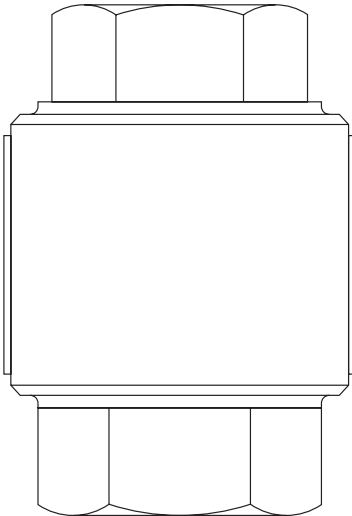


TSS21

Sealed Thermostatic Steam Tracer Trap
Installation and Maintenance Instructions



1. *Safety information*
2. *General product information*
3. *Installation*
4. *Commissioning*
5. *Operation*
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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 CE mark when so required. The product falls within the following Pressure Equipment Directive categories:

Product	Group 2 Gases	Group 2 Liquids
TSS21	SEP	SEP

- i) The product has been specifically designed for use on steam, air or water/condensate which is in Group 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 some products may reach temperatures in excess of 300°C (572°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

The product is recyclable. No ecological hazard is anticipated with the disposal of this product 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 TSS21 all stainless steel steam tracer trap is a completely sealed unit and therefore has no gasketed joints. It is operated thermostatically using a balanced pressure capsule and is specifically suitable for non critical tracing applications.

It is however a dual purpose trap in that it can be fitted in the reverse mode where it will operate as a fixed temperature discharge steam trap.

The trap fitted in the reverse mode will limit the downstream temperature to approximately 90°C (194°F) when discharging to atmosphere. In the unlikely event of the trap operating into a pressurized return main the capsule will be affected by the downstream temperature and it's operation under such conditions may be erratic and unpredictable.

Standards

This product fully complies with the requirements of the European Pressure Equipment Directive 97/23/EC.

Certification

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

Note: For further product data see the following Technical Information sheet, TI-P125-02.

2.2 Sizes and pipe connections

½" screwed BSP or NPT and socket weld ends to BS 3799 class 3000.

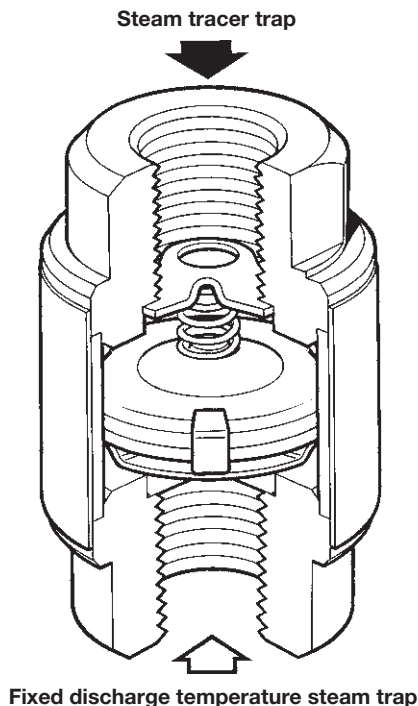
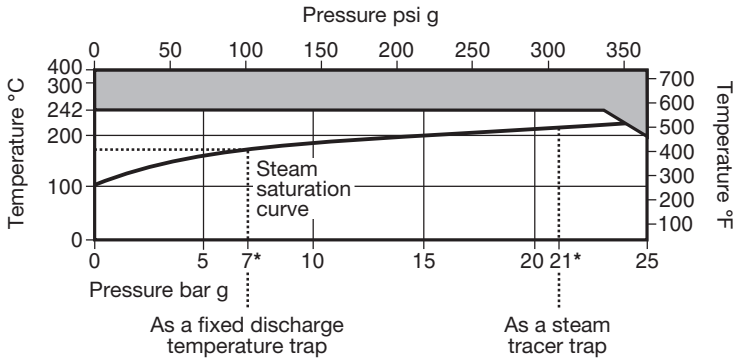



Fig. 1 Shows the direction of flow through a TSS21 when used for the stated application

2.3 Pressure / temperature limits



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

Body design conditions		PN25
PMA	Maximum allowable pressure	25 bar g @ 200°C (362.5 psi g @ 392°F)
TMA	Maximum allowable temperature	400°C (752°F)
Minimum allowable temperature		-254°C (-425°F)
* PMO	Maximum operating pressure for saturated steam service	21 bar g (305 psi g)
	Maximum operating pressure when used as a fixed discharge temperature trap	7 bar g (102 psi g)
TMO	Maximum operating temperature	242°C (468°F)
	Maximum operating temperature when used as a fixed discharge temperature trap	170°C (338°F)
Minimum operating temperature		0°C (32°F)
Designed for a maximum cold hydraulic test pressure of:		38 bar g (551 psi g)

3. Installation

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

Referring to the Installation and Maintenance Instruction, 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 trap is intended for installation in a vertical line with flow vertically downwards. **For tracing applications** observe the direction of the red arrow on the trap body. **For fixed discharge temperature applications** observe the direction of the black arrow on the trap body. This will ensure that the trap is self-draining.

