

MOUNTING AND OPERATING INSTRUCTIONS



EB 22a

Translation of the original manual



**Bottom drain ball valve BR 22a • DIN and ANSI version
to combine with actuators**

December 2023 edition



Note regarding this installation and operating manual

This Installation and Operating Manual (EB) provides guidance for safe assembly and operation.

The notes and instructions in this EB are binding when handling PFEIFFER devices. The figures and illustrations in this EB are examples and must therefore be considered as such.

- ⇒ For safe and correct use, read this EB carefully prior to use and keep it for later reference.
- ⇒ In the case of questions that go beyond the scope of this EB, please contact the After Sales Service at PFEIFFER Chemie-Armaturenbau GmbH.
- ⇒ This manual only applies to the bottom rain ball valve itself, the respective additional manual applies for the mounted actuator.

Definition of signal words

DANGER

Hazardous situations that lead to death or serious injuries

WARNING

Situations that can lead to death or serious injuries

NOTE

Property damage and malfunctions

Info

Additional information

Tip

Recommended action

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1 Safety instructions and safety measures

Intended use

The PFEIFFER bottom drain ball valve BR 22a is manually operated or in combination with an actuator and is intended for draining liquid, gaseous or vaporous media from vessels.

- The bottom drain ball valve and its actuator are designed for precisely defined conditions (e.g. operating pressure, utilised medium, temperature).

Therefore the operator must make sure that the bottom drain ball valve is only used when the conditions of use comply with the design criteria defined in the order, see also the pressure-temperature diagram.

- The data sheet contains the permissible pressure and temperature range for these bottom drain ball valves ► TB 22a.

If the operator would like to use the bottom drain ball valve in other applications or environments, they must contact PFEIFFER.

- Manual bottom drain ball valves are only intended for use, after installation in a pipe system, to cut off the media, let it flow through or regulate it within the permitted pressure and temperature limits.
- Automated bottom drain ball valves are only intended for use, after installation in a pipe system and after connecting the drive to the control, to cut off the media, let it flow through or regulate it within the permitted pressure and temperature limits.
- The safety regulations that apply to the pipe system in which the valves are installed and to the control system to which the actuator is connected also apply to the bottom drain ball valves.

This manual only provides safety instructions that are to be observed additionally for bottom drain ball valves.

There may be additional safety instructions in the manuals for the actuator assemblies.

- It is assumed that this chapter is observed when using the valve as intended.

Reasonably foreseeable erroneous use and unintended use

The bottom drain ball valve is not suited for the following areas of use:

- Use outside of the technical data and the limits defined by the design.
- Use outside of the limited defined by the peripheral devices installed on the bottom drain ball valve.

Furthermore, the following activities are considered unintended use:

- Use of third-party spare parts.
- Performance of maintenance and repair work that is not described.

Qualification of operating personnel

The bottom drain ball valve may only be disassembled, dismantled, assembled and commissioned by qualified specialist personnel

trained in pressurised pipes who are familiar with the assembly, commissioning and operation of this product.

- Specialist personnel in terms of this installation and operating manual are persons who, on the basis of their vocational education, knowledge and experience and knowledge of the relevant standards, are capable of evaluating the assigned tasks and identifying possible hazards.

Personal protective equipment

Depending on the utilized medium, PFEIFFER recommends the following protective equipment:

- Protective garments, protective gloves and eye protection when using hot, cold, aggressive and/or corrosive media.
- Hearing protection when working near the valves.
- Request additional protective equipment from the plant operator.

Prohibition of modifications

Changes to the product are not permitted without consulting PFEIFFER. Non-compliance invalidates the warranty and product guarantee. PFEIFFER shall not be held liable for any resulting property damage or personal injury.

Protective devices

In the case of a power supply failure, the automated bottom drain ball valve automatically switches to a certain fail-safe position, see Fail-safe positions in Chapter "3 Design and principle of operation".

- The fail-safe position corresponds to the effective direction and is indicated on the type plate of the actuators, see the actuator documentation.
- The valve is to be included in the equipotential bonding of the plant.

Warning of residual risks

To prevent personal injury or property damage, the operator and operating personnel must use suitable measures to prevent the hazards that can result from the flow medium and operating pressure as well as the signal pressure and moving parts of the ball valve.

- Therefore, the operator and operating personnel must observe all the hazard information, warning information and information in this installation and operating manual.

Obligation of the operator to exercise diligence

The operator is responsible for proper operation as well as compliance with the safety regulations.

- The operator is responsible for providing operating personnel with this installation and operating manual as well as the applicable documents and to provide instructions on proper operation.
- Furthermore, the operator must ensure that operating personnel and third parties are not endangered.

It is not the responsibility of PFEIFFER and therefore when using the bottom drain ball valve ensure that:

- The bottom drain ball valve is only used as intended as described in this chapter.
- An actuator unit that is subsequently installed on the bottom drain ball valve is adapted to the ball valve and the max. torque is observed, and is correctly adjusted in the end positions, and in particular in the opening position of the bottom drain ball valve.
- The pipe system and control system are properly installed and regularly checked. The wall thickness of the bottom drain ball valve body is measured such that an additional load of the usual magnitude is taken into account for a pipe system installed properly in this way.
- The valve is connected properly to these systems.
- The customary flow rates in continuous operation are not exceeded in this pipe system.
- PFEIFFER is contacted in the case of abnormal operating conditions, such as vibrations, hydraulic shock, cavitation and also small amounts of solid matter in the medium, especially abrasive matter.

Obligation of operating personnel to exercise diligence

Operating personnel must be familiar with this installation and operating manual and the applicable documents and comply with the indicated hazard information, warning information and other information. Furthermore, operating personnel must be familiar with the applicable regulations concerning occupational safety and accident prevention and observe them.

Applicable standards and directives

- The ball valves fulfil the requirements of the European Pressure Equipment Directive 2014/68/EU and the European Machinery Directive 2006/42/EC.
In the case of ball valves provided with a CE marking, the Declaration of Conformity provides information about the conformity assessment procedure that was used.
The corresponding declarations of conformity are available in the Annex of this EB, see chapter "14 Certificates".
- According to an ignition hazard assessment according to DIN EN ISO 80079-36, PFEIFFER valves do not have any own potential ignition sources and therefore are not subject to Directive 2014/34/EU.
CE marking based on this standard is not permitted. The inclusion of valves in the equipotential bonding of a plant applies independently of the directive for all metal parts in potentially explosive areas.

1.1 Notes regarding possible severe personnel injury

DANGER

Hazards and ineffectiveness of the warranty!

In the case of non-compliance with the following hazard and warning information, hazards may arise and the warranty provided by PFEIFFER may become invalid.

- ⇒ Observe the following hazards and warning information.
- ⇒ Contact PFEIFFER in the case of questions:

Hazards and damage due to unsuitable bottom drain ball valves!

Bottom drain ball valves whose permissible pressure/temperature range (= "rating") is not sufficient for the operating conditions can pose a danger to the user and cause damage to the pipe system.

- ⇒ Only operate bottom drain ball valves whose permissible pressure/temperature range (= "rating") is sufficient for the operating conditions. (see data sheet ► TB 22a)

Risk of bursting of the pressure equipment!

Bottom drain ball valves and pipes are pressure equipment. Improper opening can cause the bursting of ball valve components.

- ⇒ Observe the maximum permissible pressure for the bottom drain ball valve and plant.
- ⇒ Before working on the bottom drain ball valve, depressurise the concerned plant parts and the ball valve.
- ⇒ Before removing the bottom drain ball valve from the pipe, completely release the pressure in the pipe so that the medium does not escape uncontrolled from the line.
- ⇒ Bring the bottom drain ball valve into the open position so the pressure is released from the ball.
- ⇒ Empty the medium from the concerned plant parts and bottom drain ball valve. (Wear protective equipment)

1.2 Notes regarding possible personnel injury

WARNING

Danger of crushing due to moving parts!

The bottom drain ball valve contains moving parts (actuator stem, control shaft and hand lever) that can lead to crushing if reaching into it.

- ⇒ Do not reach into the yoke during operation.
- ⇒ When working on the bottom drain ball valve, interrupt and lock pneumatic energy and the control signal.

Danger of injury during the switching operation if performing test runs on bottom drain ball valves not installed in the pipe!

- ⇒ Do not reach into the bottom drain ball valve. This can result in serious injuries.

⚠ WARNING**Hazards due to incorrect bottom drain ball valve use!**

The incorrect use of the ball valve can represent a hazard for the user and cause damage to the pipe system that are then no longer the responsibility of PFEIFFER.

- ⇒ The material selected for the parts of the ball valve that come into contact with the media must be suitable for the utilised media, pressures and temperatures.

Danger of burning due to hot or cold components and pipes!

Depending on the utilised medium, ball valve components and pipes can become very hot or very cold and cause burns upon contact.

- ⇒ The bottom drain ball valves must be protected against contact in the case of operating temperatures $>+50\text{ °C}$ or $<-20\text{ °C}$ together with the pipe connections.

Danger of injury due to venting the actuator!

During operation, when regulating or opening and closing the bottom drain ball valve, the actuator can be ventilated.

- ⇒ Install the bottom drain ball valve such that the actuator does not ventilate at eye level.
- ⇒ Use suitable silencers and plugs.
- ⇒ Wear eye protection and, if necessary, hearing protection when working near valves.

Danger of injury due to preloaded springs!

Bottom drain ball valves that are equipped with preloaded actuator springs are under mechanical tension.

- ⇒ Before working on the actuator, release the compression from the preloaded springs, see the corresponding actuator documentation.

Danger of injury due to residual medium in the bottom drain ball valve!

When a bottom drain ball valve must be removed from a pipe, medium can escape from the pipe or the ball valve.

- ⇒ In the case of media that is harmful to health or hazardous, the pipe must be completely emptied before a bottom drain ball valve can be removed.
- ⇒ Pay attention to the afterflow of residuals or residuals that remain in dead spots.

Danger of injury due to the releasing of body screw connections!

If the body screw connections must be released, medium can escape from the ball valve.

- ⇒ The screw connections on the connection of the body parts may only be released or loosened after the bottom drain ball valve has been removed.
- ⇒ During reassembly, tighten the screws according to Table 15-1 and Table 15-2 in Chapter "15.1.1 Tightening torques" using a torque wrench.

⚠ WARNING**Dangers due to use as an end fitting!**

During normal operation, in particular with gaseous, hot and/or hazardous media, spraying medium can cause hazards. It must be kept in mind that the media is usually hazardous!

- ⇒ A blind flange must be assembled on the free connecting pieces or the bottom drain ball valve must be secured against unauthorised actuation.
- ⇒ If a bottom drain ball valve used as an end fitting in a pressurised line is opened, this may only be done with extreme caution so that the escaping medium does not cause any damage.

1.3 Notes regarding possible property damage

! NOTE**Damage to the bottom drain ball valve due to contamination!**

Contamination (e.g. solid particles) in the pipes can damage the ball valve.

- ⇒ The plant operator is responsible for cleaning the pipes in the plant.
- ⇒ Rinse the pipes prior to commissioning.
- ⇒ Observe the maximum permissible pressure for the bottom drain ball valve and plant.

Damage to the bottom drain ball valve due to unsuitable medium properties!

The bottom drain ball valve is designed for a medium with certain properties. Other media can damage the bottom drain ball valve.

- ⇒ Only use a medium that corresponds to the design criteria.

Damage to the bottom drain ball valve due to plant vibrations!

- ⇒ If necessary, secure hand-operated bottom drain ball valves in the case of plant vibrations with a locking device to prevent it from moving by itself.

Damage to the bottom drain ball valve and leakage due to excessively high or low tightening torques!

The bottom drain ball valve components must be tightened with specific torques. Deviating torques can lead to ball valve leakage or damage.

- ⇒ Excessively tightened components are subject to increased wear.
- ⇒ Insufficiently tightened components can cause leakage.
- ⇒ Observe the tightening torques, see Table 15-1 and Table 15-2 in Chapter "15.1.1 Tightening torques"

NOTE

Damage to the bottom drain ball valve due to an impermissible pressure increase!

The bottom drain ball valve body may contain small amounts of medium in the closed and open position.

