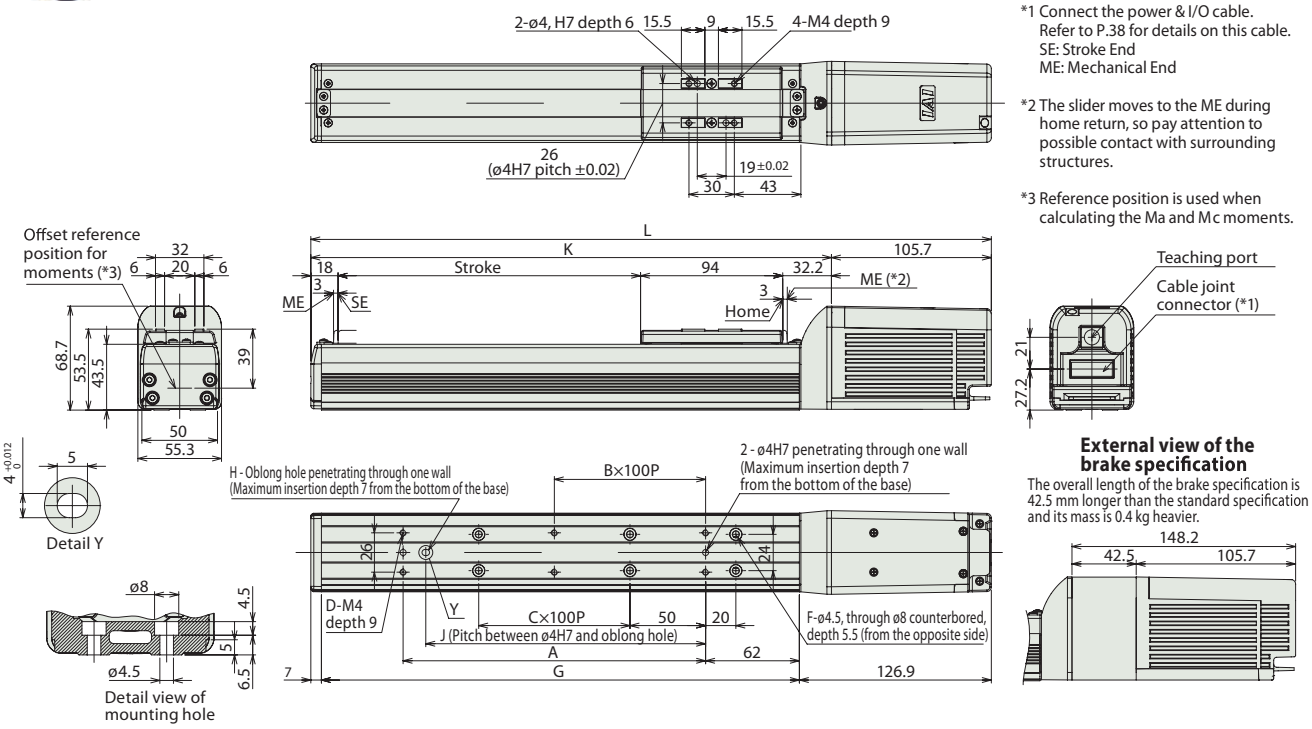
Type	Cable symbol
Standard type (Robot cable)	P (1m)
	S (3m)
	M (5m)
Special length	X06 (6m) ~ X10 (10m)

*Refer to P. 38 for maintenance cable.

Options

Name	Option code	See page
Brake	B	→P8
Non-motor end specification	NM	→P8

Dimensional Drawings



*1 Connect the power & I/O cable.
Refer to P.38 for details on this cable.
SE: Stroke End
ME: Mechanical End

*2 The slider moves to the ME during home return, so pay attention to possible contact with surrounding structures.

*3 Reference position is used when calculating the Ma and Mc moments.

External view of the brake specification

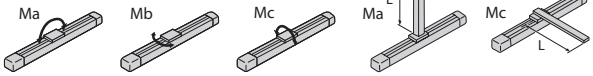
The overall length of the brake specification is 42.5 mm longer than the standard specification and its mass is 0.4 kg heavier.

Actuator specificaton

Item	Description
Drive system	Ball screw ø10 mm, rolled C10
Positioning repeatability (*1)	± 0.02 mm [± 0.03 mm]
Lost motion	0.1 mm or less
Static allowable load moment	Ma: 18.6 N•m, Mb: 26.6 N•m, Mc: 47.5 N•m
Dynamic allowable load moment (*2)	Ma: 5.8 N•m, Mb: 8.3 N•m, Mc: 14.8 N•m
Overhang load lengths	150 mm or less in Ma direction, 150 mm or less in Mb and Mc directions
Ambient operation temperature, humidity	0 to 40°C, 85% RH or less (Non-condensing)
Protection structure	Actuator part: IP30; Controller part: IP20

(*1) The specification in [ ] applies when the lead is 20 mm.
(*2) Based on 5000 km of traveling life.

Allowable load moment directions



■Dimensions and Mass by Stroke

Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	299.9	349.9	399.9	449.9	499.9	549.9	599.9	649.9	699.9	749.9	799.9	849.9	899.9	949.9	999.9	1049.9
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	194.2	244.2	294.2	344.2	394.2	444.2	494.2	544.2	594.2	644.2	694.2	744.2	794.2	844.2	894.2	944.2
Mass (kg)	1.6	1.8	2.0	2.1	2.3	2.5	2.6	2.8	3.0	3.1	3.3	3.5	3.6	3.8	4.0	4.1

Controllers (Built into the Actuator)

I/O type

With the ERC3 series, one of the following types of built-in controllers can be selected depending on the external input/output (I/O) type. Select the type that meets your purpose.

Name	External view	Model number	Features	Maximum number of positioning points	Input power	Power supply capacity	Reference page
PIO type (NPN specification)		ERC3D-SA5C-I-42P-□-□-NP-□-□	Simple I/O control type with NPN inputs/outputs (often used overseas) accommodating up to 16 positioning points	16	DC24V	High-output setting enabled: 3.5A rated 4.2A max. High-output setting disabled: 2.2A	→P30
PIO type (PNP specification)		ERC3D-SA5C-I-42P-□-□-PN-□-□	Simple I/O control type with PNP inputs/outputs accommodating up to 16 positioning points	16			
Pulse-train type (NPN specification)		ERC3D-SA5C-I-42P-□-□-PLN-□-□	Pulse-train input type supporting the NPN specification	–			
Pulse-train type (PNP specification)		ERC3D-SA5C-I-42P-□-□-PLP-□-□	Pulse-train input type supporting the PNP specification	–			

ERC3D-SA7C

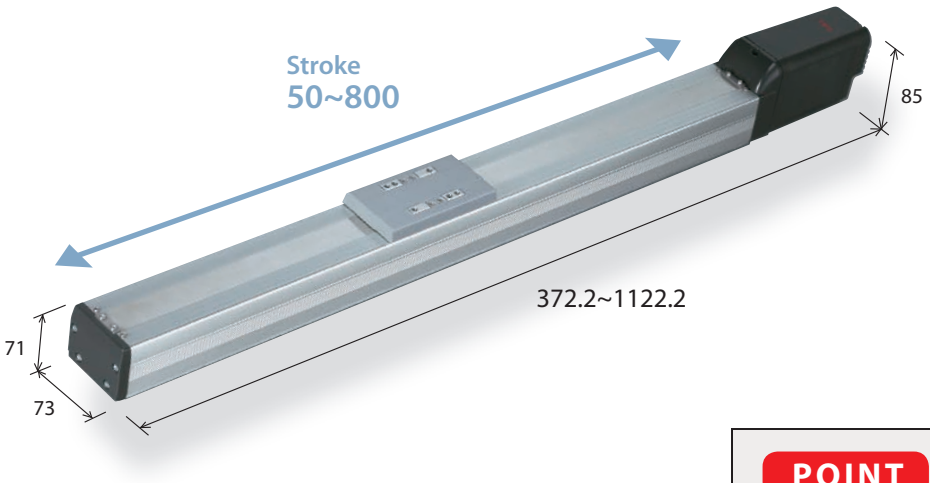
● Simple Dustproof Slider Type
● Actuator Width 73mm

■ Model Specification Items

ERC3D – SA7C – I – 56P – □ – □ – □ – □ – □ – □ – □

Series	Type	Encoder type	Motor type	Lead	Stroke	I/O type	Cable length	Controller type	Option
		I: Incremental specification	56□Pulse motor	24: 24mm 16: 16mm 8: 8mm 4: 4hmm	50:50mm ~ 800:800mm (Can be set in 50mm increments)	NP: PIO (NPN) type PN: PIO (PNP) type PLN: Pulse-train (NPN) type PLP: Pulse-train (PNP) type	N: None P: 1m S: 3 m M: 5m X□□: Specified length	CN: CON type	B : Brake NM : Non-motor end specification

*Refer to P.7 for the description of items constituting the model number.

