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INSTALLATION – OPERATION and MAINTENANCE MANUAL

ITEM 0024 THREE-WAYS FLANGED COCK

ITEM 0024/600 – 0024/601 THREE-WAYS FLANGED COCK WITH HYDRAULIC CYLINDER

ITEM 0024/605 THREE-WAYS COCK WITH HYDRAULIC ACTUATOR

ITEM 0024/620 THREE-WAYS FLANGED COCK WITH PNEUMATIC ACTUATOR



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INDEX

1. Description
 - 1.1 Types of product
 - 1.2 Convention symbols
 - 1.3 Marking and Certifications
2. Handling
3. Installation
4. Actuators
5. Dimensions - materials - operating conditions
6. Operating limits
7. Maintenance
 - 7.1 Ordinary maintenance
 - 7.2 Extraordinary maintenance
8. Storage
9. Disposal
10. List of components
11. Attachments

1. Description

Three-ways flanged cock with cylindrical male and sealing gasket, manually operated by a lever or with hydraulic and pneumatic actuators, which can be used in slurry interception and dewatering systems, short fiber biomass, dense and muddy liquids.

1.1 Types of product

ITEM 0024

Three-ways flanged cock, manual version, without control lever.
DN available: 6" - 8".

ITEM 0024/L

Three-ways flanged cock, manual version, with control lever.
DN available: 6".

ITEM 0024/600

Three-ways flanged cock, complete with double-acting hydraulic cylinder, item 0600
DN available: 6" – 8".

ITEM 0024/601

Three-ways flanged cock, complete with double-acting hydraulic cylinder, item 0601
DN available: 6" - 8".

ITEM 0024/605

Three-ways flanged cock, complete with rotary hydraulic actuator item 0605.
DN available: 6" - 8".

ITEM 0024/620

Three-ways flanged cock, complete with double-acting pneumatic actuator item 0620.
DN available: 6" - 8".

1.2 Convention symbols



this symbol highlights information and/or instructions that are critical to the prevention of serious injury to the user and/or serious damage to the product, the system and the environment.

1.3 Marking and Certifications

1.3.1 PED Directive (2014/68/EU)

The cocks are considered pressure vessels and are therefore subject to the PED Directive (2014/68/EU). The PED directive assimilates piping with valves. The applicable conformity assessment table is Table 9, "Piping referred to in Article 4, paragraph 1 letter c, point ii, second indent". It refers to "pipes for liquids with a vapor pressure at the maximum permissible temperature of less than or equal to 0.5 bar above normal atmospheric pressure (1.013 mbar) within the following limits:

fluids group 2, when PS is greater than 10 bar, DN is greater than 200 and $PS \times DN$ is greater than 5,000 bar.

Specifically, the cocks in question fall within the scope of Article 4, paragraph 3 and must therefore not be marked EC.

1.3.2 Machines Directive (2006/42/EC)

Cocks equipped with hydraulic or pneumatic actuators are considered machines and as such are subject to Directive 2006/42/EC. The cocks meet the minimum safety requirements required by the directive.

2. Handling

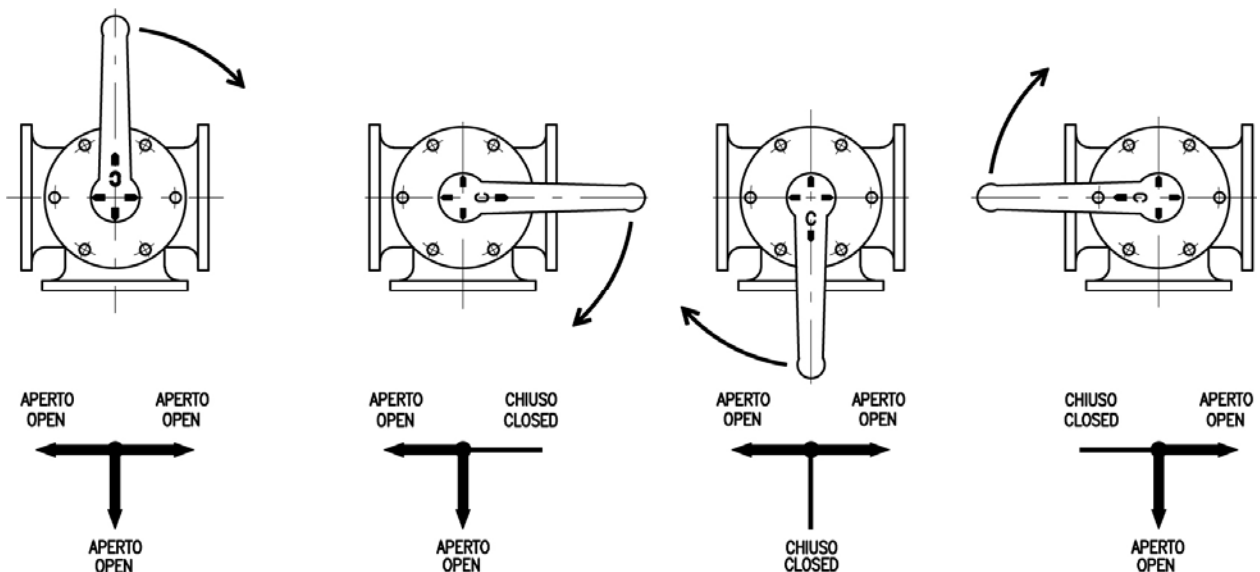
During handling, observe the following guidelines:

