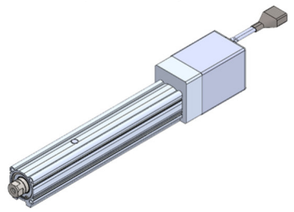
ORIGINAL INSTRUCTIONS

Instruction Manual
Electric Actuator / Rod type compatible with manifold controller
Series LE2Y

Motor: Step motor (servo 24 VDC) with Battery-less absolute encoder



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 and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power — General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines. Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots

- 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.

⚠ **Danger**	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ **Warning**	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Caution**	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate 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.
- Electromagnetic compatibility
  This product is class A equipment intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.
- Special products (-X#, -D#) might have specifications that are different from those shown in the specifications section. Contact SMC for specific drawings.

2 Specifications

2.1 LE2Y16 series

Model			LE2Y16		
Actuator specification	Stroke [mm]		30 to 300		
	Max. work load [kg] Note 1)	Horizontal	17	25	40
		Vertical	3	6	10
	Pushing Force [N] Note 2) 3) 4)		23~41	44~80	86~154
	Speed [mm/s]		15~700	8~350	4~175
	Acceleration / deceleration speed [mm/s²]	Horizontal	10,000 max.		
		Vertical	5,000 max.		
	Pushing speed [mm/s] Note 5)		1 to 50		
	Positioning repeatability [mm]		±0.02		
	Lost motion [mm] Note 6)		0.1 max.		
	Screw Lead [mm]		10	5	2.5
	Impact/Vibration resistance [m/s²] Note 7)		50 / 20		
	Actuation method		Ball screw (LE2Y*D) Ball screw + Belt (LE2Y*L/R/T)		
	Guide type		Sliding bush (Piston rod)		
	Operating temperature [℃]		5 to 40		
	Operating humidity [%RH]		90 or less (no condensation)		
Electrical	Motor size [mm]		□28		
	Motor type		Battery-less absolute (Step motor 24 VDC)		
	Encoder		Battery-less absolute		
	Power supply voltage [V]		24 VDC ±10%		
	Power consumption [W] Note 8) 9)		74 max.		
Lock	Lock Type Note 10)		Non magnetizing lock		
	Holding force [N]		20	39	78
	Power consumption [W] Note9)		4		
	Power supply voltage [V]		24 VDC ±10%		

2.2 LE2Y25 series

Model			LE2Y25			
Actuator specification	Stroke [mm]		30 to 400			
	Max. work load [kg] Note 1)	Horizontal	8	26	40	70
		Vertical	2	8	16	30
	Pushing Force [N] Note 2) 3) 4)		41~81	67~135	132~265	255~511
	Speed [mm/s]	to 300 stroke	30~900	18~700	9~450	5~225
		350 to 400 stroke	30~900	18~600	9~300	5~150
	Acceleration / deceleration speed [mm/s²]	Horizontal	10,000 max.			
		Vertical	5,000 max.			
	Pushing speed [mm/s] Note 5)		1 to 35			
	Positioning repeatability [mm]		±0.02			
	Lost motion [mm] Note 6)		0.1 max.			
	Screw Lead [mm]		20	12	6	3
	Impact/Vibration resistance [m/s²] Note 7)		50 / 20			
	Actuation method		Ball screw (LE2Y*D) Ball screw + Belt (LE2Y*L/R/T)			
	Guide type		Sliding bush (Piston rod)			
	Operating temperature [℃]		5 to 40			
	Operating humidity [%RH]		90 or less (no condensation)			
Electrical	Motor size [mm]		□42			
	Motor type		Battery-less absolute (Step motor 24 VDC)			
	Encoder		Battery-less absolute			
	Power supply voltage [V]		24 VDC ±10%			
	Power consumption [W] Note 8) 9)		71 max.			
Lock	Lock Type Note 10)		Non magnetizing lock			
	Holding force [N]		47	78	157	294
	Power consumption [W] Note9)		8			
	Power supply voltage [V]		24 VDC ±10%			

