# Programless Controller

# Series LECP1

## How rder

**LE C P 1 N 1 – LEHZ10LK2-4**

**Controller**

**Compatible motor**

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

**Number of step data (Points)**

| | |
|---|---|
| **1** | 14 (Programless) |

**Parallel I/O type**

| | |
|---|---|
| **N** | NPN |
| **P** | PNP |

**I/O cable length [m]**

| | |
|---|---|
| **Nil** | Without cable |
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |

**Actuator part number**

(Except cable specifications and actuator options)
Example: Enter [LEHZ10LK2-4] for
LEHZ10LK2-4AF-R16N1

∗ **When placing an order for the controller with an actuator, this part number is not necessary.**

**The controller is sold as single unit after the compatible actuator is set.**

Confirm that the combination of the controller and the actuator is correct.

∗ Refer to the operation manual for using the products. Please download it via our website. http://www.smcworld.com

## Specifications

### Basic Specifications

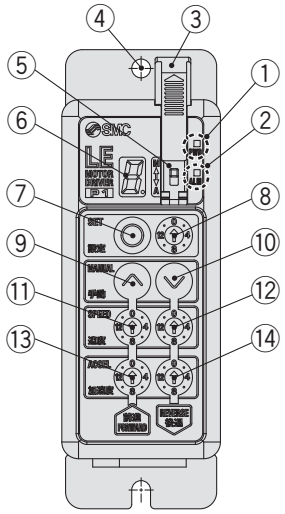
| Item | LECP1 |
|---|---|
| **Compatible motor** | Step motor (Servo/24 VDC) |
| **Power supply** Note 1) | Power supply voltage: 24 VDC ±10%<br>Max. current consumption: 3A (Peak 5A) Note 2)<br>[Including the motor drive power, control power supply, stop, lock release] |
| **Parallel input** | 6 inputs (Photo-coupler isolation) |
| **Parallel output** | 6 outputs (Photo-coupler isolation) |
| **Stop points** | 14 points (Position number 1 to 14(E)) |
| **Compatible encoder** | Incremental A/B phase (800 pulse/rotation) |
| **Serial communication** | RS485 (Modbus protocol compliant) |
| **Memory** | EEPROM |
| **LED indicator** | LED (Green/Red) one of each |
| **7-segment LED display** Note 3) | 1 digit, 7-segment display (red) Figures are expressed in hexadecimal ("10" to "15" in decimal number are expressed as "A" to "F") |
| **Lock control** | Forced-lock release terminal Note 4) |
| **Cable length [m]** | I/O cable: 5 or less Actuator cable: 20 or less |
| **Cooling system** | Natural air cooling |
| **Operating temperature range** | 32 to 104°F (0 to 40°C) (No freezing) |
| **Operating humidity range [%RH]** | 90 or less (No condensation) |
| **Storage temperature range** | 14 to 140°F (–10 to 60°C) (No freezing) |
| **Storage humidity range [%RH]** | 90 or less (No condensation) |
| **Insulation resistance [MΩ]** | Between the housing (radiation fin) and SG terminal 50 (500 VDC) |
| **Weight** | 0.29 lbs (130 g) |

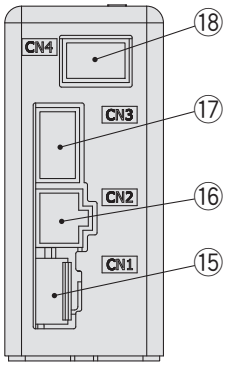
Note 1) Do not use the power supply of "inrush current prevention type" for the controller input power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the each actuator's operation manual etc. for details.
Note 3) "10" to "15" in decimal number are displayed as follows in the 7-segment LED.

| | | | | | | |
|---|---|---|---|---|---|---|
| Decimal display | 10 | 11 | 12 | 13 | 14 | 15 |
| Hexadecimal display | A | b | c | d | E | F |

Note 4) Applicable to non-magnetizing lock.

## Details of The Controller



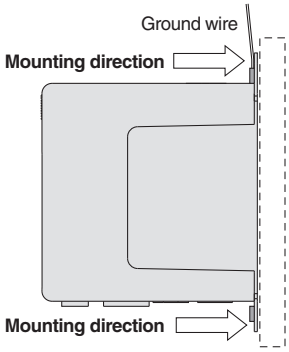

| No. | Display | Description | Details |
|---|---|---|---|
| ① | **PWR** | Power supply LED | Power supply ON/servo ON :Green turns on<br>Power supply ON/servo OFF :Green flashes |
| ② | **ALM** | Alarm LED | With alarm : Red turns on<br>Parameter setting : Red flashes |
| ③ | — | Cover | Change and protection of the mode SW (Close the cover after changing SW) |
| ④ | — | FG | Frame ground (Tighten the bolt with the nut when mounting the controller. Connect the ground wire.) |
| ⑤ | — | Mode swith | Switch the mode between manual and auto. |
| ⑥ | — | 7-segment LED | Stop position, the value set by ⑧ and alarm information are displayed. |
| ⑦ | **SET** | Set button | Decide the settings or drive operation in Manual mode. |
| ⑧ | — | Position selecting switch | Assign the position to drive (1 to 14), and the origin position (15). |
| ⑨ | **MANUAL** | Manual forward button | Perform forward jog and inching. |
| ⑩ | | Manual reverse button | Perform reverse jog and inching. |
| ⑪ | **SPEED** | Forward speed switch | 16 forward speeds are available. |
| ⑫ | | Reverse speed switch | 16 reverse speeds are available. |
| ⑬ | **ACCEL** | Forward acceleration switch | 16 forward acceleration steps are available. |
| ⑭ | | Reverse acceleration switch | 16 reverse acceleration steps are available. |
| ⑮ | **CN1** | Power supply connector | Connect the power supply cable. |
| ⑯ | **CN2** | Motor connector | Connect the motor connector. |
| ⑰ | **CN3** | Encoder connector | Connect the encoder connector. |
| ⑱ | **CN4** | I/O connector | Connect I/O cable. |

## How to Mount

Controller mounting shown below.

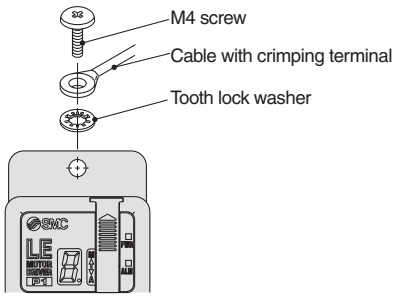
### 1. Mounting screw (LECP1□□-□)

**(Installation with two M4 screws)**




### 2. Grounding

Tighten the bolt with the nut when mounting the ground wire as shown below.

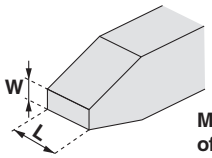



**Controller**

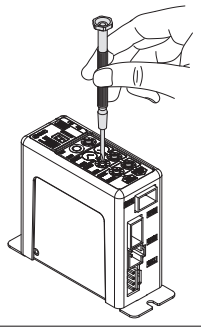
### ⚠Caution

- M4 screws, cable with crimping terminal and tooth lock washer are not included. Be sure to carry out grounding earth in order to ensure the noise tolerance.
- Use a watchmaker's screwdriver of the size shown below when changing position switch ⑧ and the set value of the speed/accele ration switch ⑪ to ⑭.

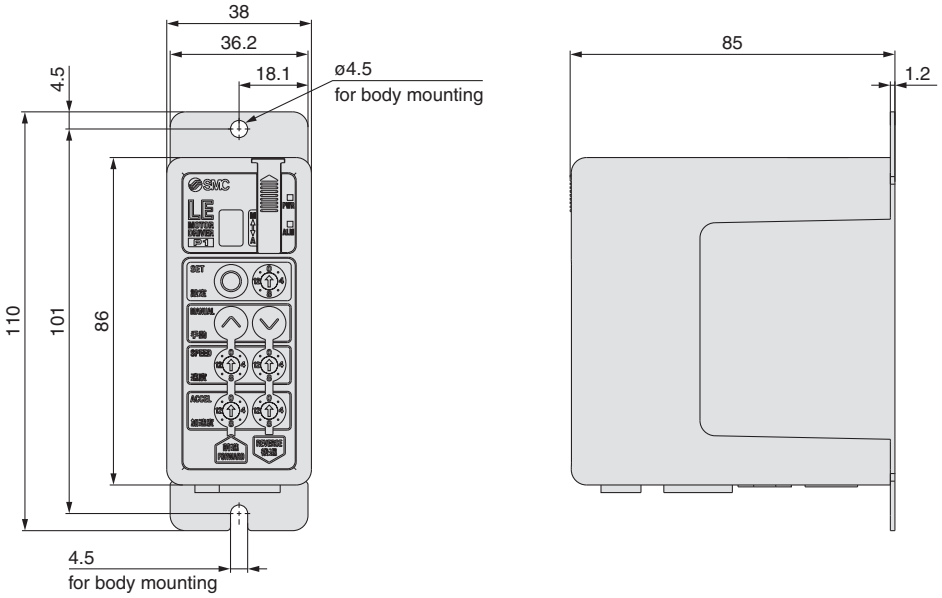
**Size**
End width **L** :2.0 to 2.4 [mm]
End thickness **W** :0.5 to 0.6 [mm]

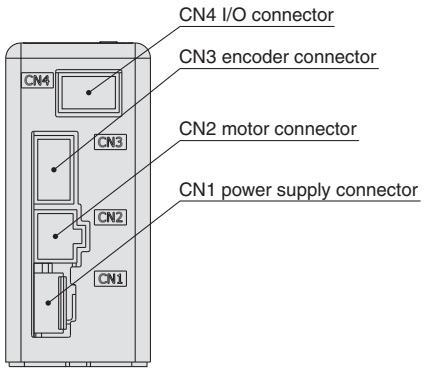



**Magnified view of the end of the screwdriver**



## Dimensions


38
36.2
18.1
ø4.5
for body mounting
4.5
110
101
86
4.5
for body mounting
85
1.2


CN4 I/O connector
CN3 encoder connector
CN2 motor connector
CN1 power supply connector
CN4
CN3
CN2
CN1

## Wiring Example 1

### Power Supply Connector: CN1

* When you connect a CN1 power supply connector, please use the power supply cable (LEC-CK1-1).
* Power supply cable (LEC-CK1-1) is an accessory.

**CN1 Power Supply Connector Terminal for LECP1**

| Terminal name | Cable color | Function | Function details |
|---|---|---|---|
| 0V | Blue | Common supply (–) | M24V terminal/C24V terminal/BK RLS terminal are common (–). |
| M24V | White | Motor power supply (+) | This is the motor power supply (+) that is supplied to the controller. |
| C24V | Brown | Control power supply (+) | This is the control power supply (+) that is supplied to the controller. |
| BK RLS | Black | Lock release (+) | This is the input (+) that releases the lock. |

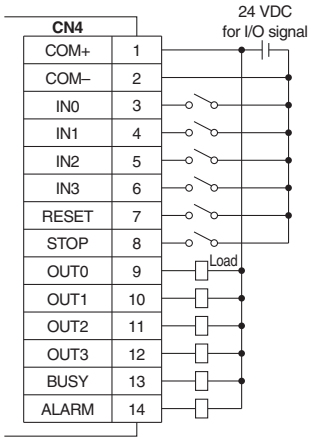
**Power supply cable for LECP1 (LEC-CK1-1)**

## Wiring Example 2

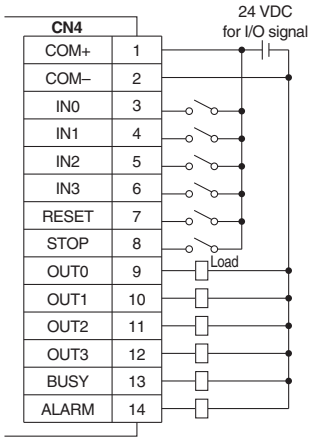
### Parallel I/O Connector: CN4

* 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**




**■PNP**




**Input Signal**

| Name | Contents |
|---|---|
| COM+ | Connects the power supply 24 V for input/output signal |
| COM– | Connects the power supply 0 V for input/output signal |
| IN0 to IN3 | • Instruction to drive (input as a combination of IN0 to IN3)<br>• Instruction to return to the origin position (IN0 to IN3 all ON simultaneously)<br>Example - (instruction to drive for position no. 5)<br>IN3 OFF / IN2 ON / IN1 OFF / IN0 ON |
| RESET | Alarm reset and operation interruption<br>During operation : deceleration stop from position at which signal is input (servo ON maintained)<br>While alarm is active : alarm reset |
| STOP | Instruction to stop (after maximum deceleration stop, servo OFF) |

**Output Signal**

| Name | Contents |
|---|---|
| OUT0 to OUT3 | Turns on when the positioning or pushing is completed.<br>(Output is instructed in the combination of OUT0 to 3.)<br>Example - (operation complete for position no. 3)<br>OUT3 OFF / OUT2 OFF / OUT1 ON / OUT0 ON |
| BUSY | Outputs when the actuator is moving |
| *ALARM Note) | Not output when alarm is active or servo OFF |

Note) These signals are output when the power supply of the controller is ON. (N.C.)

**Input Signal [IN0 - IN3] Position Number Chart** ○: OFF ●: ON

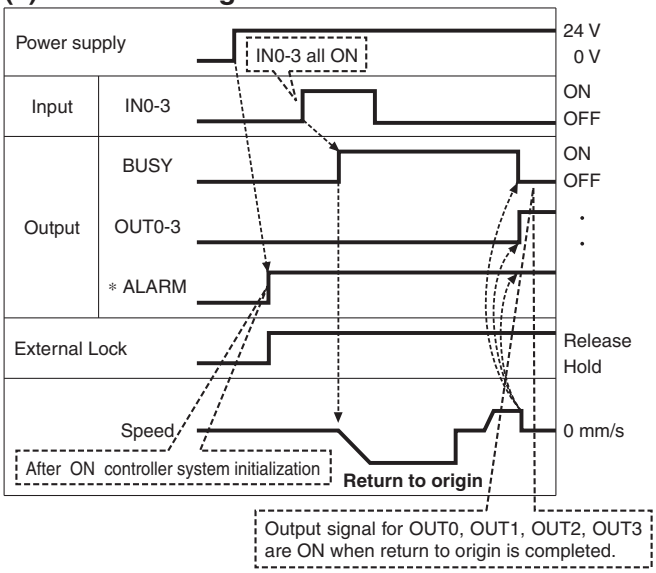
| Position number | IN3 | IN2 | IN1 | IN0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

**Output Signal [OUT0 - OUT3] Position Number Chart** ○: OFF ●: ON

| Position number | OUT3 | OUT2 | OUT1 | OUT0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

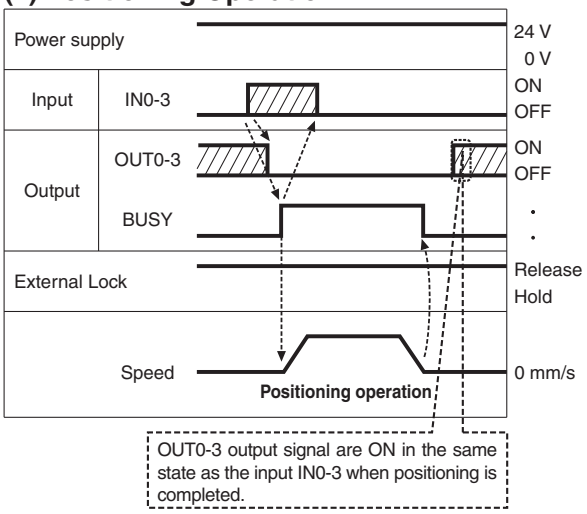
## Signal Timing

### (1) Return to Origin

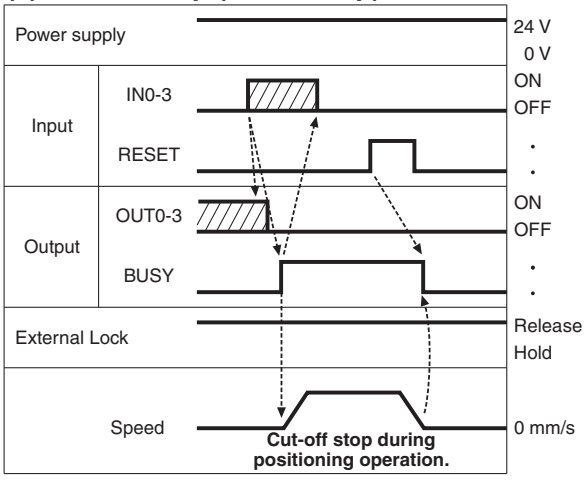



∗ "∗ALARM" is expressed as negative-logic circuit.

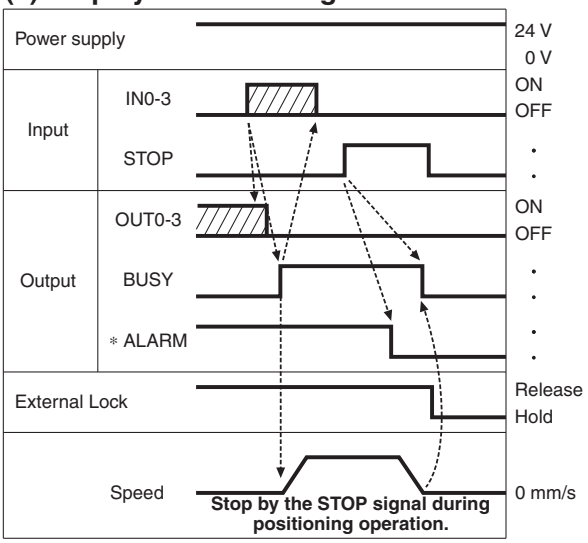
### (2) Positioning Operation



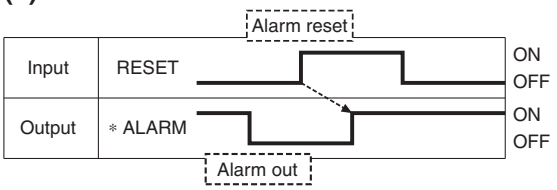

### (3) Cut-off Stop (Reset Stop)




### (4) Stop by The STOP Signal




### (5) Alarm Reset




∗ "∗ALARM" is expressed as negative-logic circuit.

## Options: Actuator Cable

### [Robotic cable for step motor (Servo/24 VDC), standard cable]

**LE – CP – 1 – ☐**

**Cable length (L)[m]**

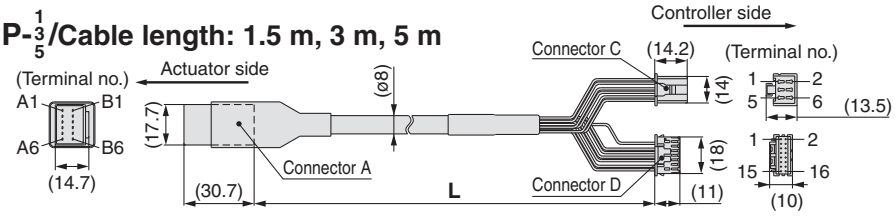
| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |
| **8** | 8* |
| **A** | 10* |
| **B** | 15* |
| **C** | 20* |

* Produced upon receipt of order (Robotic cable only)

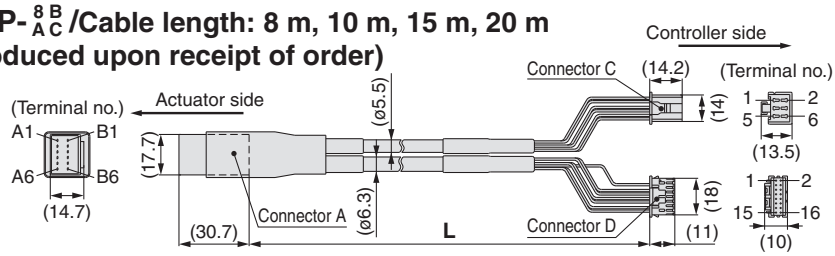
**Cable type**

| | |
|---|---|
| **Nil** | Robotic cable (Flexible cable) |
| **S** | Standard cable |

**LE-CP-$^{1}_{3}_{5}$/Cable length: 1.5 m, 3 m, 5 m**




**LE-CP-$^{8}_{A}$ $^{B}_{C}$/Cable length: 8 m, 10 m, 15 m, 20 m**
**(* Produced upon receipt of order)**



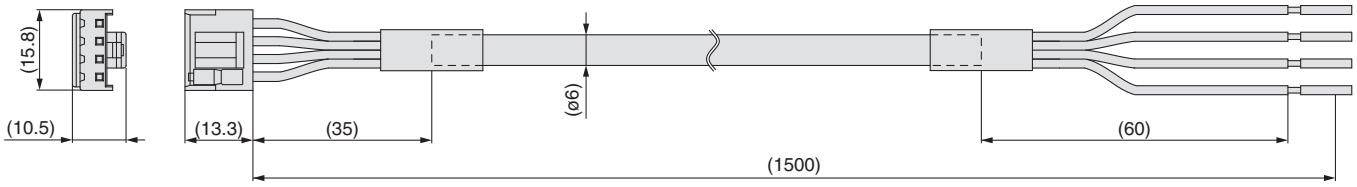

| Circuit | Connector A terminal no. | Cable color | Connector C terminal no. |
|---|---|---|---|
| A | B-1 | Brown | 2 |
| $\overline{A}$ | A-1 | Red | 1 |
| B | B-2 | Orange | 6 |
| $\overline{B}$ | A-2 | Yellow | 5 |
| COM-A/COM | B-3 | Green | 3 |
| COM-B/– | A-3 | Blue | 4 |
| | | Shield | |
| Vcc | B-4 | Brown | 12 |
| GND | A-4 | Black | 13 |
| $\overline{A}$ | B-5 | Red | 7 |
| A | A-5 | Black | 6 |
| $\overline{B}$ | B-6 | Orange | 9 |
| B | A-6 | Black | 8 |
| | | — | 3 |

| Cable color | Connector D terminal no. |
|---|---|
| Brown | 12 |
| Black | 13 |
| Red | 7 |
| Black | 6 |
| Orange | 9 |
| Black | 8 |
| — | 3 |

## Options

### [Power supply cable]

## LEC − CK1 − 1




| Terminal name | Color of covered wire | Function |
|---|---|---|
| 0V | Blue | Common supply (–) |
| M24V | White | Motor power supply (+) |
| C24V | Brown | Control power supply (+) |
| BK RLS | Black | Lock release (+) |

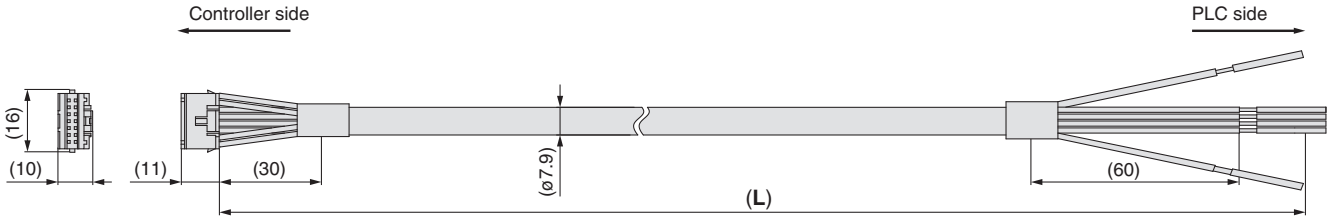
∗ Conductor size: AWG20

### [I/O cable]

## LEC − CK4 − □

**Cable length (L)[m]**

| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |




∗ Conductor size: AWG26

| Terminal no. | Insulation color | Dot mark | Dot color | Function |
|---|---|---|---|---|
| 1 | Light brown | ■ | Black | COM + |
| 2 | Light brown | ■ | Red | COM − |
| 3 | Yellow | ■ | Black | OUT0 |
| 4 | Yellow | ■ | Red | OUT1 |
| 5 | Light green | ■ | Black | OUT2 |
| 6 | Light green | ■ | Red | OUT3 |
| 7 | Gray | ■ | Black | BUSY |
| 8 | Gray | ■ | Red | ALARM |
| 9 | White | ■ | Black | IN0 |
| 10 | White | ■ | Red | IN1 |
| 11 | Light brown | ■ ■ | Black | IN2 |
| 12 | Light brown | ■ ■ | Red | IN3 |
| 13 | Yellow | ■ ■ | Black | RESET |
| 14 | Yellow | ■ ■ | Red | STOP |

∗ Parallel I/O signal is valid in auto mode. While the test function operates at manual mode, only the output is valid.

