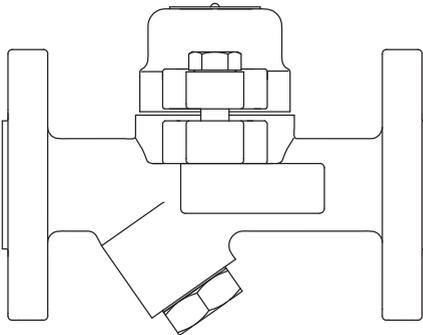


**BPC32, BPC32Y, BPC32F, BPC32YF,
BPC32CV, BPC32CVF, BPC32YCV and BPCYCVF**
Carbon Steel**Balanced Pressure Thermostatic Steam Traps**Installation and Maintenance Instructions



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



1. Safety information

Safe operation of these products can only be guaranteed if they are 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 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
BPC32	-	SEP	-	SEP
BPC32Y	-	SEP	-	SEP
BPC32F	-	SEP	-	SEP
BPC32YF	-	SEP	-	SEP
BPC32CV	-	SEP	-	SEP
BPC32CVF	-	SEP	-	SEP
BPC32YCV	-	SEP	-	SEP
BPCYCVF	-	SEP	-	SEP

- i) These 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 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 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 the products may reach temperatures in excess of 250°C (482°F).

The product is 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

These products are recyclable - No ecological hazard is anticipated with 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 Description

The BPC32, BPC32F, BPC32Y and BPC32YF are carbon steel maintainable balanced pressure thermostatic steam traps with straight connections.

The BPC32F has flanges integral to the body and has straight connections. The letter 'F' in the product name denotes this version.

The BPC32 and BPC32F have an integral flat strainer screen and the BPC32Y and BPC32YF have an integral, cylindrical, Y-type strainer. This range of steam traps is also available with a check valve option - If the check valve option has been requested it will have CV in the product nomenclature e.g.: BPC32CV. All pressure bearing components are produced by TÜV approved suppliers in accordance with AD-Merkblatt WO/TRD100.

These traps are unaffected by waterhammer and are available as follows:-

Standard units	BPC32 BPC32F BPC32Y BPC32YF	Having 'STD' fill capsule.	Note: For additional information on these steam traps see the following Technical Information Sheet TI-P005-01 and TI-P005-10.
Also available	BPC32CV BPC32CVF BPC32YCV BPS32YCVF	Having 'STD' fill capsule and check valve.	

Note: When placing an order always state capsule fill.

Capsule fill and operation:

Standard capsule - Is marked with '**STD**' for operation at approximately 12°C (21.6°F) below steam saturation temperature.

Optionally - The capsule can be supplied for sub-cooled '**SUB**' operation at approximately 24°C (43.2°F) below steam saturation temperature or near-to-steam '**NTS**' operation at approximately 6°C (10.8°F) below steam temperature.

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.

2.2 Sizes and pipe connections

½", ¾", and 1" screwed BSP or NPT.

½", ¾", and 1" socket weld ends to BS 3799.

½", ¾", and 1" butt weld ends to EN 12 627.

DN15, DN20 and DN25 standard flange to EN 1092 PN40,

ASME (ANSI) B 16.5 Class 150 and 300, JIS/KS 10K and JIS/KS 20K.

