



Installation and Maintenance Manual
AC Servo Motor Driver
Series LECS



Note: For special models LECS*-X* please check the appropriate drawing for the dimensions and specifications.

1 Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product to ensure correct handling and also read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of “Caution”, “Warning” or “Danger”, followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

Caution	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
Warning	Indicates a hazard with a medium level of risk, which, if not avoided, could result in death or serious injury.

Danger	Indicates a hazard with a high level of risk, which, if not avoided, will result in death or serious injury.
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- Electromagnetic compatibility: This product is class A equipment that is intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

Warning

- **Do not disassemble, modify (including change of printed circuit board) or repair the product.**
An injury or product failure may result.
- **Do not operate the product beyond the specification range.**
Fire, malfunction or equipment damage may result.
Use the product only after confirming the specifications.
- **Do not use the product in the presence of flammable, explosive or corrosive gas.**
Fire, explosion or corrosion may result.
This product does not have an explosion proof construction.
- **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.
- **Before performing maintenance, be sure of the following:**
Turn off the power supply.

Caution

- **Always perform a system check after maintenance.**
Do not use the product if any error occurs.
Safety cannot be assured if caused by un-intentional malfunction.
- **Provide grounding to ensure correct operation and to improve noise resistance of the product.**
This product should be individually grounded using a short cable.
- **Follow the instructions given below when handling the product.**
Failing to do so may result in product damage.
- **Maintenance space should always be provided around the product.**
- **Do not remove labels from the product.**

1 Safety Instructions (continued)

- **Do not drop, hit or apply excessive shock to the product.**
- **Unless stated otherwise, follow all specified tightening torques.**
- **Do not bend, apply tensile force, or apply force by placing heavy loads on the cables.**
- **Connect wires and cables correctly and do not connect while the power is turned on.**
- **Do not route input/output wires and cables together with power or high-voltage cables.**
- **Check the insulation of wires and cables.**
- **Take appropriate measures against noise, such as noise filters, when the product is incorporated into other equipment or devices.**
- **Take sufficient shielding measures when the product is to be used in the following conditions:**
 - Where noise due to static electricity is generated.
 - Where electro-magnetic field strength is high.
 - Where radioactivity is present.
 - Where power lines are located.
- **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.**
- **Prevent any foreign matter from entering this product.**
- **Do not expose the product to vibration or impact.**
- **Use the product within the specified ambient temperature range.**
- **Do not expose the product to any heat radiation.**
- **Use a precision screwdriver with flat blade to adjust the DIP switch.**
- **Close the cover over the switches before power is turned on.**
- **Do not clean the product with chemicals such as benzene or thinners.**

2 General Instructions

2.1 Wiring **Warning**

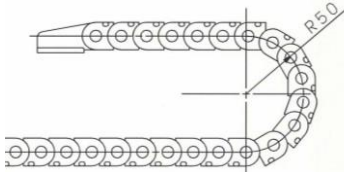
- **Adjustment, mounting or wiring changes should not be carried out**

before disconnecting the power supply to the product.
Electric shock, malfunction and damage can result.

- **Do not disassemble the cables.**
- **Use only specified cables.**
- **Do not connect or disconnect the wires, cables and connectors when the power is turned on.**

Caution

- **Wire the connector correctly and securely.**
Check the connector for polarity and do not apply any voltage to the terminals other than those specified in the Operation Manual.
- **Take appropriate measures against noise.**
Noise in a signal line may cause malfunction. As a countermeasure separate the high voltage and low voltage cables, and shorten the wiring lengths, etc.
- **Do not route input/output wires and cables together with power or high voltage cables.**
The product can malfunction due to noise interference and surge voltage from power and high voltage cables close to the signal line. Route the wires of the product separately from power or high voltage cables.
- **Take care that actuator movement does not catch cables.**
- **Operate with all wires and cables secured.**
- **Avoid bending cables at sharp angles where they enter the product.**
- **Avoid twisting, folding, rotating or applying an external force to the cable.**
Risk of electric shock, wire breakage, contact failure and loss of control of the product can result.
- **Fix the motor cables protruding from the actuator before use.**
The motor and lock cables are not robotic type cables and can be damaged when moved.
- **The actuator cables connecting the actuator and the driver are robotic type cables. These should not be placed in a flexible moving tube with a radius smaller than the specified value (min. 50 mm).**



2 General Instructions (continued)

- **Confirm correct insulation.**
Poor insulation of wires, cables, connectors, terminals, etc. can cause interference with other circuits. Also there is the possibility that excessive voltage or current may be applied to the product causing damage.

