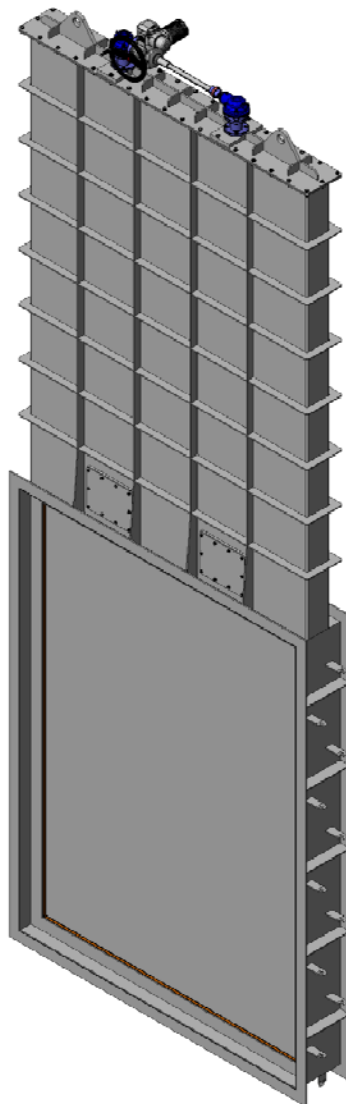




31/05/2011

INSTRUCTIONS AND MAINTENANCE MANUAL

SERIES: GC





DAMPER

GC SERIES

ASSEMBLY

THE GC DAMPER FULFILLS THE FOLLOWING:

Machinery Directive: **DIR 2006/42/EC (MACHINERY)**

Pressure Equipment Directive: **DIR 97/23/EC (PED) ART.3, P.3**

Potentially Explosive Atmospheres Directive (optional): **DIR 94/9/EC (ATEX) CAT.3 ZONE 2 and 22 GD.**

The **GC** damper complies with the Directive on Equipment and Protective Systems for Potentially Explosive Atmospheres. In these cases the logo will appear on the identification label. This label shows the exact classification of the zone in which the damper can be used. The user is responsible for its use in any other zone.



HANDLING

When handling the equipment please pay special attention to the following points:

- **SAFETY WARNING:** Before handling the damper, check that the crane to be used is capable of bearing its weight.
- Do not lift the damper or hold it with the actuator. Lifting the damper with the actuator can lead to operating problems as it is not designed to withstand the valve's weight.
- Do not lift the damper by holding the fluid passage area. The damper's seal is located in this area. If the damper is held and lifted by this area it can damage the surface and the O-ring seal and lead to leakage problems whilst the damper is operating.
- To prevent damage, especially to the anticorrosive protection, it is recommended to use soft straps to lift the CMO knife gate dampers. These straps must be fitted around the top of body.
- Packing in wooden boxes: If the equipment is packed in wooden boxes these must be provided with clearly marked holding areas where the slings will be placed when securing them. In the event of two or more dampers packed together, separation and securing elements must be provided between them to prevent possible movements, knocks and friction during transport. When storing two or more dampers in the same box you must ensure they are correctly supported to prevent deformations. In the case of dispatches by sea we recommend the use of vacuum bags inside the boxes to protect the equipment from contact with sea water.
- Pay special attention to maintaining the correct levelling of the dampers during loading and unloading as well as during transport to prevent deformations in the equipment. For this purpose we recommend the use of mounts or trestles.



INSTALLATION

In order to avoid personal harm and other type of damage (to the facilities, the damper, etc.) please follow these instructions:

- The staff responsible for the installation or operation of the equipment must be qualified and trained.
- Use suitable Personal Protective Equipment (PPE) (gloves, safety boots, goggles...).
- Shut off all lines that affect the damper and put up a warning sign to inform about the work being performed.
- Completely isolate the damper from the entire process. Depressurise the process.
- Drain all the line fluid through the damper.
- Use hand tools not electric tools during the installation and maintenance, in accordance with **EN13463-1(15)**.



