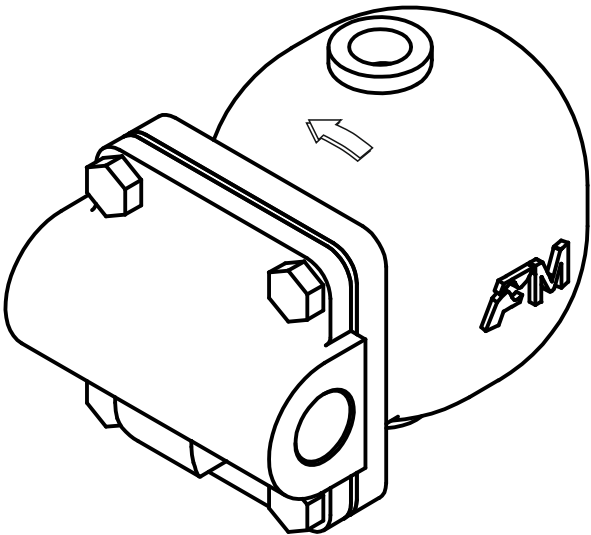


# Single Orifice Float Trap With SLR

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SOFT31-O

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# Table of Contents

1. Preface .....1

2. Important Safety Notes .....1

3. Brief Product Information .....3

4. Product Working Principle .....5

5. Installation Guidelines .....6

6. Start-up and Commissioning .....7

7. Maintenance Guidelines. ....8

8. Troubleshooting .....11

9. Available Spares .....13

10. Warranty Period .....13

**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 SLR [SOFT31-O]**

**Size:** DN15 (1/2 ")

#### **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 with SLR, SOFT31-O is a condensate drain trap of cast iron body and stainless steel internals.

#### 3.2 Sizes and Pipe Connections:

DN15 Screwed BSPT/NPT

**Note:** Available in Non IBR only.

#### 3.3 Available Types:

SOFT31-O with Steam Lock Release (SLR) only.

#### 3.4 Limiting Conditions:

PMA Maximum allowable pressure		13 bar g
TMA Maximum allowable temperature		220°C @ 13 bar g
PMO Maximum operating pressure		13 bar g
TMO Maximum operating temperature		220°C @ 13 bar g
Minimum operating temperature		0°C
$\Delta$ PMX maximum differential pressure	SOFT31-O-4.5	4.5 bar g
	SOFT31-O-10	10 bar g
	SOFT31-O-13	13 bar g
Cold hydraulic test pressure.		26 bar g

#### 3.5 Operating Range:

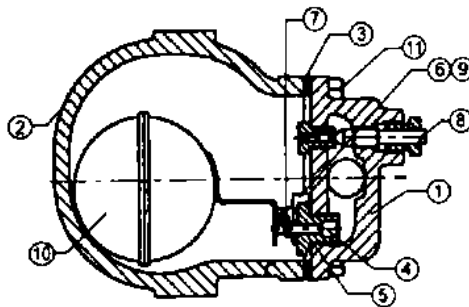
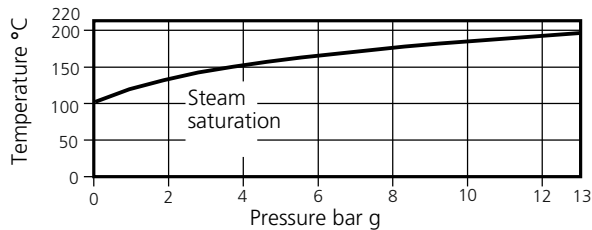
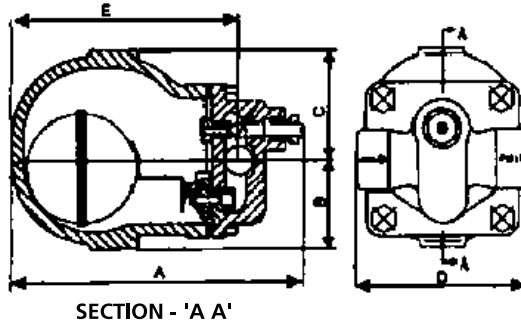


