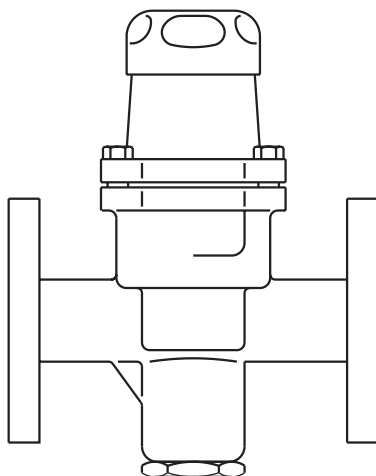


**SRV2S**

**Pressure Reducing Valve**  
**Installation and Maintenance Instructions**

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- 1. Safety information*
- 2. General  
product information*
- 3. Installation*
- 4. Maintenance*
- 5. Spare parts*
- 6. Fault finding*



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# *1. Safety information*

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Safe operation of this product can only be guaranteed if it is 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**

The bellows assembly gasket contains a thin stainless steel support ring which may cause physical injury if not handled and disposed of carefully.

## **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 product complies with the requirements of the European Pressure Equipment Directive 97/23/EC and falls 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 product has 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.

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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.

## **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.

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### **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 210°C (410°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. General product information —

### 2.1 Description

The SRV2S is a compact, stainless steel, direct acting pressure reducing valve designed for applications using steam or gases such as compressed air. All wetted parts are constructed in 316L stainless steel.

SRV2S pressure reducing valves are supplied with one of three colour coded springs which are identified by the disc (18) located on the adjustment handwheel (2):

<b>Grey</b>	For downstream pressure control: 0.14 to 1.7 bar g	(2.03 to 24.65 psi g)
<b>Green</b>	For downstream pressure control: 1.40 to 4.0 bar g	(20.30 to 58.00 psi g)
<b>Orange</b>	For downstream pressure control: 3.50 to 8.6 bar g	(50.75 to 124.70 psi g)

**Note:** Where control spring ranges overlap always use the lower range to give better control.

### Standards

This product fully complies with the requirements of the European Pressure Equipment Directive 97/23/EC.

### Certification

This product is available with certification to EN 10204 3.1. **Note:** All certification/inspection requirements must be stated at the time of order placement.

**Note:** For further product data see Technical Information Sheet, TI-P186-05.

### 2.2 Sizes and pipe connections

½", ¾" and 1" screwed BSP (BS 21 Rp) or NPT.

DN15, DN20 and DN25 Flanged EN 1092 PN25 and ANSI 150.