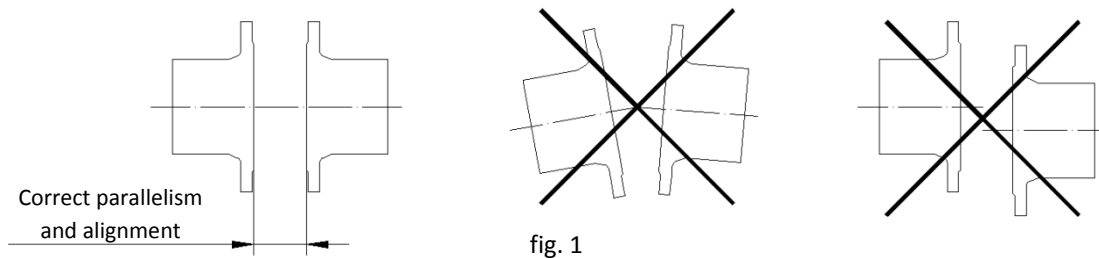
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Before installation, inspect the damper to ensure no damage has occurred during transport or storage. Make sure that the inside of the damper body and, in particular, the seal area are clean. Inspect the installation's pipes and the flanges to make sure they are clean.

IMPORTANT QUESTIONS TO CONSIDER DURING ASSEMBLY

- The GC damper is unidirectional, and so should be installed in such a manner as the pressure pushes the gate against the seat.
- Special care must be taken to respect the correct distance between the flanges and ensure they are correctly aligned and parallel (fig. 1).
The incorrect position or installation of the flanges can cause deformations on the damper body and this could lead to operating problems.



It is very important to make sure that the damper is correctly aligned and parallel to the flanges to prevent leakages and avoid deformations.

- The screws in the tapped blind holes will have a maximum depth and will never reach the bottom of the hole. As mentioned in the documentation on the characteristics of the **GRs**, due to the multiple variables of these dampers we would be grateful for information on the connection flanges in each case, allowing us to detail both the metrics of the screw and its maximum depth.
- The equipment must be firmly installed in the pipe. The joint to the duct can be screwed or welded.
 - Whenever the joint is screwed to the duct, an airtight seal must be positioned between the duct and the damper in order to prevent any possible leakages. The seal to be installed shall be selected in line with the work conditions inside the duct (temperature, pressure, fluid, etc). The screws and nuts to be fitted must also be suitable for the operating conditions and their measurements must be in accordance with the approved plans. The screws and nuts will be assembled diagonally. To torque to apply to the fastening screws and nuts must be correct according to the applicable standard, we recommend the initial assembly be carried out with a low tightening torque and after all the screws are in place, the final torque is applied.
 - When the joint is welded to the duct, great care must be taken when welding, as this may produce deformations in the damper due to the tensions created by the welding, possibly leading to operation problems. For this reason it is vitally important to choose qualified personnel and the most suitable welding procedure in each case. Once the unit is positioned and levelled at the location for welding, we recommend first welding by sections in order to control the tensions created due to the welding process. Then carry out the continuous welding of the joint between the duct and the damper.
- As regards scaffolding, ladders and other auxiliary elements to be used during the assembly, follow the safety recommendations indicated in this dossier.



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- Once the equipment has been assembled make sure that there are no elements, whether interior or exterior, which can interfere with the gate valve's movement.
- Make the relevant connections (electrical, pneumatic, hydraulic) in the equipment's drive system following the instructions and wiring diagrams supplied it.
- The operation of the equipment must be coordinated with the site's control and safety staff and no modifications are permitted in the equipment's external indication elements (limit switches, positioners, etc.).
- When operating the equipment follow the safety recommendations indicated in this dossier.

ASSEMBLY POSITIONS (horizontal pipe)

