**⊘SMC**®

## Operation Manual

### PRODUCT NAME

## *Programless controller*
## *Step motor (servo 24 VDC)*

### MODEL / Series / Product Number

## LECP1 Series

# SMC Corporation

# Contents

No. JXC※-OMU0029-A

# LECP1 Series / Controller
# 1. Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage.
These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger."
They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.
*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.
　 ISO 4413: Hydraulic fluid power -- General rules relating to systems.
　 IEC 60204-1: Safety of machinery -- Electrical equipment of machines. (Part 1: General requirements)
　 ISO 10218-1992: Manipulating industrial robots -Safety.
　 etc.

| | | |
|---|---|---|
| ⚠ | **Caution** | **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury. |
| ⚠ | **Warning** | **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. |
| ⚠ | **Danger** | **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury. |

## ⚠ Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.
   The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.
   This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
2. **Only personnel with appropriate training should operate machinery and equipment.**
   The product specified here may become unsafe if handled incorrectly.
   The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
3. **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction
4. **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

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# LECP1 Series / Controller
# 1. Safety Instructions

## ⚠ Caution

**The product is provided for use in manufacturing industries.**
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

## Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

## Limited warranty and Disclaimer

1. **The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)**
   **Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.**

2. **For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.**
   **This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.**

3. **Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.**

   **\*2) Vacuum pads are excluded from this 1 year warranty.**
      **A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.**
      **Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.**

## Compliance Requirements

1. **The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.**

2. **The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.**

## ⚠ Caution

**SMC products are not intended for use as instruments for legal metrology.**
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.
Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

# 2. Product Outline

## 2.1 Product features

The followings are the main functions of this controller:

■ Electric actuator Control

Positioning operation and Pushing operation, at a specific speed and force, of the electric actuator are possible by controlling the Step motor (24 VDC servo).

■ Operation and settings are available with the controller.

Settings can be altered and operation can be run from the controller. Adjustments of the position, speed, acceleration and test runs are available without the teaching box, PC, and PLC.

■ Specified force operation

Control the pushing force (or the pressing force) of the electric actuator.

■ Power supply separation input

The power supply is separated into the drive power and the control power. Therefore, even when the drive power is off, if the control power is on, the position information from the encoder will be maintained and the serial communication and parallel I/O control are still available.

■ Automatic sequence function of the return to origin position

Return to origin position is available through I/O signal combination.

■ Alarm detection function

Automatically detect the abnormal conditions and output the appropriate alarm signal via the serial interface and parallel I/O.

■ 14 points positioning / pushing is available

Through the combination of parallel I/O inputs, 14 points (position number 1 to 14(E)) of positioning / pushing are available. The speed and acceleration of the positioning can be set by the switch for each operating direction.

■ Data input method

Parameter settings, test runs, and alarm resets can be performed by the controller.

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## ⚠ **Caution**

When the device is set up or failure occurs, please refer to the operation manual of the actuator as well as this operation manual.

Keep this operation manual accessible so it can be referred to when necessary.

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## 2.2 Product configuration

The product configuration of this controller is as follows.

● Electric actuator [*1)]

PLC

Input / output signal
power supply
24 VDC

I/O cable [*1)]
Part No: LEC-CK4-□

●Controller

●Actuator cable [*1)]

Part No: LE-CP-□-S
        LE-CP-□-B-S
(Standard cable)
        LE-CP-□
        LE-CP-□-B
(Robotic type cable)

To CN4

To CN3

To CN2

To CN1

Controller power supply
24 VDC

●Power supply cable
Part No: LEC-CK1-1
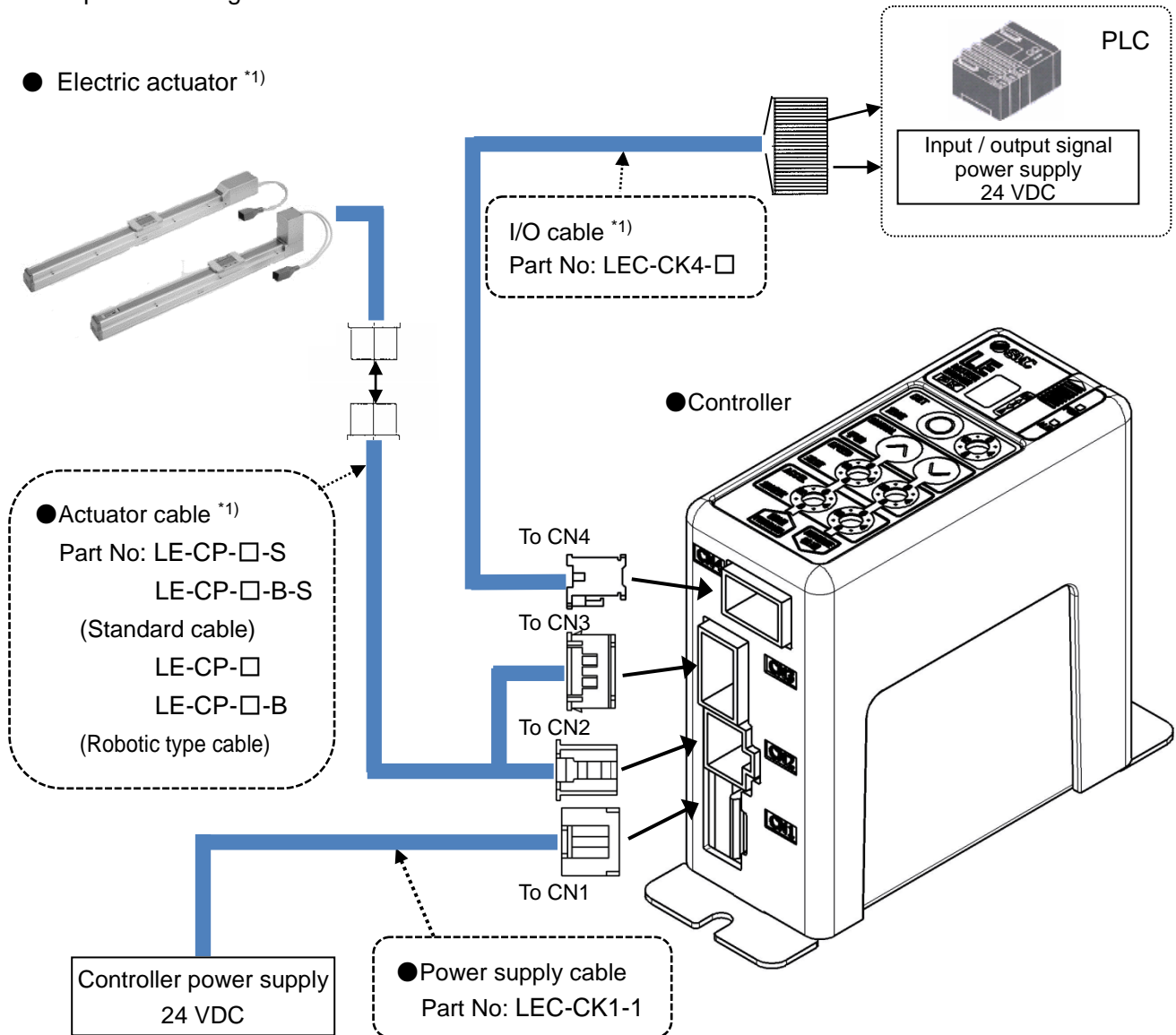
*1) These items are included when ordered using the part number for an electric actuator set.

*2) When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

⚠ **Warning**

Refer to **"4. External Connection for wiring"**
Refer to **"12. Precautions for wiring and cables"** when handling the wiring and cables.

The part number construction for this product is as follows:

Controller

L E C P 1 N ☐ ☐ − ☐

Controller ●

Compatible ●

| P | Step motor (Servo / 24 VDC) |
|---|---|

Number of step data ●

| 1 | 14 points (Programless) |
|---|---|

Parallel I/O type ●

| N | NPN type |
|---|---|
| P | PNP type |

I/O cable length ●

| Nil | None |
|---|---|
| 1 | 1.5 m |
| 3 | 3 m |
| 5 | 5 m |

1.5 m power cable is included

● Electric actuator model

Example: For LEHZ10LK2-4AF-R11N1,
specify LEHZ10LK2-4.
(Enter from the electric actuator part number
"LE" to "stroke / rotating angle")

● Option

| Nil | Screw mounting |
|---|---|
| D | DIN rail mounting |

Electric actuator＋Controller

L E H Z 1 0 L K 2 − 4 A F − R 1 1 N ☐ ☐

Electric actuator type ●

Compile the product number while referring to the How to Order
section in the electric actuator catalogue. Please refer to the table
below for the corresponding electric actuator.

| Applicable electric actuators |
|---|
| Electric gripper：LEH Series |
| Electric slide table：LES Series |
| Electric actuator / Rod type：LEY Series |
| Electric actuator / Slider type：LEF Series |
| Electric actuator / Low profile slider type：LEM Series |
| Electric actuator / Rotary type：LER Series |
| Electric actuator / Guide rod Slider：LEL Series |
| Electric actuator / Miniature type：LEP Series |

● Option

● I/O cable length [*1]

| Nil | None |
|---|---|
| 1 | 1.5 m |
| 3 | 3 m |
| 5 | 5 m |

Controller ●

| Nil | No controller* |
|---|---|
| 1N | With programless controller (NPN) |
| 1P | With programless controller (PNP) |

*1) An I/O cable cannot be specified for an actuator without a controller.

The LECP6 series I/O cable cannot be used because the specifications are different.

## ⚠ Caution

Single controllers are also shipped after setting the electric actuator specification parameters.
Check that the combination of the controller and the electric actuator is correct before use.

## 2.4 Option

### (1) Actuator cable (5m or less)

L E－C P－□ －□

Cable length (L)

| | |
|---|---|
| 1 | 1.5m |
| 3 | 3m |
| 5 | 5m |

Actuator cable type

| | |
|---|---|
| Nil | Robotic type cable |
| S | Standard cable |

① 

| signal | Terminal no. |
|---|---|
| A | B-1 |
| $\overline{A}$ | A-1 |
| B | B-2 |
| $\overline{B}$ | A-2 |
| COM-A/COM | B-3 |
| COM-B/ - | A-3 |
| | |
| Vcc | B-4 |
| GND | A-4 |
| $\overline{A}$ | B-5 |
| A | A-5 |
| $\overline{B}$ | B-6 |
| B | A-6 |

②

| Cable color | Terminal no. |
|---|---|
| Brown | 2 |
| Red | 1 |
| Orange | 6 |
| Yellow | 5 |
| Green | 3 |
| Blue | 4 |

③

| Cable color | Terminal no. |
|---|---|
| Brown | 12 |
| Black | 13 |
| Red | 7 |
| Black | 6 |
| Orange | 9 |
| Black | 8 |
| - | 3 |

Shield

Electric actuator side

Controller side

(14.2)
(14)
1 2
5 6
②

A1 ① B1
(17.7)
A6 B6
φ8
(30.7)
L
(11)
(18)
1 2
15 16
③

### (2) Actuator cable (8-20m)

L E－C P－□

Cable length (L)

| | | |
|---|---|---|
| 8 | 8m | *1) |
| A | 10m | *1) |
| B | 15m | *1) |
| C | 20m | *1) |

*1) Produced upon receipt of order.

Only Robotic type cable can be selected.

①

| signal | Terminal no. |
|---|---|
| A | B-1 |
| $\overline{A}$ | A-1 |
| B | B-2 |
| $\overline{B}$ | A-2 |
| COM-A / COM | B-3 |
| COM-B / - | A-3 |
| | |
| Vcc | B-4 |
| GND | A-4 |
| $\overline{A}$ | B-5 |
| A | A-5 |
| B | B-6 |
| B | A-6 |

②

| Cable color | Terminal no. |
|---|---|
| Brown | 2 |
| Red | 1 |
| Orange | 6 |
| Yellow | 5 |
| Green | 3 |
| Blue | 4 |

③

| Cable color | Terminal no. |
|---|---|
| Brown | 12 |
| Black | 13 |
| Red | 7 |
| Black | 6 |
| Orange | 9 |
| Black | 8 |
| - | 3 |

Shield

Electric actuator side

Controller side

(14.2)
(14)
1 2
5 6
②

A1 ① B1
(17.7)
A6 B6
φ5.5
φ6.3
(30.7)
L
(11)
(18)
1 2
15 16
③

- 9 -

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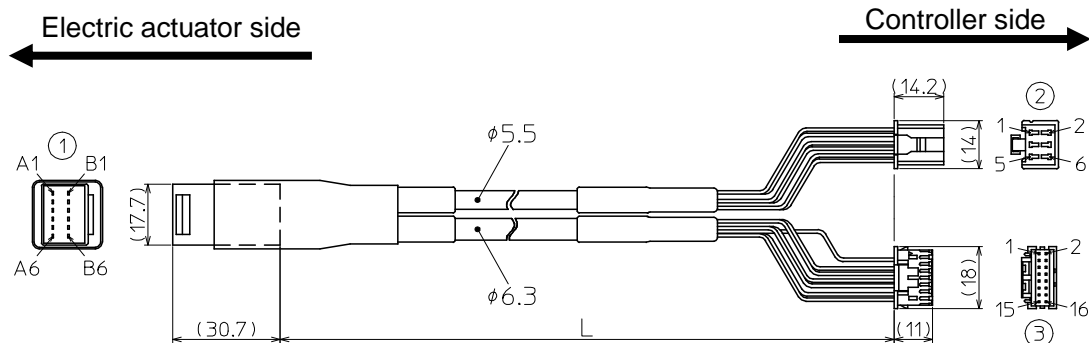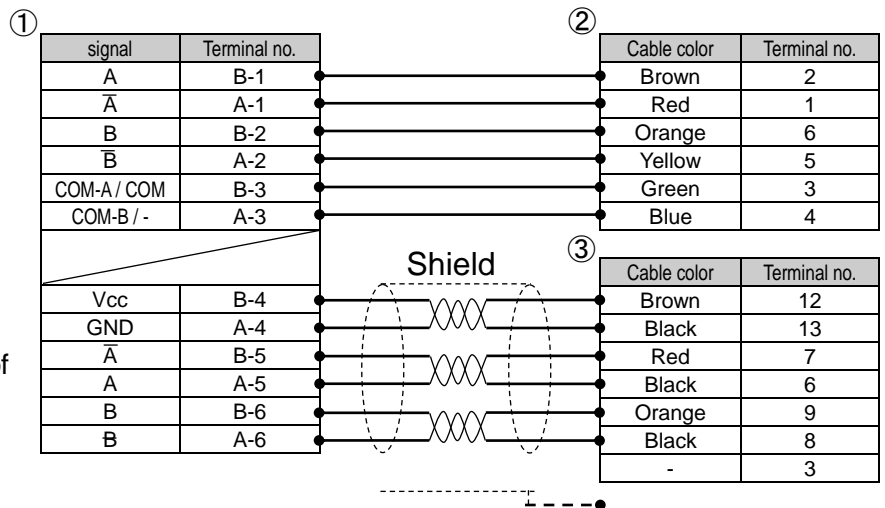
## (3) Actuator cable for with lock and sensor (5m or less)

L E－C P－□－B－□

Cable length (L)

| 1 | 1.5m |
|---|------|
| 3 | 3m |
| 5 | 5m |

Actuator cable type

| Nil | Robotic type cable |
|-----|--------------------|
| S | Standard cable |

① 

| signal | Terminal no. |
|--------|--------------|
| A | B-1 |
| $\overline{A}$ | A-1 |
| B | B-2 |
| $\overline{B}$ | A-2 |
| COM-A / COM | B-3 |
| COM-B / - | A-3 |

② 

| Cable color | Terminal no. |
|-------------|--------------|
| Brown | 2 |
| Red | 1 |
| Orange | 6 |
| Yellow | 5 |
| Green | 3 |
| Blue | 4 |

Shield

| signal | Terminal no. |
|--------|--------------|
| Vcc | B-4 |
| GND | A-4 |
| $\overline{A}$ | B-5 |
| A | A-5 |
| $\overline{B}$ | B-6 |
| B | A-6 |

③ 

| Cable color | Terminal no. |
|-------------|--------------|
| Brown | 12 |
| Black | 13 |
| Red | 7 |
| Black | 6 |
| Orange | 9 |
| Black | 8 |
| - | 3 |

④ 

| signal | Terminal no. |
|--------|--------------|
| Lock （＋） | B-1 |
| Lock （－） | A-1 |
| Sensor （＋） | B-3 |
| Sensor （－） | A-3 |

| Cable color | Terminal no. |
|-------------|--------------|
| Red | 4 |
| Black | 5 |
| Brown | 1 |
| Blue | 2 |

Electric actuator side

Controller side



## (4) Actuator cable for with lock and sensor (8-20m)

L E－C P－□－B

Cable length (L)

| 8 | 8m [*1] |
|---|---------|
| A | 10m [*1] |
| B | 15m [*1] |
| C | 20m [*1] |

*1) Produced upon receipt of order

Only "Robotic type cable" can be selected.

① 

| signal | Terminal no. |
|--------|--------------|
| A | B-1 |
| $\overline{A}$ | A-1 |
| B | B-2 |
| $\overline{B}$ | A-2 |
| COM-A / COM | B-3 |
| COM-B / - | A-3 |

② 

| Cable color | Terminal no. |
|-------------|--------------|
| Brown | 2 |
| Red | 1 |
| Orange | 6 |
| Yellow | 5 |
| Green | 3 |
| Blue | 4 |

Shield

| signal | Terminal no. |
|--------|--------------|
| Vcc | B-4 |
| GND | A-4 |
| $\overline{A}$ | B-5 |
| A | A-5 |
| $\overline{B}$ | B-6 |
| B | A-6 |

③ 

| Cable color | Terminal no. |
|-------------|--------------|
| Brown | 12 |
| Black | 13 |
| Red | 7 |
| Black | 6 |
| Orange | 9 |
| Black | 8 |
| - | 3 |

④ 

| signal | Terminal no. |
|--------|--------------|
| Lock （＋） | B-1 |
| Lock （－） | A-1 |
| Sensor （＋） | B-3 |
| Sensor （－） | A-3 |

| Cable color | Terminal no. |
|-------------|--------------|
| Red | 4 |
| Black | 5 |
| Brown | 1 |
| Blue | 2 |

Electric actuator side

Controller side



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## 2.5 Startup Procedures

Be sure to check the procedure below before use.

### (1) Confirmation of the package content

After unpacking everything, check the description on the label to identify the controller and the number of accessories. If any parts are missing or damaged, please contact your distributor.

| Item | Quantity |
|---|---|
| Controller (LECP1□□-□) | 1 unit |
| Power supply cable (LEC-CK1-1) | 1 piece |
| I/O cable (LEC-CK4-□) *1) | 1 piece |

1) Included in the package only when the I/O cable length is specified.

【Option】
● Actuator cable
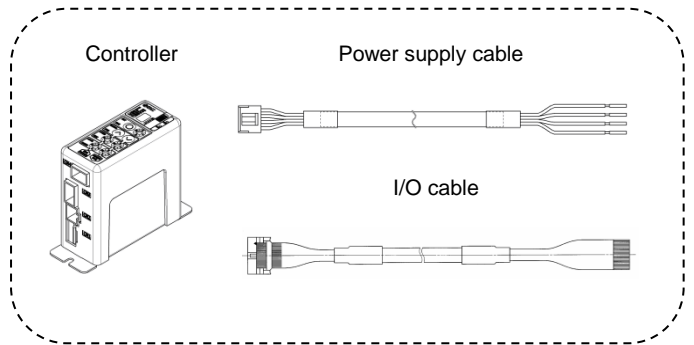
### (2) Installation

Please refer to the **"3.4 How to install"**

### (3) Wiring and connection

Connect cables, etc. to the connector (CN1 to CN4) of the controller.
Please refer to the **"4 External Wiring Diagram"** for the wiring of the connectors.

Connector

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**(4) Confirmation of the power ON alarm**

Supply power 24VDC.


Controller

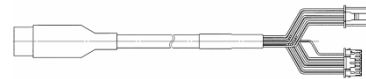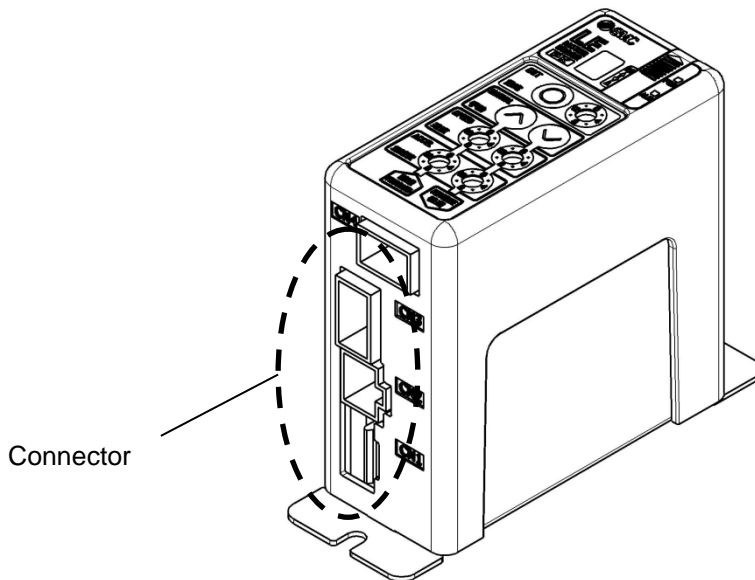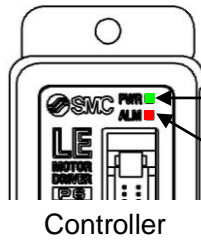| Function | LED turns on | Status |
|---|---|---|
| PWR | Green LED is ON | Servo is turned on |
|  | Green LED is flashing | Servo is turned off |
| ALM | Red LED is ON | Alarm is generated |

Under normal conditions, the LED [PWR] on the front of the controller changes from a flashing green to a solid light.

The servo will be turned ON if the conditions are normal.

When the LED [ALM] on the front of the controller lights up red, it indicates an alarm.

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## ⚠ Caution

If an alarm is generated, check the content of the alarm using the 7-segment LED on the controller or I/O output, and eliminate the cause while referring to **"11. Alarm Detection"**.

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**(5) Data (Operation pattern) setting**

Set the stop position, speed and acceleration per operating direction with the buttons and switches on the controller.

Operations other than position setting, Jog / inching can be performed after returning to origin position.

Refer to **"7. Setting method"** for the details of settings.

**(6) Test run**

Test runs can be performed using the buttons on the controller or by using I/O signals.

Refer to **"6.3 The parallel I/O signal is detailed"** and **"7.1 Setting procedure"** for details.

# 3. Product Specifications

## 3.1 Basic specifications

The basic specifications of this controller are as follows:

| Item | Specifications |
|---|---|
| Compatible motor | Unipolar winding method 2-Phase HB step motor |
| Power supply [*1] [*2] | Power voltage: 24 VDC +/-10% [*2] <br> When conformity to UL is required, use UL1310 compliant Class 2 power supply unit for direct current. |
| Parallel input | 6 inputs (photo-coupler isolation) |
| Parallel output | 6 outputs (photo-coupler isolation) |
| Stop points | 14 points (Location number 1 to 14(E)) |
| Compatible encoder | Incremental A / B phase (800 pulse / rotation) |
| Memory | EEPROM |
| LED indicator | 2 of LED's (green and red) |
| 7-segment LED display [*3] | 1 digit, 7-segment display (red) <br> Figures are expressed in hexadecimal (10 to 15 in decimal number are expressed as A to F) |
| Lock control | Forced-lock release terminal (Applicable to non -magnetizing lock.) |
| Cable length | I/O cable: 5m or less <br> Actuator cable: 20m or less |
| Cooling system | Natural air cooling |
| Operating temperature range | 0 to 40$^{\circ}$C (No freezing) |
| Operating humidity range | 90%RH or less (No condensation) |
| Storage temperature range | -10 to 60$^{\circ}$C (No freezing) |
| Storage humidity range | 90%RH or less (No condensation) |
| Insulation resistance | Between external terminals and case <br> 50 MΩ (500VDC) |
| Mass | 130 g (screw mount type) <br> 150 g (DIN rail mount type) |

*1) Do not use the inrush current suppression type power supply for the controller power (24VDC).

*2) The power consumption changes depending on the electric actuator model.
   Please refer to the specifications of the electric actuator for more details.
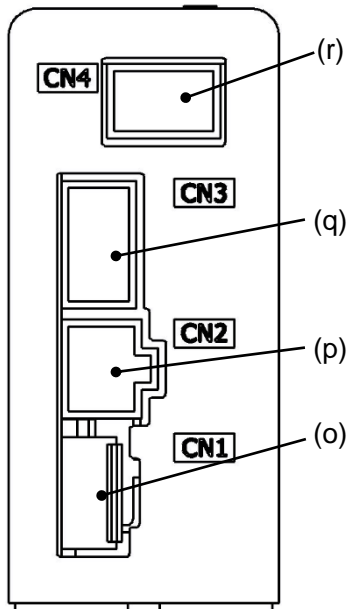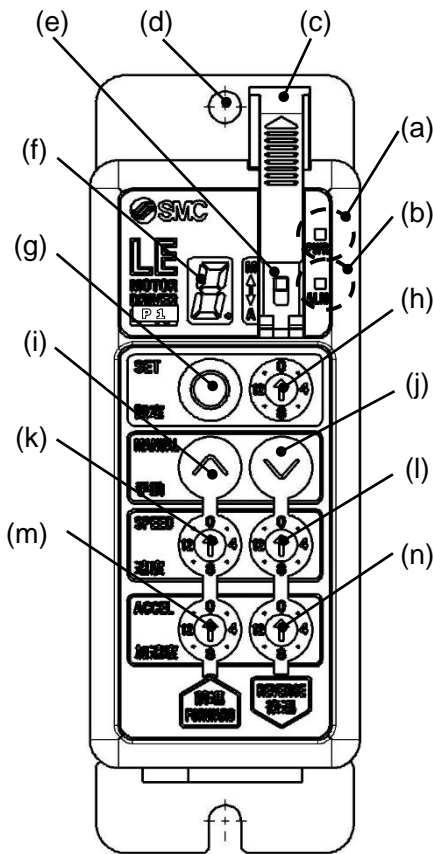
*3) "10" to "15" in decimal number are displayed as follows in the 7-segment LED.
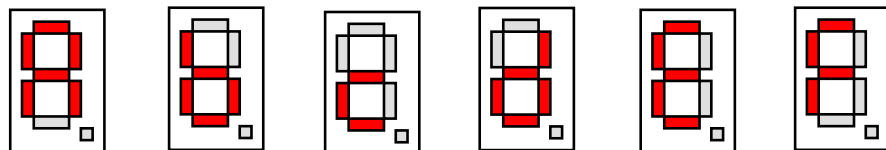
| Decimal display | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|
| Hexadecimal display | A | b | c | d | E | F |

The detailed descriptions of each part are as follows:

| No. | Display | Description | Details |
|-----|---------|-------------|---------|
| (a) | PWR | Power supply LED | Power supply ON / Servo ON: Green solid light<br>Power supply ON / Servo OFF: Green flashes |
| (b) | ALM | Alarm LED | Power supply ON / With alarm: Red solid light<br>Power supply ON / Parameter setting: Red flashes |
| (c) | — | Cover | Mode switch switching protection.<br>(Close the cover after changing switch). |
| (d) | — | FG | Frame ground<br>(Tighten the bolt with the nut when mounting the controller. Connect the grounding wire.) |
| (e) | — | Mode switch | Swich the mode between manual and auto. |
| (f) | — | 7-segment LED | Auto mode / Without alarm:<br>Indicates the position number which is instructed by ON/OFF of IN0 to IN3 of the CN4 parallel I/O.<br>(During command operation: Flashing / Instruction command completed: ON)<br>Auto mode / With alarm:<br>Indicates Alarm Group.<br>Manual mode: Indicates that content may vary depending on the operating function. |
| (g) | SET | Set button | Determines the settings and gives a command to operate in manual mode. |
| (h) | — | Position switch | Assigns the position to drive (1 to 14) and the origin (15). |
| (i) | MANUAL | Forward button | Performs forward Jog and inching. |
| (j) | | Reverse button | Performs reverse Jog and inching. |
| (k) | SPEED | Forward speed switch | 16 forward speeds are available. [1] |
| (l) | | Reverse speed switch | 16 reverse speeds are available. [1] |
| (m) | ACCEL | Forward acceleration switch | 16 forward acceleration steps are available. [1] |
| (n) | | Reverse acceleration switch | 16 reverse acceleration steps are available. [1] |
| (o) | CN1 | Power supply connector | Connect the power supply cable. |
| (p) | CN2 | Motor driving connector | Connect motor connector of actuator cable. |
| (q) | CN3 | Encoder connector | Connect encoder connector of actuator cable. |
| (r) | CN4 | I/O connector | Connect I/O cable. |

[1] The Set value of speed and acceleration are set for reverse and f forward directions.