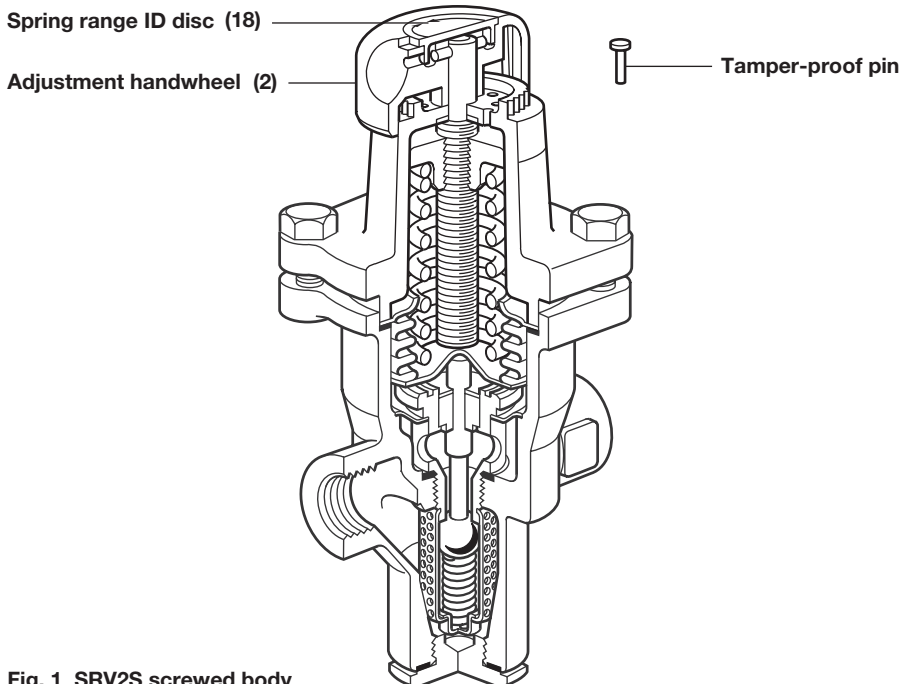
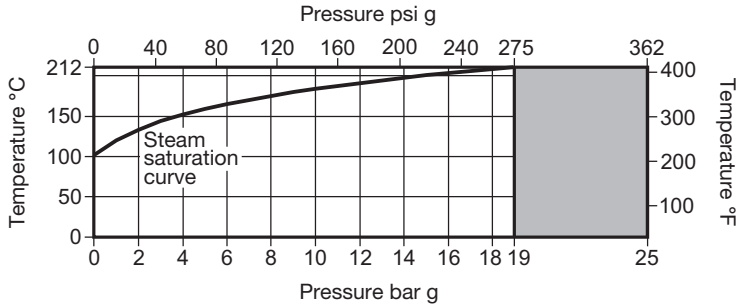



Fig. 1 SRV2S screwed body

### 2.3 Pressure/temperature limits



 The product **must not** be used in this region.

Body design conditions	PN25	
Maximum design pressure	25 bar g @ 120°C	(362 psi g @ 248°F)
Maximum design temperature	212°C @ 19 bar g	(413°F @ 275 psi g)
Minimum design temperature	0°C	(32°F)
Maximum operating pressure for saturated steam service	19 bar g	(275 psi g)
Maximum operating temperature	212°C @ 19 bar g	(413°F @ 275 psi g)
Minimum operating temperature	0°C	(32°F)
<b>Note:</b> For lower operating temperatures consult Spirax Sarco		
Maximum downstream reduced pressure	8.6 bar g	(125 psi g)
Maximum differential pressure	19 bar	(275 psi)
Maximum recommended turndown ratio 10:1 at maximum flow		
Designed for a maximum cold hydraulic test pressure of:	38 bar g	(551 psi g)
<b>Note:</b> With internals fitted, test pressure must not exceed:	19 bar g	(275 psi g)

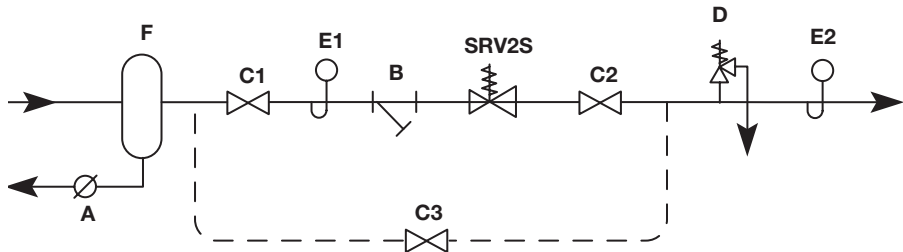
# 3. Installation

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

**Note:** If you experience difficulty with installation or operation of this equipment please contact:

**Spirax-Sarco Limited**, Charlton House, Cheltenham, Gloucestershire, GL53 8ER

Tel: +44 (0)1242 521361, Fax: +44 (0)1242 573342



- A Steam trap
- B Strainer
- C Isolating valve

- D Safety valve
- E Pressure gauge
- F Separator

**Fig. 2 Recommended installation**

## 3.1 General installation

Always install the SRV2S with the flow direction arrow (on the body) pointing downstream. The SRV2S pressure reducing valve is available as follows:

Screwed ½", ¾" and 1" BSP (BS 21 Rp) or

Flanged DN15, DN20 and DN25 EN 1092 PN25 and ANSI 150.

