

# MOUNTING AND OPERATING INSTRUCTIONS



## EB 10a

Translation of the original manual



**Control and shut-off valve BR 10a • DIN- and ANSI Version**  
to combine with actuators

October 2024 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 butterfly valve itself, the respective additional manual applies for the mounted actuator.

### Definition of signal words

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#### **DANGER**

*Hazardous situations that lead to death or serious injuries*

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#### **WARNING**

*Situations that can lead to death or serious injuries*

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#### **NOTE**

*Property damage and malfunctions*

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#### **Info**

*Additional information*

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#### **Tip**

*Recommended action*

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# 1 Safety instructions and safety measures

## Intended use

The PFEIFFER butterfly valve BR 10a is manually operated in combination with a rotary actuator for the regulation of the volume flow, pressure and temperature of fluid, gaseous or vaporous media.

- The butterfly valve and its drive are designed for precisely defined conditions (e.g. operating pressure, utilised medium, temperature).

Therefore the operator must make sure that the butterfly valve is only used when the conditions of use comply with the design criteria defined in the order.

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

- Manual butterfly 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 butterfly 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 data sheet contains the permissible pressure and temperature range for these butterfly valves ► TB 10a. 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 butterfly valves.

This manual only provides safety instructions that are to be observed additionally for butterfly 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 butterfly 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 butterfly 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 butterfly 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 butterfly 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 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 butterfly 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 butterfly 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 butterfly valve ensure that:

- The butterfly valve is only used as intended as described in this chapter.

- An actuator unit that is subsequently installed on the butterfly valve is adapted to the butterfly valve and the max. torque is observed, and is correctly adjusted in the end positions, and in particular in the closed position of the valve.
- The pipe system and control system are properly installed and regularly checked. The wall thickness of the butterfly 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. It is recommended to contact PFEIFFER 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 butterfly 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 butterfly 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 butterfly 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.

Butterfly valves with plastic lining (PFA, PTFE, EPDM, etc.) through which chargeable media flows during operation, must be provided with an electrostatically dissipative plastic lining whose surface resistance does not exceed a value of  $1 \text{ G}\Omega$  ( $10^9 \Omega$ ) in accordance with DIN EN ISO 80079-36.

## 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 butterfly valves!**

Butterfly 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 butterfly valves whose permissible pressure/temperature range (=“rating”) is sufficient for the operating conditions, see the data sheet ► TB 10a.

#### **Risk of bursting of the pressure equipment!**

Butterfly valves and pipes are pressure equipment. Improper opening can cause the bursting of butterfly valve components.

- ⇒ Observe the maximum permissible pressure for the butterfly valve and plant.
- ⇒ Before working on the butterfly valve, depressurise the concerned plant parts and the butterfly valve.
- ⇒ Before removing the butterfly valve from the pipe or loosening the screw plug, completely release the pressure in the pipe so that the medium does not escape uncontrolled from the line.
- ⇒ Empty the medium from the concerned plant parts and butterfly valve. (Wear protective equipment)

## 1.2 Notes regarding possible personnel injury

### WARNING

#### **Hazards due to incorrect butterfly valve use!**

The incorrect use of the butterfly 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 lining selected for the parts of the butterfly 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, butterfly valve components and pipes can become very hot or very cold and cause burns upon contact.

- ⇒ Butterfly valves must be protected against contact in the case of operating temperatures  $>+50 \text{ }^\circ\text{C}$  or  $<-20 \text{ }^\circ\text{C}$  together with the pipe connections.

**! WARNING****Danger of crushing due to moving parts!**

The butterfly valve contains moving parts (actuator stem and switching shaft) that can lead to crushing if reaching into it.

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

**Danger of injury during the switching operation if performing test runs on butterfly valves not installed in the pipe!**

- ⇒ Do not reach into the butterfly valve. This can result in serious injuries.

**Danger of injury due to venting the actuator!**

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

- ⇒ Install the butterfly valve such that the actuator does not ventilate at eye level.
- ⇒ Use suitable silencers and plugs.
- ⇒ Wear eye protection when working near the butterfly valve.

**Danger of injury due to preloaded springs!**

Butterfly 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 butterfly valve!**

When a butterfly valve must be removed from a pipe, medium can escape from the pipe or the butterfly valve.

- ⇒ In the case of media that is harmful to health or hazardous, the pipe must be completely emptied before a butterfly 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 butterfly valve.

- ⇒ The screw connection on the body part connection may not be released or loosened. Contact the After Sales Service at PFEIFFER for maintenance and repair work.
- ⇒ The valve body assembly is only functional in the existing assembled version. The modular unit of the body may not be disassembled any more.

**Dangers due to use of the butterfly valve as an end fitting!**

During normal operation, in particular with gaseous, hot and/or hazardous media, spraying medium can cause hazards.

- ⇒ A blind flange must be assembled on the free connecting pieces or the butterfly valve must be secured against unauthorised actuation.
- ⇒ If a butterfly valve is 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.

**! WARNING****Deviation of the breakaway and actuating forces due to non-actuation of the butterfly 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 butterfly 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 seat ring or sealing strip**

Turning the butterfly valve over 0° leads to irreparable damage to the seat ring or sealing strip.

- ⇒ Make sure, that the butterfly disc is always operated within a range of between 0° - 90°.

### 1.3 Notes regarding possible property damage

**! NOTE****Damage to the butterfly valve due to contamination!**

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

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

**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.

**Damage to the butterfly valve due to unsuitable medium properties!**

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

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

**Damage to the butterfly valve and leakage due to excessively high or low tightening torques!**

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

- ⇒ Excessively tightened components are subject to increased wear.
- ⇒ Insufficiently tightened components can cause leakage.
- ⇒ The screw connection on the body part connection may not be released or loosened.

**NOTE**

**Damage to the butterfly valve due to unsuitable tools!**

Unsuitable tools can damage the butterfly valve.

⇒ Suitable tools are required to work on the butterfly valve, see Chapter "15.1.3 Tools".

**Damage to the butterfly valve due to unsuitable lubricants!**

Unsuitable lubricants can corrode and damage the surface.

⇒ The butterfly valve material requires suitable lubricants, see Chapter "15.1.2 Lubricants".

## 1.4 Warning notes on the device

### Warning of moving parts

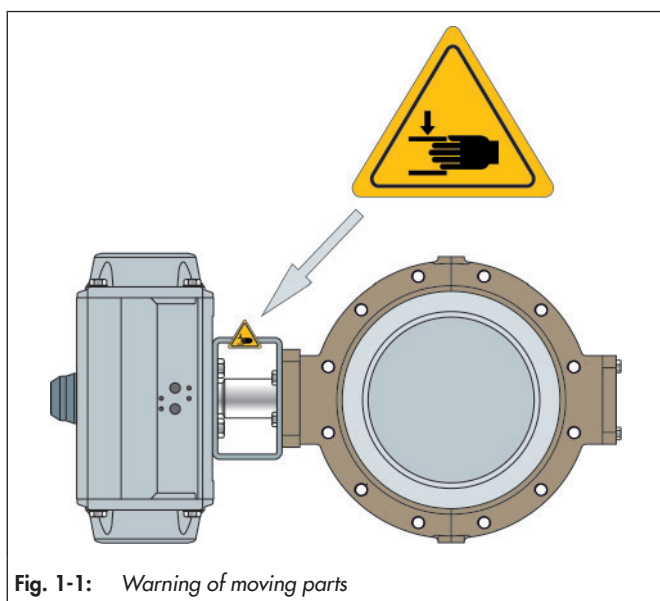


Fig. 1-1: Warning of moving parts

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 butterfly valve usually has the following marking.

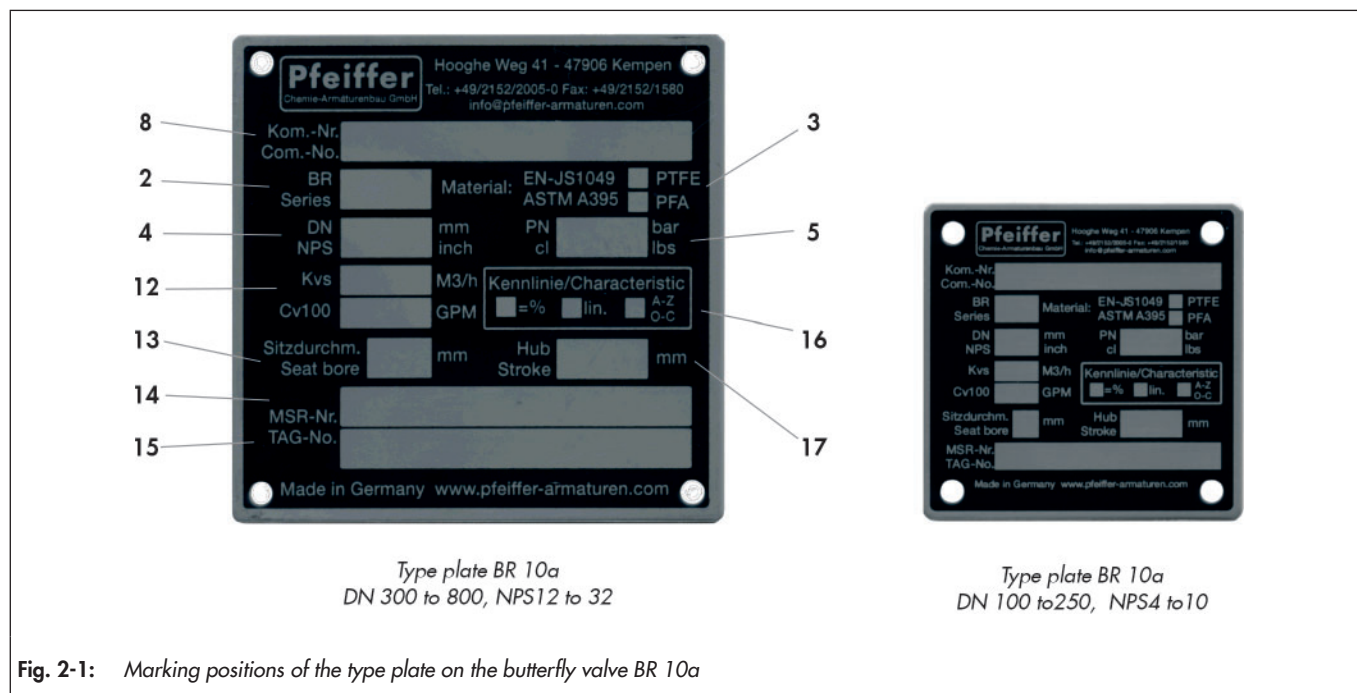
**Table 2-1:** Marking on the type plate and on the body of the valve