- ⇒ Use a bottom drain ball valve with an optional relief bore if it is possible that the closed area of the ball filled with medium can heat up due to external heat. (This prevents an impermissible pressure increase due to a change in the condition of the unit.)

Specific aspects in case of use for control purposes!

- ⇒ In the case of use for control purposes, observe the limitations indicated above in the data sheets.

Deviation of the breakaway and actuating forces due to non-actuation of the bottom drain ball valve!

Depending on the period of time of non-actuation, the breakaway and actuation forces can deviate considerably from the actuating power data in the data sheet.

It is recommended to actuate the bottom drain ball valve at regular intervals.

- ⇒ In consideration of the design, actuation must take place during the year.
- ⇒ Indicate the duration of non-actuation when making an enquiry, so that this condition is taken into consideration in the actuator design.
- ⇒ In the case of retrofitted actuators by the operator, the correct actuator design as regards the duration of non-actuation is no longer the responsibility of PFEIFFER.

Damage to the bottom drain ball valve due to unsuitable tools!

Unsuitable tools can damage the bottom drain ball valve.

- ⇒ Suitable tools are required to work on the bottom drain ball valve, see Chapter "15.1.3 Tools".

Damage to the bottom drain ball valve due to unsuitable lubricants!

Unsuitable lubricants can corrode and damage the surface.

- ⇒ The bottom drain ball valve material requires suitable lubricants, see Chapter "15.1.2 Lubricants".

1.4 Warning notes on the device

Warning of moving parts

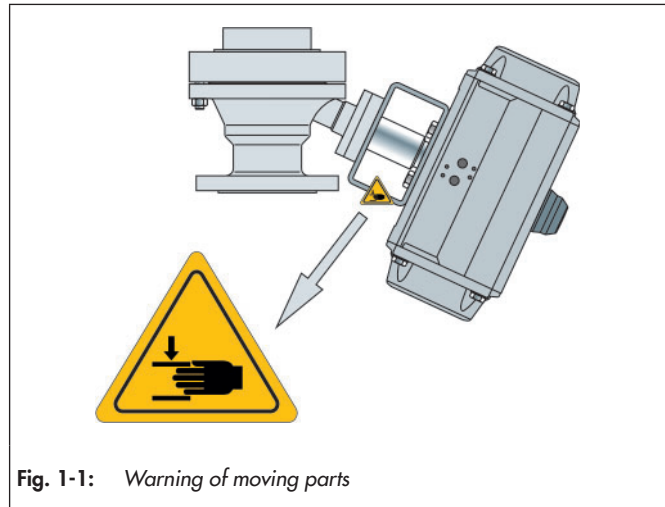


Fig. 1-1: Warning of moving parts

There is a danger of crushing due to the rotary movements of the actuator- and switching shaft when reaching into the yoke as long as the pneumatic power is connected to the actuator. At the operator's request, a warning note can be attached to the valve.

2 Markings on the device

Each bottom drain ball valve usually has the following marking.

Table 2-1: Marking on the type plate and on the body of the bottom drain ball valve

Pos.	For	Marking	Remark
1	Manufacturer	PFEIFFER	Address see Chapter "15.3 Service"
2	Valve type	BR (and number value)	e.g. BR 22a = Series 22a, see the PFEIFFER catalogue
3	Body material	e.g. 1.4408	Material standard according to DIN EN 110213-4
4	Size	DN (and number value)	Number value in [mm], e.g. DN 80 / number value in [inches], e.g. NPS3
5	Maximum pressure	PN (and number value)	Number value in [bar] e.g. PN 40 / number value, e.g. cl150 at room temperature
6	Max. permissible operating temperature	TS (and number value)	PS and TS are related values here at the max. permissible operating temperature with the max. permissible operating overpressure, see pressure-temperature diagram in data sheet ▶ TB 22a.
	Max. permissible operating pressure	PS (and number value)	
7	Test pressure	PT (and number value)	The test pressure must be observed depending on the device
8	Manufacturer number from 2018	e.g. 331234/001/001	<div> <div>33</div> <div>1234</div> <div>/001</div> <div>/001</div> <div>Valve no. within the item</div> <div>Item in the order</div> <div>Order</div> <div>Year of manufacture (38=2018, 39=2019, 30=2020, 31=2021, 32=2022, 33=2023 etc.)</div> </div>
	Manufacturer number 2009 to 2017	e.g. 211234/001/001	<div> <div>21</div> <div>1234</div> <div>/001</div> <div>/001</div> <div>Valve no. within the item</div> <div>Item in the order</div> <div>Order</div> <div>Year of manufacture (29=2009, 20=2010, 21=2011, 22=2012 etc.)</div> </div>
	Manufacturer number until 2008	e.g. 2071234/001/001	<div> <div>207</div> <div>1234</div> <div>/001</div> <div>/001</div> <div>Valve no. within the item</div> <div>Item in the order</div> <div>Order</div> <div>Year of manufacture (205=2005, 206=2006, 207=2007 etc.)</div> </div>
9	Year of manufacture	e.g. 2023	upon customer request, the year of manufacture can also be indicated on the valve
10	Data/Matrix code		
11	Conformity	CE	Conformity is certified separately by PFEIFFER
	Code No.	0035	"Notified body" according to EU Directive = TÜV Rheinland Service GmbH
12	Flow direction	➔	Attention: see the note in Chapter "5.4 Installing the bottom drain ball valve in the pipe"

Info

Markings on the body and the type plate must be permanent so that the valve remains identifiable.

2.1 Type plate

2.1.1 Actuator type plate

See the corresponding actuator documentation.

2.2 Material identification

The bottom drain ball valves are marked on the body with the material specification; see "Table 2-1: Marking on the type plate and on the bottom drain body of the ball valve".

Further details can be obtained from PFEIFFER.

3 Design and principle of operation

Function and principle of operation

Please note, normally the bottom drain valves of BR 22a is assembled with the bigger sized flange at the bottom flange of the tank.

The rotatable ball (3) has a cylindrical passage and runs on bearings with an inclination of 25° towards the joint between body inlet and body outlet.

The flow across the free area between body (1) and passage is determined by the opening angle.

Ball sealing is provided by exchangeable stainless steel seat rings (10 and 11) with PTFE insert.

The control shaft (4) is sealed by a PTFE V-ring packing (6). This self-adjusting packing is preloaded by disc springs (7) located above the packing and needs no maintenance.

The control shaft (4) can either be coupled with a pneumatic actuator via an adapter or be equipped with a lever (19).

Fail-safe position

Depending on the mounting of the pneumatic actuator, the bottom drain ball valve has two fail-safe positions that are activated when the pressure is released as well when the supply air fails:

- **Bottom drain ball valve with fail-close actuator [FC]:**
Upon air failure, the ball valve is closed. The bottom drain ball valve opens when the signal pressure increases, acting against the force of the springs.
- **Bottom drain ball valve with fail-open actuator [FO]:**
Upon air failure, the ball valve is opened. The bottom drain ball valve closes when the signal pressure increases, acting against the force of the springs.

Changing the fail-safe position

The fail-safe position of the actuator can be reversed if required, for this purpose see the installation and operating instructions for the respective pneumatic actuator.

Operating elements and functions

The BR 22a bottom drain ball valve can be selected in the following versions:

- With a hand lever (up to DN 100 or NPS4)
- With manual gear
- With PFEIFFER rotary actuator BR 31a
- With rotary actuators from other manufacturers (for details see the respective data sheet).

3.1 Variants

- Body in special material (e.g. hastelloy)
- Drain bore in the ball
- Nominal size DN 25, DN 40 and up to DN 300 available
- Pressure rating > PN 160 on request

- Heating jacket version
- Metallic sealing system
- High temperature version
- With sampling device in stainless steel
- Body with rinsing connection

3.2 Additional fittings

Insulation

The bottom drain ball valves can be insulated to reduce the passage of heat energy.

Observe the notes in Chapter " 5 Assembly".

Test connection

The test connection can be used to detect the upper flange (e.g. G1/4") between the seat ring and the packing.

Grip protection

In the case of conditions of use that require a high level of safety (e.g. if the ball valve is freely accessible to untrained specialist personnel), PFEIFFER offers a safety guard to prevent the risk of crushing due to moving parts (actuator- and switching shaft).

The risk assessment of the plant by the operator will indicate if the installation of this protective device is required for the safe operation of the ball valve in the plant.

3.3 Attachments

The following accessories are available for the valve either individually or in combinations:

- Locking device
- Control shaft extension (100 mm standard)
- Pneumatic or electric rotary actuator
- Positioner
- Limit switch
- Solenoid valves
- Filter - reducing station

Other additional equipment is possible according to specifications on request.

3.4 Technical data

The type plates of the bottom drain ball valve and actuator offer information about the valve version, see Chapter "2 Markings on the device".



Info

Detailed information is available in the data sheet ► TB 22a.

i Info

The documentation for the special bottom drain ball valves BR 22a that are not described in this chapter can be requested from PFEIFFER.

3.5 Bottom drain ball valve assembly

3.5.1 Preparation of the assembly

To assemble the bottom drain ball valve, all parts must be prepared, e. g. the parts are carefully cleaned and placed on a soft mat (rubber mat or other). Keep in mind that plastic parts are almost always very soft and very delicate, and in particular the sealing surfaces may not be damaged.

! NOTE

Damage due to cold welding of the screws in the body!

- PFEIFFER recommends a heavy-duty grease paste (e.g. Gleitmo 805, manufacturer Fuchs) to prevent the cold-welding of the screws in the bodies.
- For high temperatures, PFEIFFER uses the heavy-duty grease paste Molykote 1000.
- ⇒ Do not use this product for ball valves with use of oxygen.
- ⇒ A suitable lubricant must be selected for grease-free ball valves, especially for use with oxygen.

i Info

The position and arrangement of the individual parts shown in the drawings must be observed during assembly.

3.5.2 Pre-assembly of the main body

- ⇒ Place the main body (1) with the outlet flange on an even and clean work surface at working height. Turn the stuffing box side towards the fitter.
- ⇒ Insert the seat ring (10, with rounded steel edges) into the body.
- ⇒ Insert the ball (3).
- ⇒ Position the ball such that the control shaft (4) fits flush into the associated recess in the ball.
- ⇒ Insert the control shaft (4).
- ⇒ Press the lower bearing bush (8) into the appropriate position using a suitable tool.
- ⇒ Insert the sealing (14) into the body of the drain ball valve.

3.5.3 Pre-assembly of the flange-on body

- ⇒ Place the flange-on body (2) with the inlet flange on an even and clean work surface at working height so that the inside is easy to reach.

- ⇒ Place the disc spring jacket (13) on the disc spring (12).

i Info

Pull on the disc spring jacket so that the long side of the jacket is positioned towards the body and the short side towards the seat ring. This ensures the sealing function.

- ⇒ Insert the jacketed disc spring (12) into the body chambers in the flange-on body (2). For details on the arrangement of the disc spring, refer to the drawing (Fig. 3-1).
- ⇒ Press the seat ring (11, with sharp steel edges) up to the disc spring.

3.5.4 Assembly of the bottom drain ball valve

- ⇒ Place the flange-on body (2) including the pre-assembled seat ring (11) onto the main body (1) and carefully push the body parts together.
- ⇒ Arrange the flange-on body (2) such that the bores of both body parts (1 and 2) match.
- ⇒ Lightly grease the screws (16).
- ⇒ Screw the body parts together evenly and alternately using screws (16).

i Info

- Depending on the nominal size, stud bolts (16) with nuts (17) or screws (16) can be used.
- The permissible torque for retightening the connection of the body sections can be found in Table 15-1 in Chapter "15.1.1 Tightening torques".

- ⇒ Insert the disc (15) into the packing holder of the main body (1).
- ⇒ Slide the V-ring packing (6) over the mounted control shaft (4) with a slight rotating movement and insert it into the packing holder of the main body (1). For the arrangement and number of V-rings, see Fig. 3-1.
- ⇒ Insert the Disc spring set (7) on top of the V-ring packing. For details on the arrangement of the disc springs, see Fig. 3-1.
- ⇒ Press the bearing bush (9) into the stuffing box packing flange (5).
- ⇒ Place the stuffing box flange (5) over the control shaft (4) onto the main body (1).
- ⇒ Lightly grease the screws (18).
- ⇒ Adjust the stuffing box flange (5) with the screws (18) and tighten evenly and in a crisscross pattern.

