



ORIGINAL INSTRUCTIONS

Instruction Manual

Electric Actuator – Slide Table

Series LES*, LESH*

Motor: Step [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.**
- **The actuator and the controller are sold together as a package.** The controller is set with parameters for the actuator it is shipped with. If it is combined with a different actuator, failure can result. When purchasing the actuator separately, confirm that the combination of the controller and the actuator is compatible.
- For further safety instructions for the actuator and for the controller refer to the operation manual for each product on the SMC website (URL: <https://www.smcworld.com>).

Warning

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

2 Specifications

2.1 Specifications - LES series

Model	LES8*		LES16*		LES25*		
Stroke (mm)	30,50,75		30,50,75, 100		30,50,75, 100,125,150		
Workload (kg) ^{(1) (3)}	Horizontal		3		5		
	Vertical		0.5	0.25	3	1.5	5
Pushing force (N) ^{(1) (3)}	6-15	4-10	23.5 - 55	15 - 35	77 - 180	43 - 100	
Speed (mm/s) ^{(1) (3)}	10 - 200	20 - 400	10 - 200	20 - 400	10 - 200	20 - 400	
Pushing speed (mm/s)	10 - 20	20	10 - 20	20	10 - 20	20	
Max. acceleration / deceleration (mm/s ²)	5,000						
Positioning repeatability (mm)	±0.05						
Max. lost motion (mm) ⁽⁴⁾	0.3						
Screw lead (mm)	4	8	5	10	8	16	
Allowable static moment (Nm)	Pitching		4.8		14.1		
	Yawing		4.8		14.1		
	Rolling		0.8	1.8	4.8		
Impact / vibration resistance (m/s ²) ⁽⁵⁾	50/20						
Drive method	Slide screw + belt (LES*R/L), Slide screw (LES*D)						
Guide type	Linear guide (circulating type)						
Operating temperature range (°C)	5 to 40						
Operating humidity range (%RH)	≤90 (no condensation)						

2.2 Specifications - LESH series

Model	LESH8*		LESH16*		LESH25*			
Stroke (mm)	50,75		50,100		50,100,150			
Workload (kg) ^{(1) (3)}	Horizontal		2	1	8	5	12	8
	Vertical		0.5	0.25	2	1	4	2
Pushing force (N) ^{(1) (3)}	6-15	4-10	23.5 - 55	15 - 35	77 - 180	43 - 100		
Speed (mm/s) ^{(1) (3)}	10 - 200	20 - 400	10 - 200	20 - 400	10 - 200	20 - 400		
Pushing speed (mm/s)	10 - 20	20	10 - 20	20	10 - 20	20		
Max. acceleration / deceleration (mm/s ²)	5,000							
Positioning repeatability (mm)	±0.05							
Max. lost motion (mm) ⁽⁴⁾	0.15							
Screw lead (mm)	4	8	5	10	8	16		
Allowable static moment (Nm)	Pitching		50st: 26		50st: 77			
	Yawing		100st: 43		100st: 112			
	Rolling		12	49	50st: 146			
					100st: 177			
					150st: 152			
Impact / vibration resistance (m/s ²) ⁽⁵⁾	50/20							
Drive method	Slide screw + belt (LESH*R/L), Slide screw (LESH*D)							
Guide type	Linear guide (circulating type)							
Operating temperature range (°C)	5 to 40							
Operating humidity range (%RH)	≤90 (no condensation)							

2 Specifications (continued)

2.3 Electrical specifications - LES / LESH series

Model	LES(H)8*		LES(H)16*		LES(H)25*	
Motor size	□20		□28		□42	
Motor type	Step motor (Servo 24 VDC)					
Encoder	Incremental				Incremental / Battery-less absolute	
Power Supply voltage (V)	24 VDC ±10%					
Power (W) ⁽⁶⁾	35		69		67	

2.4 Lock specifications - LES / LESH series ⁽⁷⁾

Model	LES(H)8*		LES(H)16*		LES(H)25*	
Type	No excitation operating type					
Holding force (N)	24	2.5	300	48	500	77
Power consumption (W) ⁽⁸⁾	4		3.6		5	
Power Supply voltage (V)	24 VDC ±10%					

