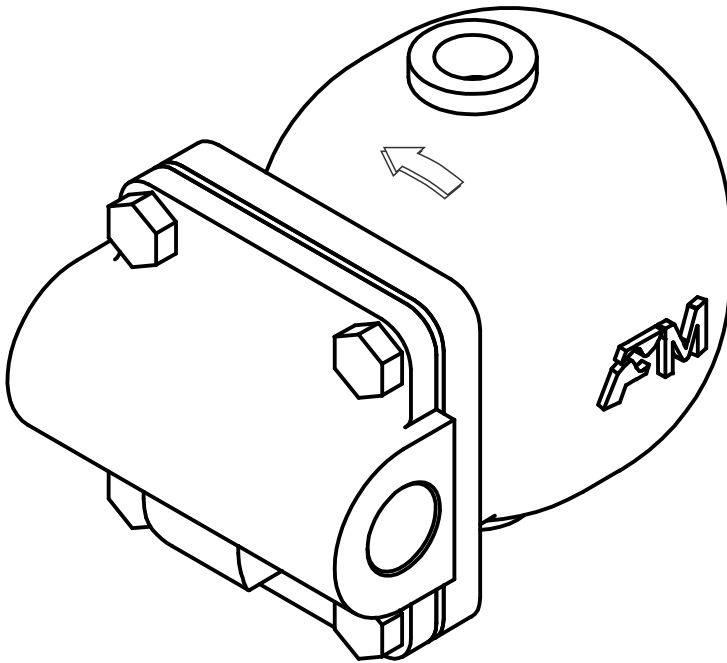


# Installation and Maintenance Manual

## Forbes Marshall Liquid Drain Trap

FMLDT31-O



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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 the below mentioned products safely and efficiently.

### **Forbes Marshall Liquid Drain Trap [FMLDT31-O]**

**Sizes: DN 15 (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. Product Disposal:**

It is necessary to dispose this product only in accordance with local regulations at the authorized, qualified collecting point specified for equipment's and its parts—Please refer the part details mentioned in the material table of this manual. Please follow all waste disposal guidelines (Management & Handling) as published by local governing authorities in India & abroad

**2.11. 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.

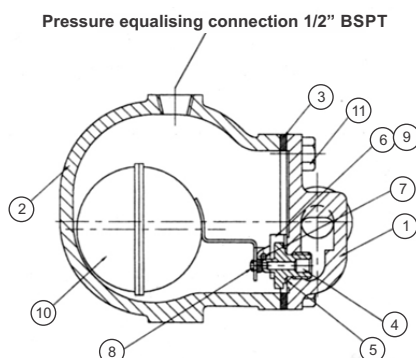
### 3. Brief Product Information:

#### 3.1 Description:

The Forbes Marshall Liquid Drain Trap, FMLDT31-O is a compressed air trap of cast iron body and cover for compressed air and other press urised gases. The trap body is equalised with the pressure in the system through the balancing connection on top of the trap body.

#### 3.2 Sizes and End Connections:

DN15 Screwed BSPT / NPT



**Figure 1: Forbes Marshall Liquid Drain Trap**

**Material:**

No	Part	Material	Standard
1	Base	Cast Iron	I S 210 FG 260
2	Cover	Cast Iron	I S 210 FG 260
3	Cover Gasket	SS Exfoliated Graphite	
4	Valve Seat	CA40	ASTM A743
5	Valve Seat Gasket	SS Type 420	ASTM A240
6	Pivot Frame	SS Type 304	ASTM A240
7	Pivot Pin	SS Type 304	
8	Button	Synthetic Rubber Viton	
9	Ch. Hd Screw M4x6Lg	SS Type 304	IS 1364
10	Float Assembly	SS Type 304	ASTM A240
11	Hex. Hd bolt	Carbon Steel	ASTM A 193 Gr B7

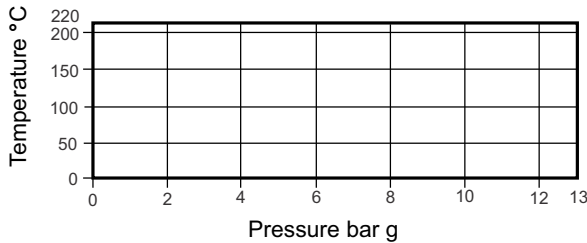
#### 3.3 Limiting Conditions:

PMO -Max. operating pressure	13 bar g
TMO-Max. operating temperature	220°C
Cold hydraulic test pressure	19.5 bar g
DPMX-Max. differential pressure	13 bar g
Min operating temperature	0°C

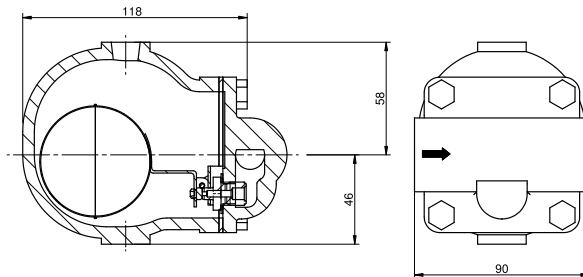
**Note:** When used on liquids having a specific gravity of less than 1, the maximum operating pressures will be.

