1. Safety information
2. General product information
3. Installation
4. Maintenance - DN15 to DN32 valves
5. Maintenance - DN40 to DN100 valves
6. Spare parts
1. 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 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
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 listed below comply with the requirements of the European Pressure Equipment Directive 2014/68/EU and carry the mark when so required.

The products fall within the following Pressure Equipment Directive categories:

<table>
<thead>
<tr>
<th>Product</th>
<th>Group 1 gases</th>
<th>Group 2 gases</th>
<th>Group 1 liquids</th>
<th>Group 2 liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLV7</td>
<td></td>
<td>SEP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN15 – DN40</td>
<td>PN16 and PN25</td>
<td>SEP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN50</td>
<td>PN16</td>
<td>SEP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN50</td>
<td>PN25</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN65 – DN100</td>
<td>PN16 and PN25</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WS4</td>
<td>SEP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WS4-3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

i) The products have been specifically designed for use on steam which is in Group 2 of the above mentioned Pressure Equipment Directive. The product’s 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 over temperature 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 minimize 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 substances 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 the danger of burns and consider whether protective clothing (including safety glasses) is required.

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. 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’). Self-acting valves may operate unexpectedly during normal service. The risk of personal injury should be assessed for each installation. Where appropriate, suitable guarding should be fitted.

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

Note: The DLV is not suitable for liquid applications

2.1 Description
The DLV pressure reducing valve is a direct acting self-powered valve of robust construction, designed to operate under arduous conditions - Ideal for steam applications.

The valve is controlled by downstream pressure acting directly on the diaphragm to oppose a 'set' spring force. Under stable conditions diaphragm force and spring force are in a state of balance, but an increase or decrease in demand raises or lowers the downstream pressure which in turn acts against the spring to close or open the valve to adjust the flowrate and maintain a constant downstream pressure.

The DLV is 'routine' maintenance free. It is a single seat, bellows sealed valve available in sizes ranging from DN15 to DN100 flanged EN 1092 PN16 and PN25 with downstream pressure ranges of between 0.2 bar to 13 bar.

Standards and approvals
This product fully complies with the requirements of the European Pressure Equipment Directive 2014/68/EU and carries the mark when so required.

Certification
This product is available with a manufacturer's Typical Test Report. Note: All certification / inspection requirements must be stated at the time of order placement.

Note: For further product data see Technical Information sheet TI-P204-04.
2.2 Pressure / temperature limits

The product must not be used in this region.

**A-B-C** Flanged EN 1092 PN16.

**A-D-E** Flanged EN 1092 PN25.

<table>
<thead>
<tr>
<th>Body design conditions</th>
<th>PN25</th>
<th>PN16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum design pressure</td>
<td>25 bar g @ 100 °C</td>
<td>16 bar g @ 100 °C</td>
</tr>
<tr>
<td>Maximum design temperature</td>
<td>250 °C @ 21.8 bar g</td>
<td>250 °C @ 13.9 bar g</td>
</tr>
<tr>
<td>Minimum design temperature</td>
<td>0 °C</td>
<td>0 °C</td>
</tr>
<tr>
<td>Maximum operating temperature</td>
<td>250 °C @ 21.8 bar g</td>
<td>250 °C @ 13.9 bar g</td>
</tr>
<tr>
<td>Minimum operating temperature</td>
<td>0 °C</td>
<td>0 °C</td>
</tr>
</tbody>
</table>

**Note:** For lower operating temperatures consult Spirax Sarco

Maximum differential pressure 16 bar g

Designed for a maximum cold hydraulic test pressure of: 24 bar g

**Note:** With internals fitted, test pressure must not exceed 16 bar g
### 2.3 Available types:
The DLV7 is available with the following pressure ranges:

