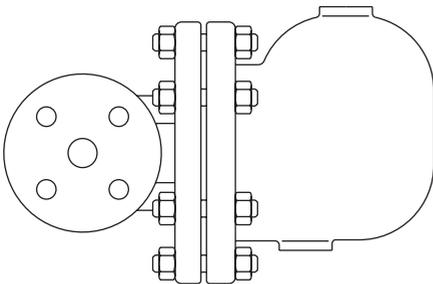


FT43 and FT44

Ball Float Steam Traps

Installation and Maintenance Instructions



1. Safety information
2. General product information
3. Installation
4. Commissioning
5. Operation
6. Maintenance and 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 Indian Boiler Regulations, 1950.

- i) 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.
- ii) Determine the correct installation situation and direction of fluid flow.
- iii) 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.
- iv) 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 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 300 °C (572 °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.

v1.16 Returning products

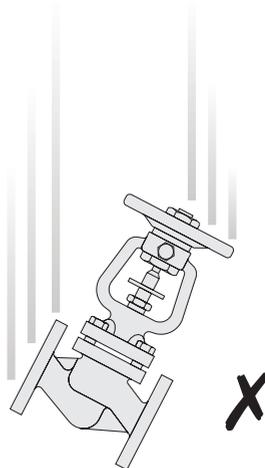
Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental 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.

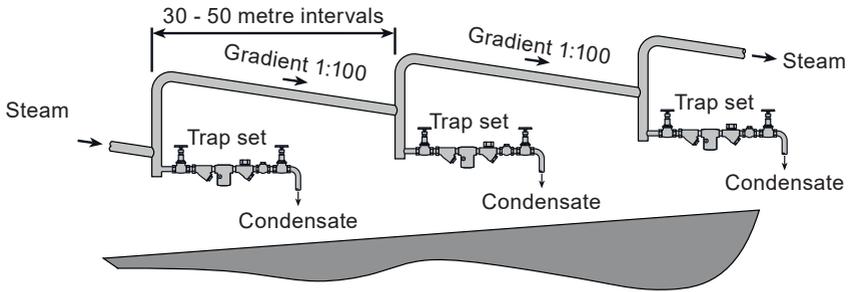
Safe Handling

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.

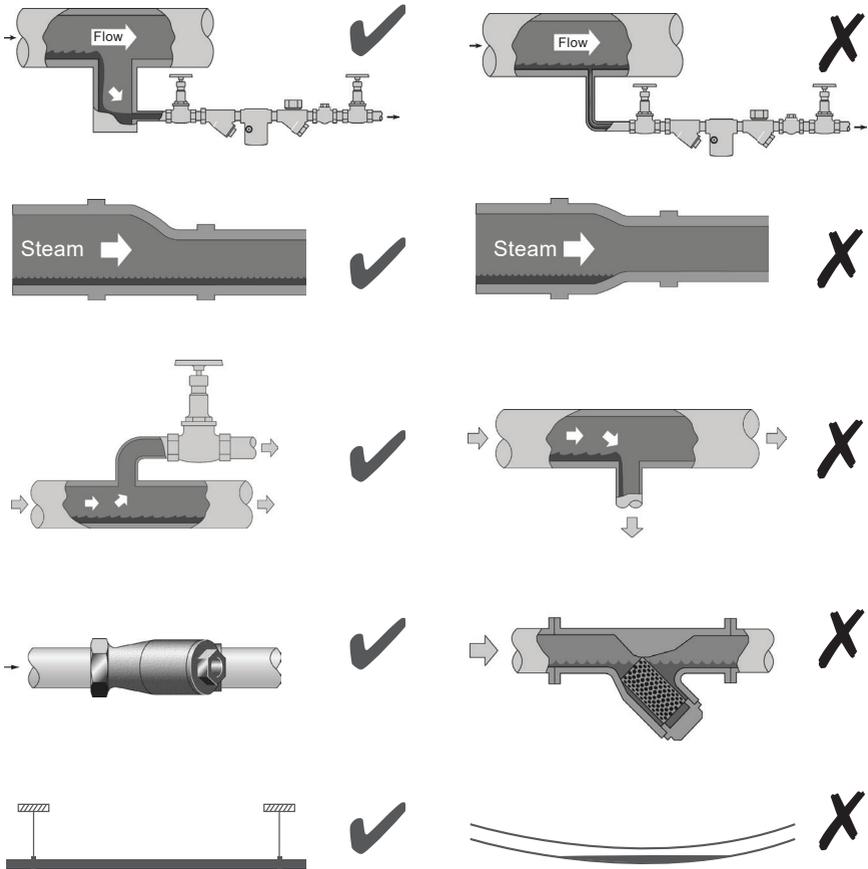


Prevention of water hammer

Steam trapping on steam mains:

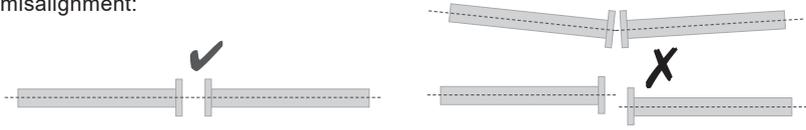


Steam Mains - Do's and Don'ts:

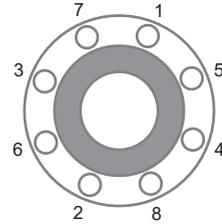
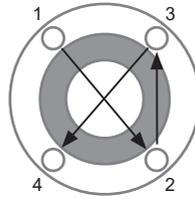


Prevention of tensile stressing

Pipe misalignment:



