



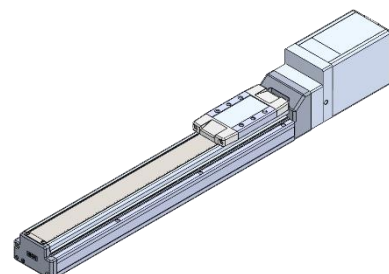
Instruction Manual

e-Actuator / Slider type

Easy to operate Integrated Controller

Series EQFS\*H\*\*-\*\*\*-B\*

Motor: Step motor 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) <sup>(1)</sup>, and other safety regulations.

- <sup>(1)</sup> 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.

	<b>Caution</b>	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	<b>Warning</b>	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	<b>Danger</b>	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.
- 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.

2. Specifications

EQFS25 series

Model		EQFS25				
Actuator specification	Stroke [mm] <sup>(1)</sup>	50 to 800				
	Max. work load [kg] <sup>(2)</sup>	Horizontal	15	26	40	40
		Vertical	2	6	12.5	15
	Speed [mm/s]	to 400 stroke	20 to 1200	12 to 850	6 to 450	3 to 225
		401 to 500 stroke	20 to 1100	12 to 750	6 to 400	3 to 225
		501 to 600 stroke	20 to 900	12 to 540	6 to 270	3 to 135
		601 to 700 stroke	20 to 630	12 to 420	6 to 230	3 to 115
		701 to 800 stroke	20 to 550	12 to 330	6 to 180	3 to 90
	Max. acceleration/ deceleration [mm/s <sup>2</sup> ]	Horizontal	10,000			
		Vertical	5,000			
Positioning repeatability [mm]	±0.02					
Lost motion [mm] <sup>(3)</sup>	0.1 or less					
Screw Lead [mm]	20	12	6	3		
Impact/Vibration resistance [m/s <sup>2</sup> ] <sup>(4)</sup>	50 / 20					
Actuation method	Ball screw (EQFS*) Ball screw + Belt (EQFS*R/L)					
Guide type	Linear guide					
Operating temperature [°C]	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 (angular displacement sensor)	Battery-less absolute				
	Power supply voltage [V]	24 VDC ±10%				
Lock	Max. Power [W] <sup>(5) (7)</sup>	89				
	Lock Type <sup>(6)</sup>	Non magnetizing lock				
	Holding force [N]	47	78	157	294	
	Power [W] <sup>(7)</sup>	5				
Power supply voltage [V]	24 VDC ±10%					

EQFS32 series

Model		EQFS32				
Actuator specification	Stroke [mm] <sup>(1)</sup>	50 to 1000				
	Max. work load [kg] <sup>(2)</sup>	Horizontal	39.5	50	68	68
		Vertical	4	10	16	20
	Speed [mm/s]	to 400 stroke	24 to 1100	16 to 750	8 to 450	4 to 125
		401 to 500 stroke	24 to 1100	16 to 750	8 to 450	4 to 125
		501 to 600 stroke	24 to 1100	16 to 750	8 to 400	4 to 125
		601 to 700 stroke	24 to 930	16 to 620	8 to 310	4 to 125
		701 to 800 stroke	24 to 750	16 to 500	8 to 250	4 to 125
	Max. acceleration/ deceleration [mm/s <sup>2</sup> ]	Horizontal	10,000			
		Vertical	5,000			
Positioning repeatability [mm]	±0.02					
Lost motion [mm] <sup>(3)</sup>	0.1 or less					
Screw Lead [mm]	24	16	8	4		
Impact/Vibration resistance [m/s <sup>2</sup> ] <sup>(4)</sup>	50 / 20					
Actuation method	Ball screw (EQFS*) Ball screw + Belt (EQFS*R/L)					
Guide type	Linear guide					
Operating temperature [°C]	5 to 40					
Operating humidity [% RH]	90 or less (no condensation)					
Electrical	Motor size [mm]	□56.4				
	Motor type	Battery-less absolute (Step motor 24 VDC)				
	Encoder (angular displacement sensor)	Battery-less absolute				
	Power supply voltage [V]	24 VDC ±10%				
Lock	Max. Power [W] <sup>(5) (7)</sup>	116				
	Lock Type <sup>(6)</sup>	Non magnetizing lock				
	Holding force [N]	72	108	216	421	
	Power [W] <sup>(7)</sup>	5				
Power supply voltage [V]	24 VDC ±10%					

