

# Operation Manual

PRODUCT NAME

## Electric Actuator / Rod Type 《 AC Servo Motor 》

MODEL / Series

### LEY Series

Applicable models: LEY□ , LEYG□

#### *LEY Series*

(Rod type)



#### *LEYG Series*

(Guide Rod type)



#This manual describes the actuators operation in combination with the LECS□ / LECY□ series drivers.

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

## SMC Corporation

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# LEY Series / Electric Rod 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.



# LEY Series / Electric Rod 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**

- 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. Procedure before operation

#This manual describes the actuators operation in combination with the LECS□ / LECY□ series drivers.  
 #Refer to the manual relevant to the controller being used for full operating instructions.

## 1.1 Preparation

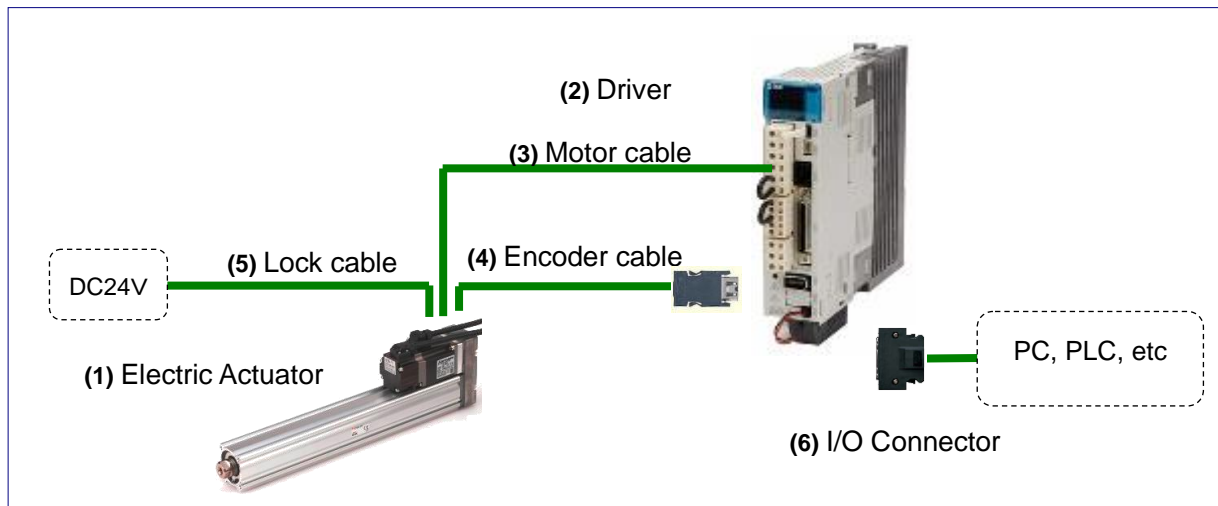
### (1) Items to be prepared

Please check on the label, and the quantity of accessories, to confirm that it is the product that was ordered.

Table 1. Components

No.	Part name	Qty
(1)	Electric Actuator /LEY Series	1
(2)	Driver / LECS Series	1(in case with driver)
(3)	Motor cable	Pre-installed (1) (in case with cable)
(4)	Encoder cable	
(5)	Lock cable	
(6)	I/O Connector	1(in case with I/O connector)

### LECSB(Pulse input) / LECSB-T(Pulse input / Positioning)

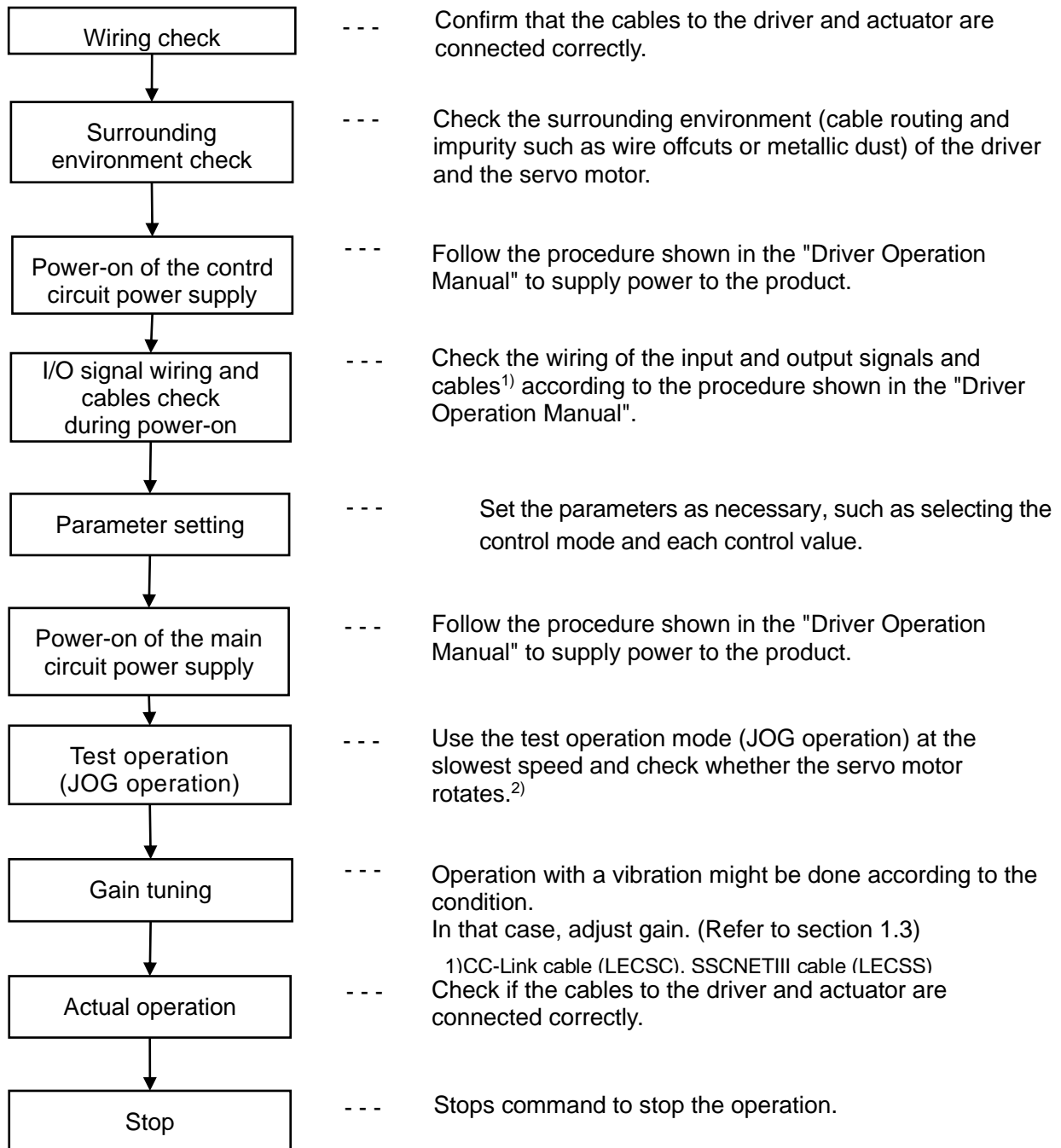


- \* The photo is for LECSB (pulse input type).
- \* The shape of the driver and I / O connector differs depending on the type of driver.

Refer to the “Electric actuator / Common precautions 5.3 Mounting No.11” for details and for cable connection methods.

## 1.2 Startup

When switching the power on for the first time, follow the startup procedure below.  
Refer to the "Driver operation manual" for wiring method and detailed procedure.



LECSS need

1)CC-Link cable (LECSC, LECSC-T), SSCNETIII cable (LECSS, LECSS-T)

2)When using test operation mode (JOG operation), the LECSC, LECSC-T, LECSS and LECSS-T need the MR-Configurator2™.

### 1.3 Gain tuning

Refer to the “Driver operation manual / NORMAL GAIN ADJUSTMENT” for details and tuning methods.

Refer to the “Driver operation manual / APPENDIX / Recommended parameter values for each actuator” for the parameter.

#### **Warning**

A mechanical resonance may occur depending on the configuration or the mounting orientation of the transferred object. Please change the appropriate parameter in the initial setting.

Refer to the “Driver operation manual / APPENDIX / Recommended parameter values for each actuator” for the parameter.

## 2. Rod type / LEY Series

### 2.1 Specification

Model		LEY25 (Top/Parallel) / LEY25D(in-line)			LEY32 (Top/Parallel)			LEY32D (in-line)			LEY63 (Top/Parallel) LEY63D (in-line)													
Stroke[mm]		30, 50, 100, 150, 200, 250, 300, 350, 400			30, 50, 100, 150, 200, 250, 300, 350, 400, 500			30, 50, 100, 150, 200, 250, 300, 350, 400, 500			100, 200, 300, 400, 500, 600, 700, 800													
Work load [kg]	Horizontal <sup>Note 1)</sup>	18	50	50	30	60	60	30	60	60	40	70	80	200										
	Vertical	8	16	30	9	19	37	12	24	46	19	38	72	115										
Force [N] <sup>Note2)</sup> (Set value LEY25S/32S: 15 to 30%) (Set value LEY63S : 15 to 50%) (Set value LEY25T/32T: 12 to 24%) (Set value LEY63T : 12 to 40%)		65 ~131	127 ~255	242 ~485	79 ~157	154 ~308	294 ~588	98 ~197	192 ~385	368 ~736	156 ~521	304 ~1012	573 ~1910	1003 ~3343										
Maximum Speed <sup>Note3)</sup> [mm/s]	Range of stroke	to 300	900	450	225	1200	600	300	1000	500	250	1000	500	250	70									
		305 to 400	600	300	150																			
		405 to 500	-	-	-											800	400	200	640	320	160			
		505 to 600	-	-	-											-	-	-	-	-	-	800	400	200
		605 to 700	-	-	-											-	-	-	-	-	-	600	300	150
705 to 800	-	-	-	-	-	-	-	-	-	500	250	125												
Pushing speed [mm/s] <sup>Note4)</sup>		35 or less			30 or less			30 or less			30 or less													
acceleration/deceleration [mm/s <sup>2</sup> ]		5,000			5,000			5,000			5,000													
Positioning repeatability [mm]		±0.02[Basic type] / ±0.01[High precision type]																						
Lost motion[mm]		0.1 or less[Basic type] / 0.05 or less[High precision type]																						
Lead[mm] (Including pulley ratio)		12	6	3	20	10	5	16	8	4	20	10	5	2.86										
Impact resistance/vibration Resistance [m/s <sup>2</sup> ] <sup>Note5)</sup>		50 / 20			50 / 20			50 / 20			50 / 20													
Drive method		Ball screw and Belt [1:1] / Ball screw			Ball screw and Belt [1.25:1]			Ball screw			Ball screw			Ball screw and Belt [4:7]										
Guide type		Sliding bush (Piston rod part)			Sliding bush (Piston rod part)			Sliding bush (Piston rod part)			Sliding bush (Piston rod part)													
Operating temperature range [°C]		5 to 40			5 to 40			5 to 40			5 to 40													
Operating humidity range [%RH]		90 or less(No condensation)			90 or less(No condensation)			90 or less(No condensation)			90 or less(No condensation)													
Motor output/size		100W / □40			200W / □60			400W / □60			400W / □60													
Type of Motor		AC servo motor (100/200VAC)			AC servo motor (100/200VAC)			AC servo motor (200VAC)			AC servo motor (200VAC)													
Encoder		[Motor type: S2, S3, S4]: Incremental 17bit encoder (Resolution: 131072 p/rev) [Motor type: S6, S7, S8]: Absolute 18bit encoder (Resolution: 262144 p/rev) [Motor type: T6, T7, T8]: (Driver type: LECSB-T/LECSS-T) Absolute 22bit encoder (Resolution: 4194304 p/rev) (Driver type: LECSC-T) Absolute 18bit encoder (Resolution: 262144 p/rev)																						
Type <sup>Note6)</sup>		Non-magnetizing lock																						
Holding force [N]		131	255	607	607	607	588	197	385	736	313	607	1146	2006										
Power consumption [W] at 20 °C <sup>Note7)</sup>		6.3			7.9			7.9			7.9													
Rated voltage [V]		24VDC <sup>0</sup> -10%																						

Note 1) The maximum value of the horizontal workload. (An external guide is necessary [Coefficient of friction:0.1 or less]).  
The actual workload will depend on the type of external guide.

Note 2) The force setting range (set values for the driver) for the force control with the torque control mode. Set it with reference to "Force Conversion Graph" of the catalog. The driver applicable to the pushing operation is "LECSB-T", "LECSS", and "LECSS-T". "The LECSB-T is only applicable when the control method is positioning. The point table is used to set the pushing operation settings. To set the pushing operation settings, an additional dedicated file (pushing operation extension file) must be downloaded separately to be used with the setup software (MR Configurator2™: LEC-MRC2□). Please download this dedicated file from the SMC website: <https://www.smcworld.com/>

When selecting the LECSB-T or LECSB-T, combine it with a master station

(such as the Simple Motion module manufactured by Mitsubishi Electric Corporation) which has a pushing operation function.

