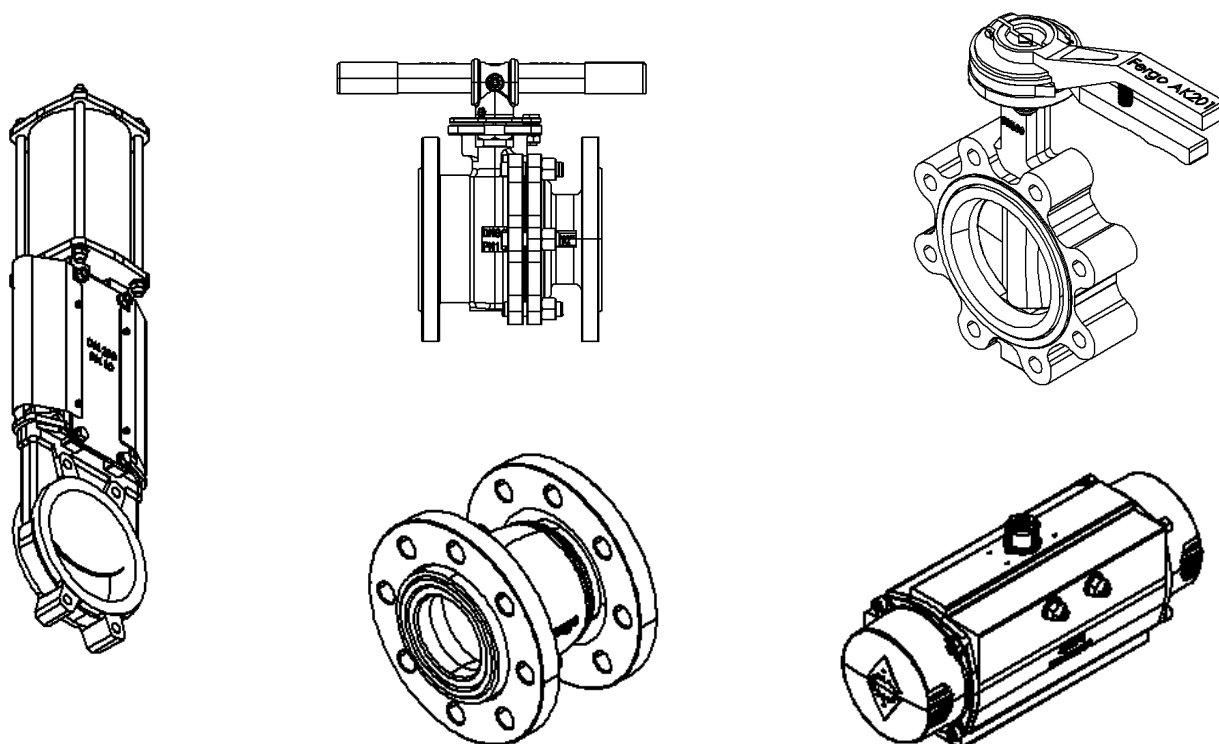


Installation, Operation & Maintenance Instruction

Double Eccentric Butterfly Valve AX130 & AX131

English



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1. SCOPE

This document applies to high performance butterfly valve from **FERGO Armaturen GmbH** Type AX.

This instructions manual contains important information concerning the installation, operation, maintenance and storage of double eccentric valves, metal and PTFE seated. Please read carefully these instructions and keep them for future occasions. It is important that only well-informed and qualified people operate the valves. Valves are delivered with labels containing the following information: anagram, model, design pressure, maximum pressure, lining, materials, manufacturing order, date and CE marking.