2.2 Transportation **Caution**

- **Do not carry or swing the product by the cables.**

2.3 Mounting **Warning**

- **Observe the required tightening torque for screws.**
Unless stated otherwise, tighten the screws to the recommended torque for mounting the product.
- **Do not make any alterations to the product.**
Alterations made to this product may lead to a loss of durability and damage to the product, which can lead to injury and damage to other equipment and machinery.
- **When an external guide is used, connect the moving parts of the product and the load in such a way that there is no interference at any point within the stroke.**
Do not scratch or dent the sliding parts of the table or mounting face, etc., by striking or holding them with other objects. The components are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation or seizure.
- **Do not use the product until it has been verified that the equipment can be operated correctly.**
After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted correctly.
- **When attaching to the work piece, do not apply strong impact or a large moment.**
If an external force in excess of the allowable moment is applied, it may cause looseness in the guide unit, an increase in sliding resistance or other problems.

- **Maintenance space**
Allow sufficient space for maintenance and inspection.

2.4 Handling **Warning**

- **Do not touch the motor while in operation.**
The surface temperature of the motor can increase to approx. 90°C to 100°C due to operating conditions.
Energizing alone may also cause this temperature increase.
As it may cause burns, do not touch the motor when in operation.
- **If abnormal heating, smoking or fire, etc. occurs in the product, immediately turn off the power supply.**
- **Immediately stop operation if abnormal operation noise or vibration occurs.**
If abnormal operation noise or vibration occurs, the product may have been mounted incorrectly. Unless operation of the product is stopped for inspection, the product can be seriously damaged.
- **Never touch the rotating part of the motor or the moving part of the actuator while in operation.**
There is a serious risk of injury.
- **When installing, adjusting, inspecting or performing maintenance on the product, the driver and related equipment, be sure to turn off the power supply to each of them. Then, lock it so that no other person can turn the power on, or implement measures such as a safety plug.**

Caution

- **Keep the driver and actuator combined as delivered for use.**
The driver is set with parameters for the actuator it is shipped with. If it is combined with a different actuator, failure can result.
- **Check the product for the following points before operation.**
 - Damage to electric cables and signal wires.
 - Looseness of the connector to the power and signal lines.
 - Looseness of the actuator/cylinder and driver mounting.
 - Abnormal operation.
 - Stop function.

2 General Instructions (continued)

- **When more than one person is performing the installation, decide on the procedures, signals, measures and resolution for abnormal conditions before beginning.**
- **Also designate a person to supervise the work, other than those performing the work.**
- **An operation test should be performed at low speed, start the test at a predefined speed, after confirming there are no problems.**
- **The actual speed of the product will be affected by the workload.**
Before selecting a product, check the catalogue for the instructions regarding selection and the specifications.
- **Do not apply a load, impact or resistance in addition to a transferred load during return to origin.**
In the case of the return to origin by pushing force, additional force will cause displacement of the origin position since it is based on the detected motor torque.
- **Do not remove the product nameplate.**

2.5 Actuator with lock **Warning**

- **Do not use the lock as a safety lock or a control that requires a locking force.**
The lock used is designed to prevent dropping of the work piece.
- **For vertical mounting, use an actuator with lock.**
If the actuator is not equipped with a lock, the product will move and drop the work piece when the power is removed.
- **"Measures against drops," means preventing a work piece from dropping due to its weight when the actuator operation is stopped and the power supply is turned off.**
- **Do not apply an impact load or strong vibration while the lock is activated.**
If an external impact load or strong vibration is applied to the product, the lock will lose its holding force and damage to the sliding part of the lock or reduced lifetime can result. The same situation will occur when the lock slips due to a force higher than its holding force, as this will accelerate the wear to the lock.

- **Do not apply liquid, oil or grease to the lock or its surroundings.**
When liquid, oil or grease is applied to the sliding part of the lock, its holding force will be reduced significantly.
- **Take “measures against drops” and check that safety is assured before mounting, adjustment and inspection of the product.**
If the lock is released with the product mounted vertically, a work piece can drop due to its weight.

2.6 Please refer to the auto switch references in “Best Pneumatics” when an auto switch is to be used.

2.7 Unpacking **Caution**

- **Check that the product received is as ordered.**
If a different product is installed from that ordered, injury or damage could result.