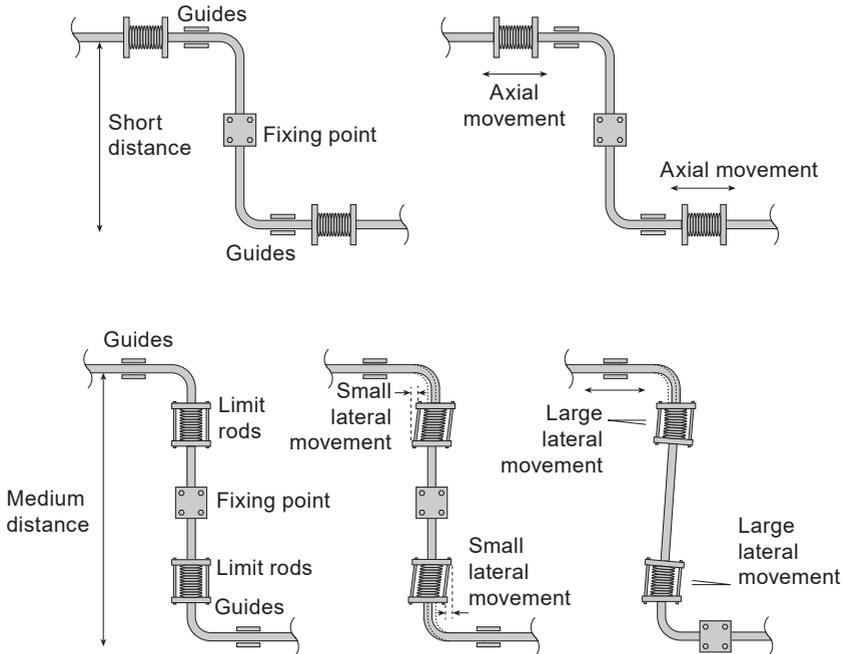
Installing products or re-assembling after maintenance:



Do not over tighten.
Use correct torque figures.

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

Thermal expansion:



2. General product information

2.1 General description

The **FT43** - cast iron and **FT44** - carbon steel ball float steam traps have stainless steel working internals and automatic built-in air venting facility. These traps are supplied with integrally flanged connections (for horizontal or vertical installations) and can be maintained without disturbing the pipework. Please be aware that the flow direction is not the same for all FT trap types or sizes but will be clearly marked on the trap body. The body and cover castings for the **FT44** are produced by a TÜV approved foundry.

Air vent

The BP99/32 capsule which is used in 4.5 bar - 21 bar ball float steam traps is suitable for use on 150 °C superheat @ 0 bar g. This value reduces with elevated pressure.

The bimetallic element is fitted as standard to the 32 bar variants to provide additional superheat resistance. It is also available on other variants on request. Please refer to the pressure/temperature graphs in the following pages.

Optional extras

A **manually adjustable needle valve** (designated 'C' on the nomenclature i.e. **FT46-C**) can be fitted to these traps. This option provides a **steam lock release (SLR)** feature in addition to the standard air vent.

Note: The steam lock release and bimetallic air vent cannot be used in conjunction with each other. Alternative arrangements may be available. For further information please contact Spirax Sarco.

The **top of the cover can be drilled and tapped 2" BSP or NPT** for the purpose of fitting a balance line if requested at the point of order.

The **bottom of the cover can be drilled and tapped 2" BSP or NPT** for the purpose of fitting a drain cock if requested at the point of order.

Standards

This product fully complies with the requirements of the Indian Boiler Regulations, 1950.

Certification

This product is available with a manufacturers' Typical Test Report. This can be supplied at extra cost for the **FT44**.

Note: All certification / inspection requirements must be stated at the time of order placement.

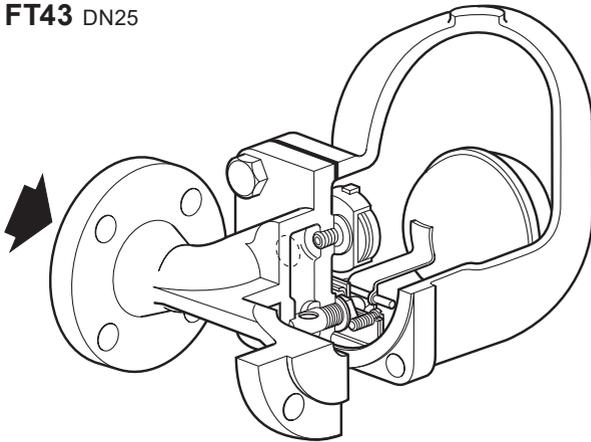
Note:

For further product data see the following sections and Technical Information Sheets:

Product		Material	Section	TI reference + Capacities
FT43	DN25 - DN50	Cast iron	Section 2.2	TI-IBR17-50IN
FT44	DN15 - DN50	Carbon steel	Section 2.3	TI-IBR17-53IN

2.2 FT43 - Cast iron

FT43 DN25



FT43-C

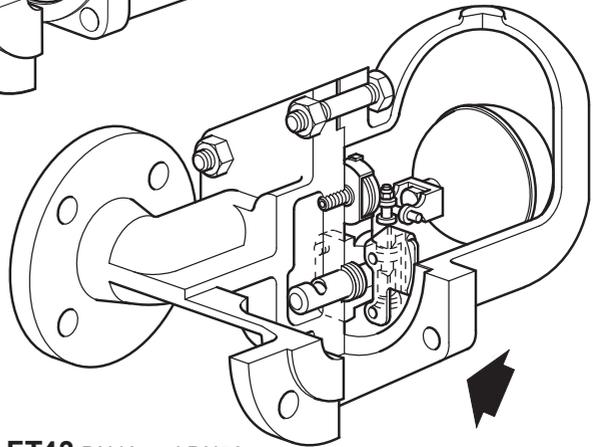
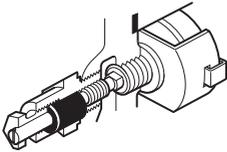


Fig. 1

FT43 DN40 and DN50

Sizes and pipe connections

DN25, DN40 and DN50

Note: Flow direction, for FT43 horizontal orientated traps, when facing the body:

- DN25 is left to right. (R-L versions are available for DN25 FT43TV PN16 only)
- DN40 and DN50 is right to left.

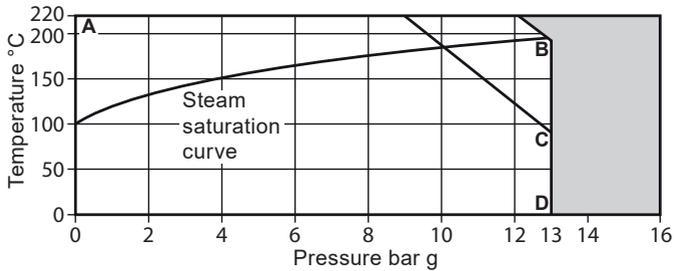
Flow direction, for FT43V vertically orientated traps is downwards only.

Standard flanges are EN 1092 PN16 with face-to-face dimensions in accordance with EN 26554 (Series 1).