- use appropriate personal protective equipment (gloves, goggles, safety shoes, etc.)
- ⚠ cocks weighing more than 20 Kg must be handled by crane, hoist or forklift with the aid of proper slings.
- avoid moving the cock by holding it by the hydraulic or pneumatic actuators.
- during handling, be careful not to knock and damage the cock.
- ⚠ damage to protective coatings can cause rapid corrosion.

3. Installation

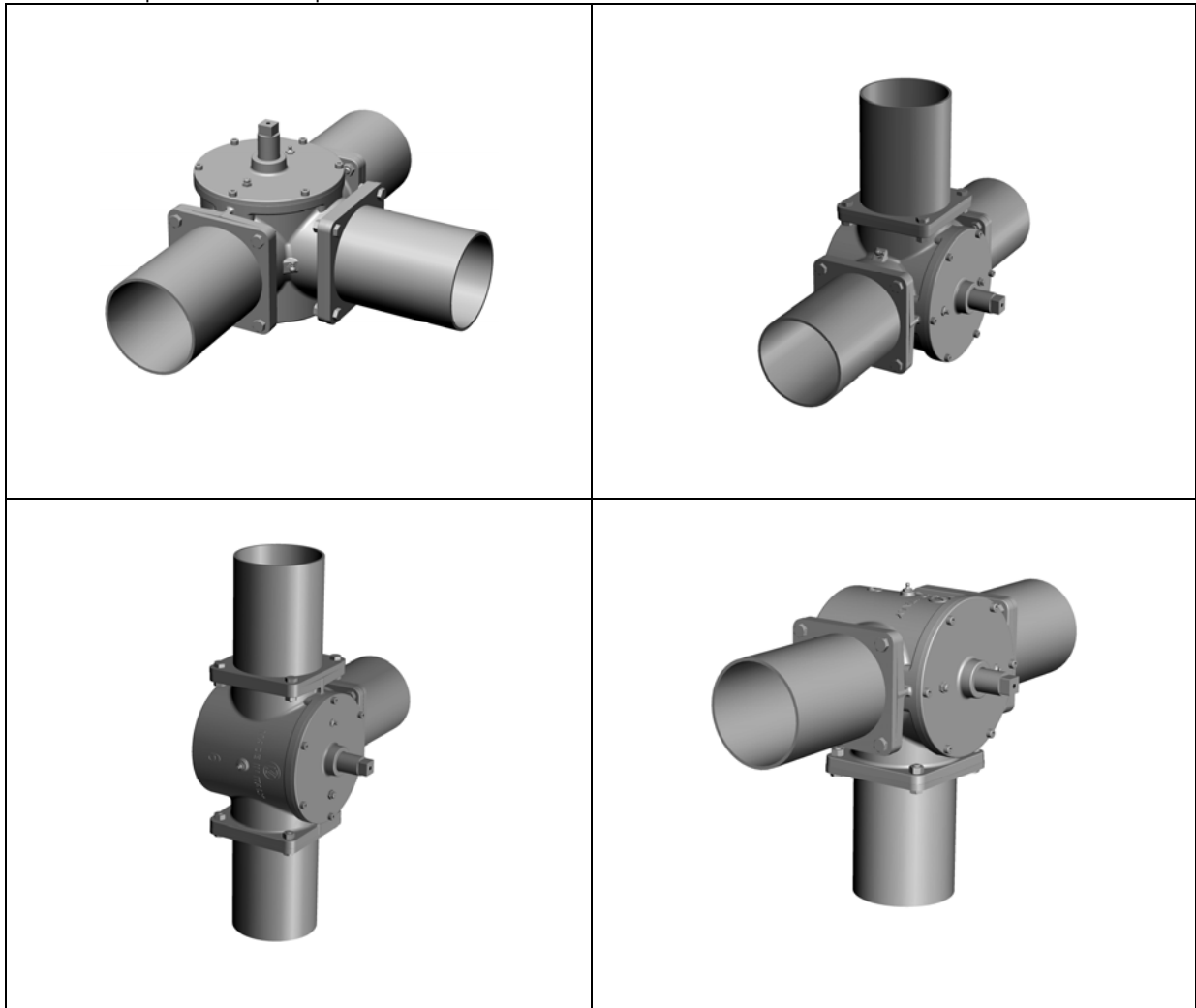
During installation, observe the following guidelines:

- move the cocks in accordance with the instructions in step 2 "Handling"
- inspect the cocks by checking the integrity and cleanliness of the internal parts
- check that the cocks are correctly positioned with respect to the desired flow direction. On the control lever (available only for DN 6") there are 4 arrows that provide immediate indication of whether the three-way door is open or closed. The maneuver lever (hence, the arrow with the letter "C") must always match the closed side of the male. In manual mode it is possible to rotate the internal male to 360°, while with the hydraulic or pneumatic actuators the rotation is only to 90° with return to start position (see diagrams below).



