



ERC3 Actuator Slider Type/Rod Type First Step Guide Sixth Edition

Thank you for purchasing our product.
Make sure to read the Safety Guide and detailed Instruction Manual as well as this First Step Guide to ensure correct use.
This Instruction Manual is original.

Warning : Read the instruction manual carefully and follow the instruction manual when handling this equipment.
Please download the user's manual from our website.
You can download it free of charge. User registration is required for first time users.
URL: www.iai-robot.co.jp/data_di/CAD_MANUAL/
Keep a printout of the introduction manual near the equipment in which this product is installed so that it can be checked at all times, or display it on your computer, tablet terminal, etc. so that you can check it immediately.
If you need a bound copy of the instruction manual, order it from the nearest sales office listed in the First Step Guide or at the end of the instruction manual. It will be provided for a fee.

- 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.)

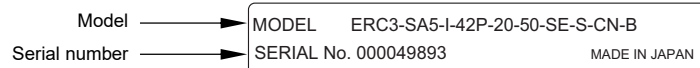
| No. | Part Name | Model | Remarks |
|--------------------|--|---|---|
| 1 | Actuator Main Body | Refer to "How to read the model plate", "How to read the model No." | |
| Accessories | | | |
| 2 | Power Supply • I/O Cable ^{Note 1} | Except for SE Type | CB-ERC3P-PWB10□□□ □□□ shows the cable length (Example) □□□ : 020 = 2[m] |
| | | SE Type | CB-ERC3S-PWB10□□□ |
| 3 | Home Position Marking Sticker | | Packaged in slider type |
| 4 | Nut | | Refer to list below |
| 5 | Safety Guide | M0194 | |

Note 1 Please refer to a cable listed in wiring for a power supply, the I/O cable attached to.

(List of Included Nut Type)

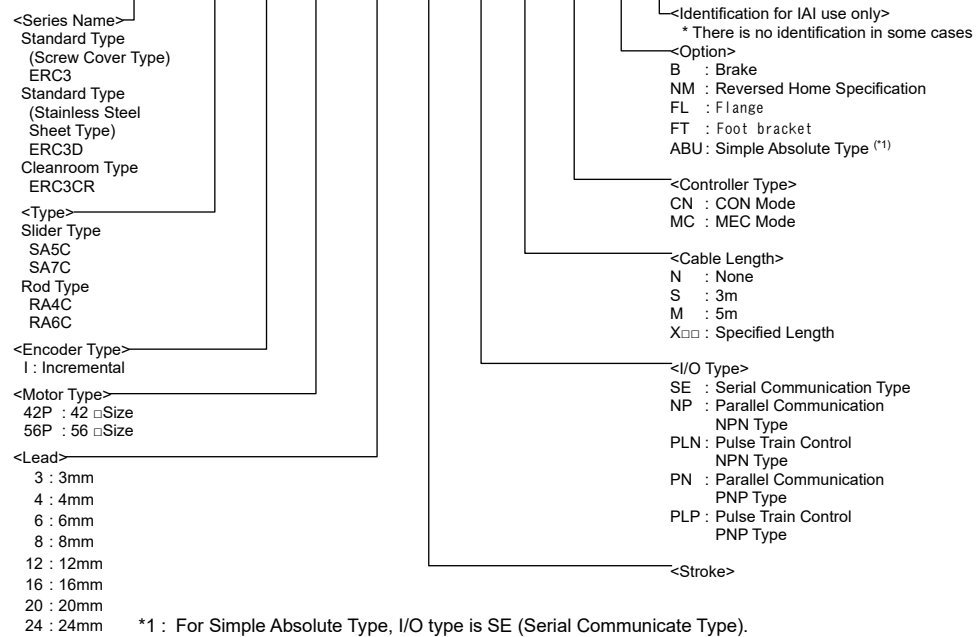
| Model No. | Nut M10x1.25 | Nut M14x1.5 |
|-----------|--------------|-------------|
| ERC3-RA5C | 1 | |
| ERC3-RA6C | | 1 |

2. How to read the model plate



3. How to read the Model No.

ERC3-SA5-I-42P-20-50-SE-S-CN-B-**



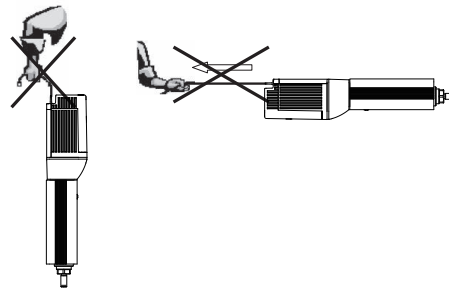
Precautions in Handling

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. 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

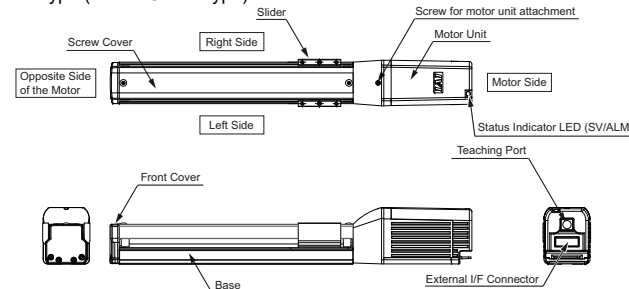
The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no dew condensation forms.

Unless specially specified, moisture absorbcency 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.

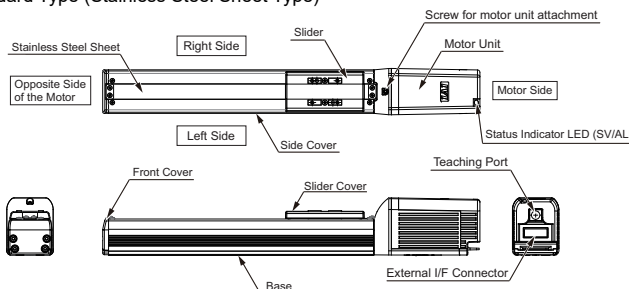
The product should be settled in the horizontal orientation while in storage and reservation. In the case it is stored in the packaged condition, follow the posture instruction if any displayed on the package.

