

# ERC3 Actuator Slider Type/Rod Type

## First Step Guide Second Edition

Thank you for purchasing our product.

Make sure to read the Safety Guide and detailed Instruction Manual (CD/DVD) included with the product in addition to this First Step Guide to ensure correct use.

This Instruction Manual is original.

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

- Using or copying all or part of this Instruction Manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

## Product Check

This product is comprised of the following parts if it is of standard configuration.

If you find any fault in the contained model or any missing parts, contact us or our distributor.

1. Parts (The option is excluded.)

No.	Part Name	Model	Remarks
1	Actuator Main Body	Refer to "2. How to read the model plate", "3. How to read the model No."	
Accessories			
2	Power Supply • I/O Cable <sup>1</sup>	PIO Converter not in use PIO Converter or Quick Teach in use	CB-ERC3P-PWBIO*** CB-ERC3S-PWBIO***
			***shows the cable length (Example) *** : 020 = 2 [m]
3	Home Position Marking Sticker		Packaged in slider type
4	Nut		Refer to list below
5	First Step Guide		
6	Instruction Manual (CD/DVD)		
7	Safety Guide		

<sup>1</sup> Please refer to the wiring layout for the enclosed motor cable and encoder cable.

(List of Included Nut Type)

Model No.	Nut M10×1.25	Nut M14×1.5
RCP4-RA5C	1	
RCP4-RA6C		1

2. How to read the model plate

Model	MODEL	ERC3-SA5-I-42P-20-50-SE-S-CN-B
Serial number	SERIAL No.	000049893
		MADE IN JAPAN

3. How to read the Model No.

<b>ERC3-SA5-I-42P-20-50-SE-S-CN-B-**</b>	
<Series Name>	<Identification for IAI use only> * There is no identification in some cases
<Type>	<Option>
Slider Type	B : Brake
SA5C	NM : Reversed Home Specification
SA7C	FL : Flange
Rod Type	FT : Foot bracket
RA4C	ABU : Simple Absolute Type (*1)
RA6C	
<Encoder Type>	<Controller Type>
I : Incremental	CN : CON Mode
	MC : MEC Mode
<Motor Type>	<Cable Length>
42P : 42 □Size	N : None
56P : 56 □Size	S : 3m
	M : 5m
<Lead>	X□□ : Specified Length
3 : 3mm	
4 : 4mm	<I/O Type>
6 : 6mm	SE : Serial Communication Type
8 : 8mm	NP : Parallel Communication
12 : 12mm	NPN Type
16 : 16mm	PLN : Pulse Train Control
20 : 20mm	NPN Type
24 : 24mm	PN : Parallel Communication
	PNP Type
	PLP : Pulse Train Control
	PNP Type
	<Stroke>

\*1 : For Simple Absolute Type, I/O type is SE (Serial Communicate Type).

[Refer to the catalog or Instruction Manual (CD/DVD) for specification details.]

## Precautions in Handling

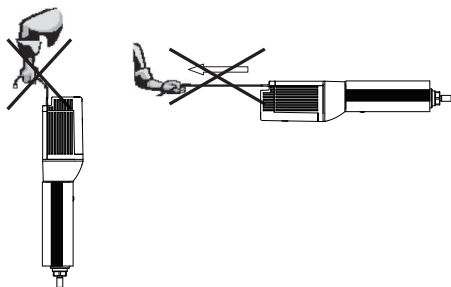
1. Handling of the Packed Product

Take the greatest care in transporting the product, not to bump or drop it.

- An operator should never attempt to carry a heavy package on their own.
- When setting down the package temporarily, keep it horizontal.
- Do not step on the package.
- Do not place on the package a heavy object that may cause the box deformation or apply stress on it.

2. Handling of the Unpacked Product

Do not transport the actuator by holding the motor unit and cable or move it by pulling the cable.



- When the actuator is taken out from the package and handled, hold the base section.
- When transporting the actuator, be careful not to hit it against other objects. In particular, pay attention to the side cover.
- Do not give any unnatural force to any of the sections in the actuator.

## Environments for Installation, Storage and Preservation

1. Installation Environment

Please attempt to avoid installing the product to such places as listed below.

It is generally the environment where a worker can work without any protection gear.

Also, make sure to keep enough space necessary for maintenance work.

- Place where exposed to radiant heat from a huge heat source such as heat treatment
- Place where the ambient temperature goes out of the applicable range from 0 to 40°C
- Place where condensation would occur due to sudden temperature change
- Place where the relative humidity exceeds 85% RH
- Place where exposed to the direct sunlight
- Place where corrosive gas or flammable gas exist
- Place where it contains a lot of dust, salt or iron (Outside of an ordinary assembly plant)
- Place where water, oil (includes oil mist and cutting fluid) or chemical is splashed
- Place where the product main body receives vibration or hit impact

Make sure to have a treatment for blocking when using in the following conditions:

- Place where noise is generated by such facts as static electricity
- Place where exposed to the influence of strong electric or magnetic field
- Place where exposed to the influence of ultraviolet or radiant rays

2. Storage and Preservation Environment

The storage and preservation environment should comply with the same standards as those for the installation environment.

In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no dew condensation forms.

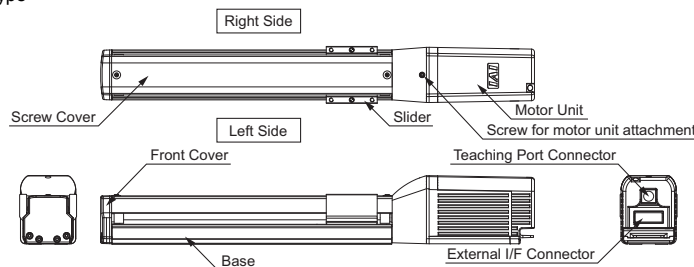
Unless specially specified, moisture absorber protection is not included in the package when the machine is delivered. In the case that the machine is to be stored and preserved in an environment where dew condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.

For storage and preservation temperature, the machine withstands temperatures up to 60°C for a short time, but in the case of the storage and preservation period of 1 month or more, control the temperature to 50°C or less.

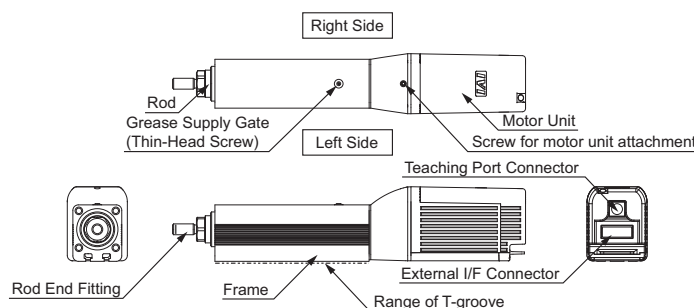
The product should be settled in the horizontal orientation while in storage and reservation. In the case it is stored in the packaged condition, follow the posture instruction if any displayed on the package.

## Names of the Parts

1. Slider Type



2. Rod Type



For the details of dimensions and outlines, refer to the catalog or Instruction Manual (CD/DVD).

