



Installation and Maintenance Manual

Air Cylinder
55-CG1 Series

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

Group II

Category 2

Suitable for Dust and Gas environment

Type of protection "constructional safety"

Max surface temperature 95°C and temperature class T5 when ambient temperature is from -10°C to 40°C

Max surface temperature 115°C and temperature class T4 when ambient temperature is from 40°C to 60°C

1 SAFETY

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 - General rules relating to systems.

Note 2:JIS B 8370:Pneumatic system axiom.

CAUTION: Operator could result in injury or equipment damage.

WARNING: Operator error could result in serious injury or loss of life.

DANGER: In extreme conditions, there is a possible result of serious injury or loss of life.

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 are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your 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 operators.

- Do not service machinery/equipment or attempt to remove component 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. (Bleed air into the system gradually to create backpressure, i.e. incorporate a soft-start valve).

- Contact SMC if the product is to be used in any of the following conditions:
 - Conditions and environments beyond the given specifications, or if product is used outdoors.
 - 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 micron.

1.2 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

1.3 Specific recommendations

WARNING:

- Do not use the cylinder with cushion valve fully closed.
 - It may cause bounds at the stroke end, interfere full stroke travel, or cushion packing breakage due to excessive pressure.
- Be certain to activate the air cushion at the stroke end.
 - When the cylinder is used with cushion valve in a fully opened position, a suitable external device should be installed to absorb all the kinetic energy of the mechanism, of which the actuator is part, before reaching each stroke end. If this is not done, the cylinder will be damaged.

2 INTENDED CONDITIONS OF USE

2.1 Specifications

| | | | |
|-------------------------------|----------------------|------------------------|---------------|
| 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 | | |
| Operating piston speed | ø20~ø63 | 50 to 1000 mm/s | |
| | ø80, ø100 | 50 to 700 mm/s | |
| Cushion | Air cushion | | Rubber bumper |
| | ø20 | R: 0.35 J H: 0.42 J | 0.28 J |
| Allowable kinetic energy | ø25 | R: 0.56 J H: 0.65 J | 0.41 J |
| | ø32 | 0.91 J | 0.66 J |
| | ø40 | 1.8 J | 1.2 J |
| | ø50 | 3.4 J | 2.0 J |
| | ø63 | 4.9 J | 3.4 J |
| | ø80 | 11.8 J | 5.9 J |
| | ø100 | 16.7 J | 9.9 J |
| | Explosive atmosphere | Gas and Dust | |
| Zone | 1, 21, 2 and 22 | | |

R: Rod side H: Head side

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.

2.2 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 | 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

WARNING:

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

3.1 Environment

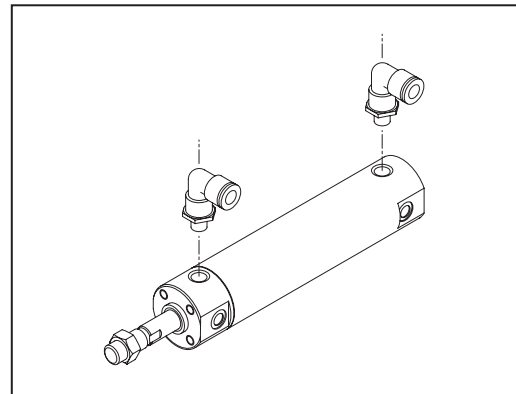
WARNING:

- 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.
- The product should not be exposed to prolonged sunlight. Use a protective cover.
- Do not mount the product in a location where it is subject to strong vibrations and/or shock. Check the product specifications for above ratings.
- Do not mount the product in a location where it is exposed to radiant heat.

3.2 Piping

CAUTION:

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



| Port size | | | | | | | | |
|-----------|--------|-----|-----|-----|-----|-----|-----|------|
| Bore | ø20 | ø25 | ø32 | ø40 | ø50 | ø63 | ø80 | ø100 |
| Rubber | 1/8 | | | 1/4 | | 3/8 | 1/2 | |
| Air | M5X0.8 | | 1/8 | | 1/4 | | 3/8 | 1/2 |

The Kind of port is Rc, NPT and G.

