

Installation and Maintenance Manual

Forbes Marshall Universal Tracer Line Trap

FMTLT63-U

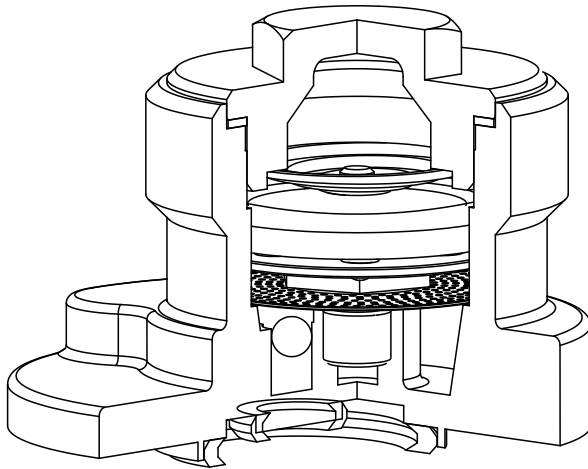


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PLEASE NOTE - Throughout this manual this cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked. This symbol denotes **CAUTION**, **WARNING** or **DANGER**.



1. Preface:

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

Forbes Marshall Universal Tracer Line Trap [FMTLT63-U]

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 Universal Tracer Line Trap, FMTLT63-U, is a maintainable balanced pressure steam trap manufactured in stainless steel. It is designed for steam pressure up to 32 bar g. When installed with a suitable pipeline connector the FMTLT63-U can easily and simply be removed without breaking into the pipeline thus speeding up trap replacement with minimum system downtime. The pipeline connector is available with screwed and socket weld connections. It is supplied with an inbuilt check valve.

3.2 Thermopod Fill and Operation

As a standard the FMTLT63-U is supplied with a thermostatic thermopod ("T" fill) which operates approximately 12°C below steam saturation temperature. It can also be supplied with a thermopod operating close to saturation 6°C ("C" fill) or under cooled 24°C below ("U" fill).

3.3 Sizes and Pipe Connections

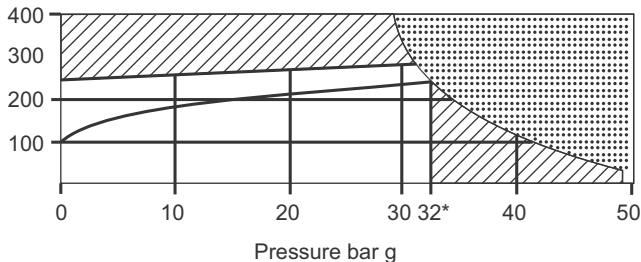
The FMTLT63-U can be fitted to pipeline connector. See the separate technical information sheet for details of connections available on pipeline connector

3.4 Limiting Conditions


PMO-Max. operating pressure	32 bar g
TMO-Max. operating temperature	287°C
Max. cold hydraulic test pressure	64 bar g

Note: The model of pipeline connector and connection selected will dictate the maximum operating pressure and temperature of the complete assembly. Consult the specified technical information sheet for this information.

3.5 Operating Range



 The product must not be used in this region

 The product should not be used in this region or beyond its operating range as damage to the internals may occur

Note

The model of pipeline connector and connection selected will dictate the maximum operating limits of the complete assembly. Refer the specific pipeline connector technical information sheet.

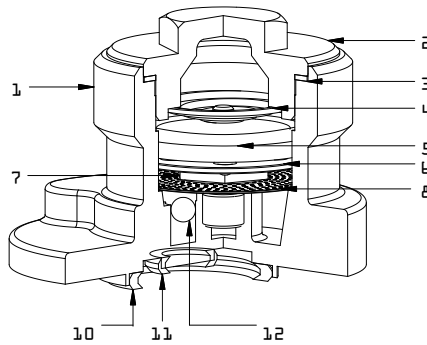


Figure 1: Forbes Marshall Universal Tracer Line Trap

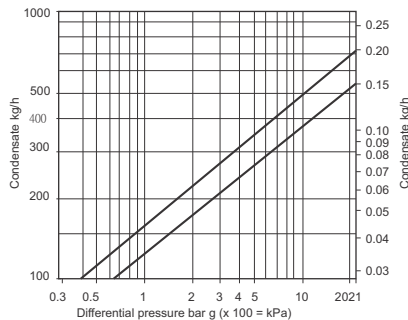
Materials:

