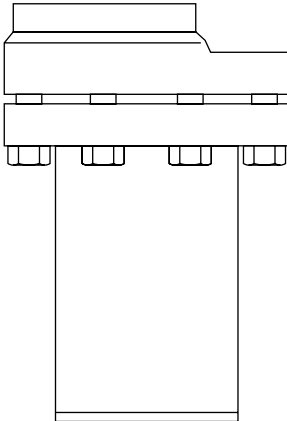


**600 and 900 Series  
Inverted Bucket Steam Traps  
Installation and Maintenance Instructions**

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

# — 1. *General safety information* —

Safe operation of these units can only be guaranteed if they are 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**

These products are recyclable. No ecological hazard is anticipated with the disposal of these products providing due care is taken.

# — 2. General product information —

## 2.1 Description

The Spirax Sarco 600 and 900 series alloy steel inverted bucket steam traps are designed for installation in vertical pipework between flanges. They are suitable for a wide range of pressures and applications and include an integral check valve on the inlet.

### Certification

The product is available with material certification to EN 10204 3.1.B as standard. Certification must be specified at the time of order placement.

**Note:** For additional information see the following Technical Information Sheets; For the **600 Series** see TI-P067-01 and for the **900 Series** see TI-P067-02. For the capacities of both the 600 and 900 Series see TI-P067-04 .

## 2.2 Sizes and pipe connections

### 600 series

DN15 - 621, DN20 - 622, DN25 - 623, DN40 - 625 and DN50 - 626

In all sizes the body and cover forgings form the inlet and outlet flanges.

The drilled holes in both inlet and outlet flanges are tapped to receive bolts.

ANSI flanges are tapped UNC. BS 4504 and DIN flanges are tapped metric.

Flanges meet the requirements of ANSI 150, 300 and 600, BS 4504 and DIN PN25 and PN40.

BS 10 flanges can be supplied on request.

### 900 series

DN15 - 921, DN20 - 922, DN25 - 923, DN40 - 925 and DN50 - 926.

In all sizes the body and cover forgings form the inlet and outlet flanges.

The drilled holes in both inlet and outlet flanges are tapped to receive bolts.

ANSI flanges are tapped UNC. BS 4504 and DIN flanges are tapped metric.

Flanges meet the requirements of ANSI 600 or PN64. BS 10 flanges can be supplied on request.

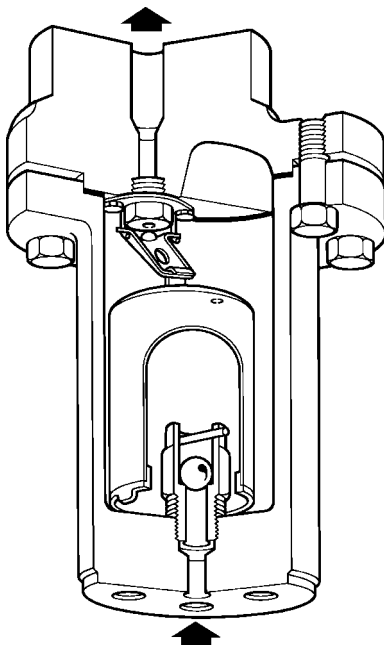


Fig. 1

## 2.3 600 series

### Limiting conditions (ISO 6552)

Maximum body design conditions	Exceeds PN40	
PMA - Maximum allowable pressure	41 bar g @ 250°C	(595 psi g @ 482°F)
TMA - Maximum allowable temperature	400°C @ 29 bar g	(752°F @ 420 psi g)
Designed for a maximum cold hydraulic test pressure of:	62 bar g	(900 psi g)

### ΔPMX - Maximum differential pressure

Size	ΔPMX - Maximum differential pressure bar (psi)			
	8.5 (123.3)	17 (246.5)	31 (449.6)	41 (594.6)
DN15	621/12	621/10	621/8	621/7
DN20	622/12	622/10	622/8	622/7
DN25	623/16	623/12	623/10	623/8
DN40	625/22	625/18	625/14	625/12
DN50	626/32	626/24	626/20	626/18

**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	13.8 bar g (200.1 psi g)	8.5 bar (123.3 psi)
ANSI 300	42.0 bar g (609.0 psi g)	all versions
ANSI 600	84.0 bar g (1218.3 psi g)	all versions
PN25	25.0 bar g (362.5 psi g)	8.5, 17 bar (123.3, 246.5 psi)
PN40	40.0 bar g (580.0 psi g)	8.5, 17, 31 bar (123.3, 246.5, 449.6 psi)