- Evaluate the installation position considering that whenever possible it is best to install the cock in a vertical position on pipes with horizontal axis. The cock can however be installed in any other position.

Table 1 examples of installation positions allowed



- check that the space between the connecting flanges of the three pipe trunks is correct and that the flanges are parallel/orthogonal and aligned. Parallelism, orthogonality and alignment errors, when mounting, may cause severe stress on the cock body which could lead to structural failure.
- During installation, the cocks must be adequately supported. At least two pipe trunks must have the necessary supports to prevent the system stress from being focused on the cock body.
- Place the fixing screws and tighten them alternately and gradually; tighten one screw and then the one diametrically opposite, proceeding in the same manner for all subsequent screws. The correct tightening torque is indicated in the following table.

Table 2 suggested tightening torque

DN	6"	8"
Flange screws	n. 4 - M10	n. 4 - M12
Tightening torque (Nm)	60	70

- When the cock is installed, check that any accessories such as hydraulic or pneumatic actuators are properly connected. Information on actuator installation, operation and maintenance is provided later in this manual.

⚠ **The use of actuators other than the standard ones supplied by Metaltecnica may cause malfunctions and/or damage to the cock structure, as well as void the Metaltecnica warranty.**

- Proceed with some open and close loop cycles and then start operating the cock, ensuring that it is functioning properly.
- ⚠ Before removing the cock from the system for maintenance and/or replacement, turn off the electrical, pneumatic and hydraulic power supply by unloading the line and cock pressure.
- ⚠ Properly protect the sealing male surface and sealing gasket when repainting the cock.

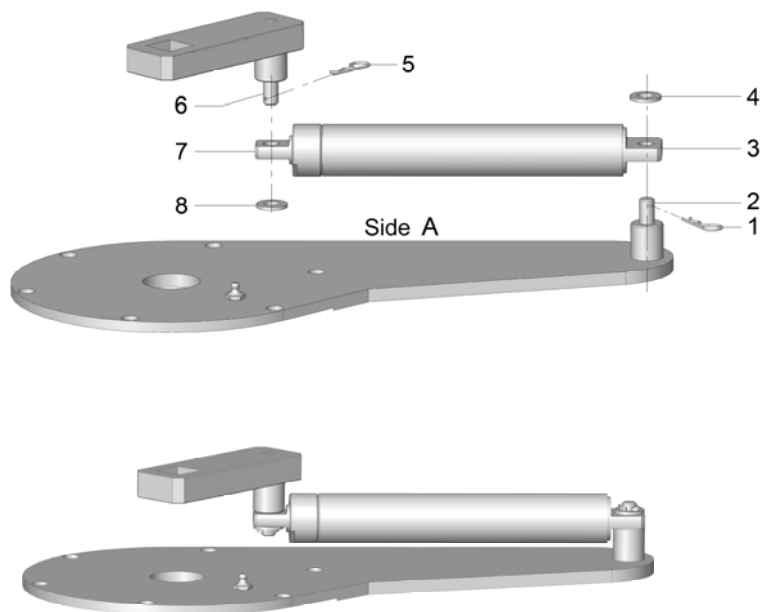
4. Actuators

The cocks can be supplied with three different types of actuators:

4.1 Double-acting hydraulic actuator (Item 0600 - Item 0601)

The cocks can be supplied with a double-acting hydraulic actuator complete with plate-lid and control lever. Item 0600 and Item 0601 differ only in the different orientation of the plate compared to the axis of the cock. With regards to the technical details and conditions of use of the hydraulic cylinder, refer to the relative technical data sheet. Information on installation, operation and maintenance is indicated below.

