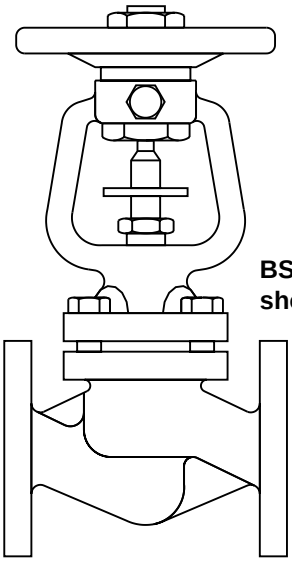
IM-P137-02
ST Issue 8

# BSA and BSAT
# Bellows Sealed Stop Valves
## Installation and Maintenance Instructions



**BSAT shown**

# 1. General safety information

**Safe operation of the unit can only be guaranteed if it is properly installed, commissioned and maintained by a qualified person (see Section 11 of the attached Supplementary Safety Information) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.**

## Warning

**The body/bonnet collar gaskets contain a thin stainless steel support ring which may cause physical injury if they are not handled and disposed of carefully.**

**Care must be taken when opening and closing the handwheel to prevent any possible injury to the hands from the locking screw.**

## Lifting

**Although the bonnet and handwheel will support the weight of the valve, it is recommended the slings for lifting are positioned around the back of the pipe flanges on the main body.**

## Isolation

**Consider whether closing isolating valves will put any other part of the system or personnel at risk. Dangers might include; isolation of vents and protective devices or alarms. Ensure isolation valves are turned off in a gradual way to avoid system shocks.**

## Pressure

**Before attempting any maintenance consider what is or may have been in the pipeline. Ensure that any pressure is isolated and safely vented to atmospheric pressure before attempting to maintain the product, this is easily achieved by fitting Spirax Sarco depressurisation valves type DV (see separate literature for details). Do not assume that the system is depressurised even when a pressure gauge indicates zero.**

## Temperature

**Allow time for temperature to normalise after isolation to avoid the danger of burns and consider whether protective clothing (including safety glasses) is required.**

## Disposal

**The product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken, EXCEPT:**

### R-PTFE

**The soft sealing disc insert (soft sealing disc option only) is made of R-PTFE, therefore, any scrap or waste material containing this part must be disposed of as follows:**

- **R-PTFE waste parts can only be disposed of by approved methods, not incineration.**
- **Keep R-PTFE waste in a separate container, do not mix it with other rubbish, and consign it to a landfill site.**

## 2.1 General description

A range of bellows sealed, in-line stop valves having flanged PN16, PN25 and PN40 connections for use on steam, gas, liquid, condensate and water systems.

**Note:** Throttling plugs, soft seats (up to DN100), balancing discs (DN125 and above) are available for certain applications.

### Available options:

| Material and type | | | Valve trim | | | | | Bellows | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Standard flat disc | Throttling plug and locking device | Balancing disc | R-PTFE soft seat standard disc | R-PTFE soft seat throttling plug | Single ply | Twin ply |
| Cast iron | BSA1 | | ● | | | | | ● | |
| | BSA1T | | | ● | | | | | ● |
| | BSA1 RPTFE | | | | | ● | | ● | |
| | BSA1T RPTFE | | | | | | ● | | ● |
| | BSA1B/D | | | | ● | | | | ● |
| SG iron | BSA2 | PN16 | ● | | | | | ● | |
| | | PN25 | ●† | | | | | | ● |
| | BSA2T | PN16 | | ● | | | | | ● |
| | | PN25 | | ● | | | | | ● |
| | BSA2 RPTFE | PN16 | | | | ● | | ● | |
| | BSA2T RPTFE | PN16 | | | | | ● | | ● |
| | | PN25 | | | | | ● | | ● |
| | BSA2B/D | | | | ● | | | | ● |
| Cast steel | BSA3 | | ●† | | | | | | ● |
| | BSA3T | | | ● | | | | | ● |
| | BSA3 RPTFE | | | | | ● | | | ● |
| | BSA3T RPTFE | | | | | | ● | | ● |
| | BSA3B/D | | | | ● | | | | ● |

† **DN125 and above only.**

### Standards

The product fully complies with the requirements of the European Pressure Equipment Directive 97/23/EC and carries the CE mark when so required.

### Certification

The BSA1 and BSA1T is available with certification to EN 10204 2.2. The BSA2, BSA2T, BSA3 and BSA3T is available with certification to EN 10204 3.1.B. **Note:** All certification/inspection requirements must be stated at the time of order placement.