Note 3) The allowable speed changes by the stroke.

Note 4) Allowable impact speed when "impact work" in torque control mode, etc.

Note 5) 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 6) Only when the motor option, "with lock", is selected.

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



Model		LEY100□L	LEY100□D	LEY100□B
Stroke[mm] <sup>Note 1)</sup>		100, 200, 300, 400, 500, 600, 700, 800, 900, 1000		
Work load [kg]	Horizontal <sup>Note 2)</sup>	1,200	1,200	240
	Vertical	200	185	80
Force [N] <sup>Note 3,4)</sup> 25 to 55%		5,500 ~12,000	3,300 ~7,200	1,100 ~2,600
Maximum Speed [mm/s] <sup>Note 5)</sup>	Range of Stroke [mm]	To 500	100	167
		500 to 600	74	123
		605 to 700	57	95
		705 to 800	45	75
		805 to 900	36	60
905 to 1,000		30	50	150
Pushing speed [mm/s] <sup>Note 6)</sup>		20 or less		
acceleration/deceleration [mm/s <sup>2</sup> ] <sup>Note 7)</sup>		2,000	3,000	
Positioning repeatability [mm]		±0.02		
Lost motion[mm] <sup>Note 8)</sup>		0.1 or less		
Reduction ratio		1/5	1/3	-
Lead[mm] (Including reduction ratio)		2	3.33	10
Impact resistance/vibration Resistance [m/s <sup>2</sup> ] <sup>Note 9)</sup>		Top/parallel : 50/20 in-line : 50/15		
Drive method		Ball screw		
Guide type		Sliding bush (Piston rod part)		
Operating temperature range [°C]		5 to 40		
Operating humidity range [%RH]		90 or less (No condensation)		
Electric specifications	Motor output/size	750W/□80		
	Type of Motor	AC servo motor (100/200VAC)		
	Encoder	Absolute 22bit encoder (Resolution: 4194304 p/rev) (Driver type: LECSC-T) Absolute 18bit encoder (Resolution: 262144 p/rev)		
	Power consumption [W] <sup>Note 10)</sup>	1,100 (Maximum power)		
Lock unit specifications	Type <sup>Note 11)</sup>	Non-magnetizing lock		
	Holding force [N]	5,700	3,400	1,200
	Power consumption [W] at 20°C	10		
	Rated voltage [V]	DC24 <sup>0</sup> <sub>-10%</sub>		

Note 1) For "double clevis type": Stroke limited to 400 or less.

Note 2) The maximum value of the horizontal workload. (An external guide is necessary [Coefficient of friction:0.1 or less]).  
The actual workload will depend on the type of external guide.

Note 3) The force setting range (set values for the driver) for the force control with the torque control mode. Set it with reference to "Force Conversion Graph" of the catalog. The driver applicable to the pushing operation is "LECSB-T", "LECSS", and "LECSS-T". "The LECSB-T is only applicable when the control method is positioning. The point table is used to set the pushing operation settings. To set the pushing operation settings, an additional dedicated file (pushing operation extension file) must be downloaded separately to be used with the setup software (MR Configurator2™: LEC-MRC2□). Please download this dedicated file from the SMC website: <https://www.smcworld.com/>  
When selecting the LECSS or LECSS-T, combine it with a master station (such as the Simple Motion module manufactured by Mitsubishi Electric Corporation) which has a pushing operation function.

Note 4) For "double clevis type": Maximum thrust limited to 6,000 or less.

Note 5) The allowable speed changes by the stroke.

Note 6) Allowable impact speed when "impact work" in torque control mode, etc.

Note 7) The maximum acceleration/deceleration speed varies depending on the payload. Please check the "Speed-Work Load Graph" in the catalog.

Note 8) Reference value when correcting for errors in reciprocating motion.

Note 9) 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 10) Indicates the maximum power when the driver is included in operation. Refer to the power supply capacity in the instruction manual of each driver when selecting the power supply capacity.

Note 11) Only when the motor option, "with lock", is selected.

[Product weight]

[kg]

Model		LEY25 (Top/Parallel)										LEY25D (in-line)											
Stroke [mm]		30	50	100	150	200	250	300	350	400	-	-	30	50	100	150	200	250	300	350	400	-	-
Motor type	Incremental Encoder(S2)	1.3	1.4	1.6	1.8	2.0	2.2	2.3	2.5	2.7	-	-	1.3	1.4	1.6	1.8	2.0	2.2	2.4	2.5	2.7	-	-
	Absolute Encoder(S6)	1.4	1.5	1.6	1.9	2.0	2.2	2.4	2.6	2.8	-	-	1.4	1.5	1.6	1.9	2.1	2.3	2.4	2.6	2.8	-	-
	Absolute Encoder(T6)	1.3	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.7	-	-	1.4	1.5	1.6	1.9	2.1	2.2	2.4	2.6	2.8	-	-

Model		LEY32 (Top/Parallel)										LEY32D (in-line)											
Stroke [mm]		30	50	100	150	200	250	300	350	400	450	500	30	50	100	150	200	250	300	350	400	450	500
Motor type	Incremental Encoder(S3)	2.4	2.5	2.8	3.3	3.6	3.9	4.1	4.4	4.7	5.0	5.3	2.4	2.6	2.8	3.3	3.6	3.9	4.2	4.4	4.7	5.0	5.3
	Absolute Encoder(S7)	2.4	2.5	2.8	3.2	3.5	3.8	4.1	4.4	4.6	4.9	5.2	2.4	2.5	2.8	3.3	3.5	3.8	4.1	4.4	4.7	4.9	5.2
	Absolute Encoder(T7)	2.3	2.4	2.7	3.2	3.5	3.8	4.1	4.3	4.6	4.9	5.2	2.4	2.5	2.8	3.2	3.5	3.8	4.1	4.4	4.6	4.9	5.2

Model		LEY63 (Top/Parallel)												
Stroke [mm]		50	100	150	200	250	300	350	400	450	500	600	700	800
Motor type	Incremental Encoder(S4)	4.9	5.4	6.0	6.6	7.8	8.3	8.9	9.4	10.0	10.5	12.2	13.4	14.5
	Absolute Encoder(S8)	5.0	5.5	6.1	6.7	7.9	8.4	9.0	9.5	10.1	10.6	12.3	13.5	14.6
	Absolute Encoder(T8)	4.9	5.4	6.0	6.6	7.8	8.3	8.9	9.4	10.0	10.5	12.2	13.4	14.5

Model		LEY63 (in-line)												
Stroke [mm]		50	100	150	200	250	300	350	400	450	500	600	700	800
Motor type	Incremental Encoder(S4)	5.1	5.6	6.2	6.7	7.9	8.4	9.0	9.6	10.2	10.7	12.4	13.5	14.7
	Absolute Encoder(S8)	5.2	5.7	6.3	6.8	8.0	8.5	9.1	9.7	10.3	10.8	12.5	13.6	14.8
	Absolute Encoder(T8)	5.1	5.6	6.2	6.7	7.9	8.4	9.0	9.6	10.2	10.7	12.4	13.5	14.7

Model		LEY100 (Top/Parallel)									
Stroke [mm]		100	200	300	400	500	600	700	800	900	1,000
Lead type	Without reducer(B)	14.5	16.1	17.8	19.4	21.1	22.7	24.4	26.0	27.7	29.3
	With reducer(D/L)	16.9	18.5	20.2	21.8	23.5	25.1	26.8	28.4	30.1	31.7

Model		LEY100 (in-line)									
Stroke [mm]		100	200	300	400	500	600	700	800	900	1,000
Lead type	Without reducer(B)	12.7	14.4	16.0	17.7	19.3	21.0	22.6	24.2	25.9	27.5
	With reducer(D/L)	14.3	16.0	17.6	19.3	20.9	22.6	24.2	25.9	27.5	29.1

[Additional weight for lock]

[kg]

Size		25	32	63	100	
					Top/Parallel	In-line
Lock	Incremental Encoder [Motor type: S2,S3,S4]	0.20	0.40	0.40	-	
	Absolute Encoder [Motor type: S6,S7,S8]	0.30	0.60	0.66	-	
	Absolute Encoder [Motor type: T7,T8,T9]	0.30	0.40	0.40	1.0	
	Absolute Encoder [Motor type: V6,V7,V8]	0.30	0.60	0.60	-	
Rod end male thread	Part of male thread	0.03	0.12	0.03	0.11	
	Nut	0.02	0.04	0.02	0.05	
Foot style (Body mounting bolt is included, 2sets)		0.08	0.14	0.26	0.8	1.4
Rod side flange style (Body mounting bolt is included)		0.17	0.2	0.51	1.1	
Motor side flange style (Body mounting bolt is included)			-	-	-	
Double clevis style (Clevis pin, Type C retaining ring for axis, Body mounting bolt is included)		0.16	0.22	0.58	-	1.3

## 2.2 How to Order

LEY **H** **25** **S2** **B** - **100** **S** **2** **A1**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭

### ① Accuracy

Nil	Basic type
H	High precision type

### ② Size

25
32
63

### ③ Motor mounting position

Nil	Top mountin
R	Right side parallel
L	Left side parallel
D	In-line

### ⑤ Lead[mm]

symbol	LEY25	LEY32	LEY63
A	12	16(20)	20
B	6	8(10)	10
C	3	4(5)	5
L	-	-	-(2.86)

### ④ Motor type

Symbol	Type	Output [W]	Size	Compatible driver
S2	AC servo motor (Incremental encoder)	100	25	LECSA□-S1
S3		200	32	LECSA□-S3
S4		400	63	LECSA2-S4
S6	AC servo motor (Absolute encoder)	100	25	LECSB□-S5 LECSC□-S5 LECSS□-S5
S7		200	32	LECSB□-S7 LECSC□-S7 LECSS□-S7
S8		400	63	LECSB2-S8 LECSC2-S8 LECSS2-S8
T6	AC servo motor (Absolute encoder)	100	25	LECSB2-T5 LECSC2-T5 LECSS2-T5
T7		200	32	LECSB2-T7 LECSC2-T7 LECSS2-T7
T8		400	63	LECSB2-T8 LECSC2-T8 LECSS2-T8

### ⑥ Stroke [mm]

30	30
to	to
800	800

\*The values shown in ( ) are the lead for top mounting, right/left side parallel types. (Equivalent lead which includes the pulley ratio)

### ⑦ Dust-tight/Water-jet-proof 《Only available for LEY63 》

Symbol	LEY25/32	LEY63
Nil	Without option	IP5x equivalent (Dust proof)
P	-	IP65 equivalent (Dust-tight/Water-jet-proof) /with Port for breath

\*When using the dust-tight/water-jet-proof (IP65 equivalent), correctly mount the fitting and tubing to the vent hole tap, and then place the end of the tubing in an area not exposed to dust or water.

\* The fitting and tubing should be provided separately by the customer. Select [Applicable tubing O.D.: o4 or more, Connection thread: Rc1/8].

### ⑧ Motor option

Nil	Without option
B	With lock

### ⑨ Rod end thread

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

### ⑩ Mounting

Symbol	Type	Motor mounting position	
		Top/Parallel	In-line
Nil	Ends tapped /Body bottom tapped	●	●
L	Foot	●	-
F	Rod flange	●	●
G	Head flange	●	-
D	Double clevis	●	-

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

\* For horizontal cantilever mounting with the rod flange, head flange and ends tapped, use the actuator within the following stroke range.

LEY25: 200 mm or less, LEY32: 100 mm or less, LEY63: 400 mm or less

\* For mounting with the double clevis, use the actuator within the following stroke range.

LEY25: 200 mm or less, LEY32: 200 mm or less, LEY63: 300 mm or less

\* Rod flange is not available for the LEY25 with stroke 30 mm and motor option "With lock".

\* Head flange is not available for the LEY32 and LEY63.

### ⑪ Actuator cable type

Nil	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)

### ⑫ Cable length [m]

Nil	Without cable
2	2
5	5
A	10

### ⑬ Driver type

	Compatible driver	Power supply voltage [V]	Size		
			25	32	63
Nil	Without driver		●	●	●
A1	LECSA1-S□	100 to 120	●	●	-
A2	LECSA2-S□	200 to 230	●	●	●
B1	LECSB1-S□	100 to 120	●	●	-
	LECSB2-S□	200 to 230	●	●	●
B2	LECSB2-T□	200 to 240	●	●	●
	LECSB2-T□	200 to 240	●	●	●
C1	LECSC1-S□	100 to 120	●	●	-
	LECSC2-S□	200 to 230	●	●	●
C2	LECSC2-T□	200 to 230	●	●	●
	LECSC2-T□	200 to 230	●	●	●
S1	LECSS1-S□	100 to 120	●	●	-
	LECSS2-S□	200 to 230	●	●	●
S2	LECSS2-T□	200 to 240	●	●	●
	LECSS2-T□	200 to 240	●	●	●

\* When the driver type is selected, the cable is included. Select cable type and cable length.