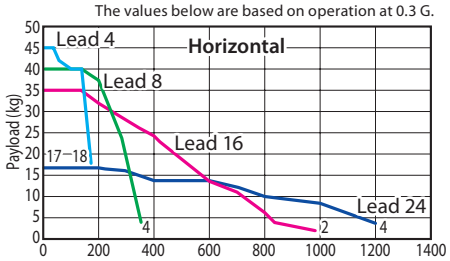


Unit: mm

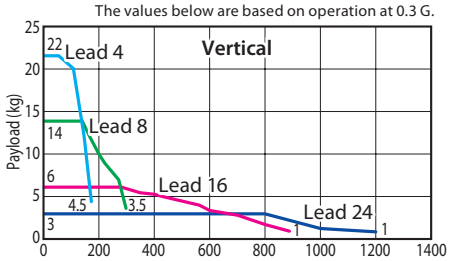
■ Correlation diagrams of Speed and Payload

With the ERC3 series, due to the characteristics of the pulse motor, payload decreases as the speed increases. Use the chart below to confirm that the desired speed and payload requirements are met.

The values below are based on operation at 0.3 G.



The values below are based on operation at 0.3 G.



High-output setting enabled (Factory default)

POINT **Notes on selection**

If the high-output setting is enabled (factory default), the duty must be limited. (Refer to P.9.) If the high-output setting is disabled, the payload and maximum speed become lower, but the actuator can be used at a duty of 100%. Refer to the operation manual for information on how to change the high-output setting. Refer to P.28 for the payload at each speed/acceleration when the high-output setting is enabled.
Refer to P.29 for the specifications that apply when the high-output setting is disabled.

For other cautionary items, refer to "Explanations of/Cautionary Notes on Items Specified in Catalog (P.9)."

Actuator Specifications (High-output Setting Enabled)

■ Leads and Payloads

(Note 1) Take caution that the maximum payload decreases as the speed increases.

Model number	Lead (mm)	Maximum payload (Note 1) Horizontal (kg)	Maximum payload (Note 1) Vertical (kg)	Stroke (mm)
ERC3D-SA7C-I-56P-24-①-②-③-④	24	17	3	50~800 (every 50mm)
ERC3D-SA7C-I-56P-16-①-②-③-④	16	35	6	
ERC3D-SA7C-I-56P-8-①-②-③-④	8	40	14	
ERC3D-SA7C-I-56P-4-①-②-③-④	4	45	22	

Legend ① Stroke ② I/O type ③ Cable length ④ Option

■ Stroke and Maximum Speed by Lead

Lead \ Stroke	50~550 (every 50mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
24	1200		1155	1010	890	790
16	980 <840>	865 <840>	750	655	580	515
8	490	430	375	325	290	255
4	210		185	160	145	125

The value inside < > indicates vertical usage. (Unit: mm/s)

Cable length

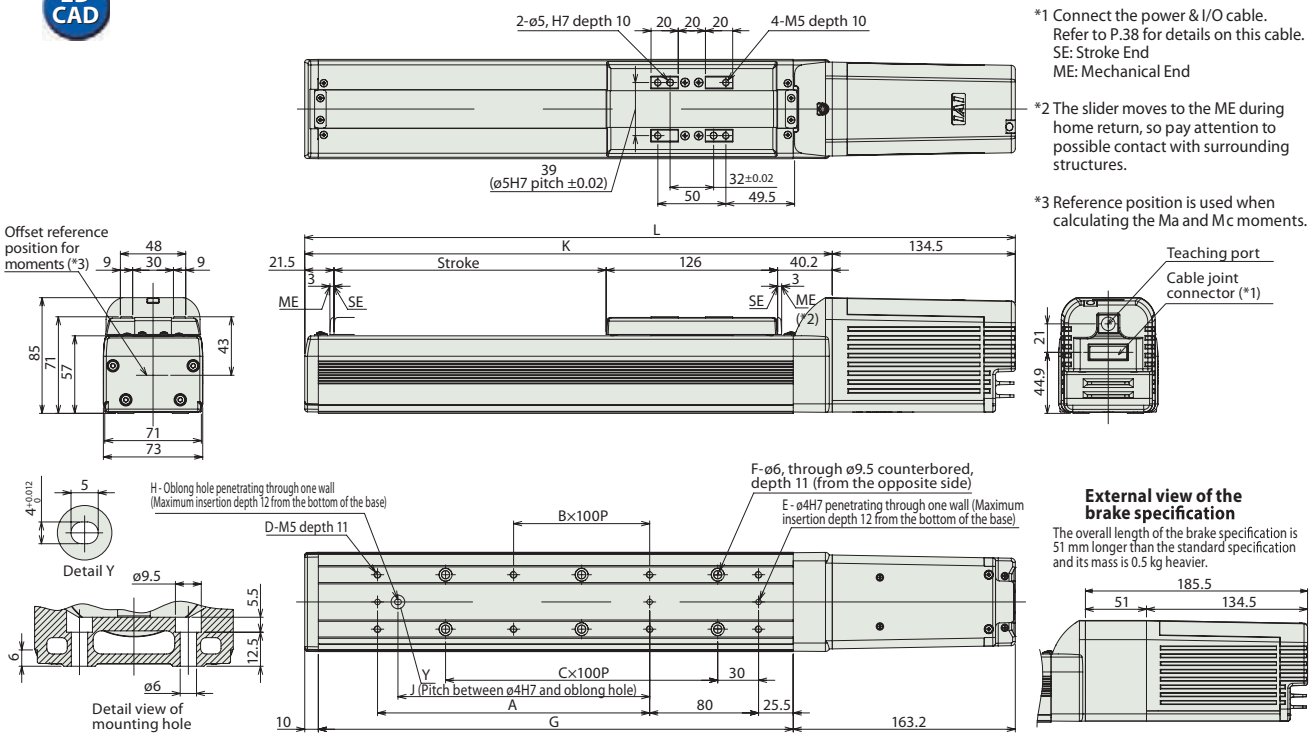
Type	Cable symbol
Standard type (Robot cable)	P (1m)
	S (3m)
	M (5m)
Special length	X06 (6m) ~ X10 (10m)

*Refer to P. 38 for maintenance cable.

Options

Name	Option code	See page
Brake	B	→P8
Non-motor end specification	NM	→P8

Dimensional Drawings



*1 Connect the power & I/O cable. Refer to P.38 for details on this cable.
SE: Stroke End
ME: Mechanical End

*2 The slider moves to the ME during home return, so pay attention to possible contact with surrounding structures.

*3 Reference position is used when calculating the Ma and Mc moments.

External view of the brake specification

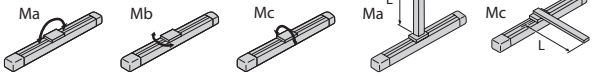
The overall length of the brake specification is 51 mm longer than the standard specification and its mass is 0.5 kg heavier.

Actuator specificaton

Item	Description
Drive system	Ball screw ø12 mm, rolled C10
Positioning repeatability (*1)	± 0.02 mm [± 0.03 mm]
Lost motion	0.1 mm or less
Static allowable load moment	Ma: 50.4 N•m, Mb: 71.9 N•m, Mc: 138.0 N•m
Dynamic allowable load moment (*2)	Ma: 20.7 N•m, Mb: 29.6 N•m, Mc: 56.7 N•m
Overhang load lengths	230 mm or less in Ma direction, 230 mm or less in Mb and Mc directions
Ambient operation temperature, humidity	0 to 40°C, 85% RH or less (Non-condensing)
Protection structure	Actuator part: IP30; Controller part: IP20

(*1) The specification in [ ] applies when the lead is 24 mm.
(*2) Based on 5000 km of traveling life.

Allowable load moment directions



■Dimensions and Mass by Stroke

Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
L	372.2	422.2	472.2	522.2	572.2	622.2	672.2	722.2	772.2	822.2	872.2	922.2	972.2	1022.2	1072.2	1122.2
A	0	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	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
D	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18	20
E	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
F	4	4	6	6	8	8	10	10	12	12	14	14	16	16	18	18
G	199	249	299	349	399	449	499	549	599	649	699	749	799	849	899	949
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	237.7	287.7	337.7	387.7	437.7	487.7	537.7	587.7	637.7	687.7	737.7	787.7	837.7	887.7	937.7	987.7
Mass (kg)	3.6	3.9	4.1	4.4	4.7	4.9	5.2	5.5	5.7	6.0	6.3	6.5	6.8	7.1	7.3	7.6

Controllers (Built into the Actuator)

I/O type

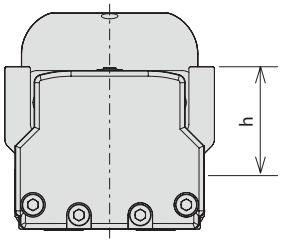
With the ERC3 series, one of the following types of built-in controllers can be selected depending on the external input/output (I/O) type. Select the type that meets your purpose.