Figure : 1: Single Orifice Float Trap With SLR

**Material:**

S.No.	Part	Material	Standard
1	Base	Cast Iron	IS 210Gr. FG 260
2	Cover	Cast Iron	IS 210Gr. FG 260
3	Cover Gasket	Reinforced exfoliated graphite	
4	Valve Seat	Stainless Steel type 410	ASTM A276
5	Valve Seat Gasket	Stainless Steel Type 304	ASTM A240
6	Pivot Frame	Stainless Steel Type 304	ASTM A240
7	Pivot pin	Stainless Steel Type 304	ASTM A276
8	SLR Assembly	Stainless Steel Type 410	ASTM A276
9	Ch. Hd Screw	Stainless Steel Type 304	I.S. 1364
10	Float assembly	Stainless Steel type 304	ASTM A240
11	Hex. Hd Bolt	Carbon steel	H.T. Gr.8.8

**3.6 Product Dimensions and Drawing:**

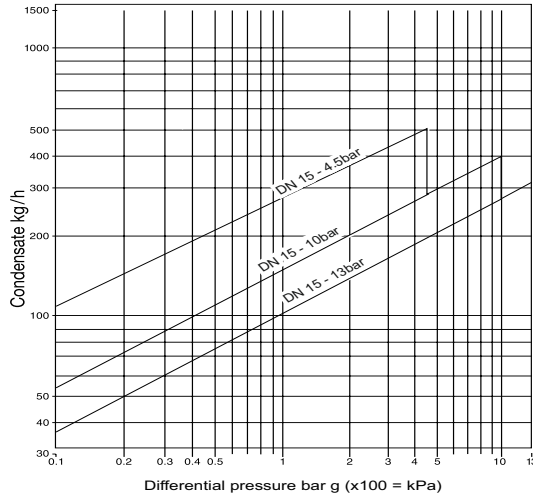


**Figure 2: Dimensional Drawing of SOFT31-O**

**Dimensions (approx.) in mm:**

Size	A	B	C	D	E	Weight
DN15	151	46	58	90	118	2.5kg

## 6. Capacity Chart:

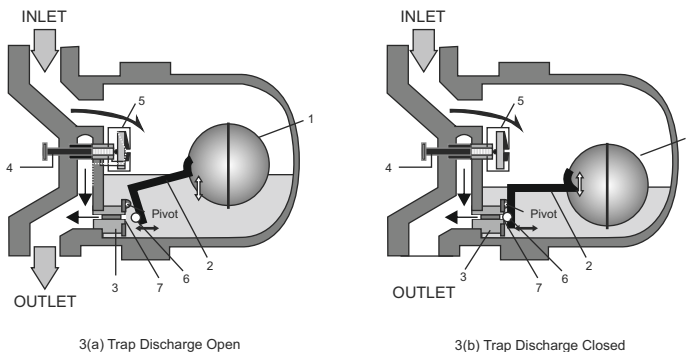


## 4. Product Working Principle: (Refer to Figure 3)

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).

SLR (4) is a needle valve which releases steam that can steam lock the trap during start-up or in operation if the steam reaches the trap before the condensate.



**Figure3: Float trap working**

\*The trap in the figure 3 shows a TV+SLR assembly. SOFT31-O comes with only SLR assembly.

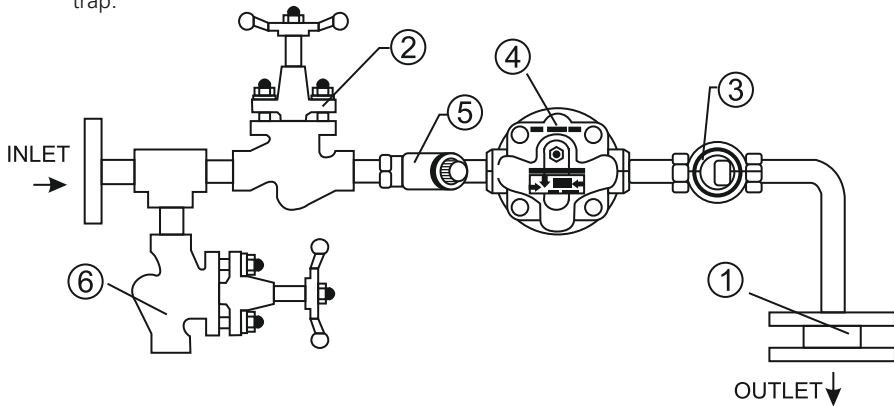
## 5. Installation Guidelines: (Refer to Figure 4, 5 and 6)



**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. Ensure the availability of all components as shown in Figure 4, to ensure the operation of the trap.



