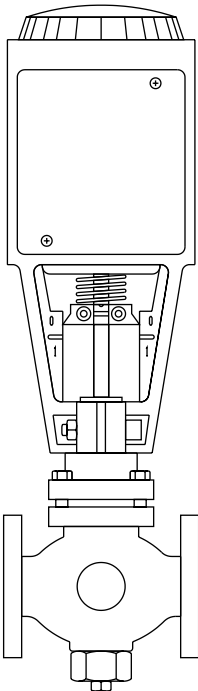


**BCV30**  
**DN20 - Blowdown Control Valve**  
**Installation and Maintenance Instructions**

1. *Safety information*
2. *Application*
3. *Technical data*
4. *Operation*
5. *Installation*
6. *Rotating the actuator*
7. *Wiring*
8. *Adjustment*
9. *Maintenance*
10. *Spare parts*

# 1. Safety information

## WARNING

Your attention is drawn to Safety Information Leaflet IM-GCM-10, as well as to any National or Regional regulations concerning boiler blowdown. In the UK, guidance is given in HSE Guidance Note PM60.

## WARNING

The actuator must be electrically isolated before any maintenance is carried out.

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11 on this document) 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.

### 1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application. The products listed below comply with the requirements of the European Pressure Equipment Directive 97/23/EC and carry the  $\text{C}\text{E}$  mark when so required. The products fall within the following Pressure Equipment Directive categories:

Product		Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
BCV30	DN20	-	SEP	-	SEP
	DN40	-	1	-	SEP
BCV31	DN20	-	SEP	-	SEP
	DN40	-	1	-	SEP

- i) The products have been specifically designed for use on steam, air or condensate which are in Group 2 of the above mentioned Pressure Equipment Directive. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections before installation.

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## **1.2 Access**

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

## **1.3 Lighting**

Ensure adequate lighting, particularly where detailed or intricate work is required.

## **1.4 Hazardous liquids or gases in the pipeline**

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

## **1.5 Hazardous environment around the product**

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

## **1.6 The system**

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

## **1.7 Pressure systems**

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

## **1.8 Temperature**

Allow time for temperature to normalise after isolation to avoid danger of burns.

## **1.9 Tools and consumables**

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

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## 1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

## 1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

## 1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

## 1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures of 250°C (482°F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

## 1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

## 1.15 Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

## 1.16 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

## 2. Application

The BCV30 is an electrohydraulically actuated control valve for the blowdown of steam boilers and is generally used with a controller as part of an automatic TDS control system. The valve may also be used for other high pressure drop, low flowrate applications such as boiler feedpump recirculation.

## 3. Technical data

<b>Media</b>			Water
<b>Maximum media pressure</b>		32 bar g	(464 psi g)
<b>Maximum media temperature</b>	239°C	(462°F)	
<b>Maximum ambient temperature</b>	24 volt version (Connect to class 2 circuit only)	-5°C to +55°C	(23°F to 131°F)
<b>temperature</b>	110 / 230 volt versions	-5°C to +50°C	(23°F to 122°F)

## 4. Operation

The valve is spring loaded to the closed position (0 on the actuator scale, see Fig. 1) and is also held closed by the boiler pressure. When power is applied to actuator terminals 21 and Y1 via terminals 3 and 5 of microswitch C1 (see Fig. 6, page 7) the valve opens to the position set by the internal adjustment cam.

The valve is supplied with a low flowrate setting of 10 mm (0.4") stroke. The internal adjustment cam may be readjusted to give 15 mm (0.6") or 20 mm (0.8") stroke for increased flowrates (see Fig. 1 below). The valve may be opened manually by turning the actuator handwheel clockwise. For automatic operation the handwheel must be turned fully anticlockwise until the 'MAN' indicator is no longer visible.