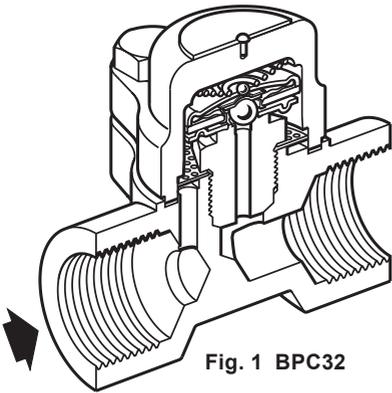


Fig. 1 BPC32

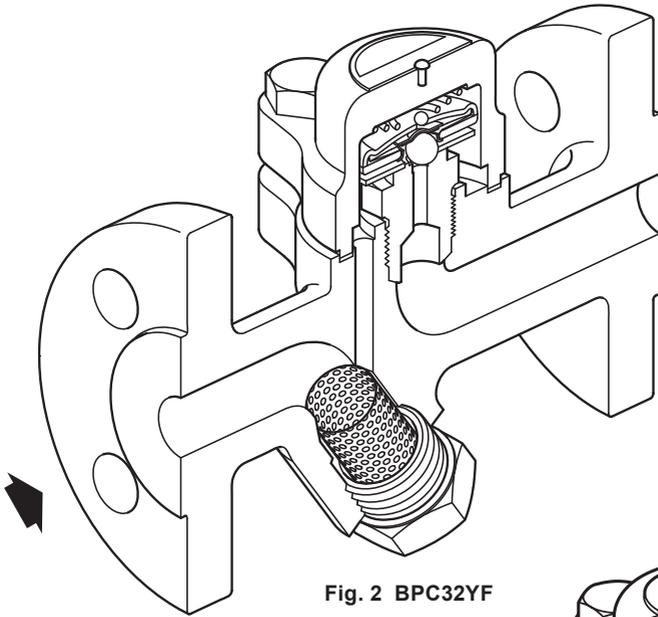


Fig. 2 BPC32YF

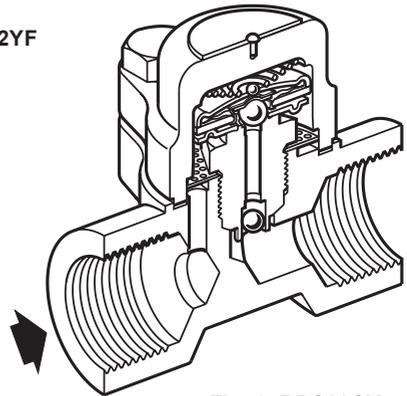
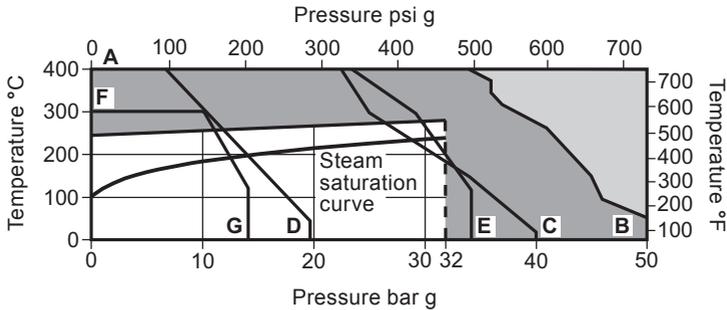


Fig. 3 BPC32CV

2.3 BPC32, BPC32Y, BPC32CV and BPC32YCV Pressure/temperature limits (ISO 6552)



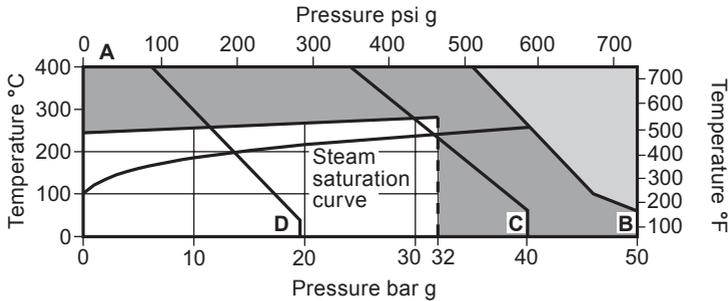
 The product **must not** be used in this region.

 The product should not be used in this region or beyond its operating range as damage to the internals may occur.

- A - B** Screwed, socket weld, butt weld and flanged ASME (ANSI) 300.
- A - C** Flanged EN 1092 PN40.
- A - D** Flanged ASME (ANSI) 150.
- A - E** Flanged JIS/KS 20K.
- F - G** Flanged JIS/KS 10K.

Body design conditions		ASME (ANSI) 300
PMA	Maximum allowable pressure	50 bar g @ 50°C (725 psi g @ 122°F)
TMA	Maximum allowable temperature	400°C @ 35 bar g (752°F @ 507 psi g)
	Minimum allowable temperature	-60°C (-76°F)
PMO	Maximum operating pressure for saturated steam service	32 bar g (464 psi g)
TMO	Maximum operating temperature	281°C @ 32 bar g (538°F @ 464 psi g)
	Minimum operating temperature	0°C (32°F)
Note: For lower operating temperatures consult Spirax Sarco.		
Designed for a maximum cold hydraulic test pressure of:		75 bar g (1088 psi g)

2.4 BPC32F, BPC32YF, BPC32CVF and BPC32YCVF Pressure/temperature limits (ISO 6552)



 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 Flanged ASME (ANSI) 300.

