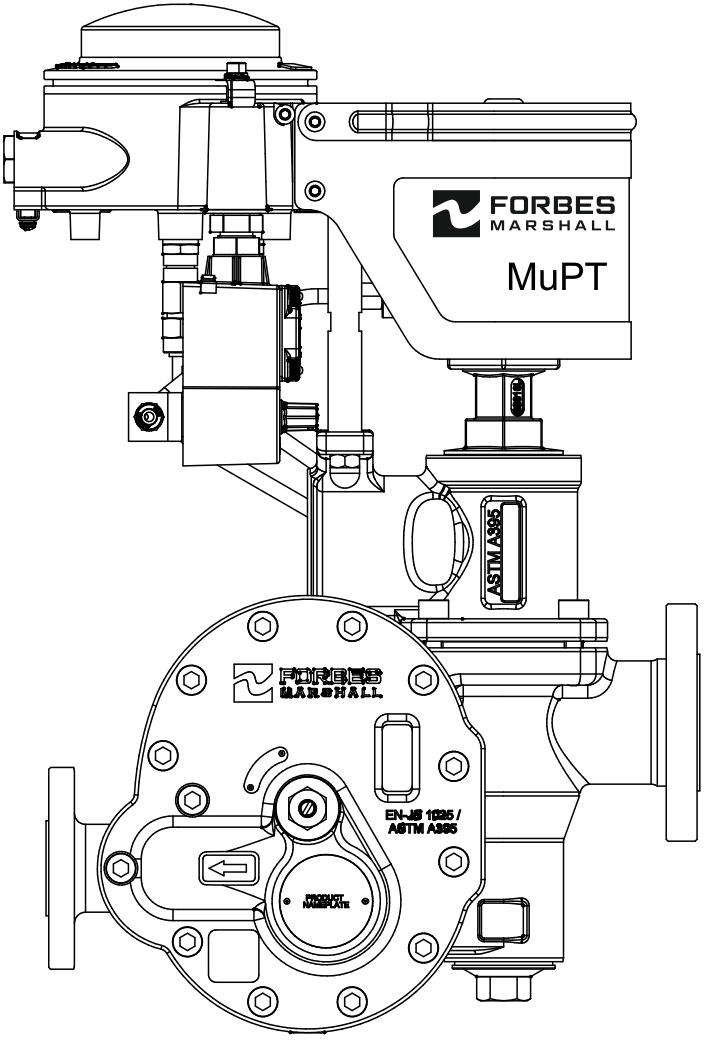
MuPT
Multi Utility Process Trap



Contents

PLEASE NOTE - Throughout the manual this cautionary symbol is used to describe 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 for the safe installation, operation and maintenance of this device. The information within this document is aimed towards those individuals who are technically qualified and experienced in the assembly, installation and operation/maintenance of the device.

IMPORTANT

Read this User Manual thoroughly and understand its contents completely before installing and powering up the product.

Nomenclature and symbols

Product : Product refers to the MuPT unit.

Size : 25, 40, 50 NB (Inlet & Bypass) & 20, 25 NB (Trap Outlet)

Nomenclature

This manual contains notes and instructions, which the user must observe to ensure the safety of all user personnel and to protect the product and equipment connected to it. These are highlighted using specific symbols and appear based on the severity levels as follows.

DANGER

This indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

This indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury

CAUTION

If used with the safety alert symbol indicates a potentially hazardous situation which if not avoided may result in minor to moderate level injury or may result in damage to property.

NOTICE

If used without the safety alert symbol indicates a potentially hazardous situation which if not avoided may result in undesirable state or result.

☞ **NOTE**

This highlights important information about the product, using the product or part of the documentation that will be beneficial to the user.

☞ **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.

This manual does not provide for every possible contingency situation that may arise during the installation, operation and maintenance of the product. For information or situations not covered by this manual, please contact your local Forbes Marshall Service support. The content herein is based on the latest data available at the time of going to print and is subject to change due to on-going product improvements in the future.

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 equipment's, pipeline and plant construction must also be complied with.

2.1. Intended use:

1. Check if the product is suitable for intended use/ application by referring to the installation and maintenance instructions, nameplates, and technical information sheets. 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 the assistance.
2. Check for the suitability in conformance to the limiting conditions specified in technical information sheet of the product.
3. The correct installation and direction of fluid flow has to be determined.
4. Forbes Marshall products are not intended to resist external stresses, hence necessary precautions to be taken to avoid 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. General Safety and security:

The Customer is solely responsible to prevent unauthorized access to its plants, systems, machines and networks, its information technology infrastructure, firewalls network, internet and appropriate security measures.

Incorrect installation, operation or maintenance of the device in potentially explosive atmospheres may lead to ignition of the atmosphere and cause risk of fatal injury, death or damage to personal property. Please note that the Customer is solely liable for any hazards, damage or injury caused to its personnel or property due to the Customer's failure to comply with the safety instructions above and as established throughout the course of this manual.

2.11. Limitation of Liability and optimum performance

For optimum performance, the Product should only be used in conjunction with components and accessories supplied by the Manufacturer. If the product accessories and components from other manufacturers are used, these must be recommended or approved by the Manufacturer. The Manufacturer shall not be liable and the Warranty shall not apply, if the Product (i) is used in any manner that is inconsistent with the intended purpose or design of the Product as described in user manual, product literature and/or technical documentation provided by the Manufacturer of the Product; (ii) is altered in any way; (iii) is used or maintained in any manner that is inconsistent with Manufacturer's instructions or warnings (“User Instructions”) provided along with the Product; (iv) subjected to any other misuse, lack of proper storage & handling, commissioning, maintenance, faulty repair, neglect, or servicing by persons other than Manufacturer’s authorized person and/or failure to operate in permissible ambient conditions.

2.12. Compliance with Laws & Directives:

Observe the test certification, provisions and laws applicable in your country during connection, assembly and operation.

2.13. 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

Viton:

- If in compliance with National and Local regulations, it can be disposed underground.
- Can be burned (Incineration) but Hydrogen Fluoride evolved from the product should be removed (in compliance with local and national regulations).
- Viton is insoluble in water.

NBR :

- If in compliance with National and Local regulations, it can be disposed underground.
- Do not burn NBR materials in open air — toxic fumes may be released.
- For used or contaminated NBR, treat as industrial or hazardous waste.

PTFE:

- Cannot be incinerated.
- Keep PTFE in a separate vessel without mixing it with other materials for disposal. Consign it to a landfill site.
- PTFE gives rise to gaseous decomposition or fumes, if heated above its sintering temperature, which produces unpleasant effects if inhaled. Hence it is recommended to have good local ventilation around the system.
- In workshop where the PTFE is handled, smoking should be prohibited because the reaction of tobacco with PTFE will give rise to polymer fumes. Hence it is advised to avoid contamination of clothes with PTFE and to maintain personal cleanliness by washing hands after working with PTFE.

2.14. Returning Products:

Customers and stockiest 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. General Information

Forbes Marshall Multi-utility Steam Trap – MuPT is a premium and differentiating solution for recovering pure condensate from multi-utility process equipment in Textile industries. This product prevents mixing of utilities with condensate, improving the Condensate Recovery Factor and reducing or eliminating the load on ETPs and Cooling Towers. It integrates a diverting and trapping system with a control and monitoring module, ensuring safe and efficient condensate removal from downstream processes, while diverting any contaminated condensate before it reaches the trap.

