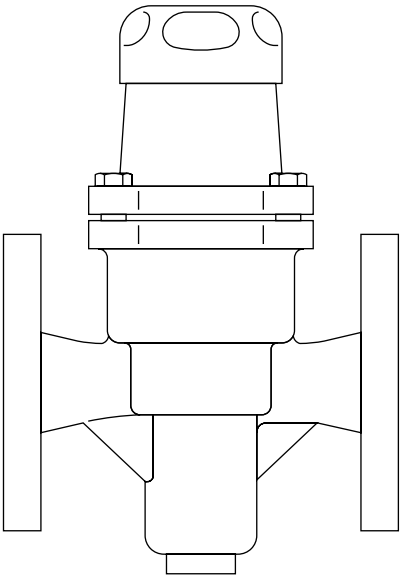
IM-P045-10
CH Issue 8

spirax sarco

BRV2
Pressure Reducing Valve
Installation and Maintenance Instructions



1. General safety information

2. General product information

3. Installation

4. Maintenance

5. Spare parts

6. Fault finding

1. General safety information

Safe operation of the unit can only be guaranteed if it is properly installed, commissioned and maintained by a qualified person (see Section 11 of the attached Supplementary Safety Information) 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.

Isolation

Consider whether closing isolating valves will put any other part of the system or personnel at risk. Dangers might include; isolation of vents and protective devices or alarms. Ensure isolation valves are turned off in a gradual way to avoid system shocks.

Pressure

Before attempting any maintenance consider what is or may have been in the pipeline. Ensure that any pressure is isolated and safely vented to atmospheric pressure before attempting to maintain the product, this is easily achieved by fitting Spirax Sarco depressurisation valves type DV (see separate literature for details). Do not assume that the system is depressurised even when a pressure gauge indicates zero.

Temperature

Allow time for temperature to normalise after isolation to avoid the danger of burns and consider whether protective clothing (including safety glasses) is required.

Disposal

The product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken.

2. General product information

The BRV2 is a direct acting pressure reducing valve suitable for steam, or gases such as compressed air with a maximum upstream pressure of 19 bar g (275.5 psi g).

Available types

BRV2	Screwed with SG iron body.
	Flanged with SG iron body.
BRV2S	With stainless steel bellows assembly.
BRV2B	With phosphor bronze / brass bellows assembly.
BRV2SP	Optional types with external pressure sensing.
BRV2BP	Optional types with external pressure sensing.

The Spirax Sarco BRV2 is supplied with one of three colour coded springs:

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

This information can be found on the spring range ID disc located on the adjustment handwheel. Check that the BRV2 has the correct spring for your application.

Note:

For additional information see the following Technical Information Sheet TI-P045-14.