**Dimensions / weights approximate in mm (ins) and kg (lb)**

Size	A	B	C	D	E	Weight
DN15 - ½"	270 (10.63)	185 (7.28)	203 (7.99)	121 (4.76)	28 (1.10)	18.1 (39.91)
DN20 - ¾"	270 (10.63)	185 (7.28)	203 (7.99)	121 (4.76)	28 (1.10)	18.1 (39.91)
DN25 - 1"	310 (12.20)	203 (7.99)	229 (9.02)	130 (5.11)	36 (1.41)	29.5 (65.04)
DN40 - 1½"	410 (16.14)	248 (9.76)	305 (12.00)	168 (6.61)	45 (1.77)	50.0 (110.23)
DN50 - 2"	452 (17.79)	301 (11.85)	330 (12.99)	213 (8.38)	52 (2.04)	79.4 (175.07)

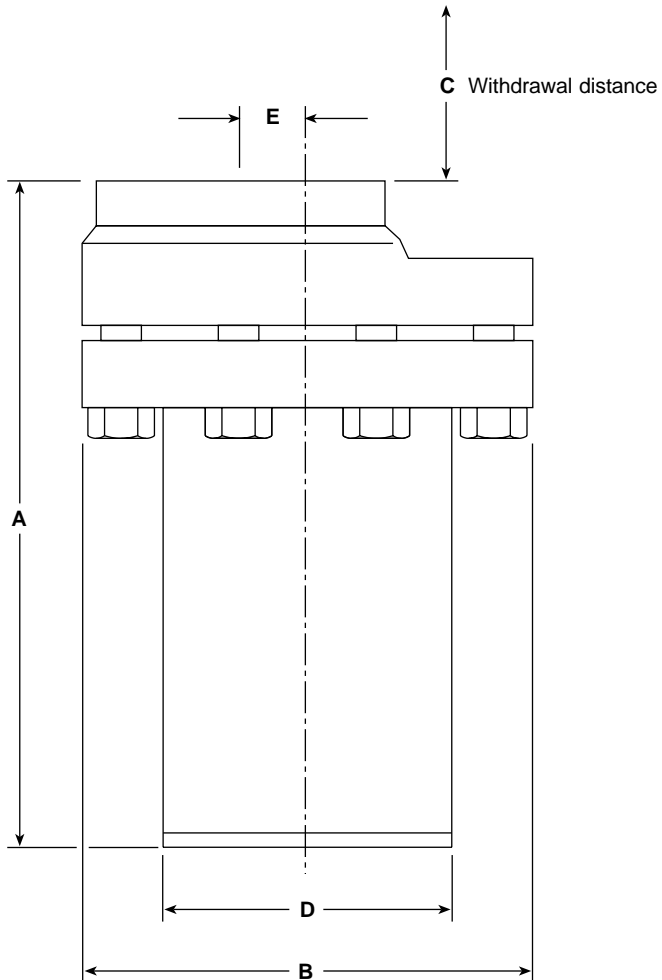


Fig. 3

## 2.4 900 series

### Limiting conditions (ISO 6552)

Maximum body design conditions	Exceeds PN63	
PMA - Maximum allowable pressure	62 bar g @ 260°C	(900 psi g @ 500°F)
TMA - Maximum allowable temperature	400°C @ 49 bar g	(752°F @ 710 psi g)
Designed for a maximum cold hydraulic test pressure of:	93 bar g	(1 348 psi g)

### ΔPMX - Maximum differential pressure

Size	ΔPMX - Maximum differential pressure bar (psi)	
	48 (696)	62 (899)
DN15	-	921/8
DN20	-	922/8
DN25	923/12	923/10
DN40	925/12	925/10
DN50	926/18	926/16

**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 600	84 bar g (1218 psi g)	all versions
PN40	60 bar g (870 psi g)	48 bar (696 psi)
PN64	64 bar g (928 psi g)	48 bar (696 psi)

