LEY#-TF2Z343EN

ORIGINAL INSTRUCTIONS

Instruction Manual
Electric Actuator / Rod Type
Series LEY

Motor: Step [servo 24 VDC], Battery-less absolute [Step 24 VDC]
Servo [24 VDC]

The intended use of this Electrical Actuator is to convert an electrical input signal into mechanical motion.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.”
They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) *1), and other safety regulations.*1)
ISO 4414: Pneumatic fluid power - General rules 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 10218-1: Manipulating industrial robots -Safety. etc.

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

⚠ **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

- **Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

Series LEY - Motor: Step [servo 24 VDC]

Model				LEY16			LEY25			LEY32			LEY40		
Stroke [mm]				30 to 300			30 to 400			30 to 500			30 to 500		
Actuator	Work load [kg]*1	Horizontal (Contoller type:JXC*1/ LECP1)	(3000 mm²/s)	6	17	30	20	40	60	30	45	60	50	60	80
			(2000 mm²/s)	10	23	35	30	55	70	40	60	80	60	70	90
		Horizontal (Contoller type:JXC*2,3 / LECPA)	(3000 mm²/s)	4	11	20	12	30	30	20	40	40	30	60	60
			(2000 mm²/s)	6	17	30	18	50	50	30	60	60	-	-	-
		Vertical	(3000 mm²/s)	2	4	8	8	16	30	11	22	43	13	27	53
	Pushing force [N] *2*3*4			14 to 38	27 to 74	51 to 141	63 to 122	126 to 238	232 to 452	80 to 189	156 to 370	296 to 707	132 to 283	266 to 553	562 to 1058
	Speed [mm/s]	JXC□1*/LECP1		15 to 500	8 to 250	4 to 125	18 to 500	9 to 250	5 to 125	24 to 500	12 to 300	6 to 150	24 to 500	12 to 350	6 to 175
		LECPA/JXC□2,3									12 to 250	6 to 125	24 to 300	12 to 150	6 to 75
	Acceleration/deceleration			3,000											
	Pushing speed [mm/s] *5			50 or less			35 or less			30 or less			30 or less		
	Positioning repeatability [mm]			+/- 0.02											
	Lost motion [mm] *6			0.1 or less											
	Screw lead [mm]			10	5	2.5	12	6	3	16	8	4	16	8	4
	Impact /Vibration resistance [m/s²] *7			50 / 20											
	Actuation type			Ball screw and Belt (For “LEY□)											
				Ball screw (For “LEY□D)											
	Guide type			Sliding bush(Piston rod part)											
	Operating temperature range [℃]			5 to 40											
	Operating humidity range [%RH]			90 or less(No condensation)											
Electrical	Motor size			□28			□42			□56.4			□56.4		
	Motor type			Step motor (Servo 24VDC)											
	Encoder			Incremental A/B phase (800 pulse/rotation)											
	Rated voltage [V]			24 VDC +/- 10%											
	Max.instantaneous power consumption [[W] *8			43			48			104			106		
Lock unit	Type *9			Non-magnetizing lock											
	Holding force [N]			20	39	78	78	157	294	108	216	421	127	264	519
	Power consumption [W] *10			2.9			5			5			5		
	Rated voltage [V]			24 VDC+/-10%											

Series LEY - Motor: Battery-less absolute [Step 24 VDC]

Model			LEY16**E			LEY25**E			LEY32**E			LEY40**E		
Stroke			30 to 300			30 to 400			30 to 500			30 to 500		
Actuator	Work load [kg] *1	Horizontal (3000 mm²/s)	6	17	30	20	40	60	30	45	60	50	60	80
		Horizontal (2000 mm²/s)	10	23	35	30	55	70	40	60	80	60	70	90
		Vertical (3000 mm²/s)	2	4	8	8	16	30	11	22	43	13	27	53
	Pushing force [N] *2*3*4		14 to **38**	27 to 74	51 to 141	63 to 122	126 to 238	232 to 452	80 to 189	156 to 370	296 to 707	132 to 283	266 to 553	562 to 1058
	Speed [mm/s]		15 to 500	8 to 250	4 to 125	18 to 500	9 to 250	5 to 125	24 to 500	12 to 300	6 to 150	24 to 500	12 to 300	6 to 150
	Acceleration/deceleratio		3,000											
	Pushing speed [mm/s]		50 or less			35 or less			30 or less			30 or less		
	Positioning repeatability [mm]		+/- 0.02											
	Lost motion [mm] *6		0.1 or less											
	Screw lead [mm]		10	5	2.5	12	6	3	16	8	4	16	8	4
	Impact /Vibration resistance [m/s²] *7		50 / 20											
	Actuation type		Ball screw and Belt (For “LEY□)											
			Ball screw (For “LEY□D)											
	Guide type		Sliding bush(Piston rod part)											
	Operating temperature range [℃]		5 to 40											
	Operating humidity range [%RH]		90 or less(No condensation)											
Electrical	Motor size		□28			□42			□56.4			□56.4		
	Type of Motor		Battery-less absolute (Step motor24VDC)											
	Encoder		Battery-less absolute (4096 pulse/rotation)											
	Rated voltage [V]		24 VDC+/- 10%											
	Max.instantaneous power consumption [[W] *8		43			48			104			106		
Lock unit	Type *9		Non-magnetizing lock											
	Holding force [N]		20	39	78	78	157	294	108	216	421	127	264	519
	Power consumption [W]		2.9			5			5			5		
	Rated voltage [V]		24 VDC +/-10%											