## Attachment

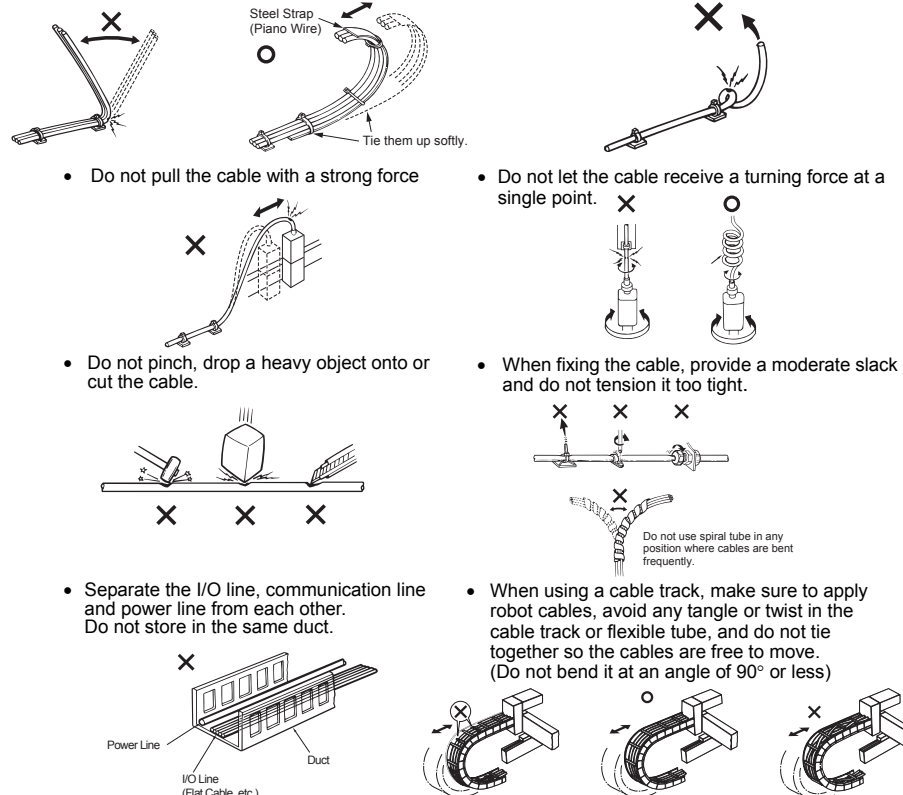
Refer to the Instruction Manual (CD/DVD) for the attachments of the actuator and loads.

[Precautions for Attachments]

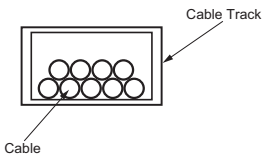
No.	Item	Precautions
1	Installation	<ul style="list-style-type: none"> <li>• If the actuator is installed in horizontally oriented wall mount for the slider types SA5C and SA7C, it is easy for a foreign object to get inside the actuator from the opening on the side of the actuator. And also it becomes easy to splash the grease applied on the guide and ball screw from the opening on the side surface.</li> <li>• Avoid using the actuator with no brake in the vertical orientation.</li> </ul>
2	Attachment Surface	<ul style="list-style-type: none"> <li>• The base has to have a structure with sufficient rigidity to prevent oscillation.</li> <li>• The side and the bottom surfaces of the base of the actuator are the datum for the slider drive. If accuracy for its run is required, use these surfaces as a datum of the installation.</li> </ul> <ul style="list-style-type: none"> <li>• The actuator mounting surface and other surfaces that are used as a datum should be flat enough with an accuracy of machining or equivalent treatment, and the flatness of the mounting surface needs to be ±0.05mm/m or less.</li> <li>• Secure the space where maintenance work can be performed.</li> </ul>
3	Bolt to be used	<ul style="list-style-type: none"> <li>• For the bolts to be used, a high-tensile bolt complying with ISO-10.9 or more is recommended.</li> <li>• If using the tapped holes, use screws with the thread length dimension being less than the effective depth of the holes.</li> <li>• In case the tapped hole is a through hole, be careful so the screw tip does not exceed the surface of the tapped hole.</li> <li>• For the actuator mounting, use a bolt with the dimension of its effective mating length to the tapped hole is as stated below.</li> </ul> <p>If tapped hole on steel → thread length same as nominal diameter If tapped hole on aluminum → thread length 2 times longer than nominal diameter</p>
4	Tightening Torque	<ul style="list-style-type: none"> <li>• Please follow the specification values stated in the Instruction Manual (CD/DVD) for the tightening torque.</li> <li>• Failure to do so may cause an operation problem.</li> </ul>
5	Load Moment and Overhung length	<ul style="list-style-type: none"> <li>• In the case of slider Type please follow the specification values stated in the Instruction Manual (CD/DVD) for the load moment and the overhung length. Failure to do so may cause abnormal vibration or noise, and also may remarkably shorten the product life.</li> <li>• Please do not apply any external force from other than rod moving direction (radial load) to the rod. Any perpendicular or radial force to the rod may cause damage to the actuator or operation problem. Equip guide in the direction of the load if any external force from other direction than the rod movement.</li> </ul>
6	Load Attachment to Rod	<ul style="list-style-type: none"> <li>• Do not apply rotation torque on the rod (slide shaft).</li> <li>• Tighten the nut on the rod tip by holding the rod with a wrench or an equivalent tool (such as a backing wrench).</li> </ul>

[Prohibited Items in the Cable Processing]

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



- The cable track capacity for cables to put in should be 60% or less to prevent cables from breaking. (Cable heat is not considered.)



**Note:**

- When the cable is connected or disconnected, make sure to turn off the power to the controller. When the cable is connected or disconnected with the controller power turned ON, it might cause a malfunction of the actuator and result in a serious injury or damage to the machinery.
- When the connector connection is not correct, it would be dangerous because of a malfunction of the actuator. Make sure to confirm that the connector is connected correctly.

