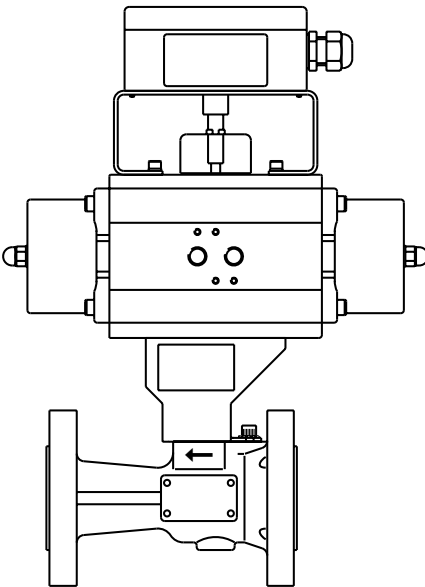


ABV20

**Air Actuated Boiler Blowdown Valve
Installation and Maintenance Instructions**



1. *General safety information*
2. *General product information*
3. *Installation*
4. *Operation*
5. *Maintenance*
6. *Maintenance for actuator and switch box*
7. *Spare parts*

1. General safety information

WARNINGS

Your attention is drawn to Safety Information leaflet IM-GCM-10.

Before commencing any dismantling work on a boiler, depressurise, drain, and vent the boiler to atmosphere.

Pipelines must be adequately isolated, depressurised, and drained. Isolation valves must be turned on and off gradually to avoid system shocks.

Ball valves can trap pressurised media in the body, so make sure there is no pressure to the valve body, or any pressure remaining in the body, before loosening or removing the flange bolts. The actuator must be isolated both pneumatically and electrically before any maintenance is carried out.

Do not attempt to service the actuator without first consulting the Installation and Maintenance Instructions, as the end caps contain springs under pressure. Failure to follow the instructions could result in injury. The actuator must be vented before dismantling.

If the valve should seize in the partly open position, the springs in the actuator will still be partly compressed, and will consequently be storing a large amount of energy, which could cause injury if released suddenly. If there is any possibility that this is the case follow the instructions given in the 'Maintenance' section of this booklet - 'Dismantling a seized valve assembly'.

If the valve has been subjected to a temperature approaching 315°C (599°F), the Viton 'O' ring may have decomposed and formed hydrofluoric acid. Avoid skin contact and inhalation of any dust or fumes as this acid causes deep burns and damage to the respiratory system.

Maximum supply pressure

BVA225S and BVA230S	6 bar g (87 psi g)
BVA220S	10 bar g (145 psi g)

— 2. General product information —

2.1 General description

The Spirax Sarco ABV20 is a ball valve with a 90° rotary spring return pneumatic actuator, and a switch box. It is used in conjunction with a Spirax Sarco blowdown timer to provide timed control of bottom blowdown, ensuring that the recommended boiler blowdown cycles occur with minimum heat loss, avoiding duplication or omission. The valve is suitable for a maximum pressure of 17.25 bar g at 208°C (250 psi g at 406°F).

A NAMUR (VDI/VDE 3845) solenoid valve is also required, and may be selected from the Spirax Sarco MV range. Alternatively, an air supply (maximum pressure DN25 10 bar (145 psi), DN32 - DN65 6 bar (87 psi)) may be connected directly to the actuator port 'A' ($\frac{1}{4}$ " BSP), for applications where it is necessary to install the solenoid valve remote from the actuator.

A standard $\frac{1}{4}$ " BSP 3-way solenoid valve could also be used.