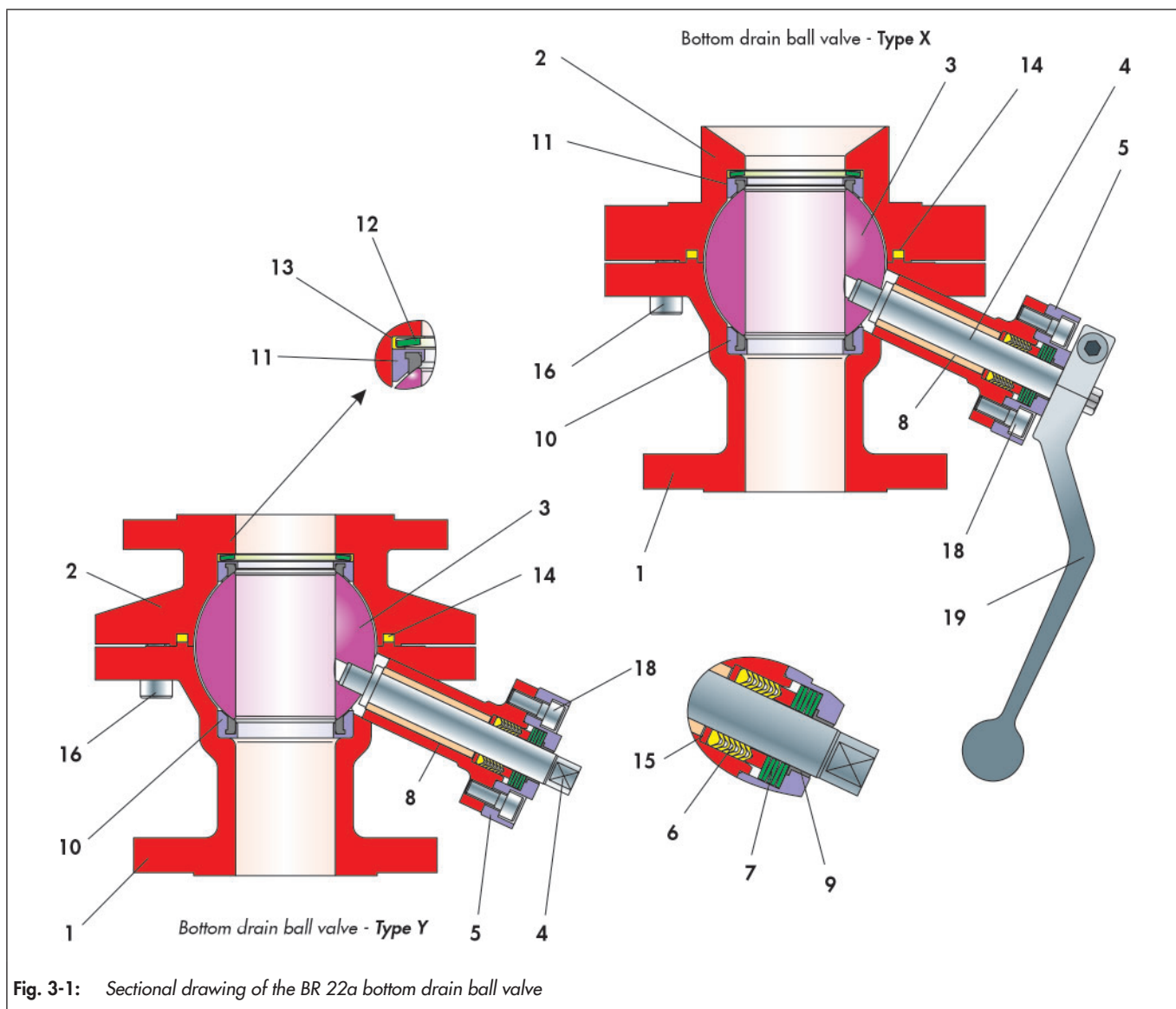


Table 3-1: Parts list

Item	Description
1	Main body
2	Flange-on body
3	Ball
4	Control shaft
5	Stuffing box flange
6	V-ring packing
7	Disc spring set
8	Bearing bush
9	Bearing bush
10	Seat ring

Item	Description
11	Seat ring
12	Disc spring
13	Disc spring jacket
14	Sealing
15	Disc
16 ¹⁾	Stud bolt / Screw
17 ¹⁾	Nut
18	Screw
19	Lever

¹⁾ Depending on the nominal size, stud bolts with nuts or screws can be used

i Info

- *The permissible torque for retightening the stuffing box flange can be found in Table 15-2 in Chapter "15.1.1 Tightening torques".*
 - *Prior to the leak test, the ball valve should be actuated a few times so that the ball can centre on the seal rings and provide an optimal seal.*
-

4 Shipment and on-site transport

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

! NOTE

Damage to the bottom drain ball valve due to improper transport and storage!

- ⇒ Bottom drain ball valves must be handled, transported and stored with care.

4.1 Accepting delivery

Perform the following steps after receiving the goods:

- ⇒ Check the scope of supply. Compare the delivered goods with the delivery note.
- ⇒ Check the supply for transport damage. Report transport damage to PFEIFFER and the transport company (see the delivery note).

4.2 Unpacking the bottom drain ball valve

Carry out the following steps:

- ⇒ Unpack the bottom drain ball valve directly before lifting for installation into the pipe.
- ⇒ Leave the bottom drain ball valve on the pallet or in the transport container for on-site transport.
- ⇒ The protective caps on the ball valve inlet and outlet prevent foreign matter from entering the bottom drain ball valve and damaging it. Only remove the protective caps prior to installation in the pipe.
- ⇒ Dispose of the packaging properly.

4.3 Transporting and lifting the bottom drain ball valve

! DANGER

Danger due to falling of suspended loads!

Do not stand under suspended loads.

! WARNING

Overturning of the lifting equipment and damage to the load lifting equipment by exceeding the lifting capacity!

- ⇒ Only used approved lifting equipment and load lifting equipment whose lifting capacity corresponds at least to the weight of the bottom drain ball valve including the actuator.
- ⇒ Take the weights from the respective data sheet.

! WARNING

Danger of injury due to the tipping of the bottom drain ball valve!

- ⇒ Observe the centre of gravity of the bottom drain ball valve.
- ⇒ Secure the bottom drain ball valve against tipping and twisting.

! NOTE

Damage to the bottom drain ball valve due to improper fastening of the sling!

The screwed-in lifting eyes on actuators are used only for actuator assembling and disassembling as well as for lifting the actuator without the ball valve. These lifting eyes are not intended for lifting the complete ball valve.

- ⇒ When lifting the bottom drain ball valve, make sure that the entire load is carried by the sling that is fastened to the ball valve body.
- ⇒ Do not fasten the load-bearing sling to the actuator, hand wheel or other components.
- ⇒ Do not use the control air lines, accessories or other components with safety functions for suspension or damage them.

4.3.1 Transporting

The bottom drain ball valve can be transported using lifting equipment such as a crane or a forklift.

- ⇒ Leave the bottom drain ball valve on the pallet or in the transport container for transport.
- ⇒ Bottom drain ball valves that weigh more than approx. 10 kg should be transported on a pallet (or supported similarly) (also to the installation site). The packaging should protect the valve from damage.
- ⇒ Comply with the transport conditions.

Transport conditions

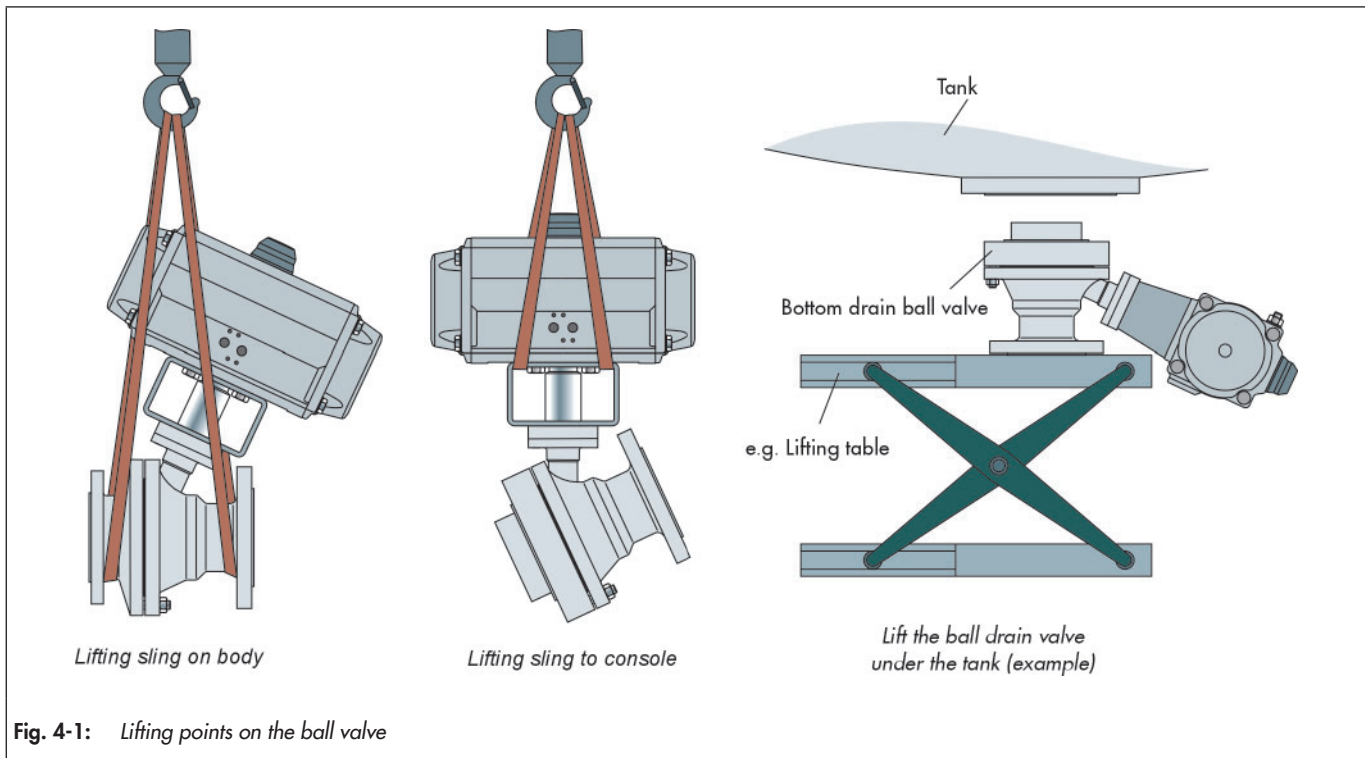
- ⇒ Protect the bottom drain ball valve against external influences, such as impacts.
- ⇒ Do not damage the corrosion protection (paint, surface coating). Repair damage immediately.
- ⇒ Protect the bottom drain ball valve against moisture and dirt.

4.3.2 Lifting

When installing the bottom drain ball valve in the pipe, larger bottom drain ball valves can be lifted using lifting equipment such as a crane or forklift.

Conditions for lifting

Use a hook with a safety clamp as the suspension element so that the sling cannot slip off the hook during lifting and transport, see Fig. 4-1.



Conditions for lifting

- ⇒ Secure the sling against shifting and slipping off.
- ⇒ Fasten the sling such that it can be removed again after installation in the pipe.
- ⇒ Avoid swinging and tipping the bottom drain ball valve.
- ⇒ In the case of interruptions in work, do not leave the lifting equipment suspended in the air for a long period of time.
- ⇒ Lift the bottom drain ball valve aligned in the same direction in which it will be installed in the pipe.
- ⇒ Always lift the bottom drain ball valve in the centre of gravity of the load to prevent uncontrolled tipping.
- ⇒ Make sure that any slings between the lifting eyes on the rotary actuator and suspension element are not loaded. These slings are used only to secure the load against turning over while lifting. Before lifting the bottom drain ball valve, pre-tension this sling so it is taut.

WARNING

Danger due to incorrect lifting and transport!