No	Part	Material	Standard
1	Body	CF8	ASTM A 351
2	Cap	CF8	ASTM A 351
3	Gasket	SS304 with exfoliated graphite	-
4	Spring	Stainless Steel	ASTM A 276 302
5	Thermopod	Stainless Steel	-
6	SpacerPlate	Stainless Steel	ASTM A 276 304
7	Seat	Stainless Steel	ASTM A 276 431
8	Screen	Stainless Steel	ASTM A 276 304
9	Gasket	Stainless Steel	-
10	Spiral Gasket-Inner	Stainless Steel/Graphite filler	-
11	Spiral Gasket-Outter	Stainless Steel/Graphite filler	-
12	Ball	Stainless Steel	AISI 440C
13	Connector Screws	Carbon Steel	HT Gr.8.8

Total assembly weight is 0.5 kg

Pressure / temperature limits (ISO6552)

3.6 Capacity Chart:



4. Product Working Principle:

The Forbes Marshall Universal Tracer Line Trap works on thermostatic principle operates on the steam temperature difference from sub-cooled condensate and air. Steam increases the pressure inside the thermostatic element i. e. thermopod, causing the trap to close. As condensate and non-condensate gases surrounding the thermopod, the temperature begins to drop and the thermopod contracts and opens the valve.

4.1 Operations of Forbes Marshall Universal Tracer Line Trap : (Refer Figure 1)

1. The operating thermostatic element is a thermopod (5) containing a small quantity of a hydrocarbon liquid with a boiling point below that of water.
2. When steam is turned on during start-up, air and sub-cooled condensate is discharged as the valve is off its seat (7) and is wide open.
3. As condensate passes through the tracer line trap, heat is transferred to the hydrocarbon liquid in the thermopod (5). The hydrocarbon liquid boils (based on thermopod (5) selected) before steam reaches the trap.
4. The vapour pressure within the thermopod (5) causes it to expand which closes the valve seat (7) and trap remains shut.
5. Heat loss from the trap cools the water surrounding the thermopod (5), the hydrocarbon liquid condenses and the thermopod (5) contracts, opening the valve seat (7) and releasing condensate until steam temperature approaches again at which the cycle is repeated.

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.

5.1. Installation of Forbes Marshall Universal Tracer Line Trap : [Refer fig. 2]

1. Check materials, pressure and temperature and there maximum values.
2. Determine the correct installation situation and the direction of fluid flow.
3. Before installing the trap, blow out the inlet piping to remove all dirt and oil.
4. Remove protective covers from all connections.
5. The Forbes Marshall Universal Tracer Line Trap **(1)** can be installed on FM Pipeline connector [FMPC53] **(2)** in any plane. Refer separate installation and maintenance of the Forbes Marshall Pipeline connector [FMPC53].
6. Ensure that spiral gasket-inner **(3)** and spiral gasket - outer **(4)** are clean and undamaged and that the transfer holes clear. Place the FMTLT63-U body against the connector gasket face and apply a small amount of anti – seize compound to the threads of the connector screws **(5)**. Tighten screws finger tight and ensure that TLT32 **(1)** body is parallel to the Forbes Marshall Pipeline connector [FMPC53] **(2)**. Tighten the screws to the recommended torque. (Refer Table 1)
7. Open integral isolation valve of Forbes Marshall Pipe Line Connector (FMPC53) **(2)**.
8. Checks for leaks and attend if any.

5.2. Typical installation of Forbes Marshall Tracer Line Trap [FMTLT63-U]:

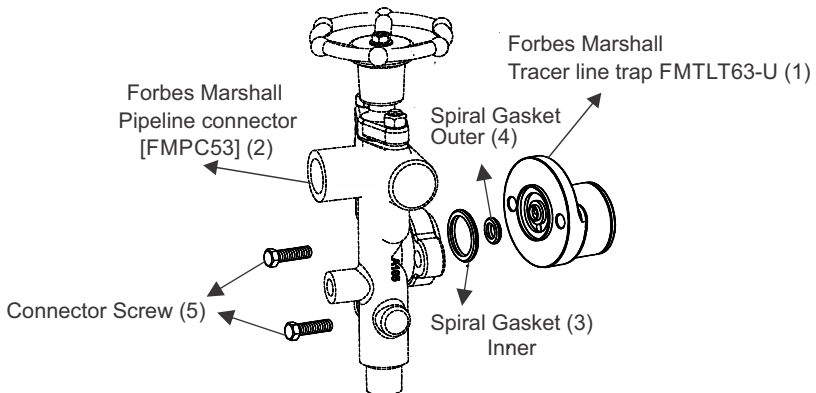


Fig. 2: Typical Installation of Forbes Marshall Tracer Line Trap on Forbes Marshall Pipeline connector [FMPC53]

6. Start-up and Commissioning:

6.1. Flushing of lines: [Refer figure 2]

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 this step to carry out flushing of lines.