**Dimensions / weights approximate in mm (ins) and kg (lb)**

Size	A	B	C	D	E	Weight
DN15 - ½"	310 (12.20)	203 (7.99)	229 (9.02)	130 (5.11)	36 (1.41)	29.5 (65.04)
DN20 - ¾"	310 (12.20)	203 (7.99)	229 (9.02)	130 (5.11)	36 (1.41)	29.5 (65.04)
DN25 - 1"	410 (16.14)	248 (9.76)	305 (12.00)	168 (6.61)	45 (1.77)	50.0 (110.23)
DN40 - 1½"	410 (16.14)	248 (9.76)	305 (12.00)	168 (6.61)	45 (1.77)	50.0 (110.23)
DN50 - 2"	452 (17.79)	301 (11.85)	330 (12.99)	213 (8.38)	52 (2.04)	79.4 (175.07)

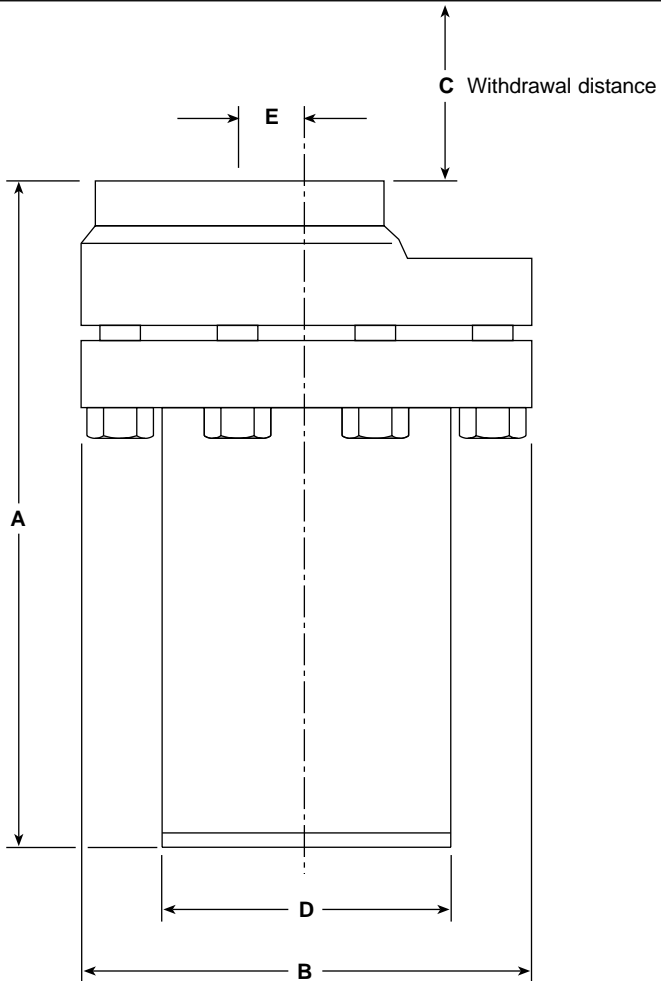


Fig. 3

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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 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 should be at the bottom with the trap installed below the drain point so that a water seal can be maintained around the open end of the bucket. When superheat conditions exist the trap body may need to be primed with water prior to steam being turned on to avoid steam blowing through the trap.  
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 waterseal could be blown away leading to steam wastage. Where inverted bucket traps are fitted in exposed conditions the possibility of freezing damage can be reduced by thermal insulation.
- 3.5** Open the isolation valves slowly until the normal operating conditions are achieved.
- 3.6** 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).

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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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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.



