LES#-TF2Z237EN-A

ORIGINAL INSTRUCTIONS

Instruction Manual
Electric Actuator / High Precision Slide Table
Series LESYH**E / LESYH**G

Motor: Step motor (servo 24 VDC) with Battery-less absolute encoder
Step motor (servo 24 VDC) with High Performance Battery-less absolute encoder

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

LESYH8*E series

Model			LESYH 8*EA	LESYH 8*EB	LESYH 8*EC
Actuator specification	Stroke [mm]		50, 75		
	Max. work load [kg] Note 1) Note 3)	Horizontal	2		
		Vertical	1.5	3	6
	Pushing Force 35 to 70% [N] Note 2) Note 3)		18 to 36	37 to 74	69 to 138
	Max. Speed [mm/s] Note 1) Note 3)		400	200	100
	Pushing speed [mm/s]		20 to 30	10 to 30	5 to 30
	Max. acceleration / deceleration [mm/s²]		5000		
	Position repeatability [mm]		±0.01		
	Lost motion [mm] Note 4)		0.1 or less		
	Screw Lead [mm]		10	5	2.5
	Impact / Vibration resistance [m/s²] Note 5)		50 / 20		
	Actuation type		Ball screw (In-Line) Ball screw + Belt (Parallel)		
	Guide type		Linear guide (circulating type)		
	Operating temperature [°C]		5 to 40		
	Operating humidity [%RH]		90 or less (no condensation)		
Electrical	Motor size [mm]		□28		
	Motor type		Step motor (Servo / 24 VDC)		
	Encoder (angular displacement sensor)		Battery-less absolute (4096 pulses / rotation)		
	Rated Voltage [V]		24 VDC ±10%		
	Instantaneous power consumption [W] Note 6)		MAX. 43		
Lock	Lock Type Note 7)		Non magnetizing lock		
	Holding force [N] Note 7)		20	39	78
	Power consumption [W] Note 8)		2.9		
	Rated voltage [V] Note 7)		24 VDC ±10%		

LESYH16*E series

Model			LESYH16*EA	LESYH16*EB
Actuator specification	Stroke [mm]		50, 100	
	Max. work load [kg] Note 1) Note 3)	Horizontal	8	
		Vertical	6	12
	Pushing Force 35 to 70% [N] Note 2) Note 3)		91 to 182	174 to 348
	Max. Speed [mm/s] Note 1) Note 3)		400	200
	Pushing speed [mm/s]		20 to 30	10 to 30
	Max. acceleration / deceleration [mm/s²]		5000	
	Position repeatability [mm]		±0.01	
	Lost motion [mm] Note 4)		0.1 or less	
	Screw Lead [mm]		12	6
	Impact / Vibration resistance [m/s²] Note 5)		50 / 20	
	Actuation type		Ball screw (In-Line) Ball screw + Belt (Parallel)	
	Guide type		Linear guide (circulating type)	
	Operating temperature [°C]		5 to 40	
	Operating humidity [%RH]		90 or less (no condensation)	
Electrical	Motor size [mm]		□42	
	Motor type		Step motor (Servo / 24 VDC)	
	Encoder (angular displacement sensor)		Battery-less absolute (4096 pulses / rotation)	
	Rated Voltage [V]		24 VDC ±10%	
	Instantaneous power consumption [W] Note 6)		Max. 48	
Lock	Lock Type Note 7)		Non magnetizing lock	
	Holding force [N] Note 7)		78	157
	Power consumption [W] Note 8)		5	
	Rated voltage [V] Note 7)		24 VDC ±10%	

2 Specifications - continued

LESYH25*E series

Model			LESYH25*EA	LESYH25*EB
Actuator specification	Stroke [mm]		50, 100, 150	
	Max. work load [kg] Note 1) Note 3)	Horizontal	12	
		Vertical	10	20
	Pushing Force 35 to 70% [N] Note 2) Note 3)		109 to 218	210 to 420
	Max. Speed [mm/s] Note 1) Note 3)		400	200
	Pushing speed [mm/s]		20 to 30	10 to 30
	Max. acceleration / deceleration [mm/s²]		5000	
	Position repeatability [mm]		±0.01	
	Lost motion [mm] Note 4)		0.1 or less	
	Screw Lead [mm]		16	8
	Impact / Vibration resistance [m/s²] Note 5)		50 / 20	
	Actuation type		Ball screw (In-Line) Ball screw + Belt (Parallel)	
	Guide type		Linear guide (circulating type)	
	Operating temperature [°C]		5 to 40	
	Operating humidity [%RH]		90 or less (no condensation)	
Electrical	Motor size [mm]		□56	
	Motor type		Step motor (Servo / 24 VDC)	
	Encoder (angular displacement sensor)		Battery-less absolute (4096 pulses / rotation)	
	Rated Voltage [V]		24 VDC ±10%	
	Instantaneous power consumption [W] Note 6)		MAX. 104	
Lock	Lock Type Note 7)		Non magnetizing lock	
	Holding force [N] Note 7)		108	216
	Power consumption [W] Note 8)		5	
	Rated voltage [V] Note 7)		24 VDC ±10%	