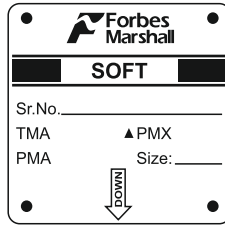
**Figure4: Single Orifice Float trap module**

**\*Typical/ Representative Installation and may vary based on application and site.**

Item No.	Description
1	Spring Loaded Check Valve
2,6	Stop Valve
3	View Glass
4	Single Orifice Float Trap
5	Strainer

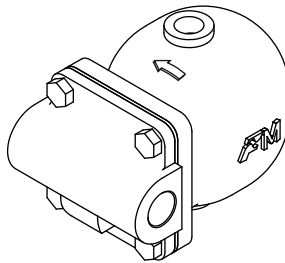
4. If the trap is to discharge to atmosphere ensure it is to a safe place, the discharging fluid may be at a temperature of 100 °C (212°F).
5. Install the trap such that the arrow on the name plate points downward to achieve proper orientation of the trap.





**Figure5: Single Orifice Float trap name plate**

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



**Figure6: Cover casting with the arrow**

## **6. Start-up and Commissioning:**

### **6.1 Flushing of Lines: (Refer to Figure 4)**

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 stop valve **(2)** and open the bypass stop valve **(6)**.
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 stop valve **(6)** and open the stop valve **(2)**

### **6.2 Commissioning: (Refer to Figure 4)**

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 stop by-pass valve **(6)** closed and stop valve **(2)** opened.
- ii) Check for leaks and attend if any.

### 6.3 Setting of Steam Lock Release (SLR) : (Refer to Figure 7)

1. Loosen the gland nut **(1)** by one thread
2. Rotate the stem **(2)** in clockwise direction. This moves the stem **(2)** towards SLR seat.
3. Once the stem touches the SLR seat, rotate the stem **(2)** in anti-clockwise direction by 1/4<sup>th</sup> of a turn.
4. Check for normal discharge pattern and leaks if any.

**Note: The SLR unit should only be used to prevent 'steam locking' and therefore is designed to pass a small amount of steam, it is not recommended that the SLR be left in the fully open condition as this may lead to premature trap failure and more frequent maintenance schedules.**

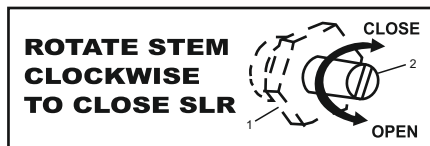


Figure7: SLR setting

## 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 product.

Sr. No.	Parameters to be checked	Frequency for checking and maintaining						
	Single Orifice float trap	Immediately	Daily	Weekly	Monthly	Quarterly	Half yearly	Annually
1	Test low pressure SOFT31-O for leakage/operation				Y			
2	Repair / Replace SOFT31-O - when testing shows leaks	Y						
3	Clean strainers of Single Orifice Float Traps				Y			
4	Clean internals of Single Orifice Float Traps					Y		
5	Visual inspection for leakages		Y					
6	Arresting any other leaks	Y						

## 7.2 Tool Kit:

To carry out any maintenance on the trap please use the tools mentioned below:

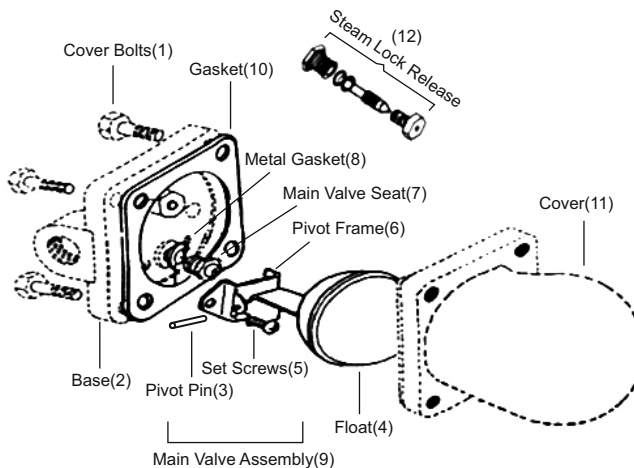
Component	Tool Used	Size
SLR seat	Box Spanner	17 mm (A/F) / 19mm (A/F)
Valve seat (4.1mm ID)	Box Spanner	17 mm (A/F)
SLR Stem	Slot Screw Driver	
Gland nut	Open Spanner	13 mm (A/F)
M4 screw (valve seat) (4No)	Screw Driver	(12 inch)
M10 Bolt for outside covering	Box Spanner	13 mm (A/F)