2. WARNINGS

- Arbitrary alterations of the product and of any of its components are not allowed. We will not assume any liability for the consequent damage due to non-compliance with these instructions.
- The valves are designed and manufactured according to the highest standards and the safety of its functionality is ensured. However, valves may be damaged if operated improperly or not installed for the intended use.
- Make sure that the pipeline section is free from hazards and has been depressurised before removing any protective devices and/or performing any work on the valves. Any kind of unauthorised, unintentional or unexpected actuation as well as any hazardous movement caused by stored energy (pressurised air, water under pressure) must be prevented.
- During monitoring or inspection of equipment, all relevant laws and regulations must be complied with (the Industrial Code, the Accident Prevention Regulations, the Ordinance of Steam Boilers and instruction pamphlets issued by the Pressure Vessel Study Group). In addition, local accident prevention regulations must be observed.
- The valves must not be used for values above the limits indicated on the valve's plate or in different conditions than those precisely described in the operating instructions, contractual documentation or type leaflet.
- The use of valves in condition different from those specifically indicated may result in overloads which in turn may damage the valves.
- The failure to observe the official instructions may lead to damage to persons or things: injuries caused by fluid (cold, hot, toxic, under pressure ...) that may leak.
- In case of corrosive or erosive action or something else that could thin the thickness of the valves wall, they must be substituted so to avoid the risk of leakage or structural failure.
- When a valve serving as an end-of-line valve (which shall be assembled with a counterflange) is opened in a pressurised pipeline, this must be performed with the utmost care to prevent the emerging fluids from causing any damage. Such valve must also be closed cautiously in order to avoid crushing or trapping.
- When a valve is dismantled from a pipeline, fluids may emerge in the pipeline or the valve. Therefore, the pipeline must be emptied completely before the valve is dismantled. Be careful that residue does not continue flowing.

3. TRANSPORT

- During transport to the installation site, the valve must be packed in a safe and stable packing material suitable for the specific valve size. The valve must be completely protected against any kind of atmospheric influence and external damage. Valves that are shipped under specific climatic conditions (e.g. overseas transport) must be specially protected.
- The valve must be placed on one of its flanges or alternatively during transport.
- Make sure that the valve is placed in horizontal position during the entire lifting procedure.
- The general regulations relating to the use of lifting devices must be met at all times.

4. STORAGE

- During storage, the valve disc must be kept slightly open.
- The valve must be stored in a clean and dry environment and avoid direct heat.
- Protect all assembly units with an adequate cover to prevent dust and dirt on the disc and body.
- The valve must be stored at a temperature between -20°C and +50°C (protected by an adequate cover).

5. HANDLING

- It is necessary to avoid moving the valve by picking it up by the handwheel, or in the case of valves with servo command, by the actuator.
- We do not recommend using chains around the body, as it will tend to damage the protective powder coatings.

6. INSTALLATION

Conditions required on site

- When the valve is installed between two pipeline flanges, these must be completely aligned. If not aligned, it may result in impermissibly high loads stressing the valve body during operation which may eventually lead to fracture.
- When the valve is installed in a pipeline, make sure it is as tension-free as possible. The pipeline forces transmitted to the valve must not exceed the values specified in EN 1074-2. The gap between the flanges must be large enough to avoid damage of the coating on the raised flange face during installation. The pipeline flanges must not be drawn towards the valve during installation.
- If work around the valve may cause dirt (e.g. painting, masonry or work with concrete), the valve must be covered adequately.

Installation location

- The location of the valve on site must allow sufficient space for maintenance work.
- If the valve is installed in the open air, make sure it is protected against extreme weather conditions (e.g. formation of ice) by adequate covers.
- If the valve is installed as an end-of-line valve, make sure the free outlet side is not accessible for any kind of interference.

Installation of the valve in the pipeline upstream and downstream

- If the valve is used in a contaminated media, it requires a filter with a suitable mesh size placed upstream of the valve in order to prevent malfunction.
- The following distances must be kept to avoid irregular flow which could disturb the valve function:
 - The distance to elbows, strainers etc. must be kept to a minimum of DN, upstream or downstream.
 - The distance to control valves must be kept to a minimum of 10 x DN upstream of the butterfly valve.