Fig. 1 ABV20

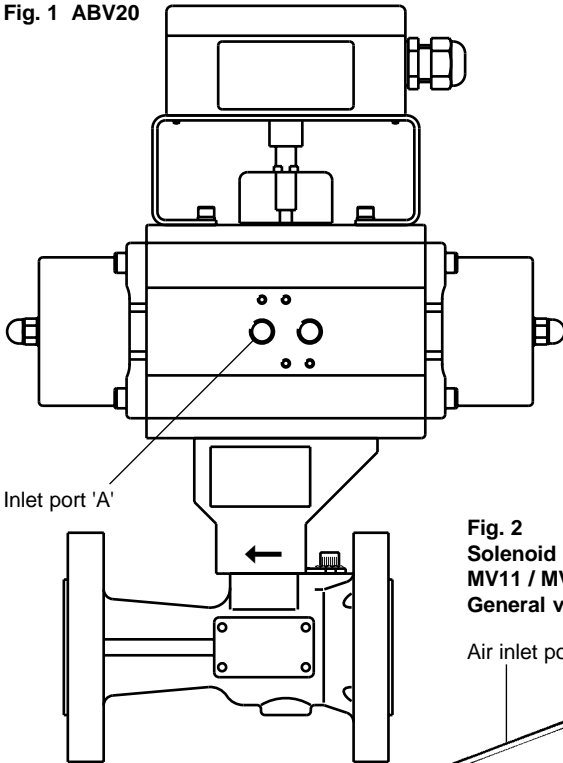
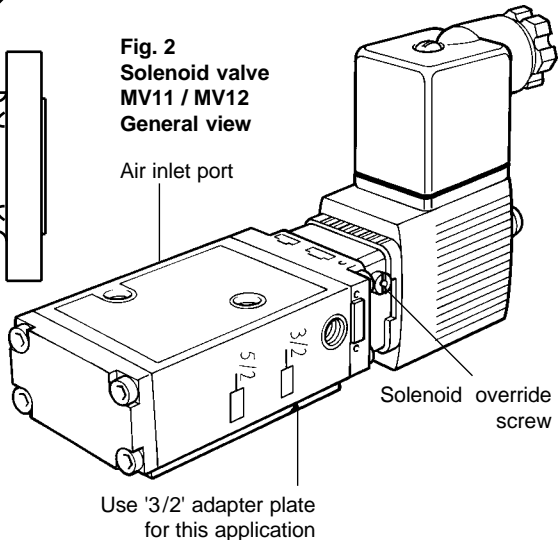


Fig. 2
Solenoid valve
MV11 / MV12
General view



2.2 Types

Valve size	Actuator	Switch box
DN25	BVA220S	LSB1
DN32	BVA225S	LSB1
DN40	BVA225S	LSB1
DN50	BVA225S	LSB1
DN65	BVA230S	LSB1

2.3 Actuator

The actuator has a double rack with integral pistons, meshing with a single pinion. The back of each rack has anti-friction pads. Spring return action is provided by three concentric springs in each end cap. The spring tension is restrained by a support, blind nut, and bolt, which allows the end caps to be removed safely. 'O' rings provide sealing. A position indicator is fitted to the top of the pinion shaft, below the switch box. BVA actuators are factory lubricated, and do not require a lubricated air supply. The air must, however, be dry and clean. Any other non-corrosive gas can be used as the operating medium.

2.4 Switch box

A switch box containing two microswitches is mounted above the actuator on a bracket, and allows connection to a building management system if required. The top microswitch is factory set to indicate whether the valve is 'closed' or not fully closed.

Note:- it does not indicate that the valve is 'fully open'.

The microswitch cams are adjustable.

An 'open/closed' indicator disc is fitted to the end of the switch box shaft and is visible through the top cover.

3. Installation

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

The valve must be installed with the arrow pointing in the direction of flow as indicated on the valve body. Install the valve between matching flanges taking care to ensure correct alignment. The air supply to the solenoid valve/actuator must be in 10 mm (3/8") minimum diameter pipe. The air inlet connection is 1/4" BSP (G).

Table 1 Maximum air pressure

Valve size	Actuator	Maximum air pressure
DN25	BVA220S	10 bar (145 psi)
DN32, DN40 and DN50	BVA225S	6 bar (87 psi)
DN65	BVA230S	6 bar (87 psi)

3.1 To fit an MV type solenoid assembly to the valve actuator:

- Turn the spring loaded solenoid override screw anticlockwise to release it for normal working.
- Fit the screwed location pin from the MV kit in the top centre position above the actuator ports (see diagram). Ensure the pin is screwed far enough into the actuator to allow a good seal to be made i.e. that it is not holding the solenoid away from the actuator.
- Use the '3/2' adapter plate supplied with the solenoid assembly. Discard the '5/2' plate. **Note:** Earlier versions used a double-sided plate. For this type, align the arrow on the plate with the '3/2' on the valve assembly.
- Fit the solenoid assembly to the actuator using the 2 screws provided in the kit. Do not overtighten the screws as this could distort the plastic body and prevent proper working.
- Connect the air supply to port 1 (1/4" BSP). Note that port 3 is blanked for this application. The unmarked port near the override screw is not connected in this application.