## 7.3 Recommended tightening torques:

Component	Torque Range
SLR seat	35 Nm
Valve seat (4.1mm ID)	35 Nm
SLR Stem	60-70 Nm
M10 Bolt for outside covering	25-35 Nm

## 7.4 Maintaining/ Replacing the main valve assembly :(Refer to Figure 8)

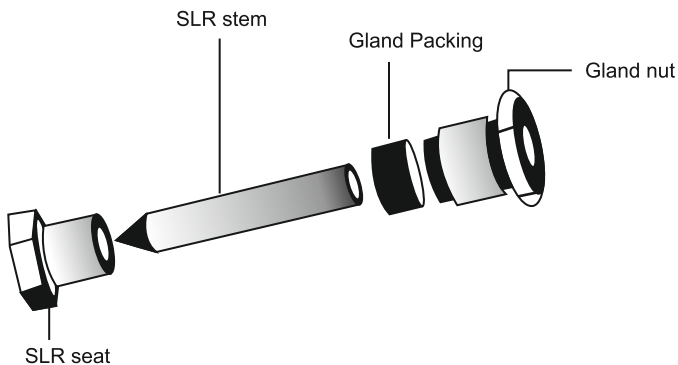
1. Unscrew cover bolts **(1)** and lift off the cover **(11)**.
2. Dismantle the pivot pin **(3)** and remove the float **(4)**.
3. Unscrew the assembly set screws **(5)**, and dismantle the pivot frame **(6)**.
4. Remove the main valve seat **(7)** along with the metal gasket **(8)**.
5. Replace the main valve assembly **(9)** and the gasket **(10)** with a new one.
6. Refit the cover **(11)** by using the cover bolts **(1)**.



**Figure8: Maintaining the main valve assembly**

### 7.5 Procedure to fit the Steam Lock Release (SLR) assembly : (Refer to Figure 9):

1. Unscrew the complete SLR assembly.
2. Remove the SLR gasket (not shown in the figure 9).
3. Replace the SLR assembly and gasket with new ones.
4. Reset the SLR.



**Figure 9: SLR 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 float trap, check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
<b>Not discharging at all.</b>	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 $P$ , the steam trap would have failed in closed position as the float buoyancy will not be adequate to open the valve seat.
		Check for the valve and seat assembly for blockage.
		Check if the ball float is punctured, if so replace it. Post replacement, check for water hammering in process to avoid reoccurrence.
	No condensate is discharged, and the surface temperature of the trap is high.	The trap is getting steam locked. Adjust the steam lock release setting by first closing it fully and then opening it by 1/4th turn.
<b>Leaking steam</b>	Live steam continuously leaking through the outlet.	Check the installation. The arrow on the name plate should point downwards.
		Check valve and seat assembly for any deposition and clean it.
		i) Clean and lap the seating area. ii) Lightly stamp an SS ball on the seating area.
		Check for SLR leakage/setting check for air vent leakage.
	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
<b>Not discharging enough condensate.</b>	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> <ul style="list-style-type: none"> <li>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,</li> <li>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,</li> <li>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.</li> </ul>
	Flooding of condensate	Check whether the inlet strainer is partially blocked.
		Check main valve seat orifice for blockage. If blocked, clean and lap.

## 9. Available spares: (Refer to Figure 8)

The spare parts available are given in the following table.

Sr.No.	SPARE PART	PART No.	SPARE CODE
1	MV Assembly 4.5barg	9	S2031851
2	MV Assembly 10barg		S2031852
3	MV Assembly 13barg		S2031853
4	Float 4.5barg	4	S2005482
5	Float 10barg		S2005483
6	Float 13barg		S2005484
7	Gasket size kit (pack of 5)	8, 10	S2031849
8	SLR unit kit	12	S2017200

### How to Order:

Example : DN15 Single Orifice Float Trap, SOFT31-O,  
14 bar g, SLR, BSPT.

### How to Order Spares:

Always order spares using the description given in the column above, headed “Available Spares”, and stating the size and type of the trap. For codes refer the user manual.

## 10. Warranty Period:

As per the ordering information and agreements in the contract.

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