<table>
<thead>
<tr>
<th>Valve + Actuator and Size</th>
<th>Pressure range (bar)</th>
<th>Actuator PN rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLV71 DN100</td>
<td>0.5 - 1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>DLV72 DN15 to DN50</td>
<td>0.2 - 1.8</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>DN65 to DN80</td>
<td>0.4 - 1.8</td>
</tr>
<tr>
<td>DLV73 DN100</td>
<td>1.0 - 4.0</td>
<td>6.0</td>
</tr>
<tr>
<td>DLV74 DN15 to DN80</td>
<td>1.0 - 5.5</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td>DN100</td>
<td>3.5 - 13</td>
</tr>
<tr>
<td>DLV75 DN15 to DN80</td>
<td>4.0 - 13</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Fig. 1 DN15 to DN32

Fig. 2 DN40 to DN100
2.4 Water seal pot - WS4/WS4-3 (optional extra)

Technical details

<table>
<thead>
<tr>
<th>Available types</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS4</td>
<td>The WS4 is for normal applications up to a volume of 1 litre.</td>
</tr>
<tr>
<td>WS4-3</td>
<td>The WS4-3 has a larger 3 litre volume and is recommended where there is rapid fluctuation of pressure or load.</td>
</tr>
</tbody>
</table>

Connection sizes

<table>
<thead>
<tr>
<th>Inlet</th>
<th>Outlet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Screwed</strong></td>
<td><strong>Screwed ¼&quot; BSP female BS 21 with 8 mm compression fittings</strong></td>
</tr>
<tr>
<td>WS4</td>
<td>¾&quot; NPT male BS 21</td>
</tr>
<tr>
<td>WS4-3</td>
<td>½&quot; BSP male BS 21</td>
</tr>
<tr>
<td></td>
<td>½&quot; NPT male</td>
</tr>
<tr>
<td></td>
<td>DN10</td>
</tr>
</tbody>
</table>

Materials

| Housing | Carbon steel |
2.5 Pressure / temperature limits - WS4 / WS4-3

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

<table>
<thead>
<tr>
<th>Body design conditions</th>
<th>PN25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum design pressure</td>
<td>25 bar g @ 120 °C</td>
</tr>
<tr>
<td>Maximum design temperature</td>
<td>225 °C @ 21 bar g</td>
</tr>
<tr>
<td>Minimum design temperature</td>
<td>0 °C</td>
</tr>
<tr>
<td>Maximum operating pressure for saturated steam</td>
<td>21 bar g</td>
</tr>
<tr>
<td>Maximum operating temperature</td>
<td>225 °C @ 21 bar g</td>
</tr>
<tr>
<td>Minimum operating temperature</td>
<td>0 °C</td>
</tr>
<tr>
<td><strong>Note:</strong> For lower operating temperatures consult Spirax Sarco</td>
<td></td>
</tr>
</tbody>
</table>

| Maximum differential pressure | 25 bar g |
| Designed for a maximum cold hydraulic test pressure of | 40 bar g |
| **Note:** With internals fitted, test pressure must not exceed | 25 bar g |
3. Installation

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

3.1 General information
The valve should be installed in a horizontal pipeline. For operating temperatures below 125 °C the valve may be installed either vertically upwards or vertically downwards (see Figure 4). For operating on steam or temperatures above 125 °C the valve must be installed vertically downwards with the spring / actuator below the pipework with a water seal pot fitted on the downstream control signal line to the actuator, a typical installation is shown in Figure 5. Care should be taken to install the valve correctly as indicated by the direction of flow arrow on the valve body.

Fig. 4 Typical installation for downstream temperatures below 125 °C the valve can alternatively be mounted vertically upwards.

Fig. 5 Typical installation for downstream temperatures above 125 °C

3.2 Pressure control pipe
The valve actuator signal connection must be piped directly to the downstream side. To provide a good control signal the downstream sensing point should be positioned a minimum of 1 metre or 15 pipe diameters away from the valve or change in pipework direction on either side. It is recommended that the actuator signal pipe should be 8 mm diameter copper or stainless steel of 1 m minimum length.

