



Installation 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

Marking description
 Group II, Category 2
 Suitable for Gas and Dust environment
 Type of protection "constructional safety"
 The maximum surface temperature is 85°C and the temperature class is T6 when the ambient temperature is: -10°C to 40°C
 The maximum surface temperature is 105°C and the temperature class is T4 when the ambient temperature is 40°C to 60°C

1 Safety Instructions

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.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

| | | |
|--|----------------|--|
| | Caution | Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury. |
| | Warning | Indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury. |
| | 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 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.**
 - Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
 - 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.
 - 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:**
 - Conditions and environments beyond the given specifications, or if the product is to be used outdoors.

1 Safety Instructions (Continued)

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

Caution

- Ensure that the air supply system is filtered to 5 microns.

2 Specifications

2.1 Specifications

Refer to the operation manual for this 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 and fluid temperature | | -10 ~ 60°C | | |
| Lubrication | | Not required | | |
| Operating piston speed | Ø12 ~ Ø160 | 50 ~ 500 mm/s | | |
| | Ø180 & Ø200 | 20 ~ 400 mm/s | | |
| Cushion | | No cushion | Rubber cushion | |
| | Ø12 | 0.022 J | 0.043 J | |
| Allowable kinetic energy | Ø16 | 0.038 J | 0.075 J | |
| | Ø20 | 0.055 J | 0.110 J | |
| | Ø25 | 0.09 J | 0.18 J | |
| | Ø32 | 0.15 J | 0.29 J | |
| | Ø40 | 0.26 J | 0.52 J | |
| | Ø50 | 0.46 J | 0.91 J | |
| | Ø63 | 0.77 J | 1.54 J | |
| | Ø80 | 1.36 J | 2.71 J | |
| | Ø100 | 2.27 J | 4.54 J | |
| | Ø125 | N/A | 7.4 J | |
| | Ø140 | N/A | 9.8 J | |
| | Ø160 | N/A | 12.4 J | |
| | Ø180 | N/A | 12.4 J | |
| | Ø200 | N/A | 12.4 J | |
| | Explosive atmosphere | | Gas and Dust | |
| | Zone | | 1, 21, 2 and 22 | |

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:

| 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 | JQ | ... | ZP | AP | BP | ... | | | | | |
| Mar | Q | HQ | IQ | JJ | ... | 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 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.

3 Installation (Continued)

- 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.

| Model | Port size | |
|-------------|-------------------|--|
| 55-CQ2*12 | M5 X 0.8 | |
| 55-CQ2*16 | | |
| 55-CQ2*20 | | |
| 55-CQ2*25 | | |
| 55-CQ2*32 | M5 x 0.8 or Rc1/8 | |
| 55-CQ2*40 | Rc1/8 | |
| 55-CQ2*50 | Rc1/4 | |
| 55-CQ2*63 | | |
| 55-CQ2*80 | | |
| 55-CQ2*100 | Rc3/8 | |
| 55-CQ2*125 | | |
| 55-CQ2*140 | | |
| 55-CQ2*160 | | |
| 55-CQ2*180 | Rc1/2 | |
| 55-CQ2*200 | | |
| 55-ECQ2*32 | M5 x 0.8 or G1/8 | |
| 55-ECQ2*40 | G1/8 | |
| 55-ECQ2*50 | G1/4 | |
| 55-ECQ2*63 | | |
| 55-ECQ2*80 | | |
| 55-ECQ2*100 | G3/8 | |
| 55-ECQ2B125 | | |
| 55-ECQ2B140 | | |
| 55-ECQ2B160 | | |
| 55-ECQ2B180 | G1/2 | |
| 55-ECQ2B200 | | |

Note 1) In the case without autoswitch, M5 x 0.8 is used for 5 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, 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.