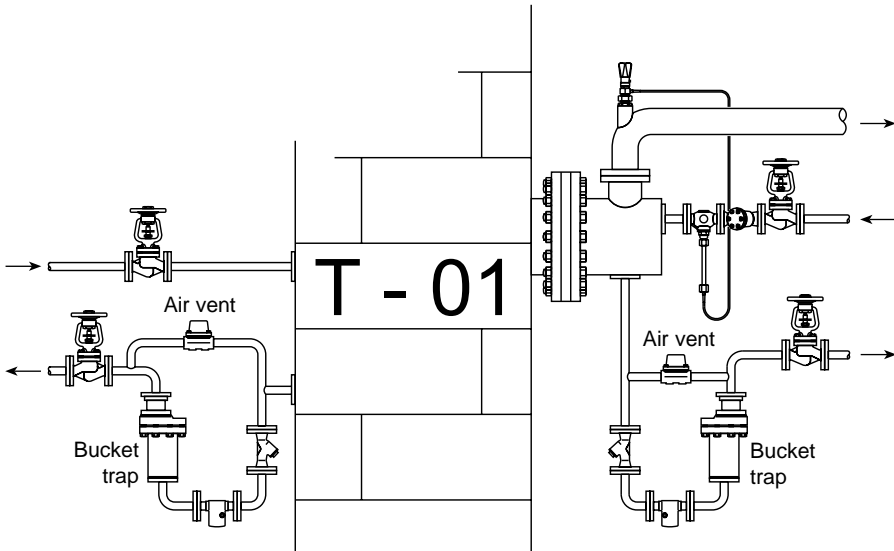


Fig. 4 Typical installation - Oil storage tanks

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# 6. Maintenance

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## Note:

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

## Warning:

The body/cover gasket contains a thin stainless steel support ring which may cause physical injury if not handled and disposed of carefully.

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. 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 reassembling, ensure that all joint faces are clean. When maintenance is complete, open isolation valves slowly and check for leaks.

### 6.1 How to fit the valve and seat assembly:

- Disconnect the outlet connection and after undoing the bolts (2) remove the cover (1) and valve seat together with bucket assembly from the body.
- Unhook the bucket (5) from the valve lever (11).
- Remove the valve guide plate (7) by undoing the two screws (6).
- Remove the valve seat (9). The valve seat is spherically ground so that a seal is made at the sealing face. When fitting a new valve seat, it is extremely important to ensure that the joint faces are clean, and STAG jointing compound should be applied to the threaded portion.
- Screw in a new valve seat (9) (see Table 1 for the recommended tightening torques).
- Fit a new valve guide plate (7) and lever (11), using new screws (6) supplied. Tighten these after checking that the valve head is properly aligned to the valve seat orifice (see Table 1 for the recommended tightening torques).
- Hook the bucket (5) onto the valve lever (11).
- Using a new gasket (8), refit the cover (see Table 1 for the recommended tightening torques) and reconnect the outlet to the pipework.
- Open the isolation valves slowly until the normal operating conditions are achieved.
- Check for leaks and correct operation.

### 6.2 How to fit the check valve assembly:

- Disconnect the outlet connection and after undoing the bolts (2) remove the cover (1) and valve seat together with bucket assembly from the body.
- Remove the check valve (12, 13 and 14) and adaptor (where fitted).  
**Note:** The DN15, 20 and 40 units have the check valve screwed directly into the body whereas the DN25 and 50 sizes use an adaptor between the body and check valve. Prior to 1996 the 600 and 900 series used a 'mushroom' pattern check valve.  
**The new 'ball' design can be fitted into all traps and does not** require the spacer tubes fitted on the earlier 'mushroom' pattern valves.
- Screw in a new check valve assembly (12, 13 and 14).
- Using a new gasket (8), refit the cover (see Table 1 for the recommended tightening torques) and reconnect the outlet to the pipework.
- Open the isolation valves slowly until the normal operating conditions are achieved.
- Check for leaks and correct operation.

