LEC#-TF2Z362EN

ORIGINAL INSTRUCTIONS

Instruction Manual
Programless Controller
Step motor (24 VDC)
Series LECP1 / LECP2

The intended use of the programless controller is to control the movement of an electrical actuator in response to step data / inputs.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) [1], and other safety regulations.

IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)

ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

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

⚠ Warning

- **Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

2.1 General specifications

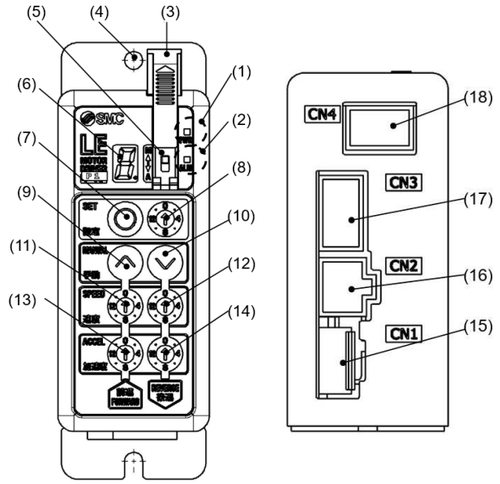
Item		Specifications
Compatible motor		Unipolar winding 2-Phase HB step motor
Power supply voltage		24 VDC +/-10%
Current consumption		Refer to actuator specifications
Parallel Inputs		6 inputs (photo-coupler isolation)
Parallel Outputs		6 outputs (photo-coupler isolation)
Stop points	LECP1	14 points (Position 1 to 14(E)
	LECP2	Stroke ends 2 points (Position 1 and 2). Intermediate: 12 points (Position 3 to 14(E).
Compatible encoder		Incremental A/B phase (800 pulses / rotation)
Memory		EEprom
Lock control		Forced lock release terminal
Cable length		I/O cable: 5 m maximum Actuator cable: 20 m maximum
Cooling method		Natural air-cooling
Operating temperature		0ºC to 40ºC (no freezing)
Storage temperature		-10ºC to 60ºC (no freezing)
Humidity		90% RH or less (no condensation)
Insulation resistance		50 MΩ (500 VDC) between external terminals and case
Weight		130 g (Direct mounting type) 150 g (DIN rail mounting type)

2 Specifications (continued)

⚠ Warning

Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 Name and function of individual parts



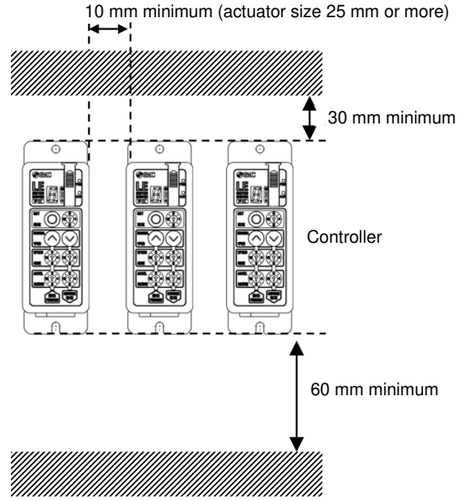
No.	Name	Description
1	PWR LED (Green)	LED is ON: Power ON / Servo ON LED flashing: Power ON / Servo OFF.
2	ALM LED (Red)	LED is ON: Power ON / with Alarm LED flashing: Parameter setting
3	Cover	Mode switch protection cover.
4	FG	Functional Ground (When mounting the controller, tighten screws and attach the grounding cable).
5	Mode switch	Switch to select auto / manual.
6	7 segment LED display	Auto mode / Without alarm: Indicates the position number which is instructed by ON/OFF of IN0 to IN3 of the CN4 parallel I/O. (During command operation: Flashing / Instruction command completed: ON) Auto mode / With alarm: Indicates Alarm Group. Manual mode: Indicates that content may vary depending on the operating function.
7	SET button	Determines the settings and gives a command to operate in manual mode.
8	Position switch	Assigns the position number.
9	MANUAL Forward button	Performs forward Jog and inching.
10	MANUAL Reverse button	Performs reverse Jog and inching.
11	SPEED Forward button	16 forward speeds are available.
12	SPEED Reverse button	16 reverse speeds are available.
13	ACCEL Forward button	16 forward acceleration steps are available.
14	ACCEL Reverse button	16 reverse acceleration steps are available.
15	CN1 power connector (4 pins)	Connection for power supply.
16	CN2 Motor drive connector (6 pins)	Connect motor connector of actuator.
17	CN3 Encode connector (16 pins)	Connect encoder connector of actuator.
18	CN4 I/O connector (14 pins)	Connection for I/O cable.