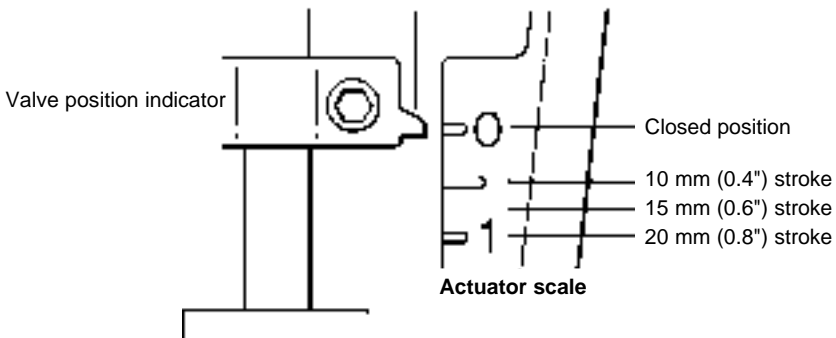


Fig. 1 Adjustment (For further information see Section 8.2)

## 5. Installation

The actuator should be protected from excessive heat.

Actuator sealing is to IP54. Additional protection is recommended for outdoor installation. The valve may be installed in horizontal or vertical lines with flow in the direction of the arrow. Do not install with the actuator below the valve. For boiler blowdown applications the ideal take-off point for the blowdown is from a boiler side connection (Figs. 2 and 3), to reduce the possibility of scale entering the blowdown valve. If the bottom connection has to be used, make a 'T' connection upstream of the main bottom blowdown valve as shown in Fig. 4. We recommend that where possible the 'T' is taken off the top of the blowdown line to reduce any problems of scale.

The ¼" BSP plug may be removed and the connection used for boiler water sampling. A sample cooler is recommended.

Fit a stop valve between the boiler and the BCV30. A check valve is recommended downstream of the BCV30. **For single boiler installations** the blowdown may discharge into the main blowdown line downstream of the main blowdown valve. In the UK, regulations for multi-boiler installations require the automatic blowdown lines to be separate from the main blowdown lines. For further information see Health and Safety Executive Guidance Note PM60.

**Note:** When installing with S11 chamber, use M12 bolts for PN16, 25 and 40 and ANSI 300 flanges. Use M16 bolts for BS 10 Tables 'H' and 'J' flanges. The holes in the S11 chamber are 19 mm Ø.