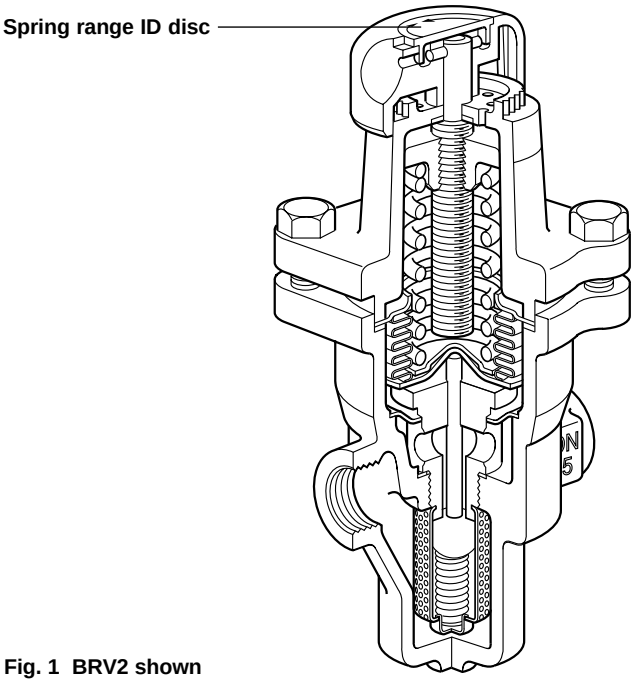


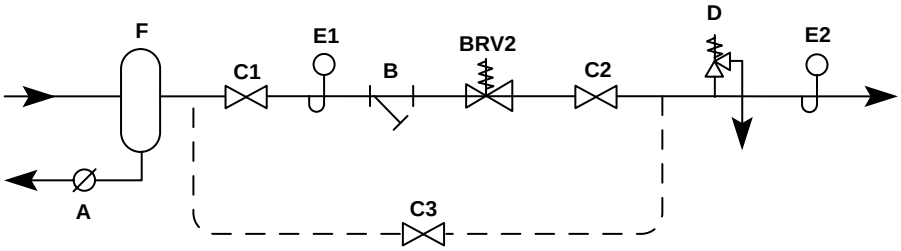
Fig. 1 BRV2 shown

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 BRV2 with the flow direction arrow (on the body) pointing downstream.
The BRV2 pressure reducing valve is available either screwed ½", ¾" and 1" BSP (BS 21 Rp) or flanged DN15, 20 and 25 BS 4504 PN25.
For installation recommendations for the BRV2SP or BRV2BP, using the external pressure sensing connection, see Section 3.4 and 3.5, pages 6 and 7.
The Spirax Sarco BRV2 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 BRV2, 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 (this may be a requisite to comply with Pressure System Requirements 1989-S12169-UK only, or 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 BRV2 should it fail in the fully open position. The safety valve set pressure should take account of its reseat characteristic and the 'No-load' pressure setting of the BRV2. Discharge pipework should be taken to a safe place.

3.2 Start-up and adjustment for the BRV2

(See Section 3.5 for the Start-up and adjustment of the BRV2SP and BRV2P)

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 BRV2 control. There will be a slight increase in set pressure under 'No-load' conditions.

3.3 How to make the BRV2 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 BRV2 is now tamper-proof.
- Replace the coloured spring range ID disc firmly into the recess of the adjustment handwheel.

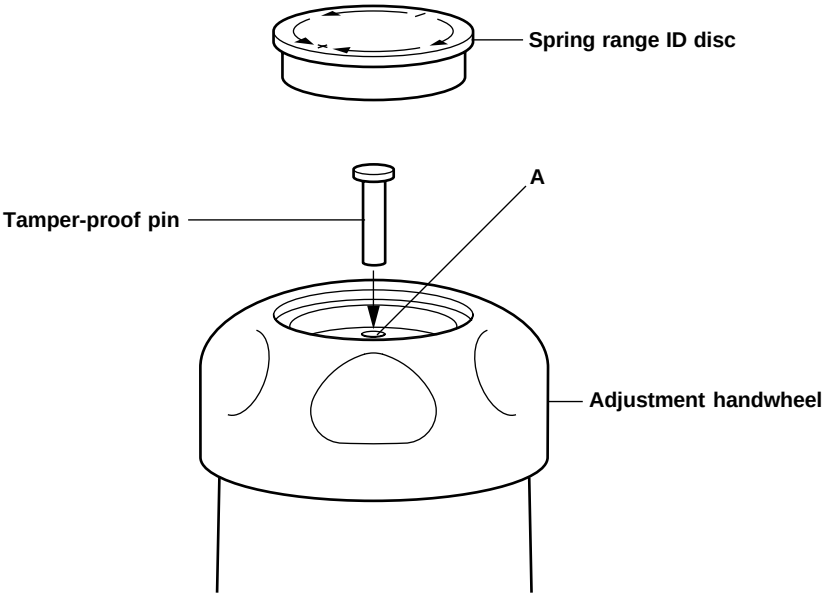


Fig. 3

3.4 Supplementary installation and start-up instructions for types BRV2SP and BRV2BP with external pressure sensing connection