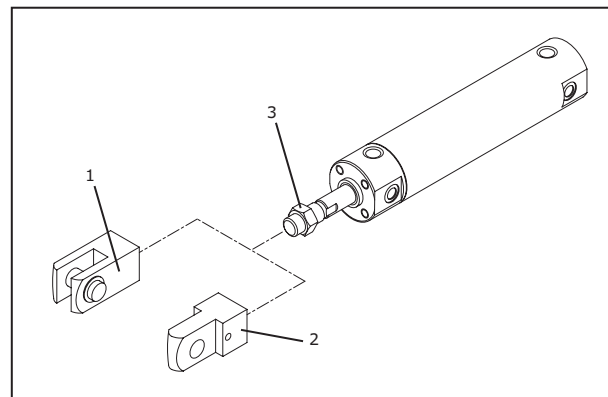
3.3 Electrical connection

WARNING:

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

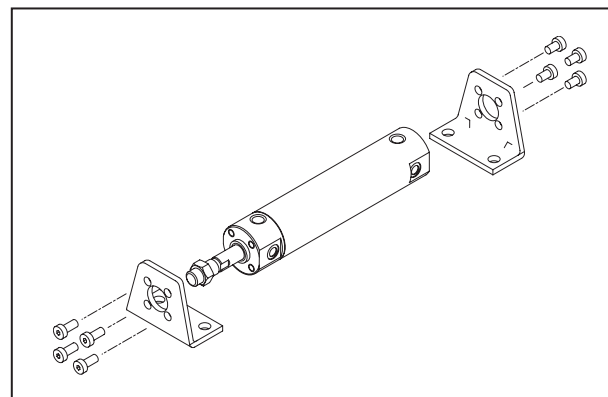
3.4 Mounting

Rod end accessories

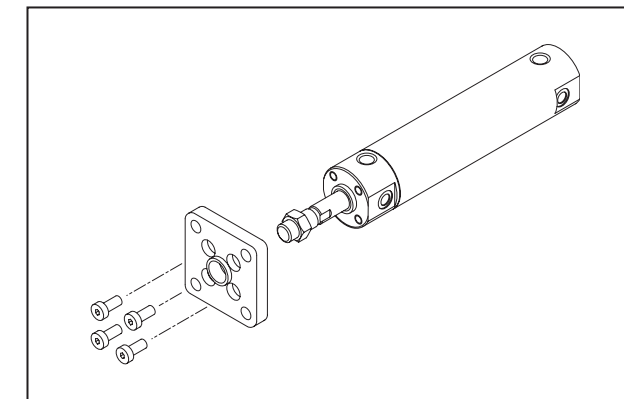


- Screw the nut (3) loosely on rod end thread.
- Screw the accessory (1 or 2) on the rod end.
- Tighten the nut against the accessory to fix it. Hold the accessory in place by applying a tool to the suitable flat surfaces.