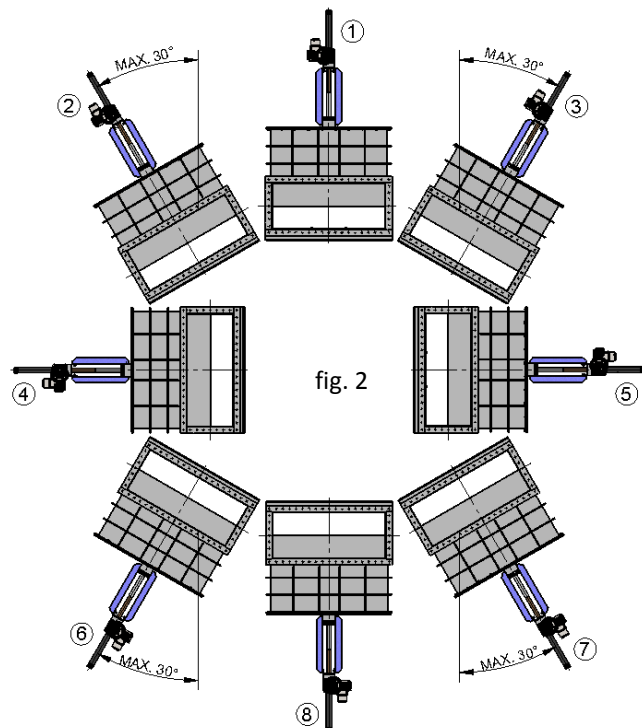
In horizontal pipes it is recommended that CMO valves be assembled in vertical position, although other assembly positions are also possible.

Position 1: This is the most advisable position.

Position number 8: The damper can be installed in this position but you are advised to contact CMO if this is necessary.

Positions 2, 3, 6 and 7: For large valves, the maximum angle with the installation vertical is 30°. For smaller sizes the angle can be increased up to 90° (positions 4 and 5).

When it is necessary to install large dampers in any of these positions, we recommend checking with CMO, as in these cases, due to the weight of the actuator, a suitable support must be made to prevent deformations and operating problems in the dampers.



Positions 4 and 5: For small sized dampers, the valves can be installed in these positions.

To install large dampers in any of these positions please contact CMO.

In these cases, due to the weight of the actuator, a suitable support must be made to prevent deformations and operating problems in the valves.

ASSEMBLY POSITIONS (vertical/inclined pipe)

CMO dampers can be assembled in all positions; however, certain aspects must be taken into account:



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Positions 1, 2, and 3: In these positions, it is recommended to make a suitable support, because, due to the weight of the actuator, deformations may arise and this can lead to operating problems in the damper.

Once the damper has been installed, check that all the screws and nuts have been correctly tightened and that the whole damper action system has been correctly adjusted (electrical connections, pneumatic connections, instruments...).

All CMO valves are tested at its facilities, however, during the handling and transport the screws on the packing gland can come loose and must be re-tightened.

Once the damper is installed in the pipeline and it has been pressurised, it is very important to check for any leakages from the packing gland to the atmosphere.

In the event of a leakage, tighten the nuts on the packing gland crosswise until the leakage stops, ensuring that there is no contact between the packing gland and the gate.

A very high tightening torque on the packing gland's nuts can lead to problems, such as an increase in the valve's torque, reduction in the packing's working life, or the breaking of the packing gland. The tightening torques are indicated in Table 1:

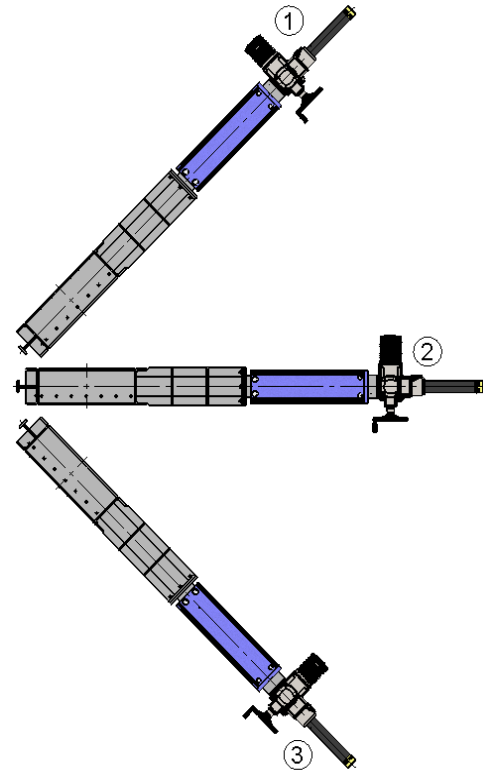


fig. 3

Tightening torques for packing gland screws	
125 x 125 to 750 x 750	5 Nm
800 x 800 to 3000 x 3000	11 Nm

table 1

Once the damper is installed in its place, check that the flanges and electrical and pneumatic connections are secure. If the damper has electrical accessories or you are in an ATEX zone, earth connections must be made before operating it.



