



## Instruction Manual

## Electric Actuator / Slider type

## Series LEKFS\*\*G

Motor: Step motor (servo 24 VDC)

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<sup>\*)</sup>, and other safety regulations.

<sup>\*)</sup> 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.

	<b>Caution</b>	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	<b>Warning</b>	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	<b>Danger</b>	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.

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

## 2 Specifications

## LEKFS25 series

Model		LEKFS25		
Stroke [mm]		50 to 800		
Max. work load [kg] <sup>Note 2)</sup>	Horizontal	15	28	40
	Vertical	3	7.5	15
Speed [mm/s]	Up to 400 stroke	20 to 1500	12 to 750	6 to 500
	401 to 500	20 to 1100	12 to 750	6 to 400
	501 to 600	20 to 900	12 to 540	6 to 270
	601 to 700	20 to 630	12 to 420	6 to 230
	701 to 800	20 to 550	12 to 330	6 to 180
Max. acceleration / deceleration [mm/s <sup>2</sup> ]		10000		
		5000		
Positioning repeatability [mm]		±0.01 (lead H: ±0.02)		
Lost motion [mm] <sup>Note 3)</sup>		0.05 or less		
Screw Lead [mm]		20	12	6
Impact/Vibration resistance [m/s <sup>2</sup> ] <sup>Note 4)</sup>		50 / 20		
Actuation method		Ball screw (LEKFS*)		
Guide type		Linear guide		
Operating temperature [°C]		5 to 40		
Operating humidity [%RH]		90 or less (no condensation)		
Electrical	Motor size [mm]	□42		
	Motor type	Battery-less absolute		
	Encoder	Battery-less absolute		
	Rated Voltage [V]	24 VDC ±10%		
Lock	Max. Power consumption [W] <sup>Note 5) 7)</sup>	126		
	Lock Type <sup>Note 6)</sup>	Non magnetizing lock		
	Holding force [N]	47	78	157
	Power consumption [W] <sup>Note 7)</sup>	5		
Rated voltage [V]	24 VDC ±10%			

## LEKFS32 series

Model		LEKFS32		
Stroke [mm]		50 to 1000		
Max. work load [kg] <sup>Note 2)</sup>	Horizontal	40	50	68
	Vertical	4	10	18
Speed [mm/s]	Up to 400 stroke	24 to 1300	16 to 1000	8 to 500
	401 to 500	24 to 1300	16 to 950	8 to 500
	501 to 600	24 to 1200	16 to 800	8 to 400
	601 to 700	24 to 930	16 to 620	8 to 310
	701 to 800	24 to 750	16 to 500	8 to 250
	801 to 900	24 to 610	16 to 410	8 to 200
901 to 1000	24 to 500	16 to 340	8 to 170	
Max. acceleration / deceleration [mm/s <sup>2</sup> ]		10000		
		5000		
Positioning repeatability [mm]		±0.01 (lead H: ±0.02)		
Lost motion [mm] <sup>Note 3)</sup>		0.05 or less		
Screw Lead [mm]		24	16	8
Impact/Vibration resistance [m/s <sup>2</sup> ] <sup>Note 4)</sup>		50 / 20		
Actuation method		Ball screw (LEKFS*)		
Guide type		Linear guide		
Operating temperature [°C]		5 to 40		
Operating humidity [%RH]		90 or less (no condensation)		
Electrical	Motor size [mm]	□56.4		
	Motor type	Battery-less absolute		
	Encoder	Battery-less absolute		
	Rated Voltage [V]	24 VDC ±10%		
Lock	Max. Power consumption [W] <sup>Note 5) 7)</sup>	222		
	Lock Type <sup>Note 6)</sup>	Non magnetizing lock		
	Holding force [N]	72	118	216
	Power consumption [W] <sup>Note 7)</sup>	5		
Rated voltage [V]	24 VDC ±10%			

## 2 Specifications (continued)

## LEKFS40 series

Model		LEKFS40		
Stroke [mm]		150 to 1200		
Max. work load [kg] <sup>Note 2)</sup>	Horizontal	26	60	75
	Vertical	4.5	4.5	25
Speed [mm/s]	Up to 400 stroke	30 to 1200	20 to 1000	10 to 500
	401 to 500	30 to 1200	20 to 1000	10 to 500
	501 to 600	30 to 1200	20 to 1000	10 to 500
	601 to 700	30 to 1200	20 to 900	10 to 440
	701 to 800	30 to 1140	20 to 760	10 to 350
	801 to 900	30 to 930	20 to 620	10 to 280
	901 to 1000	30 to 780	20 to 520	10 to 250
	1001 to 1100	30 to 660	20 to 440	10 to 220
	1101 to 1200	30 to 570	20 to 380	10 to 190
Max. acceleration / deceleration [mm/s <sup>2</sup> ]		10000		
		5000		
Positioning repeatability [mm]		±0.01 (lead H: ±0.02)		
Lost motion [mm] <sup>Note 3)</sup>		0.05 or less		
Screw Lead [mm]		30	20	10
Impact/Vibration resistance [m/s <sup>2</sup> ] <sup>Note 4)</sup>		50 / 20		
Actuation method		Ball screw (LEKFS*) Ball screw + Belt (LEKFS*R/L)		
Guide type		Linear guide		
Operating temperature [°C]		5 to 40		
Operating humidity [%RH]		90 or less (no condensation)		

## LEKFS40 series(continued)

Electrical	Motor size [mm]	□56.4		
	Motor type	Battery-less absolute (Step motor 24 VDC)		
	Encoder	Battery-less absolute		
	Rated Voltage [V]	24 VDC ±10%		
Lock	Max. Power consumption [W] <sup>Note 5) 7)</sup>	222		
	Lock Type <sup>Note 6)</sup>	Non magnetizing lock		
	Holding force [N]	75	113	245
	Power consumption [W] <sup>Note 7)</sup>	5		
Rated voltage [V]	24 VDC ±10%			

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.

