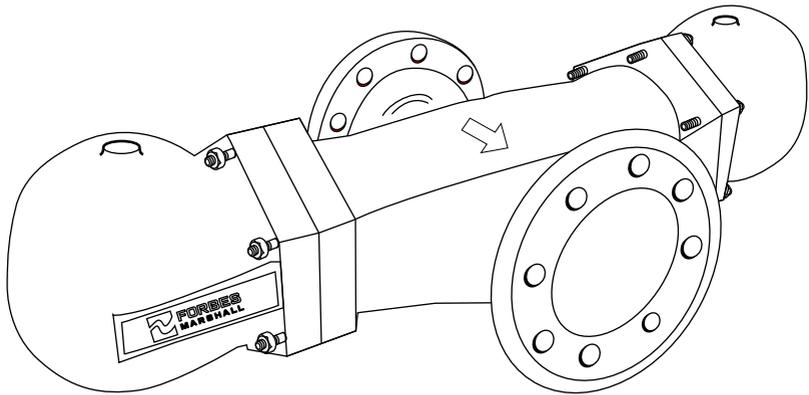


# Installation and Maintenance Manual

## Single Orifice Float Trap with TV

SOFT53-X



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PLEASE NOTE - Throughout this manual this cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked. This symbol denotes CAUTION, WARNING or DANGER.



## 1. Preface:

This manual is intended for anyone using, commissioning, servicing, or disposing of the below mentioned products safely and efficiently.

Single Orifice Float Trap With TV [SOFT53-X]

Sizes: DN100 (4")

PLEASE NOTE:

Throughout this manual the following cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked.

## 2. Important Safety Notes:



Read this section carefully before installing/operating/maintaining the product. The precautions listed in this manual are provided for personnel and equipment safety. Furthermore, Forbes Marshall accepts no responsibility for accidents or damage occurring as a result of failure to observe these precautions. Note that the product is designed to perform for non-contaminated fluids only. A contamination in the form of chemical, foreign particle etc. can lead to problem with product performance and life of the product.

If these products in compliance with the operating instructions are, properly installed, commissioned, maintained and installed by qualified personnel (refer Section 2.7) the safety operations of these products can be guaranteed. General instructions for proper use of tools and safety of equipments, pipeline and plant construction must also be complied with.

### 2.1 Intended use:

Check if the product is suitable for intended use/ application by referring to the installation and maintenance instructions, name plates and technical information sheets.

- i) The product is suitable for use as defined in the technical information sheet. In case the need arises to use the product on any other fluid please contact Forbes Marshall for assistance.
- ii) Check for the suitability in conformance to the limiting conditions specified in technical information sheet of the product.
- iii) The correct installation and direction of fluid flow has to be determined.
- iv) Forbes Marshall products are not intended to resist external stresses, hence necessary precautions to be taken to minimize the same.

### 2.2 Accessibility and Lighting:

Safe accessibility and working conditions are to be ensured prior to working on the product.

### 2.3 Hazardous environment and media:

The product has to be protected from hazardous environment and check to ensure that no hazardous liquids or gases pass through the product.

#### 2.4 Depressurizing of systems and normalizing of temperature:

Ensure isolation and safety venting of any pressure to the atmospheric pressure. Even if the pressure gauge indicates zero, do not make an assumption that the system has been depressurized.

To avoid danger of burns allow temperature to normalize after isolation.

#### 2.5 Tools and consumables:

Ensure you have appropriate tools and / or consumables available before starting the work. Use of original Forbes Marshall replacement parts is recommended.

#### 2.6 Protective clothing:

Consider for the requirement of any protective clothing for you/ or others in the vicinity for protection against hazards of temperature (high or low), chemicals, radiation, dangers to eyes and face, noise and falling objects.

#### 2.7 Permits to work:

All work to be carried out under supervision of a competent person. Training should be imparted to operating personnel on correct usage of product as per Installation and Maintenance instruction. "Permit to work" to be complied with (wherever applicable), in case of absence of this system a responsible person should have complete information and knowledge on what work is going on and where required, arrange to have an assistant with his primary goal and responsibility being safety. "Warning Notices" should be posted wherever necessary.

#### 2.8 Handling:

There is a risk of injury if heavy products are handled manually. Analyze the risk and use appropriate handling method by taking into consideration the task, individual, the working environment and the load.

