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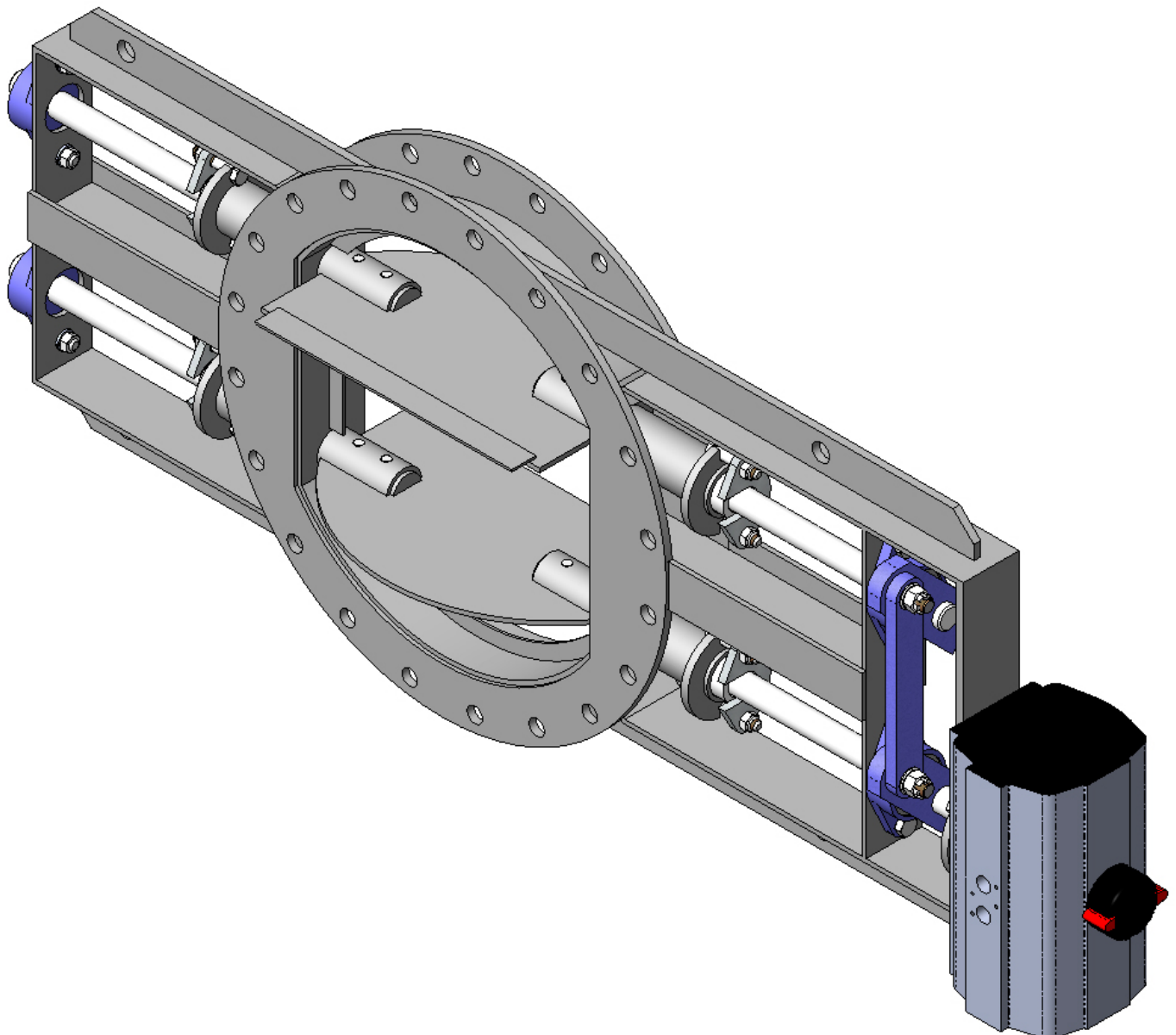
**ROUND LOUVRE DAMPER**

**LR SERIES**

05/04/2016

# INSTRUCTIONS AND MAINTENANCE MANUAL

## SERIES: LR



C.M.O.

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page 1



## ROUND LOUVRE DAMPER

## LR SERIES

### ASSEMBLY

#### THE "LR" ROUND LOUVRE DAMPER BUTTERFLY COMPLIES WITH THE FOLLOWING:

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

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

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

**LR** round butterfly valves may comply with the directive on protection systems and apparatus for use in 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 butterfly can be used. The user is responsible for its use in any other zone.



#### HANDLING

Pay special attention to the following points when handling the equipment:

- **SAFETY WARNING:** Before handling the round multilouvre damper, check that the crane to be used is capable of bearing its weight.
- Do not lift the damper valve or hold it by the actuator. Lifting the damper butterfly by the actuator can lead to operating problems as it is not designed to withstand the weight of the complete equipment.
- Do not lift the round **LR** multilouvre damper by holding the fluid passage area. If a sealing system is fitted, it is located in this area. In consequence, if the valve is lifted in this way, the sealing system and surface may be damaged, causing leakage problems during operation.
- To prevent damage, especially to the anti-corrosive protection, we recommend using soft straps to lift **C.M.O.** damper butterflies. These straps should be secured using the orifices fitted in the equipment for this purpose.
- Packing gland 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 that two or more valves are packed together, separation and securing elements must be used to prevent possible movements, knocks and friction during transport. When storing two or more round multilouvre dampers in the same box, ensure they are correctly supported in order to prevent loss of shape. 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 butterfly valves during loading and unloading as well as during transport to prevent loss of shape in the equipment. For this purpose we recommend the use of mounts or stands.