If you are in an ATEX zone, check the continuity between the damper and the pipeline (EN 12266-2, annex B, points B.2.2.2. and B.2.3.1.). Check the pipeline's earth connection and the conductivity between the outlet and inlet pipelines.

ACTUATOR

HANDWHEEL (rising stem, non-rising stem with gear box)

To operate the damper: Turn the handwheel clockwise to close or anticlockwise to open.



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CHAINWHEEL

To operate the damper pull one of the chain's vertical drops, taking into account that locking is carried out when the chainwheel turns clockwise.

LEVER

First loosen the position locking clamp located on the yoke. Once it is unlocked raise the lever to open or lower it to close. To complete the operation lock the lever again.

PNEUMATIC (double and single acting),

CMO pneumatic actuators are designed to be connected to a 6 kg/cm² pneumatic network, although these cylinders support up to 10 kg/cm².

The pressurised air used for the pneumatic actuator must be correctly filtered and lubricated.

This type of actuator does not require any adjustment, due to the fact that the pneumatic cylinder is designed for the exact stroke required by the damper.

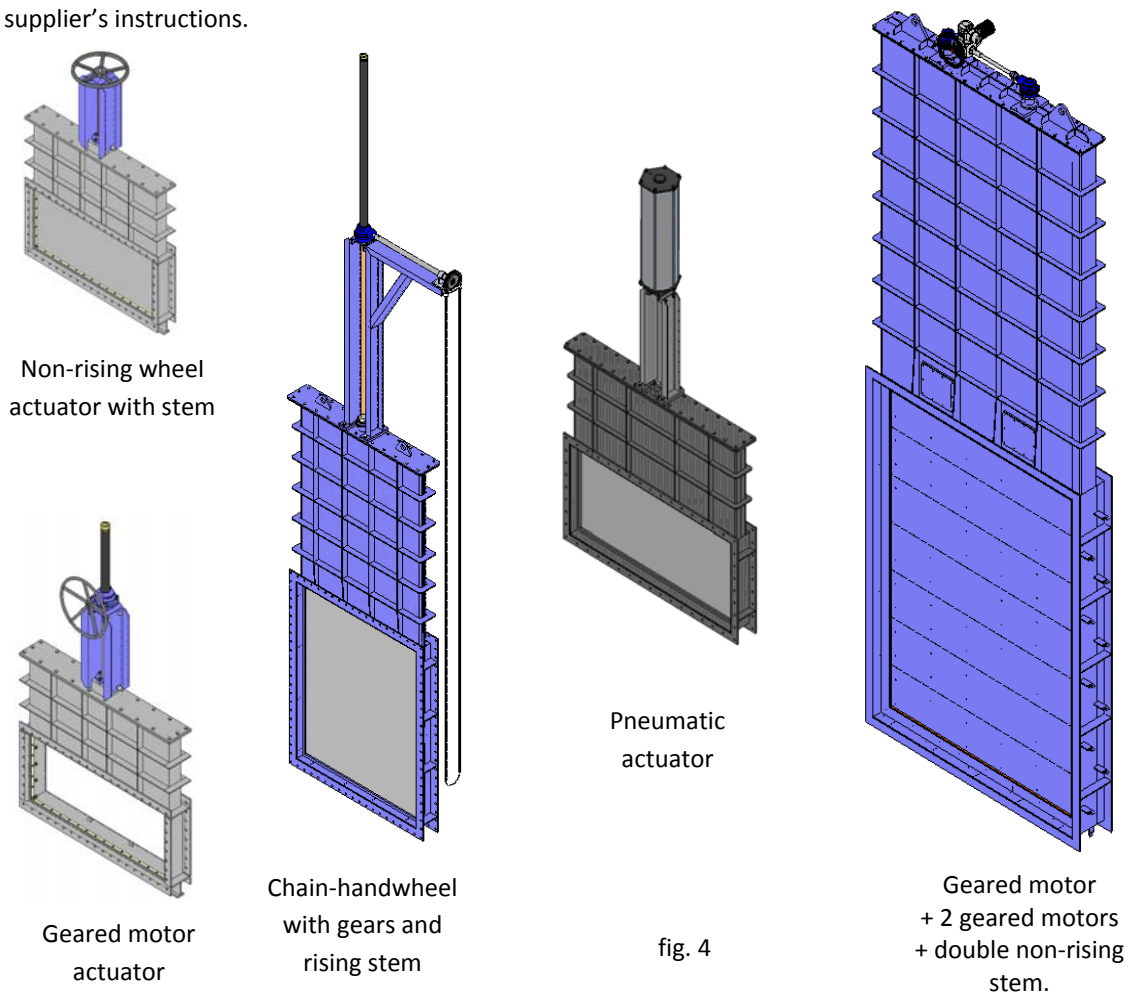
HYDRAULIC (double and single acting)