The solenoid override is operated by using a screwdriver to push the spring loaded plastic screw inwards and turning it clockwise to lock it in the 'override' position. This bypasses the solenoid and allows the ABV20 to be operated without an electricity supply. The screw is released by turning it anticlockwise.

Fit locating grub screw (in MV solenoid kit) here.

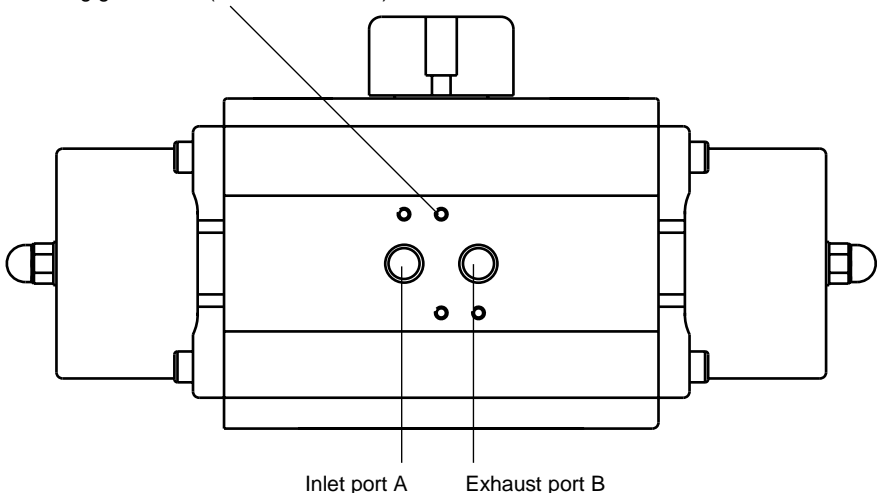


Fig. 4 BVA actuator showing inlet and exhaust ports

3.2 Switch box wiring

The switch box is supplied with a Pg 11 cable gland. The switches are suitable for 10 A, 250 Vac operation. Switch terminal connections are shown in the diagram. The cams are shown in 'valve closed' position.

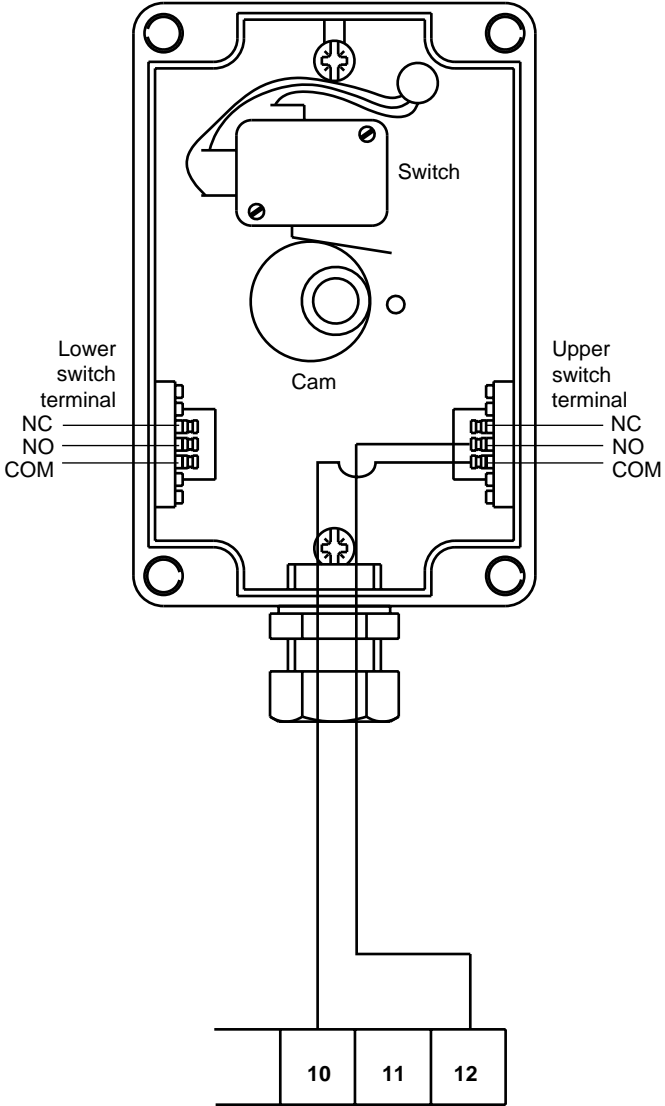


Fig. 5 LSB1 switch box wiring connections

4. Operation

The air supply is switched on by the solenoid valve, causing two pistons in the actuator to move apart against spring pressure.