3 Specifications

LECSA series					
Model		LECS*1-S5	LECS*1-S7	LECS*2-S5	LECS*2-S7
Compatible motor capacity (W)		100	200	100	200
Compatible encoder		Incremental 17-bit encoder (Resolution: 131072 pulse/rev.)			
Main power supply	Voltage	1 phase 100 to 120 VAC (50/60 Hz)		1 phase 200 to 230 VAC (50/60 Hz)	
	Allowable voltage fluctuation	1 phase 85 to 132 VAC		1 phase 170 to 253 VAC	
	Rated current (A)	3.0	5.0	1.5	2.4
Control power supply	Voltage (VDC)	24 ±10%			
	Rated current (A)	0.5			
Operating temperature range (°C)		0 to 55 (No freezing)			
Operating humidity range (%RH)		≤90 (No condensation)			
Storage temperature range (°C)		-20 to 65 (No freezing)			
Storage humidity range (%RH)		≤90 (No condensation)			
Insulation resistance (MΩ)		Between the housing and SG: 10 (500 VDC)			
Weight (g)		600			

LECSB/LECS/LECSS series							
Model		LECS*1-S5		LECS*1-S7	LECS*2-S5	LECS*2-S7	LECS*2-S8
Compatible motor capacity (W)		100		200	100	200	400
Compatible encoder		Absolute 18-bit encoder (Resolution: 262144 pulse/rev.)					
Main power supply	Voltage	1 phase 100 to 120 VAC (50/60 Hz)			3 phase or 1 phase 200 to 230 VAC (50/60 Hz)		
	Allowable voltage fluctuation	1 phase 85 to 132 VAC			3 phase or 1 phase 170 to 253 VAC		
	Rated current (A)	3.0		5.0	0.9	1.5	2.6
Control power supply	Voltage	1 phase 100 to 120 VAC (50/60 Hz)			1 phase 200 to 230 VAC (50/60 Hz)		
	Allowable voltage fluctuation	1 phase 85 to 132 VAC			1 phase 170 to 253 VAC		
	Rated current (A)	0.4			0.2		
Operating temperature range (°C)		0 to 55 (No freezing)					
Operating humidity range (%RH)		≤90 (No condensation)					
Storage temperature range (°C)		-20 to 65 (No freezing)					
Storage humidity range (%RH)		≤90 (No condensation)					

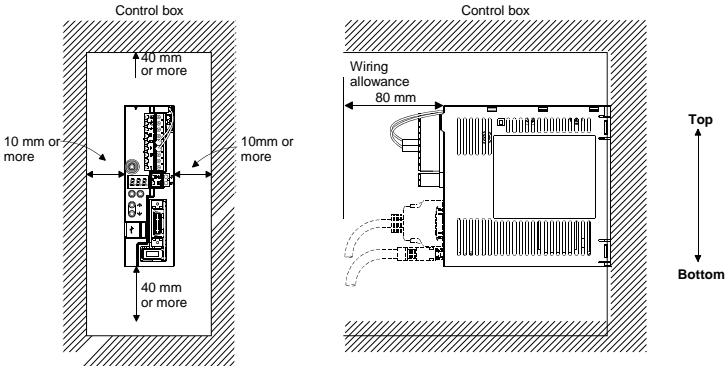
Insulation resistance (MΩ)	Between the housing and SG: 10 (500 VDC)		
Weight (g)	800		1000

4 Installation

4.1 How to install the driver

4.1.1 Installation of a single driver

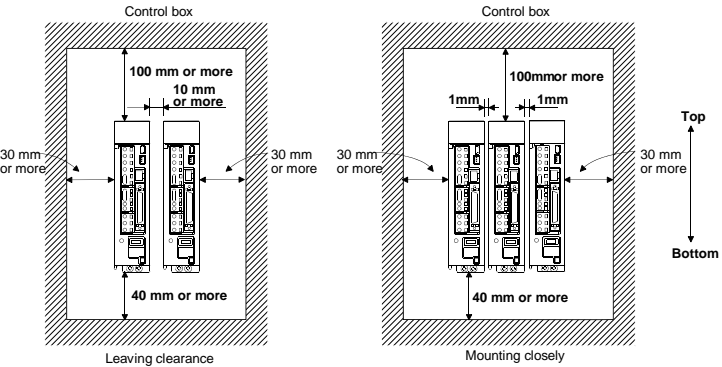
Note) A regenerative resistor is mounted on the back of the LECSA. The regenerative resistor causes a temperature rise of 100°C relative to the ambient temperature. Fully examine heat dissipation and the installation position before installing the driver.



4 Installation (continued)

4.1.2 Installation of 2 or more drivers

LECS series drivers of any capacity can be mounted together.



Note) Leave a large clearance between the top of the driver and the internal surface of a control box, and install a cooling fan to prevent the internal temperature of the control box from exceeding the environmental conditions.

When installing the drivers together, leave a clearance of 1 mm between adjacent drivers, in consideration of mounting tolerances. In this case, operate the drivers at an ambient temperature of 0°C to 45°C or at 75 % or less of the effective load ratio.

4.1.3 Others

When using heat generating equipment such as the regenerative option, install with full consideration of heat generation so that the driver is not adversely affected. Install the driver on a perpendicular wall in the correct vertical direction.