Example)

S2S2: Standard cable (2 m) + Driver (LECSS2)

S2 : Standard cable (2 m)

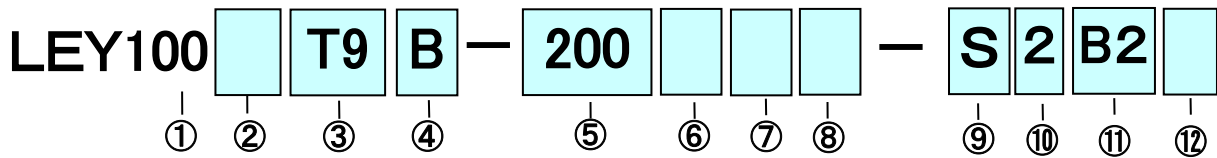
Nil : Without cable and driver

### ⑭ I/O cable length [m]

Nil	Without cable
H	Without cable (Connector only)
1	1.5

### Applicable stroke table\*

Model	Stroke [mm]	30	50	100	150	200	250	300	350	400	450	500	600	700	800
		LEY25	●	●	●	●	●	●	●	●	●	●	-	-	-
LEY32	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
LEY63	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●



①Size

100
-----

②Motor mounting position

Nil	Top mountain
R	Right side parallel
L	Left side parallel
D	In-line

③Motor type

Symbol	Type	Output	Size	driver
T9	AC servo motor (Absolute encoder)	750W	100	LECSB2-T9 LECSC2-T9 LECSS2-T9 LECSN2-T9(-□)

④Lead[mm]

Symbol	LECY100
B	10
D	3.33 <sup>*1</sup>
L	2 <sup>*2</sup>

⑤Stroke[mm]

100	100
∫	∫
1000	1000

\*Refer to the applicable stroke table for details.

⑥Motor option

Nil	Without option
B	With lock

⑦Rod end thread

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

⑧Mounting<sup>\*1</sup>

Symbol	Type	Motor mount option	
		Top/parallel	in-line
Nil	End tapped <sup>*2</sup>	●	●
L	Foot(in-line)	-	●
H	Foot	●	●
F	Rod flange	●	●
D	Double crevis <sup>*3</sup>	●	-

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

\*2 Do not use "flange type" or "end tapped" horizontal single-sided mounting.

\*3 Double crevis type: Use within the stroke limit of 400 or less and the thrust limit of 6000 or less.

⑨Cable type<sup>\*</sup>

Nil	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)

\*The motor and encoder cables are included. (The lock cable is also included when the motor with lock option is selected.)

\*Standard connector orientation of cable

• Top/parallel: "shaft side (A)"

• in-line: "opposite side (B)"

⑩Cable length<sup>\*[m]</sup>

Nil	Without cable
2	2
5	5
A	10

\*The length of the encoder, motor and lock cables are common.

LECSN2-T9-E /EtherCAT

(Absolute encoder)

LECSN2-T9-P /PROFINET

(Absolute encoder)

⑪Driver type<sup>\*</sup>

	Compatible driver	Power supply voltage
Nil	Without driver	
B2	LECSB2-T9/Pulse input (Absolute encoder)	200V~240V
C2	LECSC2-T9/CC-Link (Absolute encoder)	200V~230V
S2	LECSS2-T9/SSCNET/H (Absolute encoder)	200V~230V
N2	LECSN2-T9/Without network card (Absolute encoder)	200V~240V
E2	LECSN2-T9-E/EtherCAT (Absolute encoder)	200V~240V
92	LECSN2-T9-9/EtherNet/IP (Absolute encoder)	200V~240V
P2	LECSN2-T9-P/PROFINET (Absolute encoder)	200V~230V

⑫ I/O cable length<sup>\*[m]</sup>

Nil	Without cable
H	Without cable (Connector only)
1	1.5

\*When "Without driver" is selected for driver type, only "Nil: Without cable" can be selected. If I/O cables are required, please refer to the catalog.

\*If you select with driver, the cable is included.

Please select the cable type and length.

Example) S2S2 : Standard cable (2m) + driver (LECSS2)

S2 : Standard cable (2m)

Nil : Without cable/driver

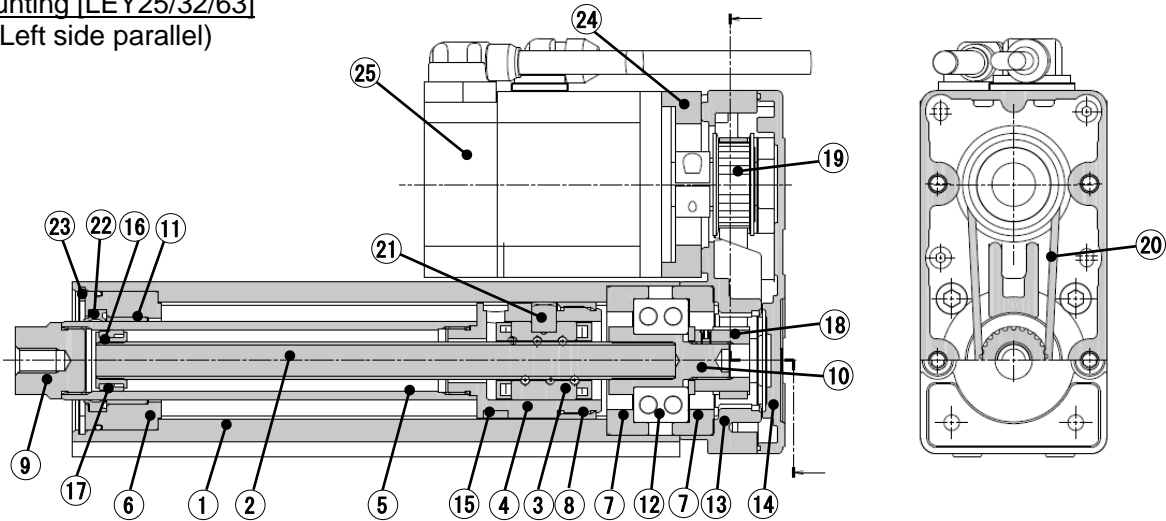
Applicable stroke table<sup>\*</sup>

Size	Stroke[mm]										Manufacturable stroke range
	100	200	300	400	500	600	700	800	900	1000	
100	●	●	●	●	●	●	●	●	●	●	100 to 1000

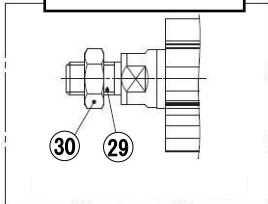
\*Please consult with SMC for non-standard strokes as they are produced as special orders.

## 2.3 Construction

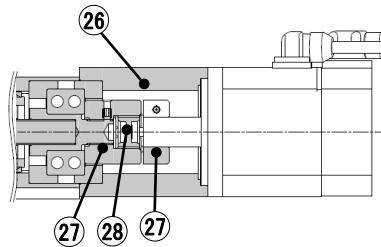
Top mounting [LEY25/32/63]  
(Right / Left side parallel)



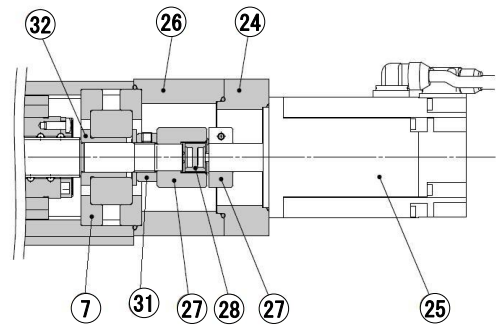
Rod end  
male thread



In-line [LEY25/32]



In-line [LEY63]



### Parts list

No.	Part	Material	Remarks
1	Body	Aluminum alloy	Anodized
2	Ball screw shaft	Alloy steel	
3	Ball screw nut	Resin alloy steel	
4	Piston	Aluminum alloy	
5	Piston rod	Stainless steel	Hard chrome anodized
6	Rod cover	Aluminum alloy	
7	Bearing holder	Aluminum alloy	
8	Rotation stopper	POM	
9	Socket	Free cutting carbon steels	Nickel plated
10	Connected shaft	Free cutting carbon steels	Nickel plated
11	Bushing	Bearing alloy	
12	Bearing	-	
13	Return box	Aluminum die-cast	Coating
14	Return plate	Aluminum die-cast	Coating
15	Magnet	-	
16	Wear ring holder	Stainless steel	LEY25/32: Only stroke 101mm or more LEY63: Only stroke 200mm or more
17	Wear ring	POM	LEY25/32: Only stroke 101mm or more LEY63: Only stroke 200mm or more
18	Pulley (For Screw shaft)	Aluminum alloy	

No.	Part	Material	Remarks
19	Pulley (For motor)	Aluminum alloy	
20	Belt	-	
21	Parallel pin	Stainless steel	
22	Rod seal	NBR	
23	Retaining ring	Steel for spring	Phosphate coated
24	Motor adapter	Aluminum alloy	Coating
25	Motor	-	
26	Motor block	Aluminum alloy	Coating
27	Hub	Aluminum alloy	
28	Spider	Urethane	Spider
29	Socket (male thread)	Free cutting carbon steels	Nickel plated
30	Nut	Alloy steel	Zinc chormaed
31	Lock-nut	Alloy steel	Black dyed
32	Spacer-A	Stainless steel	

### Mounting bracket part number\*

Size	Foot	Flange	Double clevis
25	LEY-L025	LEY-F025	LEY-D025
32	LEY-L032	LEY-F032	LEY-D032
63	LEY-L063	LEY-F063	LEY-D063

### Maintenance parts / belt

Size	Part number
25	LE-D-2-2
32	LE-D-2-4
63[Lead:A/B/C]	LE-D-2-5
63[Lead:L]	LE-D-2-6

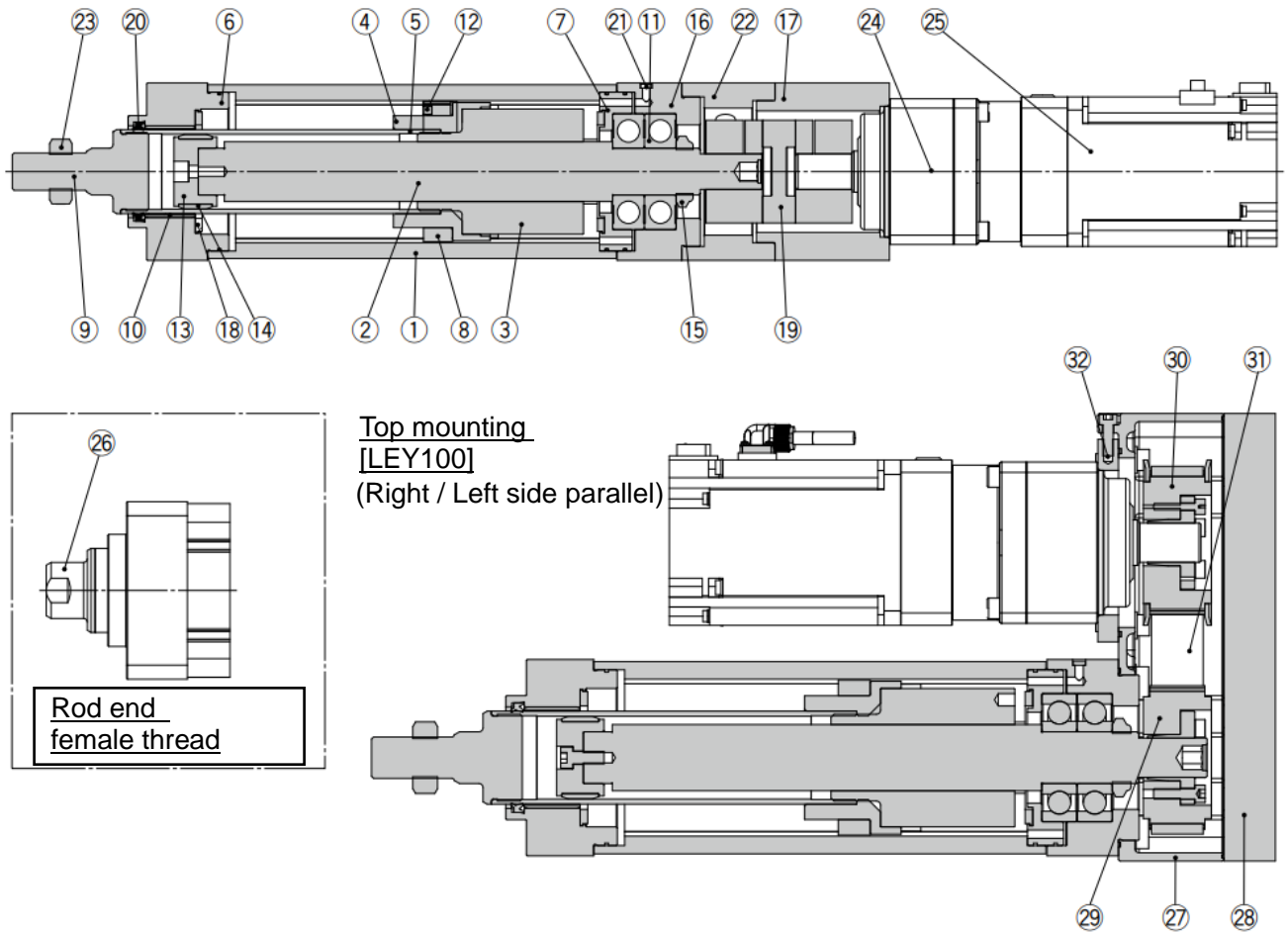
\*When ordering foot bracket, order 2 pieces per actuator.