2.5 Actuator weight (kg)

• LES series

Model	LES8	LES16	LES25
R / L / D Type	30st: 0.45 / 0.40	30st: 0.91 / 0.77	30st: 1.81 / 1.82
Without lock	50st: 0.54 / 0.52	50st: 1.00 / 0.90	50st: 2.07 / 2.05
	75st: 0.59 / 0.58	75st: 1.16 / 1.11	75st: 2.41 / 2.35
		100st: 1.24 / 1.20	100st: 3.21 / 3.07
			125st: 3.44 / 3.27
			150st: 3.68 / 3.47
R / L / D Type	30st: - / 0.47	30st: - / 0.90	30st: - / 2.08
With lock	50st: - / 0.59	50st: - / 1.03	50st: 2.34 / 2.31
	75st: 0.66 / 0.65	75st: 1.29 / 1.25	75st: 2.68 / 2.61
		100st: 1.37 / 1.33	100st: 3.48 / 3.33
			125st: 3.71 / 3.53
			150st: 3.95 / 3.74

• LESH series

Model	LESH8	LESH16	LESH25
R / L / D Type	50st: 0.55 / 0.57	50st: 1.15 / 1.25	50st: 2.50 / 2.52
Without lock	75st: 0.70 / 0.70	100st: 1.60 / 1.70	100st: 3.30 / 3.27
			150st: 4.26 / 3.60
R / L / D Type	50st: - / 0.63	50st: - / 1.36	50st: 2.84 / 2.86
With lock	75st: 0.76 / 0.76	100st: 1.71 / 1.81	100st: 3.61 / 3.64
			150st: 4.60 / 3.94

Notes

- *1) Speed changes according to the work load. Check the "Speed-work load graphs" for the selected model in the catalogue or operation manual.
- *2) Pushing force accuracy is ±20% (F.S.). Maximum setting of pushing force is 70% (F.S.).
- *3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (at 15 m: Reduced by up to 20%).
- *4) A reference value for correcting an error in reciprocal operation.
- *5) Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw (the test was performed with the actuator in the initial state).
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw (the test was performed with the actuator in the initial state).
- *6) The power (including the controller) is when the actuator is operating. This value can be used for the selection of the power supply.
- *7) Applies to actuator with lock only.
- *8) For an actuator with lock, add the power consumption for the lock.

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.
- Do not use the actuator in applications where excessive external force or impact force is applied.
- Ensure the product is sized correctly and is suitable for the application.
- Do not dent, scratch or cause other damage to the body and table mounting surfaces.
It may cause a loss of parallelism in the mounting surfaces, looseness in the guide unit, an increase in sliding resistance or other problems.
- Do not dent, scratch or cause other damage to the surface over which the rail and guide will move.
Play and increased sliding resistance can result.
- 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.
- Avoid using 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.
 - c) Areas where the ambient humidity exceeds the specified range.
 - d) Areas where strong magnetic or electric fields are generated.
 - e) Areas where there are large amounts of dust or there is exposure to water/oil droplets.
 - f) Areas at altitudes of above 1000 m.
Heat radiation performance and withstand voltage may decline as result. For details, consult with SMC.

- 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.
- Install a protective cover when the product is used in an environment directly exposed to foreign matter, such as dust, cutting chips, and spatter. Looseness or increased sliding resistance can result.
- The table and guide block are manufactured from special stainless steel. There may be rust formed on the product in an environment exposed to water drops/moisture.

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.
- 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.

3 Installation (continued)

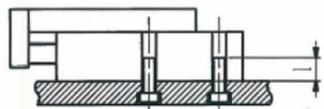
- Do not use the product until it has been verified that the equipment can be operated correctly. After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted correctly.
- When attaching to the work piece, do not apply strong impact or a large moment. If an external force in excess of the allowable moment is applied, it may cause looseness in the guide unit, an increase in sliding resistance or other problems.
- Do not apply strong impact or an excessive moment while mounting the product or a workpiece. If an external force above the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.
- Allow sufficient space for maintenance and inspection.

Caution

- When tightening the screws to install the workpiece or fixture, fix the plate so that it does not rotate, and tighten the screws properly within the specified torque range. This may cause abnormal responses of the auto switch, play in the internal guide or an increase in the sliding resistance.
- When mounting the product, use screws with adequate length and tighten them to the recommended torque. Tightening with a larger torque than the specified range may cause malfunction while tightening with a smaller torque can allow the displacement of the actuator position. In extreme conditions the actuator could become detached from its mounting position.
- In order to prevent the work piece fixing screws from damaging the table, use screws at least 0.5 mm shorter than the maximum thread depth. Longer screws can hit the end plate and cause operation failure.
- Keep the flatness of the mounting surface within 0.02 mm 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.
- Do not move the main body with the table fixed.