#### 2.9 Freezing:

Provision should be made to protect systems which are not self-draining, against frost damage (in environment where they may be exposed to temperatures below freezing point) to be made.

#### 2.10 Returning products:

Customers and Stockist are reminded that, when returning products to Forbes Marshall 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.

### 3. Brief Product Information:

#### 3.1 Description:

The Forbes Marshall Single Orifice Float Trap, SOFT53-X, is a carbon steel single orifice float trap with an integral automatic air venting facility. It is available with horizontal flanged connections only.

#### 3.2 Sizes and End Connections:

DN100

Flanged : ANSI B 16.5 class 150, class 300

Note : Available with IBR certificate

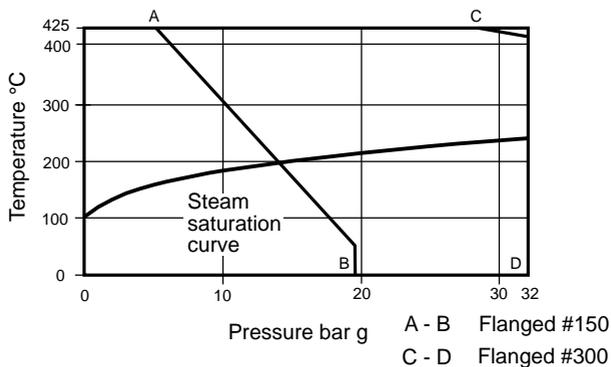
#### 3.3 Available Types:

SOFT53-X with built-in thermostatic air vent

#### 3.4 Limiting Conditions:

PMA Maximum allowable pressure	32 bar g @ 425°C	
TMA Maximum allowable temperature	425°C	
PMO Maximum operating pressure	32 bar g	
TMO Maximum operating temperature	300°C @ 32 bar g	
Minimum operating temperature	0°C	
PMX Max. differential pressure	SOFT53-X-4.5	4.5 bar g
	SOFT53-X-10	10 bar g
	SOFT53-X-14	14 bar g
	SOFT53-X-21	21 bar g
	SOFT53-X-32	32 bar g
Cold hydraulic test pressure (without internals)		64 bar g

#### 3.5 Operating Range:



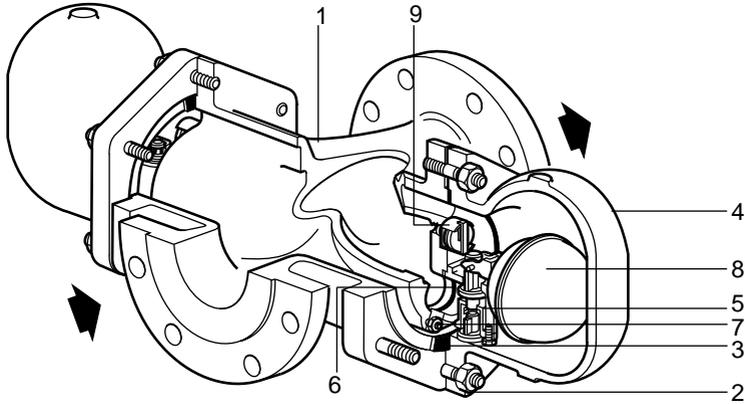


Figure: 1 Single Orifice Float Trap with TV

### Materials

No.	Part	Material	Standard
1.	Base	Cast Steel	ASTM A216 Gr. WCB
2.	Cover studs and nuts	Carbon Steel	High Tensile Gr. 8.0
3.	Cover gasket	Reinforced exfoliated graphite	
4.	Cover	Cast Steel	ASTM A216 Gr. WCB
5.	Main valve assembly	Stainless Steel	BS 3146 Pt. 2 ANC 2.
6.	Main valve assembly gasket	Reinforced exfoliated graphite	
7.	Main valve assembly studs	Stainless steel Type 431	ASTM A276 Type 431
8.	Ball float	Stainless Steel Type 304	ASTM A240
9.	Air vent Assly.	Stainless Steel Type 304	—