The set value will be reflected in the operation of all position numbers.

# ⚠ Caution

Use a flat blade watchmaker's screwdriver of the size shown below when changing position switch (h) and the set value of the speed / acceleration switches (k) to(n).

<Size>

End width L：2.0 to 2.4 [mm]

End thickness W：0.5 to 0.6 [mm]
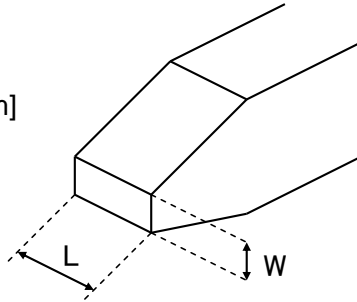
Magnified view of the end of the flat blade screwdriver
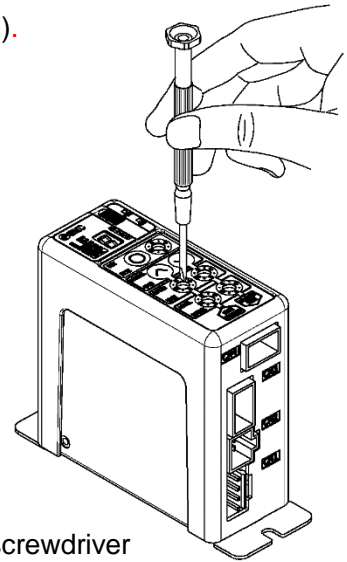
## 3.3 Outside dimension diagramm

The outside view of this product is as shown in the diagram below:

**(1) Screw mount type**
**(LECP1☐☐-☐)**

**(2) DIN rail mount type**
**(LECP1☐☐D-☐)**

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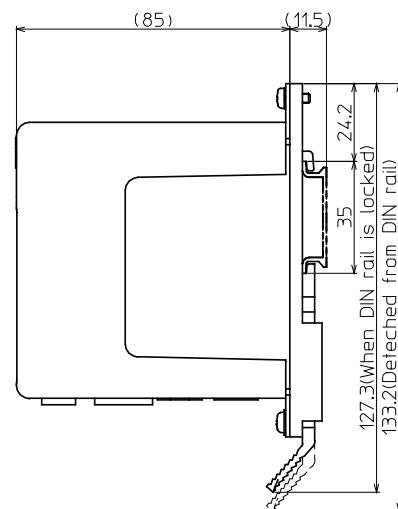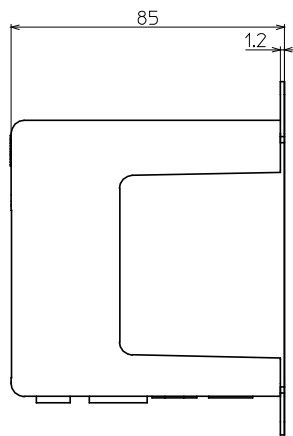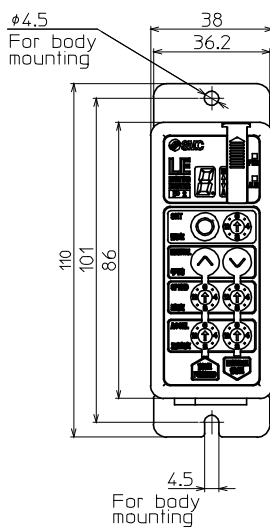
## 3.4 How to install

### (1) How to install

The followings are the descriptions on how to install each type:

**1) Screw mounting (LECP1☐☐-☐)**          **2) DIN rail mounting (LECP1☐☐D-☐)**

(Installation with two M4 screws)



Hook the controller on the DIN rail and press the lever of section A in the arrow direction to lock it.
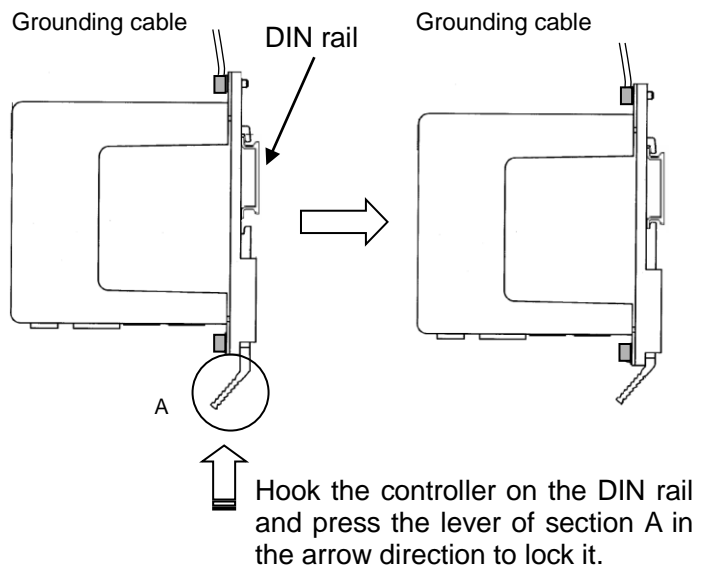
### (2) Grounding cable connection

Place the grounding cable with crimping terminal and toothed washer as shown below and tighten the screw.



M4 screw
Cable with crimping terminal
Toothed washer

Controller

---
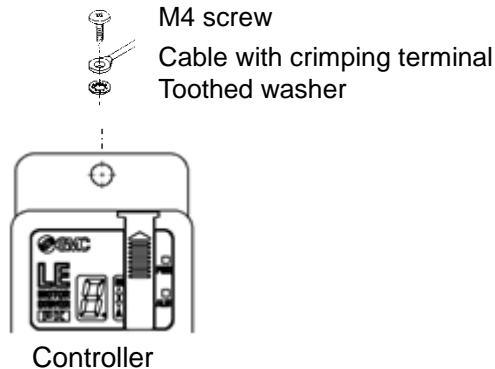
### ⚠ **Caution**

The M4 screw, cable with crimping terminal, and toothed washer should be obtained separately.

Ground the controller to shield it from electric noise.

Controller attaching hole (Installation position of grounding cable) and SG (Signal ground) are connected in the controller.

Please do not ground the controller when using it in the plus earth environment.

---

# ⚠ Caution

The earthling should be the dedicated grounding point. It should be a functional ground with less than 100 Ω resistance.

The cross section of the grounding wire should be greater than 2mm$^2$.
The ground point should be near this controller to make the wire length short.
The controller case mounting is connected to 0 V of the power supply.



Recommended Functional grounding          Not Recommended grounding
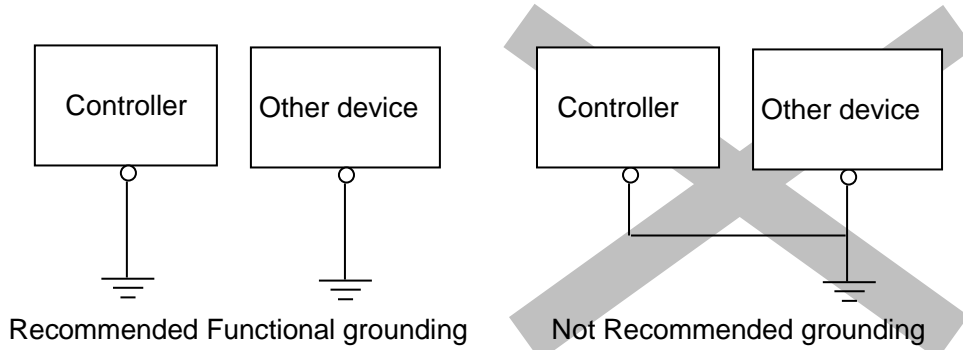
## (3) Installation location

Select the size and the installation style so that the ambient temperature around the controller is 40 $^o$C or less.
Mount the controller vertically on a wall with the space allowed as shown in Fig.1.
As shown in Fig.2, establish the construction so that the connectors can be connected and disconnected.
Enough space must be allowed around the controller so that the operating temperature of the controller stays within the specification range.
Avoid mounting the controller near a vibration source, such as a large electromagnetic contactor or circuit fuse breaker on the same panel.

0 mm or more: Body size 16 or less *Only the LEH series apply to all size
10 mm or more: Body size 25 or more *Except for LEH Series



Fig.1

30 mm or more

Controller

60 mm or more

Fig.2

Door (Lid)

Controller

60 mm or more
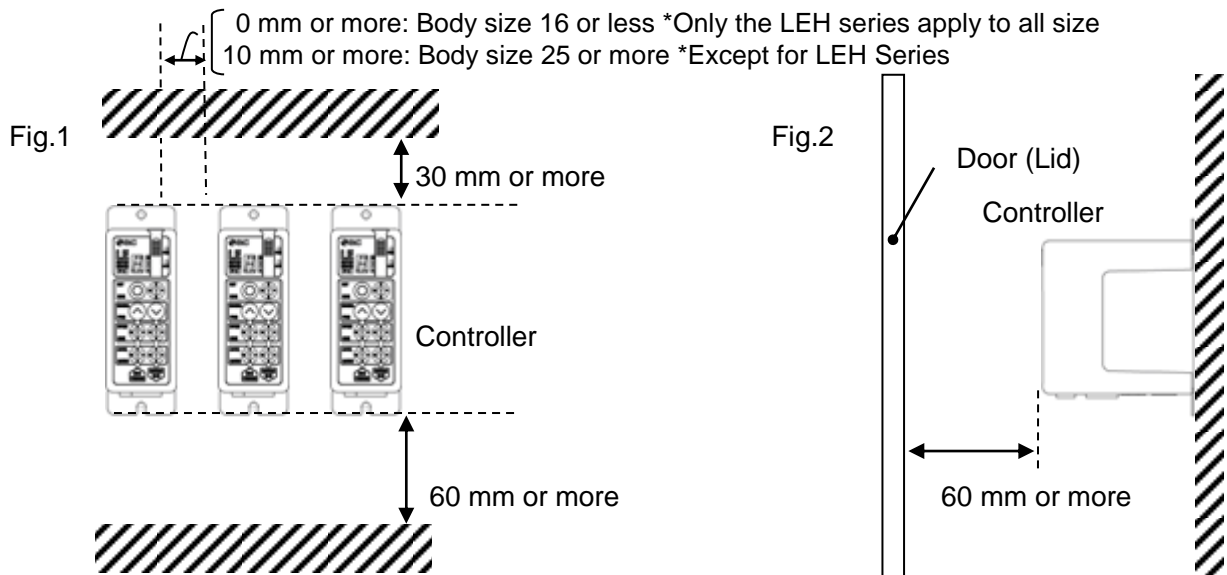
# ⚠ Caution

If the mounting surface of the controller is distorted or not flat, excessive force may be applied to the housing, etc. causing malfunction.
Mount this product on a plane flat surface.

SMC

No. JXC※-OMU0029-A

# 4. External Wiring Diagram

Examples of standard wiring are shown for each connector (CN1 to CN4) of the controller.

## 4.1 CN1: Power supply cable

Controller

CN1

Power supply cable

Controller input power supply 24 VDC

(The 24 VDC power supply and the power cable should be obtained separately.)
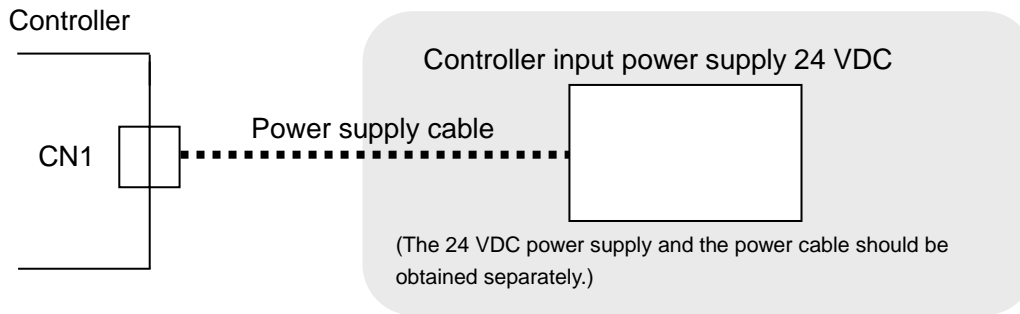
Please refer to **"5. CN1: Power supply cable"** for how to wire the CN1 connector.

## ⚠ Caution

Do not use the inrush current suppression type power supply for the controller power (24VDC).

## 4.2 CN2: Motor power connector and CN3: Encoder connector

Connect the controller and the electric actuator with the actuator cable (LE-CP-□-□).

Controller

CN3

CN2

Actuator cable

Motor

Electric actuator

## 4.3 CN4: Parallel I/O connector

Controller

I/O cable

PLC, etc.

CN4

(The PLC, etc. should be obtained separately.)
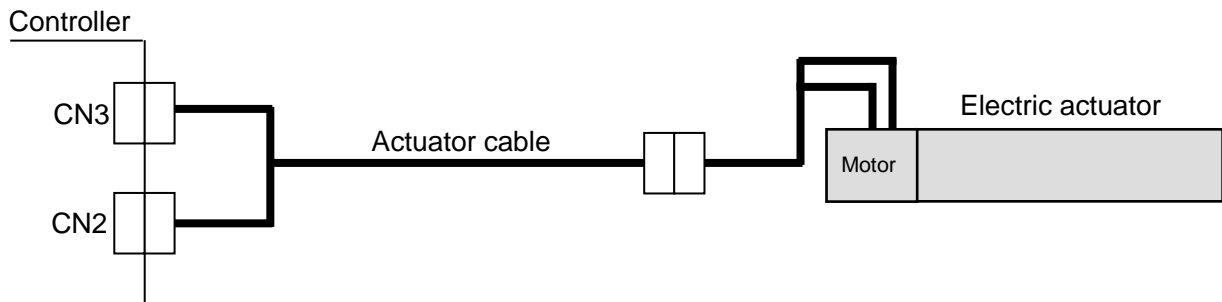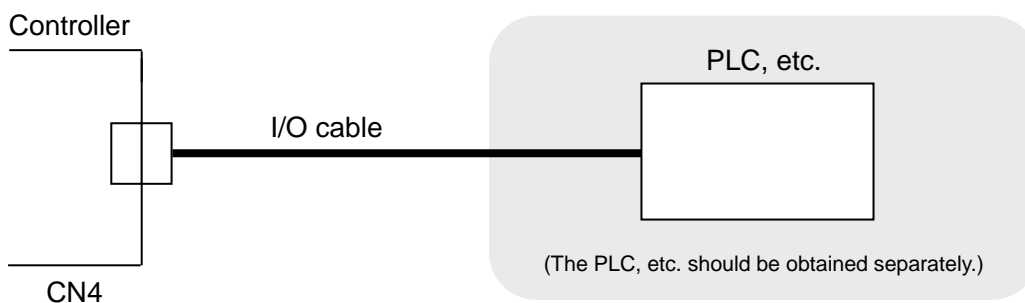
Please refer to **"6.4 Parallel I/O Wiring Example"** for how to wire the CN4 connector.

Please refer to **"6.3 The parallel I/O signal is detailed"** for details of each signal of parallel I/O.

# 5. CN1: Power supply cable

## 5.1 Power supply cable specifications

Included power supply cable specification is shown below.

Power supply cable (LEC-CK1-1)
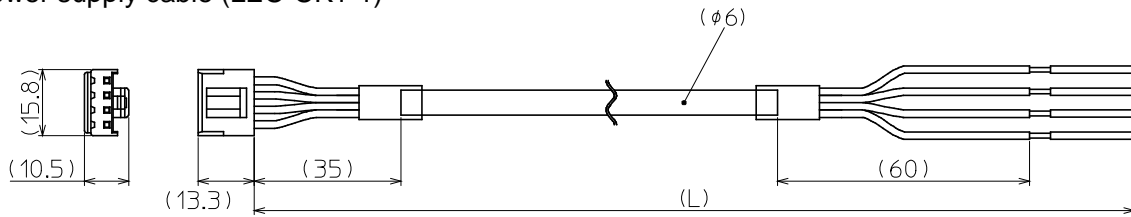


| Item | Specifications |
|---|---|
| Connector | Manufacturer : J.S.T. Mfg. Co.,Ltd.<br>Product number : VHR-4N |
| Conductor size | AWG20 |
| Length (L) | LEC-CK1-1:1.5m only |

| Terminal | Color of covered wire | Function | Functional explanation |
|---|---|---|---|
| 0V | Blue | Common power supply (-) | Negative common power for M24V, C24V, and BK RLS. |
| M24V | White | Power supply of motor (+) | Positive power for the motor to be supplied via the controller. |
| C24V | Brown | Control power supply (+) | Positive control power to be supplied to the controller. |
| BK RLS | Black | Unlocking (+) | Positive power for lock release.<br>(Connected to the M24V in the controller internal circuit.） |

## 5.2 Wiring of power supply cable

Referring to (1) to (4), connect the power supply cable included in accessories to the controller input power supply 24 VDC and insert it to the controller CN1 power supply connector.

### (1) Wiring of the power supply

Connect the positive side (+) of the controller input power supply 24 VDC to the C24V and M24V terminals of the power supply cable, and connect the negative side (-) to the 0V terminal.
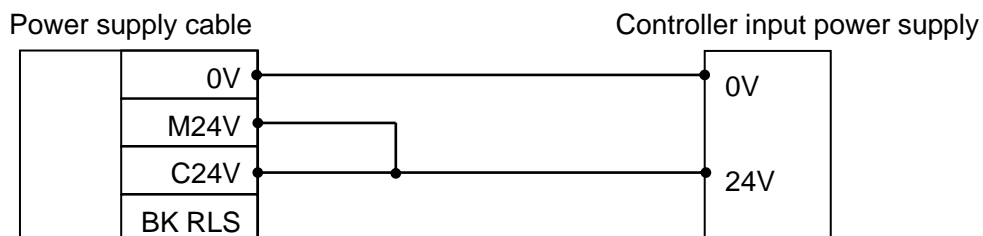


| ⚠ **Caution** |
|---|
| Do not use the inrush current suppression type power supply for the controller power (24VDC). |

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## (2) Wiring of the lock release

Install an unlocking switch for adjustment or recovery during an emergency of the electric actuator with lock. The switch (24 VDC, Contact capacity: 0.5A or more) should be obtained separately.

One terminal of the lock release switch should be connected to the 24 VDC power supply and the other should be connected to the BK RLS terminal. When this is switched on, the lock will be released forcibly.

Power supply cable                                    Controller input power supply

| 0V     |         | 0V  |
|--------|---------|-----|
| M24V   |         |     |
| C24V   |         |     |
| BK RLS |         | 24V |

Switch for forced unlocking
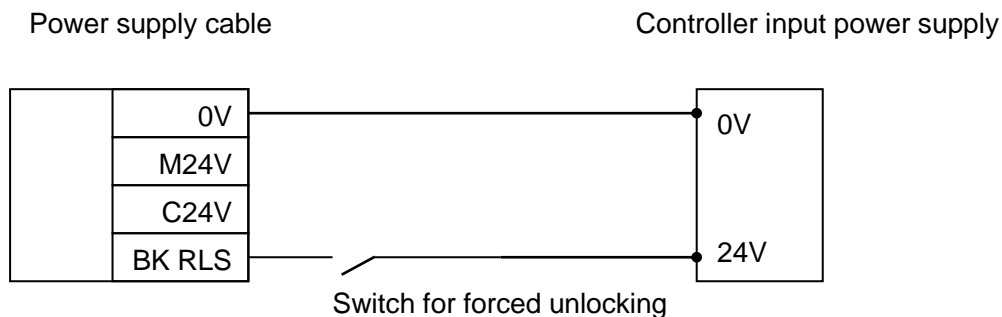
## ⚠ Caution

If the electric actuator is a non-lock type, it is not necessary to wire the BK RLS terminal.

Do not supply power to the BK RLS (lock release) during normal operation.

The 24 VDC supply to the BK RLS (lock release) is only required for the adjustment and the recovery in the emergency.

- STOP command (CN4 14pin STOP) is turned ON and Servo is turned OFF.
- When the control power supply (C24V) is shut off.

## (3) Stop the power supply for the motor

If it is necessary to shut off the power supply for the motor from outside, connect the relay between the input power supply for the controller 24 VDC and the power supply plug for the controller M24V. (Refer to the wiring diagram in the next page.)

The motor power supply should be shut off after the STOP command (CN4 14pin STOP) is turned ON.

Refer to **"6.3 Details of parallel input / output signal and cable"** for the STOP command.

## ⚠ Warning

- Do not perform a return to origin position when the power supply for the motor (M24V) is off. The controller cannot recognize the correct origin if a return to origin instruction is made with the motor drive power (M24V) disconnected.
- If the M24V is off during electric actuator operation, there will be an additional delay experienced before it stops (the stop distance will be extended) due to inertia of the work piece or regenerated energy. When the M24V is turned off, and the STOP command is turned ON (CN4pin 14 STOP) simultaneously the time to stop can be shortened.
- If the motor drive power is off during a vertical stop, the table may drop due to lock response.
- BK RLS is internally connected to the M24V inside the controller, so do not apply 24 VDC to the BK RLS terminal when the M24V is off.

(Circuit example: The figure below shows the stopped state.)
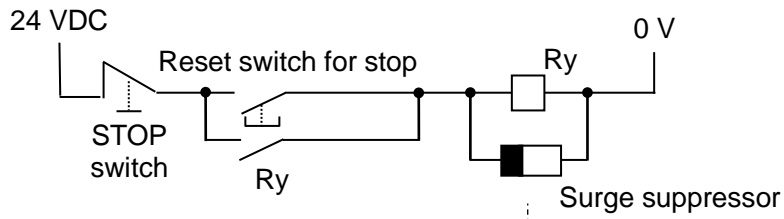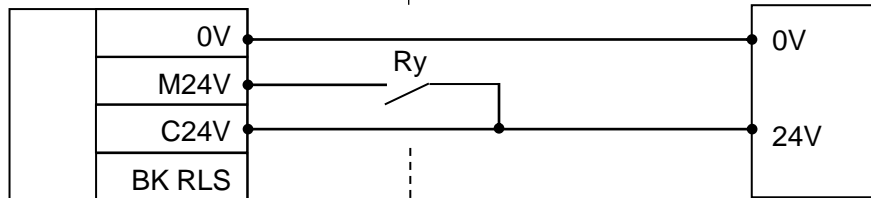
SMC
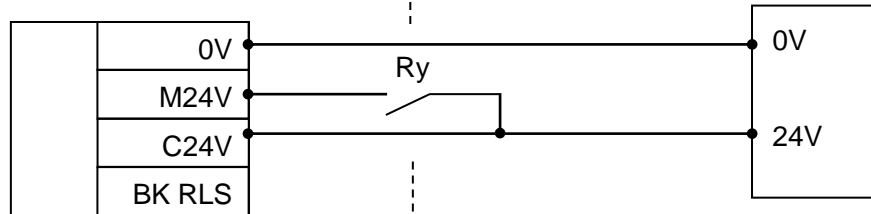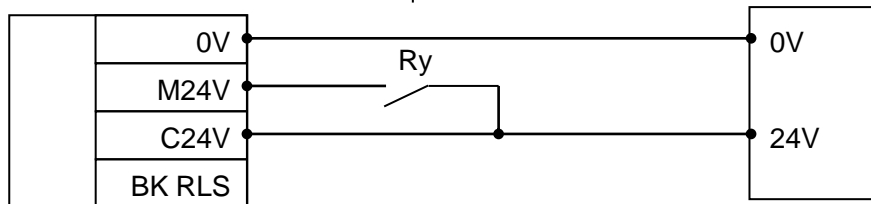
# 6. CN4: Parallel I/O Connector

## 6.1 Parallel I/O specifications

● Input specifications

| No. | Item | Specification |
|-----|------|---------------|
| 1 | Input circuit | Internal circuit and photo coupler isolation |
| 2 | Number of inputs | 6 inputs |
| 3 | Voltage | 24 VDC +/- 10% |
| 4 | Input current at ON | 3.5mA +/- 20% (at 24 VDC) |
| 5 | Input current / voltage at OFF | Current 1.5 mA or less Voltage 11V or less |

● Output specifications

| No. | Item | Specification |
|-----|------|---------------|
| 1 | Output circuit | Internal circuit and photo coupler Isolation |
| 2 | Number of outputs | 6 outputs |
| 3 | Max. voltage between terminal | 30 VDC |
| 4 | Max. output current | 10mA supply / sink |
| 5 | Saturation voltage | 2.0V (Max.) |

## 6.2 Parallel I/O type (NPN / PNP type)

There are two types of parallel I/O for this controller: NPN type and PNP type.