2 Specifications (continued)

Series LEY - Motor: Servo [24 VDC]

Model			LEY16A			LEY25A		
Stroke			30 to 300			30 to 400		
Actuator	Work load [kg] *1	Horizontal (3000 mm²/s)	3	6	12	7	15	30
		Vertical (3000 mm²/s)	2	4	8	3	6	12
	Pushing force [N] *2*3*4		16 to 30	30 to 58	57 to 111	18 to 35	35 to 72	66 to 130
	Speed [mm/s]		1 to 500	1 to 250	1 to 125	2 to 500	1 to 250	1 to 125
	Acceleration/deceleratio		3,000					
	Pushing speed [mm/s]		50 or less			35 or less		
	Positioning repeatability [mm]		+/- 0.02					
	Lost motion [mm] *6		0.1 or less					
	Screw lead [mm]		10	5	2.5	12	6	3
	Impact /Vibration resistance [m/s²] *7		50 / 20					
	Actuation type		Ball screw and Belt (For “LEY□)					
			Ball screw (For “LEY□D)					
	Guide type		Sliding bush(Piston rod part)					
	Operating temperature range [℃]		5 to 40					
	Operating humidity range [%RH]		90 or less(No condensation)					
Electrical	Motor size		□28			□42		
	Motor output [W]		30			36		
	Motor type		Servo motor (24VDC)					
	Encoder		Incremental A/B phase (800 pulse/rotation) Z					
	Rated voltage [V]		24 VDC+/- 10%					
	Max.instantaneous power		59			96		
Lock unit	Type *9		Non-magnetizing lock					
	Holding force [N]		20	39	78	78	157	294
	Power consumption [W]		2.9			5		
	Rated voltage [V]		24 VDC +/-10%					

Actuator Weight (LEY series) kg

Weight: Motor Top/Parallel Type

Series		LEY16						
Stroke[mm]		30	50	100	150	200	250	300
Product weight[kg]	Step motor	0.58	0.62	0.73	0.87	0.98	1.09	1.20
	Servo motor	0.58	0.62	0.73	0.87	0.98	1.09	1.20
	Battery-less Absolute	0.75	0.79	0.90	1.04	1.15	1.26	1.37

Series		LEY25								
Stroke[mm]		30	50	100	150	200	250	300	350	400
Product weight[kg]	Step motor Battery-less Absolute	1.18	1.25	1.42	1.68	1.86	2.03	2.21	2.38	2.56
	Servo motor	1.14	1.21	1.38	1.64	1.82	1.99	2.17	2.34	2.52

Series		LEY32										
Stroke[mm]		30	50	100	150	200	250	300	350	400	450	500
Product weight[kg]	Step motor Battery-less Absolute	2.09	2.2	2.49	2.77	3.17	3.46	3.74	4.03	4.32	4.60	4.89
	Servo motor	-	-	-	-	-	-	-	-	-	-	-

Series		LEY40										
Stroke[mm]		30	50	100	150	200	250	300	350	400	450	500
Product weight[kg]	Step motor Battery-less Absolute	2.39	2.5	2.79	3.07	3.47	3.76	4.04	4.33	4.62	4.9	5.19
	Servo motor	-	-	-	-	-	-	-	-	-	-	-