Sp.G	Kg/cm <sup>2</sup>	Bar g
0.9	13	13
0.8	11.92	11.7
0.7	8.76	8.6
0.6	5.09	5.0

### 3.4 Operating Range:



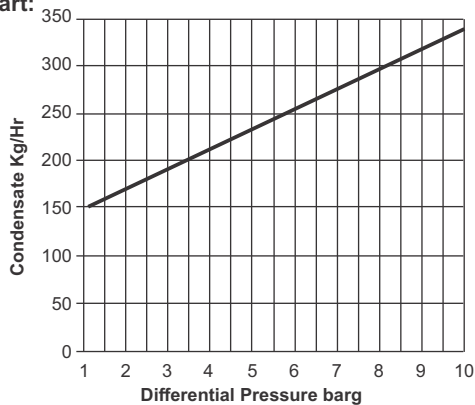
### 3.5 Product Dimension and Drawing:



All dimensions are in mm / Total assembly weight : 2.5kg

**Figure 2 : Dimensional Drawing of FMLDT31-O**

### 3.6 Capacity Chart:



#### 4. Product Working Principle:

(Refer to Fig. 1) A Forbes Marshall Liquid Drain Trap works on the Buoyancy Principle. As moisture enters the trap body and raises the ball float (10). The position of the ball float (10) depends upon the level/load of moisture (flow rate). The liquid drain trap continues to discharge moisture continuously & doesn't allow back up of moisture as long as the load is within the discharge capacity. When the moisture load drops, the ball float (10) lowers in position and closes the outlet orifice of the valve seat (4).

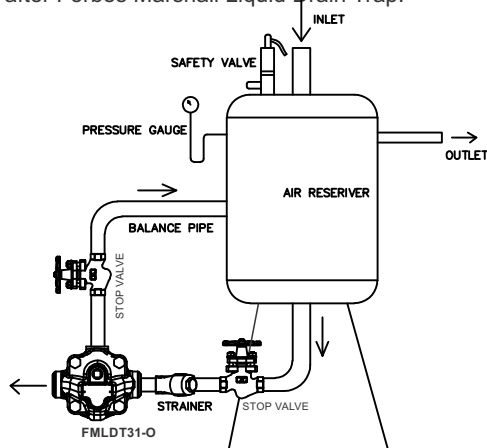
(Refer to Figure 3) A tapping is provided at the top of the Forbes Marshall Liquid Drain Trap to fit the balancing line. When there is high load, there are chances of the trap getting air locked. The balancing line is connected back to the upstream of the Liquid Drain Trap so that the air collected inside the Liquid Drain Trap is displaced back in the system.

#### 5. Installation Guidelines: (Refer to Figure 3)



**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.

1. Install Forbes Marshall Liquid Drain Trap in horizontal direction.
2. Fit Liquid Drain Trap close to the drain outlet and just below the drain equipment.
3. The arrow on the nameplate must point downwards.
4. The arrow on the casting indicates the flow direction
5. The trapped air should be removed by connecting a balancing pipe of 3/8" tapping that is provided on the cover of Forbes Marshall Liquid Drain Trap to the air receiver.
6. A strainer is always recommended before Forbes Marshall Liquid Drain Trap.
7. Avoid any lift after Forbes Marshall Liquid Drain Trap.



**Figure 3 : FMLDT31-O installation with balance line arrangement**

## 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.

**Note: For a detailed procedure on flushing of lines please visit Forbes Marshall website.**

### 6.2. Commissioning:

After installation or maintenance ensure the system is in working condition.

1. After flushing of lines is complete, open the stop valve of balancing pipe and upstream of Forbes Marshall Liquid Drain Trap respectively
2. 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 normalize to atmosphere. The product should then be allowed to cool. With suitable isolation repairs can be carried out with the product in the line.

### 7.1. Routine and Preventive Maintenance:

Please refer to the maintenance schedule mentioned in the table below to undertake

S.No	Parameters to be checked	Frequency for checking and maintaining						
	Forbes Marshall Liquid Drain Trap	Immediately	Daily	Weekly	Monthly	Quarterly	Half yearly	Annually
1	Test Forbes Marshall Liquid Drain Trap		Y					
2	Repair / Replace FMLDT31-O - when testing shows leaks	Y						
3	Clean strainers of FMLDT31-O				Y			
4	Clean internals of FMLDT31-O					Y		
5	Visual inspection for leakages		Y					
6	Arresting any other leaks	Y						

## 7.2. Tool Kit:

To carry out any maintenance on Liquid Drain Trap use the tools mentioned below:

Component	Tool Used	Size
Valve seat (4.1mm ID)	Box Spanner	17 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 torque:

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

## 7.4. Procedure to fit Main Valve Assembly : (Refer to Figure 1 and 4)

1. Unscrew cover bolts **(11)** and lift off the cover **(2)**.
2. Unscrew the assembly set screws **(9)**, and dismantle the pivot frame **(6)**.
3. Remove the valve seat **(4)** along with the valve seat gasket **(5)**.
4. Replace the main valve assembly **(A, B, C, D, E, and F)** as shown in figure 4 with a new one.
5. Refit the pivot frame **(6)** and tighten the assembly set screws **(5)**.
6. Refit the cover **(2)** by using the cover bolts **(11)**.