#### INSTALLATION

In order to avoid personal injury and other types of damage (to the facilities, the round damper valves, etc.), we recommend following these instructions:

## ROUND LOUVRE DAMPER

## LR SERIES



- The personnel responsible for the installation or operation of the equipment must be qualified and trained.
- Use suitable Personal Protective Equipment (PPE) (gloves, safety boots, goggles, etc).
- Shut off all lines which affect the damper butterfly and put up a warning sign to inform about the work being carried out.
- Completely isolate the butterfly valve from the whole process. Depressurise the process.
- Drain all the line fluid through the damper.
- Use non-electrical hand tools during installation and maintenance, in accordance with **EN13463-1(15)**.

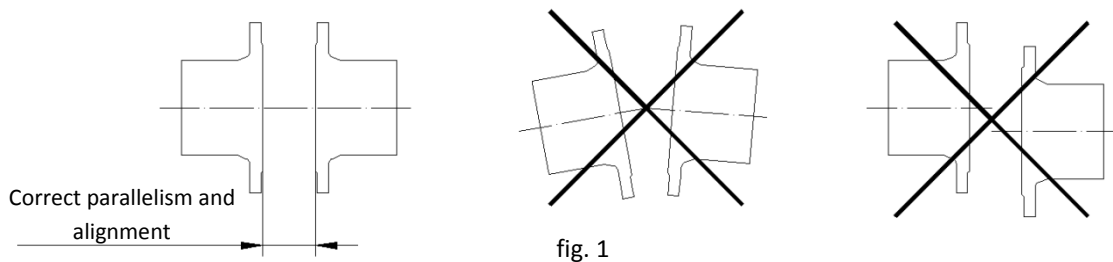
Before installation, inspect the round damper butterfly valve to ensure no damage has occurred during transport or storage.

Make sure that the inside of the damper butterfly body and, in particular, the seal area are clean. Inspect the installation's pipes and the flanges to make sure they are clean.

### IMPORTANT ASPECTS TO CONSIDER DURING ASSEMBLY

- **LR** round multilouvre damper light butterfly valves are bidirectional and work in the same way in both directions, meaning the direction the valve is mounted in in the line is irrelevant.
- 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 loss of shape on the valve's 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 loss of shape.

- The bolts in the threaded blind holes will have a maximum depth and will never reach the bottom of the hole. As indicated in the documentation of the **LR** characteristics, these round damper butterflies have numerous variables, and in consequence we recommend asking for further information about them.
- The equipment must be firmly installed in the pipe. The joint to the conduit can be bolted or welded.
  - When the joint is bolted to the conduit, watertight seals must be positioned between the conduit and the damper butterfly in order to prevent any possible leakages. The seals to be installed shall be selected in line with the work conditions inside the conduit (temperature, pressure, fluid, etc). The bolts and nuts to be fitted must also be suitable for the operating conditions and their measurements must be in accordance with the approved plans.

## ROUND LOUVRE DAMPER

## LR SERIES

The bolts and nuts will be assembled diagonally. The torque to apply to the fastening bolts and nuts must be correct according to the applicable standard; we recommend carrying out the initial assembly with a low tightening torque and, once all the bolts are in place, applying the final torque.

- When the joint is welded to the conduit, take care when welding. Loss of shape may come about in the damper butterfly due to the tensions created by welding, which may lead 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. To finish, carry out the continuous welding of the joint between the conduit and the round damper butterfly.
- As regards scaffolding, ladders and other auxiliary elements to be used during the assembly, follow the safety recommendations indicated in this dossier.
- Once the equipment has been assembled, ensure that there are no interior or exterior elements which can interfere with the movement of the louvres.
- Make the relevant connections (electrical, pneumatic, etc) in the equipment's drive system following the instructions and wiring diagrams supplied with 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, fig. 2)

**C.M.O.'s LR** round multilouvre damper butterflies. are designed for the rotation shafts to remain in horizontal position, although other assembly positions are also possible.

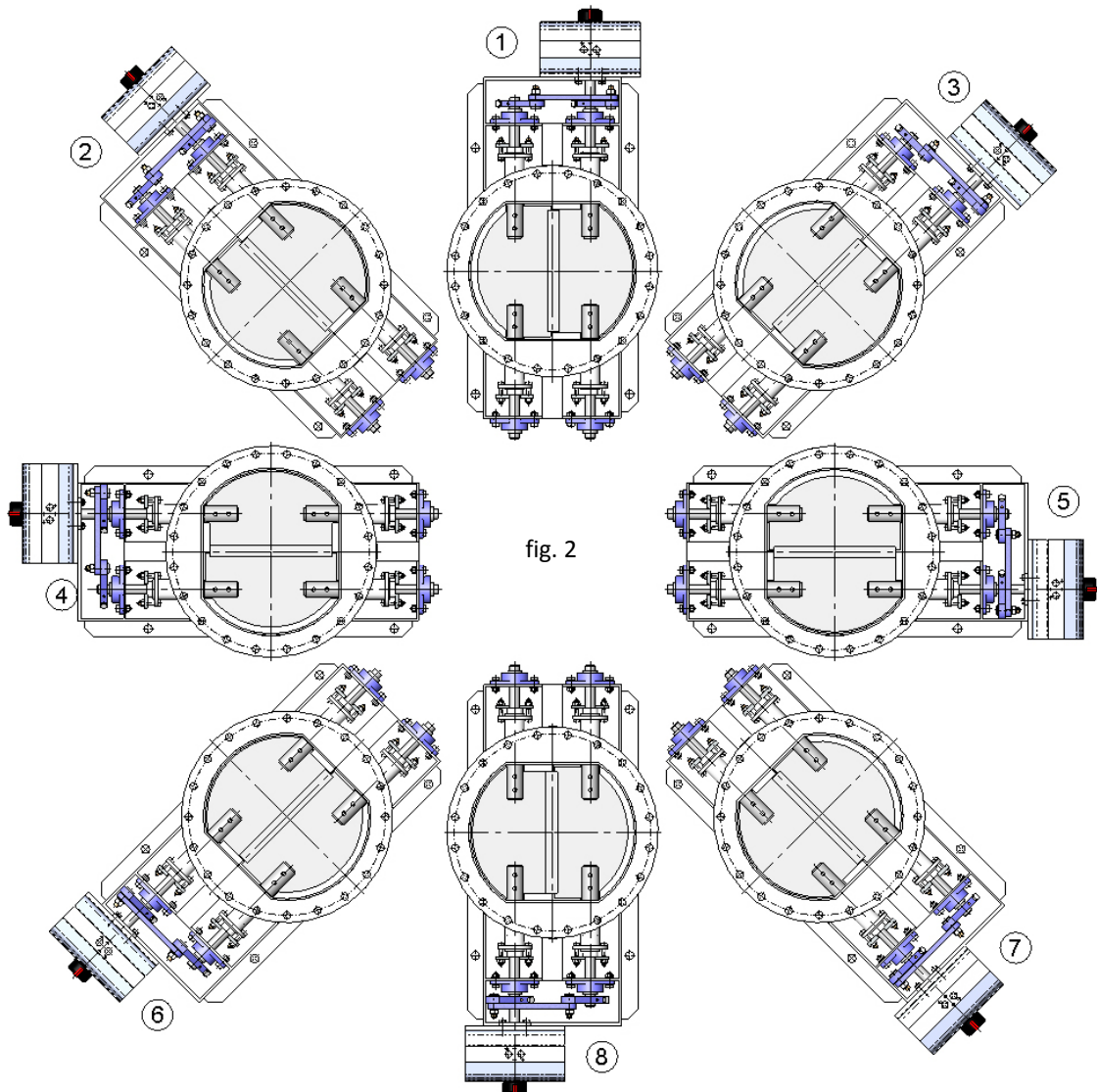
**Positions 4 and 5:** **C.M.O.'s** round damper butterflies. are designed to work in these positions.

