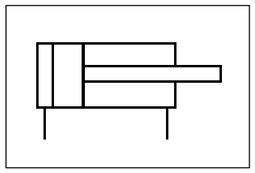
ORIGINAL INSTRUCTIONS

Refer to Declaration of Conformity for relevant Directives

Instruction Manual
Compact Cylinder
55-CQ2-Z Series



II 2GD	Ex h IIC T5/T4 Gb	-10°C ≤ Ta ≤ +60°C
	Ex h IIIC T92°C/T112°C Db	

Product marking shown above is for the standard product.

ATEX Marking Description:

Ex	Specific Marking for Explosion Protection
II	Equipment Group
2	Equipment Category
GD	Environment (Gas/Dust)
Ex h	General Protection Level Symbols
IIC	Gas Sub-Division
IIIC	Dust Sub-Division
T	Temp. Classification
Gb/Db	Equipment Protection Level
X	Special Conditions of Use
Ta	Ambient Temperature Range

The intended use of this ATEX Category 2 actuator is to convert the potential energy provided by compressed air into a force which causes mechanical linear motion.

Certifcate Number:	SMC19.0050 X

Note 1: The X at the end of the certificate number represents that this product is subject to “Special Conditions of Use”, please see Section 2.3.

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 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.

2 Specifications

This product is certified to ATEX Category 2GD and therefore is suitable for use in Zones 1, 2, 21 and 22 only.

2.1 Product Specifications:

Refer to the operation manual for this product;

2.1.1 Standard Product:

Fluid		Air	
Max. Operating Pressure	Ø12 ~ Ø160	1.0 MPa	
	Ø180 ~ Ø200	0.7 MPa	
Min. Operating Pressure	Ø12 ~ Ø16	0.07 MPa	
	Ø20 ~ Ø200	0.05 MPa	
Ambient & Fluid Temperature		-10°C to +60°C	
Lubrication		Not Required	
Operating Piston Speed	Ø12 ~ Ø160	50 to 500 mm/s	
	Ø180 & Ø200	20 to 400 mm/s	
Cushion	Ø12 ~ Ø100	None or Rubber Bumper	
	Ø125 ~ Ø200	Rubber Bumper	
Allowable Kinetic Energy		No Cushion	Rubber Bumper
	Ø 12	0.022 J	0.043 J
	Ø 16	0.038 J	0.075 J
	Ø 20	0.055 J	0.110 J
	Ø 25	0.090 J	0.180 J
	Ø 32	0.150 J	0.290 J
	Ø 40	0.260 J	0.520 J
	Ø 50	0.460 J	0.910 J
	Ø 63	0.770 J	1.540 J
	Ø 80	1.360 J	2.710 J
	Ø 100	2.270 J	4.540 J
	Ø 125	N/A	7.400 J
	Ø 140	N/A	9.800 J
	Ø 160	N/A	12.400 J
	Ø 180	N/A	12.400 J
	Ø 200	N/A	12.400 J

2.2 Production Batch Code:

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

Production Batch Codes									
Month \ Year		2017	2018	2019	…	2021	2022	2023	…
		V	W	X	…	Z	A	B	…
Jan	O	Vo	Wo	Xo	…	Zo	Ao	Bo	…
Feb	P	VP	WP	XP	…	ZP	AP	BP	…
Mar	Q	VQ	WQ	XQ	…	ZQ	AQ	BQ	…
Apr	R	VR	WR	XR	…	ZR	AR	BR	…
May	S	VS	WS	XS	…	ZS	AS	BS	…
Jun	T	VT	WT	XT	…	ZT	AT	BT	…
Jul	U	VU	WU	XU	…	ZU	AU	BU	…
Aug	V	VV	WV	XV	…	ZV	AV	BV	…
Sep	W	VW	WW	XW	…	ZW	AW	BW	…
Oct	X	VX	WX	XX	…	ZX	AX	BX	…
Nov	Y	Vy	Wy	Xy	…	Zy	Ay	By	…
Dec	Z	VZ	WZ	XZ	…	ZZ	AZ	BZ	…

2.3 Special Conditions of Use:

- Products are suitable for sub-divisions IIC & IIIC.
- Products are suitable for Zones 1, 2, 21 & 22 only.

2.3.1 Temperature Marking:

2.3.1.1 Standard Product:

- In the normal ambient temperature range (-10°C to +40°C) the product is rated to temperature class T5 and has a maximum surface temperature of 92°C.
- In the special ambient temperature range (+40°C to +60°C) the product is rated to temperature class T4 and has a maximum surface temperature of 112°C.

