



# Operation Manual

PRODUCT NAME

## Electric Actuator / Slider Type

《 for Clean Room Ball Screw type 》

MODEL / Series

### 11-LEF Series

Applicable models: 11-LEFS



※The description of this manual is only a peculiar content to "11-LEFS For Clean Room".  
※Please match and confirm the manual of each model to a detailed content of the product.

**SMC Corporation**

# Contents

<b>Safety Instructions</b> .....	<b>2</b>
<b>1. Outline of clean room specification</b> .....	<b>4</b>
<b>1 . 1 Grease used</b> .....	<b>4</b>
<b>1 . 2 Recommended tube diameter</b> .....	<b>4</b>
<b>2. Raising dust characteristic</b> .....	<b>4</b>
<b>2 . 1 Recommended tube diameter</b> .....	<b>4</b>
<b>2 . 2 Amount of vacuum aspiration</b> .....	<b>6</b>
<b>3. How to Order</b> .....	<b>7</b>
<b>4. Construction</b> .....	<b>8</b>



# 11-LEF Series / Slider type 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), Japan Industrial Standards (JIS)\*1) and other safety regulations\*2).

\*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 10218-1992: Manipulating industrial robots -- Safety

JIS B 8370: General rules for pneumatic equipment.

JIS B 8361: General rules for hydraulic equipment.

JIS B 9960-1: Safety of machinery -- Electrical equipment for machines. (Part 1: General requirements)

JIS B 8433-1993: Manipulating industrial robots - Safety. etc.

\*2) Labor Safety and Sanitation Law, 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.

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.

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.

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.



# 11-LEF Series / Slider type 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**

**The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.\*3) Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.**

**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.**

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

**\*3) 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**

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).

# 1. Outline of clean room specification

11-clean specification actuator is a vacuum type. Please it is a customer, the business mind getting a clean coupling, and lay pipes.

Please adjust and use the amount of the vacuum according to a clean class and use Actuator speed.

## 1. 1 Grease used

The special grease is used for the guide and the ball screw. Please confirm it to our company when you maintain the grease up etc..

## 1. 2 Recommended tube diameter

Table—2. Recommended tube diameter

Type	Tube diameter(mm)
LEFS16	6 or more
LEFS25/32/40	8 or more

An enough fluence is not obtained by a diameter that is thinner than this.

Moreover, please enlarge it by one size when the piping length exceeds 3m.

### Caution

#### When using it excluding specified grease

When wrong grease is used, particle might be increased. According to circumstances, please note that raising dust is increased even if the low raising dust greases other than specification are used. Especially, please do not use fluorine system grease.

# 2. Raising dust characteristic

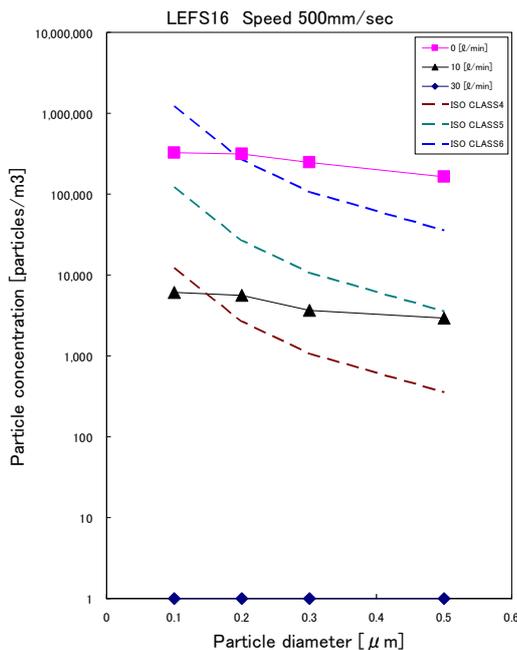
## 2. 1 Recommended tube diameter

The figure below shows the amount of the vacuum aspiration and the raising dust degree. (reference value)