Item	For	Marking	Remark
1	Manufacturer	PFEIFFER	Address see Chapter "15.3 Service"
2	Valve type	BR (and number value)	BR 10a = Series 10a, see the PFEIFFER catalogue
3	Body material	e.g. EN-JS 1049, PTFE coated	No. of the material standard according to DIN EN 1563 (previous: GGG 40.3)
4	Size	DN (and number value)	Number value in [mm], e.g. DN 100 / number value in [inches], e.g. NPS4
5	Maximum pressure	PN (and number value)	Number value in [bar] 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 the Pressure-Temperature Diagram on the data sheet ▶ TB 10a
	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. 381234/001/001	38 1234 /001 /001 
	Manufacturer number 2009 to 2017	e.g. 211234/001/001	21 1234 /001 /001 
	Manufacturer number until 2008	e.g. 2071234/001/001	207 1234 /001 /001 
9	Year of manufacture	e.g. 2023	Upon customer request, the year of manufacture can also be indicated on the valve
10	Seat material	e.g. PTFE/glass	Material marking
11	Shaft material	e.g. 1.4301	No. of the material standard according to DIN EN 10088-3
12	Kvs / Cv value		Number value in [m <sup>3</sup> /h] (not used)
13	Seat diameter		Number value in [mm] (not used)
14	MSR No. / Remark	e.g. Disc: titanium	
15	Test point number	e.g. TEST POINT F123201-1	Test point numbers are specified by the customer
16	Characteristic curve	e.g. =%	Marking for "linear" or "equal percentage"
17	Travel		Number value in [mm] (not used)
18	DataMatrix code		
19	Conformity	CE	Conformity is certified separately by the manufacturer
	Code No.	0035	"Notified body" according to EU Directive = TÜV Rheinland Service GmbH
20	Flow direction	➔	Attention: see the note in Chapter "5.4 Installing the butterfly valve in the pipe"
21	Direction of rotation		Reference to the direction of rotation

### Info

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

## 2.1 Butterfly valve type plate

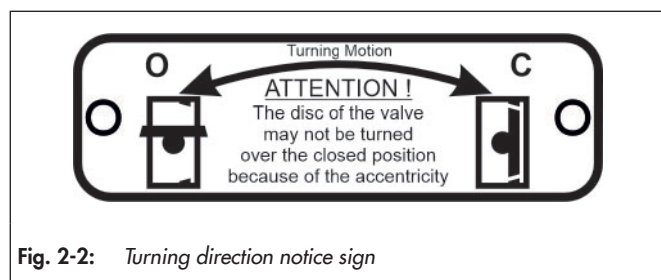


## 2.2 Actuator type plate

See the corresponding actuator documentation.

## 2.3 Turning direction notice sign

The turning direction is indicated on the butterfly valve by a sign.



### 3 Design and principle of operation

#### Version

The BR 10a butterfly valve has the following properties:

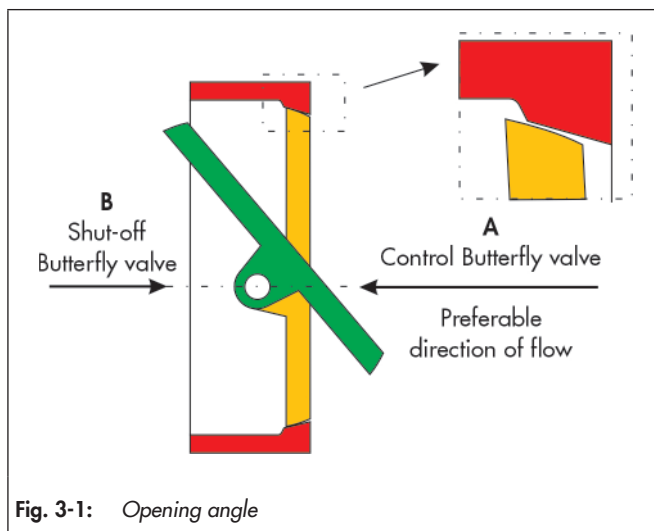
- **Valve body** from EN-JS 1049 (GGG 40.3) with DIN version or A395 with ANSI version.
- **Isostatic lining** of the butterfly valve body made of 8 to 12 mm thick PTFE.
- **Body version** as a screw-in butterfly valve (lug type) or clamping butterfly valve (wafer type).
- **Valve disc and butterfly valve shaft** made of corrosion-resistant cast steel 1.4313 with PTFE coating.

#### Function and principle of operation

The BR 10a butterfly valves can be flowed through in both directions.

The position of the valve disc (3) determines the flow with the area released opposite of the liner. Butterfly valves are sealed between the valve disc (3) and liner.

The shaft (2) is sealed towards the outside by a V-ring packing (4 and 6). This packing is maintenance-free PTFE V-ring packing, which is preloaded by spring washers (8 and 16) located above the packing space.



The direction of flow and the differential pressure determine the breakaway torque for opening the butterfly valve.

The double-eccentric bearing design of the shaft causes the valve disc to remain in contact with the seat during opening and closing only over a very small angle of rotation, see Fig. 3-1.

This reduces wear and increases the service life of the valve. It also reduces the breakaway torque.

When the medium flows through the butterfly valve in **direction A** (see Fig. 3-1), the valve disc is pressed slightly out of its seat. This reduces the pre-load force as well as the breakaway torque.

When the medium flows in **direction B**, the pre-load force increases as the breakaway torque rises.

#### Fail-safe position

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

##### – Butterfly valve with fail-close actuator [FC]:

Upon air failure, the butterfly valve is closed. The butterfly valve opens when the signal pressure increases, acting against the force of the springs.

##### – Butterfly valve with fail-open actuator [FO]:

Upon air failure, the butterfly valve is opened. The butterfly 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 10a butterfly valve can be selected in the following versions:

- Lever and ratchet
- Manual gear
- Diaphragm rotary actuator BR 30a
- PFEIFFER rotary actuator BR 31a
- Rotary actuators from other manufacturers (for details see the respective data sheet).

### 3.1 Variants

- Adjustable stuffing box
- Electric rotary actuator
- Linings with special PTFE compounds, e.g. electro conductive
- Special stem seals for high vacuum
- Disc components made of special materials, e.g. titanium, hastelloy
- End stop

### 3.2 Additional fittings

#### Strainer

PFEIFFER recommends installing a strainer in front of the butterfly valve. A strainer prevents the solid content in the medium from damaging the butterfly valve.

#### Bypass and shut-off valve

PFEIFFER recommends installing a shut-off valve in front of the strainer as well as behind the butterfly valve and to create a bypass. By means of the bypass, the entire plant does not have to be decommissioned during maintenance and repair work on the butterfly valve.

### Insulation

The butterfly valves can be insulated to reduce the passage of heat energy. Observe the notes in Chapter "5 Assembly".

### Grip protection

In the case of conditions of use that require a high level of safety (e. g. if the butterfly 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 butterfly valve in the plant.

## 3.3 Attachments

The following accessories are available either individually or in combinations:

- Positioner
- Limit switch
- Solenoid valves
- Supply air regulator/filter
- Pressure gauge mounting blocks

Other additional equipment is possible according to specifications on request.

## 3.4 Technical data

The type plates of the butterfly 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 10a.

## 3.5 Butterfly valve assembly

The BR 10a butterfly valves have design differences in the various versions so that they cannot be documented in one construction manual.

- Chapter 3.5.1 describes the butterfly valve assembly in the standard version.
- Chapter 3.5.2 describes the assembly of the butterfly valve with adjustable stuffing box.

### Preparation of the assembly

To assemble the butterfly 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.

- ⇒ Do not use this product for butterfly valves with use of oxygen.
- ⇒ A suitable lubricant must be selected for grease-free butterfly valves, especially for use with oxygen.

#### **Damage to the parts in contact with media due to unsuitable grease.**

- ⇒ When assembling the shaft, liner, valve disc and all other parts in contact with media, only use water-free grease (e. g. with halocarbon TM).

### Info

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

## 3.5.1 Assembly of the butterfly valve

- ⇒ The butterfly valve body (1) is laid with the sealing side onto a clean, soft surface, positioned at working height so permitting easy access to the shaft bearings.

The valve body forms together with the PTFE lining and the sleeves (19 and 20 ) a modular unit which is assembled with the grooved pin (13), as well as the screw (11) and the nut (12).

### Note

#### **Damage to the valve body assembly due to disassembly!**

The valve body assembly is only functional in the existing assembled version.

- ⇒ The modular unit of the body may not be disassembled any more.

The control shaft (2) and the bearing screw (21) were manufactured together and also form a modular unit.

### Note

#### **Damage to the shaft assembly due to incorrect assembly!**

- ⇒ The modular unit of control shaft and bearing screw belong together and may not be individually exchanged.

- ⇒ The bearing screw (21) is unscrewed from the control shaft (2).
- ⇒ The control shaft (2) is inserted at an angle into the valve body (1).