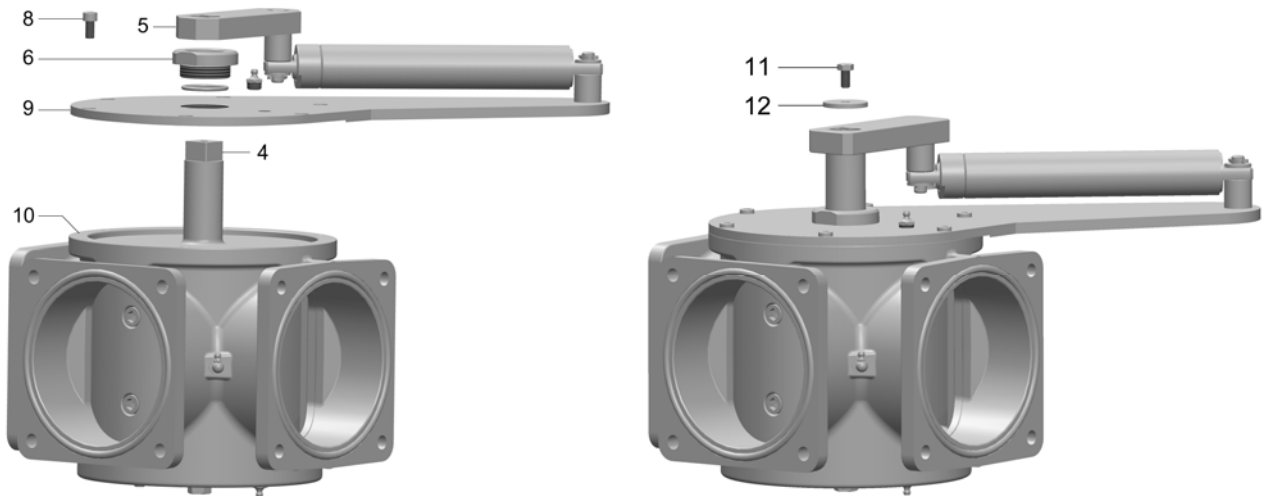
Cock mounting procedure - double-acting hydraulic cylinder item 0600 - item 0601



Mounting the hydraulic cylinder on the plate

- Insert the plate pin (2) into the end of the cylinder (3), checking that the nipples are facing the "A" side of the plate.
- Place the washer (4) on the pin.
- Insert the split pin (1).
- Insert the lever pin (6) into the end of the rod (7).
- Place the washer (8) on the pin.
- Insert the split pin (5)

Mounting the plate with hydraulic cylinder on the cock



- **Consider that the actuator rotates 90° counterclockwise (and relative return) with respect to the initial position of the fully closed cylinder (retracted rod). Therefore check that this rotation opens and closes the cock according to the needs of the system.**
- Screw and glue the gland (6) onto the plate (9);
- Place the plate (9) on the upper flange (10) of the cock, inserting the control panel (4) into the lever (5).
- Screw the fastening screws (8).
- Secure the lever (5) to the control panel, positioning the washer (12) on the lever and screwing the screw (11) to the control panel.
- Connect the hydraulic system to the cylinder and open - close 2-3 times.

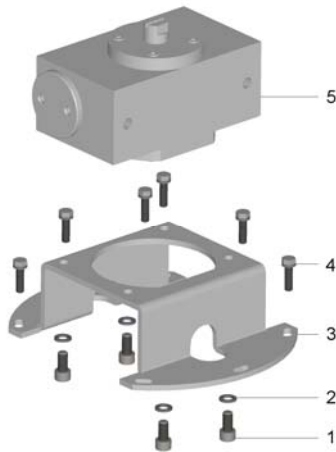
Install the cock by following the instructions in step **3. Installation** of this manual.

4.2 Double-acting rotary hydraulic actuator (item 0605)

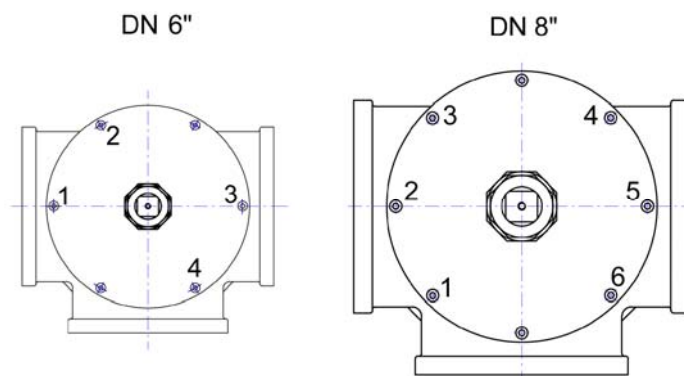
For technical details and operating conditions of the hydraulic actuator, refer to the relevant technical data sheet. Information on installation, operation and maintenance is indicated below.

Cock mounting procedure - double-acting hydraulic actuator item 0605

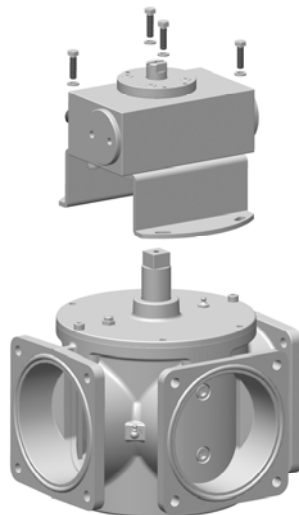
- **Consider that the actuator rotates 90° counterclockwise (and relative return) with respect to the initial position. Therefore check that this rotation opens and closes the cock according to the needs of the system.**
- Make sure that the profile for the openings on the male corresponds exactly to the openings on the body.
- Fix the actuator to the fixing plate using the 4 M10 × 20 cylindrical head screws (1) and the associated four washers (2) provided.




- Remove the 6 fixing screws of the lid indicated in the figure with 1,2,3,4,5,6.



