

FORBES MARSHALL INVERTED BUCKET TRAP

FMBT 66-U

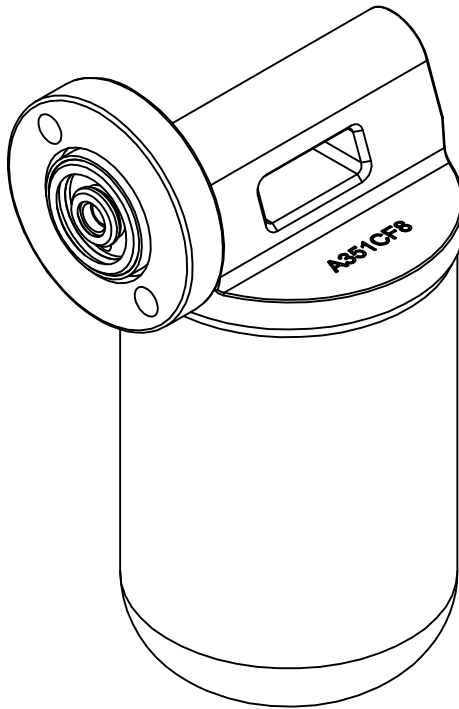


Table of Contents

| | | |
|----|-----------------------------------|----|
| 1. | Safety information | 1 |
| 2. | General Product Information | 4 |
| 3. | Installation..... | 8 |
| 4. | Commissioning..... | 10 |
| 5. | Operation..... | 10 |
| 6. | Maintenance..... | 10 |
| 7. | Spare parts..... | 11 |

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. Safety Information :

1.1 Intended use :

Referring to the User manual and Technical Information Sheet, check that the product is suitable for the intended use application.

I) This product has been specifically designed for use on steam, air or water/condensate. The products use on other fluids may be possible but, if this is contemplated, Forbes Marshall should be contacted to confirm the suitability of the product for the application being considered.

II) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous over- pressure or over temperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.

III) Determine the correct installation situation and direction of fluid flow.

IV) Forbes Marshall products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimize them.

V) Remove protection covers from all connections before installation.

1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required

1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery

1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk.

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labeling of closed valves. Do not assume that the system is depressurized even when the pressure gauge indicates zero.

1.8 Temperature

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

1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Forbes Marshall replacement parts

1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the User manual. Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary; arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures of 425 deg C (797 deg F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to Maintenance instructions).

1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

1.15 Safety information- product specific

See Section 6 'Maintenance' of this document for specific details relating to these products.

1.16 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

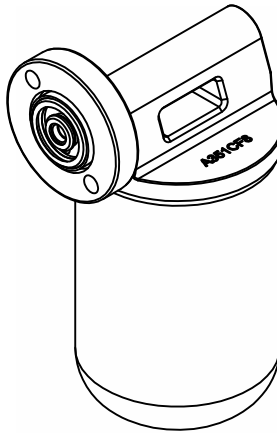
1.17 Returning products

Customers and stockist are reminded that while 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.

2. General Product Information

2. Product Description:

The FMBT66-U is a sealed inverted bucket trap with a pipeline '360°' universal connection. This trap is connected with any pipeline connector and is very easy to assemble/disassemble without affecting piping network. Totally sealed and stainless steel construction makes it compact and corrosion resistant.



2.1 Technical Specifications:

Sizes & Pipe Connections:-

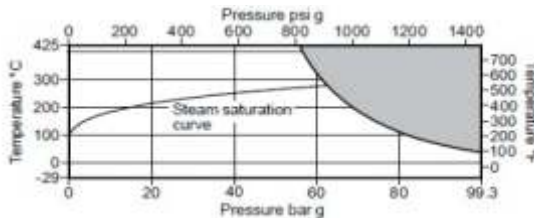
Body design conditions: ASME 600

Universal Connection

Available with IBR Certificate on request.