Racks attached to the pistons turn the actuator pinion and shaft, opening the valve fully.

On release of the air pressure, the springs return the valve to the closed position.

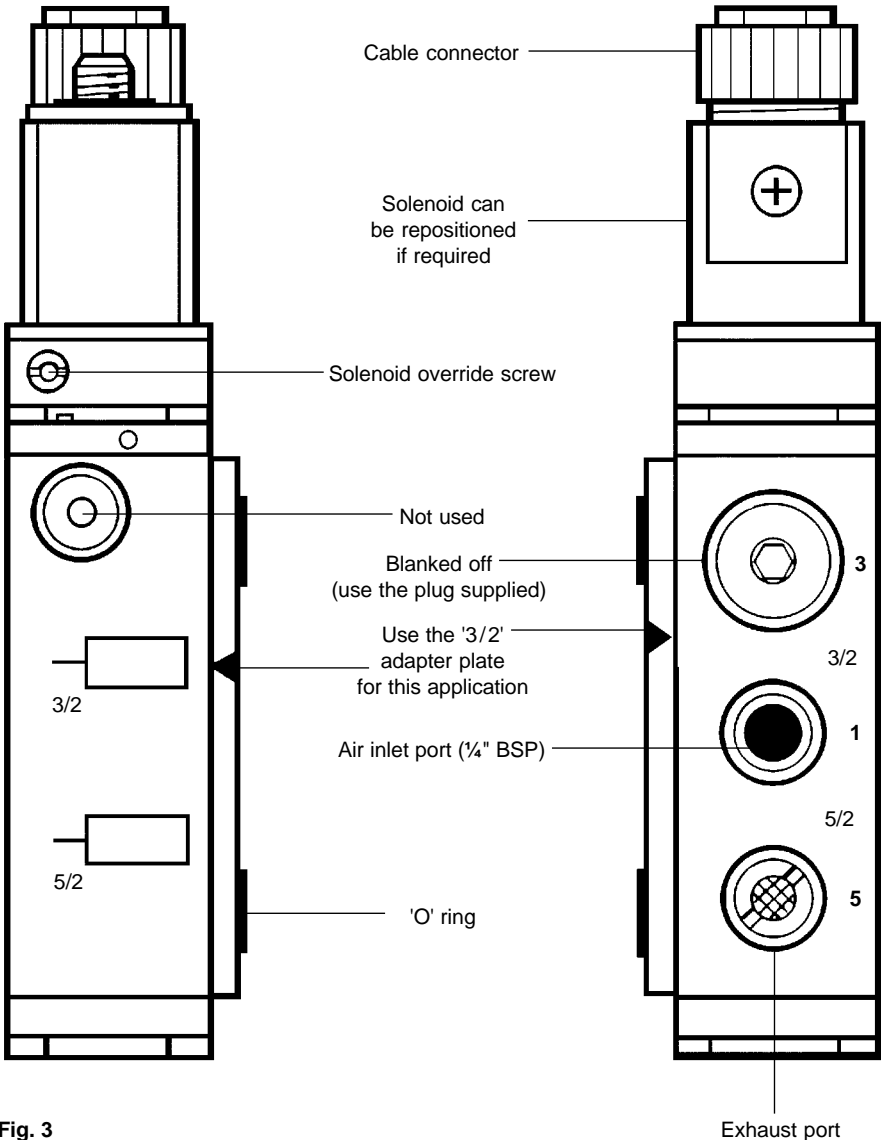


Fig. 3

5. Maintenance

Note: Before actioning any maintenance program read the 'Safety information' in Section 1.

Warning

Do not loosen or remove the blind nut in the centre of the end caps, as it retains the return springs. Do not attempt to remove the springs from the end caps without a suitable press to relieve the spring pressure. USE EXTREME CAUTION.

Isolate the actuator electrically and pneumatically before any maintenance is carried out.

5.1 General

Periodically check that all fasteners remain tight.

No routine maintenance is required, as the actuator is supplied with sufficient lubrication for a normal working life. Depending on the severity of actuator operating conditions, periodic replacement of the 'O' rings may be required. Spares are available.