**Note:** For additional information see Technical Information Sheets, TI-P137-18 and TI-P137-19.

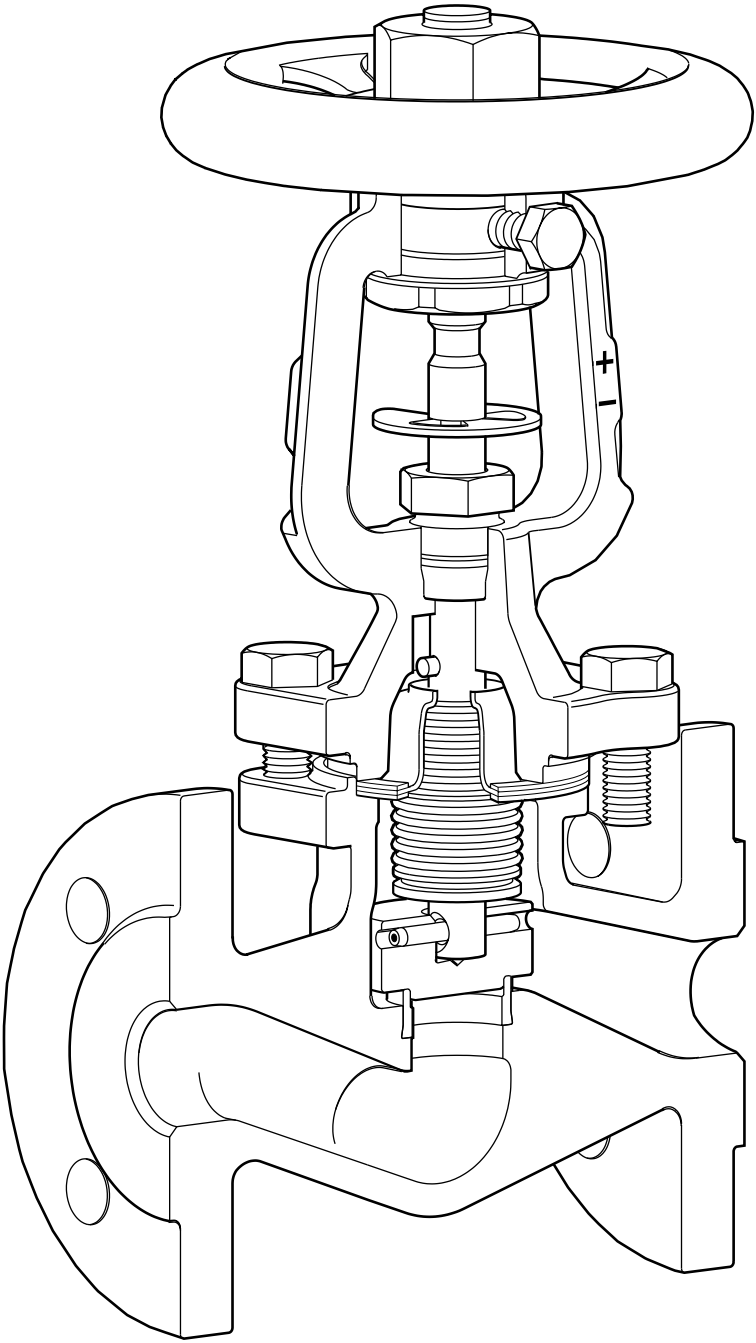



**Fig. 1 BSAT shown**

### Stroke limiter for throttling versions

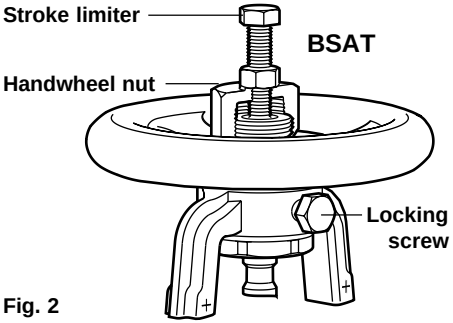


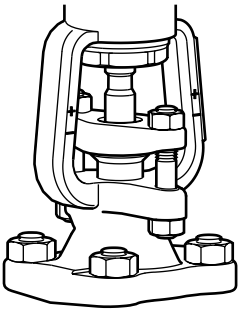

**Fig. 2**

The handwheel nut on the **BSA1T, BSA2T** and **BSA3T** has a threaded hole for provision of a stroke limiter. Customer to supply standard nuts and bolts as indicated in the table below.

| Size | Hexagon bolt |
|---|---|
| **DN15 - DN80** | M8 x 50 mm |
| **DN100 - DN150** | M12 x 75 mm |
| **DN200 - DN250** | M12 x 100 mm |

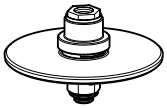
### Optional gland flange assembly
**(BSA3 ANSI ½" - 4" only)**

**Fig. 3**



### Optional balancing disc assembly

**Fig. 4**



**DN150 shown**

| | | | |
|---|---|---|---|
| | 25 bar ΔP | DN125 | |
| Used | 17 bar ΔP | DN150 | 6" |
| above | 10 bar ΔP | DN200 | 8" |
| | 6 bar ΔP | DN250 | (BSA2 only) |

### Optional soft sealing disc

**Fig. 5**

## 2.2 Sizes and pipe connections

### 2.2.1 BSA1 and BSA1T
DN15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150 and 200
Flanged EN 1092 / ISO 7005 PN16 and JIS B 2210 / KS B 1511 10K
Face-to-face EN 558

### 2.2.2 BSA2 and BSA2T
DN15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200 and 250***** (*****PN25 only)
Flanged EN 1092 / ISO 7005 PN16 and PN25
Face-to-face EN 558

### 2.2.3 BSA3 and BSA3T (DIN)
DN15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150 and 200
Flanged EN 1092 / ISO 7005 PN40 (DN15 - DN150)
Flanged EN 1092 / ISO 7005 PN25 (DN200)
Face-to-face EN 558

### 2.2.4 BSA3 and BSA3T (ANSI)
Size ½", ¾", 1", 1½", 2", 3", 4", 6"***** and 8"***** (*****ANSI 300 only)
Flanged ANSI B 16.5 / BS 1560 Class 150 and 300 and JIS B 2210 / KS B 1511 20K
Face-to-face ANSI B 16.10

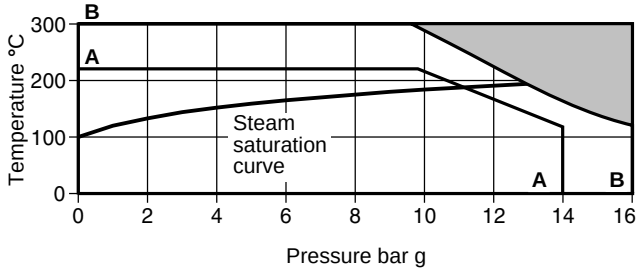
## 2.3 Product limitations

**BSA1 and BSA1T** see Section 2.4
**BSA2 and BSA2T** see Section 2.5
**BSA3 and BSA3T (DIN)** see Section 2.6
**BSA3 and BSA3T (ANSI)** see Section 2.7

**Note: The maximum permissible differential pressure in throttling function for BSA_T valves:**

| | | |
|---|---|---|
| **DN15 - DN80** | 2.0 bar | (29.00 psi) |
| **DN100 - DN125** | 1.5 bar | (21.75 psi) |
| **DN150** | 1.0 bar | (14.50 psi) |
| **DN200 - DN250** | 0.8 bar | (11.60 psi) |

## 2.4 Product limitations - BSA1 and BSA1T



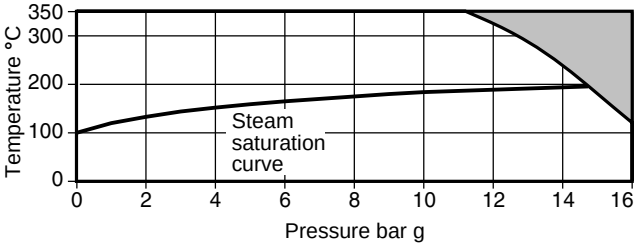

The product must not be used in this region.

