

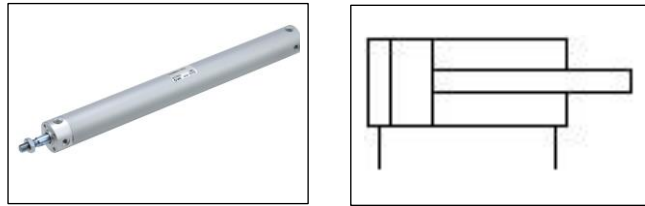


ORIGINAL INSTRUCTIONS



Refer to Declaration of Conformity for relevant Directives

Instruction Manual
Air Cylinder
Series 55-CG1-Z



The intended use of this actuator is to convert the energy from compressed air into mechanical motion.

II 2GD c 95°C (T5) Ta -10°C to 40°C
115°C (T4) Ta 40°C to 60°C

Marking description	Group II, Category 2
Suitable for Gas and Dust environment	Type of protection "constructional safety"
The maximum surface temperature is 95°C and the temperature class is T5 when the ambient temperature is: -10°C to 40°C	The maximum surface temperature is 115°C and the temperature class is T4 when the ambient temperature is 40°C to 60°C

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.

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- To ensure safety of personnel and equipment the safety instructions in this manual must be observed, along with other relevant safety practices.

	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

- **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
- Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
- **Only personnel with appropriate training should operate machinery and equipment.**
The product specified here may become unsafe if handled incorrectly.
The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
- **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
1) The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2) When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3) Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
- **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**

- 1) Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
- 2) Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustions and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specification described in the product catalogue.
- 3) An application which could have negative effects on people, property, or animals requiring special safety analysis.
- 4) Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

- **Always ensure compliance with relevant safety laws and standards.**
All electrical work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

Caution

- **The product is provided for use in manufacturing industries.**
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

2 Specifications

2.1 Specification

Refer to the operation manual for this product

Fluid	Air				
Max. operating pressure	1.0 MPa				
Min. operating pressure	0.05 MPa				
Ambient and fluid temperature	-10 to 60°C				
Lubrication	Not required (Non Lube)				
Operating piston speed	Ø20-Ø63	50 to 1000 mm/ s			
	Ø80-Ø100	50 to 700 mm/s			
Cushion	Rubber bumper		Air cushion		
		Male rod end	Female rod end	Male rod end	Female rod end
Allowable kinetic energy (J)	Ø20	0.28	0.11	R: 0.35 H: 0.42	0.11
	Ø25	0.41	0.18	R: 0.56 H: 0.65	0.18
	Ø32	0.66	0.29	0.91	0.29
	Ø40	1.20	0.52	1.8	0.52
	Ø50	2.00	0.91	3.40	0.91
	Ø63	3.40	1.54	4.90	1.54
	Ø80	5.90	2.71	11.80	2.71
Ø100	9.90	4.54	16.70	4.54	
Explosive atmosphere	Gas and Dust				
Zone	1, 21, 2 and 22				

R: Rod side H: Head side

Do not exceed the kinetic energy value shown in the table above.

2.2 Production batch code

The production batch code printed on the label indicates the month and year of production as per the following table:

Year	2016	2017	2018	...	2026	2027	2028	...
Month	U	V	W	...	E	F	G	...
Jan	O	UO	VO	WO	...	EO	FO	GO
Feb	P	UP	VP	WP	...	EP	FP	GP
Mar	Q	UQ	VQ	WQ	...	EQ	FQ	GQ
Apr	R	UR	VR	WR	...	ER	FR	GR
May	S	US	VS	WS	...	ES	FS	GS
Jun	T	UT	VT	WT	...	ET	FT	GT
Jul	U	UU	VU	WU	...	EU	FU	GU
Aug	V	UV	VV	WV	...	EV	FV	GV
Sep	W	UW	VW	WW	...	EW	FW	GW
Oct	X	UX	VX	WX	...	EX	FX	GX
Nov	Y	UY	VY	WY	...	EY	FY	GY
Dec	Z	UZ	VZ	WZ	...	EZ	FZ	GZ

3 Installation

3.1 Installation

Warning

Do not install the product unless the safety instructions have been read and understood.