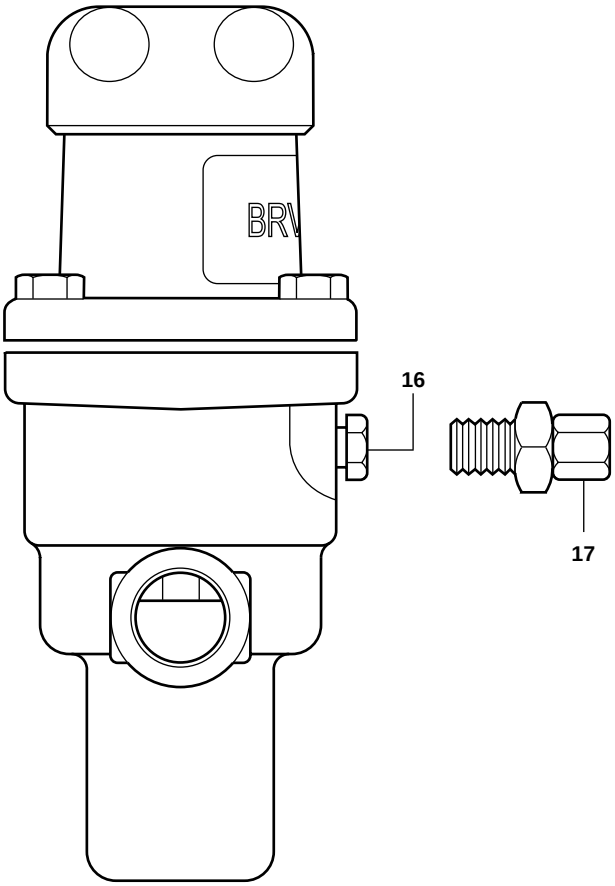


Fig. 4

To fit this downstream pressure sensing control remove the blanking plug '**16**', and install the ⅛**"** x 6 mm O/D compression fitting (**17** - supplied). The pressure sensing control pipe (6 mm O/D) should be connected into the top of the downstream pipework at point '**X**' (see Fig. 5), such that there is at least 1 m (3 ft) of straight pipe, free of fittings, between the BRV2P and point '**X**'. The pressure sensing control pipe should slope towards **'X'**. Alternatively, ⅛**"** nominal bore tube can be screwed into the main sensing connection. An isolating valve (**C4**) should be fitted.

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

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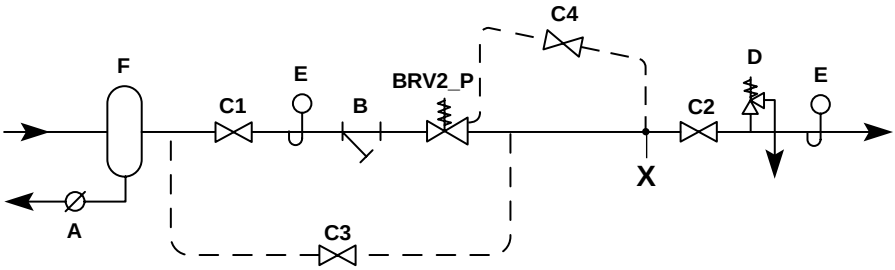

A Steam trap
B Strainer
C Isolating valve
D Safety valve
E Pressure gauge
F Separator

Fig. 5 Recommended installation for the BRV2SP and the BRV2BP

3.5 Start-up and adjustment for the BRV2SP and BRV2BP

Close the isolating valves **C2**, and **C3** if fitted, and open the isolating valve **C4**. Slowly increase the downstream pressure by turning the BRV2_P adjustment handwheel clockwise until the required pressure (shown on the downstream pressure gauge) is reached. Slowly open the isolating valve **C2**. Under flow conditions, the reduced pressure setting will fall slightly. The pressure can be reset by readjusting the main control knob. In this case, there will be a small increase in set pressure under 'No-load' conditions.

Important note: The bypass line and the isolating valve **C3** should be fitted when the installation is required to meet local requirements.