# Programless Controller

# *Series LECP1*

## How to Order

**LE C P 1 N 1 – LEL25MT-100**

**Controller**

**Compatible motor**

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

**Number of step data (Points)**

| | |
|---|---|
| **1** | 14 (Programless) |

**Parallel I/O type**

| | |
|---|---|
| **N** | NPN |
| **P** | PNP |

**I/O cable length [m]**

| | |
|---|---|
| **Nil** | Without cable |
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |

**Actuator part number**

(Except cable specifications and actuator options)
Example: Enter "LEL25MT-100" for the LEL25MT-100B-R36N3.

∗ **When controller equipped type (-□1N□/-□1P□) is selected when ordering the LE series, you do not need to order this controller.**

**The controller is sold as single unit after the compatible actuator is set.**

Confirm that the combination of the controller and the actuator is correct.

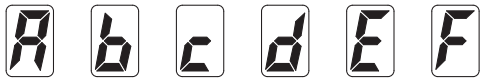
∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smcworld.com

## Specifications

### Basic Specifications

| Item | Specifications |
|---|---|
| **Compatible motor** | Step motor (Servo/24 VDC) |
| **Power supply** Note 1) | Power supply voltage: 24 VDC ±10%<br>Max. current consumption: 3 A (Peak 5 A) Note 2)<br>[Including the motor drive power, control power supply, stop, lock release] |
| **Parallel input** | 6 inputs (Photo-coupler isolation) |
| **Parallel output** | 6 outputs (Photo-coupler isolation) |
| **Stop points** | 14 points (Position number 1 to 14(E)) |
| **Compatible encoder** | Incremental A/B phase (800 pulse/rotation) |
| **Serial communication** | RS485 (Modbus protocol compliant) |
| **Memory** | EEPROM |
| **LED indicator** | LED (Green/Red) one of each |
| **7-segment LED display** Note 3) | 1 digit, 7-segment display (red) Figures are expressed in hexadecimal ("10" to "15" in decimal number are expressed as "A" to "F") |
| **Lock control** | Forced-lock release terminal Note 4) |
| **Cable length [m]** | I/O cable: 5 or less Actuator cable: 20 or less |
| **Cooling system** | Natural air cooling |
| **Operating temperature range** | 32 to 104°F (0 to 40°C) (No freezing) |
| **Operating humidity range [%RH]** | 90 or less (No condensation) |
| **Storage temperature range** | 14 to 140°F (–10 to 60°C) (No freezing) |
| **Storage humidity range [%RH]** | 90 or less (No condensation) |
| **Insulation resistance [MΩ]** | Between the housing (radiation fin) and SG terminal 50 (500 VDC) |
| **Weight** | 4.6 oz (130 g) |

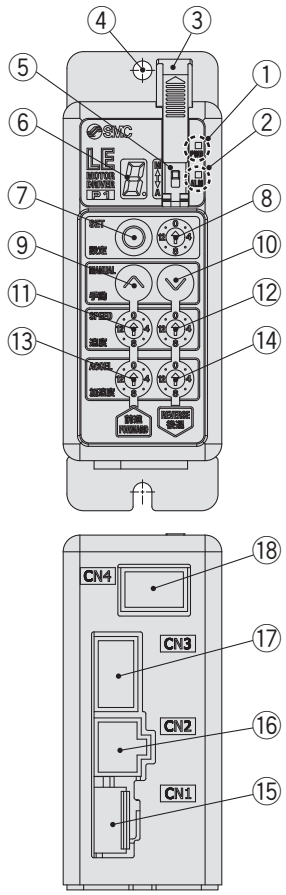
Note 1) Do not use the power supply of "inrush current prevention type" for the controller input power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the each actuator's operation manual etc. for details.
Note 3) "10" to "15" in decimal number are displayed as follows in the 7-segment LED.



| | | | | | | |
|---|---|---|---|---|---|---|
| Decimal display | 10 | 11 | 12 | 13 | 14 | 15 |
| Hexadecimal display | A | b | c | d | E | F |

Note 4) Applicable to non-magnetizing lock.

## Controller Details



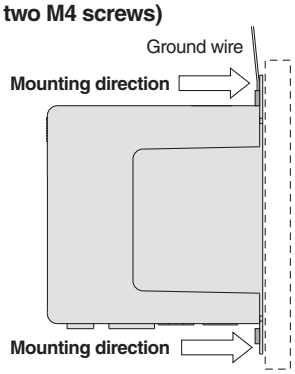

| No. | Display | Description | Details |
|---|---|---|---|
| ① | **PWR** | Power supply LED | Power supply ON/Servo ON: Green turns on<br>Power supply ON/Servo OFF: Green flashes |
| ② | **ALM** | Alarm LED | With alarm: Red turns on<br>Parameter setting: Red flashes |
| ③ | — | Cover | Change and protection of the mode SW (Close the cover after changing SW) |
| ④ | — | FG | Frame ground (Tighten the bolt with the nut when mounting the controller. Connect the ground wire.) |
| ⑤ | — | Mode switch | Switch the mode between manual and auto. |
| ⑥ | — | 7-segment LED | Stop position, the value set by ⑧ and alarm information are displayed. |
| ⑦ | **SET** | Set button | Decide the settings or drive operation in Manual mode. |
| ⑧ | — | Position selecting switch | Assign the position to drive (1 to 14), and the origin position (15). |
| ⑨ | **MANUAL** | Manual forward button | Perform forward jog and inching. |
| ⑩ | | Manual reverse button | Perform reverse jog and inching. |
| ⑪ | **SPEED** | Forward speed switch | 16 forward speeds are available. |
| ⑫ | | Reverse speed switch | 16 reverse speeds are available. |
| ⑬ | **ACCEL** | Forward acceleration switch | 16 forward acceleration steps are available. |
| ⑭ | | Reverse acceleration switch | 16 reverse acceleration steps are available. |
| ⑮ | **CN1** | Power supply connector | Connect the power supply cable. |
| ⑯ | **CN2** | Motor connector | Connect the motor connector. |
| ⑰ | **CN3** | Encoder connector | Connect the encoder connector. |
| ⑱ | **CN4** | I/O connector | Connect I/O cable. |

## How to Mount

Controller mounting shown below.

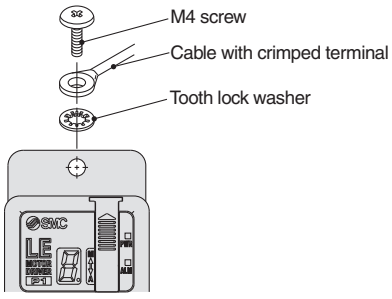
### 1. Mounting screw (LECP1□□-□)

**(Installation with two M4 screws)**




### 2. Grounding

Tighten the bolt with the nut when mounting the ground wire as shown below.

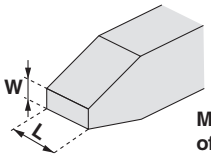



**Controller**

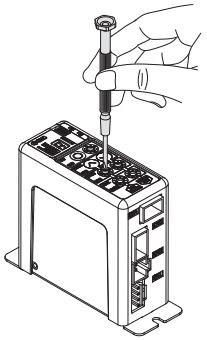
### ⚠Caution

- M4 screws, cable with crimping terminal and tooth lock washer are not included. Be sure to carry out grounding earth in order to ensure the noise tolerance.
- Use a watchmaker's screwdriver of the size shown below when changing position switch ⑧ and the set value of the speed/acceleration switch ⑪ to ⑭.

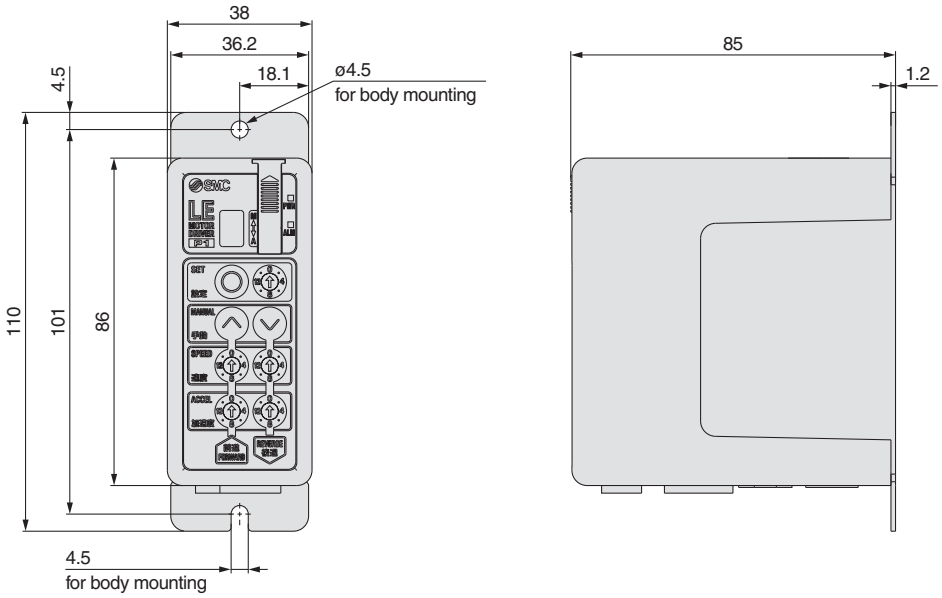
**Size**
End width **L**: 2.0 to 2.4 [mm]
End thickness **W**: 0.5 to 0.6 [mm]

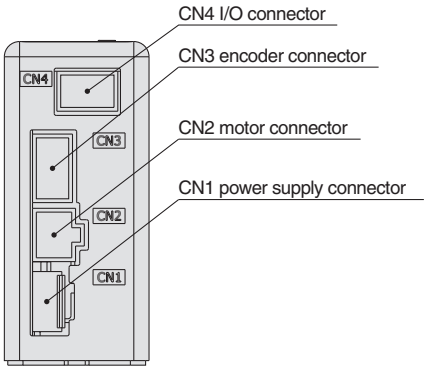



**Magnified view of the end of the screwdriver**



## Dimensions


38
36.2
18.1
ø4.5
for body mounting
4.5
110
101
86
4.5
for body mounting
85
1.2


CN4 I/O connector
CN3 encoder connector
CN2 motor connector
CN1 power supply connector
CN4
CN3
CN2
CN1

## Wiring Example 1

### Power Supply Connector: CN1

* When you connect a CN1 power supply connector, please use the power supply cable (LEC-CK1-1).
* Power supply cable (LEC-CK1-1) is an accessory.

**CN1 Power Supply Connector Terminal for LECP1**

| Terminal name | Cable color | Function | Details |
|---|---|---|---|
| 0V | Blue | Common supply (–) | M24V terminal/C24V terminal/BK RLS terminal are common (–). |
| M24V | White | Motor power supply (+) | Motor power supply (+) supplied to the controller |
| C24V | Brown | Control power supply (+) | Control power supply (+) supplied to the controller |
| BK RLS | Black | Lock release (+) | Input (+) for releasing the lock |

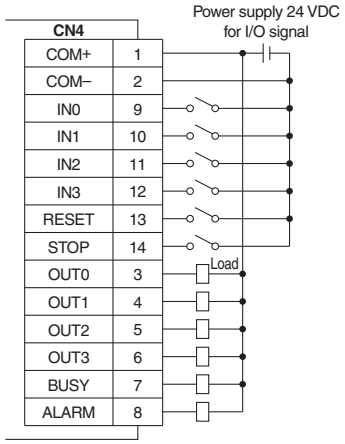
**Power supply cable for LECP1 (LEC-CK1-1)**

## Wiring Example 2

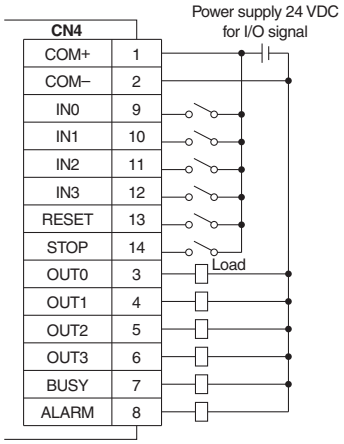
### Parallel I/O Connector: CN4

* 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).

### ■ NPN




### ■ PNP




**Input Signal**

| Name | Details |
|---|---|
| COM+ | Connects the power supply 24 V for input/output signal |
| COM– | Connects the power supply 0 V for input/output signal |
| IN0 to IN3 | • Instruction to drive (input as a combination of IN0 to IN3)<br>• Instruction to return to the origin position (IN0 to IN3 all ON simultaneously)<br>Example - (instruction to drive for position no. 5)<br>IN3: OFF, IN2: ON, IN1: OFF, IN0: ON |
| RESET | Alarm reset and operation interruption<br>During operation: deceleration stop from position at which signal is input (servo ON maintained)<br>While alarm is active: alarm reset |
| STOP | Instruction to stop (after maximum deceleration stop, servo OFF) |

**Output Signal**

| Name | Details |
|---|---|
| OUT0 to OUT3 | Turns on when the positioning or pushing is completed.<br>(Output is instructed in the combination of OUT0 to 3.)<br>Example - (operation complete for position no. 3)<br>OUT3: OFF, OUT2: OFF, OUT1: ON, OUT0: ON |
| BUSY | Outputs when the actuator is moving |
| *ALARM Note) | Not output when alarm is active or servo OFF |

Note) Signal of negative-logic circuit (N.C.)

**Input Signal [IN0 - IN3] Position Number Chart** ○: OFF ●: ON

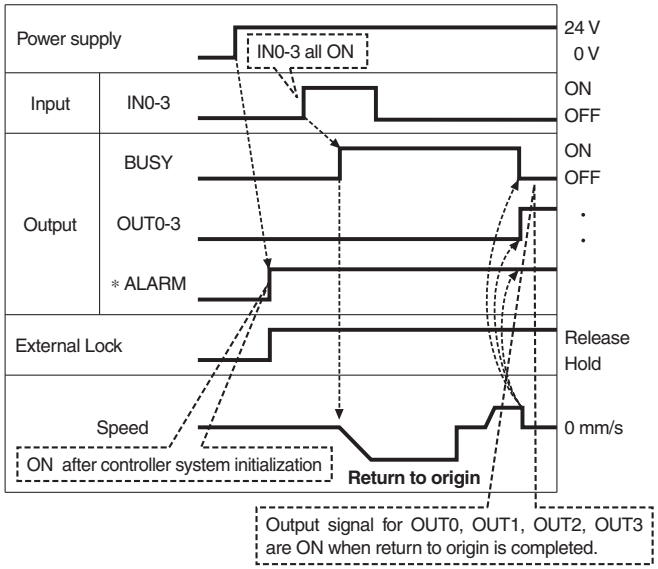
| Position number | IN3 | IN2 | IN1 | IN0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

**Output Signal [OUT0 - OUT3] Position Number Chart** ○: OFF ●: ON

| Position number | OUT3 | OUT2 | OUT1 | OUT0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

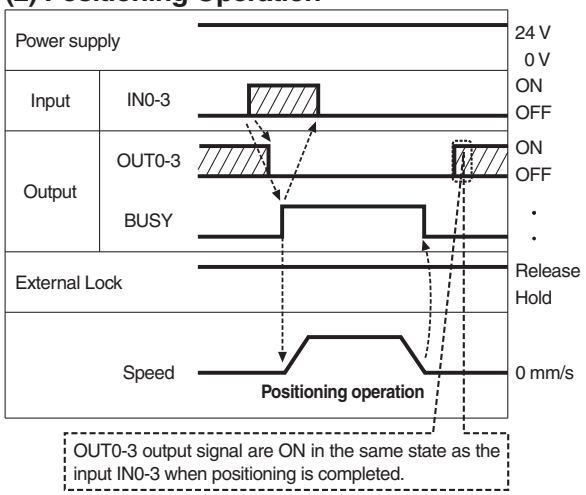
## Signal Timing

### (1) Return to Origin

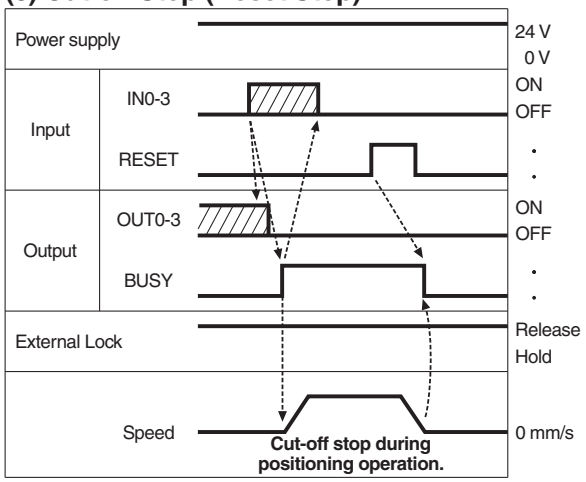



"∗ALARM" is expressed as negative-logic circuit.

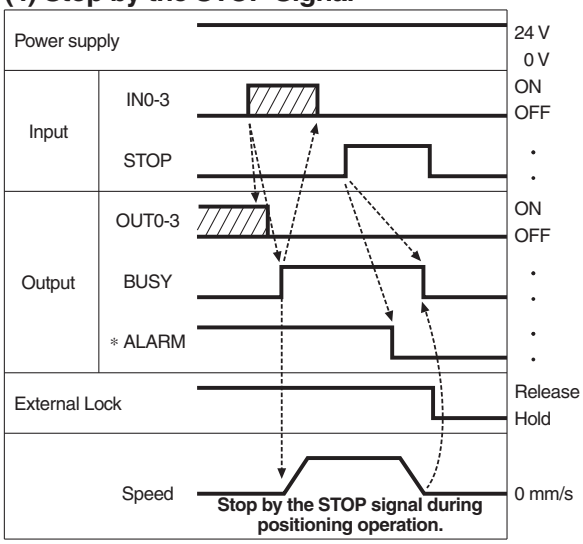
### (2) Positioning Operation



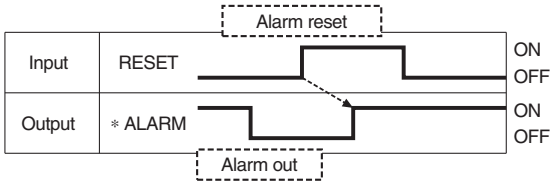

### (3) Cut-off Stop (Reset Stop)




### (4) Stop by the STOP Signal




### (5) Alarm Reset




"∗ALARM" is expressed as negative-logic circuit.

## Options: Actuator Cable

### [Robotic cable, standard cable for step motor (servo/24 VDC)]

**LE – CP – 1 – ☐**

**Cable length(L)[m]**

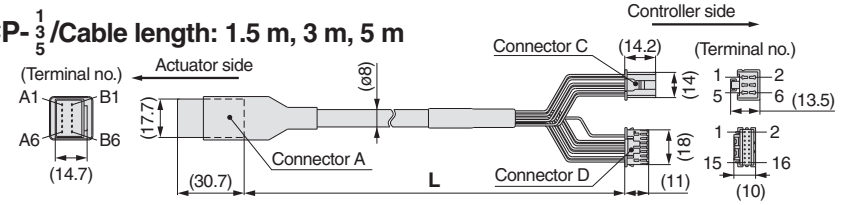
| | |
|---|---|
| 1 | 1.5 |
| 3 | 3 |
| 5 | 5 |
| 8 | 8* |
| A | 10* |
| B | 15* |
| C | 20* |

* Produced upon receipt of order (Robotic cable only)

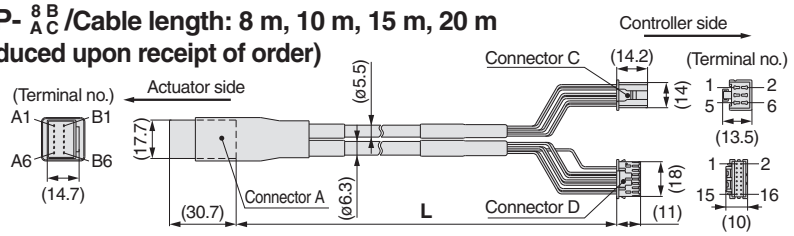
**Cable type**

| | |
|---|---|
| Nil | Robotic cable (Flexible cable) |
| S | Standard cable |

**LE-CP-$\begin{smallmatrix}1\\3\\5\end{smallmatrix}$/Cable length: 1.5 m, 3 m, 5 m**




**LE-CP-$\begin{smallmatrix}8&B\\A&C\end{smallmatrix}$/Cable length: 8 m, 10 m, 15 m, 20 m**
**(* Produced upon receipt of order)**




| Signal | Connector A terminal no. | Cable color | Connector C terminal no. |
|---|---|---|---|
| A | B-1 | Brown | 2 |
| $\overline{A}$ | A-1 | Red | 1 |
| B | B-2 | Orange | 6 |
| $\overline{B}$ | A-2 | Yellow | 5 |
| COM-A/COM | B-3 | Green | 3 |
| COM-B/– | A-3 | Blue | 4 |
| | | Shield | |
| Vcc | B-4 | Brown | 12 |
| GND | A-4 | Black | 13 |
| $\overline{A}$ | B-5 | Red | 7 |
| A | A-5 | Black | 6 |
| $\overline{B}$ | B-6 | Orange | 9 |
| B | A-6 | Black | 8 |
| | | — | 3 |

### [Robotic cable, standard cable with lock and sensor for step motor (servo/24 VDC)]

**LE – CP – 1 – B – ☐**

**Cable length(L)[m]**

| | |
|---|---|
| 1 | 1.5 |
| 3 | 3 |
| 5 | 5 |
| 8 | 8* |
| A | 10* |
| B | 15* |
| C | 20* |

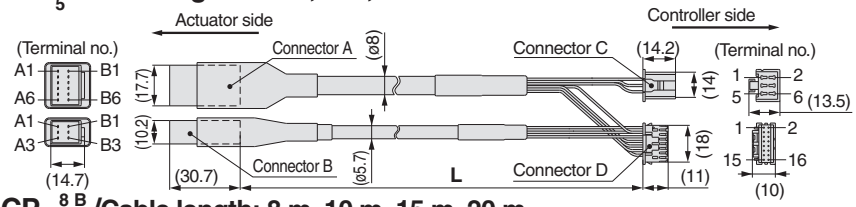
* Produced upon receipt of order (Robotic cable only)

**With lock and sensor**

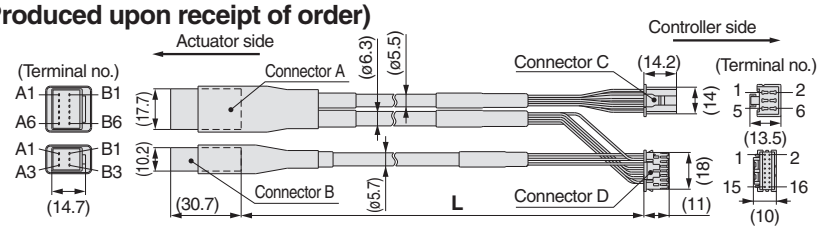
**Cable type**

| | |
|---|---|
| Nil | Robotic cable (Flexible cable) |
| S | Standard cable |

**LE-CP-$\begin{smallmatrix}1\\3\\5\end{smallmatrix}$/Cable length: 1.5 m, 3 m, 5 m**




**LE-CP-$\begin{smallmatrix}8&B\\A&C\end{smallmatrix}$/Cable length: 8 m, 10 m, 15 m, 20 m**
**(* Produced upon receipt of order)**




| Signal | Connector A terminal no. | Cable color | Connector C terminal no. |
|---|---|---|---|
| A | B-1 | Brown | 2 |
| $\overline{A}$ | A-1 | Red | 1 |
| B | B-2 | Orange | 6 |
| $\overline{B}$ | A-2 | Yellow | 5 |
| COM-A/COM | B-3 | Green | 3 |
| COM-B/– | A-3 | Blue | 4 |
| | | Shield | |
| Vcc | B-4 | Brown | 12 |
| GND | A-4 | Black | 13 |
| $\overline{A}$ | B-5 | Red | 7 |
| A | A-5 | Black | 6 |
| $\overline{B}$ | B-6 | Orange | 9 |
| B | A-6 | Black | 8 |
| | | — | 3 |

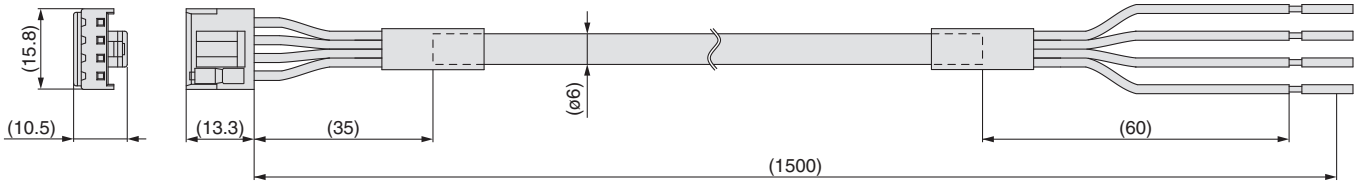
| Signal | Connector B terminal no. | | |
|---|---|---|---|
| Lock (+) | B-1 | Red | 4 |
| Lock (–) | A-1 | Black | 5 |
| Sensor (+) Note) | B-3 | Brown | 1 |
| Sensor (–) Note) | A-3 | Blue | 2 |

Note) This is not used for the LEL series.

