LECS#-TF2Z245EN

ORIGINAL INSTRUCTIONS

Instruction Manual
AC Servo Motor Driver
Series LECSB2-T, LECSN2-T, LECSS2-T

The intended use of the AC servo motor driver is to control the movement of an electrical actuator in response to point table data or 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.
- Do not operate the product beyond the specification range.
  Fire, malfunction or equipment damage may result. Use the product only after confirming the specifications.
- When using the product as part of an interlocking system:
  Provide a double interlocking system, for example a mechanical system. Check the product regularly to ensure correct operation.
- Do not use the lock as a safety lock or a control that requires a locking force.
- Do not drop, hit or apply excessive shock to the product.
- Prevent any foreign matter from entering the product.
- Use the product within the specified ambient temperature range.
- If abnormal heating, smoke or a fire occurs in the product, immediately turn off the power supply.
- Do not operate the driver with the front cover removed. High-voltage terminals and the charging area are exposed. This may result in an electric shock.
- Keep the driver and actuator combined as delivered for use.
  The driver is set with parameters for the actuator it is shipped with.
- Refer to the operation manual on the SMC website (URL: https://www.smcworld.com) for more Safety Instructions.

2 Specifications

2.1 LECSB2-T, LECSN2-T, LECSS2-T specifications

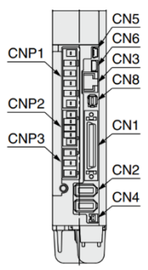
Model		LECS*2 -T5	LECS*2 -T7	LECS*2 -T8	LECS*2 -T9
Compatible motor capacity		100 W	200 W	400 W	750 W
Compatible encoder		Absolute 22-bit encoder (Resolution: 4194304 pulse/rev.)			
Main power supply	Voltage	3 phase or 1 phase 200 to 240 VAC (50/60 Hz)			
	Allowable voltage fluctuation	3 phase or 1 phase 170 to 264 VAC			
	Rated current	0.9 A	1.5 A	2.6 A	3.8 A
Control power supply	Voltage	1 phase 200 to 240 VAC (50/60 Hz)			
	Allowable voltage fluctuation	1 phase 170 to 264 VAC			
	Rated current	0.2 A			
Safety observation function (STO) IEC/EN 61800-5-2		EN ISO 13849-1 category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2 and EN 61800-5-2 SIL 2			
Mission Time		Tm = 20 [years]			
Operating temperature		0 to 55°C (no freezing)			
Storage temperature		–20 to 65°C (no freezing)			
Humidity range		≤ 90 %RH (no condensation)			
Insulation resistance		10 MΩ (500 VDC) between housing and SG			
Weight		800 g (LECSB2-T) 800 g (LECSS2-T) 1000 g (LECSN2-T)		1000 g	1400 g

⚠ Warning

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

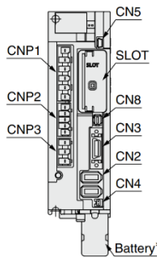
3 Names of Individual Parts

LECSB2-T



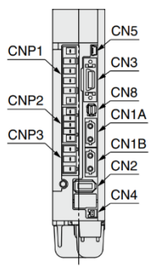
Pulse Input, Positioning

LECSN2-T



PROFINET, EtherCAT, EtherNet/IP

LECSS2-T



SSCNETIII/H

Connector	Description
CN1	I/O signal connector (LECSB2-T)
CN1-A	Front axis connector (LECSS2-T)
CN1-B	Rear axis connector (LECSS2-T)
CN2	Encoder connector
CN3	RS-422 communication connector (LECSB2-T)
	I/O signal connector (LECSN2-T and LECSS2-T)
CN4	Battery connector
CN5	USB communication connector
CN6	Analogue monitor connector (LECSB2-T)
CN8	STO input signal connector
CNP1	Main circuit power supply connector
CNP2	Control circuit power supply connector
CNP3	Servo motor power connector
SLOT	Network card slot (LECSN2-T)