- Position the actuator on the cock by engaging the control panel in the corresponding square seat on the bottom of the actuator. For DN 6", on the male panel insert the appropriate reduction bush from 34 × 34 panel to 25 × 25 panel.
- Fix the plate to the cock using the 6 M8 × 25 hexagonal head screws (5) and the related washers (4) provided. The holes on the plate are slotted to compensate for any small geometric imperfections.



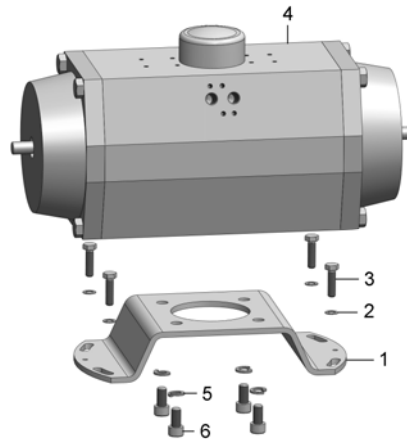
-  During mounting, do not try to adjust the male position by turning the actuator; this could damage internal parts.
- Connect the hydraulic line and run a few opening and closing cycles before using the cock.

4.3 Double-acting rotary pneumatic actuator (item 0620)

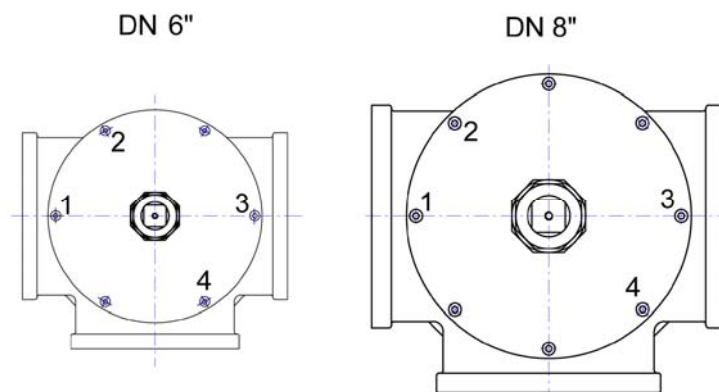
For technical details and operating conditions of the pneumatic actuator, refer to the relevant technical data sheet. Information on installation, operation and maintenance is indicated below.

Cock mounting procedure - double-acting pneumatic actuator item 0620

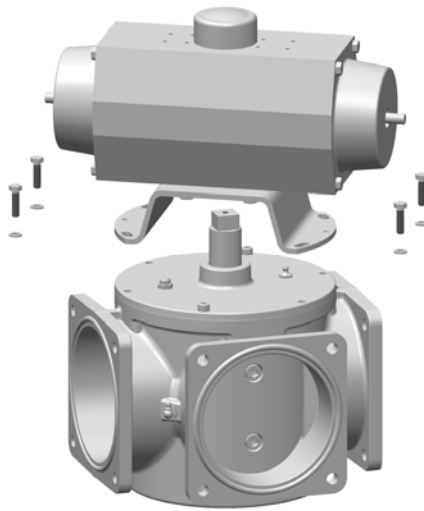
- Consider that the actuator rotates 90° counterclockwise (and relative return) with respect to the initial position. Therefore check that this rotation opens and closes the cock according to the needs of the system.
- Make sure that the profile for the openings on the male corresponds exactly to the openings on the body.
- Fix the actuator to the mounting plate using the 4 cylindrical head screws (6) and the associated four washers (5) provided.



- Remove the 4 fixing screws of the lid indicated in the figure with 1,2,3,4



- Position the actuator on the cock by engaging the control panel in the corresponding square seat on the bottom of the actuator.
- Fix the plate to the cock using the 4 hexagonal head screws and relative washers provided. The holes on the plate are slotted to compensate for any small geometric imperfections.



- ⚠ During mounting, do not try to adjust the male position by turning the actuator; this could damage internal parts.
- Connect the pneumatic line, **avoiding the use of conical threaded couplings**, and run a few opening and closing cycles before using the cock.
- If necessary, the rotation may be adjusted by $\pm 3^\circ$ using the screws on the heads.
- ⚠ To prevent damage to the internal pistons of the actuators, it is advisable to mount speed reducers on the air inlets. In applications where the Namur solenoid valve is mounted directly on the actuator, the drain regulators must be mounted on the solenoid valves.

For more information regarding the accessories available for pneumatic actuators (solenoid valves, micro boxes, etc.) contact the Metaltecnica technical service.

5. Dimensions - materials - operating conditions

Technical information on bulk dimensions, materials used and operating conditions can be found in the company catalog or at www.metaltecnicazanolo.com. Specific technical sheets for each item can be requested from the Metaltecnica technical office.

• 6. Operating limits

- The cocks cannot be used under pressure and temperature conditions other than those specified on the specific data sheets.
- Hydraulic and pneumatic actuators cannot be used under pressure and temperature conditions other than those specified on the specific data sheet.
- The cocks cannot be used with fluids of group 1 (DIR 2014/68/EU) nor with fluids whose chemical composition is not compatible with the materials that form the cock itself.
- Unauthorized modification, improper use or failure to use the cocks and/or actuators within imposed limits, may cause serious damage to both the user and the environment and will void the Metaltecnica warranty.