A - C Flanged EN 1092 PN40.

A - D Flanged ASME (ANSI) 150.

Body design conditions		ASME (ANSI) 300	
PMA	Maximum allowable pressure	50 bar g @ 50°C (725 psi g @ 122°F)	
TMA	Maximum allowable temperature	400°C @ 35 bar g (752°F @ 507 psi g)	
Minimum allowable temperature		-60°C	(-76°F)
PMO	Maximum operating pressure for saturated steam service	32 bar g	(464 psi g)
TMO	Maximum operating temperature	281°C @ 32 bar g (538°F @ 464 psi g)	
Minimum operating temperature		0°C	(32°F)
Note: For lower operating temperatures consult Spirax Sarco.			
Designed for a maximum cold hydraulic test pressure of:		75 bar g	(1088 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 and the protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.
- 3.4** The trap is designed for installation in any position, horizontal or vertical, preferably with a drop leg immediately preceding the trap - typically 150 mm (6") see Figure 4.
Caution: If no drop leg is allowed then it may be possible (under low load conditions) for steam to flow over the condensate in the bottom of the pipe and reach the trap.
- 3.5** Always fit a non-return (check) valve downstream of any steam traps which discharge into condensate return lines where backpressure is experienced. This is most commonly caused by a rising condensate line. The check valve will prevent the steam space flooding when the inlet pressure is reduced or the steam is shut off. Use a suitable valve such as the Spirax Sarco DCV41, see Figure 4.
- 3.6** When the trap is discharging to atmosphere, it is strongly recommended to install a diffuser on the outlet side of the trap. This reduces any problem of noise and erosion by cushioning high velocity discharge. See TI-P155-02 for further information.
- 3.7** Isolation valves must be installed to allow for safe maintenance and trap replacement.
- 3.8** Open isolation valves slowly until normal operating conditions are achieved.
- 3.9** Check for leaks and correct operation.
- 3.10** Ensure adequate space is left to remove the cover from the body for maintenance. Minimum withdrawal distance for the cover is 37 mm (1½") and minimum withdrawal distance for the strainer screen (BPC32Y, BPC32YF and BPC32YCVF) is 28 mm (1⅙").
- 3.11 Welding into the pipeline** - There is no need to remove the operating capsule from the product providing the welding is performed using the electric arc method. For specific weld procedures consult the relevant National and International welding standards.

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

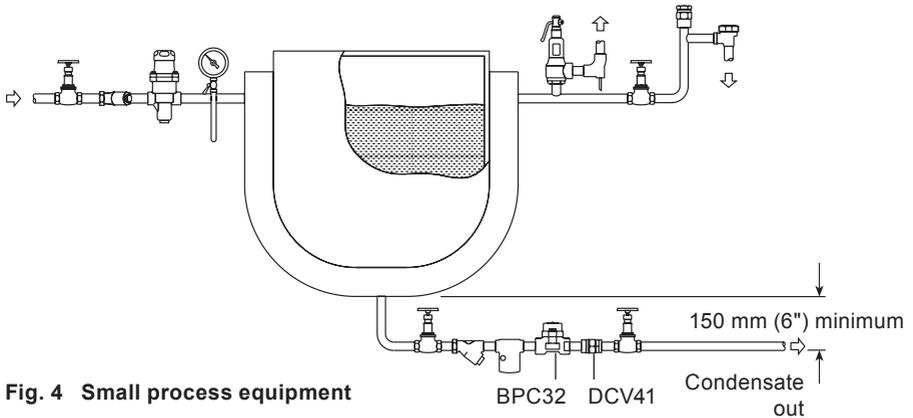


Fig. 4 Small process equipment

4. Commissioning

After installation or maintenance ensure that the system is fully functional. 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 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. 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.

