



Instructions and Maintenance Manual

Air Cylinder

Series 55-(E)CQ2



II 2GD c 85°C (T6) Ta -10°C to 40°C
105°C (T4) Ta 40°C to 60°C

Read this manual before using this product

- The information within this document is to be used by pneumatically trained personnel only.
- For future reference, please keep manual in a safe place.
- This manual should be read in conjunction with the current catalogue.

Marking description		
II 2GD c	85°C (T6) 105°C (T4)	Ta -10°C to 40°C Ta 40°C to 60°C
Group II		
Category 2		
Suitable for Dust and Gas environment		
Type of protection "constructional safety"		
Max surface temperature 85°C and temperature class T6 when ambient temperature is from -10°C to 40°C		
Max surface temperature 105°C and temperature class T4 when ambient temperature is from 40°C to 60°C		

1 Safety Recommendation

1.1 General recommendation

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO4414 (Note1), JIS B 8370 (Note2) and other safety practices.

Note 1: ISO 4414: Pneumatic fluid power - Recommendations for the application of equipment to transmission and control systems. Note 2: JIS B 8370: Pneumatic system axiom.

⚠ DANGER	In extreme conditions, there is a possibility of serious injury or loss of life.
⚠ WARNING	If instructions are not followed there is a possibility of serious injury or loss of life.
⚠ CAUTION	If instructions are not followed there is a possibility of injury or equipment damage.

⚠ WARNING

- The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here can be used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet specific requirements.

- Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced personnel.

- Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.

2) When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.

3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Supply air into the system gradually to create back pressure, i.e. incorporate a soft-start valve).

- Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions:

1) Conditions and environments beyond the given specifications, or if the product is to be used outdoors.

2) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.

3) An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

1.1 Conformity to standard

This product is certified to and complies with the following standards:

- Directive 94/9/EC
 - EN 13463-1:2001
- Non-electrical equipment for potentially explosive atmospheres
Part 1: Basic method and requirements

2 Specifications

Fluid		Air	
Max. operating pressure	Ø 12-Ø 160 Ø 180-Ø 200	1.0 MPa 0.7 MPa	
Min. operating pressure	Ø 12-Ø 16 Ø 20-Ø 200	0.07 MPa 0.05 MPa	
Ambient and fluid temperature		-10 to 60 °C	
Lubrication		Not required	
Operating piston speed	Ø 12-Ø 160 Ø 180-Ø 200	50 to 500 mm/s 20 to 400 mm/s	
Cushion	Ø 12-Ø 100 Ø 125-Ø 200	No cushion N/A	Rubber cushion
	Allowable kinetic energy	Ø 12 Ø 16 Ø 20 Ø 25 Ø 32 Ø 40 Ø 50 Ø 63 Ø 80 Ø 100 Ø 125 Ø 140 Ø 160 Ø 180 Ø 200	0.022 J 0.038 J 0.055 J 0.09 J 0.15 J 0.26 J 0.46 J 0.77 J 1.36 J 2.27 J - - - - -
Explosive atmosphere		Gas and Dust	
Zone		1, 21, 2 and 22	

⚠ WARNING

- In case the kinetic energy exceeds the value given in the table, please contact SMC.
- Do not use in case of heavy dusty environment where dust can penetrate into the cylinder and dry the grease.

2.1 Production batch code

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

Production batch codes		Year							
		2003	2004	2005	...	2021	2022	2023	...
Month		H	I	J	...	Z	A	B	...
Jan	O	HO	IO	JO	...	ZO	AO	BO	...
Feb	P	HP	IP	JP	...	ZP	AP	BP	...
Mar	Q	HQ	IQ	JQ	...	ZQ	AQ	BQ	...
Apr	R	HR	IR	JR	...	ZR	AR	BR	...
May	S	HS	IS	JS	...	ZS	AS	BS	...
Jun	T	HT	IT	JT	...	ZT	AT	BT	...
Jul	U	HU	IU	JU	...	ZU	AU	BU	...
Aug	V	HV	IV	JV	...	ZV	AV	BV	...
Sep	W	HW	IW	JW	...	ZW	AW	BW	...
Oct	X	HX	IX	JX	...	ZX	AX	BX	...
Nov	Y	HY	IY	JY	...	ZY	AY	BY	...
Dec	Z	HZ	IZ	JZ	...	ZZ	AZ	BZ	...

3 Installation

3.1 Installation

⚠ WARNING

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

3.2 Environment

⚠ WARNING

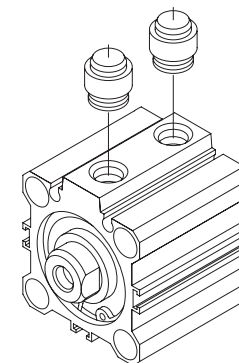
- Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
- Do not use in an explosive atmosphere, except within the specified rating.
- The product should not be exposed to prolonged sunlight such to generate surface temperature higher than the value given for temperature class. Use a protective cover.
- Do not mount the product in a location where it is subject to strong vibrations and/or shock such to generate surface temperature higher than the value given for temperature class. Check the product specifications.
- Do not mount the product in a location exposed to radiant heat.