## Basic Specifications

### ERC3 Controller Section

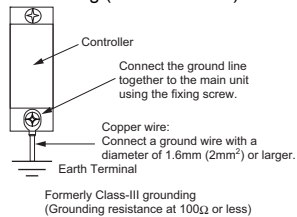
Item		Description
Power-supply Voltage		24V DC $\pm 10\%$
Load Current (including control side current consumption)		High-thrust function is enabled : Rated 3.5A (MAX.4.2A) High-thrust function is disabled : MAX.2.0A
Heat Generation		High-thrust function is enabling : 8.0W    High-thrust function is disabling : 5.0W
Rush Current <sup>(Note 1)</sup>		8.3A
Transient Power Cutoff Durability		MAX. 500 $\mu$ s
Motor Control System		Weak field-magnet vector control
Applicable Encoder		Incremental Encoder    Resolution 800pulse/rev
Actuator Cable Length		MAX. 20m
Serial Communication Interface (SIO Port)		RS485    : 1 channel (based on Modbus Protocol RTU/ASCII) Speed    : 9.6 to 230.4Kbps Control available with serial communication in the modes other than the pulse train
External Interface PIO Specification		Signal I/O dedicated for 24V DC (selected from NPN/PNP) ... Input 6 points max., output 4 points max. Cable length    MAX. 10m
Data Setting and Input		PC Software, Touch Panel Teaching, Quick Teach
Data Retention Memory		Position data and parameters are saved in the nonvolatile memory. (There is no limitation in number of writing)
Operation Mode		Positioner Mode / Pulse Train Control Mode
Number of Positions in Positioner Mode		Standard 8 points, MAX. 16 points (Note) Number of positions differs depending on the selection in PIO pattern.
Pulse Train Interface	Input Pulse	Differential System (Line Driver System) : MAX.200kpps Cable length    MAX. 10m  Open Collector System : Not applicable * If the host applies the open collector output, prepare AK-04 (option) separately to convert to the differential type.
	Command Pulse Magnifications (Electronic Gear: A/B)	1/50 < A/B < 50/1 Setting Range of A and B (set to parameter) : 1 to 4096
	Feedback Pulse Output	None
LED Display (Mounted on motor unit)		Servo ON (GN), Servo OFF (OFF), Emergency Stop (RD), Alarm generated (RD), In automatic servo off mode (Flashing in green)
Insulation Resistance		500V DC    10M $\Omega$ or more
Protection Function against Electric Shock		Class I basic insulation
Cooling Method		Natural air-cooling
Environment	Ambient Air Temperature	0 to 40°C
	Ambient Humidity	85%RH or less (non-condensing)
	Ambient Environment	[Refer to Installation Environment]
	Ambient Storage Temperature	-20 to 70°C (Excluding battery)
	Usage Altitude	1000m or lower above sea level
	Protection Class	IP20
	Vibration Durability	(Test Condition)    Frequency 10 to 57Hz / Swing width : 0.075mm Frequency 57 to 150Hz / Acceleration : 9.8m/s <sup>2</sup> XYZ Each direction Sweep time: 10 min.    Number of sweep: 10 times
	Impact	(Test Condition)    150mm/s <sup>2</sup> , 11ms Semi-sine wave pulse to each of the directions X, Y and Z

Note 1 Rush current passes for about 5ms after the power is injected (at 40°C).

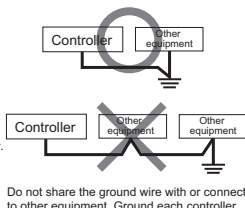
Note that the value of in-rush current differs depending on the impedance of the power supply line.

## Installation and Noise Elimination

### 1. Noise Elimination Grounding (Frame Ground)



Formerly Class-III grounding  
(Grounding resistance at 100 $\Omega$  or less)



### 2. Precautions regarding wiring method

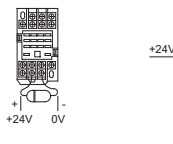
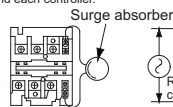
- Wire is to be twisted for the 24V DC power supply.
- Separate the signal and encoder lines from the power supply and power lines.

### 3. Noise Sources and Elimination

Carry out noise elimination measures for power devices on the same power path and in the same equipment.

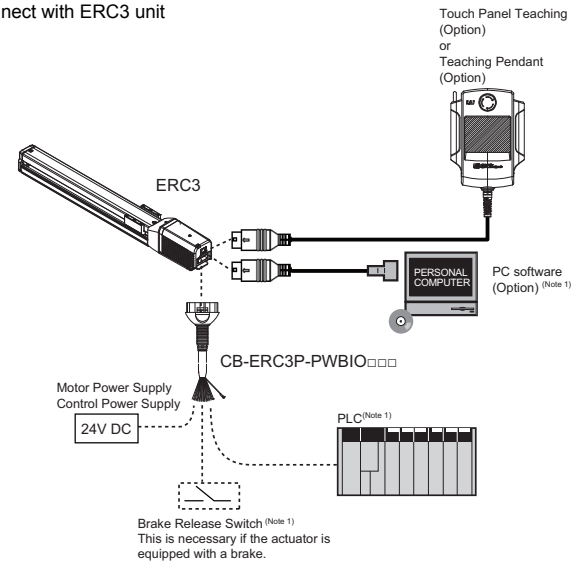
The following are examples of measures to eliminate noise sources.

- AC solenoid valves, magnet switches and relays  
[Measure] Install a Surge absorber parallel with the coil.
- DC solenoid valves, magnet switches and relays  
[Measure] Install a diode parallel with the coil. Use a DC relay with a built-in diode.



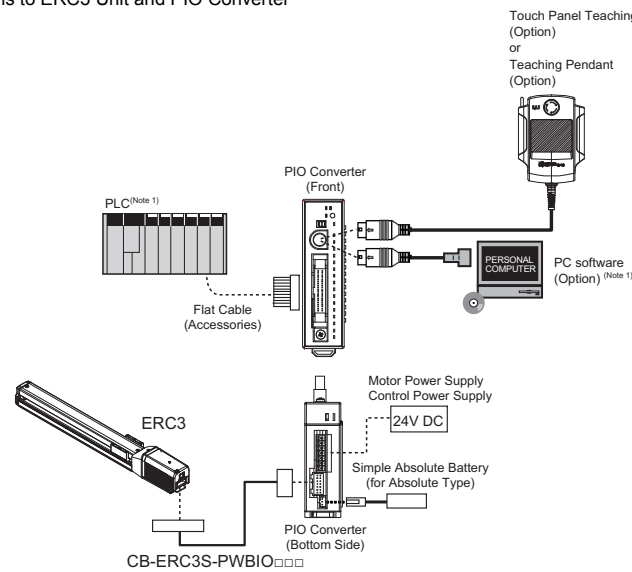
## Connection Diagram

### 1. Patterns to connect with ERC3 unit



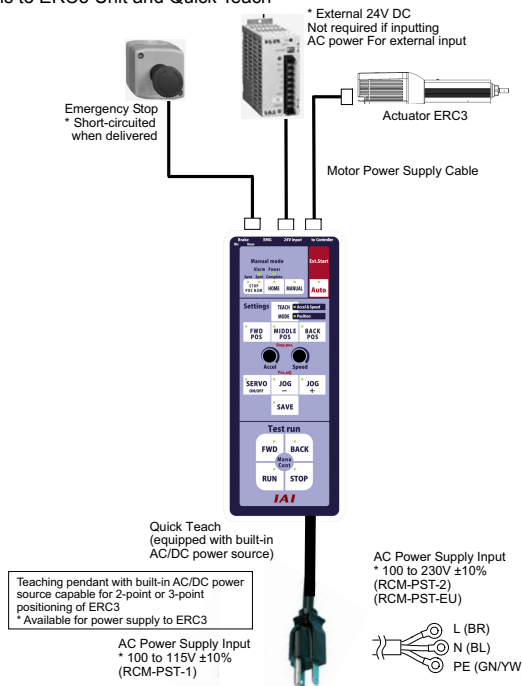
Note 1 : Please prepare separately.

### 2. Connections to ERC3 Unit and PIO Converter



Note 1 : Please prepare separately.