**Positions numbers 1, 2, 3, 6, 7 and 8:** The multilouvre damper butterflies can be installed in these positions, although we suggest checking with **C.M.O.** as necessary. For these positions it is necessary to design the valve to work correctly. Given the weight of the actuator, in some cases it may be necessary to prepare suitable support to prevent loss of shape and operation problems in these damper valves.



## ROUND LOUVRE DAMPER

## LR SERIES



### ASSEMBLY POSITIONS (vertical/slanting pipe, fig. 3)

C.M.O.'s round multilouvre damper butterflies are designed for problem-free assembly in vertical or slanting pipes, although certain aspects must be taken into account:

**Positions numbers 1, 2, and 3:** One of the most important characteristics, which must be strictly adhered to, is that the rotation shafts should be in horizontal position.

Moreover, given the weight of the actuator, in some cases it may be necessary to prepare suitable support to prevent loss of shape and operation problems in the valve.

For this reason, we recommend checking with C.M.O. as necessary in order to assemble the round damper butterfly in any of these positions.

# ROUND LOUVRE DAMPER

# LR SERIES

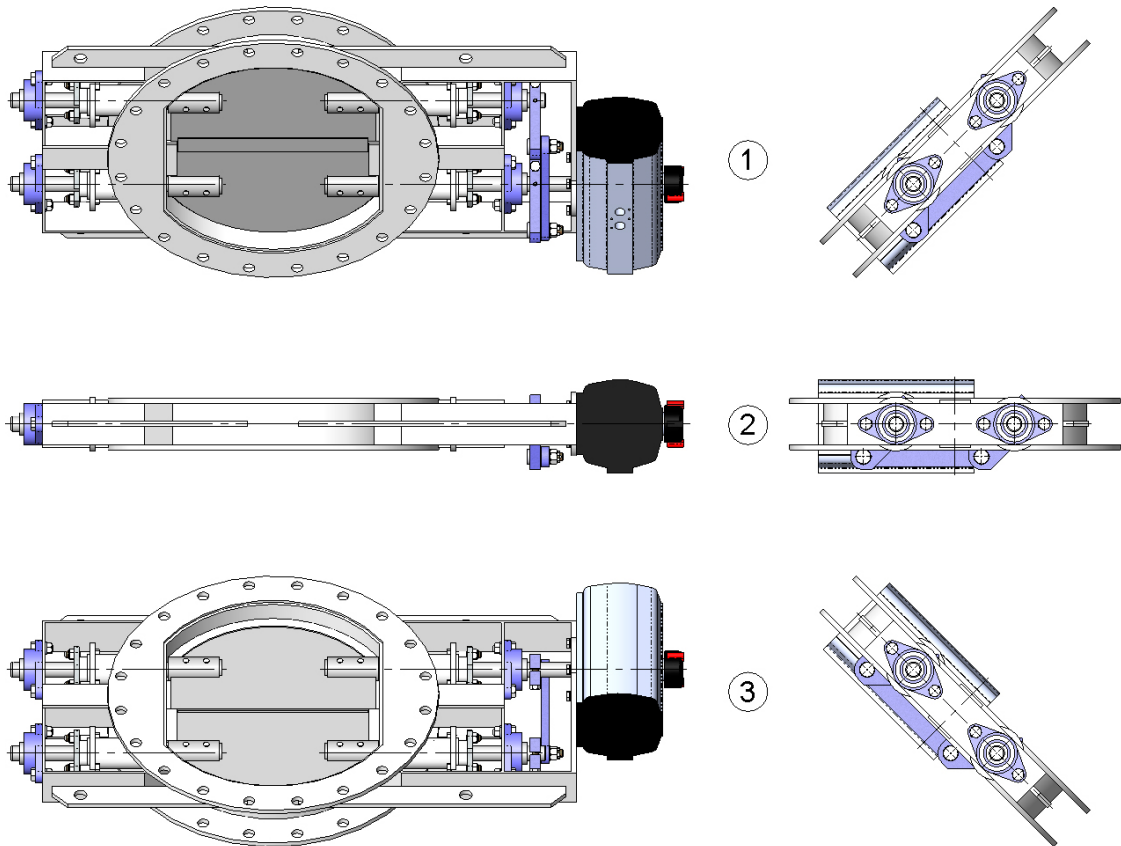


fig. 3

Once the damper butterfly has been installed, check that all the bolts and nuts have been correctly tightened and that the whole valve drive system has been correctly adjusted (electrical connections, pneumatic connections, instruments, etc.).