The Spirax Sarco SRV2S pressure reducing valve should always be fitted in a horizontal pipeline. The adjustment head may be above or below the valve.

Isolating valves should be installed, upstream and downstream of the SRV2S, with a clear run of 8 to 10 pipe diameters on either side.

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 a trap from the Spirax Sarco range should be fitted.

A pressure gauge is essential on the downstream pipework to allow setting of the operating pressure. It is an advantage to have a gauge on the upstream side of the valve, as well.

### Safety valve

A safety valve should be fitted to protect the downstream equipment from excessive pressure (to meet local standards). It should be set to lift below the safe working pressure of the downstream equipment, and will normally be sized to pass the full capacity of the SRV2S should it fail in the fully open position. The safety valve set pressure should take account of its reseal characteristic and the 'No-load' pressure setting of the SRV2S. Discharge pipework should be taken to a safe place.



### 3.2 Start-up and adjustment for the SRV2S

Before final installation, all pipework should be thoroughly 'blown through' to remove dirt, surplus jointing material, etc.

Pressure adjustment is made by turning the adjustment handwheel 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 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, but will control under 'dead end' conditions. If required the pressure setting can be increased by readjusting the SRV2S control. There will be a slight increase in set pressure under 'No-load' conditions.

### 3.3 How to make the SRV2S tamper-proof:

- When the required set pressure has been achieved, lift out the coloured spring range ID disc (grey, green or orange) from the adjustment handwheel recess. This is carried out by inserting a small screwdriver blade under the edge of the ID disc.
- A small loose pin will be found in the recess in the adjustment handwheel.
- This tamper-proof 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. The SRV2S is now tamper-proof.
- Replace the coloured spring range ID disc firmly into the recess of the adjustment handwheel.

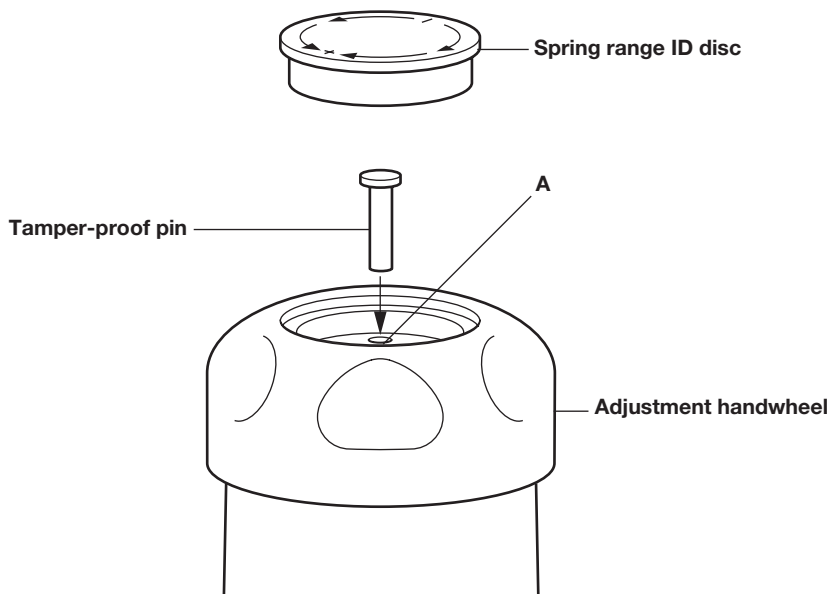


Fig. 3

# 4. Maintenance

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

## Warning

The bellows assembly gasket contains a thin stainless steel support ring which may cause physical injury if not handled and disposed of carefully.

### 4.1 General information

Refer to Fig 4 (page 7) for view of parts.

The valve and valve seat must be kept clean.

Any strainer fitted upstream of the SRV2S and strainer screen (15) fitted inside the SRV2S should be cleaned regularly so that the flow to the valve is not restricted.