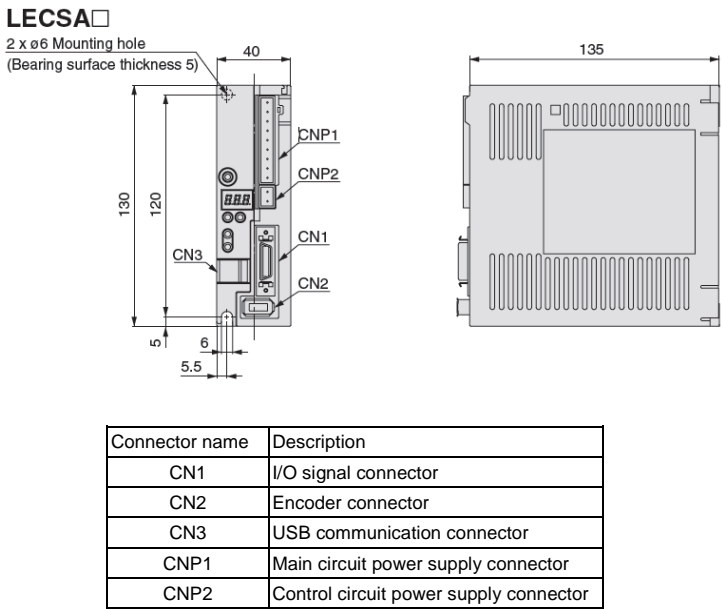


Caution

- The equipment must be installed in the specified direction. Otherwise, a fault may occur.

- Maintain the specified clearances between the driver and control box inside walls or other equipment.
- To prevent an electric shock, always connect the protective earth (PE) terminal (terminal marked ⊕) of the driver to the protective earth (PE) of the control box.

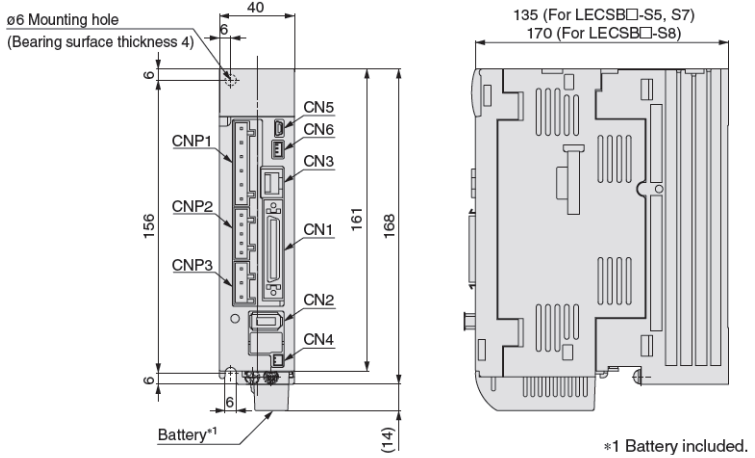
5 Names and Functions of individual parts



Connector name	Description
CN1	I/O signal connector
CN2	Encoder connector
CN3	USB communication connector
CNP1	Main circuit power supply connector
CNP2	Control circuit power supply connector

5 Names and Functions of individual parts (continued)

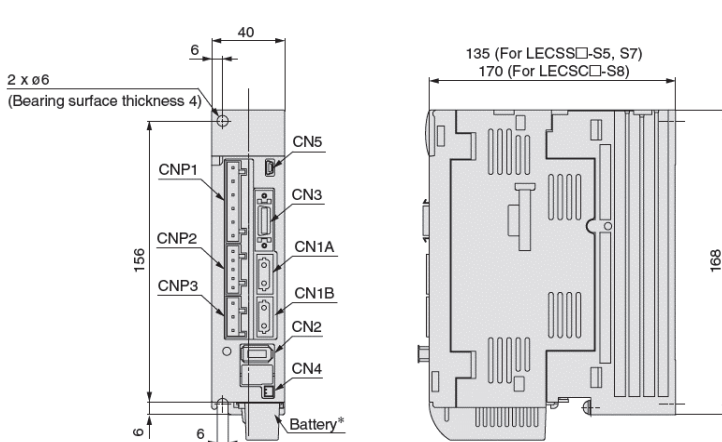
LECSB



Connector name	Description
CN1	I/O signal connector
CN2	Encoder connector
CN3	RS-422 communication connector
CN4	Battery connector
CN5	USB communication connector
CN6	Analogue monitor connector
CNP1	Main circuit power supply connector
CNP2	Control circuit power supply connector
CNP3	Servo motor power connector