**A** - **A** Flanged JIS / KS 10K
**B** - **B** Flanged PN16

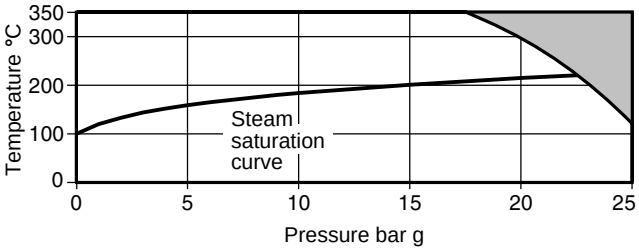
| Body design conditions | | PN16 | JIS / KS 10K |
|---|---|---|---|
| PMA - Maximum allowable pressure | | 16 bar g (232 psi g) | 14 bar g (203 psi g) |
| TMA - Maximum allowable temperature | | 300°C (572°F) | 220°C (428°F) |
| PMO - Maximum operating pressure for saturated steam service | | 12.9 bar g (187.05 psi g) | 11 bar g (159.5 psi g) |
| TMO - Maximum operating temperature | Soft seat | 230°C (446°F) | 220°C (428°F) |
| | Metal seat | 300°C (572°F) | 220°C (428°F) |
| Minimum operating temperature | | -10°C (14°F) | -10°C (14°F) |
| ΔPMX - Maximum differential pressure | | | BSA1 Limited to the PMO |
| | | | BSA1T See note in Section 2.3 |
| Designed for a maximum cold hydraulic test pressure of: | | 24 bar g (348 psi g) | 20 bar g (290 psi g) |

## 2.5 Product limitations - BSA2 and BSA2T

**PN16**




**PN25**

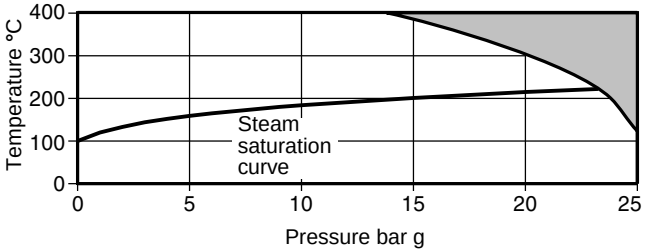



The product must not be used in this region.

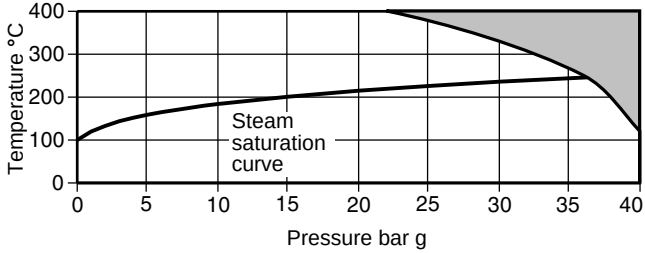
| Body design conditions | | | PN16 | PN25 |
|---|---|---|---|---|
| PMA - Maximum allowable pressure | | | 16 bar g (232 psi g) | 25 bar g (362.5 psi g) |
| TMA - Maximum allowable temperature | | | 350°C (662°F) | 350°C (662°F) |
| PMO - Maximum operating pressure for saturated steam service | | | 14.7 bar g (213.15 psi g) | 22.3 bar g (323.35 psi g) |
| TMO - Maximum operating temperature | | Soft seat | 230°C (446°F) | 230°C (446°F) |
| | | Metal seat | 350°C (662°F) | 350°C (662°F) |
| Minimum operating temperature | | | -10°C (14°F) | -10°C (14°F) |
| ΔPMX - Maximum differential pressure | | | BSA2 | Limited to the PMO |
| | | | BSA2T | See note in Section 2.3 |
| Designed for a maximum cold hydraulic test pressure of: | | | 24 bar g (348 psi g) | 38 bar g (551 psi g) |

## 2.6 Product limitations - BSA3 and BSA3T (DIN)

**PN25, DN200**



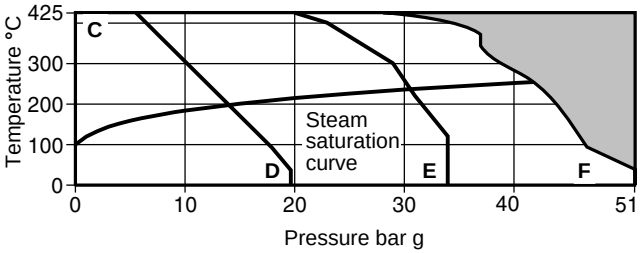

**PN40, DN15 - DN150**




The product must not be used in this region.

| Body design conditions | | | PN25, DN200 | PN40, DN15 - DN150 |
|---|---|---|---|---|
| PMA - Maximum allowable pressure | | | 25 bar g (362.5 psi g) | 40 bar g (580 psi g) |
| TMA - Maximum allowable temperature | | | 400°C (752°F) | 400°C (752°F) |
| PMO - Maximum operating pressure for saturated steam service | | Soft seat | 23.2 bar g (336.4 psi g) | 27 bar g (391.5 psi g) |
| | | Metal seat | 23.2 bar g (336.4 psi g) | 36.1 bar g (523.45 psi g) |
| TMO - Maximum operating temperature | | Soft seat | 230°C (446°F) | 230°C (446°F) |
| | | Metal seat | 400°C (752°F) | 400°C (752°F) |
| Minimum operating temperature | | | -10°C (14°F) | -10°C (14°F) |
| ΔPMX - Maximum differential pressure | | | | BSA3 Limited to the PMO |
| | | | | BSA3T See note in Section 2.3 |
| Designed for a maximum cold hydraulic test pressure of: | | | 38 bar g (551 psi g) | 60 bar g (870 psi g) |

## 2.7 Product limitations - BSA3 and BSA3T (ANSI)




The product must not be used in this region.

**C** - **D** Flanged ANSI 150
**C** - **E** Flanged JIS / KS 20K
**C** - **F** Flanged ANSI 300

| Body design conditions | | ANSI 150 | ANSI 300 | JIS/KS 20K |
|---|---|---|---|---|
| PMA - Maximum allowable pressure | | 51 bar g (739.5 psi g) | 51 bar g (739.5 psi g) | 51 bar g (739.5 psi g) |
| TMA - Maximum allowable temperature | | 425°C (797°F) | 425°C (797°F) | 425°C (797°F) |
| PMO - Maximum operating pressure for saturated steam service | Soft seat | 14 bar g (203 psi g) | 27 bar g (391.5 psi g) | 27 bar g (391.5 psi g) |
| | Metal seat | 14 bar g (203 psi g) | 30.7 bar g (445.15 psi g) | 41.6 bar g (603.2 psi g) |
| TMO - Maximum operating temperature | Soft seat | 230°C (446°F) | 230°C (446°F) | 230°C (446°F) |
| | Metal seat | 425°C (797°F) | 425°C (797°F) | 425°C (797°F) |
| Minimum operating temperature | | 0°C (32°F) | 0°C (32°F) | 0°C (32°F) |
| ΔPMX - Maximum differential pressure | | | BSA3 Limited to the PMO | |
| | | | BSA3T See note in Section 2.3 | |
| Designed for a maximum cold hydraulic test pressure of: | | 31 bar g (449.5 psi g) | 77 bar g (1116 psi g) | 50 bar g (725 psi g) |

# 3. Installation

**Note: Before actioning any installation observe the 'Safety information' in Section 1.**

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation:

**3.1** Check materials, pressure and temperature and their maximum values. If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent overpressurisation.