On request - ASME B 16.5 Class 125 flanges are also available.

Note: ASME flanges are supplied with tapped holes to receive flange bolts. ASME flanges have UNC threads.

Pressure / temperature limits



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

A - B - D Flanged EN 1092 PN16.

A - C - D Flanged ASME 125.

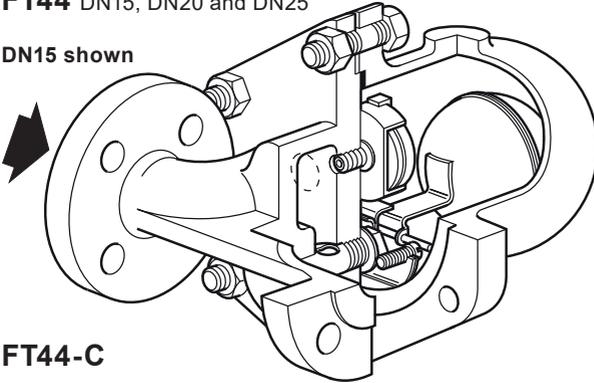
Body design conditions	PN16 (For PN16 Flange)	
PMA Maximum allowable pressure	13 bar g @ 195 °C	
TMA Maximum allowable temperature	220 °C @ 12.1 bar g	
Minimum allowable temperature	0 °C	
PMO Maximum operating pressure for saturated steam service	13 bar g @ 195 °C	
Note: The DN40 and DN50 traps are limited to a PMO equal to PMX		
TMO Maximum operating temperature	220 °C @ 12.1 bar g	
Minimum operating temperature	0 °C	
Note: For lower operating temperatures consult Spirax Sarco		
	FT43-4.5	4.5 bar
ΔPMX Maximum differential pressure	FT43-10	10 bar
	FT43-14	13 bar

Body design conditions	PN16 (For ASME 125 Flange)	
PMA Maximum allowable pressure	13 bar g @ 90 °C	
TMA Maximum allowable temperature	220 °C @ 9 bar g	
Minimum allowable temperature	0 °C	
PMO Maximum operating pressure for saturated steam service	10 bar g @ 184 °C	
Note: The DN40 and DN50 traps are limited to a PMO equal to PMX		
TMO Maximum operating temperature	220 °C @ 9 bar g	
Minimum operating temperature	0 °C	
Note: For lower operating temperatures consult Spirax Sarco		
	FT43-4.5	4.5 bar
ΔPMX Maximum differential pressure	FT43-10	10 bar
Designed for a maximum cold hydraulic test pressure of	19.5 bar g	
Note: With internals fitted, test pressure must not exceed PMX		

2.3 FT44 - Carbon steel

FT44 DN15, DN20 and DN25

DN15 shown



FT44 DN40 and DN50

DN50 shown

FT44-C

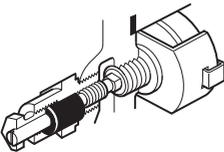
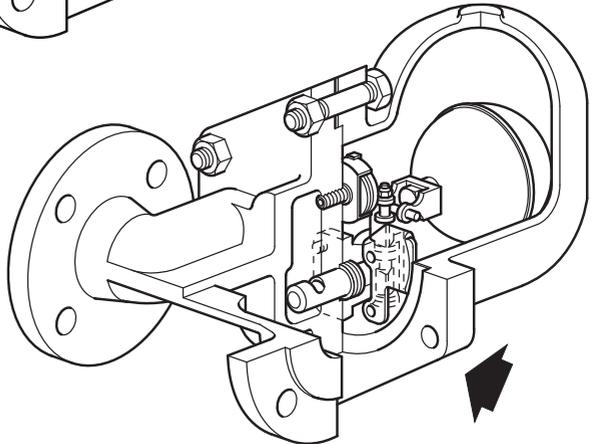


Fig. 2



Sizes and pipe connections

DN15, DN20, DN25, DN40 and DN50

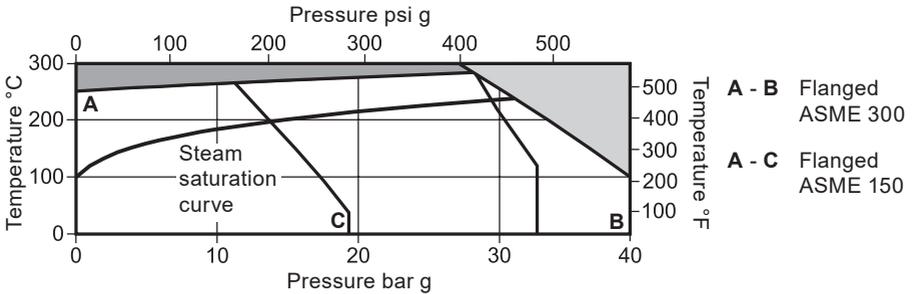
Horizontal traps:

Note the flow direction when facing the body is as follows:

- DN15 to DN25 is left to right.
- DN40 and DN50 is right to left.

Standard flanges - ASME B 16.5 Class 150 and 300 flanges are available with extended face-to-face dimensions.

Pressure / temperature limits



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

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

For ASME 150 Flange	PMA Maximum allowable pressure	19.6 bar g @ 38 °C
	TMA Maximum allowable temperature	300 °C @ 10.2 bar g
	PMO Maximum operating pressure	13.9 bar g @ 198 °C
	TMO Maximum operating temperature	266 °C @ 11.5 bar g

Note:
For lower operating temperatures consult Spirax Sarco

When fitted with a bimetallic air vent

Cold hydraulic test pressure of : 29.4 bar g

For ASME 300 Flange	PMA Maximum allowable pressure	40 bar g @ 100 °C
	TMA Maximum allowable temperature	300 °C @ 27.5 bar g
	PMO Maximum operating pressure	31.4 bar g @ 238 °C
	TMO Maximum operating temperature	284 °C @ 28.5 bar g

Note:
For lower operating temperatures consult Spirax Sarco

When fitted with a bimetallic air vent

Cold hydraulic test pressure of : 60 bar g

		Size	DN15, DN20, DN25	DN40, DN50	
ΔPMX	Maximum differential pressure	FT44-4.5	4.5 bar	4.5 bar	(65 psi)
		FT44-10	10 bar	10 bar	(145 psi)
		FT44-14	14 bar	-	(203 psi)
		FT44-21	21 bar	21 bar	(304 psi)
		FT44-32	32 bar	32 bar	(464 psi)

Note: With internals fitted, test pressure must not exceed ΔPMX

Caution: The trap in its complete operational form must not be subjected to a pressure greater than 48 bar otherwise damage to the internal mechanism may result.