Installation position

- Valves in all nominal widths can be installed with shafts in horizontal position (with gear facing upwards or downwards). A vertical position of the valve shaft is possible but it may affect the service life of the valve (number of operating cycles).
- We recommend the installation of these valves following the arrow marked on the valve body, which indicates the right valve assembly position in the pipeline according to the direction of the flow. Double eccentric metal seated butterfly valves are normally designed for unidirectional services, despite they will be able to take pressure at the other direction of the flow, according to the particular differential pressure of the installation (please consult the sales office).

Assembly instructions and fittings

- Check the valve for possible damage that may have occurred during transport or storage.
- Protect the valve from any kind of dirt on the construction site by using an adequate cover until installation.
- All components must be thoroughly cleaned before installation in order to remove all dirt particles.
- If any equipment is sand-blasted for cleaning prior to the installation, make sure that the valve is adequately covered.
- The sealing and operational parts must be checked for proper functionality before installation.
- Make sure that the proper load suspension devices as well as means of transport and lifting devices are available during assembly of the valve.
- When the valve is in open position, the disc may protrude beyond the overall length. Make sure there is enough space between the disc and other pipeline installations.
- Suspending the valve by its disc may lead to damage or destruction of disc or valve.
- Hexagon bolts and nuts with washers from flange to flange must be used in the through holes to connect the valve with the pipeline flanges. Fasten the bolts evenly and crosswise to prevent unnecessary tension with cracks or breaks in consequence. The pipeline must not be pulled towards the valve. If the gap between valve and flange is too wide, this must be compensated by thicker seals.
- The operator must select bolts and nuts suitable for the respective operating pressure, temperature, flange material, operational loads and the seal. The operator must choose the tightening torque of the flange bolts.
- Make sure the flange bolts are not tightened too hard as this may result in crack formations in the flanges.

7. SET-UP AND VALVE OPERATION

Visual inspection and preparation

A visual inspection of all functional parts must be performed before valve and equipment are put into operation. Check if all bolted connections have been properly fastened.

Functional check and pressure test

- Prior to operation, the functional parts of the valve must be opened and closed completely at least once to ensure a trouble-free operation.
- A newly installed pipeline system must be thoroughly cleaned to remove all foreign particles. Residue or dirt particles in the pipeline may damage the valve function or its free movement.
- Please note that after repair work or upon commissioning of new equipment, it is very important to clean the pipeline system again with the valve in fully open position. If detergents or disinfectants are used, it must be ensured that these materials do not attack the valve material.
- As a standard, the valve is closed by turning the handwheel clockwise towards the gearbox. The dimensions of stem and actuators allow valve operation by one person via handwheel. The 90° turn is confined by a limit stop on the gear. If it is turned any further due to excessive force, this may cause damage. Check that the function is working properly by opening and closing the valve several times (not in a dry state).

Actuator assembling

- The connections of electrical wires must be performed only by specialised operators.
- All of the electrical apparatus which are manoeuvring operators, electrical board, limit switches, electromagnetic valve, etc... as standard must be installed in dry areas that are not subject to flooding. Tension and frequency must correspond to the data on the labels.

8. MAINTENANCE AND REPAIR

- Maintenance and repair work must be done only by specialized operators. In any case, it is necessary to use adequate spare parts and utensils, even in emergency cases, because if different parts are used, the perfect functioning of the valve is no longer guaranteed.
- It is absolutely necessary to depressurize the valve and let it cool down to the point that the temperature in all of the cavities in contact with liquid is inferior to the temperature of the evaporation of the liquid.
- For security reasons and to reduce the repairing costs, all of the valves, particularly those that are rarely manoeuvred because of hard to reach places must be controlled on a regular basis. The manager of the plant has the responsibility to establish adequate controlling interval and maintenance checks.
- For all actuators that are fed by external energy resources (electrical, pneumatic, hydraulic) before starting it is necessary to disconnect the external energy and follow the instructions regarding the actuator.
- For spring-loaded actuators, it is necessary to carry out the removal operation of the cover with the maximum attention as the spring may be ejected with considerable force.