2 Specifications (continued)

2.3 LE2Y32 series

Model			LE2Y32			
Actuator specification	Stroke [mm]		30 to 500			
	Max. work load [kg] Note 1)	Horizontal	30	50	90	100
		Vertical	3	13	26	46
	Pushing Force [N] Note 2) 3) 4)		60~140	90~209	176~411	341~796
	Speed [mm/s]	to 300 stroke	30~900	24~800	12~400	6~200
		350 to 400 stroke	30~900	24~640	12~320	6~160
		401 to 500 stroke	30~900	24~640	12~320	6~160
	Acceleration / deceleration speed [mm/s²]	Horizontal	10,000 max.			
		Vertical	5,000 max.			
	Pushing speed [mm/s] Note 5)		1 to 30			
	Positioning repeatability [mm]		±0.02			
	Lost motion [mm] Note 6)		0.1 max.			
	Screw Lead [mm]		24	16	8	4
	Impact/Vibration resistance [m/s²] Note 7)		50 / 20			
	Actuation method		Ball screw (LE2Y*D) Ball screw + Belt (LE2Y*L/R/T)			
	Guide type		Sliding bush (Piston rod)			
	Operating temperature [℃]		5 to 40			
	Operating humidity [%RH]		90 or less (no condensation)			
Electrical	Motor size [mm]		□56			
	Motor type		Battery-less absolute (Step motor 24 VDC)			
	Encoder		Battery-less absolute			
	Power supply voltage [V]		24 VDC ±10%			
	Power [W] Note 8) 9)		93 max.			
Lock	Lock Type Note 10)		Non magnetizing lock			
	Holding force [N]		75	108	216	421
	Power consumption [W] Note9)		8			
	Power supply voltage [V]		24 VDC ±10%			

Note 1) Horizontal: Use an external guide (friction coefficient: 0.1 max.).
The maximum value of the work load for the positioning operation. The actual transported mass and transport speed will vary depending on the external guide conditions.
Also check the speed / acceleration and duty ratio depending on the payload in the “Speed vs payload graph” in the catalogue.
Vertical: Use an external guide (friction coefficient: 0.1 max.) when the rod is directed upward or a radial load is applied to the rod.
The maximum value of the workload for the positioning operation. The actual transported mass and transport speed will vary depending on the external guide conditions.
Also check the speed / acceleration and duty ratio depending on the payload in the “Speed vs payload graph” in the catalogue.
Set the acceleration / deceleration to: Horizontal: 10,000 [mm/s²] max., Vertical: 5,000 [mm/s²] max.
Note 2) Pushing force accuracy is ±20% (F.S.).
Note 3) The setting range for the “Pushing force” is from 25% to 45% (LE2Y16), 25% to 50% (LE2Y25) and 30% to 70% (LE2Y32).
The pushing force setting range varies depending on the duty ratio and pushing speed. Refer to the catalogue for the “Thrust Conversion Graph”.
Note 4) Speed and thrust vary depending on the cable length, load, installation conditions, etc. If the cable length exceeds 5 m, the speed / thrust will decrease by up to 10% for every 5 m (max. 20% reduction for 15 m).
Note 5) “Pushing speed” is the allowable speed for the pushing operation. When transporting and pushing a workpiece, operated the actuator according to the “Vertical Load capacity” or less.
Note 6) This is a reference value for correcting an error in reciprocal operation.
Note 7) Impact resistance: In a drop impact test, no malfunction in the axial and perpendicular direction to the lead screw. The test was performed with the actuator in the initialized state.
Vibration resistance: 45 to 2000 Hz for 1 sweep, no malfunction occurred in the an axial and perpendicular direction to the lead screw. The test was performed with the actuator in the initialized state.
Note 8) Indicates the maximum power when operating the actuator only.
Note 9) For an actuator with lock, add the power consumption for the lock.
Note 10) Only applies to actuators supplied with a lock.

2 Specifications (continued)

2.4 Actuator weight [kg]

Series	LE2Y16D (with In-line motor)						
Stroke	30	50	100	150	200	250	300
Weight	0.76	0.80	0.91	1.07	1.18	1.30	1.41
Lock	0.19						

Series	LE2Y16L/R/T (with Parallel motor)						
Stroke	30	50	100	150	200	250	300
Weight	0.80	0.84	0.96	1.11	1.23	1.34	1.45
Lock	0.19						

Series	LE2Y25D (with In-line motor)								
Stroke	30	50	100	150	200	250	300	350	400
Weight	1.43	1.50	1.68	1.97	2.14	2.32	2.50	2.68	2.86
Lock	0.34								

Series	LE2Y25L/R/T (with Parallel motor)								
Stroke	30	50	100	150	200	250	300	350	400
Weight	1.51	1.58	1.76	2.05	2.22	2.40	2.58	2.76	2.94
Lock	0.33								

Series	LE2Y32D (with In-line motor)										
Stroke	30	50	100	150	200	250	300	350	400	450	500
Weight	2.38	2.49	2.78	3.26	3.54	3.83	4.12	4.41	4.70	4.99	5.27
Lock	0.63										