3. Installation

Note: Before actioning any installation 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.

Referring to the Installation and Maintenance Instructions, name-plate, and Technical Information Sheet, check that the product is suitable for its intended use.

- 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 direction of fluid flow – please be aware that the flow direction is not the same for all FT trap types or sizes. However the flow direction will be clearly marked on the trap body.
- 3.3** Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.
- 3.4** The trap must be fitted with the float arm in a horizontal plane so that it rises and falls vertically. Note: The trap can be visually checked for its correct orientation by reading the writing on the body, cover, and name-plate. If installed correctly the writing will be seen to be displayed the correct way up.
- 3.5** The trap should be fitted below the outlet of the steam system, with a small drop leg immediately preceding the trap, typically 150 mm (6") see Figure 5. If no drop leg is allowed for 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.

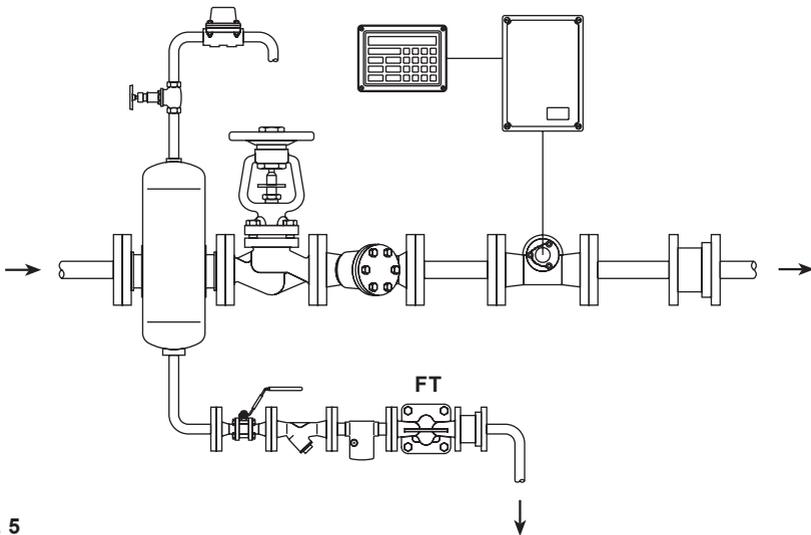


Fig. 5

3.6 Float traps should be fitted as close to the outlet of the plant to be drained as possible otherwise the trap can steam lock. Steam locking occurs when the pipe between the condensate outlet and the steam trap fills with steam and prevents condensate from reaching the trap. This can lead to the system waterlogging which will affect plant efficiency. It is very similar to the air locking experienced in water systems.

The most common application where steam locking is a risk is on rotating cylinders and other applications where condensate is removed via a dip tube or siphon pipe. Steam locking can easily be prevented by fitting the trap with a combined thermostatic air vent and an adjustable needle valve (SLR), Figure 6 shows an FT-C trap fitted on a slow speed cylinder.

The adjustable needle valve (SLR) is opened by turning the spindle anticlockwise. The standard factory setting is $\frac{1}{2}$ turn which equates to an approximate steam 'bypass' of 22 kg/h @ 10 bar.

Site adjustment of the adjustable needle valve can be achieved by turning anticlockwise to increase the bypass flow, and clockwise to reduce the flow.

When draining from a high speed cylinder application, there is need for large amounts of blow-through steam to assist the flow of condensate out of the cylinder via the siphon tube.

In such cases the adjustable needle valve cannot handle such large amounts and an external bypass with an adjustable needle valve is required. See Figure 7 (page 18).