## Options

### [Power supply cable]

## LEC−CK1−1




| Terminal name | Covered color | Function |
|---|---|---|
| 0 V | Blue | Common supply (–) |
| M24 V | White | Motor power supply (+) |
| C24 V | Brown | Control power supply (+) |
| BK RLS | Black | Lock release (+) |

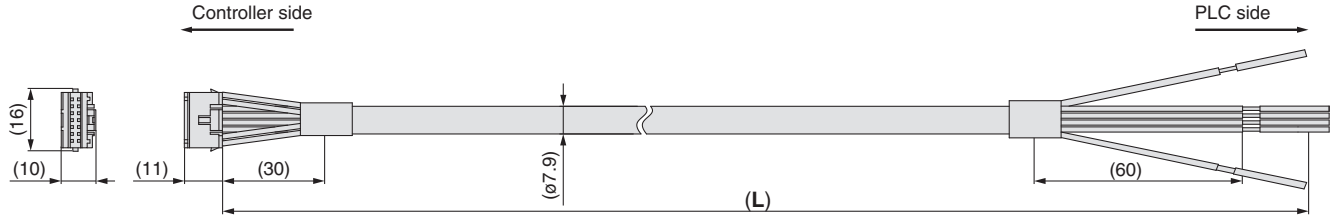
∗ Conductor size: AWG20

### [I/O cable]

## LEC−CK4−□

**Cable length(L)[m]**

| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |




| Terminal no. | Insulation color | Dot mark | Dot color | Function |
|---|---|---|---|---|
| 1 | Light brown | ■ | Black | COM + |
| 2 | Light brown | ■ | Red | COM − |
| 3 | Yellow | ■ | Black | OUT0 |
| 4 | Yellow | ■ | Red | OUT1 |
| 5 | Light green | ■ | Black | OUT2 |
| 6 | Light green | ■ | Red | OUT3 |
| 7 | Gray | ■ | Black | BUSY |
| 8 | Gray | ■ | Red | ALARM |
| 9 | White | ■ | Black | IN0 |
| 10 | White | ■ | Red | IN1 |
| 11 | Light brown | ■ ■ | Black | IN2 |
| 12 | Light brown | ■ ■ | Red | IN3 |
| 13 | Yellow | ■ ■ | Black | RESET |
| 14 | Yellow | ■ ■ | Red | STOP |

∗ Conductor size: AWG26

∗ Parallel I/O signal is valid in auto mode. While the test function operates at manual mode, only the output is valid.

## ⚠ 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.

**⚠ 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.

*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 10218-1: Manipulating industrial robots - Safety.
etc.

### ⚠ 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.

### ⚠ Caution

**1. 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.*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.

# Programless Controller

# Series LECP1

## How to Order

**LE C P 1 N 1 – LEPY10-50**

**Controller**

**Compatible motor**

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

**Number of step data (Points)**

| | |
|---|---|
| **1** | 14 (Programless) |

**Parallel I/O type**

| | |
|---|---|
| **N** | NPN |
| **P** | PNP |

**I/O cable length [m]**

| | |
|---|---|
| **Nil** | Without cable |
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |

**Actuator part number**

(Except cable specifications and actuator options)
Example: Enter "LEPY10K-50" for the LEPY10K-50U-R16NI.

∗ **When controller equipped type (-□1N□/-□1P□) is selected when ordering the LE series, you do not need to order this controller.**

**The controller is sold as single unit after the compatible actuator is set.**

Confirm that the combination of the controller and the actuator is correct.

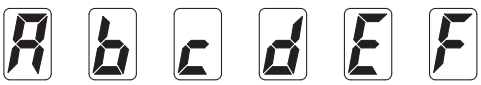
∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smcworld.com

## Specifications

### Basic Specifications

| Item | Specifications |
|---|---|
| **Compatible motor** | Step motor (Servo/24 VDC) |
| **Power supply** Note 1) | Power supply voltage: 24 VDC ±10%<br>Max. current consumption: 3 A (Peak 5 A) Note 2)<br>[Including the motor drive power, control power supply, stop, lock release] |
| **Parallel input** | 6 inputs (Photo-coupler isolation) |
| **Parallel output** | 6 outputs (Photo-coupler isolation) |
| **Stop points** | 14 points (Position number 1 to 14(E)) |
| **Compatible encoder** | Incremental A/B phase (800 pulse/rotation) |
| **Serial communication** | RS485 (Modbus protocol compliant) |
| **Memory** | EEPROM |
| **LED indicator** | LED (Green/Red) one of each |
| **7-segment LED display** Note 3) | 1 digit, 7-segment display (red) Figures are expressed in hexadecimal ("10" to "15" in decimal number are expressed as "A" to "F") |
| **Lock control** | Forced-lock release terminal Note 4) |
| **Cable length [m]** | I/O cable: 5 or less Actuator cable: 20 or less |
| **Cooling system** | Natural air cooling |
| **Operating temperature range** | 32 to 104°F (0 to 40°C) (No freezing) |
| **Operating humidity range [%RH]** | 90 or less (No condensation) |
| **Storage temperature range** | 14 to 140°F (–10 to 60°C) (No freezing) |
| **Storage humidity range [%RH]** | 90 or less (No condensation) |
| **Insulation resistance [MΩ]** | Between the housing (radiation fin) and SG terminal 50 (500 VDC) |
| **Weight** | 4.6 oz (130 g) |

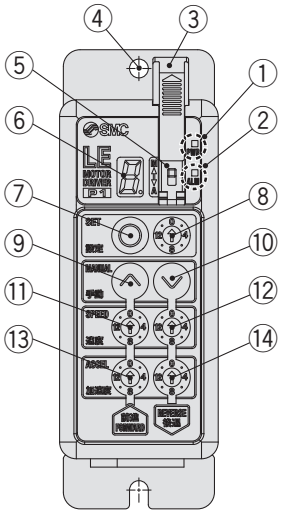
Note 1) Do not use the power supply of "inrush current prevention type" for the controller input power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the each actuator's operation manual etc. for details.
Note 3) "10" to "15" in decimal number are displayed as follows in the 7-segment LED.

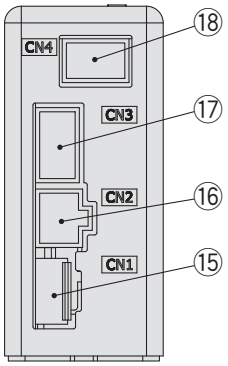


| | | | | | | |
|---|---|---|---|---|---|---|
| Decimal display | 10 | 11 | 12 | 13 | 14 | 15 |
| Hexadecimal display | A | b | c | d | E | F |

Note 4) Applicable to non-magnetizing lock.

## Controller Details



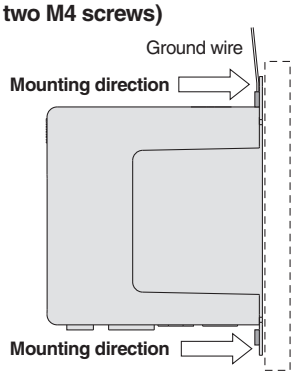

| No. | Display | Description | Details |
|---|---|---|---|
| ① | **PWR** | Power supply LED | Power supply ON/Servo ON : Green turns on<br>Power supply ON/Servo OFF : Green flashes |
| ② | **ALM** | Alarm LED | With alarm : Red turns on<br>Parameter setting : Red flashes |
| ③ | — | Cover | Change and protection of the mode SW (Close the cover after changing SW) |
| ④ | — | FG | Frame ground (Tighten the bolt with the nut when mounting the controller. Connect the ground wire.) |
| ⑤ | — | Mode swith | Switch the mode between manual and auto. |
| ⑥ | — | 7-segment LED | Stop position, the value set by ⑧ and alarm information are displayed. |
| ⑦ | **SET** | Set button | Decide the settings or drive operation in Manual mode. |
| ⑧ | — | Position selecting switch | Assign the position to drive (1 to 14), and the origin position (15). |
| ⑨ | **MANUAL** | Manual forward button | Perform forward jog and inching. |
| ⑩ | | Manual reverse button | Perform reverse jog and inching. |
| ⑪ | **SPEED** | Forward speed switch | 16 forward speeds are available. |
| ⑫ | | Reverse speed switch | 16 reverse speeds are available. |
| ⑬ | **ACCEL** | Forward acceleration switch | 16 forward acceleration steps are available. |
| ⑭ | | Reverse acceleration switch | 16 reverse acceleration steps are available. |
| ⑮ | **CN1** | Power supply connector | Connect the power supply cable. |
| ⑯ | **CN2** | Motor connector | Connect the motor connector. |
| ⑰ | **CN3** | Encoder connector | Connect the encoder connector. |
| ⑱ | **CN4** | I/O connector | Connect I/O cable. |

## How to Mount

Controller mounting shown below.

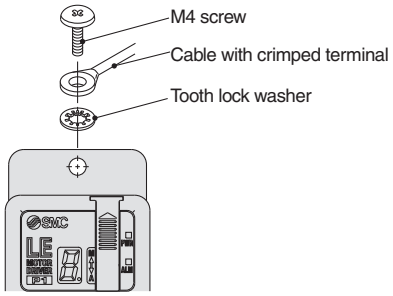
### 1. Mounting screw (LECP1□□-□)

**(Installation with two M4 screws)**




### 2. Grounding

Tighten the bolt with the nut when mounting the ground wire as shown below.

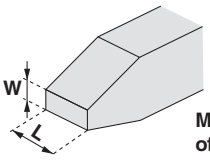



**Controller**

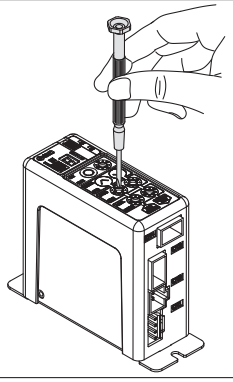
### ⚠Caution

- M4 screws, cable with crimping terminal and tooth lock washer are not included. Be sure to carry out grounding earth in order to ensure the noise tolerance.
- Use a watchmaker's screwdriver of the size shown below when changing position switch ⑧ and the set value of the speed/acceleration switch ⑪ to ⑭.

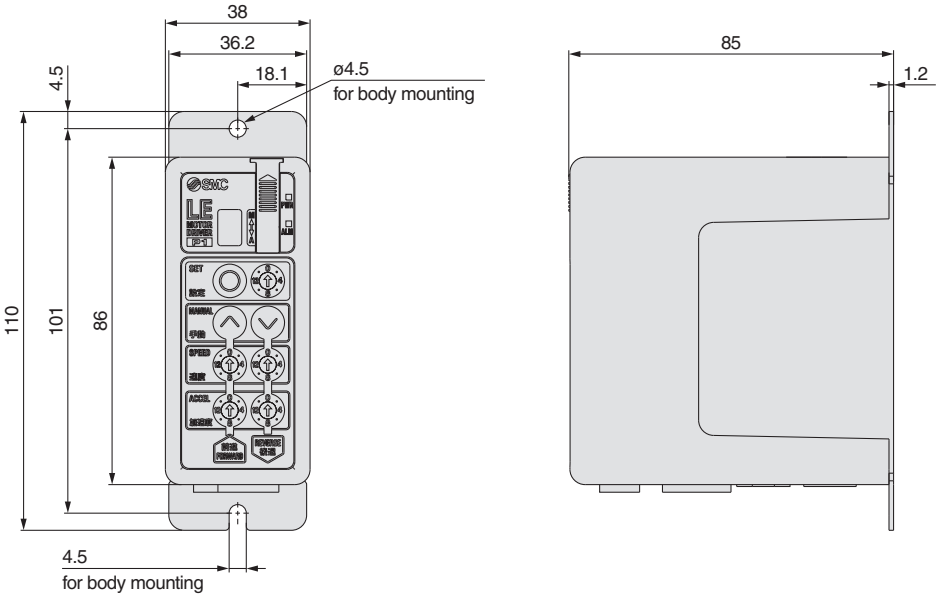
**Size**
End width **L**: 2.0 to 2.4 [mm]
End thickness **W**: 0.5 to 0.6 [mm]

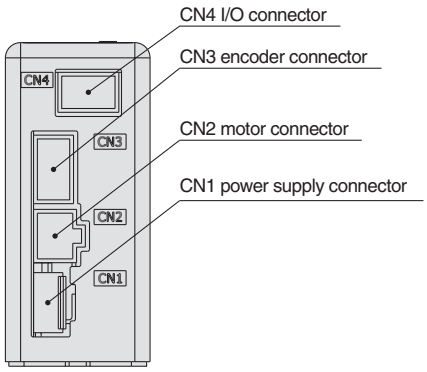



**Magnified view of the end of the screwdriver**



## Dimensions


38
36.2
18.1
4.5
ø4.5
for body mounting
110
101
86
4.5
for body mounting
85
1.2


CN4 I/O connector
CN3 encoder connector
CN2 motor connector
CN1 power supply connector
CN4
CN3
CN2
CN1

## Wiring Example 1

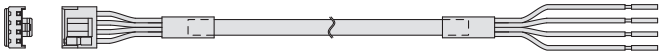
### Power Supply Connector: CN1

* When you connect a CN1 power supply connector, please use the power supply cable (LEC-CK1-1).
* Power supply cable (LEC-CK1-1) is an accessory.

**CN1 Power Supply Connector Terminal for LECP1**

| Terminal name | Cable color | Function | Details |
|---|---|---|---|
| 0V | Blue | Common supply (–) | M24V terminal/C24V terminal/BK RLS terminal are common (–). |
| M24V | White | Motor power supply (+) | Motor power supply (+) supplied to the controller |
| C24V | Brown | Control power supply (+) | Control power supply (+) supplied to the controller |
| BK RLS | Black | Lock release (+) | Input (+) for releasing the lock |

**Power supply cable for LECP1 (LEC-CK1-1)**

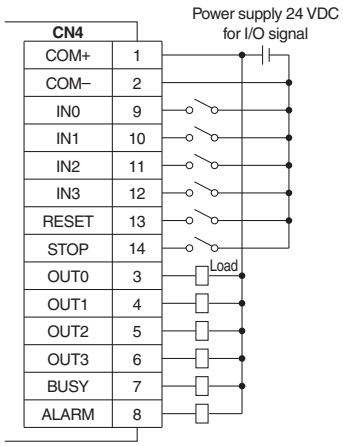


## Wiring Example 2

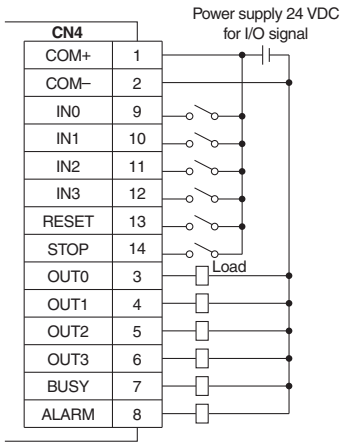
### Parallel I/O Connector: CN4

* 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).

### ■ NPN




### ■ PNP




**Input Signal**

| Name | Details |
|---|---|
| COM+ | Connects the power supply 24 V for input/output signal |
| COM– | Connects the power supply 0 V for input/output signal |
| IN0 to IN3 | • Instruction to drive (input as a combination of IN0 to IN3)<br>• Instruction to return to the origin position (IN0 to IN3 all ON simultaneously)<br>Example - (instruction to drive for position no. 5)<br>IN3: OFF, IN2: ON, IN1: OFF, IN0: ON |
| RESET | Alarm reset and operation interruption<br>During operation : deceleration stop from position at which signal is input (servo ON maintained)<br>While alarm is active : alarm reset |
| STOP | Instruction to stop (after maximum deceleration stop, servo OFF) |

**Output Signal**

| Name | Details |
|---|---|
| OUT0 to OUT3 | Turns on when the positioning or pushing is completed.<br>(Output is instructed in the combination of OUT0 to 3.)<br>Example - (operation complete for position no. 3)<br>OUT3: OFF, OUT2: OFF, OUT1: ON, OUT0: ON |
| BUSY | Outputs when the actuator is moving |
| *ALARM Note) | Not output when alarm is active or servo OFF |

Note) Signal of negative-logic circuit (N.C.)

**Input Signal [IN0 - IN3] Position Number Chart** ○: OFF ●: ON

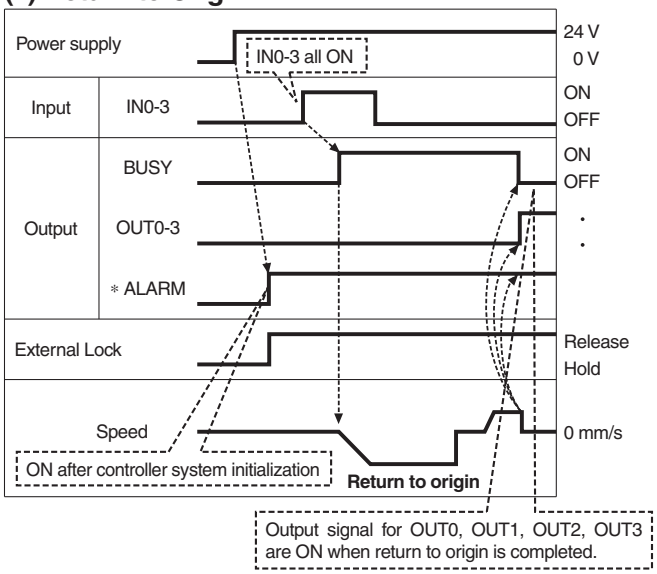
| Position number | IN3 | IN2 | IN1 | IN0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

**Output Signal [OUT0 - OUT3] Position Number Chart** ○: OFF ●: ON

| Position number | OUT3 | OUT2 | OUT1 | OUT0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

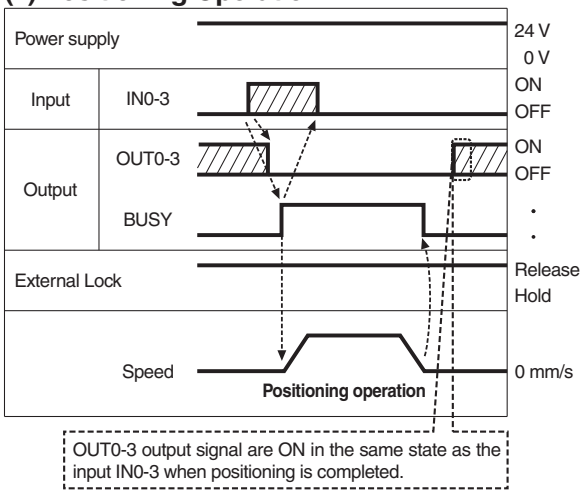
## Signal Timing

### (1) Return to Origin

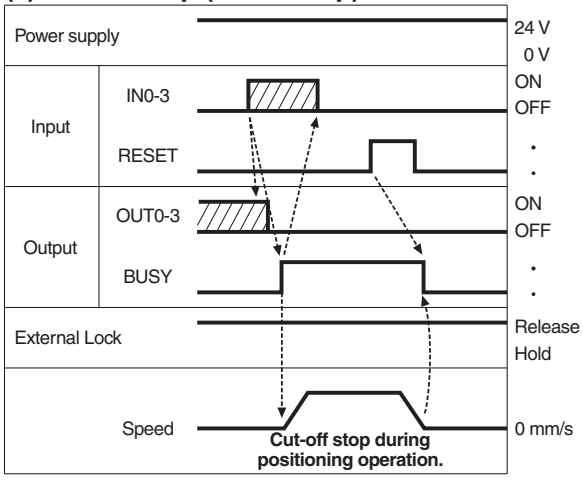



"∗ALARM" is expressed as negative-logic circuit.

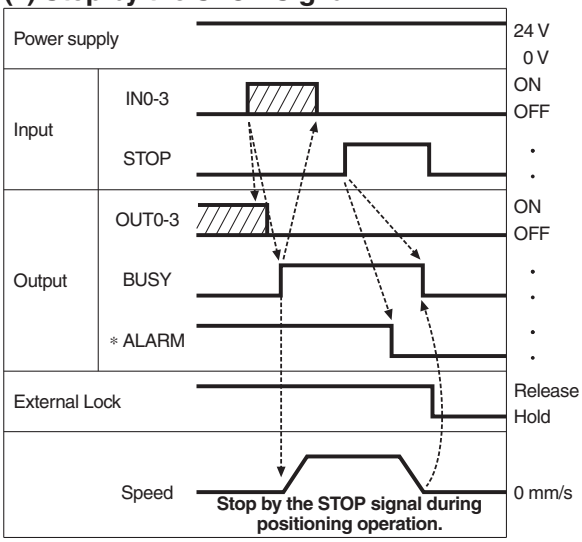
### (2) Positioning Operation



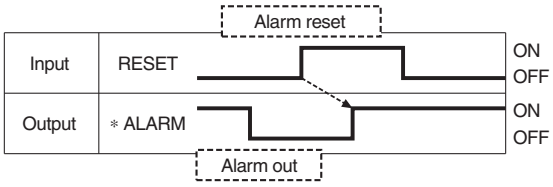

### (3) Cut-off Stop (Reset Stop)




### (4) Stop by the STOP Signal




### (5) Alarm Reset




"∗ALARM" is expressed as negative-logic circuit.

## Options: Actuator Cable

### [Robotic cable, standard cable for step motor (servo/24 VDC)]

**LE – CP – 1 – ☐**

**Cable length(L)[m]**

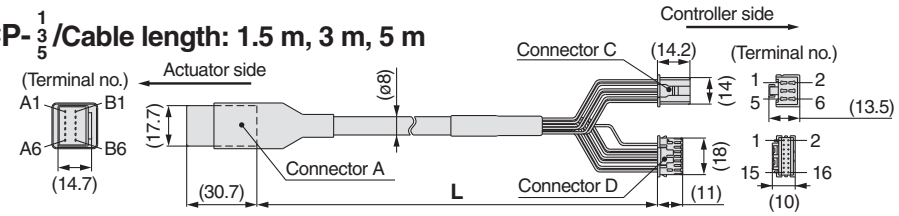
| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |
| **8** | 8* |
| **A** | 10* |
| **B** | 15* |
| **C** | 20* |

* Produced upon receipt of order (Robotic cable only)

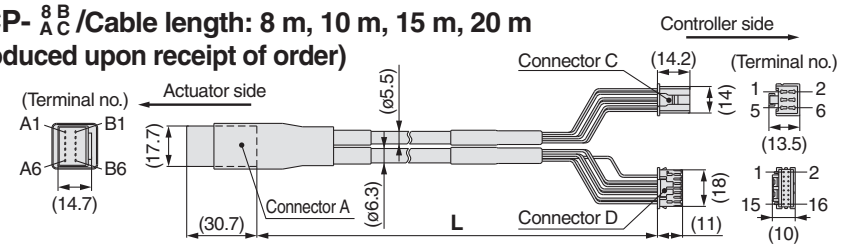
**Cable type**

| | |
|---|---|
| **Nil** | Robotic cable (Flexible cable) |
| **S** | Standard cable |

**LE-CP-** 1 3 5 **/Cable length: 1.5 m, 3 m, 5 m**




**LE-CP-** 8 A B C **/Cable length: 8 m, 10 m, 15 m, 20 m**
**(* Produced upon receipt of order)**




| Signal | Connector A terminal no. | Cable color | Connector C terminal no. |
|---|---|---|---|
| A | B-1 | Brown | 2 |
| $\overline{A}$ | A-1 | Red | 1 |
| B | B-2 | Orange | 6 |
| $\overline{B}$ | A-2 | Yellow | 5 |
| COM-A/COM | B-3 | Green | 3 |
| COM-B/– | A-3 | Blue | 4 |
| | | Shield | |

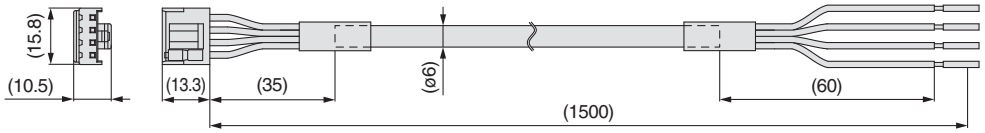
| Signal | Connector A terminal no. | Cable color | Connector D terminal no. |
|---|---|---|---|
| Vcc | B-4 | Brown | 12 |
| GND | A-4 | Black | 13 |
| $\overline{A}$ | B-5 | Red | 7 |
| A | A-5 | Black | 6 |
| $\overline{B}$ | B-6 | Orange | 9 |
| B | A-6 | Black | 8 |
| | | — | 3 |

## Options

### [Power supply cable]

**LEC – CK1 – 1**

| Terminal name | Covered color | Function |
|---|---|---|
| 0V | Blue | Common supply (–) |
| M24V | White | Motor power supply (+) |
| C24V | Brown | Control power supply (+) |
| BK RLS | Black | Lock release (+) |



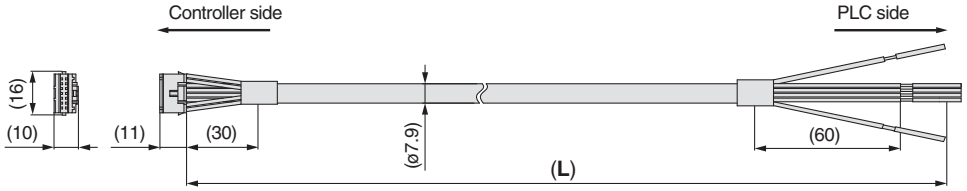

* Conductor size: AWG20

### [I/O cable]

**LEC – CK4 – ☐**

**Cable length(L)[m]**

| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |




* Conductor size: AWG26

| Terminal no. | Insulation color | Dot mark | Dot color | Function |
|---|---|---|---|---|
| 1 | Light brown | ■ | Black | COM + |
| 2 | Light brown | ■ | Red | COM – |
| 3 | Yellow | ■ | Black | OUT0 |
| 4 | Yellow | ■ | Red | OUT1 |
| 5 | Light green | ■ | Black | OUT2 |
| 6 | Light green | ■ | Red | OUT3 |
| 7 | Gray | ■ | Black | BUSY |

| Terminal no. | Insulation color | Dot mark | Dot color | Function |
|---|---|---|---|---|
| 8 | Gray | ■ | Red | ALARM |
| 9 | White | ■ | Black | IN0 |
| 10 | White | ■ | Red | IN1 |
| 11 | Light brown | ■ ■ | Black | IN2 |
| 12 | Light brown | ■ ■ | Red | IN3 |
| 13 | Yellow | ■ ■ | Black | RESET |
| 14 | Yellow | ■ ■ | Red | STOP |

* Parallel I/O signal is valid in auto mode. While the test function operates at manual mode, only the output is valid.