Weight: In-line Motor Type

Series		LEY16D						
Stroke[mm]		30	50	100	150	200	250	300
Product weight[kg]	Step motor	0.58	0.62	0.73	0.87	0.98	1.09	1.20
	Servo motor	0.58	0.62	0.73	0.87	0.98	1.09	1.20
	Battery-less Absolute	0.75	0.79	0.90	1.04	1.15	1.26	1.37

Series		LEY25D								
Stroke[mm]		30	50	100	150	200	250	300	350	400
Product weight[kg]	Step motor Battery-less Absolute	1.17	1.24	1.41	1.67	1.85	2.02	2.20	2.37	2.55
	Servo motor	1.13	1.20	1.37	1.63	1.81	1.98	2.16	2.33	2.51

Series		LEY32D										
Stroke[mm]		30	50	100	150	200	250	300	350	400	450	500
Product weight[kg]	Step motor Battery-less Absolute	2.08	2.19	2.48	2.76	3.16	3.45	3.73	4.02	4.31	4.59	4.88
	Servo motor	-	-	-	-	-	-	-	-	-	-	-

Series		LEY40D										
Stroke[mm]		30	50	100	150	200	250	300	350	400	450	500
Product weight[kg]	Step motor Battery-less Absolute	2.38	2.49	2.78	3.06	3.46	3.75	4.03	4.32	4.61	4.89	5.18
	Servo motor	-	-	-	-	-	-	-	-	-	-	-

2 Specifications (continued)

Additional weight (kg)

Size		16	25	32	40
Lock		0.12	0.26	0.53	0.53
Motor cover		0.02	0.03	0.04	0.05
Lock/Motor cover		0.16	0.32	0.61	0.62
Rod end male thread	Male thread	0.01	0.03	0.03	0.03
	Nut	0.01	0.02	0.02	0.02
Foot bracket (2 sets including mounting bolt)		0.06	0.08	0.14	0.14
Rod flange (including mounting bolt)		0.13	0.17	0.20	0.20
Head flange (including mounting bolt)					
Double clevis (including pin, retaining ring, and mounting		0.08	0.16	0.22	0.22

Note1) Horizontal: The maximum value of the work load. An external guide is necessary to support the load (Friction coefficient of guide: 0.1 or less). The actual work load and transfer speed change according to the condition of the external guide. Also, speed changes according to the work load. Check the “Model Selection” on Web catalogue.
Vertical: Speed changes according to the work load. Check the “Model Selection” on Web catalogue.
The values shown in ( ) are the acceleration/deceleration.
Note2) Pushing force accuracy is ±20% (F.S.).
Note3) The pushing force values for
LEY16* is 35% to 85%, for LEY25* is 35% to 65%, for
LEY32* is 35% to 85%, and for LEY40* is 35% to 65%.
LEY16*A is 60% to 95% and for LEY25*A is 70% to 95%.
LEY16*E is 20% to 65%, LEY25*E is 30% to 50%, for LEY32*E is 30% to 70%, and for LEY40*E is 35% to 65%.
he pushing force varies according to the duty ratio and pushing speed. Check the “Model Selection” in the catalogue.
Note 4) The speed and force may vary depending on the cable length, load, and mounting conditions. Furthermore, if the cable length exceeds 5 m, it will decrease by up to 10% for each 5 m.
(At 15 m: Reduced by up to 20%)
Note5) The allowable speed for pushing operation. When push conveying a workpiece, operate at the vertical work load or less.
Note6) A reference value for correcting an error in reciprocal operation
Note7) Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial and a perpendicular direction to the lead screw (The test was performed with the actuator in the initialized state).
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial and a perpendicular direction to the lead screw (The test was performed with the actuator in the initialized state).
Note8) The maximum instantaneous power consumption (including the controller) is for when the actuator is operating. This value can be used for the selection of the power supply.
Note9) With lock only
Note10) For an actuator with lock, add the power consumption for the lock.

⚠ Warning

For special products which include a suffix of “-X#”, “-D#”, please refer to the customer drawing of that specific product.

3 Installation

3.1 Installation

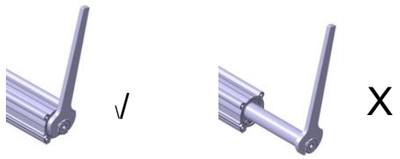
⚠ Warning

- Do not install the product unless the safety instructions have been read and understood.
- Do not use the product outside of its allowable specification.
- Ensure the product is sized correctly and is suitable for the application.
- Do not operate the product by fixing the piston rod and moving the actuator body.
- Avoid using the electric actuator in a way that rotational torque would be applied to the piston rod. If rotational torque is applied to the piston rod it will cause deformation, damage and/or reduce the non-rotational accuracy of the product. The allowable rotational torque is listed below.