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Do not twist or bend the cylinder, or mount the product when subject to tension.
- Do not use in an application where the product is stopped mid-stroke, via an external stop.
- Do not use where cylinders are being synchronised to move a single load.
- In order to install the product, use one of the brackets available found in the standard product catalogue;

Mounting Bracket [Part Number]	Sketch		Mounting Bracket [Part Number]	Sketch
Foot [CQ-Lxxx]			Compact Foot [CQ-LCxxx]	
Front Flange [CQ-Fxxx]			Head Flange [CQ-Fxxx]	
Double Clevis [CQ-Dxxx]				

Note 2: The “xxx” represents the Bore Size (e.g. Ø40 is 040), see catalogue for more details.

- When replacing brackets use the hexagon wrench and torques shown below;

Bore [mm]	Bolts	Width Across Flats [mm]	Tightening Torque [N.m]
Ø 12 & Ø 16	CQ-M3 x **L	2.5	1.43 ~ 2.55
Ø 20 ~ Ø 40	CQ-M5 x **L	4.0	8.98 ~ 12.00
Ø 50	CQ-M6 x **L	5	11.40 ~ 22.40
Ø 63	CQ-M8 x **L	6	25.00 ~ 44.90
Ø 80 & Ø 100	CQ-M10 x **L	8	43.90 ~ 78.50
Ø 125 ~ Ø 200	-	-	-

*** - Refer to the product catalogue for bolt length.*

Rod End Accessories	Sketch	Series
Rod End Nut		NT
Joint		YU
Double Knuckle Joint		Y-G
Single Knuckle Joint		I-G

Note 3: See the product catalogue for the exact code to order which relates to the bore size of your product.

- Tighten these accessories with a suitable wrench using the flat surfaces provided. Ensure that they are tightened against the rod end nut to prevent the accessory coming loose during operation.

Bore [mm]	Width Across Flats [mm]		
	Floating Joint	Double Knuckle Joint	Single Knuckle Joint
Ø 12	10	10	10
Ø 16	10	12	12
Ø 20	13	16	16
Ø 25	17	20	20
Ø 32 & Ø 40	22	22	22
Ø 50 & Ø 63	27	28	28
Ø 80	32	38	38
Ø 100	41	44	44
Ø 125 & Ø 140	46	-	-
Ø 160 ~ Ø 200	55	-	-

3.2 Environment

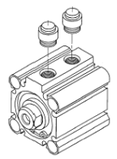
Warning

- Do not use in an environment where corrosive gases, chemicals, water, 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 in excess of the product’s specifications.
- Do not use in a place subject to heavy vibration and/or shock.
- Do not use in wet environments, where water can remove the presence of the lubrication.
- Do not use in case of heavy dusty environments where dust can penetrate into the cylinder and dry the grease.
- Do not allow dust layers to build up on the cylinder surface and insulate the product.

3.3 Piping

Caution

- Before connecting 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 thread* exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.



CQ2-Z [Nil]		CQ2-Z [TF option]	
Bore [mm]	Port Size	Bore [mm]	Port Size
Ø 12 ~ Ø 25	M5 x 0.8	Ø 32	M5 x 0.8 or G 1/8 *Note 4*
Ø 32	M5 x 0.8 or Rc 1/8 *Note 4*	Ø 40	G 1/8
Ø 40	Rc 1/8	Ø 50 & Ø 63	G 1/4
Ø 50 & Ø 63	Rc 1/4	Ø 80 ~ Ø 160	G 3/8
Ø 80 ~ Ø 160	Rc 3/8	Ø180 ~ Ø200	G 1/2
Ø180 & Ø200	Rc 1/2		

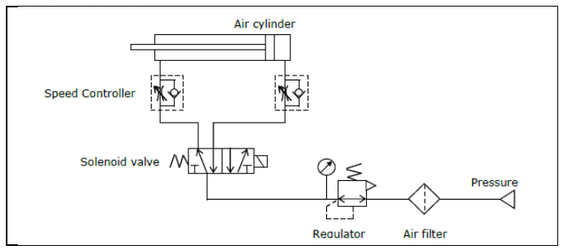
Note 4: In the case without autoswitch, M5 x 0.8 is used for 5mm stroke only.

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.

3.5 Basic Circuit



- Plugging one of the ports on the actuator is considered a non-intended use, and could relate to an increase in maximum surface temperature above what the product specification declares.

3.6 Electrical Connection

- The product should be grounded by the piston rod and the body in order to create an electrically conductive path to the system/application.
- Ground the product in accordance with applicable regulations.
- Do not pass an electrical current through the product.