The control module intelligently manages the MuPT, switching between bypass and trapping modes, with a blinking LED indicating the current status of the product. The system is equipped with digital connectivity, using MODBUS to communicate with other devices.

The MuPT trap module features a twin orifice mechanism, allowing for increased condensate discharge to meet specific process demands. It also includes an integrated monitoring system that detects and indicates trap conditions such as Bypass mode, Trap mode, Steam Leak, Waterlog and Error.

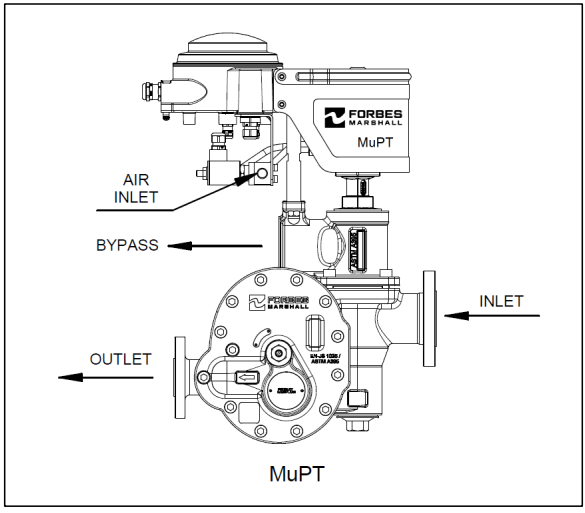


Fig. 3.1

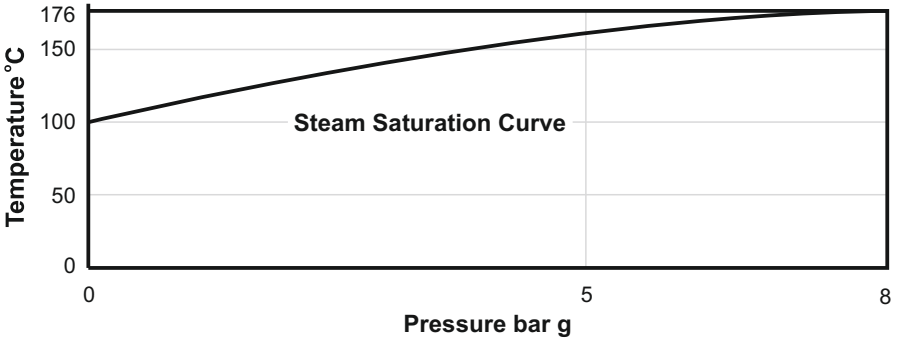
3.2. Sizes and Condensate Capacity

MuPT is pipe mounted with end connection sizes as mentioned below:

Inlet Size (ANSI CLASS #150)	DN 25	DN 40	DN 50
Outlet Size (ANSI CLASS #150)	DN 20	DN 25	
Bypass Size (SCRD BSPT)	25	40	50

3.3. Operating Range

Pressure/Temperature limits (ISO 6552)



3.4. Limiting Conditions

PMA - Maximum allowable pressure	8 bar g
TMA - Maximum allowable temperature	176°C
PMO - Maximum Operating Pressure	8 bar g
TMO – Maximum Operating Temperature	176°C
Minimum allowable temperature	0°C
Hydrostatic Test Pressure	12 bar g
Differential Pressure Segments ΔPMX	4.5 bar g 8 bar g

3.5. Technical Specifications

3.5.1. Product Specifications

Parameter	Description
Power Supply Input	24V DC ± 10% @ 4.5A
Diversion Unit Configuration	Normally Open to Bypass
Pilot Solenoid for Diversion Unit Actuation	Pneumatic 3/2 Solenoid Valve 24V DC - ON when the MuPT is in the trapping mode - OFF when the MuPT is in the bypass mode
Pilot Media	Clean, Dry, Oil-Free Instrument **Air** only
Max. Pilot Media Temperature	60°C
Min. & Max. Pilot Pressure	For DN 25 – 1.5 to 10 bar g
	For DN 40/50 – 2.2 to 7 bar g
Sensor 1 & 2	PT1000 embedded with a conductivity sensor
Communication	MODBUS RS485
Conductivity Measurement Range	10 ~ 300 ppm
Default Device ID	1
Default TDS Setpoint	50 ppm
Important: Customer-End Installation Prerequisites	**1. Power Supply** - 24V DC, 4.5A (Recommended Make: Mean Well) - 1.0 - 2.5 sq.mm, 2 Core, Shielded Cable, Cable Diameter - 6 to 12mm **2. Cooling Process Signal Connection** - Potential Free Contact, Close during Cooling signal - 0.5 sq.mm, 2 Core, Cable Diameter - 6 to 12mm **3. Modbus In & Out Connection** - 0.5 sq.mm, 2 Core Shielded Twisted Pair with AWG 24, 7*32, Cable Diameter - 3 to 6.5mm 4. **Pit / Instrumental Earth** - Resistance - ≤ 1 Ω, Voltage - ≤ 2V AC **5. Air Supply**

3.5.2. Ambient Conditions

Operating temperature (Electronics)	0 to 70 °C
Storage Temperature	0 to 70 °C
Humidity	95% RH

3.5.3. Approvals

Ingress protection	IP66 IEC 60529
EMI/EMC	IEC 61326-1
Environmental	60068 series
Vibration	10Hz to 500 Hz, 1g
Emission	IC61326-1
Pressure Vessel	Non-IBR (Available with IBR certificate on request)

3.5.4. Approvals

Indications (LED)	Trap Mode	Green
	Bypass Mode	Yellow
	Steam Leak	Red
	Waterlog / Process Off	Blue
	Error	Cyan

3.6. Dimensions and Weight (Approx.)

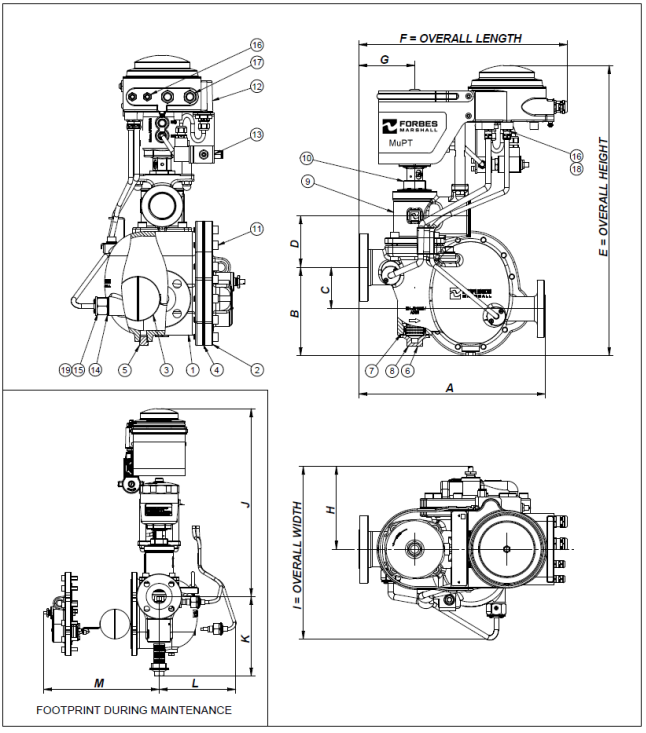


Fig. 3.2

Size	Dimensions (mm)									Footprint during Maintenance				WT. (kg)
DN	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	
25	285	122	55	77	445	360	104	130	300	490	160	250	200	20
40/50	350	166	78	97	545	375	105	160	350	530	225	330	220	33