The internal strainer is part of the valve seat assembly. This may be withdrawn by removing the spring housing (1) and bellows assembly and unscrewing the valve assembly, using a 32 mm A/F spanner.

### 4.2 How to fit a new valve and seat or clean the strainer screen:

- i. Release the adjustment spring pressure by turning the adjustment handwheel (2) fully anticlockwise.
- ii. Remove the spring housing by undoing the 4 spring housing bolts (7) using 13 mm A/F spanner.
- iii. Lift out the bellows assembly (5) and the gasket (6).
- iv. Using a 32 mm A/F spanner, unscrew the valve seat (11) and remove the valve, the return spring, the strainer screen, the pushrod and the guide bush.
- v. Clean the strainer screen (15) or replace with a new valve and seat assembly. **Note:** the valve and seat assembly incorporates the strainer screen.
- vi. Reassemble in the reverse order, using new gaskets, ensuring that the components and seating faces are clean.
- vii. Tighten the valve seat (11) to the following torque 162 - 198 N m (119 - 146 lbf ft).
- viii. Tighten the spring housing bolts (7) to the following torque 18 - 24 N m (13 - 18 lbf ft).

### 4.3 How to fit the new bellows:

Follow Steps i to iii, Section 4.2, then proceed as follows:

- ix. Replace the bellows gasket and assembly, adjustment spring and the spring housing, and tighten the spring housing bolts (7) to the following torque 18 - 24 N m (13 - 18 lbf ft).

### 4.4 How to fit a replacement pressure adjustment spring:

Follow Steps i and ii, Section 4.2, then proceed as follows:



- x. Replace the spring (4) and bonnet assembly and tighten the spring housing bolts (7) to the following torque 18 - 24 N m (13 - 18 lbf ft).
- xi. Lift out the spring identification disc (18) and press in a new disc (if spring range has been changed).

### 4.5

- xii. The lower body section can be cleaned internally by removing the bottom cap (16).

- xiii. Replace the 'O' ring (13) and retighten the bottom cap (16) to the required torque.

**Table 1 Recommended tightening torques**

Item No.	Part	 or  mm	N m	(lbf ft)
7	Hex. bolts	13 A/F	18 - 24	(13 - 18)
11	Valve seat	32 A/F	162 - 198	(119 - 146)
16	Bottom cap	32 A/F	115 - 125	(85 - 93)

