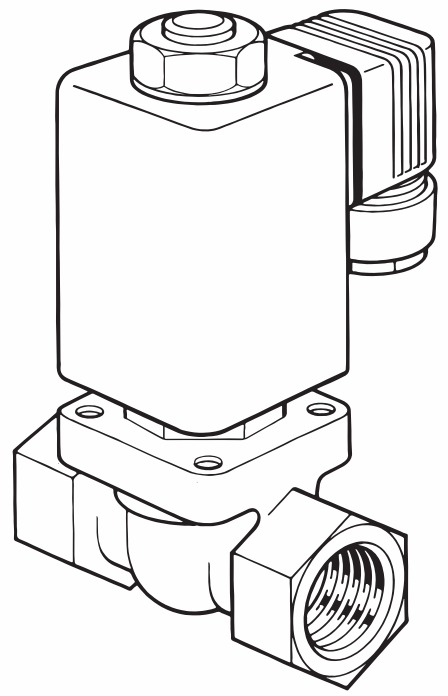
BCV1 and BCV20
Blowdown Valves

Installation and Maintenance Instructions



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Printed in GB

1. Safety information

Pressure equipment not bearing the CE mark is classified 'Sound Engineering Practice' in accordance with Article 3, Paragraph 3 of the Pressure Equipment Directive (PED). It is the responsibility of the user to ensure that the product is installed and operated safely. Detailed product information including installation, operation and maintenance instructions can be obtained from www.SpiraxSarco.com or by contacting your local Spirax Sarco sales office.

Note: By law, SEP products cannot be marked with the CE symbol.

The product is designed and constructed to withstand the forces encountered during normal use. Use of the product other than as a blowdown valve could cause damage to the product and may cause injury or fatality to personnel. This product contains materials including PTFE that can give off toxic fumes if exposed to excessive heat.
Do not install the valve outdoors without additional weather protection.

Warning

This product complies with the requirements of Electromagnetic Compatibility Directive 89/336/EEC by meeting the standards of:

- **BS EN 50081-1 (Emissions) and**
- **BS EN 50082-2 (Industrial Immunity).**
  The product may be exposed to interference above the limits of BS EN 50082-2 if:
- **The product or its wiring is located near a radio transmitter.**
- **Excessive electrical noise occurs on the mains supply.**

Cellular telephones and mobile radios may cause interference if used within approximately 1 metre (39") of the product or its wiring. The actual separation distance necessary will vary according to the surroundings of the installation and the power of the transmitter.

Power line protectors (ac) should be installed if mains supply noise is likely. Protectors can combine filtering, suppression, surge and spike arrestors.

Warning

If this product is not used in the manner specified by this IMI, then the protection provided may be impaired.

1.1 Intended use

i) Check that the product is suitable for use with the intended fluid.

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.

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

1.2 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.

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.
Many products are not self-draining. Take due care when dismantling or removing the product from an installation.

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. General product information

2.1 Description

The BCV1 and BCV20 valves are small bore, normally closed valves with a brass body and corrosion resistant internal components. They are primarily intended for low and medium pressure boiler blowdown applications. These valves are identical apart from the orifice size, the BCV1 having a 3 mm (⅛") orifice and the BCV20 a 6 mm (¼") orifice. Both valves are supplied complete with a mains connector, which is protected to IP65 and is suitable for 3 x 1 mm² (18 AWG) cable.

