Pfeiffer
Chemie-Armaturenbau GmbH

Maintenance
Drain Ball Valve Series 21a

Fig. 1 - Series 31a Drain ball valve

0. Introduction

These instructions are intended to support the user in the assembly and repair of drain ball valves of the Series 21a.

Technical details, as a result of the further development of the valves mentioned in these instructions, are subject to alteration.

The text and illustrations do not necessarily display the scope of supply or an eventual order of spare parts.
Drawings and graphics are not to scale.
Customer-related special designs, which are not in accordance with our standard offer, are not shown.

The transfer of these instructions to third parties is only allowed with the written approval of
Pfeiffer Chemie-Armaturenbau GmbH.

The equipment may only be dismounted and disassembled by skilled staff who are familiar with the assembly, the start-up and the operation of this product.

Skilled staff in the sense of these repair and assembly instructions are persons who, as a result of their training, their knowledge and their experience, as well as their knowledge of the relevant standards, are able to judge the tasks assigned to them and are able to recognize possible dangers.

1. Design, operation and dimensions

Design, operation and dimensions as well as all further details and technical data may be found in the **data sheet** < **TB 21a_EN** >.

2. Installation, start-up and maintenance

Guidelines for the installation, start-up and maintenance are to be found in the **operating instructions**
< **BA 20a-01_EN** > for pneumatic ball valves, resp.
< **BA 20a-02_EN** > for hand-operated ball valves.

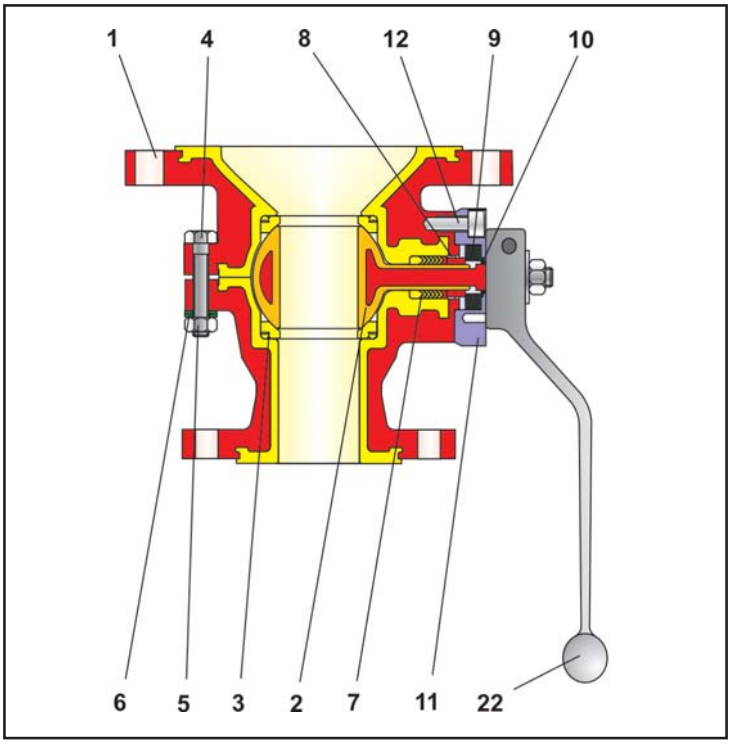

Fig. 2 – Cross-section through a drain ball valve Series 21a => for parts list see table 1 on page 2