# Programless Controller

# Series LECP1

## How to Order

**LE C P 1 N 1 – LEFS16A-400**

**Controller**

**Compatible motor**

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

**Number of step data (Points)**

| | |
|---|---|
| **1** | 14 (Programless) |

**Parallel I/O type**

| | |
|---|---|
| **N** | NPN |
| **P** | PNP |

**I/O cable length [m]**

| | |
|---|---|
| **Nil** | Without cable |
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |

**Actuator part number**

(Except cable specifications and actuator options)
Example: Enter [LEFS16A-400] for LEFS16A-400B-R16N1

∗ **When placing an order for the controller with an actuator, this part number is not necessary.**

**The controller is sold as single unit after the compatible actuator is set.**

Confirm that the combination of the controller and the actuator is correct.

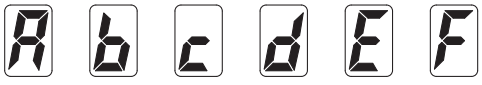
∗ Refer to the operation manual for using the products. Please download it via our website. http://www.smcworld.com

## Specifications

### Basic Specifications

| Item | LECP1 |
|---|---|
| **Compatible motor** | Step motor (Servo/24 VDC) |
| **Power supply** Note 1) | Power supply voltage: 24 VDC ±10%<br>Max. current consumption: 3A (Peak 5A) Note 2)<br>[Including the motor drive power, control power supply, stop, lock release] |
| **Parallel input** | 6 inputs (Photo-coupler isolation) |
| **Parallel output** | 6 outputs (Photo-coupler isolation) |
| **Stop points** | 14 points (Position number 1 to 14(E)) |
| **Compatible encoder** | Incremental A/B phase (800 pulse/rotation) |
| **Serial communication** | RS485 (Modbus protocol compliant) |
| **Memory** | EEPROM |
| **LED indicator** | LED (Green/Red) one of each |
| **7-segment LED display** Note 3) | 1 digit, 7-segment display (red) Figures are expressed in hexadecimal (“10” to “15” in decimal number are expressed as “A” to “F”) |
| **Lock control** | Forced-lock release terminal Note 4) |
| **Cable length [m]** | I/O cable: 5 or less  Actuator cable: 20 or less |
| **Cooling system** | Natural air cooling |
| **Operating temperature range** | 32 to 104°F (0 to 40°C) (No freezing) |
| **Operating humidity range [%RH]** | 90 or less (No condensation) |
| **Storage temperature range** | 14 to 140° (–10 to 60°C) (No freezing) |
| **Storage humidity range [%RH]** | 90 or less (No condensation) |
| **Insulation resistance [MΩ]** | Between the housing (radiation fin) and SG terminal 50 (500 VDC) |
| **Weight lb [g]** | 0.29 [130] |

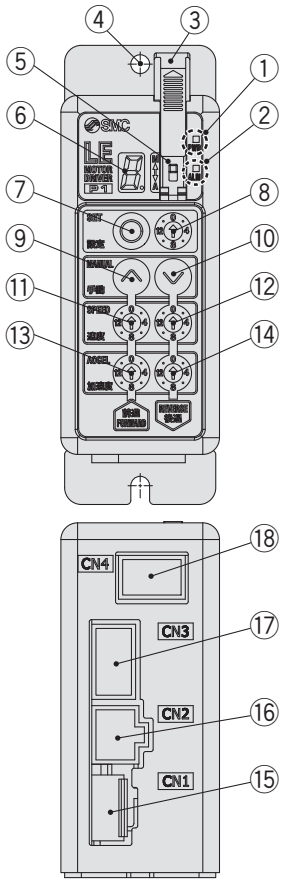
Note 1) Do not use the power supply of “inrush current prevention type” for the controller input power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the each actuator’s operation manual etc. for details.
Note 3) “10” to “15” in decimal number are displayed as follows in the 7-segment LED.



| | | | | | | |
|---|---|---|---|---|---|---|
| Decimal display | 10 | 11 | 12 | 13 | 14 | 15 |
| Hexadecimal display | A | b | c | d | E | F |

Note 4) Applicable to non-magnetizing lock.

## Details of The Controller



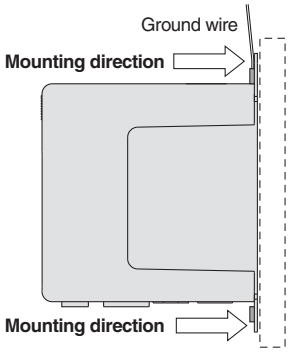

| No. | Display | Description | Details |
|---|---|---|---|
| ① | **PWR** | Power supply LED | Power supply ON/servo ON :Green turns on<br>Power supply ON/servo OFF :Green flashes |
| ② | **ALM** | Alarm LED | With alarm : Red turns on<br>Parameter setting : Red flashes |
| ③ | — | Cover | Change and protection of the mode SW (Close the cover after changing SW) |
| ④ | — | FG | Frame ground (Tighten the bolt with the nut when mounting the controller. Connect the ground wire.) |
| ⑤ | — | Mode swith | Switch the mode between manual and auto. |
| ⑥ | — | 7-segment LED | Stop position, the value set by ⑧ and alarm information are displayed. |
| ⑦ | **SET** | Set button | Decide the settings or drive operation in Manual mode. |
| ⑧ | — | Position selecting switch | Assign the position to drive (1 to 14), and the origin position (15). |
| ⑨ | **MANUAL** | Manual forward button | Perform forward jog and inching. |
| ⑩ | | Manual reverse button | Perform reverse jog and inching. |
| ⑪ | **SPEED** | Forward speed switch | 16 forward speeds are available. |
| ⑫ | | Reverse speed switch | 16 reverse speeds are available. |
| ⑬ | **ACCEL** | Forward acceleration switch | 16 forward acceleration steps are available. |
| ⑭ | | Reverse acceleration switch | 16 reverse acceleration steps are available. |
| ⑮ | **CN1** | Power supply connector | Connect the power supply cable. |
| ⑯ | **CN2** | Motor connector | Connect the motor connector. |
| ⑰ | **CN3** | Encoder connector | Connect the encoder connector. |
| ⑱ | **CN4** | I/O connector | Connect I/O cable. |

## How to Mount

Controller mounting shown below.

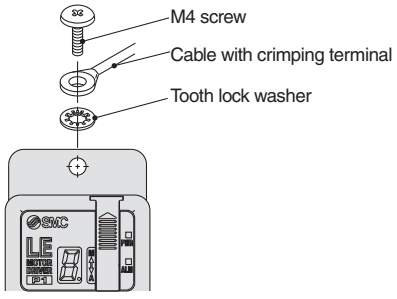
### 1. Mounting screw (LECP1□□-□)

**(Installation with two M4 screws)**




### 2. Grounding

Tighten the bolt with the nut when mounting the ground wire as shown below.



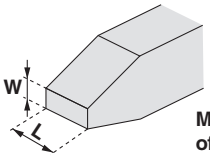

**Controller**

### ⚠Caution

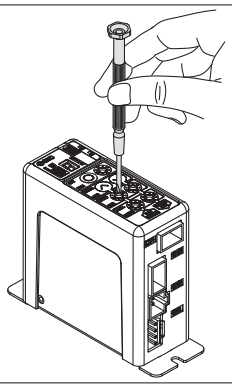
- M4 screws, cable with crimping terminal and tooth lock washer are not included. Be sure to carry out grounding earth in order to ensure the noise tolerance.
- Use a watchmaker's screwdriver of the size shown below when changing position switch ⑧ and the set value of the speed/acceleration switch ⑪ to ⑭.

**Size**

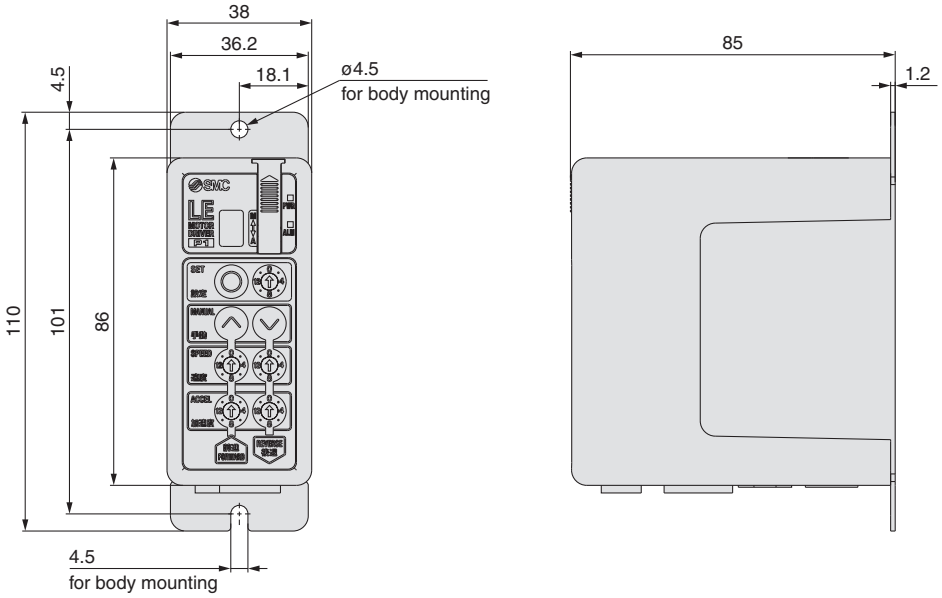
End width **L** :2.0 to 2.4 [mm]
End thickness **W** :0.5 to 0.6 [mm]

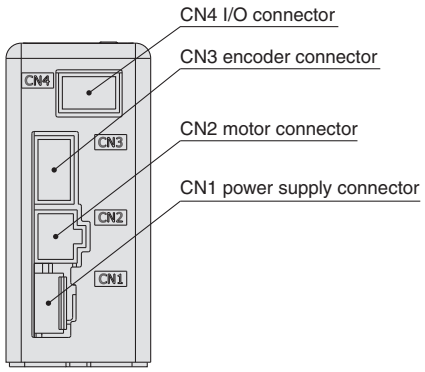



**Magnified view of the end of the screwdriver**



## Dimensions


38
36.2
18.1
ø4.5
for body mounting
4.5
110
101
86
4.5
for body mounting
85
1.2


CN4 I/O connector
CN3 encoder connector
CN2 motor connector
CN1 power supply connector
CN4
CN3
CN2
CN1

## Wiring Example 1

### Power Supply Connector: CN1

* When you connect a CN1 power supply connector, please use the power supply cable (LEC-CK1-1).
* Power supply cable (LEC-CK1-1) is an accessory.

**CN1 Power Supply Connector Terminal for LECP1**

| Terminal name | Cable color | Function | Function details |
|---|---|---|---|
| 0V | Blue | Common supply (–) | M24V terminal/C24V terminal/BK RLS terminal are common (–). |
| M24V | White | Motor power supply (+) | This is the motor power supply (+) that is supplied to the controller. |
| C24V | Brown | Control power supply (+) | This is the control power supply (+) that is supplied to the controller. |
| BK RLS | Black | Lock release (+) | This is the input (+) that releases the lock. |

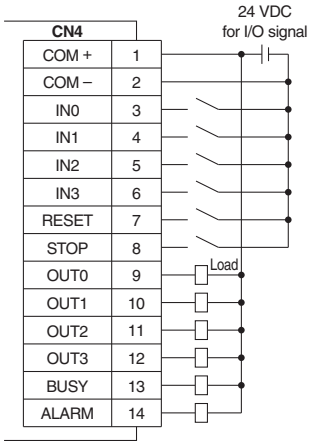
**Power supply cable for LECP1 (LEC-CK1-1)**

## Wiring Example 2

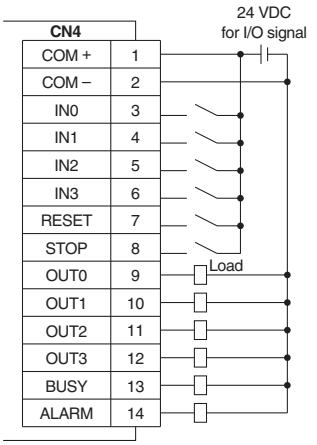
### Parallel I/O Connector: CN4

* 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**




**■PNP**




**Input Signal**

| Name | Contents |
|---|---|
| COM+ | Connects the power supply 24 V for input/output signal |
| COM– | Connects the power supply 0 V for input/output signal |
| IN0 to IN3 | • Instruction to drive (input as a combination of IN0 to IN3)<br>• Instruction to return to the origin position (IN0 to IN3 all ON simultaneously)<br>Example - (instruction to drive for position no. 5)<br>IN3: OFF, IN2: ON, IN1: OFF, IN0: ON |
| RESET | Alarm reset and operation interruption<br>During operation : deceleration stop from position at which signal is input (servo ON maintained)<br>While alarm is active : alarm reset |
| STOP | Instruction to stop (after maximum deceleration stop, servo OFF) |

**Output Signal**

| Name | Contents |
|---|---|
| OUT0 to OUT3 | Turns on when the positioning or pushing is completed.<br>(Output is instructed in the combination of OUT0 to 3.)<br>Example - (operation complete for position no. 3)<br>OUT3: OFF, OUT2: OFF, OUT1: ON, OUT0: ON |
| BUSY | Outputs when the actuator is moving |
| *ALARM Note) | Not output when alarm is active or servo OFF |

Note) These signals are output when the power supply of the controller is ON. (N.C.)

**Input Signal [IN0 - IN3] Position Number Chart** ○: OFF ●: ON

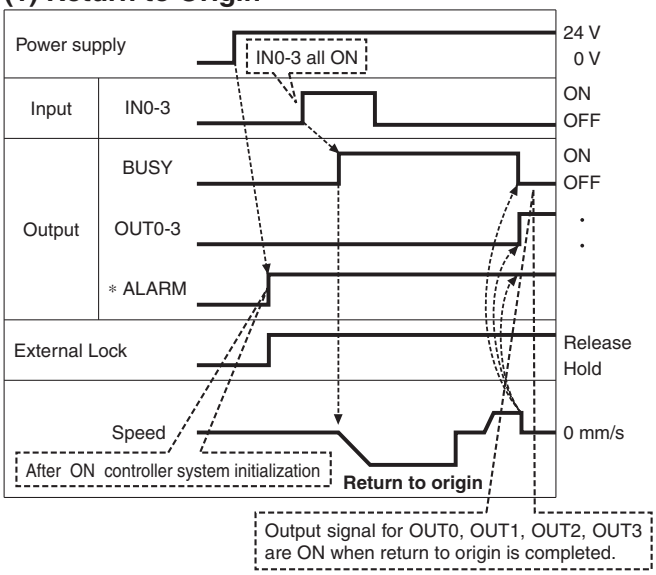
| Position number | IN3 | IN2 | IN1 | IN0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

**Output Signal [OUT0 - OUT3] Position Number Chart** ○: OFF ●: ON

| Position number | OUT3 | OUT2 | OUT1 | OUT0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

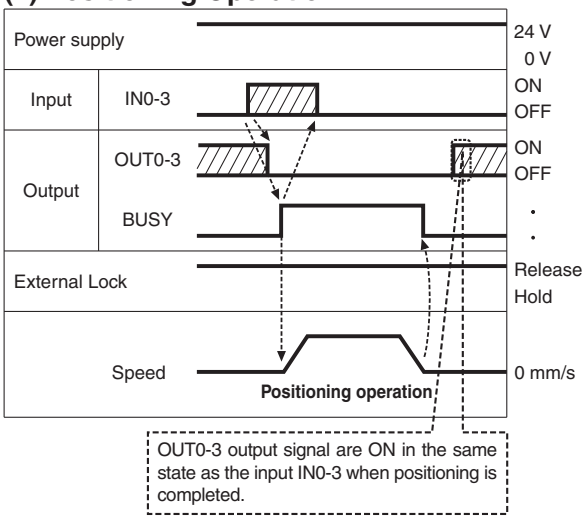
## Signal Timing

### (1) Return to Origin

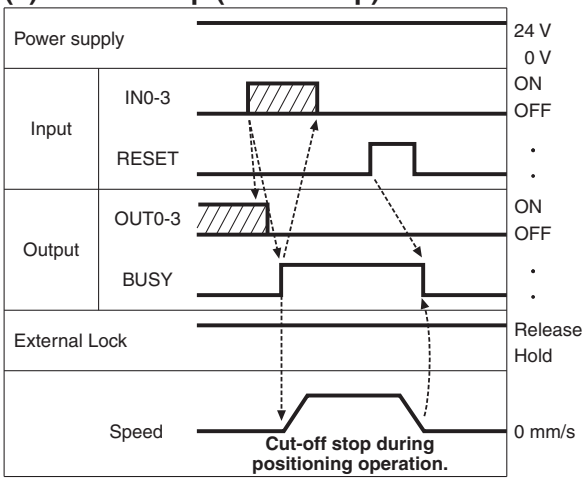



∗ "∗ALARM" is expressed as negative-logic circuit.

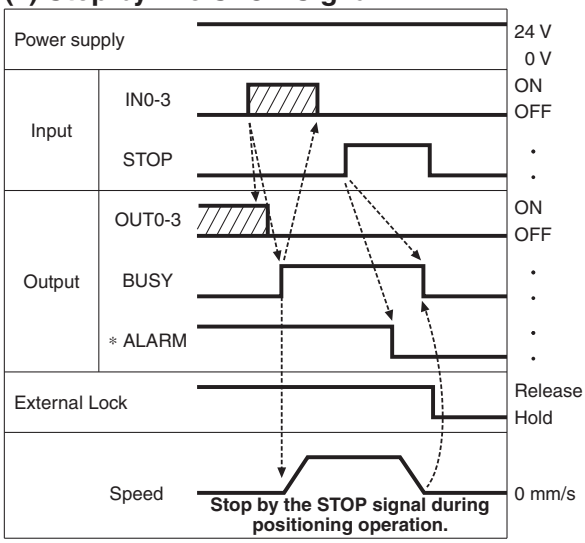
### (2) Positioning Operation



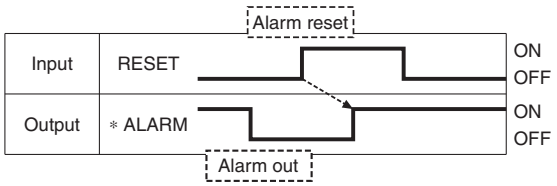

### (3) Cut-off Stop (Reset Stop)




### (4) Stop by The STOP Signal




### (5) Alarm Reset




∗ "∗ALARM" is expressed as negative-logic circuit.

## Options: Actuator Cable

(mm)

### [Robotic cable for step motor (Servo/24 VDC), standard cable]

**LE – CP – 1 – ☐**

**Cable length (L)[m]**

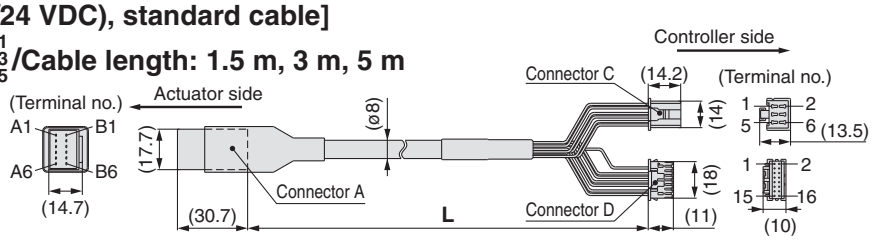
| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |
| **8** | 8* |
| **A** | 10* |
| **B** | 15* |
| **C** | 20* |

* Produced upon receipt of order (Robotic cable only)

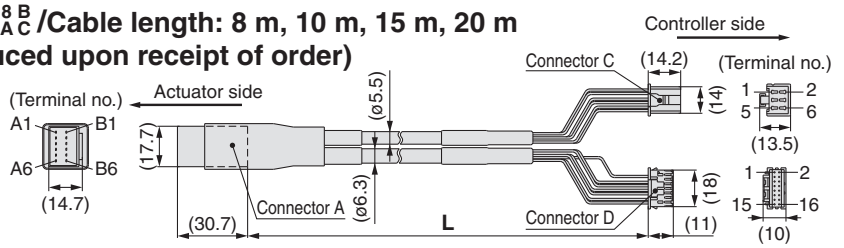
**Cable type**

| | |
|---|---|
| **Nil** | Robotic cable (Flexible cable) |
| **S** | Standard cable |

**LE-CP-$^{1}_{3}$$_{5}$/Cable length: 1.5 m, 3 m, 5 m**




**LE-CP-$^{8}_{A}$$^{B}_{C}$/Cable length: 8 m, 10 m, 15 m, 20 m**
**(* Produced upon receipt of order)**




| Circuit | Connector A terminal no. | Cable color | Connector C terminal no. |
|---|---|---|---|
| A | B-1 | Brown | 2 |
| $\overline{A}$ | A-1 | Red | 1 |
| B | B-2 | Orange | 6 |
| $\overline{B}$ | A-2 | Yellow | 5 |
| COM-A/COM | B-3 | Green | 3 |
| COM-B/– | A-3 | Blue | 4 |
| | | Shield | |
| Vcc | B-4 | Brown | 12 |
| GND | A-4 | Black | 13 |
| $\overline{A}$ | B-5 | Red | 7 |
| A | A-5 | Black | 6 |
| $\overline{B}$ | B-6 | Orange | 9 |
| B | A-6 | Black | 8 |
| | | — | 3 |

| Cable color | Connector D terminal no. |
|---|---|
| Brown | 12 |
| Black | 13 |
| Red | 7 |
| Black | 6 |
| Orange | 9 |
| Black | 8 |
| — | 3 |

### [Robotic cable with lock and sensor for step motor (Servo/24 VDC), standard cable]

**LE – CP – 1 – B – ☐**

**Cable length (L)[m]**

| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |
| **8** | 8* |
| **A** | 10* |
| **B** | 15* |
| **C** | 20* |

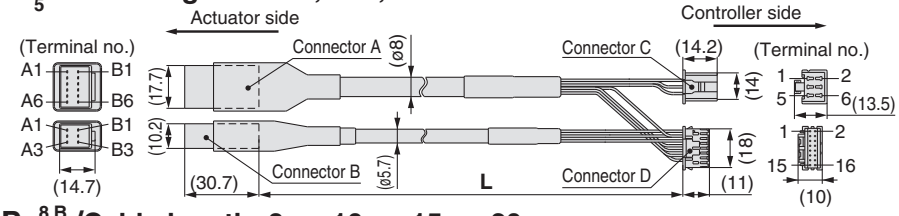
* Produced upon receipt of order (Robotic cable only)

**With lock and sensor**

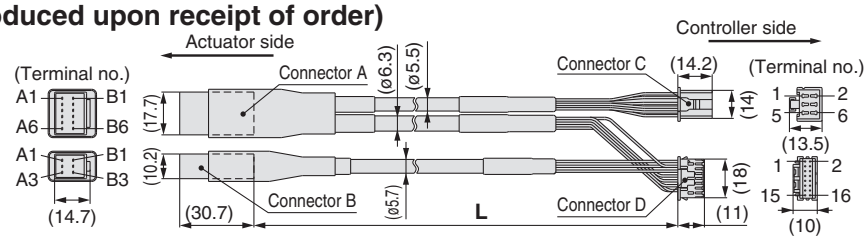
**Cable type**

| | |
|---|---|
| **Nil** | Robotic cable (Flexible cable) |
| **S** | Standard cable |

**LE-CP-$^{1}_{3}$$_{5}$/Cable length: 1.5 m, 3 m, 5 m**




**LE-CP-$^{8}_{A}$$^{B}_{C}$/Cable length: 8 m, 10 m, 15 m, 20 m**
**(* Produced upon receipt of order)**




| Circuit | Connector A terminal no. | Cable color | Connector C terminal no. |
|---|---|---|---|
| A | B-1 | Brown | 2 |
| $\overline{A}$ | A-1 | Red | 1 |
| B | B-2 | Orange | 6 |
| $\overline{B}$ | A-2 | Yellow | 5 |
| COM-A/COM | B-3 | Green | 3 |
| COM-B/– | A-3 | Blue | 4 |
| | | Shield | |
| Vcc | B-4 | Brown | 12 |
| GND | A-4 | Black | 13 |
| $\overline{A}$ | B-5 | Red | 7 |
| A | A-5 | Black | 6 |
| $\overline{B}$ | B-6 | Orange | 9 |
| B | A-6 | Black | 8 |
| | | — | 3 |

| Cable color | Connector D terminal no. |
|---|---|
| Brown | 12 |
| Black | 13 |
| Red | 7 |
| Black | 6 |
| Orange | 9 |
| Black | 8 |
| — | 3 |

| Circuit | Connector B terminal no. | | |
|---|---|---|---|
| Lock (+) | B-1 | | Red 4 |
| Lock (–) | A-1 | | Black 5 |
| Sensor (+) Note) | B-3 | | Brown 1 |
| Sensor (–) Note) | A-3 | | Blue 2 |

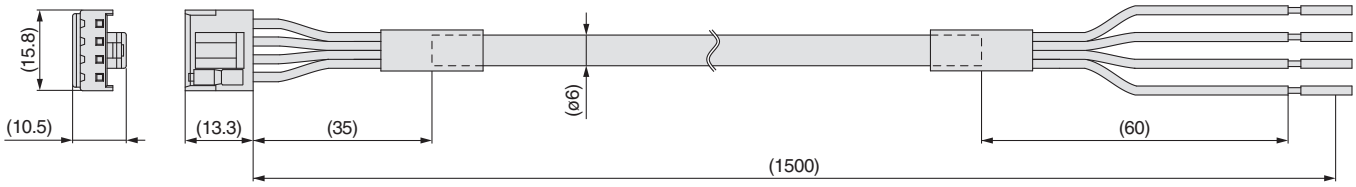
Note) This is not used for the LEF series.

