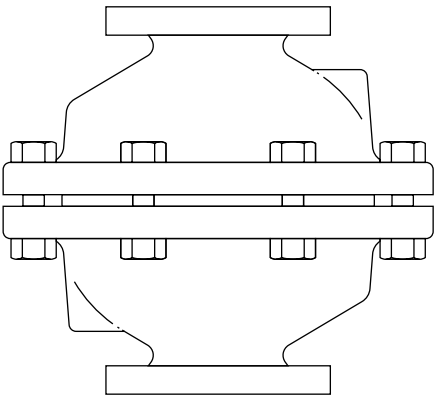
BP503
DN50 Balanced Pressure Steam Trap
Installation and Maintenance Instructions



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 cover gasket contains 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 BP503 is a very high capacity, carbon steel maintainable balanced pressure steam trap. It has been designed for very high loads yet can also be modified depending on the actual load. The trap is available with either 3, 5 or 6 balanced pressure capsules, and is designed to be installed in a vertical plane with the capsules sitting horizontally.

Available types

BP503/3H	Having three capsules
BP503/5H	Having five capsules
BP503/6H	Having six capsules

Please note: that when only three capsules are used the other seat drillings are sealed using plugs and the standard seat gaskets.

Certification

The trap body (cover and base) is available with material certification to EN 10204 3.1.B if requested at the time of order placement.

2.2 Sizes and pipe connections

The BP503 is only available in size DN50, with flanged connections to DIN PN16.

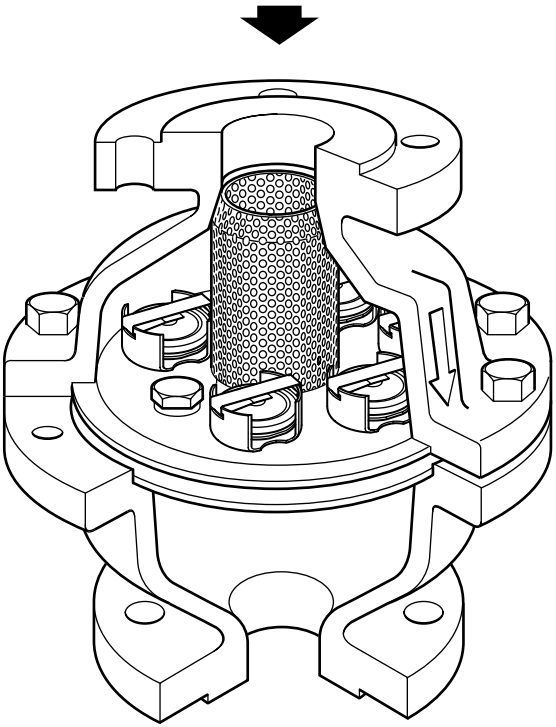
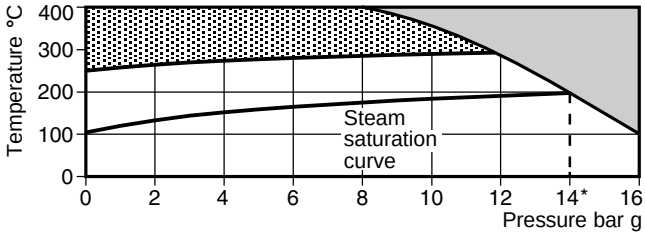


Fig. 1 BP503/5H shown

2.3 Limiting conditions

Maximum body design conditions	PN16	
PMA - Maximum allowable pressure	16 bar g	(232 psi g)
TMA - Maximum allowable temperature	400°C	(752°F)
PMO - Maximum operating pressure	14 bar g	(203 psi g)
TMO - Maximum operating pressure	285°C	(545°F)
Designed for a maximum cold hydraulic test pressure of:	24 bar g	(348 psi g)

2.4 Operating range



The product must not be used in this region.

The product should not be used in this region as damage to the internals may occur.

* PMO Maximum operating pressure recommended for saturated steam is 14 bar g (203 psi g).

3. Installation

Note: Before actioning 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 situation and the direction of fluid flow.

3.3 Remove protective covers from all connections.

3.4 The trap is designed to be installed with the capsules in a horizontal plane, and the flow vertically downwards, preferably with a drop leg immediately preceding the trap. Suitable isolation valves must be fitted to allow for safe maintenance and trap replacement.

3.5 Open isolation valves slowly, until normal operating conditions are achieved. Check for leaks and correct operation

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

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 steam temperature approaches again at which the cycle is repeated.