7. Maintenance

7.1 Ordinary maintenance

- ⚠ Ordinary maintenance operations must be carried out by qualified personnel equipped with the necessary personal protective equipment.
- Periodically check for liquid leaks from the cock lid and the absence of oil leaks from the hydraulic actuators.
 - In the system's programmed maintenance schedules, include a few opening and closing cycles at preset intervals for "normally closed" cocks and for cocks with manual closing lever, especially when dense and encrusting liquids are processed, to avoid the male blocking phenomena.
 - Consistent with the possibilities given by the system it would be preferable that when the machine is off the male remain positioned with the closed surface placed in correspondence with a cock mouth so that To ensure the perfect and constant operation of the cock, it is necessary to periodically clean the internal parts and to lubricate the male, especially when expecting prolonged periods during which the cock will not be used. **The frequency of this maintenance varies depending on the operating conditions of the cock.** For proper lubrication, proceed as follows:
 - Make sure that the inside of the cock is sufficiently clean, remove any incrustations that could prevent the male from rotating and turn the male so that all three ways are open.
 - Proceed with a first greasing, preferably with a manual grease pump, through the greaser in the rear of the cock, taking care to introduce a small amount of NLGI 1 lithium grease.
 - Proceed with a second greasing through the two greasers on the sides of the central flange, always introducing small quantities.
 - Proceed to some opening and closing maneuvers, grease again and repeat the opening and closing maneuvers.
 - Repeat the procedure if necessary.
 - Then grease the top of the male through the greaser located on the cock lid. In this case it is sufficient to fill the gap between the male surface and the lid, any excess grease will be ejected through the bleed valve located opposite to the greaser. Same procedure is used to grease the bottom of the cock.
 - ⚠ The above procedure is valid for periodic lubricating operations on properly functioning cocks. If the cock is blocked and it is not possible to open and close, it is preferable not to lubricate (it may make the situation worse!) but rather disassemble the cock, clean the interior parts, thoroughly grease the disassembled male and then re-start the cock.

⚠ The introduction of excessive amounts of grease can cause permanent deformations and even breaks on the cock structure.

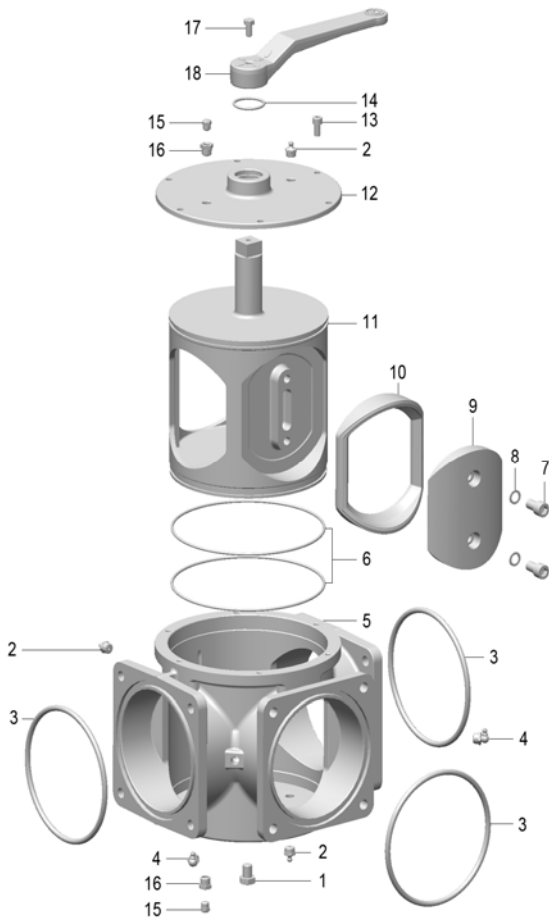
7.2 Extraordinary maintenance

⚠ Extraordinary maintenance operations must be carried out by qualified personnel equipped with the necessary personal protective equipment.

7.2.1 Extracting the male from the body

The extraction of the male becomes necessary when a cock is blocked by incrustations and/or solidification of internal slurry and if the sealing gasket is replaced.

