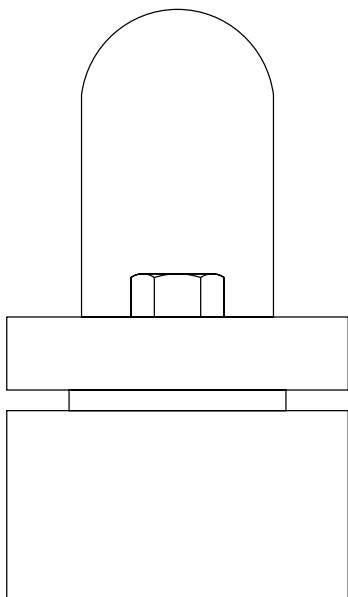


**PBX Series**  
**Quick Fit Connector Bimetallic Steam Traps**  
Installation and Maintenance Instructions

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

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# 1. Safety information

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Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11 on this document) 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 products listed below comply with the requirements of the European Pressure Equipment Directive 97/23/EC and carry the CE mark when so required. The products fall within the following Pressure Equipment Directive categories:

Product	Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
PBX	-	SEP	-	SEP

- i) The products have 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 protective 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.

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## **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.

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### **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 450°C (842°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.

### **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 Spirax Sarco PBX series, quick fit connector bimetallic steam traps are made of 316L stainless steel. The connectors are available in stainless steel 316L or carbon steel to ASTM A105. Pre-set and maintenance free, these steam traps can be mounted in any position, and once the connector is installed, the bimetallic trap assembly can be fitted in a few minutes without having to disturb the pipework. PBX steam traps are particularly suitable for food, pharmaceutical and oil industries, and are designed for a wide range of applications such as tracing, drips and draining collectors.

### Standards

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

### 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.

**Note:** For additional product data see Technical Information Sheet TI-P626-02.

### 2.2 Sizes and pipe connections

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1/2", 3/4" and 1" screwed BSP/NPT and socket weld

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DN15, DN20 and DN25 flanged PN40, ASME 150 and ASME 300

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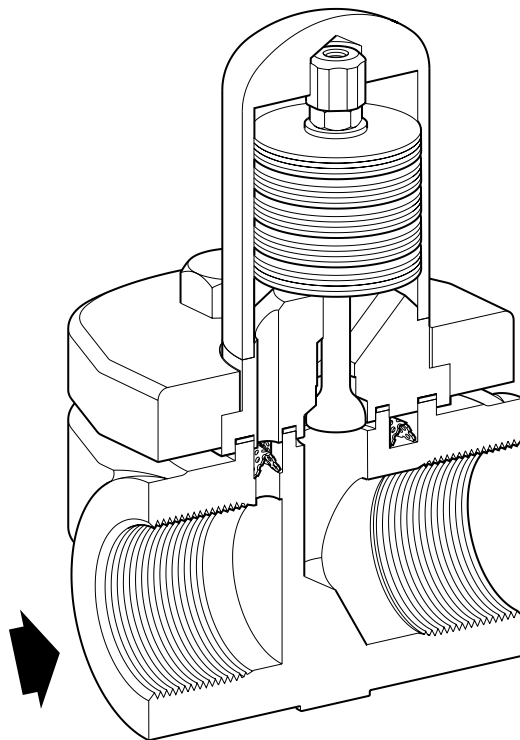
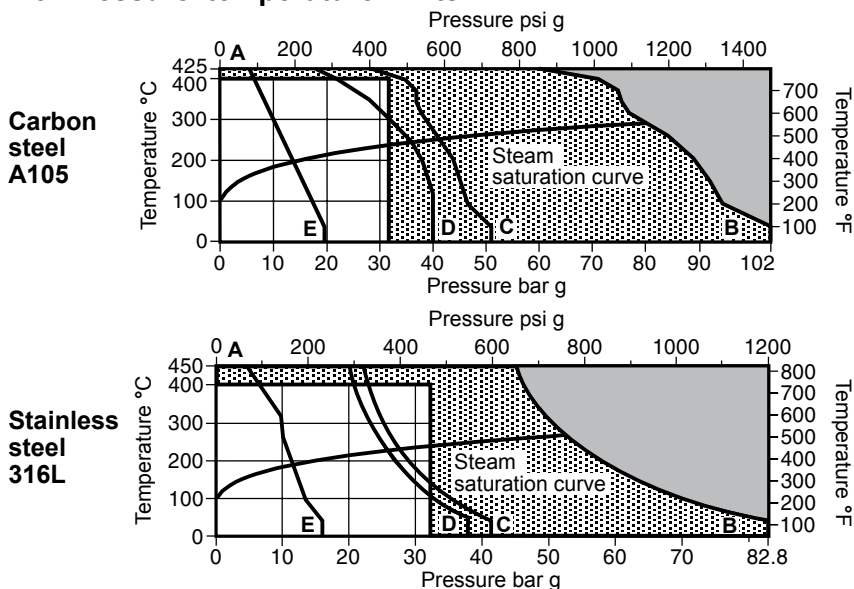