3.3 Preventing dirt
Before installing the valve the system pipework should be flushed out to remove any residual dirt or scale that may be present. The valve should be protected by a pipeline strainer of the same size as the upstream pipework. For steam applications the strainer should be installed on its side to prevent the accumulation of water.
3.4 Removal of condensate
For steam installations a separator should be installed on the upstream side of the valve fitted with a suitable steam trap.

3.5 Pressure gauges
To assist in commissioning the valve and monitoring operating conditions it is essential to fit pressure gauges on both upstream and downstream sides of the valve.

3.6 Safety valve
It is recommended that a suitable safety valve is installed on the downstream side of the valve to protect downstream equipment from excessive pressure. The valve should be set to lift at a pressure below the safe working pressure of the downstream equipment and sized to pass the full capacity of the DLV should it fail in the fully open position. The safety valve outlet pipework should discharge to a safe place.

3.7 Isolating valves
It is recommended that manually operated isolating valves are installed upstream and downstream of the pressure reducing valve station to provide means of isolation for cleaning and maintenance.

3.8 Water seal pot
If fitted, the water seal pot must be charged with water prior to the valve being put into service. Remove the water seal pot filling plug and fully charge the vessel with soft water. Replace the filling plug.
For applications where there are rapid fluctuations in load or pressure the larger volume WS4-3 is recommended.
To commission the valve, slowly open the upstream manual isolating valve to avoid waterhammer. The pressure reducing valve is now ready for operation.

3.9 Setting the desired downstream pressure
The valve is supplied 'unset' with the spring adjuster at its lowest adjustment position. The downstream pressure may be set against either a dead end condition or flowing condition, depending on the requirements of the application, taking into account the effect of proportional offset.
The desired downstream pressure is obtained by rotating the adjustment nut whilst monitoring the downstream pressure gauge.
Adjustment can be made using a standard open ended spanner size 30 mm A/F for all valves. Compressing the control spring increases downstream set pressure and conversely relaxing the spring tension reduces the downstream set pressure (see Figure 6).
Note: Prior to any re-adjusting of the set pressure, ensure the valve stem is coated with a suitable high temperature lubricant.
4. Maintenance (DN15 to DN32)

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

**Warning**
This product should not be dismantled without first releasing the compression on the control spring.

**General information**
The valve is maintenance free, but it is recommended that the valve is dismantled every 12 to 18 months for routine inspection of the component parts. Items showing signs of wear should be replaced.
Details of available spares are given in Section 6.
Prior to routine inspection or fitting spare components, firstly ensure that the DLV is isolated and that the upstream and downstream pressures are reduced to zero. This is achieved by rotating the adjustment nut to reduce the spring compression to zero.
The downstream pressure signal pipe should be disconnected from the actuator.