Names of the Parts

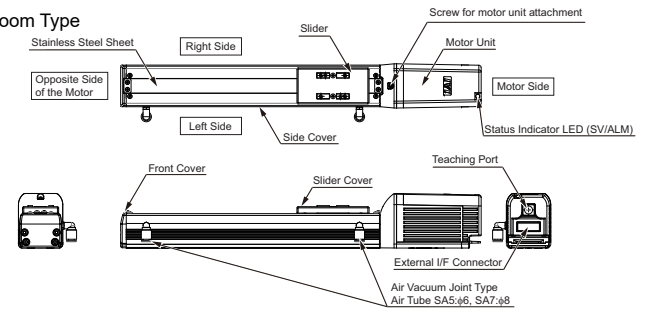
1. Slider Standard Type (Screw Cover Type)



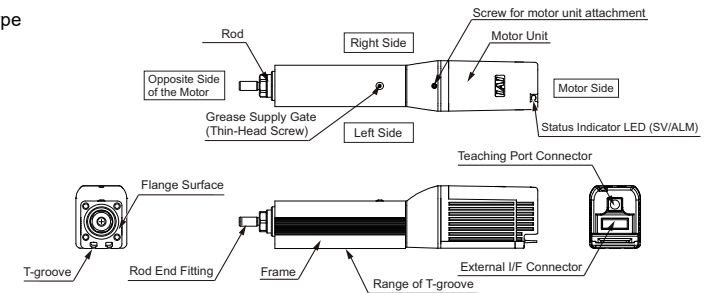
2. Slider Standard Type (Stainless Steel Sheet Type)



3. Slider Cleanroom Type



4. Rod Type



Refer to Catalog or Instruction Manual (ME0297) for the dimensions and profile.

Attachment

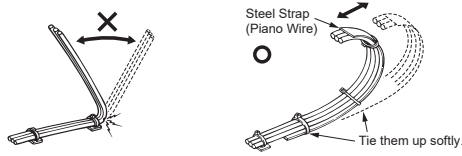
Refer to the Instruction Manual (ME0297) for the attachments of the actuator and loads.

[Precautions for Attachments]

| No. | Item | Precautions |
|-----|---------------------------------|--|
| 1 | Installation | <ul style="list-style-type: none"> • If the actuator is installed in horizontally oriented wall mount for the Slider Standard Type (Screw Cover Type) 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. • Installation of the slider standard type (stainless steel sheet type) and cleanroom types SA5C and SA7C in horizontally oriented wall mount or in ceiling mount may cause the stainless steel sheet to be slacked or displaced. Keeping use of the actuator in such conditions may cause such failures as breakage of the stainless steel sheet. Adjust the sheet condition if necessary in the daily inspections. (Refer to the section for maintenance in instruction manual for how to adjust the stainless steel sheet.) • Avoid using the actuator with no brake in the vertical orientation. • Secure the space where maintenance work can be performed. |
| 2 | Attachment Surface | <ul style="list-style-type: none"> • The base has to have a structure with sufficient rigidity to prevent oscillation. • 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. <ul style="list-style-type: none"> • 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. |
| 3 | Bolt to be used | <ul style="list-style-type: none"> • For the bolts to be used, a high-tensile bolt complying with ISO-10.9 or more is recommended. • If using the tapped holes, use screws with the thread length dimension being less than the effective depth of the holes. • For the actuator mounting, use a bolt with the dimension of its effective mating length to the tapped hole is as stated below. If tapped hole on steel → thread length same as nominal diameter If tapped hole on aluminum → thread length 1.8 times longer than nominal diameter |
| 4 | Tightening Torque | <ul style="list-style-type: none"> • Please follow the specification values stated in the Instruction Manual for the tightening torque. Failure to do so may cause an operation problem. |
| 5 | Load Moment and Overhung length | <ul style="list-style-type: none"> • In the case of slider Type please follow the specification values stated in the Instruction Manual 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. • 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. |
| 6 | Stainless Steel Sheet | <ul style="list-style-type: none"> • Do not attempt to hold the stainless steel sheet directly with hand. Also pay attention not to make a dent mark on the sheet. Stainless steel sheet is easy to get dented because it is thin. Using it with a dent on may cause a breakage. • Wipe away dust or iron particles completely if there is any on the stainless steel sheet. Operation with the stainless steel sheet that has foreign matters on its surface may cause problems such as sheet damage, waviness, etc. inside the slider. • Do not operate the product in an ambient with dust or iron particles. |
| 7 | Load Attachment to Rod | <ul style="list-style-type: none"> • Do not apply rotation torque on the rod (slide shaft). There is a possibility of damaging an inside. • Tighten the nut on the rod tip by holding the rod with a wrench or an equivalent tool (such as a backing wrench). |

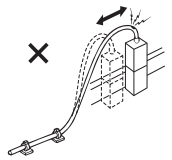
[Prohibited Items in the Cable Processing]

- 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 shorten 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.



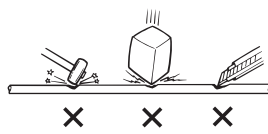
- Do not pull the cable with a strong force

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

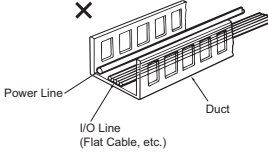


- Do not pinch, drop a heavy object onto or cut the cable.

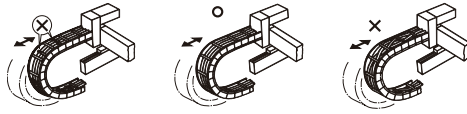
- When fixing the cable, provide a moderate slack and do not tension it too tight.



- Separate the I/O line, communication line and power line from each other. Do not store in the same duct.



- Follow the instructions below when using a cable track.
- If there is an indication to the cable for the space factor in a cable track, refer to the wiring instruction given by the supplier when storing the cable in the cable track.
 - Avoid the cables to get twined or twisted in the cable track, and also to have the cables move freely and do not tie them up. (Arrange the wiring so the cables are not to be pulled when bent.) Do not pile up cables. It may cause faster abrasion of the sheaths or cable breakage.



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.