**3.2** Remove the protective covers from all connections.

**3.3** Install the valve in the direction of flow given by the arrow on the body. The preferred position is with the spindle vertical. The valve can be installed from the vertical to the horizontal plane (see Figure 7, page 11).

**3.4** **Important note:** When a balancing disc is installed, the valve body should be mounted with the upstream fluid flowing into the upper valve chamber first, so the fluid pressure acts on top of the balancing disc. This is opposite to normal installation. If a balancing disc is upgrading or replacing a standard disc, the original valve body must be turned around in the pipeline and permanently marked with a new flow arrow indicating the changed direction of flow.

**Do not mount the valve upside down.**

**What is a balancing plug, how does it work and why use it?**

- A balancing plug is a two stage on/off mechanism.
- (See Figure 6) The pre-lifting plug (**A**) acts as a pilot valve and is opened first, allowing the medium to pass through at a controlled rate. The differential pressure then reduces across the valve - allowing the main valve plug (**B**) to be easily lifted off its seat. To assist closing the valve the flowing medium must enter on the 'Bellows' side, this is the opposite to normal installation.

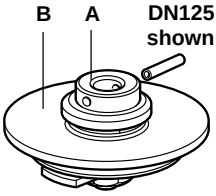


**Fig. 6**

- This device is fitted in the first instance to allow easy closure of the larger valves. In normal flow conditions it is impossible on large valves and high differential pressure to close the valve. By reversing the flow and installing a pilot valve, this problem is overcome.

Should the differential pressure exceed those listed against the respective sizes in the table below then please remember 'Balancing plugs' must be used in all the valves.

| Size | Differential pressure (bar) |
|---|---|
| **DN125** | 25.0 |
| **DN150** | 17.0 |
| **DN175** | 13.0 |
| **DN200** | 10.0 |
| **DN250** | 6.0 |

**3.5** When installed on steam systems a suitable steam trap should be fitted immediately upstream of the isolation valve to drain condensate. This will ensure drainage of the pipe when the valve is closed, and will prevent damage of the valve due to waterhammer. The drain trap should be either a ball float (FT) or thermodynamic (TD) type. Correct condensate drainage of all upstream pipework is also vital.

**3.6** Always open isolation valves slowly to avoid system shocks.

**3.7** **Note:** It is advisable that when work is being carried out downstream of a valve installation, double isolation (block and bleed) should be fitted. In addition when installed as the final valve in a pipeline, as a safety precaution, a blanking plate or blank flange must be fitted to the outlet flange of the valve.

# 4. Commissioning

After installation or maintenance ensure that the system is fully functioning. Carry out tests on any alarms or protective devices.

# 5. Operation

**5.1** The bellows sealed isolation valve plays an important role in the conservation of energy by eliminating fugitive stem seal emissions.

**5.2** The valve is operated manually by a handwheel. Special care must be taken to ensure that the movement is made in the correct direction.

To open the valve fully, it is recommended to turn the handwheel until the shaft is raised to the maximum position, indicated by the (+) on the bonnet, then turn the handwheel clockwise an ⅛ to ¼ turn to remove any backlash. This is to prevent the possibility of attempting to force open a valve, which is already fully open, resulting in damage to the stem, bellows unit or other components. Spirax Sarco BSA valves are fitted with a position indicator which can be found on the stem, and should align with the (+) or (-) on the bonnet support pillars. (+ = fully open / - = fully closed).

**5.3** If valve 'keys' are used care must be taken not to use excessive force when opening or closing the valve.

**5.4** BSAT valves are fitted with a throttling valve plug to allow close control when opening the valve. The number of turns open will affect the flowrate through the valve.
Once correct flowrate is obtained ensure the locking screw and stroke limiter (see Fig. 8, page 12) are tightened. This will minimise any vibration. The effect of valve opening for each valve size can be seen in the chart, page 12.