The lifting points for the lifting slings shown in the schematic drawing serve as examples for most valve variants. On site the conditions for lifting and transporting the valve can change however.

- ⇒ The operator makes sure that the valve is lifted and transported safely.

4.3.3 Lifting points on the body

- ⇒ Fasten a lifting sling to each flange of the housing and on the suspension element (e.g. hook) of the crane or forklift, see Fig. 4-1. When doing so, ensure the safety, bearing capacity and length of the lifting slings
- ⇒ In the case of an actuator with a lifting eye: fasten additional lifting slings to the lifting eye on the actuator and on the suspension element.
- ⇒ Lift the bottom drain ball valve carefully. Check if the load lifting equipment holds.
- ⇒ Move the bottom drain ball valve at a constant speed to the installation site.
- ⇒ Install the bottom drain ball valve to the tank, see chapter 5.4.
- ⇒ After installation to the tank: check that the flanges are firmly tightened and that the bottom drain ball valve holds in the pipe.
- ⇒ Remove the lifting slings.

4.3.4 Lifting points on the bracket

- ⇒ Fasten a lifting sling to the bracket and the suspension element (e.g. hook) of the crane or forklift, see Fig. 4-1. When doing so, ensure the safety, bearing capacity and length of the lifting slings.
- ⇒ In the case of an actuator with a lifting eye: fasten additional lifting slings to the lifting eye on the actuator and on the suspension element.

- ⇒ Lift the bottom drain ball valve carefully. Check if the load lifting equipment holds.
- ⇒ Move the bottom drain ball valve at a constant speed to the installation site.
- ⇒ Install the bottom drain ball valve to the tank, see chapter 5.4.
- ⇒ After installation to the tank: check that the flanges are firmly tightened and that the bottom drain ball valve holds in the pipe.
- ⇒ Remove the lifting slings.

4.4 Storing the bottom drain ball valve

NOTE

Damage to the bottom drain ball valve due to improper storage!

- ⇒ Comply with the storage conditions
- ⇒ Avoid long storage periods
- ⇒ In the case of deviating storage conditions and a longer storage period, contact PFEIFFER

Info

PFEIFFER recommends checking the bottom drain ball valve and the storage conditions regularly during a longer storage period.

- ⇒ In the case of storage prior to installation, the bottom drain ball valve should normally be stored in a closed room where it is protected against harmful influences such as impacts, dirt or moisture. A room temperature of $25\text{ °C} \pm 15\text{ °C}$ is recommended.
- ⇒ In particular, the actuator and the ends of the ball valve to the pipe connection may not be damaged by mechanical or any other influences.
- ⇒ Do not stack the bottom drain ball valves.
- ⇒ Prevent condensation in damp rooms. Use a desiccant or heater.
- ⇒ The bottom drain ball valve must be stored in its protective packaging and/or with the protective caps on the connection ends.
- ⇒ Bottom drain ball valves that weigh more than approx. 10 kg should be stored on a pallet (or supported similarly).
- ⇒ Bottom drain all valves are usually delivered in a completely open position. They must be stored in the position in which they were delivered. The actuating device must not be actuated.
- ⇒ Do not place any objects on the bottom drain ball valve.

5 Installation

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task. The following instructions apply additionally for bottom drain ball valves. Observe chapter "4.3 Transporting and lifting the bottom drain ball valve" for transport to the installation site.

5.1 Installation conditions

Operator level

The operator level for the bottom drain ball valve is the front view on all operating elements of the bottom drain ball valve including the attachments from the perspective of operating personnel.

The plant operator must make sure that operating personnel can carry out all work after the device is installed safely and can access it easily from the operator level.

Pipe routing

The guidelines applicable on site apply for the installation of bottom drain ball valves on a tank.

Install the bottom drain ball valve such that there is low vibration and no mechanical stress. Observe the sections "Installation orientation" and "Support and mounting" in this chapter.

Install the bottom drain ball valve so there is enough space to replace the actuator and ball valve as well as to perform maintenance work.

Do not position the bottom drain ball valves with the slid-on heat pack directly in front of the pipe elbow.

Installation position

The larger flange of the BR 22a series bottom drain ball valves is install to the bottom flange of the tank.

The actuator is therefore always located next to the bottom drain ball valve and is supported if necessary.

Support and mounting

The plant manufacturer is responsible for the selection and implementation of a suitable support or mounting for the installed bottom drain ball valve as well as the pipe.

Venting

Vents are screwed into the exhaust air connections of pneumatic and electropneumatic devices to ensure that the generated exhaust air can be released to the outside (protection against overpressure in the device). Furthermore, vents allow the intake of air (protection against underpressure in the device).

- ⇒ Carry out venting on the side that faces away from the operator level.
- ⇒ When connecting the attachments, make sure that they can be accessed from the operator level safely and easily.

5.2 Preparing for assembly

Bottom drain ball valves must be handled, transported and stored with care, see Chapter "4 Delivery and on-site transport".

Perform the following steps after receiving the goods:

- ⇒ Check the scope of supply. Compare the delivered goods with the delivery note.
- ⇒ Check the supply for transport damage. Report transport damage to PFEIFFER and the transport company (see the delivery note).

Ensure the following conditions prior to assembly:

- The bottom drain ball valve is clean.
- The ball valve data on the type plate (type, nominal size, material, nominal pressure and temperature range) matches the plant conditions (nominal size and nominal pressure of the pipe, medium temperature, etc.). For details about the marking, see Chapter "2 Markings on the device".
- Desired or required additional fittings, see Chapter "3.2 Additional fittings", are installed or prepared as far as necessary before the assembly of the ball valve.

5.3 Assembling the bottom drain ball valve and actuator

PFEIFFER bottom drain ball valves are supplied in working order. In individual cases, the actuator and ball valve are delivered separately and must be assembled. The tasks are listed below that are necessary for assembly and prior to the commissioning of the bottom drain ball valve.

WARNING

Danger and damage due to retrofitting an actuator unit!

The subsequent fitting of an actuator unit can pose a danger to the user and cause damage to the pipe system.

- ⇒ *The torque, rotation direction, actuation angle and adjustment of the "OPEN" and "CLOSED" end stops must be adapted to the bottom drain ball valve.*

Danger and damage due to use of an electrical actuator!

- ⇒ *It must be ensured that the actuator in the end positions is turned off by the limit switch signal.*
- ⇒ *If shut-off takes place in an intermediate position due to the signal of the torque switch, this signal should be used in addition for an error message. The fault must be remedied as soon as possible see Chapter "8 Malfunction".*
- ⇒ *For further instructions, see the electrical actuator manual.*

Danger and damage due to high external loads on an actuator unit!

Actuators are not "stepladders".

- ⇒ *Loads may not be applied to the actuators as they can damage or destroy the bottom drain ball valve.*

WARNING

Danger and damage due to heavy actuator units!

Actuators that are heavier than the weight of the bottom drain ball valve can pose a danger to the user and cause damage to the pipe system.

- ⇒ These actuators must be supported if they generate a bending stress on the bottom drain ball valve due to their size and/or installation situation.

NOTE

Damage to the bottom drain ball valve due to the incorrect setting of the end stops!

The actuating device is adjusted to the operating data specified in the order.

- ⇒ The adjustment of the "OPEN" and "CLOSED" end stops is the responsibility of the user.

5.4 Installing the bottom drain ball valve in the pipe

5.4.1 General

- ⇒ Transport the bottom drain ball valve in its original packaging to the installation site and unpack it only there.
- ⇒ Inspect the bottom drain ball valve and actuator for transport damage. Damaged ball valves or actuators may not be installed.
- ⇒ A functional test is to be carried out at the beginning of installation for manually-operated ball valves: the bottom drain ball valve must close and open correctly. Detected malfunctions must be fixed before commissioning. See also chapter 8 "Malfunction".
- ⇒ Handle the bottom drain ball valve with care and observe the instructions for the flange connection.
- ⇒ Make sure that only bottom drain ball valves are installed whose pressure classes, connection type (flow rate), type of lining and connection dimensions match the conditions of use. See the corresponding marking on the bottom drain ball valve.

DANGER

Danger due to exceeding the limits of use!

Exceeding the limits of use can pose a danger to the user and cause damage to the pipe system.

- ⇒ No bottom drain ball valve may be installed whose permissible pressure/temperature range is not sufficient for the operating conditions.
- ⇒ The max. permissible limits of use are marked on the bottom drain ball valve, see Chapter "2 Markings on the device".
- ⇒ The permissible range is defined in Chapter "1 Safety instructions and safety measures".

- ⇒ The counterflanges must have smooth sealing surfaces. Other shapes must be agreed upon with PFEIFFER.
- ⇒ The connection ends of the pipe must align with the bottom drain ball valve connections and have plane-parallel ends.
- ⇒ The connection data for the actuator unit must match the control data. See the type plate(s) on the actuator unit.
- ⇒ Prior to installation, the bottom drain ball valve and the connected pipe must be carefully cleaned of any contamination, in particular solid foreign matter.
- ⇒ The sealing surfaces on the flange connection and the utilized flange seals must in particular be free of all contamination during installation.
- ⇒ Optionally, an arrow is marked on the body. The direction of the arrow must correspond to the direction of flow in the pipe.
- ⇒ When pushing the bottom drain ball valve and the required flange seals into an already assembled pipe, the distance between the pipe ends must be measured such that all contact surfaces of the ball valve and seals remain undamaged.

Info

- ⇒ Tighten the flange connections evenly and in a criss-cross pattern with the torques indicated in Table 15-3 in Chapter "15.1.1 Tightening torques".
- ⇒ After longer storage of the bottom drain ball valve, retighten the body screws after installation with the corresponding tightening torques according to Table 15-1 in Chapter "15.1.1 Tightening torques".

- ⇒ Vents are screwed into the exhaust air connections of pneumatic and electropneumatic devices to ensure that the generated exhaust air can be released to the outside (protection against overpressure in the device).
Furthermore, vents allow the intake of air (protection against underpressure in the device).
- ⇒ Carry out venting on the side that faces away from the working area of operating personnel.
- ⇒ When installing peripheral devices, make sure that they can be operated from the working area of operating personnel.

5.4.2 Installing the bottom drain ball valve

- ⇒ Lift the bottom drain ball valve with suitable lifting equipment at the installation site, see chapter "4.3 Transporting and lifting the bottom drain ball valve".
- ⇒ Close the bottom drain ball valve in the pipe for the duration of the installation.
- ⇒ Remove the protective caps on the bottom drain ball valve openings prior to installation.
- ⇒ Clean the sealing surfaces on the bottom drain ball valve and pipe if necessary.
- ⇒ Use correct flange seals.

! NOTE**Tension in pipes damages bottom drain ball valve!**

⇒ Avoid or rectify tension in pipes.

- ⇒ Screw the pipe together with the bottom drain ball valve without tension.
- ⇒ After installing the Bottom drain ball valve, open it slowly in the pipe.

! NOTE**Damage to the bottom drain ball valve due to a sudden pressure increase and resulting high flow speed!**

Open the bottom drain ball valve slowly in the pipe during commissioning.

i Info**Observe the following for ball valves with a metal seat:**

To avoid damaging the seat seal, make sure that the pipe connected upstream and downstream of the bottom drain ball valve is cleaned carefully of all rigid and abrasive particles prior to installation.

- ⇒ Check the correct function of the ball valve.

5.5 Checking the assembled bottom drain ball valve

5.5.1 Functional test

! WARNING**Danger of injury due to pressurised components and escaping medium!**

- ⇒ Do not loosen the screw of an optional test connection while the bottom drain ball valve is pressurised.

Danger of crushing due to moving actuator- and switching shaft!

- ⇒ Do not reach into the yoke as long as the pneumatic power is connected to the actuator.
- ⇒ Before working on the bottom drain ball valve, interrupt and lock pneumatic energy and the control signal.
- ⇒ Vent the actuator.
- ⇒ Do not allow the jamming of objects in the yoke to hinder the operation of the actuator- and control shaft.
- ⇒ If the actuator- and control shaft are blocked (e.g. due to "seizure" if not actuated for a long period of time), release the residual energy of the actuator (spring tension) before releasing the blockage, see the corresponding actuator documentation.

! WARNING**Danger of injury due to escaping exhaust air!**

During operation, when regulating or when opening and closing the ball valve, exhaust air can escape, for example from the actuator.

