



Operation Manual

PRODUCT NAME

Electric Actuator / Slider Type
High performance Battery-less absolute encoder

MODEL / Series / Product Number

LEF Series
LEFS*G



#This manual describes the dedicated terms for "LEFS*G".

Refer to the manual of LEF series about other details.

#Refer to the manual relevant to the controller being used for full operating instructions.

SMC Corporation

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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: Manipulating industrial robots -Safety.

etc.



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

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.

This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



Safety Instructions

Caution

The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction(WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.

Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

1. Specification

LEFS*G

Model		LEFS16G			LEFS25G			LEFS32G			LEFS40G			
Actuator specification	Stroke [mm] ^{Note1)}	50~500			50~800			50~1000			150~1200			
	Work load [kg] ^{Note2)}	Horizontal		14	15	12	25	30	20	45	50	25	55	65
		Vertical		2	4	0.5	7.5	15	4	10	20	2	2	23
	Speed [mm/s]	Stroke range	~400	10~800	5~400	20~1500	12~900	6~500	24~1300	16~1000	8~500	30~1200	20~1000	10~500
			401~450	10~700	5~360	20~1100	12~750	6~400	24~1300	16~950	8~500	30~1200	20~1000	10~500
			451~500	10~600	5~300	20~1100	12~750	6~400	24~1300	16~950	8~500	30~1200	20~1000	10~500
			501~600	-	-	20~900	12~540	6~270	24~1200	16~800	8~400	30~1200	20~1000	10~500
			601~700	-	-	20~630	12~420	6~230	24~930	16~620	8~310	30~1200	20~900	10~440
			701~800	-	-	20~550	12~330	6~180	24~750	16~500	8~250	30~1140	20~760	10~350
			801~900	-	-	-	-	-	24~610	16~410	8~200	30~930	20~620	10~280
901~1000			-	-	-	-	-	24~500	16~340	8~170	30~780	20~520	10~250	
1001~1100			-	-	-	-	-	-	-	-	30~660	20~440	10~220	
1011~1200	-	-	-	-	-	-	-	-	30~570	20~380	10~190			
Max. acceleration/deceleration [mm/s ²]	Horizontal	10000												
	Vertical	5000												
Positioning repeatability [mm]	Basic type	±0.02												
	High precision type	±0.015 (Lead H : ±0.02)												
Lost motion[mm] ^{note3)}	Basic type	0.1or less												
	High precision type	0.05or less												
lead [mm]		10	5	20	12	6	24	16	8	30	20	10		
Impact/Vibration resistance [m/s ²]	^{note4)}	50 / 20												
Actuation type		Ball screw (LEFS□), Ball screw + Belt (LEFS□ ^R _L)												
Guide type		Linear Guide												
Static allowable moment [Nm] ^{Note5)}	Mep (Pitching)	10			27			46			110			
	Mey (Yawing)	10			27			46			110			
	Mer (Rolling)	20			52			101			207			
Operating temperature range [°C]		5 to 40												
Operating humidity range [%RH]		90 or less(No condensation)												
Electric specifications	Motor size	□28			□42			□56.4			□56.4			
	Motor type	Battery-less Absolute(Step motor 24VDC)												
	Encoder	Battery-less Absolute encoder												
	Rated voltage [V]	24 VDC±10%												
	Power [W] ^{note6)}	Max. power 116			Max. power 126			Max. power 222			Max. power 222			
Lock unit specifications	Type ^{note7)}	Non-magnetizing lock												
	Holding force [N]	29	59	47	78	157	72	108	216	75	113	245		
	Power consumption [W] ^{note8)}	2.9			5			5			5			
Rated voltage [V]		24 VDC±10%												

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

Note 2) The maximum work load at 3000mm/s². Speed changes according to the controller/driver type and work load.

Check the "Speed-Work Load Graph (Guide) in the WEB catalog. Furthermore, if the cable length exceeds 5m, then it will decrease by up to 10% for each 5m.

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 direction and perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)

Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz, when the actuator was tested in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)

Note 5) Static allowable moment is the static moment applied to the actuator stopped. If an impact is applied or a repeated load is applied, ensure sufficient safety before use.

Note 6) Indicates the max. power during operation.(including the controller) This value can be used for the selection of the power supply.

Note 7) With lock only

Note 8) For an actuator with lock, add the power consumption for the lock.

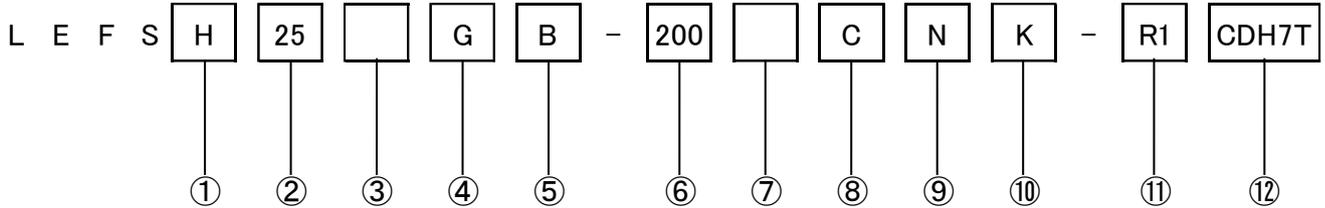
Model	LEFS16									
Stroke(mm)	50	100	150	200	250	300	350	400	450	500
Weight(kg)	0.83	0.90	0.98	1.05	1.13	1.20	1.28	1.35	1.43	1.50
Additional weight for lock(kg)	0.12									