Note 1) Speed varies according to the work load. Check the “Speed–Work Load Graph" as a Guide in the catalogue on the SMC website (URL: https://www.smcworld.com).
Furthermore, if the cable length exceeds 5 m, then the speed and work load may decrease by up to 10% for each additional 5 m.
Note 2) Pushing Force accuracy is ±20%.
Note 3) The speed and force may change depending on the cable length, load and mounting conditions. If the cable length exceeds 5 m then the speed will decrease by up to 10% for each 5 m (at 15 m it is reduced by up to 20%).
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 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 perpendicular direction to the lead screw. (The test was performed with the actuator in the initialized state).
Note 6) Maximum instantaneous power consumption (including the controller) is when the actuator is operating. This value can be used for the power supply selection.
Note 7) For models including lock only.
Note 8) For an actuator with lock, add the power consumption for the lock.

2 Specifications - continued

LESYH8*G series

Model			LESYH 8*GA	LESYH 8*GB	LESYH 8*GC
Actuator specification	Stroke [mm]		50, 75		
	Max. work load [kg] Note 1) Note 3)	Horizontal	2		
		Vertical	1.5	3	6
	Pushing Force 35 to 70% [N] Note 2) Note 3)		18 to 36	37 to 74	69 to 138
	Max. Speed [mm/s] Note 1) Note 3)		800	400	100
	Pushing speed [mm/s]		20 to 30	10 to 30	5 to 30
	Max. acceleration / deceleration [mm/s²]		Horizontal 10000 / Vertical 5000		
	Position repeatability [mm]		±0.01		
	Lost motion [mm] Note 4)		0.1 or less		
	Screw Lead [mm]		10	5	2.5
	Impact / Vibration resistance [m/s²] Note 5)		50 / 20		
	Actuation type		Ball screw (In-Line) Ball screw + Belt (Parallel)		
	Guide type		Linear guide (circulating type)		
	Operating temperature [°C]		5 to 40		
	Operating humidity [%RH]		90 or less (no condensation)		
Electrical	Motor size [mm]		□28		
	Motor type		Step motor (Servo / 24 VDC)		
	Encoder (angular displacement sensor)		Battery-less absolute (4096 pulses / rotation)		
	Rated Voltage [V]		24 VDC ±10%		
	Instantaneous power consumption [W] Note 6)		MAX. 43		
Lock	Lock Type Note 7)		Non magnetizing lock		
	Holding force [N] Note 7)		20	39	78
	Power consumption [W] Note 8)		2.9		
	Rated voltage [V] Note 7)		24 VDC ±10%		

LESYH16*G series

Model			LESYH16*GA	LESYH16*GB
Actuator specification	Stroke [mm]		50, 100	
	Max. work load [kg] Note 1) Note 3)	Horizontal	8	
		Vertical	6	12
	Pushing Force 35 to 70% [N] Note 2) Note 3)		70 to 140	135 to 270
	Max. Speed [mm/s] Note 1) Note 3)		800	400
	Pushing speed [mm/s]		20 to 30	10 to 30
	Max. acceleration / deceleration [mm/s²]		Horizontal 10000 / Vertical 5000	
	Position repeatability [mm]		±0.01	
	Lost motion [mm] Note 4)		0.1 or less	
	Screw Lead [mm]		12	6
	Impact / Vibration resistance [m/s²] Note 5)		50 / 20	
	Actuation type		Ball screw (In-Line) Ball screw + Belt (Parallel)	
	Guide type		Linear guide (circulating type)	
	Operating temperature [°C]		5 to 40	
	Operating humidity [%RH]		90 or less (no condensation)	
Electrical	Motor size [mm]		□42	
	Motor type		Step motor (Servo / 24 VDC)	
	Encoder (angular displacement sensor)		Battery-less absolute (4096 pulses / rotation)	
	Rated Voltage [V]		24 VDC ±10%	
	Instantaneous power consumption [W] Note 6)		Max. 48	
Lock	Lock Type Note 7)		Non magnetizing lock	
	Holding force [N] Note 7)		78	157
	Power consumption [W] Note 8)		5	
	Rated voltage [V] Note 7)		24 VDC ±10%	

