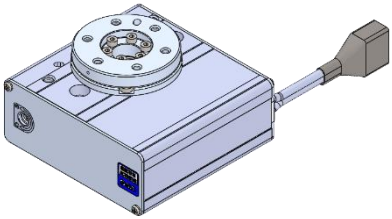




Instruction Manual

Electric Actuator / Rotary Table
compatible with manifold controller
Series LE2R*



The intended use of this Electrical Actuator is to convert an electrical input signal into mechanical rotary 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 that is 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 LE2R* series

Model		LE2R* 30HK	LE2R* 30HJ	LE2R* 50HK	LE2R* 50HJ	
Actuator	Rotation angle (°)		320			
	Lead (°)		8	12	7.5	12
	Max. Rotation torque (N·m)		2.5	1.7	13.9	8.7
	Max. Pushing Torque (N·m) Note 1) 2) 3)		1.7 to 2.5	1.1 to 1.7	5.5 to 6.9	3.5 to 4.3
	Max. Moment of Inertia (kg·m ²) Note 3) 4)		0.035	0.015	0.13	0.05
	Rotation Speed (°/sec) Note 3) 4)		20 to 400	30 to 600	20 to 400	30 to 600
	Pushing Speed (°/sec)		20	30	20	30
	Max. acceleration / deceleration (°/s ²) Note 3)		3000			
	Backlash (°)	Basic	± 0.2			
		High precision	± 0.1			
	Repeatability (°)	Basic	± 0.05			
		High precision	± 0.03			
	Lost motion (°) Note 5)	Basic	0.3 or less			
		High precision	0.2 or less			
	Impact / vibration resistance (m/s ²) Note 6)		150 / 30			
	Actuation type		Worm gear and belt			
	Operating temperature range (°C)		5 to 40			
	Operating humidity range (% R.H.)		90 or less (No condensation)			
External stopper	Rotation Angle (°)	(-2) with 1 Arm	180			
		(-3) with 2 Arms	90			
	Repeatability at the end (°)		± 0.01			
	Range of external stopper (°)		± 2			
Electrical	Motor size		□28		□42	
	Motor		Battery-less Absolute (Step motor 24 VDC)			
	Encoder		Battery-less Absolute			
	Power supply voltage (V)		24 VDC ±10%			
	Max. Power (W) Note 7)		58		52	

- Note 1) Pushing Torque accuracy should be ±25% (F.S.) for LE2R30, ± 20% (F.S.) for LE2R50.
- Note 2) The setting range for the “Pushing force” is from 40% to 60% (LE2R30) and 40% to 50% (LE2R50).
- Note 3) The speed and thrust may vary depending on the cable length, load installation conditions, etc. If the cable length exceeds 5 m then it will decrease by up to 10% for every 5 m.
- Note 4) The Angular acceleration, angular deceleration and angular speed may fluctuate due to variations in the moment of inertia. Refer to the catalogue.
- Note 5) A reference value for correcting an error in reciprocal operation.
- Note 6) Impact resistance:
In a drop impact test, no malfunction occurred in the axial and perpendicular direction to the lead screw. (The test was performed with the rotary actuator in the initial state).
Vibration resistance:
45 to 2000 Hz. 1 sweep, no malfunction occurred in the axial and perpendicular direction to the feed screw. (The test was performed with the rotary actuator in the initial state).
- Note 7) Indicates the maximum power when operating the actuator only.

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 in excess of its allowable specification.
- 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 during maintenance.
- 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.
- Allow sufficient space for maintenance and inspection.
- The electric actuator and its peripheral devices should be installed on fire-proof material.
- Install the actuator on a flat surface. If the mounting surface is distorted or uneven, an unacceptable force may be applied to the housing causing problems.
- Take measures to ensure that the operating temperature of the actuator and its peripheral devices are within the specification range.

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.
- 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.

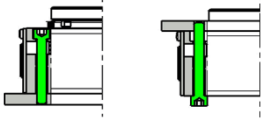
3 Installation (continued)

3.3 Mounting

Warning

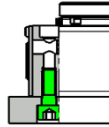
3.4 Actuator mounting (through holes)

Model	Screw	Max. tightening torque [N·m]
LE2R*30	M6 x 1.0	5.0
LE2R*50	M8 x 1.25	12.0



3.5 Actuator mounting (bottom tapped holes)

Model	Screw	Max. tightening torque [N·m]	Max. thread depth L [mm]
LE2R*30	M8 x 1.25	12.0	16
LE2R*50	M10 x 1.5	25.0	20



3.6 Mounting the Workpiece on the rotary table

- Mount the workpiece to the table using the screw length and tightening torque specified in the table below. Using long screws which interfere with the body may cause operation failure.

