



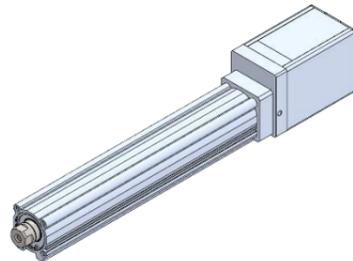
Instruction Manual

e-Actuator / Rod type

Easy to operate Integrated Controller

Series EQY*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)⁽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.

2. Specifications

2.1 EQY16 series

Model		EQY16		
Stroke [mm]		30 to 300		
Max. work load [kg] ⁽¹⁾	Horizontal	17	25	40
	Vertical	3	6	10
Pushing Force [N] ^{(2) (3) (4)}		19~38	36~7	64~191
Speed [mm/s]	to 300 stroke	15~700	8~350	4~175
	301 to 400 stroke			
Max. acceleration/ deceleration [mm/s ²]	Horizontal	10,000		
	Vertical	5,000		
Pushing speed [mm/s ²] ⁽⁵⁾		25		
Positioning repeatability [mm]		±0.02		
Lost motion [mm] ⁽⁶⁾		0.1 or less		
Screw Lead [mm]		20	12	6
Impact/Vibration resistance [m/s ²] ⁽⁷⁾		50 / 20		
Actuation method		Ball screw (EQY*DH) Ball screw + Belt (EQY*H)		
Guide type		Sliding bush (piston rod)		
Operating temperature [°C]		5 to 40		
Operating humidity [% RH]		90 or less (no condensation)		
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%		
Max. Power [W] ^{(8) (9)}		86		
Lock Type ⁽¹⁰⁾		Non magnetizing lock		
Holding force [N]	Horizontal	20	39	78
	Vertical			
Power consumption [W] ⁽⁹⁾		2.9		
Power supply voltage [V]		24 VDC ±10%		

2.2 EQY25 series

Model		EQY25			
Stroke [mm]		30 to 400			
Max. work load [kg] ⁽¹⁾	Horizontal	8	26	40	70
	Vertical	2	8	16	30
Pushing Force [N] ^{(2) (3) (4)}		31~61	63~122	126~238	232~452
Speed [mm/s]	to 300 stroke	30~900	18~700	9~450	5~225
	301 to 400 stroke	30~900	18~600	9~300	5~150
Max. acceleration/ deceleration [mm/s ²]	Horizontal	10,000			
	Vertical	5,000			
Pushing speed [mm/s ²] ⁽⁵⁾		35			
Positioning repeatability [mm]		±0.02			
Lost motion [mm] ⁽⁶⁾		0.1 or less			
Screw Lead [mm]		20	12	6	3
Impact/Vibration resistance [m/s ²] ⁽⁷⁾		50 / 20			
Actuation method		Ball screw (EQY*DH) Ball screw + Belt (EQY*H)			
Guide type		Sliding bush (piston rod)			
Operating temperature [°C]		5 to 40			
Operating humidity [% RH]		90 or less (no condensation)			
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%			
Max. Power [W] ^{(8) (9)}		86			
Lock Type ⁽¹⁰⁾		Non magnetizing lock			
Holding force [N]	Horizontal	47	78	157	294
	Vertical				
Power consumption [W] ⁽⁹⁾		5			
Power supply voltage [V]		24 VDC ±10%			

2. Specifications (continued)

2.3 EQY32 series

Model		EQY32			
Stroke [mm]		30 to 500			
Max. work load [kg] ⁽¹⁾	Horizontal	30	50	90	100
	Vertical	3	13	26	46
Pushing Force [N] ^{(2) (3) (4)}		50~118	80~189	156~370	296~707
Speed [mm/s]	to 300 stroke	36~900	24~800	12~400	6~200
	301 to 400 stroke	36~900	24~640	12~320	6~160
	450 to 500 stroke	36~900	24~640	12~320	6~160
Max. acceleration/ deceleration [mm/s ²]	Horizontal	10,000			
	Vertical	5,000			
Pushing speed [mm/s ²] ⁽⁵⁾		35			
Positioning repeatability [mm]		±0.02			
Lost motion [mm] ⁽⁶⁾		0.1 or less			
Screw Lead [mm]		24	16	8	4
Impact/Vibration resistance [m/s ²] ⁽⁷⁾		50 / 20			
Actuation method		Ball screw (EQY*DH) Ball screw + Belt (EQY*H)			
Guide type		Sliding bush (piston rod)			
Operating temperature [°C]		5 to 40			
Operating humidity [% RH]		90 or less (no condensation)			
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%			
Max. Power [W] ^{(8) (9)}		109			
Lock Type ⁽¹⁰⁾		Non magnetizing lock			
Holding force [N]	Horizontal	75	108	216	421
	Vertical				
Power consumption [W] ⁽⁹⁾		5			
Power supply voltage [V]		24 VDC ±10%			