## Options

(mm)

### [Power supply cable]

## LEC – CK1 – 1




| Terminal name | Covered color | Function |
|---|---|---|
| 0V | Blue | Common supply (–) |
| M24V | White | Motor power supply (+) |
| C24V | Brown | Control power supply (+) |
| BK RLS | Black | Lock release (+) |

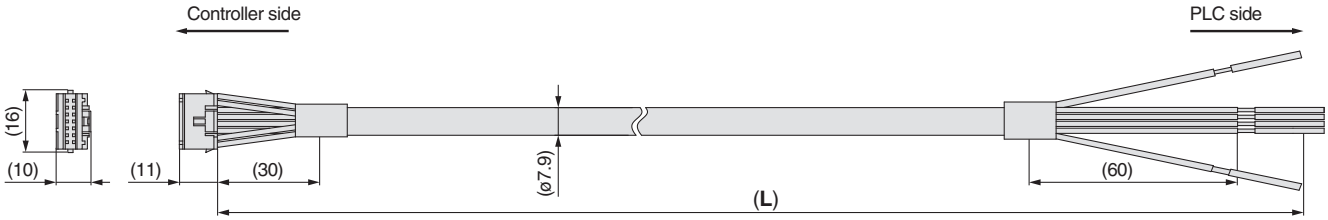
∗ Conductor size: AWG20

### [I/O cable]

## LEC – CK4 – □

**Cable length (L)[m]**

| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |




| Terminal no. | Insulation color | Dot mark | Dot color | Function |
|---|---|---|---|---|
| 1 | Light brown | ■ | Black | COM + |
| 2 | Light brown | ■ | Red | COM – |
| 3 | Yellow | ■ | Black | OUT0 |
| 4 | Yellow | ■ | Red | OUT1 |
| 5 | Light green | ■ | Black | OUT2 |
| 6 | Light green | ■ | Red | OUT3 |
| 7 | Gray | ■ | Black | BUSY |
| 8 | Gray | ■ | Red | ALARM |
| 9 | White | ■ | Black | IN0 |
| 10 | White | ■ | Red | IN1 |
| 11 | Light brown | ■ ■ | Black | IN2 |
| 12 | Light brown | ■ ■ | Red | IN3 |
| 13 | Yellow | ■ ■ | Black | RESET |
| 14 | Yellow | ■ ■ | Red | STOP |

∗ Conductor size: AWG26

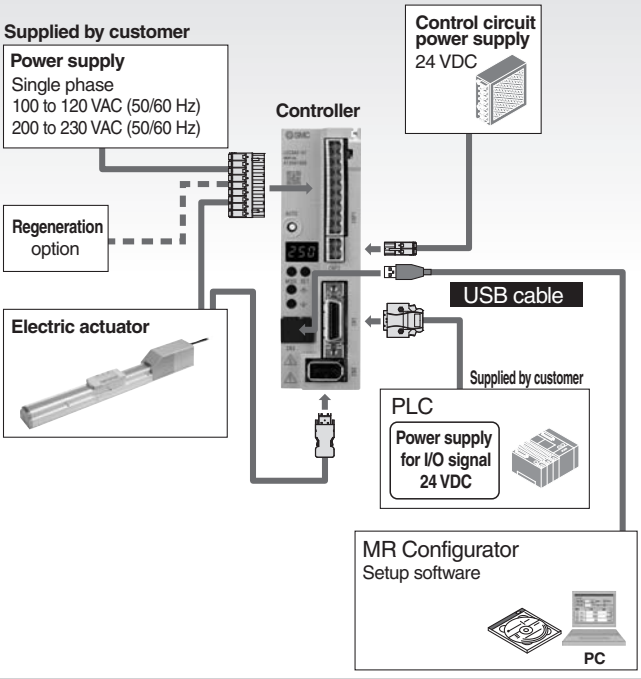
∗ Parallel I/O signal is valid in auto mode. While the test function operates at manual mode, only the output is valid.

# AC Servo Motor Controller (Pulse Input Type)

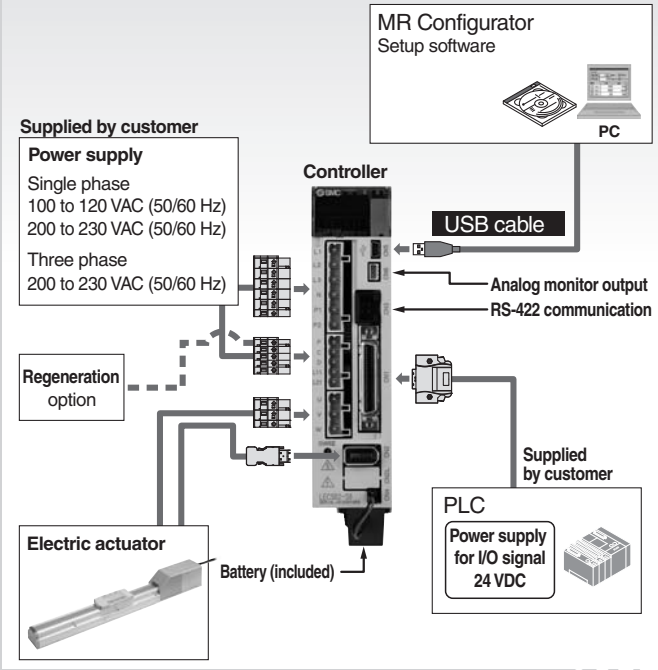
## Incremental Type
## *Series* ***LECSA***

## Absolute Type
## *Series* ***LECSB***

**Incremental encoder compatible** ***Series LECSA***




**Absolute encoder compatible** ***Series LECSB***



# AC Servo Motor Controller (Pulse Input Type)

## Incremental Type
# Series LECSA
## Absolute Type
# Series LECSB


## How to Order

**LECS A 1 – S1**

**Controller type**

| | |
|---|---|
| **A** | Pulse input type (For incremental encoder) |
| **B** | Pulse input type (For absolute encoder) |

**Power supply voltage**

| | |
|---|---|
| **1** | 100 to 120 VAC, 50/60 Hz |
| **2** | 200 to 230 VAC, 50/60 Hz |

**Motor type**

| Symbol | Type | Capacity | Encoder |
|---|---|---|---|
| **S1** | AC servo motor (S2) | 100 W | Incremental |
| **S3** | AC servo motor (S3) | 200 W | |
| **S4** | AC servo motor (S4) | 400 W | |
| **S5** | AC servo motor (S6) | 100 W | Absolute |
| **S7** | AC servo motor (S7) | 200 W | |
| **S8** | AC servo motor (S8) | 400 W | |

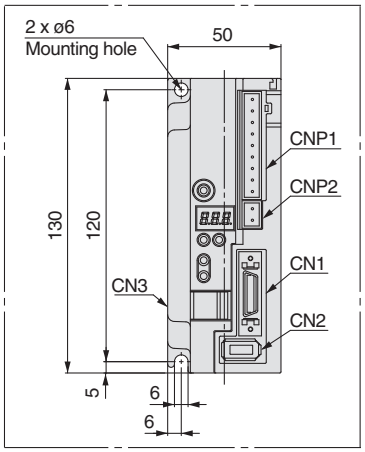
**Part no. list** Select controller type and compatible motor from the combinations in the table below.

| Controller part no. | Controller type | Motor type | Power supply voltage |
|---|---|---|---|
| **LECSA1-S1** | Pulse input type (For incremental encoder) | AC servo motor (S2) | 100 to 120 VAC 50/60 Hz |
| **LECSA1-S3** | | AC servo motor (S3) | |
| **LECSA2-S1** | | AC servo motor (S2) | 200 to 230 VAC 50/60 Hz |
| **LECSA2-S3** | | AC servo motor (S3) | |
| **LECSA2-S4** | | AC servo motor (S4) | |
| **LECSB1-S5** | Pulse input type (For absolute encoder) | AC servo motor (S6) | 100 to 120 VAC 50/60 Hz |
| **LECSB1-S7** | | AC servo motor (S7) | |
| **LECSB2-S5** | | AC servo motor (S6) | 200 to 230 VAC 50/60 Hz |
| **LECSB2-S7** | | AC servo motor (S7) | |
| **LECSB2-S8** | | AC servo motor (S8) | |

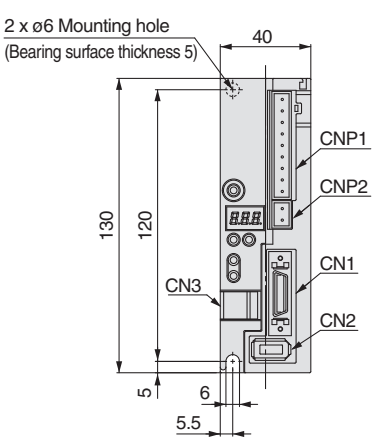
## Dimensions

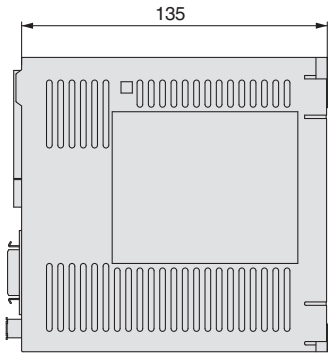
(mm)

### LECSA□

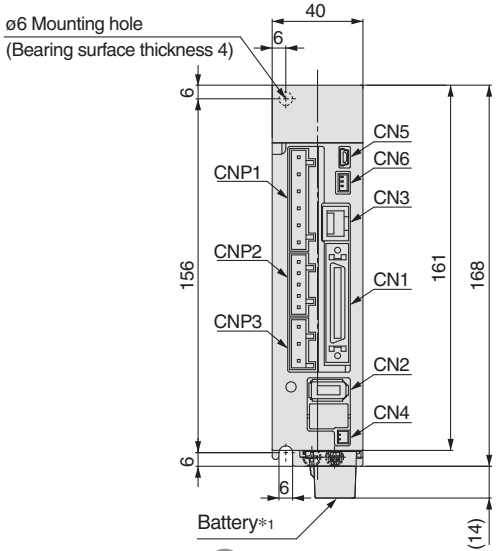


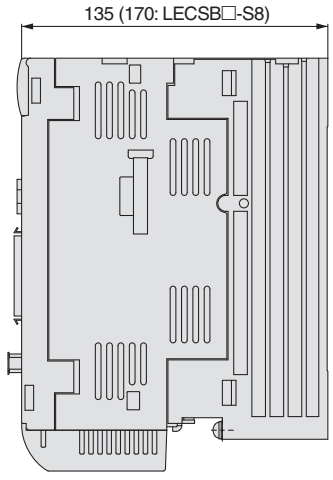

**LECSA□-S4**




### LECSB□




*1 Battery included.



SMC

## Specifications

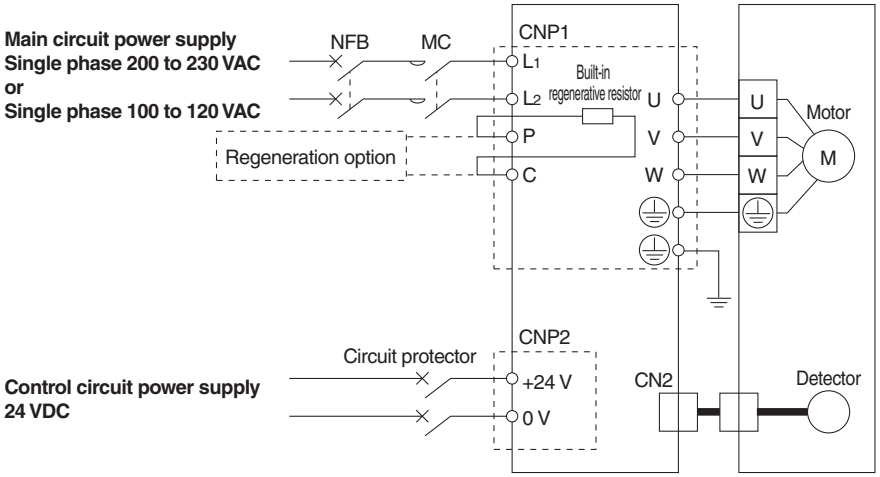
| Model | | LECSA1-S1 | LECSA1-S3 | LECSA2-S1 | LECSA2-S3 | LECSA2-S4 |
|---|---|---|---|---|---|---|
| **Compatible motor capacity [W]** | | 100 | 200 | 100 | 200 | 400 |
| **Compatible encoder** | | Incremental 17-bit encoder (Resolution: 131072 p/rev) | | | | |
| **Main power supply** | **Power voltage [V]** | Single phase 100 to 120 VAC (50/60 Hz) | | Single phase 200 to 230 VAC (50/60 Hz) | | |
| | **Allowable voltage range [V]** | Single phase 85 to 132 VAC | | Single phase 170 to 253 VAC | | |
| | **Rated voltage [A]** | 3.0 | 5.0 | 1.5 | 2.4 | 4.5 |
| **Control power supply** | **Control power supply voltage [V]** | 24 VDC | | | | |
| | **Allowable voltage range for control power supply [V]** | 21.6 to 26.4 VDC | | | | |
| | **Rated voltage [A]** | 0.5 | | | | |
| **Parallel input** | | 6 inputs | | | | |
| **Parallel output** | | 4 outputs | | | | |
| **Max. input pulse frequency [pps]** | | 1 M (when differential receiver), 200 k (when open collector) | | | | |
| **Function** | **Positioning completion width setting range [pulse]** | 0 to ±65535 (Pulse command unit) | | | | |
| | **Error excessive** | ±3 rotations | | | | |
| | **Torque limit** | Parameter setting | | | | |
| | **Communication** | USB communication | | | | |
| **Operating temperature range** | | 32 to 104°F (0 to 40°C (No freezing)) | | | | |
| **Operating humidity range [%RH]** | | 90 or less (No condensation) | | | | |
| **Storage temperature range** | | –4 to 149°F (-20 to 65°F (No freezing)) | | | | |
| **Storage humidity range [%RH]** | | 90 or less (No condensation) | | | | |
| **Insulation resistance [MΩ]** | | Between case and SG: 10 (500 VDC) | | | | |
| **Weight** | | 1.32 lbs (600g) | | | | 1.5 lbs (700g) |

| Model | | LECSB1-S5 | LECSB1-S7 | LECSB2-S5 | LECSB2-S7 | LECSB2-S8 |
|---|---|---|---|---|---|---|
| **Compatible motor capacity [W]** | | 100 | 200 | 100 | 200 | 400 |
| **Compatible encoder** | | Absolute 18-bit encoder (Resolution: 262144 p/rev) | | | | |
| **Main power supply** | **Power voltage [V]** | Single phase 100 to 120 VAC (50/60 Hz) | | Three phase 200 to 230 VAC (50/60 Hz)<br>Single phase 200 to 230 VAC (50/60 Hz) | | |
| | **Allowable voltage range [V]** | Single phase 85 to 132 VAC | | Three phase 170 to 253 VAC<br>Single phase 170 to 253 VAC | | |
| | **Rated voltage [A]** | 3.0 | 5.0 | 0.9 | 1.5 | 2.6 |
| **Control power supply** | **Control power supply voltage [V]** | Single phase 100 to 120 VAC (50/60 Hz) | | Single phase 200 to 230 VAC (50/60 Hz) | | |
| | **Allowable voltage range for control power supply [V]** | Single phase 85 to 132 VAC | | Single phase 170 to 253 VAC | | |
| | **Rated voltage [A]** | 0.4 | | 0.2 | | |
| **Parallel input** | | 10 inputs | | | | |
| **Parallel output** | | 6 outputs | | | | |
| **Max. input pulse frequency [pps]** | | 1 M (when differential receiver), 200 k (when open collector) | | | | |
| **Function** | **Positioning completion width setting range [pulse]** | 0 to ±10000 (Pulse command unit) | | | | |
| | **Error excessive** | ±3 rotations | | | | |
| | **Torque limit** | Parameter setup or external analog input setup (0 to 10 VDC) | | | | |
| | **Communication** | USB communication, RS422 communication*1 | | | | |
| **Operating temperature range** | | 32 to 104°F (0 to 40°C (No freezing)) | | | | |
| **Operating humidity range [%RH]** | | 90 or less (No condensation) | | | | |
| **Storage temperature range** | | –4 to 149°F (-20 to 65°C (No freezing)) | | | | |
| **Storage humidity range [%RH]** | | 90 or less (No condensation) | | | | |
| **Insulation resistance [MΩ]** | | Between case and SG: 10 (500 VDC) | | | | |
| **Weight** | | 1.76 lbs (800g) | | | | 2.2 lbs (1000g) |

*1 USB communication and RS422 communication cannot be performed at the same time.

## Power Supply Wiring Example: LECSA

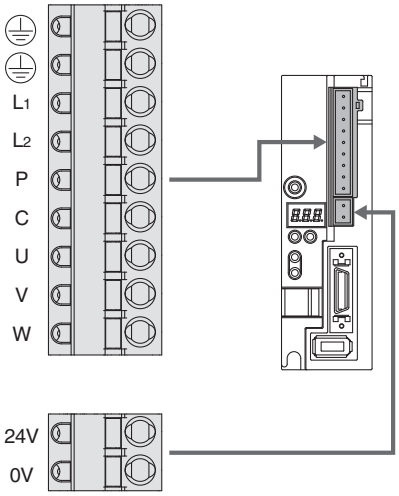
### LECSA□-□




### Main Circuit Power Supply Connector: CNP1

∗Accessory

| Terminal name | Function | Function details |
|---|---|---|
| ⏚ | Protective earth (PE) | Should be grounded via servo motor's earth terminal and control panel's protective earth (PE) after connecting them. |
| L1 | Main circuit power supply | Connect the main circuit power supply.<br>LECSA1: Single phase 100 to 120 VAC, 50/60 Hz<br>LECSA2: Single phase 200 to 230 VAC, 50/60 Hz |
| L2 | | |
| P | Regeneration option | Terminal to connect regeneration option<br>LECSA□-S1: No need for connection<br>LECSA□-S3, S4: Connected at time of shipping.<br>∗ If regeneration option is required for "Model Selection", connect to this terminal. |
| C | | |
| U | Servo motor power (U) | Connect to motor cable (U, V, W) |
| V | Servo motor power (V) | |
| W | Servo motor power (W) | |



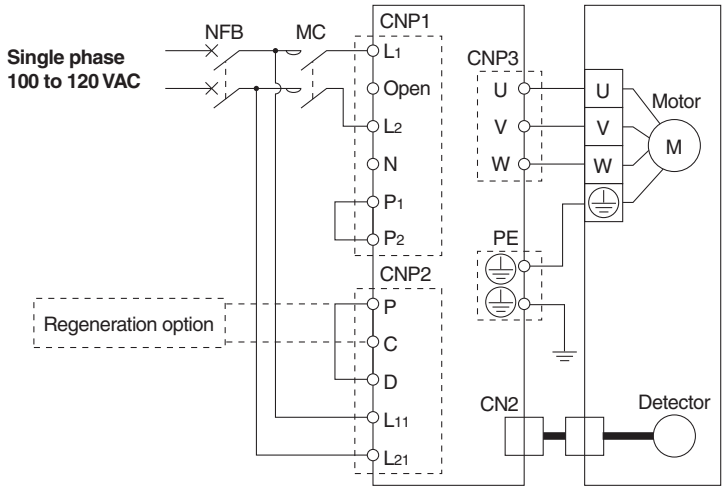

### Control Circuit Power Supply Connector: CNP2

∗Accessory

| Terminal name | Function | Function details |
|---|---|---|
| 24V | Control circuit power supply (24V) | 24V side of the control circuit power supply (24 VDC) which supplies the controller. |
| 0V | Control circuit power supply (0V) | 0V side of the control circuit power supply (24 VDC) which supplies the controller. |

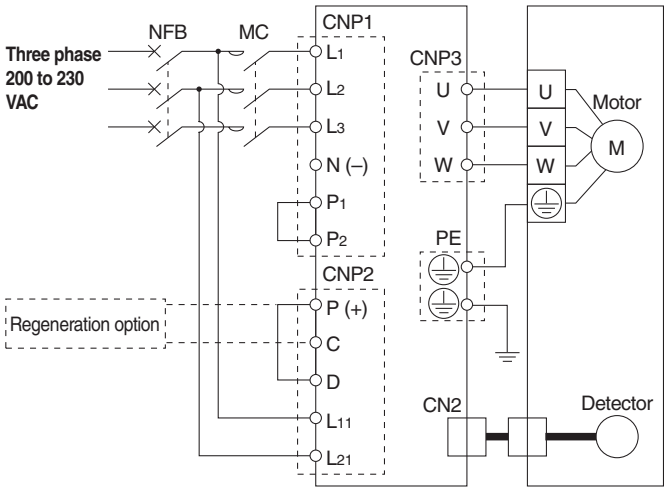
## Power Supply Wiring Example: LECSB

### LECSB1-□

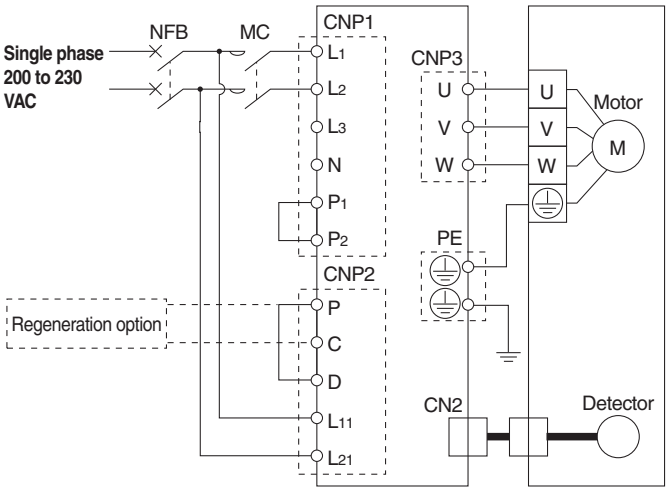



### LECSB2-□

**For three phase 200 VAC**




**For single phase 200 VAC**




Note) For single phase 200 to 230 VAC, power supply should be connected to $L_1$ and $L_2$ terminals, with nothing connected to $L_3$.