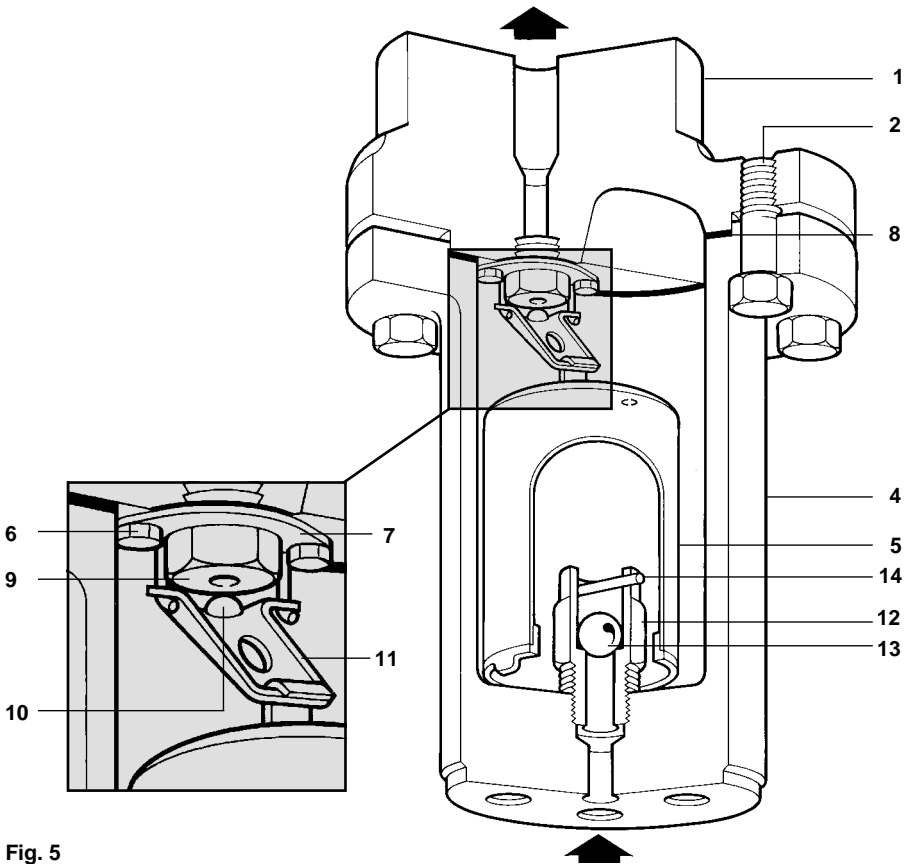




Fig. 5

**Table 1 Recommended tightening torques**

Item		 or 	mm	N m	(lbf ft)
2	(621/622)		M16 x 2.0P x 45	75 - 85	(55 - 63)
	(623/921/922)		M20 x 2.5P x 65	90 - 100	(66 - 74)
	(625) (923/925)		M20 x 2.5P x 65	120 - 135	(89 - 100)
	(626) (926)		M22 x 2.5P x 70	150 - 165	(111 - 122)
6	(621/625) (921/925)	10	1/4" whit. x 1/2"	15 - 20	(11 - 16)
	(626) (926)	13	5/16" whit. x 1/2"	20 - 25	(16 - 19)
9	(621/622/623) (921/922)	7/8" A/F	7/8" 14 UNF	80 - 88	(60 - 65)
	(625) (923/925)	1 1/4" A/F	1 1/4" x 12 UNF	180 - 200	(133 - 148)
	(626) (926)	1 1/2" A/F	1 1/2" x 12 UNF	270 - 300	(200 - 222)
12	(621/623) (921/922)	1 1/8" A/F		200 - 220	(148 - 163)
	(625/626) (923/925/926)	2" A/F		300 - 330	(222 - 244)

## 7. Spare parts

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

### Available spares

Valve and seat assembly (state pressure range)	6 (2 off), 7, 9, 10, 11
Bucket	5
Check valve assembly	12, 13, 14
Cover gasket (packet of 3)	8

### How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state and full definition of the trap e.g. 622/10.

**Example:** 1 - Valve and seat assembly for a Spirax Sarco DN20, 622/10 alloy steel inverted bucket steam trap (having a  $\Delta PMX$  of 17 bar g).

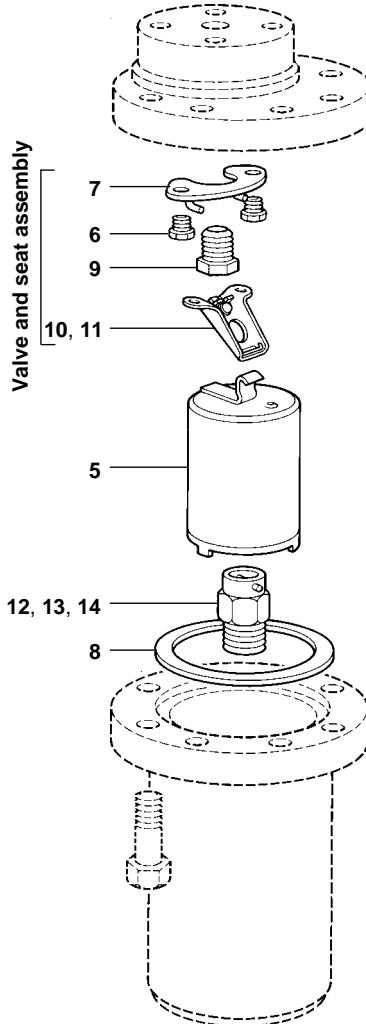


Fig. 6