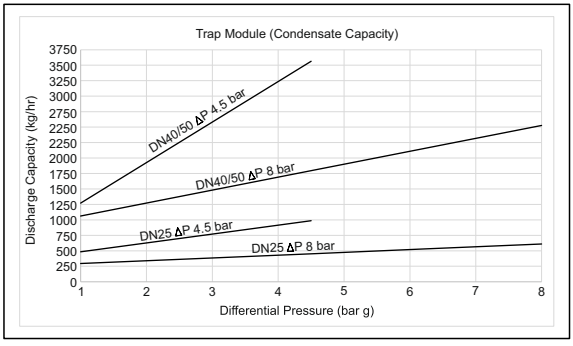
☞ **Note**: Minimum ground clearance of 200 mm to be maintained during installation.

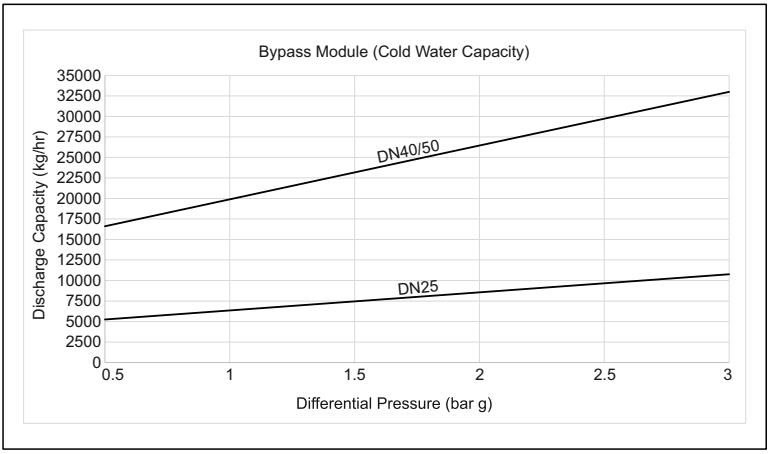
3.7. Materials

SN.	Description	Material
1	Cover	ASTM A395 / SG Iron
2	Base	ASTM A395 / SG Iron
3	Trap Mech. Sub-Assly	Stainless Steel, SS304
4	Cover Gasket	SS304, Exfoliated Graphite
5	Hex. Plug, 3/8" BSPT ASME B16.11	#3000, A105 N, Al-Zn
6	0.8 Mesh Str. Screen	ASTM A240, SS304
7	Strainer Gasket	SS304, Exfoliated Graphite
8	Strainer Cap	ASTM A216, Gr W CB
9	Bypass Manifold	ASTM A395 / S G Iron
10	Actuator Sub -Assly	Ref. Sub -Assly Drg.
11	Al. Bolt M10 X 35 / 30	ASTM A193, B7
12	MuPT, Electronic Hsg Assly	BS1490, LM6/LM9/LM25
13	Solenoid Valve, 1/4", 3/2, N	1/4", 3/2, N C, 24V DC
14	Sensor Assly	Stainless Steel
15	Sensor Gasket	ASTM A240, S S304
16	M12x1.5, Gland (Cable 3-6.5 mm)	Polyamide
17	M20x1.5, Gland (Cable 6-12 mm)	Polyamide
18	M12x1.5 Ex -D, IIC, Hex Plug, IP66	Brass Nickel Plated
19	Hex. Plug, 3/8" BSP, AMSE B16.11	#3000, A105 N, Al-Zn Coating

Note - * Item nos 18 & 19 are used only in non TMS version.

3.8. Capacity Chart





4. Product Working Principle:

The MuPT is an integrated steam trapping and condensate recovery solution including a diverting & trapping system and controlling & monitoring system specifically developed for multi-utility process equipment in Textile industries. Product is developed to remove condensate from the process downstream as well as divert contaminated condensate. There is a sensing element (14) (refer fig 3.2) provided to check the quality of condensate continuously reaching the inlet of the MuPT, which helps in the detection and diversion of contaminated condensate and recovery of quality condensate. This sensor 1 (14) measures the TDS and temperature of incoming media, be it condensate or utility. Based on the measured parameters, the control unit decides to either recover the uncontaminated condensate or bypass utilities and uncontaminated condensate. This improves the overall condensate recovery factor. This segregation of condensate and utilities happens at the process level itself. Product also indicates whether the trap is currently in Bypass mode or Trapping mode. This indication for operation in Tapping mode or Bypass mode & Trap performance condition is displayed locally on the product itself with the help of an blinking LED.

Switching to bypass and trapping mode is done with the help of a pneumatically actuated diversion unit (9 & 10) (refer fig 3.2). When switched to bypass mode, the utility or contaminated condensate leaves the product through the bypass outlet. And when switched to trapping mode, the uncontaminated condensate is diverted to the steam trap. The steam trap unit contains a twin orifice mechanism to handle large condensate loads. The diversion unit is a normally closed valve ensuring the product is normally in bypass condition. Because of this, the start-up loads, and contaminated media is bypassed ensuring recovery of uncontaminated condensate. This also helps in evacuating contaminated start-up loads quickly to get the steam process up and running quickly. The product is provided with an inbuilt trap monitoring system as well which detects the status of the trap as well as its failure condition. Upon detecting a failure condition such as Steam Leak or Waterlog condition, the product indicates that as well with the help of the blinking LED present. The product's electronics are enabled with digital connectivity features to communicate and share data with other devices with the help of MODBUS.

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5. Installation Guidelines

Note: Before starting any installations observe the 'Important Safety notes" in section 2. Referring to the Installation and Maintenance Instructions, nameplate and Technical Information Sheet, check that the MuPT is suitable for the intended installation.

Referring to the Installation and Maintenance Instructions, nameplate, and Technical Information Sheet; check that the product is suitable for the intended installation:

1. Check materials, pressure, 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 depressurization.
2. Determine the correct installation position and the correct direction of fluid flow.
3. Remove protective covers from all connections and protective film from all nameplates, where appropriate, before installation on steam or other high-temperature applications.
4. Install the product downstream of the process, ensuring that it is easily accessible for inspection and maintenance.
5. The trap must be fitted as shown in the installation diagram (Refer to Fig 5.1). Reference diagrams of how not to install the product are also shown. (Refer to Fig. 5.2 a & b)
6. The arrow on the casting should be in the direction of the flow.
7. Refer to the installation diagram added below for more details.
8. Ensure the product is installed considering the accessibility and ease of maintenance. The gaps required for online maintenance of components are as shown below.
9. Before installing the product, ensure all connecting pipework is clean, debris and flushed properly .
10. Mount the steam trap accordingly on the pipes of required pipe size considering flow direction.