### 3. Connections to ERC3 Unit and Quick Teach



Teaching pendant with built-in AC/DC power source capable for 2-point or 3-point positioning of ERC3  
\* Available for power supply to ERC3

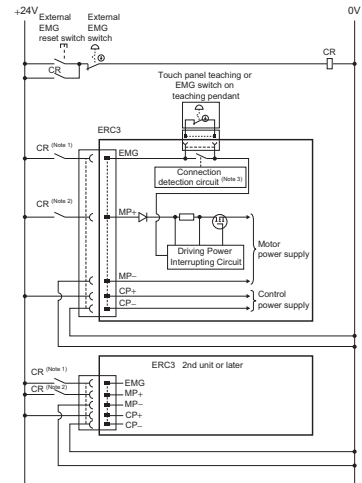
AC Power Supply Input  
\* 100 to 115V  $\pm 10\%$   
(RCM-PST-1)

AC Power Supply Input  
\* 100 to 230V  $\pm 10\%$   
(RCM-PST-2)  
(RCM-PST-EU)

L (BR)  
N (BL)  
PE (GN/YW)

## Power Source and Emergency Stop Circuit

### 1. When connecting with ERC3 main body



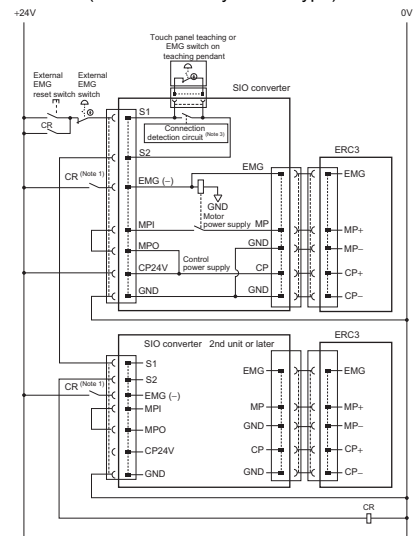
Note 1 : The rating for the emergency stop signal (EMG) to turn ON/OFF at contact CR is 24V DC and 10mA.  
For CR, select the one with coil current 0.1A or less.

Note 2 : When the motor driving source is cut off externally for a compliance with the safety category, connect a contact such as a contactor to the wires between MP+ and MP-.

Note 3 : Controller automatically confirms the teaching pendant is inserted.

(Note) It is not feasible to reflect the emergency stop switch of the touch panel teaching or teaching pendant to the circuit of the system emergency stop.

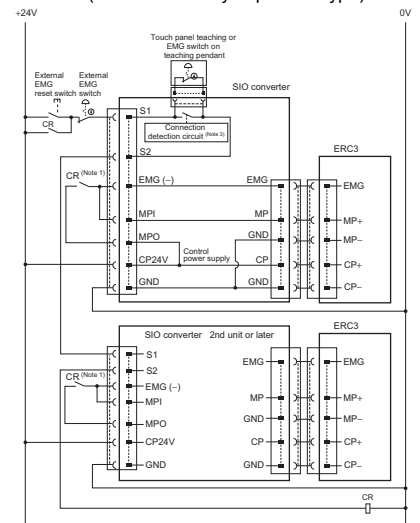
### 2. When connecting to PIO converter (drive cutoff relay built-in type)



Note 1 : The rating for the emergency stop signal (EMG) to turn ON/OFF at contact CR is 24V DC and 10mA.  
For CR, select the one with coil current 0.1A or less.

Note 2 : Controller automatically confirms the teaching pendant is inserted.

### 3. When connecting to PIO converter (drive cutoff relay separated type)



Note 1 : The rating for the emergency stop signal (EMG) to turn ON/OFF at contact CR is 24V DC and 10mA.  
For CR, select the one with coil current 0.1A or less.

Note 2 : Controller automatically confirms the teaching pendant is inserted.

## I/O Signal (PIO)

### Function description for I/O Signals

Category	Signal Abbreviation	Signal Name	Function Description
Input	CSTR	PTP strobe (Start signal)	The actuator will start to move to the position set by the command position number.
	PC1 to PC256	Command position number	Input of the position number to move (binary input)
	BKRL	Brake forcible release	The brake will forcibly be released.
	*STP	Pause	When this signal turns OFF while the actuator is moving, the actuator will decelerate to stop. The remaining movement is retained and will resume when the signal is turned ON again.
	RES	Reset	An alarm will be reset when this signal is turned ON. Also, when it is turned ON in the pause mode (*STP is turned OFF), the remaining movement amount can be cancelled.
	SON	Servo ON	The servo remains ON while this signal is ON, or OFF while this signal is OFF.
	HOME	Home return	The controller will perform home return operation when this signal is turned ON.
	MODE	Teaching mode	The operating mode will change to the teaching mode when this signal is turned ON. The mode will not be switched over unless CSTR, JOG+ and JOG- are all OFF and the actuator operation is stopped.
	JISL	Jog/inching selector	Jog Operation can be performed with JOG+ and JOG- while this signal is OFF. Inching Operation is performed with JOG+ and JOG- when it is ON.
	JOG + JOG -	Jog	Jog Operation is performed to positive direction by detecting ON edge of JOG+ signal and to negative direction by JOG- signal while JISL signal is OFF. The actuator will decelerate and stop if OFF edge is detected while in each Operation. Inching Operation is performed while JISL signal is ON.
Output	PWRT	Current Position Write	When the write position is specified in the teaching mode and this signal has remained ON for 20msec or longer, the controller will write the current position in the specified position field.
	ST0 to ST6	Start Signal	The actuator moves to the commanded position with this signal ON during the electromagnetic valve mode.
	PEND/INP	Position Complete	Turns ON in the positioning band range after actuator operation. The INP signal will turn OFF if the position deviation exceeds the in-position range. PEND and INP can be switched over by the parameter.
	PM1 to PM256	Completion Position No.	The position No. reached after the positioning completion, is output (binary output).
	HEND	Home Return Completion	This signal will turn ON when home return has been completed. It will be kept ON unless the home position is lost.
	ZONE1	Zone Signal 1	Turns ON if the current actuator position is within the range set to the parameter.
	ZONE2	Zone Signal 2	This signal will turn ON when the current actuator position enters the range specified the position data after position movement. The combined use with ZONE 1 is possible, but PZONE becomes effective only for movement to the set position.
	PZONE	Position Zone	
	*ALM	Alarm	Turns ON when the controller is in normal condition, and turns OFF when an alarm is generated.
	MOVE	Moving	Turns ON during the actuator is moving (including home-return operation and pressing operation).
	SV	Servo ON	This signal will remain ON while the servo is ON.
	*EMGS	Emergency Stop Output	This signal remains ON while the controller is under the emergency stop reset condition and turns OFF when the emergency stop condition is enabled. (Regardless of alarms.)
	MODES	Teaching Mode Output	This signal will turn ON while the teaching mode is enabled by the input of the mode signal and will turn OFF when the mode changes to the normal mode.
	WEND	Writing Complete	This signal will turn OFF after the controller has switched to the teaching mode. It will turn ON when writing in response to the PWRT signal has been completed. When the PWRT signal turns OFF, this signal will also turn OFF.
	PE0 to PE6	Current Position Number	In the electromagnetic valve mode, this signal will turn ON when the actuator completes moving to the target position.
	LS0 to LS2	Limit Switch Output	Turns ON when the current actuator position is within the range of positioning band (±) of the target position. It is output even before the movement command and the servo is OFF if the home-return operation is completed.
	*ALML	Light Error Output	Outputs when a message level alarm is generated. (It is necessary to set parameter)
	LOAD	Load output judgment signal	Outputs when current exceeds the value set to "threshold" within range of position data "ZONE+" or "ZONE-" during the pressing operation. Utilize this signal for a judgment of a press-fitting process being properly performed.
	TRQS	Torque level output	Outputs when current of motor reaches the value set to "threshold" by the slider (or rod) being hit to an obstacle during the pressing movement

