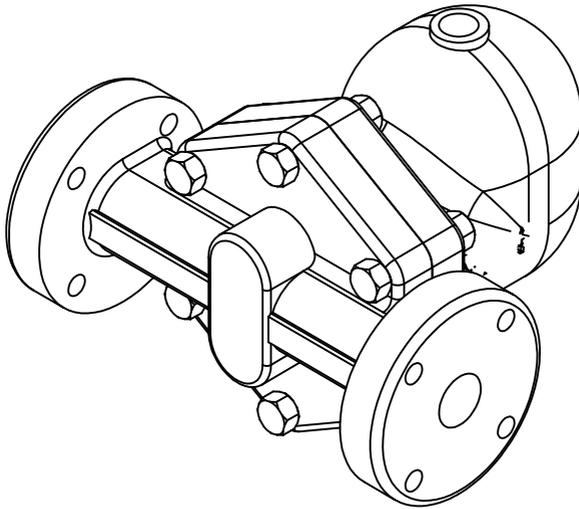


# Installation and Maintenance Manual

## Forbes Marshall Liquid Drain Trap

FMLDT53



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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.

Forbes Marshall Liquid Drain Trap, (FMLDT53).

Sizes: DN 15 (1/2"), DN 20 (3/4"), DN 25 (1").

### 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 Liquid Drain Trap, FMLDT53, is a Moisture drain trap of cast steel body and cover for compressed air and other pressurized gases. The trap body is equalized with the pressure in the system through the balancing connection on top of the trap body.

#### 3.2 Sizes and Pipe Connections:

DN 15, 20 and 25

Screwed : BSPT / NPT, Socket weldable  
ANSI 150, 300, 600

Flanged : BS table H, J, K, R  
DIN ND 10,16,25,40

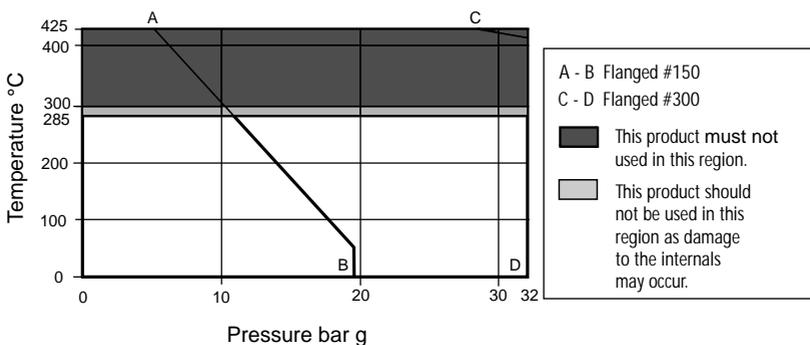
Note:

1. DN 15 ASA 150 Flange available only with weld on flange
2. Flange thickness is common for each size as shown in dimensional details

#### 3.3 Limiting Conditions:

FMLDT53 - 4.5 bar g	Max. differential pressure of 4.5 bar g
FMLDT53 - 10 bar g	Max. differential pressure of 10 bar g
FMLDT53 - 13 bar g	Max. differential pressure of 13 bar g
FMLDT53 - 21 bar g	Max. differential pressure of 21 bar g
FMLDT53 - 32 bar g	Max. differential pressure of 32 bar g
Max. body design condition - 32 bar g at 425°C	
Max. cold hydraulic test pressure - 64 bar g	

#### 3.4 Operating Range:



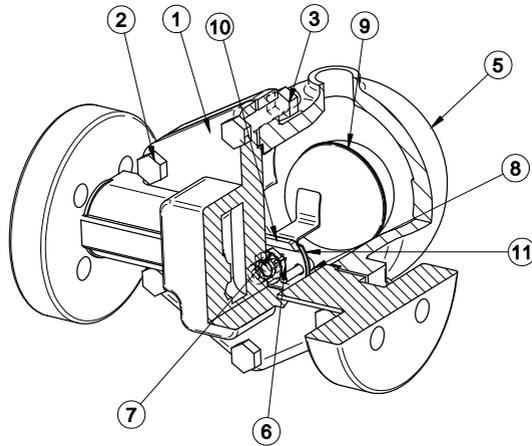


Figure 1: Forbes Marshall Liquid Drain Trap

Material:

