USM32
Sealed Bimetallic Steam Trap
for use with Pipeline Connectors
Installation and Maintenance Instructions

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

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.

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 listed below complies with the requirements of the European Pressure Equipment Directive 97/23/EC and carries the mark when so required. The product falls 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 Liquid</th>
<th>Group 2 Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>USM32</td>
<td>SEP</td>
<td>SEP</td>
<td>SEP</td>
<td>SEP</td>
</tr>
</tbody>
</table>

i) This product has been specifically designed for use on steam, air or water/condensate which are in Groups 1 and 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.

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. If used at the maximum permitted operating conditions the surface temperature of the products may reach temperatures in excess of 450°C (850°F). The product is 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
This product is recyclable - 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 General description
The USM32 is a pre-set and maintenance free sealed bimetallic steam trap manufactured in stainless steel. It is designed for steam pressures up to 32 bar and applications such as steam tracing and mains drips. When installed in any position with a suitable pipeline connector the USM32 can easily and simply be removed without breaking into the pipeline, thus speeding up trap replacement with minimal system downtime. Pipeline connectors are available with screwed, socket weld and flanged connections.

Standards
The body/cover weld joint complies with ASME Section IX and BS EN 288. This product fully complies with the requirements of the European Pressure Equipment Directive 97/23/EC and carries the CE mark when so required.

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.

2.2 Sizes and pipe connections
The USM32 can be fitted to a variety of different pipeline connectors which include:

<table>
<thead>
<tr>
<th>Connector Code</th>
<th>Description</th>
<th>Pressure (ASME / ANSI)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC10</td>
<td>Straight connector</td>
<td>ASME / ANSI 300</td>
<td>(TI-P128-10)</td>
</tr>
<tr>
<td>PC10HP</td>
<td>Straight connector</td>
<td>ASME / ANSI 600</td>
<td>(TI-P128-10)</td>
</tr>
<tr>
<td>PC20</td>
<td>Straight connector with strainer</td>
<td></td>
<td>(TI-P128-15)</td>
</tr>
<tr>
<td>IPC20</td>
<td>Straight connector with strainer or Spiratec sensor</td>
<td></td>
<td>(TI-P128-17)</td>
</tr>
<tr>
<td>IPC21</td>
<td>Connector with 1 piston isolation valve</td>
<td>ASME / ANSI 600</td>
<td>(TI-P128-02)</td>
</tr>
<tr>
<td>PC3</td>
<td>Connector with 2 piston isolation valves</td>
<td>ASME / ANSI 600</td>
<td>(TI-P128-03)</td>
</tr>
</tbody>
</table>

Note: See the relevant Technical Information sheet as listed above for further details of connections available on pipeline connectors.
2.3 Pressure / temperature limits

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

The product should not be used in this region or beyond its operating range as damage to the internals may occur.

**Note:** The model of pipeline connector and connections selected will dictate the maximum operating pressure and temperature of the complete assembly. Consult the specified Technical Information sheet as listed in 'Sizes and pipe connections' for relevant data.

<table>
<thead>
<tr>
<th>Body design conditions</th>
<th>ASME/ANSI 300</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMA Maximum allowable pressure</td>
<td>49.6 bar g @ 38°C (720 psi g @ 100°F)</td>
</tr>
<tr>
<td>TMA Maximum allowable temperature</td>
<td>450°C @ 28.8 bar g (850°F @ 420 psi g)</td>
</tr>
<tr>
<td>Minimum allowable temperature</td>
<td>-29°C (-20°F)</td>
</tr>
<tr>
<td>PMO Maximum operating pressure for saturated steam service</td>
<td>32 bar g (464 psi g)</td>
</tr>
<tr>
<td>TMO Maximum operating temperature</td>
<td>450°C @ 28.8 bar g (850°F @ 420 psi g)</td>
</tr>
<tr>
<td>Minimum operating temperature</td>
<td>0°C (32°F)</td>
</tr>
<tr>
<td>Minimum operating pressure</td>
<td>1 bar g (14.5 psi g)</td>
</tr>
<tr>
<td>ΔPMX Maximum differential pressure</td>
<td>32 bar g (464 psi g)</td>
</tr>
<tr>
<td>Designed for a maximum cold hydraulic test pressure of:</td>
<td>75 bar g (1087 psi g)</td>
</tr>
</tbody>
</table>
Note: Before attempting any installation, observe the ‘Safety information’ in Section 1.

Referring 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 that 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 and the correct direction of fluid flow.

3.3 Remove protective covers from all connections.

3.4 Install the pipeline connector and steam trap downstream of the equipment to be drained, ensuring that it is easily accessible for inspection and maintenance.

