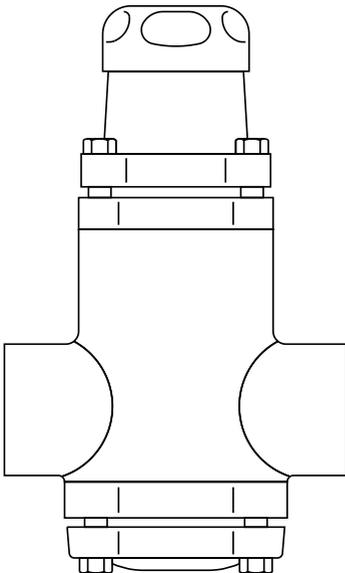


BRV71 and BRV73
Pressure Reducing Valves
Installation and Maintenance Instructions



1. *Safety information*
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3. *Installation*
4. *Start-up and adjustment*
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1. Safety information

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) 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

If the valve has been subject to steam temperatures then the pressure adjustment knob will be hot and protective gloves should be worn before making any adjustments to the valve.

Do not attempt to dismantle the valve without first releasing the compression on the control spring by winding the adjustment knob anticlockwise.

Care should be exercised when handling gaskets since the stainless steel reinforcing strip can easily inflict cuts.

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 comply with the requirements of the European Pressure Equipment Directive 97/23/EC and fall within category 'SEP'. It should be noted that products within this category are required by the Directive not to carry the CE mark.

- i) The products have been specifically designed for use on steam, compressed air and inert industrial gases 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 and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

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 and consider whether protective clothing (including safety glasses) is required. Please see Section 1.15 regarding the disposal of components using PTFE at a temperature of 260°C or higher.

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.

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.

PTFE components

Within its working temperature range PTFE is a completely inert material, but when heated to its sintering temperature it gives rise to gaseous decomposition products or fumes which can produce unpleasant side effects if inhaled. Smoking should be prohibited in workshops where PTFE is handled because tobacco contaminated with PTFE will give rise to polymer fumes when burnt. It is therefore important to avoid contamination of clothing, especially the pockets, with PTFE and to maintain a reasonable standard of cleanliness by washing hands and removing PTFE particles lodged under the fingernails.

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 210°C.

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

This product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken, except:

PTFE components:

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

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. General product information —

The BRV7 is a robust direct acting pressure reducing valve designed for use on steam, air and inert industrial type gases. The valve is available in four nominal sizes; DN25, DN32, DN40 and DN50, and is constructed in SG iron with stainless steel internals.

Two versions are available:

BRV71 Screwed BSP or NPT connections

BRV73 Flanged PN16, ANSI 150 or JIS 10 connections

In operation the valve will modulate as a result of a downstream pressure signal fed through the sensing orifice in the valve stem. This pressure acts on the control bellows generating a force which is balanced by the compressed control spring. The internal forces generated as a result of both upstream and downstream pressures acting on the area of the valve head are minimised by use of a balancing bellows. A graphite reinforced PTFE bush incorporated in both the pushrod / balancing bellows assembly and the bottom cap assembly provides two point guiding.

The maximum upstream pressure is 10 bar and it is recommended that the pressure turndown is limited to about 10:1.

The BRV71 and BRV73 are supplied with one of three colour coded springs:

Grey	for pressure control	0.14 to 1.7 bar g
Green	for pressure control	1.40 to 4.0 bar g
Orange	for pressure control	3.50 to 9.0 bar g

This information is located on the adjustment knob. Check that the BRV71 or BRV73 which has been supplied has the correct spring for your application.

3. Installation

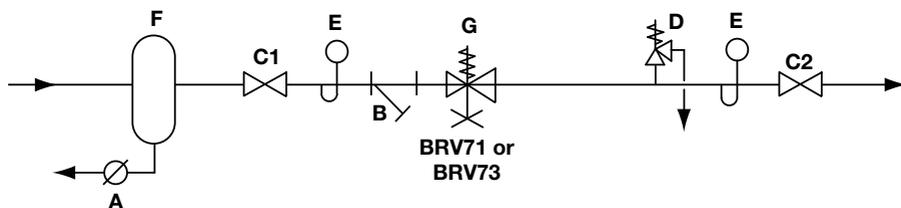
Isolation valves, upstream and downstream, should be installed with a clear run of 8 - 10 pipe diameters on either side of the BRV71 or BRV73.

It is important that line stresses, caused by expansion or inadequate pipe support, are not imposed on the valve body.