Name	External view	Model number	Features	Maximum number of positioning points	Input power	Power supply capacity	Reference page
PIO type (NPN specification)		ERC3D-SA7C-I-56P-□-□-NP-□-□	Simple I/O control type with NPN inputs/outputs (often used overseas) accommodating up to 16 positioning points	16	DC24V	High-output setting enabled: 3.5A rated 4.2A max. High-output setting disabled: 2.2A	→P30
PIO type (PNP specification)		ERC3D-SA7C-I-56P-□-□-PN-□-□	Simple I/O control type with PNP inputs/outputs accommodating up to 16 positioning points	16			
Pulse-train type (NPN specification)		ERC3D-SA7C-I-56P-□-□-PLN-□-□	Pulse-train input type supporting the NPN specification	–			
Pulse-train type (PNP specification)		ERC3D-SA7C-I-56P-□-□-PLP-□-□	Pulse-train input type supporting the PNP specification	–			

Selection Guideline (Correlation Diagram of the Push Force and the Current-limiting Value)

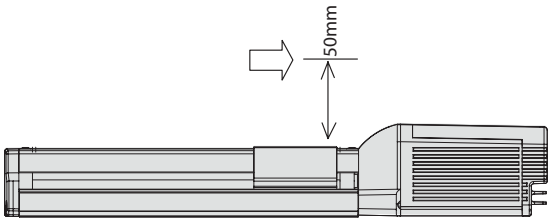
In a push-motion operation, the push force can be used by changing the current-limiting value of the controller over a range of 20% to 70%. The maximum push-force varies depending on the model, so check the required push force from the table below and select an appropriate type meeting the purpose of use.

When performing a push-motion operation using a slider actuator, limit the push current so that the reactive force moment generated by the push force will not exceed 80% of the rated moment (Ma, Mb) specified in the catalog.
To help with the moment calculations, the application position of the guide moment is shown in the figure below. Calculate the necessary moment by considering the offset of the push force application position.
Note that if an excessive force exceeding the rated moment is applied, the guide may be damaged and the life may become shorter. Accordingly, include a sufficient safety factor when deciding on the push force.



ERC3
SA5C : h=36.5mm
SA7C : h=46.5mm
ERC3CR/ERC3D
SA5C : h=39mm
SA7C : h=43mm

Calculation example:
If a push-motion operation is performed with an ERC3-SA7C by applying 100 N at the position shown to the right, the moment received by the guide, or Ma, is calculated as (46.5 + 50) x 100
= 9650 (N•mm)
= 9.65 (N•m).

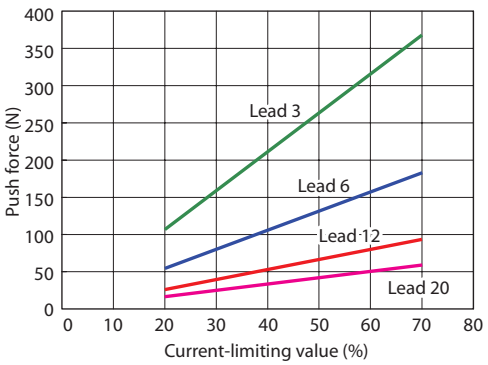


Since the rated moment Ma of the SA7C is 17.7 (N•m), 17.7 x 0.8 = 14.2 > 9.65, suggesting that this selection is acceptable. If an Mb moment generates due to the push-motion operation, calculate the moment from the overhang length and confirm, in the same way, that the calculated moment is within 80% of the rated moment.

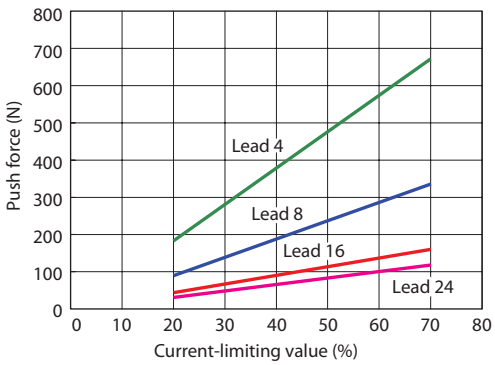
Correlation Diagrams of the Push Force and the Current-limiting Value

The table below is only a reference, and the graphs may vary slightly from the actual values.

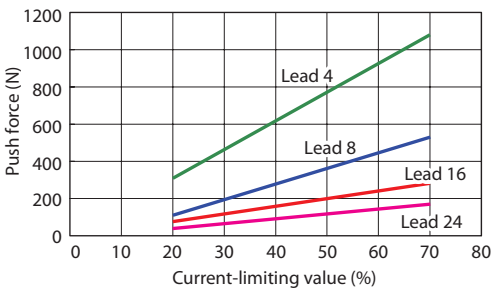
SA5C/RA4C type



SA7C type



RA6C type



Notes on Use

- The relationship of the push force and the current-limiting value is only a reference, and the graphs may vary slightly from the actual values.
- If the current-limiting value is less than 20%, the push force may vary. Make sure the current-limiting value remains 20% or more.
- The graphs assume a traveling speed of 20 mm/s during push-motion operation.

Selection Guideline
(Table of ERC3☐ Payload by Speed/Acceleration)

High-output setting enabled
(Factory default)

The maximum acceleration/deceleration of the ERC3☐ is 1.0 G in a horizontal application or 0.5 G in vertical application. The payload drops as the acceleration increases, so when selecting a model, use the tables below to find one that meets the desired speed, acceleration and payload.

■ERC3☐-SA5C

Lead 20

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	6.5	6.5	5	5	4	1	1	1
160	6.5	6.5	5	5	4	1	1	1
320	6.5	6.5	5	5	4	1	1	1
480	6.5	6.5	4	4	4	1	1	1
640	6.5	6.5	3.5	3.5	3	1	1	1
800	5.5	5.5	3.5	3	1	1	1	1
960		5.5	2.5	2	1		0.5	0.5
1120		5.5	1	1	1		0.5	0.5

Lead 12

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	9	9	9	9	8	2.5	2.5	2.5
100	9	9	9	9	8	2.5	2.5	2.5
200	9	9	9	9	8	2.5	2.5	2.5
300	9	9	9	9	7	2.5	2.5	2.5
400	9	9	8	8	6	2.5	2.5	2.5
500	9	9	8	5.5	5.5	2.5	2.5	2
600	9	9	8	5.5	4	2.5	2	1.5
700	9	7	6	4	2.5	2.5	1	0.5
800		5.5	3.5	2	1		0.5	0.5
900		5	2.5	1			0.5	

Lead 6

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	18	18	13	12	11	6	6	6
50	18	18	13	12	11	6	6	6
100	18	18	13	12	11	6	6	6
150	18	18	13	12	11	6	6	6
200	18	18	13	12	11	6	6	6
250	18	17	13	12	9	6	5	4.5
300	16	16	12	11	7	4.5	4	3.5
350	14	14	8	8	6	4	3.5	3
400	10.5	10	7	4.5	4	2.5	2	1.5
450	7.5	7	4	2.5	1	1	0.5	

Lead 3

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	20	20	16	16	13	12	12	12
25	20	20	16	16	13	12	12	12
50	20	20	16	16	12	12	12	12
75	20	20	16	16	12	12	12	12
100	20	18	14	12	10	12	10.5	10.5
125	20	17	14	9.5	8	12	10.5	10.5
150	20	17	11	8	7	9.5	8	8
175	20	10	10	4.5	3.5	7	7	6
200	20	9	3			6	4	2
225	15					4.5		

■ERC3☐-SA7C

Lead 24

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	20	17	15	13	11	3	3	3
200	20	17	15	13	11	3	3	3
400	20	14	14	13	10	3	3	3
600	20	14	10	8	8	3	3	3
800	10	10	8	6	2.5		3	2.5
1000		8	4	2	1		2	
1200		4	2				1	

Lead 16

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	35	35	35	26.5	26.5	7	6	4
140	35	35	35	26.5	26.5	7	6	4
280	35	28	28	22	18	7	6	4
420	30	23	12.5	11	10	5	5	4
560	22	15	9.5	7.5	5.5	5	4	3
700	20	11	5.5	3.5	2	3.5	2.5	1.5
840		4	2.5				1	
980		2						

Lead 8

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	43	40	40	40	40	15	14	13
70	43	40	40	40	40	15	14	13
140	40	40	40	38	35	15	14	13
210	40	36	35	30	24	11	9	9
280	40	23	11	8	2	8	7	6
350	35	4	2	2		5	3.5	1.5
420	25					2.5		
490	15					1.5		

Lead 4

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	45	45	45	40	35	22	22	22
35	45	45	45	40	35	22	22	22
70	45	42	42	35	35	22	22	22
105	42	40	40	35	35	20	20	19
140	42	40	25	25	22	15	12	11
175	38	18				10	4.5	
210	35					6.5		

■ERC3-RA4C

Lead 20

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	12	12	8	6	4.5	2	1.5	1.5
160	12	12	8	6	4.5	2	1.5	1.5
320	12	12	8	5	3	2	1.5	1.5
480	7	7	6	4.5	3	1	1	1
640		6	4	3	2		1	1
800		4	3				0.5	0.5

Lead 12

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	25	25	14	14	12	4.5	4.5	3.5
100	25	25	14	14	12	4.5	4.5	3.5
200	25	25	11	8	8	4.5	4.5	3.5
300	25	25	11	7	5.5	4	4	3.5
400	17.5	16.5	8	4	3.5	3.5	3.5	2.5
500		15	5.5	2	2		3.5	2
600		10	3.5				2	1
700		6	2				1	1

