

Installation and Maintenance Manual

Start-up Thermostatic Main Line Trap

ST-MLT

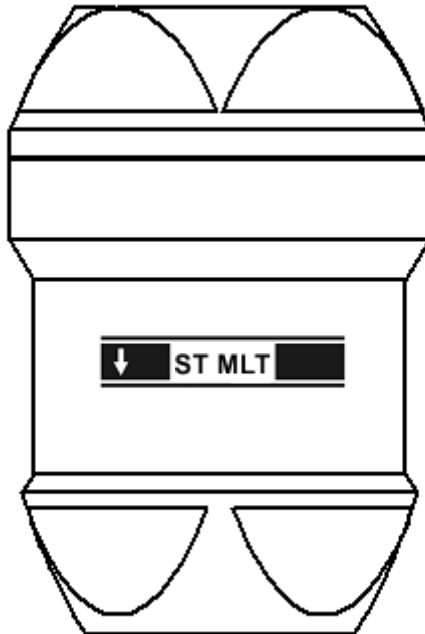


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PLEASE NOTE - Throughout this manual this cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked. This symbol denotes CAUTION, WARNING or DANGER.



1. Preface:

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

Start-up Thermostatic Main Line Trap [ST-MLT]

Size: DN15 (½")

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 Description:

3.1 Description:

ST-MLT is a Start-up Thermostatic Main Line Trap. It is operated using a balanced capsule and is specifically suitable for non-critical tracing applications. It operates as a fixed temperature discharge trap. The trap will limit the downstream temperature to approximately 90°C when discharging to atmosphere.

3.2 Sizes and Pipe Connections:

DN 15 Screwed BSPT / BSP / NPT

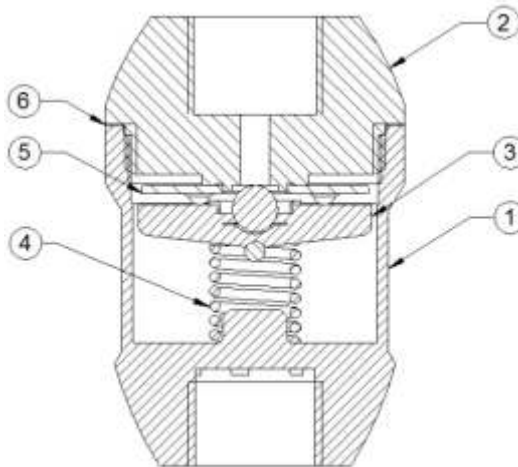


Figure 1 : Start-up Thermostatic Main Line Trap

Materials

No	Part	Material	Standard
1	Body	Stainless Steel	ASTM A276 SS304
2	Seat	Stainless Steel	ASTM A743 GR CA40
3	Thermal Element	Stainless Steel	SS316
4	Spring	Stainless Steel	ASTM A 276 SS302
5	Spacer Plate	Stainless Steel	ASTM A 276 SS304
6	gasket	Stainless Steel	ASTM A 240 SS304

3.3 Thermopod Filling for ST-MLT :

Note: Thermopod used in ST-MLT is "U" type.

"U" type. Thermopod : 24° Below Set Water temperature .

Temperature:

Allow time for temperature to normalize after isolation to avoid the danger of burns and consider whether protective clothing (including safety glasses) is required.

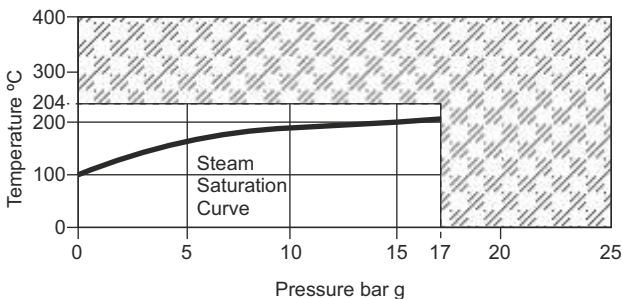
Caution:


The body / cover gasket contains a thin stainless steel support ring, which may cause physical injury if it is not handled and disposed carefully.

3.4 Limiting Conditions:

Body design conditions	17 bar g
PMA Maximum allowable pressure	17 bar g
TMA Maximum allowable temperature	400 °C
Minimum Allowable Temperature	0 °C
*PMO Maximum operating pressure	17 bar g @ 230 °C
TMO Maximum operating temperature	230 °C
Minimum operating temperature	0 °C
Designed for a maximum cold hydraulic test pressure of 26 bar g	

3.5 Operating Range:



 The product cannot be used in this region

3.6 Product Dimensional and Drawing:



Figure 2 : Dimensional Drawing of ST-MLT

Dimensions (approx.) in mm

SIZE DN	A	B	Weight kg
DN 15(1/2")	65	43	0.4

4. Product Working Principle:

Start-up Thermostatic Main 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 Start-up Thermostatic Main Line Trap: (Refer Figure 1)

1. The operating thermostatic element is a thermopod (3) 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 cap (2) is off its seat and is wide open.
3. As condensate passes through the Main line trap, heat is transferred to the hydrocarbon liquid in the thermopod (3). The hydrocarbon liquid boils (based on thermopod (3) selected) before steam reaches the trap
4. The vapour pressure within the thermopod (3) causes it to expand which closes the cap (2) and trap remains shut.
5. Heat loss from the trap cools the water surrounding the thermopod (3), the hydrocarbon liquid condenses and the thermopod (3) contracts, opening the cap (2) 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 suitable for the intended installation.