Note 1: If the MuPT is to discharge to the atmosphere ensure it is to a safe place, the discharging fluid may be at a temperature of 100°C or above (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.

5.1. Lifting Details

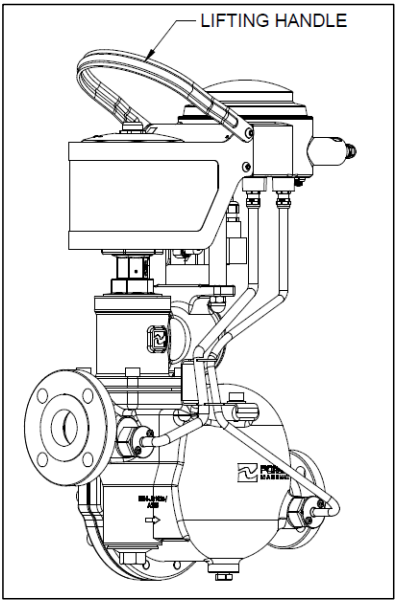
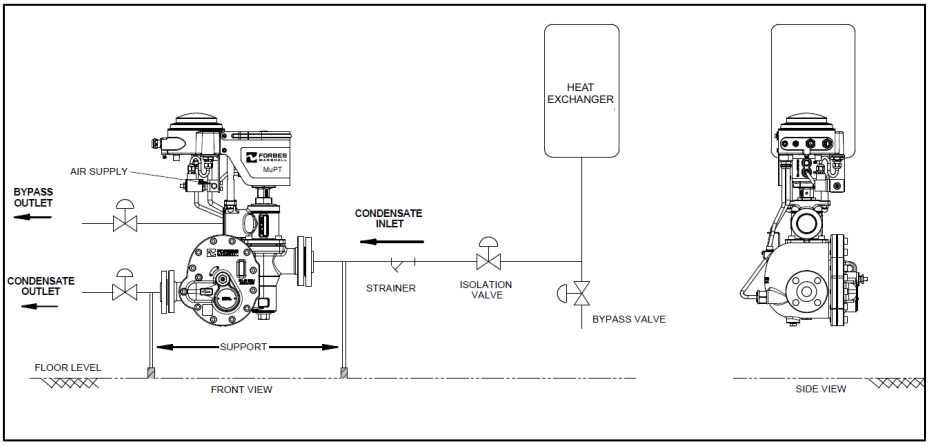


Fig. 5.1

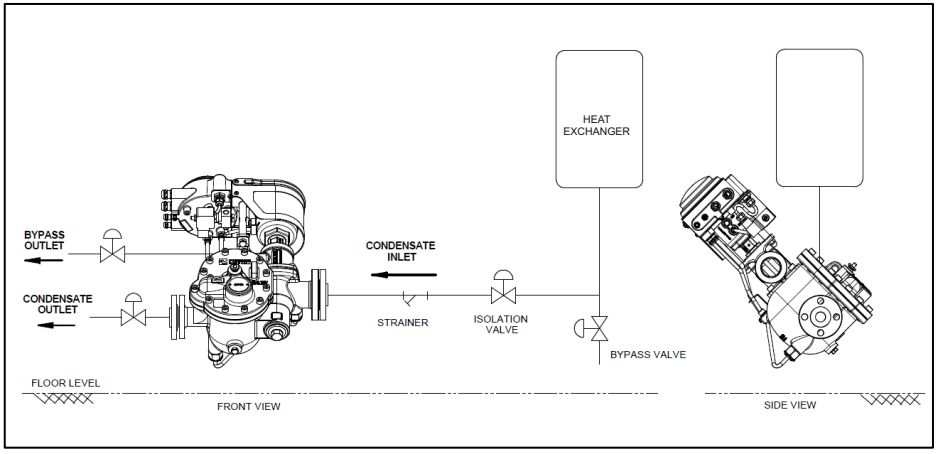
Note: Use proper lifting strap to lift the product when lifted using machinery.

5.2. Installation Diagram



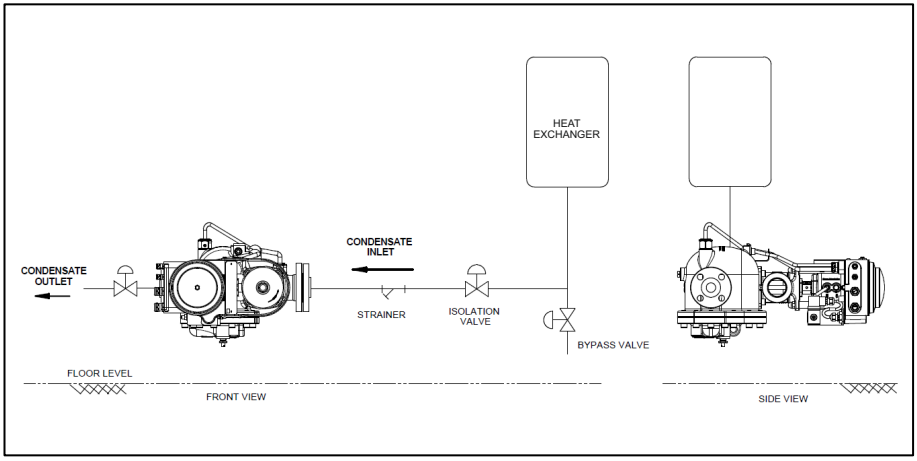
Correct Installation orientation wrt to Jet Dyeing application & floor level

Fig. 5.2



Incorrect Installation orientation wrt to Jet Dyeing application & floor level

Fig. 5.3 (a)



Incorrect Installation orientation wrt to Jet Dyeing application & floor level

Fig. 5.3 (b)

Note: The unit to must be installed as shown in correct installation orientation diagram. Incorrect installation as shown above will result in unsatisfactory response.

5.3. Mounting and Connections

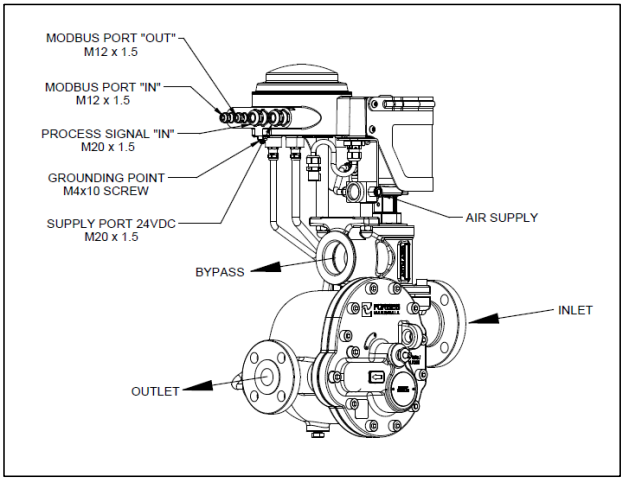


Fig. 5.4

Refer to air quality details mentioned in the specifications table.

5.4. Installation Notes

DON'Ts

- Do not connect any voltages other than the specifications of the MuPT.
- Do not connect inlet air pressure greater than or less than the specifications of the MuPT.
- Ensure that the MuPT is only energized after closing the lid.