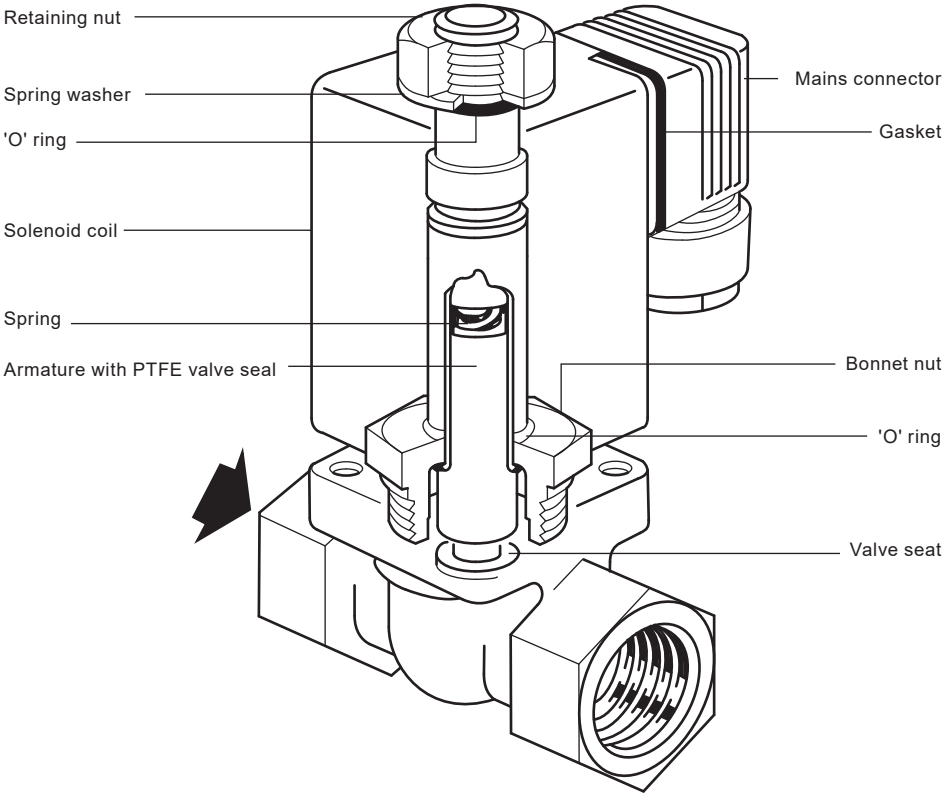

Fig. 1

3. Technical data

3.1 Available sizes and pipe connections

½" screwed	BSP - 230 V version
	BSP - 110 V version
	NPT - 120 V version

3.2 Limiting conditions

BCV1

Maximum boiler or steam pressure	14 bar g (203 psi g) (Intermittent operation)
Medium temperature range	-40 to +200 °C (-40 to +392 °F)
Medium	Water and steam
Maximum ambient temperature	55 °C (130 °F)

BCV20

Maximum boiler or steam pressure	4 bar g (58 psi g)
Medium temperature range	-40 to +180 °C (-40 to +356 °F)
Medium	Water and steam
Maximum ambient temperature	55 °C (130 °F)

3.3 Response times (ms)

BCV1	**Closing**	20 - 30	**BCV20**	**Closing**	20 - 30
	Opening	10 - 20		**Opening**	10 - 20

3.4 Electrical data

230 V version	207 V to 253 V
110 V version	99 V to 121 V
120 V version	108 V to 132 V
Frequency	50 - 60 Hz
Maximum power consumption	40 VA (inrush)
	16 VA/12 W (hold)
Protection rating	IP65 (Nema 4)

3.5 Materials

Body	Brass
Soft seal	PTFE
Internal components	Stainless steel

3.6 Capacities

Model	BCV1	BCV20
Orifice size	3 mm (⅛")	6 mm (¼")
Kv value	0.25	0.8

For conversion
C_v (UK) = K_v x 0.97
C_v (US) = K_v x 1.17

When used for boiler blowdown purposes, the valve will be controlling a mixture of water and flash steam, so the following capacity table applies:-

Boiler pressure bar g (psi g)	Capacity kg/ h (lb/ h)	
1 (14.5)	**175** (385)	**560** (1232)
2 (29)	**250** (550)	**790** (1738)
4 (58)	**350** (770)	**1120** (2464)
6 (87)	**385** (847)	-
8 (116)	**445** (979)	-
10 (145)	**495** (1089)	-
14 (203)	**590** (1298)	-