WARNING: The maintenance operations do not include the dis-assembly of stem and disc, as the assembly of these double eccentric valves requires a very demanding adjustment, which must be done at the factory.

Instructions and recommended spare parts

Assembly Instructions

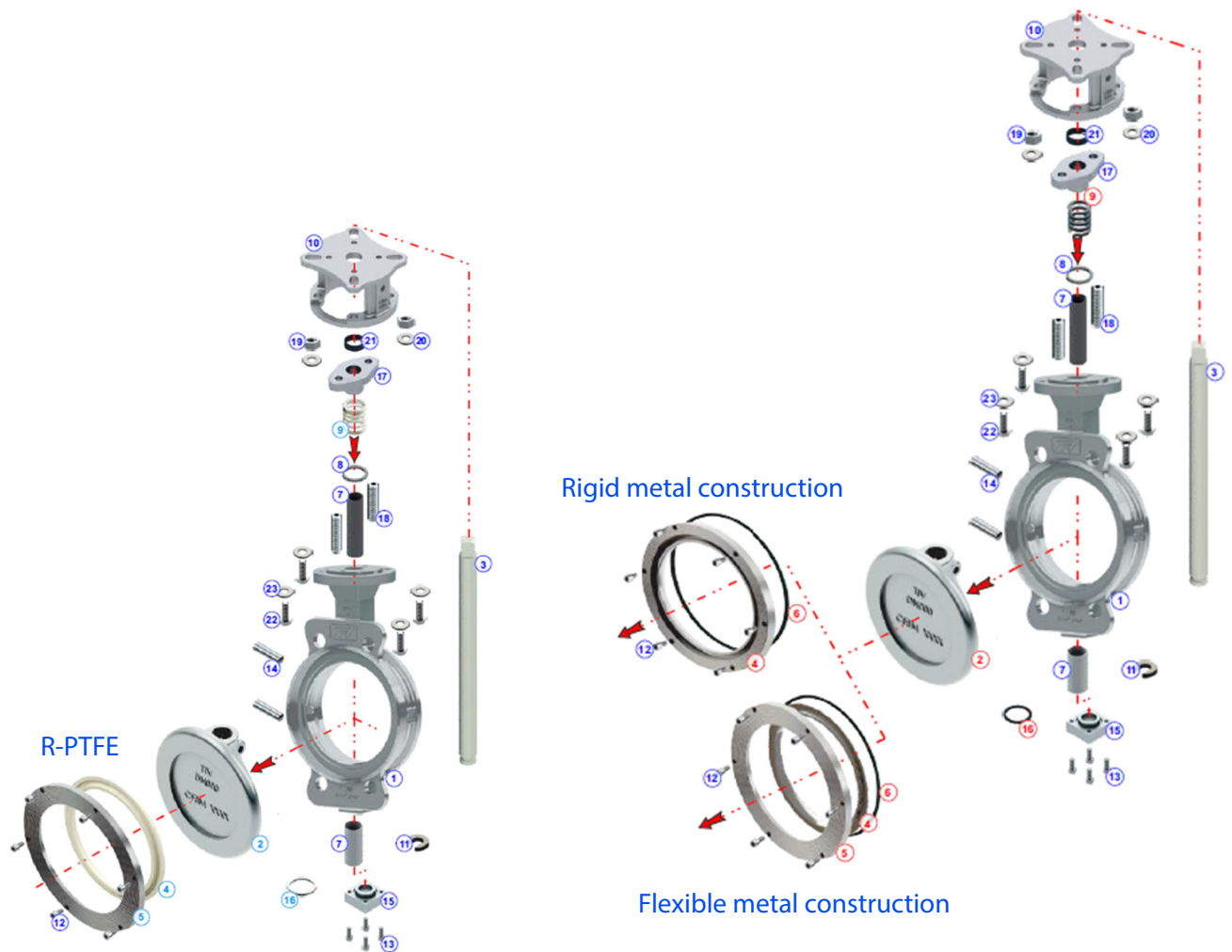
1. Assembly the guide bushings (7) in the body (1).
2. Insert the bushing (8) and the packing (9) in the upper part of the body.
3. Assembly the packing gland (17) and screw it with the studs (18) and nuts/washers (19/20).
4. Assembly the bracket (10) with its guide bushing (21) and screw it with the bolts/washers (22/23).
5. Insert the lock washer (11) in the lower part of the body.
6. Assembly the lower cap (15) with its gasket (16) and screw it with the bolts (13).
- 7a. Insert the PTFE seat (4) in the retainer (5) (PTFE construction).
- 7b. Insert the gasket (6) in the seat (4) (rigid metal construction).
- 7c. Insert the gasket (6) and the seat (4) in the retainer (5) (flexible metal construction).
8. Place the set assembled according step 7a or 7b or 7c over the body and screw it with the bolts (12).

