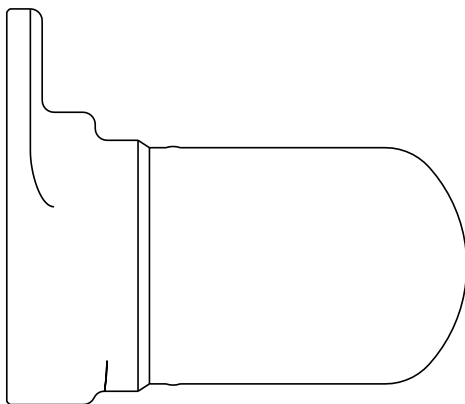


USM21

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



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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 gaskets contain 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

2.1 General description

The USM21 is a pre-set and maintenance free sealed bimetallic steam trap manufactured in stainless steel. It is designed for steam pressures up to 21 bar and applications such as steam tracing and mains drips. When installed in any position with a suitable pipeline connector the USM21 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.B. **Note:** All certification/inspection requirements must be stated at the time of order placement.

2.2 Sizes and pipe connections

The USM21 can be fitted to a variety of different pipeline connectors which include:

PC10	Straight connector	ANSI/ASME 300	(TI-P128-10)
PC10HP	Straight connector	ANSI/ASME 600	(TI-P128-10)
PC20	Straight connector with strainer		(TI-P128-15)
IPC20 IPC21	Straight connector with strainer or Spiratec sensor		(TI-P128-17)
PC3	Connector with 1 piston isolation valve	ANSI/ASME 600	(TI-P128-02)
PC4	Connector with 2 piston isolation valves	ANSI/ASME 600	(TI-P128-03)

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

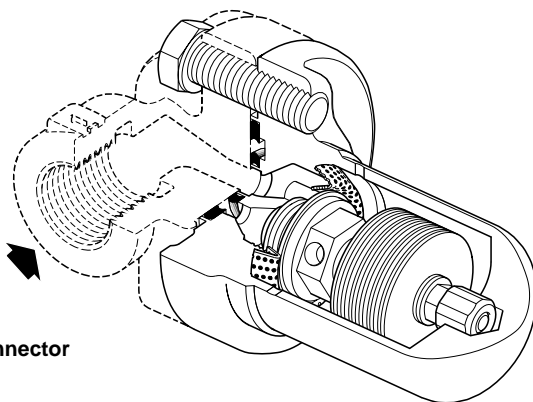


Fig. 1
USM21 fitted to a
PC10 pipeline connector

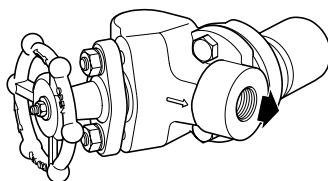


Fig. 2
USM21 fitted to a
PC3_ pipeline connector

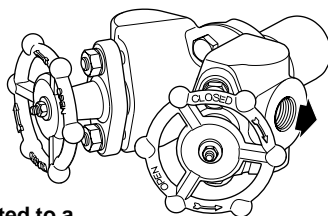
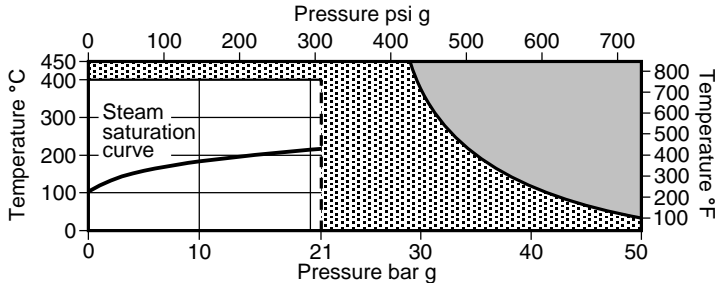



Fig. 3
USM21 fitted to a
PC4_ pipeline connector

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.