Allowable Rotational torque (N.m or less)	LEY16	LEY25	LEY32	LEY40
	0.8	1.1	1.4	1.4

3 Installation (continued)

- When attaching a bracket or nut to the end of the rod, ensure the piston rod is fully retracted.



- When installing, inspecting or performing maintenance on the product, be sure to turn off the power supplies. Then, lock it so it cannot be tampered with while work is happening.

3.2 Environment

⚠ Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications
- Prevent foreign particles from entering the product.

3.3 Mounting

⚠ Warning

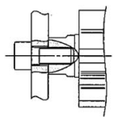
- Observe the required tightening torque for screws.
  Unless stated otherwise, tighten the screws to the recommended torque for mounting the product.
- Do not make any alterations to the product.
  Alterations made to this product may lead to a loss of durability and damage to the product, which can lead to injury and damage to other equipment and machinery.
  Do not scratch or dent the sliding parts of the table or mounting face etc., by striking or holding them with other objects. The components are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation or seizure.
- Do not use the product until it has been verified that the equipment can be operated correctly.
  After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted correctly.
- Do not use the product until it has been verified that the equipment can be operated correctly.
- After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted correctly.
- Allow sufficient space for maintenance and inspection.

⚠ Caution

- **When mounting the product, use screws with adequate length and tighten them to the recommended torque.**
  Tightening with larger torque than the specified range may cause mal-function while the tightening with smaller torque can allow the displacement of actuator position. In extreme conditions the actuator could become detached from it's mounting position.

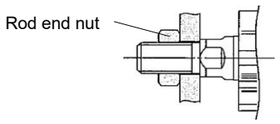
3 Installation (continued)

Work fixed / Rod end female thread



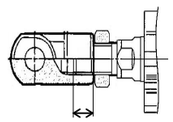
Model	Screw	Max. tightening torque [Nm]	Max. thread length [mm]	Rod end width across flats [mm]
LEY16	M5 x 0.8	3.0	10	14
LEY25	M8 x 1.25	12.5	13	17
LEY32	M8 x 1.25	12.5	13	22
LEY40	M8 x 1.25	12.5	13	22

Work fixed / Rod end male thread



Model	Screw	Max. tightening torque [Nm]	Max. thread length [mm]	Rod end width across flats [mm]
LEY16	M8 x 1.25	12.5	12	14
LEY25	M14 x 1.5	65.0	20.5	17
LEY32	M14 x 1.5	65.0	20.5	22
LEY40	M14 x 1.5	65.0	20.5	22

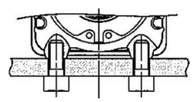
Model	Rod end nut		thread depth of bracket[mm]
	Width across flats [mm]	Length [mm]	
LEY16	13	5	8.5
LEY25	22	8	14
LEY32	22	8	14
LEY40	22	8	14



Tighten the product mounting screws to the specified torque.
Tightening to a torque over the specified range can cause operation failure, and insufficient torque can cause displacing or dropping of the attachment.

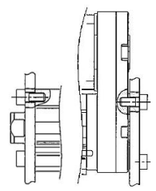
Mounting / Screw bottom tapped style

Model	Screw	Max. tightening torque [Nm]	Max. thread depth [mm]
LEY16	M4 x 0.7	1.5	5.5
LEY25	M5 x 0.8	3.0	6.5
LEY32	M6 x 1.0	5.2	8.5
LEY40	M6 x 1.0	5.2	8.5



Mounting / Rod side - Head side tapped style

Model	Screw	Max. tightening torque [Nm]	Max. thread depth [mm]
LEY16	M4 x 0.7	1.5	7
LEY25	M5 x 0.8	3.0	8
LEY32	M6 x 1.0	5.2	10
LEY40	M6 x 1.0	5.2	10



3 Installation (continued)

3.4 Lubrication

⚠ Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, refer to catalogue for details.
- The recommended grease is lithium grade No.2

Applied Region	Grease Pack Number	Weight [g]
Piston rod Guide	GR-S-010	10
	GR-S-020	20

- For products which include a "25A-" prefix the recommended grease is low condensation grease.