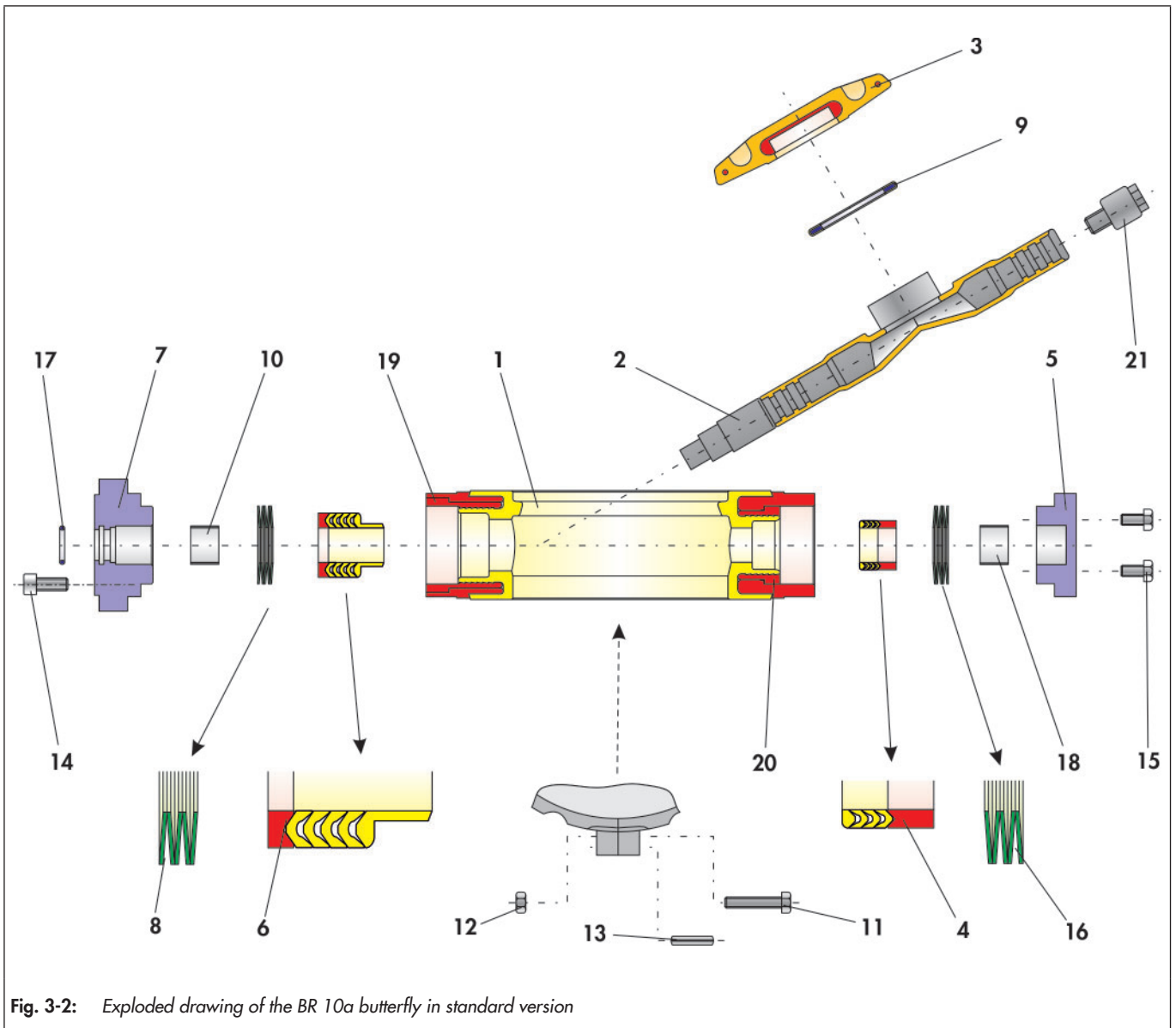


Fig. 3-2: Exploded drawing of the BR 10a butterfly in standard version

Table 3-2: List of parts

Item	Description
1	Valve body
2	Shaft
3	Valve disc
4	V-ring packing
5	Lower gland flange
6	V-ring packing
7	Guide bushing
8	Set of spring washers
9	Sealing element
10	Bearing bush
11	Screw

Item	Description
12	Nut
13	Grooved pin
14	Screw
15	Screw
16	Set of spring washers
17	O-ring
18	Bearing bush
19	Bushing
20	Bushing
21	Bearing screw
22	Threaded pin

### **Note**

#### **Damage to the liner and coating due to improper handling!**

⇒ Care must be taken that the PTFE lining and the PTFE coating of the shaft are not damaged.

- ⇒ The bearing screw (21) is screwed into the mounted control shaft ( 2 ) and tightened.
- ⇒ The base ring of the V-ring packing (6) is pushed over the free end of the shaft to the appropriate position in the valve body (1) by means of an assembly sleeve.
- ⇒ The PTFE V-ring packing (6) is now pushed over the shaft into the body bore and pressed home with an assembly sleeve. The arrangement of the packing is shown in the detail drawing Fig. 3-2.
- ⇒ The spring washers (8) is pushed over the shaft and positioned at the appropriate place on the packing. The arrangement of the springs washers ase also shown in the detail drawing Fig. 3-2.
- ⇒ The bearing bush (10) is pressed into the guide bush (7).
- ⇒ The O-ring (17) is also placed in the appropriate position of the guide bush.
- ⇒ The pre-assembled guide bush is carefully placed onto the body and adjusted with the screws ( 14 ).
- ⇒ The screws (14) are then equally and alternately tightened.
- ⇒ The PTFE V-ring packing (4) is now pushed over the shaft into the body bore and pressed home with an assembly sleeve. The arrangement of the packing is shown in the detail drawing Fig. 3-2.
- ⇒ The spring washers (16) is pushed over the shaft and positioned in the appropriate place on the packing. The arrangement of the spring washers are also shown in the detail drawing Fig. 3-2.
- ⇒ The bearing bush (18) is pressed into the lower gland (5).
- ⇒ The pre-assembled lower gland is carefully placed onto the body and adjusted with the screws (15).
- ⇒ The screws (15) are then equally and alternately tightened.
- ⇒ The sealing element (9) is laid onto the thread for the valve disc.
- ⇒ The valve disc (3) is now screwed onto the control shaft.

### **Info**

The tightening of the disc is carried out with a special tool.

- ⇒ The butterfly valve disc can now be closed.

### **Note**

#### **Damage to the valve disc and liner due to incorrect direction of rotation!**

Pay particular attention to the direction of rotation! The double eccentric butterfly valves must always be closed clockwise!

- ⇒ Therefore, attention must be paid to the direction of rotation when mounting an actuator! A plate on the butterfly valve shows the direction of rotation, see Fig. 2-2 in chapter "2.3 Turning direction notice sign".

### 3.5.2 Assembly of the butterfly valve with adjustable stuffing box (Option)

- ⇒ The valve body (1) is laid with the sealing side onto a clean, soft surface, positioned at working height so permitting easy access to the shaft bearings.

The valve body forms together with the PTFE lining and the sleeves (19 and 20) a modular unit which is assembled with the grooved pin (13), as well as the screw (11) and the nut (12).

### **Note**

#### **Damage to the valve body assembly due to disassembly!**

The valve body assembly is only functional in the existing assembled version.

- ⇒ The modular unit of the body may not be disassembled any more.

The control shaft (2) and the bearing screw (21) were manufactured together and also form a modular unit.

### **Note**

#### **Damage to the shaft assembly due to incorrect assembly!**

- ⇒ The modular unit of control shaft and bearing screw belong together and may not be individually exchanged.

- ⇒ The bearing screw (21) is unscrewed from the control shaft (2).
- ⇒ The control shaft (2) is inserted at an angle into the valve body (1).

### **Note**

#### **Damage to the liner and coating due to improper handling!**

- ⇒ Care must be taken that the PTFE lining and the PTFE coating of the shaft are not damaged.

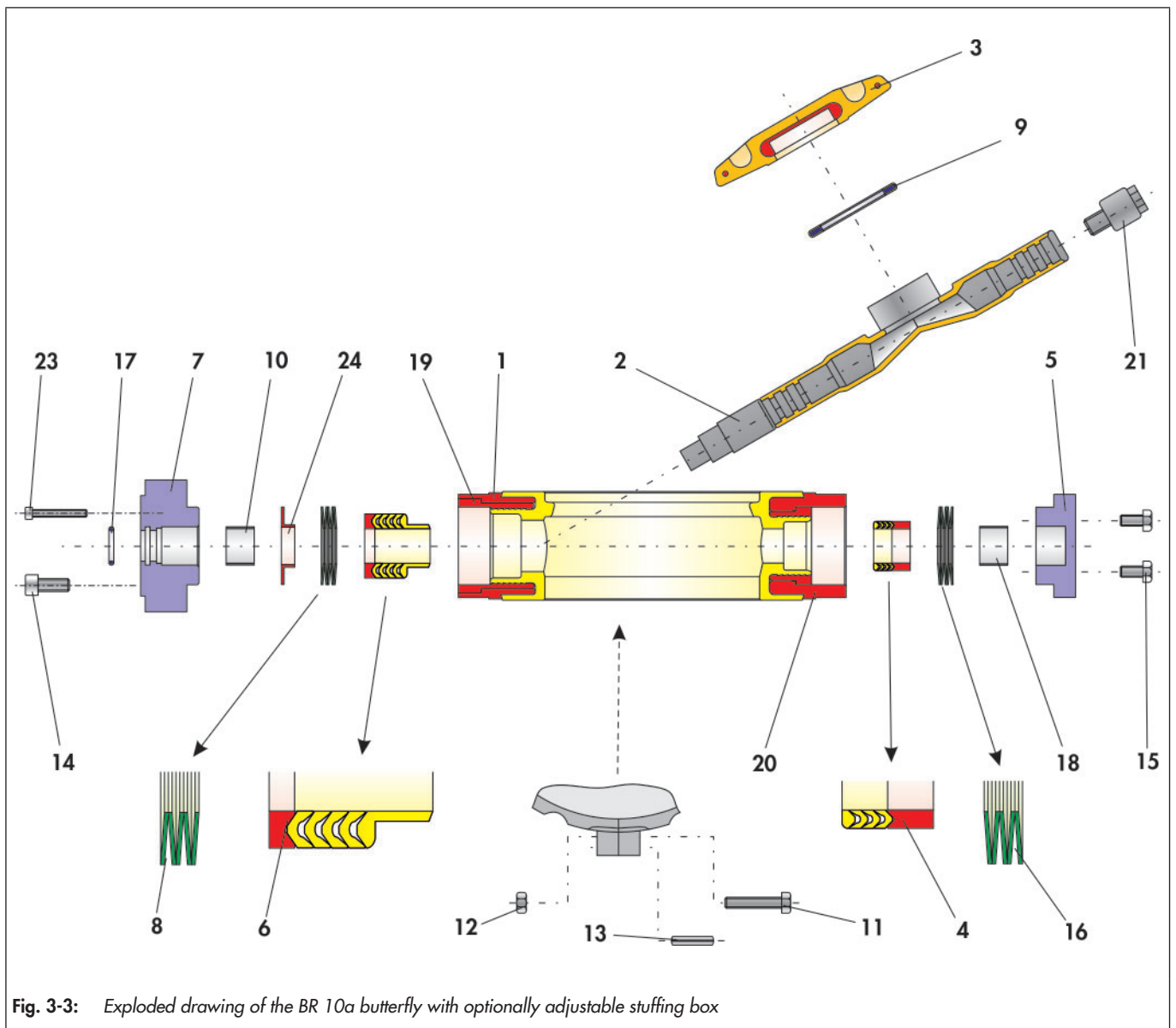


Table 3-3: List of parts

Item	Description
1	Valve body
2	Shaft
3	Valve disc
4	V-ring packing
5	Lower gland flange
6	V-ring packing
7	Guide bushing
8	Set of spring washers
9	Sealing element
10	Bearing bush
11	Screw
12	Nut

Item	Description
13	Grooved pin
14	Screw
15	Screw
16	Set of spring washers
17	O-ring
18	Bearing bush
19	Bushing
20	Bushing
21	Bearing screw
22	Threaded pin
23	Screw
24	Bushing

## Design and principle of operation

- ⇒ The bearing screw (21) is screwed into the mounted control shaft (2) and tightened.
- ⇒ The base ring of the V-ring packing (6) is pushed over the free end of the shaft to the appropriate position in the valve body (1) by means of an assembly sleeve.
- ⇒ The PTFE V-ring packing (6) is now pushed over the shaft into the body bore and pressed home with an assembly sleeve. The arrangement of the packing is shown in the detail drawing Fig. 3-3.
- ⇒ The spring washers (8) is pushed over the shaft and positioned at the appropriate place on the packing. The arrangement of the spring washers is also shown in the detail drawing Fig. 3-3.
- ⇒ The bushing (24) is placed on the spring washer.
- ⇒ The bearing bush (10) is pressed into the guide bush (7).
- ⇒ The O-ring (17) is also placed in the appropriate position of the guide bush.
- ⇒ The screws (23) are screwed in, so that the screw shafts are aligned (flush) with the underside of the guide bushing (7).