3.2 Environment

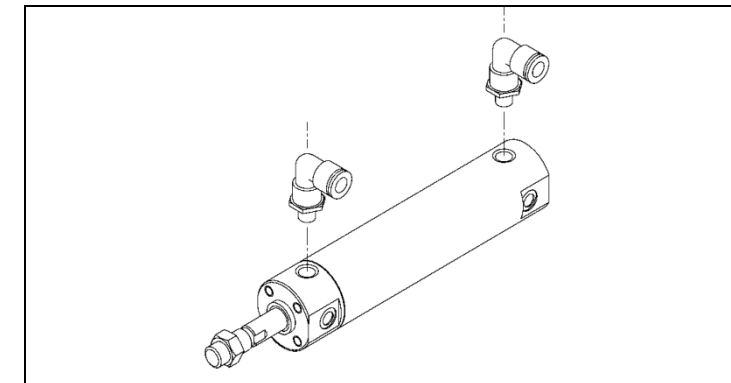
Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere, except within the specified rating.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact. Check the product specifications.
- Do not mount in a location exposed to radiant heat.
- Do not use in case of heavy dusty environment where dust can penetrate into the cylinder and dry the grease.
- Do not use in wet environments.

3.3 Piping

Caution

- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.



Port size		Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
Bore	Thread type	Rc 1/8			Rc 1/4		Rc 3/8	Rc 1/2	
		NPT 1/8			NPT 1/4		NPT 3/8	NPT 1/2	
Rubber bumper	TN	M5 x 0.8			G 1/8	G 1/4	G 3/8	G 1/2	
	TF	M5 x 0.8			Rc 1/8	Rc 1/4	Rc 3/8	Rc 1/2	
Air Cushion	TN	N/A		NPT 1/8	NPT 1/4	NPT 3/8	NPT 1/2		
	TF	N/A		G 1/8	G 1/4	G 3/8	G 1/2		

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, use turbine oil Class 1 (no additive), ISO VG32. Once lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacturing will be washed away.

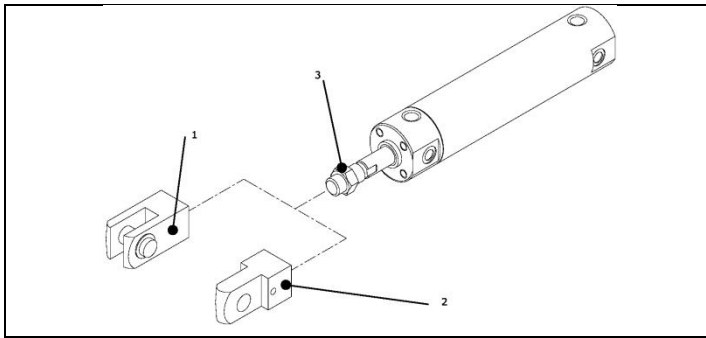
3.5 Electrical connection

Warning

- Provide a grounding connection to the actuator to avoid any spark arising from potential differences