### Main Circuit Power Supply Connector: CNP1

∗Accessory

| Terminal name | Function | Function details |
|---|---|---|
| $L_1$ | Main circuit power supply | Connect the main circuit power supply.<br>LECSB1: Single phase 100 to 120 VAC, 50/60 Hz Connection terminal: $L_1$,$L_2$<br>LECSB2: Single phase 200 to 230 VAC, 50/60 Hz Connection terminal: $L_1$,$L_2$<br>Three phase 200 to 230 VAC, 50/60 Hz Connection terminal: $L_1$,$L_2$,$L_3$ |
| $L_2$ | | |
| $L_3$ | | |
| N | Regenerative converter | Do not connect. |
| $P_1$ | DC reactor | Connect between $P_1$ and $P_2$. (Connected at time of shipping.) |
| $P_2$ | | |

### Control Circuit Power Supply Connector: CNP2

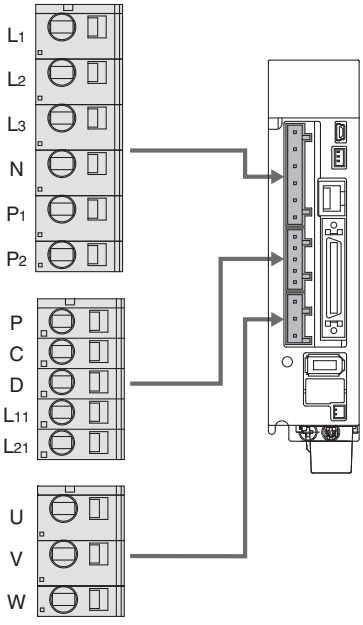
∗Accessory

| Terminal name | Function | Function details |
|---|---|---|
| P | Regeneration option | Connect between P and D. (Connected at time of shipping.)<br>∗ If regeneration option is required for "Model Selection", connect to this terminal. |
| C | | |
| D | | |
| $L_{11}$ | Control circuit power supply (24 V) | 24V side of the control circuit power supply (24 VDC) which supplies the controller. |
| $L_{21}$ | Control circuit power supply (0 V) | 0V side of the control circuit power supply (24 VDC) which supplies the controller. |

### Motor Connector: CNP3

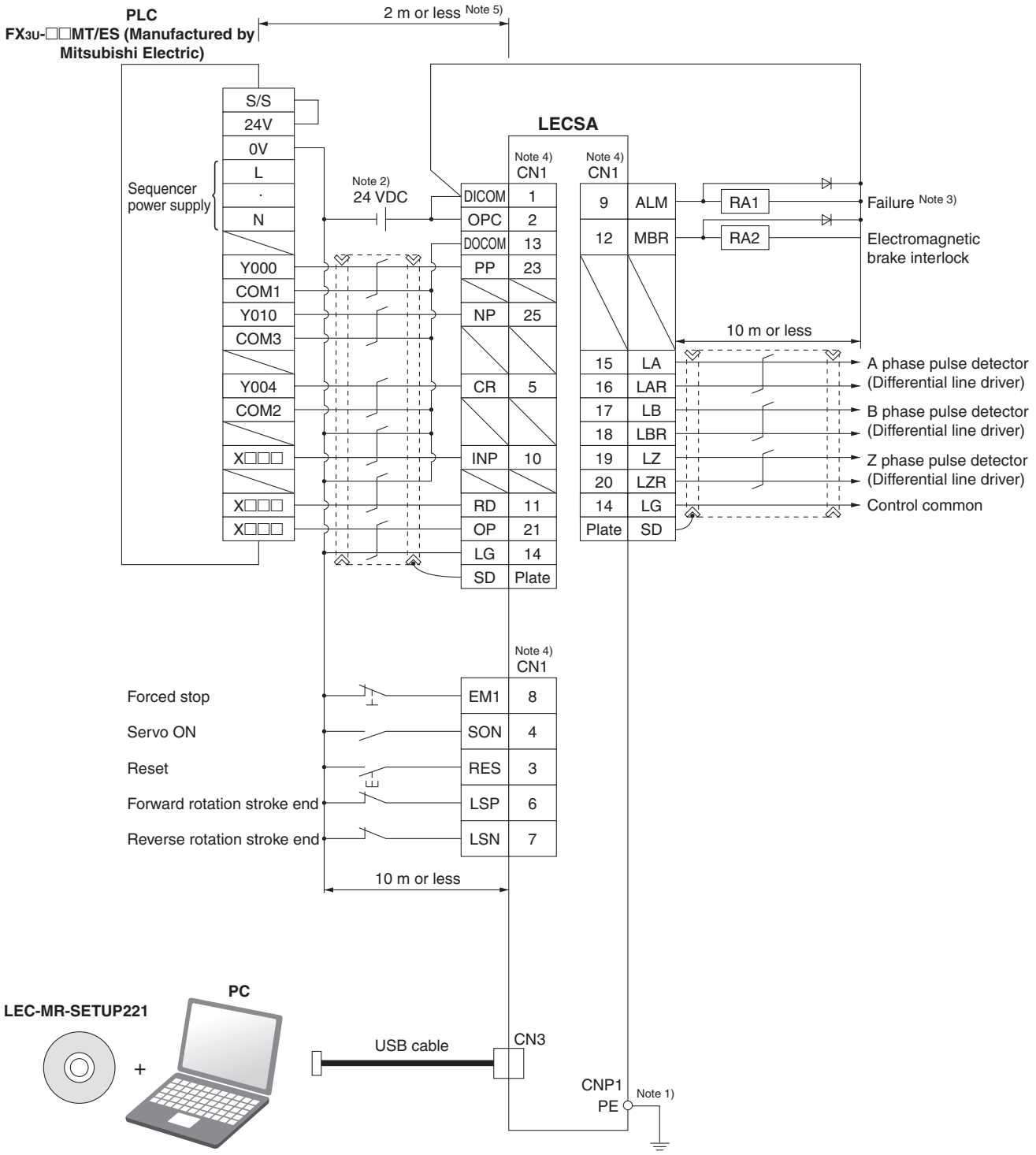
∗Accessory

| Terminal name | Function | Function details |
|---|---|---|
| U | Servo motor power (U) | Connect to motor cable (U, V, W) |
| V | Servo motor power (V) | |
| W | Servo motor power (W) | |



## Control Signal Wiring Example: LECSA

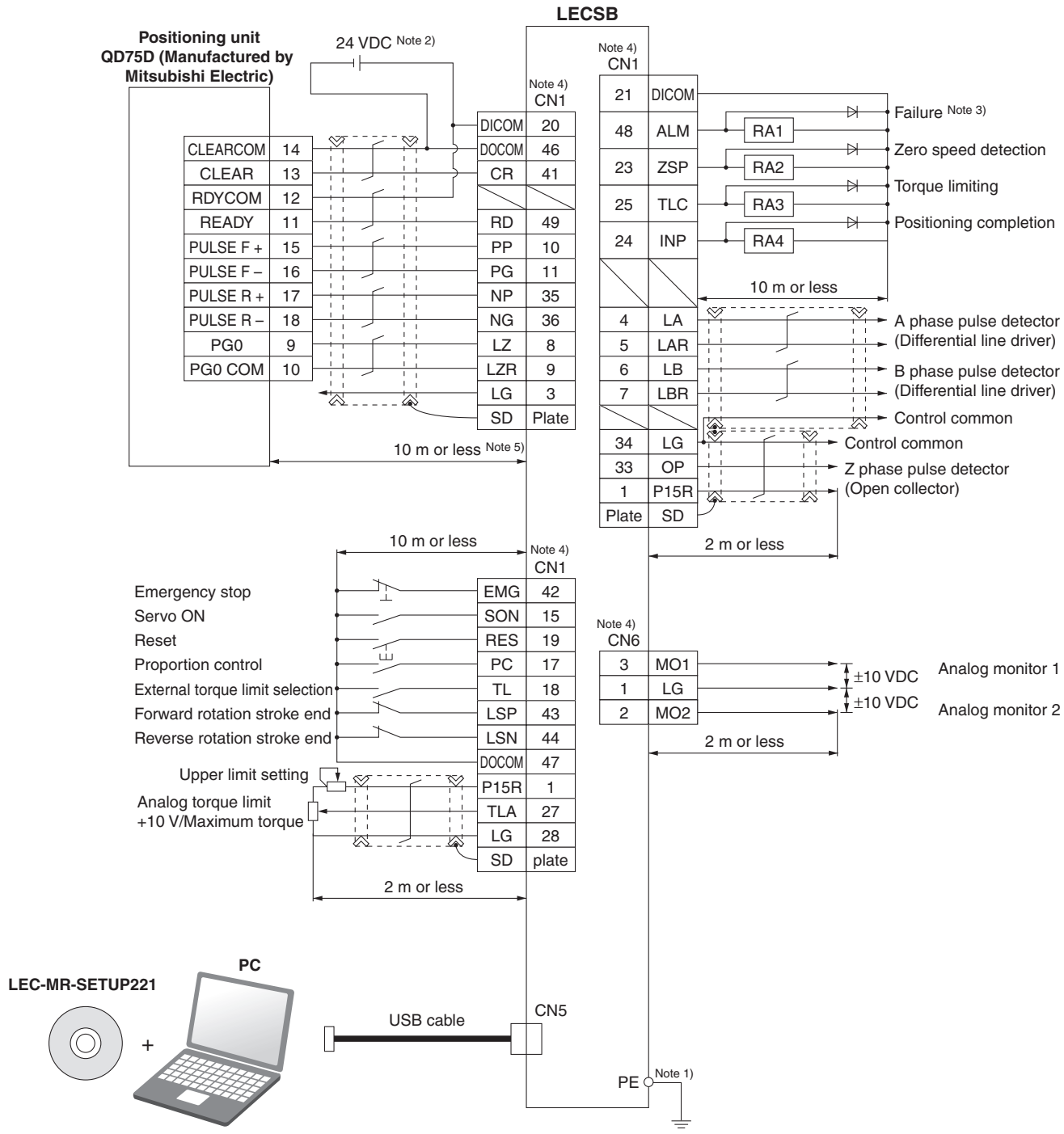
### LECSA□-□




Note 1) For preventing electric shock, be sure to connect the main circuit power supply connector for the servo amplifier (CNP1)'s protective earth (PE) terminal to the control panel's protective earth (PE).
Note 2) For interface use, supply 24 VDC ±10% 200 mA using an external source. 200 mA is the value when all I/O command signals are used and reducing the number of inputs/outputs can decrease current capacity. Refer to "Operation Manual" for required current for interface.
Note 3) The failure (ALM) is ON during normal conditions. When it is OFF (alarm occurs), stop the sequencer signal using the sequence program.
Note 4) The same name signals are connected inside the servo amplifier.
Note 5) For command pulse input with an open collector method. When a positioning unit loaded with a differential line driver method is used, it is 10 m or less.

# Control Signal Wiring Example: LECSB

## LECSB□-□




Note 1) For preventing electric shock, be sure to connect the servo amplifier's protective earth (PE) terminal to the control panel's protective earth (PE).
Note 2) For interface use, supply 24 VDC ±10% 300 mA using an external source.
Note 3) The failure (ALM) is ON during normal conditions. When it is OFF (alarm occurs), stop the sequencer signal using the sequence program.
Note 4) The same name signals are connected inside the servo amplifier.
Note 5) For command pulse input with a differential line driver method. For open collector method, it is 2 m or less.

## Options

(mm)

### Motor cable, Lock cable, Encoder cable

**LE − CS M − S 5 A**

**Motor type**

| | |
|---|---|
| **S** | AC servo motor |

**Direction of connector**

| | |
|---|---|
| **A** | Axis side |
| **B** | Counter axis side |

**Cable contents**

| | |
|---|---|
| **M** | Motor cable |
| **B** | Lock cable |
| **E** | Encoder cable |

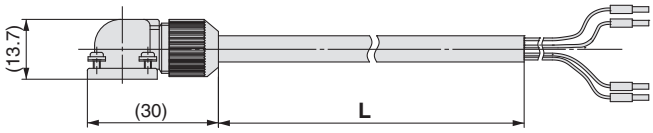
**Cable length (L) [m]**

| | |
|---|---|
| **2** | 2 |
| **5** | 5 |
| **A** | 10 |

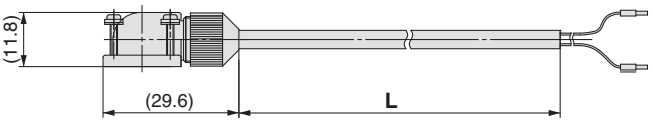
**Cable type**

| | |
|---|---|
| **S** | Standard cable |
| **R** | Robotic cable |

**LE-CSM-□□: Motor cable**




**LE-CSB-□□: Lock cable**




**LE-CSE-□□: Encoder cable**

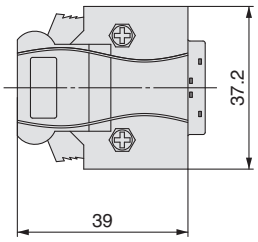

### I/O connector

**LE − C SNA**

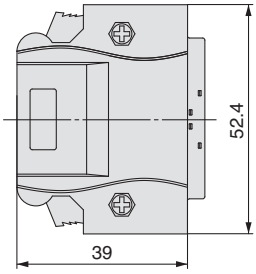
**Controller type**

| | |
|---|---|
| **SNA** | I/O connector (**LECSA□**) |
| **SNB** | I/O connector (**LECSB□**) |

**LE-CSNA**




**LE-CSNB**



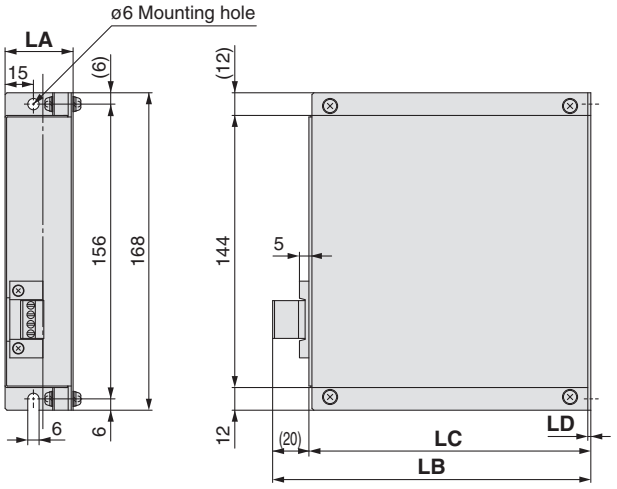

### Regeneration option

**LEC − MR − RB − □**

**Regeneration option type**

| | |
|---|---|
| **032** | Allowable regenerative power 30 W |
| **12** | Allowable regenerative power 100 W |

∗ Confirm regeneration option to be used in “Model Selection”.




**Dimensions [mm]**

| Model | LA | LB | LC | LD |
|---|---|---|---|---|
| **LEC-MR-RB-032** | 30 | 119 | 99 | 1.6 |
| **LEC-MR-RB-12** | 40 | 169 | 149 | 2 |

## Options

### MR Configurator (setup software Japanese version)

**LEC − MR − SETUP221**

∗ MRZJW3-SETUP221 manufactured by Mitsubishi Electric.
Refer to Mitsubishi Electric's website for operating environment and update information.

### Compatible PC

When using MR Configurator (setup software), use an IBM PC/AT compatible PC that meets the following operating conditions.

### Hardware Requirements

| Equipment | | MR Configurator (setup software) **LEC-MR-SETUP221** |
|---|---|---|
| Note 1) Note 2) Note 3) PC | OS | Windows®98, Windows®Me, Windows®2000 Professional, Windows®XP Professional/Home Edition, Windows Vista® Home Basic/Home Premium, Business/Ultimate/Enterprise Windows®7 Starter/Home Premium/Professional/ Ultimate/Enterprise IBM PC/AT compatible PC (Japanese version) |
| | Available HD space | 130 MB or more |
| | Communication interface | Use USB port |
| Display | | Resolution 1024 x 768 or more Must be capable of high color (16 bits) display. The connectable with the above PC |
| Keyboard | | The connectable with the above PC |
| Mouse | | The connectable with the above PC |
| Printer | | The connectable with the above PC |
| Communication cable | | LEC-MR-J3USB |

Note 1) Windows, Windows Vista, Windows 7 are registered trademarks of Microsoft Corporation in the United States and/or other countries.
Note 2) This software may not run correctly depending on the PC that you are using.
Note 3) Not compatible with 64-bit Windows® XP and 64-bit Windows Vista®.

For MR Configurator (setup software English version), contact your nearest sales branch.

### USB cable (3 m) for setup software

**LEC − MR − J3USB**

### Battery

**LEC − MR − J3BAT**

# Series LECSA/LECSB
# Specific Product Precautions 1

**Be sure to read before handling. Refer to back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.**
**Please download it via our website. http://www.smcworld.com**

## Design/Selection

### ⚠Warning

**1. Be sure to apply the specified voltage.**
Otherwise, malfunction and breakage 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 of the controller. Please check the operating voltage before use.

**2. Do not operate the product beyond the specifications.**
Otherwise, a fire, malfunction or actuator damage can result. Please check the specifications before use.

**3. Install an emergency stop circuit outside of the enclosure.**
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 damage due to the breakdown and the malfunction of the controller and its peripheral devices, 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 danger against the personnel is expected due to an abnormal heat generation, smoking, ignition, etc., of the controller and its peripheral devices, cut off the power supply for the product and the system immediately.**

## Handling

### ⚠Warning

**1. Do not touch the inside of the controller and its peripheral devices.**
It may cause an electric shock or damage to the controller.

**2. Do not perform the operation or setting of the product 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 electric actuator and controller.**
It may cause damage to the actuator or the controller.

**5. Be careful not to be caught or hit by the workpiece while the actuator is moving.**
It may cause an injury.

**6. Do not connect the power supply or power on the product before confirming the area to which the workpiece moves is safe.**
The movement of the workpiece may cause an 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 minutes after power-off in case of installation, wiring and maintenance.**
It may cause an electric shock, fire, or injury.

## Handling

### ⚠Warning

**9. Static electricity may cause malfunction or break the controller. Do not touch the controller while power is supplied.**
When touching the controller for maintenance, take sufficient measures to eliminate static electricity.

**10. Do not use the product in an area where dust, powder dust, water, chemicals or oil is in the air.**
It will cause failure or malfunction.

**11. Do not use the product in an area where a magnetic field is generated.**
It will cause failure or malfunction.

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

**13. Radiant heat from strong heat supplies such as a furnace, direct sunlight, etc., should not be applied to the product.**
It will cause failure of the controller or its peripheral devices.

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

**15. Do not use the product 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 supplies of surge generation and crossed lines.

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

**17. When a surge generating load such as a relay or solenoid valve is directly driven, use a product that incorporates a surge absorption element.**

## Installation

### ⚠Warning

**1. Install the controller and its peripheral devices on a fireproof material.**
A direct installation on or near a flammable material may cause fire.

**2. Do not install the product in a place subject to vibrations and impacts.**
It will cause failure or malfunction.

**3. The controller should be affixed verticallyto a vertical wall.**
Do not cover the controller's exhaust opening.

**4. Install the controller and its peripheral devices 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.

# Series LECSA/LECSB
# Specific Product Precautions 2

**Be sure to read before handling. Refer to back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.**
**Please download it via our website. http://www.smcworld.com**

## Power Supply

### ⚠Caution

**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. 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.**

## Wiring

### ⚠Warning

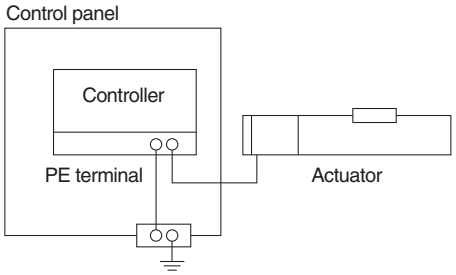
**1. The controller will be damaged if a commercial power supply (100V/200V) is added to the controller's servo motor power (U, V, W). Be sure to check wiring such as wiring mistakes when the power supply is turned on.**

**2. Connect the ends of the U, V, W wires from the motor cable correctly to the phases (U, V, W) of the servo motor power.**
**If these wires do not match up, it is unable to control the servo motor.**

## Grounding

### ⚠Warning

**1. Be sure to carry out grounding in order to ensure the noise tolerance.**
**For grounding actuator, connect the copper wire of the actuator to the controller's protective earth (PE) terminal and connect the copper wire of the controller to the earth via the control panel's protective earth (PE) terminal. Do not connect them directly to the control panel's protective earth (PE) terminal.**




**2. In the unlikely event that malfunction is caused by ground, please disconnect the unit from ground.**

## Maintenance

### ⚠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.**
At times where the equipment or machinery does not operate properly, conduct an emergency stop of the system. Otherwise, an unexpected malfunction may occur and it will become impossible to secure the safety. Conduct a test of the emergency stop in order to confirm the safety of the equipment.

**3. Do not disassemble, modify or repair the controller and its peripheral devices.**

**4. Do not put anything conductive or flammable inside of the controller.**
It may cause a fire.

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

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

# Controller





**Step Motor**
**(Servo/24 VDC)**

## *Series LECP1*

# Programless Controller
# Series LECP1

## How to Order

**LE C P 1 N 1 – LER10K-2**

**Controller**

**Compatible motor**

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

**Number of step data (Points)**

| | |
|---|---|
| **1** | 14 (Programless) |

**Parallel I/O type**

| | |
|---|---|
| **N** | NPN |
| **P** | PNP |

**I/O cable length [m]**

| | |
|---|---|
| **Nil** | Without cable |
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |

**Actuator part number**

(Except cable specifications and actuator options)
Example: Enter [LER10K-2] for LER10K-2L-R16N1

∗ **When placing an order for the controller with an actuator, this part number is not necessary.**

**The controller is sold as single unit after the compatible actuator is set.**

Confirm that the combination of the controller and the actuator is correct.

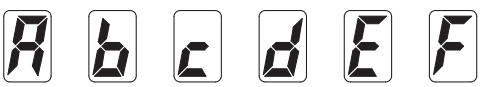
∗ Refer to the operation manual for using the products. Please download it via our website. http://www.smcworld.com

## Specifications

### Basic Specifications

| Item | LECP1 |
|---|---|
| **Compatible motor** | Step motor (Servo/24 VDC) |
| **Power supply** Note 1) | Power supply voltage: 24 VDC ±10%<br>Max. current consumption: 3A (Peak 5A) Note 2)<br>[Including the motor drive power, control power supply, stop, lock release] |
| **Parallel input** | 6 inputs (Photo-coupler isolation) |
| **Parallel output** | 6 outputs (Photo-coupler isolation) |
| **Stop points** | 14 points (Position number 1 to 14(E)) |
| **Compatible encoder** | Incremental A/B phase (800 pulse/rotation) |
| **Serial communication** | RS485 (Modbus protocol compliant) |
| **Memory** | EEPROM |
| **LED indicator** | LED (Green/Red) one of each |
| **7-segment LED display** Note 3) | 1 digit, 7-segment display (red) Figures are expressed in hexadecimal (“10” to “15” in decimal number are expressed as “A” to “F”) |
| **Lock control** | Forced-lock release terminal Note 4) |
| **Cable length [m]** | I/O cable: 5 or less  Actuator cable: 20 or less |
| **Cooling system** | Natural air cooling |
| **Operating temperature range** | 32 to 104°F (0 to 40°C) (No freezing) |
| **Operating humidity range [%RH]** | 90 or less (No condensation) |
| **Storage temperature range** | 14 to 140°F (–10 to 60°C) (No freezing) |
| **Storage humidity range [%RH]** | 90 or less (No condensation) |
| **Insulation resistance [MΩ]** | Between the housing (radiation fin) and SG terminal 50 (500 VDC) |
| **Weight** | 0.29 lbs (130g) |

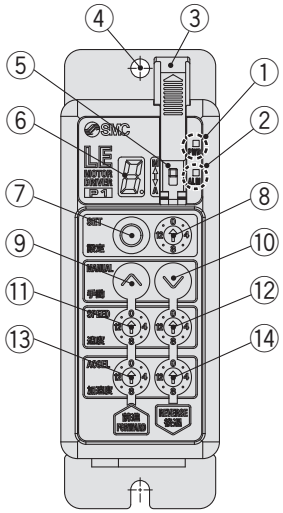
Note 1) Do not use the power supply of “inrush current prevention type” for the controller input power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the each actuator’s operation manual etc. for details.
Note 3) “10” to “15” in decimal number are displayed as follows in the 7-segment LED.

