



## Instructions and Maintenance Manual ISO Cylinder Series 55-C95

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

### 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 RECOMMENDATION

- 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 "DANGER", "WARNING" or "CAUTION", 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.

|                |  |
|----------------|--|
| <b>CAUTION</b> | Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.   |
| <b>WARNING</b> | Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. |
| <b>DANGER</b>  | 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 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 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. (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:**

1) Conditions and environments beyond the given specifications, or if product is 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) Applications, which have the possibility of having negative effects on people, properties or animals, requiring special safety analysis.

## 1 SAFETY RECOMMENDATION (CONTINUED)

### CAUTION

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

## 2 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        | Ø32-Ø100                | 50 to 1000 mm/s |
|                               | Ø125                    | 50 to 700 mm/s  |
|                               | Ø160-Ø250               | 50 to 500 mm/s  |
| Cushion                       | Air cushion (both ends) |                 |
| Allowable kinetic energy      | Ø32                     | 2.2 J           |
|                               | Ø40                     | 3.4 J           |
|                               | Ø50                     | 5.9 J           |
|                               | Ø63                     | 11 J            |
|                               | Ø80                     | 20 J            |
|                               | Ø100                    | 29 J            |
|                               | Ø125                    | 32.3 J          |
|                               | Ø160                    | 58.8 J          |
|                               | Ø200                    | 98 J            |
| Ø250                          | 147 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

### WARNING

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

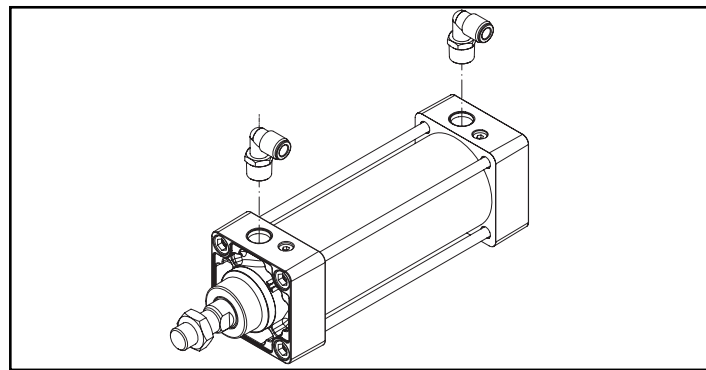
### 3.1 Environment

### WARNING

- Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
- 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 subjected to strong vibrations such to generate surface temperature higher than the value given for temperature class. Avoid any kind of shock or impact.
- Do not mount the product in a location where it is exposed to radiant heat.

### 3.2 Piping

### CAUTION



- Before piping clean away all chips, cutting oil, dust, etc.
- When installing piping or fitting into a port, in case of using sealant type fittings, 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 |       |
|-----------|-------|
| Ø32       | G 1/8 |
| Ø40       | G 1/4 |
| Ø50       | G 1/4 |
| Ø63       | G 3/8 |
| Ø80       | G 3/8 |
| Ø100      | G 1/2 |
| Ø125      | G 1/2 |
| Ø160      | G 3/4 |
| Ø200      | G 3/4 |
| Ø250      | G 1   |

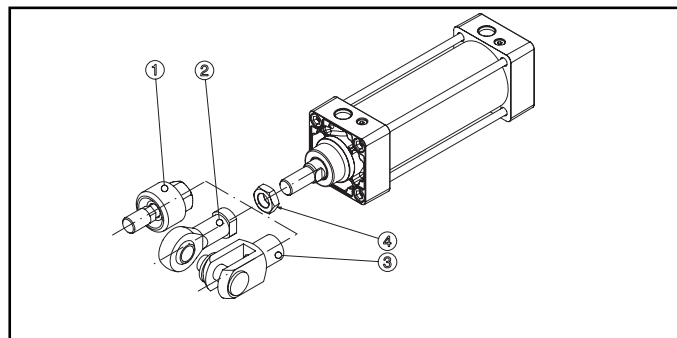
### 3.3 Electrical connection

### WARNING

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

### 3.4 Mounting accessories

#### Rod end accessories



## 3 INSTALLATION (CONTINUED)

|   |                       |
|---|-----------------------|
| 1 | Floating joint        |
| 2 | Piston rod ball joint |
| 3 | Piston rod clevis     |
| 4 | Rod end nut           |