\*Parts belonging to each bracket are as follows.

Foot, Flange: Body mounting bolt.

Double clevis: Clevis pin, Type C retaining ring for axis, Body mounting bolt.

in-line[LEY100]



Parts list

No.	Part	Material	Remarks
1	Body	Aluminum alloy	Anodized
2	Screw shaft	Alloy steel	
3	Ball screw nut	Resin alloy steel	
4	Piston	Aluminum alloy	
5	Piston rod	Stainless steel	Hard chrome anodized
6	Rod cover	Aluminum alloy	Anodized
7	Bearing hplder	Aluminum alloy	
8	Rotation stopper	Synthetic resins	
9	Socket (male screw)	Alloy steel	Nickel plated
10	Bushing	Bushing	
11	Bearing	-	
12	Magnet	-	
13	Wear ring holder	Aluminum alloy	
14	Wear ring	Synthetic resins	
15	Lock-nut	Alloy steel	
16	Motor block	Aluminum alloy	Anodized

No.	Part	Material	Remarks
17	Mora Flange	Aluminum alloy	Anodized
18	Damper	Urethane	
19	Coupling	-	
20	Scraper	NBR	
21	Sintered elements	Stainless steel	
22	Motor adapter	Aluminum alloy	Anodized
23	Nut	Alloy steel	Zinc chormaed
24	Reduction gear	-	
25	Motor	-	
26	Socket (female screw)	Alloy steel	Nickel plated
27	Return box	Aluminum die-cast	Coating
28	Return plate	Aluminum alloy	Anodized
29	Pulley for Screw Shaft	Alloy steel	
30	Pulley for motor	Alloy steel	
31	Belt	-	
32	Motor adapter	Aluminum alloy	Anodized

Mounting bracket part number

Motor mountain	Foot	Flange	Double crevis
In-line	LEY-L100	LEY-F100	-
Top/parallel	LEY-H100		D5080

Replacement parts/grease pack

Painted area	Part number
Piston rod	GR-S-010(10g)
	GR-S-020(20g)

\*Parts belonging to each bracket are as follows.

Foot, Flange: Body mounting bolt.

Double clevis: Clevis pin, Type C retaining ring for axis, Body mounting bolt.

### 3. Guide rod type / LEYG Series

#### 3.1 Specification

Model		LEYG25 <sup>M</sup> (Top/Parallel) / LEYG25 <sup>M</sup> D (In-line)			LEYG32 <sup>M</sup> (Top/Parallel)			LEYG32 <sup>M</sup> D (In-line)			
Actuator specifications	Work load [kg]	Horizontal <sup>Note 1)</sup>	18	50	50	30	60	60	30	60	60
		Vertica	7	15	29	7	17	35	10	22	44
	Force [N] <sup>Note 2)</sup> (Set value LEYG25S/32S: 15 to 30%) (Set value LEYG25T/32T: 12 to 24%)	65~131	127~255	242~485	79~157	154~308	294~588	98~197	192~385	368~736	
	Maximum Speed [mm/s]	900	450	225	1200	600	300	1000	500	250	
	Pushing speed [mm/s] <sup>Note 3)</sup>	35 or less			30 or less			30 or less			
	acceleration/deceleration [mm/s <sup>2</sup> ]	5,000						5,000			
	Positioning repeatability [mm]				±0.02[Basic type] / ±0.01[High precision type]						
	Lost motion[mm]				0.1 or less[Basic type] / 0.05 or less[High precision type]						
	Lead[mm] (Including pulley ratio)	12	6	3	20	10	5	16	8	4	
	Impact resistance/vibration Resistance [m/s <sup>2</sup> ] <sup>Note 4)</sup>	50 / 20			50 / 20						
	Drive method	Ball screw and Belt [1:1]/ Ball screw			Ball screw and Belt [1.25:1]			Ball screw			
	Guide type	Slide bearing (LEYG□M), Ball bushing bearing (LEYG□L)									
Operating temperature range [°C]	5 to 40			5 to 40							
Operating humidity range [%RH]	90 or less(No condensation)			90 or less (No condensation)							
Motor output/size	100W/□40			200W/□60							
Motor type	AC servo motor (100/200VAC)			AC servo motor (100/200VAC)							
Encoder	[Motor type: S2, S3]: Incremental 17bit encoder (Resolution: 131072 p/rev) [Motor type: S6, S7]: Absolute 18bit encoder (Resolution: 262144 p/rev) [Motor type: T6, T7]: (Driver type: LECSB-T/LECSS-T) Absolute 22bit encoder (Resolution: 4194304 p/rev) (Driver type: LECSB-T) Absolute 18bit encoder (Resolution: 262144 p/rev)										
Type <sup>Note 5)</sup>	Non-magnetizing lock										
Holding force [N]	131	255	485	157	308	588	197	385	736		
Power consumption [W] at 20 °C <sup>Note 6)</sup>	6.3			7.9			7.9				
Rated voltage [V]	24VDC <sup>0</sup> -10%										

Note 1) The maximum value of the horizontal workload. (An external guide is necessary[Coefficient of friction:0.1 or less]).  
The actual workload will depend on the type of external guide.

Note 2) The force setting range (set values for the driver) for the force control with the torque control mode. Set it with reference to "Force Conversion Graph" of the catalog. The driver applicable to the pushing operation is "LECSB-T", "LECSS", and "LECSS-T." The LECSB-T is only applicable when the control method is positioning. The point table is used to set the pushing operation settings. To set the pushing operation settings, an additional dedicated file (pushing operation extension file) must be downloaded separately to be used with the setup software (MR Configurator2™: LEC-MRC2□).  
Please download this dedicated file from the SMC website: <https://www.smcworld.com/>

When selecting the LECSB or LECSB-T, combine it with a master station (such as the Simple Motion module manufactured by Mitsubishi Electric Corporation) which has a pushing operation function.

Note 3) Allowable impact speed when "impact work" in torque control mode, etc.

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) Only when the motor option, "with lock", is selected.

Note 6) For an actuator with lock, add the power consumption for the lock.

#### [Product weight]

[kg]

Model		Guide type	LEYG25 (Top)						LEYG25D (In-line)							
Stroke [mm]			30	50	100	150	200	250	300	30	50	100	150	200	250	300
Motor type	Incremental Encoder(S2)	M	1.8	2.0	2.3	2.7	3.1	3.4	3.7	3.2	3.5	4.1	5.4	5.4	5.8	6.3
		L	1.8	2.0	2.3	2.7	3.0	3.3	3.5	3.2	3.5	3.9	5.1	5.1	5.6	6.0
	Absolute Encoder(S6)	M	1.9	2.1	2.4	2.8	3.1	3.5	3.7	3.2	3.4	4.0	5.3	5.3	5.8	6.2
		L	1.9	2.1	2.3	2.8	3.0	3.3	3.6	3.2	3.5	3.8	5.0	5.0	5.5	5.9
	Absolute Encoder(T6)	M	1.8	2.0	2.4	2.8	3.1	3.5	3.7	1.9	2.1	2.4	2.8	3.1	3.5	3.7
		L	1.9	2.1	2.3	2.7	3.0	3.3	3.6	1.9	2.1	2.3	2.8	3.0	3.3	3.6

Model		Guide type	LEYG32 (Top)						LEYG32D (In-line)							
Stroke [mm]			30	50	100	150	200	250	300	30	50	100	150	200	250	300
Motor type	Incremental Encoder(S3)	M	3.2	3.5	4.1	4.8	5.4	5.8	6.3	3.3	3.5	4.1	4.8	5.4	5.9	6.3
		L	3.2	3.5	3.9	4.6	5.1	5.6	6.0	3.3	3.5	3.9	4.7	5.1	5.6	6.0
	Absolute Encoder(S7)	M	3.2	3.4	4.0	4.7	5.3	5.8	6.2	3.2	3.5	4.0	4.8	5.3	5.8	6.2
		L	3.2	3.5	3.8	4.6	5.0	5.5	5.9	3.2	3.5	4.0	4.8	5.3	5.8	6.2
	Absolute Encoder(T7)	M	3.2	3.4	4.0	4.7	5.3	5.7	6.2	3.2	3.4	4.0	4.7	5.3	5.8	6.2
		L	3.2	3.4	3.8	4.6	5.0	5.5	5.9	3.2	3.4	3.8	4.6	5.0	5.5	5.9

#### [Additional weight for lock]

[kg]

Size		25	32
Lock	Incremental Encoder [Motor type: S2,S3]	0.20	0.40
	Absolute Encoder [Motor type: S6,S7]	0.30	0.66
	Absolute Encoder [Motor type: T6,T7]	0.30	0.70

### 3.2 How to Order

LEY **H** G **25** **M** **S2** **B** - **100** - **S** **2** **A1**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

#### ① Accuracy

Nil	Basic type
H	High precision type

#### ② Size

25
32

#### ③ Bearing type

M	Sliding bearing
L	Ball bushing bearing

#### ④ Motor mounting position

Nil	Top mountin
D	In-line

#### ⑤ Motor type

Symbol	Type	Output [W]	Size	Compatible driver
S2	AC servo motor (Incremental encoder)	100	25	LECSA□-S1
S3		200	32	LECSA□-S3
S6	AC servo motor (Absolute encoder)	100	25	LECSB□-S5 LECSC□-S5 LECSS□-S5
S7			200	32
T6		AC servo motor (Absolute encoder)	100	25
T7	200		32	LECSB2-T7 LECSC2-T7 LECSS2-T7

#### ⑥ Lead[mm]

symbol	LEY25	LEY32
A	12	16(20)
B	6	8(10)
C	3	4(5)

\*The values shown in ( ) are the lead for size 32 top mounting types. (Equivalent lead which includes the pulley ratio [1.25:1])

#### ⑦ Stroke [mm]

30	30
to	to
300	300

#### ⑧ Motor option

Nil	Without option
B	With lock

#### ⑨ Guide option

Nil	Without option
F	With grease retaining function

\* Only available for sliding bearing

#### ⑩ Cable type

Nil	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)

#### ⑫ Driver type

	Compatible driver	Power supply voltage [V]
Nil	Without driver	
A1	LECSA1-S□	100 to 120
A2	LECSA2-S□	200 to 230
B1	LECSB1-S□	100 to 120
B2	LECSB2-S□	200 to 230
	LECSB2-T□	200 to 240
C1	LECSC1-S□	100 to 120
C2	LECSC2-S□	200 to 230
	LECSC2-T□	200 to 230
S1	LECSS1-S□	100 to 120
S2	LECSS2-S□	200 to 230
	LECSS2-T□	200 to 240

#### ⑬ I/O cable length [m]

Nil	Without cable
H	Without cable (Connector only)
1	1.5

#### ⑪ Cable length [m]

Nil	Without cable
2	2
5	5
A	10

\* When the driver type is selected, the cable is included. Select cable type and cable length.  
Example)  
S2S2: Standard cable (2 m) + Driver (LECSS2)  
S2 : Standard cable (2 m)  
Nil : Without cable and driver