**(1) Parallel I/O input circuit (same for both NPN and PNP type)**

●NPN type (LECP1N□□-□)

| (a) | 「COM+」〈1〉 |
|-----|-----------|
| (b) | IN0〈9〉-STOP〈14〉 |

●PNP type (LECP1P□□-□)

| (a) | 「COM-」〈2〉 |
|-----|-----------|
| (b) | IN0〈9〉-STOP〈14〉 |
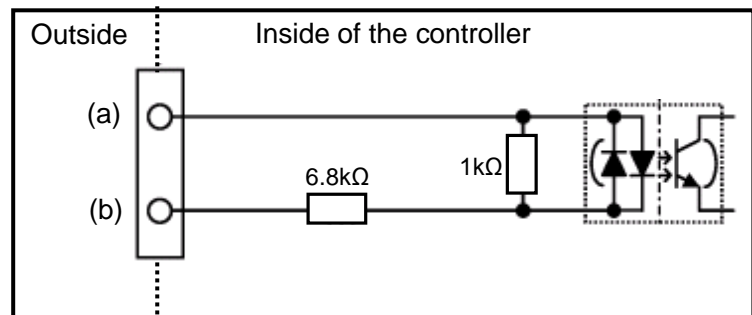
**(2) Parallel I/O output circuit**

●NPN type (LECP1N□□-□)
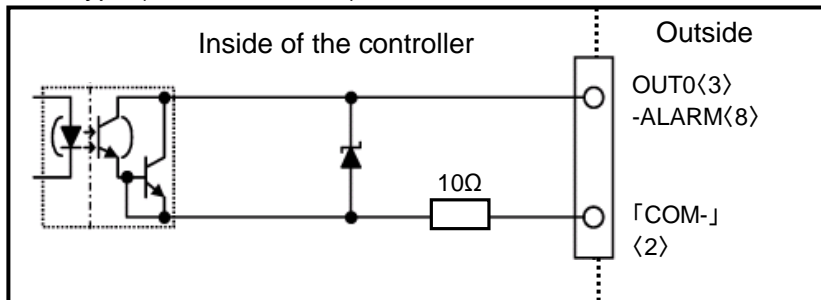
●PNP type (LECP1P□□-□)
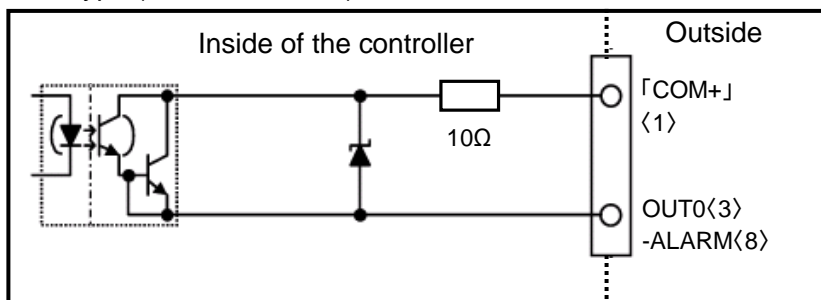
## 6.3 The parallel I/O signal is detailed

### (1) Parallel I/O cable (LEC-CK4-□)

Controller side                        (φ7.9)                    PLC side

(18)

(10) (11) (30)                                    (60)

(L)
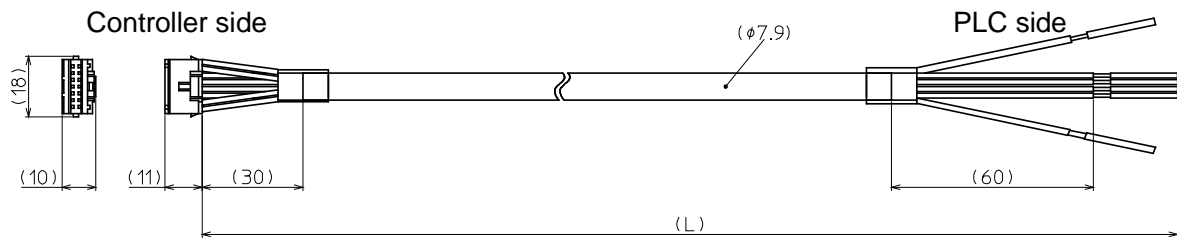
| Item | Specifications |
|---|---|
| Connector | Manufacturer: J.S.T. Mfg. Co.,Ltd.<br>Product number:PADP-14V-1-S |
| Conductor size | AWG26 |
| Length (L) | The suffix of the part number (1,3,5) specifies the length.<br>LEC-CK4-1: 1.5 m, LEC-CK4-3: 3 m, LEC-CK4-5: 5 m |

### (2) Derails of input / Output signal

| Terminal No. | Insulation color | Dot Mark | Dot color | Function | Contents |
|---|---|---|---|---|---|
| 1 | Light brown | ■ | Black | COM+ | Connect the 24V side of the power supply (24VDC) for input / output signal. |
| 2 | Light brown | ■ | Red | COM− | Connect the 0V side of the power supply (24VDC) for input / output signal. |
| 3 | Yellow | ■ | Black | OUT0 | Operation completion output |
| 4 | Yellow | ■ | Red | OUT1 | (Output with the combination of OUT0 to OUT3) *1) |
| 5 | Light green | ■ | Black | OUT2 | Example) Output the operation completion of |
| 6 | Light green | ■ | Red | OUT3 | position No. 3 |
| 7 | Grey | ■ | Black | BUSY | BUSY signal (Output during operation) |
| 8 | Grey | ■ | Red | ALARM | ALARM signal N.C.<br>(Turned off when an alarm is generated or servo is turned off. The ALARM output is turned off when STOP is input and the electric actuator has stopped). |
| 9 | White | ■ | Black | IN0 | Operation command input |
| 10 | White | ■ | Red | IN1 | (Input with the combination of IN0 to IN3) *1)<br>Return to origin command input |
| 11 | Light brown | ■■ | Black | IN2 | (Turn on IN0 to IN3 simultaneously) |
| 12 | Light brown | ■■ | Red | IN3 | Example) Commands position No. 5 to operate |
| 13 | Yellow | ■■ | Black | RESET | Interruption or alarm reset.<br>During operation: The speed is reduced from the point where signal is input until the electric actuator stops. (Servo stays ON)<br>Alarm is being generated: Alarm reset |
| 14 | Yellow | ■■ | Red | STOP | STOP command<br>(Sudden deceleration to turn off servo) |

Example for terminals 3-6:

| OUT3 | OUT2 | OUT1 | OUT0 |
|---|---|---|---|
| OFF | OFF | ON | ON |

Example for terminals 9-12:

| IN3 | IN2 | IN1 | IN0 |
|---|---|---|---|
| OFF | ON | OFF | ON |

Parallel I/O signal is valid in auto mode. (STOP signal is valid in auto mode and manual mode.)
During manual mode, input signals except STOP isinvalid. All output signals are OFF.
During manual mode testing, output signals are valid (input signals other than STOP are invalid)
*1) The following table shows the relation of the positon number and the combination of IN0 to IN3 or OUT0 to OUT3.

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○:OFF ●:ON                                           ○:OFF ●:ON

| Position number | IN3 | IN2 | IN1 | IN0 |
|---|---|---|---|---|
| 1 (End side) | ○ | ○ | ○ | ● |
| 2 (Motor side) | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (b) | ● | ○ | ● | ● |
| 12 (c) | ● | ● | ○ | ○ |
| 13 (d) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Origin (F) | ● | ● | ● | ● |

| Position number | OUT3 | OUT2 | OUT1 | OUT0 |
|---|---|---|---|---|
| 1 (End side) | ○ | ○ | ○ | ● |
| 2 (Motor side) | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (b) | ● | ○ | ● | ● |
| 12 (c) | ● | ● | ○ | ○ |
| 13 (d) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Origin (F) | ● | ● | ● | ● |

### (3) The change of I/O output signal

**The change of I/O output signal he condition of controller at auto mode.**

| Condition of the controller | Output signal | | | | | |
|---|---|---|---|---|---|---|
| | OUT0 | OUT1 | OUT2 | OUT3 | BUSY | ALARM |
| Right after supplying power | OFF | OFF | OFF | OFF | OFF | OFF |
| After supplying power and at the stop before return to origin. | OFF | OFF | OFF | OFF | OFF | ON |
| During the return to origin, positioning, and pushing operation. | OFF | OFF | OFF | OFF | ON | ON |
| When return to origin is completed. | ON | ON | ON | ON | OFF | ON |
| When positioning operation or pushing operation is completed. | *1) | *1) | *1) | *1) | OFF | ON |
| Stopped by RESET command | OFF | OFF | OFF | OFF | OFF | ON |
| Stopped by STOP command | *2) | *2) | *2) | *2) | OFF | OFF |
| When alarm is generated | OFF | *3) | *3) | *3) | OFF | OFF |

*1) ON, OFF of OUT0 to OUT3 depends on the target position

*2) The value is not decided. (It depends on the controller status (Operation / Stopped) when STOP command is input.)

*3) ON, OFF of OUT0 to OUT3 depends on the alarm group.
There is no servo ON signal with this controller. The servo turns off when conditions to turn off the servo are satisfied. Refer to **"8.5 Servo ON"** for details.

---

### ⚠ **Caution**

・IN0 to IN3 input during the switching from manual mode to auto mode are invalid. IN0 to IN3 become valid after the auto mode is set up.

・Output signal are not output from parallel I/O right after switching from manual mode to auto mode. Output signal will be output from parallel I/O after inputting the next command.

・Output from I/O is not made if switching from auto mode to manual mode.

## 6.4 Parallel I/O Wiring Example

When you connect a PLC, etc. to the CN4 parallel I/O connector, please use the I/O cable
(LEC-CK4-□).

The wiring should be changed depending on the type of the parallel I/O (NPN or PNP).

Please wire referring to the following diagram.

● **NPN type**

● **PNP type**



I/O signal power 24VDC

| COM+ |
| COM− |
| IN0 |
| IN1 |
| IN2 |
| IN3 |
| RESET |
| STOP |
| OUT0 | Load |
| OUT1 | Load |
| OUT2 | Load |
| OUT3 | Load |
| BUSY | Load |
| ALARM | Load |

I/O signal power 24VDC

| COM+ |
| COM− |
| IN0 |
| IN1 |
| IN2 |
| IN3 |
| RESET |
| STOP |
| OUT0 | Load |
| OUT1 | Load |
| OUT2 | Load |
| OUT3 | Load |
| BUSY | Load |
| ALARM | Load |
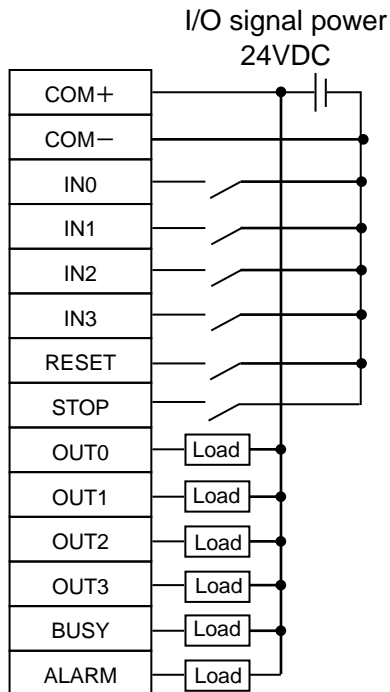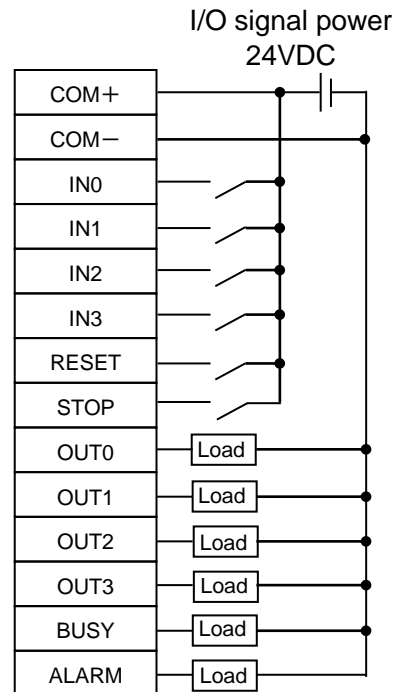
## ⚠ **Caution**

The 24 VDC controller power supply for CN1 and the 24 VDC I/O power supply for CN4 should be separated.

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# 7. Setting method

It is necessary to set the stop position and operation method using the controller in order to move the electric actuator to the specified position. Set data is stored in the memory in the controller.

Up to 14 points can be set. Set "1" to "14" with the position switch (h). ("1" to "9", "A" to "E") is displayed in hexadecimal on the 7-segment LED (f).

There are 2 types of modes on the controller (manual mode, auto mode). Setting and operating methods are different. Mode is switched by mode Switch (e).

  Upper part of the right figure (M) : Manual mode
  Lower part of the right figure (A) : Auto mode
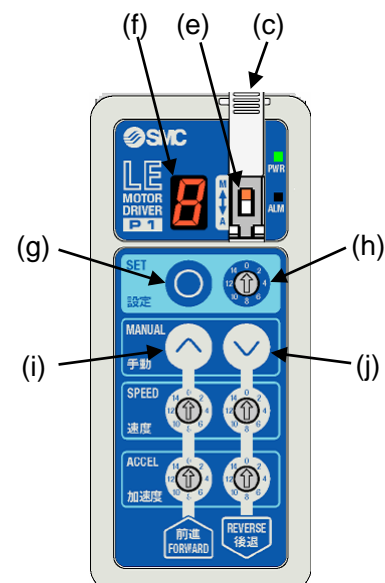
⚠ **Caution**

Close the cover (c) after the switching of the mode to avoid unexpected mode changes.

| | Manual mode (M) | Auto mode (A) |
|---|---|---|
| Setting of stop position (step data) | O | X |
| Setting of Speed and Acceleration | O | Δ (Only in speed adjustment) [*2] |
| Setting of operation method | O | X |
| Setting of parameters | O | X |
| Controller operation using the button | O | X |
| Operation from parallel I/O | X | O |
| Positioning operation | O | O |
| Pushing operation | Δ (Test function only) [*1] | O |
| Output to parallel I/O | Δ (Test function only) [*1] | O |
| Check the presence of alarm | O | O |
| Check the content of alarm | O | O |
| How to release the alarm | Press set button (g) | Turn on RESET or press set button (g) |
| Servo OFF method | - Press Forward button (i) and Reverse button (j) simultaneously for 3 sec.<br>- Turn on STOP | Turn on STOP |

*1) Refer to **"7.4 Test function"** for details of test function.

*2) Refer to **"7.3 Controller modes"** for details of the adjustment of the speed

Follow the procedure below for setting.

(1) Supply of power
  ↓
(2) Changes to Manual mode
  ↓
(3) Return to origin
  ↓
(4) Setting of position / Setting of operation method
  (A) Setting by Jog / inching
  (B) Setting by direct teaching
  ↓
(5) Test run
  ↓
(6) Setting of speed / acceleration
  ↓
(7) Setting completed
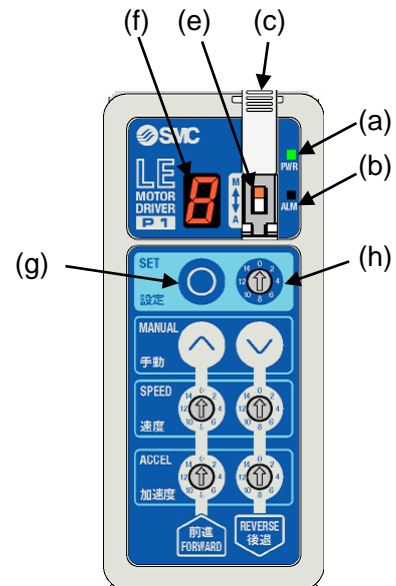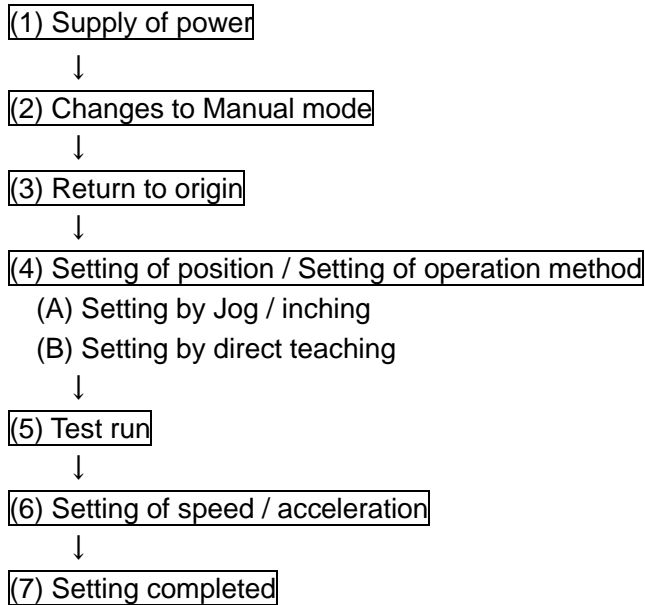
### (1) Supply of power

Apply 24 VDC to the power supply for the power line and the signal line. (*) After applying the power, confirm that the power supply LED (a) lights up green (= Servo ON). Refer to **"8.5 Servo ON"** if the power supply LED (a) flashes green.

When alarm LED (b) lights up, refer to **"11. Alarm Detection"**

(* After supplying power, it may take approximately 10 seconds until ALARM is output depending on the electric actuator positions.)

### (2) Changes to Manual mode

Switch the controller mode switch (e) to manual mode (M side). In manual mode, the 7-segment LED (f) indicates the value of the position switch (h) with flashes quickly.

### (3) Return to origin

Confirm that the 7-segment LED (f) display is changed to "F" by setting the position switch (h) to "15", then press the set button (g) to start the return to origin. When the return to origin is completed, the display of the 7-segment LED (f) from a flashing to a solid light..

---

## ⚠ Caution

・ If return to origin is performed before the servo is turned on (Power supply LED (a) lights up green), an alarm will be generated. Perform the return to origin after confirming that the servo is turned on.

・ Refer to **"8.1 Return to origin"** for details.

・ The direction of return to origin depends on the electric actuator.
  Refer to **"10. Initial setting value per electric actuator"** for the default setting.

**(4) Setting of position and operation method**

At the manual mode after returning to origin, position can be set by (A) Jog / inching or (B) Direct teaching.

Example) Setting of position number 3

**(A) Setting by Jog / inching**

1) Set the position switch (h) to the required position ("3" in this case). The value of position switch (h) flashes quickly on 7-segment LED (f)

Do not set "0" and "F (15)" because they are not position numbers.
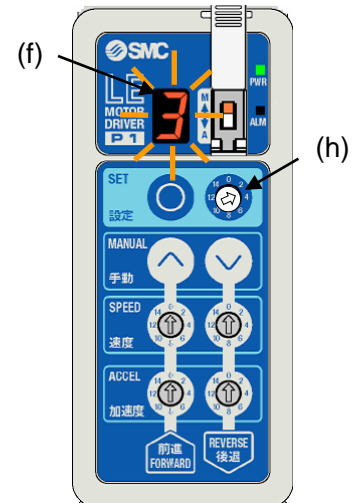
2) Confirm that the power supply LED (a) is lights up, then, press the set button (g) to move the electric actuator to the previous set position.

The 7-segment LED (f) lights up is when the electric actuator reaches the set position.

Then, keep pressing the set button (g) until the 7-segment LED (f) display starts flashing slowly.

If set button (g) is pressed again during moving, the moving to the set position is stopped.

Moving to the registered position starts by pressing set button (g) again.

---
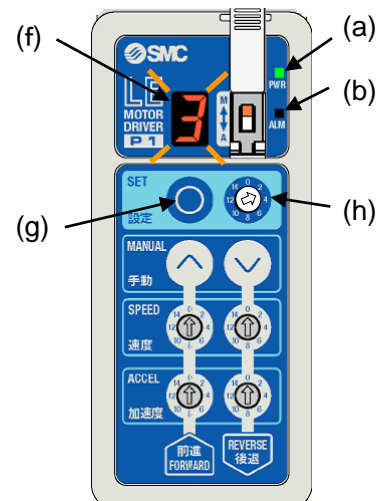
### ⚠ Caution

・ If the return to origin is performed before step (2) Changes to Manual mode, alarm is generated (7-segment LED (f) displays [C], and the alarm LED (b) lights up).　In this case, reset the alarm by pressing the set button (g). Then, set the position switch (h) to [F (15)] and perform return to origin by pressing the set button (g) before performing the step (2) Changes to Manual mode.

・ If it is not possible to return to the position before setting due to the mechanical interference, set the position by (B) Direct teaching.

**⊘SMC**

3) Perform Jog / inching using Forward button (i) and
   Reverse button (j) to move to required position.

   Inching starts by pressing either Forward button (i)
   or Reverse button (j).
   Jog starts by keeping pressing either Forward
   button (i) or Reverse button (j).Refer to **"8.4 Jog /
   inching operation"** for details.

(i)          (j)
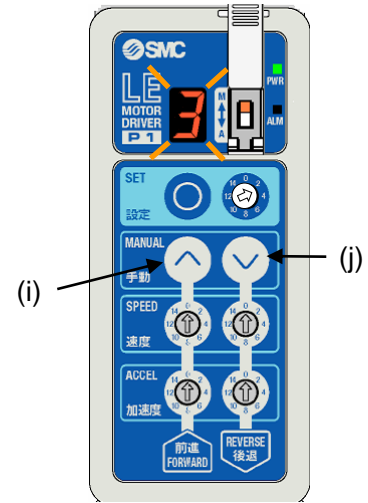
4) Lock in the position by pressing the set button (g).
   At this point, the value has not been stored. If the
   power supply is cut, it is necessary to start from
   step (1) Supply of power again.
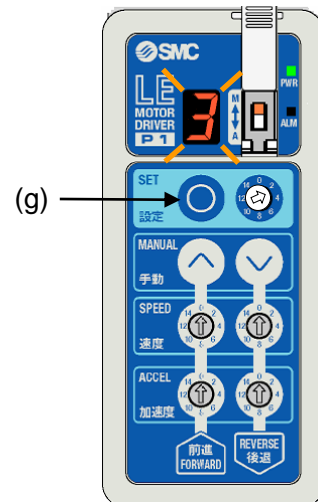
(g)

5) Set the operation method of this position by
   pressing Forward button (i) or Reverse button (j)
   monitoring 7-segment LED (f)

   Actual force of pushing force depends on the
   electric actuator. Refer to **"10.Initial setting value
   per electric actuator"** Pushing operation may not
   be possible depending on the electric actuator.

(f)

(i)          (j)

7-segment LED display (Set operation method)

| Positioning | Forward button (i) → ← Reverse button (j) | Pushing force Low | Forward button (i) → ← Reverse button (j) | Pushing force Middle | Forward button (i) → ← Reverse button (j) | Pushing force High |

SMC
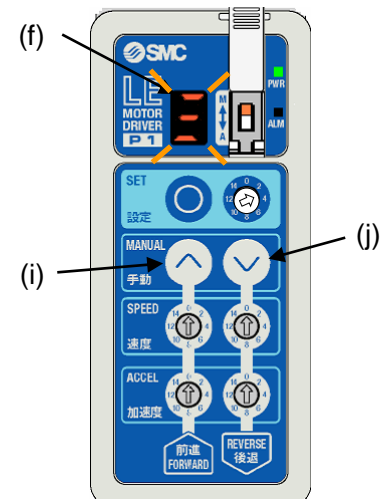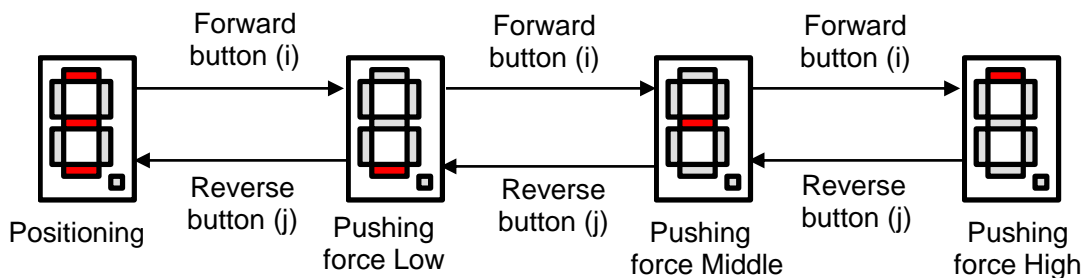
6) Press button (g) for 2 seconds to set the operation
   method. When this operation completes, the
   position set in 7-segment LED (f) is displayed.
   When the position is registered and set button (g) is
   released, 7-segment LED (f) flashes quickly.

(f)

(g)
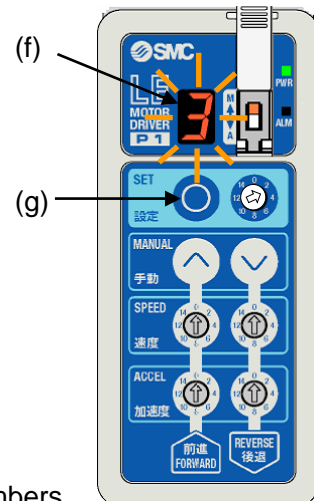
   Positioning by Jog / inching completed.
   Perform the same procedure for other required position numbers.

| ⚠ **Caution** |
|---|
| ・ If Jog / inching is performed before the servo is turned on (Power supply LED (a) lights up green), an alarm will be generated. Perform the Jog / inching after confirming that the servo is turned on.<br>・ Set operation method per position number. Refer to **"8. Operations"**. |

SMC

## (B) Setting by direct teaching (Ex. Position switch initial value "4")

1) Pressing Forward button (i) and Reverse button (j) simultaneously for 3 seconds, then the power supply LED (a) will be changed from solid light to flashing and 7-segment LED (f) will be changed a flashing to a solid light.

   The flashing of the power supply LED (a) indicates the servo is turned off.

---
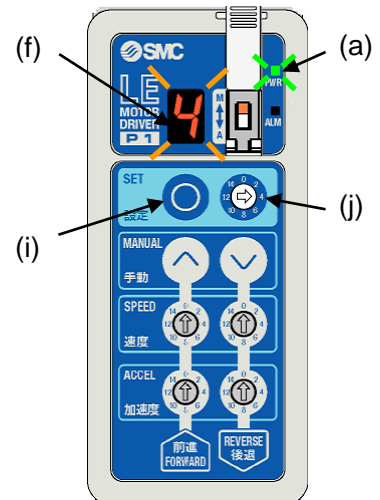
### ⚠ **Caution**

If the servo of the direct teaching is turned OFF by the electric actuator with lock, the lock will be released as well. Therefore, if an electric actuator with lock is used vertically, the moving part of the electric actuator may drop due to the weight of the electric actuator itself.

---

2) Set the position switch (h) to the required position ("3" in this case). The value of the position switch (h) flashes on the 7-segment LED (f).

   Do not set "0" and "F (15)" because they are not position numbers.
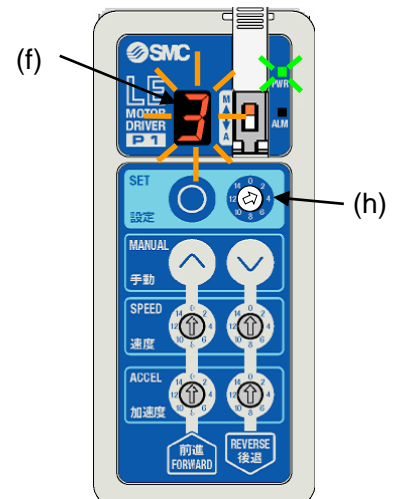
3) Press and hold the set button (g) until the 7-segment LED (f) changes from solid light to slow flashing, then release the set button (g).

**SMC**
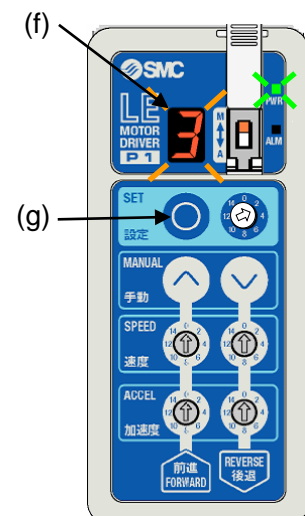
4) Move the electric actuator to required position with external force. Lock in the position by pressing the set button (g).

At this point, the position is not stored. If the power supply is cut, it is necessary to started from procedure (1) Supply of power.

In case of small lead screws, the electric actuator may not be moved by external forced even if the servo is off. Perform positioning by (A) Jog / inching
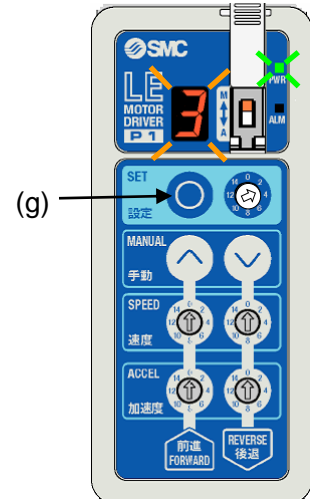
(g)

5) Set the operation method of this position by pressing Forward button (i) or Reverse button (j) while monitoring 7-segment LED (f).

Actual force of pushing force depends on the electric actuator. Refer to **"10.Initial setting value per electric actuator"** Pushing operation may not be possible depending on the electric actuator.

(f)

(i)                    (j)

7-segment LED display (Set operation method)

```
            Forward              Forward              Forward
            button (i)           button (i)           button (i)
   ┌──┐   ──────────→   ┌──┐   ──────────→   ┌──┐   ──────────→   ┌──┐
   │  │                 │  │                 │  │                 │  │
   └──┘   ←──────────   └──┘   ←──────────   └──┘   ←──────────   └──┘
           Reverse              Reverse              Reverse
Positioning button (j)  Pushing  button (j)  Pushing  button (j)  Pushing
                        force Low            force Middle          force High
```

**SMC**
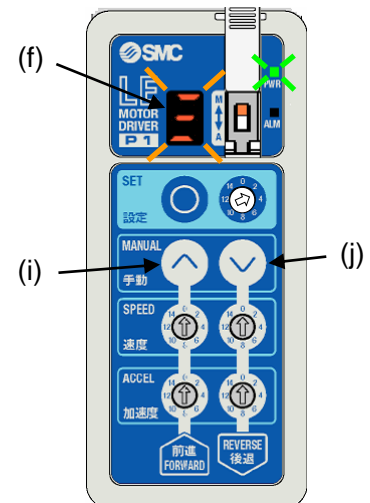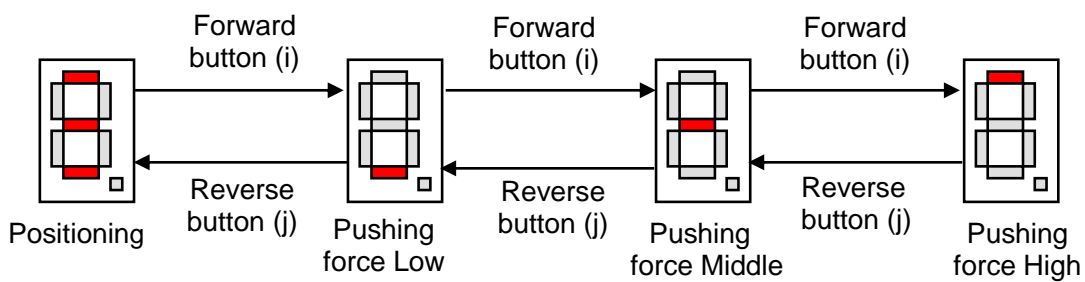
6) Press set button (g) for 2 seconds to set the
operation method. Once this operation is
completed, the position and the operation method
are stored in the controller, and position number
lights up on the 7-segment LED (f).