### 1. When connecting with ERC3 : CON mode

Pin No.	Category	PIO Functions	Parameter No.25 "PIO Pattern" Selection		
			0	1	2
			8-point type	Solenoid valve type	16-point type (Zone signal type)
	Input	Number of positioning points	8 points	3 points	16 points
		Home return signal	O	x	x
		Jog signal	x	x	x
		Teaching signal (Current position writing)	x	x	x
		Brake release	x	x	x
	Output	Moving signal	x	x	x
		Zone signal	O	x	O
		Position zone signal	x	x	x
A1	Frame ground	FG			
B1	Control power unit +24V	CP			
A2					
B2	Control power unit 0V	GND			
A3	External brake release input	BK			
B3	Motor power unit +24V	MP			
A4	Emergency-stop input	EMG			
B4	Motor power unit 0V	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) \*\*\* in codes above shows the signal of the active low.

(Reference) Signal of Active Low

Signal with \*\*\* expresses the signal of active low. A signal of active low is a signal that the input signal is processed when it is turned OFF, output signal is ordinary on while the power is ON, and turns OFF when the signal is output.

### 2. When connecting with ERC3 : MEC mode

Pin No.	Category	PIO Functions	Parameter No.25 "PIO Pattern" Selection	
			0	3
			2-point stop	2-point stop
	Input	Number of positioning points	2-point	3-point
		Home return signal	O	×
		Jog signal	×	×
		Teaching signal (Current position writing)	×	×
		Brake release	×	×
		Moving signal	×	×
	Output	Zone signal	×	×
		Position zone signal	×	×
A1	Frame ground		FG	
B1	Control power unit +24V		CP	
A2			GND	
B2	Control power unit 0V		GND	
A3	External brake release input		BK	
B3	Motor power unit +24V		MP	
A4	Emergency-stop input		EMG	
B4	Motor power unit 0V		GND	
A5				
B5				
A6				
B6				
A7				
B7				
A8				
A9	Input	IN0	ST1	ST1
B9		IN1	ST0(—)	ST0
A10		IN2	RES	RES
B10		IN3	—/SON	—/SON
A11				
B11				
A12	Output	OUT0	LS0/PE0	LS0/PE0
B12		OUT1	LS1/PE1	LS1/PE1
A13		OUT2	HEND/SV	LS2/PE2
B13		OUT3	*ALM/SV	*ALM/SV

(Note) \*\*\* in codes above shows the signal of the active low.

(Reference) Signal of Active Low

Signal with \*\*\* expresses the signal of active low. A signal of active low is a signal that the input signal is processed when it is turned OFF, output signal is ordinary on while the power is ON, and turns OFF when the signal is output.

### 3. When connecting to PIO converter

Pin No.	Category	PIO Functions	Parameter No.25 "PIO Pattern" Selection		
			0	1	2
			Positioning mode	Teaching mode	256-point mode
	Input	Number of positioning points	64 points	64 points	256 points
		Home return signal	O	O	O
		Jog signal	×	O	×
		Teaching signal (Current position writing)	×	O	×
		Brake release	O	×	O
		Moving signal	O	O	×
	Output	Zone signal	O	×	×
		Position zone signal	O	O	O
1A	—		—		
2A	—		—		
3A	—		—		
4A	—		—		
5A	Input	IN0	PC1	PC1	PC1
6A		IN1	PC2	PC2	PC2
7A		IN2	PC4	PC4	PC4
8A		IN3	PC8	PC8	PC8
9A		IN4	PC16	PC16	PC16
10A		IN5	PC32	PC32	PC32
11A		IN6	—	MODE	PC64
12A		IN7	—	JISL	PC128
13A		IN8	—	JOG+	—
14A		IN9	BKRL	JOG-	BKRL
15A		IN10	—	—	—
16A	Output	IN11	HOME	HOME	HOME
17A		IN12	*STP	*STP	*STP
18A		IN13	CSTR	CSTR/PWRT	CSTR
19A		IN14	RES	RES	RES
20A		IN15	SON	SON	SON
1B		OUT0	PM1(ALM1)	PM1(ALM1)	PM1(ALM1)
2B		OUT1	PM2(ALM2)	PM2(ALM2)	PM2(ALM2)
3B		OUT2	PM4(ALM4)	PM4(ALM4)	PM4(ALM4)
4B		OUT3	PM8(ALM8)	PM8(ALM8)	PM8(ALM8)
5B		OUT4	PM16	PM16	PM16
6B		OUT5	PM32	PM32	PM32
7B		OUT6	MOVE	MOVE	PM64
8B		OUT7	ZONE1	MODES	PM128
9B		OUT8	PZONE/ZONE2	PZONE/ZONE1	PZONE/ZONE1
10B		OUT9	—	—	—
11B		OUT10	HEND	HEND	HEND
12B		OUT11	PEND	PEND/WEND	PEND
13B		OUT12	SV	SV	SV
14B		OUT13	*EMGS	*EMGS	*EMGS
15B		OUT14	*ALM	*ALM	*ALM
16B		OUT15	LOAD/TRQS	*ALML	LOAD/TRQS
17B	—		—		
18B	—		—		
19B	—		—		
20B	—		—		

(Note) \*\*\* in codes above shows the signal of the active low.

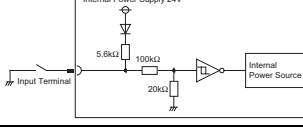
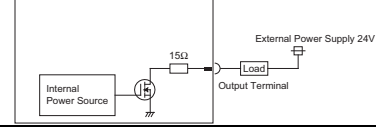
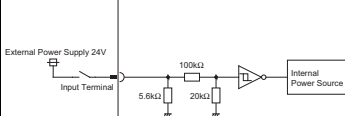
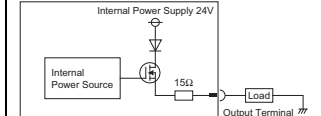
PM1 to PM8 indicate the alarm binary code output signal when an alarm is generated. (Reference) Signal of Active Low  
Signal with \*\*\* expresses the signal of active low. A signal of active low is a signal that the input signal is processed when it is turned OFF, output signal is ordinary on while the power is ON, and turns OFF when the signal is output.