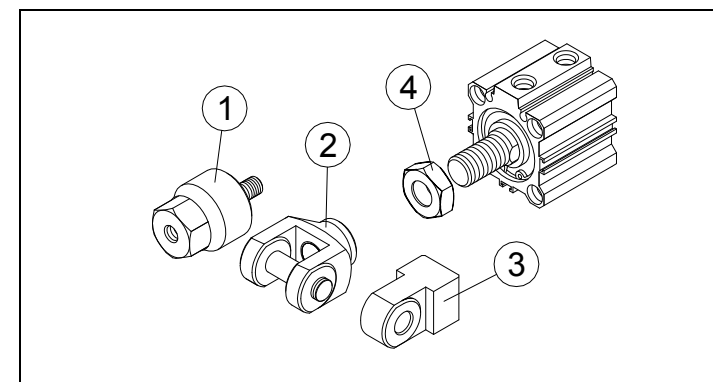
3.5 Electrical connection

Warning

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

3.6 Mounting accessories

Rod end accessories



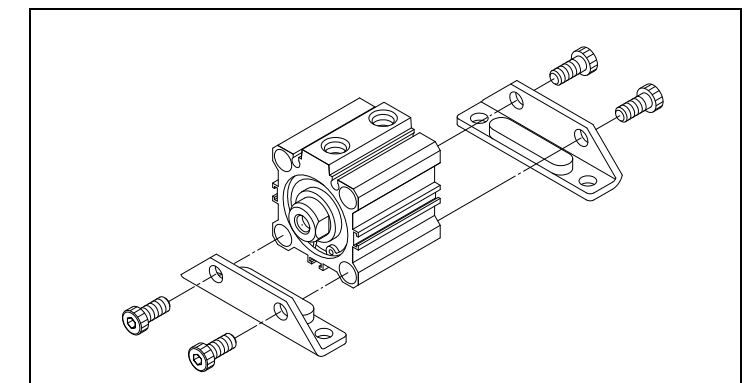
| | | | |
|---|----------------------|---|----------------------|
| 1 | Floating joint | 3 | Single knuckle joint |
| 2 | Double knuckle joint | 4 | Rod end nut |

3 Installation (Continued)

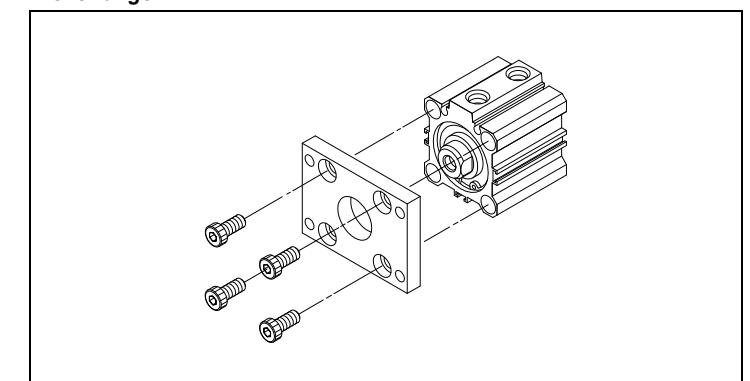
- Mounting procedure:
 - Screw the nut (4) loosely onto the rod end thread.
 - Screw the accessory (1, 2 or 3) onto the rod end thread.
 - Tighten the nut against the accessory to fix it in place.
- Use wrenches of the following dimensions:

| Bore size (mm) | Width across flats (mm) | | |
|----------------|-------------------------|----------------------|----------------------|
| | Floating joint | Double knuckle joint | Single knuckle joint |
| Ø12 | 10 | 10 | 10 |
| Ø16 | 10 | 12 | 12 |
| Ø20 | 13 | 16 | 16 |
| Ø25 | 17 | 20 | 20 |
| Ø32, Ø40 | 22 | 22 | 22 |
| Ø50, Ø63 | 27 | 28 | 28 |
| Ø80 | 32 | 38 | 38 |
| Ø100 | 41 | 44 | 44 |
| Ø125, Ø140 | 46 | - | - |
| Ø160 ~ Ø200 | 55 | - | - |