Lead 6

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	31.5	30	25	12	12	10
50	40	40	31.5	30	25	12	12	10
100	40	40	31.5	24.5	21	12	12	10
150	40	40	24.5	17.5	17.5	11	11	7
200	40	40	21	14	12.5	8	8	5.5
250	35	24.5	17.5	14	11	7	7	4
300	28	21	12.5	12.5	8	5.5	5.5	4
350	24.5	17.5	9.5	5.5	5.5	4	3.5	3.5
400	17.5	9.5	7	4	2.5	3.5	2.5	2
450	17.5	5.5	2				1	1

Lead 3

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	40	40	40	40	35	18	18	17
25	40	40	40	40	35	18	18	17
50	40	40	40	40	35	18	18	17
75	40	40	40	40	35	16	16	16
100	40	40	40	40	35	16	15	15
125	40	40	40	40	30	16	12	10
150	40	40	40	30	25	10	8	5.5
175	36	36	35	25	20	10	5.5	5
200	36	28	28	19.5	14	7	5	4.5
225	36	16	14	10	6	4	3.5	2

■ERC3-RA6C

Lead 24

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	25	25	17	12	8	3	3	2
200	25	25	17	12	8	3	3	2
400	20	20	14	10	8	3	2	2
600		13	7	5	3.5		2	2
800		3	1					

Lead 16

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	45	40	30	28	26	8	8	8
140	45	40	30	28	26	8	8	8
280	45	34	30	24	18	6.5	5.5	5.5
420	45	22	17	13	10	5.5	4	3
560		9.5	5	2.5	1.5		2	1
700		2						

Lead 8

Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	60	55	45	40	40	17.5	17.5	17.5
70	60	55	45	40	40	17.5	17.5	17.5
140	60	55	40	40	40	11	11	11
210	60	50	40	28	26	7.5	7.5	7
280	60	32	20	15	11	6	5.5	4.5
350	50	14	4.5	1		3	2.5	2
420	15					2		

Lead 4

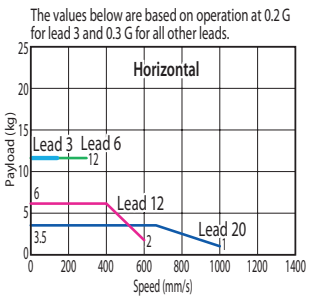
Orientation	Horizontal					Vertical		
Speed (mm/s)	Acceleration (G)							
	0.1	0.3	0.5	0.7	1	0.1	0.3	0.5
0	70	70	60	60	50	25	25	25
35	70	70	60	60	50	25	25	25
70	70	70	60	60	50	25	25	25
105	70	70	55	45	40	15	15	15
140	70	50	30	20	15	11.5	10	8
175	50	15				6	3	
210	20							

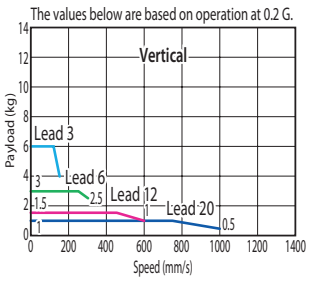
High-output setting disabled Specification

■Correlation diagrams of Speed and Payload

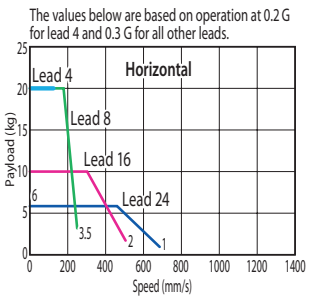
With the ERC3 series, due to the characteristics of the pulse motor, payload decreases as the speed increases.
Use the chart below to confirm that the desired speed and payload requirements are met.

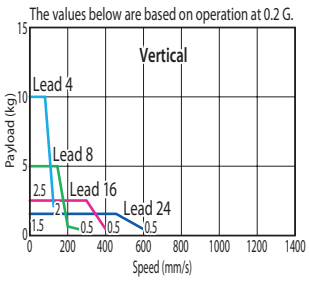
ERC3□-SA5C



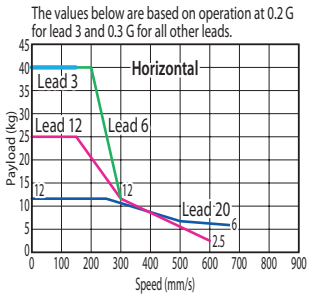


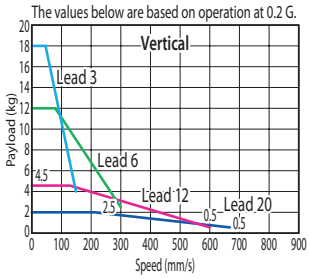
ERC3□-SA7C



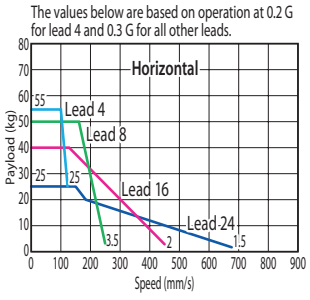


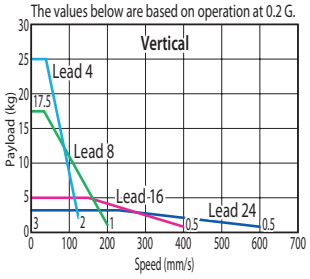
ERC3-RA4C





ERC3-RA6C





■Stroke and Maximum Speed (Unit: mm/s)

• ERC3-SA5C

Lead \ Stroke	50~550 (every 50mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
20	1000	935	795	680	585	510
12	600	560	475	405	350	300
6	300	280	235	200	175	150
3	150	140	115	100	85	75

• ERC3CR-SA5C, ERC3D-SA5C

Lead \ Stroke	50~550 (every 50mm)	600 (mm)	650 (mm)	700 (mm)	750 (mm)	800 (mm)
20	1000	1000	900	785	690	610
12	600	570	490	425	375	330
6	300	285	245	215	185	165
3	150	140	120	105	90	80

• ERC3-SA7C

Lead \ Stroke	50~750 (every 50mm)	800 (mm)
24	675 <600>	
16	450 <400>	
8	250	245
4	125	120

The value inside < > indicates vertical usage.

• ERC3CR-SA7C, ERC3D-SA7C

Lead \ Stroke	50~800 (every 50mm)
24	675 <600>
16	450 <400>
8	250
4	125

The value inside < > indicates vertical usage.

• ERC3-RA4C

Lead \ Stroke	50~250 (every 50mm)	300 (mm)
20	667	667
12	600	485
6	300	240
3	150	120

• ERC3-RA6C

Lead \ Stroke	50~300 (every 50mm)
24	675 <600>
16	450 <400>
8	250 <200>
4	125

The value inside < > indicates vertical usage.

ERC3 Controller Specification

■Model number NP/PN/PLN/PLP

Controller part of actuator with built-in controller

List of Models

Controller type	CON type			
Operation mode	Positioner mode		Pulse-train control mode	
I/O type	PIO type (NPN specification)	PIO type (PNP specification)	Pulse-train type (NPN specification)	Pulse-train type (PNP specification)
I/O type model number	NP	PN	PLN	PLP
External view				
Description	Basic type that moves by specifying the positioning number with NPN PIO from PLC.	Basic type that moves by specifying the positioning number with PNP PIO from PLC.	Pulse-train input type supporting the NPN specification	Pulse-train input type supporting the PNP specification
Position points	16 points	16 points	(–)	(–)

Model Number

⑦ & ⑨ refers to the I/O type and controller type shown in the above table.

① Series — ② Type — ③ I Encoder type — ④ Motor type — ⑤ Lead — ⑥ Stroke — ⑦ I/OType — ⑧ Cable length — ⑨ CN Controller type — ⑩ Option

① Series	
ERC3	Standard type
ERC3CR	Cleanroom type
ERC3D	Simple dustproof type

② Type	
SA5C	Actuator width 50 mm
SA7C	Actuator width 74 mm
RA4C	Actuator width 45 mm
RA6C	Actuator width 64 mm

③ Encoder type	
I	Incremental type

④ Motor type	
42P	Pulse motor 42□size
56P	Pulse motor 56□size

⑤ Lead	
20	for SA5C/RA4C 20 mm
12	for SA5C/RA4C 12 mm
6	for SA5C/RA4C 6 mm
3	for SA5C/RA4C 3 mm
24	for SA7C/RA6C 24 mm
16	for SA7C/RA6C 16 mm
8	for SA7C/RA6C 8 mm
4	for SA7C/RA6C 4 mm

⑥ Stroke		
Slider type	50	50 mm
	≀	≀
	800	800 mm
Rod type	50	50 mm
	≀	≀
	300	300 mm

(Can be set in 50mm increments)

⑦ I/OType	
NP	PIO (NPN) type
PN	PIO (PNP) type
PLN	Pulse-train (NPN) type
PLP	Pulse-train (PNP) type

⑧ Cable length	
N	None
P	1m
S	3m
M	5m
X□□	Specified length

* The standard cable is a robot cable.