**Tools list**

<table>
<thead>
<tr>
<th>Part description</th>
<th>Applicable range</th>
<th>Tool size</th>
<th>Tool required</th>
<th>Torque N m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator location nut</td>
<td>Type 2, 4 and 5</td>
<td>17 A/F</td>
<td>Spanner</td>
<td>15 - 18</td>
</tr>
<tr>
<td>Actuator stud coupling</td>
<td>Type 2, 4 and 5</td>
<td>12 A/F and 14 A/F</td>
<td>Spanner</td>
<td>7 - 9</td>
</tr>
<tr>
<td>Pillar nut</td>
<td>DN15 - DN32</td>
<td>19 A/F</td>
<td>Spanner</td>
<td>25 - 32</td>
</tr>
<tr>
<td>Adjuster lock-nut</td>
<td>DN15 - DN32</td>
<td>22 A/F</td>
<td>Spanner</td>
<td>-</td>
</tr>
<tr>
<td>Adjuster nut</td>
<td>DN15 - DN32</td>
<td>30 A/F</td>
<td>Spanner</td>
<td>-</td>
</tr>
<tr>
<td>Bellows clamp</td>
<td>DN15 - DN20</td>
<td>15 A/F</td>
<td>Spanner</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>DN25 - DN32</td>
<td>22 A/F</td>
<td>Spanner</td>
<td>-</td>
</tr>
<tr>
<td>Clamp nut</td>
<td>DN15 - DN20</td>
<td>30 A/F</td>
<td>Spanner</td>
<td>60 - 65</td>
</tr>
<tr>
<td></td>
<td>DN25 - DN32</td>
<td>36 A/F</td>
<td>Spanner</td>
<td>60 - 65</td>
</tr>
<tr>
<td>Bonnet capscrew M10</td>
<td>DN15 - DN32</td>
<td>8 A/F</td>
<td>Hexagon key</td>
<td>28 - 32</td>
</tr>
<tr>
<td>Head flat</td>
<td>DN15 - DN20</td>
<td>19 A/F</td>
<td>Spanner</td>
<td>15 ±1</td>
</tr>
<tr>
<td>Adaptor</td>
<td>DN25 - DN32</td>
<td>24 A/F</td>
<td>Spanner</td>
<td>20 ±2</td>
</tr>
</tbody>
</table>
4.1 Removal of the valve bonnet

1. Using a spanner, hold the adjustment nut, then loosen the lock-nut.

2. Loosen the adjustment nut.

3. Loosen and remove the pillar securing nuts and washers using a 19 mm A/F spanner. Then proceed to remove the pillar.

4. Remove the lock-nut.
4.1 Removal of the valve bonnet (continued)

5. Remove the adjustment spring and the lower spring plate.

6. Remove the upper spring plate.

7. Remove the adjustment nut and thrust washers.

8. Loosen and remove the bonnet cap screws using a hexagon key.
4.1 Removal of the valve bonnet (continued)

Lift the bonnet assembly away from the valve body.
4.2 Replacement of the head set

Although the seat is non-replaceable the gasket surface area will need cleaning.

Screw two M14 nuts on to the valve stem and tighten together.

**Note:** hold nut A. Only tighten nut B to ensure no damage to the bellows.

Hold the nut B using a 22 mm A/F spanner and loosen the head adaptor nut C with a 24 mm A/F spanner.

**Caution:** to prevent any damage care must be taken not to twist the bellows.
Remove the head set and guide plate.  
**Note:** Remove and clean the guide plate and the gasket surfaces and fit new gaskets throughout.

Replace the guide plate and screw the new head set onto the stem (hand tight). Then proceed to tighten by holding the nut B using a 22 mm A/F spanner and tighten the head adaptor nut C with a 24 mm A/F spanner to a torque of 15 $\pm$ 1 N m for the DN15 - DN20 and 20 $\pm$ 2 N m for the DN25 - DN100. **Caution:** to prevent any damage care must be taken not to twist the bellows. To prevent over-extension (stretching) of the bellows locate the guide plate on the head set before tightening the plug to the stem. When replacement of the head set is complete, remove nuts A and B.
4.3 Replacement of the bellows assembly

1. Screw two M14 nuts on to the valve stem and tighten together. **Note:** only tighten nut B to ensure no damage to the bellows.

2. Hold the lock-nut B using a 22 mm A/F spanner and loosen the head adaptor nut C with a 24 mm A/F spanner. **Caution:** to prevent any damage care must be taken not to twist the bellows.

3. Remove the head set.

4. Remove the bellows guide plate and clean the gasket surfaces.
Using a 24 mm A/F spanner hold the two flat edges on the bellows and then unscrew the clamp nut using a 30 mm A/F spanner for the DN15 and DN20 sizes and a 36 mm A/F spanner for the DN25 and DN32 sizes.

Supporting the bellows assembly proceed to remove the bellows from the bonnet.

Remove and clean gasket material from the upper end of the bellows and inside of the bonnet. Then remove and clean gasket material from the bellows housing.