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.

Model	Port size
55-CQ2*12	M5 x 0.8
55-CQ2*16	
55-CQ2*20	
55-CQ2*25	
55-CQ2*32	M5x0.8 – Rc1/8 (1)
55-CQ2*40	Rc 1/8
55-CQ2*50	Rc 1/4
55-CQ2*63	
55-CQ2*80	
55-CQ2*100	
55-CQ2*125	Rc 3/8
55-CQ2*140	
55-CQ2*160	
55-CQ2*180	
55-CQ2*200	Rc 1/2
55-ECQ2*32	
55-ECQ2*40	
55-ECQ2*50	
55-ECQ2*63	G 1/8
55-ECQ2*80	
55-ECQ2*100	
55-ECQ2B125	
55-ECQ2B140	G 1/4
55-ECQ2B160	
55-ECQ2B180	
55-ECQ2B200	
	G 3/8
	G 1/2



Note 1) In the case without autoswitch, M5x0.8 is used for 5 stroke only.

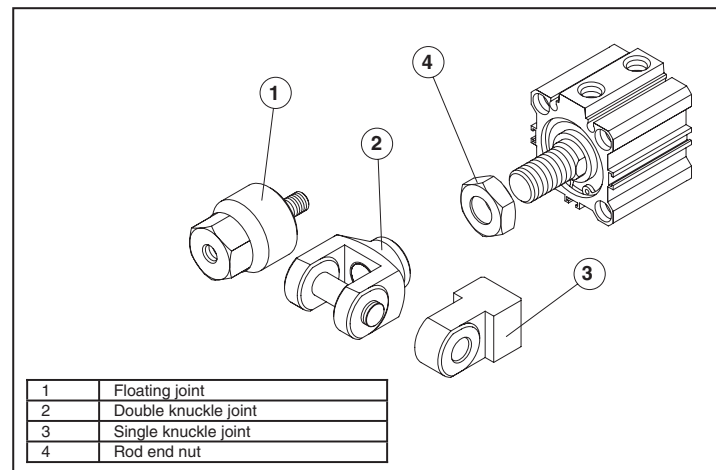
3.4 Electrical connection

⚠ WARNING

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

3.5 Mounting accessories

Rod end accessories



Mounting procedure:

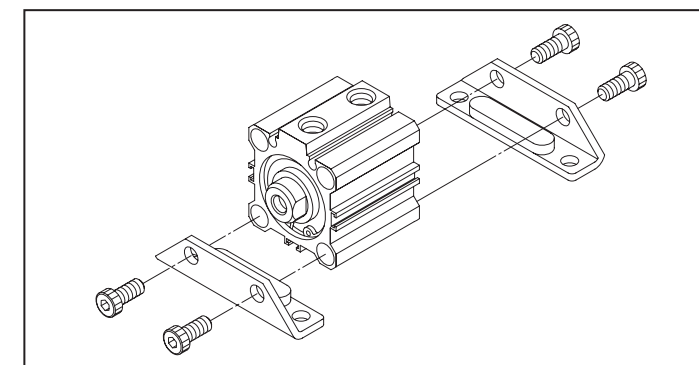
- Screw the nut (4) loosely on rod end thread.
- Screw the accessory (1, 2 or 3) on the rod end.
- Tighten the nut against the accessory to fix it.

Use wrenches of the following dimensions:

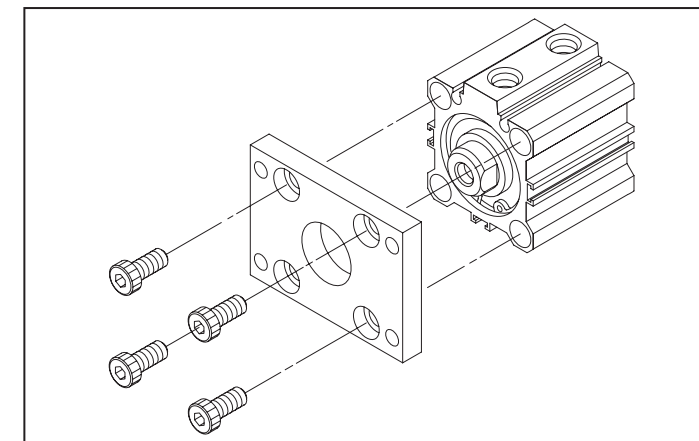
Bore size (mm)	Floating joint Width across flats (mm)	Double knuckle Joint Width across Flats (mm)	Single knuckle joint Width across flats (mm)
12	10	10	10
16	10	12	12
20	13	16	16
25	17	20	20
32	22	22	22
40	22	22	22
50	27	28	28
63	27	28	28
80	32	38	38
100	41	44	44
125	46	-	-
140	46	-	-
160	55	-	-
180	55	-	-
200	55	-	-

Apply the tool to the suitable flat surfaces on the accessory.