### 3.6 Product Dimension and Drawing:

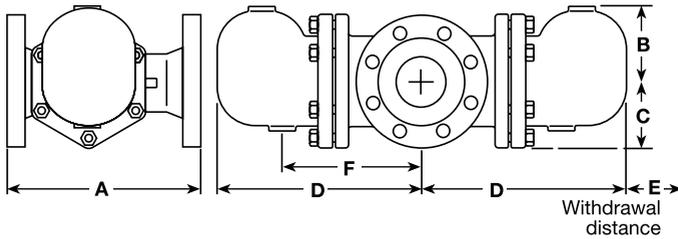
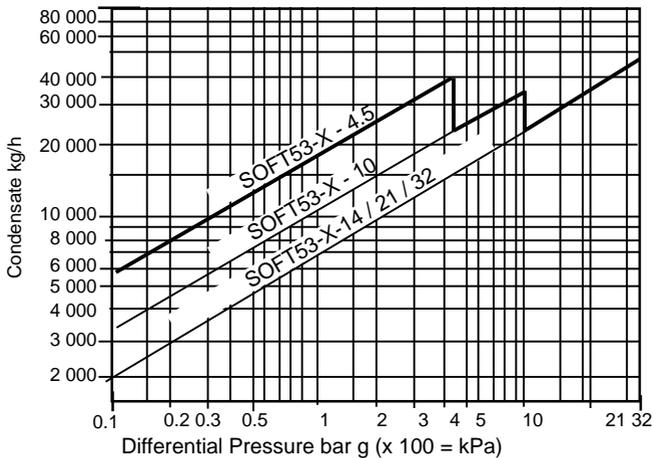


Figure 2: Dimensional Drawing of SOFT53-X

Dimensions (approx.) in mm

Size (DN)	A	B	C	D	E	Weight
100	365	140	123	390	250	110 kg

### 3.6 Capacity chart:

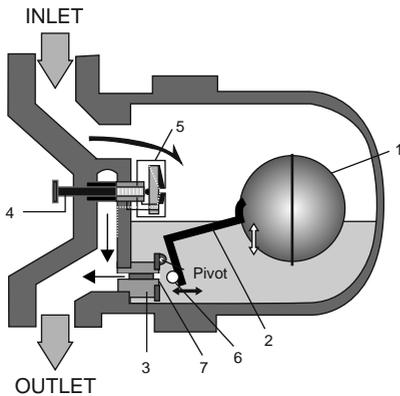


**4.** Product Working Principle: (Refer to Figure 3)

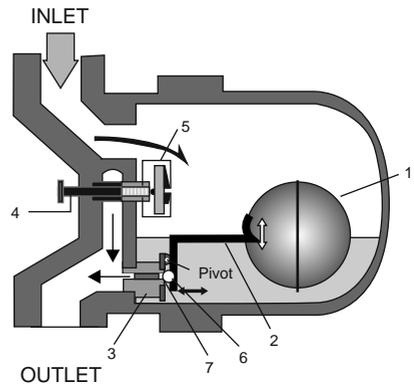
Figure 3 shows a simple float trap operational representation. A float trap works on the Buoyancy Principle. Condensate enters the trap body and raises the float (1). The position of the float (1) depends upon the level/load of condensate (flowrate). The float trap continues to discharge condensate continuously and doesn't allow back up of condensate as long as the load is within the discharge capacity.

When the condensate load drops, the float (1) lowers in position and closes the outlet valve (3) with the ball (6) resting on the orifice (7).

On the start up the air present in the pipeline/process equipment is released through the thermostatic vent (5).



3(a) Trap Discharge Open



3(b) Trap Discharge Closed

Figure 3: Single Orifice Float trap working

\*The trap in the figure 3 shows a TV+SLR assembly. SOFT53-X comes with only TV assembly.

5. Installation Guidelines: (Refer to Figure 4 and 5)



Note: Before implementing any installations observe the 'Important Safety notes' in section 2. Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation.

Installation checks and Steps:

1. Check the correct installation location/position and the direction of fluid flow.
2. Remove protective covers from all connections where appropriate, before installation.
3. 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. Install the trap such that the arrow on the name plate points downward to achieve proper orientation of the trap.