That is all for the setting by direct teaching.
To set other positions continuously, start from the
step (2) Changes to Manual mode. If setting with
Jog / inching or test run is performed after this
setting, press and hold Forward button (i) and
Reverse button (j) simultaneously for 3 seconds
to change the power supply (a) from a flashing to
a solid light.

---
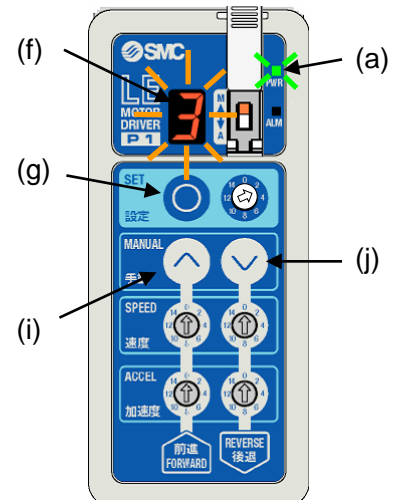
## ⚠ Caution

・ If the return to origin is performed before step (2) Changes to Manual mode, an alarm is generated
(7-segment LED (f) displays [A], and the alarm LED (b) lights up). In this case, reset the alarm by
pressing the set button (g), then press and hold Forward button (i) and Reverse button (j)
simultaneously for 3 seconds to change the power supply LED (a) from a flashing to a solid light.
Then, set the position switch (h) to "F (15)" and press the set button (g) to perform return to origin
before performing the step (1) Supply of power.
・ The electric actuators with a smaller lead, it may not be moved by the external force.
Perform positioning by **"(A) Setting by Jog / inching"** on the previous page.

**(5) Test run**

Use the controller buttons and switches to confirm the operating method and position.
Operation method is as follows.

1) Set the required position number using the position switch (h).
2) Confirm that the position number set is displayed by the
   7-segment LED (f) and flashes quickly.
3) Press the set button (g) to start movement. The 7-segment
   LED (f) flashes slowly during operation. Slow flashing
   changes to being solid up when the set position is reached.
   This operation confirms the stop position and the operation
   method.
4) Confirm other stop positions with the same operation.

   For Pushing operation, check with the test function of
   manual mode or auto mode.
   Refer to **"7.4 Test function"** for details of test function.
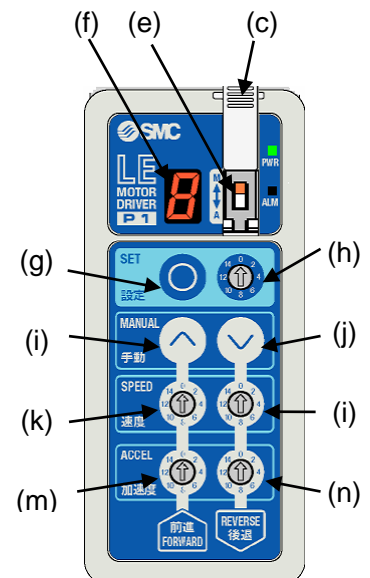
**(6) Setting of Speed and Acceleration**

One speed and acceleration can be set for each movement direction (reverse and forward) and it is
applied for the operation of all position numbers.
Set the speed and the acceleration by switch (k) to (n) per direction of actuation. The switch can be
set in 16 steps. Actual value depends on the electric actuator. Refer to **"10.Initial setting value per
electric actuator"** The operation with the set speed and acceleration can be checked by test run as
shown above (5)Test run

Different speeds and accelerations cannot be individually set for positioning of each position
number

**(7) Completion of setting**

After set-up is completed, switch to auto mode using the mode switch (e) and perform operation
with PLC. Refer to **"9. Operation instruction"** for operation examples with PLC.

| ⚠ **Caution** |
|---|
| Close the cover (c) after the switching of the mode to avoid unexpected mode change. |

## 7.2 Setting parameters

In manual mode, it is possible to set parameters. The 3 parameters below can be set and changed.

| Parameters No. | Description of parameters | Value and the content of parameters |
|---|---|---|
| 1 | Reference for rotating direction | Change the direction of the return to origin and forward and reverse *1)<br><br>| Value | Description |<br>\|---\|---\|<br>\| 1 \| CW \|<br>\| 2 \| CCW \| |
| 2 | Jog speed level | Sets the speed of Jog and inching.<br>Jog, inching speed<br>=( Reference value of electric actuator)×(Description)<br><br>| Value | Description |<br>\|---\|---\|<br>\| 1 \| 1 (Default value at the time of shipment) \|<br>\| 2 \| 2 \|<br>\| 3 \| 4 \|<br>\| 4 \| 8 \| |
| 3 | Inching level | Sets the move distance during the inching operation.<br>Inching level=(Reference value per electric actuator)×(Description)<br><br>| Value | Description |<br>\|---\|---\|<br>\| 1 \| 1 (Default value at the time of shipment) \|<br>\| 2 \| 2 \|<br>\| 3 \| 4 \|<br>\| 4 \| 8 \| |

*1) The default value varies depending on the electric actuator.
Please refer to the manual of the electric actuator for more details.

The procedure to set the parameters is shown below.

1) Switch the controller mode switch (e) to manual mode (M).

Example: "4" (Default value of position switch)
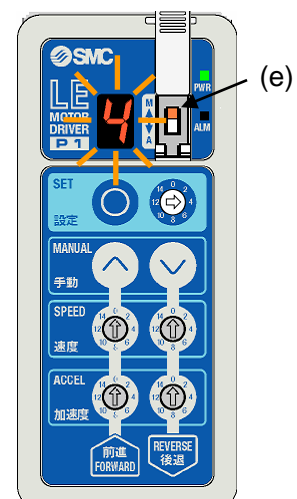
2) Press and hold Forward button (i) and Reverse button
   (j) simultaneously for 3 seconds so that the power
   supply LED (a) is changed from a solid light to a
   flashing.
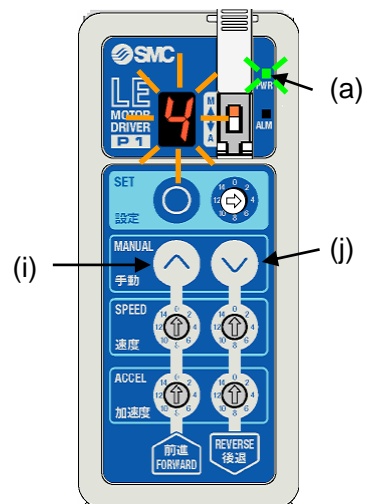
3) Set the value of the position switch (h) to "0" and
   press and hold the set button (g) for 3 seconds.
   The 7-segment LED (f) displays "0" with a dot and the
   alarm LED (b) flashes.
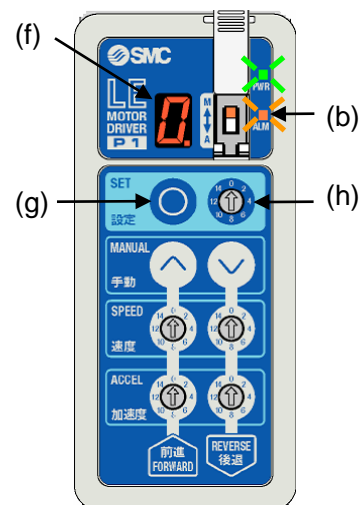
4) When the position switch (h) is set at the required
   parameter number ("2" in this case), the 7-segment
   LED (f) displays the value of the position switch (h) with
   a dot.
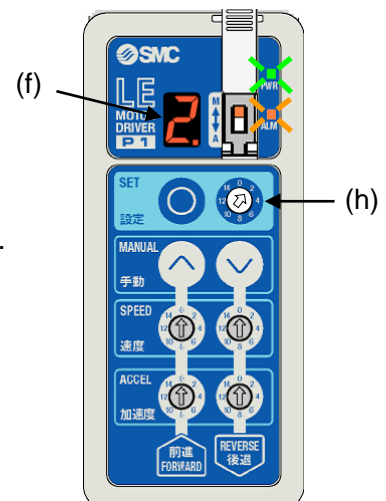
   Refer to **"7.2 Setting parameters"** for the details of parameters.

| No. | Description | Function |
|-----|-------------|----------|
| 1 | Reference for rotating direction | Return to origin or changing forward / reverse |
| 2 | Jog speed level | Adjustment of Jog speed |
| 3 | Inching level | Adjustment of inching |

5) The dot indication of the 7-segment LED (f) is turned off by pressing the set button (g), and the current parameter appears. ("1" appears in this example).

If the value of the position switch (h) is changed at this stage, it will return to the state of 4) above.
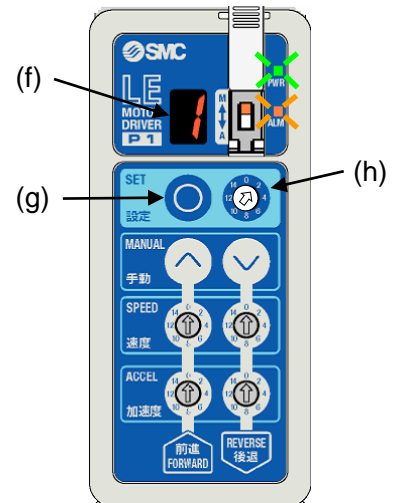
6) To change the parameter value, press and hold the set button (g) for 2 seconds. The 7-segment LED (f) changes to slow flashing.
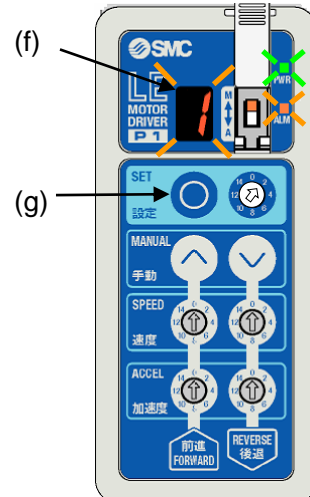
7) Press Forward button (i) and Reverse button (j) to adjust the parameter to the required value ("3" in this example). When the adjustment is completed, press the set button (g) for 2 seconds.
When this setting is completed, the 7-segment LED (f) display changes from slow flashing to a solid light and the set value is stored. However, the changes do not take effect until the power is supplied again.

That is the end for parameter setting.
Repeat 4) to 7) to continue adjusting other parameters.
To perform operation in manual mode after the setting is completed, switch the mode switch (e) to auto mode once, then switch to manual mode.

---
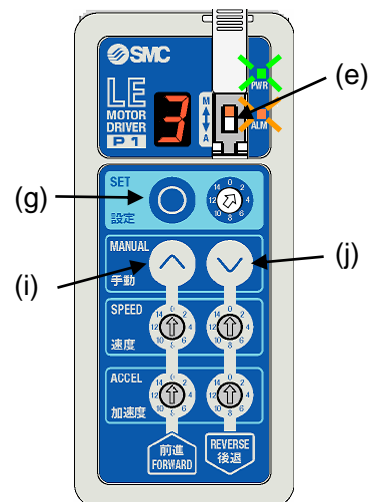
## ⚠ Caution

- Parameter changes take effect after turning off the power supply and turning it on again.
- For the default value of the return to origin and the reference value of Jog speed and the inching amount, refer to **"10. Initial setting value per electric actuator".**
- When the reference for rotating direction is changed, the direction of forward and reverse is switched, and the speed and acceleration per direction are changed as well. Therefore, it is necessary to set the position, speed and acceleration again.

## 7.3 Controller modes

Controller modes are divided into two types, auto mode and manual mode. There are several status types in one mode. The figure below shows how the status changes.
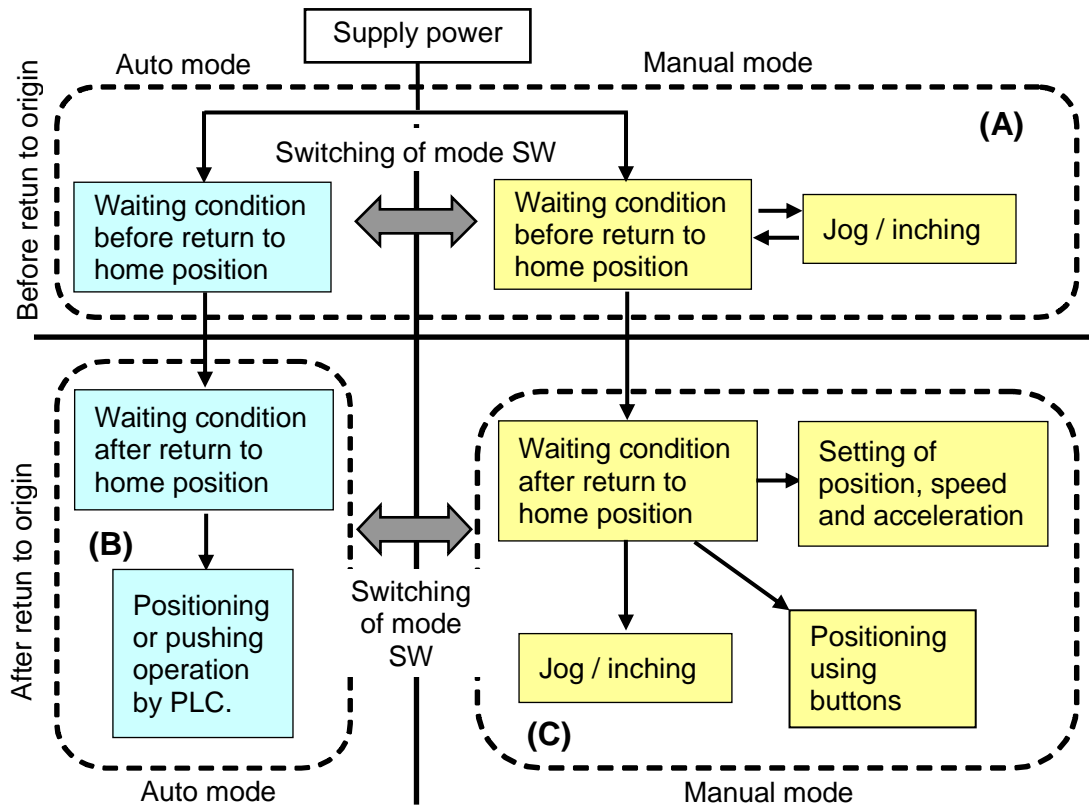


Followings are the explanation of (A), (B), and (C) circled with dashed line.

(A) Before return to origin
(B) Auto mode after return to origin
(C) Manual mode after retun to origin

| ⚠ **Caution** |
|---|
| ・ Signal is not output from I/O right after switching from manual mode to auto mode. Output from I/O is made after the next input of operation command. |
| ・ Output from I/O is not made if switching from auto mode to manual mode. (Except test function) |

## (A) Before return to origin

The transition of the status before return to origin is shown below. After turning on the power supply, the controller status is in waiting mode which is set by mode switch (e). The operation of Jog / inching at manual mode is available before retun to origin.

| Auto mode | Supply power | Manual mode |
|---|---|---|
| Mode switch (e) is on auto side | | Mode switch (e) is on manual side |

Mode switch (e) is switched

Press manual forward or manual reverse button (i),(j)

**Before retun to origin**

Waiting condition before retun to origin ⟷ Waiting condition before retun to origin → Jog / inching

Release the button being pressed.

**After retun to origin**

PLC commands to return to origin.

Command from the controller to return to origin (Position switch (h) is "15", press set button (g))

Waiting condition after retun to origin

Waiting condition after retun to origin

Refer to **"8.1 Return to origin"** for details.
Refer to **"8.4 Jog operation / inching operation"** for details
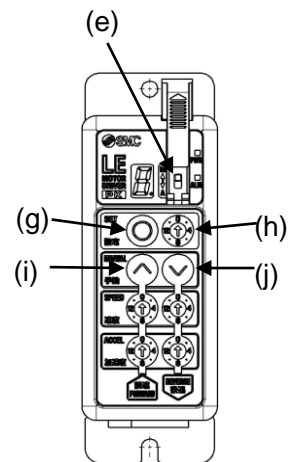
## (B) Auto mode after return to origin

The status of the auto mode after return to origin is shown below. At auto mode, only the operation command from I/O such as PLC is accepted. Basically, position, operation method, speed and acceleration cannot be adjusted in auto mode.
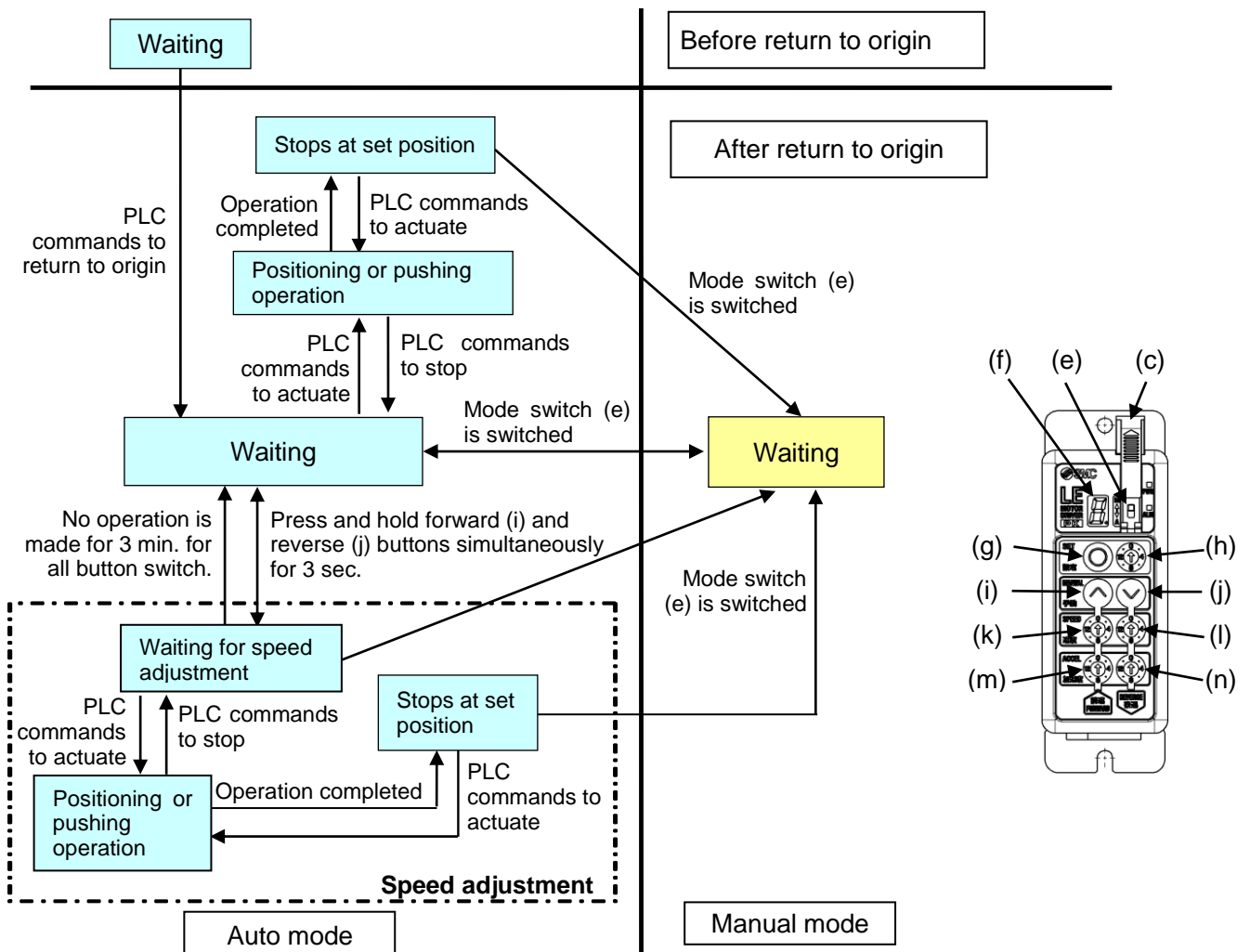


Auto mode is presupposed operation by I/O from PLC. When the buttons and switches other than set button (g) for releasing the alarm are operated, the 7-segment LED (f) indicates "L".
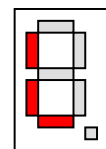
When the status is moved to speed adjustment, following items are become different from normal operation.

(1) More dots of 7-segment LED (f) indication than normal operation.

(2) Speed and acceleration adjustment become available temporarily.

(3) When no operation is made for 3 minutes for any buttons or switches, operation returns to normal mode.

L display

| ⚠ **Caution** |
|---|
| ・ In auto mode, changing the speed, acceleration switch values which are set by (k) to (n) do not take effect except during the speed adjustment status. If returning to auto mode after changing to manual mode, the value of the switch affects the operation. |
| ・ Close the cover (c) after the switching of the mode to avoid unexpected mode change. |

## (C) Manual mode after retun to origin

The status of the manual mode after return to origin is shown below. In manual mode, return to origin is controlled by the operation of the controller buttons and switches. The speed and acceleration can be adjusted any time. It is also possible to set the position and operation method. Pushing operation is available only with test function.

Waiting | Before return to origin

After return to origin

**Auto mode**

Set the position switch (h) to "15" and press the set button (g).

Press the set button (g) for 2 sec.

**Position setting (Jog / inching)**

Waiting for the completion of setting

Adjust by pressing manual button (i) or (j)

Waiting for setting of operation method

**Normal operation**

Positioning operation

Operation completed

Press the set button (g) for 2sec

Jog / inching

Press manual button (i) or (j)

Press the set button (g)

Stop at set position

(g) After specifying the position with switch (h), press the set button to start operation. Operation stops when the set button is pressed again.

Release manual button (i) or (j)

Stop before adjusting the position

Position adjustment is completed

Stop after adjusting the position

Release the button being pressed.

Jog / inching

Press manual button (i) or (j)

Press the manual buttons (i), (j) simultaneously for 3 sec.

Set the position switch (h) to "0" and press the set button (g) for 3sec

Setting of parameters

Wait ing

Waiting

Release the button being pressed.

Press the manual buttons (i),(j) simultaneously for 3sec.

Waiting by servo off

Press the set button (g) for 2 sec.

Waiting for completion of setting

Adjust by pressing manual button (i) or (j)

Mode switch (e) is switched

Set the position switch (h) to "0" and press the set button (g) for 3sec.

Set the position switch (h) and adujust the position

Waiting for test

Press manual button (i) or (j)

Release the button being pressed.

Stop after adjusting the position

Press the set button (g)

Waiting for setting of operation method

Operation completed

After specifying the position with switch (h), press the set button (g).

Jog / inching

Positioning or pushing operation

**Test function**

**Servo OFF Direct teaching Parameter setting**

Manual mode

Refer to **"7.4 Test function"** for details of normal operation and test function.
Refer to **"8.5 Servo ON"** for turning off of servo.
Refer to **"7.2 Setting parameters"** for parameter setting.
Refer to **"8.4 Jog operation / inching operation"** for Jog and inching.

(f) (e) (c)
(g) (h)
(i) (j)
(k) (l)
(m) (n)

⚠ **Caution**

Close the cover (c) after the switching of the mode to avoid unexpected mode change.

## 7.4 Test function

The table below shows the difference between normal operation and test function in manual mode. To start the test function, set the position switch (h) to "0" while the power LED (a) is lights up (= Servo ON) in manual mode and the electric actuator stops, and press the set button (g) for 3 seconds. When test function starts, the dot on the lower right of the 7-segment LED (f) will light up.
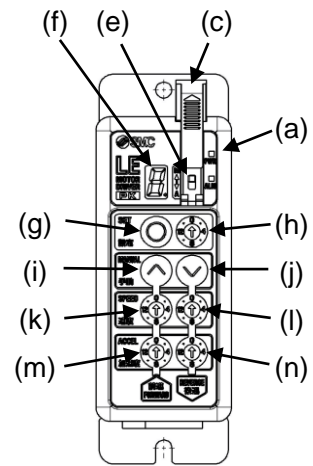
|  | Normal operation | Test function |
|---|---|---|
| Availability of pushing operation | X | O |
| Operation by parallel I/O input | X<br>(Valid only for STOP) | X<br>(Valid only for STOP) |
| Output to parallel I/O | X | O |
| 7-segment LED (f) display | Without dot<br>  Target position setting: Quick flashing<br>  During operation: Slow flashing<br>  Reached the target position: ON | With dot<br>  Target position setting: ON<br>  During operation: Slow flashing<br>  Reached the target position: ON |
| Adjustment of the speed / acceleration | O | O |
| Operation method using buttons | Press the set button (g) to start operation. Operation stops when the set button is pressed again. | Moves towards the target position when the set button (g) is pressed. (Not necessary to keep pressing the button) |

# 8. Operations

## 8.1 Return to origin

After supplying power, it is necessary to perform return to origin first to perform positioning or pushing with the electric actuator. (To ensure the position of origin)

● Input of return to origin

There are 2 ways for return to origin per mode

・ Manual mode : Set the position switch (h) at "15" and press the set button (g).

・ Auto mode : Turn on I/O IN0 to IN3 simultaneously.

● Return to origin operation

The electric actuator moves in the return to origin direction (this direction is dependent on the electric actuator) from the initial position at the moment of power-on: See (1) in the diagram below.

When the electric actuator reaches the end of move limit it pauses for a short time. The controller recognizes the position as the end of move limit of the electric actuator. Then, the electric actuator moves at a low speed in the direction opposite to the return to origin direction: See (2) in the diagram below.

| Return to origin signal |
| ↓ |
| Move in the return to origin direction |
| ↓ |
| Stop the movement |
| ↓ |
| Move in the opposite direction |
| ↓ |
| Origin position |

**(Example) Return to origin operation**

Load

Motor

Electric actuator

(2)

Origin position

electric Actuator end
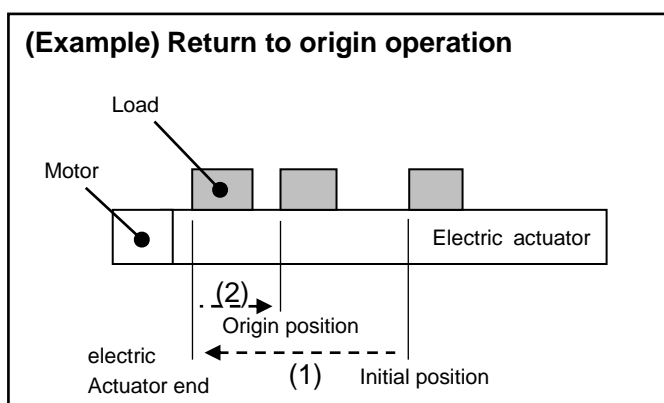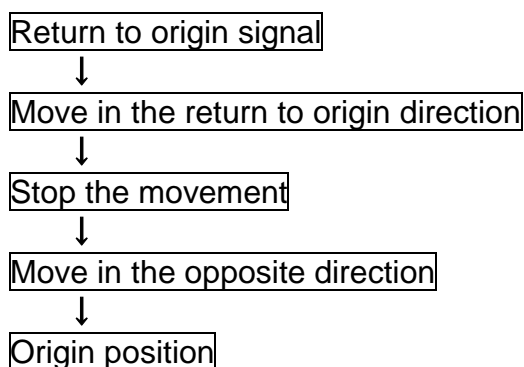
(1)　Initial position

## ⚠Caution

The direction of return to home depends on the electric actuator. Refer to **"10. Initial setting value per electric actuator"** for the default setting of the return to origin direction.

## 8.2 Positioning operation

The electric actuator moves to the target position at speed and acceleration which are set per operating direction.

When the electric actuator reaches the target position, an operation complete signal (OUT0 to OUT3) is output.