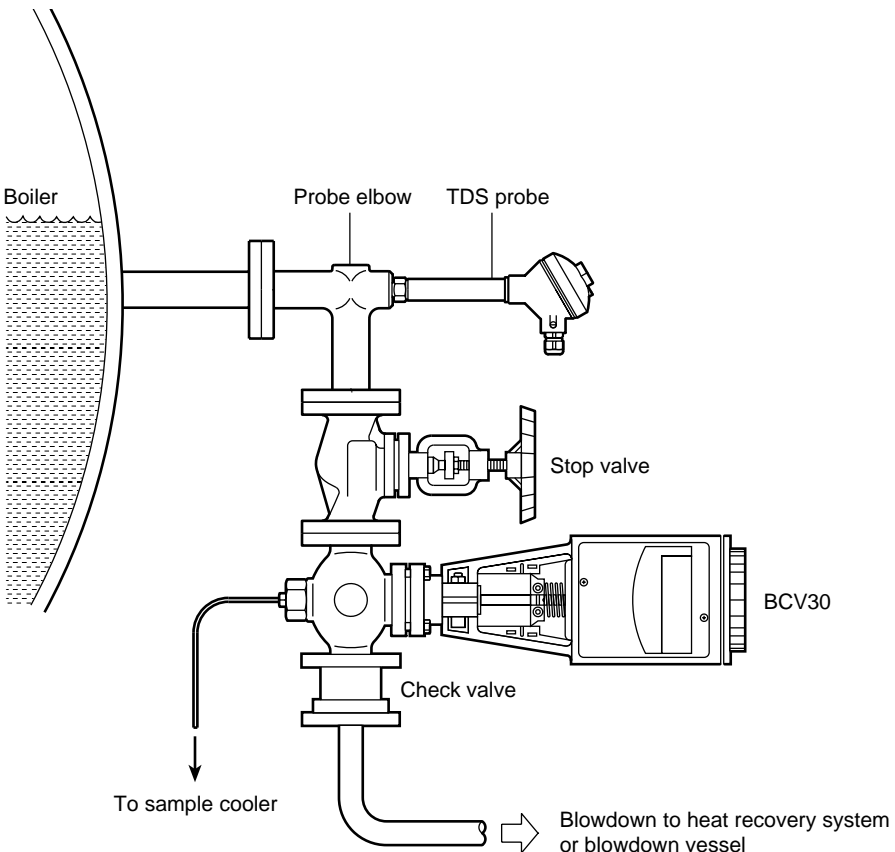
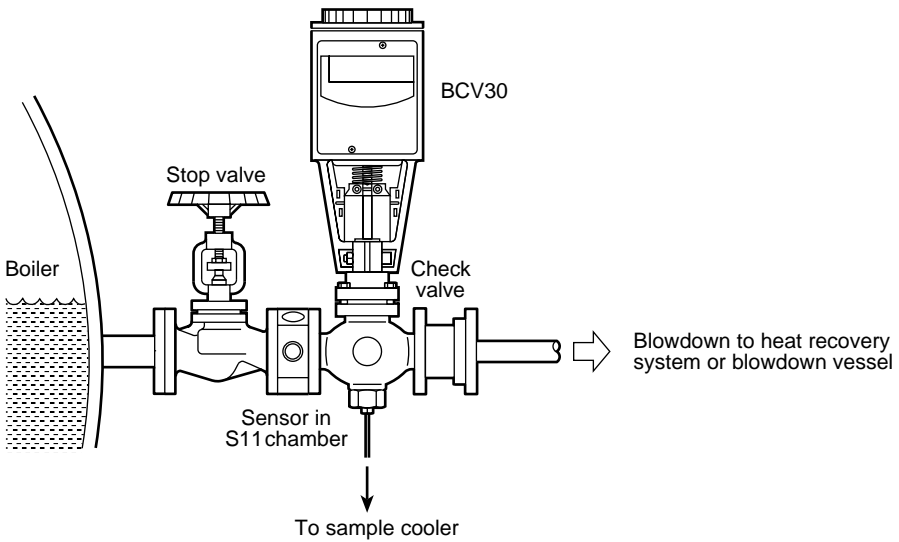
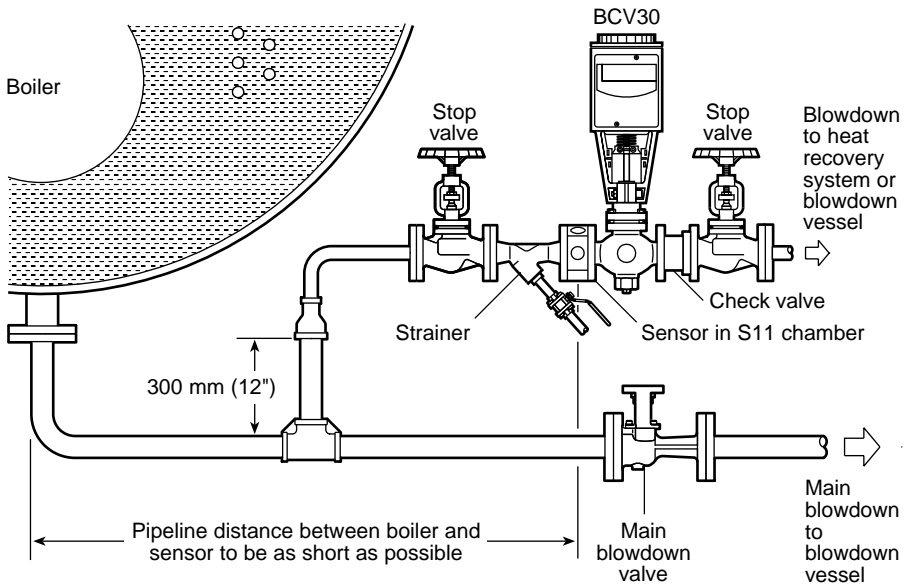


Fig. 2 Installation on a probe elbow



**Fig. 3 Installation on a boiler side connection**



**Fig. 4 Installation on a boiler with no suitable side connection**

## 6. Rotating the actuator

The actuator may be rotated on the valve body so that the terminal cover points in the most convenient direction. To rotate the actuator proceed as follows:  
Turn the actuator handwheel a few turns clockwise to ensure that the valve cone is off its seat.  
Turn the actuator handwheel a few turns clockwise to ensure that the valve cone is off its seat. Loosen the two clamping screws (5 mm allen key). Rotate the actuator as required and clamp in position. Turn the actuator handwheel fully anticlockwise until the 'MAN' indicator is no longer visible.