5.2 Dismantling a seized valve assembly

If there is any possibility that the valve has seized in the partially open position, dismantle the valve as follows to avoid a sudden release of spring pressure which could cause injury:-

- Hold the valve/actuator assembly in a vice.
- Remove the solenoid valve assembly.
- Connect a pressure regulated compressed air supply (0 - 6 bar g, 0 - 87 psi g), to the air inlet port 'A'.
- Gradually increase the air pressure until the valve stem just begins to rotate.
- Loosen and remove the bolts securing the bracket to the valve body and lift away the actuator/ bracket assembly.
- Place the actuator on the bench and gradually reduce the pressure. The valve body is now ready for dismantling.

5.3 Dismantling the valve body

A special tool is required to remove the screw-in insert in order to dismantle the valve. The tool may be fabricated from a suitable thickness of steel plate (with rounded off edges) to fit into and across the counterbored holes in the insert. Considerable force may be required to 'break' the joint, and the use of a strong, rigidly mounted vice is a necessity. **DO NOT APPLY HEAT** - see the 'Safety information' Section 1.

Alternatively, the entire valve may be returned to Spirax Sarco for service exchange.

For blowdown applications it is important that carbon reinforced PTFE stem seals are used, not graphite.

- Once the insert has been removed, withdraw the ball.
- Loosen valve stem lock-nut(s) and gland nuts then tap the stem into the body using a soft-faced hammer to avoid damage to the thread.
- Remove all traces of the old seals using a soft metal scraper if necessary.
- Note the number and position of the stem seals. The innermost seal may need to be prised from its housing - take care not to scratch the seating surface.
- Ideally the bare casting should be degreased and shotblasted internally to remove all loose rust and deposits.
- Clean the ball and stem.
- If the valve has seized, the stem may need to be replaced.

5.4 Rebuilding the valve:

- Place the required quantity of new stem seals on the valve stem and carefully insert into the body casting. Avoid scratching the stem bore.
- Fit the top stem seals and press down into the gland.
- Fit the gland follower, disc springs (if used) and gland nut.
- Tighten the nut to pull the stem up and locate the stem seals.
- Fit the new valve seats and drop in the ball. **Caution:** Ensure that the vent hole is on the 'upstream' side of the valve. Ensure that the ball locates on the stem spigot.
- Fit a new insert seal (of the type previously used) and tighten the insert until it 'bottoms out'.
- Tighten the gland nut:

Valve size	Gland nut torques	
DN25 - DN50	34 - 41 Nm	(25 - 30 lbf ft)
DN65	41 - 47 Nm	(30 - 35 lbf ft)

5.5 Testing:

- Ensure that the stem can rotate freely, without undue friction.
- Carry out seat leakage and body hydraulic testing as appropriate:

Seat leakage test at 6 bar g (87 psi g) (air under water)
Cold hydraulic test at 78 bar g (1 131 psi g) (Class 300)

5.6 Assembly:

- Refit actuator/bracket assembly ensuring that the valve is fully closed before attempting to locate the drive adapter.
- Connect an air supply and check that the valve opens and closes correctly and fully.

6. Maintenance for actuator and switch box

Note: Before actioning any maintenance program observe the 'Safety information' in Section 1.

6.1 Actuator

To dismantle the actuator:-

- Disconnect air and electrical supply.
- Remove solenoid valve assembly.
- Remove switch box from actuator.
- Remove actuator and mounting bracket from valve. Note position of bracket.
- Remove end cap screws from both sides of actuator.

WARNING:- Do not loosen or remove central blind nuts (16).

Any initial spring pressure will be released once the screws (13) are undone by about 5 mm.

- Withdraw both end caps (4) complete with spring assemblies.
- Rotate pinion counter-clockwise until the piston gears disengage from the pinion.
- Remove the pistons (2).
- Remove the pinion top circlip (7) and washers (5 and 8), and withdraw the pinion (3) downwards.
- Clean and inspect all components. If the actuator bore is scratched or scored, replace complete actuator.
- Reassemble unit, using 'Molycote B2-2 Plus' grease on all 'O' rings and moving components.
- Insert both pistons.

IMPORTANT:- To ensure correct 90° rotation:-

- The racks on the pistons must engage with the pinion equally.
- The flats on the pinion shaft must be at 90° to the line of the bore when the pistons are fully home (see diagram).

To do this, turn the pinion so that the flats are at a suitable angle (22½°) before fitting the pistons. The pinion must turn clockwise as the pistons are fitted.

- Fit the MV series solenoid valve with the arrow on the adapter plate in line with '3/2' on the valve assembly.