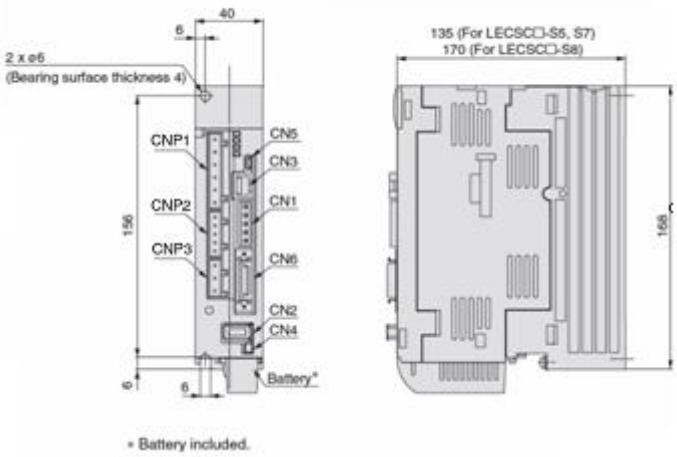
5 Names and Functions of individual parts (continued)

LECSS



Connector name	Description
CN1A	Front axis connector for SSCNET III optical cable
CN1B	Rear axis connector for SSCNET III optical cable
CN2	Encoder connector
CN3	I/O signal connector
CN4	Battery connector
CN5	USB communication connector
CNP1	Main circuit power supply connector
CNP2	Control circuit power supply connector
CNP3	Servo motor power connector

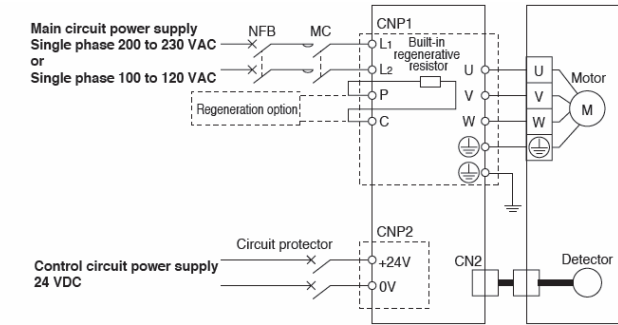
LECS



Connector name	Description
CN1	CC-Link connector
CN2	Encoder connector
CN3	RS-422 communication connector
CN4	Battery connector
CN5	USB communication connector
CN6	I/O signal connector
CNP1	Main circuit power supply connector
CNP2	Control circuit power supply connector
CNP3	Servo motor power connector

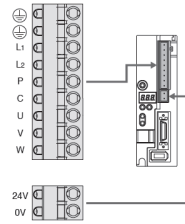
6 Wiring

6.1 LECSA-* series



Main circuit power supply connector: CNP1 *Accessory

Terminal name	Function	Details
⊕	Protective earth (PE)	Provide a ground connection to the servo motor earth terminal and the control panel's protective earth (PE).
L1	Main circuit power supply	Connect the main circuit power supply. LECSA1: Single phase 100 to 120 VAC, 50/60 Hz LECSA2: Single phase 200 to 230 VAC, 50/60 Hz
L2		
P	Built-in regenerative resistor	Terminal to connect regeneration option. • LECSA-S1: No regeneration option. • LECSA-S3, S4: External regenerative resistor to be connected to P and C. Ensure internal resistor has been disconnected when using external resistor. Internal resistor connected when shipped.
C	Regeneration option	
U	Servo motor power (U)	Connect to motor cable (U, V, W)
V	Servo motor power (V)	
W	Servo motor power (W)	

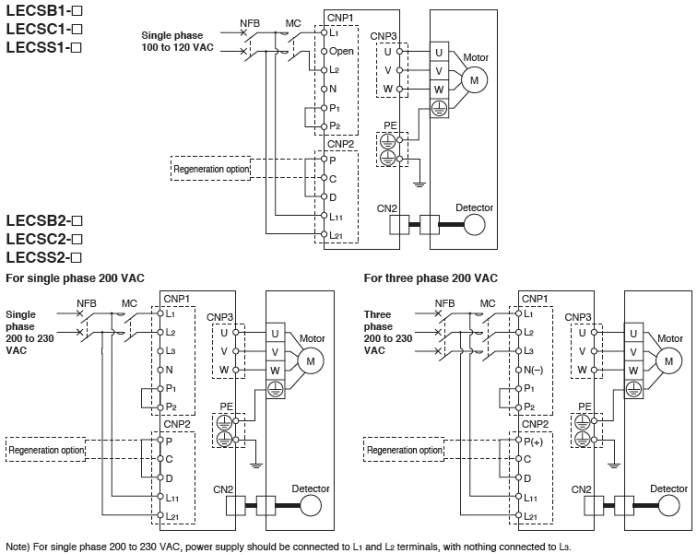


6 Wiring (continued)

Control circuit power supply connector: CNP2 *Accessory

Terminal name	Function	Details
24V	Control circuit power supply (24 V)	24 V side of the control circuit power supply (24 VDC), which supplies the driver.
0V	Control circuit power supply (0 V)	0 V side of the control circuit power supply (24 VDC) which supplies the driver.