Disassembly Instructions

1. Unscrew the bolts/washers (22/23) and remove the bracket (10) and its guide bushing (21).
2. Unscrew the studs (18) and nuts/washers (19/20) and extract the packing gland (17).
3. Remove the packing (9) and substitute it by a new one.
4. Remove the guide bushing (7) and substitute it by a new one.
5. Unscrew the bolts (13) and remove the lower cap (15).
6. Remove the gasket (16), the lock washer (11) and the guide bushing (7) and substitute the gasket and the guide bushing by new ones.
7. Unscrew the bolts (12) and remove the retainer (5) (PTFE & flexible metal constructions) or the seat (4) (rigid metal construction).
8. Extract the gasket (6) (rigid & flexible metal constructions) or the PTFE seat (4) (PTFE construction) and substitute it by a new one.

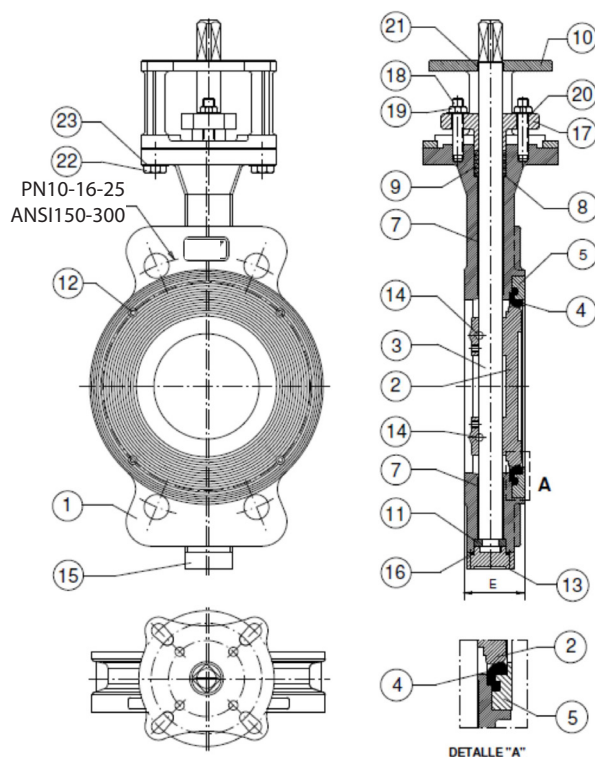
Recommended spare parts

1. Gasket (6) (rigid & flexible metal construction)
2. PTFE seat (4) (PTFE construction)
3. Guide bushings (7)
4. Packing (9)
5. Lower cap gasket (16)