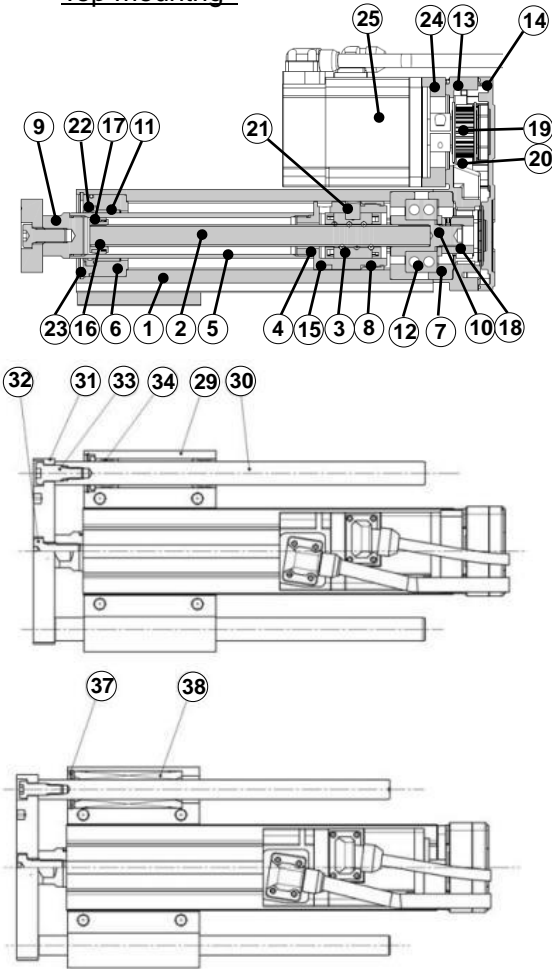
#### \*Applicable stroke table

Model \ Stroke [mm]	30	50	100	150	200	250	300
LEYG25	●	●	●	●	●	●	●
LEYG32	●	●	●	●	●	●	●

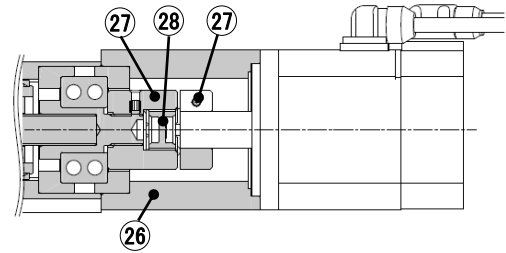


### 3.3 Construction

Motor mounting position:  
Top mounting



Motor mounting position:  
In-line



When Grease retaining function selected

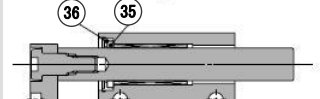
LEYG<sup>25</sup><sub>32</sub>M : 50 stroke or less



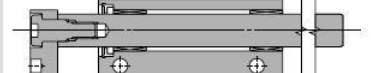
LEYG<sup>25</sup><sub>32</sub>M : Over 50 stroke



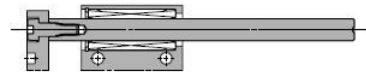
LEYG<sup>25</sup><sub>32</sub>M □ □ □ □ <sup>A</sup>/<sub>B</sub> □ □ F :



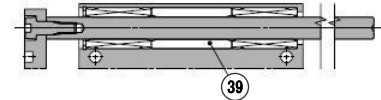
LEYG<sup>25</sup><sub>32</sub>M □ □ □ □ <sup>A</sup>/<sub>B</sub> □ □ F : Over 50 stroke



LEYG<sup>25</sup><sub>32</sub>L : 100 stroke or less



LEYG<sup>25</sup><sub>32</sub>L : Over 100 stroke



No.	Part	Material	Remarks
1	Body	Aluminum alloy	Anodized
2	Ballscrew shaft	Alloy steel	
3	Ball screw nut	Resin alloy steel	
4	Piston	Aluminum alloy	
5	Piston rod	Stainless steel	Hard chrome anodized
6	Rod cover	Aluminum alloy	
7	Bearing holder	Aluminum alloy	
8	Rotation Stopper	POM	
9	Socket	Free cutting carbon steels	Nickel plated
10	Connected shaft	Free cutting carbon steels	Nickel plated
11	Bushing	Bearing alloy	
12	Bearing	-	
13	Return box	Aluminum die-cast	Coating
14	Return plate	Aluminum die-cast	Coating
15	Magnet	-	
16	Wear ring holder	Stainless steel	Only stroke 101mm or more
17	Wear ring	POM	Only stroke 101mm or more
18	Pulley (For Screw shaft)	Aluminum alloy	
19	Pulley (For motor)	Aluminum alloy	
20	Belt	-	

#### Support block

Size	Part number
25	LEYG-S025
32	LEYG-S032

\*Mounting bolt (2 pieces) is included in Support block.

No	Part	Material	Remarks
21	Parallel pin	Stainless steel	
22	Rod seal	NBR	
23	Retaining ring	Spring steel	Phosphate coated
24	Motor adapter	Aluminum alloy	Coating
25	Motor	-	
26	Motor block	Aluminum alloy	Coating
27	Hub	Aluminum alloy	
28	Spider	Urethane	Spider
29	Guide attachment	Aluminium alloy	Anodized
30	Guide rod	Carbon steel	-
31	Plate	Aluminium alloy	Anodized
32	Plate mounting bolt	Carbon tool steel	Nickel plateing
33	Guide bolt	Carbon tool steel	Nickel plateing
34	Slide Bearing	Bearing alloy	
35	Felt	Felt	
36	Holder	Resin	
37	Retaining ring	Steel for spring	Phosphate coated
38	Ball bushing	-	
39	Spacer	Aluminium alloy	Chormated

#### Maintenance parts / belt

Size	Part number
25	LE-D-2-2
32	LE-D-2-4

## 4. Product Outline

### 4.1 System construction

Refer to the “Driver operation manual / FUNCTIONS AND CONFIGURATION” for system construction.

## 5. Electric actuators / Common precautions

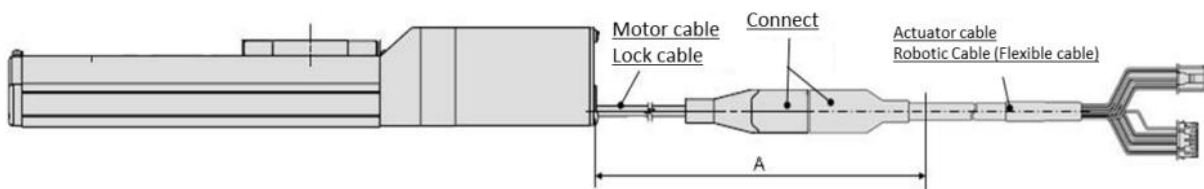
### 5.1 Wiring/Cables

#### Warning

- 1. Adjustment, installation, inspection, or wiring changes should be conducted after the power supply to this product has been turned off.**  
Electrical shock, malfunction, or damage can result.
- 2. Never disassemble the cable. Use only the specified cables.**
- 3. Never connect or disconnect the cable or connector with the power on.**

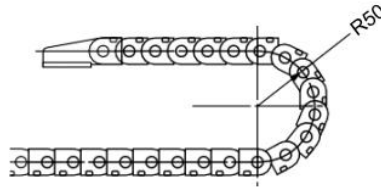
#### Caution

- 1. Wiring should be done correctly.**  
For each terminal, voltages other than those stipulated in the operation manual should not be applied.
- 2. Connect the connector securely.**  
Check for correct connector wiring and polarity.
- 3. Handling noise**  
If the noise is at the same wavelength as the signal lines, it will lead to malfunction.  
As a countermeasure, separate the high and low electrical lines, shorten the length of wiring, etc.
- 4. Do not connect power or high-voltage cables in the same wiring path as the unit.**  
The product can malfunction due to noise and surge voltage interference in the signal line from power and high-voltage cables. Separate the wiring of the controller and its peripheral device from that of power and high-voltage cable.
- 5. Be careful that cables are not caught by actuator movement.**
- 6. Operate with cables such that they are not easily moved.**  
Avoid bending cables at sharp angles where they enter the product.
- 7. Avoid twisting, folding, rotating, or applying external force to the cable.**  
Electric shock, wire breakage, contact failure, or a loss of product control may occur.
- 8. Not move cables connected to the actuator.**  
The motor and lock cables are not robotic cables and can be broken when moved. Therefore, secure the cables and the connectors (part “A” in the figure below) in place during set up.



9. **Select a “robotic cable (flexible cable)” when repeated bending of the actuator cable is required. Also, do not put cables into a flexible moving tube with a radius smaller than the specified value (50 mm or longer).**

Electric shock, wire breakage, contact failure, or a loss of product control may occur if “standard cables” are used for repeated bending.



10. **Confirm wiring insulation.**

Insulation failure (interference with other circuits, poor insulation between terminals, etc.) could introduce excessive voltage or current to the controller or its peripheral devices, causing damage to them.

11. **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 every additional 5 m. (At 15 m: Reduced by up to 20%)

12. **When checking the conductivity of the cable, be careful not to deform the connector’s mating hole and terminals.**

Inserting a non-compatible connector, tool, cylinder-shaped object, etc., into the connector’s mating hole can cause the mating hole or terminals to become deformed, which may cause contact failure or disconnection.

13. **Refrain from plugging in and unplugging the connector frequently.**

Doing so may result in contact failure or disconnection.

14. **Do not connect wires while power is being supplied.**

It may cause the electric actuator to break or its peripheral devices could be damaged, causing a malfunction.

## **【Transportation】**

### **⚠Caution**

1. **Do not carry or swing the product by the cable.**

## **5.2 Design/Selection**

### **⚠Warning**

1. **Be sure to read the operation manual (this manual and the one for the controller: LEC series).**

Handling or usage/operation other than that specified in the operation manual may lead to breakage or operation failure of the product. Any damage attributed to use beyond the specifications is not covered by the warranty.

2. **There is a possibility of dangerous sudden action by the product if the sliding parts of the machinery are twisted due to external forces, etc.**

In such cases, human injury may occur, such as by hands or feet getting caught in the machinery, or damage to the machinery itself may occur. Design the machinery so as to avoid such dangers.

3. **A protective cover is recommended to minimize the risk of personal injury.**

If a driven object and the moving parts of the product are in close proximity, personal injury may occur. Design the system to avoid contact with the human body.

- 4. Securely tighten all stationary parts and connected parts so that they will not become loose.**  
When the product operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.
- 5. Consider a possible loss of power source.**  
Take measures to prevent injury and equipment damage in the event of a power source failure.
- 6. Consider emergency stops.**  
Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions, such as a power outage or a manual emergency stop.
- 7. Consider the whole system.**  
Design the system so that human injury or equipment damage will not occur upon the restart of operation of the whole system.
- 8. Never disassemble the product or make any modifications, including additional machining.**  
Doing so may cause human injury and/or an accident. It may also cause the deterioration of the product's performance.
- 9. Do not use the stop signals, the "EMG" of the controller and the stop switch on the teaching box, as the emergency stop of the system.**  
The stop signals, "EMG" of the controller and the stop switch on the teaching box, are for decelerating and stopping the actuator. Design the system with an emergency stop circuit which applies to the relevant safety standards separately.
- 10. When using the product vertically for applications, it is necessary to install a built-in safety device.**  
The table may fall due to the weight of a workpiece. The safety device should not interfere with the normal operation of the machine.
- 11. Do not exceed the product specifications even if a work load is supported by external guides.**  
Although the Electric actuator moment is reduced by external guides, the required transport ability (the relationship between the speed and the work load) is not reduced.
- 12. In order to prevent danger and damage due to the breakdown and the malfunction of this product, which may occur at a certain probability, a backup system should be established in advance by giving a multiple-layered structure or a fail-safe design to the equipment, etc.**
- 13. Avoid designing a system that allows the driving part of an electric actuator to operate with a spring or other external force.**

#### **Caution**

- 1. Operate within the limits of the maximum usable stroke.**  
The product will be damaged if it is used with a stroke which exceeds the maximum stroke. Refer to the specifications of the product.
- 2. When the product repeatedly cycles with partial strokes, operate it at a full stroke at least once a day or every 1000 strokes.**  
Otherwise, lubrication may run out.
- 3. Do not use the product in applications where excessive external force or impact force is applied to it.**  
The product can be damaged. The components, including the motor, are manufactured to precise tolerances. Even a slight deformation may cause a malfunction or seizure.

4. **During operation (positioning operation or pushing operation), it cannot be returned to the origin position.**
5. **Refer to the Auto Switches Precautions (pages 15 to 19) if an auto switch is to be built in and used.**
6. **Step motor (servo/24 VDC) and servo motor (24 VDC) specifications with the following model number are not compliant with UL Standards: “Controller/Driver type: Without controller/driver (Nil).”**  
Individual actuators are not certified as UL Standards compliant products.
7. **When UL Standards compliance is required, the electric actuator and controller/driver should be used with a UL1310 class 2 power supply.**
8. **Do not exceed the product specifications even if a work load is supported by external guides.**  
Although the actuator moment is reduced by external guides, the required transport ability (the relationship between the speed and the work load) is not reduced.