6. Maintenance

Note: Before actioning any maintenance program 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

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.
The trap must be fully removed from the pipepline to allow maintenance to be completed, once the safety procedures have been observed. It is recommended that new gaskets and spares are used whenever maintenance is undertaken. Ensure that the correct tools and necessary protective equipment are used at all times.

6.2 How to fit capsules and seats:

- Remove the trap from the pipeline (as explained above), and remove the cover, by unscrewing the cover nuts and bolts (**3**).
- Remove the capsule assemblies (**6** and **7**) and unscrew the valve seat from the body.
- Replace with new gaskets (**7**), mounting frames, and valve seat, and tighten to the recommended torque (see Table 1).
- Reassemble the spacer plates, capsules and spring clips.
- Fit new cover gaskets (**5**) and retighten cover nuts and bolts (**3**), evenly, to the recommended torque (see Table 1).
- When maintenance is complete, open isolation valves slowly until the normal pressure is obtained.
- Check for leaks.

6.3 How to clean or replace the strainer screen:

- Once the trap has been removed from the pipeline (as explained above) and the cover bolts and nuts have been unscrewed, the strainer screen (**8**) can easily be removed.
- Clean or replace as required, and reassemble the two halves of the trap to the recommended torque (see Table 1).
- When maintenance is complete, open isolation valves slowly until the normal pressure is obtained.
- Check for leaks.

Table 1 Recommended tightening torques

Item No.	Part	 or mm 	N m	(lbf ft)
3	**Cover bolt**	M12 x 50	85 - 95	(63 - 70)
6	**Capsule**	17 A/F	50 - 55	(37 - 40)
9	**Plug**	17 A/F	50 - 55	(37 - 40)

7. Spare parts

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

Available spares

Capsule and seat assembly set		**6, 7**
Strainer screen		**8**
Cover gaskets	(2 off)	**5**
Plug and gasket	(packet of 3 of each)	**9, 7**

How to order spares

Always order spares using the description given in the column headed 'Available spares' and state the size and model number and capsule reference.

Example: 3 off Capsule assembly and seat sets for a DN50 BP503/3H balanced pressure steam trap.

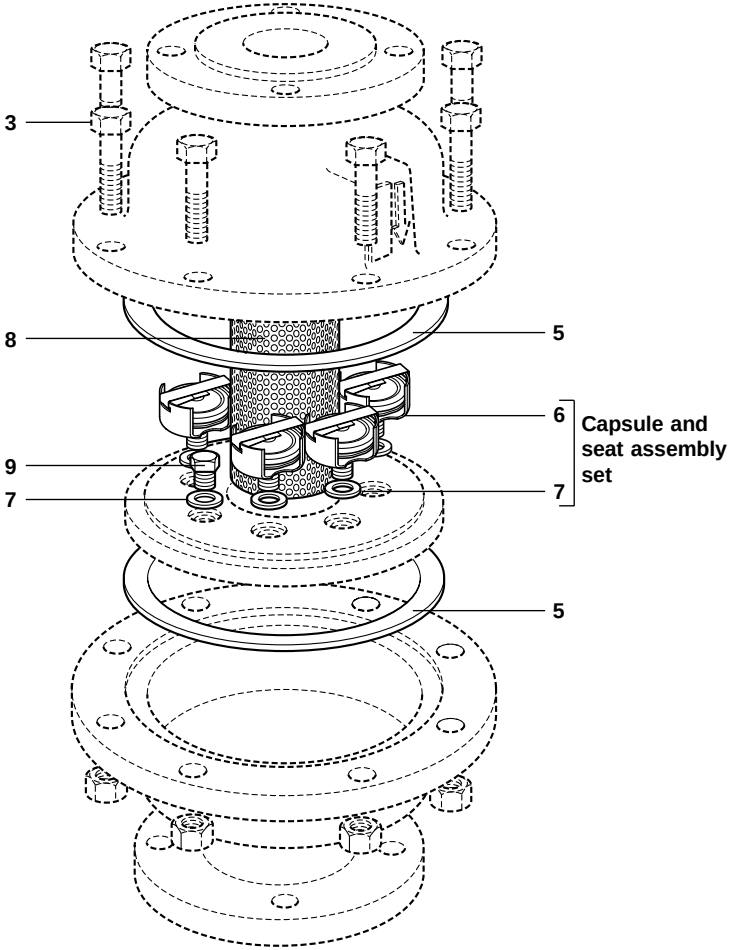


Fig. 2 BP503/5H shown