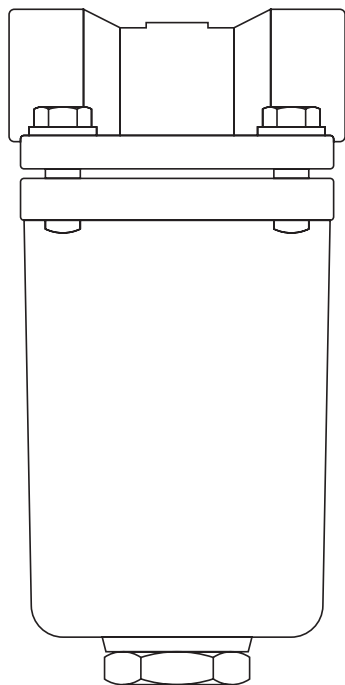


SCA Series

Inverted Bucket Steam Traps

Installation and Maintenance Instructions




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

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 Pressure Equipment Directive 2014/68/EU and carries the  mark when so required.

The product falls within the following Pressure Equipment Directive categories:

Product	Group 2 Gases	Group 2 Liquids
SCA Series	SEP	SEP

- i) The product has been specifically designed for use on steam, air or water/condensate which are 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 before installation.

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 425 °C (797 °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.

Please visit the Spirax Sarco product compliance web pages <https://www.spiraxsarco.com/product-compliance> for up to date information on any substances of concern that may be contained within this product. Where no additional information is provided on the Spirax Sarco product compliance web page, this product may be safely recycled and/or disposed providing due care is taken. Always check your local recycling and disposal regulations.

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.

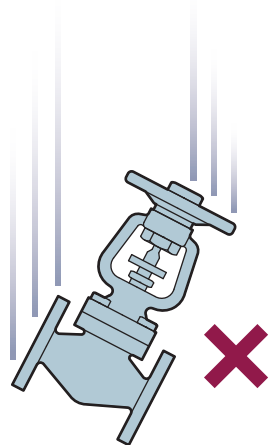
1.17 Working safely with cast iron products on steam

Cast iron products are commonly found on steam and condensate systems. If installed correctly using good steam engineering practices, it is perfectly safe.

However, because of its mechanical properties, it is less forgiving compared to other materials such as SG iron or carbon steel. The following are the good engineering practices required to prevent waterhammer and ensure safe working conditions on a steam system.

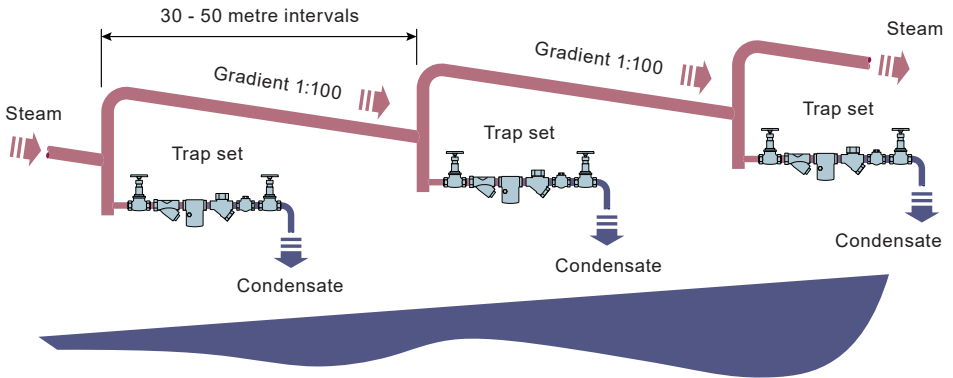
Safe Handling

Cast Iron is a brittle material. If the product is dropped during installation and there is any risk of damage the product should not be used unless it is fully inspected and pressure tested by the manufacturer.

