LES#-TF2Z238EN

ORIGINAL INSTRUCTIONS

# Instruction Manual
# Electric Actuator / High Precision Slide Table
# Series LESYH

Motor:AC servo motor (100-200 VAC)

The intended use of this Electrical Actuator is to convert an electrical input signal into mechanical motion.

## 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.

*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.

- Refer to the 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 LESYH series … Motor type S2/S3 Note 1)

| | Model | | LESYH16 | | LESYH25R/L (Parallel) | | LESYH25D (In-line) | |
|---|---|---|---|---|---|---|---|---|
| Actuator specification | Stroke [mm] | | 50, 100 | | 50, 100, 150 | | 50, 100, 150 | |
| | Max. work load [kg] Note 2) Note 4) | Horizontal | 8 | | 12 | | 12 | |
| | | Vertical | 6 | 12 | 10 | 20 | 10 | 20 |
| | Force [N] Note 2) | | 65 to 131 | 127 to 255 | 79 to 157 | 154 to 308 | 98 to 197 | 192 to 385 |
| | Max. Speed [mm/s] | | 400 | 200 | 400 | 200 | 400 | 200 |
| | Pushing speed [mm/s] Note 3) | | 35 or less | | 30 or less | | | |
| | Max. acceleration / deceleration [mm/s$^2$] | | 5000 | | | | | |
| | Position repeatability [mm] | | ±0.01 | | | | | |
| | Lost motion [mm] Note 4) | | 0.1 or less | | | | | |
| | Screw Lead [mm] | | 12 | 6 | 20 | 10 | 16 | 8 |
| | Impact / Vibration resistance [m/s$^2$] Note 5) | | 50 / 20 | | | | | |
| | Actuation type | | Ball screw (In-line) Ball screw + Belt (Parallel) | | Ball screw + Belt [1.25:1] | | Ball screw | |
| | Guide type | | Linear guide (circulating type) | | | | | |
| | Operating temperature [°C] | | 5 to 40 | | | | | |
| | Operating humidity [%RH] | | 90 or less (no condensation) | | | | | |
| | Regeneration option | | May be required depending on speed and work load | | | | | |
| Electrical | Motor Output / Size [mm] | | 100W / □40 | | 200W / □60 | | | |
| | Motor type | | AC servo motor (100 / 200 VDC) | | | | | |
| | Encoder | | Incremental 17-bit encoder (resolution: 131072 pulses/rev.) | | | | | |
| | Power consumption [W] Note 6) | Horizontal | 45 | | 65 | | | |
| | | Vertical | 145 | | 175 | | | |
| | Standby power consumption when operating [W] Note 7) | Horizontal | 2 | | | | | |
| | | Vertical | 8 | | | | | |
| | Max. instantaneous power consumption [W] Note 8) | | 445 | | 724 | | | |
| Lock | Lock Type *9 | | Non magnetizing lock | | | | | |
| | Holding force [N] | | 131 | 255 | 157 | 308 | 197 | 385 |
| | Power consumption [W] Note 10) | | 6.3 | | 7.9 | | | |
| | Rated voltage [V] | | 24 VDC +0/-10% | | | | | |

Note 1) Refer to the catalogue on the SMC website if the motor types are different.
Note 2) The force setting range (set values for the driver) for the force control with the torque control mode. Set the force with reference to “Force Conversion Graph” of the catalogue on the SMC website (URL: https://www.smcworld.com).
Note 3) Allowable impact speed when "impact work" in torque control mode, etc.
Note 4) A reference value for correcting an error in reciprocal operation.
Note 5) Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial and perpendicular direction to the lead screw. (The test was performed with the actuator in the initialized state).
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz, when the actuator was tested in both an axial and a perpendicular direction to the lead screw (The test was performed with the actuator in the initialized state).
Note 6) Power consumption (including the controller) is when the actuator is operating.
Note 7) Standby power consumption when operating (including the controller) is when the actuator is at the set position during a positioning operation.
Note 8) Maximum instantaneous power consumption (including the controller) is when the actuator is operating. This value can be used for the power supply selection.
Note 9) Only when the motor option, "with lock" is selected.
Note 10) For an actuator with lock, add the power consumption for the lock.

### 2.2 Product Weight [kg] … Motor type S2/S3 Note 1)

| Model | Stroke [mm] | | | Lock weight |
|---|---|---|---|---|
| | 50 | 100 | 150 | |
| LESYH16 | 1.96 | 2.35 | - | 0.20 |
| LESYH25 | 3.86 | 4.43 | 5.83 | 0.40 |

**⚠ Warning**

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

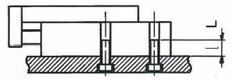
## 3 Installation

### 3.1 Installation

**⚠ Warning**

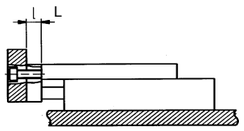
- Do not install the product unless the safety instructions have been read and understood.
- Do not use the product in excess of its allowable specification.
- When installing, inspecting or performing maintenance on the product, be sure to turn off the power supplies. Then, lock it so it cannot be tampered with while work is happening.
- Keep the flatness of the mounting surface to within 0.02 mm maximum. Insufficient flatness of a work piece or actuator mounting surface can cause play in the guide and increased sliding resistance.
- When mounting the actuator, use all mounting holes. If all mounting holes are not used, this will not maintain the specified performance. e.g. the amount of displacement of the table will increase.
- When mounting the actuator leave a gap of 40 mm or more to allow for bending of the actuator cable.
- When mounting the actuator, use screws with adequate length and tighten them with the required torque. Tightening the screws with a torque higher than recommended may cause malfunction, whilst tightening with a torque lower than recommended can cause displacement of the mounting position, or dropping of the work piece.
- In order to prevent the work fixing screw from damaging the table, use a screw of a length at least 0.5mm shorter than the maximum thread depth. Longer screws can hit the end plate, which will cause operation failure.