When the BCV20 valve is used as part of the BCS2 blowdown control system, downstream of a steam trap, the following capacity table applies:-

Head across valve m (ft)	Cold water capacity kg/h (lb/h)	Hot water capacity with flash steam kg/h (lb/h)
1 (3)	**253** (557)	**63** (138)
2 (6)	**358** (787)	**90** (198)
3 (9)	**438** (963)	**110** (242)
5 (15)	**566** (1245)	**142** (312)
10 (30)	**800** (1760)	**200** (440)

4. Mechanical installation

Observe the permissible pressure ranges given on the valve label.

Before installing the valve ensure pipeline etc. is free of foreign matter (e.g. metal fillings, seal materials, welding scale etc.)

A strainer should be fitted upstream of the valve. The valve should be fitted with the flow in the direction of the arrow, in a horizontal plane. The solenoid should be above the valve body (prevents foreign material accumulating around the armature tube and reducing product life).

Do not over-tighten screws, nuts, or pipework as this could damage the valve body.

The valve can be installed without a separate support in the pipeline or can be attached by means of two support holes of 7 mm diameter. Support and align pipelines sufficiently to prevent strain on the valve bodies.

Caution: When screwing the pipeline connections, **do not** use the solenoid as a lever. Threads should be sealed using PTFE tape.

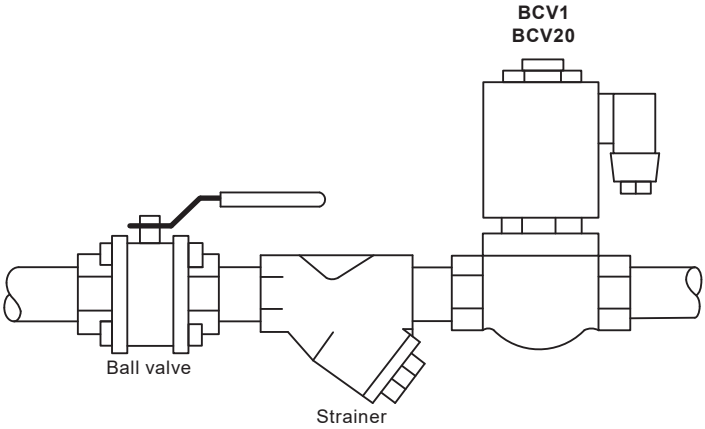

Fig. 2

5. Electrical 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 solenoid label to ensure the operating voltage is correct for the mains supply.

Suitable ac voltages are:

230 V version	207 V to 253 V
110 V version	99 V to 121 V
120 V version	108 V to 132 V
Frequency	50 - 60 Hz
Maximum power consumption	40 VA (inrush)
	16 VA/12 W (hold)
Protection rating	IP65 (Nema 4)

Caution: Do not apply power to the coil unless it is fitted to the valve. For ease of installation, the solenoid coil can be moved through 360 °C by slackening the solenoid nut.

Wiring should be carried out using suitable 3 core, 1 mm2 (18 AWG) high temperature (90 °C minimum) cable.

Ensure that sufficient cable length is provided to allow removal of the cable socket and to ensure that no strain is placed on the unit.

The cable socket for the standard valve is fitted with a Pg 16 cable gland.

Caution: Care must be taken to ensure that any condensation, which might build up in the conduit network, is prevented from accumulating in the valve cable socket.

To unplug the cable socket, remove the central screw.

To gain access to the connector block within the cable socket for the standard valve, remove the plastic internal central screw and withdraw the connector block.

The connector block maybe rotated in 90° steps to facilitate wiring.
Electrical connection must be made before the socket and the gasket is fitted to the valve. Flat terminal = Earth connection.