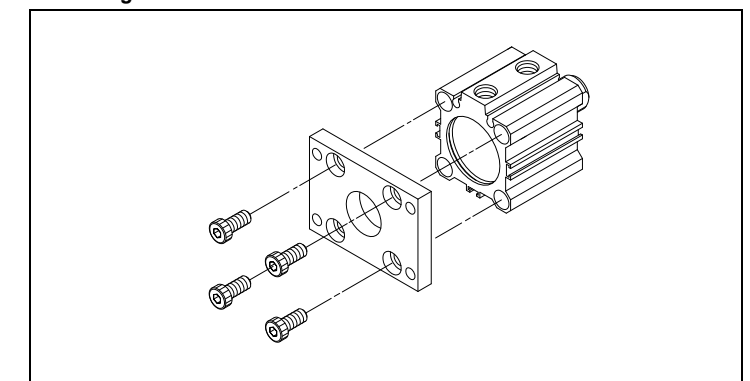
Foot brackets



Front flange

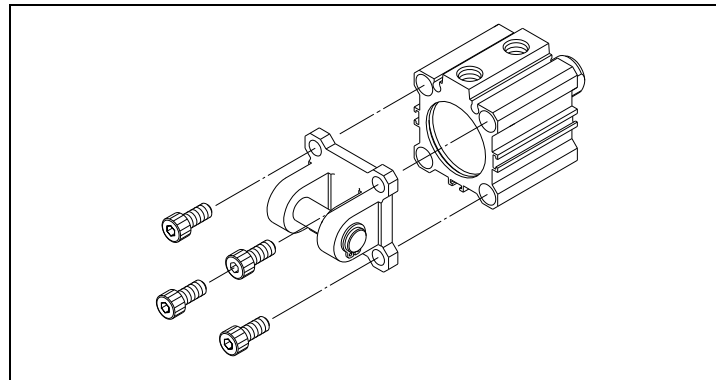


Rear flange



3 Installation (Continued)

Rear double clevis



- When replacing brackets, use the hexagon wrenches shown below.

| Bore size (mm) | Width across flats (mm) | Tightening torque (Nm) |
|----------------|-------------------------|------------------------|
| Ø12, Ø16 | 2.5 | 1.43 to 2.55 |
| Ø20 ~ Ø40 | 4 | 8.98 to 12.0 |
| Ø50 | 5 | 11.4 to 22.4 |
| Ø63 | 6 | 25.0 to 44.9 |
| Ø80, Ø100 | 8 | 43.9 to 78.5 |
| Ø125 ~ Ø200 | - | - |

4 Settings

Refer to the operation manual for this product.

5 How to order

Refer to the operation manual for this product.

6 Outline dimensions

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.
- 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 Maintenance (Continued)

7.2 Seal replacement



Warning

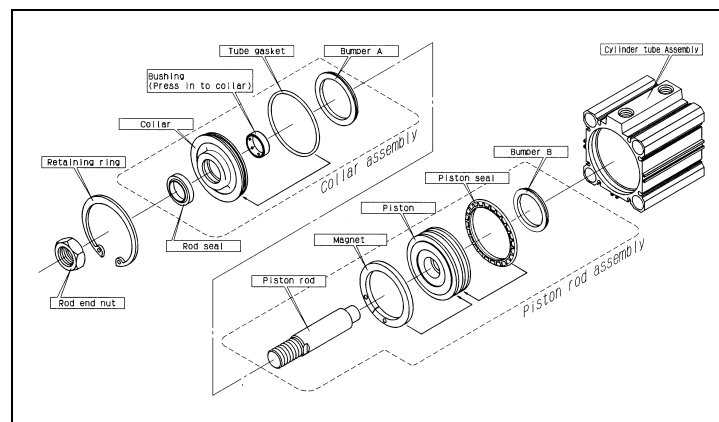
- Only use SMC seal kits as listed in the table below.

| Bore size (mm) | Seal kit number | |
|----------------|-----------------|------------------|
| | Standard | Long stroke type |
| Ø12 | CQ2B12-PS | |
| Ø16 | CQ2B16-PS | |
| Ø20 | CQ2B20-PS | |
| Ø25 | CQ2B25-PS | |
| Ø32 | CQ2B32-PS | CQ2A32-L-PS |
| Ø40 | CQ2B40-PS | CQ2A40-L-PS |
| Ø50 | CQ2B50-PS | CQ2A50-L-PS |
| Ø63 | CQ2B63-PS | CQ2A63-L-PS |
| Ø80 | CQ2B80-PS | CQ2A80-L-PS |
| Ø100 | CQ2B100-PS | CQ2A100-L-PS |
| Ø125 | CQ2B125-PS | |
| Ø140 | CQ2B140-PS | |
| Ø160 | CQ2B160-PS | |
| Ø180 | CQ2B180-PS | |
| Ø200 | CQ2B200-PS | |