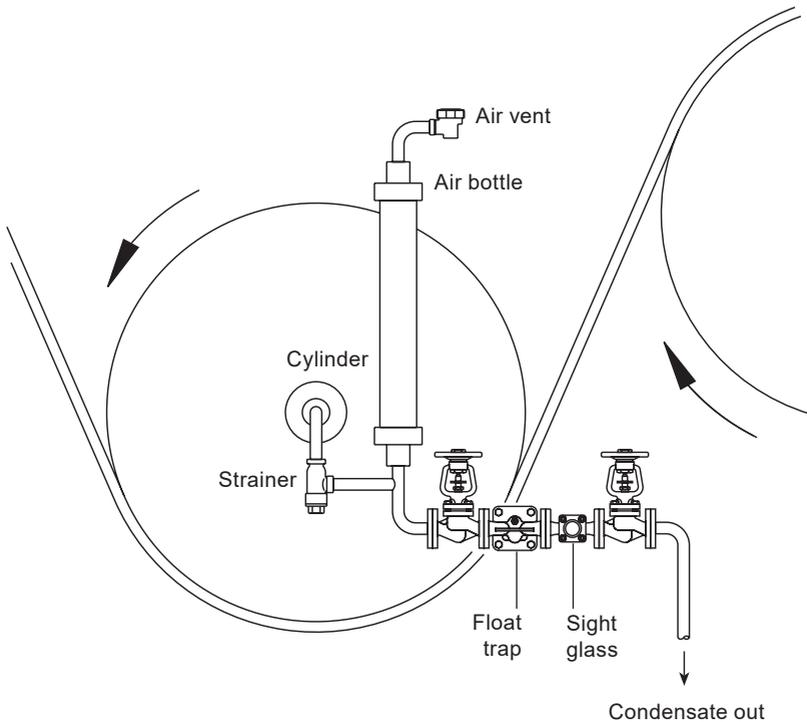


Fig. 6 Slow speed cylinder drainage with system unit

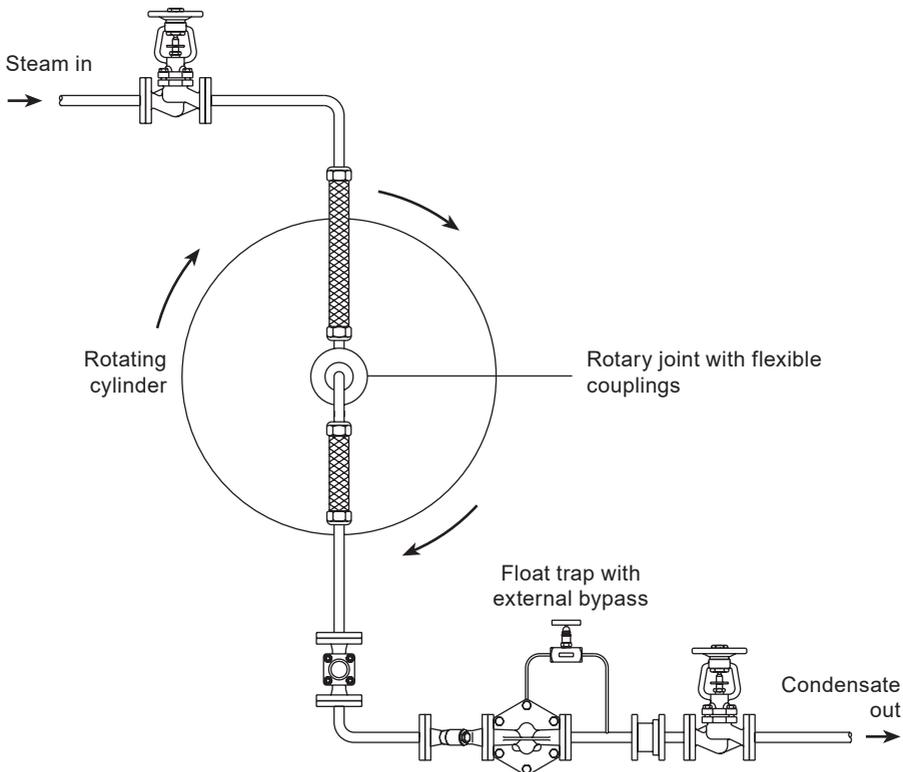


Fig. 7 High speed cylinder with float trap and parallel blow-through valve

- 3.7** If the trap is to be situated in an exposed position, it should be either lagged or drained by a separate small thermostatic trap such as the Spirax Sarco No.8, or Bydrain.
- 3.8** Always fit a non-return (check) valve downstream of any steam trap which discharges into condensate return lines where back pressure is experienced. This is not 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.
- 3.9** Ensure adequate space is left to remove the cover from the body for maintenance – the maximum withdrawal to remove the cover is 200 mm (8").

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 float trap is a continuous trap, removing condensate the instant it forms. On start-up, the thermostatic air vent allows air to bypass the main valve preventing the system air binding. Hot condensate will close the air vent tightly, but as soon as it enters the main chamber of the trap, the float rises and the lever mechanism attached to it opens the main valve - keeping the system drained of condensate at all times. When the steam arrives, the float drops and closes the main valve. Float traps are renowned for their high start-up load handling capability, clean tight shut-off and resistance to waterhammer and vibration.

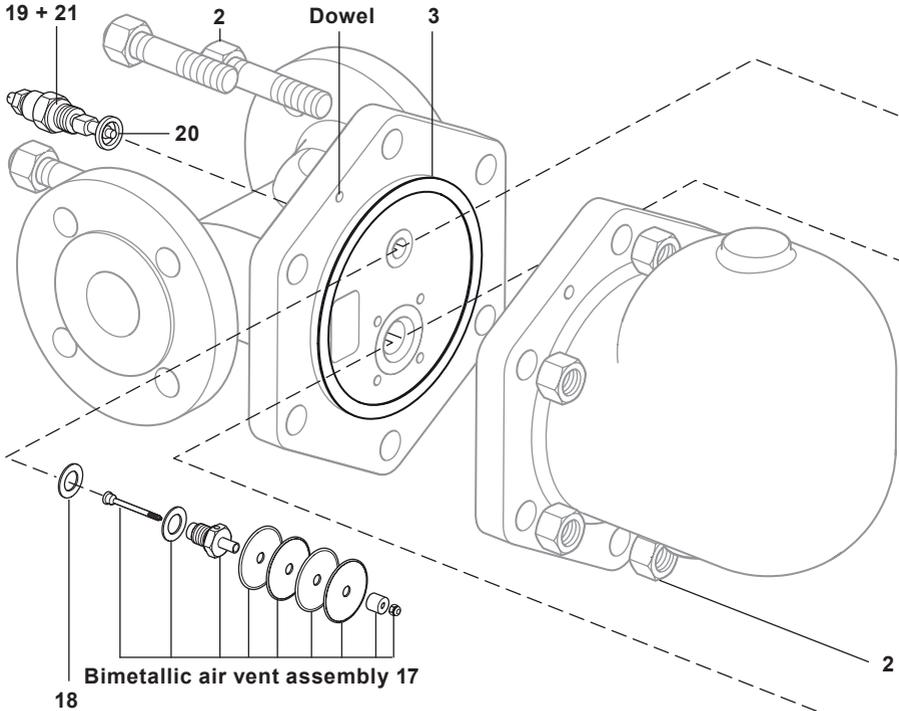
6. Maintenance and Spare parts

6.1 FT43 and FT44 (DN15 to DN50)

Notes:

- Before actioning any maintenance programme observe the 'Safety information' in Section 1.
- The FT43 is not normally provided with a bimetallic air vent due to its PN16 rating. This arrangement can be made available on request.

Steam lock release assembly



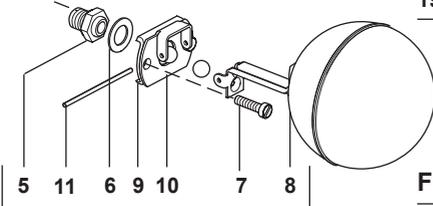
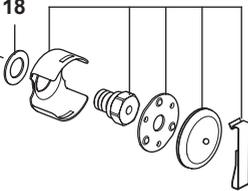
Warning

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

Table 1 Recommended tightening torques

Item No.	Size	 or 	mm	N m	(lbf ft)
2*	DN15, DN20, DN25	17 A/F	M10 x 30	29 - 33	(19 - 24)
	DN40	24 A/F	M12 x 60	60 - 66	(44 - 48)
	DN50	24 A/F	M16 x 70	80 - 88	(58 - 65)
5	DN15, DN20, DN25			50 - 55	(37 - 40)
7	DN15, DN20, DN25		M5 x 20	2.5 - 2.8	(1.8 - 2.1)
	DN40	10 A/F	M6 x 20	10 - 12	(7.0 - 9.0)
	DN50	13 A/F	M8 x 20	20 - 24	(15 - 17)
17		17 A/F		50 - 55	(37 - 40)
19*		22 A/F		40 - 45	(29 - 33)