Pin No.	Category	PIO Functions	Parameter No.25 "PIO Pattern" Selection		
			3	4	5
			512-point mode	Solenoid valve mode 1	Solenoid valve mode 2
	Input	Number of positioning points	512 points	7 points	3 points
		Home return signal	O	O	×
		Jog signal	×	×	×
		Teaching signal (Current position writing)	×	×	×
		Brake release	O	O	O
		Moving signal	×	×	×
	Output	Zone signal	×	O	O
		Position zone signal	×	O	O
1A	24V		P24		
2A	24V		P24		
3A	Pulse input		—		
4A			—		
5A	Input	IN0	PC1	ST0	ST0
6A		IN1	PC2	ST1	ST1(JOG+)
7A		IN2	PC4	ST2	ST2
8A		IN3	PC8	ST3	—
9A		IN4	PC16	ST4	—
10A		IN5	PC32	ST5	—
11A		IN6	PC64	ST6	—
12A		IN7	P128	—	—
13A		IN8	PC256	—	—
14A		IN9	BKRL	BKRL	BKRL
15A		IN10	—	—	—
16A		IN11	HOME	HOME	—
17A		*STP	*STP	*STP	—
18A		CSTR	—	—	—
19A		RES	RES	RES	RES
20A		SON	SON	SON	SON
1B	Output	OUT0	PM1(ALM1)	PE0	LS0
2B		OUT1	PM2(ALM2)	PE1	LS1(TRQS)
3B		OUT2	PM4(ALM4)	PE2	LS2
4B		OUT3	PM8(ALM8)	PE3	—
5B		OUT4	PM16	PE4	—
6B		OUT5	PM32	PE5	—
7B		OUT6	PM64	PE6	—
8B		OUT7	PM128	ZONE1	ZONE1
9B		OUT8	PM256	PZONE/ZONE2	PZONE/ZONE2
10B		OUT9	—	—	—
11B		OUT10	HEND	HEND	HEND
12B		OUT11	PEND	PEND	—
13B		OUT12	SV	SV	SV
14B		OUT13	*EMGS	*EMGS	*EMGS
15B		OUT14	*ALM	*ALM	*ALM
16B		OUT15	LOAD/TRQS	*ALML	*ALML
17B	—		—		
18B	—		—		
19B	—		—		
20B	—		—		

(Note) Shown in ( ) after the signal names above tell the functions performed before the home-return operation. \*\*\* in codes above shows the signal of the active low.

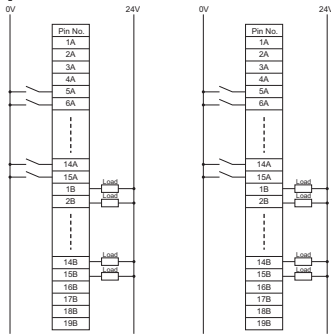
PM1 to PM8 indicate the alarm binary code output signal when an alarm is generated. [Refer to 3.3.2 [7] Binary Output of Alarm Data Output]

\*1 It is invalid before home-return operation.

Specification	Input Section		Output Section	
	Input Voltage	24V DC $\pm 10\%$	Rated Load Voltage	24V DC $\pm 10\%$
	Input Current	5mA / 1 circuit	MAX. current	50mA / 1 point
	ON/OFF voltage	ON voltage MIN.DC18V OFF voltage MAX.DC6V	Residual Voltage	2V or less
	Leak Current	MAX. 1mA/1 point		
	Insulation Type	Not insulated	Insulation Type	Not insulated
NPN	 <p>The diagram shows the input section for an NPN transistor. An 'Input Terminal' is connected to the base of the transistor through a 5.6kΩ resistor. The emitter is connected to ground through a 20kΩ resistor. The collector is connected to an 'Internal Power Source' through a 100kΩ resistor. The transistor is labeled 'T1'.</p>		 <p>The diagram shows the output section for an NPN transistor. The collector of the transistor is connected to an 'Internal Power Source' through a 15Ω resistor. The emitter is connected to ground. The output is taken from the collector, passing through a 'Load' resistor, and is connected to an 'Output Terminal'. An 'External Power Supply 24V' is also shown connected to the output terminal.</p>	
PNP	 <p>The diagram shows the input section for a PNP transistor. An 'External Power Supply 24V' is connected to the emitter of the transistor. The base is connected to an 'Input Terminal' through a 5.6kΩ resistor. The collector is connected to an 'Internal Power Source' through a 100kΩ resistor. The emitter is also connected to ground through a 20kΩ resistor. The transistor is labeled 'T1'.</p>		 <p>The diagram shows the output section for a PNP transistor. The emitter of the transistor is connected to an 'Internal Power Source' through a 15Ω resistor. The collector is connected to ground. The output is taken from the collector, passing through a 'Load' resistor, and is connected to an 'Output Terminal'.</p>	



[When connecting to PIO converter]

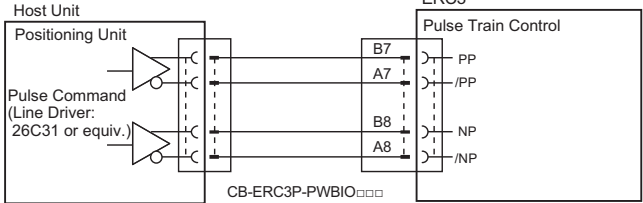


## Operation in Pulse Train Control Mode (function for PLN and PLP Types only)

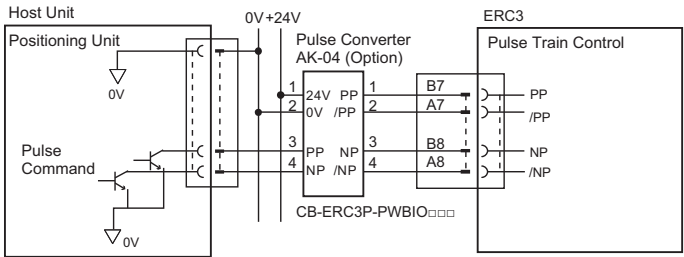
### Pulse Train Input and Output Interface

Category	Signal Abbreviation	Signal Name	Function Description
Input	PP, /PP	Command Pulse Input	Inputs the command pulse train. Input pulse frequency differs depending on the type. [Refer to Basic Specifications]
	NP, /NP		

#### • When Host Unit is Differential System



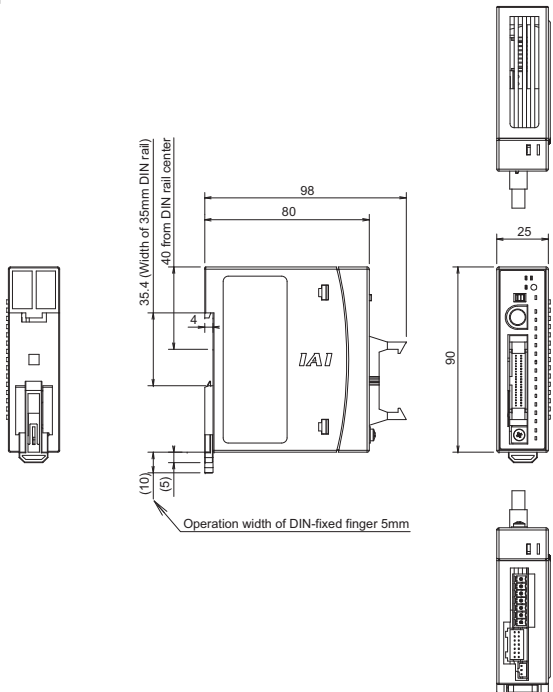
#### • When Host Unit is Open Collector System [AK-04 option is required]



Note1 : Use the same power source (0V) for the host open collector output, AK-04.