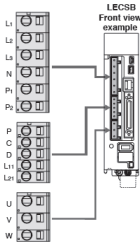
6.2 LECSB*-* / LECSC*-* / LECSS*-* series



Note) For single phase 200 to 230 VAC, power supply should be connected to L1 and L2 terminals, with nothing connected to L3.

Main circuit power supply connector: CNP1 *Accessory

Terminal name	Function	Details
	Protective earth (PE)	Provide a ground connection to the servo motor earth terminal and the control panel's protective earth (PE).
L1	Main circuit power supply	Connect the main circuit power supply. LECS□1: Single phase 100 to 120 VAC, 50/60 Hz: : L1,L2 LECS□2: Single phase 200 to 230 VAC, 50/60 Hz: : L1,L2 Three phase 200 to 230 VAC, 50/60 Hz: : L1,L2,L3
L2		
L3		



Control Circuit Power Supply Connector : CNP2 *Accessory

Terminal name	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		

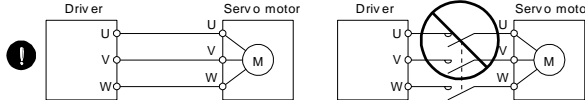
Motor Connector : CNP3 *Accessory

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

Caution

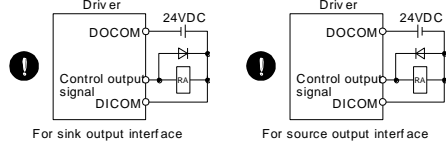
- Before disconnecting the CNP1 connector from the driver, ensure that the regenerative resistor has been disconnected (LECSA□ series).
- Install and wire the equipment correctly and securely. Otherwise, the servo motor may operate unexpectedly.

- Do not install a power capacitor, surge suppressor or radio noise filter (FR-BIF option) between the servo motor and the driver.
- Connect the wires to the correct phase terminals (U, V, W) of the driver and servo motor.
- Connect the servo motor power terminal (U, V, W) directly to the servo motor power input terminals (U, V, W). Otherwise a malfunction or fault may occur.



6 Wiring (continued)

- Do not connect AC power directly to the servo motor. Otherwise, it may cause a malfunction.
- The surge absorbing diode installed to the DC relay for control output should be fitted with correct polarity. Otherwise, the emergency stop and other protective circuits may not operate.



- Tighten the cables to the specified torque. When cables are loose, the cable or terminal block (connector) will generate heat due to poor contact.

7 Maintenance

- **Perform a maintenance check periodically**
Confirm wiring and screws are not loose.

7.1 To prevent electric shock

Warning

- Ensure that the driver and servo motor are installed securely, before wiring commences.

- Only fully trained personnel should perform wiring and/or inspection of the product.
- Ensure that the driver and servo motor are connected to ground.
- Before wiring or inspection, turn off the power and wait until the charge lamp turns off, this may take more than 15 minutes. Always confirm the charge lamp is off on the front of the driver before working on the product.
- Operate the switches with dry hands.
- The cables should not be damaged, stressed, loaded, or pinched.

7.2 To prevent fire

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.
- 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 transistor will fail and there is a risk of fire.
- Remove the built-in regenerative resistor and it's wiring from the driver when adding an external regeneration unit (LECSA□ series).
- 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.

7.3 To prevent injury

Warning

- Only the voltage specified in the manual should be applied to each terminal.
- Connect the terminals correctly.
- Ensure that the polarity (+, -) is correct.
- Take safety measure, e.g. provide covers, to ensure personnel or foreign matter cannot touch the equipment accidentally.

- During operation, never touch the rotating parts of the servo motor.

7.4 Additional instructions

The following instructions should also be fully noted. Incorrect handling may cause a fault, injury, electric shock, etc.

7.4.1 Transportation and installation

Caution

- Transport the products correctly according to their mass.

7 Maintenance (continued)

- Stacking in excess of the specified number of products is not permitted.
- Do not hold the lead wires of the built-in regenerative resistor when carrying the driver. (LECSA□ series)
- Do not carry the motor by holding the cables, shaft, encoder, or connector.
- Install the driver in a load-bearing place in accordance with the manual.
- Do not put a heavy load on the equipment.
- The driver and servo motor must be installed in the specified direction.
- Leave the specified clearance between the driver and control enclosure walls or other equipment.
- Do not install or operate the driver and servo motor which has been damaged or has any parts missing.
- Do not drop or strike the driver or servo motor. Isolate them from all impact loads.
- When storing or using the driver and servo motor, comply with the environmental conditions given in the manual.
- Securely attach the servo motor to the machine. If the servo motor is not attached correctly it may detach during operation.
- The servo motor with reduction gear must be installed in the specified direction to prevent oil leakage.
- Take safety measures, e.g. provide covers, to prevent accidental access to the rotating parts of the servo motor during operation.
- Never hit the servo motor or shaft, especially when coupling the servo motor to the machine. Otherwise, the encoder may malfunction.
- Do not subject the servo motor shaft to more than the permissible load. Otherwise, the shaft may be damaged.