DOs

- Confirm that the MuPT is firmly mounted on the pipeline.
- Before making connections or touching the PCB, take precautions to prevent damage due to static build-up.
- Ensure instrument earth and power earth are connected correctly.
- Ensure proper fitting of cable glands and connection of cables to the electronics module. Ensure proper gripping of cables by cable glands.
- Ensure that the air supply is free of water/ moisture, oil, and dust conforming to the specifications of air quality according to: ISO8573-1: 2010 Class 3.3.3 or ISA S7.0.01. Confirm & set supply air pressure as per MuPT datasheet / name plate.
- Ensure proper earth is connected to the earth lug of the MuPT electronics housing.
- Ensure all ports/openings on the electronics enclosure are closed or mounted with an appropriate cable gland.

5.5. Electrical Connections

PCB	Colour Code / Signal Name	Scope of supply
Power Supply	(+ve) – Red +24V, (-ve) – Black, Shield	Customer
Modbus IN	A/D+, B/D-, Shield	Customer
Modbus OUT	A/D+, B/D-, Shield	Customer
Cooling Process Signal	Contact to be closed, when "Jet Cooling Cycle" is ON	Customer
Sensor 1	C-Inner, C-Outer, Temp-A, Temp-B, Shield	As built at FMPL
Sensor 2	C-Inner, C-Outer, Temp-A, Temp-B, Shield	As built at FMPL
Solenoid	(+ve) – Red +24V, (-ve) – Black, Shield	As built at FMPL

5.6. PCB Connections

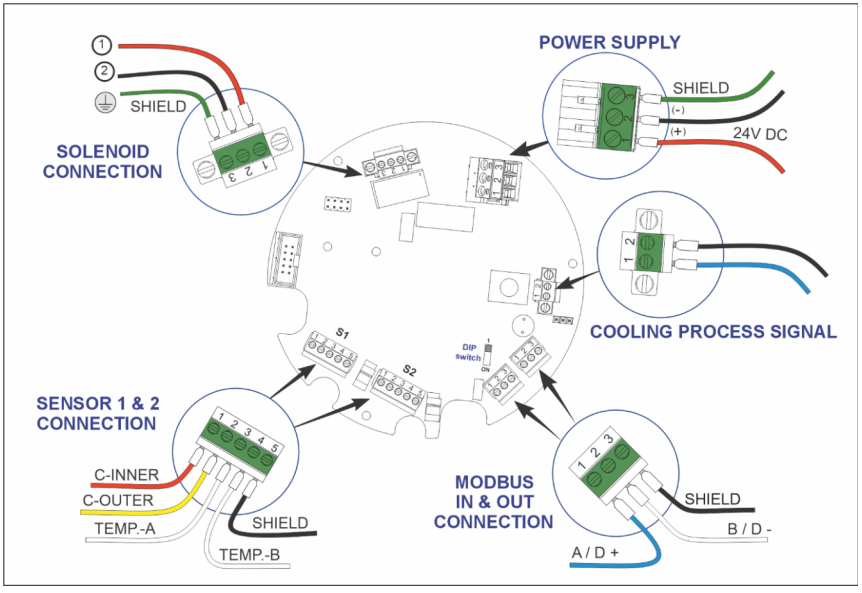


Fig. 5.5

5.7. Earthing Connections

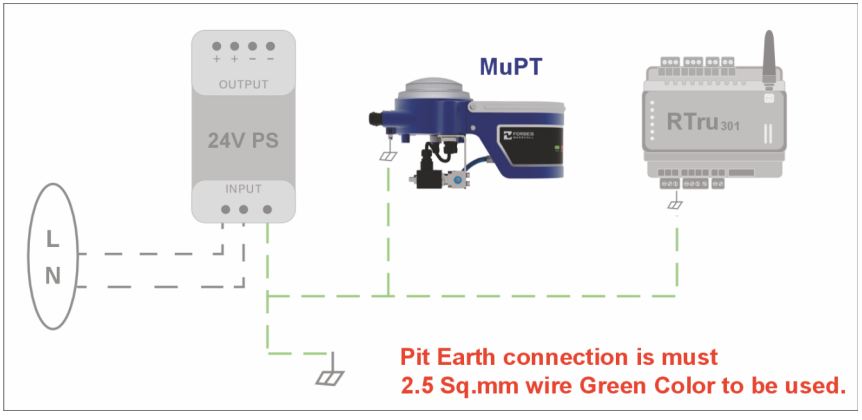


Fig. 5.6

5.8. Modbus Map

Modbus Address	Parameter Name	Data Type	Min	Max	Default Value	Remarks
30013	Conductivity	Float	10 ppm	300 ppm		Live Value of TDS
30014						
30017	Temperature	Float	20°C	180°C		Live Value of Temperature
30018						
10002	Trap Mode	Bit	0	1	0	Trap mode
10003	Bypass Mode	Bit	0	1	0	Bypass mode
10004	Trap-Bypass Switch	Bit	0	1	0	Solenoid status
10005	Steam Leak	Bit	0	1	0	Steam leak
10006	Waterlog	Bit	0	1	0	Waterlog
40005	Conductivity Set Point	Float	10 ppm	300 ppm	50	TDS Set value, Set by value
40017	WL Announcing Delay	Unsigned Int	1	120	10	Delay is in mins
40018	SL Announcing Delay	Unsigned Int	1	120	30	Delay is in mins
10011	Need Calibration Flag	Bit	0	1	0	Status indicating whether device needs calibration or not
40012	Modbus Slave ID	Unsigned Int	1	35	1	Device ID
40013	Modbus Parity	Unsigned Int	1	3	1	1: None, 2: odd, 3: even
40014	Modbus Stop Bits	Unsigned Int	1	2	1	1: 1 Stop Bit, 2: 2 Stop Bit,
40015	Modbus Baud rate	Unsigned Int	1	5	1	1: 9600, 2: 19200, 3: 38400, 4: 57600, 5: 4800

Default Modbus Configuration after pressing the reset switch.

Device ID : 230
Stop Bit : 2
Parity : None
Baud Rate : 9600

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 another suitable medium.

Follow these steps to carry out the flushing -

- Flush all the lines before installing the MuPT.
- Product is normally in bypass condition and hence during flushing, debris and other scaling flow through the bypass line.
- Let the condensate or media drain for 10-15 minutes or until clear condensate starts coming out through bypass, whichever is earlier.
- Now slowly starts closing the isolation valve on the upstream side. Refer to the configuration guidelines for commissioning.

6.2. Commissioning:

1. Make sure the power supply for electronics unit and air supply to the solenoid valve are given according to the specifications and details provided under the installation guidelines.
2. At start up, open the inlet isolation valve in a gradual way to avoid system shocks. Wait for some time.
3. MuPT comes with a default set points configured for measurement parameters. The same shall be reconfigured as per the application requirements.
4. Allow the trap to operate for several minutes & review the operation to ensure it is correct with respect to the set points provided.
5. Check the LED indications to confirm the performance. (Refer to the LED indications chart under technical specifications 3.5.4 for more details)

Strictly follow the above procedure for system safety & correct functioning of the trap.