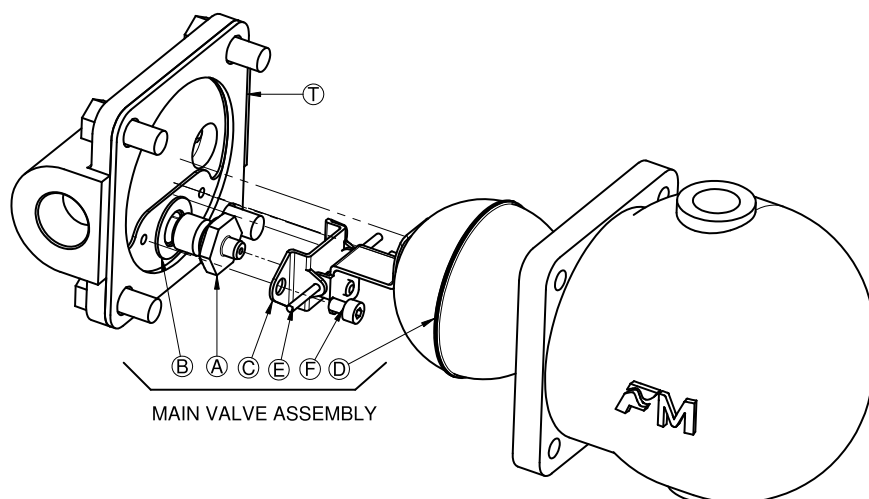
## 8. Troubleshooting:

If the expected performance is unachievable after the installation of Forbes Marshall Liquid Drain. Trap liquid drain trap, check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
<b>Trap does not pass moisture</b>	Wrong Installation	Check the installation. Check for the flow direction arrow on the cover casting and the name plate arrow on the base casting.
	Blocked strainer	Check the strainer for any blockage and clean it if found blocked.
	Differential pressure greater than the max. allowable differential pressure	If the actual differential pressure is higher than the design $\Delta P$ , the trap would have failed in closed position as the float buoyancy will not be adequate to open the valve seat.
	Deposition on the main valve assembly	Check for the valve and seat assembly for blockage.
	Float punctured	Check if the ball float is punctured, if so replace it
	Stop valve of balancing pipe is closed.	Stop valve should be fully opened of the balancing pipe.
<b>Leaking air</b>	Air continuously leaking from the outlet	Check the installation. The arrow on the name plate should point downwards
		Check valve seat assembly for any deposition and clean it
		Clean and lap the seating area.
	Air 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.
<b>Not Draining Enough moisture</b>	Reduced moisture draining capacity of Forbes Marshall Liquid Drain Trap	Check parameters and trap sizing. The trap will not drain enough moisture if the actual size is below the recommended size based on the load
	Flooding of moisture (water)	Check whether the inlet strainer is partially blocked.
		Check main valve seat orifice for blockage. If blocked, clean and lap.
<b>Trap is air bound</b>	When Forbes Marshall Liquid Drain Trap is connected to any compressed air plant, and there is a high load, there is a possibility of air binding in the trap.	Fit the balance pipe as shown in fig3. This will help the liquid to discharge the trapped air back into the mainstream.

## 9. Available Spares:

Spare part	Symbol	Spare code
Main Valve Assembly with float	A,B,C,D,E,F	S2031927
Two complete Set of Gaskets (Packet of 5)	B,T	S2005471



**Figure 4 : Exploded View of Forbes Marshall Liquid Drain Trap [FMLDT31-O]**

### How to Order:

Example:1 No. Forbes Marshall Liquid Drain Trap, FMLDT31-O, DN 15 BSPT

### How to Order Spares:

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

**Example: 1 No. Main valve Assembly for DN 15 Forbes Marshall Liquid Drain Trap FMLDT31-O**

## 10. Warranty Period:

As per the ordering information and agreement in the contract.



[www.forbesmarshall.com](http://www.forbesmarshall.com)

Forbes Marshall Arca

Codel International

Krohne Marshall

Forbes Vyncke

Forbes Marshall Steam Systems

**A: Forbes Marshall Pvt. Ltd.**

Opp. 106th Milestone, CTS 2220,  
Mumbai-Pune Road, Kasarwadi,  
Pune MH 411034 INDIA

**P:** +91(0)20-68138555

**F:** +91(0)20-68138402

**E:** [ccmidc@forbesmarshall.com](mailto:ccmidc@forbesmarshall.com)

**Forbes Marshall International Pte. Ltd.**

16A, Tuas Avenue 1,  
#05-21, JTC Space @Tuas  
Singapore - 639533

**P:** +65 6219 3890

**CIN No:** U28996PN1985PTC037806