



# Operation Manual

## PRODUCT NAME

Electric Actuator / Rod Type  
Battery-less absolute encoder

## MODEL / Series / Product Number

### LEY Series

Applicable models: LEY□E, LEYG□E,

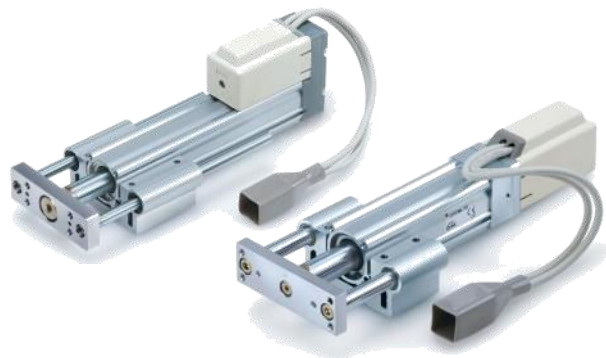
#### **LEY Series**

(Rod type)



#### **LEYG Series**

(Guide Rod type)



#This manual describes the dedicated terms for "LEY□E" and "LEYG□E".

Refer to the manual of LEY series about other details.

(No.LEY-OM00212)

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

## SMC Corporation

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# LEY/LEYG Series / Electric Actuator 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.



# LEY/LEYG Series / Electric Actuator 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. Rod type / LEY Series

## 1.1 Specification

Model			LEY 16□E			LEY 25□E			LEY 32□E			LEY 40□E			
Work load [kg] *1	Horizontal	(3000[mm <sup>2</sup> /s])	6	17	30	20	40	60	30	45	60	50	60	60	
		(2000[mm <sup>2</sup> /s])	10	23	35	30	55	70	40	60	80	60	70	90	
	Horizontal (Controller type:LECPA)	(3000[mm <sup>2</sup> /s])	4	11	20	12	30	30	20	40	40	30	60	60	
		(2000[mm <sup>2</sup> /s])	6	17	30	18	50	50	30	60	60				
	Vertical	(3000[mm <sup>2</sup> /s])	2	4	8	8	16	30	11	22	43	13	27	53	
Actuator specifications	Pushing force [N] *2,*3,*4		14 to 38	27 to 74	51 to 141	63 to 122	126 to 238	232 to 452	80 to 189	156 to 370	296 to 707	132 to 283	266 to 553	562 to 1058	
	Speed [mm/s] *4		15 to 500	8 to 250	4 to 125	18 to 500	9 to 250	5 to 125	15 to 500	8 to 250	4 to 125	24 to 300	12 to 150	6 to 75	
	acceleration/deceleration		3,000 or less												
	Pushing speed [mm/s] Note6)		50 or less			35 or less			30 or less			30 or less			
	Positioning repeatability [mm]		+/- 0.02												
	Lost motion[mm]		0.1 or less												
	Lead [mm]		10	5	2.5	12	6	3	16	8	4	16	8	4	
	Impact resistance/vibration Resistance [m/s <sup>2</sup> ] Note7)		50 / 20												
	Drive method		Ball screw and Belt (For "LEY*_ / R / L"), Ball screw (For "LEY*D)												
	Guide type		Sliding bush (Piston rod part)												
	Operating temperature range [°C]		5 to 40												
	Operating humidity range [%]		90 RH or less(No condensation)												
	Electric specifications	Motor size		□28			□42			□56.4 (M)			□56.4 (L)		
		Type of Motor		Step motor (Servo 24VDC)											
Encoder		Incremental A/B phase (800 pulse/rotation)													
Rated voltage [VDC]		24 +/- 10%													
Power consumption [W] Note8)		23			40			50			50				
Standby power consumption when operating [W] Note9)		16			15			48			48				
Moment max. power Consumption [W] Note10)		43			48			104			106				
Rated voltage [VDC]		No excitation operating type													
Lock unit specifications	Holding force [N]		20	39	78	78	157	294	108	216	421	127	264	519	
	Power consumption [W] Note12)		3.6			5			5			5			
	Rated voltage [VDC]		24+/-10%												

\*1 Horizontal: The maximum value of the work load. An external guide is necessary to support the load (Friction coefficient of guide: 0.1 or less). The actual work load and transfer speed change according to the condition of the external guide. Also, speed changes according to the work load.

Vertical: Speed changes according to the work load. Check "Model Selection" in the Catalog. The values shown in ( ) are the acceleration/deceleration. Set these values to be 3000 [mm/s<sup>2</sup>] or less.

\*2 Pushing force accuracy is ±20% (F.S.).

\*3 The pushing force values for LEY16□E is 20% to 65%, for LEY25□E is 30% to 50%, for LEY32□E is 30% to 70%, and for LEY40□E is 35% to 65%. The pushing force values change according to the duty ratio and pushing speed. Check "Model Selection" in the Catalog.

\*4 The speed and force may change depending on the cable length, load, and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)

\*5 The allowable speed for pushing operation.