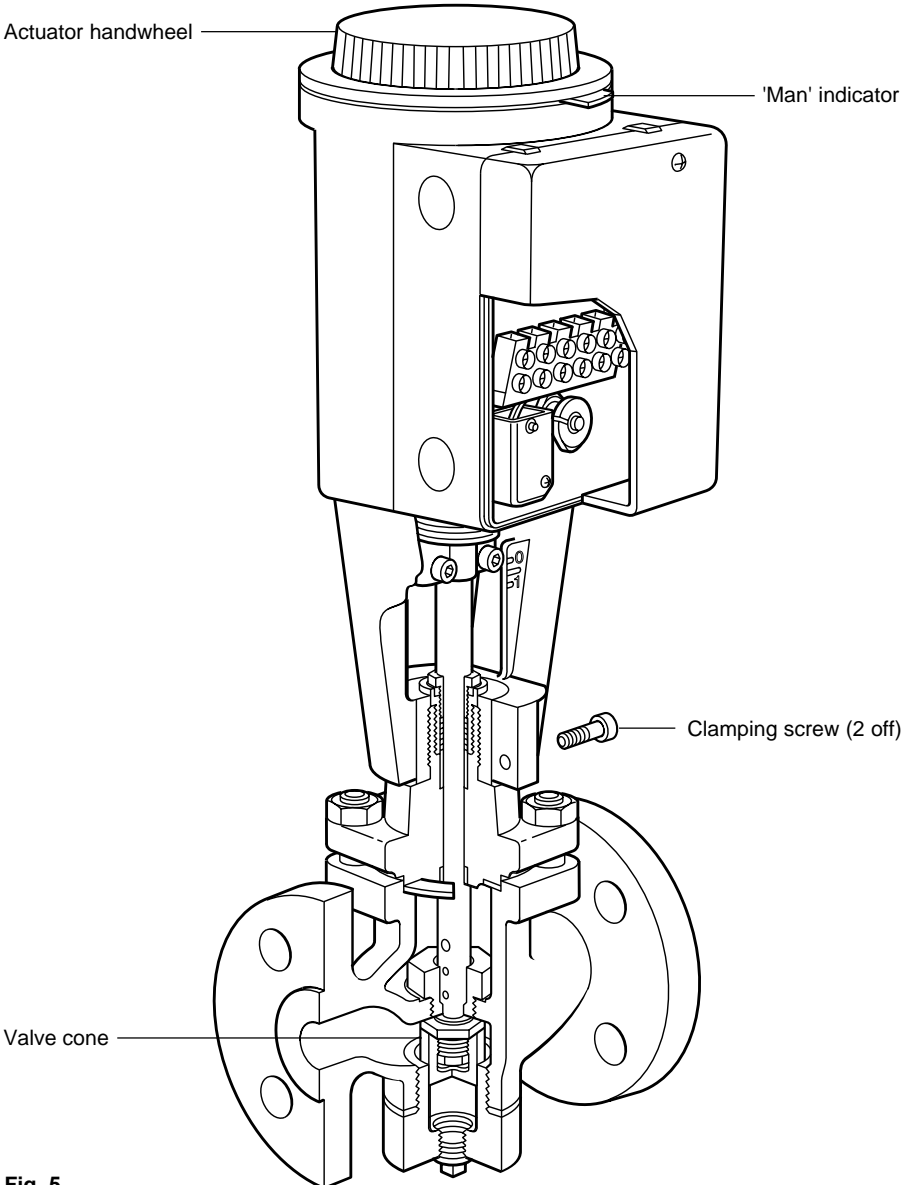


Fig. 5



# 7. Wiring

All wiring materials and methods shall comply with relevant EN and IEC standards where applicable. For installations in the US and Canada, the controller and valve must be wired in accordance with the Local and National Electrical Code (NEC) or the Canadian Electrical Code (CEC).