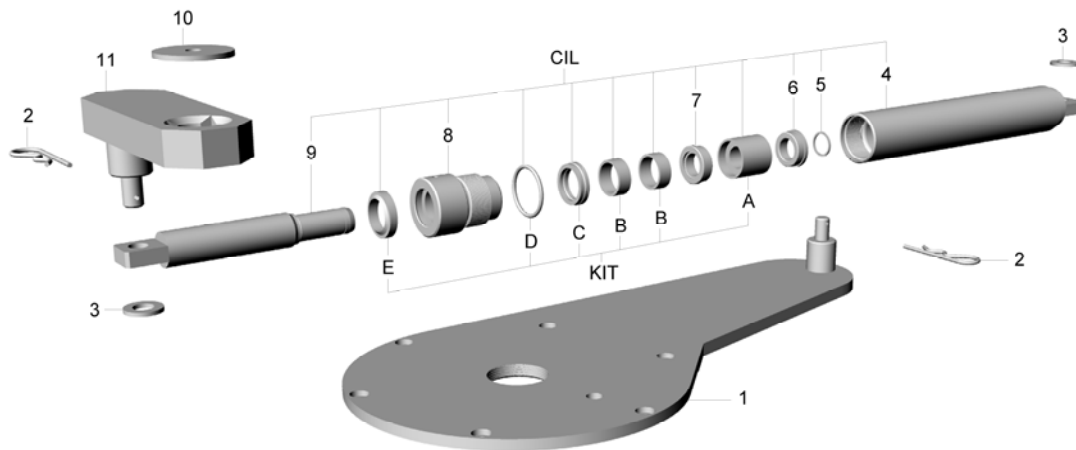
Following is the procedure for extracting the male from the cock body and for replacing the sealing gasket.



1. **⚠ In the case of a locked male, avoid unlocking by increasing the operating pressure of the actuators; an excessively high torque may cause the male control panel to break.**
2. Unscrew the screws (13) and remove the lid (12)
3. If the male is blocked inside the body, spray the cleansing/unblocking liquid (like Svitol®) along the visible edges of the male-body coupling (windows and lid attachment side) and allow it to penetrate for a few minutes.
4. Unscrew the M12 × 16 screw (1) on the bottom of the cock and screw a M12 screw with a useful thread length of at least 70 mm.
5. Screw the screw gradually using it as an ejector. If the screwing force is excessive, let the unblocking fluid act for a little longer and then try again.
6. Fully screw the extractor screw and remove the male from the cock body. Remove the extractor screw from the cock body.
7. Carefully clean the inside of the body by removing incrustation, oxidation and slurry deposits. Also accurately clean the male.
8. Unscrew the screws (7) and remove the gasket fastening cover (9).
9. Remove the worn gasket (10), clean the seat and insert a new gasket. Replace the gasket fastening cover, position the copper washers, and tighten the two screws (7) by securing them with medium strength thread locking paste. Reposition the o-rings on the male.
10. Grease the cylindrical surface of the male including the sealing gasket.
11. Insert the male fully inside the cock body, taking care that the sealing gasket is facing the closed side of the cock body. During this phase, avoid rotating the male to prevent damage to the sealing gasket.
12. Replace the lid (or the plate-lid of item 0600-0601) on the body and fix with the screws (13).
13. Completely screw the M12 × 16 (1) screw on the bottom of the cock.
14. Grease the top of the male through the greaser on the lid
15. Do the same to grease the bottom of the cock.
16. Apply any pneumatic or hydraulic actuators and run some opening and closing cycles before re-starting the cock.

7.2.3 Replacement of hydraulic cylinder gasket kits

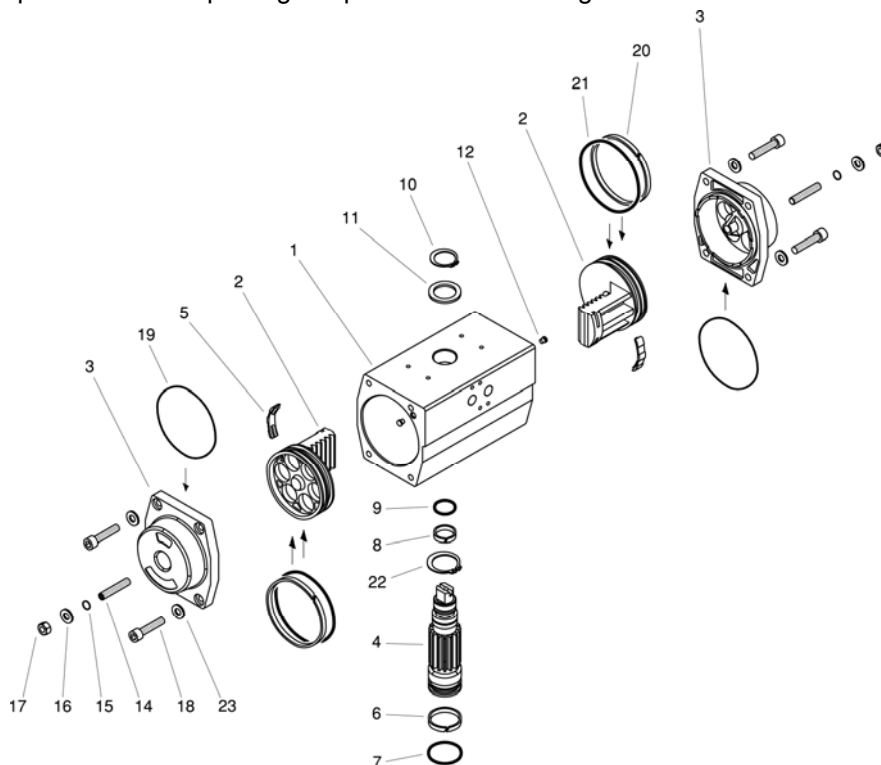
Following is the procedure for replacing the hydraulic cylinder gasket kit.