Fig. 1

## 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.

**A - B** Screwed BSP/NPT and socket weld.  
**A - C** Flanged ASME 300.

**A - D** Flanged PN40  
**A - E** Flanged ASME 150.

Body design conditions		PN110, Class 600 to ASME B 16.34	
PMA	Maximum allowable pressure	Stainless steel	82.8 bar g @ 37.8°C (1200.6 psi g @ 100°F)
		Carbon steel	102 bar g @ 37.8°C (1479 psi g @ 100°F)
TMA	Maximum allowable temperature	Stainless steel	450°C (842°F)
		Carbon steel	425°C (797°F)
Minimum allowable temperature		Stainless steel	- 10°C (14°F)
		Carbon steel	- 10°C (14°F)
PMO	Maximum operating pressure	PBX20	21.0 bar g @ 400°C (305 psi g @ 752°F)
		PBX30	32.0 bar g @ 400°C (464 psi g @ 752°F)
		PBX40	12.0 bar g @ 400°C (174 psi g @ 752°F)
		PBX50	21.0 bar g @ 400°C (305 psi g @ 752°F)
TMO	Maximum operating temperature	400°C (752°F)	
Minimum operating temperature		0°C (32°F)	
Minimum operating pressure for satisfactory operation is:		PBX20	0.1 bar g (1.5 psi g)
		PBX30	10.0 bar g (145 psi g)
		PBX40	0.1 bar g (1.5 psi g)
		PBX50	1.0 bar q (14.5 psi g)

ΔPMX The backpressure for correct operation must not exceed 90% of the upstream pressure

Designed for a maximum cold hydraulic test pressure of: 124 bar g (1798 psi g)

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## 3. Installation

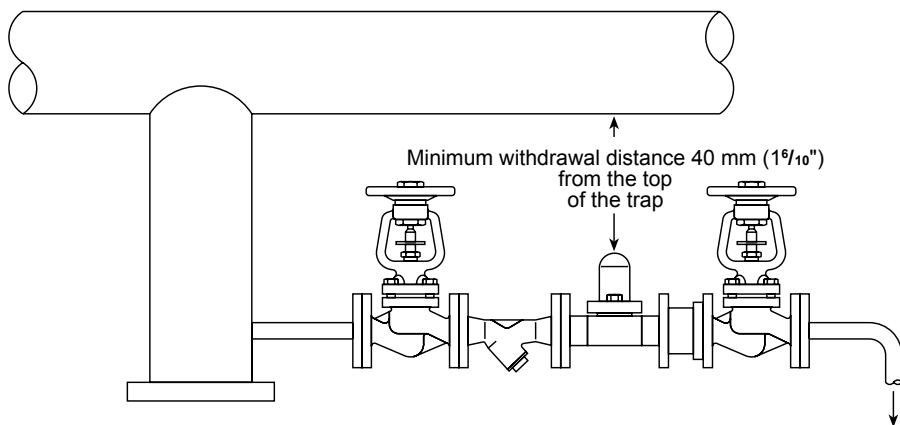
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**Note:** Before actioning any installation observe the 'Safety information' in Section 1.

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 correct 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** Install the steam trap downstream of the equipment to be drained, ensuring that it is easily accessible for inspection and maintenance.
- 3.5** The steam trap may be installed in any position.
- 3.6** Before installing the trap, ensure all connecting pipework is clean and free of debris.
- 3.7** Mount the steam trap with the arrow on the body pointing in the direction of the flow of the liquid.
- 3.8** The steam trap can be welded onto the pipework without removing the internal components. For socket welded traps, observe qualified welding procedures. It is not necessary to remove the trap internals when welding, but avoid excessive heat.
- 3.9** The steam trap is factory set.

**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).



**Fig. 3 Recommended installation**

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## 4. Commissioning

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

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## 5. Operation

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The Spirax Sarco PBX range are bimetallic steam traps.

These traps operate 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 PBX range operates with no loss of steam and automatically and quickly drains air, non-condensable gases and large quantities of cold water on start-up.

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## 6. Maintenance

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### **Note:**

Before actioning any maintenance programme observe the 'Safety information' in Section 1.

### **Warning**

The flange gasket contains 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.

The equipment needed to proceed with any maintenance programme is listed in Table 1.

Maintenance can be completed with the trap in the pipeline, 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. When maintenance is complete open isolation valves slowly and check for leaks.

