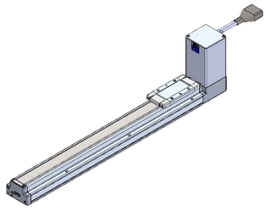
LE2FB-TF224-056EN

ORIGINAL INSTRUCTIONS

Instruction Manual
Electric Actuator / Slider type compatible with manifold controller
Series LE2FB

Motor: Step motor (servo 24 VDC) with 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 and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power — General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines. Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots

- Refer to the product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

⚠ **Danger**	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ **Warning**	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Caution**	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate 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.
- Electromagnetic compatibility
  This product is class A equipment 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.
- Special products (-X#, -D#) might have specifications that are different from those shown in the specifications section. Contact SMC for specific drawings.

2 Specifications

2.1 LE2FB** series

	Model		LE2FB16	LE2FB25	LE2FB32
Actuator	Stroke [mm] Note 1)		300, 500, 600, 700, 800, 900, 1000, 1200	300, 500, 600, 700, 800, 900, 1000, 1200, 1500, 1800, 2000, 2200	300, 500, 600, 700, 800, 900, 1000, 1200, 1500, 1800, 2000, 2200, 2400, 2600
	Max. work load [kg] Note 2)	Horizontal	1	10	19
	Maximum speed [mm/s] Note 2)		1300	1600	1700
	Minimum speed [mm/s] Note 2)		48	48	48
	Acceleration / deceleration speed [mm/s^2]		3,000 max.		
	Positioning repeatability [mm]		± 0.08		
	Lost motion [mm] Note 3)		0.1 max.		
	Screw Lead [mm]		48		
	Impact / Vibration resistance [m/s^2] Note 4)		50 / 20		
	Actuation method		Belt drive		
	Guide type		Linear guide		
	Operating temperature [°C]		5 to 40		
	Operating humidity [%RH]		90 or less (no condensation)		
	Enclosure rating		IP30		
Electrical	Motor size [mm]		□28	□42	□56.4
	Motor type		Battery-less absolute (Step motor 24 VDC)		
	Encoder		Battery-less absolute		
	Power supply voltage [V]		24 VDC ±10%		
	Power consumption [W] Note 5) 7)		22 max.	40 max.	62 max.
Lock	Lock Type Note 6)		Non magnetizing lock		
	Holding force [N]		4	19	36
	Power consumption [W] Note7)		4	8	8
	Power supply voltage [V]		24 VDC ±10%		

Note 1) Non standard strokes are available as special orders, contact SMC.
Note 2) The max. work load at 3000 mm/s2 acceleration and deceleration speed. Work load varies depending on the speed and acceleration. Check the "Speed-Work Load Graph" in the catalog.
Note 3) A reference value for correcting an error in reciprocal operation.
Note 4) Impact resistance: In a drop impact test, no malfunction occurred in the axial and perpendicular direction to the lead screw. The test was performed with the actuator in the initialized state.
Vibration resistance: 45 to 2000 Hz for 1 sweep, no malfunction occurred in the axial and perpendicular direction to the lead screw. The test was performed with the actuator in the initialized state.
Note 5) Indicates the maximum power during operation (excluding the controller). This value can be used for the selection of the power supply.
Note 6) Only applies to actuators supplied with a lock.
Note 7) For an actuator with lock, add the power consumption for the lock.

2.2 Actuator weight [kg]

- **Motor mounting: Top side parallel**

Series	LE2FB16T							
Stroke	300	500	600	700	800	900	1000	1200
Weight	1.22	1.48	1.61	1.74	1.87	2.00	2.13	2.39
Lock	0.19							

Series	LE2FB25T										
Stroke	300	500	600	700	800	900	1000	1200	1500	1800	2000	2200
Weight	2.31	2.77	3.00	3.23	3.46	3.69	3.92	4.38	5.07	5.76	6.22	6.68
Lock	0.34											

Series	LE2FB32T													
Stroke	300	500	600	700	800	900	1000	1200	1500	1800	2000	2200	2400	2600
Weight	3.59	4.27	4.61	4.95	5.29	5.63	5.97	6.65	7.67	8.69	9.37	10.05	10.73	11.41
Lock	0.63													

2 Specifications (continued)

- **Motor mounting: Bottom side parallel**

Series	LE2FB16U							
Stroke	300	500	600	700	800	900	1000	1200
Weight	1.24	1.50	1.63	1.76	1.89	2.02	2.15	2.41
Lock	0.19							

Series	LE2FB25U											
Stroke	300	500	600	700	800	900	1000	1200	1500	1800	2000	2200
Weight	2.39	2.85	3.08	3.31	3.54	3.77	4.00	4.46	5.15	5.84	6.30	6.76
Lock	0.34											

Series	LE2FB32U													
Stroke	300	500	600	700	800	900	1000	1200	1500	1800	2000	2200	2400	2600
Weight	3.81	4.49	4.83	5.17	5.51	5.85	6.19	6.87	7.89	8.91	9.59	10.27	10.95	11.63
Lock	0.63													

3 Installation

⚠ Warning

- Do not install the product unless the safety instructions have been read and understood.
- Do not use the product in excess of the allowable specifications.
- 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 during maintenance.
- 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.
- Allow sufficient space for maintenance and inspection.
- The electric actuator and its peripheral devices should be installed on fire-proof material.
- Take measures to ensure that the operating temperature of the actuator and its peripheral devices are within the specification range.
- The actuator should be installed with 50 mm or more space between each side of it and other equipment or components.
- Belt drive actuators are not suitable for vertically mounted applications.
- When using belt driven actuators, vibration may occur during operation at speeds within the specification. This could be caused by the operating conditions. Adjust the speed setting to a speed that does not cause a vibration.