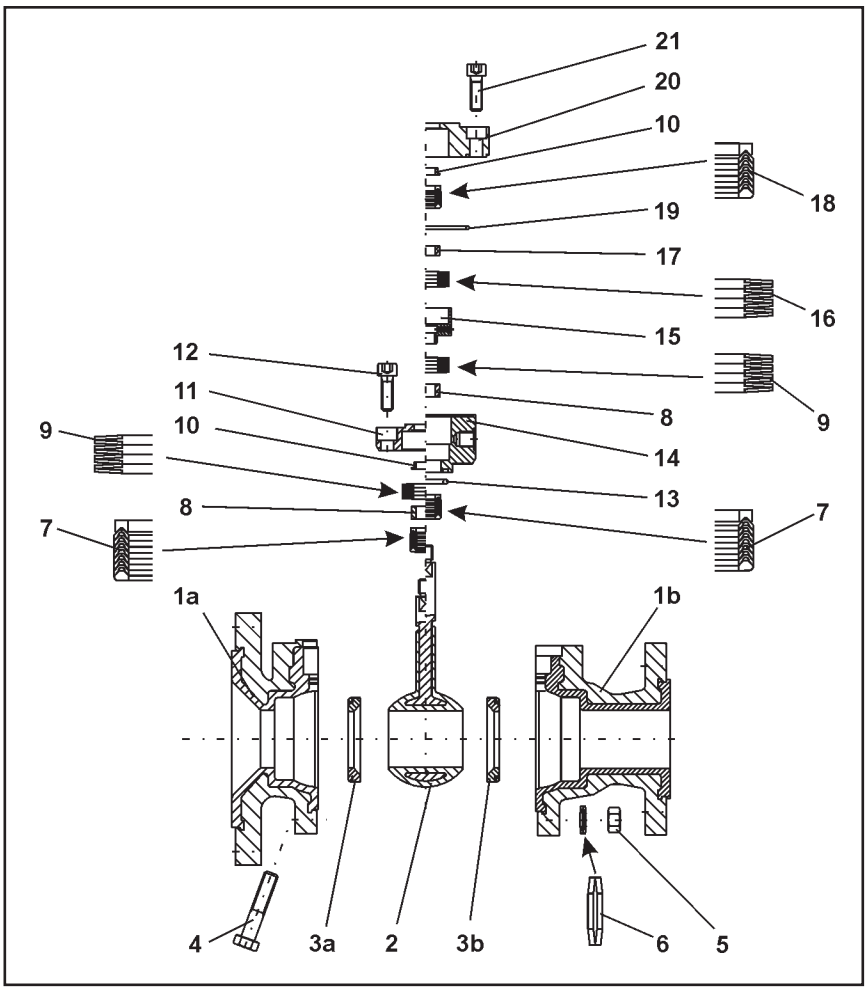

Fig. 3 – Detail drawing of the drain ball valve Series 21a

Item	Description	Material
1	Body with lining	0.7043 / virgin PTFE
2	Ball with coating	1.4313 / virgin PTFE
3	Set of sealing rings	virgin PTFE
4	Hexagon bolt	A2-70
5	Hexagon nut	A2-70
6	Spring washer	1.4310
7	V-ring packing	1.4305 / virgin PTFE
8	Thrust ring	1.4301
9	Set of spring washers	1.8159 / Delta Tone
10	Bearing bushing	PTFE with 25% carbon
11	Stuffing box	1.4305
12	Fillister head screw	A2-70
13	O-ring	Viton
14	Bottom stuffing box	1.4301
15	Distance bushing	1.4301
16	Set of spring washers	1.8159 / Delta Tone
17	Thrust ring	1.4301
18	V-ring packing	1.4305 / virgin PTFE
19	O-ring	Viton
20	Bonnet stuffing box	1.4301
21	Fillister head screw	A2-70

Table 1 – Parts list and materials of construction

3. Assembly of the ball valve

3.1 Preparation for the assembly

In order to assemble the ball valve, all the parts must be prepared, i.e. the parts are carefully cleaned and placed on a soft surface (rubber mat or similar).
Please, pay attention! Plastic parts are nearly always soft and very sensitive, and particularly the sealing surfaces should not be damaged.

Caution: In order to prevent a cold welding of the screws in the bodies, a high-performance grease paste is employed during manufacturing (e.g. Gleitmo 805. from Fuchs).
For valves employed in oxygen environments, this agent may not be used. For grease-free valves, especially when employed in an oxygen environment, a suitable lubricant is to be chosen.

Note: The position and arrangement of the individual parts shown in the detail drawing (Fig. 3) are to be observed during assembly.