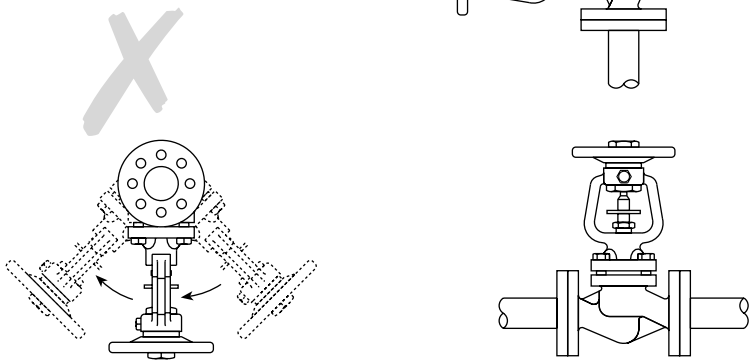


**Fig. 7** **Incorrect installation** **Correct installation**

## BSAT flow data - The effect of valve opening for each valve size

| Size DN | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 | 250 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hand-wheel rotations | $K_V$ values for given handwheel rotations tested to EN 60534-2-3 Water at 20°C | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.5 | 1.2 | 1.2 | 1.4 | 2.2 | 4.4 | 4.1 | 5.6 | 10.4 | 12.0 | 21 | 28 | 66 | 110 |
| 1 | 1.7 | 1.7 | 2.0 | 3.7 | 5.0 | 5.0 | 7.0 | 11.5 | 14.3 | 23 | 30 | 81 | 140 |
| 1.5 | 2.7 | 2.9 | 2.9 | 5.0 | 5.5 | 6.0 | 9.2 | 13.6 | 24.5 | 26 | 33 | 97 | 150 |
| 2 | 3.6 | 4.0 | 4.6 | 7.9 | 7.6 | 7.2 | 11.6 | 16.3 | 34.1 | 42 | 46 | 111 | 165 |
| 2.5 | 4.4 | 5.3 | 6.4 | 10.6 | 11.0 | 9.7 | 12.4 | 18.5 | 59.6 | 67 | 65 | 149 | 190 |
| 3 | 5.4 | 6.6 | 8.5 | 13.8 | 14.7 | 14.1 | 13.0 | 21.1 | 86.2 | 94 | 90 | 199 | 225 |
| 4 | | | 10.6 | 17.0 | 22.6 | 24.4 | 25.2 | 24.5 | 123.0 | 140 | 152 | 302 | 330 |
| 4.5 | | | 11.2 | 18.3 | 24.4 | 29.4 | 32.5 | 29.0 | 139.0 | 181 | 177 | 355 | 451 |
| 5 | | | 11.9 | 19.6 | 27.2 | 37.0 | 43.6 | 39.1 | 164.1 | 185 | 216 | 403 | 460 |
| 6 | | | | | 28.9 | 46.2 | 60.2 | 61.0 | 179.0 | 220 | 264 | 455 | 600 |
| 6.5 | | | | | 29.1 | 47.0 | 63.0 | 69.0 | 186.0 | 230 | 288 | 480 | 641 |
| 6.7 | | | | | 29.3 | 47.2 | 64.3 | 73.0 | | 235 | 293 | 487 | 656 |
| 7 | | | | | | | 65.9 | 78.0 | | 241 | 305 | 495 | 678 |
| 8 | | | | | | | 71.2 | 90.0 | | 259 | 337 | 507 | 738 |
| 8.5 | | | | | | | 74.6 | 92.0 | | | 348 | 522 | 760 |
| 9.5 | | | | | | | | 99.0 | | | 369 | | 793 |
| 10 | | | | | | | | 101.6 | | | | | 805 |
| 10.7 | | | | | | | | | | | | | 827 |

### Stroke limiter for throttling versions

The handwheel nut on the **BSA1T, BSA2T** and **BSA3T** has a threaded hole for the provision of a stroke limiter. Customer to supply standard nuts and bolts as indicated in the table below:

| Size | Hexagon bolt |
|---|---|
| **DN15 - DN80** | M8 x 50 mm |
| **DN100 - DN150** | M12 x 75 mm |
| **DN200 - DN250** | M12 x 100 mm |

**Note:** The maximum permissible differential pressure in throttling function:

| | |
|---|---|
| **DN15 - DN80** | 2.0 bar |
| **DN100 - DN125** | 1.5 bar |
| **DN150** | 1.0 bar |
| **DN200 - DN250** | 0.8 bar |

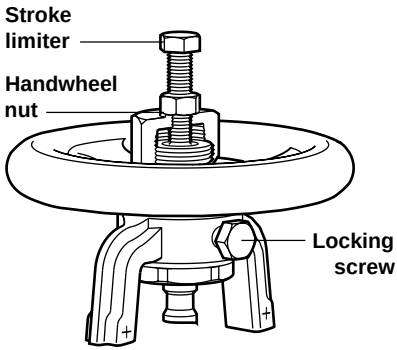



**Fig. 8**

**All the internals of the bellows sealed valve can be replaced (See Section 7, Spare parts).**

### Note:

**Before actioning any maintenance programme observe the data in Section 1 - 'Safety information'.**

### Warning

**The body/bonnet collar gaskets (10a and 10b) contain a thin stainless steel support ring which may cause physical injury if they are not handled and disposed of carefully.**

**6.1** Before undertaking any maintenance on the valve, ensure that any pressure is isolated and safely vented to atmospheric pressure. The valve should then be allowed to cool. When reassembling, ensure that all joint faces are clean.

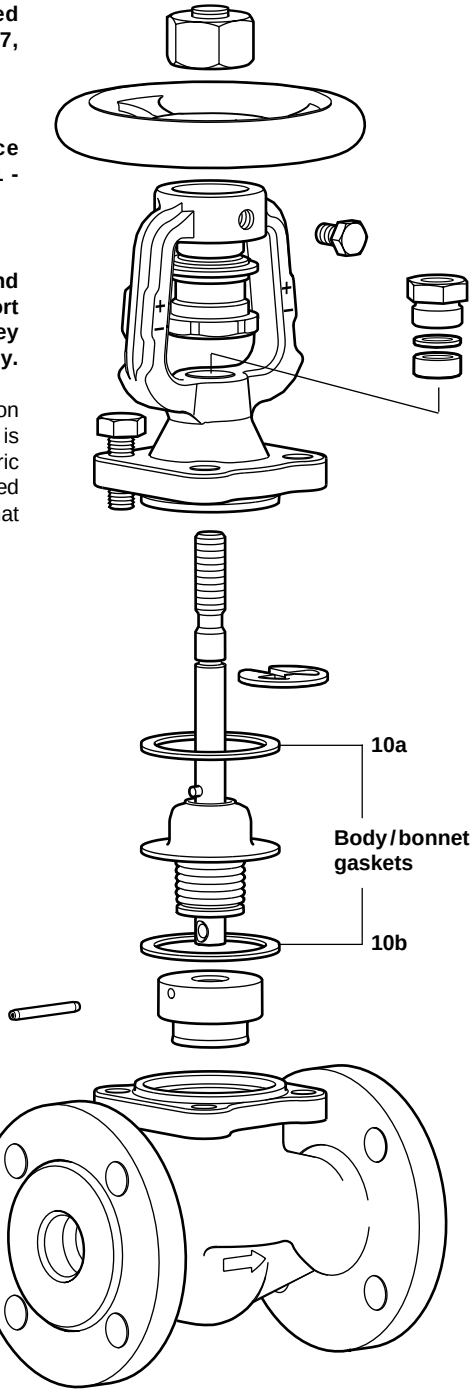



**Fig. 9**

## 6.2 How to fit the body / bonnet gaskets

This can be carried out whilst the valve is connected in the pipeline. Remove the valve bonnet (**2**) from the body (**1**) by unscrewing bonnet studs / nuts (**9**). The body gasket (**10b**) is now visible and can quickly be replaced. Ensure the gasket face in the body (**1**) is clean before fitting a replacement.

To replace the second gasket (**10a**) which is situated between the bonnet (**2**) and the stainless steel bellows support collar, firstly remove the clip-on position indicator, remove the locking screw (BSAT versions only). Rotate the handwheel (**7**) in a clockwise direction. This pushes the main stem (**6**) downwards and creates a gap between the bellows support collar and the bonnet (**2**). If the support collar remains attached to the bonnet (**2**), gently prise the collar away from the bonnet being careful not to damage the collar.

