



ORIGINAL INSTRUCTIONS

Instruction Manual
Step Motor Driver (24 VDC Servo)
Pulse input type
Series LECPA###-#



The intended use of the step motor driver is to control the movement of an electrical actuator in response to step data and electrical 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

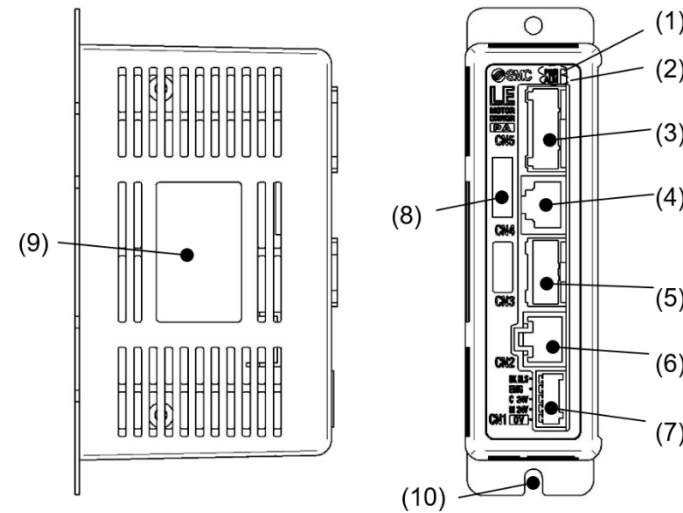
Item	Specifications
Compatible motor	Step motor (servo 24 VDC)
Power supply voltage	24 VDC +/-10% (motor drive control, stop, lock brake release).
Current consumption	3 A (Peak 5 A) maximum
Parallel Inputs	5 inputs (photo-coupler isolation)
Parallel Outputs	9 outputs (photo-coupler isolation)
Compatible encoder	Incremental A/B phase (resolution: 800 pulses / rotation)
Serial communication	RS485
Lock control	Forced lock release terminal (applicable to non-magnetizing lock).
Cable length	IO cable: 5 m maximum Actuator cable: 20 m maximum
Cooling method	Natural air-cooling
Operating temperature	0°C to 40°C (no freezing)
Storage temperature	-10°C to 60°C (no freezing)
Operating humidity	90% RH or less (no condensation)
Insulation resistance	50 MΩ (500 VDC) between external terminals and case
Weight	120 g (Direct mounting type) 140 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



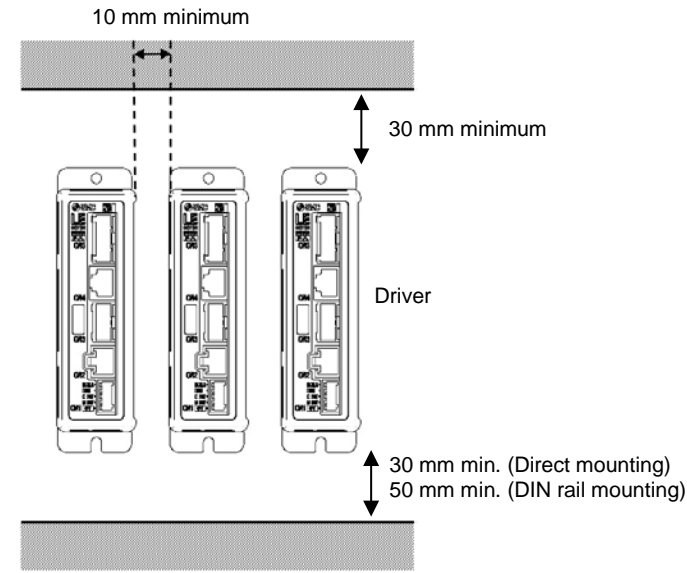
No.	Name	Description
1	PWR LED (Green)	LED to indicate power ON and data being written (flashing).
2	ALM LED (Red)	LED to indicate Alarm condition.
3	Parallel I/O connector (20 pins) CN5	Connector for I/O connection to PLC using I/O cable (LEC-CL5-#).
4	Serial I/O connector (8 pin) CN4	Connector for the teaching box (LEC-T1) or the driver communication cable (LEC-W2-C).
5	Encoder connector (16 pin) CN3	Connector for actuator cable.
6	Motor power connector (6 pin) CN2	
7	Power supply connector (5 pin) CN1	Connector for driver power supply (24 VDC) using the power supply plug. Control power (+), Stop signal (+), Motor power (+), Lock release (+), Common power (-)
8	Applicable electric actuator model number label	Label indicating the electric actuator model number which can be connected to the driver.
9	Driver label	Label indicating the model number of the driver.
10	FE	Functional Ground (When the driver is mounted, tighten screws and connect the grounding 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 on the top and 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 screws or mounted on a DIN rail (model LECPA##D).
- When using DIN rail mounting, hook the controller on the DIN rail and press the lever down 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.