3.2 Assembling the discharge ball valves

Insert the sealing rings (3a and 3b) into both body sections (1a and 1b) standing on their flange surfaces.

Note: Do not install the seat rings without clearance. To achieve tight shut-off of the ball valve, the seat rings must be installed in the seat with sufficient clearance. If this is not possible, contact the manufacturer.

Place the ball (2) on the sealing ring of one body section (1a or 1b).
Place V-ring packing (7) over the stem of the ball while slightly turning it. Then insert the ball stem and the V-ring packing into the packing space in the body.
Make sure the ball and the
V-ring packing are then clearly fitted in the body.

Place the other body section on the previously described mounted unit so that it centers itself on the ball stem and the V-ring packing as well as on the sealing ring.

Note: Make sure while doing this that the V-ring packing is not squashed at the side by the body sections.

Fasten the two body sections together with hexagon nuts (5) and bolts (4) with spring washers (6) underneath them.
Refer to the exploded view diagram for the arrangement of the spring washers.

Note:
The tightening sequences and tightening torques for each nominal size can be found in Fig. 4 and Table 2.

Further installation steps depend on the version concerned.

3.3.1 Assembling the standard discharge ball valve version

Press the thrust ring (8) over the ball shaft in the body at the appropriate place. Then place the set of spring washers (9) as shown in the diagram over the ball shaft onto the thrust ring.

Insert the bearing bushing (10) into the stuffing box flange (11).

Place the stuffing box flange previously assembled onto the body and position correctly using fillister head screws (12).
Tighten the screws evenly in a criss-cross pattern.

Important:
Screw the fillister head screws very tight.

3.3.2 Assembling the discharge ball valve with double packing

Before continuing to assemble the valve, we recommend you insert the O-ring (13) into the bottom section of the stuffing box (14) and place it over the ball stem onto the intended bore in the body sections assembled together.

Insert the thrust ring (8) into the bottom section of the stuffing box so that it lies on the V-ring packing.
Place in sequence the first set of spring washers (9), the distance bushing (15) and the second set of spring washers (16).
It is important to follow the sequence of spring washers as indicated in the diagram. Finally place the thrust ring (17) on top.

Prepare the stuffing box flange (20) for assembly by pushing in the bearing bushings (10) and after that the V-ring packing (18).
Insert the O-ring (19) into the intended groove.

Place the entire preassembled unit of the upper section of the stuffing box onto the bottom section.
In order to be able to fasten the unit with fillister head screws (21) it must be pretensioned.
To proceed, push an assembly sleeve over the ball stem up to the stuffing box flange.
Fasten it to the ball stem using a nut, and tighten the upper and bottom sections of the stuffing box until the fillister head screws thread into the threaded holes of the body.
Completely tighten the fillister head screws.
The upper and bottom sections of the stuffing box center themselves and form together with both body sections a unit.

3.4 General items

Note : When these instructions are followed correctly, the torques and breakaway torques listed in the table 2 below arise depending on the nominal size for the standard material, PTFE – virgin with a tolerance of +/-15%.

The effectiveness of sealing when the process medium flows through the valve and at the spindle as well as the satisfactory function are then guaranteed.

Influences such as pressure, temperature and the use of other PTFE materials can lead to alterations in the assembly instructions.

Please note when repairing! Influences from the process medium and residues can affect the torques stated when balls and seals are reused.
To install the ball valve into a pipeline, DIN soft seals suitable for the process medium must be used.

3.5 Tightening torques to connect the body sections

On connecting the body sections together, the sequence for securing bolts and the tightening torques for each nominal size must be strictly observed.