### **i** Info

*The pre-loaded tension of the packing (6) is effective only through the spring washer set (8).*

- ⇒ The pre-assembled guide bush is carefully placed onto the body and adjusted with the cheese head screws (14).
- ⇒ The screws (14) are then equally and alternately tightened.
- ⇒ The PTFE V-ring packing (4) is now pushed over the shaft into the body bore and pressed home with an assembly sleeve. The arrangement of the packing is shown in the detail drawing Fig. 3-3.
- ⇒ The spring washers (16) are pushed over the shaft and positioned at the appropriate place on the packing. The arrangement of the spring washers are also shown in the detail drawing Fig. 3-3.
- ⇒ The bearing bush (18) is pressed into the lower gland (5).
- ⇒ The pre-assembled lower gland is carefully placed onto the body and adjusted with the screws (15).
- ⇒ The screws (15) are then equally and alternately tightened.
- ⇒ The sealing element (9) is laid onto the thread for the valve disc.
- ⇒ The valve disc (3) is now screwed onto the control shaft.

### **i** Info

*The tightening of the disc is carried out with a special tool.*

- ⇒ The butterfly valve disc can now be closed.

### **!** Note

#### **Damage to the valve disc and liner due to incorrect direction of rotation!**

*Pay particular attention to the direction of rotation! The double eccentric butterfly valves must always be closed clockwise!*

- ⇒ *Therefore, attention must be paid to the direction of rotation when mounting an actuator! A plate on the butterfly valve shows the direction of rotation, see Fig. 2-2 in chapter "2.3 Turning direction notice sign".*



## 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 butterfly valve due to improper transport and storage!**

⇒ Butterfly valves with lining must be handled, transported and stored with particular 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 butterfly valve

Carry out the following steps:

- ⇒ Unpack the butterfly valve directly before lifting for installation into the pipe.
- ⇒ Leave the butterfly valve on the pallet or in the transport container for on-site transport.
- ⇒ The protective caps on the butterfly valve inlet and outlet prevent foreign matter from entering the butterfly 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 butterfly 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 butterfly valve including the actuator.
- Take the weights from the respective data sheet.

#### ! WARNING

#### **Danger of injury due to the tipping of the butterfly valve!**

- Observe the centre of gravity of the butterfly valve.
- Secure the butterfly valve against tipping and twisting.

#### ! NOTE

#### **Damage to the butterfly valve due to improper fastening of the sling!**

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

- When lifting the butterfly valve, make sure that the entire load is carried by the sling that is fastened to the butterfly valve body.
- Do not fasten the load-bearing sling to the actuator, hand wheel or other components.

### 4.3.1 Transporting

The butterfly valve can be transported using lifting equipment such as a crane or a forklift.

- ⇒ Leave the butterfly valve on the pallet or in the transport container for transport.
- ⇒ Butterfly 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 butterfly valves from damage.
- ⇒ Comply with the transport conditions.

#### Transport conditions

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

### 4.3.2 Lifting

When installing the butterfly valve in the pipe, larger butterfly 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.
- ⇒ Secure the sling against shifting and slipping off.
- ⇒ Fasten the sling such that it can be removed again after installation in the pipe.

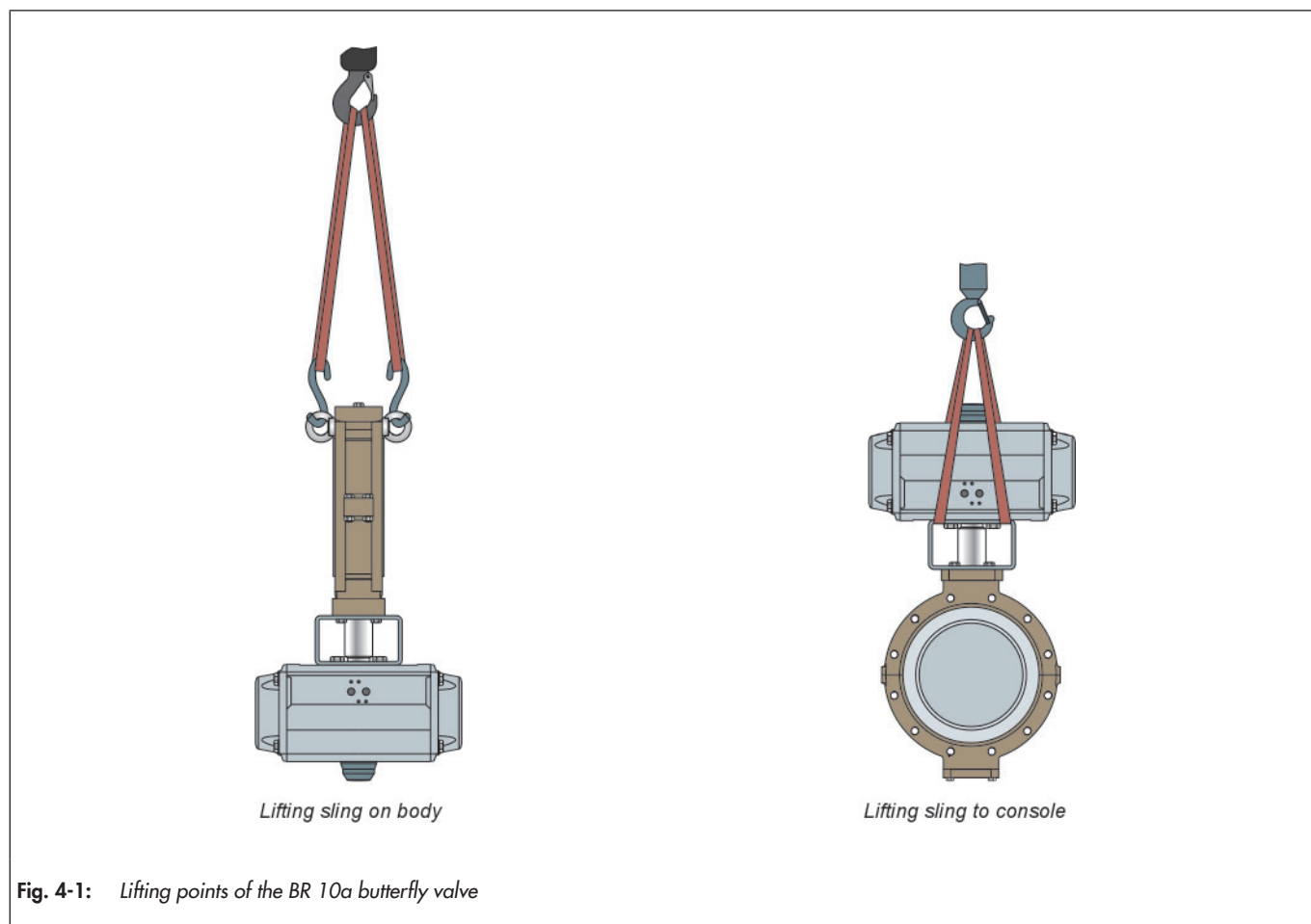


Fig. 4-1: Lifting points of the BR 10a butterfly valve

- ⇒ Avoid swinging and tipping the butterfly 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 butterfly valves aligned in the same direction in which they will be installed in the pipe.
- ⇒ Always lift the butterfly 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 butterfly valve, pretension 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

- ⇒ Attach the eyebolts in the flange bores in the body. When doing so, make sure that the carrying capacity of the utilised eyebolts is sufficient.
- ⇒ Connect the lifting sling with hooks to the eyebolts. Make sure that the hook is seated properly in the eyebolts.
- ⇒ Fasten a lifting sling to each 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 butterfly valve carefully. Check if the load lifting equipment holds.
- ⇒ Move the butterfly valve at a constant speed to the installation site.
- ⇒ Install the butterfly valve in the pipe, see chapter 5.4
- ⇒ After installation in the pipe, check if the flange is screwed in firmly and the butterfly 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 butterfly valve carefully. Check if the load lifting equipment holds.
- ⇒ Move the butterfly valve at a constant speed to the installation site.
- ⇒ Install the butterfly valve in the pipe, see chapter 5.4
- ⇒ After installation in the pipe, check if the flange is screwed in firmly and the butterfly valve holds in the pipe.
- ⇒ Remove the lifting slings.

#### **i** Info

- In the case of butterfly valves that are delivered without an actuator, the valve disc is not secured to prevent it from moving. It must not be opened from the closed position due to external influences (e.g. shaking).
- Only in the case of butterfly valves with a pneumatic actuator does the valve disc protrude outside of the body on body sides in the delivered state. The packaging on the protruding edge should protect the valve disc from damage. The superfinished sealing surface on the disc edge may not be damaged.

- ⇒ Do not place any objects on the butterfly valve.

## 4.4 Storing the butterfly valve

#### **!** NOTE

#### **Damage to the butterfly 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.

#### **i** Info

PFEIFFER recommends checking the butterfly valve and the storage conditions regularly during a longer storage period.

- ⇒ In the case of storage prior to installation, the 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 plastic lined sealing surfaces of the butterfly valve flange ends for pipe connection may not be damaged by mechanical or any other influences.
- ⇒ Do not stack the butterfly valves.
- ⇒ Prevent condensation in damp rooms, use a desiccant or heater if necessary.
- ⇒ The butterfly valve must be stored in its protective packaging and/or with the protective caps on the connection ends.
- ⇒ Butterfly valves that weigh more than approx. 10 kg should be stored on a pallet (or supported similarly).
- ⇒ Butterfly valves are usually delivered in a closed position. They must be stored in the position in which they were delivered. The actuating device must not be actuated.



## 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 butterfly valves. Observe chapter "4.3 Transporting and lifting the butterfly valve" for transport to the installation site.

### 5.1 Installation conditions

#### Operator level

The operator level for the butterfly valve is the front view on all operating elements of the butterfly 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 butterfly valves in the pipe.

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

#### Installation position

The recommended installation position of the BR 10a butterfly valve must be selected so that the control shaft is always aligned parallel to the ground.

In the event of deviations from this installation position, contact PFEIFFER.