2. Specifications (continued)

EQFS40 series

Model		EQFS40				
Actuator specification	Stroke [mm] <sup>(1)</sup>	150 to 1200				
	Max. work load [kg] <sup>(2)</sup>	Horizontal	26	60	75	80
		Vertical	4.5	4.5	25	40
	Speed [mm/s]	to 400 stroke	30 to 1200	20 to 1000	10 to 500	5 to 225
		401 to 500 stroke	30 to 1200	20 to 1000	10 to 500	5 to 225
		501 to 600 stroke	30 to 1200	20 to 1000	10 to 500	5 to 225
		601 to 700 stroke	30 to 1200	20 to 900	10 to 440	5 to 220
		701 to 800 stroke	30 to 1140	20 to 760	10 to 350	5 to 175
		801 to 900 stroke	30 to 930	20 to 620	10 to 280	5 to 140
		901 to 1000 stroke	30 to 780	20 to 520	10 to 250	5 to 125
Max. acceleration/ deceleration [mm/s <sup>2</sup> ]	Horizontal	10,000				
	Vertical	5,000				
Positioning repeatability [mm]	±0.02					
Lost motion [mm] <sup>(3)</sup>	0.1 or less					
Screw Lead [mm]	30	20	10	5		
Impact/Vibration resistance [m/s <sup>2</sup> ] <sup>(4)</sup>	50 / 20					
Actuation method	Ball screw (EQFS*) Ball screw + Belt (EQFS*R/L)					
Guide type	Linear guide					
Operating temperature [°C]	5 to 40					
Operating humidity [% RH]	90 or less (no condensation)					
Electrical	Motor size [mm]	□56.4				
	Motor type	Battery-less absolute (Step motor 24 VDC)				
	Encoder (angular displacement sensor)	Battery-less absolute				
	Power supply voltage [V]	24 VDC ±10%				
Lock	Max. Power [W] <sup>(5) (7)</sup>	116				
	Lock Type <sup>(6)</sup>	Non magnetizing lock				
	Holding force [N]	75	113	225	421	
	Power [W] <sup>(7)</sup>	5				
Power supply voltage [V]	24 VDC ±10%					

Notes

- <sup>(1)</sup> Non-standard strokes are available to special order, contact SMC.
- <sup>(2)</sup> Maximum payload at acceleration/deceleration of 3000 mm/s<sup>2</sup>. Work load varies depending on the velocity and acceleration. Please refer to the catalog for the "speed - payload graph" (URL: <https://www.smcworld.com>). Furthermore, if the cable length exceeds 5 m, the payload will decrease by up to 10% for each 5 m.
- <sup>(3)</sup> A reference value for correcting an error in reciprocal operation.
- <sup>(4)</sup> Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial and perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state).  
Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial and perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state).
- <sup>(5)</sup> Indicates the max. power during operation (including the controller). This value can be used for the selection of the power supply.
- <sup>(6)</sup> Only applies to actuators supplied with a lock.
- <sup>(7)</sup> For the actuator with lock, add the power consumption for the lock.

2.1 Weight [kg]

Series	EQFS25 (with In-line motor)															
Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Weight	1.77	1.91	2.05	2.19	2.33	2.47	2.61	2.75	2.89	3.03	3.17	3.31	3.45	3.59	3.73	3.87
Lock	0.31															

Series	EQFS25L/R (with Parallel motor)															
Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Weight	1.75	1.89	2.03	2.17	2.31	2.45	2.59	2.73	2.87	3.01	3.15	3.29	3.43	3.57	3.71	3.85
Lock	0.31															

Series	EQFS32 (with In-line motor)																			
Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Weight	3.12	3.32	3.52	3.72	3.92	4.12	4.32	4.52	4.72	4.92	5.12	5.32	5.52	5.72	5.92	6.12	6.32	6.52	6.72	6.92
Lock	0.58																			

Series	EQFS32L/R (with Parallel motor)																			
Stroke	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Weight	3.09	3.29	3.49	3.69	3.89	4.09	4.29	4.49	4.69	4.89	5.09	5.29	5.49	5.69	5.89	6.09	6.29	6.49	6.69	6.89
Lock	0.58																			

2. Specifications (continued)

Series	EQFS40 (with In-line motor)																			
Stroke	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1100	1200
Weight	4.99	5.27	5.55	5.83	6.11	6.39	6.77	6.95	7.23	7.51	7.79	8.07	8.35	8.63	8.91	9.19	9.47	9.75	10.31	10.87
Lock	0.6																			

Series	EQFS40L/R (with Parallel motor)																			
Stroke	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1100	1200
Weight	5.15	5.43	5.71	5.99	6.27	6.55	6.93	7.11	7.39	7.67	7.95	8.23	8.51	8.79	9.07	9.35	9.63	9.91	10.47	11.03
Lock	0.6																			

**Warning**

Special products (-X#, -D#) might have specifications different from those shown in this section. Contact SMC for specific drawings.