CMO hydraulic actuators are designed to work at a standard pressure of 135 kg/cm².

This type of actuator does not require any adjustment, due to the fact that the hydraulic cylinder is designed for the exact stroke required by the damper.

MOTORISED (Rising or non-rising stem)

If the damper incorporates a motorised actuator, it will be accompanied with the electric actuator supplier's instructions.





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MAINTENANCE

If the dampers suffer any damage due to improper handling or without the proper authorisation, CMO will not be responsible. The dampers must not be modified except under express authorisation from CMO.

In order to avoid personal or material damage when performing the maintenance tasks, it is recommended to follow these instructions:



- The staff responsible for the maintenance or operation of the equipment must be qualified and trained.
- Use suitable Personal Protective Equipment (PPE) (gloves, safety boots, goggles...).
- Shut off all lines that affect the damper and put up a warning sign to inform about the work being performed.
- Completely isolate the damper from the entire process. Depressurise the process.
- Drain all the line fluid through the damper.
- Use hand tools not electric tools during the maintenance, in accordance with **EN13463-1(15)**.

The only maintenance required in this type of damper is to change the seat's rubber joint (if soft seated valve is used) and the packing. It is recommended to regularly check the seal every 6 months, however its working life will depend on the valve's operating conditions, such as: Pressure, temperature, number of operations, type of fluid and others.



In an ATEX zone, electrostatic charges may be present inside the damper, which can cause a risk of explosion. The user will be responsible for carrying out the appropriate actions in order to minimise the risks.

The maintenance staff must be informed about the risks of explosion and ATEX training is recommended.



If the fluid transported constitutes an internal explosive atmosphere, the user must regularly check the installation's correct seal-tightness.

Regularly clean the damper in order to prevent accumulations of dust.

Assemblies not permitted at the end of the line.

Avoid re-painting the products supplied.

IMPORTANT SAFETY ASPECTS:

- All areas where there is movement, either inside or outside the ducts, are areas of risk. Particularly in equipment supplied with systems which do not require energy (air tank, counterweight, etc), since there is a risk of movement even when disconnected from the mains, hydraulic line or pressurised air line.
- In order to work under ideal safety conditions, the magnetic and electrical elements must be in idle mode and the air tanks depressurised. The electrical control cabinets must also be out of service. The maintenance staff must be up to date with the safety regulations and work can only start under orders from the site's safety staff.
- The safety areas must be clearly marked, avoiding the use of auxiliary equipment (ladders, scaffolding, etc.) in levers or moving parts, in order to produce the movement of the guillotine.
- In equipment with spring return actuators, the gate must be mechanically locked and only unlocked when the actuator is pressurised.
- In equipment with electrical actuator, it is recommended to disconnect it from the mains in order to access the mobile parts without any risk.

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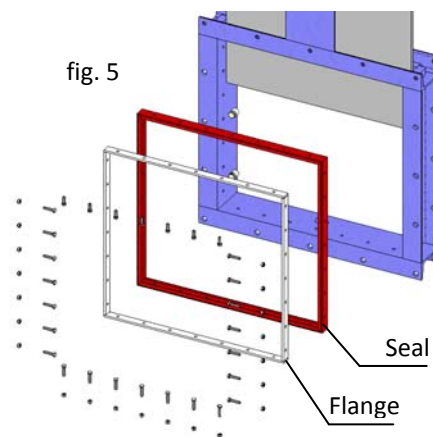
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- Due to its great importance, you must check that the damper shaft has no load before disassembling the actuator system.