- When mounting the actuator maintain the appropriate space (40 mm or more) for bending of the cable.
- When installing the actuator using side holders, be sure to use positioning pins for installation. If vibration or excessive external force is applied to the actuator, it can cause displacement if positioning pins are not used.

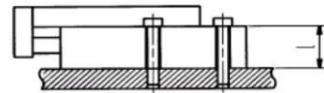
3.3.1 Actuator mounting (bottom tapped holes)



Model	Screw size	Max. torque (N.m)	l Max. thread depth (mm)
LES*8R/L*	M4 x 0.7	1.5	8
LES*8D*	M5 x 0.8	3	10
LES16R/L*	M5 x 0.8	3	10
LES16D*	M6 x 1	5.2	12
LESH16*			
LES25R/L*	M6 x 1	5.2	12
LES25D*	M8 x 1.25	10	16
LESH25*			

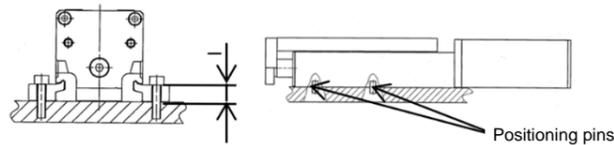
3 Installation (continued)

3.3.2 Actuator mounting (top through holes)



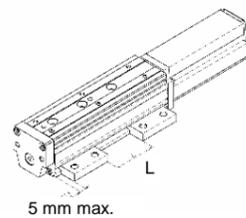
Model	Screw	Max. torque (Nm)	l (mm)
LES8R/L*	M3 x 0.5	0.63	23.5
LESH8R/L*			25.5
LES*8D*	M4 x 0.7	1.5	18.2
LES16R/L*			33.5
LES16D*	M5 x 0.8	3.0	25.2
LESH16R/L*			35.5
LESH16D*			27.3
LES25R/L*	M5 x 0.8	3.0	49
LES25D*			39.8
LESH25R/L*	M6 x 1	5.2	50.5
LESH25D*			39.5

3.3.3 Actuator mounting (side holder)



Model	Screw	Maximum torque (Nm)	l (mm)
LES*8D*	M4 x 0.7	1.5	6.7
LES*16D*	M5 x 0.8	3.0	8.3
LES*25D*	M6 x 1	5.2	14

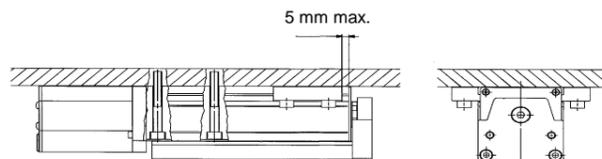
- When installing the actuator using side holders, it should be installed according to the dimensions shown below. Otherwise, the actuator will be in an unbalanced state, causing looseness.



Model	L (mm)
LES*8D*-30*	5~10
LES*8D*-50*	20~30
LES*8D*-75*	50~60
LES*16D*-30*	5~10
LES*16D*-50*	20~30
LES*16D*-75*	60~75
LES*16D*-100*	85~100
LES*25D*-30*	5~15
LES*25D*-50*	25~35
LES*25D*-75*	60~75
LES*25D*-100*	70~100
LES*25D*-125*	155~170
LES*25D*-150*	160~180

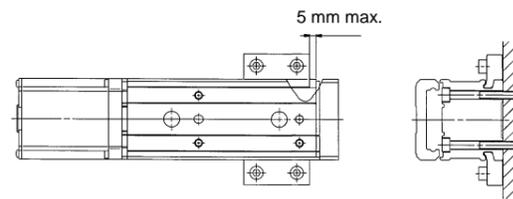
- When fixing the actuator using the through holes in the mounting orientations shown below, be sure to use 2 side holders as shown. Otherwise, the actuator will be in an unbalanced state, causing looseness.

Mounting upside down (through hole)

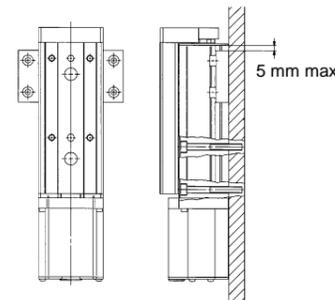


3 Installation (continued)

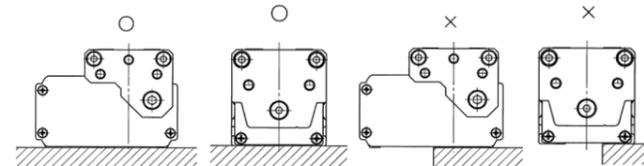
Mounting horizontally on a wall (through hole)



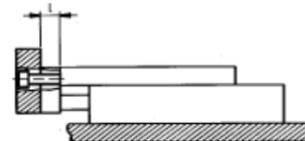
Mounting vertically (through hole)



- The actuator should be mounted as shown in the figures marked with ○ shown below. Unstable mounting of the actuator may cause operation failure, generation of abnormal noise or increase in the deflection etc.