**Do not allow the bellows to stretch as this can reduce the bellows life.**

By continually rotating the handwheel (**7**) in a clockwise direction, the stem (**6**) can be unscrewed from the bonnet bush. When the stem (**6**) is disconnected from the bonnet bush, unscrew the gland nut (unbolt the gland flange if fitted) and remove both this and the gland washer (or gland follower if fitted). Keep these parts safe as they are not supplied as spares. The stem / bellows assembly (**6, 5**) can now be withdrawn out of the bonnet (**2**) . The second bellows collar gasket (**10a**) can now be replaced - ensuring both the bellows support collar surface and bonnet surface are clean and the gasket is accurately located. Before the stem / bellows assembly (**6, 5**) is reassembled into the bonnet (**2**), the stem packing ring (**8**) should be replaced (see Section 6.3).

## 6.3 How to fit the stem packing

By following through Section 6.2 it is now possible to replace the stem packing ring (**8**). Two of these rings are provided in the spares kit but only one is required. Ensure all of the old stem packing material is removed from the bonnet cavity and all locating surfaces are clean. Valve assembly is the opposite to removal - remembering to fit a bellows collar gasket between the collar and the valve bonnet. Ensure the solid stem pin (which is pressed into the stem) is aligned with the slot inside the bonnet. Before screwing the end of the stem into the bonnet bush remember to fit a new stem packing ring (**8**), the original gland washer (or gland follower) and gland nut (or gland flange) over the stem. **Do not allow the stem thread to damage the inner surface of the gland packing ring.** Carefully slide the new packing ring down the stem into the cavity and slide the original gland washer (or gland follower if fitted) on top of the packing ring. Remember to tighten the gland packing ring after the valve has been fully assembled.

## 6.4 How to fit the stem and bellows assembly

By following through Section 6.2 it is now possible to fit a new stem / bellows assembly (**6, 5**). Fitting this is opposite to removal - remembering to fit a bellows collar gasket (**10a**) between the bellows support collar and valve bonnet (**2**). Ensure the bellows collar gasket (**10a**) is accurately located. Before fitting the new stem / bellows assembly (**6, 5**) into the bonnet (**2**), apply a small amount of lubricating compound such as Gulf Sovereign LC grease to the end of the stem pin (which is pressed into the stem). Ensure the stem pin is aligned with the slot inside the bonnet. Carefully slide the stem up through the bonnet. Before screwing the end of the stem into the bonnet bush remember to fit a new stem packing ring (**8**) (see Section 6.3), the original gland washer (or gland follower) and gland nut (or gland flange) over the stem (**6**). **Do not allow the stem thread to damage the inner surface of the gland packing ring.** Carefully slide the new packing ring down the stem into the cavity and slide the original gland washer (or gland follower if fitted) on top of the packing ring (**8**). Remember to tighten the gland packing ring after the valve has been fully assembled.

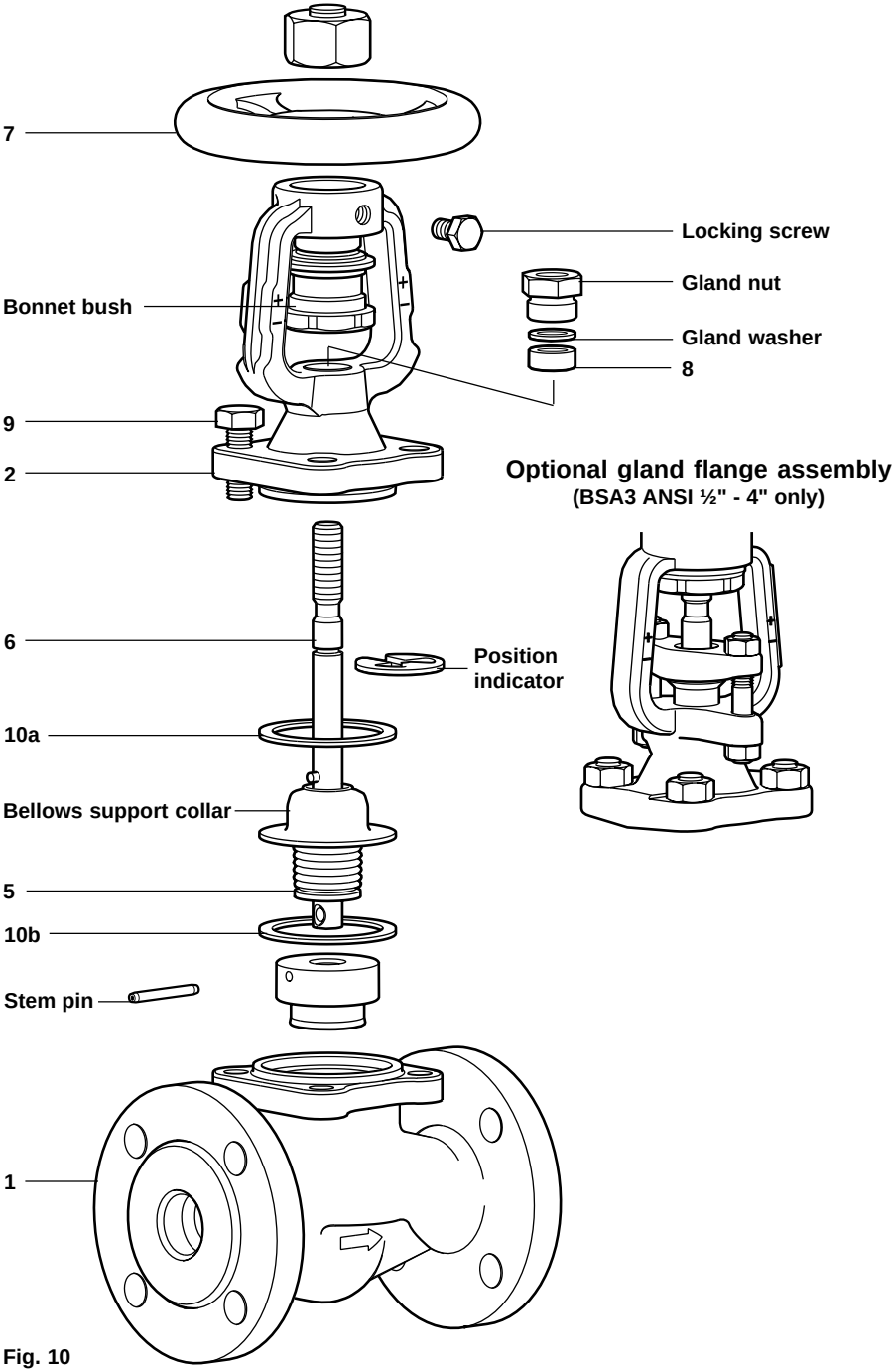

7
Locking screw
Gland nut
Bonnet bush
Gland washer
8
9
2
Optional gland flange assembly
(BSA3 ANSI ½" - 4" only)
6
Position indicator
10a
Bellows support collar
5
10b
Stem pin
1