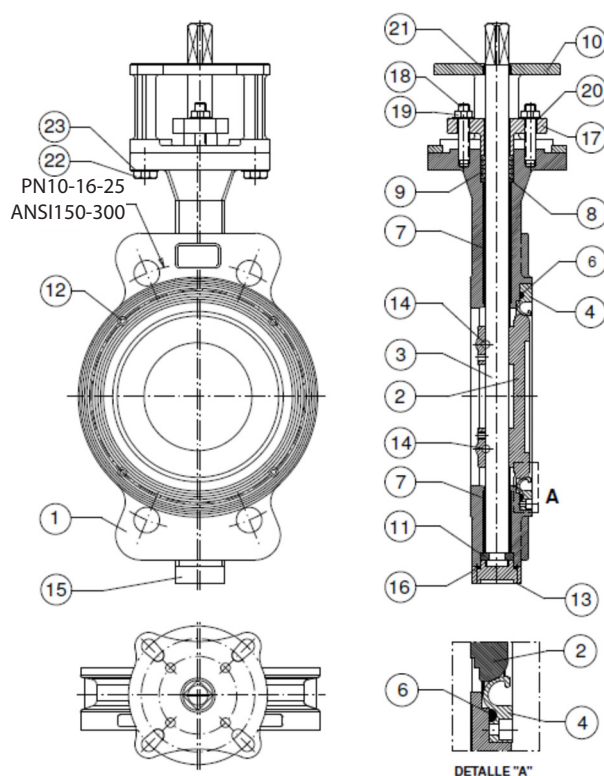
9. COMPONENTS AND DRAWINGS

a) PTFE seat



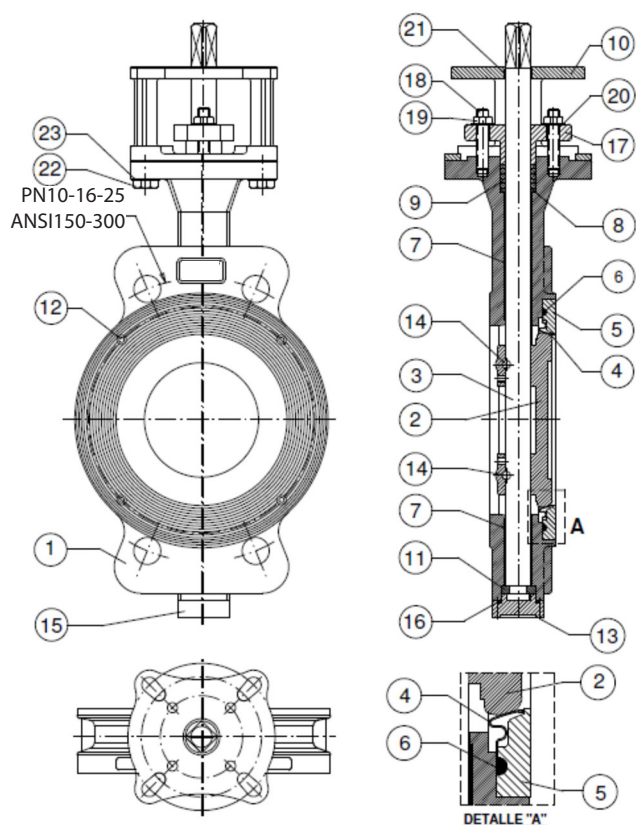
Nr.	Description
1	Body
2	Disc
3	Stem
4	PTFE seat
5	Retainer
7	Guide bushing
8	Bushing
9	PTFE packing
10	Bracket
11	Lock washer
12	Bolts
13	Lower cap bolts
14	Fasteners
15	Lower cap
16	PTFE gasket
17	Packing gland
18	Studs
19	Nuts
20	Washers
21	Guide bushing
22	Bolts
23	Washers

b) Rigid metal seat



Nr.	Description
1	Body
2	Disc
3	Stem
4	Rigid metal seat
6	Graphite seat gasket
7	Guide bushing
8	Bushing
9	Graphite packing
10	Bracket
11	Lock washer
12	Bolts
13	Lower cap bolts
14	Fasteners
15	Lower cap
16	Graphite gasket
17	Packing gland
18	Studs
19	Nuts
20	Washers
21	Guide bushing
22	Bolts
23	Washers