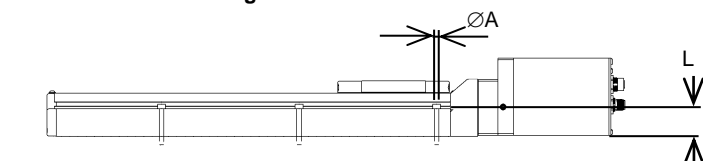
3. Installation

**Warning**

- Do not install the product unless the safety instructions have been read and understood.
- Do not use the product in excess of the allowable specifications.
- 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.
- 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.
- Tightening the screws with a torque higher than recommended may

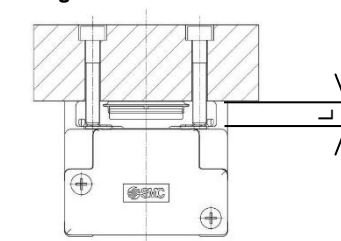
cause malfunction, whilst tightening with a torque lower than recommended can cause displacement of the mounting position, or dropping of the work piece.

3.1 Actuator mounting



Model	Screw size	Max. tightening torque [N.m]	Ø A [mm]	L [mm]
EQFS25	M4	1.5	4.5	24
EQFS32	M5	3.0	5.5	30
EQFS40	M6	5.2	6.6	31

3.2 Work piece Mounting



Model	Screw size	Max. tightening torque [N.m]	L Max. thread depth [mm]
EQFS25	M5 x 0.8	3.0	8.3
EQFS32	M6 x 1.0	5.2	12.2
EQFS40	M8 x 1.25	12.5	13

### 3. Installation (continued)

#### 3.3 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 damage the sliding part by hitting it with an object. Components are manufactured to precise tolerances, so the slightest deformation may cause faulty operation.
- Prevent seizure of rotating parts (pins, etc.) by applying grease.
- Do not use the product until it is verified 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 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.
- 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.

#### 3.4 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:
  - Locations where a large amount of dust and cutting chips are airborne.
  - Locations where the ambient temperature is outside the range of the temperature specification (refer to specifications).
  - Locations where the ambient humidity is outside the range of the humidity specification (refer to specifications).
  - Locations where strong magnetic or electric fields are generated.
  - Locations where direct vibration or impact is applied to the product.
  - Areas that are dusty, or are exposed to splashes of water and oil drops.
  - Environments at an altitude of 1000 meters or higher. Heat dissipation and withstand voltage will decrease. Contact SMC for 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.

#### 3.5 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.

### 4. Wiring

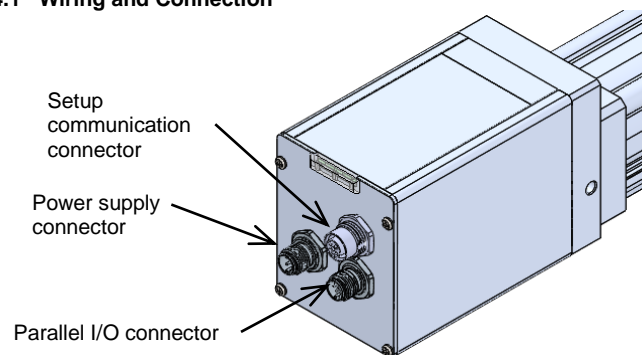
##### Warning

- Adjustment, installation, inspection, or wiring changes should be conducted with the power supply turned OFF. Never connect or disconnect the cables with the power supply ON.
- Do not disassemble the cables.

##### Caution

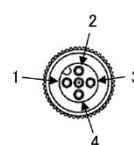
- Wire the connector correctly and securely.
- Take appropriate measures against noise. Noise in a signal line may cause malfunction. As a countermeasure separate the high voltage and low voltage cables, and shorten the wiring lengths, etc.
- Do not route input/output wires and cables together with power 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 damage the cables.
- Operate with all cables secured.
- Avoid twisting, folding, rotating or applying an external force to the cable.
- Select "Robotic cables" in applications where cables are moving repeatedly (encoder/ motor/ lock).
- Confirm correct insulation. Poor insulation of cables and connectors 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.
- When mounting the actuator, leave a space of 40 mm or more to allow for bending of the actuator cable.
- Use a power supply with low noise between lines and between the power and ground. In cases where noise is high, an isolation transformer should be used.
- If the power supply is of the inrush-current limited type, a voltage drop may occur during the acceleration or deceleration of the actuator.