6.2 How to fit a new capsule and seat:

- Remove the cover (1) and the spring (17) from the body (8) by unscrewing the two cover bolts (9).
- Remove the capsule (2) and spacer plate (18).
- Unscrew the valve seat (3) from the body (8).
- Clean or replace the strainer screen (5, BPC32, BPC32F, BPC32CV and BPC32CVF only).
- Replace the valve seat (3) and tighten to the recommended torque (see Table 1, page 13).
- It is recommended to fit a new cover gasket (7) reassemble the spacer plate (18) ensuring that it is located centrally on the valve seat (3).
- Reassemble the capsule (2), spring (17) and cover (1).

Note: Care must be taken to ensure that the cover bolts (9) are progressively tightened to the recommended torque (see Table 1, page 13).

6.3 How to clean or replace the 'Y' type strainer screen - BPC32YF and BPC32YCVF:

- Undo the strainer cap (10) and remove the strainer screen (5).
- Clean or replace as required and reassemble the strainer cap (10) into the body (8), ensuring that the strainer screen (5) is located centrally and a new strainer cap gasket (11) is recommended.
- Using a little anti-seize compound on the threads tighten to the recommended torque (see Table 1, page 13).

6.4 How to clean or replace the strainer screen - BPC32, BPC32F, BPC32CV and BPC32CVF:

- Remove the cover (1) and spring (17) from the body (8) by unscrewing the two cover bolts (9).
- Remove the capsule (2) and spacer plate (18).
- Unscrew the valve seat (3) from the body (8).
- Clean or replace the screen (5) as required.
- Replace the valve seat (3) and tighten to the recommended torque (see Table 1, page 13).
- It is recommended to fit a new cover gasket (7), reassemble the spacer plate (18) ensuring that it is located centrally on the valve seat (3).
- Reassemble the capsule (2), spring (17) and cover (1).

Note: Care must be taken to ensure that the cover bolts (9) are progressively tightened to the recommended torque (see Table 1, page 13).