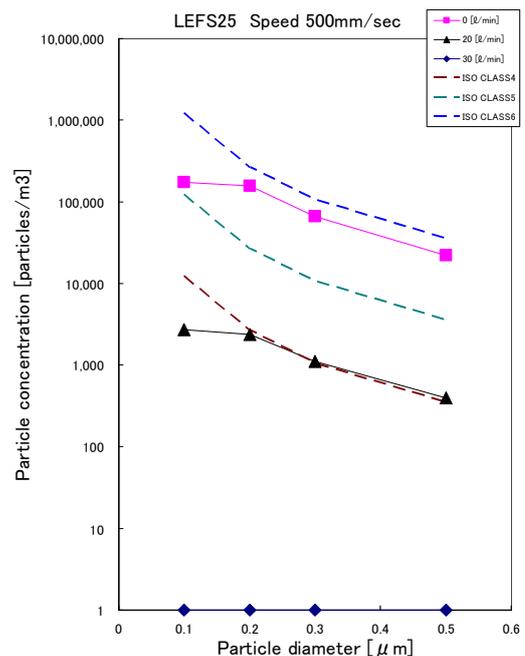
### (1) Step motor (servo 24VDC) / Servo motor (24VDC)

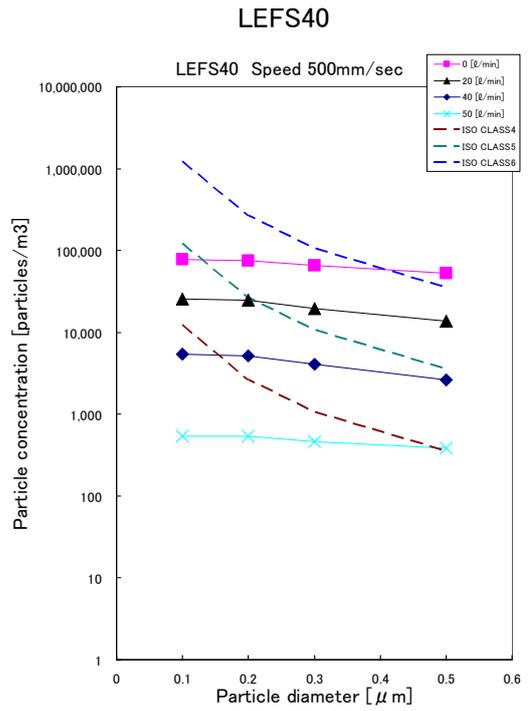
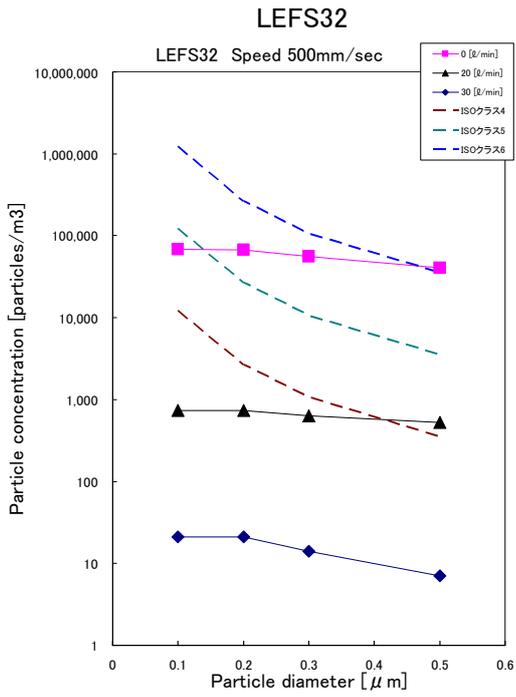
The table below shows the amount of the vacuum aspiration and the raising particle.