Series	LE2Y32L/R/T (with Parallel motor)										
Stroke	30	50	100	150	200	250	300	350	400	450	500
Weight	2.50	2.61	2.90	3.38	3.67	3.96	4.25	4.53	4.82	5.11	5.40
Lock	0.64										

3 Installation

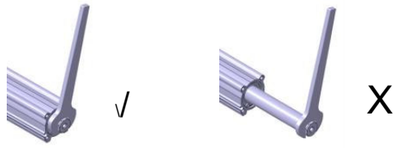
⚠ Warning

- Do not install the product unless the safety instructions have been read and understood.
- Do not use the product outside of the allowable specifications.
- 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.
- Keep the flatness of the mounting surface to within 0.1 mm max. (based on 500 mm stroke length).
  Insufficient flatness of a work piece or actuator mounting surface can cause play in the guide and increased sliding resistance. In the case of overhang mounting (including cantilever), use a support plate or support guide to avoid deflection of the actuator body.
- When mounting the actuator, use all mounting holes.
  If all mounting holes are not used, this will not maintain the specified performance. e.g. the amount of displacement of the table will increase.
- When mounting the actuator or workpiece, use screws with adequate length, but with length less than the maximum thread depth. The use of screws that are too long can touch the body and cause malfunction.
- Tigthen screws to the recommended tightening torque.
  Tightening the screws with a torque higher than recommended may cause malfunction, whilst tightening with a torque lower than recommended can cause displacement of the mounting position, or dropping of the work piece.
- 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 max.)	LE2Y16	LE2Y25	LE2Y32
	0.8	1.1	1.4

3. Installation (continued)

- When screwing a bracket or nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod fully, and place a wrench over the flat portion of the rod that protrudes.
  Tighten with consideration to prevent the tightening torque from being applied to the non-rotating guide.



3.1 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.
- Avoid use in the following environments:
  1. Locations where a large amount of dust and cutting chips are airborne.
  2. Locations where the ambient temperature is outside the range of the temperature specification (refer to specifications).
  3. Locations where the ambient humidity is outside the range of the humidity specification (refer to specifications).
  4. Locations where strong magnetic or electric fields are generated.
  5. Locations where direct vibration or impact is applied to the product.
  6. Areas that are dusty, or are exposed to splashes of water and oil drops.
  7. At an altitude of 1000 meters or higher. Heat dissipation and withstand voltage will decrease. Contact SMC for further details.
- Do not use in an environment where the product is directly exposed to liquid, such as cutting oils.
- Install a protective cover when the product is used in an environment directly exposed to foreign matter such as dust, cutting chips and spatter.

3.1 Lubrication

⚠ Caution

- The product has been lubricated for life at manufacture and does not require lubrication in service. If a lubricant is to be used, contact SMC.

3.2 Mounting

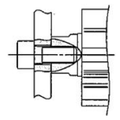
⚠ Warning

- 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.
- When an external guide is used, connect the moving parts of the product 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 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.
- When mounting the actuator or attaching the work piece, do not apply strong impact or large moment.
  If an external force over the allowable moment is applied, it may cause looseness in the guide unit, an increase in sliding resistance or other problems.
- Allow sufficient space for maintenance and inspection.

3. Installation (continued)

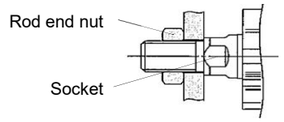
- The electric actuator and its peripheral devices should be installed on a fire-proof material.
  Direct installation on or near a flammable material may cause a fire.
- Take measures to ensure that the operating temperature of the actuator and its peripheral devices are within the range of the specifications.
  The actuator should be installed with 50 mm or more space between each side of it and other equipment or components.
- Do not mount the controller or its peripheral devices near a large electromagnetic contactor or non fused breaker which generate vibration on the same panel. Mount them on different panels, or keep the controller and its peripheral devices away from a vibration source.