#### Support and mounting

The plant manufacturer is responsible for the selection and implementation of a suitable support or mounting for the installed butterfly 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

Butterfly 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 butterfly valve is clean.
- The butterfly 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 butterfly valve.

### 5.3 Assembling the butterfly valve and actuator

PFEIFFER butterfly valves are supplied in working order. In individual cases, the actuator and butterfly 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 butterfly 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 butterfly valve.

#### **Danger and damage due to use of an electrical actuator!**

- ⇒ Make sure that the butterfly valve in the "CLOSED" position is turned off by the signal of the torque switch.
- ⇒ In the "OPEN" position, the butterfly valve must be turned off by the limit switch.
- ⇒ 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 Faults".
- ⇒ 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 butterfly valve.

**WARNING**

**Danger and damage due to heavy actuators!**

Actuators that are heavier than the weight of the butterfly 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 butterfly valve due to their size and/or installation situation.

**NOTE**

**Damage to the butterfly valve due to the incorrect actuator assembly!**

Double eccentric butterfly valves must always be closed clockwise!

- ⇒ Observe the turning direction when assembling an actuator.
- ⇒ The turning direction is indicated on the butterfly valve by a sign, see Fig. 5-1.

**Damage to the butterfly 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.

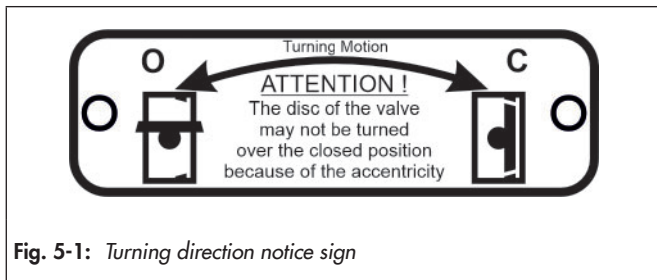


Fig. 5-1: Turning direction notice sign

## 5.4 Installing the butterfly valve in the pipe

### 5.4.1 General

- ⇒ Transport the valve in its original packaging to the installation site and unpack it only there.
- ⇒ Inspect the butterfly valve and actuator for transport damage. Damaged butterfly valves or actuators may not be installed.
- ⇒ A functional test is to be carried out at the beginning of installation for manually-operated butterfly valves: the butterfly valve must close and open correctly. Detected malfunctions must be fixed before commissioning, see also Chapter "8 Faults".
- ⇒ Handle the butterfly valve with care and observe the instructions for the flange connection.

**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 butterfly 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 butterfly valve, see Chapter "2 Markings on the device".
- ⇒ The permissible range is defined in Chapter "1 Safety instructions and safety measures".

- ⇒ Only install butterfly valves whose pressure classes, connection type (flow rate), type of lining and connection dimensions match the conditions of use. See the corresponding marking on the butterfly valve.
- ⇒ The counterflanges must have smooth sealing surfaces. Other flange shapes must be agreed upon with PFEIFFER.
- ⇒ The connection ends of the pipe must align with the butterfly valve connections and have plane-parallel ends. Connection flanges that are not plane parallel can damage the PTFE lining during installation.
- ⇒ 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 butterfly 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 any utilized flange seals must be free of all contamination during installation.
- ⇒ Any flow direction is possible.
- ⇒ An arrow is marked on the body. The direction of the arrow must correspond to the direction of flow in the pipe.

**i Info**

**It may be necessary in special cases for a butterfly valve to be tight against the direction of flow.**

For installation in these special cases, contact PFEIFFER as this could lead to an excessive strain on the seal ring, washer, etc.

- ⇒ When pushing the butterfly valve (and the flange seals) into an already assembled pipe, the distance between the pipe ends must be measured such that all contact surfaces of the butterfly valve and seals remain undamaged.

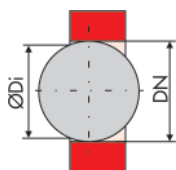
**NOTE****Damage to the valve disc due to improper installation!**

The valve disc could be damaged and the butterfly valve could leak.

- ⇒ Push the butterfly valve with a closed valve disc into the gap between the pipe flanges.
- ⇒ The clear width of the counterflange must leave enough space for the opened valve disc so that it is not damaged when swinging out, see Table 5-1.

**Table 5-1:** Minimum required inner diameter  $D_i$  of the counterflange

Nominal size		$D_i$
DN 100	NPS4	76.5
DN 150	NPS6	126
DN 200	NPS8	175
DN 250	NPS10	222
DN 300	NPS12	274
DN 350	NPS14	326
DN 400	NPS16	366
DN 500	NPS20	465
DN 600	NPS24	573
DN 800	NPS32	763



**Fig. 5-2:** Inside diameter

**DANGER****Danger due to incorrect installation of the butterfly valve with the pneumatic "spring opening" actuator!**

- ⇒ Observe the following for installation:
  - Disassemble the actuator in the open position
  - Close the valve disc manually
  - Install the butterfly valve in the pipe
  - Open the valve disc manually
  - Assemble the actuator again

## 5.4.2 Installing the butterfly valve

**i Info**

The butterfly valve is lined with PTFE.

- ⇒ Handle the butterfly valve with particular care and observe the instructions for the flange connection.

Protect the lined butterfly valve surfaces in particular prior to/during installation.

- ⇒ Transport the butterfly valve in its original packaging to the installation site and unpack it only there.

- ⇒ Lift the butterfly valve with suitable lifting equipment at the installation site, see chapter "4.3 Transporting and lifting the butterfly valve".

**WARNING****Danger due to crushing!**

There is a risk of crushing when the flap with actuator is not installed.

- ⇒ Only connect and actuate the actuator after the butterfly valve is connected in the pipe.
- ⇒ If the butterfly valve is provided as an end fitting in a pipe section, either fit the end bonnet on the outfeed or lock the actuator securely to prevent unauthorised actuation to prevent the danger of crushing.

- ⇒ Close the butterfly valve in the pipe for the duration of the installation.
- ⇒ Remove the protective caps on the valve openings prior to installation.
- ⇒ Use correct flange seals.
- ⇒ Clean the sealing surfaces on the butterfly valve and pipe.
- ⇒ Screw the pipe together with the butterfly valve without tension.

**i Info**

The sealing surfaces on the butterfly valve body are lined with plastic.

- ⇒ Flange seals made of PTFE are recommended.
- ⇒ Counterflanges have smooth sealing surfaces. Other flange shapes must be agreed upon with PFEIFFER

**WARNING****Danger due to installation of the butterfly valve without the actuator!**

- ⇒ If - in an exceptional case - a butterfly valve is installed without an actuator, pressure must not be applied on this butterfly valve.

**NOTE****Damage to the sealing surfaces and seals or untight flange connection due to improper assembly!**

- ⇒ Tighten flange connections in at least three steps evenly and in a criss-cross pattern.
- ⇒ Tighten the flange connections with the torques indicated in Table 15-1 in Chapter "15.1.1 Tightening torques".
- ⇒ Use a torque wrenches to ensure that the torque is reached but not exceeded.

- ⇒ After installing the butterfly valve, open it slowly in the pipe.

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

⇒ Open the butterfly valve slowly in the pipe during commissioning.

- ⇒ The plastic sealing surfaces tend to “flow”. After a long storage period, retighten the body screws if necessary.
- ⇒ 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.
- ⇒ Check the correct function of the butterfly valve.

## 5.5 Checking the assembled butterfly valve

### 5.5.1 Functional check

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

⇒ Do not loosen the screw of an optional test connection while the butterfly 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 butterfly 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 switching shaft.
- ⇒ If the actuator- and switching 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 butterfly 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 butterfly valve must close and open correctly according to the control commands. Detected malfunctions must be fixed before commissioning, see Chapter “8 Faults”.

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

*Incorrectly executed control commands can cause bodily injury or even death and cause damage to the pipe system.*

⇒ Check the actuator unit and control command, see chapter “8 Faults”.

### 5.5.2 Pressure test of the pipe section

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

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

If a butterfly valve leaks, observe chapter “8 Faults”.

**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 switching shaft must be linear without any jerky movements.

- ⇒ Open and close the butterfly 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 butterfly valve.
- ⇒ Check the display on the position indicator.

### 5.5.4 Fail-safe position

- ⇒ Close the signal pressure line.
- ⇒ Check whether the butterfly valve moves to the fail-safe position, see Chapter “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!**

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 an optional test connection while the butterfly 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 butterfly 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 switching shaft.
- ⇒ If the actuator- and switching 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 butterfly valve, exhaust air can escape, for example from the actuator.

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

### Commissioning/recommissioning

- ⇒ The PTFE plastic sealing surfaces tend to flow. After commissioning and reaching the operating temperature, tighten all flange connections between the pipe and butterfly valve with the corresponding tightening torques, see Table 15-1 in Chapter "15.1.1 Tightening torque".
- ⇒ It may be necessary to tighten the screw connections of the body parts.
- ⇒ Open the butterfly valve slowly in the pipe. Opening slowly prevents a sudden increase in pressure and a resulting high flow speed that damages the butterfly valve.
- ⇒ Check the correct function of the butterfly valve.

### Ensure the following conditions prior to commissioning/recommissioning:

- The butterfly 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 butterfly 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 butterfly valve is ready for operation.

### WARNING

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

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 an optional test connection while the butterfly valve is pressurised.

#### **Danger of crushing due to moving actuator and plug stem!**

- ⇒ Do not reach into the yoke as long as the pneumatic power is connected to the actuator.
- ⇒ Before working on the butterfly 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 switching shaft.
- ⇒ If the actuator- and switching 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 butterfly 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:

- After commissioning and reaching the operating temperature, it may be necessary to retighten all flange connections between the pipe and butterfly valve with the corresponding tightening torques, see Table 15-1 in Chapter "15.1.1 Tightening torque".
- It may be necessary to tighten the screw connections of the body parts.
- The butterfly valve/actuator unit must be actuated with the control signals.
- Butterfly 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 butterfly valves with a ratchet lever, the position of the lever indicates the position of the butterfly valve:
  - Ratchet lever 90° transverse to the pipe: butterfly valve closed,
  - Ratchet lever parallel to the pipe: butterfly valve open.

### DANGER

#### **Danger of injury due to jerky operation of the butterfly valve!**

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

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

- If a butterfly valve leaks, observe chapter "8 Faults".