1. Close the trap isolation valve, open the trap vent valve (DV2) until trap depressurize then close the trap vent valve (DV2) and later open the trap bypass valve (DV1) of the tracer line compact module - 05 respectively
2. Drain the condensate for 10-15 minutes or until clear condensate starts coming out, whichever is earlier.
3. Now slowly close the trap bypass valve (DV1) (2) and open the trap isolation valve (1).

Note: Trap bypass valve (2) should be used to remove muck or dirt and not for welding fluxes and metal burrs. For a detailed procedure on flushing of lines please visit Forbes Marshall website.

6.2. Commissioning: [Refer figure 2]

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

1. After flushing of lines is complete, ensure that trap bypass valve (DV1) is closed and trap isolation valve (DV1) is opened.
2. To check swivel connector trap operation, first close the integral isolation valve of manifold to which it is connected. Open the Hex Knob of the trap test valve to ensure trap discharge fluid later close the Hex Knob of the trap test valve respectively
3. Ensure only trap isolation valve and integral isolation valve of manifold is open, similarly trap bypass valve (DV1), trap vent valve (DV2) and trap test valve (DV3) should be remained closed when the module is in operation.
4. Check for leaks and attend if any.

7. Maintenance Guidelines:



Note: Before undertaking any maintenance on the product it must be isolated from both supply line and return line and ensure pressure 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. When re-assembling, make sure that all joint faces are clean.

7.1 Routine and preventive maintenance:

Sr. No.	Parameters to be check	Frequency for checking various parameters					
		Daily	Weekly	Monthly	Quarterly	Half Yearly	Annually
1	Test High Pressure Steam Traps (17.5 bar g & above)	Y					
2	Test Medium Pressure steam traps (3.5 bar g to 17.5 bar g)		Y				
3	Test Low pressure steam traps (below 3.5 bar g)			Y			
4	Repair / Replace steam traps - when testing shows leaks		Y				
5	Clean internals of FMTLT63-U					Y	
6	Visual Inspection for leakages	Y					
7	Arresting Leaks		Y				
8	Valve Operation for Forbes Marshall Pipeline Connector			Y			

7.2. Recommended tightening torque:

Item	Torque Range
Cap (2)	100 – 110 Nm
Connector Screws M10 (13)	40 – 45 Nm

Table 1: Recommended tightening torques.

7.3. Procedure to repair or replace thermopod and seat assembly: (Refer Figure 2)

1. Remove the Forbes Marshall Universal Tracer Line Trap [FMTLT63-U] by unscrewing the two connector screws (13) from the Forbes Marshall Pipe Line Connector.
2. Remove the inner and outer spiral gasket (10 and 11) from the flange end of the trap.
3. Unscrew the cap (2) to remove the thermopod and seat assembly (5 and 7) and lift the thermopod (5) from the spacer (8).
4. Remove the gasket (9), and clean the internals using WD40 liquid spray and clean with lint free cloth.
5. After cleaning refit the thermopod and seat assembly (5 and 7) and insert new cover gasket (9) make sure that the strainer screen (8) is correctly located.
6. Insert new inner and outer spiral gasket (10 and 11) and ensure that the two connector screws (13) are tightened evenly. The recommended torques for tightening as shown in table 1.
7. When maintenance is complete, open isolation valves slowly until the normal pressure is obtained.
8. Checks for leaks and attend if any.

7.4. Procedure to clean or replace the strainer screen: (Refer Figure 2)

1. Remove the Forbes Marshall Universal Tracer Line Trap [FMTLT63-U] by unscrewing the two connector screws (13) from the Forbes Marshall Pipeline Connector.
2. Remove the inner and outer spiral gasket (10 and 11) from the flange end of the trap.
3. Replace with new strainer screen (8).
4. Insert new inner and outer spiral gasket (10 and 11) and ensure that the two connector screws (13) are tightened evenly. The recommended torques for tightening as shown in table 1.
5. When maintenance is complete, open isolation valves slowly until the normal pressure is obtained.
6. Checks for leaks and attend if and any.

7.5. Replacement of the trap unit:

1. Ensure that correct tools and necessary protective equipment are used at all times.
2. Replacement of the steam trap unit is achieved by removing the connector screws (13) and removing the steam trap from the Forbes Marshall Pipeline connector [FMPC53]
3. The steam trap unit should be positioned against the connector gasket face and apply a small amount of anti – seize compound to the threads of the connector screws.
4. Tighten the connector screws to the specified torque. (See Table 1)
5. Open isolation valves slowly until normal operating condition are achieved.
6. Checks for leaks and attend if any.