\*6 A reference value for correcting an error in reciprocal operation

\*7 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a 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. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)

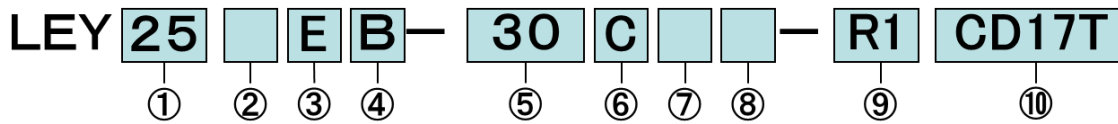
\*8 The power consumption (including the controller) is for when the actuator is operating.

\*9 The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation. Except during the pushing operation

\*10 The maximum instantaneous power consumption (including the controller) is for when the actuator is operating. This value can be used for the selection of the power supply.

\*11 With lock only

\*12 For an actuator with lock, add the power consumption for the lock.



① Size

16
25
32
40

② Motor mounting position

Symbol	Mounting	Motor cover direction
Nil	Top-mounting	-
D	In-line	-
D1		Left side
D2		Right side
D3		Top side
D4		Bottom side

\*1 Only size25/32/40  
\*2 Only size16

③ Motor type

Symbol	Type
E	Battery-less absolute (Step motor 24 VDC)

④ Motor option

C	With motor cover
W	With lock/motor cover

\*When "With lock/motor cover" is selected for the top mounting type, the motor body will stick out from the end of the body for size 40 with strokes of 30 mm or less. Check for interference with workpieces before selecting a model.

⑤ Lead [mm]

Symbol	LEY16	LEY25	LEY32 /40
A	10	12	16
B	5	6	8
C	2.5	3	4

⑥ Rod end thread

Nil	Rod end female thread
M	Rod end male thread (1 rod end nut included)

⑦ Controller

\*Refer to catalog

⑧ Stroke [mm]

Stroke	Note	
	Size	Applicable stroke
30 to 300	16	30,50,100,150,200,250,300
30 to 400	25	30,50,100,150,200,250,300,350,400
30 to 500	32/40	30,50,100,150,200,250,300,350,400,450,500

⑨ Actuator cable type/length

Robotic cable

Nil	None	R8	8'
R1	1.5	RA	10'
R3	3	RB	15'
R5	5	RC	20'

\*Produced upon receipt of order

⑩ Mounting

Symbol	Type	Motor mounting	
		Parallel	In-line
Nil	Ends tapped / *2 Body bottom tapped	●	●
L	Foot	●	-
F	Rod flange *2	● *4	●
G	Head flange *2	● *5	-
D	Double clevis *3	●	-

\*1 Mounting bracket is shipped together, (but not assembled).

\*2 When mounting styles are [Rod/Head flange] or [Ends tapped] with horizontal cantilever, use it within the following stroke.

- LEY16:100 or less - LEY25:200 or less - LEY32/40:200 or less

\*3 In case of [Double clevis], use the actuator within the following stroke limit.

- LEY25:200 or less - LEY32/40:200 or less

\*4 LEY16:50 or less/LEY40:30 or less and Motor option is "With lock". With "Lock/Cover"

\*5 "G" Head flange is not available for LEY32/40

## ! 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.>

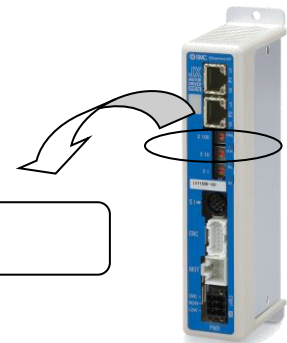
① "Actuator" matches "Actuator part number described in controller."

Example) Actuator number  
LEY25EB-30C-R1CD17T

①

①

LEY25EB-30



## 2. Guide rod type / LEYG Series

### 2.1 Specification

Model		LEY 16			LEY 25			LEY 32			LEY 40			
Work load [kg] <small>(note 2)</small>	Horizontal	(3000[mm <sup>2</sup> /s])	6	17	30	20	40	60	30	45	60	50	60	60
		(2000[mm <sup>2</sup> /s])	10	23	35	30	55	70	40	60	80	60	70	90
	Vertical	(3000[mm <sup>2</sup> /s])	2	4	8	8	16	30	11	22	43	13	27	53
Pushing force [N] <small>(Note3)4) 5)</small>			14 to 38	27 to 74	51 to 141	63 to 122	126 to 238	232 to 452	80 to 189	156 to 370	296 to 707	132 to 283	266 to 553	562 to 1058
Speed [mm/s] <small>(Note 5)</small>		(Controller type: LECPE,LECP1,LECPM)	15 to 500	8 to 250	4 to 125	18 to 500	18 to 500	5 to 125	24 to 500	12 to 300	6 to 150	24 to 500	12 to 300	6 to 150
Max acceleration/deceleration			3,000											
Pushing speed [mm/s] <small>(Note6)</small>			50 or less			35 or less			30 or less			30 or less		
Positioning repeatability [mm]			+/- 0.02											
Lost motion[mm]			0.1 or less											
Lead [mm]			10	5	2.5	12	6	3	16	8	4	16	8	4
Impact resistance/vibration Resistance [m/s <sup>2</sup> ] <small>(Note7)</small>			50 / 20											
Drive method			Ball screw and Belt (For "LEY* "), Ball screw (For "LEY*D)											
Guide type			Sliding bush (Piston rod part)											
Operating temperature range [°C]			5 to 40											
Operating humidity range [%]			90 RH or less (No condensation)											
Motor size			□28			□42			□56.4 (M)			□56.4 (L)		
Type of Motor			Battery-less absolute (Step motor 24VDC)											
Encoder			Battery-less absolute (4096 pulse/rotation)											
Rated voltage [VDC]			24 +/- 10%											
Power consumption [W] <small>(Note8)</small>			23			40			50			50		
Standby power consumption when operating [W] <small>(Note9)</small>			16			15			48			48		
Moment max. power Consumption [W] <small>(Note10)</small>			43			48			104			106		
Rated voltage [VDC]			No excitation operating type											
Holding force [N]			20	39	78	78	157	294	108	216	421	127	264	519
Power consumption [W] <small>(Note12)</small>			3.6			5			5			5		
Rated voltage [VDC]			24+/-10%											