Check the actuator label to ensure the operating voltage is correct for the mains supply.

**Suitable ac voltages are:-**

230 V version	195 V - 264 V
110 V version	96 V - 127 V
24 V version	19.2 V - 28 V
Frequency	50 - 60 Hz
Maximum power consumption	15 VA

Any suitable 3 core cable may be used.

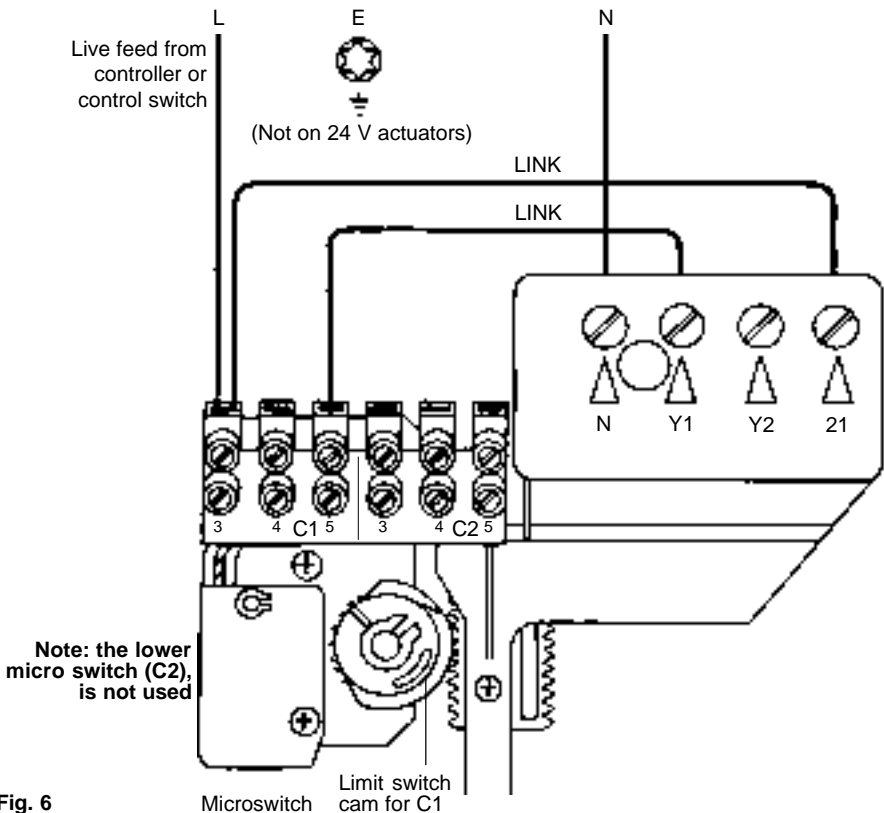
A conductor size of 1 mm<sup>2</sup> or 1.5 mm<sup>2</sup> is ideal.

Maximum conductor size 2 mm<sup>2</sup> (14 AWG) - 24 V version.

4 off Pg 11 (UL Listed ½" NPSM) size cable entries are provided.

Connect the wiring as shown in the diagram.

**Note:** 24 V actuators do not need to have an earth connection.



**Fig. 6**

# 8. Adjustment

## 8.1 Limit switch assembly

The BCV30 is supplied with a limit switch assembly already fitted, and adjusted to its low flowrate setting of 10 mm (0.4") stroke. For higher flowrates, the internal cam is adjusted to operate at 15 mm (0.6") or 20 mm (0.8") valve stroke to give the required blowdown valve capacity (see Table 1 below).