Speed

Set speed

Position

Load

Motor

Electric actuator

Stop position　Target position
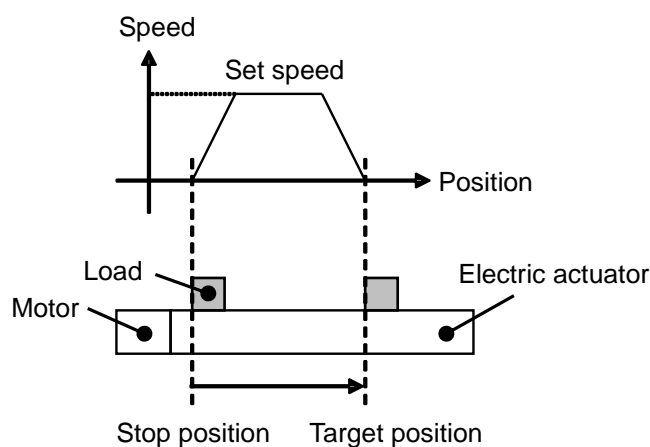
The speed wave in the chart above is simplified.

## 8.3 Pushing operation

Perform pushing operation after performing the positioning operation at the set speed and acceleration. At pushing operation, the electric actuator moves at slow pushing speed from the operation starting position to the opposite side electric actuator end with less than the set pushing force.

---

### ⚠ Caution

・ At manual mode, positioning is performed even if pushing is set. (Except during test function)
・ Pushing operation may not be possible depending on the electric actuator. Refer to **"10.Initial setting value per electric actuator"**.

---

### (1) Successful pushing operation

At pushing operation, operation complete signal is output when the pushing force is kept at more than the set value for a specific period of time. However, the set pushuing force continues to be generated even when the pushing operation is completed.
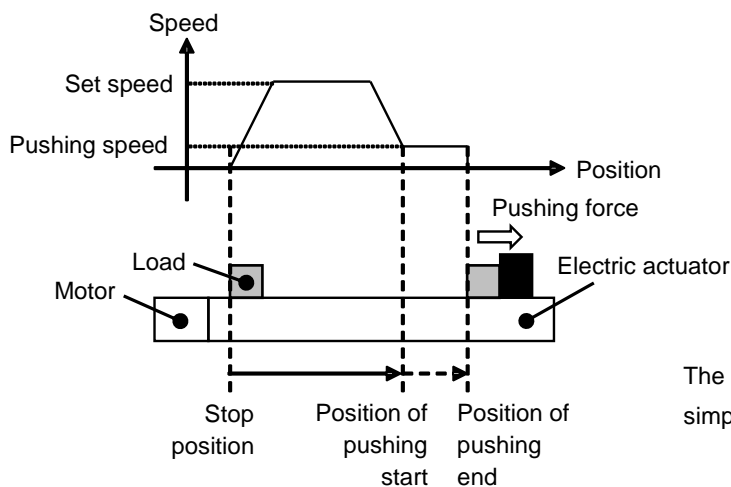


The speed wave form in the chart on the left is simplified.

### (2) Pushing operation is failed (pushing the air)

If pushing is not completed even when the electric actuator moves from the pushing start position to the electric actuator end, it is pushed at the electric actuator end and the operation complete signal is output.
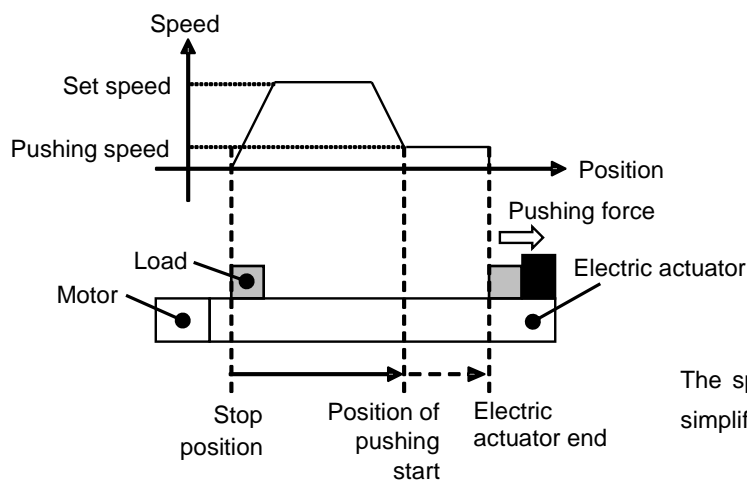


The speed wave form in the chart on the left is simplified.

**(3) Movement of the work piece after the completion of the pushing operation**

1) Movement of the work piece in the pushing direction.

When the reaction force of the pushed object becomes small after the completion of pushing and the electric actuator is moved by the pushing force smaller than the set pushing force, the completion signal is not output, and the electric actuator will continue to move within the range up to the electric actuator end.

Operation complete signal is output when the pushing force is kept at larger than the set value for a specific period.

Speed

Set speed

Position

Stop position

Pushing again

Motor　Load　Electric actuator

Stop position　Position of pushing start　Position of pushing end
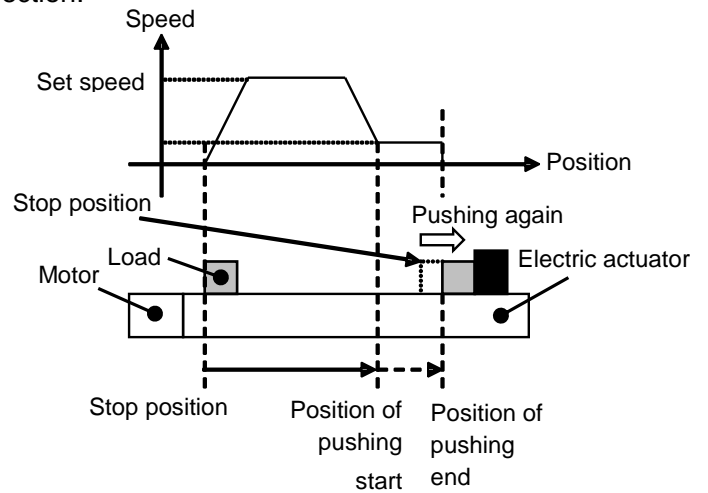
The speed wave form in the chart above is simplified.

2) Movement of the work piece in the direction opposite to the pushing direction
(The electric actuator is pushed back since the reaction force from the work piece is too large.)

When the electric actuator is pushed back after the pushing operation is completed the electric actuator is pushed until the reaction force and pushing force are balanced in the direction that the pushing started. (Completion signal stays ON) An alarm (Pushing failure) is generated when the electric actuator is pushed back farther than the start position of pushing.

Speed

Set speed

Pushing speed

Position

Pushing again

Motor　Load　Electric actuator

Stop position　Position of pushing start　Position of pushing end　Position of pushing back

The speed wave form in the chart above is simplified.

**SMC**
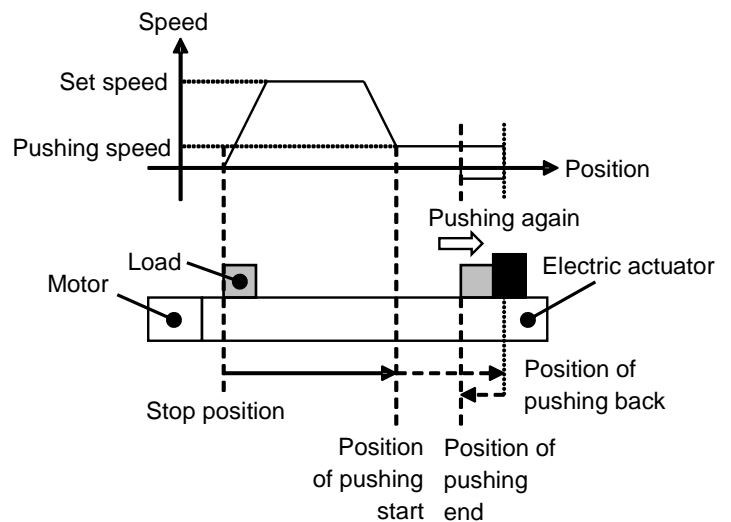
## 8.4 Jog operation / inching operation

Jog / inching is available by pressing forward button (i) or reverse button (j) at manual mode. Jog / inching can be performed before return to origin.

Operation method
Inching starts and stops by pressing forward button (i) or reverse button (j). When the button is pressed continuously for 1 second or longer after inching is completed, the Jog operation starts. Jog operation stops when the button is released.



```
         Position
                    ┌─────────────────┐          ┌─────┐        ┌──────────────────┐
                    │Press Forward    │          │Press│        │Press Reverse     │
                    │button           │          │Rev. │        │button            │
                    └─────────────────┘          │button│       └──────────────────┘

                      Stop    Jog    Stop    Stop     Stop    Jog
                                                                              Time
         Inching    1 sec.         Inching   1 sec. or less   1 sec.
```

---
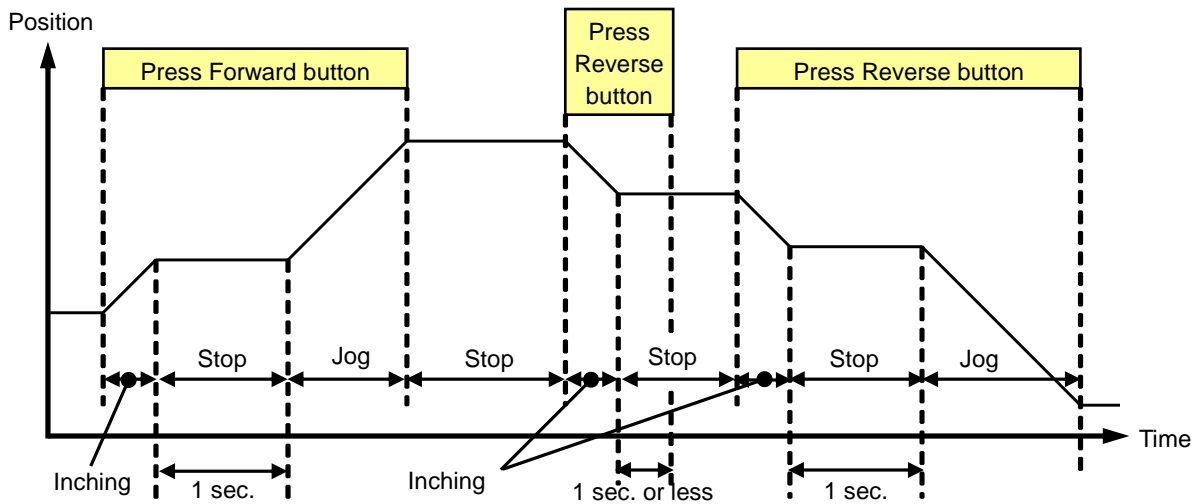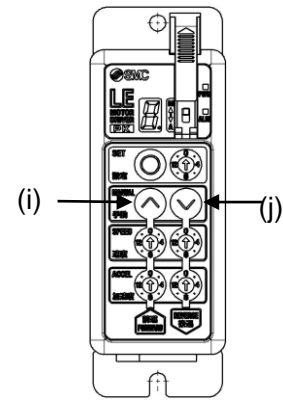
## ⚠ Caution

The move distance and speed in the inching operation and the speed in the Jog operation will vary depending on the electric actuator.
Refer to **"10.Initial setting value per electric actuator"**.
The move distance and speed of the inching operation and the speed of the Jog operation can be changed by parameter.
Refer to **"7.2 Setting parameters"** for details.

---

## 8.5 Servo ON

Servo ON signal is not assigned to the parallel I/O of this controller. The power supply LED (a) changes from a flashing light to a solid light after a specific period of time after power supply and the servo turns on. The conditions for turning the servo OFF are shown in the table below.[*1)]

| | Conditions for servo OFF | Indication of servo OFF |
|---|---|---|
| Manual mode | Alarm is generated, or servo OFF by pressing Forward button (i) and Reverse button (j) simultaneously for 3 seconds. | Power supply LED (a): Flashing Alarm: OFF |
| Auto mode | Alarm is generated, or servo OFF by inputting I/O STOP signal. | Power supply LED (a): Flashing |
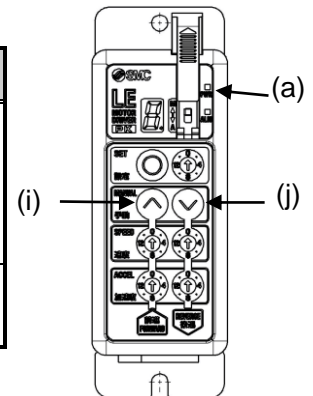
*1) It may take about 10 seconds from the power supply turning on to the ALARM output.

## 8.6 Response time for the controller input signal

Response delay due to the controller input signal contains following factors.

(1) Controller input signal scan delay

(2) Delay due to input signal analysis

(3) Delay of command analysis

Leave an interval of a minimum of 15 ms (recommendation is 30 ms) between input signals and maintain the state of the signal for a minimum of 15ms (recommendation is 30 ms), because PLC processing delays and controller scanning delays can occur. Time the input signal conditions according to the response output signals.

When one command is made by inputting several I/O simultaneously, the time difference between signals has to be 3 ms or less. If the time difference is longer than 3 ms, it is recognized as another signal and starts the operation. For example, when IN0 and IN1 are commanded to turn ON (position number 3) simultaneously and the time difference between them is large, only the first command is recognized (Only IN0 input is recognized in the following example).
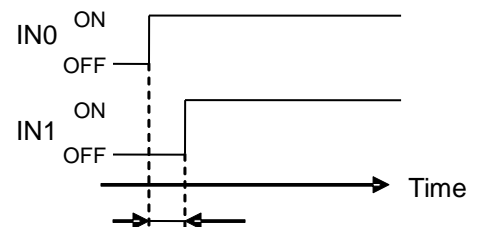
If the time difference is large, only the IN0 input is recognized.

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## 8.7 LED display in auto mode

The 7-segment LED (f) in auto mode displays position number during operation (or operation completion) and alarm group when alarm is generated (ALM LED lights up).

| 7-segment LED (f) display | ALM LED (b) (Red) | PWR LED (a) (Green) | Controller status |
|---|---|---|---|
| "-" (Solid light) | OFF | Flashing / Solid light *1) | Right after supplying power |
| "F" (Flashing) | OFF | ON | During return to origin *4) |
| "F" (Solid light) | OFF | ON | Return to origin completed |
| Position numbers "1" to "9", "A" to "E" (Flashing) | OFF | ON | During operation *4) |
| Position numbers "1" to "9", "A" to "E" (Solid light) | OFF | ON | Operation completed |
| Alarm group "A" to "E" (Solid light) | ON | Flashing / Solid light *2) | Alarm generated |
| "L" (Flashing) *3) | ON | Flashing / Solid light | Buttons and switches operated |

*1) It is changed from a flashing to a solid light after servo is turned on. (Refer to **"8.5 Servo ON"** for details.)

*2) The servo is turned off depending on the alarm contents. If so, the LED is changed from a solid light to a flashing light.

*3) This indicates that the operation of forward / reverse buttons and speed / acceleration switches are disable (locked). The operating conditions or servo ON / OFF are not influenced.
When alarm is being generated, it displays the alarm group ("L" is not displayed).

  - When the set button (g), forward button (i), or reverse button (j) is operated, "L" will be displayed for 3 seconds before returning to the display of before operating those buttons.

  - If the speed or acceleration switches (k) to (n) have been changed, the display is not returned unless change the switch value to the value before changing the switches or switch to manual mode and store the changed switch value to the controller.

   ("L" will continue to be displayed even when power is supplied again.)

*4) If RESET or STOP is turned ON; or M24V is disconnected during return to origin or operation, the operation will stop and 7-segment LED will be changed from a flashing to a solid light.
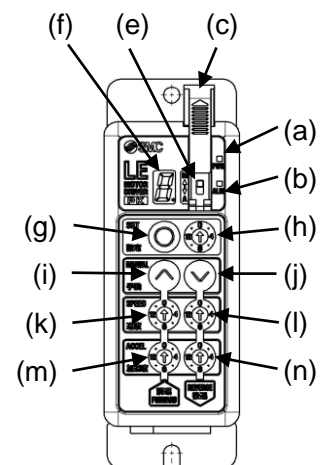
## 9.1 Positioning / Return to origin

Example)

If the operation pattern is Return to origin → Position No.1 → Position No.2 → Position No.1:

Forward : Speed 5, acceleration 3 (Switch value)

Reverse : Speed 9, acceleration 7 (Switch value)
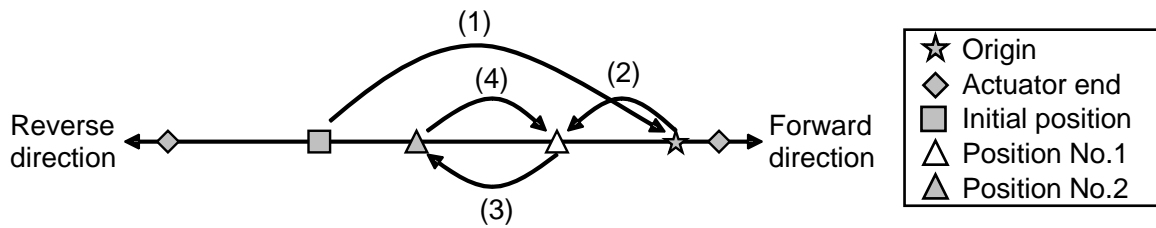


|  | Start position | End position | Operating direction | speed | acceleration | Operation method |
|---|---|---|---|---|---|---|
| (1) | Undecided | Origin position | Forward | Fixed | Fixed | Return to origin |
| (2) | Origin position | No. 1 | Reverse | 9 | 7 | Positioning |
| (3) | No. 1 | No. 2 | Reverse | 9 | 7 | Positioning |
| (4) | No. 2 | No. 1 | Forward | 5 | 3 | Positioning |

Even for the same position number 1, the move speed and the acceleration may vary due to the operating direction.

I/O timing chart when the electric actuator is operated by PLC.



<Procedure>
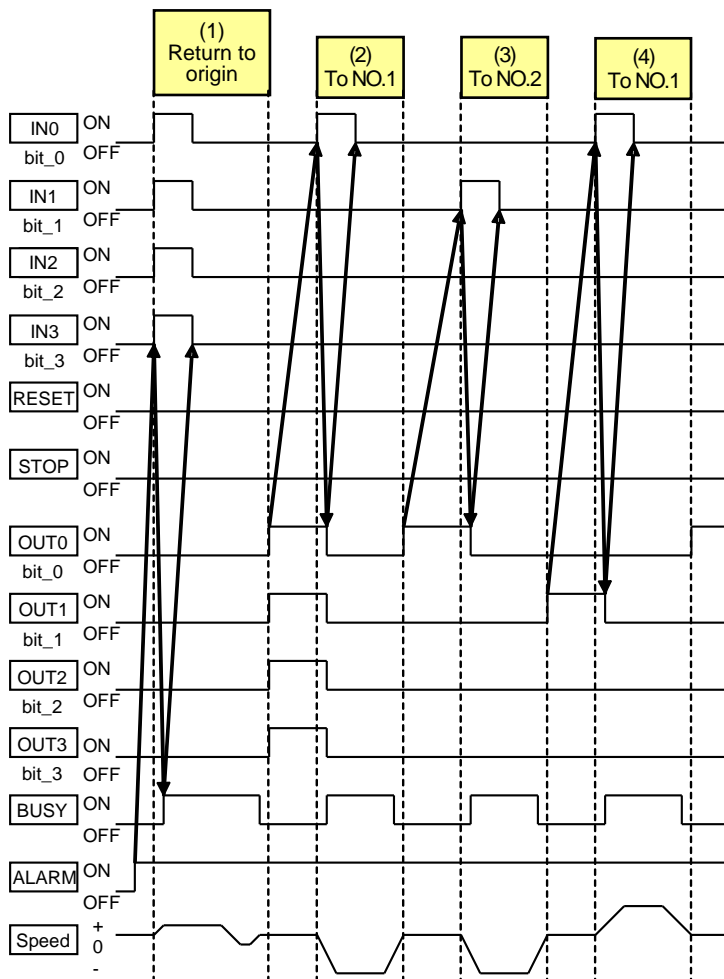
[1] After supplying power, servo is turned on. Then, ALARM is turned on.

[2] After confirming that the ALARM is turned on, turn on IN0 to 3 to perform (1) Return to origin.

[3] When return to origin starts, BUSY is turned on.

[4] After confirming that BUSY is turned on, turn off IN0 to IN3.

[5] When return to origin is completed, BUSY is turned off and OUT0 to ONT3 are turned on.

[6] After confirming that OUT0 to OUT3 are turned on, turn on IN0 to start (2) move to the position No. 1.

[7] When the operation starts, BUSY is turned on and OUT0 to OUT3 are turned off.

[8] After confirming that BUSY is turned on, turn off IN0.

[9] When the operation is completed, BUSY is turned off and OUT0 is turned on.

[10] Do the same for the move to the position No. 2 and No. 1.

## 9.2 Pushing operation

Example) If the operation pattern is Position No.3 → Position No.4 → Position No.3 → Position No.5 :

Forward : Speed 5, acceleration 3 (Switch value)

Reverse : Speed 9, acceleration 7 (Switch value)
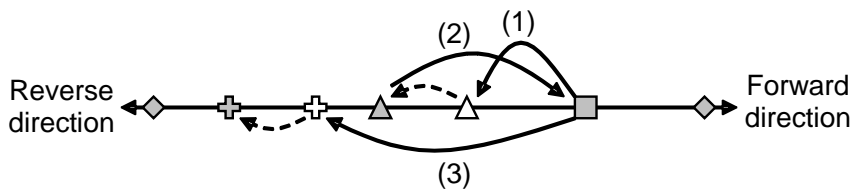


◇ Actuator end

☐ Position No. 3

△ Position No. 4

△ Position at which pushing to the reverse direction from position No. 4 is completed

✛ Position No. 5

✚ Position at which pushing to the reverse direction from position No. 5 is completed

| | Start position | End position | Operating direction | speed | acceleration | Operation method |
|---|---|---|---|---|---|---|
| (1) | No. 3 | No. 4 | Reverse | 9 | 7 | Pushing |
| (2) | No. 4 | No. 3 | Forward | 5 | 3 | Positioning |
| (3) | No. 3 | No. 5 | Reverse | 9 | 7 | Pushing |

I/O timing chart when the electric actuator is operated by PLC.



<Procedure>
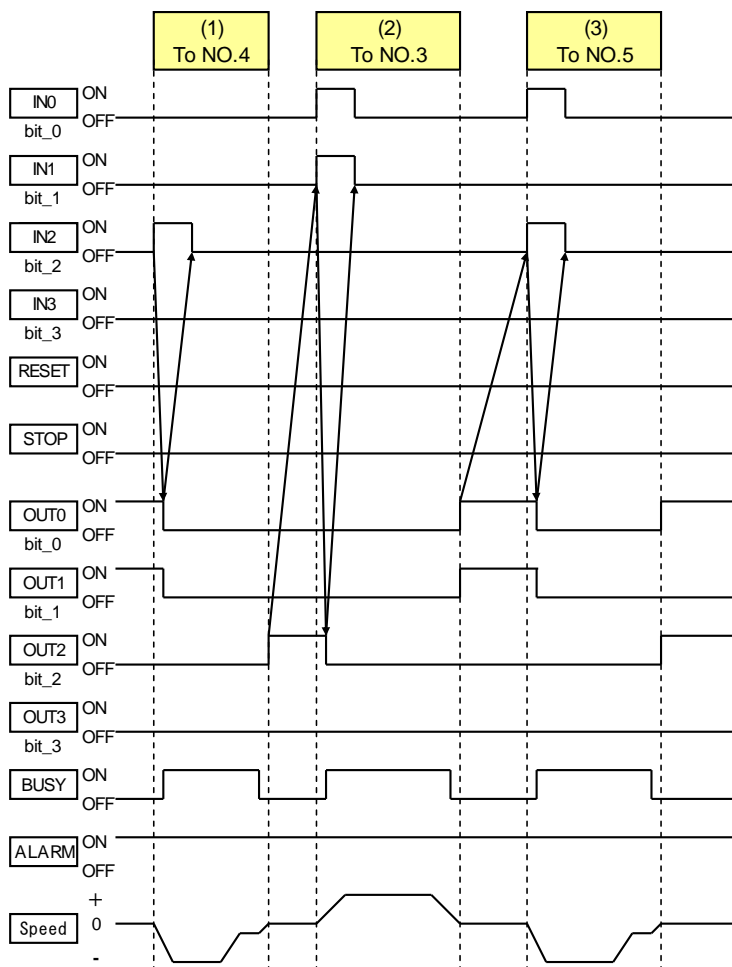
[1] After confirming that OUT0 and OUT1 are turned on, turn on IN2 to start (1) move to the position No. 4.

[2] When the operation starts, BUSY is turned on and OUT0 and OUT1 are turned off.

[3] After confirming that BUSY is turned on, turn off IN2.

[4] When the operation is completed, BUSY is turned off and OUT2 is turned on.

[5] Do the same for the move to the position No. 3 and No. 5.

## 9.3 Stoppage during operation

Example) Position No. 6 → Stop by inputting the RESET signal while the electric actuator is moving to position No. 7 → Position No. 8 → Stop by inputting the STOP signal while the electric actuator is moving to position No. 7 → Position No. 9]

Forward : Speed 5, acceleration 3 (Switch value)
Reverse : Speed 9, acceleration 7 (Switch value)
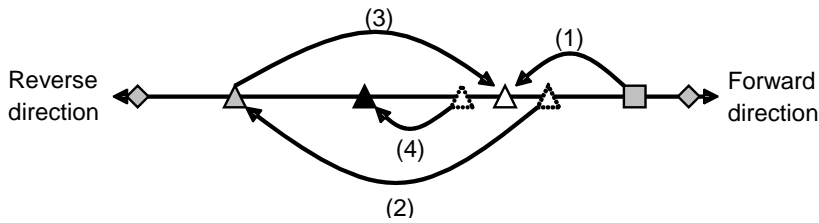
◇ Actuator end
☐ Position No. 6
△ Position No. 7
△ Position at which stops during movling to position No. 7
△ Position No. 8
▲ Position No. 9

|     | Start position | End position | Operating direction | speed | acceleration | Operation method |
|-----|----------------|--------------|---------------------|-------|--------------|------------------|
| (1) | No. 6          | No. 7        | Reverse             | 9     | 7            | Positioning      |
| (2) | -              | No. 8        | Reverse             | 9     | 7            | Positioning      |
| (3) | No. 8          | No. 7        | Forward             | 5     | 3            | Positioning      |
| (4) | No. 7          | No. 9        | Reverse             | 9     | 7            | Positioning      |

Even for the same position number 1, the move speed and the acceleration may vary due to the operating direction.

I/O timing chart when the electric actuator is operated by PLC.
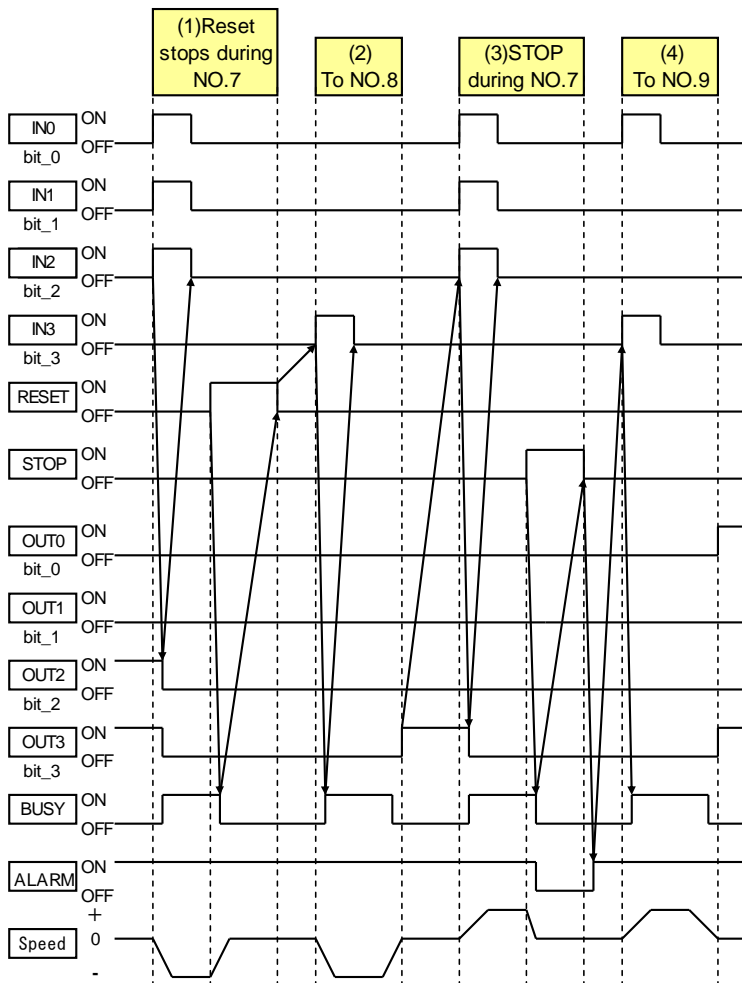


<Procedure>
[1] After confirming that OUT2 and OUT3 are turned on, turn on IN0 to IN2 to start (1) move to the position No. 7.
[2] When the operation starts, BUSY is turned on and OUT0 and OUT1 are turned off.
[3] After confirming that BUSY is turned on, turn off IN2.
[4] Input RESET during operation.
[5] The operation stops by reducing speed, and BUSY is turned off.
[6] After confirming that BUSY is turned off, turn off RESET.
[7] Turn on IN3 to start (2) move to the position No. 8.
[8] When the operation starts, BUSY is turned on.
[9] After confirming that BUSY is turned on, turn off IN3.
[10] When the operation is completed, BUSY is turned off and OUT3 is turned on.
[11] After confirming that OUT3 is turned on, turn on IN0 to IN2 to start (3) move to the position No. 7.
[12] When the operation starts, BUSY is turned on and OUT3 is turned off.
[13] Input STOP during operation.
[14] The operation stops by reducing speed, and Servo is turned off. BUSY and ALARM are turned off.
[15] After confirming that BUSY and ALARM are turned off, turn off STOP.
[16] Turn on Servo to turn on ALARM.
[17] After confirming that ALARM is turned on, turn on IN0 and IN3 to start move to the position No. 9. (The rest is omitted.)