LEFS16



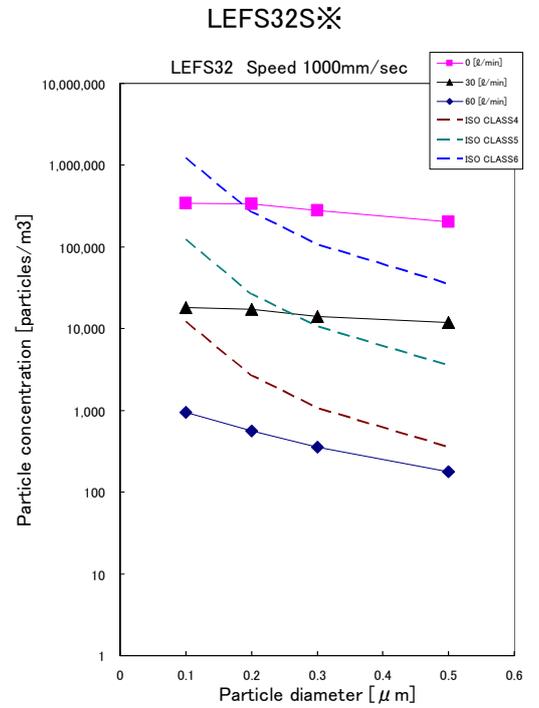
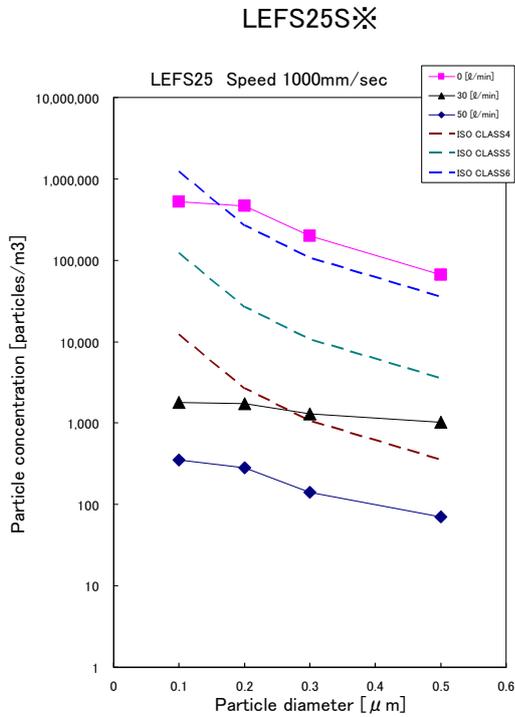
LEFS25



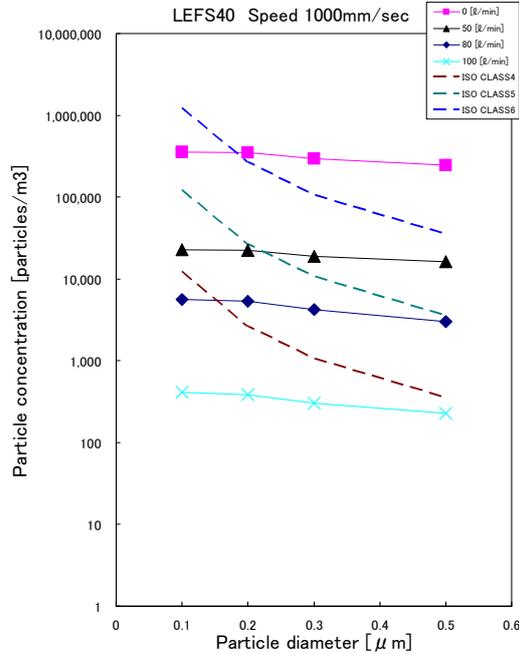


## (2) AC Servo motor

The table below shows the amount of the vacuum aspiration and the raising particle.



## LEFS40S※



### 2. 2 Amount of vacuum aspiration

The amount of recommended vacuum aspiration according to the clean time class is shown in the following..