4.3 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.

4.4 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.

4 Installation (continued)

- Do not connect multiple wires to one connector terminal.

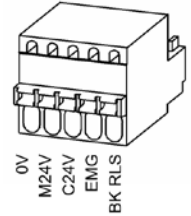
Power Supply Connector

Wire the power supply cable to the power supply plug connector, then insert it into connector PWR on the driver.

- Use special screwdriver (Phoenix Contact No. SZS0.4x2.0) to open / close lever and insert the wire into the connector terminal.

Power supply connector.
SMC Part No. LEC-D-1-1.

Phoenix Contact Part No:
FK-MC0.5/5-ST-2.5



Pin No.	Terminal	Function	Description
1	0V	Common power (-)	Negative common power for M24V, C24V, EMG and LK RLS.
2	M24V	Motor power (+)	Positive power for the actuator motor supplied via the controller.
3	C24V	Power supply (+)	Positive control power.
4	EMG	Stop (+)	Positive power for emergency stop signal
5	BK RLS	Unlocking (+)	Positive power for lock release.

Power Supply Wire specifications

Prepare the wiring according to the following specifications (to be prepared by the user).

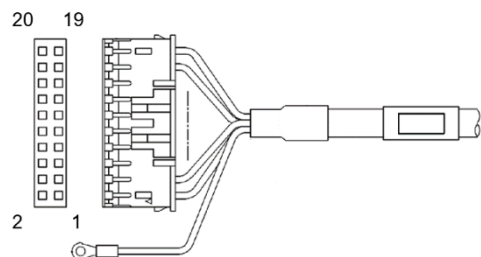
Item	Specifications
Applicable wire size	<ul style="list-style-type: none"> Single stranded wire AWG20 (0.5 mm²) Rated temperature of insulation should be 60°C or more. The OD should be ø2.5 mm or less.
Stripped wire length	8 mm

4 Installation (continued)

Parallel I/O Connector

- When connecting the parallel I/O connector to a PLC use an SMC parallel I/O cable (LEC-CL5-#).
- 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.	Insulation Colour	Dot mark	Dot colour	Category	Signal
1	Light brown	●	Black	24 V	COM+
2	Light brown	●	Red	0 V	COM-
3	Yellow	●	Black	Pulse signal	NP+
4	Yellow	●	Red	Pulse signal	NP-
5	Light green	●	Black	Pulse signal	PP+
6	Light green	●	Red	Pulse signal	PP-
7	Grey	●	Black	Input	SETUP
8	Grey	●	Red	Input	RESET
9	White	●	Black	Input	SVON
10	White	●	Red	Input	CLR
11	Light brown	●●	Black	Input	TL
12	Light brown	●●	Red	Output	TLOUT
13	Yellow	●●	Black	Output	WAREA
14	Yellow	●●	Red	Output	BUSY
15	Light green	●●	Black	Output	SETON
16	Light green	●●	Red	Output	INP
17	Grey	●●	Black	Output	SVRE
18	Grey	●●	Red	Output	ESTOP
19	White	●●	Black	Output	ALARM
20	White	●●	Red	Output	AREA

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

4.5 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.

The controller must be connected to Ground to reduce noise. If higher noise resistance is required, ground the 0 V (signal ground). When grounding the 0 V, avoid flowing noise from ground to 0 V.

- 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 mm² minimum.
- The Grounding point should be as near as possible to the controller. Keep the grounding cable as short as possible.

5 Setting

In order to move the electric actuator to a specific position, it is necessary to set up the patterns of operation with a PC using the controller setting software or by using a teaching box. This set up data will be recorded in the memory of the controller.

Step data describes the data that sets items of operation (such as positioning width) excluding speed, position, acceleration, and deceleration, which are determined by the pulse-signal input. Step data will become effective as soon as it is recorded into the driver.

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

6 LED Display

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

	LED	Description
PWR	OFF	Power is not supplied
	Green LED is ON	Power is supplied
	Green LED is flashing	EEPROM memory writing
ALM	OFF	Normal operation
	Red LED is ON	Controller Alarm generated

7 How to Order

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

8 Outline Dimensions (mm)

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

9 Maintenance

9.1 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.

10 Limitations of Use

10.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

11 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.

12 Contacts

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

SMC Corporation

URL: <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
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 Template DKP50047-F-085M