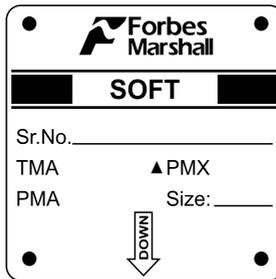


Figure 4: Single Orifice Float trap name plate

6. The arrow on the casting should be in the direction of the flow.

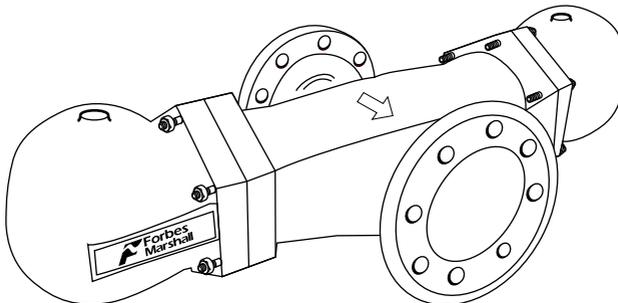


Figure 5: Cover casting with the arrow

## 6. Start-up and Commissioning:

### 6.1 Flushing of Lines:

As part of pre-installation all fluid handling equipment particularly piping should be thoroughly cleaned of scale and the internal debris which accumulates during construction. This is accomplished by blowing or flushing with air, steam, water and other suitable medium.

Follow these steps to carry out the flushing.

1. Close the isolation valve and open the bypass isolation valve.
2. Let the condensate drain for 10-15 minutes or until clear condensate starts coming out, whichever is earlier.
3. Now slowly close the bypass isolation valve and open the trap isolation valve.
4. Check for normal discharge pattern and leaks if any.

### 6.2 Commissioning:

After installation or maintenance ensure that the system is fully functioning by confirming condensate is passing through it.

- i) After flushing of lines is complete, ensure isolation by-pass valve closed and isolation valve opened.
- ii) Check for leaks and attend if any.

## 7. Maintenance Guidelines:



Before undertaking any maintenance on the product it must be isolated from both supply line and return line and any pressure should be allowed to safely normalise to atmosphere. The product should then be allowed to cool. With suitable isolation repairs can be carried out with the product in the line. When re-assembling, make sure that all joint faces are clean. Once completed open isolation valves slowly and check for leaks.

### 7.1 Routine and preventive maintenance:

Please refer to the maintenance schedule mentioned in the table below to undertake routine maintenance of the trap.

Sr.No	Parameters to be checked	Frequency for checking and maintaining						
		Immediate y	Daily	Weekly	Monthl y	Quarterly	Half yearly	Annual y
1	Test High pressure SOFT53-X (17.5 barg & above)		Y					
2	Repair / Replace SOFT53-X when testing shows leaks	Y						
3	Clean strainers before SOFT53-X				Y			
4	Clean internals of SOFT53-X					Y		
5	Visual inspection for leakages		Y					
6	Arresting any other leaks	Y						

### 7.2 Tool Kit:

Components	Tool	Tool Size
Float Unit Assembly:	M8 box spanner, M6 thread	
	Allen key	3mm
	Plier	1No
	Ball punch	
	Hammer	
Tightening of Float Unit Assembly to the body	Open spanner	13mm
Gland nut	Open spanner	22 mm
	M8 stud nut runner	M6 X 1.25
	Screw driver	12 inch
M10 bolts for outside covering (6 bolts)	Box spanner	24 mm

### 7.3 Recommended tightening torques:

Components	Torque Range
SLR seat	35 Nm
M10 Bolt for outside covering	25-35 Nm

#### 7.4 Maintaining/ Replacing the main valve assembly : (Refer to Figure 6)

1. Unscrew cover bolts (1) and lift off the base (2).
2. Unscrew main valve assembly nuts, and dismantle the main valve assembly (3).
3. Remove the deflector plate (5).
4. Replace the assembly (3) and gaskets (4) with new ones.
5. Place back the deflector plate(5) and refit the assembly(3)
6. Put the cover(6) back and refit

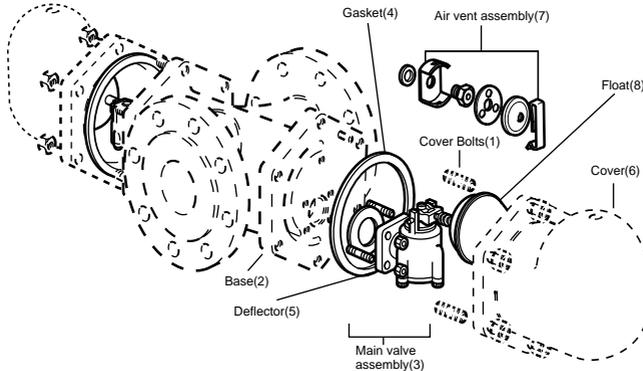


Figure 6: Maintaining the main valve assembly

#### 7.5 Inspection and maintenance of air vent assembly : (Refer to Figure 7)

1. Remove locking clip, thermopod and spacer plate.
2. Fit new gasket between mounting frame and body of the trap. (not visible in the figure 8), valve seat and mounting frame.
3. Assemble spacer plate and fit locking clip.