Upstream and downstream piping must be of ample size to avoid undue pressure drop. Any reduction in line size should be made using eccentric reducers.

Fitting a strainer on the upstream side will give additional protection to the valve. Install the strainer on its side to prevent the body filling with water, which will reduce the effective screening area. If the steam supply is wet a separator / trap set should be installed upstream.

Alternatively, an adequate drain pocket and trap should be fitted (ancillary products are available from Spirax Sarco). A pressure gauge is essential on the downstream pipework to allow setting of the valve, a gauge on the upstream side of the valve is also recommended if practicable to check supply pressure. An adequately sized Spirax Sarco safety valve may be necessary to protect the downstream system. It is important to ensure that there is sufficient difference between the no-load set pressure of the BRV71 or BRV73 and the reseal pressure of the safety valve (if one is fitted) to prevent nuisance operation.



Recommended installation

- A Steam trap
- B Strainer
- C Isolating valve
- D Safety valve
- E Pressure gauge
- F Separator
- G BRV71 or BRV73

Fig. 1

Note: If you experience difficulty with the installation or operation of this equipment please contact our nearest company or sales office.

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4. Start-up and adjustment

Before commissioning the BRV71 or BRV73, all pipework should be thoroughly 'blown through' to remove dirt, surplus jointing material, etc.

Pressure adjustment is made by turning the adjustment knob clockwise to increase pressure and anticlockwise to reduce pressure. With the upstream stop valve fully open and the downstream stop valve closed, slowly increase the downstream pressure by turning the adjustment handwheel/knob clockwise until the desired pressure, (shown on the downstream pressure gauge) is achieved.

Slowly open the downstream stop valve. Under normal flow condition, the reduced pressure setting will fall slightly. If required the pressure setting can be increased by readjusting the BRV71 or BRV73 control. There will be a slight increase in set pressure under no-load conditions.

To make the BRV71 or BRV73 tamper-proof

1. When the required set pressure has been achieved, lift out the coloured (grey, green or orange) adjustment knob insert. This is carried out by inserting a small screwdriver blade under the edge of the insert.
2. A small loose pin will be found in the recess in the adjustment knob.
3. This pin is inserted into the locking hole 'A', and into one of a ring of 10 matching holes in the top of the spring housing.

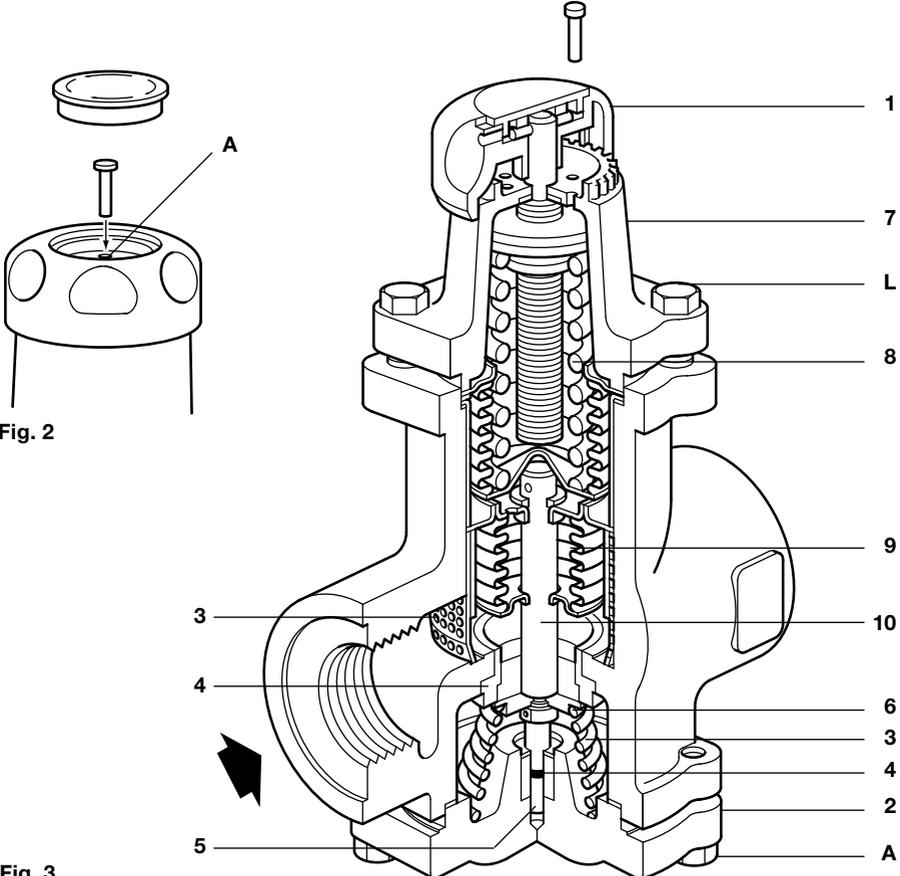


Fig. 3

5. Maintenance

The valve and valve seat must be kept clean.