1. Before installing Start-up Thermostatic Main Line Trap, Flush out the inlet piping to remove all dirt and oil from the pipe line.
2. Remove protective covers from all connections where appropriate, before installation
3. The ST-MLT is designed for installation in a vertical line with the inlet at the top and outlet at the bottom. This will ensure that it is self-draining.
4. Suitable isolation valves and strainer must be installed to allow for safe maintenance and trap replacement
5. Open isolation valves slowly until normal conditions are achieved. Check for leaks and correct operation.

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 stop valve and open the bypass stop valve.
2. Drain the condensate 10 -15 minutes or until clear condensate starts coming out, whichever is earlier.

6.2. Commissioning:

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 bypass valve is closed and down stream stop valve is opened respectively
2. Check for leaks and attend if any.

7. Maintenance Guidelines:



Note: Before undertaking any maintenance of the product it must be isolated from both supply line and return line and ensure pressure is normalized to atmosphere. The product should then be allowed to cool. When re-assembling ensure that all joint faces are clean.

7.1. Routine and preventive maintenance:

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


No.	PARAMETER TO BE CHECKED	FREQUENCY FOR CHECKING VARIOUS PARAMETERS						
		Immediate	Daily	Weekly	Monthly	Quarterly	Half Yearly	Annually
1	Test ST-MLT trap			Y				
2	Repair / Replace ST-MLT - when testing shows leaks	Y						
3	Clean internals of ST-MLT						Y	
4	Visual Inspection for leakages		Y					
5	Arresting any other leaks	Y						

7.2. Tool Kit:

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

Size	Component	Tool used and size
DN 15	Body and Cap	Box spanner of 32mm (A/F)

7.3. Recommended tightening torques:

Item	Size		Torque Range
Body (1) Cap (2)	DN 15	32 mm (A/F)	100-110 Nm

7.4. Procedure to fit or replace the internals set: (Refer Figure1)



Note: The cover gasket contains a thin stainless steel support ring, which may cause physical injury if it is not handled and disposed carefully.

1. Remove the cap (2) from body (1) using box spanner.
2. Clean the internals & cap orifice (2) using WD40 liquid spray & clean with lint free cloth.
3. After cleaning fit new gasket (7) and internals with new strainer screen (6), refit the cap (2), using a little anti-seize compound on the threads
4. Ensure that the cap (2) is tighten to the recommended torque as mention 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 any.

8. Troubleshooting:

If the expected performance is unachievable after installation of Start-up Thermostatic Main Line Trap [ST-MLT], check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
No condensate discharge (blocked)	Cap orifice is block	Clean the cap and thermopod ball surface then re-assemble the Trap.
	Thermopod may be over extended due to excessive internal pressure caused by superheat steam making it impossible for the thermopod ball (valve head) to lift off from valve seat.	Replace the thermopod assembly
	Improper Installation.	Check installation with the inlet from the top and outlet at the bottom and thermopod in vertical line
Steam leakage or blowing from the outlet	Foreign material has built-up between thermopod ball (valve head) and cap orifice	Clean the cap and thermopod ball surface then re-assemble the steam trap, check for further steam leak and correct operation.
	Cap orifice damage due to wire drawing.	Replace the Instrument MainLine Trap
	Cap orifice and thermopod ball (valve head) does not shut-off tightly	Clean both cap orifice and thermopod ball after that *seat stamping should be done
	Check if the thermopod is in good condition. Thermopod should not be compressible when cool; any flabbiness indicates failure	Replace with new thermopod assembly set.
Steam leaks from body	Spring / gasket deterioration or damage.	Replace with new spring and 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 valve seat orifice.**

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

9. Available Spares: [Refer figure 3]

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

Spares	Spare Code
INTERNAL KIT	SPARE-15ST-MLT-INTKIT
SPRING & GASKET KIT	SPARE-15ST-MLT-SGKIT

How to Order Spares:

Always order spares by using the description given above and stating the size and type of steam trap. Example: 1 No. Thermopod and seat assembly set for DN 15 Forbes Marshall Main Line Trap, ST-MLT, "U" Fill

10. Warranty Period:

As per ordering information and agreements in the contract.



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