Taking into account the recommendations indicated, below we indicate the maintenance operations carried out in this type of equipment:

REPLACING THE SEAL (except metal/metal)

1. Make sure there is absolutely no pressure and fluid in the installation.
2. Remove the damper from the pipeline if necessary.
3. Place the gate (2) in open position.
4. Unscrew and remove the screws from the flange and the seal.
5. Remove the flange and finally the old sealing joint and clean its housing.
6. Fit a new sealing joint covered with Vaseline with the same dimensions as the old one or use the dimensions shown in table 2.
7. Place the flange back, checking that it is correctly fitted and the seal has not been damaged in the process.
8. Before starting up the installation, perform various operations to open and close the damper.



Width	125	150	200	250	300	350	400	450	500	550	600	650	700	750	800	900	1000	1500	2000	2500	3000
Height	125	150	200	250	300	350	400	450	500	550	600	650	700	750	800	900	1000	1500	2000	2500	3000
Length (mm.)	4 x 126	4 x 151	4 x 201	4 x 251	4 x 301	4 x 351	4 x 401	4 x 451	4 x 501	4 x 551	4 x 601	4 x 651	4 x 701	4 x 751	4 x 801	4 x 901	4 x 1001	4 x 1501	4 x 2001	4 x 2501	4 x 3001

table 2

***Note:** The numbers in brackets refer to the components list in Table 6.

***Note:** During the assembly of the new sealing joint it is recommended to apply “Vaseline” to the seal to facilitate the assembly process and the valve’s correct operation (do not use oil or grease), table 3 below shows details of the Vaseline used.

WHITE PETROLEUM JELLY		
Saybolt Colour	ASTM D-156	15
Melting point (°C)	ASTM D-127	60
Viscosity at 100°C	ASTM D-445	5
Penetration 25°C mm/ 10	ASTM D-937	165
Silicone content	None	
Farmacopea BP	OK	

Table 3



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REPLACING THE PACKING

1. Make sure there is absolutely no pressure and fluid in the installation.
2. Position the damper in open position.
3. First release and remove the packing gland flange nuts (9), in order to then separate it from the cover (3), giving access to the compression packing.
4. Extract the stem gland socket (8) in order to access the packing strips (7).
5. Remove the old packing (7) using a pointed tool, taking care not to damage the surface of the stem(10).
6. Carefully clean the packing and make sure that there are no residues anywhere so that the packing strips (7) fit correctly.
7. Insert the new packing. During this operation it is very important that both ends of each strip are perfectly joined, forming a ring.
8. Positioning the packing gland in its original position, taking into account that it should not touch the stem, carefully tighten all the nuts crosswise and make sure the same distance is left between the packing gland and the stem.
9. Perform several manoeuvres with no load, checking the correct operation of the damper and ensuring the packing gland is correctly centred.
10. Pressurise the damper in the line and tighten the packing gland crosswise, enough to prevent leakages to the atmosphere.