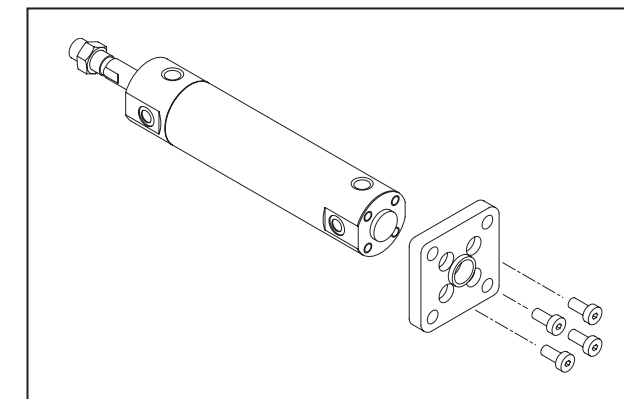
Axial Foot



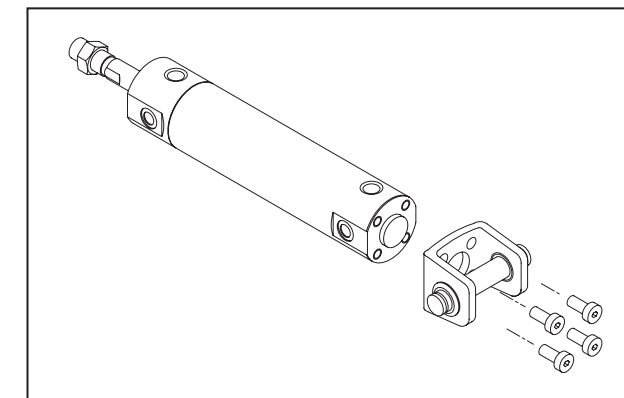
Front flange



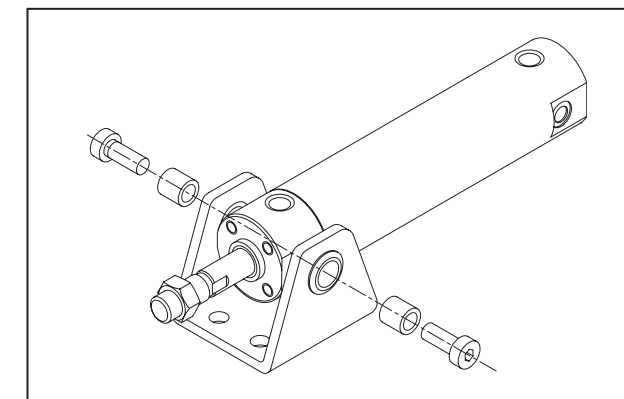
Rear flange



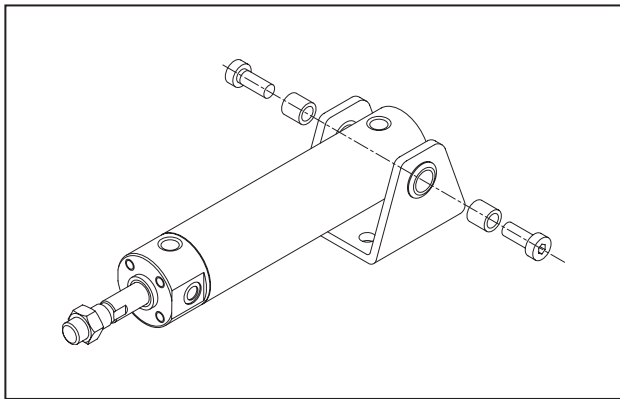
Clevis



Front trunnion



Rear trunnion



| Bore size (mm) | Tightening torque for mounting accessories on the cylinder (Nm) | | | |
|----------------|---|----------|---------------------------|--------------------------|
| | Foot, Flange, Clevis | Trunnion | Cushion valve (press nut) | Cushion valve (Lock nut) |
| 20 | 1.5 | 2.2 | 2.0 | 0.5 |
| 25 | 2.9 | 3.6 | 2.0 | 0.5 |
| 32 | 2.9 | 9.0 | 2.0 | 0.5 |
| 40 | 4.9 | 18.1 | 2.0 | 0.5 |
| 50 | 11.8 | 31.9 | 4.9 | 1.0 |
| 63 | 24.5 | 52.0 | 4.9 | 1.0 |
| 80 | 24.5 | - | 19.6 | 2.0 |
| 100 | 42.2 | - | 19.6 | 2.0 |

3.5 Lubrication

CAUTION:

- SMC 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 AIR CUSHION ADJUSTMENT

- For air-cushion adjustment, tighten or loosen the cushion valve using a screwdriver and a spanner. Ensure to tighten the lock nut firmly after adjustment.

5 MAINTENANCE

- Cylinders with a bore of ø50 or more cannot be disassembled. When disassembling a cylinder with a bore of ø20 to ø40, use a vise or the like to hold the wrench flats portion of the tube cover or the rod cover on one side, while placing a wrench or an adjustable wrench on the other side to loosen and remove the cover. To replace, tighten it an additional 2° from the installed position. (Those with a bore of ø50 or more cannot be disassembled because they have been tightened with greater torque. If they must be disassembled, contact SMC.)

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) |

WARNING:

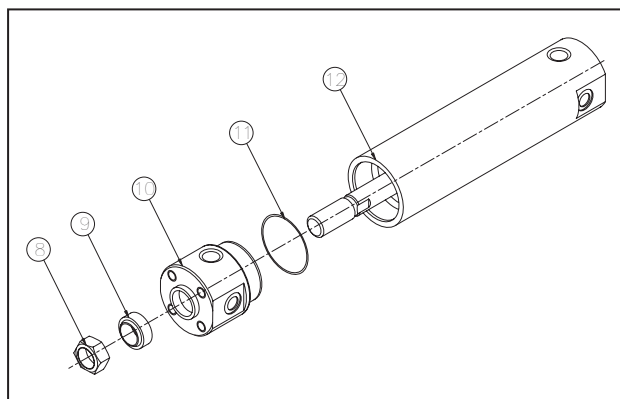
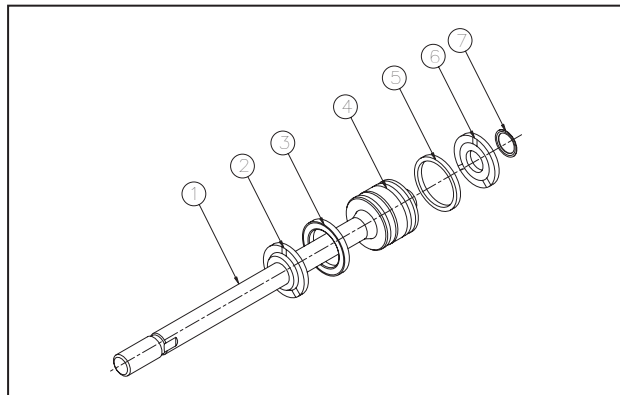
- Use only original SMC seal kits, given in the table below:

