AE44 and AE44S
Automatic Air and Gas vents for Liquid Systems
Installation and Maintenance Instructions

1. Safety information
2. General product information
3. Installation
4. Commissioning
5. Operation
6. Maintenance
7. Spare parts
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.

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 97/23/EC and carry the ⚅ mark when so required. It should be noted that products rated as ‘SEP’ are required by the Directive not to carry the ⚅ mark. 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>AE44</td>
<td>SEP</td>
<td>SEP</td>
<td>SEP</td>
<td>SEP</td>
</tr>
<tr>
<td>AE44S DN15 and DN20</td>
<td>SEP</td>
<td>SEP</td>
<td>SEP</td>
<td>SEP</td>
</tr>
<tr>
<td>DN25</td>
<td>2</td>
<td>1</td>
<td>SEP</td>
<td>SEP</td>
</tr>
</tbody>
</table>

i) The AE44 and AE44S range have been specifically designed for use on air or water/condensate which are in Group 2 of the 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 protective 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.

If parts made from Viton have been subjected to a temperature approaching 315°C (599°F) or higher, it may have decomposed and formed hydrofluoric acid. Avoid skin contact and inhalation of any fumes as the acid will cause deep skin burns and damage the respiratory system.

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 100°C (212°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, except:

**Viton:**
- Can be landfilled, when in compliance with National and Local regulations.
- Can be incinerated, but a scrubber must be used to remove Hydrogen Flouride, which is evolved from the product and with compliance to National and Local regulations.
- Is insoluble in aquatic media.

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 General description
The AE44 and AE44S are float type automatic air and gas vents for liquid systems. The body and cover castings are produced by a TÜV approved foundry.

Available types and further technical data:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE44</td>
<td>Cast steel body and cover with viton valve cone.</td>
</tr>
<tr>
<td>AE44S</td>
<td>Cast steel body and cover with stainless steel valve cone.</td>
</tr>
</tbody>
</table>

Standards
These products fully comply with the requirements of the European Pressure Equipment Directive 97/23/EC and carry the CE mark when so required.

Certification
This product range is available with a Manufacturer's Typical Test Report for the body and cover as standard and certification to EN 10204 3.1 if specified at the time of ordering.

Note: For additional information see the Technical Information Sheet TI-P149-08.
2.2 AE44 and AE44S - Cast steel

![Fig. 3 AE44 DN15 and DN20 shown](image1)

![Fig. 4 AE44S DN25 shown](image2)

### Sizes and pipe connections

<table>
<thead>
<tr>
<th>Model</th>
<th>Sizes</th>
<th>Flange DIN face-to-face connections</th>
<th>Balance pipe</th>
<th>Valve cone</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE44</td>
<td>DN15 and DN20</td>
<td>EN 1092 PN40</td>
<td>½&quot; BSP</td>
<td>Viton</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASME (ANSI) 150</td>
<td>½&quot; NPT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASME (ANSI) 300</td>
<td>½&quot; NPT</td>
<td></td>
</tr>
<tr>
<td>AE44S</td>
<td>DN15, DN20 and DN25</td>
<td>EN 1092 PN40</td>
<td>½&quot; BSP</td>
<td>Stainless steel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASME (ANSI) 150</td>
<td>½&quot; NPT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASME (ANSI) 300</td>
<td>½&quot; NPT</td>
<td></td>
</tr>
</tbody>
</table>
Body design conditions

**PN40**

- **PMA** Maximum allowable pressure: 40 bar g @ 120°C (580 psi g @ 248°F)
- **TMA** Maximum allowable temperature: 400°C @ 20 bar g (752°F @ 290 psi g)
- **Minimum allowable temperature**: 0°C (32°F)

**TMO** Maximum operating temperature

- **AE44**: 200°C @ 34 bar g (392°F @ 493 psi g)
- **AE44S**: 400°C @ 20 bar g (752°F @ 290 psi g)

- **PMO** Maximum operating pressure: 40 bar g @ 120°C (580 psi g @ 248°F)

- **Minimum operating temperature**: 0°C (32°F)

- **Minimum specific gravity of liquid**: 0.6 (Note: The ΔPMX is affected by the specific gravity)

- **Designed for a maximum cold hydraulic test pressure of**: 35 bar g (500 psi g)

- **JIS/KS 20**: 60 bar g (870 psi g)

- **PN40/ASME (ANSI) 300**: 60 bar g (870 psi g)

**Note**: With internals fitted, test pressure must not exceed ΔPMX

**Caution**: The automatic air and gas vent in its complete operational form must not be subjected to a pressure greater than 48 bar g (696 psi g) otherwise damage to the internal mechanism may result.

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

- **A - B**: Flanged EN 1092 PN40 and ASME (ANSI) 300.
- **A - D**: Flanged ASME (ANSI) 150.
3. Installation

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

Refering to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation:

3.1 Check materials, pressure and temperature and their maximum values. If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent overpressurisation.