All **C.M.O.** valves are tested at its facilities, however, during handling and transport the packing gland nuts can come loose and must be re-tightened.

Once the damper butterfly 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 of the packing gland flanges crosswise until the leakage stops, ensuring that there is no contact between the packing gland and the shafts.

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

Tightening torques for packing gland bolts	
DN 400 to DN 1000	5 Nm
DN 1100 to DN 3000	11 Nm

table 1

## ROUND LOUVRE DAMPER

## LR SERIES

Once the multilouvre damper butterfly is in place, check that the flanges and electrical or pneumatic connections are secure. If the valve 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 butterfly and the pipe (EN 12266-2, annex B, points B.2.2.2 and B.2.3.1.). Check the pipe's earth connection and the conductivity between the outlet and inlet pipes.

### DRIVE

#### HANDWHEEL (with gears, fig. 4)

In order to operate the damper butterfly, turn the wheel anti-clockwise to close. On the other hand, turning the wheel anticlockwise causes it to open.

#### CHAINWHEEL

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

#### LEVER (fig. 5)

First loosen the position lock system, which is located on the lever itself. Once released, the lever can be turned to open or close the valve. Lock the lever again to finish the operation.

#### PNEUMATIC (double and single acting)

The pneumatic actuators used by **C.M.O.** are designed to be connected to a 6 kg/cm<sup>2</sup> pneumatic network, although these cylinders support up to 10 kg/cm<sup>2</sup>.

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

It is necessary to fit speed regulators in this type of actuator. The minimum time for each operation (opening or closing) is 6 seconds.

Two types of pneumatic actuator can be distinguished:

- The most common in this type of damper butterfly are ¼-turn (fig. 6 and 7). These are mounted directly on the actuator shaft.
- There are also the linear pneumatic cylinders (fig. 8). This type of actuator is mounted on a rod on the actuator shaft in order to convert the linear movement generated by the cylinder into rotational movement and turn the louvres.

These pneumatic actuators do not require any adjustment, since the pneumatic cylinder is designed for the exact run required by the round damper butterfly.

#### HYDRAULIC (double and single acting)

**C.M.O.**'s hydraulic actuators are designed to operate at a standard pressure of 135 kg/cm<sup>2</sup>.

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 butterfly.



## ROUND LOUVRE DAMPER

## LR SERIES

### MOTORISED (fig. 9)

If the multilouvre damper butterfly is fitted with a motorised actuator, it will be accompanied by the electrical actuator supplier's instructions.