## 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 lined butterfly valve is leaky	<p>Tighten the flange screws:</p> <hr/> <p><b>! NOTE</b></p> <p><b>An excessive tightening torque when retightening the flange screws can damage the butterfly valve and pipe!</b></p> <p><i>The permissible torque for retightening the pipe flange screws is limited.</i></p> <hr/> <p>Retighten the flange connection with the respective tightening torque, see Table 15-1 in Chapter "15.1.1 Installing the butterfly valve in the pipe".</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 butterfly 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>
Leakage on the lower gland flange	Connection of the lower gland flange to the body released	Retighten the screws.
	Lower gland flange still un-tight after retightening	Replace the V-ring packing and/or butterfly valve, see chapter "1 Safety instructions and safety measures".
Leaks in the control shaft sealing	Medium escapes	<p><b>! DANGER</b></p> <p><b>Danger of injury due to escaping medium!</b></p> <p><i>To protect operating personnel from danger, depressurise the line on both sides of the butterfly valve, see Chapter "1 Safety instructions and safety measures".</i></p> <hr/>
	Medium escapes from the guide bushing	<p>Remove the butterfly valve, see chapter "1 Safety instructions and safety measures".</p> <p>Disassemble the butterfly valve and replace the switching 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>
	Medium escapes from the adjustable stuffing box	<p>Retighten screws on the guide bushing alternately and in small amounts with a 1/4 turn each in the clockwise direction until the leakage stops.</p> <p>If the leakage is not stopped in this way, a repair is necessary.</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
Increased medium flow rate with the butterfly valved closed	Leakage in the closed position	<p>Close the butterfly valve 100%.</p> <p>If the butterfly valve is in the closed position, check if the actuator closes with full torque. If the actuator closes with full torque, open/close the butterfly valve when pressurised multiple times.</p> <p>If the butterfly valve is still leaky, increase the tightening torque of the actuator in the "CLOSED" position up to maximum 1.1 x the nominal torque.</p> <p>If the butterfly valve is still leaky, it could be damaged.</p>
	The butterfly valve is damaged	<p>Repairs are necessary.</p> <p>Remove the butterfly 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>
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 butterfly valve, see chapter "1 Safety instructions and safety measures".
	The butterfly valve is damaged	<p>Repair or replacement is necessary.</p> <p>Remove the butterfly 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>
Problems in the actuator unit	The pneumatic actuator must be removed	<p>Disconnect the connection to the control pressure.</p> <p>Remove the actuator from the butterfly valve, observe the "Safety instructions and safety measures", see the included actuator unit manuals.</p>

**i Info**

- In the case of faults that are not listed in the table, contact the After Sales Service at PFEIFFER.
- Spare parts are not possible. If necessary, the butterfly valve is replaced or can be repaired by the After Sales Service at PFEIFFER.
- If it is determined after removal that the butterfly valve material lining is not sufficiently resistant for the medium, parts must be selected made of a suitable material.

**In case of a butterfly valve fault:**

- Close the shut-off valves upstream and downstream of the butterfly valve so that no medium flows through the butterfly 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".

**8.2 Carrying out emergency measures**

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

The system operator is responsible for emergency measures.

## 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 butterfly valve:

- Installation and operating manual for the installed actuator, e.g. ▶ EB 30a for diaphragm rotary actuators BR 30a, ▶ EB 31a for rotary actuators BR 31a or the corresponding actuator documentation of other manufacturers.

### WARNING

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

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 an optional test connection while the butterfly 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 butterfly 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 switching shaft.
- ⇒ If the actuator- and switching 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 butterfly 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 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.

#### **Danger of injury due to residual medium in the butterfly valve!**

When working on the butterfly 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.

### NOTE

#### **Damage to the butterfly valve due to excessively high or low tightening torques!**

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

- ⇒ Retighten the body screws if necessary.

#### **Damage to the butterfly valve due to unsuitable tools!**

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

#### **Damage to the butterfly valve due to unsuitable lubricants!**

Unsuitable lubricants can corrode and damage the surface.

- ⇒ The butterfly valve material requires suitable lubricants, see Chapter "15.1.2 Lubricants".

### Info

#### **The butterfly valve was checked by PFEIFFER prior to delivery.**

- Certain test results certified by PFEIFFER are no longer valid when disassembling the butterfly 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 butterfly 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. <b>WARNING!</b> Danger of injury due to pressurised components and escaping medium! Do not loosen the test connection while the butterfly valve is pressurised.	Decommission the butterfly valve, see chapter "10 Decommissioning". For repair, contact the After Sales Service at PFEIFFER.
Check the control shaft sealing for tightness from the outside.	The control shaft sealing with a PTFE V-ring packing is preloaded with a set of spring washers and is therefore maintenance free.

Test	Measures in the case of a negative test result
Check the rotary movement of the actuator- and control shaft for smooth movement.	If the actuator- and control shaft are blocked, remove the blockage. <b>WARNING!</b> 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 butterfly valve by briefly interrupting the power supply.	Decommission the butterfly valve, see Chapter "10 Decommissioning". Then determine the cause and remedy it, see Chapter "8 Malfunctions".
Check pipe connections and seals of the butterfly valve and actuator for leaks.	Regular maintenance work on the butterfly 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.

## 9.2 Maintenance work

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

### 9.2.1 Replacing the and valve disc

- ⇒ Check the condition of the valve disc and liner.
- ⇒ Remove the valve disc (3) as described in Chapter "12.3 Replacing the valve disc". Check the valve disc as well as all plastic parts for damage and if in doubt replace them.
- ⇒ If the liner is damaged, replace the butterfly valve.

## 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".



## 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!**

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 an optional test connection while the butterfly 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 butterfly 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 switching shaft.
- ⇒ If the actuator- and switching 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 butterfly 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 butterfly valve!**

When working on the butterfly 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 an optional test connection while the butterfly valve is pressurised.

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

- ⇒ Close the valves upstream and downstream of the butterfly valve so that no medium flows through the butterfly valve.
- ⇒ Empty the pipe and butterfly valve completely.
- ⇒ Shut off the pneumatic power and lock it, to depressurise the actuator unit.
- ⇒ Let the pipes and butterfly 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!**

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 switching shaft!**

- ⇒ Do not reach into the yoke as long as the pneumatic power is connected to the actuator.
- ⇒ Before working on the butterfly 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 switching shaft.
- ⇒ If the actuator- and switching 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 butterfly valve!**

When working on the butterfly 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 an optional test connection while the butterfly valve is pressurised.

#### **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 butterfly valve is decommissioned, see chapter "10 Decommissioning".

### 11.1 Removing the butterfly valve from the pipe

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

### WARNING

#### **If a used valve is sent to PFEIFFER for service:**

The valves must be decontaminated 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".

### 11.2 Disassembling the actuator

See the corresponding actuator documentation.



## 12 Repairs

If the operation of the butterfly 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 butterfly 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 butterfly valves. For decommissioning and disassembly, observe Chapter "10 Decommissioning" and "11 Disassembly".

### 12.1 Replacing the V-ring packings

Replacing the optional adjustable stuffing box packing

If you notice a leak in the shaft bushing of the guide bushing (7) or in the lower gland flange (5), the PTFE rings of the V-ring packing (4) and/or (6) may be defective.

- ⇒ Check the condition of the packing.

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

#### 12.1.1 Replacing the V-ring packing (4)

- ⇒ Place the butterfly valve on an even and clean work surface so that the packing space is easy to reach.
- ⇒ Loosen the screws (15) and carefully remove the lower gland flange (5) pre-assembled with the bearing bush (18).
- ⇒ Remove the spring washers from the set of spring washers (16).
- ⇒ Remove the V-ring packing (4).
- ⇒ 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 butterfly valve as described in Chapter "3.5.1 Assembly of the butterfly valve."

#### 12.1.2 Replacing the V-ring packing (6)

- ⇒ Place the butterfly valve on an even and clean work surface so that the packing space is easy to reach.

- ⇒ Loosen the screws (14) and carefully remove the guide bushing (7) pre-assembled with bearing bushing (10) and O-ring (17).
- ⇒ Remove the spring washers from the set of spring washers (8).
- ⇒ 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 butterfly valve as described in Chapter "3.5.1 Assembly of the butterfly valve."

### 12.2 Replacing of the adjustable stuffing box packing (Option)

- ⇒ If you notice a leak in the shaft bushing of the guide bushing (7), tighten the screws (23) further and tighten the spring washers and the V-ring packing.

If this does not eliminate the leak, the V-ring packings (4 and 6) may be defective.

- ⇒ Check the condition of the packing.

#### 12.2.1 Replacing the V-ring packing (4)

- ⇒ Remove and replace the V-ring packing (4) as described in chapter "12.1.1 Replacing the V-ring packing (4)".

#### 12.2.2 Replacing the V-ring packing (6)

- ⇒ Place the butterfly valve on an even and clean work surface so that the packing space is easy to reach.
- ⇒ Loosen the screws (14) and carefully remove the guide bushing (7) pre-assembled with bearing bushing (10) and O-ring (17).
- ⇒ Remove bushing (24).
- ⇒ Remove the spring washers from the set of spring washers (8).
- ⇒ 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 butterfly valve as described in Chapter "3.5.2 Assembly of the butterfly valve."

### 12.3 Replacing the valve disc (3)

- ⇒ If you notice a leak in the valve passage, the liner or the valve disc (3) may be defective.
- ⇒ Check the condition of the liner and the valve disc.