### 5.3 Mounting

#### **Warning**

1. **Keep the manual in a safe place for future reference.**  
The product should be mounted and operated only after thoroughly reading the operation manual and understanding its contents.
2. **Observe the tightening torque for screws.**  
Tighten the screws to the recommended torque for mounting the product.
3. **Do not make any alterations to this product.**  
Alterations made to this product may lead to a loss of durability or damage to the product, which can lead to human injury or damage to other equipment and machinery.
4. **When connecting, make sure the rod axis and the load, and the direction of the movement match.**  
Failure to do so may cause complications with the lead screw, such as wear or damage.
5. **When an external guide is used, connect the moving parts of the actuator 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 product tube, piston rod, etc., by striking or grasping them with other objects. The components are manufactured to precise tolerances. Even a slight deformation may cause a malfunction or seizure.
6. **Prevent the seizure of rotating parts (pins, etc.) by applying grease.**
7. **Do not use the product until you confirm that the equipment can operate properly.**  
After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted properly.
8. **When one side is fixed**  
When an actuator is operated at a high speed with one end fixed and the other free (basic, flange, or direct mount types), a bending moment may act on the actuator due to the vibration generated at the stroke end, which can damage the actuator. In such a case, install a mounting bracket to suppress the vibration of the actuator body, or reduce the speed so that the actuator does not vibrate. Also, use a mounting bracket when moving the actuator body or when a long stroke actuator is mounted horizontally and fixed at one end.
9. **Do not apply strong impact or an excessive moment while mounting the product or a workpiece.**  
If an external force over the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.

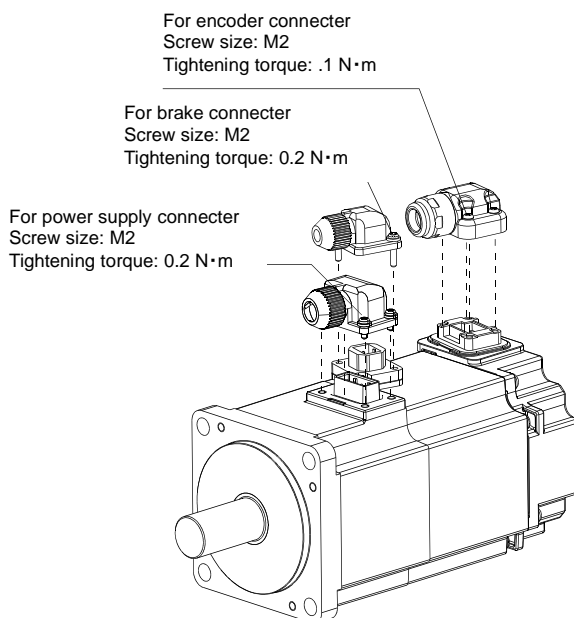
10. **The electric actuator and its peripheral devices should be installed on a fire-proof material.**  
Direct installation on or near a flammable material may cause a fire.
11. **Do not install the product in a place subject to vibrations and impacts.**  
It will cause failure or malfunction.
12. **Take measures to ensure that the operating temperatures of the electric actuator and its peripheral devices are within the range of the specifications.**  
**also should be installed with 50mm or larger spaces between each side of it and the other structures or components.**  
It may cause a malfunction of the controller and its peripheral devices and a fire.
13. **Do not mount the controller and its peripheral devices near a large electromagnetic contactor or no-fuse breaker which generates vibration on the same panel. Mount them on different panels, or keep the controller and its peripheral devices away from such a vibration source.**
14. **Install the electric actuator and its peripheral devices on a flat surface.**  
If the mounting surface is distorted or uneven, an unacceptable force may be added to the housing, etc., causing problems.

**15. Maintenance space**

Reserve sufficient space for maintenance.

**16. Mounting connectors**

Tighten the screws evenly. Tightening torques are as indicated below.



**5.4 Handling**

**⚠Warning**

1. **Do not touch the motor during operation.**  
The surface temperature of the motor can increase to approx. 80 C due to operating conditions. The temperature may also increase due to energiza- tion. As it may cause burns, do not touch the motor when in operation.
2. **If abnormal heating, smoking, fire, etc., occurs in the product, immediately shut off the power supply.**
3. **Stop operation at once if there are abnormal noises or vibrations.**  
Abnormal noises or vibrations may mean that the product is not properly mounted, and if allowed to continue in this state, damage to the equipment may occur.
4. **Never touch the rotating parts of the motor while in operation.**
5. **Before installing, adjusting, inspecting, or performing maintenance on the product, controller, and related equip- ment, be sure to shut off the power supply. Then, lock it so that no one other than the person working can turn the power on, or implement measures such as a safety plug.**

- 6. In the case of an actuator that has a servo motor (24 VDC), the motor phase detection step is conducted by inputting the servo's on signal just after the controller power is turned on. The motor phase detection step moves the table/rod the distance of the one screw-lead as the maximum.**  
(The motor rotates in the reverse direction if the table/rod hits an obstacle such as the end stop damper.) Take the motor phase detection step into consideration when installing and operating this actuator.
- 7. Do not perform the operation or setting of the product with wet hands.**  
Doing so may cause an electric shock.
- 8. Products with damage or those missing any components should not be used.**  
An electric shock, fire, or injury may result.
- 9. Be careful not to be caught or hit by the workpiece while the electric actuator is moving.**  
It may cause an injury.
- 10. Do not connect the power supply or power on the product before confirming the area to which the work-piece moves is safe.**  
The movement of the workpiece may cause an accident.
- 11. Before installation, wiring, and maintenance, the voltage should be checked with a tester 5 minutes after the power supply has been turned off.**  
Otherwise, an electric shock, fire, or injury may result.
- 12. Do not use the product in an area where dust, powder dust, water, chemicals, or oil is in the air.**  
It will cause failure or malfunction.
- 13. Do not use the product in an area where a magnetic field is generated.**  
It will cause failure or malfunction.
- 14. Do not install the product in an environment containing flammable gas, explosive gas, or corrosive gas.**  
It could lead to fire, explosion and corrosion.
- 15. Radiant heat from strong heat sources, such as a furnace, direct sunlight, etc., should not be applied to the product.**  
It will cause failure of the electric actuator or its peripheral devices.
- 16. Do not use the product in an environment subject to a temperature cycle.**  
It will cause failure of the electric actuator or its peripheral devices.
- 17. Do not use the product in a place where surges are generated.**  
When there are units that generate a large amount of surge around the product (e.g. solenoid type lifters, high-frequency induction furnaces, motors, etc.), this may cause deterioration or damage to the product's internal circuit. Avoid sources of surge generation and crossed lines.
- 18. Do not install the product in an environment under the effect of vibrations and impacts.**  
It will cause failure or malfunction.
- 19. When a surge-generating load, such as a relay or solenoid valve, is driven directly, use a product that incorporates a surge absorption element.**

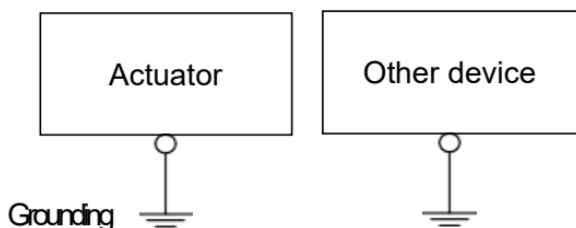
## Caution

- 1. Keep the controller and the actuator combined as delivered for use.**  
The actuator's parameters are set at the time of shipment. If it is combined with a different set of parameters, failure can result.
- 2. Conduct the following inspection before operation.**
  - a) Confirm that the power supply line and each signal line is not damaged.
  - b) Confirm that the power supply line and each signal line is not loosened.
  - c) Confirm that the electric actuator/cylinder/controller/driver is not mounted loosely.
  - d) Confirm that the electric actuator/cylinder/controller/driver is operating correctly.
  - e) Confirm the function of the emergency stop of the whole system.
- 3. If several persons are to be working conjointly, determine the procedure, signs, measures against abnormality, and restarting measures in advance. Then, have someone else, supervise the work.**
- 4. The product may operate at a speed different from the set speed depending on the load and resistance.**  
When selecting a product, check the catalog for instructions regarding selection and specifications.
- 5. Do not apply a load, impact, or resistance in addition to the transferred load during the return to origin.**  
If the product is made to return to origin by pushing force, a displacement of the origin position may occur.
- 6. Do not remove the name plate.**
- 7. Operation tests should be done at a low speed. Start operation by predefined speed after confirming there are no problems.**
- 8. Do not apply forces of impact, collision, or resistance to the moving parts of an actuator in operation.**  
Doing so will cause a decrease in product life, damage to the product, etc..

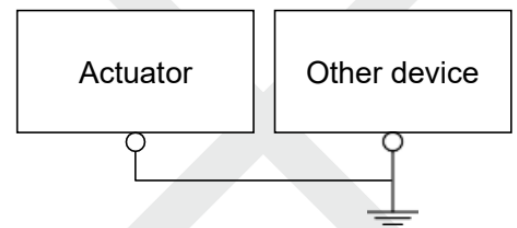
## 【Grounding】

### Warning

- 1. Be certain to ground the actuator.**
- 2. Dedicated grounding should be used.**  
Grounding should be to a D-class ground. (Ground resistance of 100  $\Omega$  or less.)
- 3. Grounding should be performed near the actuator to shorten the grounding distance.**
- 4. The cross-sectional area of this wire shall be a minimum of 2 mm<sup>2</sup>.**
- 5. Avoid common grounding with other devices.**



Recommended: Ground



Not recommended: Common ground



## 【Power supply】

### ⚠Caution

1. **Use a power supply that has low noise between lines and between the power and ground.**  
In cases where noise is high, an isolation transformer should be used.
2. **The grounding point should be as near as possible to the electric actuator length short.**  
If the power supply is of the “inrush-current limited” type, a voltage drop may occur during the acceleration or deceleration of the actuator.
3. **To prevent lightning surges, appropriate measures should be taken. Ground the surge absorber for lightning separately from the grounding of the controller and its peripheral devices.**

## 【Unpackaging】

### ⚠Caution

1. **Check that the received product is as ordered.**  
If a product different from the one ordered is installed, injury or damage can result.

## 5.5 Operating Environment

### ⚠Warning

1. **Avoid use in the following environments.**
  - a) Areas with large amounts of dust or cutting chips that could enter the product
  - b) Areas where the ambient temperature exceeds the specified range (Refer to the specifications.)
  - c) Areas where the ambient humidity exceeds the specified range (Refer to the specifications.)
  - d) Areas with corrosive gas, flammable gas, sea water, water, or steam that could adhere to the product
  - e) Areas where strong magnetic or electric fields are generated
  - f) Areas where direct vibration or impact shock is applied to the product
  - g) Areas where there are large amounts of dust or there is exposure to water/oil droplet
  - h) Areas that are exposed to direct sunlight (ultraviolet rays)
  - i) Areas at altitudes of over 1000 m  
Heat radiation performance and withstand voltage may decline as a result. For details, consult with SMC.
2. **Do not use in an environment where the product is directly exposed to liquid, such as cutting oils.**  
If cutting oil, coolant, or oil mist adheres to the product, failure or increased sliding resistance can result.
3. **Install a protective cover when the product is used in an environment directly exposed to foreign matters, such as dust, cutting chips, and spatter.**  
Looseness or increased sliding resistance can result.
4. **Shade the product from direct sunlight.**
5. **In locations near heat sources, block them off.**  
When there is a heat source surrounding the product, the radiated heat from the heat source can increase the temperature of the product beyond the operating temperature range. Protect it with a cover, etc.
6. **Levels of the base oil of grease may decrease due to the external environment and operating conditions, causing a decline in lubrication performance and a shortened life of the product.**

## 【Storage】

### Warning

1. **Do not store the product in a place in direct contact with rain or water drops or where it is exposed to harmful gas or liquid.**
2. **Store in an area that is shaded from direct sunlight and has a temperature and humidity within the specified range (–10°C to 60°C and 35 to 85% no condensation or freezing).**
3. **Do not apply vibration or impact to the product during storage.**

## 5.6 Maintenance

### Warning

1. **Do not disassemble or repair the product.**  
Fire or electric shock can result. Contact SMC if the disassembly of the product is required for maintenance.
2. **Before modifying or checking the wiring, the voltage should be checked with a tester 5 minutes after the power supply has been turned off.**  
Failure to do so may result in electrical shock.
3. **Install the electric actuator and its peripheral devices on a fire-proof material.**  
Direct installation on or near a flammable material may cause a fire.
4. **Do not install the product in a place subject to vibrations and impacts.**  
It will cause failure or malfunction.
5. **Take measure so that the operating temperature of this controller and its peripheral devices are within the range of the specifications. Also, this controller should be installed with 50mm or larger spaces between each side of it and the other structures or components.**  
It may cause a malfunction of the controller and its peripheral devices and a fire.
6. **Do not mount the controller and its peripheral devices near a large electromagnetic contactor or no-fuse breaker which generates vibration on the same panel. Mount them on different panels, or keep the controller and its peripheral devices away from such a vibration source.**
7. **Install the electric actuator and its peripheral devices on a flat surface.**  
If the mounting surface is distorted or uneven, an unacceptable force may be added to the case, etc., causing problems.