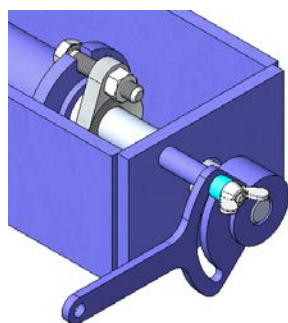


fig. 5

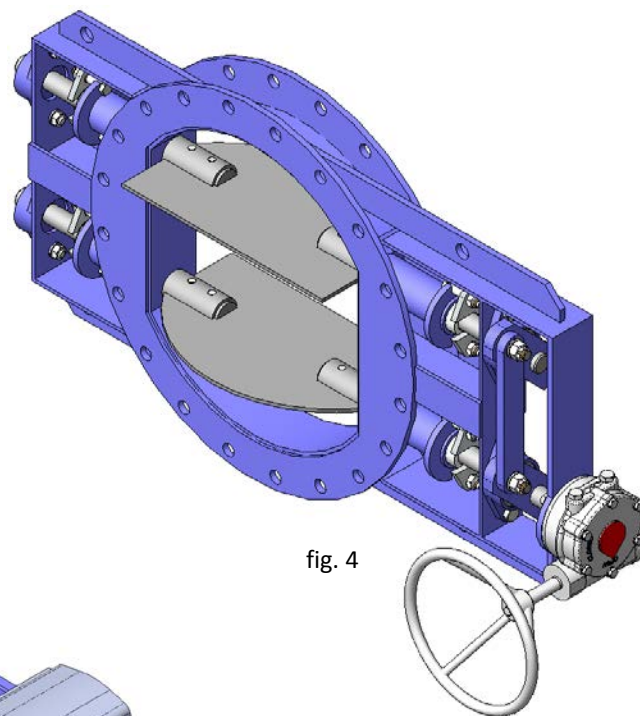


fig. 4

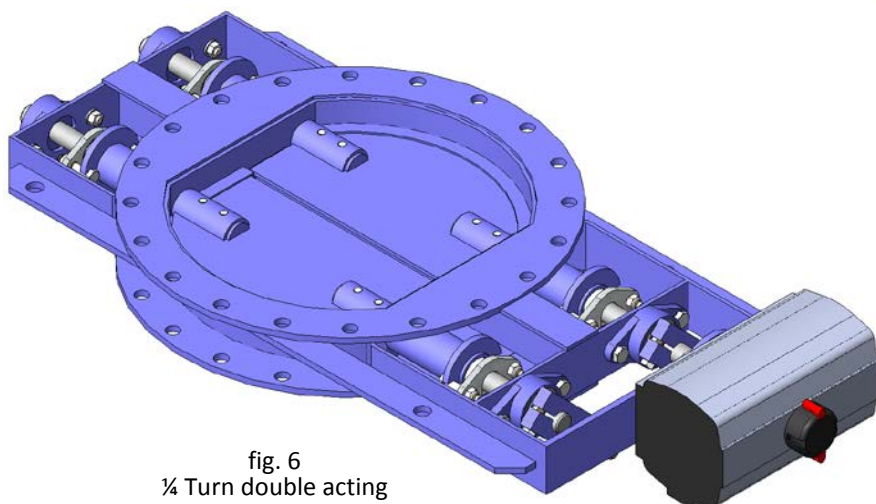


fig. 6  
1/4 Turn double acting  
pneumatic actuator

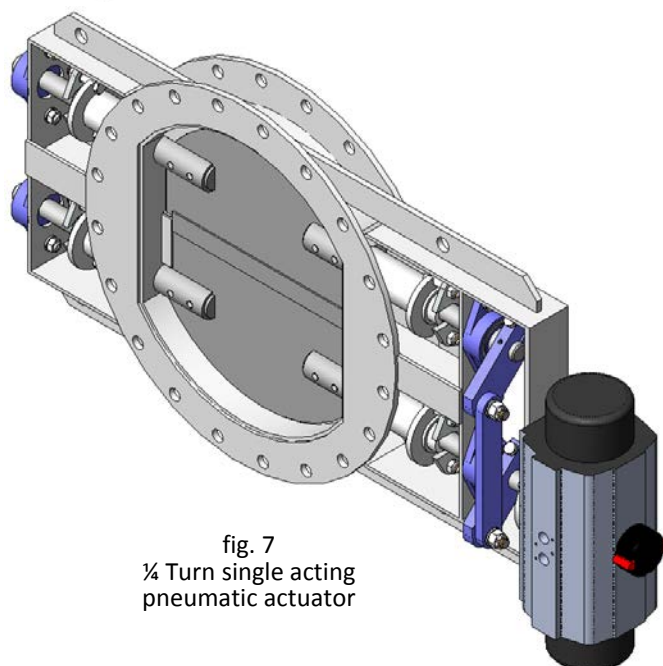


fig. 7  
1/4 Turn single acting  
pneumatic actuator





## ROUND LOUVRE DAMPER

## LR SERIES

fig. 8  
Double acting linear  
pneumatic actuator

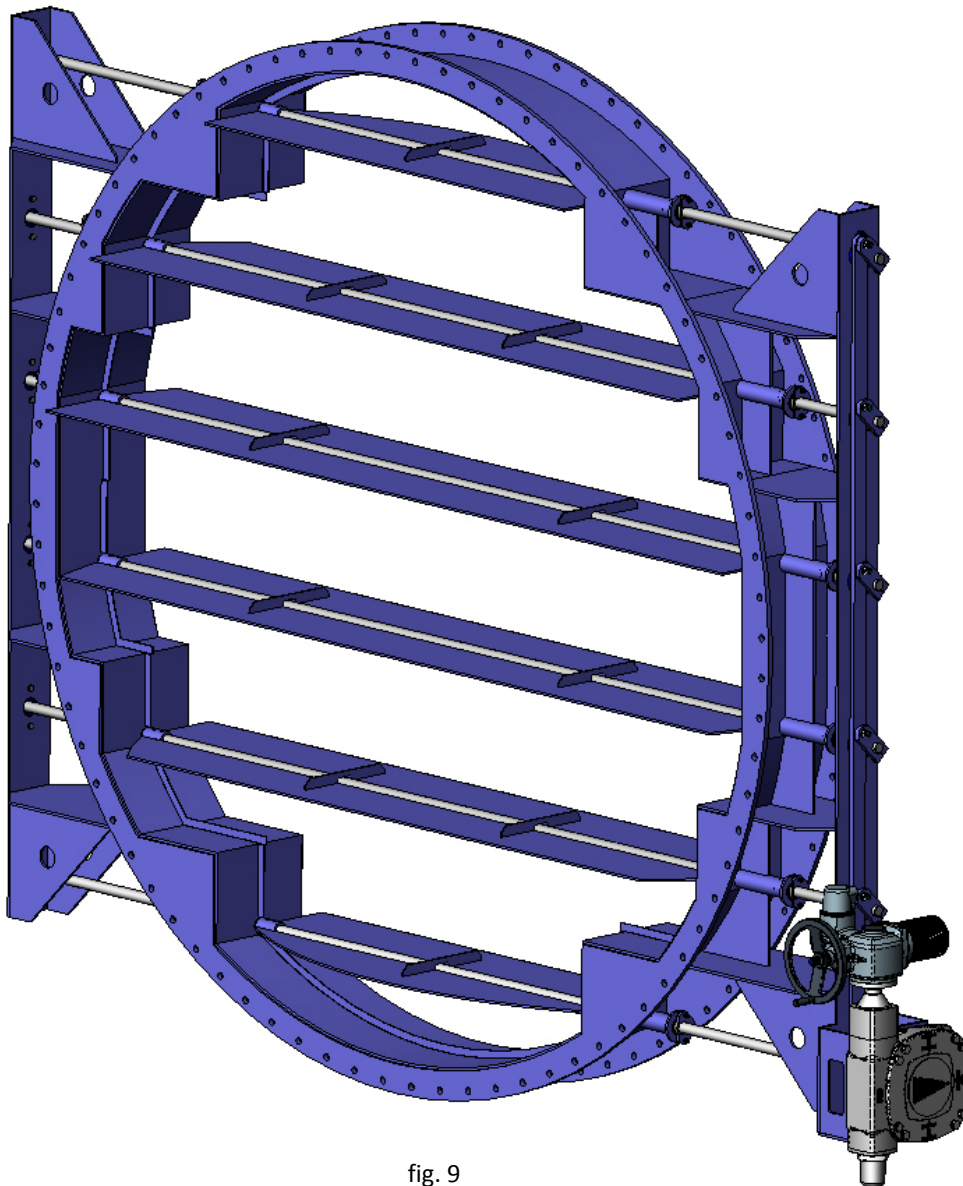
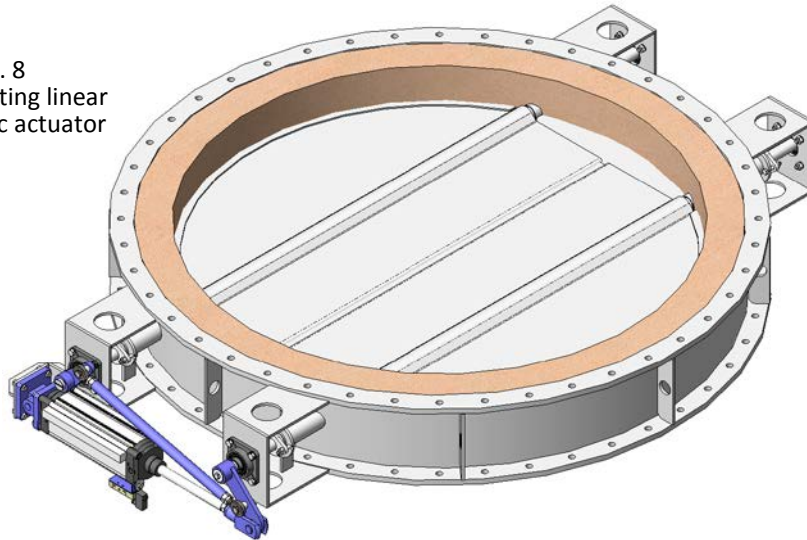