### Mounting procedure:

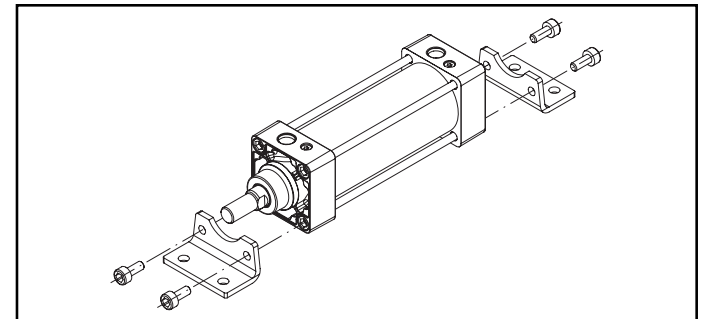
- Screw the nut (4) loosely on rod end thread.
- Screw the accessory (1, 2 or 3) on the rod end.
- Tighten the nut against the accessory to fix it.

### Use wrenches of the following dimensions:

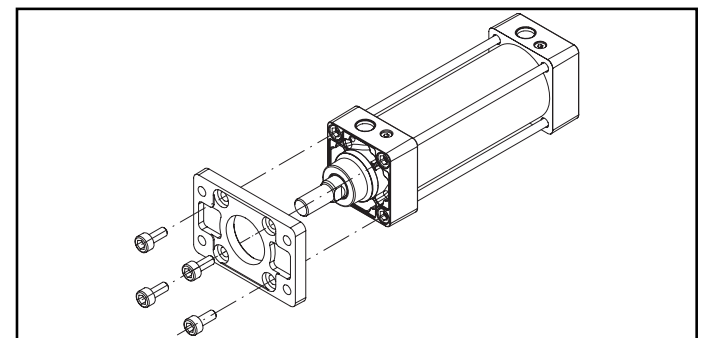
| Bore size (mm)     | Floating joint Width across flats (mm) | Clevis Width across flats (mm) | Ball joint Width across flats (mm) |
|--------------------|--|--------------------------------|------------------------------------|
| 32                 | 17                                     | 20                             | 17                                 |
| 40                 | 22                                     | 24                             | 19                                 |
| 50, 63             | 27                                     | 32                             | 32                                 |
| 80, 100            | 32                                     | 40                             | 32                                 |
| 125, 160, 200, 250 | -                                      | -                              | -                                  |