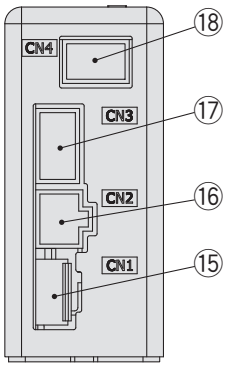


| | | | | | | |
|---|---|---|---|---|---|---|
| Decimal display | 10 | 11 | 12 | 13 | 14 | 15 |
| Hexadecimal display | A | b | c | d | E | F |

Note 4) Applicable to non-magnetizing lock.

## Details of The Controller



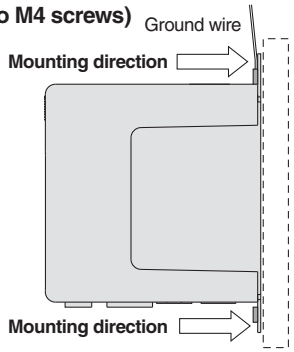

| No. | Display | Description | Details |
|---|---|---|---|
| ① | **PWR** | Power supply LED | Power supply ON/servo ON :Green turns on<br>Power supply ON/servo OFF :Green flashes |
| ② | **ALM** | Alarm LED | With alarm : Red turns on<br>Parameter setting : Red flashes |
| ③ | — | Cover | Change and protection of the mode SW (Close the cover after changing SW) |
| ④ | — | FG | Frame ground (Tighten the bolt with the nut when mounting the controller. Connect the ground wire.) |
| ⑤ | — | Mode swith | Switch the mode between manual and auto. |
| ⑥ | — | 7-segment LED | Stop position, the value set by ⑧ and alarm information are displayed. |
| ⑦ | **SET** | Set button | Decide the settings or drive operation in Manual mode. |
| ⑧ | — | Position selecting switch | Assign the position to drive (1 to 14), and the origin position (15). |
| ⑨ | **MANUAL** | Manual forward button | Perform forward jog and inching. |
| ⑩ | | Manual reverse button | Perform reverse jog and inching. |
| ⑪ | **SPEED** | Forward speed switch | 16 forward speeds are available. |
| ⑫ | | Reverse speed switch | 16 reverse speeds are available. |
| ⑬ | **ACCEL** | Forward acceleration switch | 16 forward acceleration steps are available. |
| ⑭ | | Reverse acceleration switch | 16 reverse acceleration steps are available. |
| ⑮ | **CN1** | Power supply connector | Connect the power supply cable. |
| ⑯ | **CN2** | Motor connector | Connect the motor connector. |
| ⑰ | **CN3** | Encoder connector | Connect the encoder connector. |
| ⑱ | **CN4** | I/O connector | Connect I/O cable. |

## How to Mount

Controller mounting shown below.

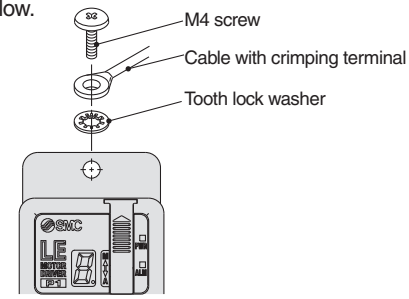
### 1. Mounting screw (LECP1□□-□)

**(Installation with two M4 screws)**




### 2. Grounding

Tighten the bolt with the nut when mounting the ground wire as shown below.

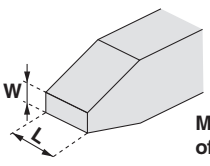



**Controller**

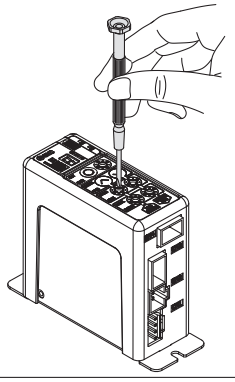
### ⚠Caution

- M4 screws, cable with crimping terminal and tooth lock washer are not included. Be sure to carry out grounding earth in order to ensure the noise tolerance.
- Use a watchmaker's screwdriver of the size shown below when changing position switch ⑧ and the set value of the speed/acceleration switch ⑪ to ⑭.

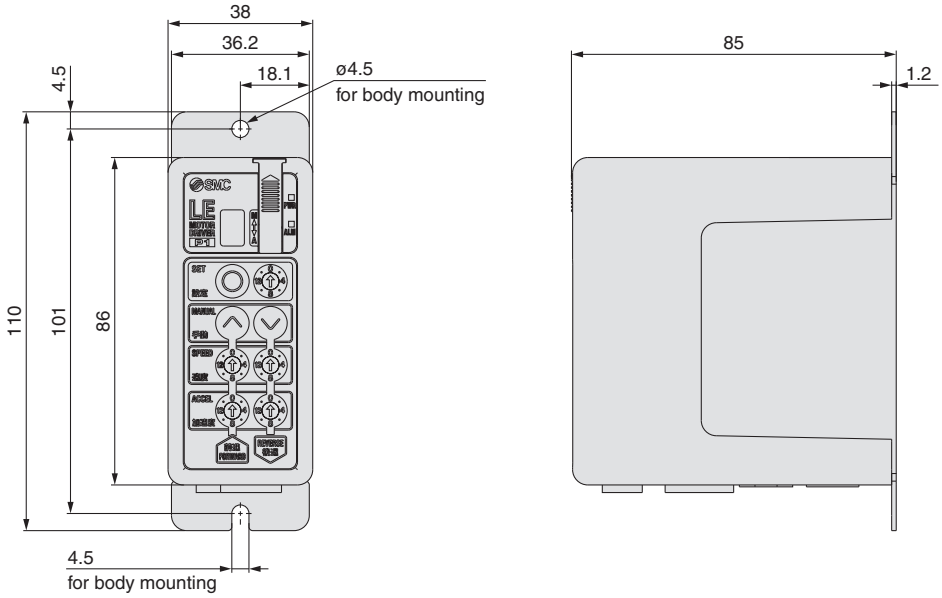
**Size**
End width **L**: 2.0 to 2.4 [mm]
End thickness **W**: 0.5 to 0.6 [mm]

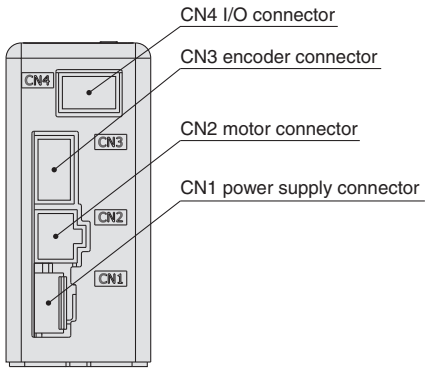



**Magnified view of the end of the screwdriver**



## Dimensions


38
36.2
18.1
ø4.5
for body mounting
4.5
110
101
86
4.5
for body mounting
85
1.2


CN4 I/O connector
CN3 encoder connector
CN2 motor connector
CN1 power supply connector
CN4
CN3
CN2
CN1

## Wiring Example 1

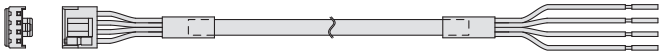
### Power Supply Connector: CN1

* When you connect a CN1 power supply connector, please use the power supply cable (LEC-CK1-1).
* Power supply cable (LEC-CK1-1) is an accessory.

**CN1 Power Supply Connector Terminal for LECP1**

| Terminal name | Cable color | Function | Function details |
|---|---|---|---|
| 0V | Blue | Common supply (–) | M24V terminal/C24V terminal/BK RLS terminal are common (–). |
| M24V | White | Motor power supply (+) | This is the motor power supply (+) that is supplied to the controller. |
| C24V | Brown | Control power supply (+) | This is the control power supply (+) that is supplied to the controller. |
| BK RLS | Black | Lock release (+) | This is the input (+) that releases the lock. |

**Power supply cable For LECP1 (LEC-CK1-1)**

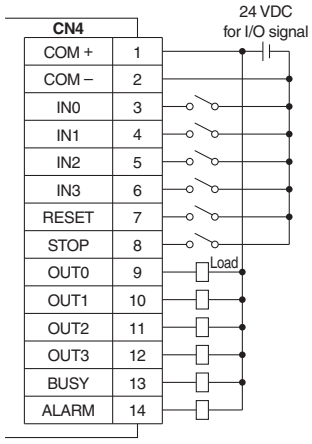


## Wiring Example 2

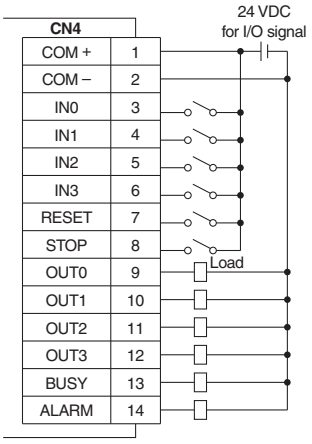
### Parallel I/O Connector: CN4

* 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**




**■PNP**




**Input Signal**

| Name | Contents |
|---|---|
| COM+ | Connects the power supply 24 V for input/output signal |
| COM– | Connects the power supply 0 V for input/output signal |
| IN0 to IN3 | • Instruction to drive (input as a combination of IN0 to IN3)<br>• Instruction to return to the origin position (IN0 to IN3 all ON simultaneously)<br>Example - (instruction to drive for position no. 5)<br>IN3: OFF, IN2: ON, IN1: OFF, IN0: ON |
| RESET | Alarm reset and operation interruption<br>During operation : deceleration stop from position at which signal is input (servo ON maintained)<br>While alarm is active : alarm reset |
| STOP | Instruction to stop (after maximum deceleration stop, servo OFF) |

**Output Signal**

| Name | Contents |
|---|---|
| OUT0 to OUT3 | Turns on when the positioning or pushing is completed.<br>(Output is instructed in the combination of OUT0 to 3.)<br>Example - (operation complete for position no. 3)<br>OUT3: OFF, OUT2: OFF, OUT1: ON, OUT0: ON |
| BUSY | Outputs when the actuator is moving |
| *ALARM Note) | Not output when alarm is active or servo OFF |

Note) These signals are output when the power supply of the controller is ON. (N.C.)

**Input Signal [IN0 - IN3] Position Number Chart** ○: OFF ●: ON

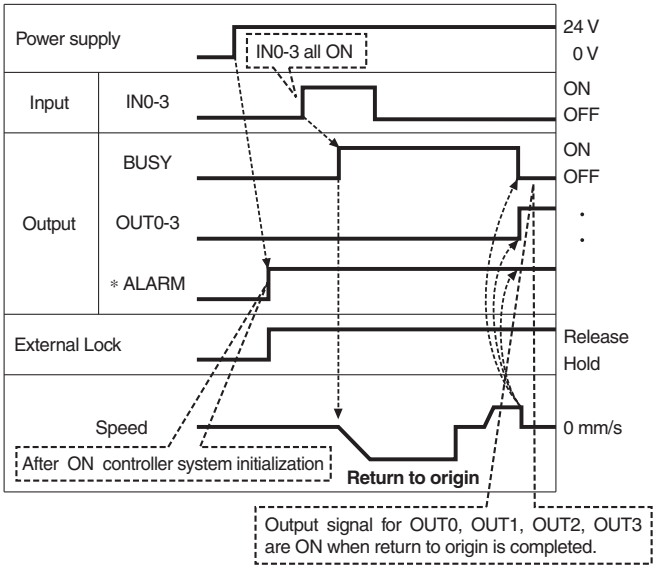
| Position number | IN3 | IN2 | IN1 | IN0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

**Output Signal [OUT0 - OUT3] Position Number Chart** ○: OFF ●: ON

| Position number | OUT3 | OUT2 | OUT1 | OUT0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

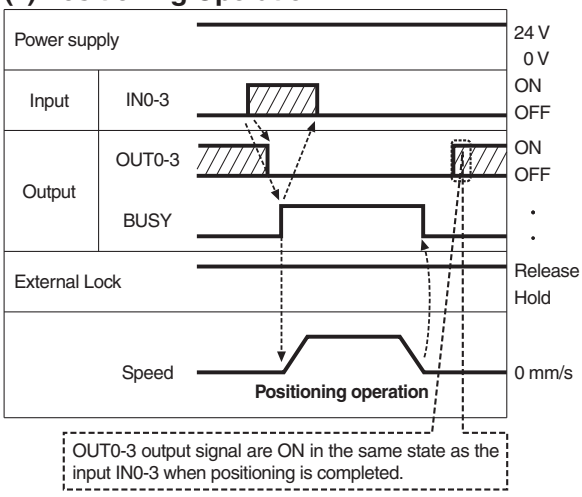
## Signal Timing

### (1) Return to Origin

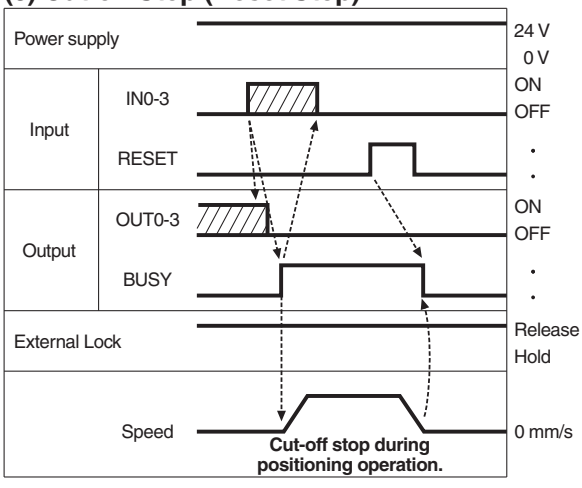



∗ "∗ALARM" is expressed as negative-logic circuit.

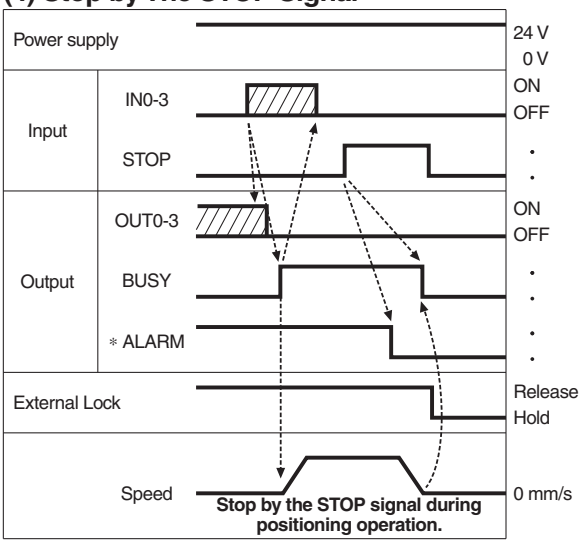
### (2) Positioning Operation



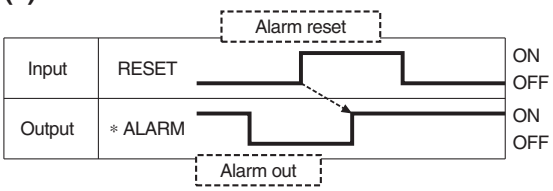

### (3) Cut-off Stop (Reset Stop)




### (4) Stop by The STOP Signal




### (5) Alarm Reset




∗ "∗ALARM" is expressed as negative-logic circuit.

## Options: Actuator Cable

**[Robotic cable for step motor (Servo/24 VDC), standard cable]**

**LE – CP – 1 – □**

**Cable length (L)[m]**

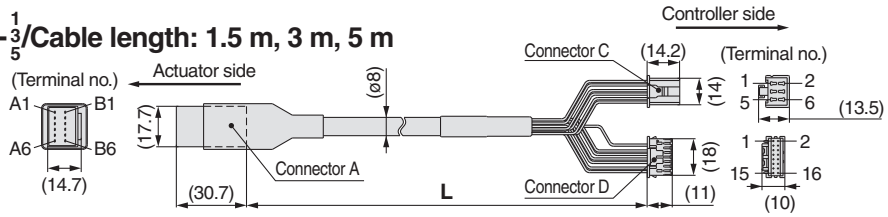
| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |
| **8** | 8* |
| **A** | 10* |
| **B** | 15* |
| **C** | 20* |

* Produced upon receipt of order (Robotic cable only)

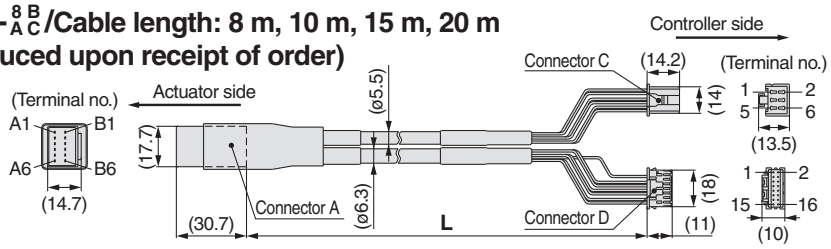
**Cable type**

| | |
|---|---|
| **Nil** | Robotic cable (Flexible cable) |
| **S** | Standard cable |

**LE-CP-1/3/5/Cable length: 1.5 m, 3 m, 5 m**




**LE-CP-8/A/B/C/Cable length: 8 m, 10 m, 15 m, 20 m**
**(* Produced upon receipt of order)**




| Circuit | Connector A terminal no. | Cable color | Connector C terminal no. |
|---|---|---|---|
| A | B-1 | Brown | 2 |
| $\overline{A}$ | A-1 | Red | 1 |
| B | B-2 | Orange | 6 |
| $\overline{B}$ | A-2 | Yellow | 5 |
| COM-A/COM | B-3 | Green | 3 |
| COM-B/– | A-3 | Blue | 4 |

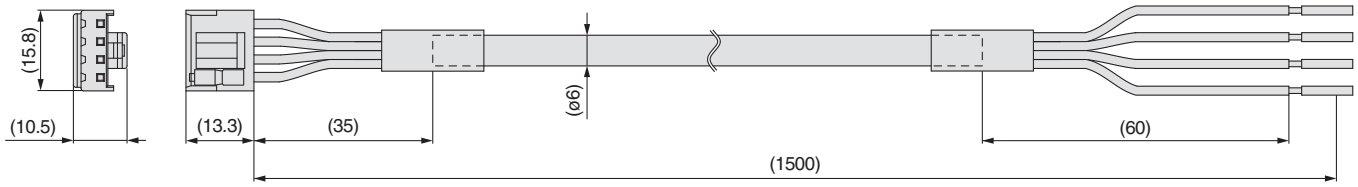
Shield

| Circuit | Connector A terminal no. | Cable color | Connector D terminal no. |
|---|---|---|---|
| Vcc | B-4 | Brown | 12 |
| GND | A-4 | Black | 13 |
| $\overline{A}$ | B-5 | Red | 7 |
| A | A-5 | Black | 6 |
| $\overline{B}$ | B-6 | Orange | 9 |
| B | A-6 | Black | 8 |
| | | — | 3 |

## Options

### [Power supply cable]

## LEC – CK1 – 1




| Terminal name | Covered color | Function |
|---|---|---|
| 0V | Blue | Common supply (–) |
| M24V | White | Motor power supply (+) |
| C24V | Brown | Control power supply (+) |
| BK RLS | Black | Lock release (+) |

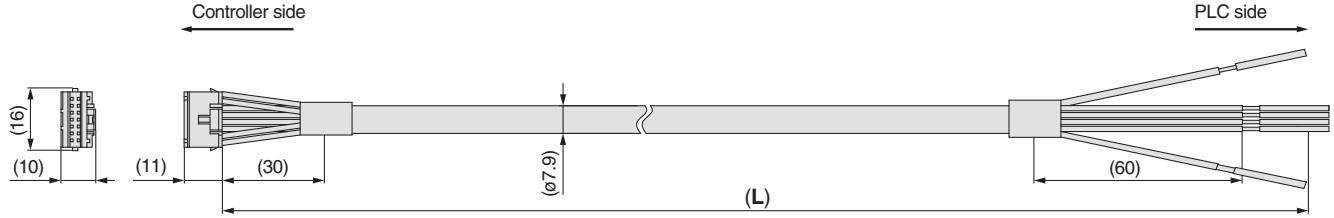
∗ Conductor size: AWG20

### [I/O cable]

## LEC – CK4 – □

**Cable length (L)[m]**

| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |




∗ Conductor size: AWG26

| Terminal no. | Insulation color | Dot mark | Dot color | Function |
|---|---|---|---|---|
| 1 | Light brown | ■ | Black | COM + |
| 2 | Light brown | ■ | Red | COM – |
| 3 | Yellow | ■ | Black | OUT0 |
| 4 | Yellow | ■ | Red | OUT1 |
| 5 | Light green | ■ | Black | OUT2 |
| 6 | Light green | ■ | Red | OUT3 |
| 7 | Gray | ■ | Black | BUSY |
| 8 | Gray | ■ | Red | ALARM |
| 9 | White | ■ | Black | IN0 |
| 10 | White | ■ | Red | IN1 |
| 11 | Light brown | ■ ■ | Black | IN2 |
| 12 | Light brown | ■ ■ | Red | IN3 |
| 13 | Yellow | ■ ■ | Black | RESET |
| 14 | Yellow | ■ ■ | Red | STOP |

∗ Parallel I/O signal is valid in auto mode. While the test function operates at manual mode, only the output is valid.

# Programless Controller

# Series LECP1

## How to Order

**LE C P 1 N 1 – LESH8RJ-50**

**Controller**

**Compatible motor**

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

**Number of step data (Points)**

| | |
|---|---|
| **1** | 14 (Programless) |

**Parallel I/O type**

| | |
|---|---|
| **N** | NPN |
| **P** | PNP |

**I/O cable length [m]**

| | |
|---|---|
| **Nil** | Without cable |
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |

**Actuator part number**

(Except cable specifications and actuator options)
Example: Enter [LESH8RJ-50] for
LESH8RJ-50B-R16N1

∗ **When placing an order for the controller with an actuator, this part number is not necessary.**

**The controller is sold as single unit after the compatible actuator is set.**

Confirm that the combination of the controller and the actuator is correct.

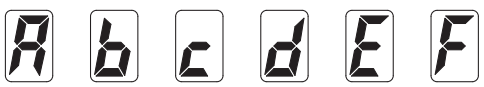
∗ Refer to the operation manual for using the products. Please download it via our website. http://www.smcworld.com

## Specifications

### Basic Specifications

| Item | LECP1 |
|---|---|
| **Compatible motor** | Step motor (Servo/24 VDC) |
| **Power supply** Note 1) | Power supply voltage: 24 VDC ±10%<br>Max. current consumption: 3A (Peak 5A) Note 2)<br>[Including the motor drive power, control power supply, stop, lock release] |
| **Parallel input** | 6 inputs (Photo-coupler isolation) |
| **Parallel output** | 6 outputs (Photo-coupler isolation) |
| **Stop points** | 14 points (Position number 1 to 14(E)) |
| **Compatible encoder** | Incremental A/B phase (800 pulse/rotation) |
| **Serial communication** | RS485 (Modbus protocol compliant) |
| **Memory** | EEPROM |
| **LED indicator** | LED (Green/Red) one of each |
| **7-segment LED display** Note 3) | 1 digit, 7-segment display (red) Figures are expressed in hexadecimal (“10” to “15” in decimal number are expressed as “A” to “F”) |
| **Lock control** | Forced-lock release terminal Note 4) |
| **Cable length [m]** | I/O cable: 5 or less Actuator cable: 20 or less |
| **Cooling system** | Natural air cooling |
| **Operating temperature range** | 32 to104°F (0 to 40°C) (No freezing) |
| **Operating humidity range [%RH]** | 90 or less (No condensation) |
| **Storage temperature range** | 14 to 140°F (–10 to 60°C) (No freezing) |
| **Storage humidity range [%RH]** | 90 or less (No condensation) |
| **Insulation resistance [MΩ]** | Between the housing (radiation fin) and SG terminal 50 (500 VDC) |
| **Weight** | 4.6 oz. (130g) |

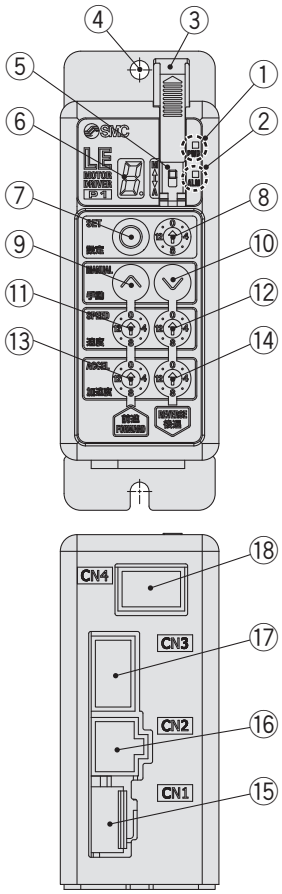
Note 1) Do not use the power supply of “inrush current prevention type” for the controller input power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the each actuator’s operation manual etc. for details.
Note 3) “10” to “15” in decimal number are displayed as follows in the 7-segment LED.



| | | | | | | |
|---|---|---|---|---|---|---|
| Decimal display | 10 | 11 | 12 | 13 | 14 | 15 |
| Hexadecimal display | A | b | c | d | E | F |

Note 4) Applicable to non-magnetizing lock.