2.2 Limiting Conditions:

Pressure/Temperature limits (ISO 6552)

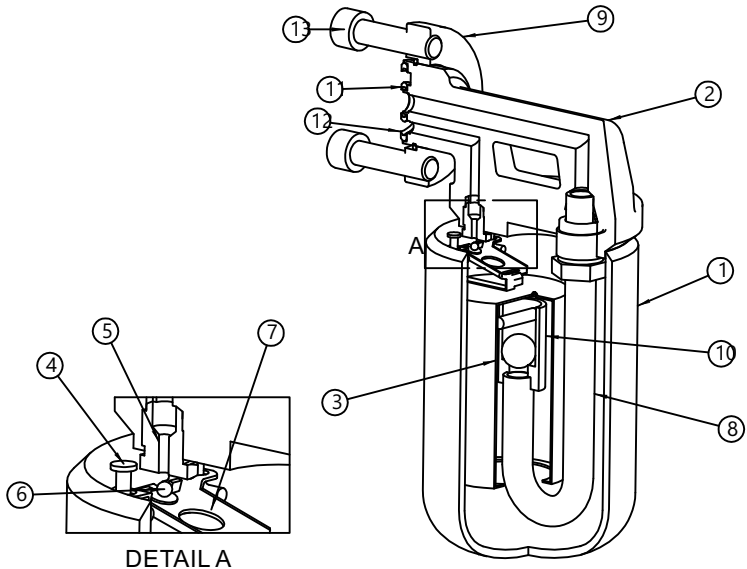


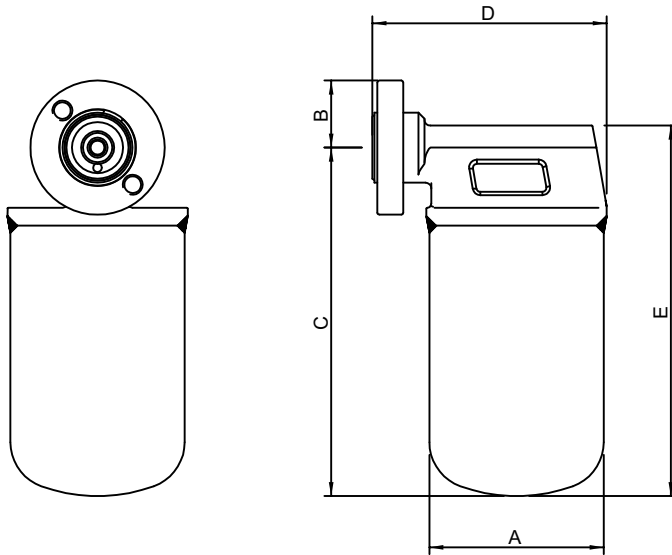
 The product must not be used in this region.

| | | |
|--|----------|-------------------|
| Body design conditions | | ASME 600 |
| PMA Maximum allowable pressure | | 99 bar g @ 38°C |
| TMA Maximum allowable temperature | | 425°C @ 56 bar g |
| Minimum allowable temperature | | -29°C |
| PMO Maximum operating pressure for saturated steam service | | 63 bar (g) |
| TMO Maximum operating temperature | | 425°C @ 56 bar g |
| Minimum operating temperature | | 0°C |
| PMX Maximum Differential Pressure | 45.0 bar | FMBT66-U/45 |
| | 20.0 bar | FMBT66-U/20 |
| | 8.5 bar | FMBT66-U/8.5 |
| | 4.5 bar | FMBT66-U/4.5 |
| Designed for a maximum cold hydraulic test pressure | | 94.5 bar (g) IBR |

2.3 Materials

| Sr.No. | Part | Material |
|--------|------------------|--|
| 1 | Cover | ASTM A240 Gr. 304 |
| 2 | Body | ASTM A351 Cf8 |
| 3 | Bucket | ASTM A240 Gr. 304 |
| 4 | Plate Assembly | STAINLESS STEEL |
| 5 | Valve Seat | AISI 431 |
| 6 | Valve | AISI 440C |
| 7 | Lever assembly | STAINLESS STEEL |
| 8 | Internal tube | ASTM A213 Gr. 304 |
| 9 | U-Flange | ASTM A105N |
| 10 | Check Valve | STAINLESS STEEL |
| 11 | Inlet Gasket | GRAPHITE/STAINLESS STEEL LAMINATE AISI 304 STRIP |
| 12 | Outlet Gasket | GRAPHITE/STAINLESS S13TEEL LAMINATE AISI 304 STRIP |
| 13 | Connector screws | ASTM A193 B7 |