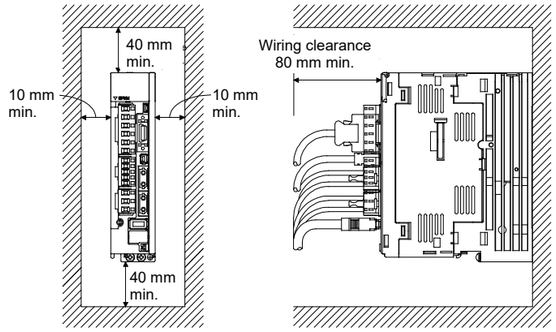
4 Installation

4.1 Installation

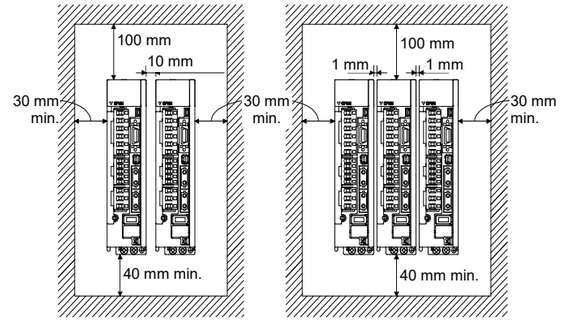
⚠ Warning

- Do not install the product unless the safety instructions have been read and understood.
- Design the installation so that the temperature surrounding the driver is within the specified operating temperature. Leave enough space between the drivers so that the operating temperature of the drivers remains within the specification range.
- Install a cooling fan if necessary.
- The driver must be mounted vertically with sufficient space at the top and bottom of the driver as shown below.
- Allow 80 mm minimum space between the front of the driver and a door (lid) so that the connectors can be connected and disconnected.
- When installing a number of drivers together, leave a minimum of 1 mm between adjacent drivers, allowing for mounting tolerances.
- The driver must be installed in a metal cabinet (control box).

Installation of single driver



Installation of 2 or more drivers



4.2 Mounting

- The driver should be mounted vertically onto a panel using screws tightened to the required tightening torque.

⚠ Caution

If the mounting surface for the driver 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

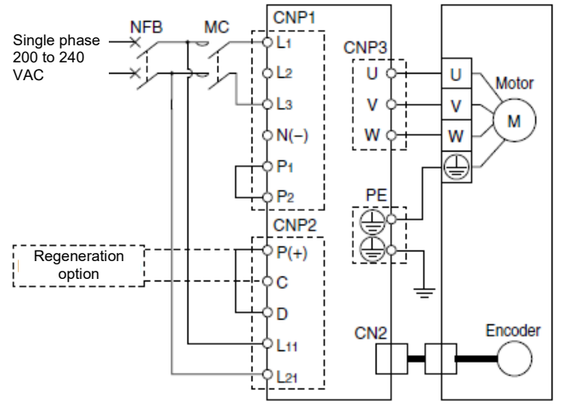
- Do not use the product in the presence of flammable, explosive or corrosive gases, chemicals, salt water or steam.
  This product does not have an explosion proof construction.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or 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 driver near a vibration source, such as a large electromagnetic contactor or circuit breaker on the same panel.

5 Wiring

⚠ Caution

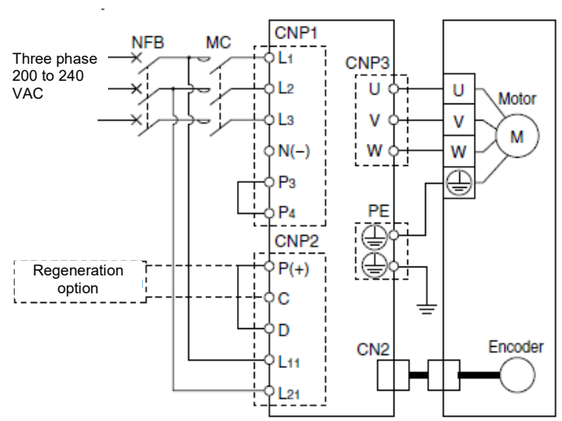
- Do not perform wiring while the power is on.
- Confirm proper insulation of wiring.
- Use only the specified cables.
- Ensure that the driver and servo motor are installed securely before wiring commences.
- Wire the connector correctly and securely.
- Check the connector for polarity and do not apply any voltage to the terminals other than those specified.
- Take appropriate measures against noise. Noise in a signal line may cause malfunction.
- 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 the product in a place where electrical surges are generated.
- Use suitable surge protection when a surge generating load such as a solenoid valve is to be directly driven.
- Take care that actuator movement does not catch the cables.

Wiring for Single phase 200 to 240 VAC



Note) For single phase, the power supply should be connected to terminals L1 and L3 (not L2).