fig. 9

C.M.O.

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page 9

## MAINTENANCE

C.M.O. will not be liable if the round damper butterflies suffer any damage due to improper handling or without proper authorisation. The valves should not be modified unless expressly authorised by **C.M.O.** Following these instructions is recommended in order to avoid personal or material damage when performing the maintenance tasks:



- The personnel responsible for the maintenance or operation of the equipment must be qualified and trained.
- Use suitable Personal Protective Equipment (PPE) (gloves, safety boots, goggles, etc).
- Shut off all lines which affect the multilouvre damper and put up a warning sign to inform about the work being carried out.
- Completely isolate the damper butterfly from the whole process. Depressurise the process.
- Drain all the line fluid through the valve.
- Use non-electrical hand tools during maintenance, in accordance with **EN13463-1(15)**.

The only maintenance required in this type of dampers is to change the shaft packings. It is recommended to regularly check the packing gland every 6 months, however its working life will depend on the valve's working conditions, such as: pressure, temperature, number of operations, type of fluid and others.



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

Maintenance personnel 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 watertight integrity.

Regular cleaning of the damper valve to prevent accumulation of dust.

Assemblies are not permitted at the end of the line.

Avoid re-painting the products supplied.

### IMPORTANT SAFETY ASPECTS

- The areas in which there is movement, whether inside or outside the conduit, are risk areas. This is particularly true in equipment supplied with drive systems which do not require energy (air tank, springs, etc.), since there is a risk of movement even when disconnected from the grid 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 personnel must be up to date with the safety regulations and work can only start under orders from the site's safety personnel.

## ROUND LOUVRE DAMPER

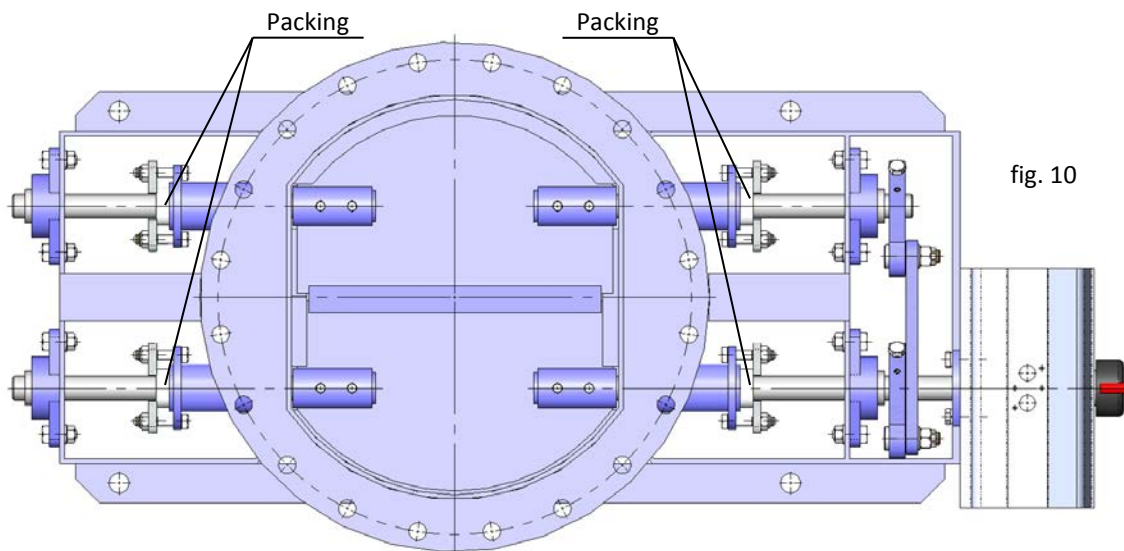
## LR SERIES

- 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 louvres.
- In units fitted with spring return actuators, the louvres 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.
- Its great importance means you should check that the multilouvre damper butterfly's shaft has no load before disassembling the drive system.

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

### REPLACING THE PACKING

1. Make sure there is absolutely no pressure and fluid in the installation.
2. These LR multilouvre damper butterflies often have a packing gland system on each side of the louvre (fig. 10). All the packing gland systems of the same valve are identical, meaning the same operations must be repeated with all of the packings, it being irrelevant which one is first.