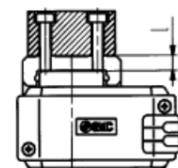


3.3.4 Workpiece mounting (End face)



Model	Screw	Max. torque (Nm)	l (mm)
LES8R/L*	M3 x 0.5	0.63	6
LESH8R/L			5.5
LES*8D*	M4 x 0.7	1.5	8
LES16R/L*	M4 x 0.7	1.5	8
LES16D*			
LESH16*	M5 x 0.8	3.0	12
LES25R/L*	M6 x 1	5.2	
LESH25R/L			14
LES*25D			

3.3.5 Workpiece mounting (Top face)



Model	Screw	Max. torque (Nm)	l (mm)
LES8*	M3 x 0.5	0.63	2.1 - 4.1
LESH8*			5 (Max)
LES16*	M4 x 0.7	1.5	2.7 - 5.7
LESH16*	M5 x 0.8	3	6.5 (Max)
LES25*	M5 x 0.8	3	3.3 - 7.3
LESH25*	M6 x 1	5.2	8 (Max)

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	GR-S-010	10
Guide	GR-S-020	20

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, otherwise there is a risk of fire or 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. Refer to the relevant operation manual for the bending life of the cable.
- Secure the motor cables protruding from the actuator before use. The motor and lock cables are not robotic cables and can be broken when moved.
- The cables connecting the actuator and the controller are robotic type cables. These should not be placed in a flexible moving tube with a radius smaller than the specified value (Min. 50 mm).
- 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.

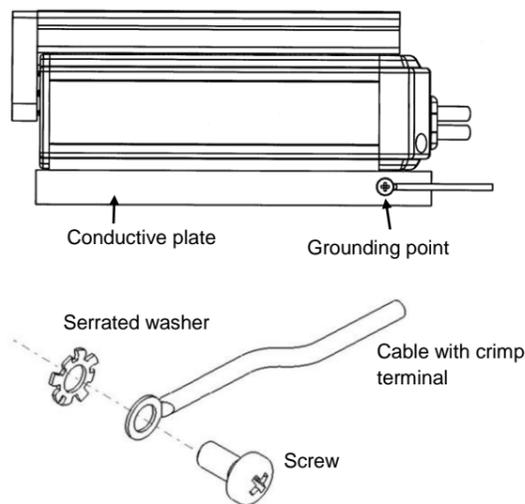
4.2 Actuator Ground connection

Caution

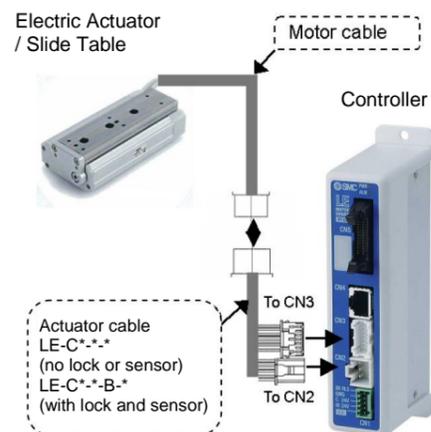
- The Actuator must be mounted to a conductive plate and connected to ground to shield the actuator from electrical noise.
- Dedicated grounding should be used. Grounding should be to a D-class ground (resistance of 100Ω or less).
- Grounding should be performed near the actuator to shorten the wiring 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.

4 Wiring (continued)

Location of grounding point



4.3 Wiring of Actuator to Controller



5 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.

6 Outline Dimensions

- For standard products, refer to the catalogue 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

- Maintenance should be performed according to the table below:

*whichever of these occurs first	Appearance Check	Belt Check
Inspection before daily operation	✓	✓
Inspection every six months*	✓	✓
Inspection every 1,000 km*	✓	✓
Inspection 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 Belt Check

- Stop operation immediately and replace the belt when it appears to be in the condition shown in the following pictures.

- 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.



7 Maintenance (continued)

- 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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