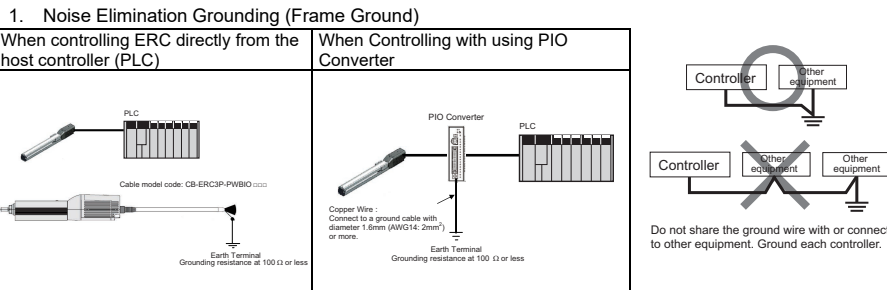
Basic Specifications

| Item | Description | |
|---|---|---|
| Power-supply Voltage | 24V DC ±10% | |
| Load Current (including current consumption for control) | High output setting is enabled (Set in delivery) : 3.5A (MAX. 4.2A) High output setting is disabled : 2.2A | |
| Power Supply for Electromagnetic Brake ^(Note 1) (In the case of the actuator with a brake) | 24V DC ±10% 0.15A (MAX.) | |
| Heat Generation | High output setting is enabled (Set in delivery) : 8.0W High output setting is disabled : 5.0W | |
| Rush Current ^(Note 2) | 8.3A | |
| Transient Power Cutoff Durability | MAX. 500µs | |
| Motor Control System | Weak field-magnet vector control | |
| Applicable Encoder | Incremental Encoder Resolution 800pulse/rev | |
| Actuator Cable Length | MAX. 10m | |
| Serial Communication Interface (SIO Port) | RS485 : 1CH (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 Type | Signal I/O dedicated for 24V DC (selected from NPN/PNP) ... Input 6 points max., output 4 points max. Cable length MAX. 10m |
| | Fieldbus Type | Not applicable |
| Data Setting and Input | PC Software, Teaching Pendant | |
| Data Retention Memory | Position data and parameters are saved in the nonvolatile memory. (There is no limitation in number of writing) | |
| Operation Mode (I/O Type) | SE/NP/PN Positioner Mode PLN/PNP 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 |
| | 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) | 2 colors LED: Servo ON (GN) / Servo OFF (OFF) / Emergency Stop (RD) / Alarm generated (RD) / Automatic servo-off (Flashing in green) | |
| Electromagnetic Brake Compulsory Release Switch | Not equipped on main unit, equipped on PIO Converter (option) | |
| Insulation Resistance | 500V DC 10MΩ or more | |
| Protection Function against Electric Shock | Class I basic insulation | |
| Cooling Method | Natural air-cooling | |

| Item | Description | |
|---------------------------------|----------------------------------|--|
| Environment ^(Note 4) | Surrounding Air Temperature | 0 to 40°C |
| | Surrounding Humidity | 85%RH or less (non-condensing) |
| | Surrounding Environment | [Refer to Installation Environment] |
| | Surrounding Storage Temperature | 0 to 60°C (0 to 50°C if stored for 1 month or more.) |
| | Surrounding Storage Humidity | 85%RH or less (non-condensing) |
| | 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 ² XYZ Each direction Sweep time: 10 min. Number of sweep: 10 times Impact 150mm/s ² , 11mm/s Semi-sine wave pulse to each of the directions X, Y and Z |
| Weight | Refer to the Instruction Manual. | |
| External Dimensions | Refer to the Instruction Manual. | |

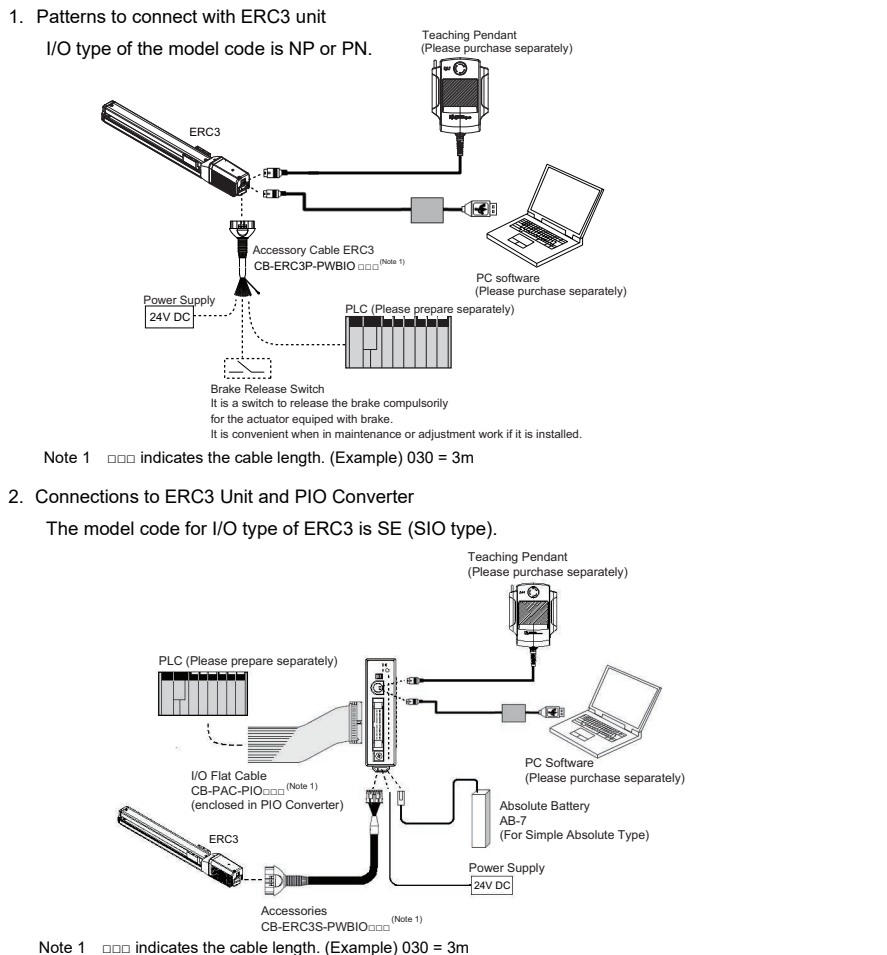
- Note 1 It is the power source to be supplied when compulsorily releasing the brake.
 Note 2 Rush current passes for about 5ms after the power is injected (at 40°C).
 The rush current value varies depending on the impedance of the power line.
 Note 3 If the pulse train applies the open collector output, prepare AK-04 (option) separately to convert to the differential type.
 Note 4 The environmental specifications include the actuator main unit.