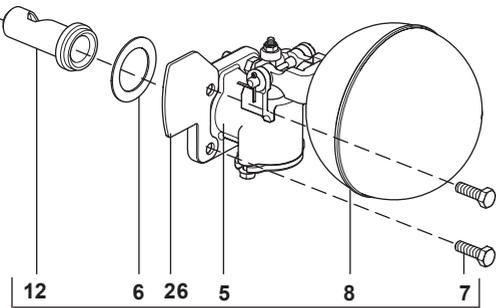
Capsule air vent assembly 17



Main valve assembly with float (DN15, DN20 and DN25)

FT44 only*

2	DN15, DN20, DN25	17 A/F	M10 x 30	19 - 22	(14 - 16)
19		22 A/F		50 - 55	(37 - 40)

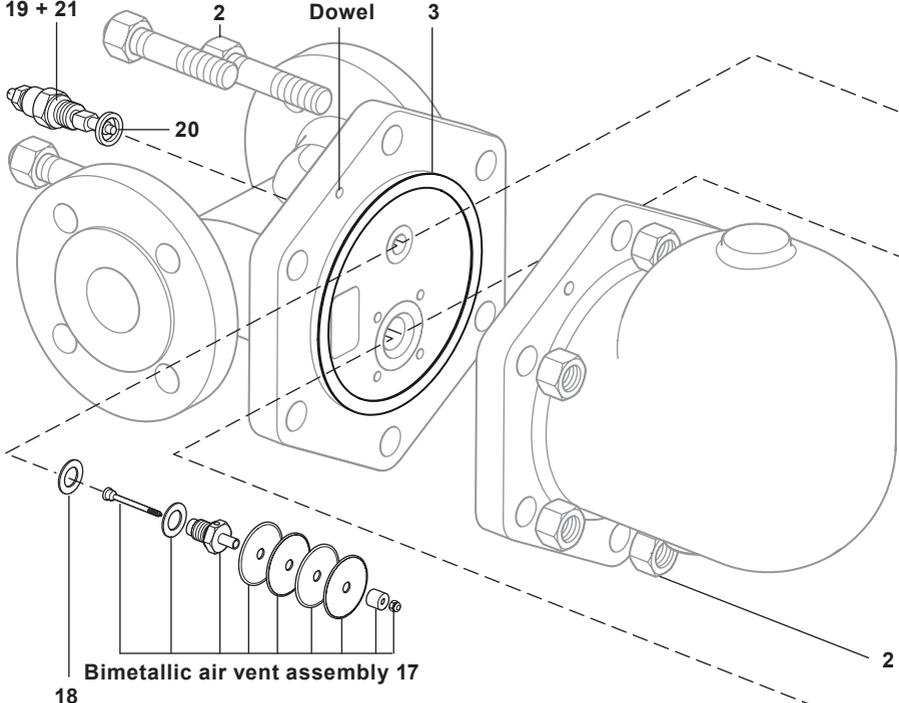


Main valve assembly (DN40 and DN50)

Servicing:

- With suitable isolation, repairs can be carried out with the trap in the pipeline.
- When reassembling, make sure that all joint faces are clean and the dowel locates in the cover.

Steam lock release assembly 19 + 21

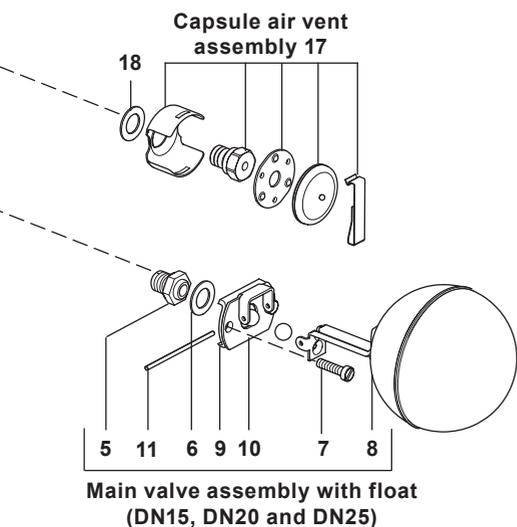


How to fit the main valve assembly for DN15, DN20 and DN25:

- Unscrew the support frame (9), pivot frame (10) and the valve seat (5).
- Ensure the seat/gasket faces are clean and dry.
- Fit the new gasket (6) and the valve seat (5) to the body (**Do not use gasket paste**).
- Attach the support frame (9) and pivot frame (10) to the body with the assembly set screws (7) but do not tighten.
- Fit the float arm (8) to the pivot frame (10) using the pin (11) and by moving the complete assembly centre the valve head onto the seat orifice.
- Tighten the assembly set screws (see Table 1 for the recommended tightening torques).

How to fit the main valve assembly for DN40 and DN50:

- Unscrew the 4 bolts or nuts (7).
- Remove the main valve assembly (5) and gasket (6).
- Ensure the gasket faces are clean and dry.
- Fit the new gasket (6) and the main valve assembly (5), including the baffle plate (see Figures 10 and 11).
- Tighten the bolts or nuts (7) evenly (see Table 1 for recommended tightening torques).

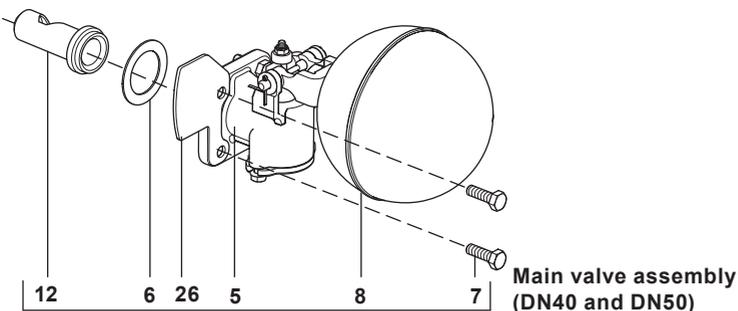


How to fit the capsule air vent assembly for DN15 to DN100:

- Remove the spring clip, capsule, spacer plate, unscrew the seat and remove the frame (17) and gasket (18).
- Ensure the gasket faces are clean and dry.
- Fit the new gasket (18), the frame and seat (17) and tighten to the recommended torque (see Table 1).
- Assemble the new spacer plate, capsule and clip.