Important Note: After the trap has been in service at normal operating pressure & temperature for 24 hours, it is essential that the cover nuts are retighten (see Table for recommended tightening torques). This will ensure the correct compression of gaskets under service conditions.

6.3. Setting of Steam Lock Release (SLR):

Fig. 6.1

1. SLR unit stem (2) should be screwed in the clockwise direction to close and anticlockwise direction to open.
2. Rotate the gland nut (1) in the anti-clockwise direction to loosen. Loosen the gland nut by one thread (one rotation).
3. Rotate the stem (2) clockwise to move it towards the seat. Once the stem touches the seat, rotate it anticlockwise by 1/4 of a turn (90°) to set the SLR.

Note: The SLR unit should only be used to prevent 'steam locking' and therefore is designed to pass a small amount of steam, it is not recommended that the SLR be left in the fully open condition as this may lead to premature trap failure and more frequent maintenance schedules.

6.4. Multi-drop Configuration:

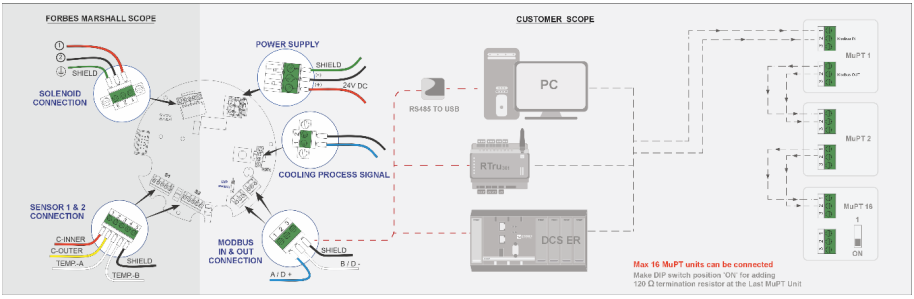


Fig. 6.2

7. Maintenance Guidelines:

Notes:

1. Before undertaking any maintenance of the product, it must be isolated from inlet line, outlet line and bypass line.
2. Open all test valves to ensure pressure is normalized to atmosphere.
3. Disconnect the power supply from the product and wait for 10 seconds until the LED stops blinking.
4. The product should then be allowed to cool.
5. When re-assembling, ensure that all joint faces are clean.
6. Refer tools and torque as mentioned in section 7.14.

7.1. Procedure to assemble and dis-assemble Electronics

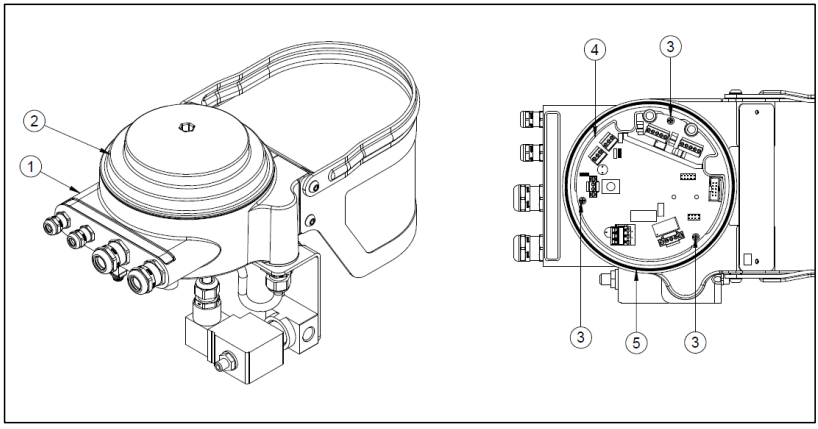


Fig. 7.1

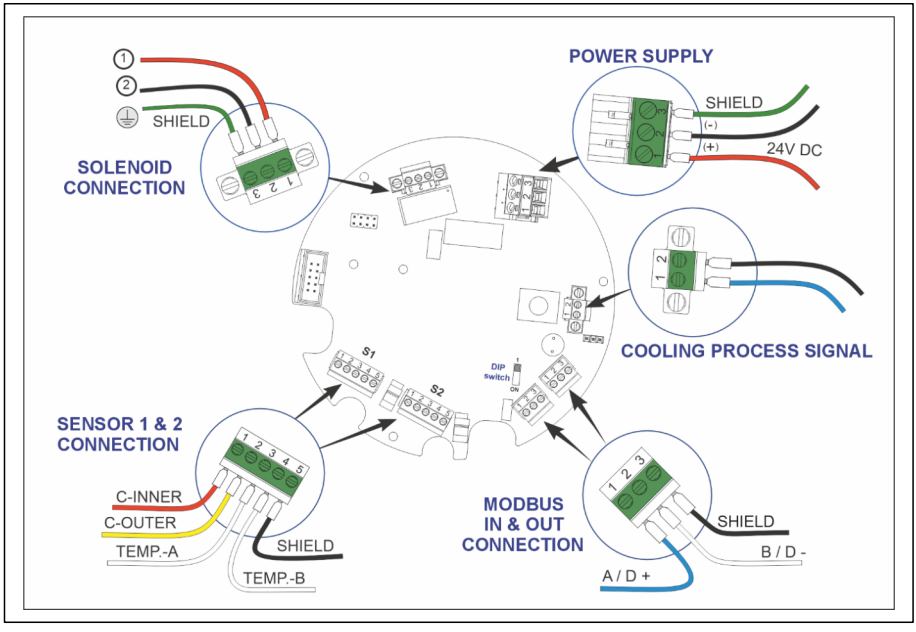


Fig. 7.2

7.1.1. Accessing the Electronics:

1. Disconnect the power supply from the product and wait for 10 seconds until the LED stops blinking.
2. Rotate the Plastic Lid (2) counterclockwise manually to detach it from the Housing (1). Keep the Plastic Lid (2) and O-ring (5) at safe place.
3. Disconnect the power connector from the Electronics Board (4) (Refer to fig. 7.3).

7.1.2. Assembly Procedure of Electronics and Lid Assembly:

1. After completing the required repair, maintenance, or replacement, reconnect the Power Supply connector to the Electronic Board (4).
2. If needed, replace the old O-ring (5) with the new one.
3. Apply Molykote 33 light grease to the groove of housing and O-ring (5) while reassembling. Ensure O-ring (5) is properly fitted inside the groove.
4. Hand-tighten the Plastic Lid (2) to the Housing (1) ensuring proper contact for ingress protection.
5. Restore power supply to the Product.

7.2. Procedure to replace the Electronics Board:

1. Follow steps 1 to 3 from section 7.1.1 to access the electronic board.
2. Disconnect the cable terminals for the solenoid valve, process signal, Sensor1, Sensor-2, Modbus-In, and Modbus-Out (refer fig 7.3).
3. Loosen and remove the mounting screws (3), then carefully remove the existing PCB by holding the power supply connector.
4. Handle the new PCB (4) by the power supply connector, position it inside the housing, and mount it.
5. Secure the new PCB (4) with the mounting screws (3) and reconnect the solenoid, process signal, Sensor-1, Sensor-2, Modbus-In, and Modbus-Out cables (refer fig 7.3).
6. Follow steps 1 to 5 from section 7.1.2 to complete the reassembly of the electronic board and plastic lid assembly.