**Bottom Mounting the Actuator**



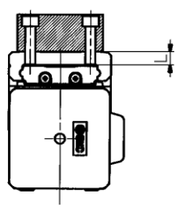

| Model | Screw | Max. tightening torque [N·m] | Max. thread depth L [mm] |
|---|---|---|---|
| LESYH16 | M5x0.8 | 3.0 | 6.5 |
| LESYH25 | M6x1.0 | 5.2 | 8.5 |

**Workpiece front mounting**




| Model | Screw | Max. tightening torque [N·m] | Max.thread depth L[mm] |
|---|---|---|---|
| LESYH16 | M5x0.8 | 3.0 | 10 |
| LESYH25 | M6x1.0 | 5.2 | 12 |

**Workpiece Top mounting**




| Model | Screw | Max.tightening torque [N·m] | Max.thread depth L[mm] |
|---|---|---|---|
| LESYH16 | M5x0.8 | 3.0 | 6.5 |
| LESYH25 | M6x1.0 | 5.2 | 8 |

## 3 Installation - continued

### 3.2 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.
- Prevent foreign particles from entering the product.

### 3.3 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. 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.
- 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 functional inspections to check it is mounted correctly.

### 3.4 Lubrication

**⚠ Caution**

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, refer to catalogue for details.
- The recommended grease is lithium grade No.2

| Apply for | Grease Pack No. |
|---|---|
| For Piston rod and Guide | GR-S-010 (10 g) |
| | GR-S-020 (20 g) |

# 4 Wiring

## 4.1 Wiring

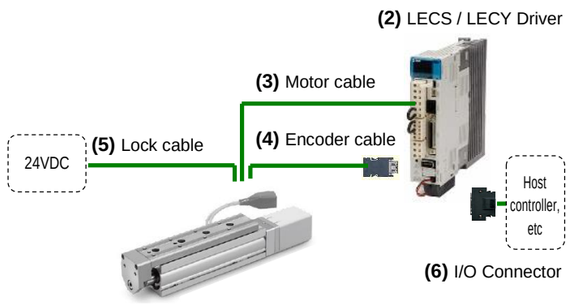
**Warning**

- 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.
  Use only specified cables otherwise there may be risk of fire and damage.
- 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.
- Select “Robotic cables” in applications where cables are moving repeatedly (encoder/ motor/ lock).
  Refer to the relevant operation manual for the bending life of the cable.
- 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.
- Refer to the auto switch references in “Best Pneumatics“ when an auto switch is to be used

## 4.2 Wiring of Actuator to AC Servo Motor Driver




## 4.3 Actuator Ground connection

- The Actuator must be connected to ground to shield the actuator from electrical noise. The screw and cable with crimping terminal and toothed washer should be prepared separately by the user.
- Avoid shared grounding points with other devices.

# 5 How to Order

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

# 6 Outline Dimensions (mm)

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

# 7 Maintenance

## 7.1 General Maintenance

**Caution**

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly electricity and compressed air can be dangerous.
- Maintenance of electromechanical and pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the power has been discharged and the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical or pneumatic 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.
- Incorrect handling can cause an injury, damage or malfunction of the equipment and machinery, so ensure that the procedure for the task is followed.
- Always allow sufficient space around the product to complete any maintenance and inspection.

## 7.2 Periodical Maintenance

- Maintenance should be performed according to the table below:

| Frequency | Appearance Check | Belt Check |
|---|---|---|
| Before daily operation | ✓ | |
| Every 6 months* | ✓ | ✓ |
| Every 250 km* | ✓ | ✓ |
| Every 5 million cycles* | ✓ | ✓ |

**whichever of these occurs first.*

- Following any maintenance, always perform a system check. Do not use the product if any error occurs, as safety cannot be assured if caused by any un-intentional malfunction.

## 7.3 Appearance Check

- The following items should be visually monitored to ensure that the actuator remains in good condition and there are no concerns flagged;
  - Loose Screws
  - Abnormal level of dust or dirt
  - Visual flaws / faults
  - Cable connections
  - Abnormal noises or vibrations

## 7.4 Belt Check

- If one of the 6 conditions below are seen, do not continue operating the actuator, contact SMC immediately.
  - **Tooth shaped canvas is worn out.**
    Canvas fibre becomes “fuzzy”, rubber is removed, and the fibre gains a white colour. The lines of fibre become very unclear.

# 7 Maintenance - continued

- **Peeling off or wearing of the side of the belt.**
  The corner of the belt becomes round and frayed, with threads beginning to stick out.

- **Belt is partially cut.**
  Belt is partially cut. Foreign matter could be caught in the teeth and cause flaws.

- **Vertical line of belt teeth.**
  Flaw which is made when the belt runs on the flange.
- **Rubber back of the belt is softened and sticky.**
- **Crack on the back of the belt.**

# 8 Limitations of Use

## 8.1 Limited warranty and Disclaimer/Compliance Requirements

- Refer to Handling Precautions for SMC Products.

# 9 Product disposal

This product should 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.

# 10 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)
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