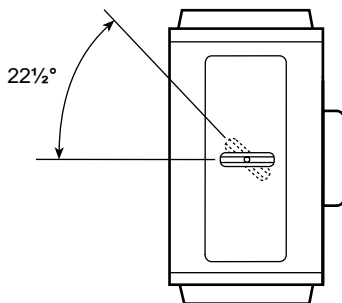


Fig. 6

6.2 Switch box

To adjust switch box microswitch settings:-

- Switch off power supply to switch box.
- Remove switch box cover.
- Remove indicator disc.
- Push the cam against the spring pressure until it clears the spline, then turn to the required position.
- Replace indicator disc - ensure it is aligned correctly.
- Replace cover and switch on air and power supply.

7. Spare parts

A valve spares kit is available, which includes all seals and gaskets and a valve ball. Spare valve stems are also available. An actuator 'O' ring kit is available which also contains pinion washers and circlip (items 5, 7, 8, 9, 10, 11, 12, 18). State actuator type on order. No spares are available for the switch box.

Caution: The vent hole in the ball must be on the upstream side of the valve.

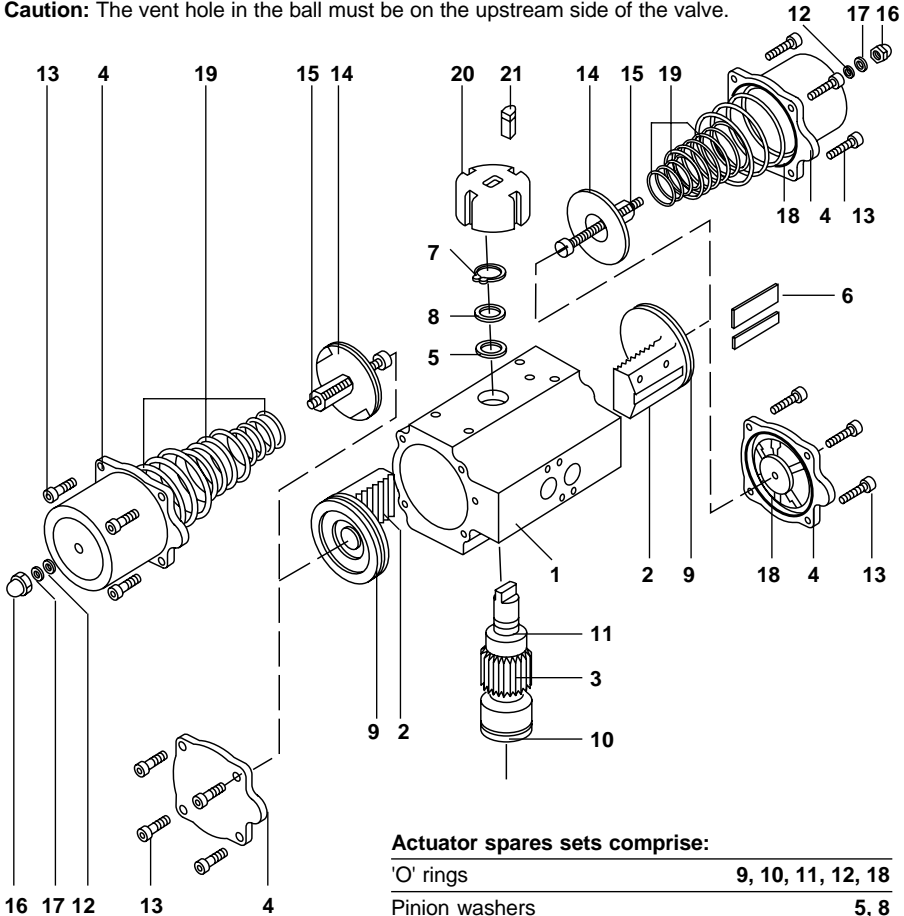


Fig. 7

Actuator spares sets comprise:

'O' rings	9, 10, 11, 12, 18
Pinion washers	5, 8
Pinion circlip	7
State actuator model / type on order e.g. BVA220-S	

1	Body
2	Piston
3	Pinion
4	End caps
5	Washer
6	Anti-friction pads
7	Pinion circlip

8	Washer
9	'O' ring
10	'O' ring
11	'O' ring
12	'O' ring
13	Bolt
14	Spring support

15	Bolt
16	Blind nut
17	Washer
18	'O' ring
19	Spring
20/21	Position indicator