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

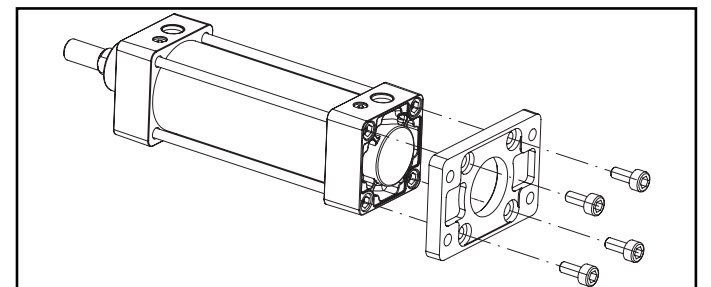
### Foot brackets



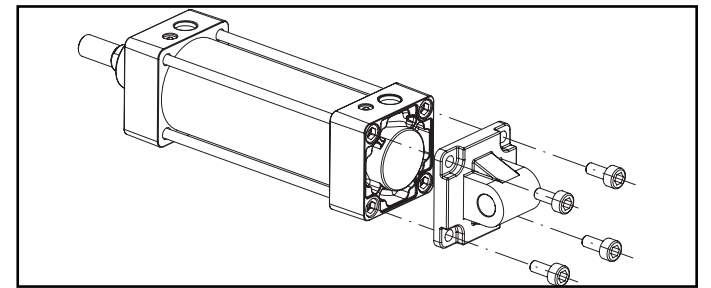
### Front flange



### Rear flange

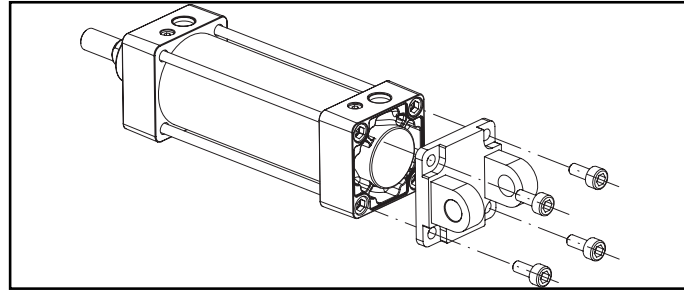


### Rear single clevis



### 3 INSTALLATION (CONTINUED)

Rear double clevis



When replacing brackets, use the hexagon wrenches shown below.

| Bore size (mm) | Bolt           | Width across flats (mm) | Tightening torque (Nm) ±10% |
|----------------|----------------|-------------------------|-----------------------------|
| 32, 40         | MB-32-48-C1247 | 4                       | 4.9                         |
| 50, 63         | MB-50-48-C1249 | 5                       | 11                          |
| 80, 100        | MB-80-48AC1251 | 6                       | 25                          |
| 125            | M12x1.75x25L   | 10                      | 30.1                        |
| 160, 200       | M16x2x30L      | 14                      | 99                          |
| 250            | Foot           | M20x2.5x35L             | 193.5                       |
|                | Others         | M20x2.5x30L             |                             |

#### 3.5 Lubrication

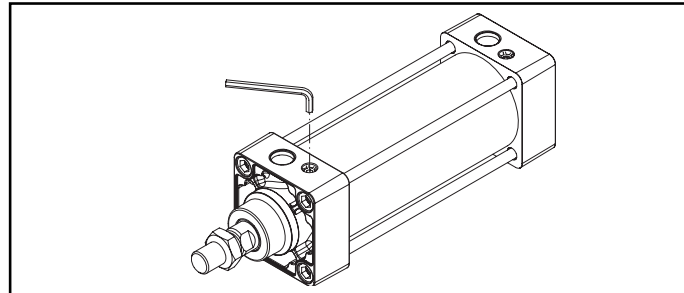
#### CAUTION

Our 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.

### 4 AIR CUSHION ADJUSTMENT

For air-cushion adjustment, tighten or loosen the cushion valve using a hexagon socket wrench.



| Bore size (mm)     | Width across flats (mm) | Socket wrench                   |
|--------------------|-------------------------|---------------------------------|
| 32, 40, 50         | 2.5                     | JIS 4648 Hex spanner wrench 2.5 |
| 63, 80, 100        | 4                       | JIS 4648 Hex spanner wrench 4   |
| 125, 160, 200, 250 | 4                       |                                 |

#### WARNING

- Do not open the cushion valve above the stopper.

Cushion valves are provided with a crimp (Ø32) or retaining ring (Ø40 to Ø250) as a stopping mechanism, and the cushion valve should not be opened above that point.

If air is supplied and operation started without confirming the above condition, the cushion valve may be ejected from the cover.

- 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 tie-rods or piston-rod assembly will be damaged.