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

The valve and valve seat must be kept clean.
Any strainer fitted upstream of the BRV2 and strainer screen fitted inside the BRV2 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 adjustment housing 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 push rod and the guide bush.
v. Clean the strainer screen 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 to the following torque 108 - 132 N m (80 - 97 lbf ft).
viii. Tighten the spring housing bolts to the following torque18 - 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. Remove the cone shaped washer (**9**) from inside the bellows.
x. Replace the cone shaped washer, bellows gasket and assembly, adjustment spring and the spring housing, and tighten the spring housing bolts 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:
xi. Replace the spring and bonnet assembly and tighten the spring housing bolts to the following torque 18 - 24 N m (13 - 18 lbf ft).
xii. Lift out the spring identification disc (**18**) and press in a new disc (if spring range has been changed).

Table 1 Recommended tightening torques

Item No.	Part	 or mm 		N m	(lbf ft)
7	**Hex. bolts**	13 A/F	M8 x 25	18 - 24	(13 - 18)
11	**Valve seat**	32 A/F		108 - 132	(80 - 97)

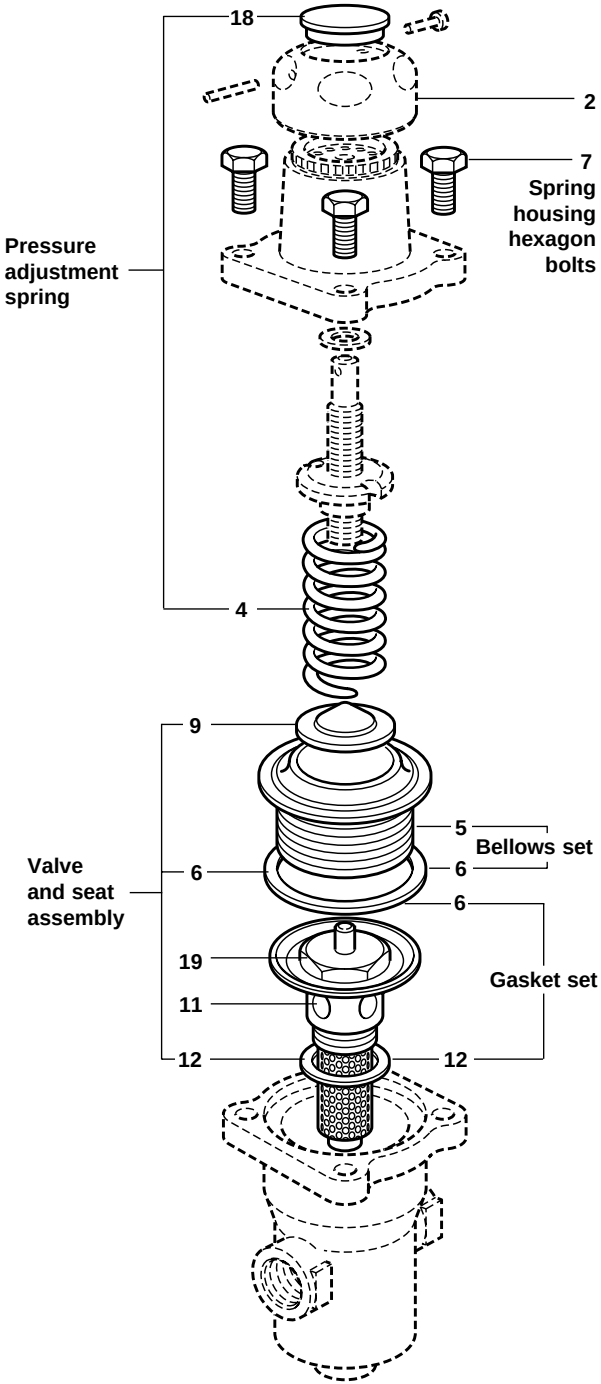
18
2
7
Spring housing hexagon bolts
Pressure adjustment spring
4
9
5
Bellows set
Valve and seat assembly
6
6
6
19
Gasket set
11
12
12