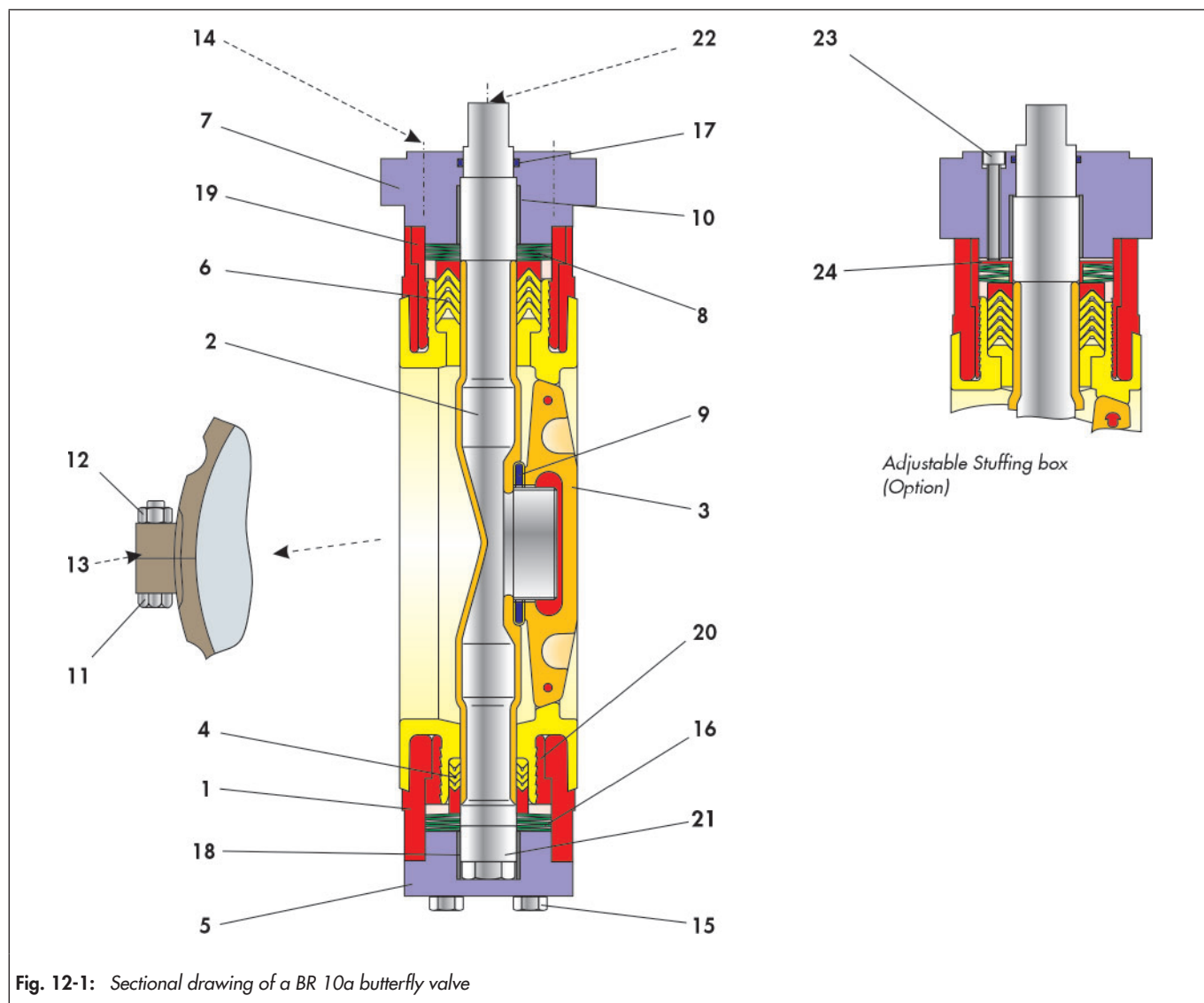


Fig. 12-1: Sectional drawing of a BR 10a butterfly valve

Table 12-1: List of parts

Item	Description
1	Valve body
2	Shaft
3	Valve disc
4	V-ring packing
5	Lower gland flange
6	V-ring packing
7	Guide bushing
8	Set of spring washers
9	Sealing element
10	Bearing bush
11	Screw
12	Nut

Item	Description
13	Grooved pin
14	Screw
15	Screw
16	Set of spring washers
17	O-ring
18	Bearing bush
19	Bushing
20	Bushing
21	Bearing screw
22	Threaded pin
23	Screw
24	Bushing

**NOTE****Damage to the butterfly valve due to improper repair!**

- ⇒ Do not perform repair work on the liner or valve disc (3) yourself.
- ⇒ Contact the After Sales Service at PFEIFFER for Repair work.

**12.4 Sending devices to PFEIFFER**

Defective butterfly valves can be sent to PFEIFFER for repair.

Proceed as follows to send devices:

**WARNING****Danger due to a contaminated butterfly 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".

- ⇒ Include the following information for returns:
  - Manufacturer number
  - Butterfly valve type
  - Article number
  - Nominal size and version of the butterfly valve
  - Manual valve/automated valve
  - Medium (designation and consistency)
  - Medium pressure and temperature
  - Flow rate in m<sup>3</sup>/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](http://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 butterfly valve BR 10e, see page 14-4.
- Declaration of installation for partly completed machinery according to Machinery Directive 2006/42/EC for butterfly valve BR 10e, 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	<b>PFEIFFER Chemie-Armaturenbau GmbH</b> , D47906 Kempen, Germany
declares that:	<b>Type 10a PTFE-lined Butterfly valves (BR 10a) with PTFE liner and shaft packing</b> <ul style="list-style-type: none"> <li>• with pneumatic/ electric/ hydraulic actuator</li> <li>• with free shaft end for subsequent mounting of an actuator</li> </ul>
<p>1. The valves are pressure accessories within the meaning of the <b>Pressure Equipment Directive 2014/68/EU</b> and conform with the requirements of this Directive.</p> <p>2. They may only be operated observing the Installation and operating instructions ► EB 10a delivered together with the valve.</p> <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 ► EB 10a, Chapter 1 for butterfly valves intended for dead-end service)</p>	

*Applied standards:*

<b>EN 593 AD 2000 Regulations</b>	Product standard for butterfly valves Regulations for pressurized valve body parts
---------------------------------------	---

*Type designation and technical features:*

PFEIFFER Data sheet ► TB 10a NOTE: This Manufacturer's Declaration applies to all valve types listed in this catalogue.
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*Applied conformity assessment procedure:*

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

*Name of notified body:*

*Identification number of the notified body:*

<b>TÜV Rheinland Service GmbH</b> Am Grauen Stein 51101 Köln Germany	0035
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These Declarations become invalid when modifications are made to the shut-off butterfly valves and/or assemblies that affect the technical data of the shut-off butterfly valve or the <Intended use> described in ► EB 10a, Chapter 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	<b>PFEIFFER Chemie-Armaturenbau GmbH</b> , D47906 Kempen, Germany
declares that:	<b>Type 10a PTFE-lined Butterfly valves (BR 10a)</b> <b>with PTFE liner and shaft packing</b> <ul style="list-style-type: none"> <li>• with worm gear and hand wheel</li> <li>• with lever for 90° operation</li> </ul>
<p>1. The valves are pressure accessories within the meaning of the <b>Pressure Equipment Directive 2014/68/EU</b> and conform with the requirements of this Directive.</p> <p>2. They may only be operated observing the Installation and operating instructions ► EB 10a delivered together with the valve.</p> <p><i>(See ► EB 10a, Chapter 1 for butterfly valves intended for dead-end service)</i></p>	

*Applied standards:*

<b>EN 593</b> <b>AD 2000 Regulations</b>	Product standard for butterfly valves Regulations for pressurized valve body parts
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*Type designation and technical features:*

PFEIFFER Data sheet ► TB 10a NOTE: This Manufacturer's Declaration applies to all valve types listed in this catalogue.
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*Applied conformity assessment procedure:*

<b>Conforming to Annex III of the Pressure Equipment Directive 2014/68/EU, Module H</b>
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*Name of notified body:*

*Identification number of the notified body:*

<b>TÜV Rheinland Service GmbH</b> Am Grauen Stein 51101 Köln Germany	0035
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These Declarations become invalid when modifications are made to the shut-off butterfly valves and/or assemblies that affect the technical data of the shut-off butterfly valve or the <Intended use> described in ► EB 10a, Chapter 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



# EU DECLARATION OF CONFORMITY TRANSLATION

The manufacturer	<b>PFEIFFER Chemie-Armaturenbau GmbH</b> , 47906 Kempen, Germany
declares for the listed products that:	<p><b>Type 10a Control and Shut-off Butterfly Valve (BR10a)</b></p> <ul style="list-style-type: none"> <li>• with a <b>Type 30a Multi-turn Actuator (BR30a)</b></li> <li>• with a <b>Type 31a Quarter-turn Actuator (BR31a)</b></li> <li>• with a <b>rotary actuator of a different make</b></li> </ul> <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:*

<p>a) VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]</p> <p>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</p>
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*Product description and technical features:*

<p>Tight-closing butterfly 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.</p> <p>For product descriptions refer to:</p> <p>PFEIFFER data sheet for Type 10a Valve ▶ TB 10a  PFEIFFER data sheet for Type 30a Actuator ▶ TB 30a  PFEIFFER data sheet for Type 31a Actuator ▶ TB 31a  PFEIFFER mounting and operating instructions for Type 10a Valve ▶ EB 10a  PFEIFFER mounting and operating instructions for Type 30a Actuator ▶ EB 30a  PFEIFFER mounting and operating instructions for Type 31a Actuator ▶ EB 31a  PFEIFFER safety manual for Type 10a Valve ▶ SH 10  PFEIFFER safety manual for Type 30a Actuator ▶ SH 30a  PFEIFFER safety manual for Type 31a Actuator ▶ SH 31a</p> <p>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.</p>
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This declaration becomes invalid when modifications are made to the butterfly valves and/or assemblies that affect the technical data of the control valve or the intended use (▶ EB 10a, section 1) and considerably change the valve or an assembly delivered with it.

Persons authorized to compile the technical file:

Kempen, 28 May 2021


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**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 10a Control and Shut-off Butterfly Valve (Type 10a) <ul style="list-style-type: none"> <li>with free shaft end</li> </ul>
<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 butterfly valve for aggressive media, particularly for strict requirements in chemical applications.


For product descriptions refer to:  
 PFEIFFER Data Sheet for Type 10a Butterfly Valve ▶ TB 10a  
 PFEIFFER Mounting and Operating Instructions for Type 10a Butterfly Valve ▶ EB 10a

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 butterfly valves and/or assemblies that affect the technical data of the butterfly valve or the intended use (▶ EB 10a, section 1) and considerably change the valve or an assembly delivered with it.

Persons authorized to compile the technical file:

Kempen, 22 November 2021

  
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 Stefan Czayka  
 Head of Quality Management/IMS Representative





## 15 Annex

### 15.1 Tightening torques, lubricant and tools

#### 15.1.1 Tightening torques

##### 15.1.1.1 Flange connections

- ⇒ Tighten flange connections in at least three steps evenly and in a criss-cross pattern.
- ⇒ Tighten the flange connections with the torques indicated in Table 15-1.
- ⇒ Use a torque wrenches to ensure that the torque is reached but not exceeded.

### 15.2 Spare parts

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

- “15.2.1 Spare parts for butterfly valve in standard version” on page 15-2 and
- “15.2.2 Spare parts for butterfly valve with optionally adjustable stuffing box” on page 15-3.