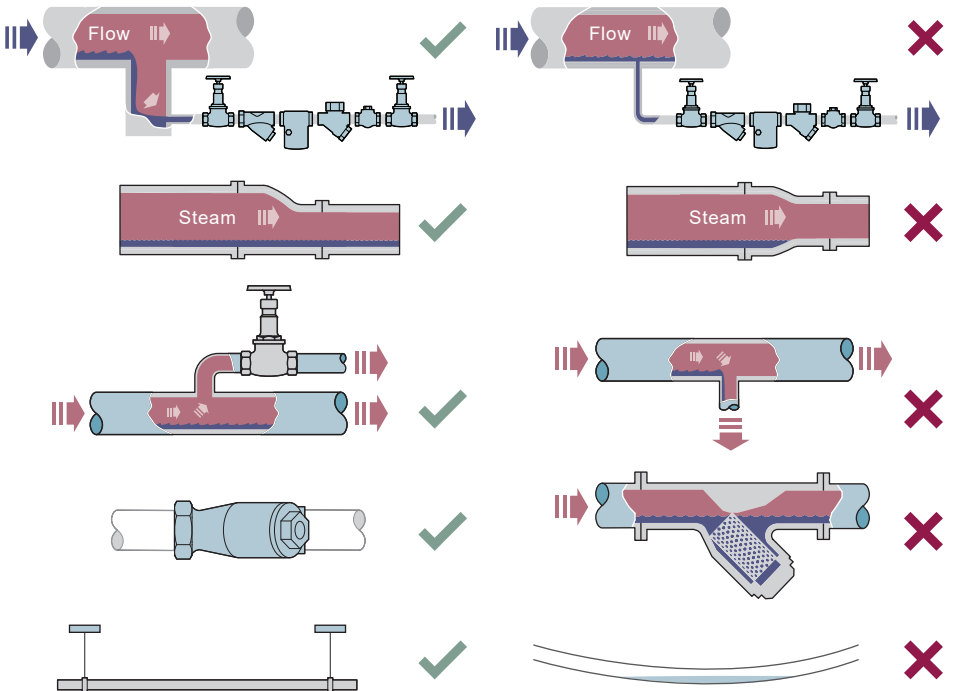


Prevention of waterhammer

Steam trapping on steam mains:

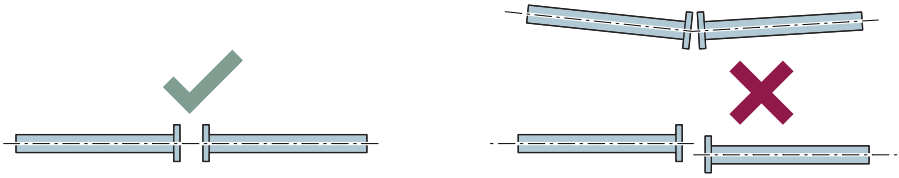


Steam Mains - Do's and Don'ts:



Prevention of tensile stressing

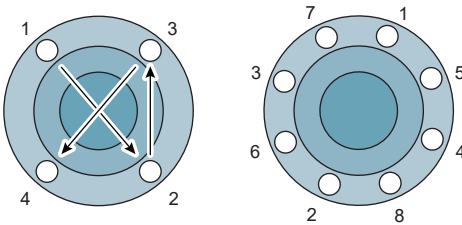
Pipe misalignment:



Installing products or re-assembling after maintenance:



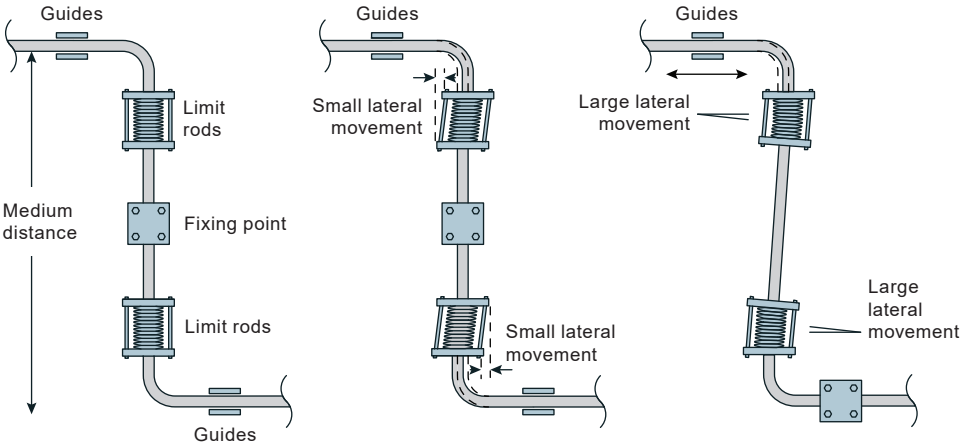
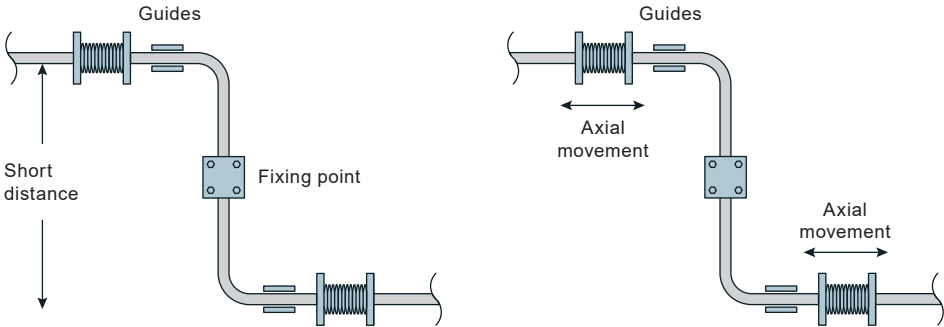
Do not over tighten.
Use correct torque figures.