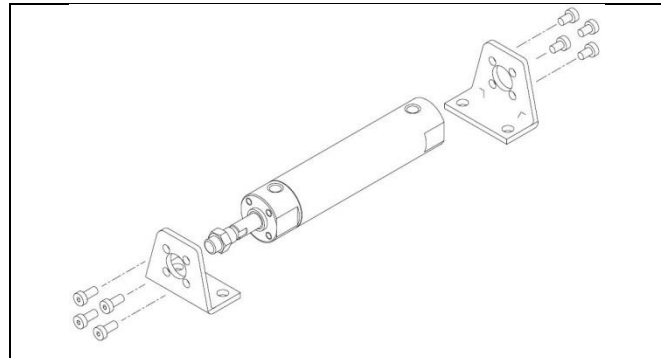
3.6 Mounting accessories

Rod end accessories

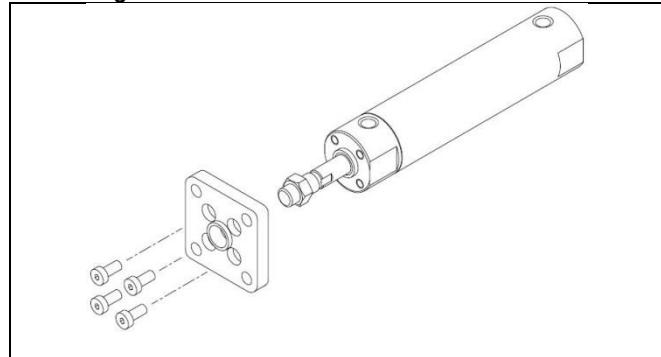


1	Double knuckle joint	2	Single knuckle joint
3	Rod end nut		

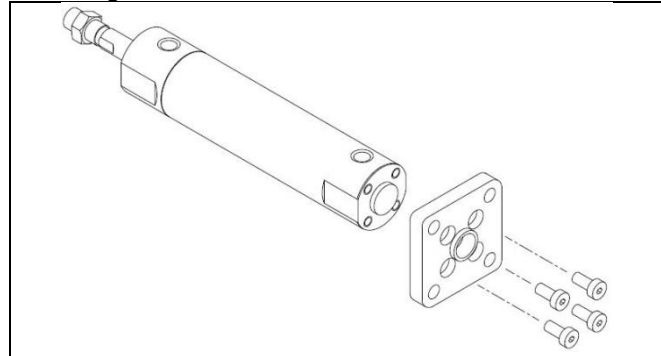
- Mounting procedure:
 - Screw the nut (3) loosely onto the rod end thread.
 - Screw the accessory (1 or 2) onto the rod end thread.
 - Tighten the nut against the accessory to fix it in place.
- **Axial Foot**



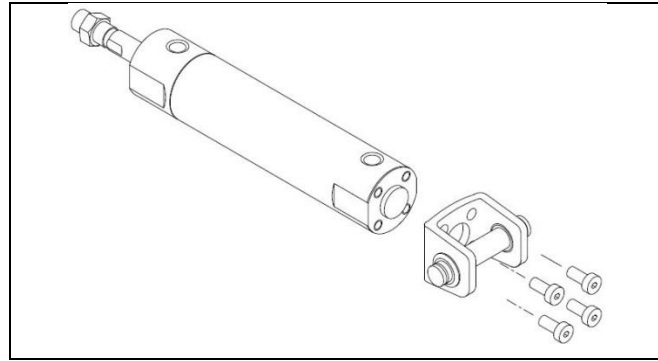
Front Flange



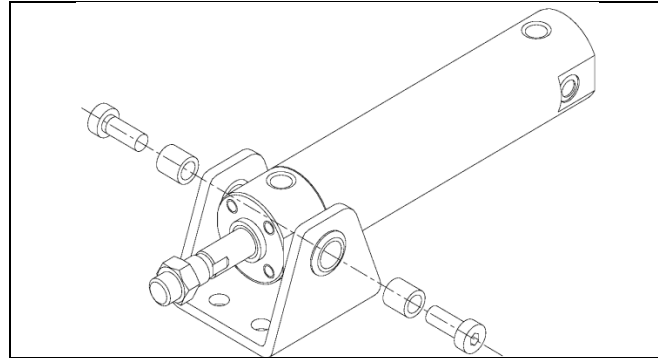
Rear Flange



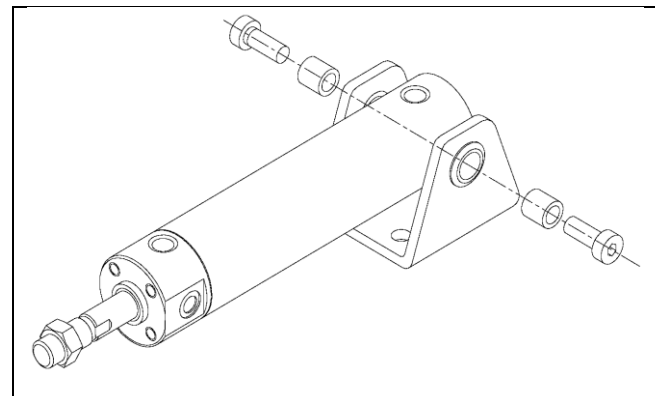
Headside Clevis



Front Trunnion



Rear Trunnion



Tightening torque for mounting accessories on the cylinder (Nm) ±10%		
Bore size (mm)	Foot, Flange, Clevis	Trunnion
Ø20	1.5	2.2
Ø25	2.9	3.6
Ø32	2.9	9.0
Ø40	4.9	18.1
Ø50	11.8	31.9
Ø63	24.5	52.0
Ø80	24.5	-
Ø100	42.2	-

4 Settings

4.1 Air cushion adjustment

For air-cushion adjustment, tighten or loosen the cushion valve using an allen key for more information see the table below.