Remove the bonnet gasket and clean.
4.3 Replacement of the bellows assembly (continued)

9 Arrangement of the gaskets for reassembly of the bellows.

10 Bellows gasket

Ensure that the internal gasket face is clean before placing a new upper bellows gasket over the spindle and carefully fitting the bellows into the bonnet.

11 Using a 24 mm A/F spanner hold the two flat edges on the bellows and then tighten the clamp nut to a torque of 60 - 65 Nm by using a 30 mm A/F spanner for the DN15 and DN20 sizes and a 36 mm A/F spanner for the DN25 and DN32 sizes.

12 Carefully place a new inner bonnet gasket followed by the spindle guide plate. Replace the nut and hand tighten.
Replace the guide plate and screw the new head set onto the stem (hand tight). Then proceed to tighten by holding the nut B using a 22 mm A/F spanner and tighten the head adaptor nut C with a 24 mm A/F spanner to a torque of 15 ±1 N m for the DN15 - DN20 and 20 ±2 N m for the DN25 - DN100. Caution: to prevent any damage care must be taken not to twist the bellows. To prevent over-extension (stretching) of the bellows locate the guide plate on the head set before tightening the plug to the stem. When replacement of the head set is complete, remove nuts A and B.

Fit the guide plate and screw the head set onto the stem. Ensure the guide plate locates over the head set. Hand tighten.
4.4 Re-assembly of the valve bonnet

1. Invert the bonnet assembly; add the new bonnet gasket on to the bellows guide plate then lower the valve body onto the bonnet. Ensure the gaskets are aligned correctly. Turn assembly back to the upright position and loosely re-fit the cap screws.

2. Fit the screws and leave a small gap. Raise and then lower the stem while holding the bonnet firmly (to ensure plug and seat alignment).

3. Tighten the four bonnet screws with an 8 mm hexagon key in stages following the sequence shown in Figure 7 to a torque of 28 - 32 N m.
4.5 Refitting of the spring and actuator assembly

1. Replace the lower spring plate and spring.

2. Replace the upper spring plate and washers and adjustment nut.

3. Screw the adjustment nut down (hand tight), approximately 20 mm.

4. Loosely fit the lock-nut onto the spindle.
4.5 Refitting of the spring and actuator assembly (continued)

5 Lower the actuator holder on to the valve and locate the mounting holes.

6 Re-fit the pillar, washers and nuts. Use a 19 mm A/F spanner to tighten the nuts to a torque of 25 - 32 N m.
5. Maintenance (DN40 to DN100)

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

Warning
This product should not be dismantled without first releasing the compression on the control spring.

General information
The valve is maintenance free, but it is recommended that the valve is dismantled every 12 to 18 months for routine inspection of the component parts. Items showing signs of wear should be replaced.
Details of available spares are given in Section 6.
Prior to routine inspection or fitting spare components, firstly ensure that the DLV is isolated and that the upstream and downstream pressures are reduced to zero. This is achieved by rotating the adjustment nut to reduce the spring compression to zero.
The downstream pressure signal pipe should be disconnected from the actuator.