Type	Speed (mm/s)	Clean class		Amount of recommended vacuum aspiration (ℓ/min(ANR))
		ISO 14644-1	Fed.Std.209E	
LEFS16	~500	6	1000	5
		5	100	10
		4	10	30
LEFS25	~500	6	1000	5
		5	100	10
		4	10	30
	~900	6	1000	20
		5	100	30
		4	10	50
LEFS32	~500	6	1000	5
		5	100	15
		4	10	30
	~1000	6	1000	20
		5	100	50
		4	10	※60
LEFS40	~500	6	1000	10
		5	100	40
		4	10	50
	~1000	6	1000	50
		5	100	※80
		4	10	※100

※Please aspirate it from the port on both sides when aspirating 50 ℓ /min(ANR). Please select "D" about the type.

### Caution

As for the raising particle, the amount of the aspiration is different depending on the speed.

Please do the vacuum aspiration according to customer's specification. The vacuum aspiration flunce shows the flunce immediately before piping in the actuator.

### 3. How to Order

#### ● Step motor (servo 24VDC) / Servo motor (24VDC)

11-LEFS 25 □ B - 100 □ □ - □ 1 6N 1 □

**Size**

16
25
32
40

**Motor**

Sym-bol	Type	Applicable size			
		16	25	32	40
Nil	Step motor (Servo24VDC)	●	●	●	●
A	Servo motor (DC24V)	●	●	—	—

**Ball screw lead**

	Size			
	16	25	32	40
A	10mm	12mm	16mm	20mm
B	5mm	6mm	8mm	10mm

**Stroke**

100	100mm
∫	∫
1000	1000mm

\*Refer to the table of Applicable stroke

**Vacuum port direction**

Nil	Left side
R	Right side

**Motor option**

Nil	Without lock
B	With lock

**Controller mounting**

Nil	Screw mounting type
D	DIN rail mounting type

**I/O cable length**

Nil	Without cable
1	1.5m
3	3m
5	5m

**Controller option**

Nil	Without controller
6N	With controller (NPN)
6P	With controller (PNP)
1N	With programless controller (NPN)
1P	With programless controller (PNP)

**Actuator cable length**

Nil	Without cable	8	8m *
1	1.5m	A	10m *
3	3m	B	15m *
5	5m	C	20m *

\*produced upon receipt of order  
(Only "Robotic type cable" can be selected)

**Actuator cable type**

Nil	Without cable
R	Robotic type cable
S*	Standard cable

\*Only "Step motor" can be selected

**\*Applicable stroke**

	Standard									
	100	200	300	400	500	600	700	800	900	1000
11-LEFS16	●	●	●	○	○	○	○	○	○	○
11-LEFS25	●	●	●	○	●	○	○	○	○	○
11-LEFS32	●	●	●	○	●	○	○	○	○	○
11-LEFS40	○	●	●	○	●	○	○	○	○	○

○produced upon receipt of order

#### ● AC Servo motor

11-LEFS 25 S2 B - 100 □ □ - S 2 A1 □

**Size**

25
32
40

**Motor**

TYPE	Out put [W]	size	Applicable controller	
				S2
S3	200	32		
S4	400	40		
S6	AC servo motor (Absolute encoder)	100	25	B1,B2
S7	200	32		
S8	400	40		

**Ball screw lead**

	Size		
	25	32	40
A	12mm	16mm	20mm
B	6mm	8mm	10mm

**Stroke**

100	100mm
∫	∫
1000	1000mm

\*Refer to the table of Applicable stroke

**Vacuum port direction**

Nil	Left side
R	Right side
D	Both side

**Motor option**

Nil	Without lock
B	With lock

**I/O connector**

Nil	None
D	With connector

**Controller type**

	Applicable controller	Power supply voltage
A1	LECSA1	100 to 120VAC
A2	LECSA2	200 to 230VAC
B1	LECSB1	100 to 120VAC
B2	LECSB2	200 to 230VAC

**Cable length**

Nil	Without cable
2	2m
5	5m
A	10m

The length of motor, encoder and lock cables are same.