How to fit the bimetallic air vent assembly for DN15 to DN100:

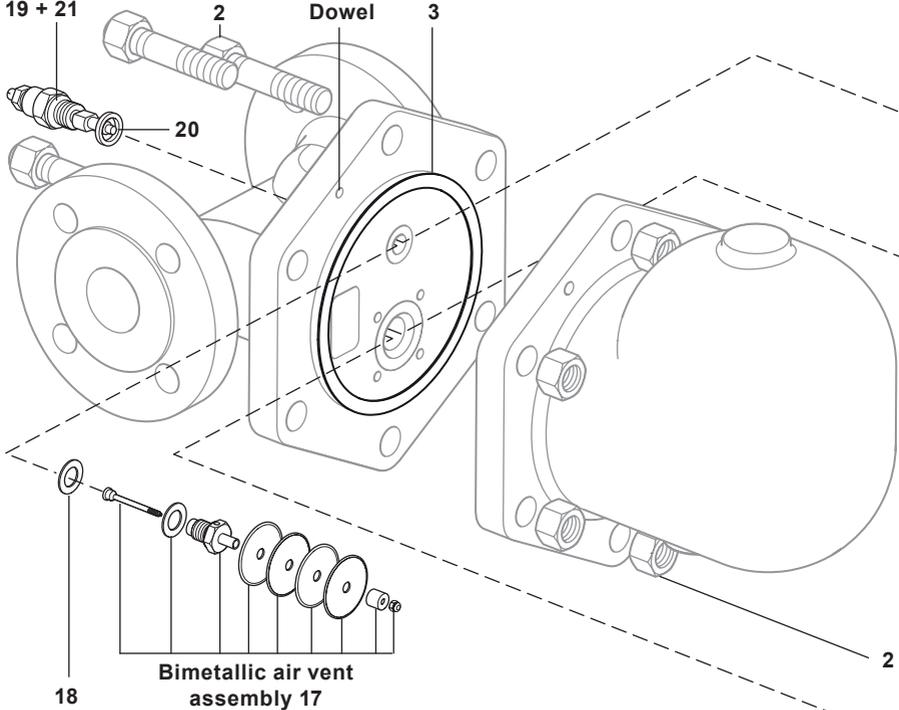
- Unscrew and remove the element assembly (17) and gasket (18).
- Ensure the gasket faces are clean and dry.
- Fit the new gasket (18) and element assembly (17) and tighten to the recommended torque (see Table 1).



Spare parts

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

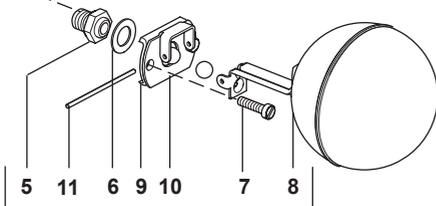
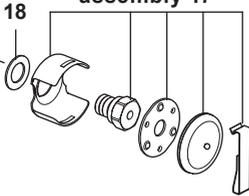
Steam lock release assembly 19 + 21



Available spares

Main valve assembly with float (DN15, DN20 and DN25) (specify horizontal or vertical traps)	5, 6, 7, 8, 9, 10, 11				
Main valve assembly with erosion deflector (DN40 and 50) (specify horizontal or vertical trap)	5, 6, 7, 12, 26				
Ball float and lever (DN40 and DN50)	8				
Air vent assembly	<table border="0"> <tr> <td>Bimetallic air vent assembly</td> <td>17, 18</td> </tr> <tr> <td>Capsule air vent assembly</td> <td></td> </tr> </table>	Bimetallic air vent assembly	17, 18	Capsule air vent assembly	
Bimetallic air vent assembly	17, 18				
Capsule air vent assembly					
Steam lock release and capsule air vent assembly	17, 18, 19, 20, 21				
Complete set of gaskets (packet of 3 sets)	3, 6, 18, 20				

Capsule air vent assembly 17



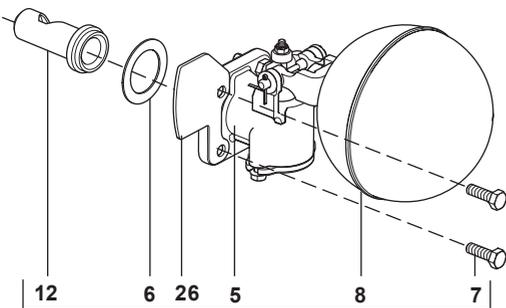
**Main valve assembly with float
(DN15, DN20 and DN25)**

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size, type of trap, connection: horizontal or vertical and pressure range.

Note: When ordering a spare air vent Assembly, please specify whether you require a bimetallic or capsule air vent assembly.

Example: 1 - Capsule air vent assembly for a Spirax Sarco DN20 FT46-4.5 ball float steam trap, with horizontal connectors.



**Main valve assembly
(DN40 and DN50)**

6.2 FT43 and FT44 (DN80 and DN100)

Notes:

- Before actioning any maintenance programme observe the 'Safety information' in Section 1.
- The FT43 is not normally provided with a bimetallic air vent due to its PN16 rating. This arrangement can be made available on request.