- ⇒ Wear eye protection and, if necessary, hearing protection when working near valves.

- ⇒ At the end of installation, perform a functional test with the control signals:

The bottom drain ball valve must close and open correctly according to the control commands. Detected malfunctions must be fixed before commissioning, see Chapter "8 Malfunction".

! WARNING**Danger due to improperly executed control commands!**

Incorrectly executed control commands can cause serious injuries or even death and damage to the pipe system.

- ⇒ Check the actuator unit and control command., see chapter "8 Malfunction".

5.5.2 Pressure test of the pipe section

The pressure test was already performed on the bottom drain ball valves by PFEIFFER. Observe the following for the pressure test of a pipe section with installed bottom drain ball valves:

- ⇒ First carefully rinse newly installed pipe systems in order to wash out all foreign matter.
- ⇒ Ensure the following conditions for the pressure test:
 - Bottom drain ball valve open: the test pressure may not exceed the value $1.5 \times PN$ (according to the type plate).
 - Bottom drain ball valve closed: the test pressure may not exceed the value $1.1 \times PN$ (according to the type plate).

If a ball valve leaks, observe chapter "8 Malfunction".

i Info

The plant operator is responsible for performing the pressure test. After Sales Service at PFEIFFER can provide you with support for the planning and implementation of a pressure test specific to your plant.

5.5.3 Rotary movement

The rotary movement of the actuator- and control shaft must be linear without any jerky movements.

- ⇒ Open and close the bottom drain ball valve. When doing so, observe the movement of the actuator shaft.
- ⇒ Set the maximum and minimum control signal in succession to check the end positions of the bottom drain ball valve.
- ⇒ Check the display on the position indicator.

5.5.4 Fail-safe position

- ⇒ Close the signal pressure line.
- ⇒ Check whether the bottom drain ball valve moves to the fail-safe position, see "Fail-safe positions in Chapter "3 Design and principle of operation".

6 Start-up

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

WARNING

Danger of burning due to hot or cold components and pipe!

Ball valve components and pipes can become very hot or very cold during operation and cause burns upon contact.

⇒ Let the components and pipes cool down or warm up.

⇒ Wear protective garments and protective gloves.

Danger of injury due to pressurised components and escaping medium!

⇒ Do not loosen the screw of the optional test connection while the ball valve is pressurised.

Danger of crushing due to moving actuator- and control shaft!

⇒ Do not reach into the yoke as long as the pneumatic power is connected to the actuator.

⇒ Before working on the bottom drain ball valve, interrupt and lock pneumatic energy and the control signal.

⇒ Vent the actuator.

⇒ Do not allow the jamming of objects in the yoke to hinder the operation of the actuator- and control shaft.

⇒ If the actuator- and control shaft are blocked (e.g. due to "seizure" if not actuated for a long period of time"), release the residual energy of the actuator (spring tension) before releasing the blockage, see the corresponding actuator documentation.

Danger of injury due to escaping exhaust air!

During operation, when regulating or when opening and closing the ball valve, exhaust air can escape, for example from the actuator.

⇒ Wear eye protection and, if necessary, hearing protection when working near valves.

Commissioning/recommissioning

- Open the bottom drain ball valves slowly in the pipe. Opening slowly prevents a sudden increase in pressure and a resulting high flow speed that damages the bottom drain ball valve.
- Check the correct function of the bottom drain ball valve.

Ensure the following conditions prior to commissioning/recommissioning:

- The bottom drain ball valve is installed properly in the pipe, see Chapter "5 Assembly".
- The leak and function tests have been completed successfully, see Chapter "5.1 Installation conditions".
- The current conditions in the concerned plant section correspond to the design of the bottom drain ball valve, see Intended use in Chapter "1 Safety instructions and safety measures".

7 Operation

As soon as the commissioning/recommissioning work is complete, see Chapter "6 Commissioning", the bottom drain ball valve is ready for operation.

⚠ WARNING

Danger of burning due to hot or cold components and pipe!

Ball valve components and pipes can become very hot or very cold during operation and cause burns upon contact.

- ⇒ Let the components and pipes cool down or warm up.
- ⇒ Wear protective garments and protective gloves.

Danger of injury due to pressurised components and escaping medium!

- ⇒ Do not loosen the screw of the optional test connection while the bottom drain ball valve is pressurised.

Danger of crushing due to moving actuator- and control shafts!

- ⇒ Do not reach into the yoke as long as the pneumatic power is connected to the actuator.
- ⇒ Before working on the bottom drain ball valve, interrupt and lock pneumatic energy and the control signal.
- ⇒ Vent the actuator.
- ⇒ Do not allow the jamming of objects in the yoke to hinder the operation of the actuator- and control shaft.
- ⇒ If the actuator- and control shaft are blocked (e.g. due to "seizure" if not actuated for a long period of time"), release the residual energy of the actuator (spring tension) before releasing the blockage, see the corresponding actuator documentation.

Danger of injury due to escaping exhaust air!

During operation, when regulating or when opening and closing the ball valve, exhaust air can escape, for example from the actuator.

- ⇒ Wear eye protection and, if necessary, hearing protection when working near valves.

Observe the following points during operation:

- If required, after commissioning and reaching the operating temperature, tighten all flange connections between the pipe and bottom drain ball valve with the corresponding tightening torques, see Table 15-3 in Chapter "15.1.1 Tightening torque".
- It can also be necessary to retighten the screw connections on the body sections with the corresponding tightening torques according to Table 15-1 in Chapter "15.1.1 Tightening torque".
- The bottom drain ball valve/actuator unit must be actuated with the control signals.
- Bottom drain ball valves that were delivered from the factory with an actuator are precisely adjusted. The user is responsible for any changes they make.

- For the manual operation or manual override of the actuator (if present), normal manual forces are sufficient and the use of extensions to increase the actuation torque is not permitted.
- In the case of bottom drain ball valves with a hand lever, the position of the hand lever indicates the location of the bore in the ball. The hand lever moves in general parallel to the bore. Special versions are to be taken from the respective order.

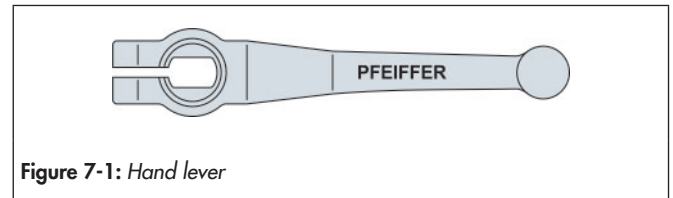


Figure 7-1: Hand lever

⚠ DANGER

Danger of injury due to jerky operation of the bottom drain ball valve!

The failure to observe these warnings can cause extreme danger for persons or for the pipe system.

- ⇒ Do not open and close the bottom drain ball valve suddenly to prevent pressure surges and/or a temperature shock in the pipe system.

- The bottom drain ball valves can optionally have a test connection (e.g. 1/4") between the ball seal and the outer control shaft sealing. This makes it possible to check if the seat rings are not damaged.
- If a bottom drain ball valve leaks, observe chapter "8 Malfunction".

8 Malfunction

When rectifying the faults, chapter "1 Safety instructions and safety measures" must be observed.

8.1 Detecting and rectifying errors

Type of fault	Possible cause	Measures
Leaks in the pipe connection	The flange connection of the bottom drain ball valve is leaky	<p>Tighten the flange screws.</p> <hr/> <p>! NOTE</p> <p>An excessive tightening torque when retightening the flange screws can damage the bottom drain ball valve and pipe!</p> <p>The permissible torque for retightening the pipe flange screws is limited.</p> <hr/> <p>Retighten the flange connection with the respective tightening torque, see Table 15-3 in Chapter "15.1.1 Tightening torques".</p> <p>If necessary, increase the tightening torque to max. 20%.</p>
	The flange connection is still leaky after retightening	<p>Loosen the flange connection and remove the ball valve, see chapter "1 Safety instructions and safety measures".</p> <p>Check the plane parallelism of the flange connection and correct if it is not sufficient.</p> <p>Check the flange seals, if the seals are damaged, replace them.</p>
Leaks in the body sections	Body section connection loosened	Retighten the connection of the body sections with the respective tightening torque, see Table 15-1 in Chapter "15.1.1 Tightening torques".
	Body sections untight after retightening	Replace the body sealing and/or bottom drain ball valve, see chapter "1 Safety instructions and safety measures".
Increased medium flow rate with the bottom drain ball valve closed	Leakage in the closed position	Remove and inspect the ball valve, see chapter "1 Safety instructions and safety measures".
	The bottom drain ball valve is damaged	<p>Repairs are necessary</p> <p>Remove the bottom drain ball valve, see chapter "1 Safety instructions and safety measures".</p> <p>Request spare parts from PFEIFFER, see Chapter "15.2 Spare parts".</p> <p>For the required repair instructions, see Chapter "12 Repairs"</p>
Leaks in the control shaft sealing	Medium escapes	<p>! DANGER</p> <p>Danger of injury due to escaping medium!</p> <p>To protect operating personnel from danger, depressurise the line on both sides of the bottom drain ball valve, see Chapter "1 Safety instructions and safety measures".</p> <hr/>
	Medium escapes from the stuffing box	<p>Remove the bottom drain ball valve, see chapter "1 Safety instructions and safety measures".</p> <p>Disassemble the bottom drain ball valve and replace the control shaft sealing.</p> <p>Request spare parts from PFEIFFER, see Chapter "15.2 Spare parts".</p> <p>For the required repair instructions, see Chapter "12 Repairs"</p>

Type of fault	Possible cause	Measures
Malfunction	The actuator unit or control does not react	Check the actuator unit and control command.
	The actuator and control are OK	Remove and inspect the bottom drain ball valve, see chapter "1 Safety instructions and safety measures".
	The bottom drain ball valve is damaged	Repairs are necessary. Remove the bottom drain ball valve, see chapter "1 Safety instructions and safety measures". Request spare parts from PFEIFFER, see Chapter "15.2 Spare parts". For the required repair instructions, see Chapter "12 Repairs"
Problems in the actuator unit	The pneumatic actuator must be removed	Disconnect the connection to the control pressure. Remove the actuator from the bottom drain ball valve (observe the "Safety instructions and safety measures", see the included actuator unit manuals).

i Info

- In the case of faults that are not listed in the table, contact the After Sales Service at PFEIFFER.
- Spare parts must be ordered indicating all the data according to the bottom drain ball valve marking. Only original parts from PFEIFFER Chemie-Armaturenbau GmbH may be installed.
- If it is determined after removal that the bottom drain ball valve material lining is not sufficiently resistant for the medium, parts must be selected made of a suitable material.

8.2 Carrying out emergency measures

In the case of a power supply failure, the ball valve automatically switches to the preset fail-safe position, see "Fail-safe positions" in Chapter "3 Design and principle of operation".

The system operator is responsible for emergency measures.

In case of a bottom drain ball valve fault:

- Close the shut-off valves upstream and downstream of the bottom drain ball valve so that no medium flows through the bottom drain ball valve.
- Troubleshoot the error, see chapter "8.1 Detecting and rectifying errors".
- Rectify the fault that can be fixed as indicated in the instructions provided in this installation and operating manual. For faults that cannot be fixed, contact the After Sales Service at PFEIFFER.

Recommissioning after faults

See Chapter "6 Commissioning".

9 Servicing

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task. The following documents are required in addition for the maintenance of the bottom drain ball valve:

- Installation and operating manual for the installed actuator, e.g. ► EB 31a for BR 31a rotary actuators or the corresponding actuator documentation of other manufacturers.

WARNING

Danger of burning due to hot or cold components and pipe!

Bottom drain ball valve components and pipes can become very hot or very cold during operation and cause burns upon contact.

- ⇒ Let the components and pipes cool down or warm up.
- ⇒ Wear protective garments and protective gloves.

Danger of injury due to pressurised components and escaping medium!

- ⇒ Do not loosen the screw of the optional test connection while the bottom drain ball valve is pressurised.

Danger of crushing due to moving actuator- and control shaft!