Installation and Noise Elimination

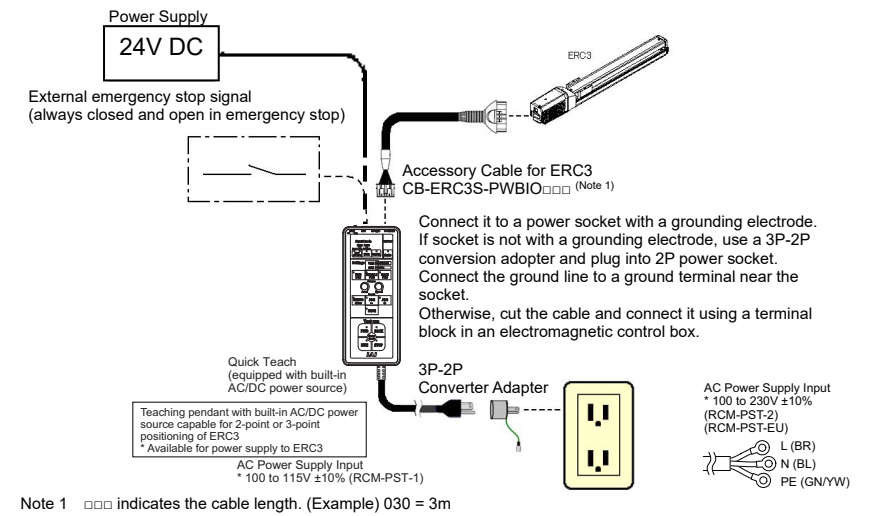


- 2. Precautions regarding wiring method**
- Wire is to be twisted for the 24V DC power supply.
 - Separate the signal and encoder lines from the power supply and power lines.
- 3. Noise Sources and Elimination**
- Carry out noise elimination measures for power devices on the same power path and in the 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.

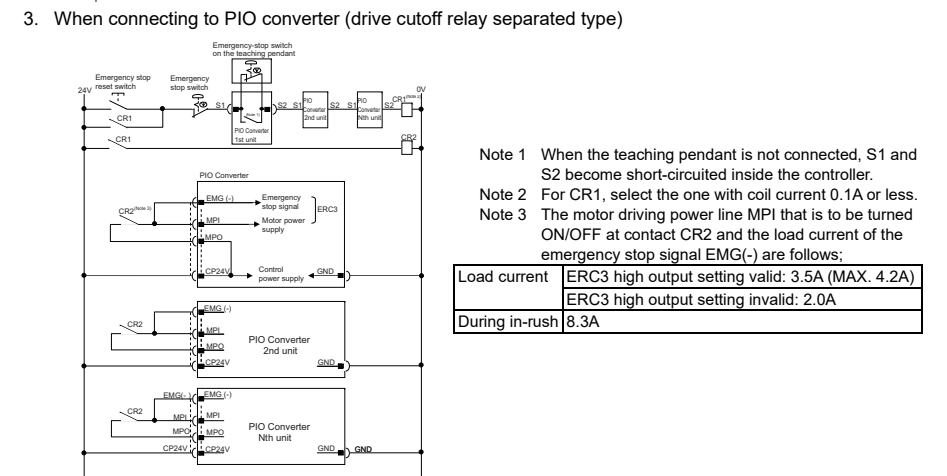
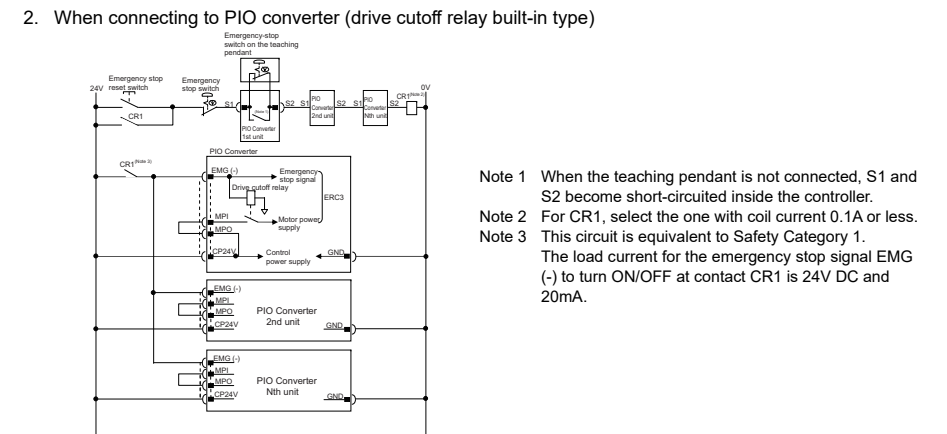
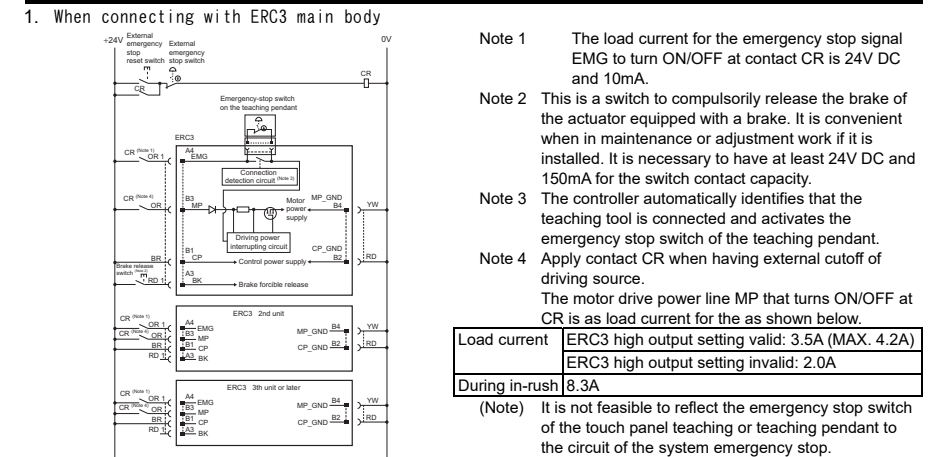
Connection Diagram



3. Connections to ERC3 Unit and Quick Teach



Power Source and Emergency Stop Circuit



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. |
| 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. | |
| Output | 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) | |