Flange bolts should be gradually tightened across diameters to ensure even load and alignment.

Prevention of tensile stressing continued on next page

Thermal expansion:



2. General product information

2.1 General description

The Spirax Sarco SCA series are maintainable carbon steel inverted bucket steam traps with in-line connections. They are suitable for a wide range of pressures and incorporate an integral strainer.

Note: For additional information see the following Technical Information Sheet: TI-P077-05.

2.2 Sizes and pipe connections

½", ¾" and 1" screwed BSP T Rp (ISO 7-1) or NPT and socket weld ends to ANSI B16.11 Class 3000.
DN15, DN20 and DN25 flanged PN40, ANSI 150 and ANSI 300.

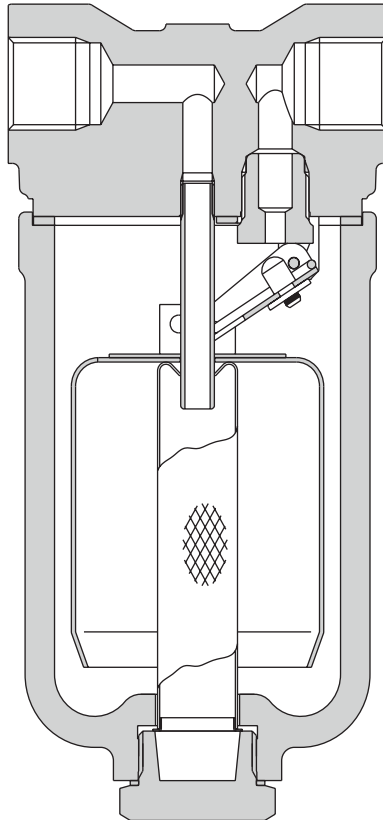
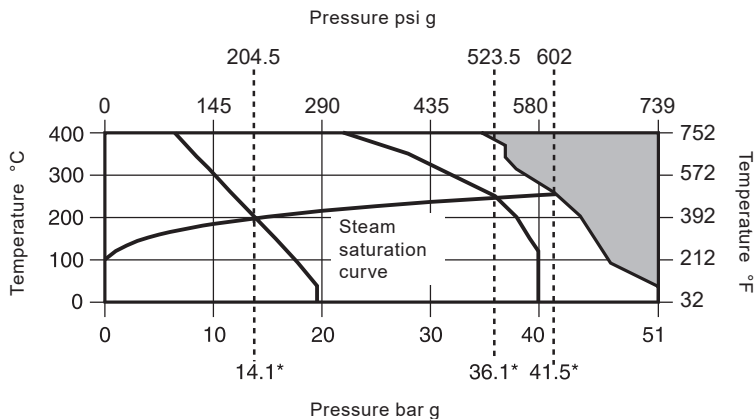


Fig. 1 SCA series inverted bucket steam trap

2.3 Pressure/temperature limits (ISO 6552)



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

*PMO Maximum operating pressure recommended for saturated steam

A - B Flanged ANSI 300, screwed and socket weld.

A - C Flanged BS 4504 PN40 (ISO 7005.1).

A - D Flanged ANSI 150.

Maximum operating conditions depend on the orifice size.

Body design conditions		ANSI/ASME 300 (PN50)	
PMA	Maximum allowable pressure	51 bar g	(739 psi g)
TMA	Maximum allowable temperature	400 °C	(752 °F)
Designed for a maximum cold hydraulic test pressure of:		78 bar g	(1 131 psi g)

SCA 30 product is verified safe for use under full vacuum conditions.

ΔPMX - Maximum differential pressure

ΔPMX - Maximum differential pressure bar						
Size	3	5	11	15	30	40
DN15 ½"	SCA3	SCA5	SCA11	SCA15	SCA30	SCA40
DN20 ¾"						
DN25 1"						

The SCA15, SCA30 and SCA40 are available as standard and the SCA3, SCA5 and SCA11 to special request.