1. Drain the pressure of the hydraulic system and disconnect the cylinder from the system itself.
2. Remove the screw that fixes the lever to the male stem.
3. Remove the split pins (2) and the washers (3), remove the lever (11) from the cylinder rod (9) and from the male stem.
4. Remove the cylinder from the plate (1).
5. Drain the oil through the two connecting nipples
6. Lock the cylinder in a vice, clamping on the flat end opposite to the rod.
7. Fully unscrew the head (8) using a sector wrench and remove the rod (9) together with all internal components.
8. Remove the stop ring (5) at the end of the rod (9) and remove the metal rings (6 and 7) and the gaskets A - B - C - D.
9. Remove the gasket E from the head (8)
10. Clean all the parts, replace the gaskets and remount the cylinder following the disassembly in reverse order.

7.2.4 Replacing pneumatic actuator gasket kits.

Following is the procedure for replacing the pneumatic actuator gasket kit.



1. Remove the Allen screws (18) from the heads (3).
2. Remove the heads (3)
3. Rotate the stem (4) counterclockwise so that the pistons (2) protrude from the body (1)
4. Remove the Seeger (10) from the stem (4)
5. Remove the stem (4) from the lower part of the body (1) by applying a slight pressure on the top of the stem (4).
6. Replace the following parts:
on the body (1)
 No. 2 plugs (12)

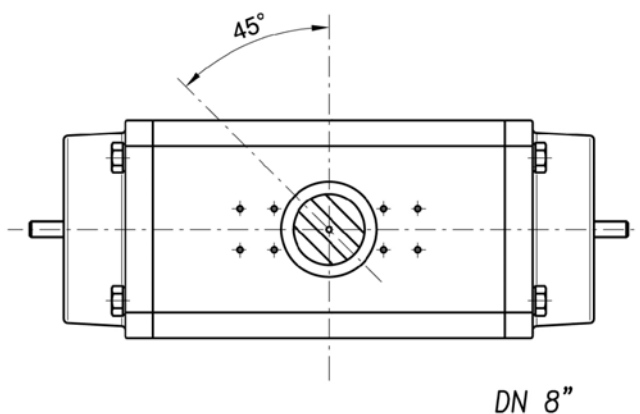
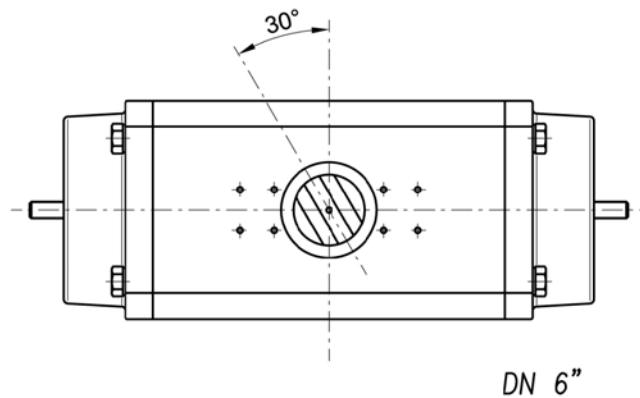
on the pistons (2)

- No. 2 O-rings (21)
- No. 2 guide rings (20)
- No. 2 piston guides (5)

on the stem (4)

- No. 2 O-rings (7-9)
- No. 2 guide rings (6-8)

7. When replacement is complete, lubricate the inner surface of the actuator body, the stem and guide rings again with silicone-free NLGI 1 lithium grease.
8. Proceed with remounting all parts, following the reverse order of the disassembly.
9. Take care when inserting the pistons, with particular attention to the gearing stage of the pistons. Verify that when the pistons are inward, one against the other, the top milling of the stem is positioned as shown in the following diagram.



8. Storage

If stored prior to long-term installation or long-term storage it is recommended to keep the cocks in a cool (max 40°C) and ventilated place, away from direct sunlight and other sources of heat and humidity. Protect cocks to avoid damage to protective coating and subsequent rust formation.

9. Disposal

Before being disposed of, the cocks must be disassembled from the system according to the following procedure:

- open the cock and empty the pipes on which it is mounted
- disconnect the cock from any pneumatic or hydraulic lines
- disassemble the cock using appropriate personal protective equipment (gloves, safety goggles, safety shoes, etc.)
- clean the cock to prevent any leakage of the treated fluid that could cause injury to persons, things, and the environment. In the same way, the hydraulic oil contained in any hydraulic cylinder must be carefully removed.
- After cleaning, separate any recyclable materials (metal parts, plastic parts) from those to be disposed of as special waste (P.T.F.E. gaskets, rubber parts, etc.) according to local laws.



Scrapping assembled and non-reclaimed cocks can cause emissions with harmful environmental consequences.