3. Choose any of the packing glands and start to release and remove the nuts (13) from the packing gland flange (8) in order to move it along the shaft, separating it from the packing gland bushing (7) (fig. 11).
4. Extract the packing gland bushing (7) from its location, moving it along the shaft for free access to the packing strips (6) (fig. 12).
5. Remove the old packing (6) using a pointed tool, taking care not to damage the surface of the shaft (fig. 13).

## ROUND LOUVRE DAMPER

## LR SERIES

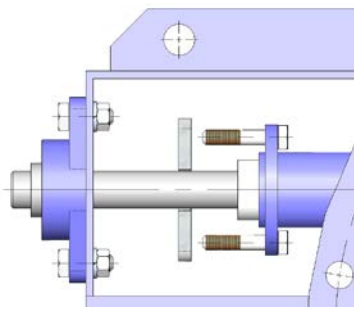


fig. 11

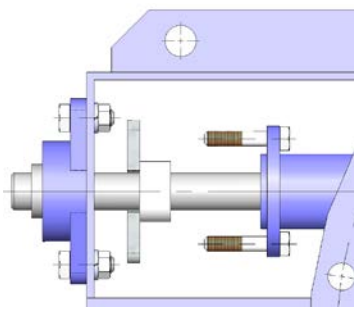


fig. 12

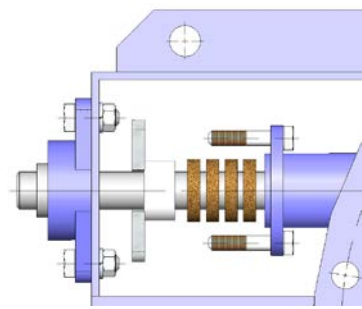


fig. 13

6. Carefully clean the packing housing and make sure to remove any excess or waste, thus ensuring that the packing strips (6) fit correctly.
7. Insert the new packing (6). During this operation it is very important that both ends of each strip are perfectly joined, forming a ring.
8. After correctly introducing all the packing strips (6), insert the packing gland bushing (7) in its original position.
9. Continue to move the packing gland flange (8) along the shaft, until it is supported on the gland bushing (7).
10. Mount the nuts (13) of the gland flange (8) and tighten them carefully crosswise, taking care to ensure the packing gland bushing (7) cannot come into contact with the shaft.
11. It is very important to ensure that the surface of the packing gland flange (8) is always perpendicular to the shaft, thus ensuring that the press is exerting the same pressure throughout the packing (6).
12. After replacing one of the packing gland systems, carry out the same operations as described in point number 3 to 11 with the other packing gland.
13. Once the packings of both shafts have been replaced, carry out several operations without load in order to check the correct operation of the multilouvre damper and ensure that the packing gland bushing (7) is correctly aligned.
14. Subject the valve to pressure in the line and, if necessary, retighten the nuts (13) of the packing gland flanges (8) crosswise in order to prevent leakages.

**\*Note:** The numbers in brackets refer to the components list in Table 4.

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

table 2

# ROUND LOUVRE DAMPER

# LR SERIES

## LINEAR PNEUMATIC ACTUATOR MAINTENANCE

The linear pneumatic cylinders in our damper butterflies are manufactured and assembled at our premises. Maintenance for these cylinders is straightforward; if you need to replace any elements or have any questions please ask **C.M.O.** 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 over Ø200 mm are made of cast iron GJS-400.

The maintenance kit normally includes: the bushing with its seals and the scraper. The piston can also be supplied if the customer so requires.

The steps to follow to replace these parts are shown below.

1. Position the round damper butterfly in closed position and shut off the pneumatic circuit pressure.
2. Release the cylinder air input connections.
3. Release and remove the top cover (5), the casing (4) and the braces (16).
4. Loosen the nut (14) which connects the piston (3) and the spindle (1), and remove the pieces.
5. Disassemble the cir-clip (10) and remove the bushing (7) with its joints (8, 9) .
6. Release and remove the mount cover (2), in order to remove the scraper (6).
7. Replace the damaged parts with new ones and assemble the actuator in the reverse order to that described for disassembly.

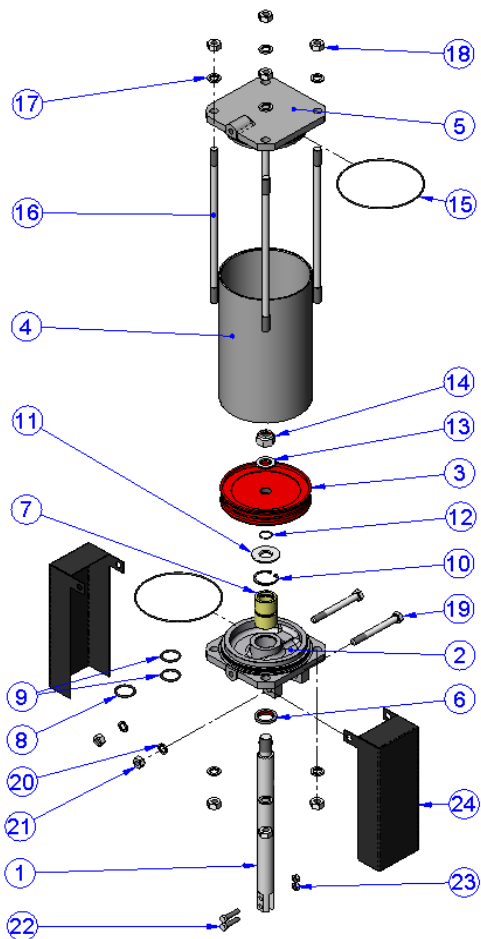


fig. 14

PNEUMATIC ACTUATOR		
POS.	DESCRIPTION	MATERIAL
1	SPINDLE	AISI-304
2	SUPPORT COVER	ALUMINIUM
3	PISTON	S275JR + EPDM
4	CASING	ALUMINIUM
5	UPPER COVER	ALUMINIUM
6	SCRAPER	NITRILE
7	BUSHING	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	SHAFT	F-114 ZINC
17	WASHER	ST ZINC
18	NUT	5.6 ZINC
19	BOLT	5.6 ZINC
20	WASHER	ST ZINC
21	NUT	5.6 ZINC
22	BOLT	A-2
23	SELF-LOCKING NUT	A-2
24	PROTECTION	S275JR