### 5 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, ensure the supply pressure is shut off and all residual air pressure is released from the system.
- After maintenance apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, verify product set-up parameters.
- 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 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 <sup>3</sup> /min (ANR) |
| External leakage | 5 cm <sup>3</sup> /min (ANR)  |

#### Seals replacement

#### WARNING

Use only original seal kits, given in the table below.

| Bore (mm) | Kit No.  |              |            |                             |
|-----------|----------|--------------|------------|-----------------------------|
|           | Standard | Non-rotating | Double rod | Non-rotating and double rod |
| 32        | CS95-32  | CK95-32      | C95W-32    | CK95W-32                    |
| 40        | CS95-40  | CK95-40      | C95W-40    | CK95W-40                    |
| 50        | CS95-50  | CK95-50      | C95W-50    | CK95W-50                    |
| 63        | CS95-63  | CK95-63      | C95W-63    | CK95W-63                    |
| 80        | CS95-80  | CK95-80      | C95W-80    | CK95W-80                    |
| 100       | CS95-100 | CK95-100     | C95W-100   | CK95W-100                   |
| 125       | CS95-125 | -            | C95W-125   | -                           |
| 160       | CS95-160 | -            | C95W-160   | -                           |
| 200       | CS95-200 | -            | C95W-200   | -                           |
| 250       | CS95-250 | -            | C95W-250   | -                           |

Note: In the case of double rod cylinders no wear ring is fitted.

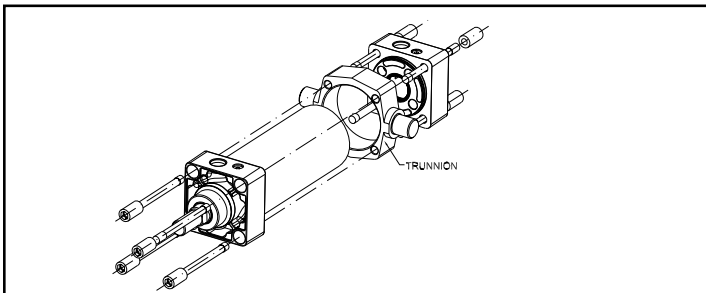
#### Procedure

Disassemble the cylinder, remove the old grease and place all the parts on a clean cloth in a clean environment. The following hexagon socket wrenches shall be used to loosen the tie-rod nuts:

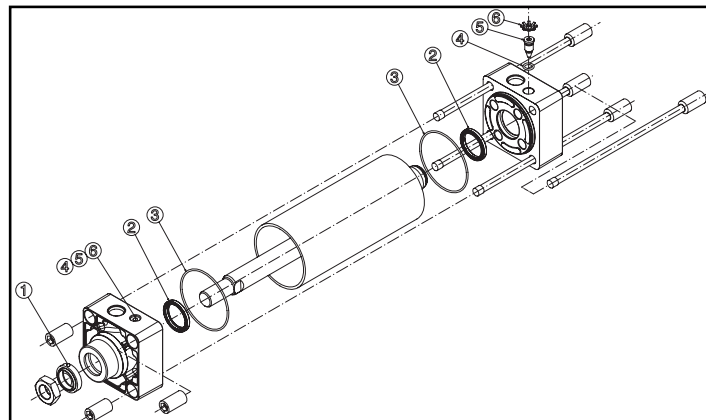
| Bore size (mm) | Width across flats (mm) |
|----------------|-------------------------|
| 32, 40         | 6                       |
| 50, 63         | 8                       |
| 80, 100        | 10                      |
| 125            | 12                      |
| 160, 200       | 32                      |
| 250            | 41                      |

Remove the old tube gaskets, rod seal, cushion seals, piston seal, wear ring, cushion screw seal (for bore sizes above or equal to 40 mm), 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.