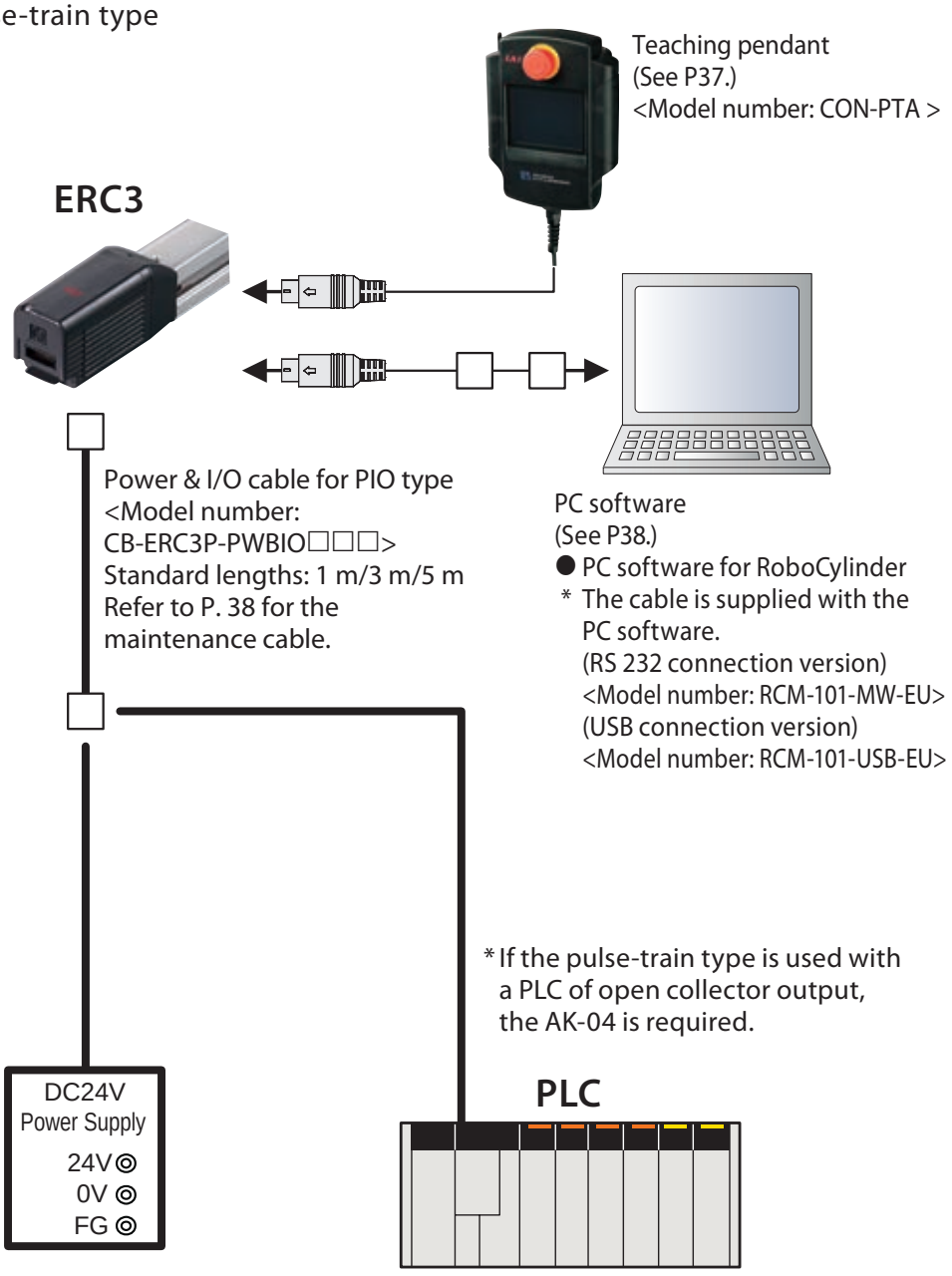
⑨ CN Controller type	
CN	CON type

⑩ Option	
B	Brake
NM	Non-motor end specification
FL	Flange
FT	Foot bracket
VR	Vacuum joint on opposite side

* The flange and foot bracket option can be selected only for rod types.

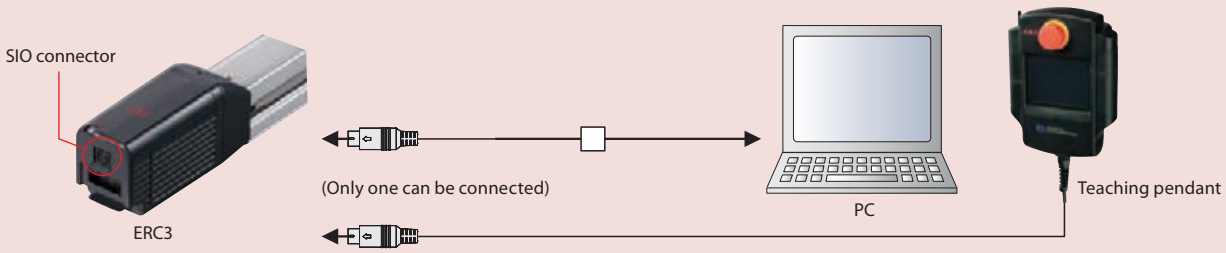
System Configuration

■PIO Type/Pulse-train type



PC Wiring Diagram

The SIO connector is used to connect a teaching tool.



List of Base Controller Specifications

Item		Description
Power supply voltage		24 VDC±10%
Load current (including current consumed for control)		High-output setting enabled: 3.5 A rated/4.2 A max. High-output setting disabled: 2.2 A
Heat output		High-output setting enabled: 8 W High-output setting disabled: 5 W
Rush current (Note 1)		8.3 A
Momentary power failure resistance		Max. 500 µs
Motor control method		Field-weakening vector control
Supported encoder		Incremental encoder of 800 pulses/rev in resolution
Actuator cable length		10 m max.
Serial communication interface (SIO port)		RS485: 1 channel (conforming to Modbus protocol RTU/ASCII) / Speed: 9.6 to 230.4 kbps
External interface PIO specification		Dedicated 24-VDC signal input/output (NPN or PNP selected)—Up to 6 input points, up to 4 output points Cable length: 10m max.
Data setting/input method		PC software, touch-panel teaching pendant
Data retention memory		Position data and parameters are saved in the non-volatile memory (There is no limit to the number of times the memory can be written.)
Operation mode		Positioner mode/Pulse-train control mode
Number of positions in positioner mode		Standard 8 points, maximum 16 points Note: Positioning points vary depending on the selected PIO pattern.
Pulse-train interface	Input pulse	Differential method (line driver method): 200 kpps max. / Cable length: 10m max.
		Open collector method: Not supported * If the host is of open collector output type, use the optional AK-04 (sold separately) to convert open collector pulses to differential pulses.
	Command pulse magnification (electronic gear ratio: A/B)	1/50 < A/B < 50/1 Setting range of A and B (set by parameters): 1 to 4096
	Feedback pulse output	None
LED indicators (installed on the motor unit)		Servo ON (green), servo OFF (unlit), emergency stop (red), alarm (red), resetting (orange)
Isolation resistance		500 VDC, 10 MΩ or more
Electric shock protection mechanism		Class I (basic isolation)
Cooling method		Natural air cooling
Environment	Ambient operating temperature	0 to 40°C
	Ambient operating humidity	85% RH or less (non-condensing)
	Ambient storage temperature	-20 to 70°C (excluding batteries)
	Operating altitude	Altitude 1000 m or less
	Protection degree	IP20
	Cooling method	Natural air cooling
	Vibration resistance	(Test conditions) Number of vibrations: 10 to 57 Hz/Amplitude: 0.075 mm Number of vibrations: 57 to 150 Hz/Acceleration: 9.8 m/s^2 Sweep time in X/Y/Z directions: 10 minutes/Number of sweeps: 10 times
	Impact	(Test conditions) 150 mm/sec^2, 11mm/sec, sinusoidal half pulse, 3 times each in X, Y and Z directions

Note 1 Rush current will flow for approx. 5msec after the power is turned on (at 40°C).
Take note that the value of rush current varies depending on the impedance of the power line.

Emergency Stop Circuit

The ERC3 series has no built-in emergency stop circuit, so the customer must provide an emergency stop circuit. Refer to the operation manual for details on the emergency stop circuit.

■Positioner mode

I/O specification (PIO type)

■Input Part

Item	Specification
Input points	6 points
Input voltage	24 VDC ±10%
Input current	5mA/1 circuit
Leak current	1mA/point max.

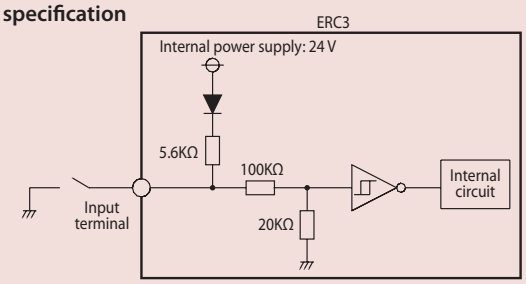
* The input circuit is not isolated from signals input from external equipment.