- If the equipment has been stored for an extended period of time, contact your nearest sales branch.
- When using the driver, be careful of the edged parts, such as the corners of the driver.
- The driver must be installed in a metal cabinet (control box).

7.4.2 Test run adjustment

Caution

- Before operation, check the parameter settings. Improper settings may cause some machines to perform unexpected operations.
- Changing the parameter settings excessively may cause unstable operation.

7.4.3 Usage

Caution

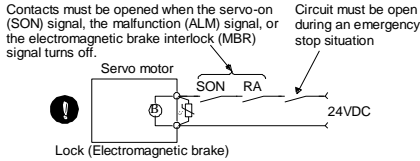
- Provide an external emergency stop circuit to ensure operation can be stopped and the power switched off immediately.
- All personnel involved in the maintenance and repair of the equipment should be fully competent to do the work.
- Before resetting an alarm, make sure that the run signal of the driver is off to prevent an accident. A sudden restart will occur if an alarm is reset with the run signal on.
- Do not modify the equipment.
- Use a noise filter, etc. to minimize the influence of electromagnetic interference, which may be caused by electronic equipment used near the driver.
- Use the driver with the specified servo motor.
- The lock (electromagnetic brake) on the servo motor is designed to hold the motor shaft and should not be used for ordinary braking.
- The lock (electromagnetic brake) may not hold the motor shaft, for reasons such as service life or the mechanical structure (e.g. where a ball screw and the servo motor are coupled via a timing belt). To ensure safety, install a stopper on the machine side.
- Do not burn or break the driver, toxic gas may be generated.

7.4.4 Corrective actions

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.

7 Maintenance (continued)



- When any alarm has occurred, eliminate the cause, ensure safety and deactivate the alarm before restarting operation.
- Provide adequate protection to prevent an unexpected restart after an instantaneous power failure.

7.4.5 Maintenance, inspection and parts replacement

Caution

- The electrolytic capacitor in the driver will deteriorate with age. It is recommended that the electrolytic capacitor is replaced every 10 years when used under normal conditions. Please contact your nearest sales branch.

7.4.6 General instruction

Caution

- To illustrate details, the equipment in the diagrams of this guide and manual may have been drawn without covers and safety guards. When the equipment is operated, the covers and safety guards must be installed as specified. Operation must be performed in accordance with this guide and manual.

Warning

- **Do not disassemble or repair the product.**
Fire or electric shock can result.

8 Disposal of Waste

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

8.1 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
- Home position setting in the absolute position detection system
- Writing to the memory due to device changes
- Writing to the memory due to point table changes
- Writing to the memory due to program changes
- Writing to the memory due to data recording by drive recorder

8.2 Battery transportation

Caution

To transport lithium batteries, take appropriate actions to comply with the instructions and regulations stipulated by the United Nations (UN), the International Civil Aviation Organization (ICAO), and the International Maritime Organization (IMO). The battery pack (LEC-MR-J3BAT) is an electric cell (lithium metal battery ER6). The IATA Dangerous Goods Regulations are revised, and the requirements are updated annually. When transporting lithium batteries, the responsibility lies with the customer, 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.

9 CE Directive

- **Electromagnetic Compatibility (EMC) Directive**
The LE series actuators and motor drivers conform to the EMC directive, if they are installed in accordance with the following instructions. These components are intended for incorporation into machinery and assemblies forming a part of a larger system.

Please note that the EMC performance changes according to the configuration of the customers control panel and the relationship with other electrical equipment and wiring.
Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the whole machinery and equipment.

- **Low Voltage Directive (LVD)**
The LE series of actuators and drivers are in compliance with the LVD. Please refer to the relevant manuals for installation guidelines.

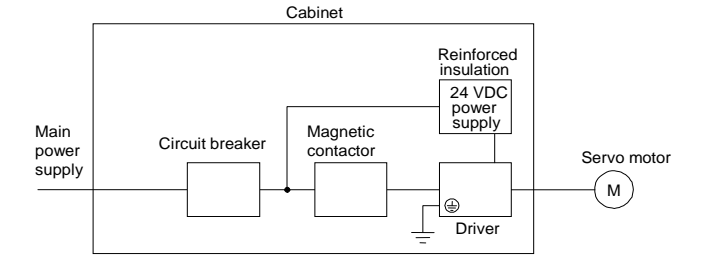
- **Driver Ground connection**
Please refer to the “Installation” section

9.1 Compliance

Be sure to perform an appearance inspection of every unit before installation. In addition, have a final performance inspection on the entire machine/system and keep an inspection record.