1. When connecting with ERC3 : CON mode

| Pin No. | Wire Color | Category | PIO Functions | Parameter No.25 "PIO Pattern" Selection | | | | | |
|---------|------------|----------|--|---|---------------------|---------------|-------|------|-------------|
| | | | | 0 | 1 | 2 | | | |
| | | | | 8-point type | Solenoid valve type | 16-point type | | | |
| Input | | | Number of positioning points | 8 points | 3 points | 16 points | | | |
| | | | Home return signal | ○ | × | × | | | |
| | | | Jog signal | × | × | × | | | |
| | | | Teaching signal (Current position writing) | × | × | × | | | |
| | | | Brake release | × | × | × | | | |
| | | | Moving signal | × | × | × | | | |
| Output | | | Zone signal | ○ | × | ○ | | | |
| | | | Position zone signal | × | × | × | | | |
| | | | Frame ground | FG | | | | | |
| | | | Control power unit +24V | CP | | | | | |
| | | | Control power unit 0V | CP_GND | | | | | |
| | | | External brake release input | BK | | | | | |
| Input | | | IN0 | PC1 | ST0 | PC1 | | | |
| | | | IN1 | PC2 | ST1 | PC2 | | | |
| | | | IN2 | PC4 | ST2 | PC4 | | | |
| | | | IN3 | HOME | RES | PC8 | | | |
| | | | IN4 | CSTR | RES | CSTR | | | |
| | | | IN5 | *STP | *STP | *STP | | | |
| | | | Output | | | OUT0 | PEND | PE0 | PEND |
| | | | | | | OUT1 | HEND | PE1 | HEND |
| | | | | | | OUT2 | ZONE1 | PE2 | PZONE/ZONE1 |
| | | | | | | OUT3 | *ALM | *ALM | *ALM |

*** 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. | Wire Color | Category | Operation pattern | | |
|---------|------------|-------------------------|---|---|--|
| | | | Stopping at 2 points (2-point positioning) | Stopping at 3 points (3-point positioning) | |
| | | | Movement by 1 input between 2 points [Single-solenoid mode] | Movement by 2 input between 2 points [Double-solenoid mode] | Movement by 2 input between 3 points [3-point positioning] |
| A1 | Drain | Frame ground | FG | | |
| B1 | BR | Control power unit +24V | CP | | |
| A2 | - | - | - | | |
| B2 | RD | Control power unit 0V | CP_GND | | |
| A3 | RD 1 | Brake forcible release | BK | | |
| B3 | OR | Motor power unit +24V | MP | | |
| A4 | OR 1 | Emergency-stop input | EMG | | |
| B4 | YW | Motor power unit 0V | MP_GND | | |
| A5 | - | - | - | | |
| B5 | GN | - | - | | |
| A6 | - | - | - | | |
| B6 | BR 1 | - | - | | |
| A7 | BL | - | - | | |
| B7 | PL | - | - | | |
| A8 | GY | - | - | | |
| B8 | WT | - | - | | |
| A9 | BR 2 | IN0 | ST0 | ST0 | |
| B9 | RD 2 | IN1 | RES | ST1 | |
| A10 | OR 2 | IN2 | RES | RES | |
| B10 | YW 2 | IN3 | - | - | |
| A11 | GN 2 | IN4 | - | - | |
| B11 | BL 2 | IN5 | - | - | |
| A12 | PL 2 | OUT0 | LS0/PE0 | LS0/PE0 | |
| B12 | GY 2 | OUT1 | LS1/PE1 | LS1/PE1 | |
| A13 | WT 2 | OUT2 | HEND | LS2/PE2 | |
| B13 | BK | OUT3 | *ALM | *ALM | |

*** 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. | Wire Color | 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 | ○ | ○ | ○ |
| | | | Jog signal | × | ○ | × |
| | | | Teaching signal (Current position writing) | × | ○ | × |
| | | | Brake release | ○ | × | ○ |
| | | | Moving signal | ○ | ○ | × |
| Output | | | Zone signal | ○ | × | × |
| | | | Position zone signal | ○ | ○ | ○ |
| | | | IN0 | PC1 | PC1 | PC1 |
| | | | IN1 | PC2 | PC2 | PC2 |
| | | | IN2 | PC4 | PC4 | PC4 |
| | | | IN3 | PC8 | PC8 | PC8 |
| Output | | | IN4 | PC16 | PC16 | PC16 |
| | | | IN5 | PC32 | PC32 | PC32 |
| | | | IN6 | MODE | MODE | PC64 |
| | | | IN7 | - | JISL | PC128 |
| | | | IN8 | - | JOG+ | - |
| | | | IN9 | BKRL | JOG- | BKRL |
| | | | IN10 | - | - | - |
| | | | IN11 | HOME | HOME | HOME |
| | | | IN12 | *STP | *STP | *STP |
| | | | IN13 | CSTR | CSTR/PWRT | CSTR |
| | | | IN14 | RES | RES | RES |
| | | | IN15 | SON | SON | SON |
| | | | OUT0 | PM1(ALM1) | PM1(ALM1) | PM1(ALM1) |
| | | | OUT1 | PM2(ALM2) | PM2(ALM2) | PM2(ALM2) |
| | | | OUT2 | PM4(ALM4) | PM4(ALM4) | PM4(ALM4) |
| OUT3 | PM8(ALM8) | PM8(ALM8) | PM8(ALM8) | | | |
| OUT4 | PM16 | PM16 | PM16 | | | |
| OUT5 | PM32 | PM32 | PM32 | | | |
| OUT6 | MOVE | MOVE | PM64 | | | |
| OUT7 | ZONE1 | MODES | PM128 | | | |
| OUT8 | PZONE/ZONE2 | PZONE/ZONE1 | PZONE/ZONE1 | | | |
| OUT9 | - | - | - | | | |
| OUT10 | HEND | HEND | HEND | | | |
| OUT11 | PEND | PEND/WEND | PEND | | | |
| OUT12 | SV | SV | SV | | | |
| OUT13 | *EMGS | *EMGS | *EMGS | | | |
| OUT14 | *ALM | *ALM | *ALM | | | |
| OUT15 | *ALML | *ALML | *ALML | | | |