Example) Position No. 10→Alarm generated during the move to Position No. 11→Take
countermeasures to reset the alarm→moves to position No. 11→moves to Position No. 10
Forward: Speed 5, acceleration 3 (Switch value)
Reverse: Speed 9, acceleration 7 (Switch value)
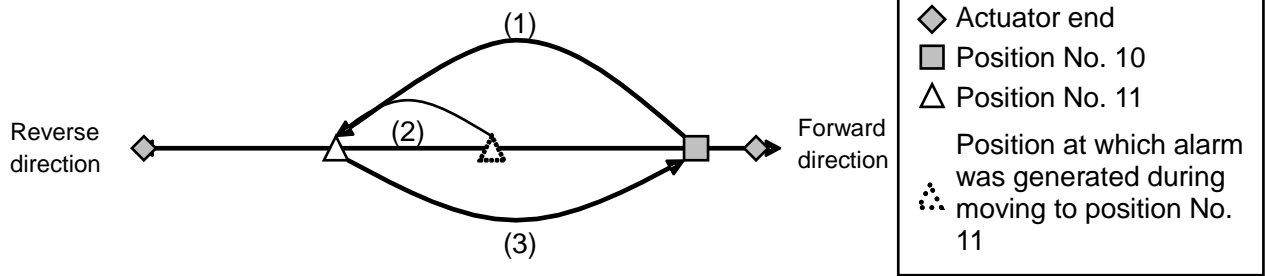


| | Start position | End position | Operating direction | speed | acceleration | Operation method |
|---|---|---|---|---|---|---|
| (1) | No. 10 | No. 11 | Reverse | 9 | 7 | Positioning |
| (2) | - | No. 11 | Reverse | 9 | 7 | Positioning |
| (3) | No. 11 | No. 10 | Forward | 5 | 3 | Positioning |

I/O timing chart when the electric actuator is operated by PLC.



<Procedure>
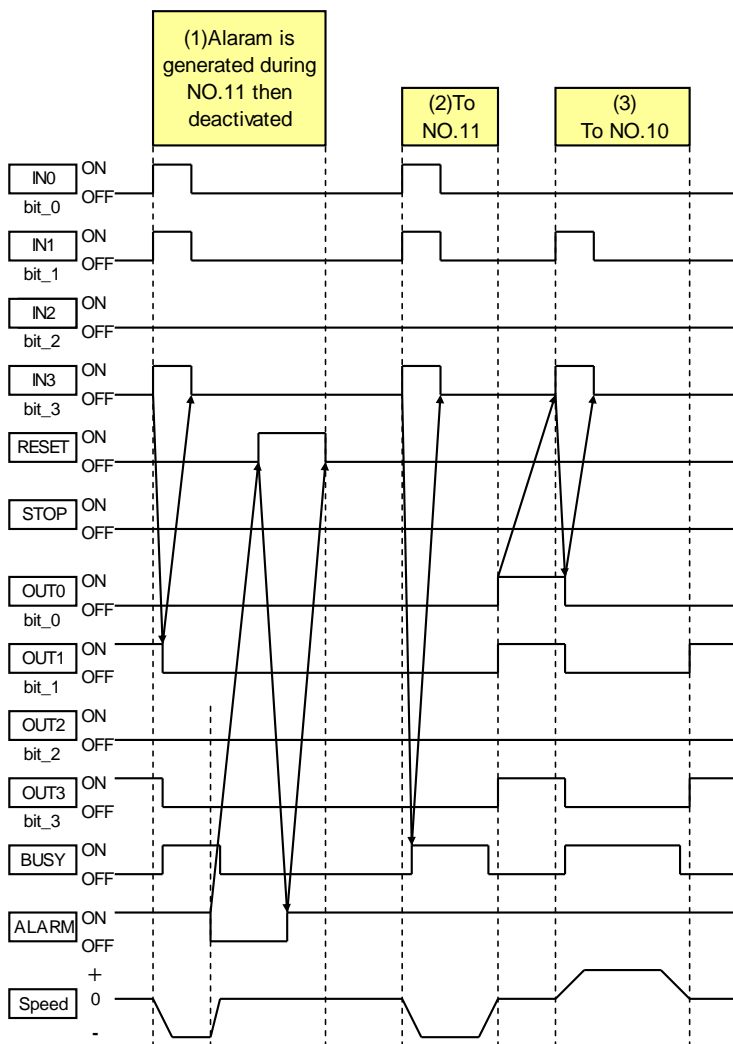
[1] After confirming that OUT1 and OUT3 are turned on, turn on IN0, IN1 and IN3 to start (1) move to the position No. 11.

[2] When the operation starts, BUSY is turned on and OUT1 and OUT3 are turned off.

[3] After confirming that BUSY is turned on, turn off IN0, IN1 and IN3.

[4] Alarm is generated during the operation, and ALARM and BUSY are turned OFF, then the operation stops.

[5] Resolve the cause of the alarm and turn on RESET.

[6] Alarm is reset. ALARM is turned OFF.

[7] After confirming that ALARM is turned off, turn off RESET.

[8] Turn on IN0, IN1 and IN3. Then, start the (2) move to the position No. 11 again.

[9] When the operation starts, BUSY is turned on.

[10] After confirming that BUSY is turned on, turn off IN0, IN1 and IN3.

[11] When the operation is completed, BUSY is turned off and OUT0, OUT1 and OUT3 are turned on.

[12] After confirming that OUT0, OUT1 and OUT3 are turned on, turn on IN1 and IN3 to start move to the position No. 10.

[13] When the operation starts, BUSY is turned on and OUT0, OUT1 and OUT3 are turned off.

[14] After confirming that BUSY is turned on, turn off IN1 and IN3.

[15] When the operation is completed, BUSY is turned off and OUT1 and OUT3 are turned on.

# 10. Initial setting value per electric actuator

## 10.1 Initial setting value of LEF series

Initial setting values of the LEF series are shown below.

Refer to the table below for the initial setting of the Return to origin, Jog and inching.

| | | LEFB | LEFS | | | | |
|---|---|---|---|---|---|---|---|
| | | 16, 25, 32 common | 16A | 16B | 25H | 25A | 25B |
| Return to origin | Direction | Motor side | | | | | |
| | Speed [mm/s] | 60 | 30 | | | | |
| | Acceleration[mm/s$^2$] | 1000 | | | | | |
| Jog | Speed [mm/s] | 48 | 10 | 5 | 20 | 12 | 6 |
| | Acceleration[mm/s$^2$] | 1000 | | | | | |
| Inching | Distance [mm] | 5 | 1 | | | | |

| | | LEFS | | | | | |
|---|---|---|---|---|---|---|---|
| | | 32H | 32A | 32B | 40H | 40A | 40B |
| Return to origin | Direction | Motor side | | | | | |
| | Speed [mm/s] | 30 | | | | | |
| | Acceleration[mm/s$^2$] | 1000 | | | | | |
| Jog | Speed [mm/s] | 24 | 16 | 8 | 30 | 20 | 10 |
| | Acceleration[mm/s$^2$] | 1000 | | | | | |
| Inching | Distance [mm] | 1 | | | | | |

Pushing is not available for LEF series. Even if pushing is set on the the 7-segment LED (f) of the controller, it becomes positioning.

Refer to the table below for the speed and the acceleration of the LEFB series.

| | LEFB16 | | LEFB25 | | LEFB32 | |
|---|---|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 48 | 200 | 48 | 200 | 48 | 200 |
| 1 | 60 | 300 | 60 | 300 | 60 | 300 |
| 2 | 70 | 400 | 70 | 400 | 70 | 400 |
| 3 | 80 | 500 | 80 | 500 | 80 | 500 |
| 4 | 100 | 600 | 100 | 600 | 100 | 600 |
| 5 | 150 | 700 | 200 | 700 | 200 | 700 |
| 6 | 200 | 800 | 300 | 800 | 300 | 800 |
| 7 | 300 | 900 | 400 | 900 | 400 | 900 |
| 8 | 400 | 1000 | 500 | 1000 | 500 | 1000 |
| 9 | 500 | 1200 | 600 | 1200 | 600 | 1200 |
| 10 | 600 | 1400 | 700 | 1400 | 700 | 1400 |
| 11 | 700 | 1600 | 800 | 1600 | 800 | 1600 |
| 12 | 800 | 1800 | 900 | 1800 | 900 | 1800 |
| 13 | 900 | 2000 | 1000 | 2000 | 1000 | 2000 |
| 14 | 1000 | 2500 | 1200 | 2500 | 1200 | 2500 |
| 15 | 1100 | 3000 | 1400 | 3000 | 1500 | 3000 |

Refer to the table below for the speed and the acceleration of the LEFS series.

| | LEFS16A | | LEFS16B | | LEFS25H | | LEFS25A | |
|---|---|---|---|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 10 | 200 | 5 | 200 | 20 | 200 | 12 | 200 |
| 1 | 20 | 300 | 10 | 300 | 30 | 300 | 20 | 300 |
| 2 | 30 | 400 | 15 | 400 | 40 | 400 | 30 | 400 |
| 3 | 40 | 500 | 20 | 500 | 50 | 500 | 40 | 500 |
| 4 | 50 | 600 | 25 | 600 | 60 | 600 | 50 | 600 |
| 5 | 60 | 700 | 30 | 700 | 80 | 700 | 60 | 700 |
| 6 | 80 | 800 | 40 | 800 | 100 | 800 | 80 | 800 |
| 7 | 100 | 900 | 50 | 900 | 200 | 900 | 100 | 900 |
| 8 | 150 | 1000 | 75 | 1000 | 300 | 1000 | 200 | 1000 |
| 9 | 200 | 1200 | 100 | 1200 | 400 | 1200 | 250 | 1200 |
| 10 | 250 | 1400 | 125 | 1400 | 500 | 1400 | 300 | 1400 |
| 11 | 300 | 1600 | 150 | 1600 | 600 | 1600 | 400 | 1600 |
| 12 | 350 | 1800 | 175 | 1800 | 700 | 1800 | 500 | 1800 |
| 13 | 400 | 2000 | 200 | 2000 | 800 | 2000 | 540 | 2000 |
| 14 | 450 | 2500 | 225 | 2500 | 900 | 2500 | 600 | 2500 |
| 15 | 700 | 3000 | 360 | 3000 | 1100 | 3000 | 750 | 3000 |

| | LEFS25B | | LEFS32H | | LEFS32A | | LEFS32B | |
|---|---|---|---|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 6 | 200 | 24 | 200 | 16 | 200 | 8 | 200 |
| 1 | 10 | 300 | 30 | 300 | 20 | 300 | 10 | 300 |
| 2 | 15 | 400 | 40 | 400 | 30 | 400 | 15 | 400 |
| 3 | 20 | 500 | 50 | 500 | 40 | 500 | 20 | 500 |
| 4 | 25 | 600 | 60 | 600 | 50 | 600 | 25 | 600 |
| 5 | 30 | 700 | 80 | 700 | 60 | 700 | 30 | 700 |
| 6 | 40 | 800 | 100 | 800 | 80 | 800 | 40 | 800 |
| 7 | 50 | 900 | 200 | 900 | 100 | 900 | 50 | 900 |
| 8 | 75 | 1000 | 300 | 1000 | 200 | 1000 | 75 | 1000 |
| 9 | 100 | 1200 | 400 | 1200 | 300 | 1200 | 100 | 1200 |
| 10 | 125 | 1400 | 500 | 1400 | 400 | 1400 | 125 | 1400 |
| 11 | 150 | 1600 | 600 | 1600 | 500 | 1600 | 150 | 1600 |
| 12 | 175 | 1800 | 750 | 1800 | 600 | 1800 | 175 | 1800 |
| 13 | 200 | 2000 | 930 | 2000 | 620 | 2000 | 200 | 2000 |
| 14 | 225 | 2500 | 1000 | 2500 | 700 | 2500 | 225 | 2500 |
| 15 | 400 | 3000 | 1200 | 3000 | 800 | 3000 | 520 | 3000 |

| | LEFS40H | | LEFS40A | | LEFS40B | |
|---|---|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 30 | 200 | 20 | 200 | 10 | 200 |
| 1 | 40 | 300 | 30 | 300 | 12 | 300 |
| 2 | 50 | 400 | 40 | 400 | 15 | 400 |
| 3 | 60 | 500 | 50 | 500 | 20 | 500 |
| 4 | 80 | 600 | 60 | 600 | 25 | 600 |
| 5 | 100 | 700 | 80 | 700 | 30 | 700 |
| 6 | 200 | 800 | 100 | 800 | 40 | 800 |
| 7 | 300 | 900 | 200 | 900 | 50 | 900 |
| 8 | 500 | 1000 | 300 | 1000 | 75 | 1000 |
| 9 | 600 | 1200 | 400 | 1200 | 100 | 1200 |
| 10 | 700 | 1400 | 500 | 1400 | 125 | 1400 |
| 11 | 780 | 1600 | 520 | 1600 | 150 | 1600 |
| 12 | 930 | 1800 | 620 | 1800 | 175 | 1800 |
| 13 | 1000 | 2000 | 760 | 2000 | 200 | 2000 |
| 14 | 1140 | 2500 | 800 | 2500 | 225 | 2500 |
| 15 | 1200 | 3000 | 1000 | 3000 | 300 | 3000 |

SMC.

## 10.2 Initial setting value of LEH series

Initial setting values of the LEH series are shown below.

Refer to the table below for the initial setting of Return to origin, Jog and inching.

| | | Common for all LEHF series | Common for all LEH (S, Z) series |
|---|---|---|---|
| Return to origin | Direction | Closed side (Clamped side) | |
| | speed [mm/s] | 10 | |
| | acceleration [mm/s$^2$] | 2000 | |
| Jog | speed [mm/s] | 5 (basic type), 10 (Long type) | 5 |
| | acceleration [mm/s$^2$] | 1000 | |
| Inching | Distnace [mm] | 1 | 1 |

Refer to the table below for the set value for 3 levels of pushing force of LEHF series.
Pushing speed is fixed at 5 mm/s.

| | | LEHF10 | LEHF20 | LEHF32 | LEHF40 |
|---|---|---|---|---|---|
| Pushing force [N] | Low | 3 | 11 | 48 | 72 |
| | Middle | 5 | 19.5 | 84 | 126 |
| | High | 7 | 28 | 120 | 180 |

Pushing force accuracy → LEHS10:±30%F.S.,LEHS20:±25%F.S.,LEHS32, 40:±20%F.S.
　　　　　　　　　　　　Refer to the operation manual of the electric actuator for details.

Refer to the table below for the set value for 3 levels of pushing force of the LEHS series.
Pushing speed is fixed at 5 mm/s.

| | | LEHS10 | | LEHS20 | | LEHS32 | LEHS40 |
|---|---|---|---|---|---|---|---|
| | | Basic | Compact | Basic | Compact | | |
| Pushing force [N] | Low | 2.2 | 1.4 | 9 | 7 | 36 | 52 |
| | Middle | 3.9 | 2.5 | 15.5 | 12 | 63 | 91 |
| | High | 5.5 | 3.5 | 22 | 17 | 90 | 130 |

Pushing force accuracy → LEHS10: ±30%F.S.,LEHS20:±25%F.S.,LEHS32,40:±20%F.S.
　　　　　　　　　　　　Refer to the operation manual of the electric actuator for details.

Refer to the table below for the set value for 3 levels of pushing force of the LEHZ series.
Pushing speed is fixed at 5 mm/s.

| | | LEHZ10 | | LEHZ16 | | LEHZ20 / 25 | | LEHZ32 | LEHZ40 |
|---|---|---|---|---|---|---|---|---|---|
| | | Basic | Compact | Basic | Compact | Basic | Compact | | |
| Pushing force [N] | Low | 6 | 2 (3) | 6 | 3 (4) | 16 | 11 | 52 | 84 |
| | Middle | 10 | 4 | 10 | 5.5 | 28 | 19.5 | 91 | 147 |
| | High | 14 | 6 | 14 | 8 | 40 | 28 | 130 | 210 |

Pushing force accuracy → LEHZ10,16: ±30%F.S.,LEHZ20, 25:±25%F.S.,LEHZ32,40:±20%F.S
　　　　　　　　　　　　Refer to the operation manual of the electric actuator for details.
The values in parenthesis are for dust cover type (LEHZJ series). The values without parenthesis are common values.

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Refer to the table below for the speed / acceleration of LEHF series.

| | LEHF10 | | LEHF20 | | LEHF32 | | LEHF40 | |
|---|---|---|---|---|---|---|---|---|
| | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] |
| 0 | 5 | 100 | 5 | 100 | 5 | 100 | 5 | 100 |
| 1 | 10 | 150 | 10 | 150 | 10 | 150 | 10 | 150 |
| 2 | 15 | 200 | 15 | 200 | 15 | 200 | 15 | 200 |
| 3 | 20 | 300 | 20 | 300 | 20 | 300 | 20 | 300 |
| 4 | 25 | 400 | 25 | 400 | 25 | 400 | 25 | 400 |
| 5 | 30 | 500 | 30 | 500 | 30 | 500 | 30 | 500 |
| 6 | 35 | 600 | 35 | 600 | 35 | 600 | 35 | 600 |
| 7 | 40 | 700 | 40 | 700 | 40 | 700 | 40 | 700 |
| 8 | 45 | 800 | 45 | 800 | 45 | 800 | 45 | 800 |
| 9 | 50 | 900 | 50 | 900 | 50 | 900 | 50 | 900 |
| 10 | 55 | 1000 | 55 | 1000 | 55 | 1000 | 55 | 1000 |
| 11 | 60 | 1200 | 60 | 1200 | 60 | 1200 | 60 | 1200 |
| 12 | 65 | 1400 | 70 | 1400 | 70 | 1400 | 70 | 1400 |
| 13 | 70 | 1600 | 80 | 1600 | 80 | 1600 | 80 | 1600 |
| 14 | 75 | 1800 | 90 | 1800 | 90 | 1800 | 90 | 1800 |
| 15 | 80 | 2000 | 100 | 2000 | 100 | 2000 | 100 | 2000 |

Refer to the table below for the speed / acceleration of LEHS series.

| | LEHS10 | | LEHS20 | | LEHS32 | | LEHS40 | |
|---|---|---|---|---|---|---|---|---|
| | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] |
| 0 | 5 | 100 | 5 | 100 | 5 | 100 | 5 | 100 |
| 1 | 7 | 150 | 10 | 150 | 10 | 150 | 10 | 150 |
| 2 | 10 | 200 | 15 | 200 | 15 | 200 | 15 | 200 |
| 3 | 12 | 300 | 20 | 300 | 20 | 300 | 20 | 300 |
| 4 | 15 | 400 | 25 | 400 | 25 | 400 | 25 | 400 |
| 5 | 20 | 500 | 30 | 500 | 30 | 500 | 30 | 500 |
| 6 | 25 | 600 | 35 | 600 | 35 | 600 | 35 | 600 |
| 7 | 30 | 700 | 40 | 700 | 40 | 700 | 40 | 700 |
| 8 | 35 | 800 | 45 | 800 | 45 | 800 | 50 | 800 |
| 9 | 40 | 900 | 50 | 900 | 50 | 900 | 60 | 900 |
| 10 | 45 | 1000 | 55 | 1000 | 55 | 1000 | 70 | 1000 |
| 11 | 50 | 1200 | 60 | 1200 | 60 | 1200 | 80 | 1200 |
| 12 | 55 | 1400 | 65 | 1400 | 70 | 1400 | 90 | 1400 |
| 13 | 60 | 1600 | 70 | 1600 | 80 | 1600 | 100 | 1600 |
| 14 | 65 | 1800 | 75 | 1800 | 90 | 1800 | 110 | 1800 |
| 15 | 70 | 2000 | 80 | 2000 | 100 | 2000 | 120 | 2000 |

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Refer to the table below for the speed / acceleration of LEHZ series.

| | LEHZ10 | | LEHZ16 | | LEHZ20 | | LEHZ25 | |
|---|---|---|---|---|---|---|---|---|
| | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] |
| 0 | 5 | 100 | 5 | 100 | 5 | 100 | 5 | 100 |
| 1 | 10 | 150 | 10 | 150 | 10 | 150 | 10 | 150 |
| 2 | 15 | 200 | 15 | 200 | 15 | 200 | 15 | 200 |
| 3 | 20 | 300 | 20 | 300 | 20 | 300 | 20 | 300 |
| 4 | 25 | 400 | 25 | 400 | 25 | 400 | 25 | 400 |
| 5 | 30 | 500 | 30 | 500 | 30 | 500 | 30 | 500 |
| 6 | 35 | 600 | 35 | 600 | 35 | 600 | 35 | 600 |
| 7 | 40 | 700 | 40 | 700 | 40 | 700 | 40 | 700 |
| 8 | 45 | 800 | 45 | 800 | 45 | 800 | 45 | 800 |
| 9 | 50 | 900 | 50 | 900 | 50 | 900 | 50 | 900 |
| 10 | 55 | 1000 | 55 | 1000 | 55 | 1000 | 55 | 1000 |
| 11 | 60 | 1200 | 60 | 1200 | 60 | 1200 | 60 | 1200 |
| 12 | 65 | 1400 | 65 | 1400 | 70 | 1400 | 70 | 1400 |
| 13 | 70 | 1600 | 70 | 1600 | 80 | 1600 | 80 | 1600 |
| 14 | 75 | 1800 | 75 | 1800 | 90 | 1800 | 90 | 1800 |
| 15 | 80 | 2000 | 80 | 2000 | 100 | 2000 | 100 | 2000 |

| | LEHZ32 | | LEHZ40 | |
|---|---|---|---|---|
| | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] |
| 0 | 5 | 100 | 5 | 100 |
| 1 | 10 | 150 | 10 | 150 |
| 2 | 15 | 200 | 15 | 200 |
| 3 | 20 | 300 | 20 | 300 |
| 4 | 25 | 400 | 25 | 400 |
| 5 | 30 | 500 | 30 | 500 |
| 6 | 35 | 600 | 35 | 600 |
| 7 | 40 | 700 | 40 | 700 |
| 8 | 50 | 800 | 50 | 800 |
| 9 | 60 | 900 | 60 | 900 |
| 10 | 70 | 1000 | 70 | 1000 |
| 11 | 80 | 1200 | 80 | 1200 |
| 12 | 90 | 1400 | 90 | 1400 |
| 13 | 100 | 1600 | 100 | 1600 |
| 14 | 110 | 1800 | 110 | 1800 |
| 15 | 120 | 2000 | 120 | 2000 |

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## 10.3 Initial setting value of LES，LESH series

Initial setting values of the LES series are shown below.

| | | Common to all LES / LESH series |
|---|---|---|
| Return to origin | Direction | Table retracted side |
| | speed [mm/s] | 20 |
| | acceleration [mm/s$^2$] | 100 |
| Jog | speed [mm/s] | 20 |
| | acceleration [mm/s$^2$] | 500 |
| Inching | Distance[mm] | 1 |

Refer to the table below for the set value for 3 levels of pushing force.　Pushing speed is fixed at 20 mm/s for LESH**J and at 10 mm/s for LESH**K.

| | | LES8□ / LESH8□ | | LES16□ / LESH16□ | | LES25□ / LESH25□ | |
|---|---|---|---|---|---|---|---|
| | | J | K | J | K | J | K |
| Pushing force [N] | Low | 4 | 6 | 15 | 23.5 | 43 | 77 |
| | Middle | 7 | 10.5 | 25 | 39 | 71.5 | 128.5 |
| | High | 10 | 15 | 35 | 55 | 100 | 180 |

Pushing force accuracy is ±20%F.S.

Refer to the operation manual of the electric actuator for details.

Refer to the table below for the speed and the acceleration of the LES series

| | LES□J | | LES□K | |
|---|---|---|---|---|
| | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] |
| 0 | 20 | 300 | 10 | 300 |
| 1 | 25 | 400 | 13 | 400 |
| 2 | 30 | 500 | 15 | 500 |
| 3 | 40 | 600 | 20 | 600 |
| 4 | 50 | 700 | 25 | 700 |
| 5 | 60 | 800 | 30 | 800 |
| 6 | 70 | 900 | 35 | 900 |
| 7 | 80 | 1000 | 40 | 1000 |
| 8 | 90 | 1500 | 45 | 1500 |
| 9 | 100 | 2000 | 50 | 2000 |
| 10 | 150 | 2500 | 75 | 2500 |
| 11 | 200 | 3000 | 100 | 3000 |
| 12 | 250 | 3500 | 125 | 3500 |
| 13 | 300 | 4000 | 150 | 4000 |
| 14 | 350 | 4500 | 175 | 4500 |
| 15 | 400 | 5000 | 200 | 5000 |

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Refer to the table below for the speed and the acceleration of the LESH series.

| | LESH8□J,16□J | | LESH8□K,16□K | | LESH25□J | | LESH25□K | |
|---|---|---|---|---|---|---|---|---|
| | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] | speed [mm/s] | acceleration [mm/s$^2$] |
| 0 | 20 | 300 | 10 | 300 | 20 | 300 | 10 | 300 |
| 1 | 25 | 400 | 13 | 400 | 25 | 400 | 15 | 400 |
| 2 | 30 | 500 | 15 | 500 | 30 | 500 | 20 | 500 |
| 3 | 40 | 600 | 20 | 600 | 40 | 600 | 30 | 600 |
| 4 | 50 | 700 | 25 | 700 | 50 | 700 | 40 | 700 |
| 5 | 60 | 800 | 30 | 800 | 60 | 800 | 50 | 800 |
| 6 | 70 | 900 | 35 | 900 | 70 | 900 | 60 | 900 |
| 7 | 80 | 1000 | 40 | 1000 | 80 | 1000 | 70 | 1000 |
| 8 | 90 | 1500 | 45 | 1500 | 90 | 1500 | 80 | 1500 |
| 9 | 100 | 2000 | 50 | 2000 | 100 | 2000 | 90 | 2000 |
| 10 | 150 | 2500 | 75 | 2500 | 150 | 2500 | 100 | 2500 |
| 11 | 200 | 3000 | 100 | 3000 | 200 | 3000 | 110 | 3000 |
| 12 | 250 | 3500 | 125 | 3500 | 250 | 3500 | 120 | 3500 |
| 13 | 300 | 4000 | 150 | 4000 | 300 | 4000 | 130 | 4000 |
| 14 | 350 | 4500 | 175 | 4500 | 350 | 4500 | 140 | 4500 |
| 15 | 400 | 5000 | 200 | 5000 | 400 | 5000 | 150 | 5000 |

## 10.4 Initial setting value of LEY, LEYG series

Initial setting values of the LEY , LEYG series are shown below.