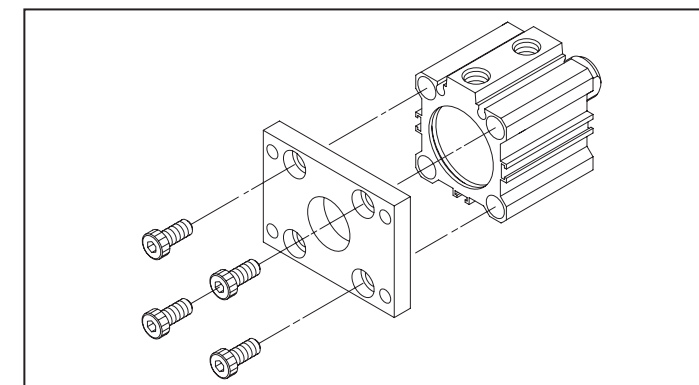
Foot brackets



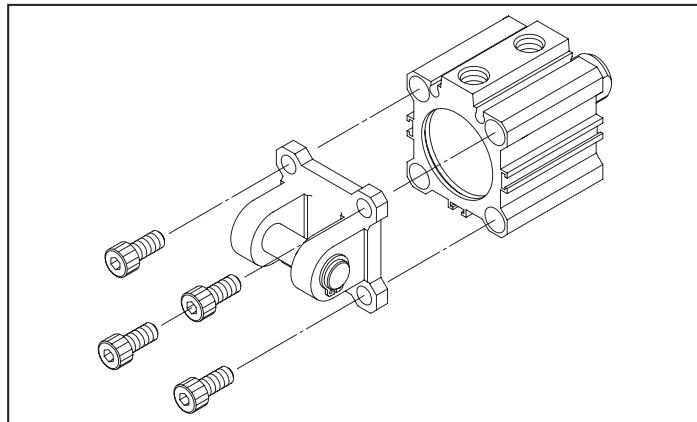
Front flange



Rear flange



Rear double clevis



When replacing brackets, use the hexagon wrenches shown below.

Bore size (mm)	Width across flats (mm)	Tightening torque (Nm)
12	2.5	1.43 to 2.55
16	2.5	1.43 to 2.55
20	4	8.98 to 12.0
25	4	8.98 to 12.0
32	4	8.98 to 12.0
40	4	8.98 to 12.0
50	5	11.4 to 22.4
63	6	25.0 to 44.9
80	8	43.9 to 78.5
100	8	43.9 to 78.5
125	-	-
140	-	-
160	-	-
180	-	-
200	-	-

3.5 Lubrication

CAUTION

Our products have been lubricated for life at manufacturer, 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.

4 Maintenance

WARNING

- Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.
- If handled improperly, compressed air can be dangerous. Assembly, handling and repair of pneumatic system should be performed by qualified personnel only.
- Drain: remove condensate from the filter bowl on a regular basis.
- Shut down before maintenance: before attempting any kind of maintenance make sure the supply pressure is shut off and all residual air pressure is released from the system to be worked on.
- Start up after maintenance: apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.
- Do not make any modification to the product.
- Periodically check the rod surface, the rod seal and the cylinder tube external surface. Any damage in 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)

Seals replacement

WARNING

Use only original SMC seal kits, given in the tables below.

Bore size (mm)	Kit no.
12	CQ2B12-PS
16	CQ2B16-PS
20	CQ2B20-PS
25	CQ2B25-PS
32	CQ2B32-PS
40	CQ2B40-PS
50	CQ2B50-PS
63	CQ2B63-PS
80	CQ2B80-PS
100	CQ2B100-PS
125	CQ2B125-PS
140	CQ2B140-PS
160	CQ2B160-PS
180	CQ2B180-PS
200	CQ2B200-PS

For (E)C(D)Q2*32 100-DC(M)/Long stroke type use the following seal kits:

Bore size (mm)	Kit no.
32	CQ2A32-L-PS
40	CQ2A40-L-PS
50	CQ2A50-L-PS
63	CQ2A63-L-PS
80	CQ2A80-L-PS
100	CQ2A100-L-PS

Procedure

Disassemble the cylinder, remove the old grease and place all the parts on a clean cloth in a clean environment. The snap ring pliers shall be used to remove snap ring. Remove the old tube gaskets, rod seal, piston seal, wear ring, using a fine screwdriver where necessary. If the magnet is present on the piston, do not remove it. This part is not to be replaced.