## PIO converter (Option)

[External Dimensions]

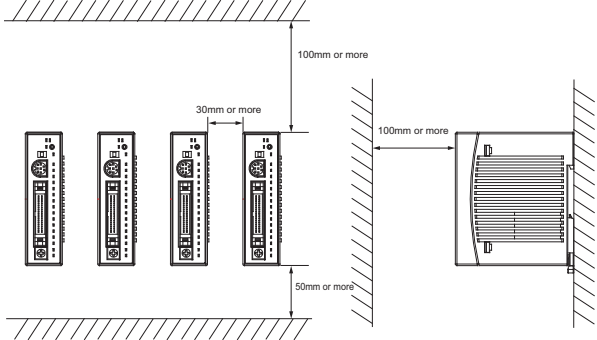


[Specification]

Item	Description
Number of controlled axes	ERC3 1-axis
Power-supply Voltage	24V DC $\pm 10\%$
Control Power Capacity	MAX. 0.8A
Heat Generation	1.3W
Transient Power Cutoff Durability	MAX. 500 $\mu$ s
Serial Communication Interface (SIO Port)	RS485 : 1 channel (based on Modbus Protocol RTU/ASCII) Speed : 9.6 to 230.4Kbps Control available with serial communication in the modes other than the pulse train
External Interface	PIO Specification Signal I/O dedicated for 24V DC (selected from NPN/PNP) ... Input 16 points max., output 16 points max. Cable length MAX. 10m
Data Setting and Input	PC Software, Touch Panel Teaching, Teaching Pendant
Operation Mode	Positioner Mode
Number of Positions in Positioner Mode	Standard 64 points, MAX. 512 points (Note) Number of positions differs depending on the selection in PIO pattern.
LED Display (mounted on Front Panel)	Status indicator LEDs Green Light is turned ON. : Servo ON Flashing in green : In automatic servo OFF mode Red Light is turned ON. : Alarm generated Absolute Battery Status Display LEDs GN : Fully Charged OR : Charging Operation RD : Unconnected Absolute Reset Status Display LEDs GN : Absolute Reset Complete RD : Absolute Reset Incomplete ST0 to ST16 (Option) 4 types of displays are available by changing over the switch Command current ratio, Alarm code, PIO input status and PIO output status
Electromagnetic Brake Compulsory Release Switch (mounted on Front Panel)	Switching NOM (standard)/BK RLS (compulsory release)
Insulation Resistance	500V DC 10M $\Omega$ or more
Protection Function against Electric Shock	Class I basic insulation
Cooling Method	Natural air-cooling
Environment	Ambient Air Temperature 0 to 40°C
	Ambient Humidity 85%RH or less (non-condensing)
	Ambient Environment [Refer to Installation Environment]
	Ambient Storage Temperature -20 to 70°C (Excluding battery)
	Usage Altitude 1000m or lower above sea level
	Protection Class IP20
	Vibration Durability Frequency 10 to 57Hz / Swing width : 0.075mm Frequency 57 to 150Hz / Acceleration : 9.8m/s <sup>2</sup> XYZ Each direction Sweep time: 10 min. Number of sweep: 10 times
Weight	103g or less, 287g or less for Simple Absolute Type (including 190g for battery)
External Dimensions	25W $\times$ 90H $\times$ 98D [mm]

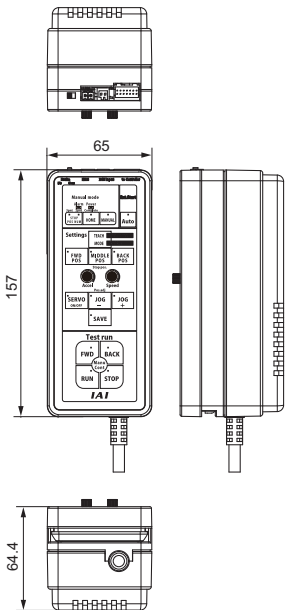
[Installation]

Design and Build the system considering the size of the controller box, location of the controller and cooling factors to keep the ambient temperature around the controller below 40°C



## Quick Teach (Option)

[External Dimensions]



[Specification]

Specification Item	RCM-PST-0	RCM-PST(PS)-1	RCM-PST(PS)-2	RCM-PST(PS)-EU
Number of Controlled Axes	1-axis			
Power-supply Voltage	24V DC $\pm 10\%$ (21.6 to 26.4V DC)	Single-phase 100 to 115V AC $\pm 10\%$ (90 to 126.5V AC)	Single-phase 100 to 230V AC $\pm 10\%$ (90 to 253V AC)	
Control Power Capacity	0.5A (MAX)			
Connection	ERC3			
Load Capacity (Motor Power Capacity)	Rated MAX		1.2A 2.0A (Note)	
Power Supply Frequency	50Hz/60Hz			
Protection Function against Electric Shock	Class I basic insulation			
Insulation Strength	1500V AC for 1 min			
Insulation Resistance	500V DC 10M $\Omega$ or more			
Pollution Degree	Pollution Degree 2			
Rush Current	—	MAX. 30A (It depends on the power supply environment. Take the values as a reference.)	MAX. 15A	
Leak Current	—	0.5mAmax	0.75mAMax	
Heat Generation	2W	11W		
Ambient Temperature Range	0°C to 40°C			
Ambient Humidity Range	10 to 85% (non-condensing)			
Ambient Humidity	There should be no corrosive gas.			
Storage Temperature Range	-20°C to 60°C			
Ambient Storage Humidity	90%RH or less (non-condensing)			
Protection Class	IP20			
Maximum Operation Height	2000m			
Vibration	5 $\leq f < 9$ 1.75mm (continuous), 3.5mm (continuous) 9 $\leq f \leq 150$ 4.9m/S <sup>2</sup> (continuous), 9.8m/S <sup>2</sup> (intermittent) XYZ Each direction			
Cooling Method	Natural air-cooling			
Cable Length	Actuator cable : 10m or less AC Cable : 2m			
Product Size	65(W) $\times$ 157(H) $\times$ 21.6(D)	65(W) $\times$ 157(H) $\times$ 64.4(D)		
Weight	120g	540g	535g	
Connection cable excluded				