Note: - To provide environmental protection the valve is supplied with a gasket between the cable socket and the valve connector. To maintain environmental integrity, ensure gasket is always present when reconnecting cable socket and contact surfaces are undamaged and are clean.

The tightening torque for the cable plug central retaining screw is 1 N m.

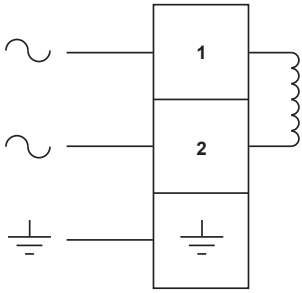

Fig. 3 Wiring diagram

6. Maintenance

If it becomes necessary to dismantle the valve, proceed as follows:-

1. Disconnect the mains supply.
2. Remove retaining nut and washer and withdraw solenoid coil.
3. Remove the bonnet nut and withdraw armature and spring.
4. Clean the valve and examine the seating surfaces for damage.
5. Replace the spring and armature if required.
6. Reassemble valve in the reverse order of dismantling.

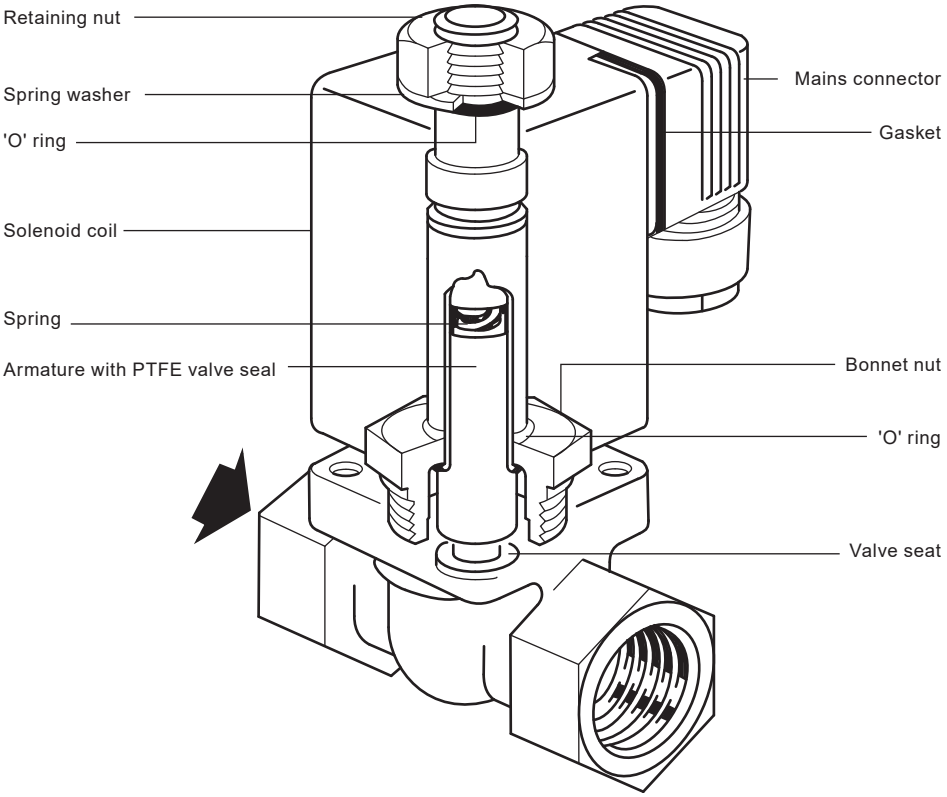

Fig. 4

7. Spare parts

The spare parts available are detailed below. No other parts are supplied as spares.

Available spares

Armature and spring set (kit).	Stock No. 4034080
Solenoid coil 230 V	Stock No. 4034081
Solenoid coil 110/120 V	Stock No. 4034082

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the valve type.

Example: 1 off Armature and spring set (Stock No. 4034080) for a Spirax Spirax BCV20 blowdown valve.