Model	Screw	Screw length [mm]	Max. tightening torque [N·m]
LE2R*30	M5 x 0.8	8	3.0
LE2R*50	M6 x 1.0	10	5.0

- The rotary table mounting face has holes and slots for positioning. If required use them for accurate positioning of the rotary actuator.
- If it is necessary to operate the product when it is not energized, use the manual override screws.

When the product is operated with the manual override screws, check the position of the manual override of the table, and leave necessary space. Do not apply excessive torque to the manual override screws that could lead to damage and malfunction of the product.

Caution

- If the mounting surface of the electric actuator is distorted or not flat, excessive force may be applied to the housing, etc. causing malfunction.
Mount the actuator on a plane surface.

3.7 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

4 Wiring

4.1 Wiring

Warning

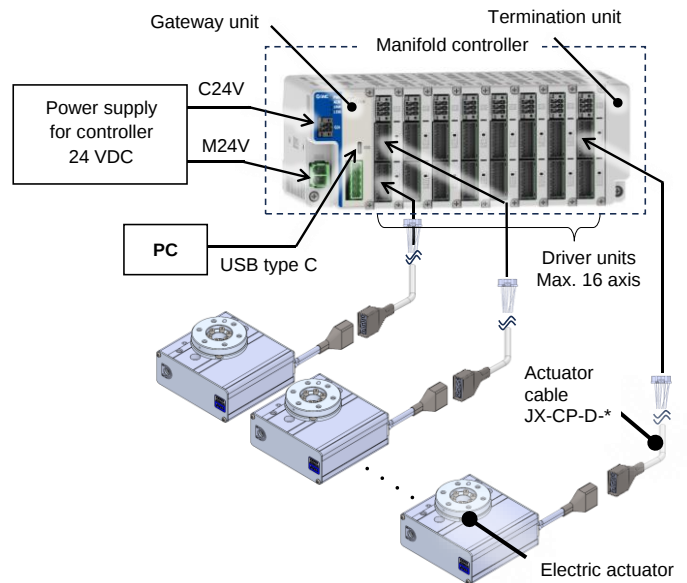
- Adjustment, mounting or wiring changes should not be carried out before disconnecting the power supply to the product.
Electric shock, malfunction and damage can result.
- Do not disassemble the cables.
- Use only specified cables.
Use only specified cables otherwise there may be risk of fire and damage.
- 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.
- Check wiring 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.
- Do not use the product in a place where electrical surges are generated.
- Use suitable surge protection when a surge generating load such as a solenoid valve is to be directly driven.

4.2 Wiring of Actuator to Controller

- Prepare the electric actuator LE2R series and Manifold controller.
- Connect the Driver unit of the Manifold controller and the electric actuator using an actuator cable.



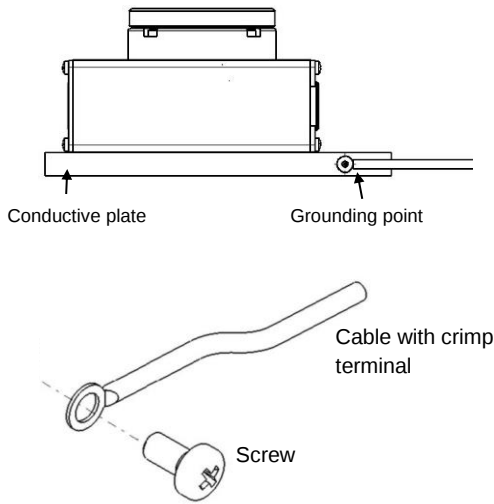
4 Wiring (continued)

4.3 Actuator Ground connection

Caution

- The Actuator must be mounted to a conductive plate and connected to ground to shield the actuator from electrical noise.
- Dedicated grounding should be used. Grounding should be to a D-class ground (resistance of 100 Ω or less).
- Grounding should be performed near the actuator to shorten the wiring distance. The cross-sectional area of the ground wire shall be a minimum of 2 mm². Avoid common grounding with other devices.
- The screw, cable with crimping terminal and shakeproof washer must be provided by the user.

Location of grounding point



5 How to Order

Refer to the operation manual or 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.

7 Maintenance (continued)

- 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.
- Maintenance should be performed according to the procedure indicated in the Operating Manual.
Improper handling can cause injury, damage or malfunction of equipment and machinery.
- Removal of product
When the equipment is serviced, first confirm that measures are in place to prevent dropping of work pieces and run-away of equipment, etc, and then turn off the power supply to the system.
When the machinery is restarted, check that the operation is normal with the rotary actuator in a safe position.

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*	✓	✓	✓

* Select the inspection interval which occurs first.

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

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

7.5 Belt Check

- Stop the operation immediately and contact SMC when the belt appears to be like the photographs shown below.

- Tooth shaped canvas is worn out.**

Canvas fibre becomes “fuzzy”, rubber is removed, and the fibre becomes white in 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.**



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](http://www.smcworld.com) (Global) [http// www.smc.eu](http:// www.smc.eu) (Europe)
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Template DKP50047-F-085N