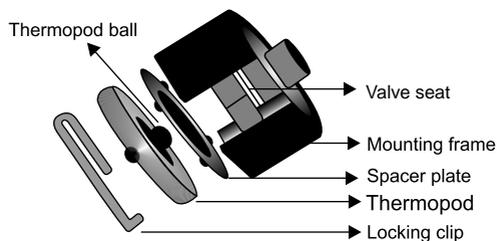


Figure 7: Maintaining the Air Vent assembly

#### 7.6 Steam trap testing:

Following methods can be used to determine the operating condition of a trap and determine if its working properly:

1. Testing traps through visual inspection.
2. Testing traps using temperature gun/equipment.
3. Testing traps using sound/ultrasound.
4. Testing traps through online monitoring.

**8.** Troubleshooting:

If the expected performance is unachievable after the installation of the single orifice trap, check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
Not discharging at all.	No condensate is discharged, and the surface temperature of the trap is low.	Check the installation. Check for the flow direction arrow on the cover casting and the name plate arrow on the base casting.
		Check for blockage in the strainer.
		If the actual differential pressure is higher than the design $\Delta P$ , the steam trap would have failed in closed position as the float buoyancy will not be adequate to open the main valve assembly.
		Check for blockage in main valve assembly and clean it.
		Check if the ball float is punctured, if so replace it. Post replacement, check for water hammering in process to avoid reoccurrence.
Leaking steam.	Live steam continuously leaking through the outlet.	Check the installation. The arrow on the name plate should point downwards
		Check main valve assembly for any deposition and clean it
		<ul style="list-style-type: none"> <li>i) Clean and lap the seating area of main valve assembly.</li> <li>ii) Lightly stamp an SS ball on the seating area of main valve assembly.</li> </ul>
	Steam leaking from the trap body.	Tighten the cover nuts and bolts to the recommended torque.
		Check the gasket for any possible damage and replace it if required.

Failure Mode	Possible Cause	Remedy
Not discharging enough condensate.	Reduced condensate carrying capacity of the trap.	Check parameters and trap sizing. The trap will not discharge enough condensate if the actual size is below the recommended size based on the condensate load.
		<p>Check for back pressure and corresponding discharge capacities as per the capacity charts.</p> <p>i) Replace/repair the leaking and non-working traps with working traps, the leak traps may create/increase the back pressure on the other working traps connected to the same return line or,</p> <p>ii) if there are more than one trap discharging in a single condensate return line, then ensure all the traps have an NRV installed on the outlet of each trap or,</p> <p>iii) ensure all the by-pass valve are closed, if by-pass valve is leaking or if it is kept open in closed loop condition which creates/increases back pressure on the other working traps, connected to the same return line.</p>
	Flooding of condensate	Check whether the inlet strainer is partially blocked.
		Check thermostatic valve seat orifice for blockage. If blocked, clean and lap.
		Check main valve seat orifice for blockage. If blocked, clean and lap.

**9.** Available Spares: (Refer to Figure 6)

The spare parts available are given in the following table

Spare Part		Part No.	Spare Code
*Air Vent Assembly		7	S2031914
*Main Valve Assembly	4.5barg	3	S2031957
	10barg		S2031958
	14barg		S2031959
	21barg		S2031959
	32barg		S2031959
*Ball float		8	S2031913
*Set of gaskets		4	S2031921

\*The spares thus marked are interchangeable with those used in the DN50 SOFT53 trap but 2 sets will be required for completely refurbishing the DN100 SOFT53-X trap.

How to Specify

DN 100 SOFT53-X-4.5 steam trap flanged ASA 300.

How to Order Spares:

Always order spares by using the description given in the column headed 'Available Spares' in the table above and stating the size and type of trap.

Example:- Air Vent Assembly for DN100 SOFT53-X 4.5 bar steam trap flanged to ASA 300.

**10** Warranty Period:

As per the ordering information and agreements in the contract.

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