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<tr>
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<td>Spanner</td>
<td>15 - 18</td>
</tr>
<tr>
<td>Actuator stud coupling</td>
<td>Type 2, 4 and 5</td>
<td>12 A/F and 14 A/F</td>
<td>Spanner</td>
<td>7 - 9</td>
</tr>
<tr>
<td>Pillar nut</td>
<td>DN40 - DN100</td>
<td>19 A/F</td>
<td>Spanner</td>
<td>25 - 32</td>
</tr>
<tr>
<td>Adjuster lock-nut</td>
<td>DN40 - DN100</td>
<td>22 A/F</td>
<td>Spanner</td>
<td>-</td>
</tr>
<tr>
<td>Adjuster nut</td>
<td>DN40 - DN100</td>
<td>30 A/F</td>
<td>Spanner</td>
<td>-</td>
</tr>
<tr>
<td>Bellows clamp</td>
<td>DN40 - DN100</td>
<td>22 A/F</td>
<td>Spanner</td>
<td>-</td>
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<tr>
<td>Clamp nut</td>
<td>DN40 - DN100</td>
<td>36 A/F</td>
<td>Spanner</td>
<td>60 - 65</td>
</tr>
<tr>
<td>Bonnet capscrew</td>
<td>M12</td>
<td>DN40 - DN50</td>
<td>10 A/F</td>
<td>Hexagon key</td>
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<tr>
<td>Bonnet nuts</td>
<td>M12</td>
<td>DN65</td>
<td>19 A/F</td>
<td>Spanner</td>
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<tr>
<td></td>
<td>M16</td>
<td>DN80 - DN100</td>
<td>24 A/F</td>
<td>Spanner</td>
</tr>
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<td>Adaptor</td>
<td>DN40 - DN100</td>
<td>24 A/F</td>
<td>Spanner</td>
<td>20 ±2</td>
</tr>
</tbody>
</table>
5.1 Removal of the valve bonnet

1. Using a spanner hold the adjustment nut and loosen the lock-nut.

2. Loosen the adjustment nut.

3. Loosen and remove the pillar securing nuts and washers using a 19 mm A/F spanner. Then proceed to remove the pillar.

4. Remove the lock-nut.
5 Remove the adjustment nut.

6 Remove the washers and upper spring plate.

7 Remove the spring and the lower spring plate.

8 Loosen and remove the bonnet cap screws using a 10 mm hexagon key.
5.2 Replacement of the head set

Although the seat is non-replaceable, the gasket surface area will need cleaning.

Using two spanners hold nut A and tighten nut B.

Hold the lock-nut B using a 22 mm A/F spanner and loosen the head adaptor nut C with a 24 mm A/F spanner.  
**Caution:** to prevent any damage care must be taken not to twist the bellows.
Remove the head set.
Carefully screw a new plug onto its spindle - finger tight.

Replace the guide plate and screw the new head set onto the stem (hand tight). Then proceed to tighten by holding the nut B using a 22 mm A/F spanner and tighten the head adaptor nut C with a 24 mm A/F spanner to a torque of 15 ±1 N m for the DN15 - DN20 and 20 ±2 N m for the DN25 - DN100. **Caution:** to prevent any damage care must be taken not to twist the bellows. To prevent over-extension (stretching) of the bellows locate the guide plate on the head set before tightening the plug to the stem. When replacement of the head set is complete, remove nuts A and B.
5.3 Replacement of the bellows assembly

1. Screw two M14 nuts on to the valve stem and tighten together. **Note:** only tighten nut B to ensure no damage to the bellows.

2. Hold the lock-nut B using a 22 mm A/F spanner and loosen the head adaptor nut C with a 24 mm A/F spanner. **Caution:** to prevent any damage care must be taken not to twist the bellows.

3. Remove the head set.

4. Remove the bellows guide plate and clean the gasket surfaces.
5 Locate the small hole and cover it with the snap ring (DN65 to DN100 only).

6 Use a small blunt instrument to push the snap ring out of the groove (DN65 to DN100 only).

7 Remove the spindle guide plate (DN65 to DN100 only).

8 Using a 24 mm A/F spanner hold the two flat edges on the bellows and then unscrew the clamp nut using a 36 mm A/F spanner.
5.3 Replacement of the bellows assembly (continued)

9. Support the bellows assembly and remove the lock-nut, then proceed to remove the bellows (DN40 to DN50 bonnet shown).

10. Remove the bellows gasket and clean.

11. Remove the bonnet gasket and clean.

12. Fit new gasket over the new bellows spindle.
Support the bellows spindle while replacing the clamp nut. Using a 24 mm A/F spanner hold the two flat edges on the bellows and then tighten the clamp nut to a torque of 60 - 65 Nm by using a 36 mm A/F spanner.