| Bore size (mm) | Kit no. (Rubber bumper) | Kit no. (Air cushion) |
|----------------|-------------------------|-----------------------|
| 20 | CG1N20-PS | CG1A20-PS |
| 25 | CG1N25-PS | CG1A25-PS |
| 32 | CG1N32-PS | CG1A32-PS |
| 40 | CG1N40-PS | CG1A40-PS |

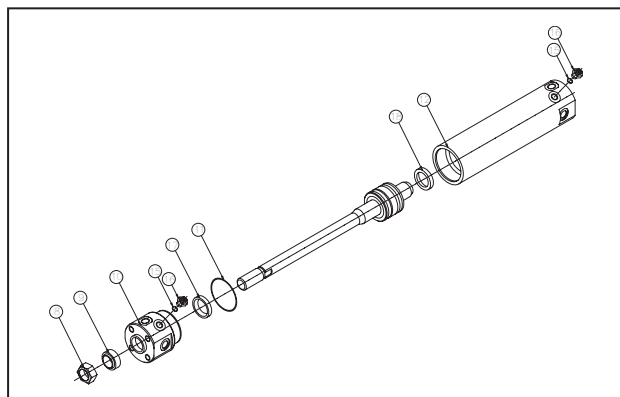
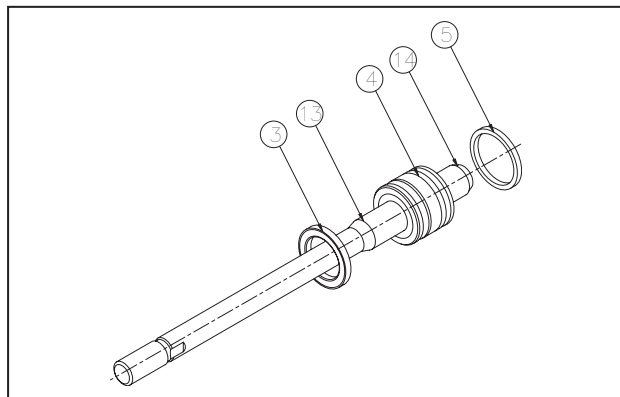
Use the following procedure for disassembling the cylinder and replacing the seals:

- 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 rod | 10 | Rod cover |
| 2 | Bumper A | 11 | Tube gasket |
| 3 | Piston seal | 12 | Tube cover |
| 4 | Magnet | 13 | Cushion ring A |
| 5 | Wear ring | 14 | Cushion ring B |
| 6 | Bumper B | 15 | Needle retainer gasket |
| 7 | Retaining ring | 16 | Cushion needle |
| 8 | Rod end nut | 17 | Cushion seal A |
| 9 | Rod seal | 18 | Cushion seal B |

Lubricate the parts using "Mitsubishi Multi Purpose Grease 2" or "Lithium Type Grease JIS 2".

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

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 50 mm (g) |
|----------------|-------------------------|-------------------------------|
| 20 | 2 | 0.5 |
| 25 | 3 | 0.5 |
| 32 | 3 | 0.5 |
| 40 | 3~4 | 1 |

Check for cylinder smooth movement and for air leakage.

6 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.

7 EUROPEAN CONTACT LIST

7.1 SMC Corporation

| Country | Telephone | Country | Telephone |
|----------------|-------------------|----------------|--------------------|
| Austria | (43) 2262-62 280 | Italy | (39) 02-92711 |
| Belgium | (32) 3-355 1464 | Netherlands | (31) 20-531 8888 |
| Czech Republic | (420) 5-414 24611 | Norway | (47) 67 12 90 20 |
| Denmark | (45) 70 25 29 00 | Poland | (48) 22-548 50 85 |
| Finland | (358) 9-859 580 | Portugal | (351) 22 610 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 |
| Ireland | (353) 1-403 9000 | United Kingdom | (44) 1908-56 3888 |

7.2 Websites

| | |
|-----------------|------------------|
| SMC Corporation | www.smcworld.com |
| SMC Europe | www.smceu.com |