### Caution

1. **Perform maintenance and inspection according to the procedures indicated in the operation manual.**  
Improper handling can cause an injury, damage, or the malfunction of equipment and machinery.
2. **Removal of equipment**  
**Before equipment is removed, first confirm that measures are in place to prevent the dropping or runaway of driven objects, etc. Proceed only after cutting off the electric power. When starting up again, proceed with caution after confirming that conditions are safe.**
3. **Be sure to cut the power to the controller and disconnect the electric actuator cable before moving the electric actuator slider manually by hand.**  
If the slider is moved with the electric actuator and controller still connected, the induced voltage of the motor will go to the controller, making it difficult to move the electric actuator smoothly. Moreover, frequently moving the electric actuator slider may result in controller damage or malfunction due to the induced voltage.

## 【Lubrication】

### Caution

1. **The product has been lubricated for life by the manufacturer and does not require any further lubrication.**  
When lubrication is applied, special grease must be used. Please read the maintenance manual of each actuator.

## 5.7 Actuator with Lock

### Warning

1. **Do not use the lock as a safety brake or as a control that requires a locking force.**  
The lock used for the product with lock is designed to prevent the dropping of workpieces.
2. **For vertical mounting, use the product with lock.**  
If the product is not equipped with a lock, the product will move and drop the workpiece when the power is removed. Please ensure that your safe equipment designs include measures to prevent the falling of workpieces.
3. **“Drop prevention” is a safety precaution that prevents a workpiece from dropping due to its weight when the product operation is stopped and the power supply is turned off.**
4. **Do not apply an impact load or strong vibration while the lock is activated.**  
If an external impact load or strong vibration is applied to the product, the lock will lose its holding force and damage to the sliding parts of the lock or a reduced service life may result. The same adverse effects may also occur when the lock slips due to a force exceeding the holding force, as this accelerates the wear of the lock.
5. **Do not apply liquid, oil, or grease to the lock or the area surrounding it.**  
When liquid, oil, or grease are adhered to the sliding parts of the lock, its holding force will reduce significantly. Any changes in lock sliding performance and condition may cause a lock release malfunction.
6. **Take measures against drops and check that safety is assured before the mounting, adjustment, and inspection of the product.**  
If the lock is released with the product mounted vertically, a workpiece can drop due to its weight.
7. **When the actuator is operated manually (when the SVRE output signal is off), supply 24 VDC to the [BK RLS] terminal of the power supply connector.**  
If the product is operated without releasing the lock, the wearing of the lock sliding surface will be accelerated, causing a reduction in the holding force and the life of the locking mechanism.
8. **Do not supply 24 VDC power supply continuously to the [BK RLS (Lock release)] terminal.**  
Stop supplying 24 VDC power supply to the [BK RLS (Lock release) terminal during normal operation. If power is supplied to the [BK RLS] terminal continuously, the lock will be released, and workpieces may be dropped when the stop signal (EMG) is received.
9. **The actuator may be unable to unlock when the sliding part for locking reaches its life due to the rotation/sliding of the shoe during operation. When the lock mechanism reaches its life, please contact SMC sales office for the replacement parts.**  
The sliding part for locking may make noise during operation, but this is normal.

## Controller (Including Driver) and Peripheral Devices

## 5.8 Design/Selection

### Warning

1. **Be sure to apply the specified voltage.**  
Otherwise, malfunction or breakage may occur. If the applied voltage is lower than the specified voltage, it is possible that the load will not be able to be moved due to an internal voltage drop of the controller. Please check the operating voltage before use.

2. **Do not operate the product beyond the specifications.**  
Otherwise, a fire, malfunction, or actuator damage may result. Please check the specifications before use. Install an emergency stop circuit.
3. **Please install an emergency stop outside of the enclosure so that the system operation can be stopped immediately and the power supply can be intercepted.**
4. **In order to prevent any damage caused by the break-down or malfunction of the controller and its peripheral devices, a backup system should be established in advance by giving a multiple-layered structure or a fail-safe design to the equipment, etc.**
5. **If a danger of human injury is expected due to abnormal heat generation, smoking, ignition, etc., of the controller and its peripheral devices, cut off the power supply of the product and the system immediately.**

### **Caution**

1. **Use an actuator with the lock option if the actuator will not be mounted horizontally for use .Burnout of the internal parts of the controller may occur. If the actuator is not equipped with a lock, it will move and drop the workpiece when the power and servo are turned OFF.**

## **5.9 Handling**

### **Warning**

1. **Do not touch the inside of the controller and its peripheral devices.**  
Doing so may cause an electric shock or damage to the controller.
2. **Do not perform the operation or setting of the product with wet hands.**  
Doing so may cause an electric shock.
3. **Products with damage or those missing any components should not be used.**  
An electric shock, fire, or injury may result.
4. **Use only the specified combination between the electric actuator and controller.**  
Failure to do so may cause damage to the actuator or the controller.
5. **Be careful not to be hit by workpieces while the actuator is moving.**  
It may cause an injury.
6. **Do not connect the power supply or power on the product before confirming the area to which the workpiece moves is safe.**  
The movement of the workpiece may cause an accident.
7. **Do not touch the product when it is energized and for some time after power has been disconnected, as it is very hot.**  
Doing so may lead to a burn due to the high temperature.
8. **Before installation, wiring, and maintenance, the voltage should be checked with a tester 5 minutes after the power supply has been turned off.**  
Otherwise, an electric shock, fire, or injury may result.
9. **Static electricity may cause malfunction or break the controller. Do not touch the controller while power is supplied.**  
When touching the controller for maintenance, take sufficient measures to eliminate static electricity.
10. **Do not use the product in an area where dust, powder dust, water, chemicals, or oil is in the air.**  
It will cause failure or malfunction.
11. **Do not use the product in an area where a magnetic field is generated.**  
It will cause failure or malfunction.

- 12. Do not install the product in an environment containing flammable gas, explosive gas, or corrosive gas.**  
It could lead to fire, explosion, or corrosion.
- 13. Radiant heat from strong heat sources, such as a furnace, direct sunlight, etc., should not be applied to the product.**  
It will cause failure of the controller or its peripheral devices.
- 14. Do not use the product in an environment subject to a temperature cycle.**  
It will cause failure of the controller or its peripheral devices.]
- 15. Do not use the product in a place where surges are generated.**  
When there are units that generate a large amount of surge around the product (e.g. solenoid type lifters, high-frequency induction furnaces, motors, etc.), this may cause deterioration or damage to the product's internal circuit. Avoid sources of surge generation and crossed line.
- 16. Do not install the product in an environment under the effect of vibrations and impacts.**  
It will cause failure or malfunction.
- 17. When a surge-generating load, such as a relay or solenoid valve, is driven directly, use a product that incorporates a surge absorption element.**
- 18. The power supplies should be separated between the controller power and the I/O signal power, and both power supplies must not be of the "inrush-current limited" type.**  
If the power supply is of the "inrush-current limited" type, a voltage drop may occur during the acceleration or deceleration of the actuator.

## 5.10 Mounting

### Warning

- 1. Install the controller and its peripheral devices on a fire-proof material.**  
Direct installation on or near a flammable material may cause a fire.
- 2. Do not install the product in a place subject to vibrations and impacts.**  
It will cause failure or malfunction.
- 3. Do not mount the controller and its peripheral devices together with a large-sized electromagnetic contactor or no-fuse breaker, which generate vibration, on the same panel. Mount them on different panels, or keep the controller and its peripheral devices away from such a vibration source**
- 4. Install the controller and its peripheral devices on a flat surface.**  
If the mounting surface is distorted or uneven, an unacceptable force may be added to the housing, etc., causing problems.
- 5. Take measures to ensure that the operating temperatures of the controller and its peripheral devices are within the range of the specifications. Also, the controller should be installed with spaces between its sides and the other structures or components.**  
Failure to do so may cause the malfunction of the controller and its peripheral devices or a fire.

## 5.11 Power Supply

### Caution

- 1. Use a power supply that has low noise between lines and between the power and ground.**  
In cases where noise is high, an isolation transformer should be used.
- 2. To prevent lightning surges, appropriate measures should be taken. Ground the surge absorber for lightning separately from the grounding of the controller and its peripheral devices.**

## 5.12 Grounding

### Warning

- 1. Be sure to carry out grounding in order to ensure the noise tolerance.**

2. **Dedicated grounding should be used.**  
Grounding should be to a D-class ground. (Ground resistance of 100Ω or less)
3. **Grounding should be performed near the controller and its peripheral devices to shorten the grounding distance.**
4. **In the unlikely event that a malfunction is caused by the ground, please disconnect it.**

### 5.13 Wiring

#### Warning

1. **Do not apply any excessive force to cables, such as repeated bending, tensioning, or placing a heavy object on the cables.**  
It may cause an electric shock, fire, or the breaking of a wire.
2. **Connect wires and cables correctly.**  
Incorrect wiring could break the controller or its peripheral devices depending on the seriousness.
3. **Do not connect wires while power is being supplied.**  
It may cause the controller to break or its peripheral devices could be damaged, causing a malfunction.
4. **Do not carry the product by holding its cables.**  
It may cause an injury or damage to the product.
5. **Do not connect power or high-voltage cables in the same wiring path as the unit.**  
The product can malfunction due to noise and surge voltage interference in the signal line from the power and high-voltage cables. Separate the wiring of the controller and its peripheral devices from that of the power and high-voltage cables.
6. **Confirm wiring insulation.**  
Insulation failure (interference with other circuits, poor insulation between terminals, etc.) could introduce excessive voltage or current to the controller or its peripheral devices and damage them.

### 5.14 Maintenance

#### Warning

1. **Perform a maintenance and inspection periodically.**  
Confirm wiring and screws are not loose. Loose screws or wires may cause unintentional malfunction.
2. **Conduct an appropriate functional inspection after completing the maintenance and inspection.**  
At times where the equipment or machinery does not operate properly, conduct an emergency stop of the system. Otherwise, an unexpected malfunction may occur and it will become impossible to ensure safety. Conduct a test of the emergency stop in order to confirm the safety of the equipment.
3. **Do not disassemble, modify, or repair the controller and its peripheral devices.**
4. **Do not put anything conductive or flammable inside of the controller.**  
It may cause a fire.
5. **Do not conduct an insulation resistance test or with-stand voltage test on this product.**
6. **Ensure sufficient space for maintenance activities.**  
Design the system allowing the required space for maintenance and inspection.

## 6. Electric actuators / Rod Type Common precautions

### 6.1 Design

#### Warning

**1. Do not apply a load in excess of the actuator specification.**

A product should be selected based on the maximum work load and allowable moment. If the product is used outside of the operating specification, eccentric load applied to the guide will become excessive and have adverse effects such as creating play in the guide, reduced accuracy and reduced product life.

**2. Do not use the product in applications where excessive external force or impact force is applied to it.**

**The product can be damaged.**

The components including the motor are manufactured to precise tolerances. So that even a slight deformation may cause faulty operation or seizure.

### 6.2 Selection

#### Warning

**1. Do not exceed the speed limit of the actuator specification.**

Select a suitable actuator by the relationship of allowable work load and speed.

Noise or reduction of accuracy may occur if the actuator is operated in excess of its specification and could lead to reduced accuracy and reduced product life.

**2. When the product repeatedly cycles with partial strokes, lubrication can run out. Operate it at a full stroke at least once a day or every 1000 strokes.**

### 6.3 Handling

#### Caution

**1. For thrust control, make sure to set it to "torque control mode", and operate within the "pushing speed" range of each model.**

Do not hit the workpiece or the stroke end with the piston in the "position control mode", "speed control mode" or "positioning mode". The lead screw, bearing and internal stopper may be damaged, causing malfunction.

**2. When using the thrust control, the following parameter should be set.**

- LECSA: The value of the parameter value [PC12] "Internal torque command" should be 30% or less. (LEY63 : 50% or less)
- LECSB: The value of the parameter value [PC13] "Analog torque maximum output command" should be 30% or less. (LEY63 : 50% or less)
- LECSS: The torque maximum output command" should be 30% or less. (LEY63 : 50% or less)
- LECSB-T: The value of the parameter value [PC13] "Analog torque maximum output command" should be 24% or less. (LEY63 : 40% or less, LEY100 : 55% or less)
- LECSS-T: The torque maximum output command" should be 24% or less. (LEY63 : 40% or less, LEY100 : 55% or less)
- LECSN-T: The torque maximum output command" should be 24% or less. (LEY63 : 40% or less, LEY100 : 55% or less)

It may lead to breakage and malfunction.

**3. Normal/reverse torque limit value is set to 100 % as a default.**

It is the maximum torque (the limit value) in the "position control mode", "speed control mode" or "positioning mode". When the product is operated with a smaller value than the default, acceleration when driving can decrease. Set it upon confirmation with the actual equipment used.

**4. The maximum speed of this actuator varies depending on the stroke of the product.**

When selecting a product, check the catalog for the model selection.

**5. Do not apply a load, impact or resistance in addition to a transferred load during return to origin.**

Otherwise, the origin can be displaced since it is based on detected motor torque.

**6. Do not scratch or gouge the sliding parts of the piston rod, by striking or grasping them with other objects.**

Piston rod is manufactured to precise tolerances, so that even a slight deformation may cause malfunction.