Note: The pressure limit on the flange specified should be greater than the pressure limit of the internal mechanism. The table below offers guidance.

Flange	Pressure (at saturation)	Mechanism available
ANSI 150	14.1 bar g	SCA3, 5, 11 (15 limited to 14.1 bar g)
ANSI 300	41.6 bar g	all versions
PN40	36.1 bar g	SCA3, 5, 11, 15, 30 (40 limited to 36.1 bar 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 must be installed with the body upright so that the bucket is rising and falling vertically. The inlet and outlet connections should be in a horizontal plane, with the trap installed below the drain point so that a water seal can be maintained around the open end of the bucket. Inverted bucket steam traps do not permit rapid release of air. On process applications, in particular, this can lead to slow warm-up times and waterlogging of the steam space. A separate external air vent is therefore required in parallel to vent air efficiently. Any bypass should be positioned above the trap. If it is below, and is leaking or left open, the water seal could be blown away leading to steam wastage.
- 3.5** If the trap is installed on a superheated steam system application, then a non return valve should be fitted on the trap inlet, to prevent the trap from losing its waterseal. Priming of the trap with water may be required before commissioning.
- 3.6** Where inverted bucket steam traps are fitted in exposed conditions the possibility of freezing damage can be reduced by thermal insulation. Ensure you have the required tools available before undertaking the installation.
- 3.7** Open isolation valves slowly, until normal operating conditions are achieved.
- 3.8** 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 functional. Carry out tests on any alarms or protective devices.

5. Operation

Under most conditions the trap will discharge condensate with a 'blast' type action. Under low load and /or low pressure applications the discharge may tend to 'dribble'.

Condensate is discharged at steam temperature so due care must be given to the site of the discharge.

6. Maintenance

Note: Before actioning any maintenance programme 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.

6.2 How to fit the valve and seat assembly

- Isolate the inverted bucket steam trap and remove the cover by undoing the cover bolts (3).
- Remove the complete bucket assembly by undoing the two screws (11).
- Remove the valve seat (9).
- Screw in a new valve seat to the recommended torque (see Table 1), using a little jointing paste on the threads and making sure that joint faces are clean.
- Fix a new bucket assembly in position by using new screws (11) (supplied with the spares kit), centralise the valve to the orifice and tighten screws to the recommended torque (see Table 1).
- Using new gaskets, refit the body to the recommended torque (see Table 1) and reconnect outlet pipework.
- Isolation valves should be opened slowly to allow the pressure and temperature to build up in a controlled manner.
- Check for leaks.