■Output Part

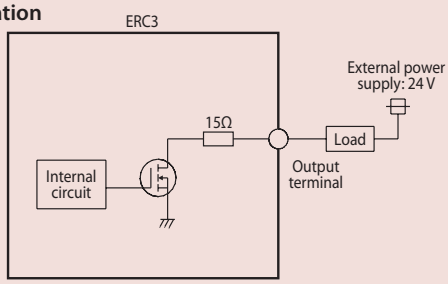
Item	Specification
Output points	4 points
Load voltage	24 VDC ±10%
Maximum load current	5mA/1 circuit
Residual voltage	2 V or less

* The output circuit is not isolated from signals output to external equipment.

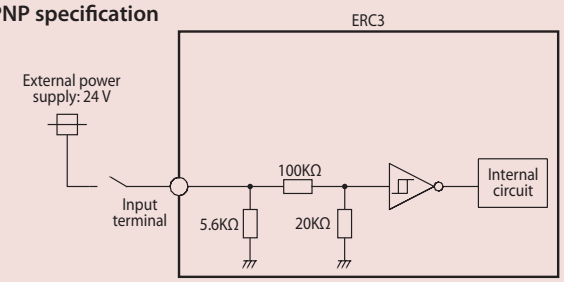
NPN specification



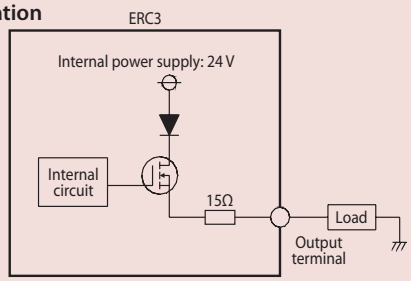
NPN specification



PNP specification



PNP specification



I/O Signal Table (PIO Type) [ERC3 and PLC Connected Directly]

Pin number	Category	Controller type	CN (CON type)		
		PIO function	Parameter No. 25 (PIO pattern) selection		
			0	1	2
			8-point type	Solenoid type	16-point type
	Input	Number of positioning points	8 points	3 points	16 points
		Home return signal	○	—	—
		Jog signal	—	—	—
		Teaching signal (writing of current position)	—	—	—
		Brake release	—	—	—
	Output	Moving signal	—	—	—
		Zone signal	○	—	○
		Position zone signal	—	—	○
A1	Frame ground	FG			
B1	+24V for control power supply	CP			
A2	—	—			
B2	0 V for control power supply	GND			
A3	External brake release input	BK			
B3	+24V for motor power supply	MP			
A4	Emergency stop input	EMG			
B4	0 V for motor power supply	GND			
A5	—	—			
B5	—	—			
A6	—	—			
B6	—	—			
A7	—	—			
B7	—	—			
A8	—	—			
B8	—	—			
A9	Input	IN0	PC1	ST0	PC1
B9		IN1	PC2	ST1	PC2
A10		IN2	PC4	ST2	PC4
B10		IN3	HOME	—	PC8
A11		IN4	CSTR	RES	CSTR
B11		IN5	*STP	*STP	*STP
A12	Output	OUT0	PEND	PE0	PEND
B12		OUT1	HEND	PE1	HEND
A13		OUT2	ZONE1	PE2	PZONE/ZONE1
B13		OUT3	*ALM	*ALM	*ALM

(Note) Signals marked with an asterisk (*) (ALM/STP) are negative logic signals so they are nomally on.

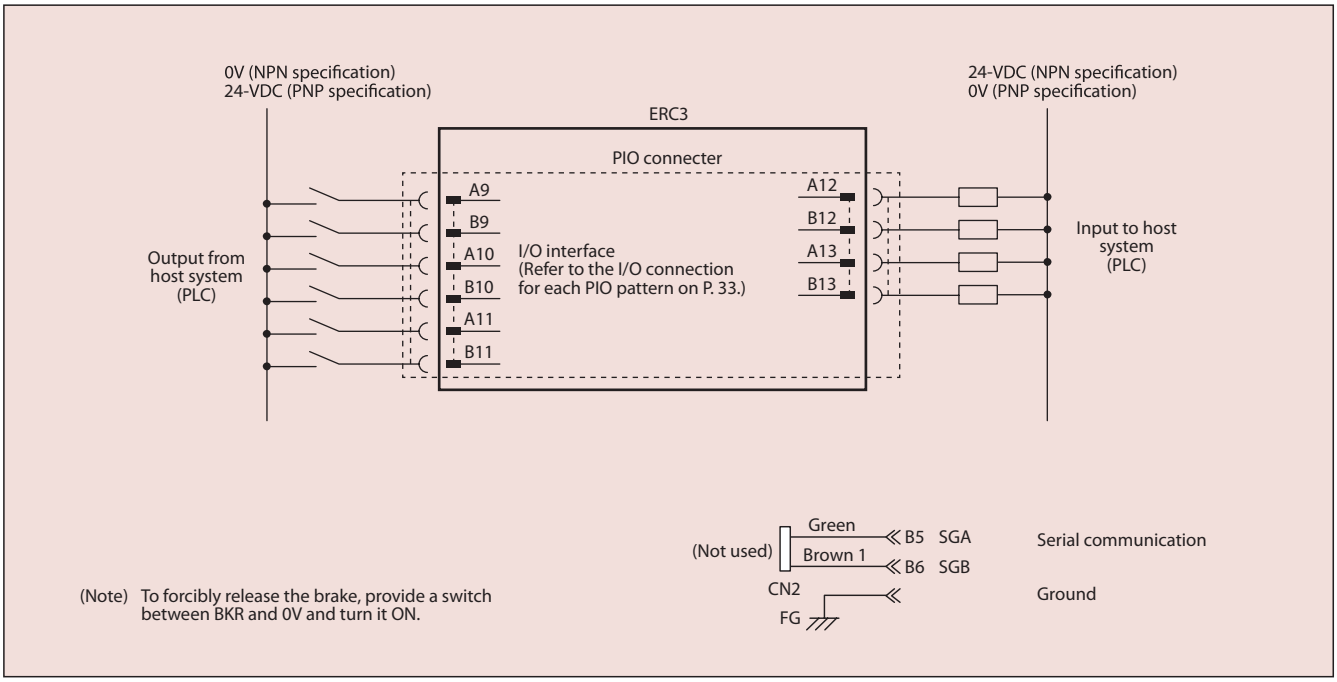
Explanation of Signal Names

Category	Signal name	Signal abbreviation	Function overview
Input	PTP strobe (start signal)	CSTR	The actuator starts moving to the position set by the command position number.
	Command position number	PC1~PC256	This signal is used to input the position number of the position to move the actuator to (binary input).
	Forced brake release	BKRL	The brake is forcibly released.
	Pause	*STP	When this signal turns OFF while the actuator is moving, the actuator will decelerate to a stop. The remaining travel is put on hold while the actuator is stopped and will resume when the signal turns ON.
	Reset	RES	Present alarms are reset when this signal turns ON. By turning ON this signal while the actuator is paused (*STP signal is OFF), the remaining travel can be cancelled.
	Servo ON	SON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
	Home return	HOME	Home return operation is performed when this signal is turned ON.
	Teaching mode	MODE	The actuator switches to the teaching mode when this signal turns ON. The mode will not change unless the CSTR, JOG+ and JOG- signals are all OFF and the actuator is not operating.
	Jog/inching switching	JISL	The actuator can be jogged with a JOG+ or JOG- command while this signal is OFF. The actuator operates by inching with a JOG+ or JOG- command while this signal is ON.
	Jog	JOG + JOG –	When the JISL signal is OFF, the actuator jogs in the positive direction upon detection of the ON edge of the JOG+ signal, or in the negative direction upon detection of the ON edge of the JOG- signal. The actuator decelerates to a stop if the OFF edge is detected while jogging in each direction. The actuator operates by inching when the JISL signal is ON.
	Current position write	PWRT	When a position number is specified and this signal is turned ON for 20 ms or more in the teaching mode, the current position is written to the specified position number.
	Start signal	ST0~ST6	In the solenoid mode, the actuator moves to the specified position when this signal turns ON.
Out put	ositioning complete	PEND/INP	This signal turns ON when the actuator reaches the positioning band after moving. The PEND signal does not turn OFF even when the actuator moves beyond the positioning band, but the INP signal turns OFF. A parameter is used to switch between PEND and INP.
	Completed position number	PM1~PM256	The position number of the position reached upon completion of positioning is output (by a binary signal).
	Home return complete	HEND	This signal turns ON upon completion of home return. It will remain ON until the home position is lost.
	Zone signal 1	ZONE1	This signal turns ON when the current position of the actuator falls within the parameter-set range.
	Zone signal 2	ZONE2	
	Position zone	PZONE	This signal turns ON when the current position of the actuator enters the range set in the position data table while moving to a position. This signal can be used with ZONE1, but the PZONE signal is effective only when moving to a set position.
	Alarm	*ALM	This signal remains ON while the controller is normal, and turns OFF when an alarm occurs.
	Moving	MOVE	This signal is ON while the actuator is moving (also during home return and push-motion operation).
	Servo ON	SV	This signal is ON when the servo is ON.
	Emergency stop output	*EMGS	This signal is ON when the controller is not in the emergency stop mode, and turns OFF when an emergency stop is actuated.
	Teaching mode output	MODES	This signal turns ON when the actuator enters the teaching mode due to an input of the MODE signal. It turns OFF when the actuator returns to the normal mode.
	Write complete	WEND	This signal is OFF immediately after switching to the teaching mode, and turns ON the moment the writing per the PWRT signal is completed. This signal also turns OFF when the PWRT signal turns OFF.
	Current position number	PE0~PE6	This signal turns ON when the actuator completes moving to the target position in the solenoid mode.
	Limit switch output	LS0~LS2	This signal turns ON when the current position of the actuator enters the positioning band (±) around the target position. If the home return has been completed, this signal is output even before a move command is issued or the servo is OFF.
	Load output judgment status	LOAD	This signal turns ON when the in-certification-range command torque exceeds the threshold.
	Torque level status signal	TRQS	This signal turns ON when the motor current reaches the threshold.
	Minor failure alarm	*ALML	This signal is output when a message-level alarm generates.