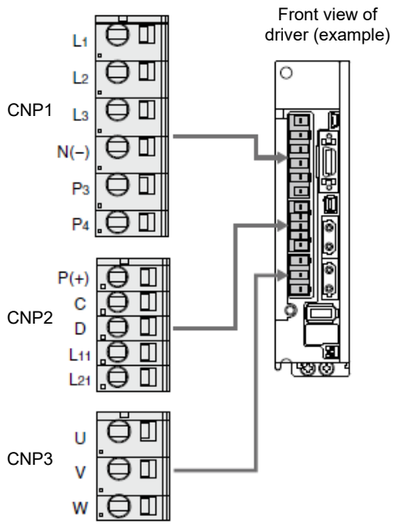
Wiring for Three phase 200 to 240 VAC



5.1 Ground connection

- Provide grounding to ensure correct operation and to improve noise resistance of the product.
- This product should be individually grounded using a short cable.
- 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.

5 Wiring (continued)



Main circuit power supply connector (CNP1)

Terminal	Function	Details
L1	Main circuit power supply	Connect the main circuit power supply. Single phase 200 to 240 VAC, 50/60 Hz : L1, L2 Three phase 200 to 240 VAC, 50/60 Hz : L1, L2, L3
L2		
L3		
N(-)	Not connected	
P3	Connection between P3 and P4 (connected at time of shipping)	
P4		

Control circuit power supply connector (CNP2)

Terminal	Function	Details
P(+)	Regeneration option	When using a driver built-in regenerative resistor, connect P+ and D (factory-wired). When using a regenerative option, disconnect P+ and D, and connect the regenerative option to P+ and C.
C		
D		
L11	Control circuit power supply	Single phase 200 to 240 VAC, 50/60 Hz : L11 L21 Three phase 200 to 240 VAC, 50/60 Hz : L11, L21
L21		

Servo Motor power connector (CNP3)

Terminal	Function	Details
U	Servo motor power (U)	Connect to motor cable (U, V, W)
V	Servo motor power (V)	
W	Servo motor power (W)	

⚠ Warning

- Do not install the driver, servo motor or the regeneration option, on or near combustible materials.
- Always use a magnetic contactor between the main circuit power supply and the “L” terminals of the driver. Configure the wiring to ensure the power supply can be turned off at the driver. The magnetic contactor prevents a continuous large current flow if the driver malfunctions.

5 Wiring (continued)

- When a regenerative resistor is used, monitor the resistor temperature and cut the main power to the driver if the temperature exceeds safe levels, otherwise the regenerative resistor will fail and there is a risk of fire.
- Provide adequate protection to prevent foreign matter from entering the driver and servo motor.
- Always connect a circuit breaker to the power supply of the driver.

Caution

- When it is assumed that a hazardous condition may occur due to a power failure or a product fault, use a servo motor with lock (electromagnetic brake) or an external brake.
- Configure the circuit so that the lock (electromagnetic brake) activates when the external emergency stop is activated.

6 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 driver setting software. This set up data will be recorded in the memory of the driver.

Point table data describes the data that sets items of operation (such as positioning width) excluding speed, position, acceleration, and deceleration. Point table data will become effective as soon as it is recorded into the driver.

The driver has an LED display to show the servo status and alarm details, and parameter setting switches.

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

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. Wait until the charge lamp turns OFF.
  Check the voltage with a tester 15 minutes after the power supply is turned OFF.
  Lock the system so that no other person can turn the power on or implement measures such as a safety plug.
- 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.

9 Maintenance (continued)

⚠ 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 or near to the driver.
- Ensure sufficient space around the driver for maintenance.
- Always perform a system check after maintenance.

10 Limitations of Use

10.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

10.2 Memory Life

⚠ Caution

The number of write times to the memory, which stores parameter settings, etc., is limited to 100,000. If the total number of the following operations exceeds 100,000 the driver may fail when the memory reaches the end of its useful life.

- Writing to the memory due to parameter setting changes
- Writing to the memory due to device changes

10.3 Battery transportation

⚠ Caution

To transport lithium batteries, take actions to comply with the instructions and regulations such as the United Nations (UN), the International Civil Aviation Organization (ICAO), and the International Maritime Organization (IMO).
The battery (LEC-MR-BAT6V1SET(-A)) is an assembled battery from two batteries (lithium metal battery CR17335A).
The IATA Dangerous Goods Regulations are revised, and the requirements are changed annually. When transporting lithium batteries, the responsibility for the cargo lies with the customer. Thus, be sure to check the latest version of the IATA Dangerous Goods Regulations.
When contracting transportation to a carrier, follow the carrier’s instructions.
For more information, consult your nearest sales branch.

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.

Dispose of the driver, battery (primary battery) and other options according to local laws and regulations.

12 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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