Dimensions and weight (approximate) in mm and kg:

| A | B | C | D | E | Weight (Kg) |
|----|------|-----|-----|-----|-------------|
| 90 | 33.5 | 179 | 116 | 189 | 3 |

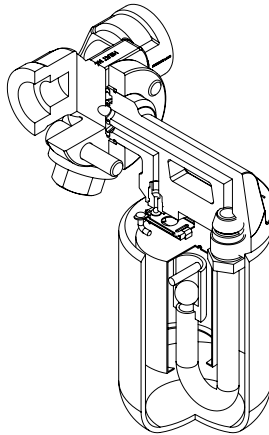
3 **INSTALLATION**

Note: Before doing any installation observe the 'Safety information' in Section 1. Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation:

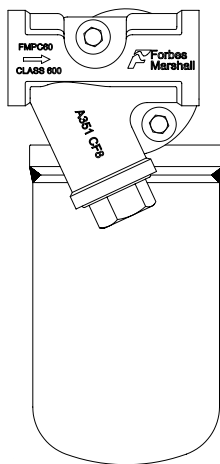
- 3.1 Check materials, pressure and temperature and their maximum values. If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent over pressurization.
- 3.2 Determine the correct installation situation and the direction of fluid flow.
- 3.3 Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.
- 3.4 The FMBT66-U can be installed on any pipeline connector. See separate Installation and Maintenance Instructions for Forbes Marshall pipeline connectors. Ensure that both gaskets are clean and undamaged and that the transfer holes are clear. Assemble FMBT66-U with pipe line connector, ensuring that the trap itself is vertical so the bucket always rises and falls in a vertical plain. Apply a suitable anti-seize thread lubricant to the threads of the connector screws (13). Tighten the screws finger tight until the mating gasket faces are in parallel, intimate contact. Tighten the screws evenly and gradually. Open isolation valves slowly until normal operating conditions are achieved.
- 3.5 Inverted bucket steam traps do not permit rapid release of air. On process applications, in particular, this can lead to slow warm-up times and water logging of the steam space. A separate external air vent is therefore required in parallel to vent air efficiently. Any bypass should be positioned above the trap. If it is below, and is leaking or left open, the water seal could be blown away leading to steam wastage. Where inverted bucket traps are fitted in exposed conditions the possibility of freezing damage can be reduced by thermal insulation.
- 3.6 The inlet of the trap should be below the drain point of the plant being drained, so that a water seal can be maintained around the open end of the bucket. When installed in a horizontal pipeline a small drop leg should precede the trap - typically 150 mm (6").
- 3.7 Where the trap discharges into a closed condensate return system or where there is a lift at the trap, a check valve should be fitted downstream of the trap.
- 3.8 If the trap has to be installed at a higher point than the drainage point, then a small bore riser into a 'U' seal should be used. A check valve should be fitted before the trap to prevent the loss of the internal water seal.
- 3.9 If the trap is installed on a superheated steam system application, then a non-return valve should be fitted on the trap inlet, to prevent the trap from losing its water seal. Priming of the trap with water may be required before commissioning.
- 3.10 Check for leaks.

Note 1: 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).

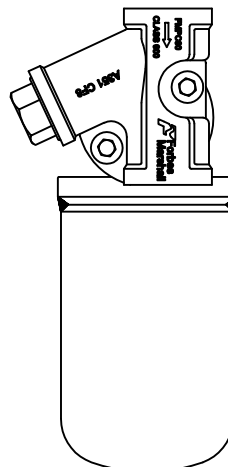
Note 2: On all blast discharge steam traps check valves and sight glasses must be installed at least 1 meter (3 ft) downstream of the trap.



FMBT66-U Inverted Bucket Trap
Pipeline Connector



FMBT66-U in horizontal pipeline



FMBT66-U in vertical pipeline

4. COMMISSIONING:

After installation or maintenance ensure that the system is fully functioning. Carry out tests on any alarms or protective devices.

5. OPERATION:

As condensate reaches the trap it forms a water seal inside the body. The weight of the bucket keeps the valve off its seat. Condensate can then flow around the bottom of the bucket and the trap. Under low load or superheat conditions the trap may need to be 'primed' with water before system start-up. When steam enters the underside of the bucket it gives it buoyancy and the bucket rises allowing the valve to seat and stop steam escaping.