Bore size (mm)	Cushion valve number of rotations	Hexagon wrench nominal size
Ø20	2	1.5
Ø25	3	
Ø32	4	
Ø40	5	
Ø50	3	3
Ø63	4.5	
Ø80	5	
Ø100	5	4

- Do not operate the cushion valve in the fully closed or fully opened state. Using it in the fully closed state will cause the cushion seal to be damaged. Using it in the fully opened state will cause the piston rod assembly or the cover to be damaged.
- Be certain to activate the air cushion at the stroke end. When the cylinder is used with the cushion valve in a fully open position, a suitable external device should be installed to absorb all of the kinetic energy of the mechanism, of which the actuator is part, before reaching each end of stroke. If this is not done, the piston rod assembly will be damaged.

5 How to Order

Refer to the operation manual for this product.

6 Outline Dimensions (mm)

Refer to the operation manual for this product.

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, compressed air can be dangerous. Maintenance of 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 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 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.
- Periodically check the rod surface, the rod seal and the cylinder tube external surface. Any damage or rust appearing on these components could increase friction and lead to dangerous conditions. Replace the whole actuator if any of these conditions should appear.
- Replace the seals, when air leakage is above allowable value given in the table below.

Internal leakage	10 cm ³ /min (ANR)
External leakage	5 cm ³ /min (ANR)
- Do not allow dust to form deposits on the outer surface of the actuator and mounting bracket.
- Periodically check for presence of lubrication.

7.2 Seal replacement

Warning

- Only use SMC seal kits as listed in the table below.

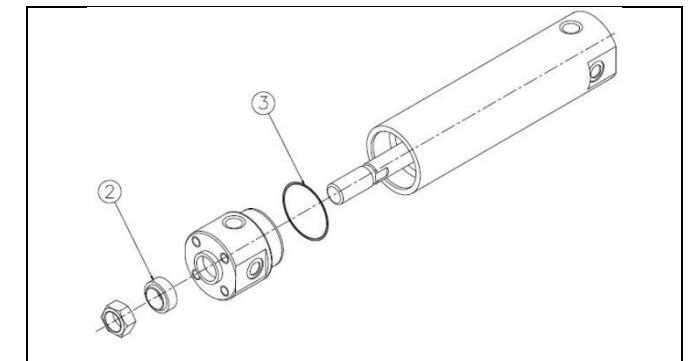
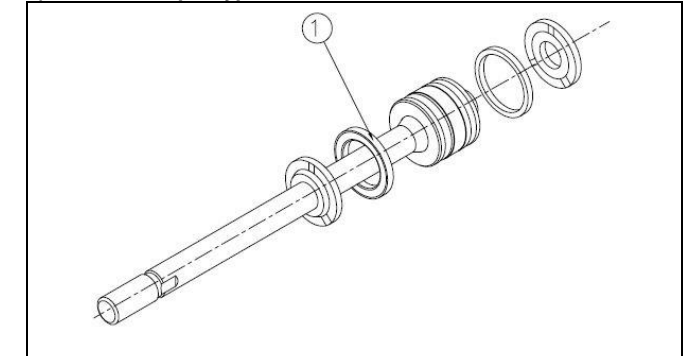
Bore size (mm)	Seal kit number
Ø20	CG1N20Z-PS
Ø25	CG1N25Z-PS
Ø32	CG1N32Z-PS
Ø40	CG1N40Z-PS

Note: For -XC10 version, 2 seals kits are required per cylinder. Each kit contains rod seal, piston seal and tube gaskets.