## 8.2 Adjustment - resetting the stroke

- Use Table 1 below to find the stroke setting which gives the required blowdown rate.
- Turn the actuator handwheel to set the valve to the required stroke (10 mm [0.4"], 15 mm [0.6"], or 20 mm [0.8"] only). **Do not select an intermediate stroke.**
- Turn the top limit switch cam (by hand or with a screwdriver in the curved slot) anticlockwise until the cam is not operating the top micro switch (C1).  
Note that the lower micro switch (C2), is not used.
- Turn the cam slowly clockwise until the top micro switch just operates (audible click).  
Confirmation of micro switch operation may be made with a continuity meter.  
When the switch operates, C1 terminals 3 and 5 will change from closed to open circuit, and terminals 3 and 4 will change from open to closed circuit.
- Turn the actuator handwheel fully anticlockwise so that the 'MAN' indicator is not showing.
- Replace the actuator cover, switch on the power supply, and confirm that the stroke is correct.  
Once set, the valve may be opened manually to temporarily increase the blowdown rate or to purge the system.

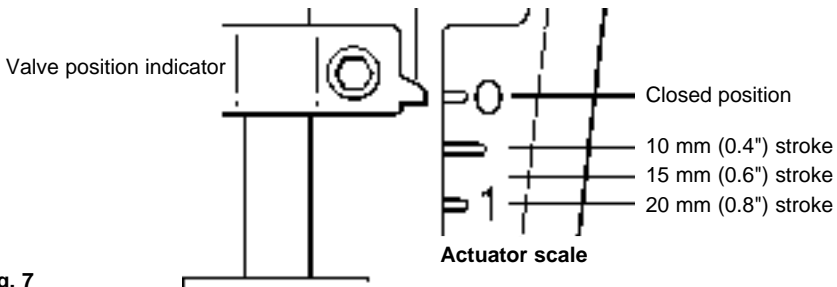


Fig. 7

Table 1 Blowdown valve capacities

Boiler pressure		Blowdown valve capacities					
		Low flowrates 10 mm (0.4") stroke		Medium flowrates 15 mm (0.6") stroke		High flowrates 20 mm (0.8") stroke	
bar g	psi g	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)
5.5	80	400	880	550	1 210	860	1 900
7.0	102	460	1 015	710	1 565	1 150	2 540
10.0	145	570	1 260	950	2 100	1 500	3 310
15.0	218	700	1 540	1 150	2 540	1 650	3 640
20.0	290	780	1 720	1 250	2 760	1 700	3 750
32.0	464	940	2 075	1 400	3 090	1 800	3 970

# 9. Maintenance

## 9.1 Materials

No.	Description
1	Actuator handwheel
2	Manual indicator
3	Seat
4	Washer (seat)
5	Valve cone
6	Cap
7	Stem
8	Wave spring
9	Gasket
13	Gasket
15	Plug
16	Gasket
20	Guide bush
22	Gasket
23	Plug 1/4" BSP
25	Clamping screw
26	Actuator (includes limit switch)
27	Limit switch assembly
40	Bottom support ring
41	Graphite stem seal set
42	Top support ring
43	Stuffing box
44	Gland nut