*** 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. | Wire Color | 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 | ○ | ○ | × | |
| | | | Jog signal | × | × | × | |
| | | | Teaching signal (Current position writing) | × | × | × | |
| | | | Brake release | ○ | ○ | ○ | |
| | | | Moving signal | × | × | × | |
| Output | | | Zone signal | × | ○ | ○ | |
| | | | Position zone signal | × | ○ | ○ | |
| | | | 1A | BR-1 | 24V | P24 | |
| | | | 2A | RD-1 | 24V | P24 | |
| | | | 3A | OR-1 | - | - | |
| | | | 4A | YW-1 | - | - | |
| Input | | | IN0 | PC1 | ST0 | ST0 | |
| | | | IN1 | PC2 | ST1 | ST1(JOG+) | |
| | | | IN2 | PC4 | ST2 | ST2>Note1) | |
| | | | IN3 | PC8 | ST3 | - | |
| | | | IN4 | PC16 | ST4 | - | |
| | | | IN5 | PC32 | ST5 | - | |
| | | | IN6 | PC64 | ST6 | - | |
| | | | IN7 | P128 | - | - | |
| | | | IN8 | PC256 | - | - | |
| | | | IN9 | BKRL | BKRL | BKRL | |
| | | | IN10 | - | - | - | |
| | | | IN11 | HOME | HOME | - | |
| | | | IN12 | *STP | *STP | - | |
| | | | IN13 | CSTR | - | - | |
| | | | IN14 | RES | RES | RES | |
| IN15 | SON | SON | SON | | | | |
| Output | | | OUT0 | PM1(ALM1) | PE0 | LS0 | |
| | | | OUT1 | PM2(ALM2) | PE1 | LS1(TRGS) | |
| | | | OUT2 | PM4(ALM4) | PE2 | LS2>Note1) | |
| | | | OUT3 | PM8(ALM8) | PE3 | - | |
| | | | OUT4 | PM16 | PE4 | - | |
| | | | OUT5 | PM32 | PE5 | - | |
| | | | OUT6 | PM64 | PE6 | - | |
| | | | OUT7 | PM128 | ZONE1 | ZONE1 | |
| | | | OUT8 | PM256 | PZONE/ZONE2 | PZONE/ZONE2 | |
| | | | OUT9 | - | - | - | |
| | | | OUT10 | HEND | HEND | HEND | |
| | | | OUT11 | PEND | PEND | PEND | |
| | | | OUT12 | SV | SV | SV | |
| | | | OUT13 | *EMGS | *EMGS | *EMGS | |
| | | | OUT14 | *ALM | *ALM | *ALM | |
| OUT15 | *ALML | *ALML | *ALML | | | | |

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.

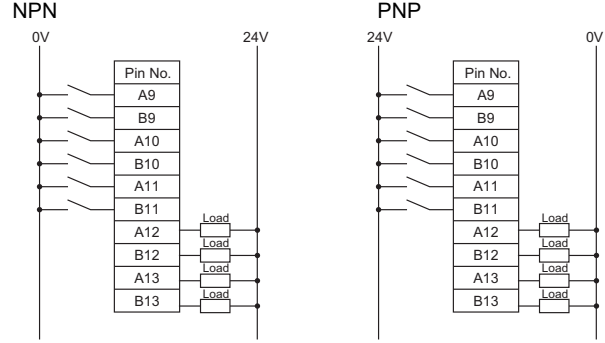
Note 1 It is invalid before home-return operation.

(Reference) Signal of Active Low

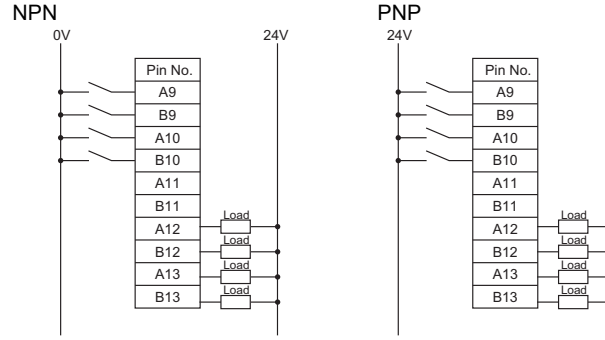
Signal with *** expresses the signal of active low. A signal of active low is a signal that the input signal is processed when it is turned OFF, output signal is ordinary on while the power is ON, and turns OFF when the signal is output.

| Specification | Input Section | | Output Section | |
|-----------------|--|------------------|---|-------------|
| | Input Voltage | 24V DC ±10% | Rated Load Voltage | 24V DC ±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 | Non-isolated from external output signal | | Non-isolated from external input signal | |
| NPN | | | | |
| PNP | | | | |

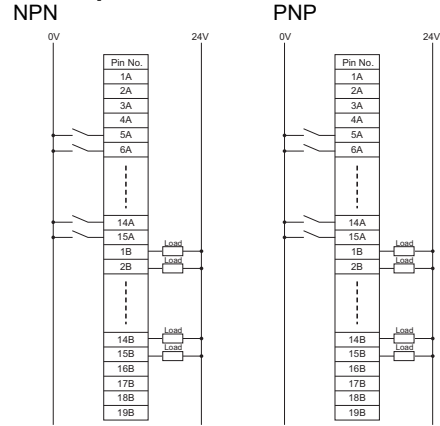
[When Connecting to ERC3 Unit, in CON Mode]



[When Connecting to ERC3 Unit, in MEC Mode]



[When connecting to PIO converter]

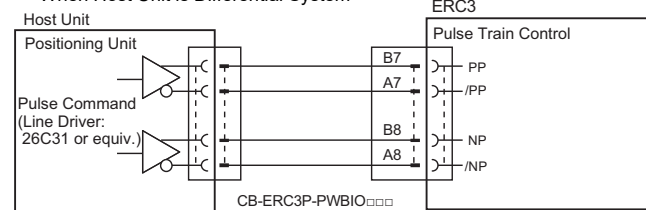


Operation in Pulse Train Control Mode (function for PLN and PLP Types only)

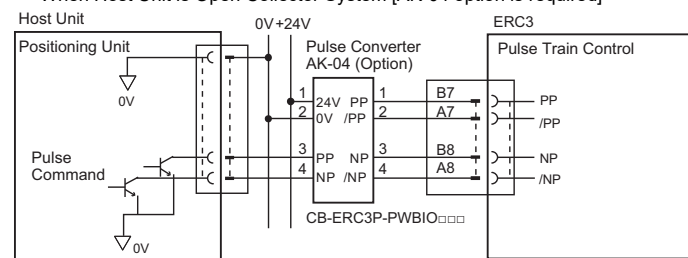
Pulse Train Input and Output Interface

| 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



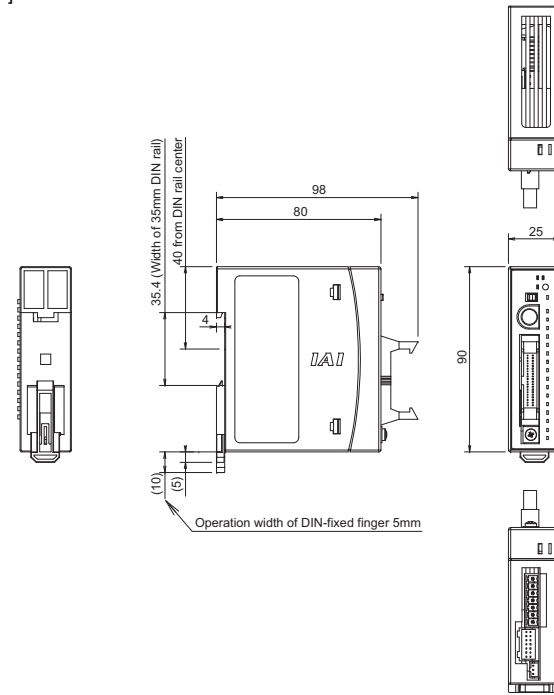
When Host Unit is Open Collector System [AK-04 option is required]



Note 1 : Use the same power source (0V) for the host open collector output, AK-04.