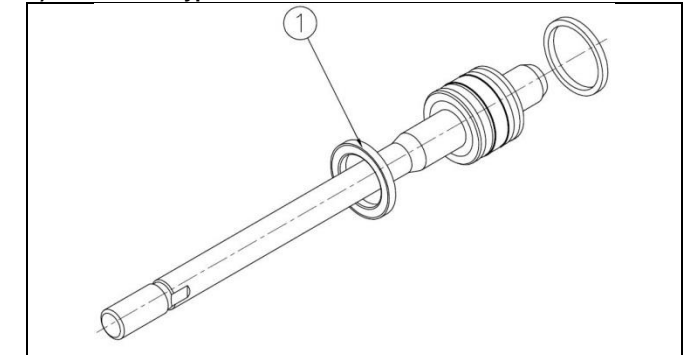
7.3 Disassembly procedure

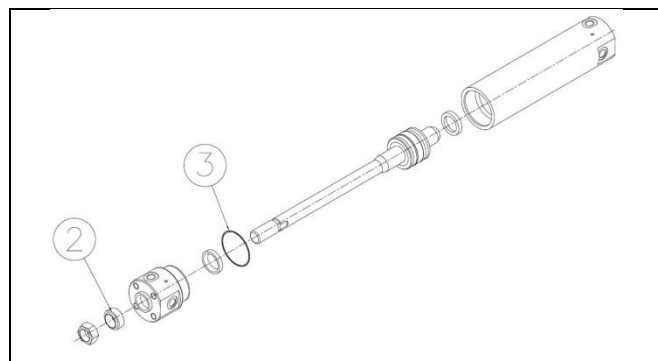
- Use the following procedure for disassembling the cylinder and replacing the seals:
 - Gently hold tube cover at spanner flats with a vice, loosen the rod cover by applying a spanner or a monkey wrench on the spanner flats to take it off.
 - Disassemble the cylinder, remove the old grease and place all the parts on a clean cloth in a clean environment.
 - On reassembling, tighten the rod cover a little further (0° to 2°) than where it was before.

a) Rubber bumper type



b) Air cushion type





1	Piston seal	3	Tube gasket
2	Rod seal		

7.4 Lubrication procedure

- Apply lubricant to:
 - rod seal. rod seal groove on the rod cover.
 - piston outer surface.
 - piston seal groove.
 - Piston seal inner and outer surface
 - Tube gaskets
 - Cushion seals
 - Cushion seal grooves on the covers
 - Piston rod surface
 - Tube inner surface

- Lubricate the parts using the following SMC grease packs:

Product	Grease pack number	Weight (g)
All cylinders	GR-S-010	10
except -XC85	GR-S-020	20
-XC85 cylinders	GR-H-010	10

- The amount of lubricant, to be applied is given in the following table:

Bore size (mm)	Stroke up to 100 mm (g)	For each additional 50mm (g)
Ø20	2	0.5
Ø25 , Ø32	3	0.5
Ø40	3 ~ 4	1

Check for cylinder smooth movement and for air leakage.

8 Limitations of Use

8.1 Limited warranty and Disclaimer/Compliance Requirements

- The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements". Read and accept them before using the product.

- Limited warranty and Disclaimer**

1) The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first⁽¹⁾. Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2) For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3) Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

⁽¹⁾ Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

- Compliance Requirements**

1) The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2) The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Caution

- SMC products are not intended for use as instruments for legal metrology.**

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.

Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Danger

- Do not exceed any of the specifications listed in section 2 of this document or the specific product catalogue.
- Air equipment has standard air leakage within certain limits. Do not use the equipment when the air itself can lead to explosion.
- Do not use this equipment where vibration could lead to equipment failure. Contact SMC for this specific situation.
- External impacts on the cylinder body could result in spark and/or cylinder damage. Avoid any application where foreign objects can hit the cylinder. In such situations install a suitable guard to prevent such impacts.
- Do not install or use this actuator in applications where the piston rod can impact foreign objects.
- Avoid applications where the piston rod end and the application joining parts create a possible ignition source.
- Use only ATEX certified auto switches. Order them separately.
- Do not use in the presence of strong magnetic fields that could generate a surface temperature higher than the value given for the temperature class.

9 Contacts

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