Body design conditions		ANSI/ASME 300
PMA	Maximum allowable pressure	50 bar g @ 40°C (725 psi g @ 104°F)
TMA	Maximum allowable temperature	450°C @ 29 bar g (842°F @ 420 bar g)
Minimum allowable temperature		-29°C (-20°F)
PMO	Maximum operating pressure for saturated steam service	21 bar g (304 psi g)
TMO	Maximum operating temperature	400°C @ 21 bar g (752°F @ 304 psi g)
* Minimum operating pressure		0°C (32°F)
ΔPMX	Maximum differential pressure	21 bar g (304 psi g)
Designed for a maximum cold hydraulic test pressure of:		75 bar g (1 087 psi g)

* Traps are available in a range of subcooled temperature settings. Except for start-up and shutdown, they must operate above the minimum differential pressure values shown in the table below:

Nominal subcooled temperature	External identification	Threshold differential pressure
-10°C (14°F)	"-1"	5 bar g (72.51 psi g)
-30°C (-22°F)	"-3"	2 bar g (29.00 psi g)
-50°C (-58°F)	"-5"	0.5 bar g (7.25 psi g)
-70°C (-94°F)	"-7"	0.1 bar g (1.45 psi g)

3. Installation

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 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 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 USM21 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 7.
- 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-P155-02 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 USM21 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 USM21 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 USM21 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 7).
- Open isolation valves slowly until normal operating conditions are achieved.
- Check for leaks.

7. Spare parts

The USM21 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

Connector screws (2 off)

11

Complete USM21 trap unit inclusive of gaskets (**9** and **10**) and connector screws (**11**)

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 USM21 sealed bimetallic steam trap.

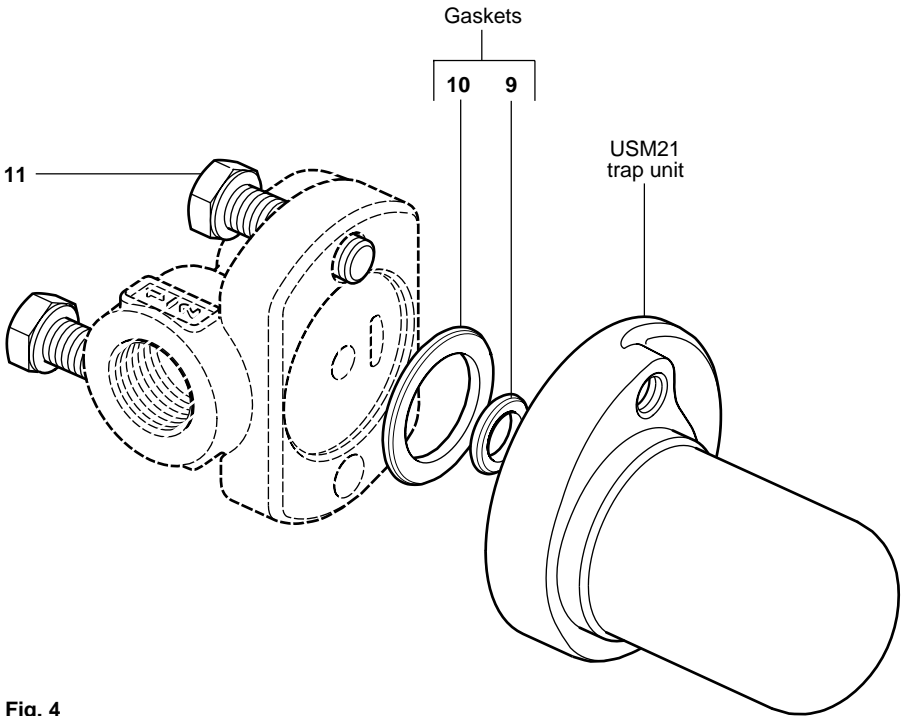




Fig. 4

Table 1 Recommended tightening torques

Item No.	Part	or		N m	(lb ft)
			 mm		
11	Connector screw	$\frac{9}{16}$ " A/F		30 - 35	(22 - 26)

8. *Fault finding*

Trap fails to pass condensate	<ol style="list-style-type: none">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	<ol style="list-style-type: none">1. Dirt on seating surface. Replace trap unit.2. Bimetallic element failed. Replace trap unit.3. Worn valve seat. Replace trap unit.
Trap passing condensate at a lower discharge temperature and lower capacity	<ol style="list-style-type: none">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.