- ⇒ Do not reach into the yoke as long as the pneumatic power is connected to the actuator.
- ⇒ Before working on the bottom drain ball valve, interrupt and lock pneumatic energy and the control signal.
- ⇒ Vent the actuator.
- ⇒ Do not allow the jamming of objects in the yoke to hinder the operation of the actuator- and control shaft.
- ⇒ If the actuator- and control shaft are blocked (e.g. due to "seizure" if not actuated for a long period of time"), release the residual energy of the actuator (spring tension) before releasing the blockage, see the corresponding actuator documentation.

Danger of injury due to escaping exhaust air!

During operation, when regulating or when opening and closing the bottom drain ball valve, exhaust air can escape, for example from the actuator.

- ⇒ Wear eye protection and, if necessary, hearing protection when working near valves.

Danger of injury due to residual medium in the bottom drain ball valve!

When working on the bottom drain ball valve, residual medium can escape and, depending on the medium properties, cause injuries (e.g. scalding, chemical burns).

- ⇒ Wear protective garments, protective gloves and eye protection.
- ⇒ Do not loosen the screw of the optional test connection while the ball valve is pressurised.
- ⇒ Bring the ball valve into the open position so the pressure is released from the ball.

WARNING

Danger of injury due to preloaded springs!

Actuators with preloaded actuator springs are pressurised.

- ⇒ Release the compression from the preloaded springs before working on the actuator, see the corresponding actuator documentation.

NOTE

Damage to the ball valve due to excessively high or low tightening torques!

The ball valve components must be tightened with specific torques. Excessively tightened components are subject to increased wear. Insufficiently tightened components can cause leakage.

- ⇒ Observe the tightening torques, see Table 15-1 or Table 15-2 in Chapter "15.1.1 Tightening torques".

Damage to the ball valve due to unsuitable tools!

- ⇒ Only use tools approved by PFEIFFER, see Chapter "15.1.3 Tools".

Damage to the ball valve due to unsuitable lubricants!

- ⇒ Only use lubricants approved by PFEIFFER, see Chapter "15.1.2 Lubricants".

Info

The ball valve was checked by PFEIFFER prior to delivery.

- Certain test results certified by PFEIFFER are no longer valid when disassembling the ball valve. This includes the test for seat leakage and the leak test (outer tightness).
- If maintenance and repair work is performed without approval from the After Sales Service of PFEIFFER, the product guarantee will be voided.
- Only use original parts from PFEIFFER as spare parts that correspond to the original specification.
- Wear parts are not covered by the warranty.

9.1 Periodic tests

- ⇒ Depending on the conditions of use, the ball valve must be checked at defined intervals in order to take remedial measures prior to possible malfunctions. The plant operator is responsible for preparing a suitable test plan
- ⇒ PFEIFFER recommends the following inspections that can be carried out during operation:

Test	Measures in the case of a negative test result
If present, check the optional test connection for tightness. WARNING! Danger of injury due to pressurised components and escaping medium! Do not loosen the screw of the test connection while the ball valve is pressurised.	Decommission the bottom drain ball valve, see chapter "10 Decommissioning" Contact the After Sales Service at PFEIFFER for repairs, See chapter "12 Repairs".
Check the control shaft sealing for tightness from the outside.	The control shaft sealing with a PTFE V-ring packing is preloaded with a disc spring set and is therefore maintenance free.
Check the rotary movement of the actuator- and control shaft for smooth movement.	If the actuator- and control shaft are blocked, remove the blockage. WARNING! If the actuator- and control shaft are blocked (e.g. due to "seizure" if not actuated for a long period of time) they can release unexpectedly and move uncontrolled. This can lead to crushing if reaching into them. Before trying to release a blockage of the actuator- and control shaft, interrupt and lock the pneumatic energy and the control signal. Release the residual energy of the actuator (spring tension or compressed air reservoir) before releasing the blockage, see the corresponding actuator documentation.
If possible, check the fail-safe position of the bottom drain ball valve by briefly interrupting the power supply.	Decommission the bottom drain ball valve, see chapter "Decommissioning". Then determine the cause and remedy it, see Chapter "8 Malfunctions".
Check pipe connections and seals of the bottom drain ball valve and actuator for leaks.	Regular maintenance work on the bottom drain ball valve is not necessary, but when checking the pipe section, no medium may escape from the flange and screw connections of the body or from the control shaft sealing.

9.3 Ordering spare parts and consumables

Information about spare parts, lubricants and tools can be received from the After Sales Service at PFEIFFER.

Spare parts

Information on spare parts can be found in Chapter "15.2 Spare parts".

9.2 Maintenance work

- ⇒ The bottom drain ball valve must be prepared before all maintenance work, see Chapter 12 "Repairs".
- ⇒ After all maintenance work, the bottom drain ball valve must be checked prior to recommissioning, see Chapter "5.5 Checking the mounted bottom drain ball valve".

9.2.1 Replacing the seat rings and ball

- ⇒ Check the condition of the ball and seat rings.
- ⇒ Remove the seat rings (10 and 11) as described in Chapter "12.2 Replacing the seat rings and ball". Check the seat rings as well as all plastic parts for damage and if in doubt replace them.
- ⇒ Also remove the ball (3). Check the ball as well as all plastic parts for damage and if in doubt replace them.

10 Decommissioning

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

WARNING

Danger of burning due to hot or cold components and pipe!

Ball valve components and pipes can become very hot or very cold during operation and cause burns upon contact.

- ⇒ Let the components and pipes cool down or warm up.
- ⇒ Wear protective garments and protective gloves.

Danger of injury due to pressurised components and escaping medium!

- ⇒ Do not loosen the screw of the optional test connection while the bottom drain ball valve is pressurised.

Danger of crushing due to moving actuator- and control shaft!

- ⇒ Do not reach into the yoke as long as the pneumatic power is connected to the actuator.
- ⇒ Before working on the ball valve, interrupt and lock pneumatic energy and the control signal.
- ⇒ Vent the actuator.
- ⇒ Do not allow the jamming of objects in the yoke to hinder the operation of the actuator- and control shaft.
- ⇒ If the actuator- and control shaft are blocked (e.g. due to "seizure" if not actuated for a long period of time"), release the residual energy of the actuator (spring tension) before releasing the blockage, see the corresponding actuator documentation.

Danger of injury due to escaping exhaust air!

During operation, when regulating or when opening and closing the bottom drain ball valve, exhaust air can escape, for example from the actuator.

- ⇒ Wear eye protection and, if necessary, hearing protection when working near valves.

Danger of injury due to residual medium in the bottom drain ball valve!

When working on the bottom drain ball valve, residual medium can escape and, depending on the medium properties, cause injuries (e.g. scalding, chemical burns).

- ⇒ Wear protective garments, protective gloves and eye protection.
- ⇒ Do not loosen the screw of the optional test connection while the bottom drain ball valve is pressurised.
- ⇒ Bring the bottom drain ball valve into the open position so the pressure is released from the ball.

To decommission the bottom drain ball valve for maintenance and repair work or for disassembly, perform the following steps:

- ⇒ Close the valves upstream and downstream of the bottom drain ball valve so that no medium flows through the bottom drain ball valve.
- ⇒ Empty the pipe and bottom drain ball valve completely.
- ⇒ Shut off the pneumatic power and lock it, to depressurise the actuator.
- ⇒ Let the pipe and ball valve components cool down or warm up.

11 Removal

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

WARNING

Danger of burning due to hot or cold components and pipe!

Ball valve components and pipes can become very hot or very cold during operation and cause burns upon contact.

- ⇒ Let the components and pipes cool down or warm up.
- ⇒ Wear protective garments and protective gloves.

Danger of crushing due to moving actuator- and control shaft!

- ⇒ Do not reach into the yoke as long as the pneumatic power is connected to the actuator.
- ⇒ Before working on the bottom drain ball valve, interrupt and lock pneumatic energy and the control signal.
- ⇒ Vent the actuator.
- ⇒ Do not allow the jamming of objects in the yoke to hinder the operation of the actuator- and control shaft.
- ⇒ If the actuator- and control shaft are blocked (e.g. due to "seizure" if not actuated for a long period of time"), release the residual energy of the actuator (spring tension) before releasing the blockage, see the corresponding actuator documentation.

Danger of injury due to residual medium in the bottom drain ball valve!

When working on the bottom drain ball valve, residual medium can escape and, depending on the medium properties, cause injuries (e.g. scalding, chemical burns).

- ⇒ Wear protective garments, protective gloves and eye protection.
- ⇒ Do not loosen the screw of the optional test connection while the bottom drain ball valve is pressurised.
- ⇒ Bring the bottom drain ball valve into the open position so the pressure is released from the ball.

Danger of injury due to preloaded springs!

Actuators with preloaded actuator springs are pressurised.

- ⇒ Before working on the actuator, release the compression from the preloaded springs.

Prior to disassembly, make sure that the following conditions are met:

- The bottom drain ball valve is decommissioned, see chapter "10 Decommissioning".

11.1 Removing the bottom drain ball valve from the pipe

- ⇒ Loosen the flange connection.
- ⇒ Remove the bottom drain ball valve from the pipe, see Chapter "4.3 Transporting and lifting the bottom drain ball valve".

WARNING

If a used valve is sent to PFEIFFER for service:

- ⇒ Decontaminate the valves properly in advance.

- ⇒ When returning a used valve, include the safety data sheet for the medium as well as confirmation of decontamination of the valve. Otherwise the valve will not be accepted.

Tip

- PFEIFFER recommends documenting the following contamination data in the form ► FM 8.7-6 "Declaration regarding the contamination of PFEIFFER valves and components".
- This form is available at ► www.pfeiffer-armaturen.com.

11.2 Disassembling the actuator

See the corresponding actuator documentation.

12 Repairs

If the operation of the bottom drain ball valve is no longer compliant or if it does not work at all, it is defective and must be repaired or replaced.

! NOTE

Damage to the bottom drain ball valve due to improper maintenance and repair!

- ⇒ Do not perform maintenance and repair work on your own.
- ⇒ Contact the After Sales Service at PFEIFFER for maintenance and repair work.

In special cases, certain maintenance and repair work may be performed.

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

The following instructions apply additionally for ball valves. For decommissioning and disassembly, observe Chapter "10 Decommissioning" and Chapter "11 Disassembly".

12.1 Replacing the V-ring packing

If a leak is found in the stuffing box (5), the PTFE rings of the V-ring packing (6) could be defective.

- ⇒ Check the condition of the V-ring packing.

Disassemble the bottom drain ball valve to remove the packing. For this purpose, observe Chapter "1 Safety instructions and safety measures".

- ⇒ Place the bottom drain ball valve with the flange-on body on an even and clean work surface so that the packing space is easy to reach.
- ⇒ Loosen the screws (18) and remove the stuffing box flange (5) carefully.
- ⇒ Remove the disc spring from the disc spring set (7).
- ⇒ Remove the V-ring packing (6).
- ⇒ Check the PTFE rings of the V-ring packing as well as all plastic and graphite parts for damage and, in the case of doubt, replace them.
- ⇒ Assemble the bottom drain ball valve as described in Chapter "3.5 Bottom drain ball valve assembly".

12.2 Replacing the seat rings and the ball

If there is a leak in the passage, the seat rings (10 and 11) as well as the ball (3) can be defective.

- ⇒ Check the condition of the seat rings and the ball.

Disassemble the bottom drain ball valve to remove the seat rings and ball of the bottom drain ball valve. For this purpose, observe Chapter "1 Safety instructions and safety measures".

- ⇒ Place the bottom drain ball valve with the flange-on body on an even and clean work surface so that the packing space

and the screws (16) of the body connection are easy to reach.

- ⇒ Loosen the screws (18) and remove the stuffing box flange (5) carefully.
- ⇒ Remove the disc springs from the disc spring set (7).
- ⇒ Remove the V-ring packing (6).
- ⇒ Remove the control shaft (4) with bearing bush (8).
- ⇒ Loosen the screws (16)

i Info

Depending on the nominal size, stud bolts (16) with nuts (17) or screws (16) can be used.

- ⇒ Carefully remove the flange-on body (2).
- ⇒ Remove the seat ring (10), ball (3), seat ring (11) and jacked disc spring (12 and 13).
- ⇒ Check the seat rings and the ball as well as all plastic and graphite parts for damage and, in the case of doubt, replace them.
- ⇒ Assemble the bottom drain ball valve as described in Chapter "3.5 Bottom drain ball valve assembly".