***Note:** The numbers in brackets refer to the components list in Table 6.

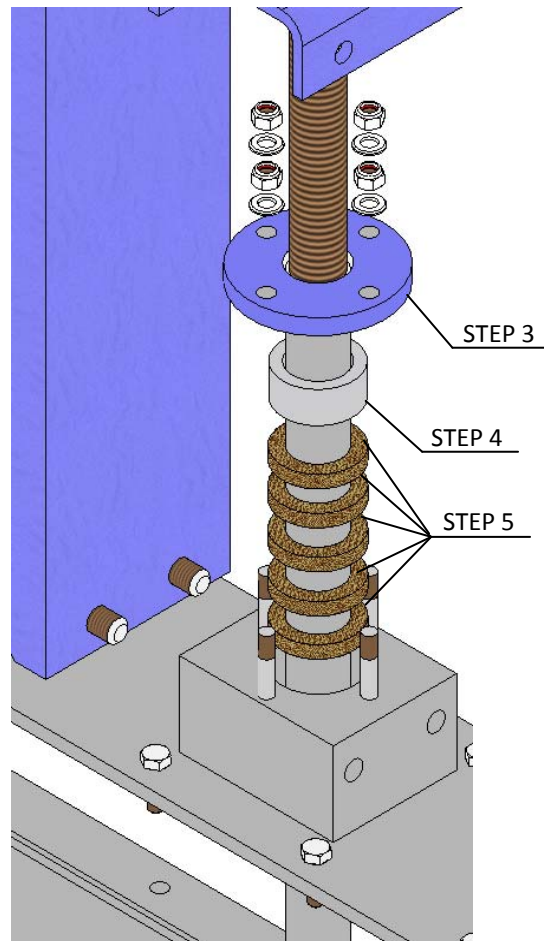


fig. 6

Ø STEM	PACKING
Ø20	4 lines of 6 mm ² x 82 mm
Ø25	4 lines of 6 mm ² x 98 mm
Ø35	5 lines of 8 mm ² x 135 mm
Ø50	5 lines of 10 mm ² x 189 mm
Ø60	5 lines of 12 mm ² x 226 mm
Ø70	5 lines of 14 mm ² x 264 mm

Table 4

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MAINTENANCE OF THE PNEUMATIC ACTUATOR

The pneumatic cylinders in our dampers are manufactured and assembled at our premises. The maintenance of these cylinders is simple, if you need to replace any elements or have any questions please consult CMO. Below is an exploded diagram of the pneumatic actuator and a list of the cylinder's components. The top cover and the support cover are usually made of aluminium, although pneumatic cylinders greater than $\varnothing 200$ mm are made of cast iron GGG40

The maintenance kit normally includes: The socket and its joints and the scraper, and if the customer wishes the piston is also supplied. Below we show the steps to follow to replace these parts.

1. Shut off the pneumatic circuit pressure and position the damper in closed position.
2. Release and remove the cylinder cap (5), the cylinder tube (4) and the tie rods (16).
3. Loosen the nut (14) which connects the piston (3) and the rod (1), remove the parts. Disassemble the cir-clip (10) and remove socket (7) with its joints (8,9) .
4. Release and remove the support cover (2), in order to remove the scraper (6).
5. Replace the damaged parts with new ones and assemble the actuator in the opposite order to that described for the disassembly.