**Cable type**

Nil	Without cable
R	Robotic type cable
S	Standard cable

Motor cable and encoder cable included. (If motor option "With lock" was selected lock cable is included too.)

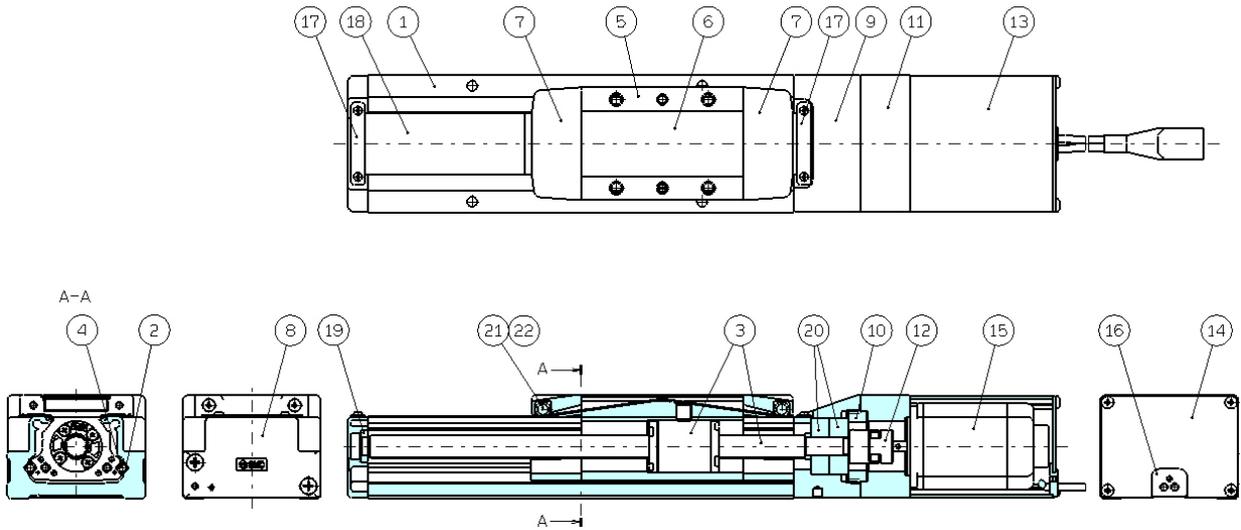
**\*Applicable stroke**

	Standard									
	100	200	300	400	500	600	700	800	900	1000
11-LEFS25	●	●	●	○	●	○	○	○	○	○
11-LEFS32	●	●	●	○	●	○	○	○	○	○
11-LEFS40	○	●	●	○	●	○	○	○	○	○

○produced upon receipt of order

## 4. Construction

### ● 11-LEFS※



No.	Description	Material	Remarks	No.	Description	Material	Remarks
1	Body	Aluminium alloy	Anodized	12	Coupling	-	
2	Rail guide	-		13	Motor cover	Aluminium alloy	Anodized
3	Ball screw Ass'y	-		14	End cover	Aluminium alloy	Anodized
4	Connector shaft	Stainless steel		15	Motor	-	
5	Table	Aluminium alloy	Anodized	16	Rubber bushing	NBR	
6	Blanking plate	Aluminium alloy	Anodized	17	Band holder	Stainless steel	
7	Seal band holder	Synthetic resin		18	Dust seal band	Stainless steel	
8	Housing A	Aluminum die-cast	Chromating	19	Bearing	-	
9	Housing B	Aluminium alloy	Anodized	20	Bearing	-	
10	Bearing holder	Aluminium alloy		21	Roller A'ssv	-	
11	Motor mount	Aluminium alloy	Anodized	22	Bearin	-	

Revision history

# SMC Corporation

4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021 JAPAN

Tel: + 81 3 5207 8249 Fax: +81 3 5298 5362

URL <http://www.smcworld.com>

---

Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
© 2012 SMC Corporation All Rights Reservedd