Any strainer fitted upstream of the BRV71 or BRV73 and the strainer screen fitted inside the valve should be cleaned regularly so that the flow to the valve is not restricted.

Dismantling and reassembly instructions (Refer to Figure 3)

1. Be sure that the adjustment knob (1) is backed off properly and the valve is fully isolated. Gradually loosen the 4 x 17 mm A / F hex head screws from the bottom cap (2) and carefully remove the return spring (3) and gasket. The return spring will be under compression. Tools required: 17 mm A / F socket.
2. Carefully remove the 'O' ring (4) from the lower pushrod (5).
3. Unscrew the lower pushrod and carefully remove the valve head (6). Tools required: 15 mm A / F spanner.
4. Remainder of the work can now be carried out from the top of the valve by loosening and removing the 4 x 13 mm A / F hex head screws. Tools required: 13 mm A / F socket.
5. Remove the spring housing (7) and control spring (8).
6. Remove control bellows (9), gasket, balancing bellows/pushrod assembly (10) and gasket.
7. The internal strainer (11) can then be removed.
8. **Note:** The valve seat is permanently fitted into the body and should be wiped clean before the valve is rebuilt. If the seat is damaged then the valve should be replaced.

Reassembly

1. Ensure the screen is clean, then load, taper face downwards with joint of screen facing away from the inlet port.
2. Fit gasket to body.
3. Fit bellows and pushrod assembly with pushrod facing downwards.
4. Fit gasket and bellows assembly (control bellows).
5. Place control spring on to bellows assembly.
6. Locate spring housing on to body, ensuring that the flange profile matches the body flange profile.
7. Fit 4 x 13 mm A / F hex head screws and torque tighten to 18 / 24 N m. Tools required: 13 mm A / F socket and torque wrench.
8. Ensuring that the 'O' ring is fitted inside the valve head and the head recess is facing away from the hex shoulder on the lower pushrod, locate the lower pushrod into pushrod / bellows assembly. The internal thread of the pushrod / balancing bellows assembly has a self-locking feature. The lower pushrod should be screwed fully in to the shoulder and then backed off by ¼ turn to allow the valve head to articulate. Tools required: 15 mm A / F spanner.
9. Assemble the 'O' ring into the groove on the lower pushrod.
10. Load gasket to body.
11. Locate return spring into valve head.
12. Locate return spring into cap, ensuring correct orientation of cap profile to body is observed.
13. Compress spring by pressing cap to body and locate 2 of the 4 x 17 mm A / F hex head screws to secure cap.
14. Add the last 2 screws and torque tighten all 4 x 17 mm A / F hex head screws to 20 / 26 N m. Tools required: 17 mm A / F socket and torque wrench.

Once free and easy adjustment is checked, the valve can now be recommissioned.

Recommended tightening torques

L	Spring housing hexagon bolts	18 / 24 N m
A	End cap hexagonal bolts	20 / 26 N m

6. Spare parts

Spare parts

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

Note: the available spares are common to all sizes.

Available spares

	Grey	0.14 to 1.7 bar g	K, Q
Control spring	Green	1.40 to 4.0 bar g	K, Q
	Orange	3.50 to 9.0 bar g	K, Q
Control bellows	Stainless steel		J
Bellows / pushrod assembly			E, C, H
(Which includes valve head (E) and 'O' rings, lower pushrod (C) and PTFE washer)			
Bottom cap			B
Strainer screen			G
Return spring and gasket set			F
Bolt set	Spring housing	(set of 4)	L
	Bottom cap	(set of 4)	A
Return spring			D

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size, type and pressure range of the reducing valve.

Example - Pressure control spring having a pressure range of 3.5 to 9 bar g (orange) for DN25 Spirax Sarco Type BRV73 pressure reducing valve.

How to fit spares

Before carrying out any work on the valve make sure that it is fully isolated.