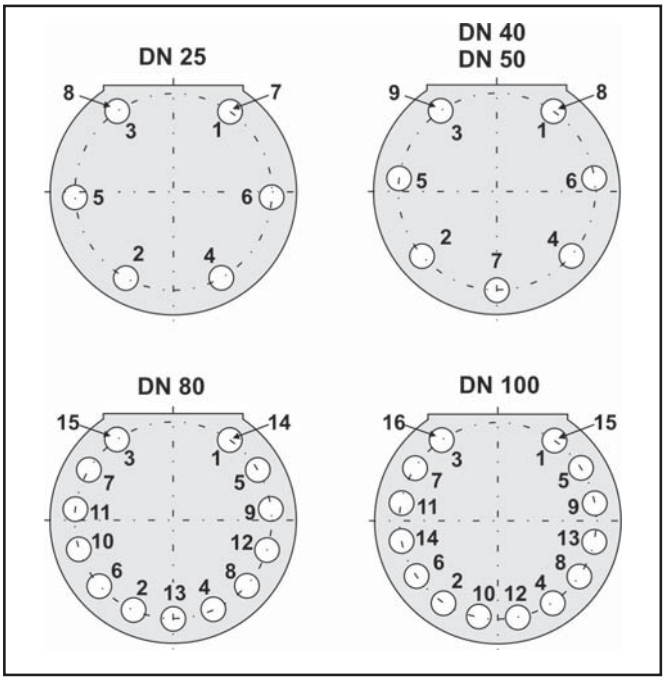

Fig. 4 - Sequence for securing the bolts

Nominal size	Connection	Tightening torque
DN 25 / 1"	1 bis 6	25 Nm
	7 und 8	35 Nm
DN 40 / 11/2"	1 bis 7	25 Nm
	8 und 9	35 Nm
DN 50 / 2"	1 bis 7	30 Nm
	8 und 9	40 Nm
DN 80 / 3"	1 bis 13	35 Nm
	14 und 15	40 Nm
DN 100 / 4"	1 bis 14	35 Nm
	15 und 16	45 Nm

Table 2 - Tightening torque

The assembly of the valve is now completed.

4. Malfunctions and their elimination

Assistance in the case of malfunctions is provided in the operating instructions
< **BA 20a-01_EN** > for automatic ball valves, resp.
< **BA 20a-02_EN** > for manually-operated ball valves
under section 7.

5. Repair of the ball valve

5.1 Standard stuffing box: Exchange of the packing

If a leak is detected at the stuffing box, the PTFE rings of the packing (7) may be defect. It is recommendable to check the condition of the packing.
To remove the packing, the valve is disassembled in the reverse order to that described in chapter 3.
The PTFE rings of the packing are, together with all plastic parts, checked for damage and, in case of doubt, exchanged.

5.2 Double stuffing box: Exchange of the packing

If a leak is detected at the monitoring connection (14), the PTFE rings of the packing (7) may be defect. It is recommendable to check the condition of the packing
To remove the packing, the valve is disassembled in the reverse order to that described in chapter 3.
The PTFE rings of the packing are, together with all plastic parts, checked for damage and, in case of doubt, exchanged.

If a leak is detected at the stuffing box, the PTFE rings of the packing (7) and (18) may be defect. It is recommendable to check the condition of the packing.
To remove the packing, the valve is disassembled in the reverse order to that described in chapter 3.
The PTFE rings of the packing are, together with all plastic parts, checked for damage and, in case of doubt, exchanged.

5.3 Exchange of the sealing unit and the ball

If the ball valve is untight in the bore, the sealing ring set (3a and 3b) and the ball (2) may be defect. . It is recommendable to check the condition of these components.
To remove the sealing rings and the ball, the valve is disassembled in the reverse order to that described in chapter 3.
The sealing rings and the ball are, together with all plastic parts, checked for damage and, in case of doubt, exchanged.

Note: Do not install the seat rings without clearance. To achieve tight shut-off of the ball valve, the seat rings must be installed in the seat with sufficient clearance. If this is not possible, contact the manufacturer.

5.4 Further repair work

In case of further more serious damage, we recommend the repair work to be carried out by Pfeiffer.

6. Queries to the manufacturer

(in case of queries please provide following information)

1. Order number (embossed on the type plate)
2. Type, product number, nominal diameter and design of ball valve
3. Pressure and temperature of the flow medium
4. Flow rate in m^3/h
5. Drawing of installation, if possible

For your special requirements please contact our technical sales department.

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Values subject to change

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