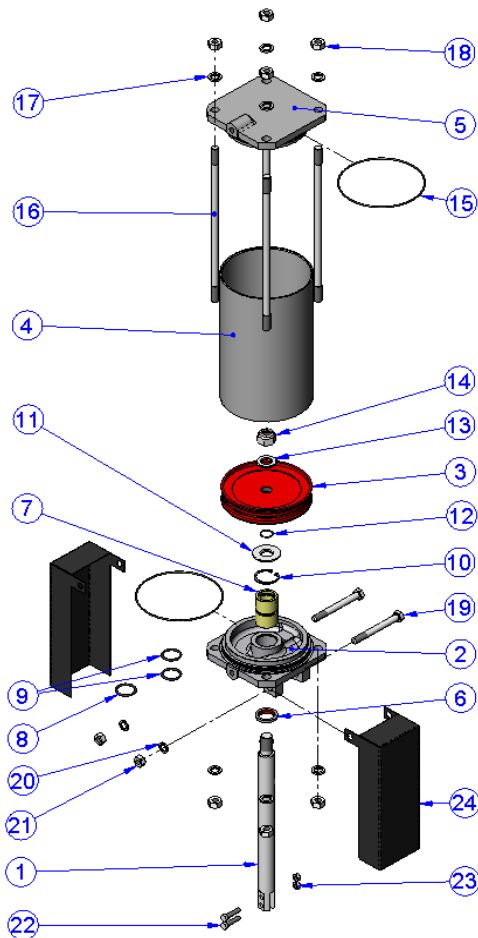


fig. 7

PNEUMATIC ACTUATOR		
POS.	DESCRIPTION	MATERIAL
1	STEM	AISI-304
2	COVER SUPPORT	ALUMINIUM
3	PISTON	S275JR + EPDM
4	CASING	ALUMINIUM
5	UPPER COVER	ALUMINIUM
6	SCRAPER	NITRILE
7	SOCKET	NYLON
8	EXTERIOR O-RING	NITRILE
9	INTERIOR O-RING	NITRILE
10	CIR-CLIP	STEEL
11	WASHER	ST ZINC
12	O-RING	NITRILE
13	WASHER	ST ZINC
14	SELF-LOCKING NUT	5.6 ZINC
15	O-RING	NITRILE
16	TIES	F-114 ZINC
17	WASHER	ST ZINC
18	NUT	5.6 ZINC
19	SCREW	5.6 ZINC
20	WASHER	ST ZINC
21	NUT	5.6 ZINC
22	SCREW	A-2
23	SELF-LOCKING NUT	A-2
24	PROTECTION	S275JR

table 5



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LUBRICATION

It is recommended to lubricate the stem twice a year by removing the protection cap and filling it with grease up to half its volume.



After the maintenance and in an ATEX zone, you must check the electrical continuity between the pipe and the rest of the damper's components, such as the body, gate, stem... EN 12266-2 Standard, annex B, points B.2.2.2. and B.2.3.1.)

STORAGE

To ensure the damper is in optimum conditions of use after long periods of storage, it should be stored in a well-ventilated place at temperatures below 30°C.

It is not advisable, but if it is stored outside, the damper must be covered to protect it from heat and direct sunlight, with good ventilation to prevent humidity. The following aspects must be considered for storage purposes:

- The storage place must be dry and under cover.
- It is not recommended to store the equipment outdoors with direct exposure to adverse weather conditions, such as rain, wind, etc. Even less so if the equipment is not protected with suitable packaging.
- This recommendation is even more important in areas with high humidity and saline environments. Wind can carry dust and particles which can come into contact with the damper's mobile parts and this can lead to operating difficulties. The actuator system can also be damaged due to the introduction of particles in the different elements.
- The equipment must be stored on a flat surface to avoid deformations.
- If the equipment is stored without suitable packaging it is important to keep the damper's mobile parts lubricated, for this reason it is recommended to carry out regular checks and lubrication.
- Likewise, if there are any machined surfaces without surface protection it is important for some form of protection to be applied to prevent the appearance of corrosion.

COMPONENTS LIST	
POS	DESCRIPTION
1	BODY
2	GATE
3	COVER
4	SUPPORT PLATES
5	SEAL RIM
6	WEDGES
7	PACKING
8	GLAND SOCKET
9	GLAND FLANGE
10	STEM
11	ACTUATOR SUPPORT
12	GEARED MOTOR
13	HOOD
14	CAP

table 6

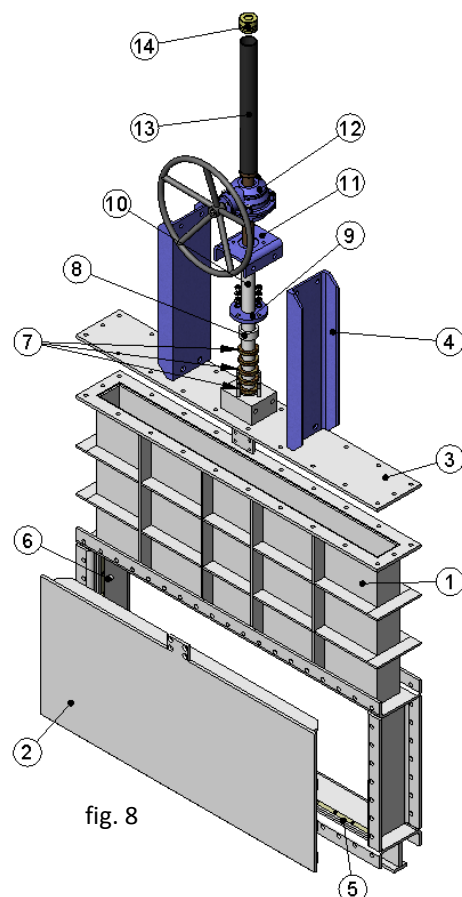


fig. 8