9.1.1 Drivers and Servo motors used
Driver : LECSA1-S1 to LECSA1-S3・LECSA2-S1 to LECSA2-S4
LECSB1-S5 to LECSB1-S7・LECSB2-S5 to LECSB2-S8
LECSC1-S5 to LECSC1-S7・LECSC2-S5 to LECSC2-S8
LECSS1-S5 to LECSS1-S7・LECSS2-S5 to LECSS2-S8
Servo motor: HF-KN□・HF-KP□

9.1.2 Structure
The control circuit provides safe separation of the main circuit in the driver.



- 9.1.3 Environment
- Install and operate the driver in a cabinet (IP54) to conform to current standards.
 - Ensure the environmental conditions are within the specified ranges.

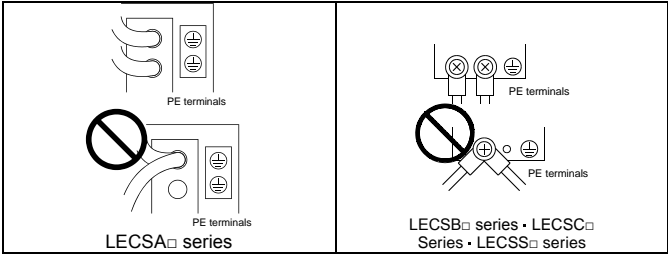
Item			Environmental conditions
(Note 1) Ambient temperature	Operation	(°C)	(Note 2) 0 to 55
		(°F)	32 to 131
	Storage, transportation	(°C)	-20 to 65
		(°F)	-4 to 149

Note 1. Ambient temperature is the internal temperature of the cabinet.
2. The driver can be mounted close to other equipment. In this case, keep the ambient temperature within 0°C to 45°C (32°F to 113°F) or use the driver with 75% or less of the effective load ratio.

9 CE Directive (continued)

- 9.1.4 Power supply
- This driver can be supplied from a star-connected supply with earthed neutral point. Ensure that the over voltage protection conforms to current standards. However, when using a neutral point of 400 V for 1-phase supply, a reinforced insulating transformer is required in the power input section.
 - For the interface power supply, use a 24 VDC power supply with reinforced insulation on the I/O terminals.

- 9.1.5 Grounding
- To prevent an electric shock, the protective earth (PE) terminal (markedⓈ) of the driver must be connected to the protective earth (PE) of the cabinet.
 - Do not connect two ground cables to the same protective earth (PE) terminal. Always connect cables to the terminals one-to-one.

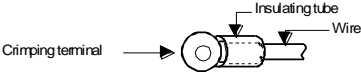


- If an earth leakage circuit breaker is used, always connect the protective earth (PE) terminal of the driver to earth, to prevent an electric shock.

- 9.1.6 Wiring
- When using twisted wires to connect CNP1, CNP2, and CNP3 (excluding LECSA□ series), use the wire after stripping the sheath and twisting the core. At this time, take care to avoid a short caused by loose wires of the core and the adjacent pole. Do not solder the core as it may cause a contact fault. Alternatively, a ferrule may be used to put the

wires together.

- The wires to be connected to the terminal block of the driver must have crimping terminals with insulating tubes to prevent contact with adjacent terminals. (LECSB□ series・LECSC□ series・LECSS□ series)



- The driver must be installed in a metal cabinet.

- 9.1.7 Peripheral devices, options
- Use circuit breakers and magnetic contactors which comply with European standards, as described in the AC servo motor driver manual. Use a type B leakage current breaker (RCD). When this is not used, provide insulation between the driver and other device using double insulation or reinforced insulation, or install a transformer between the main power supply and driver.
 - The sizes of the wires given in the AC servo motor driver manual meet the following conditions. For use in any other conditions, check current standards for recommendations.
 - Ambient temperature: 40°C (104°F)
 - Sheath: PVC (polyvinyl chloride)
 - Installation: Mount on wall surface or open cable tray.
 - Use an EMC filter for noise reduction.

9.1.8 Performing EMC tests
When EMC tests are run on a machine/device into which the driver has been installed, it must conform to the electromagnetic compatibility (immunity/emission) standards after it has satisfied the operating environment/electrical equipment specifications.
For other EMC directive guidelines on the driver, refer to the EMC installation guidelines (IB(NA)67310) issued by Mitsubishi Electric Corporation.

Caution

Note: During installation and maintenance protect the driver from electrostatic discharge (ESD).

10 Contacts

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DENMARK	(45) 7025 2900	POLAND	(48) 22 211 9600
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