2 Specifications - continued

LESYH25*G series

Model			LESYH25*GA	LESYH25*GB
Actuator specification	Stroke [mm]		50, 100, 150	
	Max. work load [kg] Note 1) Note 3)	Horizontal	12	
		Vertical	10	20
	Pushing Force 35 to 70% [N] Note 2) Note 3)		197 to 395	382 to 765
	Max. Speed [mm/s] Note 1) Note 3)		800	400
	Pushing speed [mm/s]		20 to 30	10 to 30
	Max. acceleration / deceleration [mm/s^2]		Horizontal 10000 / Vertical 5000	
	Position repeatability [mm]		±0.01	
	Lost motion [mm] Note 4)		0.1 or less	
	Screw Lead [mm]		16	8
	Impact / Vibration resistance [m/s^2] Note 5)		50 / 20	
	Actuation type		Ball screw (In-Line) Ball screw + Belt (Parallel)	
	Guide type		Linear guide (circulating type)	
	Operating temperature [°C]		5 to 40	
	Operating humidity [%RH]		90 or less (no condensation)	
Electrical	Motor size [mm]		□56	
	Motor type		Step motor (Servo / 24 VDC)	
	Encoder (angular displacement sensor)		Battery-less absolute (4096 pulses / rotation)	
	Rated Voltage [V]		24 VDC ±10%	
	Instantaneous power consumption [W] Note 6)		MAX. 222	
Lock	Lock Type Note 7)		Non magnetizing lock	
	Holding force [N] Note 7)		108	216
	Power consumption [W] Note 8)		5	
	Rated voltage [V] Note 7)		24 VDC ±10%	

Note 1) Speed varies according to the work load.
The duty ratio is 40% or less.Check the “Speed–Work Load Graph" as a Guide in the catalogue on the SMC website (URL: https://www.smcworld.com).
Furthermore, if the cable length exceeds 5 m, then the speed and work load may decrease by up to 10% for each additional 5 m.
Note 2) Pushing Force accuracy is ±20%.
Note 3) The speed and force may change depending on the cable length, load and mounting conditions. If the cable length exceeds 5 m then the speed will decrease by up to 10% for each 5 m (at 15 m it is reduced by up to 20%).
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 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 perpendicular direction to the lead screw. (The test was performed with the actuator in the initialized state).
Note 6) Maximum instantaneous power consumption (including the controller) is when the actuator is operating. This value can be used for the power supply selection.
Note 7) For models including lock only.
Note 8) For an actuator with lock, add the power consumption for the lock.

2.1 Product Weight [kg]

Model	Stroke [mm]				Lock weight
	50	75	100	150	
LESYH8	1.06	1.23	-	-	0.16
LESYH16	1.87	-	2.26	-	0.32
LESYH25	3.50	-	4.10	4.90	0.61

Warning

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

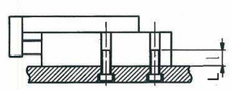
3 Installation

3.1 Installation

Warning

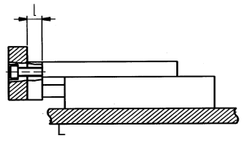
- Do not install the product unless the safety instructions have been read and understood.
- Do not use the product in excess of its allowable specification.
- When installing, inspecting or performing maintenance on the product, be sure to turn off the power supplies. Then, lock it so it cannot be tampered 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



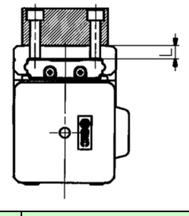
Model	Screw	Max. tightening torque [N·m]	Max. thread depth L[mm]
LESYH8	M4x0.7	1.5	5
LESYH16	M5x0.8	3.0	6.5
LESYH25	M6x1.0	5.2	8.5

Workpiece front mounting



Model	Screw	Max. tightening torque [N·m]	Max. thread depth L[mm]
LESYH8	M4x0.7	1.5	8
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]
LESYH8	M3x0.5	0.63	5
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 appropriate 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 (10g)
	GR-S-020 (20g)

4 Wiring

4.1 Wiring

Warning

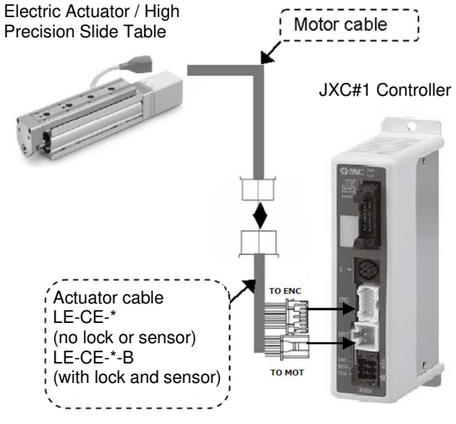
- Adjustment, mounting or wiring changes should not be carried out before disconnecting the power supply to the product.
  Electric shock, malfunction and damage can result.
- Do not disassemble the cables.
- Use only specified cables.
  Use only specified cables otherwise there may be risk of fire and 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).

- 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 Controller



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)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan
Specifications are subject to change without prior notice from the manufacturer.

Template DKP50047-F-085M