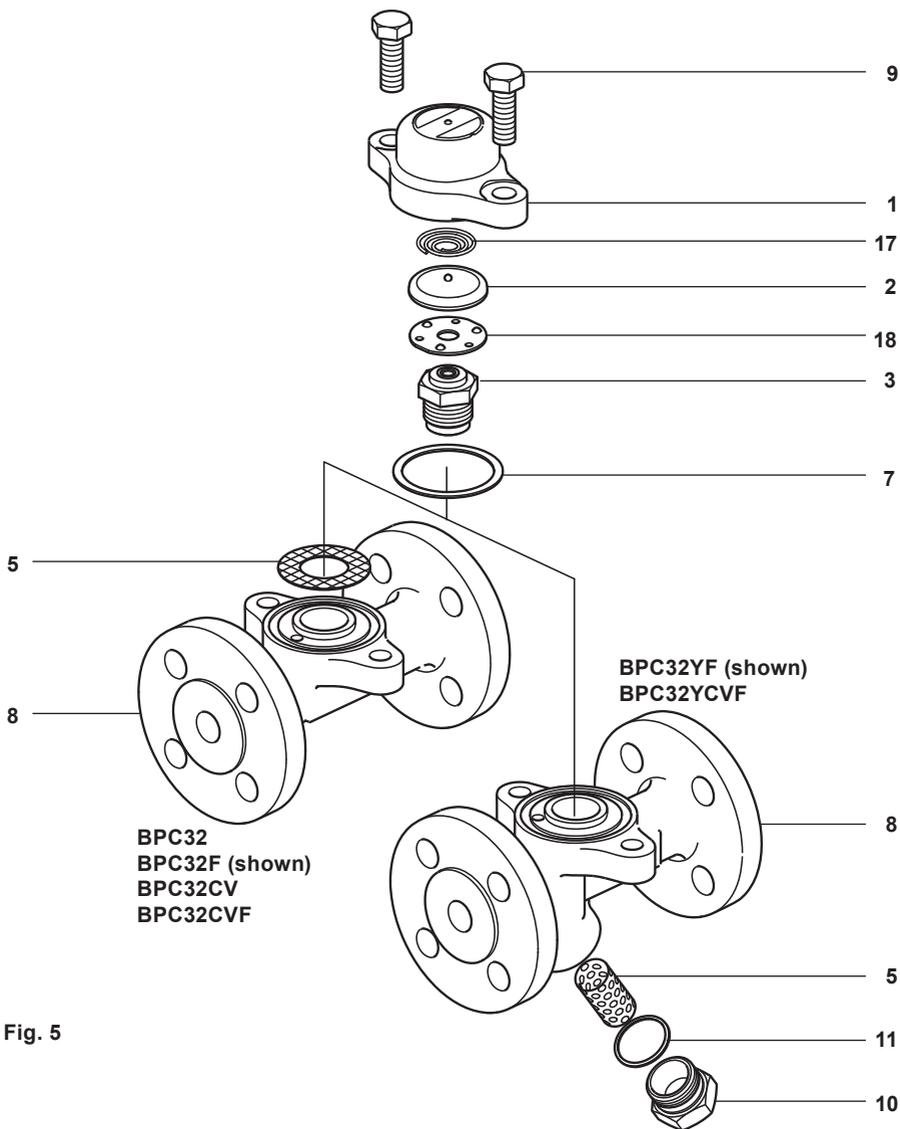


Fig. 5

Table 1 Recommended tightening torques

Item	Part	 or mm		N m	(lbf ft)
3	Valve seat	24 A/F		115 - 125	(82 - 89)
9	Cover bolts	16 A/F	M10 x 30	23 - 27	(16 - 19)
10	Strainer cap	27 A/F		120 - 135	(86 - 96)

7. Spare parts

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

Available spares

Capsule and seat assembly set		2, 3, 17, 18
Strainer screen	BPC32, BPC32F, BPC32CV and BPC32CVF	(3 off) 5
Strainer screen and gasket	BPC32Y, BPC32YF, BPC32YCV and BPC32YCVF	(1 off each) 5, 11
Set of cover gaskets		(packet of 3) 7
Strainer cap gasket		(packet of 3) 11

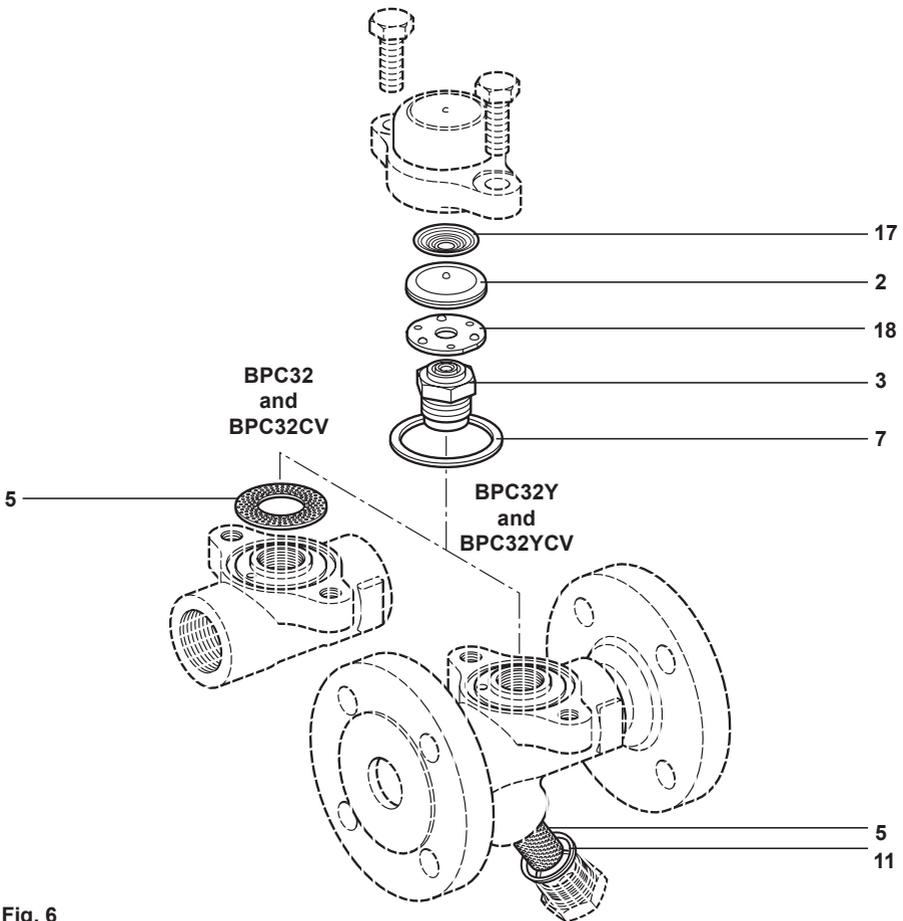


Fig. 6

How to order spares

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

Example: 1 - Capsule and seat assembly set for a Spirax Sarco DN25 BPC32F having an 'STD' fill capsule for operation at 12°C (21.6°F) below steam saturation temperature.