## Details of The Controller



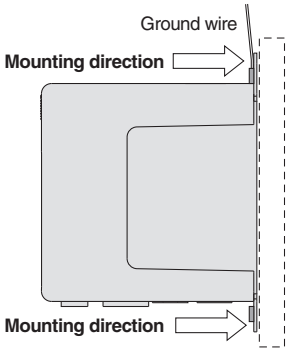

| No. | Display | Description | Details |
|---|---|---|---|
| ① | **PWR** | Power supply LED | Power supply ON/servo ON :Green turns on<br>Power supply ON/servo OFF :Green flashes |
| ② | **ALM** | Alarm LED | With alarm : Red turns on<br>Parameter setting : Red flashes |
| ③ | — | Cover | Change and protection of the mode SW (Close the cover after changing SW) |
| ④ | — | FG | Frame ground (Tighten the bolt with the nut when mounting the controller. Connect the ground wire.) |
| ⑤ | — | Mode swith | Switch the mode between manual and auto. |
| ⑥ | — | 7-segment LED | Stop position, the value set by ⑧ and alarm information are displayed. |
| ⑦ | **SET** | Set button | Decide the settings or drive operation in Manual mode. |
| ⑧ | — | Position selecting switch | Assign the position to drive (1 to 14), and the origin position (15). |
| ⑨ | **MANUAL** | Manual forward button | Perform forward jog and inching. |
| ⑩ | | Manual reverse button | Perform reverse jog and inching. |
| ⑪ | **SPEED** | Forward speed switch | 16 forward speeds are available. |
| ⑫ | | Reverse speed switch | 16 reverse speeds are available. |
| ⑬ | **ACCEL** | Forward acceleration switch | 16 forward acceleration steps are available. |
| ⑭ | | Reverse acceleration switch | 16 reverse acceleration steps are available. |
| ⑮ | **CN1** | Power supply connector | Connect the power supply cable. |
| ⑯ | **CN2** | Motor connector | Connect the motor connector. |
| ⑰ | **CN3** | Encoder connector | Connect the encoder connector. |
| ⑱ | **CN4** | I/O connector | Connect I/O cable. |

## How to Mount

Controller mounting shown below.

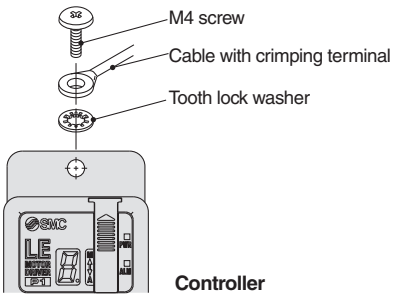
### 1. Mounting screw (LECP1□□-□)

**(Installation with two M4 screws)**




### 2. Grounding

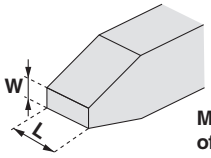
Tighten the bolt with the nut when mounting the ground wire as shown below.



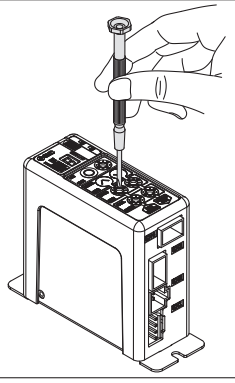

### ⚠Caution

- M4 screws, cable with crimping terminal and tooth lock washer are not included. Be sure to carry out grounding earth in order to ensure the noise tolerance.
- Use a watchmaker's screwdriver of the size shown below when changing position switch ⑧ and the set value of the speed/acceleration switch ⑪ to ⑭.

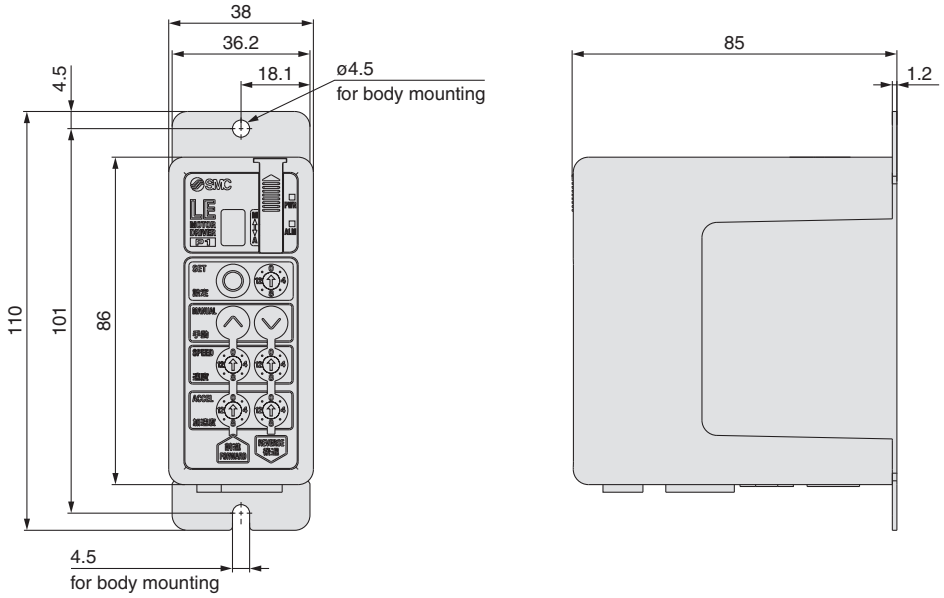
**Size**
End width **L** :2.0 to 2.4 [mm]
End thickness **W** :0.5 to 0.6 [mm]

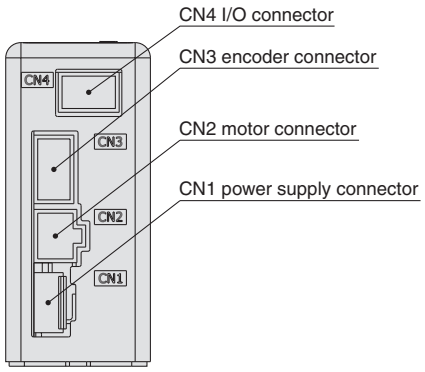



**Magnified view of the end of the screwdriver**



## Dimensions


38
36.2
18.1
ø4.5
for body mounting
4.5
110
101
86
4.5
for body mounting
85
1.2


CN4 I/O connector
CN3 encoder connector
CN2 motor connector
CN1 power supply connector
CN4
CN3
CN2
CN1

## Wiring Example 1

### Power Supply Connector: CN1

* When you connect a CN1 power supply connector, please use the power supply cable (LEC-CK1-1).
* Power supply cable (LEC-CK1-1) is an accessory.

**CN1 Power Supply Connector Terminal for LECP1**

| Terminal name | Cable color | Function | Function details |
|---|---|---|---|
| 0V | Blue | Common supply (–) | M24V terminal/C24V terminal/BK RLS terminal are common (–). |
| M24V | White | Motor power supply (+) | This is the motor power supply (+) that is supplied to the controller. |
| C24V | Brown | Control power supply (+) | This is the control power supply (+) that is supplied to the controller. |
| BK RLS | Black | Lock release (+) | This is the input (+) that releases the lock. |

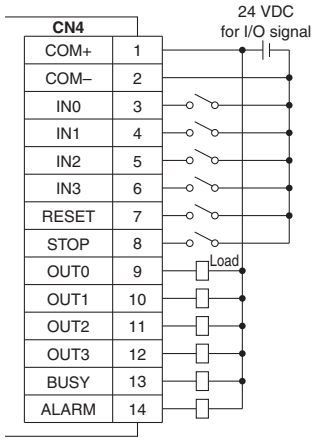
**Power supply cable for LECP1 (LEC-CK1-1)**

## Wiring Example 2

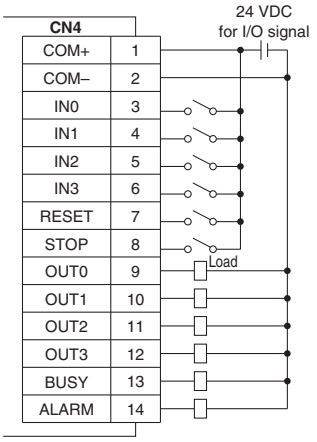
### Parallel I/O Connector: CN4

* 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**




**■PNP**




**Input Signal**

| Name | Contents |
|---|---|
| COM+ | Connects the power supply 24 V for input/output signal |
| COM– | Connects the power supply 0 V for input/output signal |
| IN0 to IN3 | • Instruction to drive (input as a combination of IN0 to IN3)<br>• Instruction to return to the origin position (IN0 to IN3 all ON simultaneously)<br>Example - (instruction to drive for position no. 5)<br>IN3: OFF, IN2: ON, IN1: OFF, IN0: ON |
| RESET | Alarm reset and operation interruption<br>During operation : deceleration stop from position at which signal is input (servo ON maintained)<br>While alarm is active : alarm reset |
| STOP | Instruction to stop (after maximum deceleration stop, servo OFF) |

**Output Signal**

| Name | Contents |
|---|---|
| OUT0 to OUT3 | Turns on when the positioning or pushing is completed.<br>(Output is instructed in the combination of OUT0 to 3.)<br>Example - (operation complete for position no. 3)<br>OUT3: OFF, OUT2: OFF, OUT1: ON, OUT0: ON |
| BUSY | Outputs when the actuator is moving |
| *ALARM Note) | Not output when alarm is active or servo OFF |

Note) These signals are output when the power supply of the controller is ON. (N.C.)

**Input Signal [IN0 - IN3] Position Number Chart** ○: OFF ●: ON

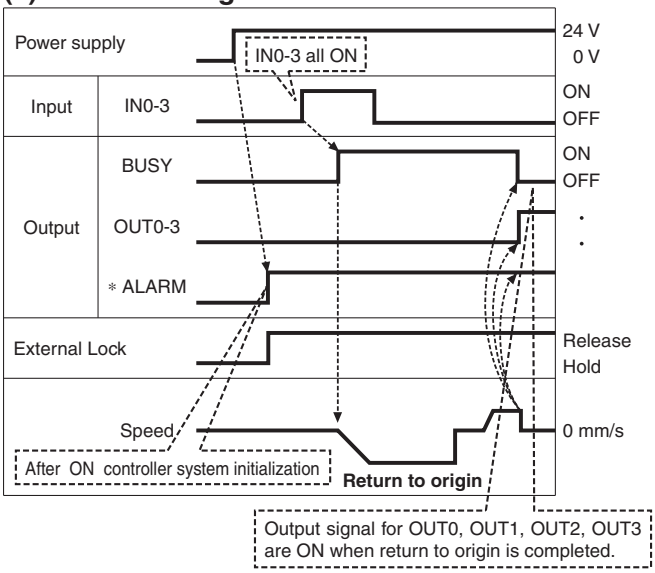
| Position number | IN3 | IN2 | IN1 | IN0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

**Output Signal [OUT0 - OUT3] Position Number Chart** ○: OFF ●: ON

| Position number | OUT3 | OUT2 | OUT1 | OUT0 |
|---|---|---|---|---|
| 1 | ○ | ○ | ○ | ● |
| 2 | ○ | ○ | ● | ○ |
| 3 | ○ | ○ | ● | ● |
| 4 | ○ | ● | ○ | ○ |
| 5 | ○ | ● | ○ | ● |
| 6 | ○ | ● | ● | ○ |
| 7 | ○ | ● | ● | ● |
| 8 | ● | ○ | ○ | ○ |
| 9 | ● | ○ | ○ | ● |
| 10 (A) | ● | ○ | ● | ○ |
| 11 (B) | ● | ○ | ● | ● |
| 12 (C) | ● | ● | ○ | ○ |
| 13 (D) | ● | ● | ○ | ● |
| 14 (E) | ● | ● | ● | ○ |
| Retun to origin | ● | ● | ● | ● |

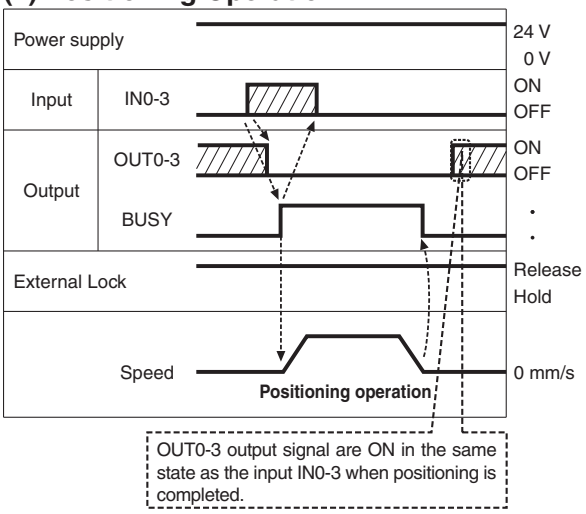
## Signal Timing

### (1) Return to Origin

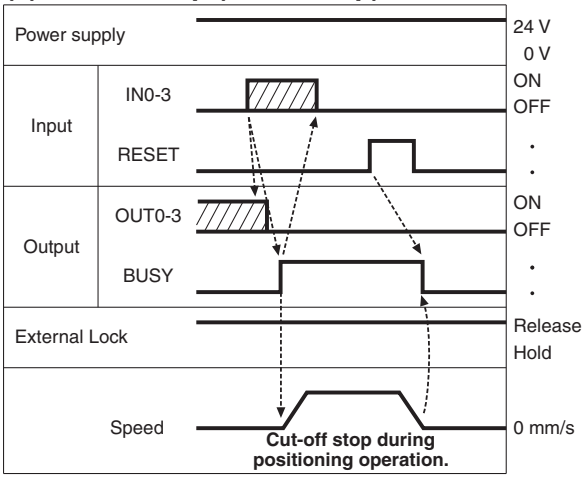



∗ "∗ALARM" is expressed as negative-logic circuit.

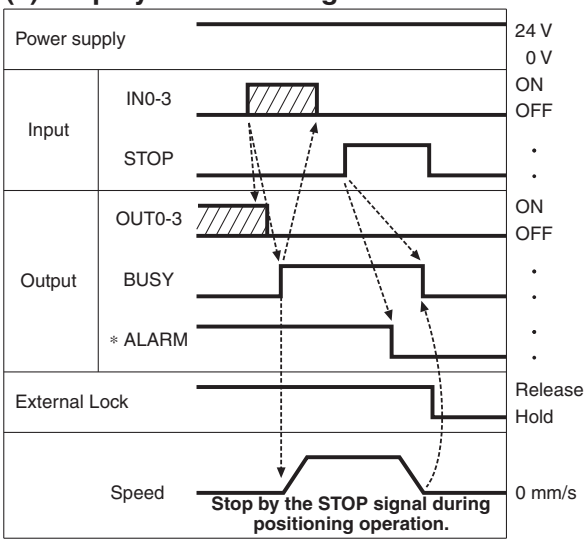
### (2) Positioning Operation



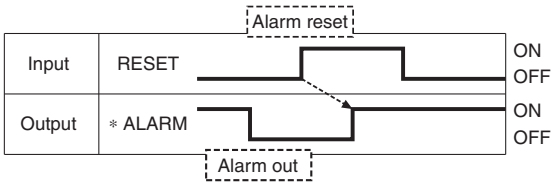

### (3) Cut-off Stop (Reset Stop)




### (4) Stop by The STOP Signal




### (5) Alarm Reset




∗ "∗ALARM" is expressed as negative-logic circuit.

## Options: Actuator Cable

### [Robotic cable for step motor (Servo/24 VDC), standard cable]

**LE – CP – 1 – □**

**Cable length (L)[m]**

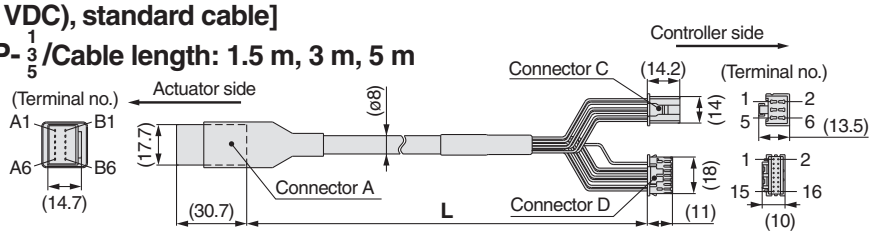
| | |
|---|---|
| 1 | 1.5 |
| 3 | 3 |
| 5 | 5 |
| 8 | 8* |
| A | 10* |
| B | 15* |
| C | 20* |

* Produced upon receipt of order (Robotic cable only)

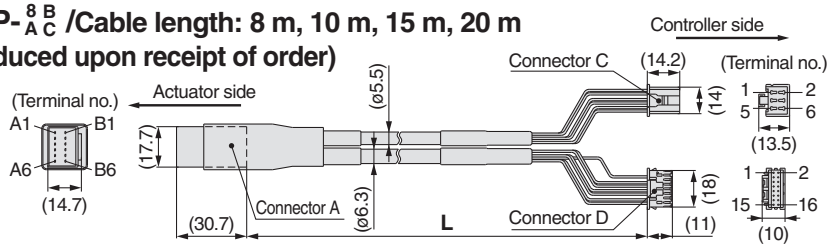
**Cable type**

| | |
|---|---|
| Nil | Robotic cable (Flexible cable) |
| S | Standard cable |

**LE-CP-1/3/5 /Cable length: 1.5 m, 3 m, 5 m**




**LE-CP-8/A/C /Cable length: 8 m, 10 m, 15 m, 20 m**
**(* Produced upon receipt of order)**




| Circuit | Connector A 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 |

Shield

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

| Cable color | Connector D terminal no. |
|---|---|
| Brown | 12 |
| Black | 13 |
| Red | 7 |
| Black | 6 |
| Orange | 9 |
| Black | 8 |
| — | 3 |

### [Robotic cable with lock and sensor for step motor (Servo/24 VDC), standard cable]

**LE – CP – 1 – B – □**

**Cable length (L)[m]**

| | |
|---|---|
| 1 | 1.5 |
| 3 | 3 |
| 5 | 5 |
| 8 | 8* |
| A | 10* |
| B | 15* |
| C | 20* |

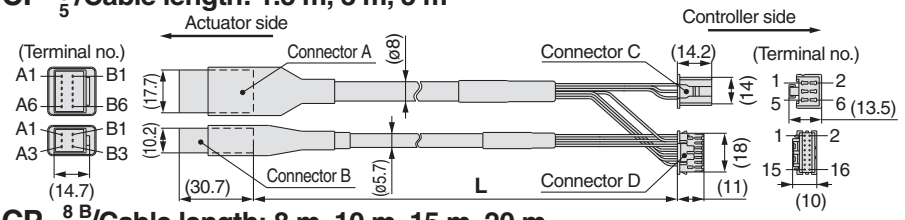
* Produced upon receipt of order (Robotic cable only)

**With lock and sensor**

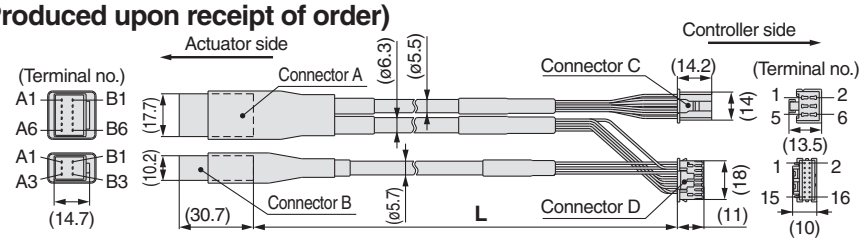
**Cable type**

| | |
|---|---|
| Nil | Robotic cable (Flexible cable) |
| S | Standard cable |

**LE-CP-1/3/5 /Cable length: 1.5 m, 3 m, 5 m**




**LE-CP-8/A/C/Cable length: 8 m, 10 m, 15 m, 20 m**
**(* Produced upon receipt of order)**




| Circuit | Connector A 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 |

Shield

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

| Cable color | Connector D terminal no. |
|---|---|
| Brown | 12 |
| Black | 13 |
| Red | 7 |
| Black | 6 |
| Orange | 9 |
| Black | 8 |
| — | 3 |

| Circuit | Connector B terminal no. |
|---|---|
| Lock (+) | B-1 |
| Lock (–) | A-1 |
| Sensor (+) Note) | B-3 |
| Sensor (–) Note) | A-3 |

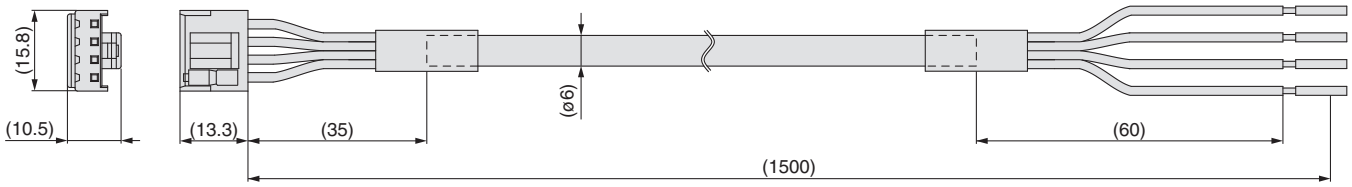
| | |
|---|---|
| Red | 4 |
| Black | 5 |
| Brown | 1 |
| Blue | 2 |

Note) This is not used for the LES series.

## Options

### [Power supply cable]

## LEC − CK1 − 1




| Terminal name | Covered color | Function |
|---|---|---|
| 0V | Blue | Common supply (–) |
| M24V | White | Motor power supply (+) |
| C24V | Brown | Control power supply (+) |
| BK RLS | Black | Lock release (+) |

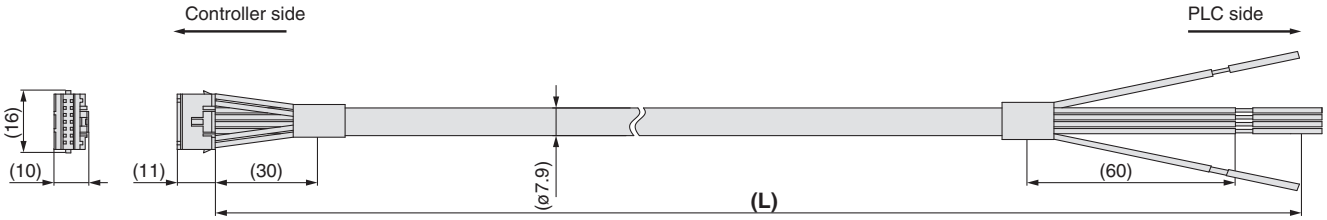
∗ Conductor size: AWG20

### [I/O cable]

## LEC − CK4 − □

**Cable length (L)[m]**

| | |
|---|---|
| **1** | 1.5 |
| **3** | 3 |
| **5** | 5 |




∗ Conductor size: AWG26

| Terminal no. | Insulation color | Dot mark | Dot color | Function |
|---|---|---|---|---|
| 1 | Light brown | ■ | Black | COM + |
| 2 | Light brown | ■ | Red | COM – |
| 3 | Yellow | ■ | Black | OUT0 |
| 4 | Yellow | ■ | Red | OUT1 |
| 5 | Light green | ■ | Black | OUT2 |
| 6 | Light green | ■ | Red | OUT3 |
| 7 | Gray | ■ | Black | BUSY |
| 8 | Gray | ■ | Red | ALARM |
| 9 | White | ■ | Black | IN0 |
| 10 | White | ■ | Red | IN1 |
| 11 | Light brown | ■ ■ | Black | IN2 |
| 12 | Light brown | ■ ■ | Red | IN3 |
| 13 | Yellow | ■ ■ | Black | RESET |
| 14 | Yellow | ■ ■ | Red | STOP |

∗ Parallel I/O signal is valid in auto mode. While the test function operates at manual mode, only the output is valid.