No	Part	Material	Standard
1a	Base flange DN 20-50	Cast Steel	ASTM A216 Gr.WCB
1b	Base Screwed / SWE DN 15-20	Forged Carbon Steel	ASTM A105
1c	Base Screwed/SWE DN 25	Cast Steel	ASTM A216 Gr.WCB
2	Cover Bolts	Carbon Steel	IS 1367 Gr. 8.8
3	Cover Nuts	Carbon Steel	IS 1367 Gr. 8
4	Cover Gasket	S.S. Reinforced Exfoliated Graphite	
5	Cover	Cast Steel	ASTM A216 Gr.WCB
6	Valve Seat	Stainless Steel	ASTM A743 CA40
7	Valve Seat Gasket	Stainless Steel	SS420
8	Pivot Frame Assly Set Screws	Stainless Steel Type 304	ASTM A240
9	Ball Float and Lever	Stainless Steel Type 304	ASTM A240
10	Support Frame	Stainless Steel Type 304	ASTM A240
11	Pivot Frame	Stainless Steel Type 304	ASTM A240

### 3.5 Product Dimension and Drawing:

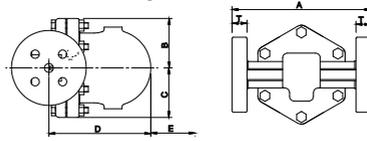


Figure 2: Dimensional Drawing of FMLDT53-Screw Connection

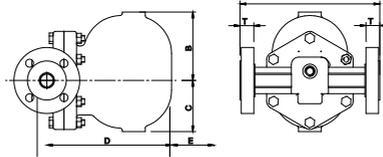
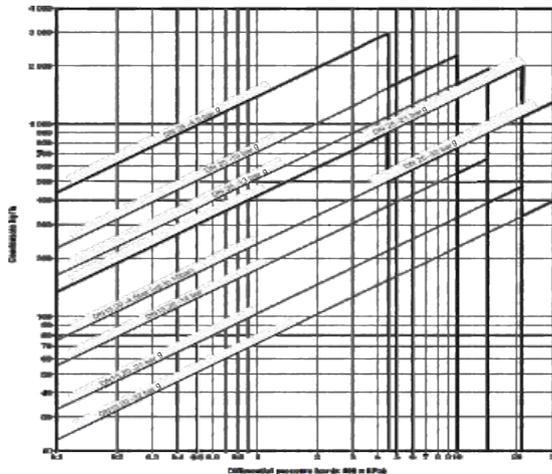


Figure 3: Dimensional Drawing of FMLDT53-Flange Connection  
Dimensions (approx.in mm) Flanged:

Size	A	B	C	D	E	T	Weight(kg)
DN15/20	350	68	84	172	120	21	11
DN 25	240	119	88	225	160	24	30

### 3.6 Capacity Chart:



## 4. Product Working Principle :

(Refer to Figure 1) A Forbes Marshall Liquid Drain Trap works on the Buoyancy Principle. As Moisture enters the trap and raises the ball float (9). The position of the ball float (9) depends upon the level/load of Moisture (flow rate). The liquid drain trap continues to discharge Moisture and 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 (9) lowers in position and closes the outlet orifice of the valve seat (6).

(Ref.Fig. 4) A tapping is provided at the top of Forbes Marshall Liquid Drain Trap to fit the balancing line. When there is high load, there are chances of the Forbes Marshall Liquid Drain 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 Forbes Marshall Liquid Drain Trap is displaced back in the

5. Installation Guidelines:



*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 the 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 the Liquid Drain Trap to the air receiver as shown in figure 4.
6. A strainer is always recommended before Forbes Marshall Liquid Drain Trap.
7. Avoid any lift after the liquid drain trap.

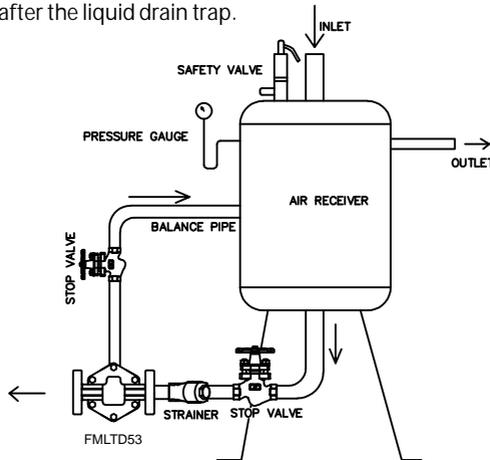


Figure 4: FMLDT53 installation with balance line arrangement

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 routine maintenance of the Forbes Marshall Liquid Drain Trap.