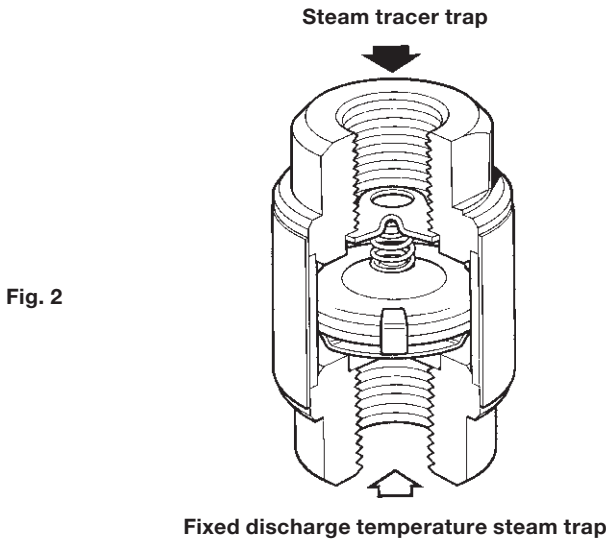


Fig. 2

- 3.5** When the trap is installed in its fixed discharge temperature mode it must discharge to atmosphere. The trap has not been designed to operate when discharging into a pressurised return main - under such conditions its operation will be erratic and unpredictable.
- 3.6 Note on welding:** When welding the socket weld version into the line, the electric arc process should be used. If both ends are being welded e.g. on tracing applications, then it is important to complete one weld and let it cool before starting the second weld in order to prevent the risk of damage to the internal capsule.

Note: If the trap is to discharge to atmosphere ensure it is to a safe place, the discharging fluid may be at a temperature of 100°C (212°F).

4. Commissioning

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

5. Operation

5.1 As a tracer trap

The operating element is a capsule containing a small quantity of a special liquid with a boiling point below that of water. In the cold conditions that exist at start-up, the capsule is relaxed. The valve is off its seat and is wide open, allowing unrestricted removal of air. This is a feature of all balanced pressure traps and explains why they are well suited to air venting.

As condensate passes through the balanced pressure steam trap, heat is transferred to the liquid in the capsule. The fill liquid boils before steam reaches the trap. The vapour pressure within the capsule causes it to expand and the trap shuts. Heat loss from the trap then cools the water surrounding the capsule, the fill condenses and the capsule contracts, opening the valve and releasing condensate until the steam temperature rises again at which point the cycle is repeated.

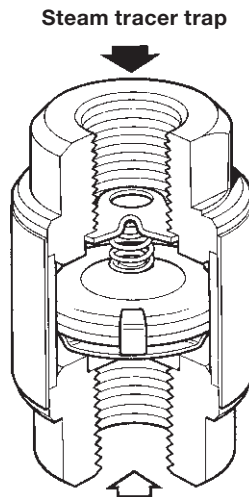


Fig. 3

5.2 As a fixed temperature discharge trap

When fitted in the reverse mode, the label will read 'Fixed temperature discharge PMO 7 bar (101 psi) TMO 170°C (338°F)'. This 'TMO' refers to the maximum downstream temperature which the capsule can withstand. Of course, the maximum upstream conditions can be 7 bar (101 psi) at the appropriate saturation temperature of 170°C (338°F). The capsule is now on the downstream side of the seat orifice and is protected from upstream temperature. It will then operate at a temperature of approximately 90°C (194°F) discharging sub-cooled condensate. It will open at this temperature irrespective of steam pressure. In this mode it can be used for instrument and non-critical steam tracing lines, where some use is made of the sensible heat in the condensate.

6. Maintenance

The TSS21 is a sealed stainless steel, thermostatic balanced pressure steam tracer trap. It is non adjustable and requires no maintenance.

7. Spare parts

The TSS21 is a sealed, non maintainable, steam tracer trap. Therefore, no spare parts are available.

7.1 How to order a new product

Example: 1 off 1/2" Spirax Sarco TSS21 sealed thermostatic steam tracer trap having screwed NPT connections.