Applied Region	Grease Pack Number	Weight [g]
Piston rod Guide	GR-D-010	10

3.5 Wiring

⚠ Warning

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

⚠ Caution

- Wire the connector correctly and securely.
  Check the connector for polarity and do not apply any voltage to the terminals other than those specified in the Operation Manual.
- Take appropriate measures against noise.
  Noise in a signal line may cause malfunction. As a countermeasure separate the high voltage and low voltage cables, and shorten the wiring lengths, etc.
- Do not route input/output wires and cables together with power or high voltage cables.
  The product can malfunction due to noise interference and surge voltage from power and high voltage cables close to the signal line. Route the wires of the product separately from power or high voltage cables.
- Take care that actuator movement does not catch cables.
- Operate with all wires and cables secured.
- Avoid bending cables at sharp angles where they enter the product.
- Avoid twisting, folding, rotating or applying an external force to the cable.
  Risk of electric shock, wire breakage, contact failure and loss of control of the product can result. Select "Robotic cables" in applications where cables are moving repeatedly (encoder/ motor/ lock).
  Refer to the relevant operation manual for the bending life of the cable.
- Confirm correct insulation.
  Poor insulation of wires, cables, connectors, terminals etc. can cause interference with other circuits. Also there is the possibility that excessive voltage or current may be applied to the product causing damage.
- Refer to the auto switch references in "Best Pneumatics" when an auto switch is to be used

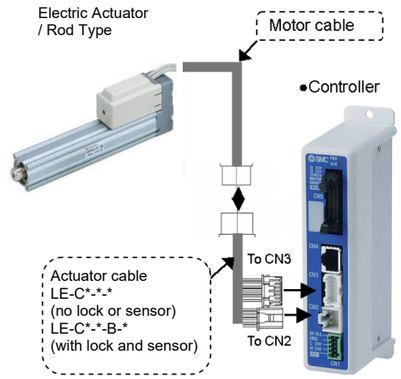
3 Installation (continued)

3.6 Actuator Ground connection

⚠ Caution

- The Actuator must be connected to ground to shield the actuator from electrical noise. The screw and cable with crimping terminal and toothed washer should be prepared separately by the user.

3.7 Wiring of Actuator to Controller



4 How to Order

- For standard products, refer to the catalogue on the SMC website (URL: https://www.smcworld.com) for the how to order information.

5 Outline Dimensions

- For standard products, refer to the catalogue on the SMC website (URL: https://www.smcworld.com) for outline dimensions.

6 Maintenance

6.1 General Maintenance

⚠ Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly electricity and compressed air can be dangerous.
- Maintenance of electromechanical and pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the power has been discharged and the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical or pneumatic connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Incorrect handling can cause an injury, damage or malfunction of the equipment and machinery, so ensure that the procedure for the task is followed.
- Always allow sufficient space around the product to complete any maintenance and inspection.

6 Maintenance (continued)

6.1 Periodical Maintenance

- Maintenance should be performed according to the table below:

	Appearance Check	Belt Check
Inspection before daily operation	✓	
Inspection every six months*	✓	✓
Inspection every 1,000 km*	✓	✓
Inspection every 5 million cycles*	✓	✓

**whichever of these occurs first.*

- Following any maintenance, always perform a system check. Do not use the product if any error occurs, as safety cannot be assured if caused by any un-intentional malfunction.

6.2 Appearance Check

- The following items should be visually monitored to ensure that the actuator remains in good condition and there are no concerns flagged;
  - Loose Screws,
  - Abnormal level of dust or dirt,
  - Visual flaws / faults,
  - Cable connections,
  - Abnormal noises or vibrations.

6.4 Belt Check

- If one of the 6 conditions below are seen, do not continue operating the actuator, contact SMC immediately.
  - **Tooth shaped canvas is worn out.**
    Canvas fibre becomes “fuzzy”, rubber is removed, and the fibre gains a white colour. The lines of fibre become very unclear.

  - **Peeling off or wearing of the side of the belt.**
    The corner of the belt becomes round and frayed, with threads beginning to stick out.

  - **Belt is partially cut.**
    Belt is partially cut. Foreign matter could be caught in the teeth and cause flaws.

  - **Vertical line of belt teeth.**
    Flaw which is made when the belt runs on the flange.
  - **Rubber back of the belt is softened and sticky.**
  - **Crack on the back of the belt.**

7 Limitations of Use

7.1 Limited warranty and disclaimer/compliance requirements

- Refer to Handling Precautions for SMC Products.

8 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

9 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.

SMC Corporation

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