c) Flexible metal seat

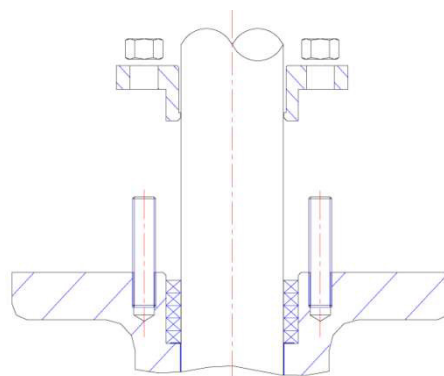
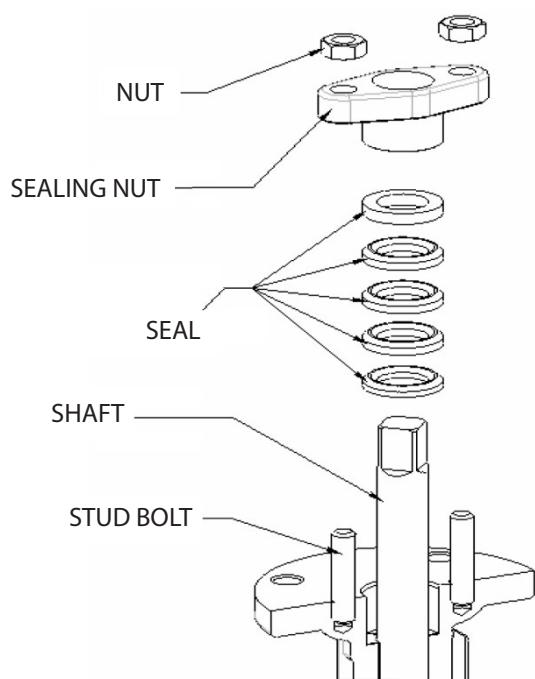


Nr.	Description
1	Body
2	Disc
3	Stem
4	Flexible metal seat
5	Retainer
6	Graphite seat gasket
7	Guide bushing
8	Bushing
9	Graphite packing
10	Bracket
11	Lock washer
12	Bolts
13	Lower cap bolts
14	Fasteners
15	Lower cap
16	Graphite gasket
17	Packing gland
18	Studs
19	Nuts
20	Washers
21	Guide bushing
22	Bolts
23	Washers

10. ADJUSTMENT AND MAINTENANCE OF THE PACKING

The packing must be checked periodically to guarantee a correct operation. Whenever a leakage is appreciated through the packing, tighten the hexagonal nuts alternatively, $\frac{1}{2}$ turn each time, as the service life of the packing could be reduced and make the valve operation difficult and even damage the stem. If the leakage continues, substitute the packing.

To substitute the packing, loose the hexagonal nuts, remove the packing gland and the packing rings, graphite or PTFE.



Place the new rings in its location, install the bushing of packing gland and tighten the nuts screwing alternatively $\frac{1}{2}$ turn each time. The bushing of packing gland must not be compressed excessively, and neither in only one side; it always have to go down or go up perpendicularly to the stem. The maximum torque to tighten the nuts for the packing is shown as follows:

Packing of Graphite	
Bolt size	Maximum Torque [Nm]
M8	24
M10	27
M12	36

Packing of PTFE	
Bolt size	Maximum Torque [Nm]
M8	15
M10	18
M12	24

11. GUARANTEE

Guarantee is indicated in the edition of „General Business Conditions of FERGO Armaturen GmbH“ valid at the date of delivery or is indicated differing from this in the contract of sale.

For damages, which occur by improper handling or disregard of these fitting and operating instructions, of the standards EN, DIN, VDE and other standards, no guarantee claims can be enforced. Damages which occur during operating caused by working conditions different to those of data sheet or other agreements are also no subject for guarantee. Claims which exceed the guarantee are also excluded. Claims for spare delivery do not exist.

The installation of external parts, changes of the construction as well as natural wear and tear are also excluded from the guarantee. We are not responsible for any transport damage, this must be reported immediately to your freight forwarder, railway company or carrier to avoid the loss of any claims for compensation against such companies.