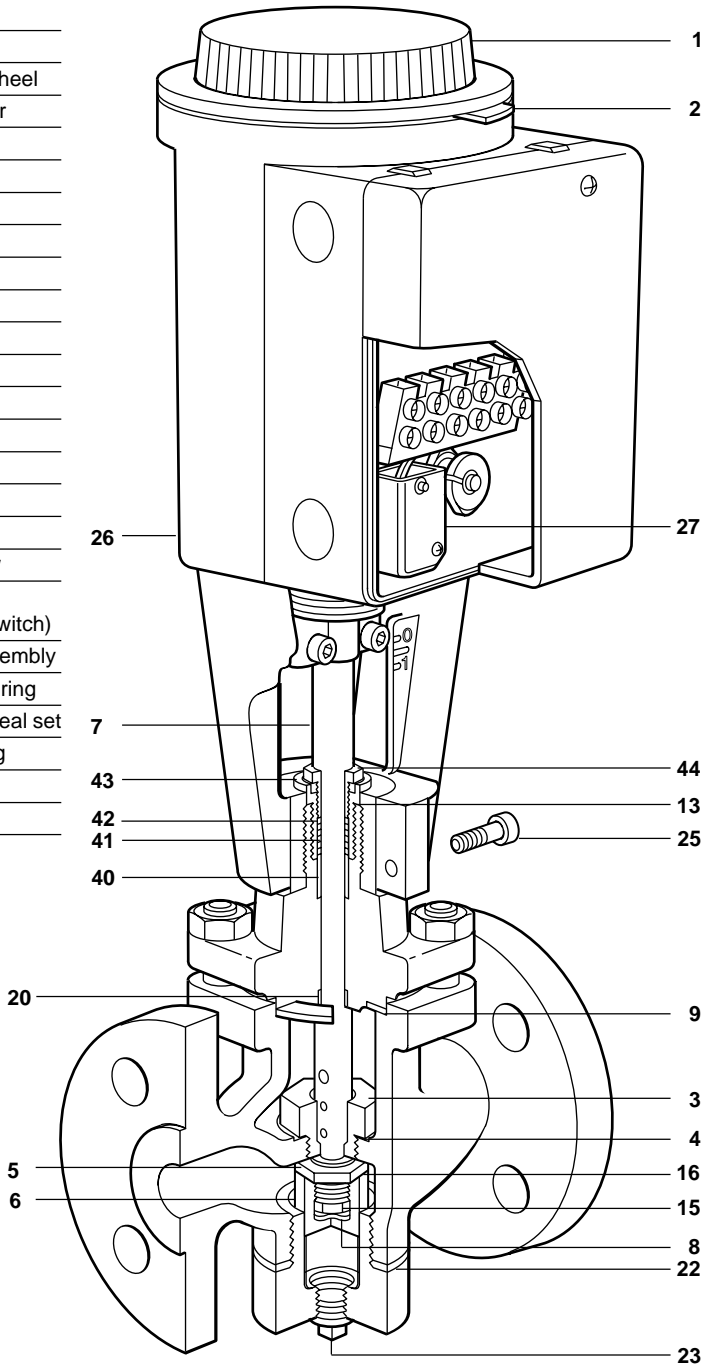


Fig. 8

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**No routine maintenance is required. The standard valve stem is sealed by packing rings which can be adjusted if any leakage should occur at the valve stem.**

## **9.2 To adjust:**

- Turn the adjustable gland nut (44) clockwise one flat (60°) at a time, then operate the valve several times. Repeat if still leaking.

## **9.3 To replace spring loaded PTFE chevron seals with an adjustable graphite packing ring set:**

- Remove the actuator.
- Remove and discard the existing stuffing box, PTFE chevron seals, guide bush, and spring (see inset in Fig. 9).
- Ensure the valve stem and bonnet are clean.

### **9.3.1 If the new seal set is supplied assembled into the stuffing box:**

- Fit the bottom support ring (40, see Fig. 9) over the valve stem and locate in the valve bonnet with its small diameter downwards.
- Fit the stuffing box gasket (13) to the stuffing box (43), and pass the stuffing box assembly over the valve stem (7).

**WARNING: Handle the gasket with care - it is fragile, and has a sharp reinforcement.**

- Screw the stuffing box into the valve bonnet and torque to 25 - 30 N m (18 - 22 lbf ft).
- Ensure the gland nut (44) is finger tight against the top support ring (42), then move the valve stem up and down over its full travel five or six times to bed in the packing rings.
- Tighten the gland nut by two flats (120°).
- Reassemble the actuator, pressurise the system, and operate the valve five or six times.
- Adjust the gland nut to stop any leaks.

### **9.3.2 If the new seal set is supplied as separate components:**

- Fit the top support ring (42), chamfer first, into the stuffing box (43). (See Fig. 9).
- Fit the five packing rings (41) into the stuffing box from below, so the thread in the top of the stuffing box cannot damage the rings. Ensure that the splits in the packing rings are staggered.  
**Tip:-** Use the bottom support ring (40) as a temporary tool to push the packing rings into place.
- Fit the bottom ring support over the valve stem (7) and locate in the valve bonnet with its small diameter downwards.
- Fit the gland nut (44), and tighten finger-tight only at this stage.
- Fit the stuffing box gasket (13) to the stuffing box, and pass the stuffing box assembly over the valve stem.