#### 4.1 Wiring and Connection



#### 4.2 Power supply connector

- Connect the power supply cable (SMC part number JX-CDS-E-\*-S with straight connector, JX-CDA-E-\*-S with angled connector) to the power supply connector on the actuator (cable supplied separately).
- Tighten the connector to a torque of 0.6 N·m.
- Connector: M12 4-pin socket, A code (normal key).
- Cable specification: AWG22, number of cores: 4



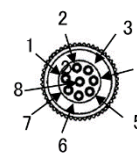
Pin No.	Wire colour	Name	Function
1	Brown	C24V	Control power supply +
2	White	M24V	Motor power supply +
3	Blue	0V	Common power supply -
4	Black	LK RLS	Lock release +

(View on cable connector)

### 4. Wiring (continued)

#### 4.3 Parallel I/O connector

- Connect the parallel I/O cable (SMC part number JX-CIS-E-\*-S with straight connector, JX-CIA-E-\*-S with angled connector) to the parallel I/O connector on the actuator (cable supplied separately).
- Tighten the connector to a torque of 0.6 N·m.
- Connector: M12 8-pin socket, A code (normal key).
- Cable specification: AWG22, number of cores: 8



(View on cable Connector)

Pin No.	Wire colour	Signal Name
1	White	IN0
2	Brown	IN1
3	Green	RESET
4	-	Not used
5	Grey	OUT0
6	Pink	OUT1
7	Blue	OUT2
8	Red	ALARM

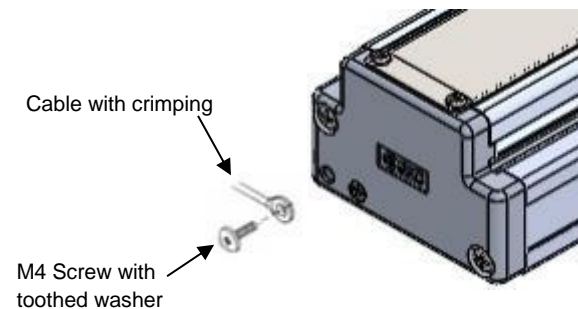
- NPN and PNP specifications are available for this electric actuator (the parallel I/O type is different between the NPN and PNP type).
- The parallel I/O is of non-isolated specification.
- Use the electric actuator power supply 24 VDC for the power supply of both parallel input and output. (Use the same input power supply as the control power supply C24V for the parallel input/output power supply).
- For further details of the I/O functions available refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>).

#### 4.4 Communication cable

- Connect the communication cable (SMC part number JX-CT-E-S) to the communication connector on the actuator (cable supplied separately).
- A USB cable with A-miniB connector (SMC part number LEC-W2-U) is required for connection to a PC (option).
- The communication cable should be used for initial setup and configuration, using the latest configuration software available on the SMC website (URL: <https://www.smcworld.com>).

#### 4.5 Actuator Ground connection

- Ensure that the product is connected to ground to improve the noise tolerance of the electric actuator.
- A dedicated ground connection should be used for the actuator.
- The ground connection should be to a D-class ground (resistance 100 Ω or less).
- The grounding point should be as near as possible to the electric actuator to keep the wire length short.
- Appropriate measures should be taken to prevent lightning surges. Ground the surge absorber separately from the grounding of the actuator and its peripheral devices.



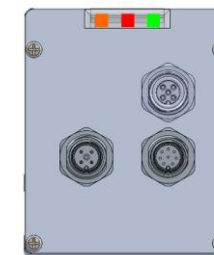
### 5. How to Order

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. LED Display



LED	Colour	LED Status	Status
PWR	Green	ON	Normal
ALM	Red	OFF	No alarms
OVL	Orange	OFF	No overload warning

- If the LED [PWR] on the electric actuator is ON green, it is in normal condition.
- If the LED [PWR] on the electric actuator is OFF, the voltage between M24V - 0V is low or at 0 VDC.
- If the LED [ALM] on the electric actuator is ON red, an alarm has been generated.
- If the LED [OVL] on the electric actuator is ON orange, the electric actuator operation may be in an overload condition.

### 8. Maintenance

#### 8.1 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.
- After installation and maintenance, apply power to the equipment and

perform appropriate functional tests to make sure the equipment is installed correctly.

- If any electrical 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.

#### 8.2 Periodical Maintenance

Frequency	Appearance Check	Internal check	Belt Check
Before daily 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.

#### 8.3 Appearance Check

The following items should be visually checked to ensure that the actuator remains in good condition and there are no concerns;

- Loose Screws,
- Abnormal level of dust or dirt,
- Visual flaws / faults,
- Cable connections,
- Abnormal noises or vibrations.

#### 8.4 Internal check

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

## 8. Maintenance (continued)

### 8.5 Belt Check

If one of the 6 conditions below are seen, do not continue operating the actuator and immediately contact SMC.

#### a. 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.



#### b. 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.



#### c. Belt is partially cut.

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

#### 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.



## 9. Limitations of Use

### 9.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

## 10. 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.

## 11. Contacts

Refer to [www.smcworld.com](http://www.smcworld.com) or [www.smc.eu](http://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  
 Specifications are subject to change without prior notice from the manufacturer.  
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