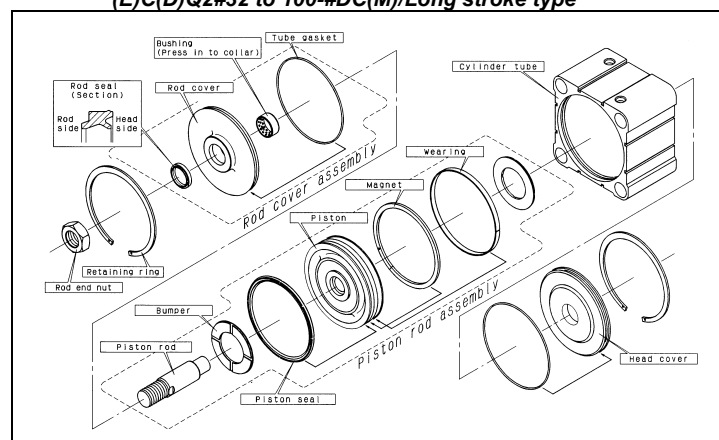
7.3 Disassembly procedure

- 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.

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



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



Maintenance (Continued)

7.4 Lubrication procedure

- 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
- Lubricate the parts using the following SMC grease packs:

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

- The amount of lubricant to be applied is listed 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) |
|----------------|--|---|
| Ø12 | 0.07 | 0.01 |
| Ø16 | 0.10 | 0.01 |
| Ø20 | 0.12 | 0.015 |
| Ø25 | 0.18 | 0.02 |
| Ø32 | 0.25 | 0.035 |
| Ø40 | 0.36 | 0.045 |
| Ø50 | 0.665 | 0.055 |
| Ø63 | 0.77 | 0.07 |
| Ø80 | 1.14 | 0.09 |
| Ø100 | 1.51 | 0.11 |
| Ø125 | 2.35 | 0.17 |
| Ø140 | 2.95 | 0.22 |
| Ø160 | 3.87 | 0.28 |
| Ø180 | 4.89 | 0.36 |
| Ø200 | 6.04 | 0.44 |

7.5 Assembly procedure

- Inserting the collar 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.

8 Limitations of use



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

| | | | |
|------------|-------------------|----------------|-------------------|
| AUSTRIA | (43) 2262 62280-0 | LATVIA | (371) 781 77 00 |
| BELGIUM | (32) 3 355 1464 | LITHUANIA | (370) 5 264 8126 |
| BULGARIA | (359) 2 974 4492 | NETHERLANDS | (31) 20 531 8888 |
| CZECH REP. | (420) 541 424 611 | NORWAY | (47) 67 12 90 20 |
| DENMARK | (45) 7025 2900 | POLAND | (48) 22 211 9600 |
| ESTONIA | (372) 651 0370 | PORTUGAL | (351) 21 471 1880 |
| FINLAND | (358) 207 513513 | ROMANIA | (40) 21 320 5111 |
| FRANCE | (33) 1 6476 1000 | SLOVAKIA | (421) 2 444 56725 |
| GERMANY | (49) 6103 4020 | SLOVENIA | (386) 73 885 412 |
| GREECE | (30) 210 271 7265 | SPAIN | (34) 945 184 100 |
| HUNGARY | (36) 23 511 390 | SWEDEN | (46) 8 603 1200 |
| IRELAND | (353) 1 403 9000 | SWITZERLAND | (41) 52 396 3131 |
| ITALY | (39) 02 92711 | UNITED KINGDOM | (44) 1908 563888 |

SMC Corporation

URL : [http:// www.smcworld.com](http://www.smcworld.com) (Global) <http:// www.smceu.com> (Europe)

Specifications are subject to change without prior notice from the manufacturer.

© 2011 SMC Corporation All Rights Reserved.