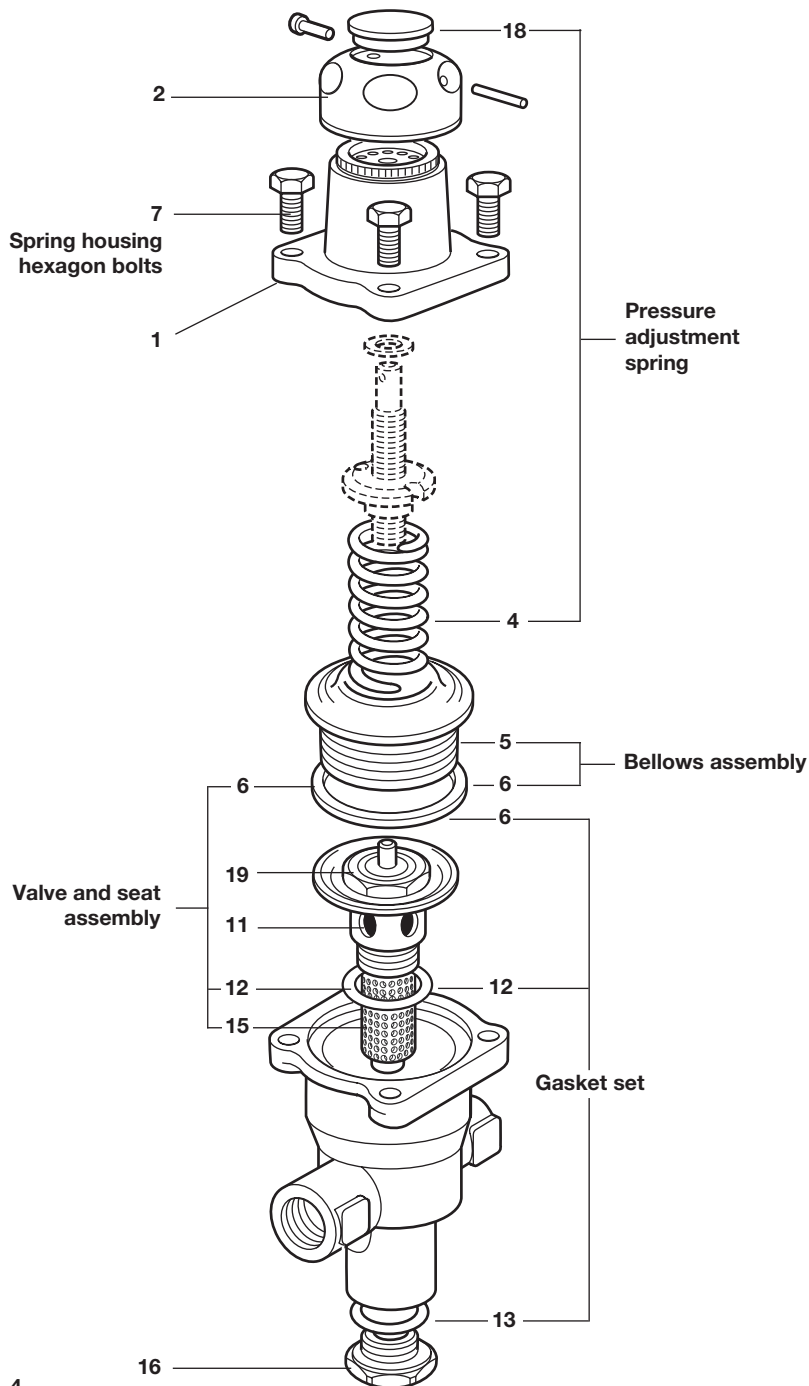


Fig. 4

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## 5. Spare parts

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

### Available spares

	Grey	0.14 to 1.7 bar g	<b>4, 18</b>
* Pressure adjustment spring	Green	1.40 to 4.0 bar g	<b>4, 18</b>
	Orange	3.50 to 8.6 bar g	<b>4, 18</b>
* Bellows (stainless steel)			<b>5, 6</b>
* Spring housing hex. bolts (set of 4)			<b>7</b>
Valve and seat assembly			<b>6, 11, 12, 15, 19</b>
* Set of gaskets/'O' ring			<b>6, 12, 13</b>
* Common to all sizes.			

### 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:** 1 off Spirax Sarco pressure adjustment spring, having a downstream pressure range of 3.5 to 8.6 bar g (orange) for a DN15 type SRV2S pressure reducing valve.