Carefully refit the bellows into the bonnet.

Replace guide plate and snap ring (DN65 to DN100 only).
5.3 Replacement of the bellows assembly (continued)

Carefully screw head set onto spindle until hand tight. **Caution:** ensure plug adaptor is engaged in the spindle guide plate before tightening fully, otherwise damage to the bellows may occur. Refit two M14 nuts onto the stem and lock together.

Replace the guide plate and screw the new head set onto the stem (hand tight). Then proceed to tighten by holding the nut B using a 22 mm A/F spanner and tighten the head adaptor nut C with a 24 mm A/F spanner to a torque of 15 ±1 N m for the DN15 - DN20 and 20 ±2 N m for the DN25 - DN100. **Caution:** to prevent any damage care must be taken not to twist the bellows. To prevent over-extension (stretching) of the bellows locate the guide plate on the head set before tightening the plug to the stem. When replacement of the head set is complete, remove nuts A and B.
5.4 Reassembly of the valve bonnet

**Fig. 8** Four-hole mounting on the DN40 - DN80 sizes

**Fig. 9** Eight-hole mounting on the DN100 only

Invert the bonnet assembly; add the new bonnet gasket on to the bellows guide plate then lower the valve body onto the bonnet. Ensure the gaskets are aligned correctly. Turn assembly back to the upright position and loosely re-fit the cap screws.

Fit the screws and leave a small gap. Raise and then lower the stem while holding the bonnet firmly (to ensure plug and seat alignment).

Tighten the four bonnet screws with an 8 mm hexagon key in stages following the sequence shown in Figure 7 to a torque of 28 - 32 N m.
5.5 Refitting of the spring and actuator assembly

1. Replace the lower spring plate and spring.

2. Replace the upper spring plate and washers and adjustment nut.

3. Screw the adjustment nut down (hand tight), approximately 20 mm.

4. Loosely fit the lock-nut onto the spindle.
Lower the actuator holder on to the valve and locate the mounting holes.

Re-fit the pillar, washers and nuts. Use a 19 mm A/F spanner to tighten the nuts to a torque of 25 - 32 N m.
6. Spare parts

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

Available spares

<table>
<thead>
<tr>
<th>Available spares</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coupling</td>
<td>A</td>
</tr>
<tr>
<td>Diaphragm set</td>
<td>Diaphragm and sealing washer</td>
</tr>
<tr>
<td>Needle bearing</td>
<td>D</td>
</tr>
<tr>
<td>Sealing bellows set</td>
<td>Sealing bellows assembly, sealing bellows gasket, bonnet gasket and (DN65 - DN100) snap ring</td>
</tr>
<tr>
<td>Control spring(s)</td>
<td>For the Spring setting range, see page 39</td>
</tr>
<tr>
<td>Head set (DN15 - DN100)</td>
<td>Head assembly and bonnet gaskets</td>
</tr>
<tr>
<td>Note</td>
<td>The seat cannot be replaced</td>
</tr>
<tr>
<td>Gasket set</td>
<td>Sealing bellows gasket and bonnet gasket</td>
</tr>
</tbody>
</table>

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

Example: 1 - Gasket set for a Spirax Sarco DN15 DLV72 pressure reducing valve.

Head and seat arrangement

![Diagram showing head and seat arrangement for DN15 and DN20 valves](image1)

![Diagram showing head and seat arrangement for DN40 and DN50 valves](image2)
**Spring setting range (I)**

1 = DN100  
0.5 - 1.5 bar g

2 = DN15 to DN50  
0.2 - 1.8 bar g

DN65 to DN80  
0.4 - 1.8 bar g

3 = DN100  
1.0 - 4.0 bar g

4 = DN15 to DN80  
1.0 - 5.5 bar g

DN100  
3.5 - 13 bar g

5 = DN15 to DN80  
4.0 - 13 bar g