12.3 Additional repairs

- ⇒ In the case of additional major damage, it is recommended to have repairs performed by PFEIFFER.

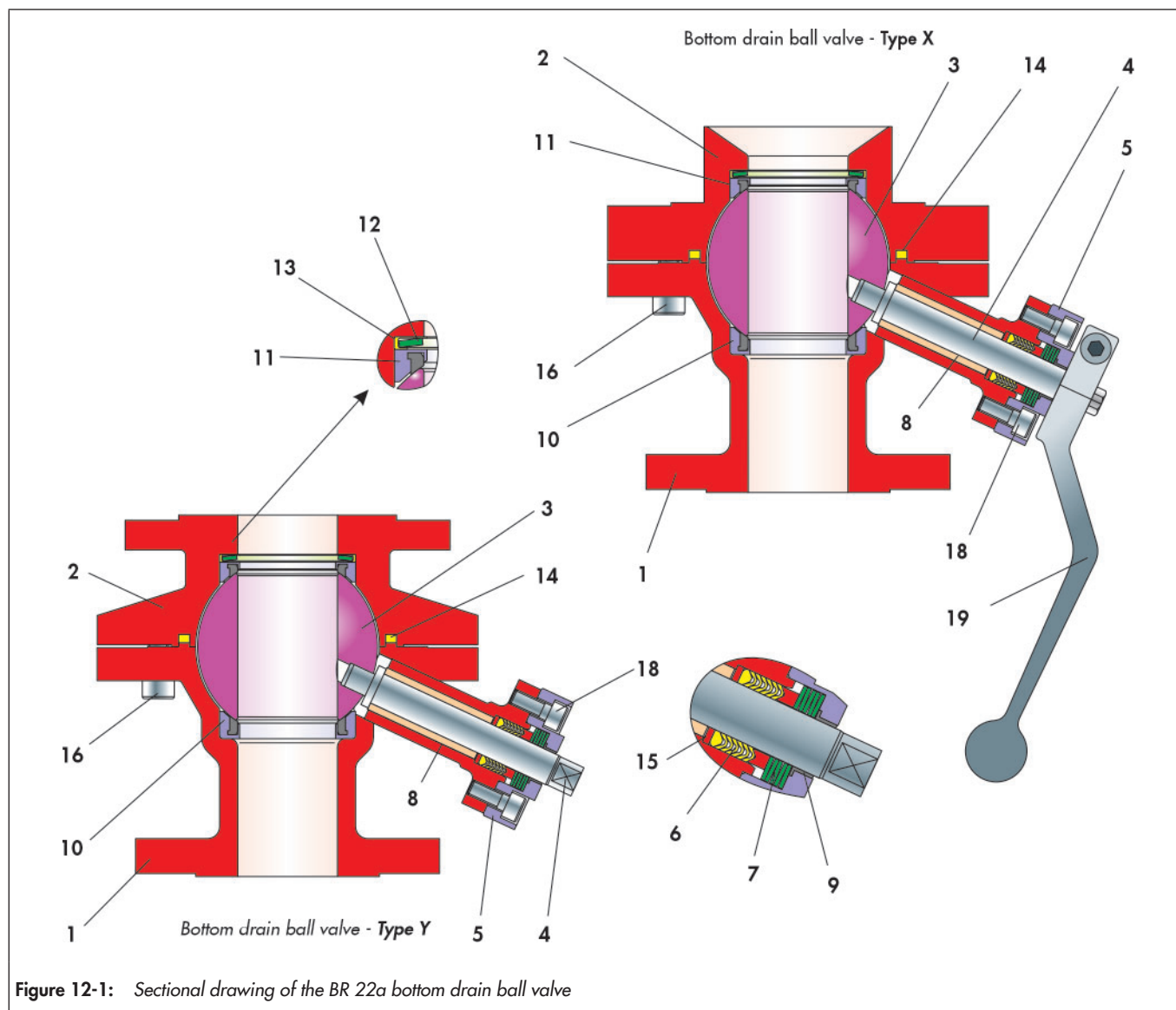


Figure 12-1: Sectional drawing of the BR 22a bottom drain ball valve

Table 12-1: Parts list

Item	Description
1	Main body
2	Flange-on body
3	Ball
4	Control shaft
5	Stuffing box flange
6	V-ring packing
7	Disc spring set
8	Bearing bush
9	Bearing bush
10	Seat ring

Item	Description
11	Seat ring
12	Disc spring
13	Disc spring jacket
14	Sealing
15	Disc
16 ¹⁾	Stud bolt / Screw
17 ¹⁾	Nut
18	Screw
19	Lever

¹⁾ Depending on the nominal size, stud bolts with nuts or screws can be used

12.4 Sending devices to PFEIFFER

Defective bottom drain ball valves can be sent to PFEIFFER for repair.

Proceed as follows to send devices:

WARNING

Danger due to a contaminated bottom drain ball valve!

- ⇒ *When returning a used valve to PFEIFFER for service, decontaminate the valve properly in advance.*
 - ⇒ *When returning a used valve, include the safety data sheet for the medium as well as confirmation of decontamination of the valve. Otherwise the valve will not be accepted.*
-

Tip

- PFEIFFER recommends documenting the following contamination data in the form ► FM 8.7-6 “Declaration regarding the contamination of PFEIFFER valves and components”.
 - This form is available at ► www.pfeiffer-armaturen.com.
-

- ⇒ Include the following information for returns:
 - Manufacturer number
 - Bottom drain ball valve type
 - Article number
 - Nominal size and version of the bottom drain ball valve
 - Manual valve/automated valve
 - Medium (designation and consistency)
 - Medium pressure and temperature
 - Flow rate in m³/h
 - Bench range of the actuator
 - Number of actuations (year, month, week or day)
 - Installation drawing if available
 - Completed declaration regarding contamination. This form is available at ► www.pfeiffer-armaturen.com.

13 Disposal

- ⇒ For disposal, observe the local, national and international regulations.
- ⇒ Do not dispose of old components, lubricant and hazardous materials with domestic waste.

14 Certificates

The declaration of conformity is available on the following pages:

- Declaration of conformity according to Pressure Equipment Directive 2014/68/EU for automated valves, see page 14-2.
- Declaration of conformity according to Pressure Equipment Directive 2014/68/EU for manually operated valves, see page 14-3.
- Declaration of conformity for completed machinery according to Machinery Directive 2006/42/EC for the bottom drain ball valve BR 22a, see page 14-4.
- Declaration of conformity for partly completed machinery according to Machinery Directive 2006/42/EC for bottom drain ball valve BR 22a, see page 14-5.

The printed certificates correspond to the status at the time of printing. Further optional certificates are available upon request.

DECLARATION OF CONFORMITY

As per Pressure Equipment Directive 2014/68/EU
TRANSLATION



The manufacturer	PFEIFFER Chemie-Armaturenbau GmbH , D47906 Kempen, Germany
declares that:	Type 22a Ball valves (BR 22a) with stuffing box packing <ul style="list-style-type: none"> • with pneumatic/ electric/ hydraulic actuator • with free shaft end for subsequent mounting of an actuator
<ol style="list-style-type: none"> 1. The valves are pressure accessories within the meaning of the Pressure Equipment Directive 2014/68/EU and conform with the requirements of this Directive. 2. They may only be operated observing the Installation and operating instructions ► BA 26a-01 and/or ► EB 22a delivered together with the valve. <p>The commissioning of these valves is only permitted after the valve has been installed from both sides in the pipeline and a risk of injury can be ruled out. (See ► BA 26a-01, section 2.3 for ball valves intended for dead-end service)</p>	

Applied standards:

AD 2000 Regulations	Regulations for pressurized valve body parts
----------------------------	--

Type designation and technical features:

PFEIFFER Data sheet ► TB 22a NOTE: This Manufacturer's Declaration applies to all valve types listed in this catalogue.
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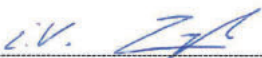
Applied conformity assessment procedure:

Conforming to Annex III of the Pressure Equipment Directive 2014/68/EU, Module H

<i>Name of notified body:</i>	<i>Identification number of the notified body:</i>
TÜV Rheinland Service GmbH Am Grauen Stein 51101 Köln Germany	0035

These Declarations become invalid when modifications are made to the ball valves and/or assemblies that affect the technical data of the ball valve or the <Intended use> described in ► BA 26a-01, section 1 of the operating instructions, and considerably change the valve or an assembly delivered with it.

Kempen, 1. September 2022


Stefan Czayka
Head of Quality Management/IMS Representative

DECLARATION OF CONFORMITY

As per Pressure Equipment Directive 2014/68/EU
TRANSLATION



The manufacturer	PFEIFFER Chemie-Armaturenbau GmbH , D47906 Kempen, Germany
declares that:	Type 22a Ball valves (BR 22a) with stuffing box packing • with lever for 90° operation • with worm gear and handwheel
1. The valves are pressure accessories within the meaning of the Pressure Equipment Directive 2014/68/EU and conform with the requirements of this Directive. 2. They may only be operated observing the Installation and operating instructions ► BA 26a-02 and/or ► EB 22a delivered together with the valve. <i>(See ► BA 26a-02, section 2.3 for ball valves intended for dead-end service)</i>	

Applied standards:

AD 2000 Regulations	Regulations for pressurized valve body parts
----------------------------	--

Type designation and technical features:

PFEIFFER Data sheet ► TB 22a

NOTE: This Manufacturer's Declaration applies to all valve types listed in this catalogue.

Applied conformity assessment procedure:

Conforming to Annex III of the Pressure Equipment Directive 2014/68/EU, Module H

Name of notified body:

Identification number of the notified body:

TÜV Rheinland Service GmbH Am Grauen Stein 51101 Köln Germany	0035
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These Declarations become invalid when modifications are made to the ball valves and/or assemblies that affect the technical data of the ball valve or the <Intended use> described in ► BA 26a-02, section 1 of the operating instructions, and considerably change the valve or an assembly delivered with it.

Kempen, 1. September 2022


 Stefan Czayka
 Head of Quality Management/IMS Representative

DECLARATION OF CONFORMITY

TRANSLATION



The manufacturer	PFEIFFER Chemie-Armaturenbau GmbH, 47906 Kempen, Germany
declares for the listed products that:	<p>Type 22a Bottom Drain Ball Valve (BR 22a)</p> <ul style="list-style-type: none"> • with a Type 31a Quarter-turn Actuator (BR 31a) • with a rotary actuator of a different make <p>Prerequisite: the unit was sized and assembled by PFEIFFER Chemie-Armaturenbau GmbH. The serial number on the valve refers to the entire unit.</p>
<p>1. It complies with all applicable requirements stipulated in Machinery Directive 2006/42/EC.</p> <p>2. In the delivered state, the valve with actuator is considered to be final machinery as defined in the above mentioned directive.</p> <p>The start-up of these units is only permitted after the valve has been installed from both sides in the pipeline and a risk of injury can be ruled out as a result.</p>	

Referenced standards:

- a) VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]
- b) VCI, VDMA, VGB: "Zusatzdokument zum Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen vom Mai 2018" [German only], based on DIN EN ISO 12100:2011-03

Product description and technical features:

Tight-closing bottom drain ball valve for aggressive media, particularly for strict requirements in chemical applications, automated with a single or double-acting piston actuator for butterfly valves, ball valves and other valves with rotating throttle bodies.

For product descriptions refer to:

PFEIFFER Data sheet for Type 22a Bottom Drain Ball Valve ► TB 22a

PFEIFFER Data sheet for Type 31a Actuator ► TB 31a

PFEIFFER Mounting and operating instructions for Type 22a Bottom Drain Ball Valve ► EB 22a

PFEIFFER Mounting and operating instructions for Type 31a Actuator ► EB 31a

PFEIFFER Safety manual for Type 22a Bottom Drain Ball Valve ► SH 26

PFEIFFER Safety manual for Type 31a Actuator ► SH 31a

Valve accessories (e.g. positioners, limit switches, solenoid valves, lock-up valves, supply pressure regulators, volume boosters and quick exhaust valves) are classified as machinery components and do not fall within the scope of the Machinery Directive as specified in § 35 and § 46 of the Guide to Application of the Machinery Directive 2006/42/EC issued by the European Commission.