4 Installation

4.1 Installation

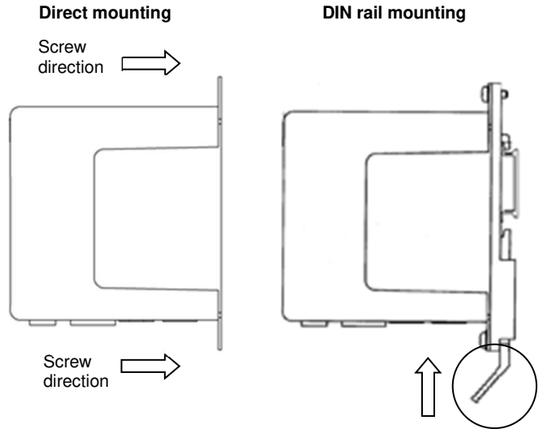
⚠ Warning

- Do not install the product unless the safety instructions have been read and understood.
- Design the installation so that the temperature surrounding the controller is within the specified operating temperature. Leave enough space between the controllers so that the operating temperature of the controllers remains within the specification range.
- Mount the controller vertically with 30 mm minimum space at the top and 60 mm minimum at the bottom of the controller as shown below.
- Allow 60 mm minimum space between the front of the controller and a door (lid) so that the connectors can be connected and disconnected.



4.2 Mounting

- The controller can be direct mounted using M4 screws (LECP1** / LECP2**) or mounted on a DIN rail (model LECP1**D / LECP2**D).
- When using DIN rail mounting, hook the controller on the DIN rail and press the lever in the direction of the arrow to lock it.



⚠ Caution

If the mounting surface for the controller is not flat or is uneven, excessive stress may be applied to the enclosure, which can cause failure. Be sure to mount on a flat surface.

4 Installation (continued)

4.3 Environment

⚠ Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.
- Avoid mounting the controller near a vibration source, such as a large electromagnetic contactor or circuit breaker on the same panel.
- Do not use in an environment with strong magnetic fields present.

5 Wiring

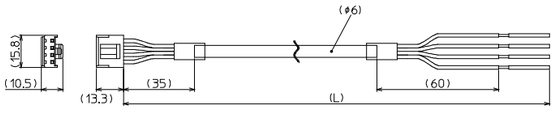
5.1 Wiring

⚠ Caution

- Do not perform wiring while the power is on.
- Confirm proper insulation of wiring.
- Do not route wires and cables together with power or high voltage cables.
- Keep wiring as short as possible to prevent interference from electromagnetic noise and surge voltage.
- Do not use an inrush current limited type of power supply for the controller.
- Do not connect multiple wires to one connector terminal.

5.2 Power Supply Connector

The power supply cable with connector (LEC-CK1-1) is supplied with the controller. Plug the connector into CN1 on the controller.



Pin No.	Terminal	Function	Description
1	0V	Common power (-)	Negative common power for M24V, C24V, EMG, BK RLS.
2	M24V	Motor power (+)	Positive power for the actuator motor to be supplied via the controller.
3	C24V	Control power (+)	Positive control power.
4	BK RLS	Unlocking (+)	Positive power for lock release.