Warning

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

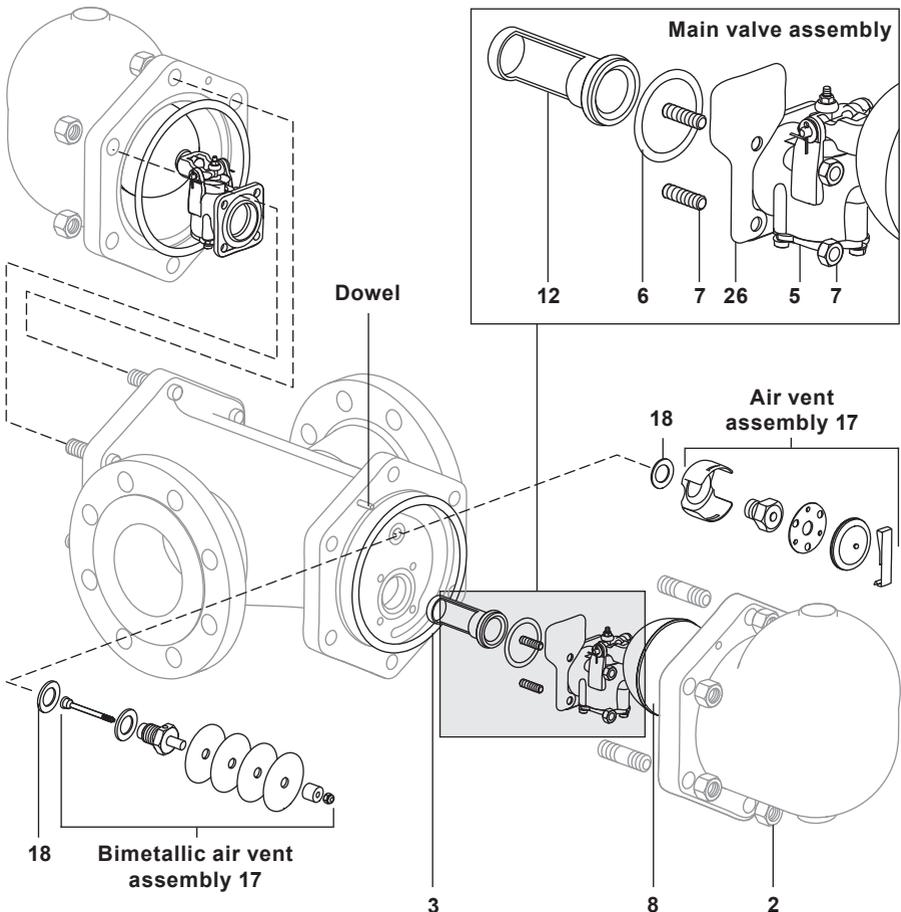


Table 2 Recommended tightening torques

Item No.		or mm		N m	(lbf ft)
2	24 A/F		M16 x 45	80 - 88	(58 - 65)
7	13 A/F		M8 x 20	20 - 24	(15 - 17)
17	17 A/F			50 - 55	(37 - 40)

Unscrew element assembly

- Remove the cover nuts (2) and cover.
- Undo the 4 main valve assembly nuts (7).
- Remove the main valve assembly (5) and gasket (6).
- Ensure gasket faces are clean and dry.
- Fit new gasket (6) and main valve assembly (5).
- Tighten nuts (7) evenly (see Table 2 for the recommended tightening torques).
- Re-use or replace the ball float (8) as required.
- Replace cover gasket (3) ensuring the gasket face has been cleaned.
- Replace the cover, ensuring the dowel is located correctly.
- Retighten the cover nuts (2) evenly (see Table 2 for the recommended tightening torques).

How to fit the capsule air vent assembly:

- Remove the spring clip, capsule, spacer plate, unscrew the seat and remove the frame (17) and gasket (18).
- Ensure the gasket faces are clean and dry.
- Fit the new gasket (18), frame and seat (17) and tighten evenly (see Table 2 for the recommended tightening torques).
- Assemble new spacer plate, capsule and clip.

How to fit the bimetallic air vent assembly for DN15 to DN100:

- Unscrew and remove the element assembly (17) and gasket (18).
- Ensure the gasket faces are clean and dry.
- Fit the new gasket (18) and element assembly (17) and tighten evenly to the recommended torque (see Table 2).

6.3 FT mechanisms (DN40 only)

Baffle arrangement used on FT43 and FT44 (horizontal only)

In line with our policy of continuous product improvement, we have found it beneficial to add a baffle plate over the inlet port.

This eliminates any risk of flow from the inlet port affecting the correct operation of the float. When fitting the mechanism, assemble the baffle plate supplied under the mechanism retaining bolts.

The correct positioning is shown below.

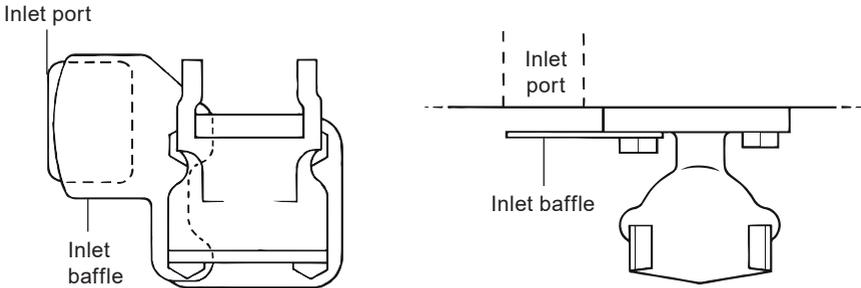


Fig. 8

6.4 FT mechanisms (DN50 only)

Baffle arrangement used on FT43 and FT44 (horizontal only)

When fitting the mechanism, assemble as follows:

1. Remove two uppermost studs and replace with the longer studs provided.
2. Assemble the mechanism over the four studs.
3. Place the spacer collars then baffle plate over the longer studs so that the collars rest on the back of the square flange.
4. Replace the nuts and tighten as normal.

The correct assembly and positioning is shown below.

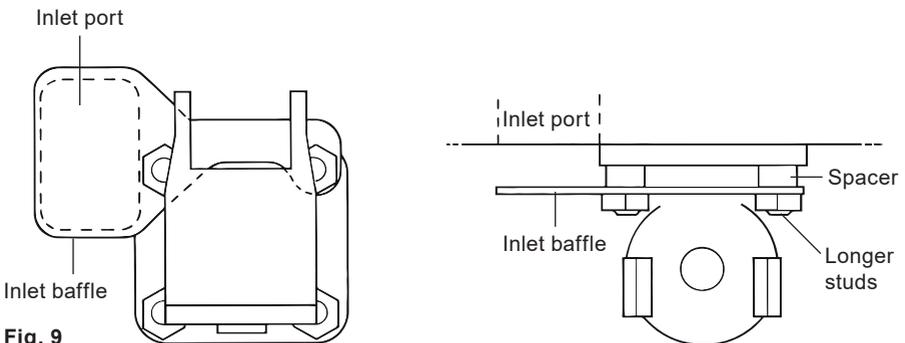


Fig. 9