**Table 15-1:** Required tightening torques

DIN butterfly valve		ANSI butterfly valve	
Nominal size	MA [Nm]	Nominal size	MA [Nm]
DN 100	75	NPS4	50
DN 150	140	NPS6	100
DN 200	170	NPS8	150
DN 250	140	NPS10	140
DN 300	170	NPS12	160
DN 350	170	NPS14	160
DN 400	240	NPS16	230
DN 500	240	NPS20	240
DN 600	310	NPS24	300
DN 800	480	NPS32	470

#### 15.1.2 Lubricant

**Table 15-2:** 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 butterfly valves or for use with oxygen
Stem sealing and parts in contact with media	-10 ... +200°C	Water-free grease, e.g. with halocarbon TM

#### 15.1.3 Tools

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

## 15.2.1 Spare parts for butterfly valve in standard version

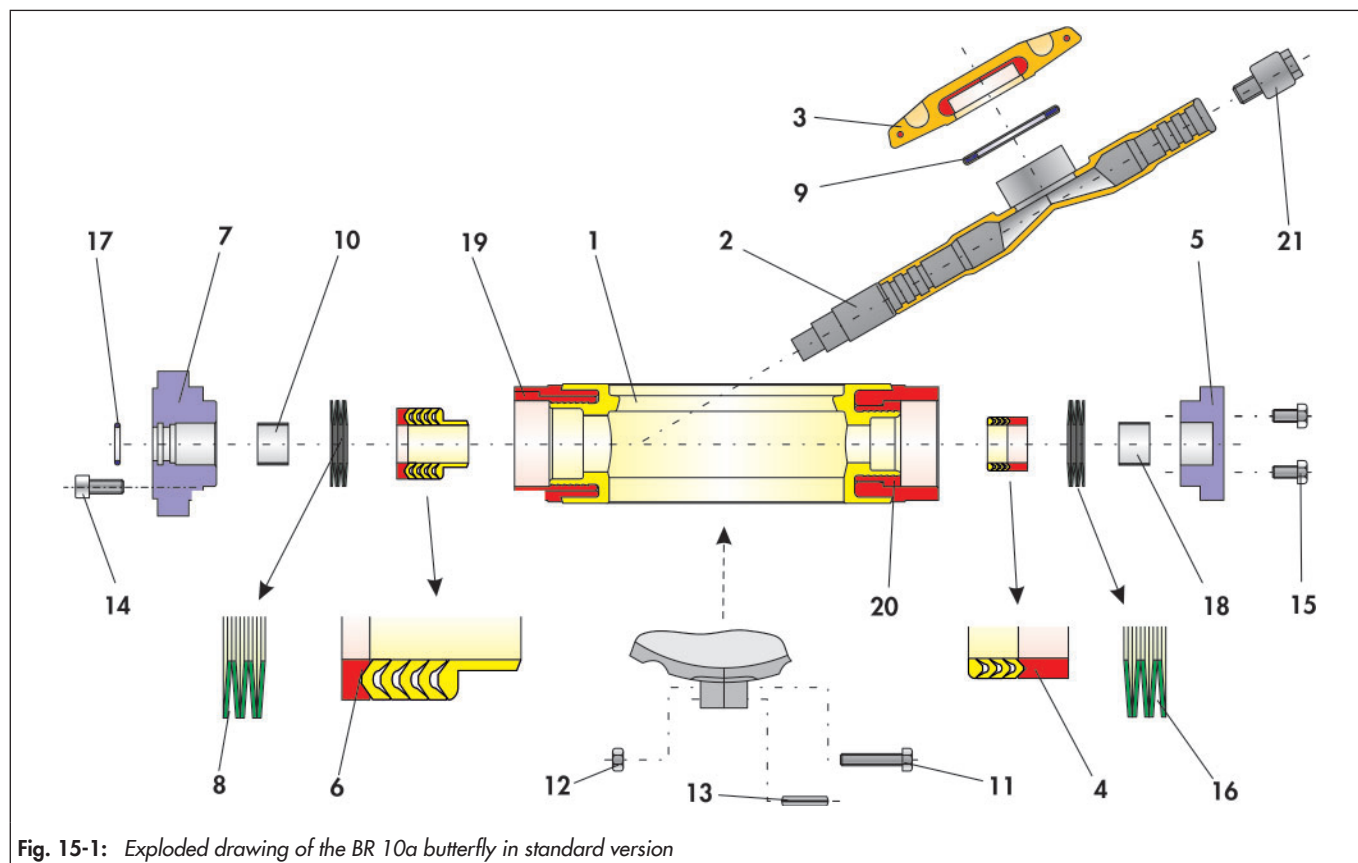


Fig. 15-1: Exploded drawing of the BR 10a butterfly in standard version

Table 15-3: Recommended spare parts for the butterfly valve BR 10a in standard version

Item	Description	Material	In the spare parts set for commissioning	In the spare parts set for 2 year operation
1	Valve body	EN-JS 1049 / M-PTFE		
2	Shaft	1.4313 / M-PTFE		•
3	Valve disc	1.4313 / PTFE		•
4	V-ring packing	PTFE / 1.4305	•	•
5	Lower gland flange	1.0503		
6	V-ring packing	PTFE / 1.4305	•	•
7	Guide bushing	1.0503		
8	Set of spring washers	1.1859 / DeltaTone	•	•
9	Sealing element	PTFE / EPDM	•	•
10	Bearing bush	PTFE with carbon	•	•
11	Screw	A2-70		
12	Nut	A2-70		
13	Grooved pin	1.4301		•
14	Screw	A2-70		
15	Screw	A2-70		
16	Set of spring washers	1.1859 / DeltaTone	•	•
17	O-ring	Viton	•	•
18	Bearing bush	PTFE with carbon	•	•
19	Bushing	1.0037		
20	Bushing	1.0037		
21	Bearing screw	1.0503		
22	Threaded pin	1.4301		

## 15.2.2 Spare parts for butterfly valve with optionally adjustable stuffing box

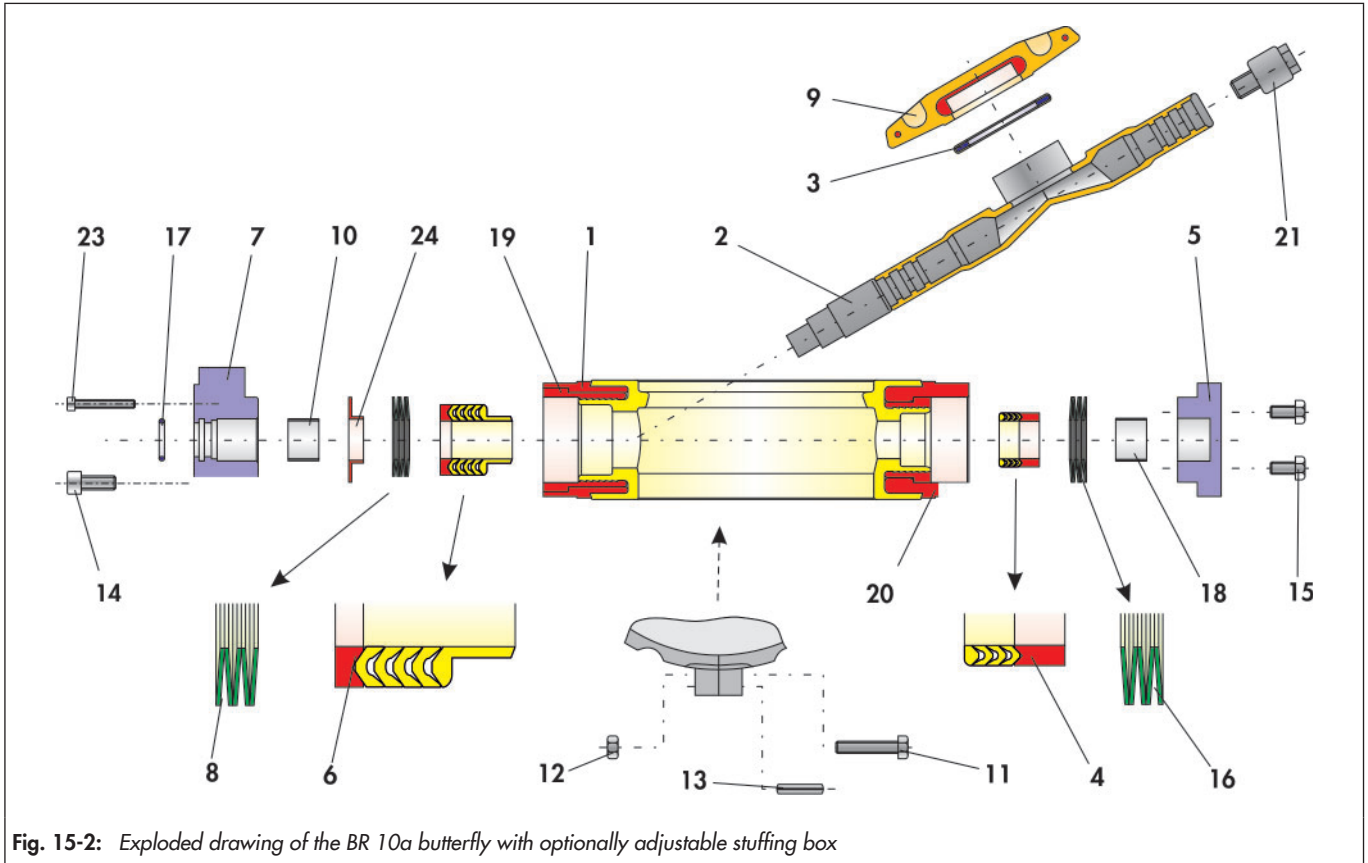


Table 15-4: Recommended spare parts for the butterfly valve BR 10a with optionally adjustable stuffing box

Item	Description	Material	In the spare parts set for commissioning	In the spare parts set for 2 year operation
1	Valve body	EN-JS 1049 / M-PTFE		
2	Shaft	1.4313 / M-PTFE		•
3	Valve disc	1.4313 / PTFE		•
4	V-ring packing	PTFE / 1.4305	•	•
5	Lower gland flange	1.0503		
6	V-ring packing	PTFE / 1.4305	•	•
7	Guide bushing	1.0503		
8	Set of spring washers	1.1859 / DeltaTone	•	•
9	Sealing element	PTFE / EPDM	•	•
10	Bearing bush	PTFE with carbon	•	•
11	Screw	A2-70		
12	Nut	A2-70		
13	Grooved pin	1.4301		•
14	Screw	A2-70		
15	Screw	A2-70		
16	Set of spring washers	1.1859 / DeltaTone	•	•
17	O-ring	Viton	•	•
18	Bearing bush	PTFE with carbon	•	•
19	Bushing	1.0037		
20	Bushing	1.0037		
21	Bearing screw	1.0503		
22	Threaded pin	1.4301		
23	Screw	A2-70		
24	Bushing	1.4301		

## 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](mailto:sales-pfeiffer-de@samsongroup.com).

### Necessary data

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

- Manufacturer number
- Butterfly valve type
- Article number
- Nominal size and version of the butterfly valve
- Manual valve/automated valve
- Medium (designation and consistency)
- Medium pressure and temperature
- Flow rate in m<sup>3</sup>/h
- Actuator signal pressure
- Installation drawing if available
- Completed declaration regarding contamination. This form is available at ▶ [www.pfeiffer-armaturen.com](http://www.pfeiffer-armaturen.com).

### Further information

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

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