Fig. 10

## 6.5 How to fit the disc

By following through Section 6.2 it is now possible to replace the valve's disc. To replace the disc (**4**) (or balancing disc assembly*****) simply remove the old stem pin and replace the disc (**4**). Attach the new disc with the new stem pin (supplied). Where the disc (**4**) is attached using a retaining nut and collet arrangement, simply prise the crimped skirt away from the retaining nut and unscrew. Remove the collets remembering to save these and the retaining nut as they are not supplied as spares. Fitting is the opposite to removal but ensure the collets and threads are lightly greased with lubricating compound such as Molybdenum Sulphide.

If a new disc is being fitted then crimp the collet retaining nut securely across two corners by deforming the disc's thin metal skirt. If the original disc is being fitted then re-crimp using a fresh part of the skirt.

### *Important note

**When a balancing disc is installed, the valve body should be mounted with the upstream fluid flowing into the upper valve chamber first, so the fluid pressure acts on top of the balancing disc. This is opposite to normal installation. If a balancing disc is upgrading or replacing a standard disc, the original valve body must be turned around in the pipeline and permanently marked with a new flow arrow indicating the changed direction of flow. See Section 3.4 for additional information.**

## 6.6 Final assembly

Ensure the bellows support collar and gaskets (**10a, 10b**) are accurately aligned with the bonnet (**2**) before final assembly into the body (**1**).

Tighten the bonnet bolts/nuts (**9**) evenly to the recommended tightening torque (See Table 1).

## Handwheel

The handwheel (**7**) is not supplied as a spare part. However, to remove the handwheel unscrew the main handwheel nut in a **clockwise** direction.

**Note: The thread in the handwheel nut is left handed, so it must be unscrewed in a clockwise direction.** Place a suitable spanner (a detailed drawing is available from Spirax Sarco) across the flats of the bonnet bush (**2**) and unscrew the handwheel in the normal way. **Note:** the handwheel maybe firmly secured on the bonnet bush (**2**). Refitting the handwheel is the opposite to removal. Apply Loctite 638 to the threads of the handwheel boss and tighten to 50 N m (36 lbf ft). Remember to tighten the handwheel nut to 40 N m (29 lbf ft) in an **anticlockwise** direction.

**Table 1 Recommended bonnet tightening torques N m (lbf ft)**

| Size |  mm | BSA1 / BSA1T PN16 JIS/KS 10K | BSA2 / BSA2T PN16 / PN25 | BSA3 / BSA3T PN40 | BSA3 / BSA3T ANSI 150 / 300 JIS/KS 20K |
|---|---|---|---|---|---|
| **DN15 - DN32** | 17 A/F | 20 - 25 (15 - 18) | 35 - 40 (26 - 29) | 35 - 40 (26 - 29) | 50 - 55 (36 - 40) |
| **DN40 - DN65** | 19 A/F | 40 - 45 (29 - 33) | 55 - 60 (40 - 44) | 55 - 60 (40 - 44) | 85 - 90 (63 - 66) |
| **DN80 - DN150** | 24 A/F | 70 - 80 (51 - 59) | 130 - 140 (95 - 103) | 130 - 140 (95 - 103) | 190 - 200 (140 - 147) |
| **DN200** | 30 A/F | 180 - 200 (132 - 147) | 260 - 280 (191 - 206) | 260 - 280 (191 - 206) | 300 - 320 (220 - 235) |
| **DN250** | 36 A/F | 480 - 520 (352 - 382) | | | |