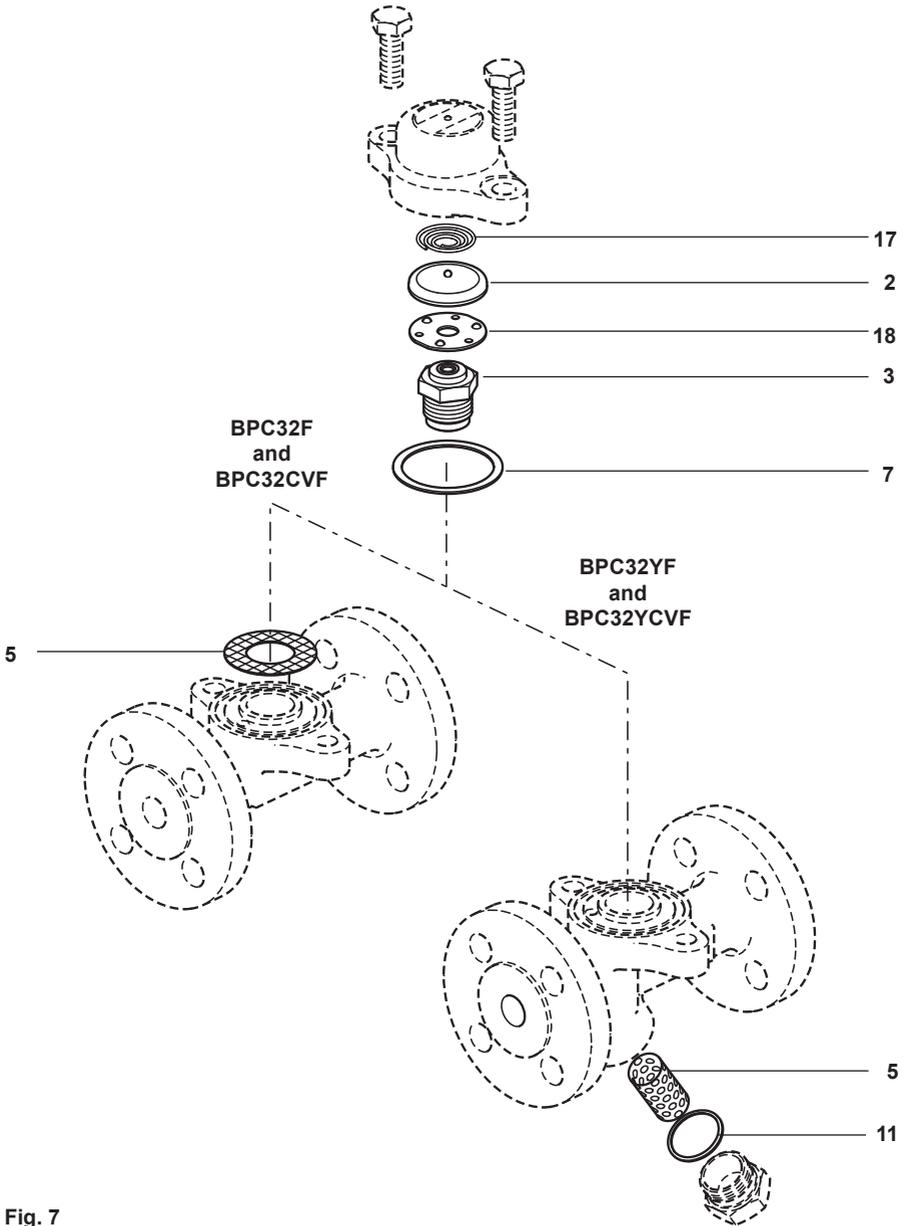


Fig. 7