The bucket will lose its buoyancy as the enclosed steam condenses due to radiation losses and steam escapes through the vent hole. Once this happens the weight of the bucket will pull the valve off its seat and the cycle is then repeated.

Any air reaching the trap will also give the bucket buoyancy and close the valve preventing condensate flow. The small vent hole in the bucket will bleed air into the top of the trap. The vent hole is of small diameter to reduce steam loss and will consequently vent air very slowly. Under most conditions the trap will discharge condensate with a blast type action. Under low load and / or low pressure applications the discharge may tend to 'dribble'. Condensate is discharged at steam temperature consequently, Due care must be given to the site of the discharge.

6. MAINTENANCE:

Note: Before actioning any maintenance programme observe the 'Safety information' in Section

Warning

The inner and outer gaskets used when installing / maintaining the FMBT66-U to a pipeline connector contain thin stainless steel support rings which may cause physical injury if not handled and disposed of carefully.

6.1 General information

Before undertaking any maintenance on the trap it must be isolated from both the supply line and return line and any pressure allowed to safely normalize to atmosphere. The trap should then be allowed to cool. When reassembling, ensure that all joint faces are clean.

6.2 Replacement of the trap unit:

- Ensure that the correct tools and necessary protective equipment are used at all times.
- Replacement of the trap unit is achieved by removing the two connector screws and removing the trap.
- The new trap unit should be positioned against the connector gasket face and apply a suitable anti-seize thread compound to the threads of the connector screws.
- Tighten screws finger tight and ensure that the trap body is parallel to the connector.
- Tighten the screws evenly and gradually to the recommended torque as per following table.
- Open isolation valves slowly until normal operating conditions are achieved.
- Check for leaks.

| Item | Part | Torque (Nm) |
|------|------------------|-------------|
| 13 | Connector Screws | 40-45 |

7. SPARE PARTS:

FMBT66-U is a sealed trap so internal spares can not be changed. The available spares are connector screws and gasket kit as shown in following fig.

Available spares

Allen Bolt--- 13

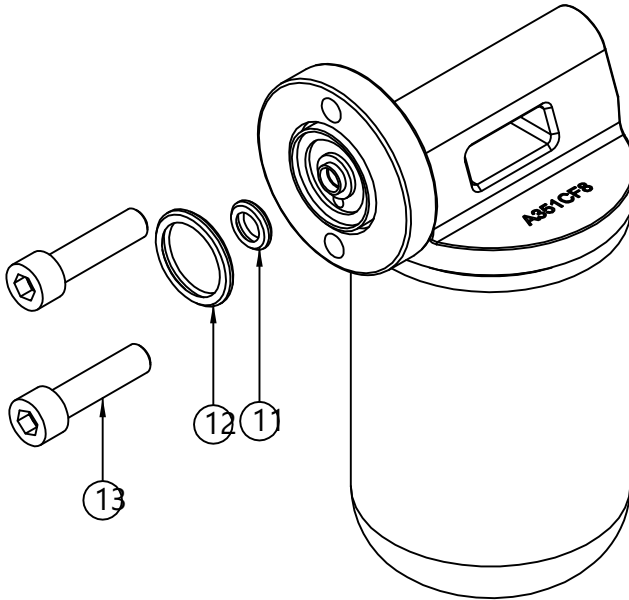
Gasket kit-- 11, 12

| Spares | Part No. | Spare Code |
|--|----------|--------------------|
| INNER AND OUTER GASKET (PACK OF 10 EACH) | 11,12 | SPARE-FMTD64U-GKIT |
| ALLEN BOLTS (PACK OF 10) | 13 | SPARE-FMTD64U-BKIT |

How to order Spares

Always order spares by using given in column headed 'Available spares' and state the type of trap.

Example:1- Connector screw and gasket kit for FMBT66-U sealed inverted bucket steam trap.



Recommended tightening torques
(for suitably lubricated threads)

| Item | Part | Torque (Nm) |
|------|------------------|-------------|
| 13 | Connector Screws | 40-45 |



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

Forbes Marshall International Pte. Ltd.

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

P: +65 6219 3890

CIN No: U28996PN1985PTC037806