Notes

⁽¹⁾ Horizontal: Use an external guide (external guide friction coefficient: 0.1 or less).

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.

Vertical: Use an external guide (external guide friction coefficient: 0.1 or less) when the rod is directed upward or radial load is applied to the rod. This is 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.

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] or less, vertical: 5000 [mm/s²] or less.

⁽²⁾ Pushing force accuracy is ±20% (F.S.).

⁽³⁾ The setting range for the "Pushing force" is from 25% to 50% (EQY25*H) and 30% to 70% (EQY32*H).

The pushing force setting range varies depending on the duty ratio and pushing speed. Check the "Thrust Conversion Graph" in the catalogue.

⁽⁴⁾ Speed and thrust may 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. (for 15 m: max. 20% reduction)

⁽⁵⁾ "Pushing speed" is the allowable speed for the pushing operation.

When transporting and pushing a workpiece, operate the actuator according to the "vertical load capacity" or less.

⁽⁶⁾ This is a reference value for correcting errors in reciprocating motion.

⁽⁷⁾ Impact resistance: In a drop impact test, no malfunction occurred in the axial direction and perpendicular direction of the feed screw (at the initial state).

Vibration resistance: 45 to 2000 Hz, 1 sweep, no malfunction in the axial direction and perpendicular direction of the feed screw (at the initial state).

⁽⁸⁾ Power indicates the maximum power during operation including the controller.

Use this when selecting the power supply capacity.

⁽⁹⁾ For an actuator with lock, add the power consumption for the lock.

⁽¹⁰⁾ Only applies to actuators supplied with a lock.

2. Specifications (continued)

2.4 Weight [kg]

Series	EQY16 (with In-line motor)					
Stroke	30	50	100	150	200	300
Weight	0.60	0.63	0.76	0.92	1.09	1.20
Lock	0.19					

Series	EQY16 (with Parallel motor)					
Stroke	30	50	100	150	200	300
Weight	0.62	0.64	0.77	0.93	1.10	1.22
Lock	0.19					

Series	EQY25 (with In-line motor)					
Stroke	30	50	100	150	200	300
Weight	1.60	1.67	1.84	2.10	2.28	2.45
Lock	0.31					

Series	EQY25 (with Parallel motor)					
Stroke	30	50	100	150	200	300
Weight	1.74	1.81	1.98	2.24	2.59	2.77
Lock	0.31					

Series	EQY32 (with In-line motor)					
Stroke	30	50	100	150	200	300
Weight	2.55	2.66	2.95	3.23	3.63	4.20
Lock	0.58					

Series	EQY32 (with Parallel motor)					
Stroke	30	50	100	150	200	300
Weight	2.74	2.85	3.14	3.42	3.82	4.39
Lock	0.58					

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

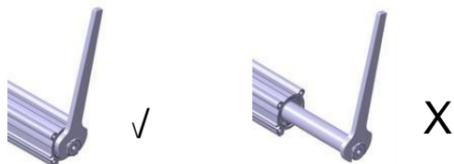
Warning

- 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.
- Keep the flatness of the mounting surface to within 0.1 mm max. 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.
- 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.)	EQY16	EQY25	EQY32
	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.



3.2 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:
 - 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.

3.3 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.

3.4 Mounting

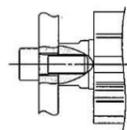
Warning

- 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.