Refer to the table below for initial setting of Return to origin, Jog and inching.

| | | Common to all LEY / LEYG series |
|---|---|---|
| Return to origin | Direction | Rod retracted side |
| | speed [mm/s] | 20 |
| | acceleration [mm/s$^2$] | 1000 |
| Jog | speed [mm/s] | 10 |
| | acceleration [mm/s$^2$] | 1000 |
| Inching | Distance[mm] | 1 |

Refer to the table below for the set value for 3 levels of pushing force and the pushing speed. Pushing speed is fixed.

| | | LEY16 / LEYG16 | | | LEY25 / LEYG25 | | | LEY32 / LEYG32 | | | LEY40 / LEYG40 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C |
| Pushing force [N] | Low | 14 | 27 | 51 | 63 | 126 | 232 | 80 | 156 | 296 | 156 | 298 | 570 |
| | Middle | 26 | 50.5 | 96 | 92.5 | 182 | 342 | 134.5 | 263 | 501.5 | 218 | 425 | 814 |
| | High | 38 | 74 | 141 | 122 | 238 | 452 | 189 | 370 | 707 | 283 | 553 | 1058 |
| Pushing speed [mm/s] | | 15 | 8 | 4 | 18 | 9 | 5 | 24 | 12 | 6 | 24 | 12 | 6 |

Pushing force accuracy is ±20%F.S.

Refer to the operation manual of the electric actuator for details.

Refer to the table below for the speed and the acceleration of the LEY and LEYG series.

| | LEY16A / LEYG16A | | LEY16B / LEYG16B | | LEY16C / LEYG16C | |
|---|---|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 15 | 200 | 8 | 200 | 4 | 200 |
| 1 | 20 | 300 | 10 | 300 | 6 | 300 |
| 2 | 30 | 400 | 15 | 400 | 8 | 400 |
| 3 | 40 | 500 | 20 | 500 | 10 | 500 |
| 4 | 50 | 600 | 25 | 600 | 13 | 600 |
| 5 | 60 | 700 | 30 | 700 | 15 | 700 |
| 6 | 80 | 800 | 40 | 800 | 20 | 800 |
| 7 | 100 | 900 | 50 | 900 | 25 | 900 |
| 8 | 150 | 1000 | 75 | 1000 | 38 | 1000 |
| 9 | 200 | 1200 | 100 | 1200 | 50 | 1200 |
| 10 | 250 | 1400 | 125 | 1400 | 63 | 1400 |
| 11 | 300 | 1600 | 150 | 1600 | 75 | 1600 |
| 12 | 350 | 1800 | 175 | 1800 | 88 | 1800 |
| 13 | 400 | 2000 | 200 | 2000 | 100 | 2000 |
| 14 | 450 | 2500 | 225 | 2500 | 113 | 2500 |
| 15 | 500 | 3000 | 250 | 3000 | 125 | 3000 |

| | LEY25A / LEYG25A | | LEY25B / LEYG25B | | LEY25C / LEYG25C | |
|---|---|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 18 | 200 | 9 | 200 | 5 | 200 |
| 1 | 24 | 300 | 12 | 300 | 7 | 300 |
| 2 | 36 | 400 | 18 | 400 | 9 | 400 |
| 3 | 48 | 500 | 24 | 500 | 12 | 500 |
| 4 | 60 | 600 | 30 | 600 | 15 | 600 |
| 5 | 72 | 700 | 36 | 700 | 18 | 700 |
| 6 | 84 | 800 | 42 | 800 | 21 | 800 |
| 7 | 100 | 900 | 50 | 900 | 25 | 900 |
| 8 | 150 | 1000 | 75 | 1000 | 38 | 1000 |
| 9 | 200 | 1200 | 100 | 1200 | 50 | 1200 |
| 10 | 250 | 1400 | 125 | 1400 | 63 | 1400 |
| 11 | 300 | 1600 | 150 | 1600 | 75 | 1600 |
| 12 | 350 | 1800 | 175 | 1800 | 88 | 1800 |
| 13 | 400 | 2000 | 200 | 2000 | 100 | 2000 |
| 14 | 450 | 2500 | 225 | 2500 | 113 | 2500 |
| 15 | 500 | 3000 | 250 | 3000 | 125 | 3000 |

| | LEY32A / LEYG32A | | LEY32B / LEYG32B | | LEY32C / LEYG32C | |
|---|---|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 24 | 200 | 12 | 200 | 6 | 200 |
| 1 | 32 | 300 | 19 | 300 | 15 | 300 |
| 2 | 40 | 400 | 23 | 400 | 20 | 400 |
| 3 | 48 | 500 | 27 | 500 | 30 | 500 |
| 4 | 56 | 600 | 32 | 600 | 40 | 600 |
| 5 | 64 | 700 | 44 | 700 | 50 | 700 |
| 6 | 80 | 800 | 54 | 800 | 60 | 800 |
| 7 | 100 | 900 | 77 | 900 | 70 | 900 |
| 8 | 150 | 1000 | 90 | 1000 | 80 | 1000 |
| 9 | 200 | 1200 | 120 | 1200 | 90 | 1200 |
| 10 | 250 | 1400 | 150 | 1400 | 100 | 1400 |
| 11 | 300 | 1600 | 180 | 1600 | 110 | 1600 |
| 12 | 350 | 1800 | 210 | 1800 | 120 | 1800 |
| 13 | 400 | 2000 | 240 | 2000 | 130 | 2000 |
| 14 | 450 | 2500 | 270 | 2500 | 140 | 2500 |
| 15 | 500 | 3000 | 300 | 3000 | 150 | 3000 |

| | LEY40A / LEYG40A | | LEY40B / LEYG40B | | LEY40C / LEYG40C | |
|---|---|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 24 | 200 | 12 | 200 | 6 | 200 |
| 1 | 32 | 300 | 20 | 300 | 10 | 300 |
| 2 | 40 | 400 | 35 | 400 | 14 | 400 |
| 3 | 48 | 500 | 50 | 500 | 18 | 500 |
| 4 | 56 | 600 | 65 | 600 | 24 | 600 |
| 5 | 64 | 700 | 80 | 700 | 30 | 700 |
| 6 | 80 | 800 | 95 | 800 | 36 | 800 |
| 7 | 100 | 900 | 110 | 900 | 42 | 900 |
| 8 | 150 | 1000 | 140 | 1000 | 48 | 1000 |
| 9 | 200 | 1200 | 170 | 1200 | 55 | 1200 |
| 10 | 250 | 1400 | 200 | 1400 | 65 | 1400 |
| 11 | 300 | 1600 | 230 | 1600 | 75 | 1600 |
| 12 | 350 | 1800 | 260 | 1800 | 100 | 1800 |
| 13 | 400 | 2000 | 290 | 2000 | 125 | 2000 |
| 14 | 450 | 2500 | 320 | 2500 | 150 | 2500 |
| 15 | 500 | 3000 | 350 | 3000 | 175 | 3000 |

## 10.5 Initial setting value of LER series

Initial setting values of the LER series are shown below.

Refer to the table below for initial setting of Return to origin, Jog and inching.

| | | LER□□□K series | LER□□□J series |
|---|---|---|---|
| Return to origin | Direction | Counterclockwise (CCW) | Counterclockwise (CCW) |
| | speed [°/s] | 20 | 30 |
| | acceleration [°/s$^2$] | 20 | 20 |
| Jog | speed [°/s] | 20 | 30 |
| | acceleration [°/s$^2$] | 1000 | 1000 |
| Inching | Distance [°] | 1 | 1 |

During pushing operation of the LER series, the indication of the 7-segment LED of the controller varies, but the pushing torque is as shown in the table below regardless any of the 3 pushing force levels is selected. Pushing speed is fixed at 20 [°/s] for LER***K and at 30 [°/s] for LER***J.

| | LER10 | | LER30 | | LER50 | |
|---|---|---|---|---|---|---|
| | K | J | K | J | K | J |
| Pushing torque [N·m] | 0.16 | 0.11 | 0.6 | 0.4 | 5.0 | 3.3 |

Pushing torque accuracy → LER10□:±30%F.S.,LER30□:±25%F.S.,LER50□:±20%F.S.
Refer to the operation manual of the electric actuator for details.

Refer to the table below for the speed and the acceleration.

| | LER□□□K | | LER□□□J | |
|---|---|---|---|---|
| | Angular speed [°/s] | Angular acceleration [°/s$^2$] | Angular speed [°/s] | Angular acceleration [°/s$^2$] |
| 0 | 20 | 200 | 30 | 200 |
| 1 | 30 | 300 | 50 | 300 |
| 2 | 40 | 400 | 60 | 400 |
| 3 | 50 | 500 | 80 | 500 |
| 4 | 60 | 600 | 100 | 600 |
| 5 | 70 | 700 | 120 | 700 |
| 6 | 80 | 800 | 140 | 800 |
| 7 | 90 | 900 | 160 | 900 |
| 8 | 100 | 1000 | 180 | 1000 |
| 9 | 110 | 1200 | 200 | 1200 |
| 10 | 130 | 1400 | 220 | 1400 |
| 11 | 150 | 1600 | 260 | 1600 |
| 12 | 170 | 1800 | 300 | 1800 |
| 13 | 200 | 2000 | 340 | 2000 |
| 14 | 230 | 2500 | 380 | 2500 |
| 15 | 280 | 3000 | 420 | 3000 |

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## 10.6 Initial setting value of LEPY, LEPS series

Initial setting values of the LEP (LEPY / LEPS) series are shown below.

Refer to the table below for initial setting of Return to origin, Jog and inching.

| | | LEP☐☐☐J | LEP☐☐☐K |
|---|---|---|---|
| Return to origin | Direction | Rod and table retracted side | |
| | speed [mm/s] | 20 | 10 |
| | acceleration [mm/s$^2$] | 1000 | 1000 |
| Jog | speed [mm/s] | 20 | 10 |
| | acceleration [mm/s$^2$] | 1000 | 1000 |
| Inching | Distance[mm] | 1 | 1 |

Refer to the table below for the set value for 3 levels of pushing force and the pushing speed. Pushing speed is fixed.

| | | LEP☐6 | | LEP☐10L | | LEP☐10 | |
|---|---|---|---|---|---|---|---|
| | | J | K | J | K | J | K |
| Pushing force [N] | Low | 7 | 14 | 12 | 24 | 12.5 | 25 |
| | Middle | 8.5 | 17 | 16 | 32 | 19 | 37.5 |
| | High | 10 | 20 | 20 | 40 | 25 | 50 |
| Pushing speed [mm/s] | | 20 | 10 | 20 | 10 | 20 | 10 |

Pushing force accuracy is ±30%F.S. for the LEP☐6 and ±25%F.S. for the LEP☐10.
Refer to the operation manual of the electric actuator for details.

Refer to the table below for the speed and the acceleration

| | LEP☐6J | | LEP☐6K | | LEP☐10 (L)J | | LEP☐10 (L)K | |
|---|---|---|---|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 20 | 200 | 10 | 200 | 20 | 200 | 10 | 200 |
| 1 | 30 | 300 | 15 | 300 | 30 | 300 | 15 | 300 |
| 2 | 40 | 400 | 20 | 400 | 40 | 400 | 20 | 400 |
| 3 | 50 | 500 | 30 | 500 | 50 | 500 | 30 | 500 |
| 4 | 60 | 600 | 40 | 600 | 75 | 600 | 40 | 600 |
| 5 | 70 | 700 | 50 | 700 | 100 | 700 | 50 | 700 |
| 6 | 80 | 800 | 60 | 800 | 125 | 800 | 60 | 800 |
| 7 | 100 | 900 | 70 | 900 | 150 | 900 | 70 | 900 |
| 8 | 125 | 1000 | 80 | 1000 | 175 | 1000 | 80 | 1000 |
| 9 | 150 | 1200 | 90 | 1200 | 200 | 1200 | 90 | 1200 |
| 10 | 175 | 1400 | 100 | 1400 | 225 | 1400 | 100 | 1400 |
| 11 | 200 | 1600 | 110 | 1600 | 250 | 1600 | 120 | 1600 |
| 12 | 225 | 1800 | 120 | 1800 | 275 | 1800 | 140 | 1800 |
| 13 | 250 | 2000 | 130 | 2000 | 300 | 2000 | 160 | 2000 |
| 14 | 275 | 2500 | 140 | 2500 | 325 | 2500 | 180 | 2500 |
| 15 | 300 | 3000 | 150 | 3000 | 350 | 3000 | 200 | 3000 |

## 10.7 Initial setting value of LEL series

Initial setting values of the LEL series are shown below.

Refer to the table below for initial setting of Return to origin, Jog and inching.

| | | Common for all LEL series |
|---|---|---|
| | | Motor side |
| Return to origin | Direction | |
| | speed [mm/s] | 80 |
| | acceleration [mm/s$^2$] | 1000 |
| Jog | speed [mm/s] | 100 |
| | acceleration [mm/s$^2$] | 1000 |
| Inching | Distance[mm] | 10 |

Refer to the table below for the speed and the acceleration of the LEL series.

| | LEL25M | | LEL25L | |
|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 50 | 200 | 50 | 200 |
| 1 | 60 | 300 | 60 | 300 |
| 2 | 70 | 400 | 70 | 400 |
| 3 | 80 | 500 | 80 | 500 |
| 4 | 100 | 600 | 100 | 600 |
| 5 | 120 | 700 | 150 | 700 |
| 6 | 140 | 800 | 200 | 800 |
| 7 | 160 | 900 | 250 | 900 |
| 8 | 180 | 1000 | 300 | 1000 |
| 9 | 200 | 1200 | 400 | 1200 |
| 10 | 250 | 1400 | 500 | 1400 |
| 11 | 300 | 1600 | 600 | 1600 |
| 12 | 350 | 1800 | 700 | 1800 |
| 13 | 400 | 2000 | 800 | 2000 |
| 14 | 450 | 2500 | 900 | 2500 |
| 15 | 500 | 3000 | 1000 | 3000 |

The LEL series cannot perform the pushing operation.

Even if pushing is set on the controller 7-segment LED (f) it will perform a positioning operation.

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## 10.8 Initial setting value of LEM series

Initial setting values of the LEM series are shown below.

Refer to the table below for initial setting of Return to origin, Jog and inching.

| | | Common for all LEL series |
|---|---|---|
| | | Motor side |
| Return to origin | Direction | |
| | speed [mm/s] | 60 |
| | acceleration [mm/s$^2$] | 500 |
| Jog | speed [mm/s] | 48 |
| | acceleration [mm/s$^2$] | 1000 |
| Inching | Distance[mm] | 0.12 |

Refer to the table below for the speed and the acceleration of the LEM series.

| | LEMB25 / LEMB32 LEMC25 / LEMC32 | | LEMH25 / LEMHT32 LEMH25 / LEMHT32 | |
|---|---|---|---|---|
| | Speed [mm/s] | Acceleration [mm/s$^2$] | Speed [mm/s] | Acceleration [mm/s$^2$] |
| 0 | 48 | 250 | 48 | 250 |
| 1 | 75 | 500 | 75 | 500 |
| 2 | 100 | 1000 | 100 | 1000 |
| 3 | 150 | 1500 | 150 | 1500 |
| 4 | 200 | 2000 | 200 | 2000 |
| 5 | 250 | 2500 | 300 | 2500 |
| 6 | 300 | 3000 | 400 | 3000 |
| 7 | 350 | 4000 | 500 | 4000 |
| 8 | 400 | 5000 | 600 | 5000 |
| 9 | 450 | 6000 | 800 | 6000 |
| 10 | 500 | 7500 | 1000 | 7500 |
| 11 | 600 | 10000 | 1200 | 10000 |
| 12 | 700 | 12500 | 1400 | 12500 |
| 13 | 800 | 15000 | 1600 | 15000 |
| 14 | 900 | 17500 | 1800 | 17500 |
| 15 | 1000 | 20000 | 2000 | 20000 |

The LEM series cannot perform the pushing operation.

Even if pushing is set on the controller 7-segment LED (f) it will perform a positioning operation.

# 11. Alarm Detection

Details of the alarm can be checked by the controller LED indication and parallel I/O terminal.

(During manual mode, only the 7-segment LED is on)

When an alarm has been generated, reset the alarm after taking countermeasures and correcting the error, referring to **"11.2 Alarm details"**.

Alarms are divided into two types. One type can be cleared by pressing the set button (g) or inputting the RESET I/O signal. The other type cannot be cleared unless the power supply control (C24V) is turned off and on once.

## 11.1 Alarm group output

This controller outputs signals from LED output and I/O so that the type of alarm can be determined when an alarm occurs. The alarm LED (b) of the controller is lights up in red, and the 7-segment LED (f) displays the alarm group. From I/O, ALARM indicates presence / absence of alarm, and it is expressed by OUT 0 to OUT 3.

If multiple alarms occur at the same time, the 7-segment LED display will show a severe alarm group.

【 Light A－B－C－D－E Severe 】

| Alarm group | 7-segment LED Display | Parallel signal output [3] | | | | | How to restart the operation |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | ALARM [1], [2] | OUT0 | OUT1 | OUT2 | OUT3 | |
| A | A | OFF | ON | OFF | OFF | OFF | Press the set button (g) or input RESET. |
| B | b | OFF | OFF | ON | OFF | OFF | |
| C | c | OFF | OFF | OFF | ON | OFF | |
| D | d | OFF | OFF | OFF | OFF | ON | |
| E | E | OFF | OFF | OFF | OFF | OFF | Power off ⇒Turn on the power again |

When multiple alarms in alarm groups A to D occur, the relevant OUT 0 to 3 will be ON.

However, when alarm group E occurs, regardless of any other alarms that may be occurring, OUT 0 to 3 will all be OFF.

[1] ALARM is turned OFF when an alarm occurs because of N.C. specification.

[2] Because the ALARM output is turned OFF even when the servo is OFF, alarm occurrence can not be identified with ALARM output only.

[3] Parallel signal output during manual mode will not turn ON.
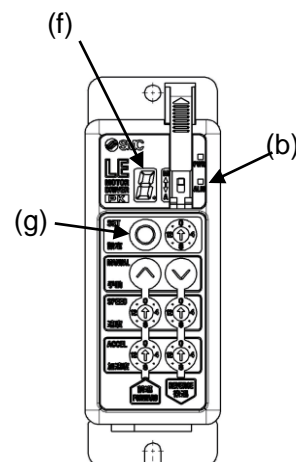
## 11.2 Alarm details

| Group | The condition of the controller when an alarm is generated | How to reset | Alarm contents / Countermeasure |
|---|---|---|---|
| A | Manual mode Servo is OFF | Press the Set button (RESET Input) | **<Contents>** During intermediate position registration by direct teaching, the position is registered before return to origin. |
| | | | **<Countermeasure>** Perform return to origin. |
| B | Any condition | RESET input (Press the Set button) | **<Contents>** Problem occurred with the controller data or parameters. |
| | | | **<Countermeasure>** If the problem is not solved by supplying power again, contact SMC. |
| C | During or after pushing operation | RESET input (Press the Set button) | **<Contents>** During the pushing operation, the electric actuator is pushed back beyond the start position of pushing |
| | | | **<Countermeasure>** Set a larger pushing thrust force or reduce the reaction force of the load. Refer to **"8.3 Pushing operation"** for details of pushing operation. |
| C | Stopped | RESET input (Press the Set button) | **<Contents>** Command for return to origin, positioning, pushing or Jog operation is sent when the servo is off. |
| | | | **<Countermeasure>** Check if I/O signal STOP is input. Also, check if the servo is OFF in manual mode. Refer to **"8.5 Servo ON"** for turning off the servo. |
| C | Stopped | RESET input (Press the Set button) | **<Contents>** Command for positioning or pushing is sent before return to origin is completed. |
| | | | **<Countermeasure>** Start operation after the completion of the return to origin. Return to origin must be performed after a group D alarm is generated and deactivated. |
| D | During operation | RESET input (Press the Set button) | **<Contents>** The number of motor rotations exceeds the specified number. |
| | | | **<Countermeasure>** If an external force is being applied, remove it. If there is no external force being applied, and the problem is not solved by supplying power again, please contact SMC. |
| D | During operation | RESET input (Press the Set button) | **<Contents>** The power supply voltage for motor which is detected in the controller is outside of the specified range. The alarm may be generated when the regenerated power of the motor is large. |
| | | | **<Countermeasure>** Check the voltage supplied to the power supply for the controller motor (M24V). Check if the operating condition of the electric actuator is within the specification range. <br><br> ⚠ **Caution** <br> If the power supply is an inrush current suppression type, a voltage drop may occur during acceleration / deceleration, generating an alarm. |

| | | | |
|---|---|---|---|
| D | Any condition | RESET input (Press the Set button) | **\<Contents\>**<br>The temperature around the power element of the controller is too high.<br>**\<Countermeasure\>**<br>Check the mounting condition of the controller and improve the ambient temperature of the controller to an appropriate temperature. Refer to **"3.4 How to install"** for the mounting conditions of the controller. |
| D | Any condition | RESET input (Press the Set button) | **\<Contents\>**<br>The power supply voltage for control which is detected in the controller is outside of the specified range.<br>**\<Countermeasure\>**<br>Check the voltage suplied to the control power supply for the controller (C24V).<br><table><tr><td>⚠ **Caution**</td></tr><tr><td>If a single power supply is used for both the control power and the motor power, or the power supply is "inrush current suppression type", a power voltage drop may occur during acceleration / deceleration, generating an alarm.</td></tr></table> |
| D | During or after suspension of operation | RESET input (Press the Set button) | **\<Contents\>**<br>The time to reach the target position is longer than the specified value.<br>**\<Countermeasure\>**<br>Check if the move of the electric actuator was interrupted. |
| E | Immidiately after applying power | Shut off the control power supply | **\<Contents\>**<br>This alarm occurs when an abnormality is detected in the encoder signals.<br>**\<Countermeasure\>**<br>Please check whether there are any loose connections or any damage to the connector of the controller and or electric actuator.<br>Please check whether there is any damage to the actuator cable (severed wires, etc.) |
| E | Immidiately after applying power | Shut off the control power supply | **\<Contents\>**<br>Positioning of the polarity is not completed properly. The electric actuator slightly moves to detect the polarity of the motor after power is supplied. If the electric actuator cannot be moved at that time, this alarm will be generated.<br>**\<Countermeasure\>**<br>Supply power in conditions in which the electric actuator is operable. |
| E | Immidiately after applying power | Shut off the control power supply | **\<Contents\>**<br>An abnormality with the current sensors which is recognized when the controller is initialized is detected.<br>**\<Countermeasure\>**<br>Please check that the motor is not operated by external force during servo ON. Install the electric actuator vertically and check that the BK RLS is not energized. Confirm the combination of the controller and the electric actuator is correct. If the problem is not solved by supplying power again, please contact SMC. |
| E | During operation | Shut off the control power supply | **\<Contents\>**<br>Position deviation counter in the controller is overflowed.<br>**\<Countermeasure\>**<br>Check if the move of the electric actuator is interrupted. Check if the load of the electric actuator is within the specification range. |
| E | Any condition | Shut off the control power supply | **\<Contents\>**<br>Output current at the power supply circuit is abnormally high.<br>**\<Countermeasure\>**<br>Check if the actuator cable or connector is short-circuited.<br>Confirm the combination of the controller and the electric actuator is correct. |

**SMC**

| E | Any condition | Shut off the control power supply | **\<Contents\>** <br> Abnormality concerning EEPROM is confirmed. |
|---|---|---|---|
| | | | **\<Countermeasure\>** <br> If the problem is not solved by supplying power again, please contact SMC (The write limit of the EEPROM is roughly 100,000 times). |
| E | Any condition | Shut off the control power supply | **\<Contents\>** <br> CPU is not operating properly. (Failure of CPU and peripheral circuits, or malfunction due to noise) |
| | | | **\<Countermeasure\>** <br> If the problem is not solved by supplying power again, please contact SMC. |

# 12. Wiring of cables / Common precautions

⚠**Warning**

(1) **Adjusting, mounting or wiring change should never be done before shutting off the power supply to the product.**

   Electrical shock, malfunction and damaged can result.

(2) **Never disassemble the cable. Use only specified cables.**

(3) **Do not remove or connect the cable and connector while power is supplied.**

⚠**Caution**

(1) **Wire the connector securely. Do not apply any voltage to the terminals other than those specified in the product Manual.**

(2) **Wire the connector securely.**

   Check for correct connector wiring and polarity.

(3) **Take appropriate measures against noise.**

   Noise in a signal line may cause malfunction. As a countermeasure, separate high voltage and low voltage cables, and shorten wiring lengths, etc.

(4) **Do not route wires and cables together with power or high voltage cables.**

   The product can malfunction due to interference of noise and surge voltage from power and high voltage cables to the signal line. Route the wires of the product separately from power or high voltage cables.

(5) **Take care that electric actuator movement does not catch cables.**

(6) **Operate with cables secured. Avoid bending cables at sharp angles where they enter the product.**

(7) **Avoid twisting, folding, rotating or applying an external force to the cable.**

   Risk of electric shock, wire break, contact failure and loss of control for the product can happen.

(8) **Fix the motor cable protruding from the product in place before using.**

   The motor and lock cables are not robotic type cables and can be damaged when moved. Therefore, do not place A part below it in a flexible moving tube.
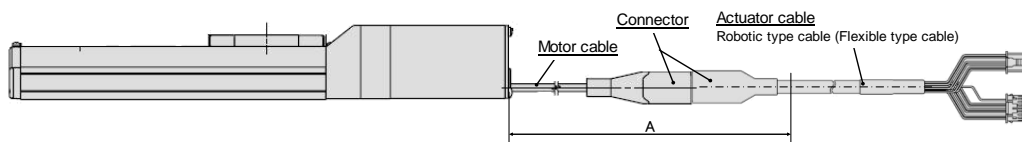


(9) **Select "Robotic type cables" in case of inflecting the electric actuator-cable repeatedly. And do not put cables into a flexible moving tube with a radius smaller than the specified value. (Min. 50mm).**

   Risk of electric shock, wire break, contact failure and loss of control for the product can happen if "Standard cables" are used in case of inflecting the cables repeatedly.
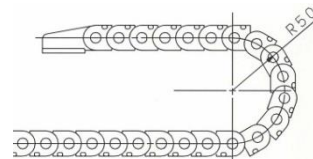


(10) **Confirm proper wiring of the product.**

   Poor insulation (interference with other circuits, poor insulation between terminals and etc.) can apply excessive voltage or current to the product causing damage.

(11) **The Speed / pushing force may vary, depending on the cable length, load and mounting conditions etc.**

   If the cable length exceeds 5m, the speed / pushing force will be reduced by a maximum of 10% per 5m. (If cable length is 15m: Maximum 20% reduction.)

# [Transportation]

⚠**Caution**

(1) **Do not carry or swing the product by the motor or the cable**

## 13. Electric actuators / Common precautions

### 13.1 Design and selection

⚠ **Warning**

**(1) Be sure to read the Operation Manual.**

Handling or usage / operation other than that specified in the Operation Manual may lead to breakage and operation failure of the product.

Any damage attributed to the use beyond the specifications is not guaranteed.

**(2) There is a possibility of dangerous sudden action by the product if sliding parts of machinery are twisted due to external forces etc.**

In such cases, human injury may occur, such as by catching hands or feet in the machinery, or damage to the machinery itself may occur. Design the machinery should be designed to avoid such dangers.

**(3) A protective cover is recommended to minimize the risk of personal injury.**

If a driven object and moving parts of the product are in close proximity, personal injury may occur. Design the system to avoid contact with the human body.

**(4) Securely tighten all stationary parts and connected parts so that they will not become loose.**

When the product operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

**(5) Consider a possible loss of power source.**

Take measures to prevent injury and equipment damage even in the case of a power source failure.

**(6) Consider behavior of emergency stop of whole system.**

Design the system so that human injury and or damage to machinery and equipment will not be caused, when it is stopped by a safety device for abnormal conditions such as a power outage or a manual emergency stop of whole system.

**(7) Consider the action when operation is restarted after an emergency stop or abnormal stop of whole system.**

Design the system so that human injury or equipment damage will not occur upon restart of operation of whole system.

**(8) Disassembly and modification prohibited**

Do not modify or reconstruct (including additional machining) the product. An injury or failure can result.

**(9) When using it for vertical application, it is necessary to build in a safety device.**

The rod may fall due to the weight of work. The safety device should not interfere with normal operation of the machine.