S.No	Parameters to be checked	Frequency for checking and maintaining						
		Immediately	Daily	Weekly	Monthly	Quarterly	Half yearly	Annually
1	Test Forbes Marshall Liquid Drain Trap			Y				
2	Repair / Replace FMLDT53 - when testing shows leaks	Y						
3	Clean strainers				Y			
4	Clean internals of FMLDT53					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:

Components	Tool	Tool Size
Valve assembly	Box spanner	17 mm (A/F)
Body cover tightening	Box spanner	16 or 17 mm (A/F)
float trap assembly adjustment	Hammer	
	Seat punch	
	Screw driver	

### 7.3. Recommended tightening torque:

Components	Torque Range
Valve assembly	25 - 35 Nm
Body cover tightening	25 - 35 Nm

### 7.4. Maintaining the main valve assembly: [Refer figure 1 and 5]

1. Unscrew cover bolts (2) and lift off the cover (5).
2. Dismantle the pivot pin and remove the ball float (9).
3. Unscrew the assembly set screws (8), and dismantle the pivot frame (11).
4. Remove the valve seat (6) along with the valve seat gasket (7).
5. Replace the main valve assembly (A, B, C, D, E, F, G, & T as shown in fig.5) with a new one.
6. Fit support frame and pivot frame (11) by using two set screws (8) but do not tighten full.
7. Place the float arm and complete the assembly by placing the pin.
8. Now tighten the set screws (8).
9. Refit the cover (5) by using the cover bolts (2).

**8.** Troubleshooting:

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

Condition	Description	Remedy
Trap does not pass moisture	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 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.
Leaking air	Air continuously leaking from 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
		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.
Not Draining Enough moisture	Reduced Moisture draining capacity of the 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	Check whether the inlet strainer is partially blocked.
		Check main valve seat orifice for blockage. If blocked, clean and lap.
Trap is air bound	When the 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 fig 4. This will help the liquid to discharge the trapped air back into the mainstream.

**9.** Available Spares: (Refer Fig.5)

Spare part	Symbol	Spare code
Main Valve Assembly (DN 15/20) 4.5 bar g	A,B,C,D,E,F,G	SPARE-1520FMLDTAE53-4.5MVKIT
Main Valve Assembly (DN 15/20) 10 bar g	A, B, C, D, E, F, G, T	SPARE-1520FMLDTAE53-10MVKIT
Main Valve Assembly (DN 15/20) 14 bar g	A, B, C, D, E, F, G, T	SPARE-1520FMLDTAE53-14MVKIT
Main Valve Assembly (DN 15/20) 21 bar g	A, B, C, D, E, F, G, T	SPARE-1520FMLDTAE53-21MVKIT
Main Valve Assembly (DN 15/20) 32 bar g	A, B, C, D, E, F, G, T	SPARE-1520FMLDTAE53-32MVKIT
Main Valve Assembly (DN 25) 4.5 bar g	B, C, D, E, F, G,T	SPARE-25FMLDTAE53-4.5MVKIT
Main Valve Assembly (DN 25) 10 bar g	A, B, C, D, E, F, G, T	SPARE-25FMLDTAE53-10MVKIT
Main Valve Assembly(DN 25) 14 bar g	A, B, C, D, E, F, G, T	SPARE-25FMLDTAE53-14MVKIT
Main Valve Assembly(DN 25) 21 bar g	A, B, C, D, E, F, G, T	SPARE-25FMLDTAE53-21MVKIT
Main Valve Assembly(DN 25) 32 bar g	A, B, C, D, E, F, G,T	SPARE-25FMLDTAE53-32MVKIT
Set of Gaskets (Packet of 3)	B,T	SPARE-1520FMLDTAE53-GKIT

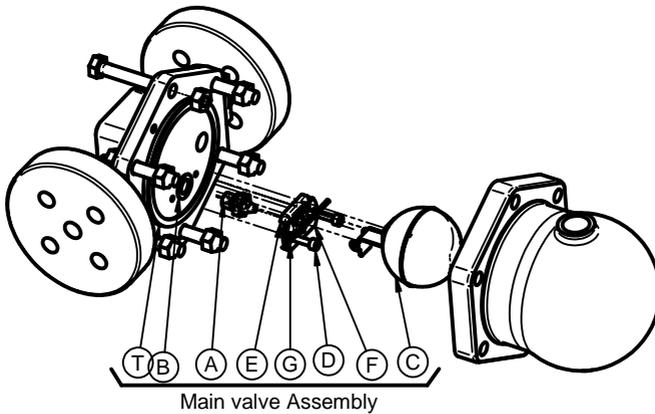


Figure 5: Parts available as spares for FMLDT53

How to Order:

Example: DN 20 Forbes Marshall Liquid Drain Trap FMLDT53 - 14 bar g flanged to ANSI # 150

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: Main valve assembly for DN 20 Forbes Marshall Liquid Drain Trap FMLDT53-14 bar g.

**10** Warranty Period:

As per the ordering information and agreement in the contract.

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