Table 3

## ROUND LOUVRE DAMPER

## LR SERIES



After maintenance and in an ATEX zone, you must check the electrical continuity between the pipe and the rest of the multilouvre damper butterfly components, such as the body, louvres, shafts, etc., Standard EN 12266-2, Annex B, points B.2.2.2. and B.2.3.1.

### STORAGE

To ensure the round damper butterfly is in optimum conditions of use after long periods of storage, we recommend storing it in a well-ventilated place at temperatures below 30°C.

It is not advisable, but, if stored outside, the damper valve 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. This is particularly important 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 multilouvre damper's moving 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 any loss of shape.
- If the equipment is stored without suitable packaging it is important to keep the damper butterfly's moving 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.

**ROUND LOUVRE DAMPER**

**LR SERIES**

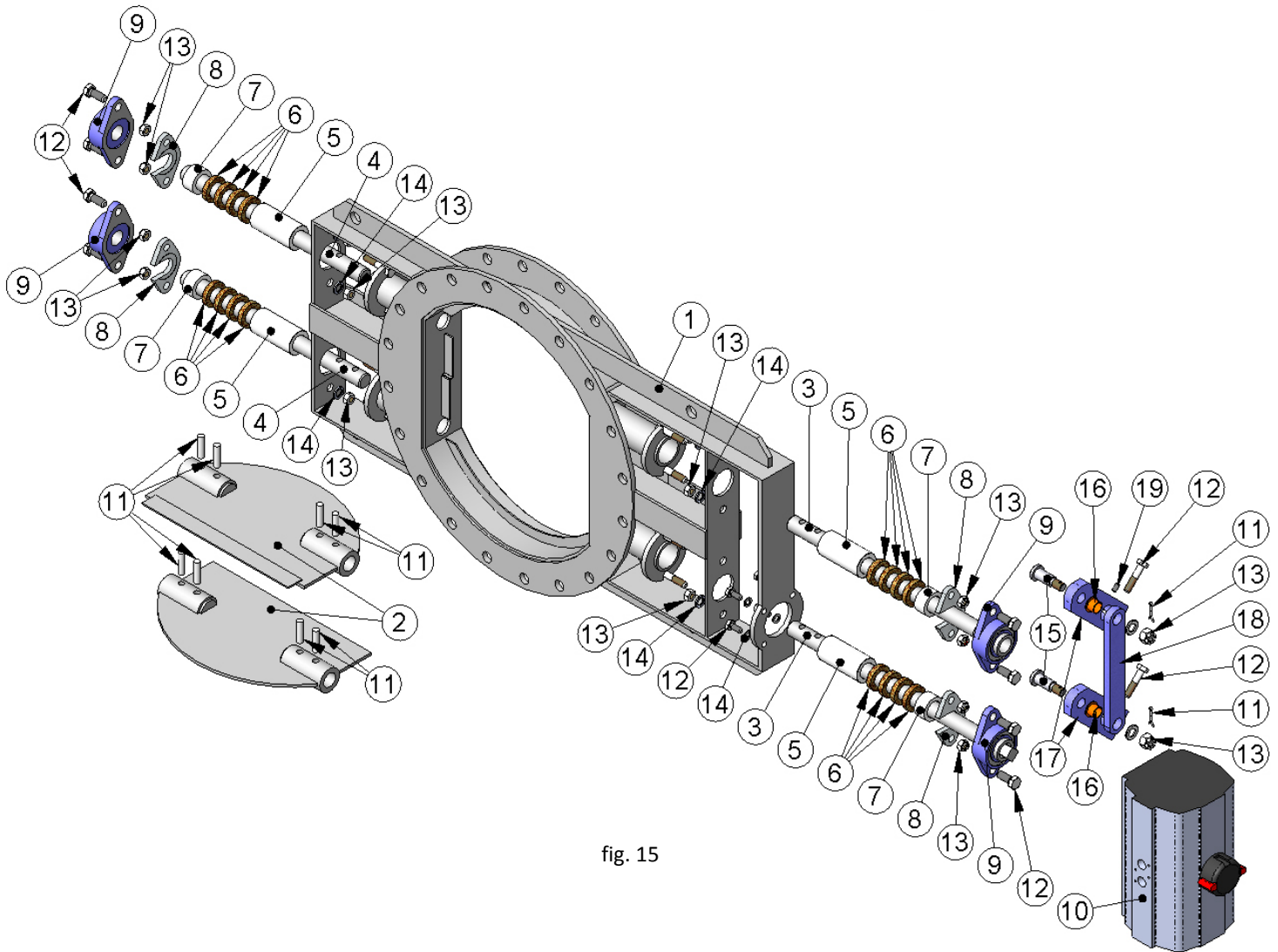


fig. 15

STANDARD COMPONENTS LIST					
POS.	COMPONENT	POS.	COMPONENT	POS.	COMPONENT
1	Body	7	Packing gland bushing	14	Washer
2	Louvres	8	Packing gland flange	15	Bolt
3	Drive shaft	9	Support with bearing	16	Self-lubricated bushing
4	Driven shaft	10	Actuator	17	Lever
5	Spacer	11	Pin	18	Rod
6	Packing	12	Bolt	19	Setscrew
		13	Nut		

Table 4