This declaration becomes invalid when modifications are made to the bottom drain ball valves and/or assemblies that affect the technical data of the bottom drain ball valve or the intended use (► EB 22a, section 1) and considerably change the valve or an assembly delivered with it.

Persons authorized to compile the technical file:

Kempen, 22 November 2021


 Stefan Czayka
 Head of Quality Management/IMS Representative

DECLARATION OF CONFORMITY

TRANSLATION



The manufacturer	PFEIFFER Chemie-Armaturenbau GmbH, 47906 Kempen, Germany
declares for the listed products that:	Type 22a Bottom Drain Ball Valve (Type 22a) <ul style="list-style-type: none"> with free shaft end
<p>1. In the delivered state, the valve prepared for mounting on a rotary actuator (not a clearly defined actuator system) is considered to be partly completed machinery as defined in the Machinery Directive 2006/42/EC.</p> <p>Machinery is considered to be partly completed machinery when the machinery manufacturer has not determined all required specifications such as model type, thrusts, torques etc.</p> <p>The start-up of these units is only permitted after the valve has been installed from both sides in the pipeline and a risk of injury can be ruled out as a result.</p>	

Referenced standards:

- a) VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]
- b) VCI, VDMA, VGB: "Zusatzdokument zum Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen vom Mai 2018" [German only], based on DIN EN ISO 12100:2011-03

Product description and technical features:

Tight-closing bottom drain ball valve for aggressive media, particularly for strict requirements in chemical applications.

For product descriptions refer to:

PFEIFFER Data Sheet for Type 22a Bottom Drain Ball Valve ► TB 22a


PFEIFFER Mounting and Operating Instructions for Type 22a Bottom Drain Ball Valve ► EB 22a

Valve accessories (e.g. positioners, limit switches, solenoid valves, lock-up valves, supply pressure regulators, volume boosters and quick exhaust valves) are classified as machinery components and do not fall within the scope of the Machinery Directive as specified in § 35 and § 46 of the Guide to Application of the Machinery Directive 2006/42/EC issued by the European Commission.

This declaration becomes invalid when modifications are made to the bottom drain ball valves and/or assemblies that affect the technical data of the bottom drain ball valve or the intended use (► EB 22a, section 1) and considerably change the valve or an assembly delivered with it.

Persons authorized to compile the technical file:

Kempen, 22 November 2021


Stefan Czayka
Head of Quality Management/IMS Representative

15 Annex

15.1 Tightening torques, lubricant and tools

15.1.1 Tightening torques

i Info

¹⁾ The tightening torques stated in the tables can only be understood as very rough and non-binding guide values and refer to a coefficient of friction of 0.2 μ . Lubricating the threads leads to indeterminate tightening conditions.

15.1.1.1 Body sections

For the connection of the body sections, the screw connections are tightened in a criss-cross pattern with the tightening torques indicated below.

Table 15-1: Body section tightening torques

Nominal size of the main body (1)		Qty.	Thread (16)	Tightening torque ¹⁾
DN	NPS			
50	2			
80	3			
100	4			
150	6			

15.1.1.2 Stuffing box flange

For the assembly of the stuffing box flange, the screw connections are tightened in a criss-cross pattern with the tightening torques indicated below.

Table 15-2: Stuffing box flange tightening torques

Nominal size of the main body (1)		Qty.	Thread (18)	Tightening torque ^{1) 2)}
DN	NPS			
50	2			
80	3			
100	4			
150	6			

²⁾ Tighten the stuffing box screws until the bushing lies on the dome.

15.1.1.3 Flange connection

i Info

Required tightening torques for assembly for flanges according to DIN EN 1092-1 type 11 and connecting elements (e.g. screws, threaded pins) made of 25CrMo4 / A4-70 or a comparable strength.

The values are taken from the "Guidelines for assembly of flange connections in processing plants" of the VCI (Verband der Chemischen Industrie e.V.).

Table 15-3: Flange connection torque

Nominal size		Thread	Tightening torques [Nm] for sealing units ³⁾		Tightening method ⁶⁾
DN	PN		A	B	
50	40	M16	125 ⁴⁾	80	I
80	10 ... 40	M16			
100	10 ... 16	M16			
	25 ... 40	M20	240 ⁵⁾	150	II
150	10 ... 16	M20	240 ⁵⁾	150	
	25 ... 40	M24	340	200	
200	10 ... 16	M20	240 ⁵⁾	150	I
	25	M24	340	200	II
	40	M27	500	250	
250	10	M20	240 ⁵⁾	150	I
	16	M24	340	200	II
	25	M27	500	250	
	40	M30	700	300	

³⁾ These tightening torques were calculated by the company BASF SE and confirmed by partner companies.

⁴⁾ Recommended lever length 300 mm.

⁵⁾ Recommended lever length 550 mm.

⁶⁾ I) With manually-operated spanner with a suitable extension if necessary.

II) With a torque wrench or other torque-controlled procedure.

Table 15-4: Sealing unit A

Seal	Nominal pressure	Description
Flat seal	PN 10 to PN 25	Without inner eyelet
	PN 40	With inner eyelet
Shaft ring seals PN 40 are covered by this. Flat seals with inner eyelet for PN 10 - 25 are already covered, providing that the required characteristic values are complied with.		

Table 15-5: Sealing unit B

Seal	Nominal pressure	Description
Seal for tongue and groove flanges	PN 10 to PN 40	With fibre gaskets and metal-reinforced graphite gaskets
Grooved gasket		-
Spiral gasket with graphite		-

15.1.2 Lubricant

Table 15-6: Recommended lubricant

Use	Temperature range	Lubricant
Screws and nuts	-10 ... +200°C	Heavy-duty grease paste (e.g. Gleitmo 805, manufacturer Fuchs) ! Not suitable for grease-free ball valves or for use with oxygen !

15.1.3 Tools

Suitable tools are required to work on the ball valve. Unsuitable tools can damage the ball valve.

15.2 Spare parts

PFEIFFER recommends spare part sets for "Commissioning" and for "2-year operation", see Chapter:

- "15.2.1 Spare parts of the bottom drain ball valve" on page 15-2.

15.2.1 Spare parts of the bottom drain ball valve

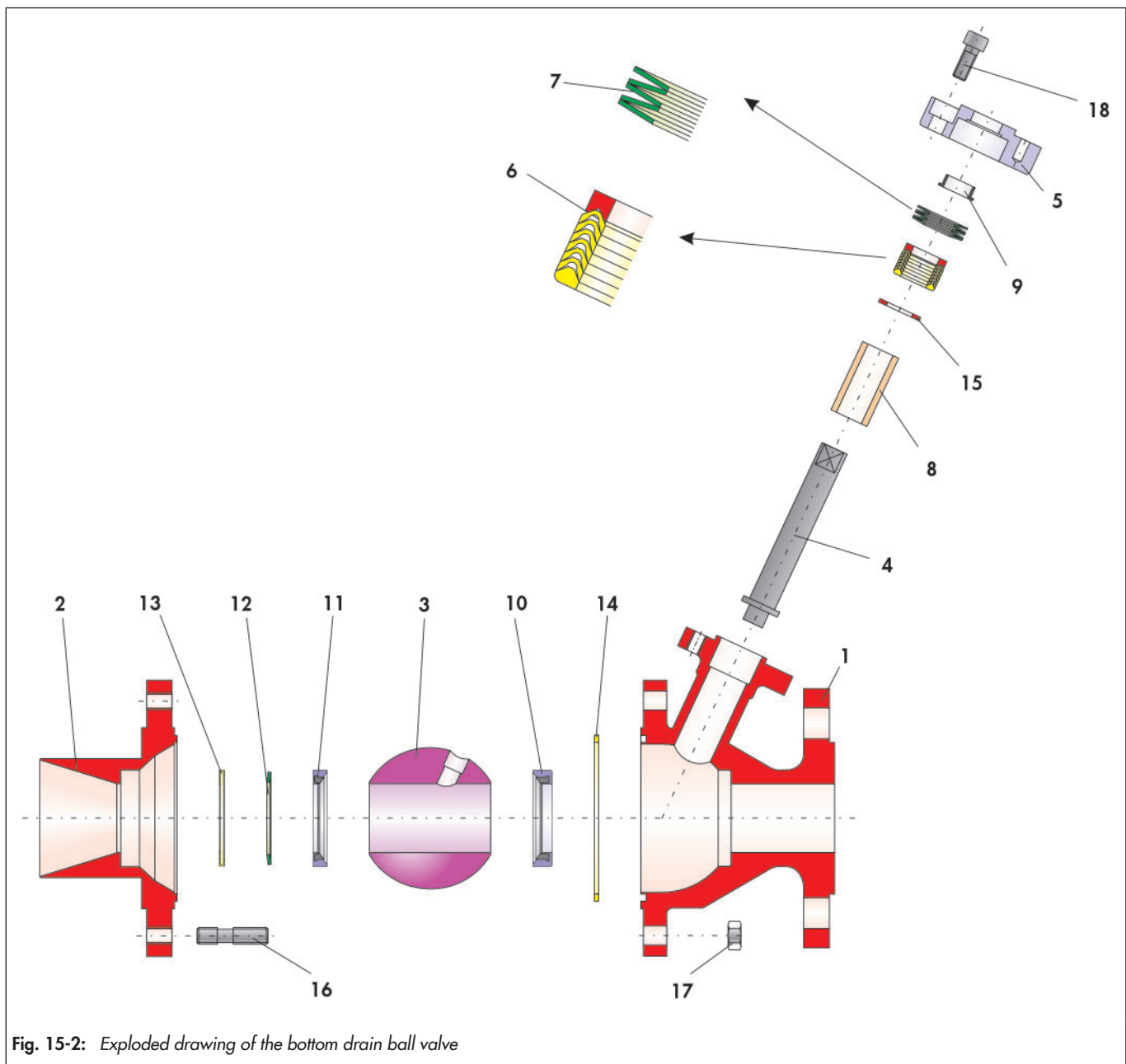


Fig. 15-2: Exploded drawing of the bottom drain ball valve

Table 15-7: Recommend spare parts for the bottom drain ball valve

Item	Description	Material	Spare parts kit	
			Commissioning	2-year operation
1	Main body	1.4404 • A182 F316L		
2	Flange-on body	1.4404 • A182 F316L		
3	Ball	1.4408 • A351 CF8M		•
4	Control shaft	1.4980 • AISI660		•
5	Stuffing box flange	1.4571 • A182 F316Ti		
6	V-ring packing	PTFE / 1.4305	•	•
7	Disc spring set	2.4668	•	•
8	Bearing bush	PTFE with 40% glass	•	•
9	Bearing bush	PTFE with 25% carbon	•	•
10	Seat ring	1.4571 / PTFE with 25% carbon	•	•
11	Seat ring	1.4571 / PTFE with 25% carbon	•	•
12	Disc spring	1.4404	•	•
13	Disc spring jacket	PTFE	•	•
14	Ring	PTFE	•	•
15	Disc	1.4305		
16 ¹⁾	Stud bolt / Screw	A4-70		•
17 ¹⁾	Nut	A4-70		•
18	Screw	A4-70		•

¹⁾ Depending on the nominal size, stud bolts can be fitted with nuts or screws.

15.3 Service

For maintenance and repair work as well as malfunctions or defects, contact the After Sales Service at PFEIFFER for support.

E-mail

The After Sales Service can be reached at the e-mail address "sales-pfeiffer-de@samsongroup.com".

Necessary data

Provide the following information in the case of questions and for troubleshooting:

- Manufacturer number
- Bottom drain ball valve type
- Article number
- Nominal size and version of the bottom drain ball valve
- Manual valve/automated valve
- Medium (designation and consistency)
- Medium pressure and temperature
- Flow rate in m³/h
- Actuator signal pressure
- Number of actuations (year, month, week or day)
- Installation drawing if available
- Completed declaration regarding contamination. This form is available at ► www.pfeiffer-armaturen.com.

Further information

The indicated <data sheets> and further information are available, also in English, at the following address:

PFEIFFER Chemie-Armaturenbau GmbH

Hooghe Weg 41 • 47906 Kempen • Germany

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