(Note) In the table above, * indicates a negative logic signal.

I/O Wiring Diagram

PIO 8-point Type (ERC3 and PLC Connected Directly)



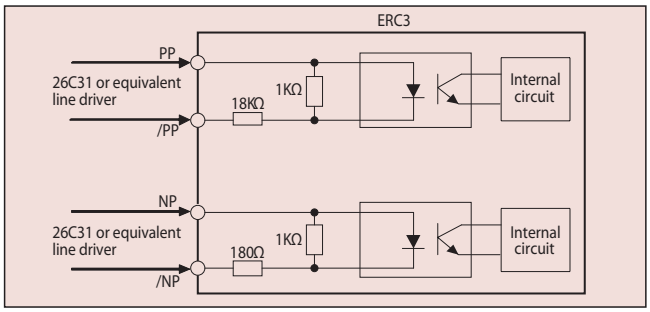
■Pulse-train control mode

I/O specification (Pulse-train type)

■Input Part

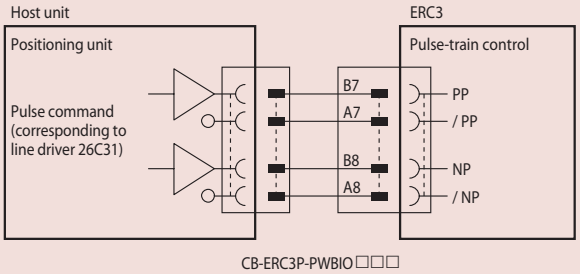
Code	Remarks
Differential input voltage range	26C31 or equivalent
Maximum cable length	Differential line driver method: 10m max. Open collector method (AK-04 used): 2m max.
Maximum number of input pulses	Differential line driver method: 200 kpps max. Open collector method (AK-04 used): 60kpps max.

* If the user-side I/O is of open collector type, use the AK-04.

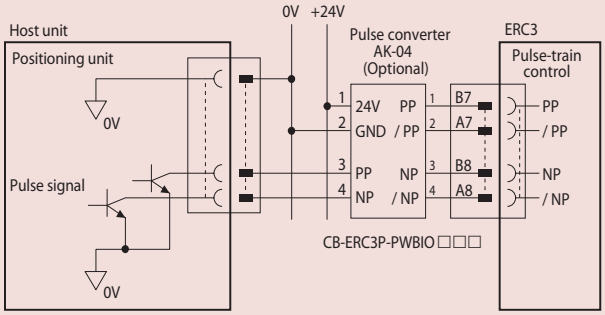


Pulse-train Control Circuit

● Host Unit = Differential Type



● Host Unit = Open Collector Type



* The AK-04 (optional) is needed to input pulses.
* Use the same power supply for open collector input/output to/from the host and for the AK-04.

I/O Signals for the Pulse-train Control Mode

The table below lists the signal assignments for the flat cable for the pulse-train control mode. Connect an external device (such as PLC) according to this table.

[1] Positioning Operation - PIO Pattern: 0

Pin number	Category	I/O number	Signal abbreviation	Signal name	Description of function
A1	Frame ground		FG	—	Frame ground.
B1	+24 V for control power supply		CP	—	+24 V of the control power supply is input.
A2				—	
B2	0 V for control power supply		GND	—	0 V of the control power supply.
A3	External brake release input		BK	—	This signal is used to release the brake externally. The brake is released when +24 V is input.
B3	+24 V for motor power supply		MP	—	+24 V of the motor power supply is input.
A4	Emergency stop input		EMG	—	Input signal for emergency stop.
B4	0 V for motor power supply		GND	—	+24 V of the motor power supply is input.
A5					
B5					
A6					
B6					
A7			/PP	Command pulse	
B7			PP	Command pulse	
A8			/NP	Command pulse	
B8			NP	Command pulse	
A9	Input	IN0	SON	Servo ON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
B9		IN1	TL	Torque limit selection	When this signal is turned ON, the motor torque is limited to the value set by a parameter.
A10		IN2	HOME	Home return	Home return operation is performed when this signal is turned ON.
B10		IN3	RES	Reset	Present alarms are reset when this signal is turned ON.
A11		IN4	—		
B11		IN5	—		
A12	Output	OUT0	SV	Servo ON status	This signal turns ON when the servo is ON.
B12		OUT1	INP	Positioning complete	This signal turns ON when the amount of remaining travel pulses in the deviation counter falls within the positioning band.
A13		OUT2	HEND	Home return complete	This signal turns ON upon completion of home return.
B13		OUT3	*ALM	Controller alarm status	This signal turns ON when the controller is normal, and turns OFF when an alarm generates.

* indicates a negative logic signal. Negative logic signals are normally ON while the power is supplied, and turn OFF when the signal is output.

[2] Push-motion Operation - PIO Pattern: 1

Pin number	Category	I/O number	Signal abbreviation	Signal name	Description of function
A1	Frame ground		FG	—	Frame ground.
B1	+24 V for control power supply		CP	—	+24 V of the control power supply is input.
A2				—	
B2	0 V for control power supply		GND	—	0 V of the control power supply.
A3	External brake release input		BK	—	This signal is used to release the brake externally. The brake is released when +24 V is input.
B3	+24 V for motor power supply		MP	—	+24 V of the motor power supply is input.
A4	Emergency stop input		EMG	—	Input signal for emergency stop.
B4	0 V for motor power supply		GND	—	+24 V of the motor power supply is input.
A5					
B5					
A6					
B6					
A7			/PP	Command pulse	
B7			PP	Command pulse	
A8			/NP	Command pulse	
B8			NP	Command pulse	
A9	Input	IN0	SON	Servo ON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
B9		IN1	TL	Torque limit selection	When this signal is turned ON, the motor torque is limited to the value set by a parameter.
A10		IN2	HOME	Home return	Home return operation is performed when this signal is turned ON.
B10		IN3	RES	Reset	This signal serves as a reset signal when the torque is not limited (torque TL signal is OFF). When this signal turns ON, present alarms are reset.
			DCLR	Deviation counter clear	This signal serves as a deviation counter signal when the torque is limited (torque TL signal is ON). This signal clears the deviation counter.
A11		IN4	—		
B11		IN5	—		
A12	Output	OUT0	SV	Servo ON status	This signal turns ON when the servo is ON.
B12		OUT1	INP	Positioning complete	This signal serves as a positioning complete signal when the torque is not limited (torque TL signal is OFF). It turns ON when the remaining travel pulses in the deviation counter are within the range of positioning band.
			TLR	Torque limited	This signal serves as a torque limited signal when the torque is limited (torque TL signal is ON). If the torque is limited, this signal turns ON when the torque limit is reached.
A13		OUT2	HEND	Home return complete	This signal turns ON upon completion of home return.
B13		OUT3	*ALM	Controller alarm status	This signal turns ON when the controller is normal, and turns OFF when an alarm generates.

*indicates a negative logic signal. Negative logic signals are normally ON while the power is supplied, and turn OFF when the signal is output.

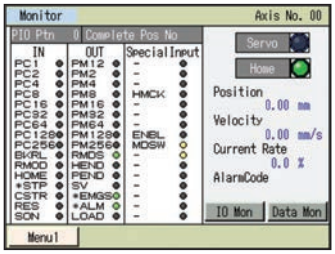
Options

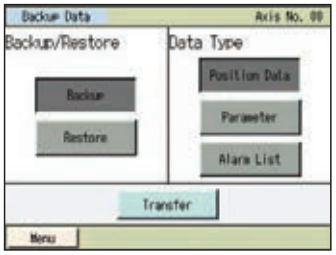
Touch-panel Teaching Pendant for Position Controller

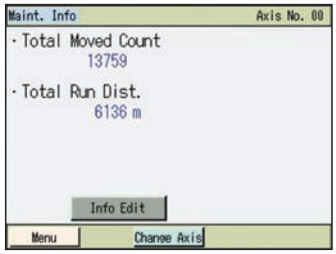
Developed based on the design of the popular CON-PT series adopting an easy-to-use interactive touch-panel menu screen, this new data input device supports various functions offered by the ERC3 series controller.