### **6.1 Replacing the bimetallic element**

Spares available to repair steam traps (see Section 7).

### **6.2 Replacing the bimetallic trap assembly:**

- Isolate the steam trap.
- Unscrew the 2 cover bolts (5).
- Remove the fixing flange (4) and gasket (6).
- Remove the bimetallic trap assembly (3).
- Remove the strainer screen (2) and clean the sealing surfaces in the body (1).
- The replacement bimetallic trap assembly comes complete with new gaskets and strainer screen, ensure that if the replacement strainer screen is vee shaped, it is installed with the apex pointing upwards.
- Place the new gasket (6) over the trap before fitting the fixing flange assembly (4).
- Screw the 2 cover bolts (5) in place ensuring they are tightened evenly to the recommended torque (see Table 1).



# 7. Spare parts

The spare parts available are detailed below. No other parts are supplied as spares.

## Available spares

Bimetallic trap assembly with gasket and strainer screen

2, 3, 6

## How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and model of the bimetallic steam trap.

**Example:** 1 - Bimetallic trap assembly with gasket and strainer screen for a Spirax Sarco ½" PBX20 quick fit connector bimetallic steam trap.

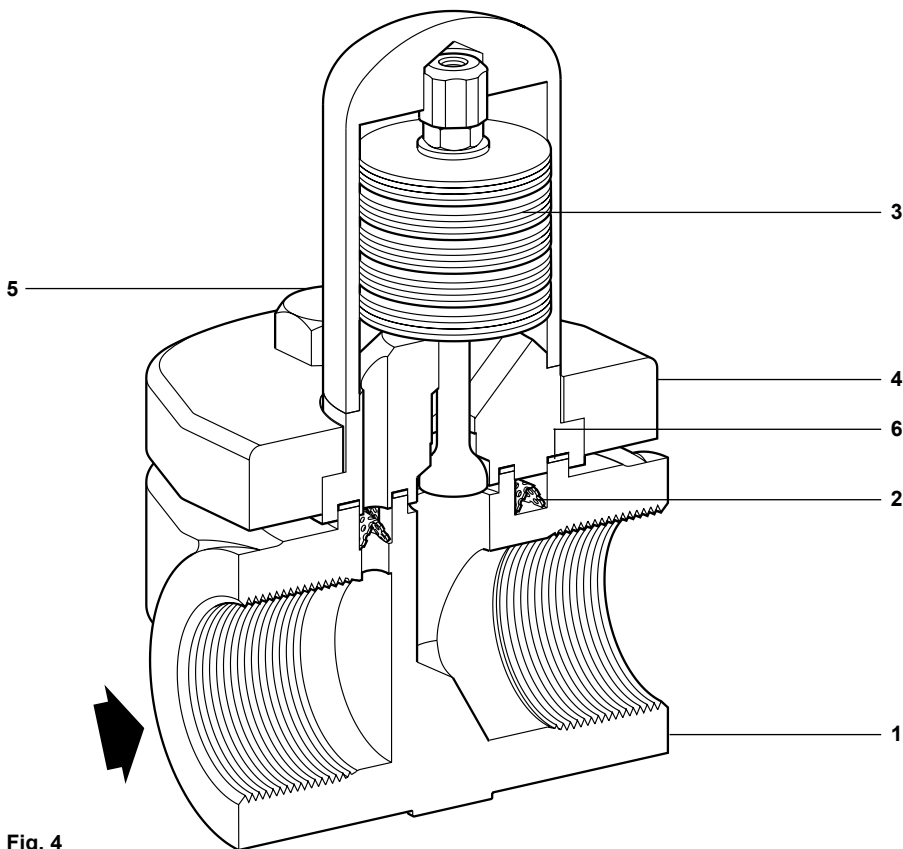




Fig. 4

Table 1 Recommended tightening torques

Item	Option	 or  mm	N m	lbf ft
5	PBX20 PBX30	16 A/F	45 - 55	33 - 40
	PBX40 PBX50	19 A/F	45 - 55	33 - 40

## 8. Fault finding

<b>Trap fails to pass condensate</b>	1. Make sure upstream and downstream valves are open.
	2. Check external strainers for clogging; blowdown or dismantle and clean.
	3. Backpressure too high. Downstream system must be corrected. Backpressure will also lower the discharge temperature.
	4. Valve port or internal filter clogged with dirt. Dismantle, inspect and clean.
	5. Dismantle and inspect internals.
	6. Bimetallic element failed. Replace trap module.
<b>Trap blows live steam</b>	1. Dirt on seating surface. Replace trap module.
	2. Bimetallic element failed. Replace trap module.
	3. Worn valve seat. Replace trap module.