4 Settings

Refer to the standard product operation manual for settings.

5 How to Order

Refer to the standard product catalogue for 'How to Order'.

6 Outline Dimensions (mm)

Refer to the standard product catalogue for general 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, 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.
- Do not use a product which looks or contains damage, this will invalidate the certification. If damage is seen, please replace the product immediately.
- Periodically check the product for any damage or rust appearing. This could result in an increase in friction and lead to dangerous conditions. Replace the whole actuator if any of these conditions appear.
- Periodically check the condition of the rod seal and for the presence of lubrication, where possible. If these areas appear to be dry, please follow the lubrication procedure.
- Replace the seals, when air leakage is above the allowable value given in the table below;

	Allowable Leakage
Internal Leakage	10 cm^3 / min (ANR)
External Leakage	5 cm^3 / min (ANR)

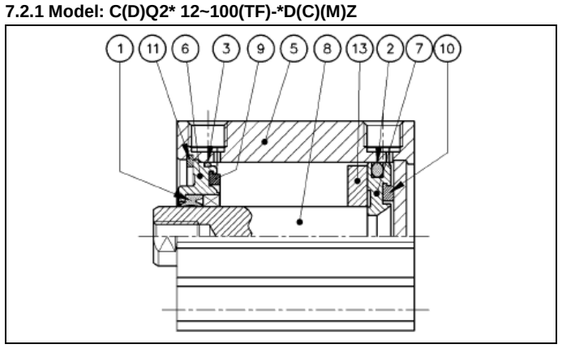
7.2 Disassembly Procedure

- Disassemble the cylinder, remove the old grease and place all the parts on a clean cloth in a clean environment. Use a set of snap ring pliers to remove the snap ring. Remove the old tube gaskets, rod seal, piston seal, wear ring using a fine screwdriver where necessary.

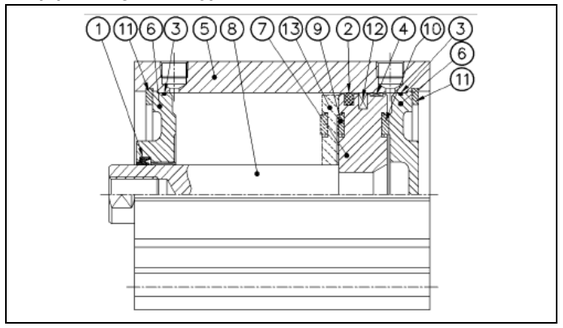
Caution

- If a magnet is present on the piston do not remove it. The magnet is not replaceable.

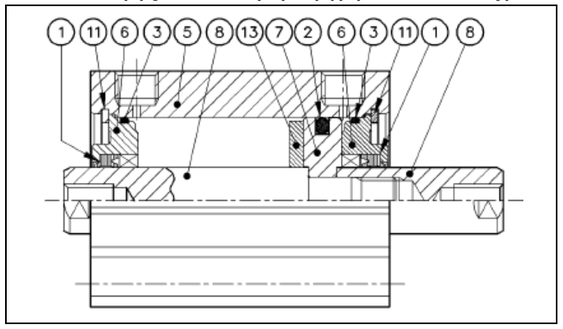
7.2.1 Model: C(D)Q2* 12~100(TF)-*D(C)(M)Z



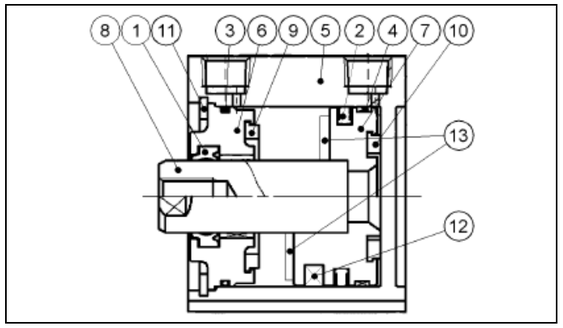
7.2.2 Models: C(D)Q2B 125~200(TF)-*DC(M)Z, C(D)Q2* 32~100(TF)-*DC(M)Z / Long Stroke type



7.2.3 Model: C(D)Q2W* 12~200(TF)-*D(C)(M)Z / Double Rod type



7.2.4 Model: C(D)Q2BS 32~100(TF)-*DC(M) / Anti-Lateral Load type



1	Rod Seal	8	Piston Rod
2	Piston Seal	9	Bumper A
3	Tube Gasket	10	Bumper B
4	Wear Ring	11	Snap Ring
5	Cylinder Tube	12	Magnet
6	Collar Assembly	13	Spacer (when fitted)
7	Piston		