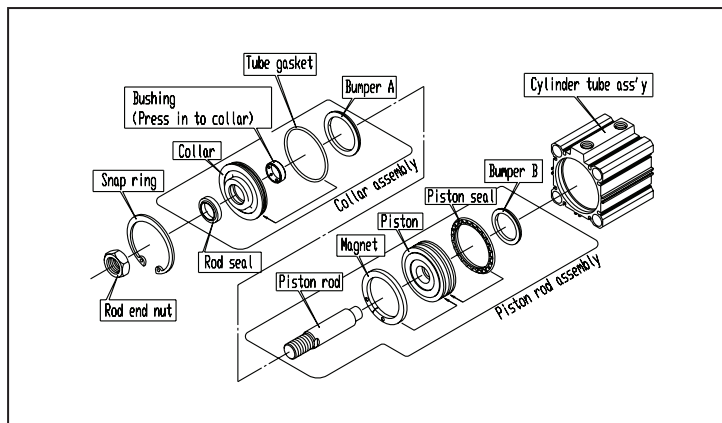
Apply lubricant to:

- rod seal
- rod seal groove on the rod cover
- piston outer surface
- piston seal groove
- piston seal
- tube gaskets
- piston rod surface
- tube inner surface

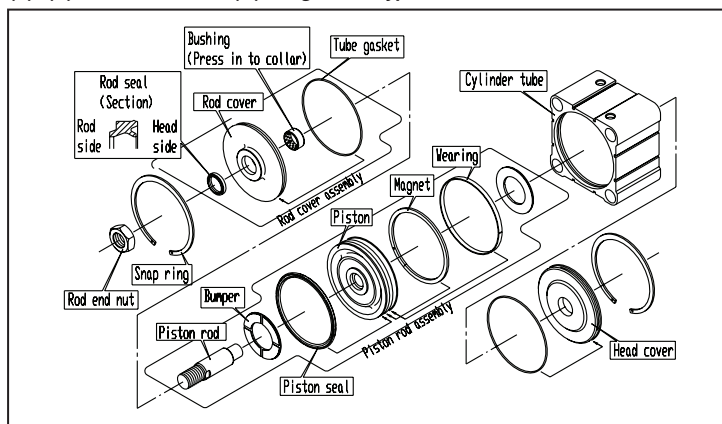
The amount of lubricant to be applied is given in the following table:

Bore size (mm)	Required amount of grease for the minimum stroke (g)	Additional amount of grease required for each 5mm of stroke (g)
12	5 mm stroke	0.07
16		0.10
20		0.12
25		0.18
32		0.25
40	0.36	0.045
50	10 mm stroke	0.665
63		0.77
80		1.14
100		1.51
125		2.35
140		2.95
160		3.87
180		4.89
200		6.04

Model: (E)C(D)Q2#12 to 100-#D(C)(M)



Models: EC(D)Q2B125 to 200-#DC(M), (E)C(D)Q2#32 to 100-#DC(M)/Long stroke type



Lubricate the parts using the following SMC grease packs:

Grease pack part number	Weight
GR-S-010	10 g
GR-S-020	20 g

Assembling the cylinder

- 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 rod cover to prevent any damage to the rod seal.
- Inserting piston rod assembly and rod cover assembly into the cylinder tube. Insert slowly with care the piston assembly and the rod cover 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.

5 Limitations of Use

WARNING

- Do not exceed any of the specifications laid out in section 2 of this document or the specific product catalogue.

DANGER

- Air equipment has standard air leakage within certain limits.
- Do not use this equipment when the air itself can lead to explosion danger.

CAUTION

- Do not install and use this equipment in case of vibration such to lead to equipment failure. Contact SMC for this specific situation.

WARNING

- External impact 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 suitable guard to prevent such impacts.
- Use only ATEX certified auto-switch. Order them separately.
- Do not use in presence of strong magnetic fields, which could generate surface temperature higher than the value given for the temperature class.

6 Contacts

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BELGIUM / (32) 3-355 1464	NETHERLANDS / (31) 20-531 8888
CZECH REP. / (420) 5-414 24611	NORWAY / (47) 67 12 90 20
DENMARK / (45) 70 25 29 00	POLAND / (48) 22-548 50 85
FINLAND / (358) 207 513 513	PORTUGAL / (351) 2 610 89 22
FRANCE / (33) 1-64 76 1000	SPAIN / (34) 945-18 4100
GERMANY / (49) 6103 4020	SWEDEN / (46) 8-603 0700
GREECE / (30) 1- 342 6076	SWITZERLAND / (41) 52-396 3131
HUNGARY / (36) 1-371 1343	TURKEY / (90) 212 221 1512
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