Work fixing / Rod end female thread



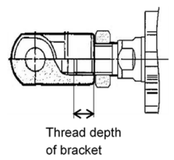
Model	Screw	Max. tightening torque [N.m]	Max. thread length [mm]	Rod end width across flats [mm]
LE2Y16	M5 x 0.8	3.0 ±10%	10	14
LE2Y25	M8 x 1.25	12.5 ±10%	13	17
LE2Y32	M8 x 1.25	12.5 ±10%	13	22

Work fixing / Rod end male thread



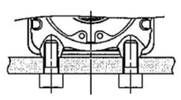
Model	Screw	Max. tightening torque [N.m]	Max. thread length [mm]	Rod end width across flats [mm]
LE2Y16	M8 x 1.25	12.5 ±10%	12	14
LE2Y25	M14 x 1.5	50.0 ±10%	20.5	17
LE2Y32	M14 x 1.5	50.0 ±10%	20.5	22

Model	Rod end nut		Thread depth of fitting [mm]
	Width across flats [mm]	Length [mm]	
LE2Y16	13	5	5 min.
LE2Y25	22	8	8 min.
LE2Y32	22	8	8 min.



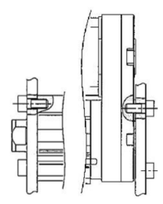
Actuator Mounting / bottom tapped style

Model	Screw	Max. tightening torque [N.m]	Max. screw depth [mm]
LE2Y16	M4 x 0.7	1.5 ±10%	5.5
LE2Y25	M5 x 0.8	3.0 ±10%	6.5
LE2Y32	M6 x 1.0	5.2 ±10%	8.8



Mounting / Rod side - Head side tapped style

Model	Screw	Max. tightening torque [N.m]	Max. screw depth [mm]
LE2Y16	M4 x 0.7	1.5 ±10%	7.0
LE2Y25	M5 x 0.8	3.0 ±10%	7.0
LE2Y32	M6 x 1.0	5.2 ±10%	7.0



4 Wiring

4.1 Wiring

⚠ Warning

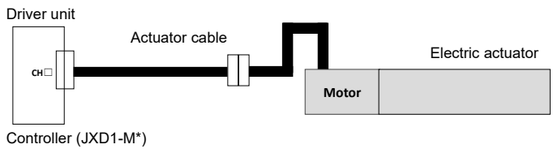
- Adjustment, mounting or wiring changes should not be carried out before disconnecting the power supply to the product.
  Electric shock, malfunction and damage can result.
- Do not disassemble the cables.
- Use only specified cables.
  Use only specified cables otherwise there may be risk of fire and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

⚠ Caution

- 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.
- 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.
- Take care that actuator movement does not catch cables.
- Avoid bending cables at sharp angles where they enter the product.
  Avoid twisting, folding, rotating or applying an external force to the cable.
- Do not allow the cable near to the actuator to move repeatably. The motor cable is not a robotic type cable. Secure the cable between the actuator and the connector to prevent movement.
- When the actuator cable is bent repeatedly, do not store them in a movable wiring duct smaller than the specified bending radius (for cable lengths up to 10 m: bend radius = 56 mm min.; for cable lengths up to 15 m: bend radius = 77 mm min.).

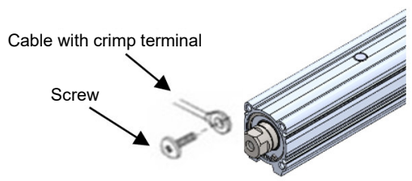
4.2 Wiring of Actuator to Controller

- Connect the actuator to the manifold controller using an actuator cable (SMC part number JX-CP-D-*).



4.3 Actuator Ground connection

- 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.
- The ground cable cross sectional area should be 2 mm^2 minimum.
- The ground connection should be a dedicated D-class ground connection (resistance less than 100Ω). Avoid shared grounding points with other devices.



5 How to Order

Refer to the catalogue on the SMC website
(URL: https://www.smcworld.com) for the How to Order information.

6 Outline Dimensions (mm)

Refer to the drawings / operation manual on the SMC website
(URL: https://www.smcworld.com) for Outline dimensions.

7 Maintenance

7.1 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.

7.2 Periodical Maintenance

Frequency	Appearance Check	Internal check	Belt Check
Daily before operation	✓		
Every 6 months*	✓	✓	✓
Every 1,000 km*	✓	✓	✓
Every 5 million cycles*	✓	✓	✓

- 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.

7.3 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.

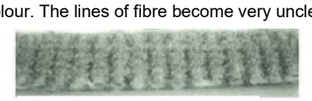
7.4 Internal parts check

1. Lubricant condition on moving parts.
2. Loose or mechanical play in fixed parts or fixing screws.

7.5 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.



7 Maintenance (continued)

- **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.**

8 Limitations of Use

8.1 Limited warranty and Disclaimer/Compliance Requirements

- Refer to Handling Precautions for SMC Products.

9 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.

10 Contacts

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

SMC Corporation

URL : http// www.smcworld.com (Global) http// www.smc.eu (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan

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