3.2 Determine the correct installation situation and the direction of fluid flow.

3.3 Remove protective covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

3.4 The automatic air and gas vent must be fitted into a vertical pipeline above the point being vented with the direction of flow upward as indicated on the body so that the float mechanism is free to rise and fall in a vertical plane. The arrow on the name-plate must point downwards. The low point of the cover is provided with a ½" tapping for a balance pipe which is essential for satisfactory operation. The balance pipe must be connected between the inlet pipe and the tapping provided on the cover as shown in Figure 7.

![Fig. 7](image)

As with all automatic air vents, dribbling may occur if the valve becomes fouled with dirt. For this reason it is recommended that a drip pipe is fitted to the outlet discharging to a safe place (see Figure 8).
Because of the way automatic air vents operate they all dribble water when discharging air. This is perfectly normal, because of this we recommend piping the discharge to a drain via an air break.

Fig. 8 Typical application showing an AE44 on a high temperature hot water (HTHW) system.

4. Commissioning

After installation or maintenance ensure that the system is fully functioning. Carry out tests on any alarms or protective devices.

5. Operation

Spirax Sarco automatic air eliminators utilise a simple, but well proven, float and lever valve assembly which opens to air and gases and closes tightly against water. Once fitted they require no adjustment, either on start-up or during subsequent running. Operation is totally automatic over a variety of light or heavy duty applications.
6. Maintenance

Note: Before actioning any maintenance observe the ‘Safety information’ in Section 1.

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

6.1 General information
All work must be carried out by a suitably competent person. Before starting work ensure that suitable tools are available. Use only Spirax Sarco replacement parts. Before attempting to work on the automatic air eliminator ensure that it is isolated from the rest of the pressurised system (repairs can be carried out with the automatic air eliminator in the pipeline). Allow time for the temperature of the automatic air eliminator to normalise. The unit has a long service life and the only maintenance that is normally required is the occasional cleaning or replacement of the valve and seat assembly.

6.2 How to clean/replace the valve and seat assembly:
- Once the eliminator has been isolated, undo the cover studs and nuts (2) and lift off the cover (4).
- Remove the existing main valve assembly with float, by undoing the pivot frame assembly set screws (7), and the valve seat (5) and assess if it needs cleaning or replacing.
- The soft valve cone (item 9, AE44 only) is easily changed once the float (8) has been removed.
- Using a little jointing paste on the thread and gasket (6), fit the valve seat (5) to the body (1).
- Attach the support frame (15) and pivot frame (16) to the body (1) using the assembly set screws (7) but do not tighten.
- Fit the float arm (8) to the pivot frame (16) using the pin (17) and by moving the complete assembly, centre the valve cone onto the seat orifice. Tighten the assembly set screws (7) to the recommended torque (see Table 1).
- Check the operation by raising and lowering the float several times, making sure that the valve cone is centring properly on the seat.
- When reassembling the cover (4) to the body (1) make sure that all joint faces are clean. Always use a new gasket (3).  
  **Note:** On reassembly make sure that the dowel (see Figure 9) is located into the body.
- Tighten the cover studs and nuts (2) uniformly to the recommended torque (see Table 1).
- When maintenance is complete open isolation valves, allowing system pressure to build up slowly.
- Check for leaks.

After maintenance ensure that the system is fully functioning.
Table 1  Recommended tightening torques

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part</th>
<th>or mm</th>
<th>N m</th>
<th>(lbf ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Cover studs and nuts</td>
<td>17 A/F M10 x 60</td>
<td>19 - 21</td>
<td>(13.6 - 15.0)</td>
</tr>
<tr>
<td>5</td>
<td>Valve seat</td>
<td>17 A/F M12 x 8</td>
<td>50 - 55</td>
<td>(36 - 40)</td>
</tr>
<tr>
<td>7</td>
<td>Pivot screws</td>
<td>Cheesehead M5 x 20</td>
<td>2.5 - 2.8</td>
<td>(1.8 - 2.0)</td>
</tr>
</tbody>
</table>

Table 2  Flange bolt hole tappings

<table>
<thead>
<tr>
<th>Size</th>
<th>ASME (ANSI) 150</th>
<th>ASME (ANSI) 300</th>
<th>JIS/KS 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN15</td>
<td>½&quot; - 13 UNC - 2B</td>
<td>½&quot; - 13 - UNC - 2B</td>
<td>M12</td>
</tr>
<tr>
<td>DN20</td>
<td>½&quot; - 13 UNC - 2B</td>
<td>3 &quot; - 11 - UNC - 2B</td>
<td>M12</td>
</tr>
<tr>
<td>DN25</td>
<td>3 &quot; - 11 UNC - 2B</td>
<td>3 &quot; - 11 - UNC - 2B</td>
<td>M16</td>
</tr>
</tbody>
</table>

Fig. 9
7. **Spare parts**

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

**Available spares**

<table>
<thead>
<tr>
<th>Available spares</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft valve cone (packet of 3 of each)</td>
<td>AE44</td>
<td>9</td>
</tr>
<tr>
<td>Main valve assembly with float</td>
<td>AE44 5, 6, 7, 8, 9, 15, 16, 17</td>
<td></td>
</tr>
<tr>
<td>Complete set of gaskets (packet of 3 sets)</td>
<td>3, 6</td>
<td></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 automatic air and gas vent.

**Example:** 1 - Main valve assembly for a DN20 Spirax Sarco AE44 automatic air vent.