7.3 Seal Replacement Part Numbers

Warning

Only use SMC seal kits as listed in the table below;

Description	Applicable Bore [mm]	Part Number
Standard Single Rod	Ø 12 ~ Ø 200	CQ2B*-PS
Anti-Lateral Load Type	Ø 32 ~ Ø 100	CQ2B*-PS
Long Stroke Type	Ø 32 ~ Ø 100	CQ2A*-L-PS
Standard Double Rod Type	Ø 12 ~ Ø 100	CQ2WB*-PS

Note 4: The * represents the Bore Size (e.g. Ø50 is 50, Ø100 is 100).

7.4 Lubrication Procedure

- Apply lubricant to:
  - The rod seal and the rod seal groove on the rod cover.
  - The piston outer surface and piston seal groove.
  - The piston seal and tube gaskets.
  - The piston rod surface and cylinder tube internal surface.

- Lubricate the parts with the grease packs provided with the seal kit. For additional grease use the grease pack listed below.

Product	Grease Pack Number	Weight [g]
Standard	GR-S-010	10
	GR-S-020	20
-XC85	GR-H-010	10

The amount of lubricant to be applied is listed in the following table.

Bore [mm]	Required amount of grease up to minimum stroke [g]		For each additional 5mm Stroke [g]
Ø 12	5 mm Stroke	0.07	0.010
Ø 16		0.10	0.010
Ø 20		0.12	0.015
Ø 25		0.18	0.020
Ø 32		0.25	0.035
Ø 40		0.36	0.045
Ø 50	10 mm Stroke	0.67	0.055
Ø 63		0.77	0.070
Ø 80		1.14	0.090
Ø 100		1.51	0.110
Ø 125		2.35	0.170
Ø 140		2.95	0.220
Ø 160		3.87	0.280
Ø 180		4.89	0.360
Ø 200		6.04	0.440

7.5 Reassembly Procedure

- Inserting the collar assembly into the piston rod assembly.

Apply grease to the end of the piston rod, especially on the 30° chamfer and on the flats. Insert with care the piston rod into the collar assembly to prevent any damage to the rod seal.

- Inserting piston rod assembly and collar assembly into the cylinder tube.

Insert slowly with care the piston assembly and the collar assembly into the cylinder tube to prevent any damage of the piston seal and tube gasket.

- Installing snap ring.

Use appropriate pliers (tool for C-shape snap ring) for installation.

Caution

When installing the snap ring, be aware that the snap ring may come off the pliers and could result in operator injury or equipment damage. Also make sure ring is firmly seated in ring groove.

- Checking assembly.

Make sure that no air is leaking from packing seals and that the cylinder operates smoothly at minimum operating pressure. Check for cylinder smooth movement and for air leakage.

8 Limitations of Use

8.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products located on www.smcworld.com .

8.2 Obligations of the end-user

- Ensure the product is used within the specification outlined.
- Ensure that the maintenance periods are suitable for the application.
- Ensure any cleaning processes to remove dust layers are made with the atmosphere in mind (e.g. using a damp cloth to avoid static build up).
- Ensure that the application does not introduce additional hazards by mounting, loading, impacts or other methods.
- Ensure that there is sufficient ventilation and air circulation around the product.
- If the product is subject to direct heat sources in the application, they should be shielded so that the actuator temperature stays within the stated operating range.

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.

Danger

- Do not exceed any of the specifications listed in Section 2 of this document as this will be deemed improper use.
- Air equipment has an air leakage during operation within certain limits. Do not use this equipment when the air itself introduces additional hazards and could lead to an explosion.
- Use only ATEX certified auto switches. These should be ordered separately.
- Do not use this product in the presence of strong magnetic fields that could generate a surface temperature higher than the product specification.
- Avoid applications where the piston rod end and the adjoining part in the application can create a possible ignition source.
- Do not install or use these actuators where there is the possibility for the piston rod to impact foreign objects.
- In the event of damage or failure of any parts located in the vicinity where this product has been installed, it is the responsibility of the user to determine whether or not this has compromised the safety and condition of this product and/or the application.
- External impact on the cylinder body could result in a spark and/or cylinder damage. Avoid any application where foreign objects can hit or impact the cylinder. In such situations the application should install a suitable guard to prevent this occurrence.
- Do not use this equipment where vibration could lead to failure.

9 Contacts

Refer to Declaration of Conformity and www.smcworld.com for contacts.

SMC Corporation

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