Fig. 6

5. Spare parts

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

Available spares

* Pressure adjustment spring	Grey	0.14 to 1.7 bar g	**4, 18**
	Green	1.40 to 4.0 bar g	**4, 18**
	Orange	3.50 to 8.6 bar g	**4, 18**
* Bellows stainless steel (option of phosphor bronze if specified)			**5, 6**
* Spring housing bolts (set of 4)			**7**
Valve and seat assembly			**6, 9, 11, 12, 19**
* Set of all gaskets			**6, 12**

* 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 BRV2 pressure reducing valve.

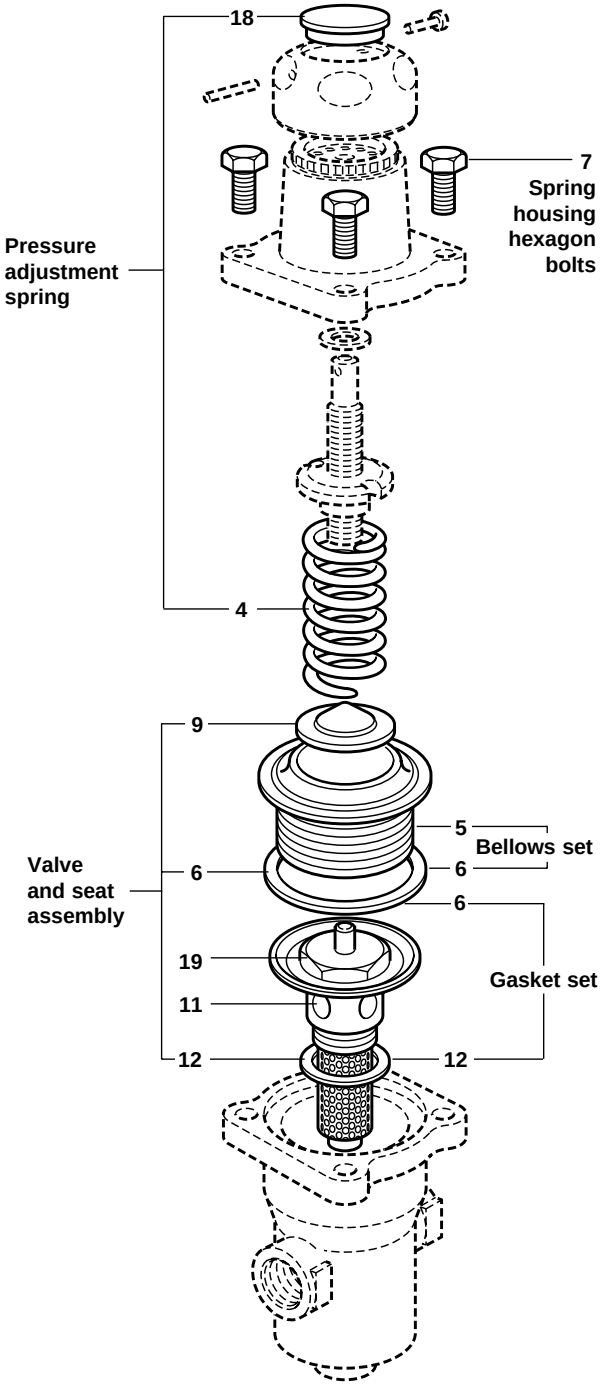
18
7
Spring housing hexagon bolts
Pressure adjustment spring
4
9
5
Bellows set
Valve and seat assembly
6
6
6
19
Gasket set
11
12
12

Fig. 7

6. Fault finding

Before investigating any fault ensure that both upstream and downstream isolating valves are shut off and that the BRV2 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. Check bellows is not subject to corrosive attack e.g. for BRV2SP - chloride contamination. For BRV2BP - halide contamination.
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 push rod.**
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 push rod due to dirt / scale build up.**
CHECK and CURE	Replace valve and seat assembly.