⚠ **Caution**

**(1) Operate within the limits of the maximum usable stroke.**

The product will be damaged if it is used with the stroke which is over the maximum stroke. Refer to the specifications of the product.

**(2) When the product repeatedly cycles with partial strokes, operate it at a full stroke at least once a day or every 1000 strokes.**

Otherwise, lubrication can run out.

**(3) Do not use the product in applications where excessive external force or impact force is applied to it.**

The product can be damaged. Each component that includes motor is made with accurate tolerance. So even slightly deformed or miss-alignment of component may lead operation failure of the product.

**(4) Return to origin cannot return while operating.**

It cannot be done during positioning operation, pushing operation and pushing.

**(5) Refer to a common auto switch / matter (Best Pneumatics No 2) when an auto switch is built in and used.**

**(6) When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.**

## 13.2 Mounting

### ⚠Warning

**(1) Install and operate the product only after reading the Operation Manual carefully and understanding its contents. Keep the manual in a safe place future reference.**

**(2) Observe the tightening torque for screws.**

Tighten the screws to the recommended torque for mounting the product.

**(3) Do not make any alterations to this product.**

Alterations made to this product may lead to a loss of durability and damage to the product, which can lead to human injury and damage to other equipment and machinery.

**(4) When using external guide, the guide axis should be parallel to the electric actuator axis.**

There will be damage / excessive wear on the lead screw if the external guide is not parallel.

**(5) When an external guide is used, connect the moving parts of the product and the load in such a way that there is no interference at any point within the stroke.**

Do not scratch or dent the sliding parts of the product tube or piston rod etc., by striking or grasping them with other objects. Components are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation.

**(6) Prevent the seizure of rotating parts.**

Prevent the seizure of rotating parts (pins, etc.) by applying grease.

**(7) Do not use the product until you verify that the equipment can be operated properly.**

After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted properly.

**(8) At the overhang mounted impeller fixation**

There is a possibility that the power at the bending moment damages the electric actuator when moving it at high speed.

The support metal fittings that suppress the vibration of the main body of the electric actuator are installed.

Lower and use speed for the state that the electric actuator doesn't vibrate.

**(9) When mounting the electric actuator or attaching to the work piece, do not apply strong impact or large moment.**

If an external force over the allowable moment is applied, it may cause looseness in the guide unit, an increase in sliding resistance or other problems.

**(10) Maintenance space.**

Allow sufficient space for maintenance and inspection.

## 13.3 Precautions for Use

### ⚠ Warning

**(1) Do not touch the motor while in operation.**

The surface temperature of the motor can increase to approx. 90 °C to 100 °C due to operating conditions. Energizing alone may also cause this temperature increase. As it may cause burns, do not touch the motor when in operation.

**(2) If abnormal heating, smoking or fire, etc., occurs in the product, immediately shut off the power supply.**

**(3) Immediately stop operation if abnormal operation noise or vibration occurs.**

The product may have been mounted incorrectly. Unless operation of the product is stopped for inspection, the product can be seriously damaged.

**(4) Never touch the rotating part of the motor or moving part of the electric actuator while in operation.**

**(5) When installing, adjusting, inspecting or performing maintenance on the product, controller and related equipment, be sure to shut off the power supply to each of them. Then, lock it so that no one other than the person working can turn the power on, or implement measures such as a safety plug.**

## ⚠ Caution

**(1) Keep the controller and product combined as delivered for use.**

The product is set in parameters for shipment. If it is combined with a different parameter, failure can result.

**(2) Check the product for the following points before operation.**

    a) Damage to electric driving line and signal lines

    b) Looseness of the connector to each power line and signal line

    c) Looseness of the electric actuator / cylinder and controller / driver mounting

    d) Abnormal operation

    e) Emergency stop of the total system

**(3) When more than one person is performing work, decide on the procedures, signals, measures and resolution for abnormal conditions before beginning the work. Also, designate a person to supervise work other than those performing work.**

**(4) Actual speed of the product will be changed by the workload.**

Before selecting a product, check the catalog for the instructions regarding selection and specifications.

**(5) Do not apply a load, impact or resistance in addition to a transferred load during return to origin.**

In the case of the return to origin by pushing force, additional force will cause displacement of the origin position since it is based on detected motor torque.

**(6) Do not remove the nameplate.**

**(7) Operation test should be done by low speed. Start operation by predefined speed after confirming there is no trouble.**

# [Ground]
## ⚠ Warning

**(1) Be sure to ground the electric actuator.**

**(2) Grounding should be dedicated ground.**

**Ground construction is Class D grounding. (Ground resistance 100 Ω or less)**

**(3) Make the grounding as close as possible to the electric actuator and shorten the distance to ground.**

# [Unpackaging]
## ⚠ Caution

**(1) Check the received product is as ordered.**

If a different product is installed from the one ordered, injury or damage can result.

**SMC**

## 13.4 Operating environment

### ⚠Warning

**(1) Do not use the product in environment below.**

1. Locations where a large amount of dusts and cutting chips are airborne.
2. Locations where the ambient temperature is outside the range of the temperature specification (refer to specifications).
3. Locations where the ambient humidity is outside the range of the humidity specification (refer to specifications).
4. Locations where corrosive gas, flammable gas, seawater, water and steam are present.
5. Locations where strong magnetic or electric fields are generated.
6. Locations where direct vibration or impact is applied to the product.
7. Areas that are dusty, or are exposed to splashes of water and oil drops.
8. Areas exposed to direct sunlight (ultraviolet ray).
9. Environment at an altitude of 1000 meters or higher
   Heat radiation and withstand voltage will decrease. Contact SMC for details.

**(2) Do not use in an environment where the product is directly exposed to liquid, such as cutting oils.**
If cutting oils, coolant or oil mist contaminates the product, failure or increased sliding resistance can result.

**(3) Install a protective cover when the product is used in an environment directly exposed to foreign matters such as dust, cutting chips and spatter.**
Play or increased sliding resistance can result.

**(4) Shade the sunlight in the place where the product is applied with direct sunshine.**

**(5) Shield the valve from radiated heat generated by nearby heat sources.**
The radiated heat from the heat source can increase the temperature of the product beyond the operating temperature range.

**(6) Grease oil can be decreased due to external environment and operating conditions, and it deteriorates lubrication performance to shorten the life of the product.**

# [Storage]

### ⚠Warning

**(1) Do not store the product in direct contact with rain or water drops or is exposed to harmful gas or liquid.**

**(2) Store in an area that is shaded from direct sunlight and has a temperature and humidity within the specified range (-10 $^{\circ}$C to 60 $^{\circ}$C and 35 to 85% No condensation or freezing).**

**(3) Do not apply vibration and impact to the product during storage.**

## 13.5 Maintenance

### ⚠Warning

**(1) Do not disassemble or repair the product.**
Fire or electric shock can result.

**(2) Before modifying or checking the wiring, the voltage should be checked with a tester 5 minutes after the power supply is turned off.**
Electrical shock can result.

⚡SMC.

## ⚠ Caution

**(1) Maintenance should be performed according to the procedure indicated in the Operating Manual.**

Incorrect handling can cause injury, damage or malfunction of equipment and machinery.

**(2) Removal of product.**

When equipment is serviced, first confirm that measures are in place to prevent dropping of work pieces and run-away of equipment, etc., and then cut the power supply to the system. When machinery is restarted, check that operation is normal with the electric actuators in the proper positions.

**(3) When moving the electric actuator slider manually by hand, please disconnect the actuator cable.**

The electric actuator cannot be moved smoothly by the induced voltage of the motor goes to the controller when the electric actuator slider is moved with the electric actuator connected with the controller. Moreover, the controller might break down by the induced voltage when moving the electric actuator slider at high frequency.

# [Lubrication]
## ⚠Caution

**(1) The product has been lubricated for life at manufacturer, and does not require lubrication in service.**

Contact SMC if lubrication will be applied.

## 13.6 Precautions for electric actuator with lock

## ⚠Warning

**(1) Do not use the lock as a safety lock or a control that requires a locking force.**

The lock used for the product with a lock is designed to prevent dropping of work piece.

**(2) For vertical mounting, use the product with a lock.**

If the product is not equipped with a lock, the product will move and drop the work piece when the power is removed.

**(3) "Measures against drops" means preventing a work piece from dropping due to its weight when the product operation is stopped and the power supply is turned off.**

**(4) Do not apply an impact load or strong vibration while the lock is activated.**

If an external impact load or strong vibration is applied to the product, the lock will lose it's holding force and damage to the sliding part of the lock or reduced lifetime can result. The same situations will happen when the lock slips due to a force over the thurst of the product, as this accelerates the wear to the lock.

**(5) Do not apply liquid or oil and grease to the lock or its surrounding.**

When liquid or oil and grease is applied to the sliding part of the lock, its holding force will reduce significantly.

**(6) Take measures against drops and check that safety is assured before mounting, adjustment and inspection of the product.**

If the lock is released with the product mounted vertically, a work piece can drop due to its weight.

**(7) When the electric actuator is operated manually (when SVRE output signal is off), supply 24 VDC to the [BK RLS] terminal of the power supply connector.**

If the product is operated without releasing the lock, wearing of the lock sliding surface will be accelerated, causing reduction in the holding force and the life of the locking mechanism.

**(8) Do not supply 24 VDC power supply constantly to the [BK RLS (Lock release)] terminal.**

Stop supplying 24 VDC power supply to the [BK RLS (Lock release)] terminal during normal operation. If power is supplied to the [BK RLS] terminal continuously, the lock will be released, and work pieces may be dropped at stop (EMG).

/ Refer to the operation manual of LEC (controller) for details of wiring.

## 14.1 Design and selection

### ⚠Warning

**(1) Be sure to apply the specified voltage.**
Otherwise, a malfunction and breakage of the controller may be caused.
If the applied voltage is lower than the specified, it is possible that the load cannot be moved due to an internal voltage drop. Please check the operating voltage before use.

**(2) Do not operate beyond the specifications.**
It may cause a fire; malfunction or the electric actuator damage can result. Please check the specifications before use.

**(3) Install an emergency stop circuit.**
Please install an emergency stop outside of the enclosure so that it can stop the system operation immediately and intercept the power supply.

**(4) In order to prevent danger and damage due to the breakdown and the malfunction of this product, which may occur at a certain probability, a backup system should be established previously by giving a multiple-layered structure or a fail-safe design to the equipment, etc.**

**(5) If a fire or danger against the personnel is expected due to an abnormal heat generation, ignition, smoking of the product, etc., cut off the power supply for this product and the system immediately.**

## 14.2 Handling

### ⚠ Warning

**(1) The inside of the controller and its connector should not be touched.**
It may cause an electric shock or damage to the controller.

**(2) Do not perform the operation or setting of this equipment with wet hands.**
It may cause an electric shock.

**(3) Product with damage or the one lacking of any components should not be used.**
It may cause an electric shock, fire, or injury.

**(4) Use only the specified combination between the controller and the electric actuator.**
It may cause damage to the controller or the electric actuator.

**(5) Be careful not to be caught or hit by the work piece while the electric actuator is moving.**
It may cause an injury.

**(6) Do not connect the power supply or power on the product before confirming the area where the work moves is safe.**
The movement of the work may cause accident.

**(7) Do not touch the product when it is energized and for some time after power has been disconnected, as it is very hot.**
It may lead to a burn due to the high temperature.

**(8) Check the voltage using a tester for more than 5 minute after power-off in case of installation, wiring and maintenance.**
There is a possibility of getting electric shock, fire and injury.

**(9) Do not use in an area where dust, powder dust, water or oil is in the air.**
It will cause failure or malfunction.

**(10) Do not use in an area where a magnetic field is generated.**
It will cause failure or malfunction.

**(11) Do not install in the environment of flammable gas, corrosive gas and explosive gas.**
It could lead to fire, explosion and corrosion.

**(12) Do not apply radiant heat from a large heat source such as direct sunlight or heat treatment furnace.**
It will cause failure of the controller or its peripheral devices.

**(13) Do not use the product in an environment subject to a temperature cycle.**
It will cause failure of the controller or its peripheral devices.

**(14) Do not use in a place where surges are generated.**
When there are units that generate a large amount of surge around the product (e.g., solenoid type lifters, high frequency induction furnaces, motors, etc.), this may cause deterioration or damage to the product's' internal circuit. Avoid supplys of surge generation and crossed lines.

**(15) Do not install this product in an environment under the effect of vibrations and impacts.**
It will cause failure or malfunction.

**(16) If this product is used with a relay or solenoid valve, they should be the surge absorbing element built-in type.**

## 14.3 Installation

⚠ **Warning**

**(1) The controller and its peripheral devices should be installed on a fire-proof material.**
A direct installation on or near a flammable material may cause fire.

**(2) Do not install this product in a place subject to vibrations and impacts.**
It may cause an electric shock, fire, or injury.

**(3) Take measure so that the operating temperature of this controller and its peripheral devices are within the range of the specifications. Also, this controller should be installed with 50mm or larger spaces between each side of it and the other structures or components.**
It may cause a malfunction of the controller and its peripheral devices and a fire.

**(4) Do not mount this controller and its peripheral devices together with a large-sized electromagnetic contactor or no-fuse breaker, which generates vibration, on the same panel. Mount them on different panels, or keep the controller and its peripheral devices away from such a vibration supply.**

**(5) This controller and its peripheral devices should be installed on a flat surface.**
If the mounting surface is distorted or not flat, an unacceptable force may be added to the housing, etc. to cause troubles.

## 14.4 Wiring

⚠ **Warning**

**(1) Do not apply any excessive force to cables by repeated bending, tensioning or placing a heavy object on the cables.**
It may cause an electric shock, fire, or breaking of wire.

**(2) Connect wires and cables correctly.**
Incorrect wiring could break he controller or its peripheral devices depending on the seriousness.

**(3) Do not connect wires while the power is supplied.**
It can break the controller or its peripheral devices could be damaged to cause a malfunction.

**(4) Do not carry this product by holding its cables.**
It may cause an injury or damage to the product.

**(5) Do not connect power cable or high-voltage cable in the same wiring route as the unit.**
The wires to the controller or its peripheral devices can be interrupted with noise or induced surge voltage from power lines or high-voltage lines and malfunction could be caused.
Separate the wiring of the controller and its peripheral device from that of power line and high voltage line.

**(6) Verify the insulation of wiring.**
Insulation failure (interference with other circuit, poor insulation between terminals and etc.) could introduce excessive voltage or current to the controller or its peripheral devices and damage them.

## 14.5 Power supply

⚠ **Warning**

**(1) Use a power supply that has low noise between lines and between power and ground.**
   In cases where noise is high, an isolation transformer should be used.

**(2) The power supplys should be separated between the controller power and the I/O signal power and both of them do not use the power supply of "inrush current restraining type".**
   If the power supply is "inrush current restraining type", a voltage drop may be caused during the acceleration of the electric actuator.

**(3) To prevent surges from lightning, an appropriate measure should be taken. Ground the surge absorber for lightning separately from the grounding of the controller and its peripheral devices.**


## 14.6 Grounding

⚠ **Warning**

**(1) Be sure to ground to ensure noise immunity of the controller.**
    It may cause an electric shock or fire.

**(2) Controller mount hole (mounting part for ground cable) is connected to SG (signal ground) in the controller.**
   **Do not ground the controller when the controller is used in positive grounding environment.**

**(3) Dedicated grounding should be used.**
   Grounding should be to a D-class ground (Ground resistance of 100 Ω or less.)

**(4) Grounding should be performed near the unit as much as possible to shorten the grounding distance.**

**(5) In the unlikely event that malfunction is caused by the ground, it may be disconnected.**


## 14.7 Maintenace

⚠**Warning**

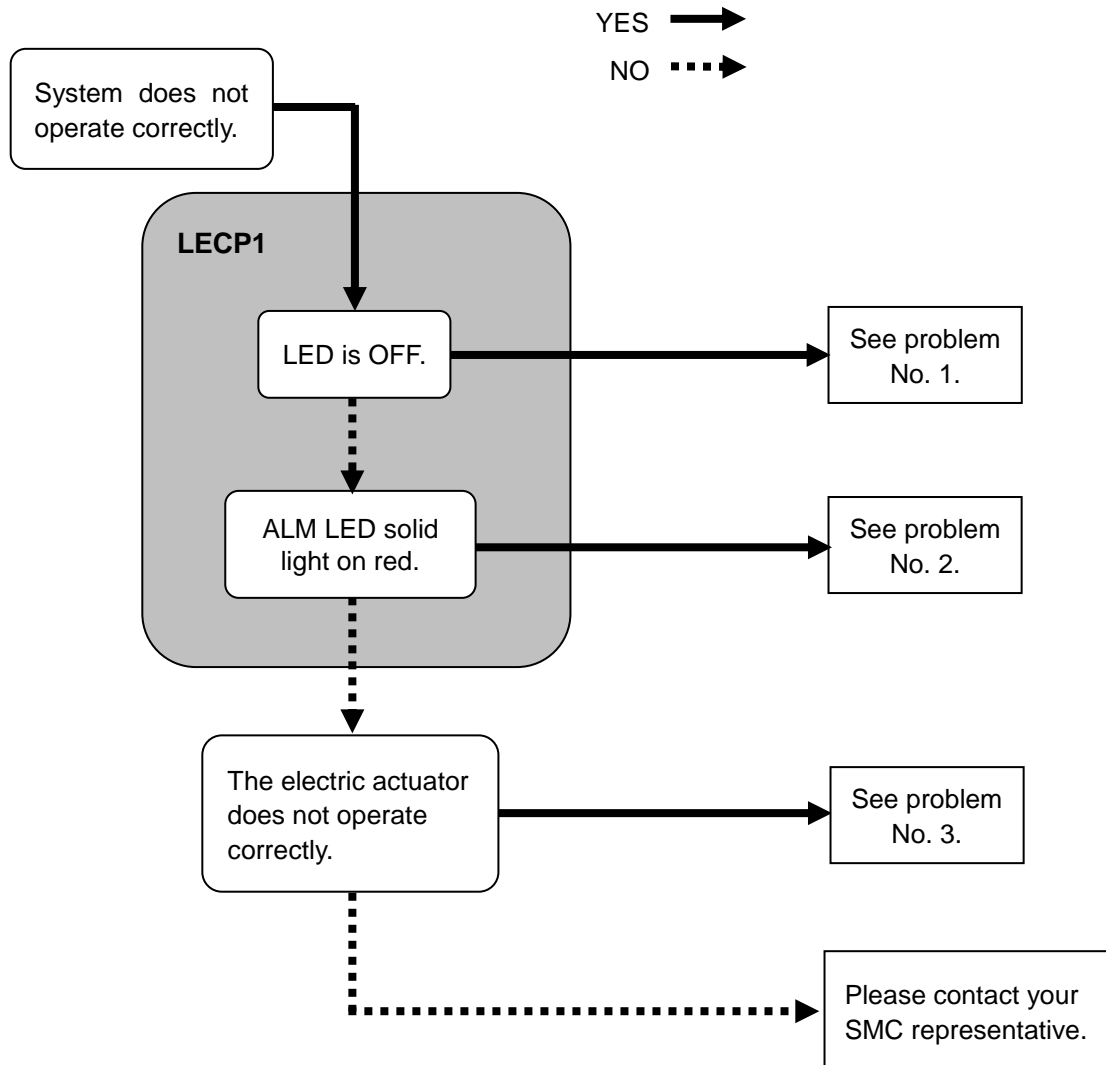**(1) Perform a maintenance check periodically**
   Confirm wiring and screws are not loose.
   Loose screws or wires may cause unintentional malfunction.

**(2) Conduct an appropriate functional inspection after completing the maintenance.**
   In case of any abnormities (in the case that the electric actuator does no move, etc.), stop the operation of the system. Otherwise, an unexpected malfunction may occur and it will become impossible to secure the safety.

**(3) Do not disassemble, modify or repair this controller and the peripheral equipment.**

**(4) Do not put anything conductive or flammable inside of this controller.**
   It may cause a fire and explosion.

**(5) Do not conduct an insulation resistance test and withstand voltage test on this product.**

**(6) Ensure sufficient space for maintenance activities. Provide space required for maintenance.**
   Design the system that allows required space for maintenance.

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# 15. Troubleshooting

In case of any troubles, please consult the following table.

Consider replacing controller, if not of the causes on this table are applicable.

It is possible that this product is damaged due to the operating conditions (applications), please contact SMC to discuss appropriate measures.

YES ──────▶

NO ▪▪▪▪▶

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┌─────────────────┐
│ System does not │
│ operate         │
│ correctly.      │
└────────┬────────┘
         │
  ┌──────┼─────────────────────────────────┐
  │ LECP1 │                                 │
  │      ▼                                  │
  │  ┌─────────────┐        ┌──────────────┐
  │  │ LED is OFF. │───────▶│ See problem  │
  │  └──────┬──────┘        │ No. 1.       │
  │         ┊               └──────────────┘
  │         ┊                                │
  │  ┌─────────────┐        ┌──────────────┐
  │  │ ALM LED solid│──────▶│ See problem  │
  │  │ light on red.│       │ No. 2.       │
  │  └──────┬──────┘        └──────────────┘
  │         ┊                                │
  └─────────┊────────────────────────────────┘
            ┊
  ┌──────────────────┐     ┌──────────────┐
  │ The electric     │────▶│ See problem  │
  │ actuator does    │     │ No. 3.       │
  │ not operate      │     └──────────────┘
  │ correctly.       │
  └────────┬─────────┘
           ┊
           ┊               ┌──────────────────┐
           ┊▪▪▪▪▪▪▪▪▪▪▪▪▪▶│ Please contact your│
                           │ SMC representative.│
                           └──────────────────┘
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| Trouble No. | Trouble | Possible cause | How to diagnose the trouble | Solutions |
|---|---|---|---|---|
| 1 | LED is OFF | Power fault | Check if the LED (green) of the controller is lights up. | The power supply, voltage or current should be modified to an appropriate one.<br>→ 4. External Wiring Diagram<br>→ 5. CN1: Power supply cable |
| | | Wiring fault | Is the wiring connected correctly? | Check if the wiring is connected correctly or if there is broken wire or short-circuit by referring to this Operation Manual. Correct the wiring and check that the input / output of each signal is correct.<br>Separate the power supply for the CN1 controller and the CN4 I/O signal power supply.<br>→ 4. External Wiring Diagram<br>→ 6.4 Parallel I/O Wiring Example |
| 2 | ALM is ON | Alarm occurring | Is the controller alarm occurring? | Refer to the controller operation manual, and take appropriate measures. Take appropriate measures based on the operation manual.<br>→ 11. Alarm Detection |
| 3 | The electric actuator does not move at all. | Lock release error | Check if you can hear the sound of lock release when the manual lock switch is turned on and off. | If there is no sound of lock release from the electric actuator with lock, the lock may be broken. If the trouble continues, please contact SMC. |
| | | External device fault | Check that the PLC connected to the controller operates correctly. | Make a confirmation of operation by a test run only with the controller.<br>Refer to the Operation Manual and take appropriate measures.<br>→ 6. CN4: Parallel I/O Connector |
| | | Servo OFF | Is servo OFF (controller green LED flashes)? | Servo is OFF and the operation is not available under the following conditions. Eliminate the cause and follow the operation instruction after the servo is turned ON.<br>- STOP input is ON.<br>- Motor power supply is OFF. |
| | Does not work occasionally | Wiring fault | Is the wiring connected correctly? | Check if the wiring is connected correctly or if there is broken wire or short-circuit by referring to this Operation Manual. Correct the wiring and check that the input / output of each signal is correct.<br>Separate the power supply for the CN1controller and the CN4 I/O signal power supply.<br>→ 4. External Wiring Diagram<br>→ 6.4 Parallel I/O Wiring Example |
| | | Counter-measures against noise | Check that the Grounding is connected correctly?<br>Are power cables for other equipment and controller cables bundled together? | Connect to Ground correctly.<br>Avoid bundling the cables with power cables of other equipment.<br>Take appropriate measures by referring to the Operation Manual for the controller.<br>→ 3.4 How to install |

| | | | | |
|---|---|---|---|---|
| 3 | Does not work occasionally | Voltage drop | Check for a temporary voltage drop in the power supply? | There is a possibility of a momentary voltage drop because the capacity of the power supply is insufficient, or if the power supply has "inrush current suppression type". → 3.1 Basic specifications |
| | | Pushing operation failure | Is pushing operation performed in manual mode? | Pushing operation is not available in manual mode except for testing. Switch to test function or perform pushing in auto mode. → 7.3 (3) Manual mode after retun to origin |
| | | Inappropriate specifications | Check that the combination of the electric actuator and controller is correct? | Check if the product number of the used electric actuator matches with the electric actuator which is applicable to the controller. → 2.3 How to Order |
| | | Servo ON time | When the power supply for the motor is applied (or STOP input is turned off), commands can be given when ALARM output is ON? | Just after the motor power is applied, it may take up to 10 seconds for ALARM output depending on the electric actuator position. Send a command operation when the ALARM output has turned ON. |
| | | Alarm occurring | Is the controller alarm occurring? | Refer to the controller operation manual, and take appropriate measures. Take appropriate measures based on the operation manual. → 11. Alarm Detection |
| | | Command the position number repeatedly | Is the same position number specified? | The operation is not performed when the position number of the current stop position is specified repeatedly. There is no operation start either when the position number to which the current stop position number is registered is specified. Check if the position number specified before operation, the position number which specifies the position and operation, and the registered position number are not overlapped. |
| | | Inappropriate basic parameters | Check that the parameter values are appropriate and the program is correct. | Check the max. speed, acceleration speed, and deceleration speed of the electric actuator and be sure to input the correct parameters. →7. Setting method |
| | | Signal timing | Check the timing of the signal from the PLC to the controller. | PLC processing delay and controller scan delay are generated. Please ensure an interval of 15ms (30 ms if possible) or more between input signals, and maintain the signal state. →8.6 Response time for the controller input signal |

| | | Incorrect origin position | If it is a pushing operation, repeat return to origin operations several times to check if the electric actuator returns to the origin correctly. | Perform the return to origin position operation several times to check the origin position. Take measure to make the electric actuator operates normally (remove foreign matters that interferes with the electric actuator movement, etc.) |
|---|---|---|---|---|
| | The actuator does not move to the correct position. | Inappropriate specifications | Check that the combination of the electric actuator and controller is correct? | Check if the product number of the used electric actuator matches with the electric actuator which is applicable to the controller. → 2.3 How to Order |
| | The electric actuator does not move correctly. | Wiring fault | Is the wiring connected correctly? | Check if the wiring is connected correctly or if there is broken wire or short-circuit by referring to this Operation Manual. Correct the wiring and check that the input / output of each signal is correct. → 4. External Wiring Diagram → 6.4 Parallel I/O Wiring Example |
| | | Inappropriate specifications | Check that the combination of the electric actuator and controller is correct? | Check if the product number of the used electric actuator matches with the electric actuator which is applicable to the controller. → 2.3 How to Order |
| 3 | | Signal timing | Check the timing of the signal from the PLC to the controller. | PLC processing delay and controller scan delay are generated. Please ensure an interval of 15ms (30 ms if possible) or more between input signals, and maintain the signal state. →8.6 Response time for the controller input signal |
| | Insufficient speed | Inappropriate step data | Is the operation pattern trapezoidal? | In case of such operation, the electric actuator may start slowing down before it reaches the maximum speed. Modify the setting to make the moving distance longer or the acceleration larger. → 7.1 Setting procedure |
| | | Inappropriate specifications | Check that the combination of the electric actuator and controller is correct? Check if the electric actuator is operating within the specification range. | Check if the product number of the used electric actuator matches with the electric actuator which is applicable to the controller. Check if the operating condition of the electric actuator is within the specification range. → 2.3 How to Orde |
| | | Speed change in auto mode. | Change the value of the speed or acceleration switch in auto mode. | Go to speed adjustment in auto mode to change the speed and acceleration. →7.3(2) Auto mode after return to origin |
| | | Voltage drop | Check if there has been any temporary voltage drop in the power supply. (If there is a temporary voltage drop in the power supply, the EMG terminal of CN1 power connector will turn OFF so the electric actuator will stop. However, this stop will be released when the voltage recovers.) | There is a possibility of a momentary voltage drop because the capacity of the power supply is insufficient, or the power supply has inrush current suppression type. →3. Product Specifications |

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