**7. Please connect it so that the impact and load may not be added to the rod from the side when external guide is used.**

**8. Please do not operate body itself by the piston rod fixing.**

An excessive load joins the piston rod, and it causes defective operation and the longevity decrease.

**9. When the actuator is operated at high speed while it is fixed at one end and free at the other end (flange type, foot type, double clevis type, direct mount type), a bending moment may act on the actuator due to vibration generated at the stroke end, which can damage the actuator. In such a case, install a support bracket to suppress the vibration of the actuator body or reduce the speed so that the actuator does not vibrate.**

Use a support bracket also when moving the actuator body or when a long stroke actuator is mounted horizontally and fixed at one end.

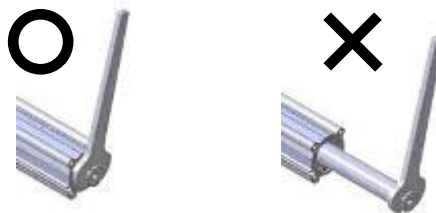
**10. Avoid using the electric actuator in such a way that rotational torque would be applied to the piston rod.**

If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy.

Refer to the table below for the approximate values of the allowable range of rotational torque.

Allowable Rotational Torque (Nm or less)	LEY25**	LEY32**	LEY63**	LEY63**
	1.1	1.4	2.8	4.6

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes. Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



**11. When rotational torque is applied to the plate end, use within the allowable range. [LEYG series]**

Excessive torque could cause the guide rod and bushing to be deformed, causing looseness of the guide or increase in sliding resistance.

The applied rotational torque should be less than the "Allowable Rotational Torque of Plate" in the table below.

Stroke [mm]	30	50	100	200	300	
Allowable Rotational Torque of Plate[Nm]	LEYG25M	1.56	1.29	3.50	2.18	1.36
	LEYG32M	2.55	2.09	5.39	3.26	1.88
	LEYG25L	1.52	3.57	2.47	2.05	1.44
	LEYG32L	2.80	5.76	4.05	3.23	2.32

**12. When the fluctuation of load is caused during operation, malfunction/noise/alarm may occur.**

The tuning of gain may not suit for fluctuation load. Adjust the gain properly by following the manual of driver.



## 6.4 Mounting

### ⚠ Caution

1. Fix 'Socket' square width across flats in the piston rod point with the spanner etc. , prevent the piston rod from rotating, and tighten the screw tightening when work piece or jig, etc. are installed properly by the torque value within the range of the limitation.

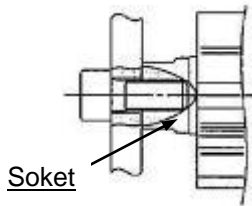
It causes the abnormal reaction of an auto switch, the space of an internal guide, and an increase of the sliding resistance, etc..

2. When mounting the workpiece or other device to the actuator tighten the fixing screws with adequate torque within the specified torque range.

Tightening the screws with a higher torque than the maximum may cause malfunction, whilst tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions detaching of the work piece.

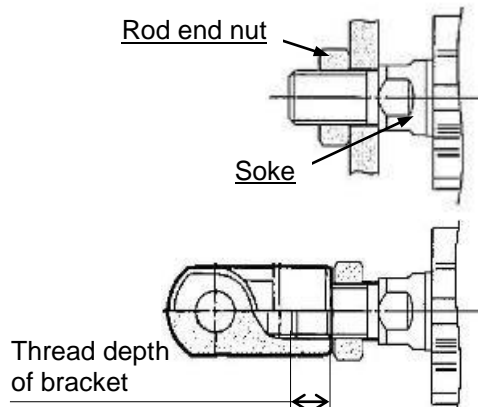
### <LEY Series>

#### Work fixed / Rod end female thread



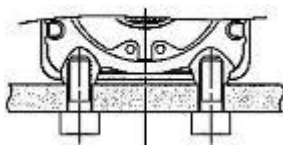
Model	Bolt	Max. tightening torque [Nm]	Max.thread depth [mm]	Socket width across flats [mm]
LEY25	M8x1.25	12.5	13	17
LEY32	M8x1.25	12.5	13	22
LEY63	M16x2	106	21	36
LEY100	M20x2.5	204	27	27

#### Work fixed / Rod end male thread



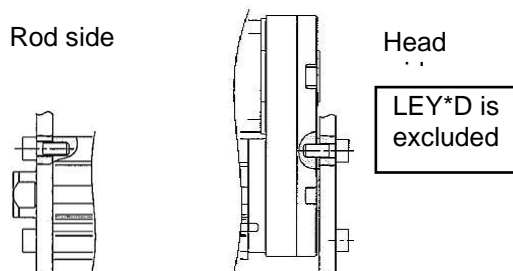
Model	Bolt	Max. tightening torque [Nm]	Max.thread length [mm]	Socket width across flats [mm]
LEY25	M14x1.5	50	20.5	17
LEY32	M14x1.5	50	20.5	22
LEY63	M18x1.5	97	26	36
Model	Rod end nut		thread depth of bracket[mm]	
	Width across flats [mm]	Length [mm]		
LEY25	22	8	8 or more	
LEY32	22	8	8 or more	
LEY63	27	11	18	

#### Mounting / Body bottom tapped style (When "Body bottom tapped" is selected)



Model	Bolt	Max. tightening torque [Nm]	Max.thread depth [mm]
LEY25	M5x0.8	3.0	6.5
LEY32	M6x1.0	5.2	8.8
LEY63	M8x1.25	12.5	10
LEY100	M10x1.5	24.5	17

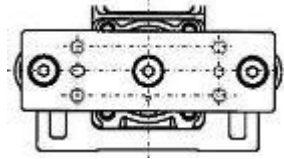
#### Mounting / Rod side•Head side tapped style



Model	Bolt	Max. tightening torque [Nm]	Max.thread depth [mm]
LEY25	M5x0.8	3.0	8
LEY32	M6x1.0	5.2	10
LEY63	M8x1.25	12.5	16
LEY100	M10x1.5	24.5	18

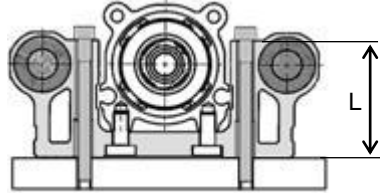
<LEYG Series>

Work fixed/ Plate tapped style



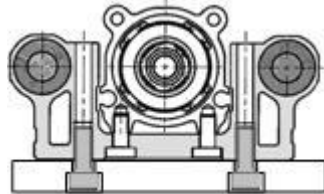
Model	Bolt	Max. tightening torque [N•m]	Max. thread depth [mm]
LEYG25 <sup>M</sup> <sub>L</sub>	M6×1.0	5.2	11
LEYG32 <sup>M</sup> <sub>L</sub>	M6×1.0	5.2	12

Mounting / Upper mounting tapped style



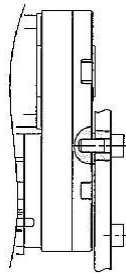
Model	Bolt	Max. tightening torque [N•m]	Max. thread depth [mm]
LEYG25 <sup>M</sup> <sub>L</sub>	M5×0.8	3.0	40.3
LEYG32 <sup>M</sup> <sub>L</sub>	M5×0.8	3.0	50.3

Mounting / Lower mounting tapped style



Model	Bolt	Max. tightening torque [N•m]	Max. thread depth [mm]
LEYG25 <sup>M</sup> <sub>L</sub>	M6×1.0	5.2	12
LEYG32 <sup>M</sup> <sub>L</sub>	M6×1.0	5.2	12

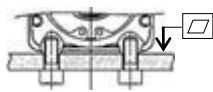
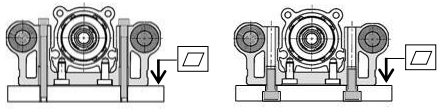
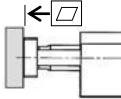
Mounting / Head side tapped style



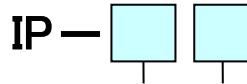
Model	Bolt	Max. tightening torque [N•m]	Max. thread depth [mm]
LEYG25 <sup>M</sup> <sub>L</sub>	M5×0.8	3.0	8
LEYG32 <sup>M</sup> <sub>L</sub>	M6×1.0	5.2	10

**3. Keep the flatness of the mounting surface within the following ranges when mounting the actuator body and work piece.**

Insufficient flatness of the work piece or the surface onto which the actuator body is to be mounted can cause increased sliding resistance.

Model	Mounting part	Flatness
LEYG*	Actuator body /Body bottom tapped style 	0.1mm or less
LEYG*	/ Lower mounting tapped style 	0.02mm or less
	Work piece /Plate tapped style 	0.02mm or less

4. Encloure



First characteristic numeral      Second characteristic numeral

● **First Characteristics: Degrees of protection against solid foreign objects**

0	Non-protected
1	Protected against solid foreign objects of 50 mm and grater
2	Protected against solid foreign objects of 12 mm and grater
3	Protected against solid foreign objects of 2.5 mm and grater
4	Protected against solid foreign objects of 1.0 mm and grater
5	Dust-protected
6	Dust-tight

● **Second Characteristics: Degrees of protection against water**

0	Non-protected	-
1	Protected against vertically falling water drops	Dripproof type 1
2	Protected against vertically falling water drops when enclosure tilted up to 15°	Dripproof type 2
3	Protected against rainfall when enclosure tilted up to 60°	Rainroof type
4	Protected against splashing water	Splashprof type
5	Protected against water jets	Water-jet-proof type
6	Protected against powerful water jets	Powerful water-jet-proof type
7	Protected against the effects of temporary immersion in water	Immersible type
8	Protected against the effects of continuous immersion in water	Submersible type

Example) IP65: Dust-tight, Water-jet-proof type “Water-jet-proof type” means that no water intrudes inside an equipment that could hinder from operating normally by means of applying water for 3 minutes in the prescribed manner. Take appropriate protection measures, since a device is not usable in an environment where a droplet of water is splashed constantly.

## 6.5 Precaution on maintenance

### Caution

1. Cut the power supply during maintenance and replacement of the product.

### [Maintenance frequency]

Preform maintenance according to the table below.

	Appearance check	Check belt
Inspection before daily operation	○	—
Inspection every six months *	○	○
Inspection every 250km *	○	○
Inspection are every five million times *	○	○

\* Either of inspection early time is selected.

### [Items for visual appearance check]

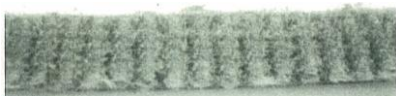
1. Loose set screws, abnormal dirt.
2. Check of flaw and cable joint
3. Vibration, noise.

### [Items for belt check]

Stop operation immediately and replace the belt when belt appear to be like photos below.

#### a . Tooth shape canvas is worn out

Canvas fiber becomes fuzzy. Rubber is removed and the fiber becomes whitish. Lines of fibers become unclear.



Teeth become fuzzy

#### b . Peeling off or wearing of the side of the belt

Belt is partially cut. Foreign matter caught in teeth other than cut part causes flaw.

#### c . Belt partially cut

Belt corner becomes round and frayed thread sticks out.

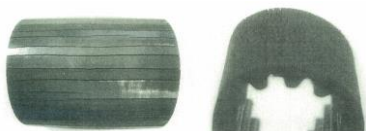


#### d . Vertical line of belt teeth

Flaw which is made when the belt runs on the flange.

#### e . Rubber back of the belt is softened and sticky

#### f . Crack on the back of the belt



## 7. Troubleshooting

### 7.1 Alarms and Warning

When a fault occurs during the operation, the corresponding alarm or warning is displayed.

If any alarm or warning has occurred, refer to “Driver Operation Manual” and take the appropriate action.

## Revision history

### No.LEY-OM00401

Jun / 2011 1st printing

### No.LEY-OM00402

July / 2012 Revision

- Addition / LEYG Series (Guide rod type)
- Addition / LECSC Series (CC-Link)
- Addition / LECSS Series (SSCNET III)

### No.LEY-OM00403

Nov / 2013 Revision

- Addition / The recommended the parameter for each driver
- Addition / LEY63 Parallel mounting type

### No.LEY-OM00404

July / 2014 Revision

- Change of recommended the parameter

### No.LEY-OM00405

Mar/ 2016 Revision

- Addition / LECSS-T Series (SSCNET III/H)

### No.LEY-OM00406

Jan / 2017 Revision

- Change and Addition / Common precautions

### No.LEY-OM00407

Jan / 2017 Revision

- Change of How to order

### No.LEY\*-OM0213Q

Jan/ 2020 Revision

- Addition / LECSB-T Series (Pulse input / Positioning)
- Addition / LECSC-T Series (CC-Link)

### No.LEY\*-OMZ0015

May/ 2021 Revision

- Addition / LEY100 Series ( in-line )

Dece/ 2022 Revision

- Addition / LEY100 Series (Parallel)

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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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