PIO converter (Option)

[External Dimensions]



[Specification]

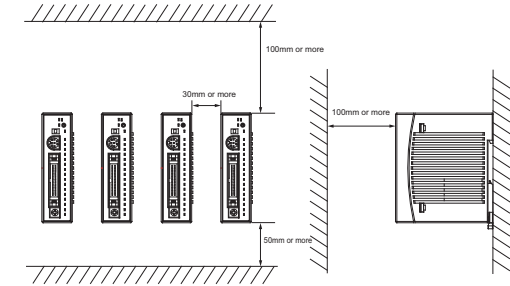
| Item | Description |
|---|---|
| Number of Controlled Axes | 1 axis |
| Power-supply Voltage | 24V DC $\pm 10\%$ |
| Load current when actuator is connected (including current consumption for control) | High output setting is enabled (Set in delivery) : 4.3A (MAX. 5.0A) High output setting is disabled : 3.0A |
| Power Supply for Electromagnetic Brake ^(Note 1) (In the case of the actuator with a brake) | 24V DC $\pm 10\%$ 0.15A (MAX.) |
| Heat Generation | 1.3W |
| In-rush current when actuator is connected ^(Note 2) | 8.4A |
| Transient Power Cutoff Durability | MAX. 500 μ s |
| Serial Communication Interface (SIO Port) | RS485: 1CH (based on Modbus Protocol RTU/ASCII) Speed : 9.6 to 230.4Kbps Control available with serial communication |
| External Interface | PIO Type |
| | Fieldbus Type |
| Data Setting and Input | PC Software, Teaching Pendant Position data and parameters to be saved in the non-volatile memory inside the built-in controller in the actuator via this unit (There is no limitation in number of writing) However, the clock data is to be stored in this unit (retained by capacitor power: approx. 10 days) |
| Actuator I/O Type | SIO Type (Model: SE) An operation with Positioner Mode is available |
| Number of Positions in Positioner Mode | MAX. 512 points (Note) Number of positioning points differs depending on the selected PIO pattern |
| LED Display | Standard Type |
| | Simple Absolute Type |
| | With Monitor |
| Electromagnetic Brake Compulsory Release Switch | NOM (Normal Operation) / RLS (Brake release) Changeover |
| Insulation Resistance | 500V DC 10M Ω or more |
| Protection Function against Electric Shock | Class I basic insulation |
| Cooling Method | Natural air-cooling |
| Environment | Surrounding Air Temperature |
| | Surrounding Humidity |
| | Surrounding Environment |
| | Surrounding Storage Temperature |
| | Surrounding Storage Humidity |
| | Usage Altitude |
| | Protection Class |
| | Vibration Durability |
| Impact | |
| Weight | Standard: 103g, Simple Absolute Type: 287g (including 190g for battery) |
| External Dimensions | 25W \times 90H \times 98D |

Note 1 It is the power source to be supplied when compulsorily releasing the brake.

Note 2 Rush current passes for about 5ms after the power is injected (at 40°C). The rush current value varies depending on the impedance of the power line.

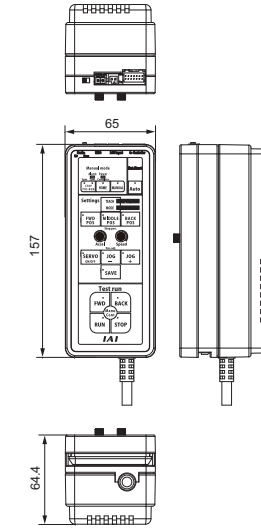
[Installation]

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]