\*1 Horizontal: An external guide is necessary to support the load (Friction coefficient of guide: 0.1 or less). The actual work load and transfer speed change according to the condition of the external guide. Also, speed changes according to the work load.

Vertical: Speed changes according to the work load. Check "Model Selection" in the Catalog.

Set the acceleration/deceleration values to be 3000 [mm/s<sup>2</sup>] or less.

\*2 Pushing force accuracy is ±20% (F.S.).

\*3 The pushing force values for LEYG16□□E is 20% to 65%, for LEYG25□□E is 30% to 50%, for LEYG32□□E is 30% to 70%, and for LEYG40□□E is 35% to 65%.

The pushing force values change according to the pushing speed. Check "Model Selection" in the Catalog.

\*4 The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)

When [M: Sliding bearing] is selected, the maximum speed of lead [A] is 400 mm/s (at no-load, horizontal mounting).

The speed is also restricted with a horizontal/moment load. Refer to "Model Selection" in the Catalog.

\*5 The allowable speed for the pushing operation

\*6 A reference value for correcting an error in reciprocal operation

\*7 Impact resistance: No malfunction occurred when it was tested with a drop tester in both an axial direction and a 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. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)

\*8 The power consumption (including the controller) is for when the actuator is operating.

\*9 The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation. Except during the pushing operation

\*10 The maximum instantaneous power consumption (including the controller) is for when the actuator is operating. This value can be used for the selection of the power supply.

\*11 With lock only

\*12 For an actuator with lock, add the power consumption for the lock.

## 2.2 How to Order

LEYG **25** **M** **E** **B** — **50** **C** — **R1** **CD17T**

①    ②    ③    ④    ⑤                      ⑥    ⑦    ⑧                      ⑨                      ⑩

### ① Size ② Bearing type

Size	Symbol	Mounting	Motor cover direction
16	Nil	Top-mounting	-
25			
32	D	In-line	-
40			Left side
			Right side
			Top side
	D4		Bottom side

\*1 Only size25/32/40

\*2 Only size16

### ③ Motor mounting position

Symbol	Mounting position
Nil	Top mounting
D	In-line

### ⑥ Stroke [mm]

Stroke	Applicable stroke
30 to 300	30,50,100,150,200,250,300

### ④ Motor type

Symbol	Type
Nil	Battery-less absolute (Step motor 24 VDC)

### ⑦ Motor option

Symbol	Option
C	With motor cover
W	With lock/motor cover

\*When "With lock/motor cover" is selected for the top mounting type, the motor body will stick out from the end of the body for size 40 with strokes of 30 mm or less.

Check for interference with [workpieces](#) before selecting a model.

### ⑩ Controller

\*Refer to catalog

### ⑤ Lead [mm]

Symbol	LEY16	LEY25	LEY32 /40
A	10	12	16
B	5	6	8
C	2.5	3	4

### ⑧ Guide option

Symbol	Option
Nil	Without option
F	With grease holding function

\* Only available for slide bearings

### ⑨ Actuator cable type/length

Robotic cable

Symbol	Length	Symbol	Length
Nil	None	R8	8"
R1	1.5	RA	10"
R3	3	RB	15"
R5	5	RC	20"

\*Produced upon receipt of order

## ⚠ 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.>

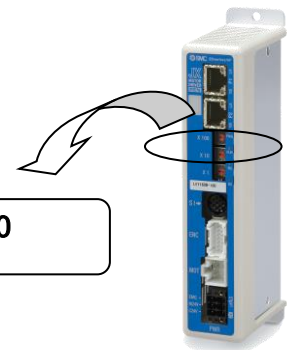
① "Actuator" matches "Actuator part number described in controller."

Example) Actuator number

LEYG25MEB-50C-R1CD17T

①

① **LEYG25MEB-50**



## 3. Specific product precautions

About precautions for installation of actuator, refer to [Specific precautions for Battery-less absolute encoder] that is described in the manual of used controller.



#### Revision history

No.LEY\*-OMZ0002

April,2021

•Revised Old documentNo.(LEY\*-OMO214Q )to New documentNo.

•Model addition

## SMC Corporation

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

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

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

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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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