1. Color screen for greater ease of view
2. Supporting the takt time minimization function and maintenance information checking/ input functions of the ERC3 series.
3. Position, parameters and other data can be saved in a SD card
4. Built-in clock function records the date & time of each event; data can then be saved in a SD card.

CON-PTA





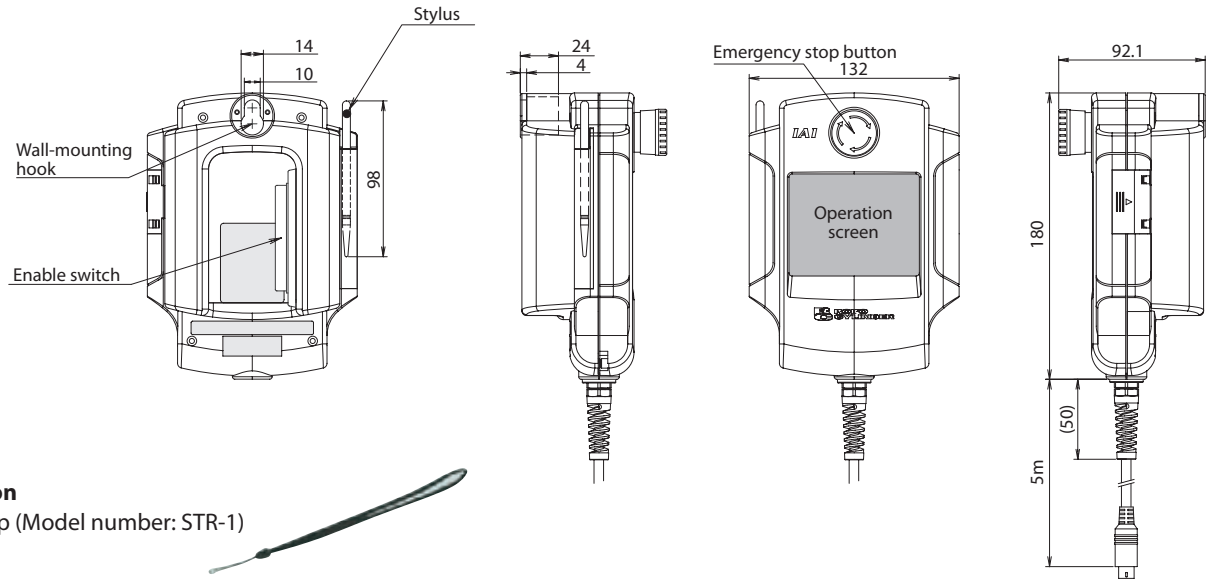


Model Numbers/Specifications

Item	Description		
Model number	CON-PTA-C-ENG	CON-PDA-C-ENG	CON-PGAS-C-S-ENG
Type	Standard type	Enable switch type	Safety-category compliant type
Connectable controllers	ACON/PCON/DCON/SCON/MSCON RACON/RPCON ASEP/PSEP/DSEP/MSEP PMEC ERC2(*)/ERC3		
3-position enable switch	—	○	○
Functions	• Position data input/editing • Moving function (moving to set positions, jogging/inching) • Parameter editing • Monitoring (current position, current speed, I/O signals, alarm code, alarm generation time) • Saving/reading data to/from external SD cards (position data parameters, alarm list) • Takt time minimization function • Maintenance information (total number of movements, total distance travelled, etc.)		
Display	65536 colors (16-bit colors), white LED backlight		
Ambient operating temperature/humidity	0 to 50 °C, 20 to 80 % RH (non-condensing)		
Environmental resistance	IP40 or equivalent		
Mass	Approx. 570 g	Approx. 600 g	
Cable length	5 m		
Accessories	Stylus	Stylus	Stylus, TP adapter (Model number: RCB-LB-TGS) Dummy plug (Model number: DP-4S) Controller cable (Model number: CB-CON-LB005)

(*) Among the ERC2 series, only the actuators bearing 4904 or greater number stamped on the serial number label can be connected.

Name of Each Part/External Dimensions



Option

• Strap (Model number: STR-1)

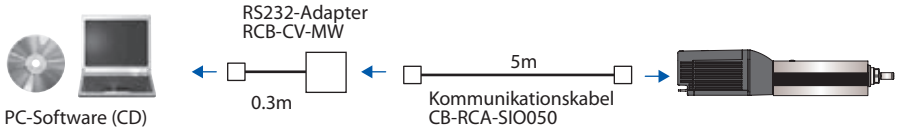
Optionen

PC-Software (nur Windows)

Beschreibung Diese Inbetriebnahme-Software stellt u.a. Funktionen zu Positionseingabe, Testfahrten und Datenüberwachung bereit.
Sie umfaßt alle notwendigen Funktionseinstellungen und hilft so die anfängliche Inbetriebnahmezeit zu verkürzen.
* Dieses Handprogrammiergerät kann verwendet werden, wenn "CON-Typ" als ERC3-Steuerungstyp ausgewählt ist.

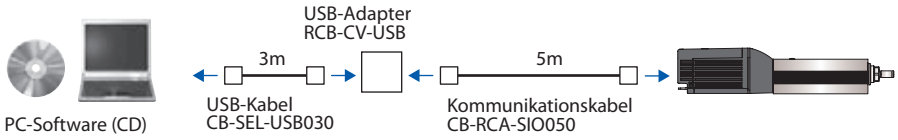
Modell **RCM-101-MW-EU**
Software-Kit mit Kommunikationskabel und RS232-Adapter

Konfiguration



Modell **RCM-101-USB-EU**
Software-Kit mit Kommunikationskabel, USB-Adapter und USB-Kabel

Konfiguration



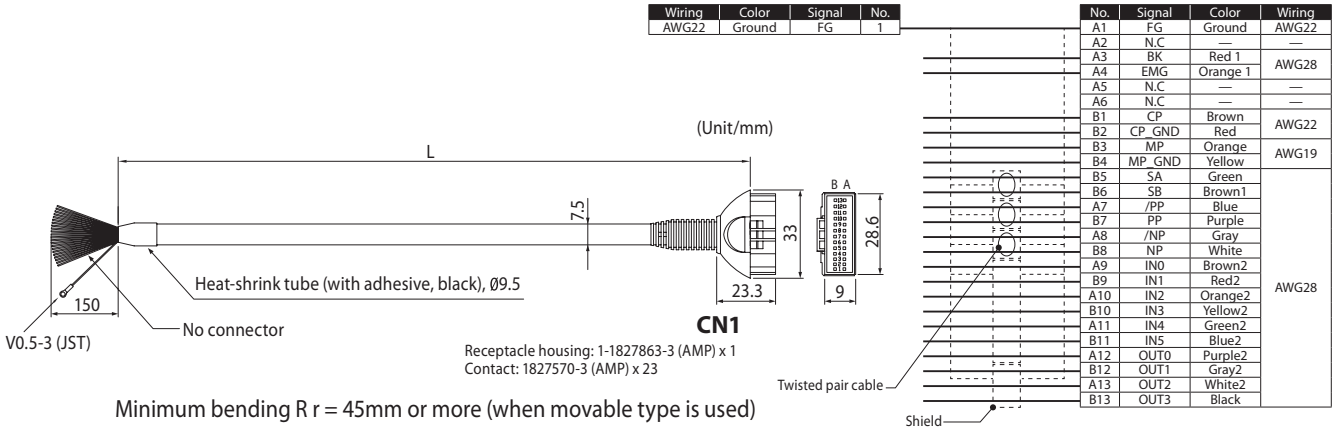
Maintenance Cable

Power & I/O Cable for PIO Type

Model number **CB-ERC3P-PWBIO□□□**

*□□□ indicates the cable length (L). A desired length can be specified up to 10m. Example: 080=8m

* The standard cable is a robot cable.



Wiring	Color	Signal	No.
AWG22	Ground	FG	1

No.	Signal	Color	Wiring
A1	FG	Ground	AWG22
A2	N.C	—	—
A3	BK	Red 1	AWG28
A4	EMG	Orange 1	
A5	N.C	—	—
A6	N.C	—	—
B1	CP	Brown	AWG22
B2	CP_GND	Red	
B3	MP	Orange	AWG19
B4	MP_GND	Yellow	
B5	SA	Green	AWG28
B6	SB	Brown1	
A7	/PP	Blue	
B7	PP	Purple	
A8	/NP	Gray	
B8	NP	White	
A9	IN0	Brown2	
B9	IN1	Red2	
A10	IN2	Orange2	
B10	IN3	Yellow2	
A11	IN4	Green2	
B11	IN5	Blue2	
A12	OUT0	Purple2	
B12	OUT1	Gray2	
A13	OUT2	White2	
B13	OUT3	Black	

Minimum bending R r = 45mm or more (when movable type is used)