8. Troubleshooting:

If the expected performance is unachievable after installation of the Forbes Marshall Universal Tracer Line Trap [FMTLT63-U], check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
No Condensate discharge (blocked)	Strainer Screen is clogged with rust or scale	Clean Strainer Screen if rusted replace with new one
	Valve seat is blocked.	Clean the valve seat and capsule ball surface then re-assemble the steam trap.
	Thermopod may be over extended due to excessive pressure making it impossible for the valve to lift off its seat.	Replace the thermopod; steam trap should be opened only when cool to atmospheric temperature
	Over expansion capsule due to superheat steam or perhaps someone opening the steam trap while the capsule was hot.	
Steam leakage or blowing	Spiral Gasket deterioration or damage.	Replace inner and outer spiral gasket with new one and retain them in the grooves using suitable adhesive (Locktite). Note: Care must be taken not to damage gasket faces. Do not use sharp edges to clean gasket and gasket faces.
	Foreign material has built-up between capsule ball (valve head) and valve seat.	Clean the valve seat and capsule ball surface then re-assemble the steam trap; check for any steam leak. If valve seat damage replace the seat assembly
	Valve seat and thermopod ball (valve head) does not shut – off tightly	Clean both valve seat and thermopod ball after that seat stamping* should be done
	Thermopod should not be compressible cool; any flabbiness indicates failure	Replace with new thermopod.
	Valve seat is wire drawing	Replace valve seat.
	Improper Tightening torque of screws.	Tighten to the suitable torque of 40 – 45 Nm
	Cover gasket deterioration or damage	Replace with new Cover Gasket.

Seat Stamping* Procedure:

Place valve seat on the fixture with thermopod on the valve seat (thermopod ball side resting on the valve seat orifice) and tap slightly on the center with a mallet. Due to stamping a seating surface is formed on the orifice.

Note: Never attempt to modify the product. When replacing part with new, use the spare parts listed in Section 9.

9. Available Spares:

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

Sr.No.	SPARE PART	SPARE CONSIST OF	PART No.	SPARE CODE
1	THERMOPOD KIT (U -24 DEG C)	THERMOPOD U FILL- UNDERCOOLED(24 DEG.C SUBCOOLED), SEAT, SPACER PLACER PLATE, SPRING,GASKET (PACK OF 1 EACH)	4,5,6, & 7	SPARE-FMTLT63U-UTPKIT
2	THERMOPOD KIT (T - 12 DEG C)	THERMOPOD T FILL- TYPICAL(12 DEG.C SUBCOOLED), SEAT, SPACER PLATE, SPRING,GASKET (PACK OF 1 EACH)	4,5,6, & 7	SPARE-FMTLT63U-TTPKIT
3	THERMOPOD KIT (C - 6 DEG C)	THERMOPOD C FILL- CLOSE TO STEAM (6 DEG.C SUBCOOLED), SEAT, SPACER PLATE,SPRING,GASKET (PACK OF 1 EACH)	4,5,6, & 7	SPARE-FMTLT63U-CTPKIT
4	STRAINER GASKET KIT	STRAINER SCREEN(0.8MM PERFORATION) & GASKET KIT (PACK OF 5 EACH)	3,8,9	SPARE-FMTLT63U-SGKIT
5	GASKET KIT	INNER AND OUTER SPIRAL GASKETS (PACK OF 5 EACH)	10,11,12	SPARE-FMTLT63U-GKIT

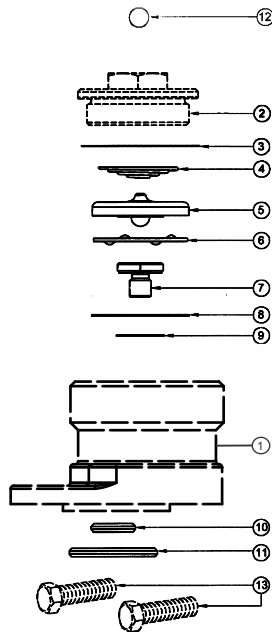


Figure 3: Parts available as spares (Heavy outline) of FMTLT63-U

How to Order:

When ordering the FMTLT63-U and pipeline connector they must be ordered individually as they are supplied as separate components to ease installation. Each FMTLT63-U is supplied in a protective box complete with inner and outer gaskets (securely crimped in place) and two connector screws.

How to Order Spares:

Always order spares parts by using the description given in the column headed available spares and state the size, Model No. and pressure rating of the trap.

Example Screen and Gasket Kit for FMTLT63-U.

10. Warranty Period:

As per ordering information and agreements in the contract.



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