3.5 The USM32 can be installed on any pipeline connector in any plane. See separate Installation and Maintenance instructions for Spirax Sarco pipeline connectors (IM-P128-06, IM-P128-11 and IM-P128-13).

3.6 Mount the steam trap with the arrow on the body pointing in the direction of the flow of the fluid.

3.7 For socket welded traps, observe qualified welding procedures in accordance with the relevant National and International welding standards. When welding, it is not necessary to remove the trap from the PC connector so long as the electric arc method is used. Avoid excessive heat.

3.8 Ensure both gasket faces are clean and that transfer holes are clear. Place the trap against the connector and fit the bolts (11). Ensure that the bolt threads have a small amount of anti-seize compound on them. Tighten the screws finger tight to ensure the trap/connector face is parallel and then tighten to the required torque see Table 1, Page 9.

3.9 Open isolation valves slowly until normal operating conditions are achieved.

3.10 Check for leaks.

Note: If the trap is to discharge to atmosphere ensure that it is to a safe place, the discharging fluid may be at a temperature of 100°C (212°F). It is strongly recommended that a diffuser is installed on the outlet side of the trap. This reduces the problem of noise and erosion by cushioning the high velocity discharge. See TI-P625-11 for further information.
4. Commissioning

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

5. Operation

The Spirax Sarco USM32 is a sealed bimetallic steam trap designed for use with any Spirax Sarco PC pipeline connector. This trap operates on the basis of two opposing forces acting on the valve - an opening force created by system pressure, and a closing force resulting from the condensate temperature acting on the bimetallic elements. The USM32 operates with no loss of steam and automatically and quickly drains air, non-condensable gases and large quantities of cold water on start-up.

6. Maintenance

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

Warning:
The inner and outer gaskets (9 and 10), used when installing/maintaining the USM32 to a PC pipeline connector contain a thin stainless steel support ring which may cause physical injury if not handled and disposed of carefully.

Safety note:
These traps are installed in high pressure steam lines. Personnel doing the adjustment work should wear heavy gloves, long sleeve shirt and other safety equipment designed to protect the wearer (goggles, face shield etc.) in the event of a leak.

6.1 General information
All work must be carried out by a suitably competent person. Before undertaking any maintenance on the trap it must be isolated from both the supply line and return line and any pressure allowed to safely normalise to atmosphere. The trap should then be allowed to cool. When reassembling, ensure that all joint faces are clean.

6.2 Replacing the bimetallic trap assembly:
- Ensure that the correct tools and necessary protective equipment are used at all times.
- Replacement of the trap unit is achieved by removing the two connector screws (11) and removing the trap unit.
- The new trap unit should be positioned against the connector gasket face and apply a small amount of anti-seize compound to the threads of the connector screws.
- Finger tighten the connector screws (11) ensuring that the trap unit is parallel to the pipeline connector.
- Gradually tighten the connector screws to the recommended torque (see Table 1, page 9).
- Open isolation valves slowly until normal operating conditions are achieved.
- Check for leaks.
The USM32 is a sealed non-maintainable trap unit. No internal spares are available. The spares which are available are shown in heavy outline. Parts shown in a broken line are not available as spares.

### Available spares

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector screws (2 off)</td>
<td>11</td>
</tr>
<tr>
<td>Complete USM32 trap unit inclusive of gaskets (9 and 10) and connector screws (11)</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The gaskets contain sharp metal reinforcement, please handle with care.

### 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 steam trap.

**Example:** 2 - Connector screws for a USM32 sealed bimetallic steam trap.

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**Fig. 4**

**Table 1  Recommended tightening torques**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part</th>
<th>( \frac{3}{8} ) “ A/F</th>
<th>( \text{mm} )</th>
<th>N m</th>
<th>(lb ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Connector screw</td>
<td>( \frac{3}{8} ) “ A/F</td>
<td>3.5</td>
<td>30 - 35</td>
<td>(22 - 26)</td>
</tr>
</tbody>
</table>
## 8. Fault finding

### Trap fails to pass condensate

1. Make sure upstream, and downstream valves are open.

2. Check external strainers, e.g.: PC20, for clogging; blowdown or dismantle and clean.

3. Backpressure too high. Downstream system must be corrected.

4. Valve port clogged with dirt. Dismantle, inspect and clean.

5. Internal filter in trap clogged with dirt or bimetallic element failed. Replace trap unit.

### Trap blows live steam

1. Dirt on seating surface. Replace trap unit.


3. Worn valve seat. Replace trap unit.

### Trap passing condensate at a lower discharge temperature and lower capacity

1. Backpressure may be too high, try and reduce backpressure. If it cannot be reduced, replace the trap with a less sub-cooled trap, see Section 2.3 for details.