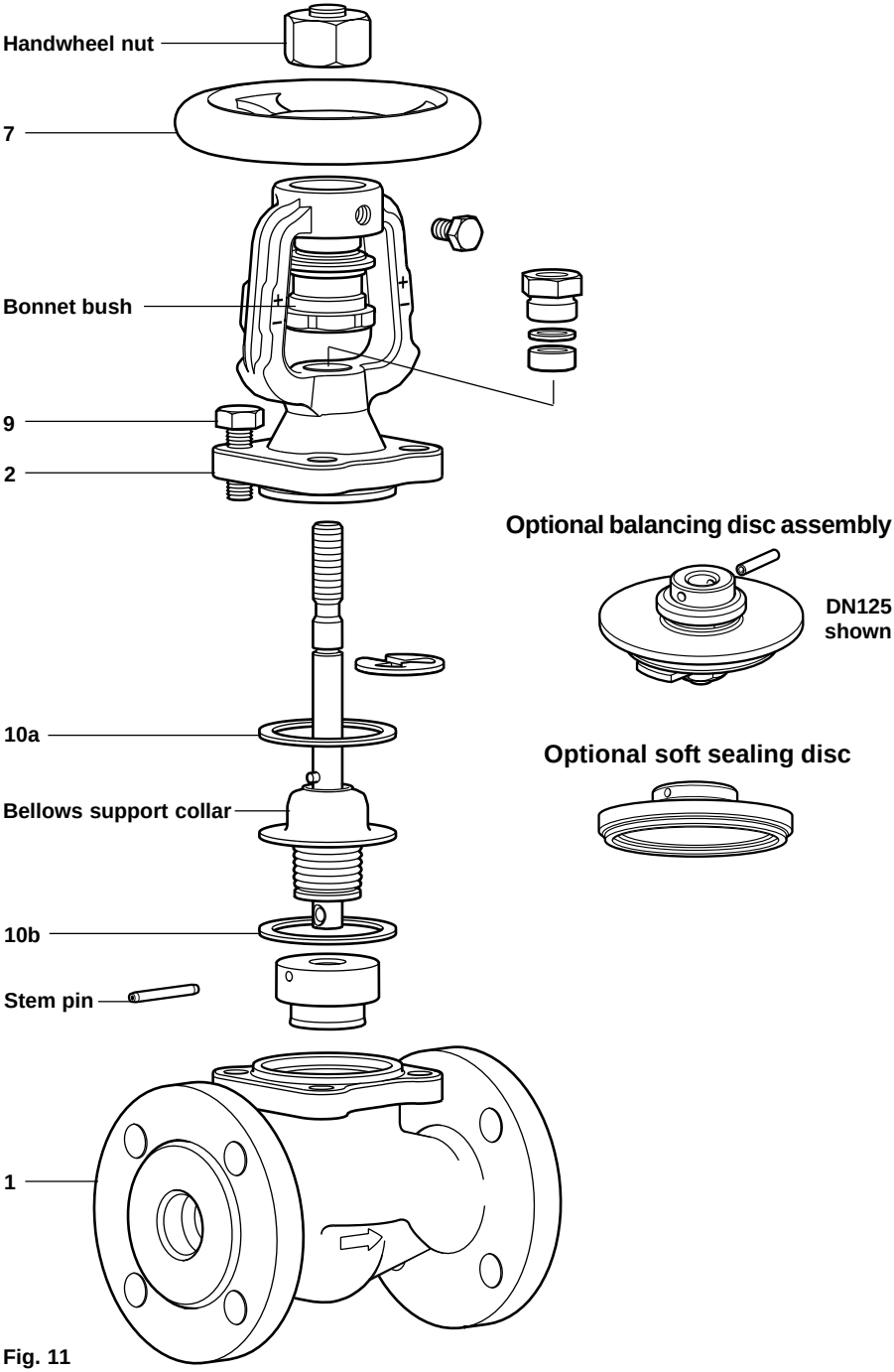

Handwheel nut
7
Bonnet bush
9
2
Optional balancing disc assembly
DN125
shown
10a
Optional soft sealing disc
Bellows support collar
10b
Stem pin
1

Fig. 11

# 7. Spare parts

The spare parts available are shown in heavy outline. Parts drawn in broken line are not supplied as spares.

## Available spares

| | |
|---|---|
| Body/bonnet gasket and stem packing | **10a, 10b, 8** (2 off) |
| Stem and bellows assembly (state if BSA or BSAT) | **6, 5** |
| Disc (and optional disc where fitted) - state full description of the valve | **4** |

## How to order spares

Please note: for customer convenience spares are supplied in kits to ensure all the appropriate replacement parts are supplied to carry out a specific maintenance task. e.g. when a stem/bellows assembly is ordered, parts (**10a** and **10b**), (**8**) and (**6, 5**) will be included in the kit.
Always order spares by using the description given in 'Available spares' and state the size and type of stop valve.
**Example:** 1 - Body / bonnet gasket and stem packing for a DN15 Spirax Sarco BSA2 PN16 bellows sealed stop valve.

**Note: The gaskets contain sharp metal reinforcement, please handle with care.**

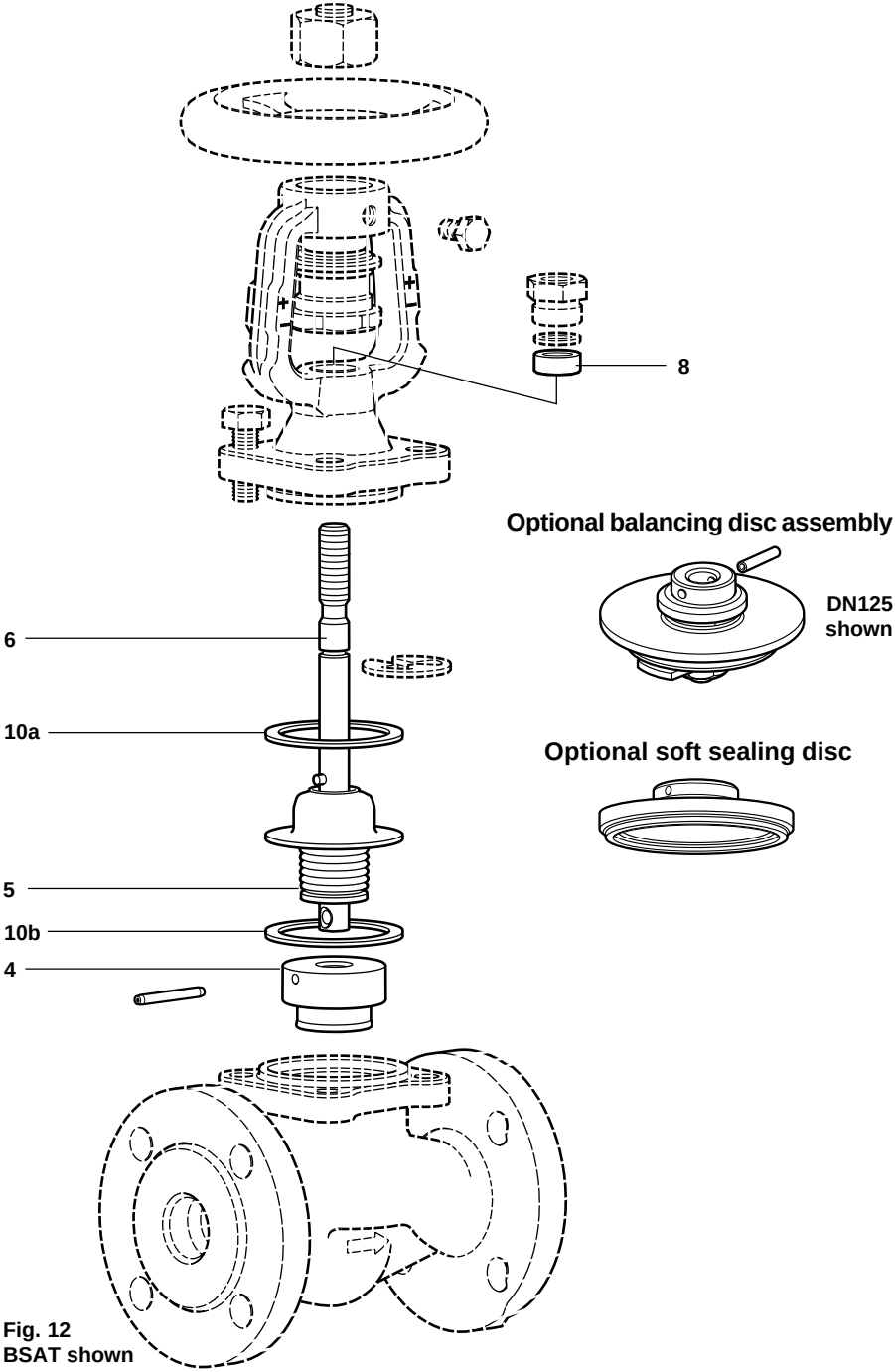



**Fig. 12**
**BSAT shown**