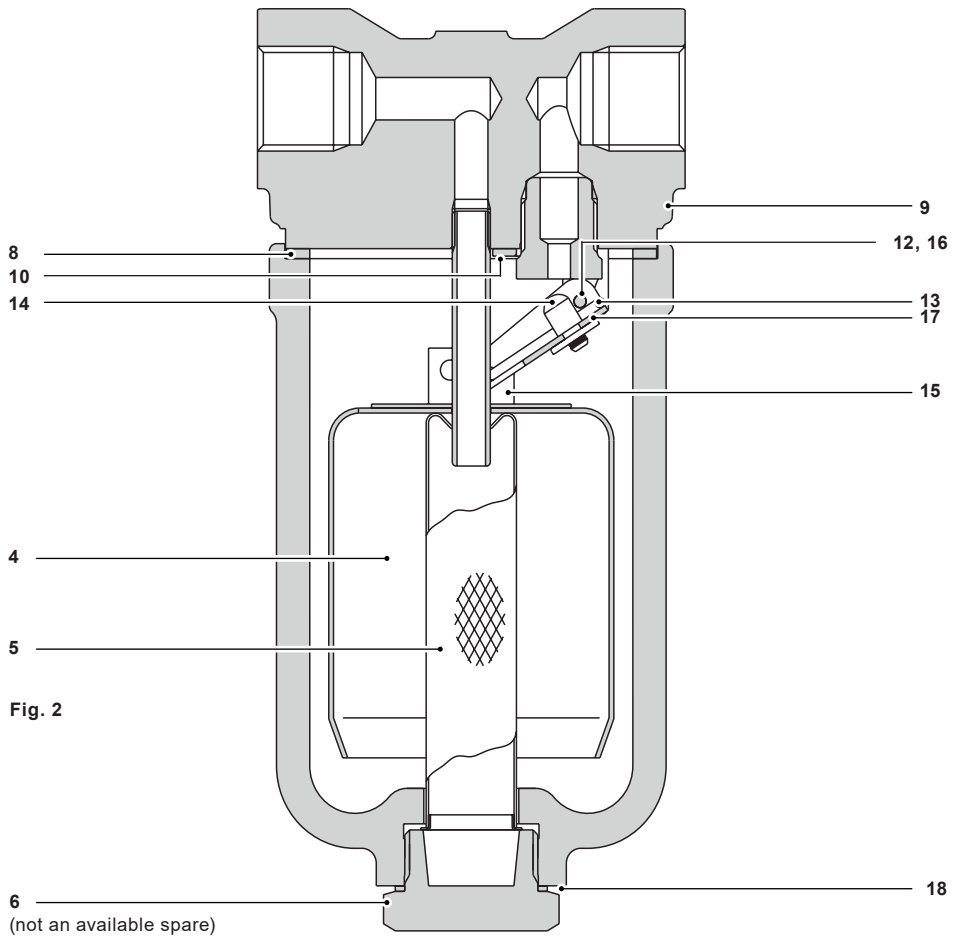
Table 1 Recommended tightening torques

Item	Part	 or mm		N m	(lbf ft)
3 *	Cover bolts	14 A/F	M10	40 - 45	30 - 33
6	Strainer cap	32 A/F	M28	170 - 190	125 - 140
9	Valve seat	17 A/F	M16	35 - 40	26 - 30
11 *	Valve guide plate screws	Posidrive	M4 x 6	2.5 - 3.0	2.0 - 2.5

* Items 3 and 11 are not illustrated

6.3 How to clean/replace strainer screen

- Unscrew the strainer cap (6).
- Remove the strainer screen (5).
- Clean or replace the strainer screen and reassemble using a new strainer cap gasket (18).
- Tighten the strainer cap (6) to the recommended tightening torques (see Table 1).
- Isolation valves should be opened slowly to allow the pressure and temperature to build up in a controlled manner.
- Check for leaks.



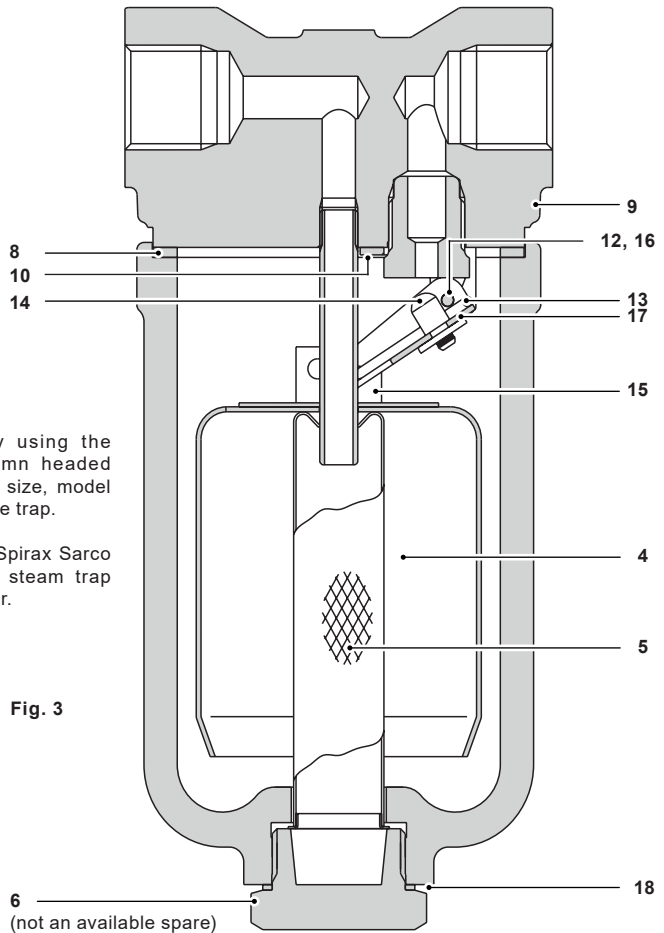
7. Spare parts

Spare parts are available as indicated. No other parts are supplied as spares.

Available spares

Internal set (state pressure range)	4, 8, 9, 10, 11 (2 off)*, 12, 13, 14, 15, 16 (2 off), 17
Strainer set	5, 18
Cover and strainer gasket (packet of three)	8, 18

*Item 11 (valve guide plate screws) are not shown.



How to order spares

Always order spare parts by using the description given in the column headed 'Available spares' and state the size, model number and pressure rating of the trap.

Example: 1 - Internal set for a Spirax Sarco DN20, SCA15 inverted bucket steam trap having a pressure rating of 15 bar.