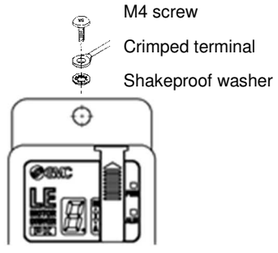
5.2.1 Cable / Connector specifications

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

5 Wiring (continued)

5.3 Ground connection

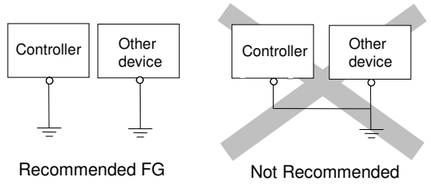
- Place a ground cable with crimped terminal under one of the M4 mounting screws with a shakeproof washer and tighten the screw.



Caution

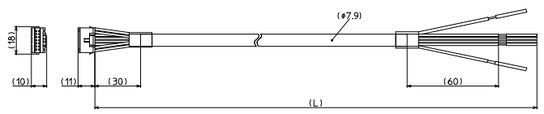
The M4 screw, cable with crimped terminal and shakeproof washer must be prepared by the user.

- A dedicated Ground connection must be used. Grounding should be to a D-class ground (ground resistance of 100 Ω maximum).
- The cross-sectional area of the ground cable shall be 2 mm^2 minimum.
- The Grounding point should be as near as possible to the controller. Keep the grounding cable as short as possible.



5.4 Parallel I/O Connector

- When connecting the parallel I/O connector to a PLC use an SMC parallel I/O cable (LEC-CK4-#).
- There are 2 types of parallel I/O with this controller: NPN type and PNP type. Check the polarity required before use.
  The parallel I/O wiring should be prepared according to the polarity.



Pin No.	Wire colour	Dot Mark	Dot colour	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	Grey	■	Black	BUSY
8	Grey	■	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

For further details of the Parallel I/O wiring refer to the Operation Manual on the SMC website (URL: https://www.smcworld.com).

6 Setting

6.1 Stop position and operation mode

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

6.2 Auto / Manual mode setting

- There are 2 types of modes on the controller (manual and auto mode).
- Setting and operating methods are different. The mode is selected using the mode switch on the front of the controller.

Refer to the Operation Manual on the SMC website (URL: https://www.smcworld.com) for further setting details.

7 LED Display

Refer to the table below for details of the LED status.

LED		Description
PWR	Green LED is ON	Servo is turned ON
	Green LED is flashing	Servo is turned OFF
ALM	OFF	Normal operation
	Red LED is ON	Alarm is generated

8 How to Order

Refer to the catalogue on the SMC website (URL: https://www.smcworld.com) for the How to Order information.

9 Outline Dimensions (mm)

Refer to the drawings / operation manual on the SMC website (URL: https://www.smcworld.com) for outline dimensions.

10 Maintenance

10.1 General Maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- Before performing maintenance, turn off the power supply. Check the voltage with a tester 5 minutes after the power supply is turned OFF.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

Caution

- Maintenance should be performed according to the procedure indicated in the Operation Manual.
- When equipment is serviced, first confirm that measures are in place to prevent dropping of work pieces and run-away of equipment, etc, then cut the power supply to the system. When machinery is restarted, check that operation is normal with actuators in the correct position.

Warning

- Perform maintenance checks periodically.
- Confirm wiring and screws are not loose. Loose screws or wires may cause unexpected malfunction.
- Conduct an appropriate functional inspection and test after completing maintenance. In case of any abnormalities (if the actuator does not move, etc.), stop the operation of the system. Otherwise, an unexpected malfunction may occur and it will become impossible to ensure safety. Operate an emergency stop instruction to confirm safety.
- Do not put anything conductive or flammable inside of the controller.
- Ensure sufficient space around the controller for maintenance.

11 Limitations of Use

11.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

12 Product disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

13 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.

SMC Corporation

URL : http// www.smcworld.com (Global) http// www.smc.eu (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan

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