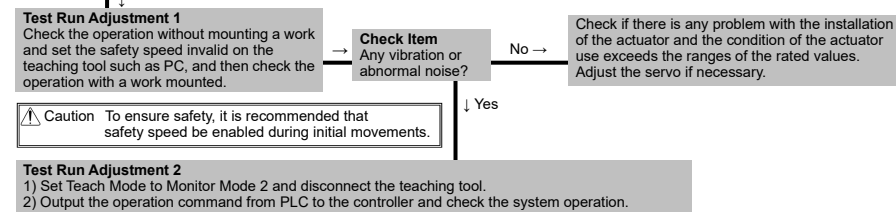
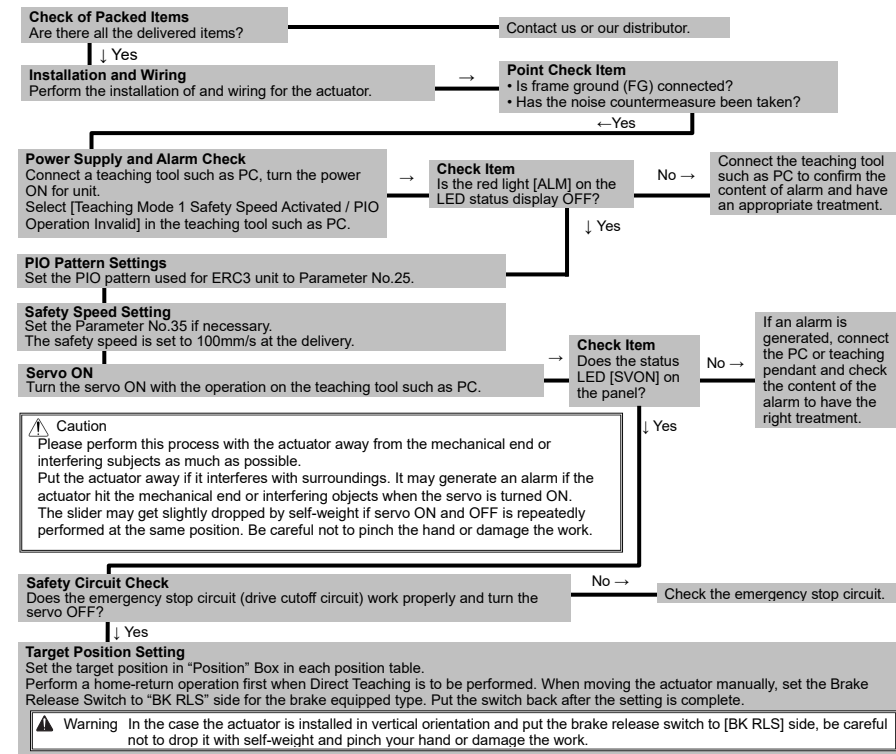
| Item | RCM-PST-0 | RCM-PST-1 | RCM-PST-2 |
|---|---|---|---|
| | 24V DC power supply type (Main unit of teaching pendant) | Equipped with 100V AC power supply unit | Equipped with 200V AC power supply unit |
| Power Supply Unit Model | - | RCM-PS-1 (Equipped with 2m cable with 3P power socket plug) | RCM-PS-2 (Equipped with 2m cable with ϕ 4.3-hole solderless ring tongue terminals) |
| Number of Controlled Axes | 1 axis | | |
| Power-supply Voltage | 24V DC $\pm 10\%$ | Single-phase 100 to 115V AC $\pm 10\%$ 50/60Hz | Single-phase 100 to 230V AC $\pm 10\%$ 50/60Hz |
| Load current when actuator is connected (including current consumption for control) | 2.2A (High output setting is disabled) | 1.3A (when 100V AC is used) | 0.67A (when 100V AC is used) 0.36A (when 200V AC is used) |
| Heat generation when actuator is connected | 2W | 11W | |
| In-rush current when actuator is connected ^(Note 1) | 8.3A | MAX. 30A | MAX. 15A |
| Current leakage when actuator is connected | - | MAX. 5mA | MAX. 0.75mA |
| Transient Power Cutoff Durability | - | MAX. 10ms | MAX. 10ms |
| Emergency Stop | External signal input | | |
| Data Setting and Input | Pressing button switches and dials on the operation panel | | |
| Data Retention Memory | Position data to be saved in non-volatile memory inside built-in controller in actuator (There is no limitation in number of writing) | | |
| Number of Settable Positions | 2 or 3-point | | |
| Operation Functions/LED Display | Servo ON/OFF, try run function as JOG, power ON/OFF, error display, etc. | | |
| Electromagnetic Brake Compulsory Release Switch | Normal / Release (Compulsory release) changeover | | |
| Insulation Resistance | 500V DC 10M Ω or more | | |
| Protection Function against Electric Shock | Class I basic insulation | | |
| Cooling Method | Natural air-cooling | | |
| Environment | Surrounding Air Temperature | 0 to 40°C | |
| | Surrounding Humidity | 10 to 85%RH (non-condensing) | |
| | Surrounding Environment | [Refer to installation Environment] | |
| | Surrounding Storage Temperature | -20 to 70°C | |
| | Surrounding Storage Humidity | 90%RH (non-condensing) | |
| | Usage Altitude | 1000m or lower above sea level | |
| | Protection Class | IP20 | |
| | Vibration Durability | Frequency 5 to 9Hz / Swing width: 1.75mm (continuous), 3.5mm (intermittent) Frequency 9 to 150Hz / Acceleration 4.9m/s ² (continuous), 9.8m/s ² (intermittent) XYZ Each direction | |
| Weight | 120g | 540g | 535g |
| External Dimensions | 65W \times 157H \times 21.6D | | 65W \times 157H \times 64.4D |

Note 1 Rush current passes for about 5ms after the power is injected (at 40°C). The rush current value varies depending on the impedance of the power line.

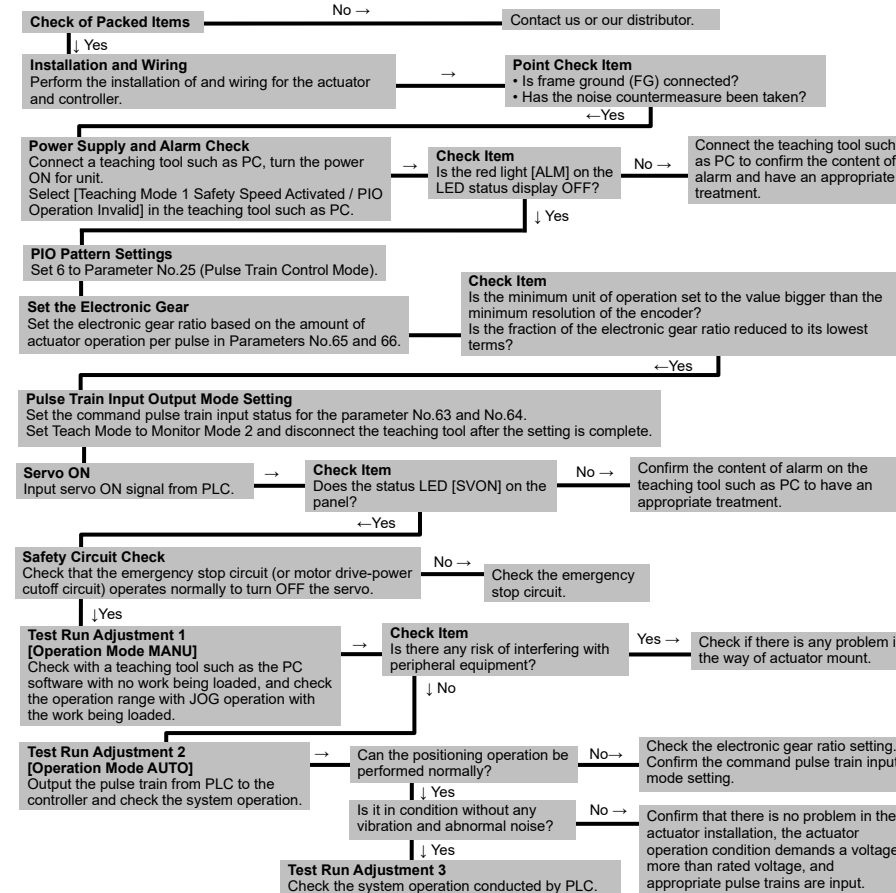
Starting Procedures

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 (ME0297) 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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