3. Installation (continued)

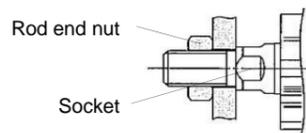
- If an external force above the allowable moment is applied, it may cause looseness in the guide unit, an increase in sliding resistance or other problems.
- Allow sufficient space for maintenance and inspection.
- The electric actuator and its peripheral devices should be installed on a fire-proof 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 40 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



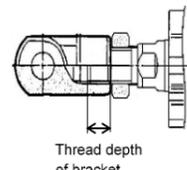
Model	Screw	Max. tightening torque [N.m]	Max. thread length [mm]	Rod end width across flats [mm]
EQY16	M5 x 0.8	3.0 ±10%	10	14
EQY25	M8 x 1.25	12.5 ±10%	13	17
EQY32	M8 x 1.25	12.5 ±10%	13	22

Work fixing / Rod end male thread



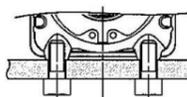
Model	Screw	Max. tightening torque [N.m]	Max. thread length [mm]	Rod end width across flats [mm]
EQY16	M8 x 1.25	12.5 ±10%	12	14
EQY25	M14 x 1.5	50.0 ±10%	20.5	17
EQY32	M14 x 1.5	50.0 ±10%	20.5	22

Model	Rod end nut		Thread depth of bracket [mm]
	Width across flats [mm]	Length [mm]	
EQY16	13	5	5 min.
EQY25	22	8	8 min.
EQY32	22	8	8 min.



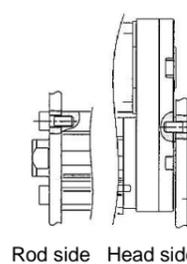
Actuator Mounting / bottom tapped style

Model	Screw	Max. tightening torque [N.m]	Max. screw depth [mm]
EQY16	M4 x 0.7	1.5 ±10%	5.5
EQY25	M5 x 0.8	3.0 ±10%	6.5
EQY32	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]
EQY16	M4 x 0.7	1.5 ±10%	7.0
EQY25	M5 x 0.8	3.0 ±10%	7.0
EQY32	M6 x 1.0	5.2 ±10%	7.0



4. Wiring

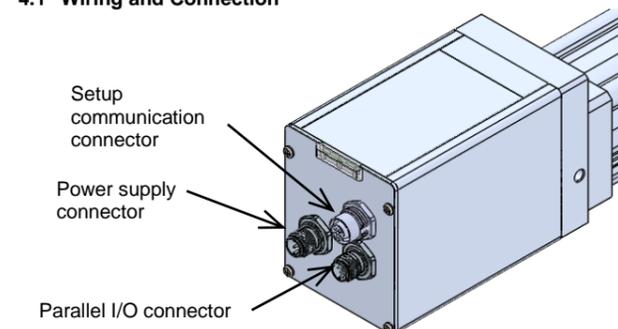
Warning

- 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 +

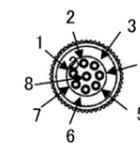
(View on cable connector)

4.3 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).

4. Wiring (continued)

- 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

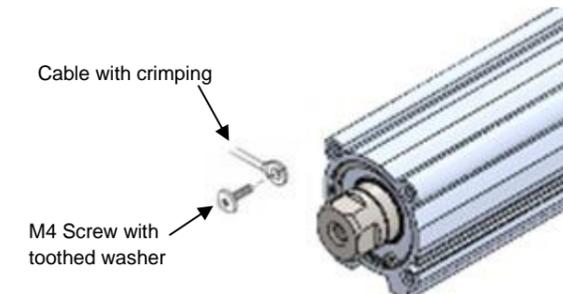
- NPN and PNP specifications are available for this electric actuator (the parallel I/O type is different between the NPN and PNP type).
- The parallel I/O is of non-isolated specification.
- Use the electric actuator power supply 24 VDC for the power supply of both parallel input and output. (Use the 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). Wire size 2 mm² minimum.
- 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.



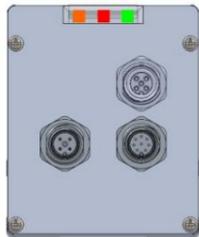
5. How to Order

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

1. Lubricant condition on moving parts.
2. 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 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> (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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