**WARNING: Handle the gasket with care - it is fragile, and has a sharp reinforcement.**

- Screw the stuffing box into the valve bonnet and torque to 25 - 30 N m (18 - 22 lbf ft).
- Move the valve stem up and down over its full travel five or six times to bed in the packing rings.
- Tighten the gland nut by two flats (120°).
- Reassemble the actuator, pressurise the system, and operate the valve five or six times.
- Adjust the gland nut to stop any leaks.

## **9.4 Replacing the valve seat:**

- When replacing the valve seat (3), it will be necessary to fit a guide bush (20) into the valve bonnet if one is not already fitted.
- The bush is a press fit - fit with chamfered end first.
- It is recommended that a suitable press is used to insert the bush flush into the bonnet.  
**Note: to avoid damage, the bush must not be hammered.**
- A guide bush is included in the 'Valve cone, seat and stem spares set' (see Section 10).

# 10. Spare parts

## Spare parts

A gasket and packing set, and a valve cone and stem set are available.

An adjustable stuffing box kit is also available, enabling a valve with spring loaded PTFE seals to be converted to the adjustable graphite seal system.\*

The spare parts are available as indicated below. No other parts are available as spares.

### Available spares

<b>Gasket and packing set</b>	Stock No. 4034482	<b>4, 9, 13, 16, 22, 41</b>
<b>Valve cone, seat and stem set</b>	Stock No. 4034483	<b>3, 5, 6, 7, 8, 15, 16, 20 + Gasket and packing set</b>

**Note:** Stem (7) is supplied with plug (15) tightened to a specific torque (14 N m). Do not loosen as it is a safety critical item.

<b>Adjustable stuffing box kit</b>	Stock No. 4034484	<b>40, 42, 43, 44 + Gasket and packing set</b>
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\* **Note:** The adjustable graphite seal system is not currently approved for use on the UL Listed valve.

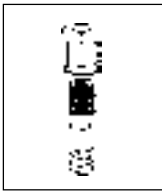
<b>Actuator with limit switch assembly</b> (see Fig. 8)	115 V	Stock No. 4034466	<b>26</b>
	230 V	Stock No. 4034467	<b>26</b>
	24 V	Stock No. 4034468	<b>26</b>

<b>Actuator limit switch assembly</b> (see Fig. 8)	Stock No. 4034419	<b>27</b>
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### How to order spares

Always order spares by using the description given in the Table above and state the size and flange type of the blowdown control valve.

**Example:** 1 - Gasket and packing set Stock No. 4034482, for Spirax Sarco BCV30 blowdown control valve flanged BS 4504 PN40.



UL Listed valve sealing arrangement

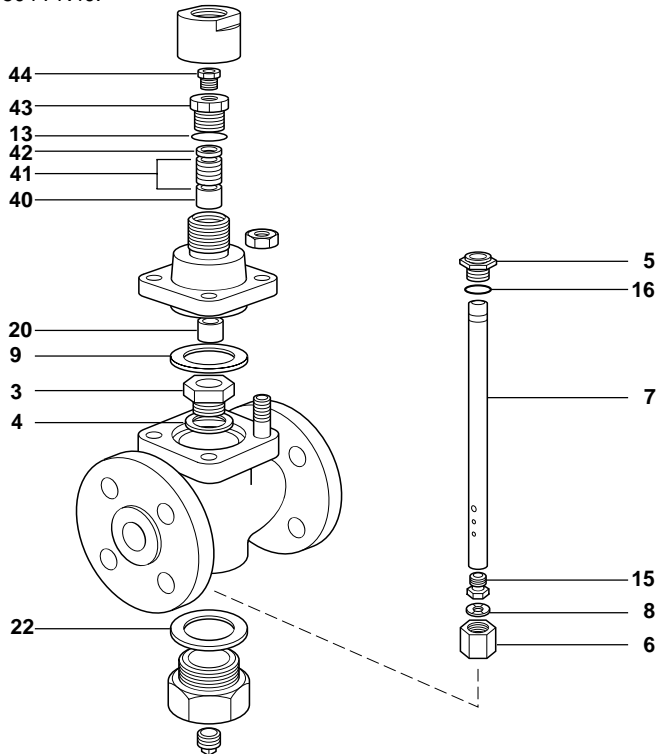


Fig. 9