3.1 Mounting

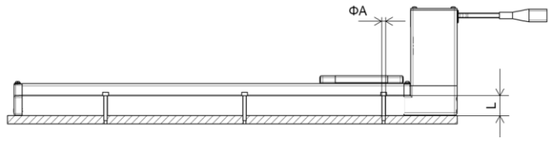
⚠ Warning

- When mounting the actuator or attaching the work piece, do not apply strong impact or large moment.
  If an external force above the allowable moment is applied, it may cause looseness in the guide unit, an increase in sliding resistance or other problems.
- Keep the flatness of the mounting surface to within 0.1 mm max. (based on 500 mm stroke length).
  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.

3 Installation (continued)

3.2 Actuator mounting

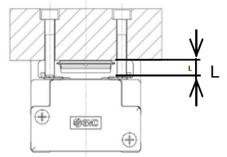
- When mounting the actuator, use all mounting holes.
  If all mounting holes are not used, this will not maintain the specified performance. e.g. the amount of displacement of the table will increase.
- Tigthen screws to the recommended tightening torque.
  Tightening the screws with a torque higher 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.
- Be sure to use positioning pins on the body mounting reference plane for accurate and secure actuator mounting and for running parallelism.



Model	Screw size	Tightening torque [N•m]	Ø A [mm]	L [mm]
LE2FB16	M3 x 0.5	0.63 ±10%	3.5	20
LE2FB25	M4 x 0.7	1.5 ±10%	4.5	24
LE2FB32	M5 x 0.8	3.0 ±10%	5.5	30

3.3 Work piece fixing

- When mounting the work piece or other device to the actuator, tighten the fixing screws with adequate torque.
- 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 damage the body and cause failure.



Model	Screw size	Tightening torque [N•m]	L Max. thread depth [mm]
LE2FB16	M4 x 0.7	1.5 ±10%	6
LE2FB25	M5 x 0.8	3.0 ±10%	8
LE2FB32	M6 x 1.0	5.2 ±10%	9

3.4 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.
- Avoid use in the following environments:
  1. Locations where a large amount of dust and cutting chips are airborne.
  2. Locations where the ambient temperature is outside the range of the temperature specification (refer to specifications).
  3. Locations where the ambient humidity is outside the range of the humidity specification (refer to specifications).
  4. Locations where strong magnetic or electric fields are generated.
  5. Locations where direct vibration or impact is applied to the product.
  6. Areas that are dusty, or are exposed to splashes of water and oil drops.
  7. At an altitude of 1000 meters or higher. Heat dissipation and withstand voltage will decrease. Contact SMC for further details.
- Do not use in an environment where the product is directly exposed to liquid, such as cutting oils.
- Install a protective cover when the product is used in an environment directly exposed to foreign matter such as dust, cutting chips and spatter.

3 Installation (continued)

3.5 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 (10 g)
	GR-S-020 (20 g)

4 Wiring

4.1 Wiring

Warning

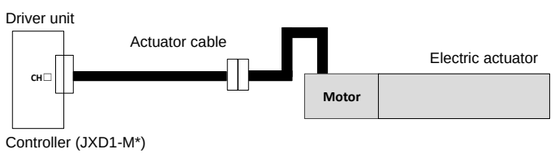
- Adjustment, mounting or wiring changes should not be carried out before disconnecting the power supply to the product.
  Electric shock, malfunction and damage can result.
- Do not disassemble the cables.
- Use only specified cables.
  Use only specified cables otherwise there may be risk of fire and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

Caution

- 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.
- 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.
- Take care that actuator movement does not catch cables.
- Avoid bending cables at sharp angles where they enter the product.
  Avoid twisting, folding, rotating or applying an external force to the cable.
- Do not allow the cable near to the actuator to move repeatably. The motor cable is not a robotic type cable. Secure the cable between the actuator and the connector to prevent movement.
- When the actuator cable is bent repeatedly, do not store them in a movable wiring duct smaller than the specified bending radius (for cable lengths up to 10 m: bend radius = 56 mm min.; for cable lengths up to 15 m: bend radius = 77 mm min.).

4.2 Wiring of Actuator to Controller

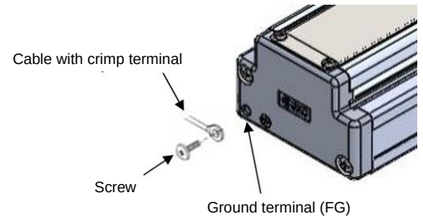
- Connect the actuator to the manifold controller using an actuator cable (SMC part number JX-CP-D-*).



4 Wiring (continued)

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 cable cross sectional area should be 2 mm^2 minimum.
- The ground connection should be a dedicated D-class ground connection (resistance less than 100Ω). 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.
- Always allow sufficient space around the product to complete any maintenance and inspection.

7.2 Periodical Maintenance

Frequency	Appearance Check	Internal check	Belt Check
Daily before operation	✓		
Every 6 months*	✓	✓	✓
Every 1,000 km*	✓	✓	✓
Every 5 million cycles*	✓	✓	✓

7 Maintenance (continued)

- 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 Internal parts check

1. Lubricant condition on moving parts.
2. Loose or mechanical play in fixed parts or fixing screws.

7.5 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 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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