7.3. Solenoid Valve replacement

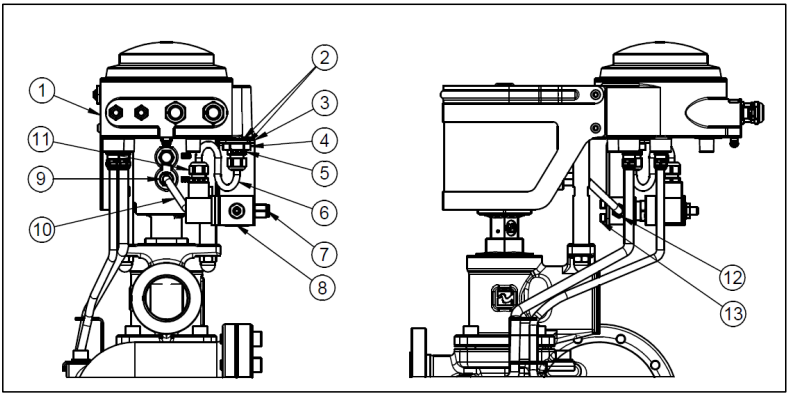


Fig. 7.3

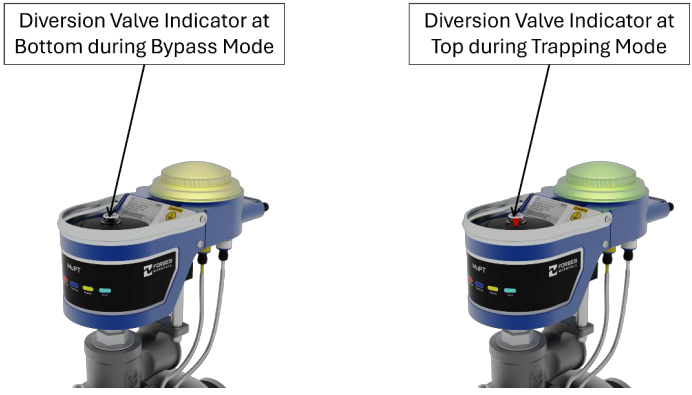


Fig. 7.4

1. Following the steps outlined in section 7.1.1, disconnect the solenoid cable (6) terminal from the electronics and remove the solenoid cables from the terminal. Refer to Figure 7.3 of the connection diagram for reference.
2. Close the air-line valve and disconnect the pneumatic connection from the solenoid inlet port (7).
3. Detach the pneumatic tube (10) from the solenoid valve outlet port (12).
4. Unscrew the pneumatic connector (7) from the solenoid valve (8).
5. Loosen the PG9 gland-1 (5) assembled with M20 connector (4) so that solenoid cable (6) can be removed from electronic housing (1).
6. Loosen the Allen bolts (13) from L-bracket (3) to remove the solenoid (8).
7. The newly supplied solenoid valve (8) comes pre-assembled with PG9 Gland2 (11), connected cables (6) and Allen bolts with spring washers (13).

8. Assemble the new solenoid (8) to L-bracket (3) with the help of Allen bolt and spring washer (13).
9. Pass the solenoid cable (6) through PG9 gland-1 (5) attached to electronic housing (1) till electronic board.
10. Connect the solenoid cable to solenoid connector and attach the solenoid connector to the electronic board as shown in fig. 7.3. Tighten the PG9 gland1 & 2 (5 & 11) properly for ingress protection.
11. Connect the air supply pipe to the solenoid valve inlet (7) and open the air-line valve to start the air supply.
12. Follow steps 1 to 5 from section 7.1.2 to complete the reassembly of the electronic board and plastic lid assembly.

7.4. Procedure to Flush the Trap:

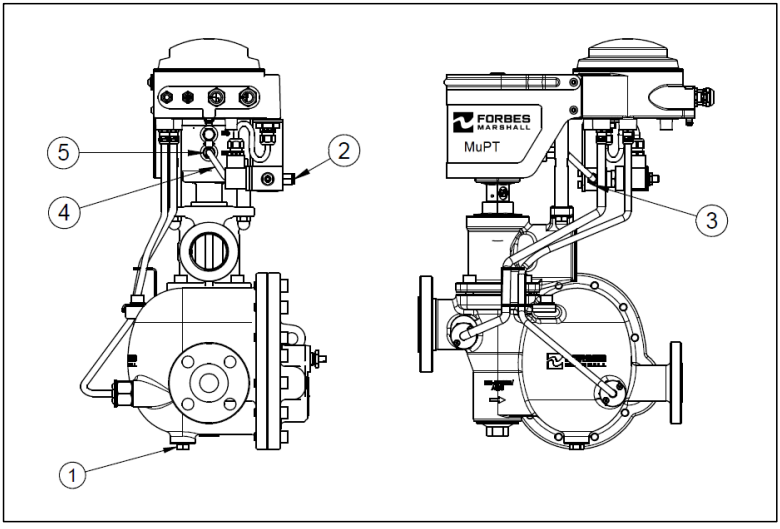


Fig. 7.5

1) Remove the drain plug (1) from the trap cover.
2) To switch the MuPT to trap mode, regardless of its current state, follow the procedure below:
   - Disconnect the pneumatic pipe (4) that runs from the solenoid outlet (3) to the actuator NC port inlet (5) and place it in a clean area.
   - Turn off the inlet pneumatic supply to the solenoid valve.
   - Remove the pneumatic supply pipe from the solenoid inlet (2) and connect it directly to the actuator NC port inlet (5).
   - Turn on the incoming pneumatic supply.
   - This will activate the actuator, putting the product in trap mode, which can be verified by the red indicator pin being in the topmost position (refer to the figure 7.5).

3. Once the device is in trap mode, slightly open the inlet isolation valve. This will trigger a strong purging action that clears out any impurities from the upstream side of the steam trap and within the trap itself. Allow the system to flush for 2- 3 minutes, and impurities will be expelled through the drain.
4. Close the inlet isolation valve.
5. Turn off the incoming pneumatic supply.
6. Disconnect the pneumatic pipe from actuator port (5) and reconnect it to the solenoid inlet (2). Reconnect the pneumatic tube (4) from the solenoid outlet (3) to the actuator NC port (5).
7. Turn on the incoming pneumatic supply.
8. Allow time for any remaining media to drain completely.
9. Then apply Loctite 577 to drain plug (1) and reinstall the drain plug (1).
10. Open the inlet isolation valve (in a closed return system, open the discharge line and close the test valve).
11. Finally, restore the power supply to the device.