Model	LEFS25															
Stroke(mm)	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Weight(kg)	1.70	1.84	1.98	2.12	2.26	2.40	2.54	2.68	2.82	2.96	3.10	3.24	3.38	3.52	3.66	3.80
Additional weight for lock(kg)	0.26															

Model	LEFS32																			
Stroke(mm)	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Weight(kg)	3.15	3.35	3.55	3.75	3.95	4.15	4.35	4.55	4.75	4.95	5.15	5.35	5.55	5.75	5.95	6.15	6.35	6.55	6.75	6.95
Additional weight for lock(kg)	0.53																			

Model	LEFS40																			
Stroke(mm)	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1100	1200
Weight(kg)	5.37	5.65	5.93	6.21	6.49	6.77	7.15	7.33	7.61	7.89	8.17	8.45	8.73	9.01	9.29	9.57	9.85	10.13	10.69	11.25
Additional weight for lock(kg)	0.53																			

2. How to order



① Accuracy

Nil	Basic type
H	High-precision type

② Size

16
25
32
40

③ Motor mounting position

Nil	In-line
R	Right side parallel
L	Left side parallel

④ Motor type

G	High performance battery-less absolute (Step motor 24 VDC)
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⑤ Lead[mm]

Symbol	LEFS16	LEFS25	LEFS32	LEFS40
H	-	20	24	30
A	10	12	16	20
B	5	6	8	10

⑥ Stroke^{*1} [mm]

50	50
?	?
1200	1,200

⑦ Motor option

Nil	Without option
B	With lock

⑧ Auto switch compatibility (In-line only)^{**2**3**4**5**6}

Nil	None
C	With (Includes 1 mounting bracket)

⑨ Grease application (Seal band part)

Nil	With
N	Without (Roller specification)

⑩ Positioning pin hole

Nil	Housing B bottom ^{**6}
K	Body bottom 2 locations

*Refer to Stroke table about detail.

⑪ Actuator cable type/length

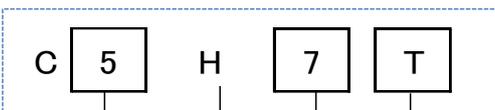
Robotic cable		[m]	
Nil	None	R8	8 ^{*7}
R1	1.5	RA	10 ^{*7}
R3	3	RB	15 ^{*7}
R5	5	RC	20 ^{*7}

Stroke [mm]

Stroke	Note	
	Size	Applicable stroke
50~500	16	50,100,150,200,250,300,350,400,450,500
50~800	25	50,100,150,200,250,300,350,400,450,500,550,600,650,700,750,800
50~1000	32	50,100,150,200,250,300,350,400,450,500,550,600,650,700,750,800,850,900,950,1000
150~1200	40	150,200,250,300,350,400,450,500,550,600,650,700,750,800,850,900,950,1000,1100,1200

⑫ Controller

Nil	Without controller
C□H□□	With controller



Interface

(Communication protocol/Input/Output)

E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
5	Parallel input(NPN)
6	Parallel input(PNP)

Communicating plug connector, I/O cable

Symbol	Type	Applicable interface
Nil	Without accessory	-
1	I/O cable(1.5m)	Parallel input(NPN) Parallel input(PNP)
3	I/O cable(3m)	
5	I/O cable(5m)	

Mounting

7	Screw mounting
8	DIN rail

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

Note 2) Excluding LEFS16

Note 3) If 2 or more are required, please order them separately. (Part no. LEF-D-2-1 For details, refer to the Web Catalog.)

Note 4) Order auto switches separately. (For details, refer to the Web Catalog.)

Note 5) When "Nil" is selected, the product will not come with a built-in magnet for an auto switch, and so a mounting bracket cannot be secured. Be sure to select an appropriate model initially as the product cannot be changed to have auto switch compatibility after purchase.

Note 6) For details on the mounting method, refer to the Web Catalog.

Note 7) Produced upon receipt of order

Note 8) The DIN rail is not included. Order it separately.

Note 9) Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input. Select "Nil", "S", or "T" for DeviceNet™ or CC-Link. Select "Nil", "1", "3", or "5" for parallel input.

Caution

Actuator and controller are sold as a set.

**When purchasing without controller,
make sure that the combination of actuator and controller is correct.**

<Be sure to check the following before use.>

① "Actuator" matches "Actuator part number described in controller."

① LEFS25GB-100



3. Specific product precautions

1. About precautions for installation of actuator, refer to [Specific precautions for Battery-less absolute encoder] that is described in the manual of used controller.
2. Please use the product with a duty ratio of 35% or less.

Revision history
<u>1st printing</u> Nov / 2021
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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.

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