Note 2) The maximum workload at 3000 m/s<sup>2</sup>. 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 3) A reference value for correcting an error in reciprocal operation.

Note 4) Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial and a 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. The test was performed in both an axial and a perpendicular direction to the lead screw. The test was performed with the actuator in the initialized state.

Note 5) The power consumption including the controller is for when the actuator is operating.

Note 6) For models with lock only.

Note 7) For an actuator with lock, add the power consumption for the lock.

## 2 Specifications (continued)

## 2.1 Product weight

Series	LEKFS25							
Stroke [mm]	50	100	150	200	250	300	350	400
Product weight [kg]	1.7	1.8	1.9	2.1	2.3	2.4	2.5	2.6
Lock weight [kg]	0.26							

Series	LEKFS25				
Stroke [mm]	450	500	600	700	800
Product weight [kg]	2.8	2.9	3.2	3.5	3.8
Lock weight [kg]	0.26				

Series	LEKFS32							
Stroke [mm]	50	100	150	200	250	300	350	400
Product weight [kg]	3.6	3.8	4.0	4.2	4.5	4.7	4.9	5.1
Lock weight [kg]	0.53							

Series	LEKFS32							
Stroke [mm]	450	500	600	700	800	900	1000	
Product weight [kg]	5.3	5.5	5.9	6.3	6.7	7.1	7.5	
Lock weight [kg]	0.53							

Series	LEKFS40							
Stroke [mm]	150	200	250	300	350	400	450	500
Product weight [kg]	5.5	5.8	6.1	6.4	6.7	7	7.3	7.6
Lock weight [kg]	0.53							

Series	LEKFS40							
Stroke [mm]	600	700	800	900	1000	1100	1200	
Product weight [kg]	8.2	8.8	9.4	10	10.6	11.2	11.8	
Lock weight [kg]	0.53							

## 3 Installation

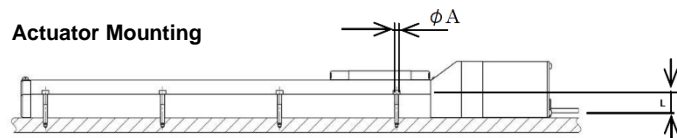
## 3.1 Installation

**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 0.1 mm maximum. Insufficient flatness of a work piece or actuator mounting surface can cause play in the guide and increased sliding resistance. In the case of overhang mounting (including cantilever), use a support plate or support guide to avoid deflection of the actuator body.
- 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 or workpiece, use screws with adequate length and tighten them with adequate 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.

### 3 Installation (continued)

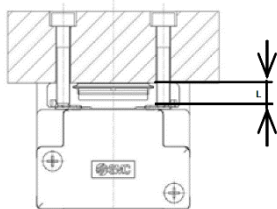
#### Actuator Mounting



Model	Screw size	Max. tightening torque [N.m]	Ø A [mm]	L [mm]
LEKFS25	M4	1.5	4.5	24
LEKFS32	M5	3.0	5.5	30
LEKFS40	M6	5.2	6.6	31

#### Work piece Mounting

- In order to prevent the work piece fixing screws from damaging the table, use screws at least 0.5 mm shorter than the maximum thread depth. Longer screws can hit the body and cause operation failure.



Model	Screw size	Max. tightening torque [N.m]	L Max. thread depth [mm]
LEKFS25	M5 x 0.8	3.0	8
LEKFS32	M6 x 1.0	5.2	9
LEKFS40	M8 x 1.25	12.5	13

### 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 Installation (continued)

#### 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 the catalogue for details.
- The recommended grease is lithium grade No.2

Apply for	Grease Pack order No.
Ball screw 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.

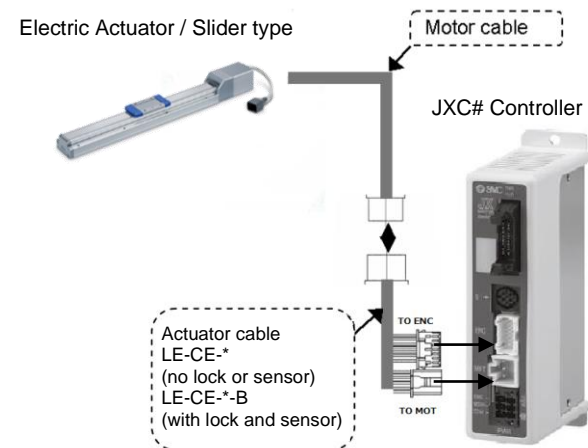
The product can malfunction due to noise interference and surge voltage from power and high voltage cables close to the signal line. Route the wires of the product separately from power or high voltage cables.

- 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.

### 4 Wiring (continued)

- 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.
- The ground wire cross sectional area should be 2 mm<sup>2</sup> minimum.
- Avoid shared grounding points with other devices.

### 5 How to Order

Refer to the 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.

### 7 Maintenance (continued)

- 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	Internal check	Belt Check
Before daily operation	✓	✓	✓
Every 6 months*	✓	✓	✓
Every 1,000 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.



- 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](http://www.smcworld.com) or [www.smc.eu](http://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.  
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