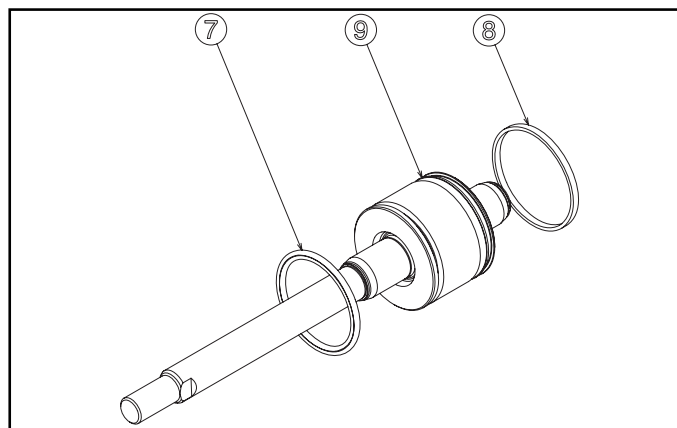
#### Trunnion assembly, if fitted



### 5 MAINTENANCE (CONTINUED)



|   |              |   |                          |
|---|--------------|---|--------------------------|
| 1 | Rod seal     | 4 | Cushion screw seal       |
| 2 | Cushion seal | 5 | Cushion adjustment screw |
| 3 | Tube gasket  | 6 | Washer                   |



|   |             |
|---|-------------|
| 7 | Piston seal |
| 8 | Wear ring   |
| 9 | Magnet      |

Lubricate the parts using the following SMC grease packs:

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

- 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) |
|----------------|-------------------------|-------------------------------|
| 32             | 3                       | 0.5                           |
| 40             | 3 ~ 4                   | 1                             |
| 50             | 3 ~ 5                   | 1                             |
| 63             | 4 ~ 5                   | 1.5                           |
| 80             | 6 ~ 8                   | 1.5                           |
| 100            | 8 ~ 10                  | 2                             |
| 125            | 15 ~ 17                 | 3                             |
| 160            | 24 ~ 26                 | 3                             |
| 200            | 30 ~ 32                 | 4                             |
| 250            | 33~ 35                  | 5                             |

### 5 MAINTENANCE (CONTINUED)

The cylinder is assembled in the following order: head cover, tube, piston rod sub-assembly and rod cover. Screw the tie-rod nuts onto the tie-rods, to the end of the threaded part. Put this assembly into the cylinder assembly from the head cover side. Tighten the diagonally opposing tie-rod nuts on the rod cover side according to the torque values given below.

| Bore size (mm) | Torque Nm | Width across flats (mm) |
|----------------|-----------|-------------------------|
| 32, 40         | 5.0±10%   | 6                       |
| 50, 63         | 11.0±10%  | 8                       |
| 80, 100        | 25.0±10%  | 10                      |
| 125            | 30.1±10%  | 12                      |
| 160, 200       | 99±10%    | 32                      |
| 250            | 193.5±10% | 41                      |

Check the cylinder for 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.
- Air equipment has standard air leakage within certain limits.
- Do not use this equipment when the air itself can lead to explosion danger.
- Do not install and use this equipment in case of vibration such to lead to equipment failure. Contact SMC for this specific situation.
- 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.
- 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-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 CONTACTS

|            |                   |                |                   |
|------------|-------------------|----------------|-------------------|
| AUSTRIA    | (43) 2262 62280   | NETHERLANDS    | (31) 20 531 8888  |
| BELGIUM    | (32) 3 355 1464   | NORWAY         | (47) 67 12 90 20  |
| CZECH REP. | (420) 541 424 611 | POLAND         | (48) 22 211 9600  |
| DENMARK    | (45) 7025 2900    | PORTUGAL       | (351) 21 471 1880 |
| FINLAND    | (358) 207 513513  | SLOVAKIA       | (421) 2 444 56725 |
| FRANCE     | (33) 1 6476 1000  | SLOVENIA       | (386) 73 885 412  |
| GERMANY    | (49) 6103 4020    | SPAIN          | (34) 945 184 100  |
| GREECE     | (30) 210 271 7265 | SWEDEN         | (46) 8 603 1200   |
| HUNGARY    | (36) 23 511 390   | SWITZERLAND    | (41) 52 396 3131  |
| IRELAND    | (353) 1 403 9000  | UNITED KINGDOM | (44) 1908 563 888 |
| ITALY      | (39) 02 92711     |                |                   |

## SMC Corporation

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