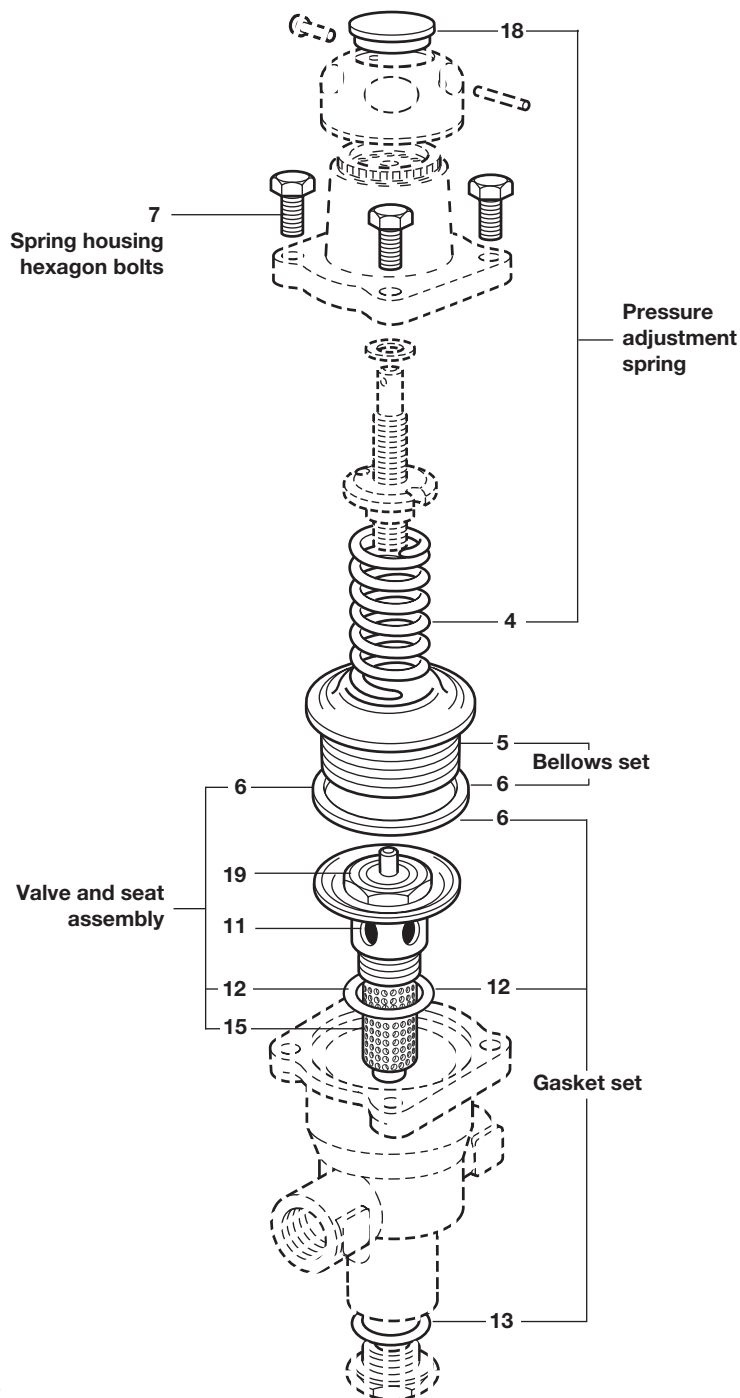


Fig. 5

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## 6. *Fault finding*

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Before investigating any fault ensure that both upstream and downstream isolating valves are shut off and that the SRV2S is vented.

SYMPTOM	
Downstream pressure increases above set pressure.	
CAUSE 1	Bellows failure or bellows leakage.
CHECK and CURE	Replace bellows set. Check valve is not subject to rapid oscillation causing bellows fatigue failure.
CAUSE 2	Damage or erosion to valve seat.
CHECK and CURE	Replace valve and seat assembly.
CAUSE 3	Excessive dirt /scale build up on seat and head, blocked pressure sensing orifice/sticking pushrod.
CHECK and CURE	Replace valve and seat assembly.
SYMPTOM	
Downstream pressure is below set pressure under full load conditions.	
CAUSE 4	Valve was set at 'No-load'.
CHECK and CURE	Reset at full load (Refer to start-up and adjustment, Section 3).
CAUSE 5	Valve is undersized for required duty.
CHECK and CURE	Check maximum installed load and valve size selected and installed.
SYMPTOM	
Adjustment knob will not turn.	
CAUSE 6	Tamper-proof pin is preventing adjustment.
CHECK and CURE	Remove pin from cap.
SYMPTOM	
Hunting /unstable control.	
CAUSE 7	Wet steam.
CHECK and CURE	Ensure lines are properly trapped, install separator if necessary.
CAUSE 8	Externally transmitted signals.
CHECK and CURE	Check proximity of valve to other associated control equipment e.g. on /off valves.
CAUSE 9	Sticking pushrod due to dirt /scale build up.
CHECK and CURE	Replace valve and seat assembly.