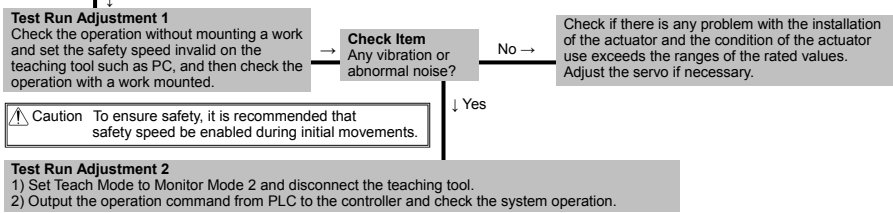
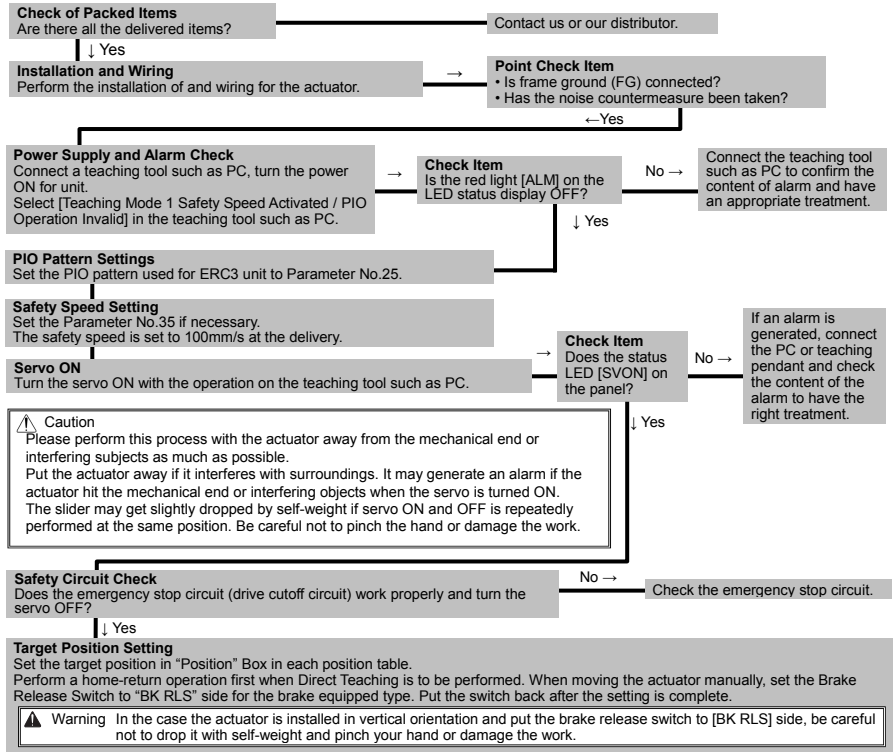
Item	RCM-PST-0	RCM-PST-1	RCM-PST-2/RCM-PST-EU
Control Power Input	24V DC $\pm 10\%$	100 to 115V AC $\pm 10\%$	100 to 230V AC $\pm 10\%$
Motor Power Input	24V DC $\pm 10\%$	100 to 115V AC $\pm 10\%$	100 to 230V AC $\pm 10\%$
Power Supply Cable (2m)	–	3-pin plug cable with ground line	Ring tongue terminal (M4) cable with ground line
Connector	JST S14B-PADSS-1		
Number of Controllable Axes	1-axis		
Operation Method	For position controller		
Number of Positions	2 points or 3 points		
Communication Protocol	Serial communication RS485		
Baud Rate	230400bps		
Emergency Stop Function	Equipped		
Emergency Stop Line Output	24V output of emergency stop line		
Operation at Emergency Stop	Motor power stop		
LED Indication	Power, Error, Selection of modes		
Axis No. Setting	None		
Brake Control	24V brake operation using control power supply		
Brake Release Method	ON/OFF of brake release switch on side		
CPU ROM Capacity	512KB		
Update Function	Onboard programming available via SIO		
Internal SRAM Capacity	40KB		
CE Certification	Expected to acquire CE certification soon		

Note) The excitation detection operation is performed after the power is input. In this case the current becomes the maximum. (Normal : 100ms)  
However, a current of approx. 6.0 A flows if the motor driving power is turned on again after its shutdown. (1 to 2ms) Also, it is not applied for the boost circuit.

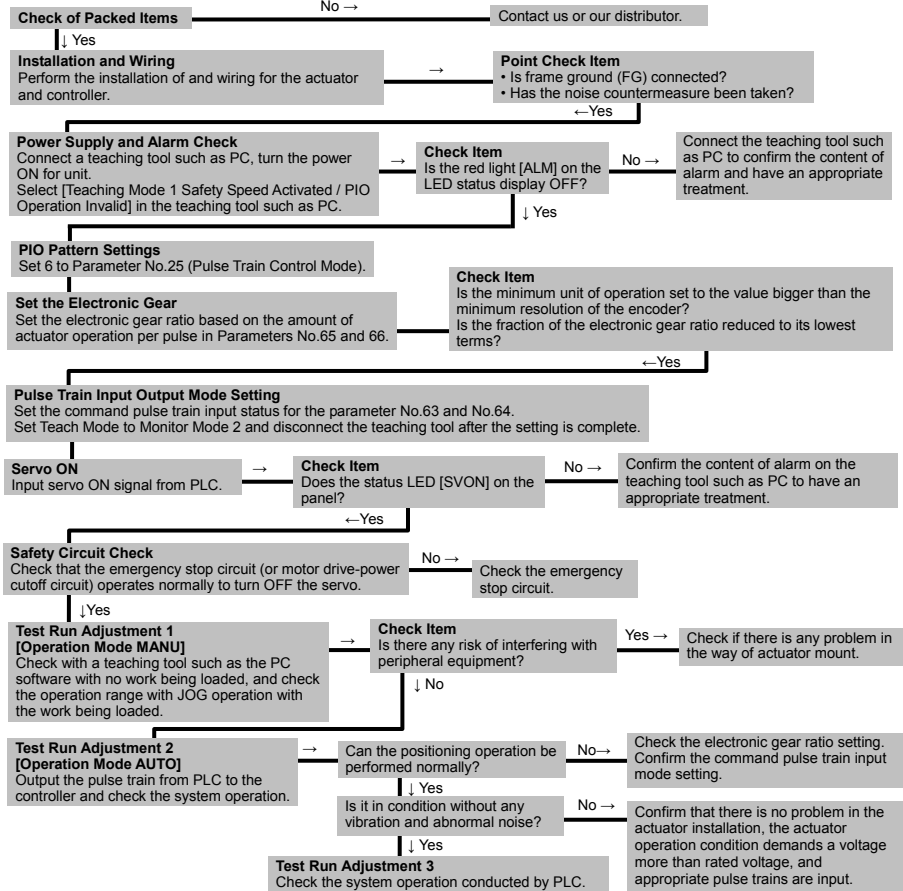
## Starting Procedures

When using this product for the first time, work while making sure to avoid omission and incorrect wiring by referring to the procedure below.

### 1. PIO



### 2. Pulse Train Control



#### ● Action to Take When Error Occurred

Shown below are the alarms that you may often see after power up. Have an appropriate treatment following the instructions below.

Please refer to the Instruction Manual for other alarms.

Error Code	Error Description	Cause and Treatment
069	Real Time Clock Operation Stop Detection	It indicates that the calendar function is stopped in PIO converter and the current time data has been lost. Reset the clock settings again from the teaching tool.
0B8	Excitement Detection Error	The detection of excitation is conducted when the servo is turned ON for the first time after the power is supplied. The status is that the detection did not complete even after a certain time (set in Parameter No.29) was passed. 1) Connection error or wire breakage of motor/encoder cables 2) Brake is not released (when equipped with a brake). 3) Load to the motor is high due to external force. 4) Power was turned on while touching to the mechanical end. 5) The slide resistance of the actuator itself is large.
0E5	Encoder Receive Error	This error code appears when the right signal was not received from the encoder side to the controller command. Check if any wire breakage on a connector and the condition of wire connections. If no error is generated under the condition that the power to all the peripheral equipment is shut and operate only this ERC3, noise can be considered as the cause of the problem.
0EE	Absolute Encoder Error Detection 2	This error code appears when the absolute encoder PCB cannot detect the position information properly. The voltage for the absolute data battery is dropped. Check the battery alarm output on PIO, and if it is off, replace the battery. Perform Absolute Reset after the replacement. Check the encoder cable connection.
20A	Servo OFF While in Operation	It shows the operation command was generated in the condition that the servo is OFF. Resume the operation after turning the servo ON.



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