7.5. Sensor Maintenance:

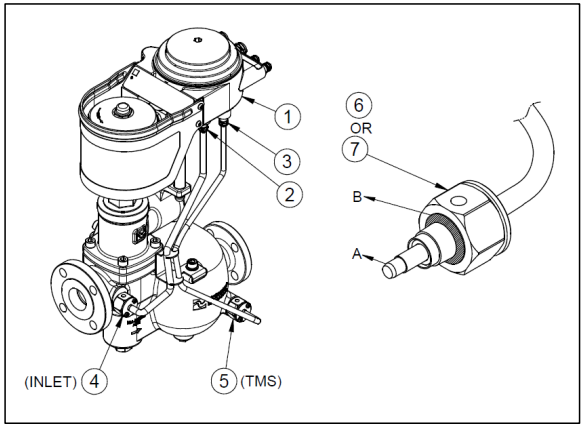


Fig. 7.6

Sr. No.	Part Description	Material
A	Sensor Probe	Stainless Steel
B	Sensor Gasket	Stainless Steel

1. Follow steps 1 to 3 from section 7.1.1 to access to the electronic board.
2. Disconnect the sensor connectors from the terminal PCB. Refer to Figure 7.3 of the connection diagram for reference.
3. Loosen the cable glands (2 & 3) to release the sensor cables. The cable glands (2 & 3) do not need to be completely removed from the housing (1).
4. Use a 32 mm A/F spanner to remove sensors (4 & 5) from the product inlet ports and cover TMS ports as shown in Figure 7.6.

3. Clean the sensor probe (A) with soft cloth, removing any accumulated dirt and debris. Refer to the sensor details in Figure 7.6.
4. Ensure the sensor gasket (B) is in place, then reinstall sensors (4 & 5) back into their respective positions in the inlet and TMS cover.
5. Reconnect the cable connectors to the corresponding terminals on the electronics board. Refer to Figure 7.3 in the connection diagram for reference.
6. Tighten the cable glands (2 & 3) to secure the cables.

   steps 1 to 5 from section 7.1.2 to finish reassembling the electronic board.
7. Check around sensors (4 & 5) for any signs of leakage. If found, tighten then sensors.

7.6. Actuator Indicator Pin Maintenance:

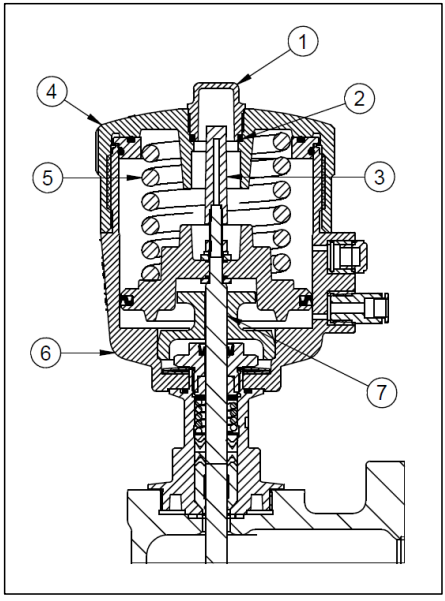


Fig. 7.7

1. Unscrew the Top Lid (1) and remove the O-ring (2) from Actuator Cap (4).
2. Unscrew the Indicator Pin (3) from Stem (7) by rotating anticlockwise.
3. Assemble the new Indicator Pin (3) to the Stem (7).
4. Replace the old O-ring (2) with the new one. Ensure that O-ring is properly assembled.
5. Apply Molykote 33 light grease and assemble the new Top Lid (1).

7.7. Actuator Spring Maintenance:

1. Rotate the Actuator Cap (4) (refer fig 7.8) counterclockwise using the appropriate tools as specified in the torque table to detach it from the Actuator Housing (6). If rotation is not possible, then hold the Actuator Housing (6) from bottom side with appropriate tool and then rotate the Actuator Cap (4).
2. Replace the Actuator Spring (5) with new spring.
3. Ensure all O-ring are replaced with new ones and applied with molykote 33 light grease.
4. Apply Molykote 33 light grease and assemble the Actuator Cap (4).

7.8. Actuator & Diversion Valve Maintenance Procedure :

The procedure to remove the diversion valve unit and replace the seals must be done with at most care to avoid further damages to the components. The below mentioned procedure must be followed to do the maintenance activity.

7.8.1. Procedure To Remove Electronics Housing:

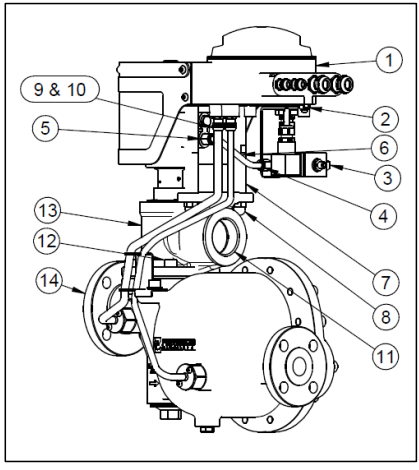


Fig. 7.8

1. Follow steps 1 to 3 from section 7.1.1 to access the electronic board.
2. Disconnect the Power Supply, Process Signal, Modbus-In, Modbus-Out, Sensor 1, and Sensor 2 cables from their connectors. Refer to Figure 7.3 of the connection diagram for reference.
3. Remove Electronic Housing Earthing from port 2 as shown in fig 7.8.
4. Loosen the cable glands and remove the power supply, process signal, Modbus, and sensor cables, along with the glands, from the electronics housing.
5. Close the air inlet valve and disconnect the air supply from the solenoid inlet port (3).

6. Detach the pneumatic pipe (6) running between the solenoid outlet port (4) and the actuator NC port (5).
7. Secure the electronic housing (1) and unscrew the nuts (8) from the both support rods (7).
8. Carefully remove the electronic housing (1) along with the support rods (7) and place it aside to prevent any physical damage.

7.8.2. Procedure To Remove Actuator Assembly :

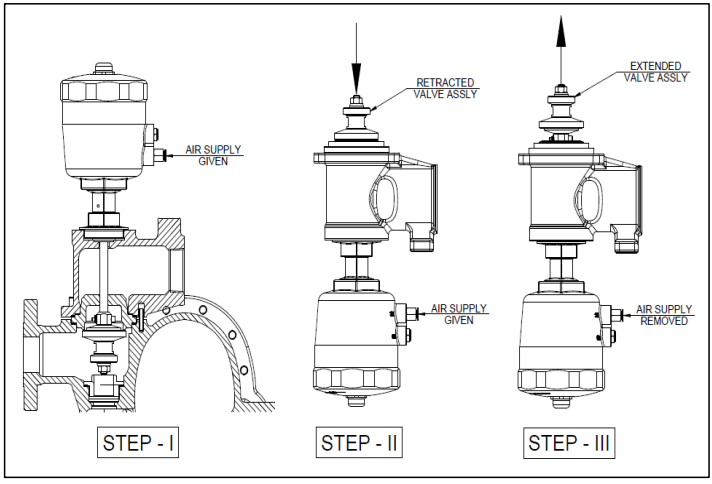


Fig. 7.9

1. Disconnect the pipeline attached to the product's diversion unit outlet (11) (refer fig 7.8).
2. Connect the air supply directly to the actuator NC port (5) (refer fig 7.8) and open the air inlet valve. This will cause the actuator to retract and switch the system to trapping mode (see Fig. 7.9, Step-I for reference).
3. Remove the socket head bolts (12).
4. Carefully lift the diversion unit assembly (13) and set it aside.
5. Position the actuator assembly (13) in an upright vertical position as shown in Fig. 7.9, Step-II.
6. Disconnect the air supply from the actuator NC port (5), which will extend the valve assembly to allow access to the internal components (refer to Fig. 7.9, Step-III).

7.8.3. Procedure For Replacement / Maintenance of Actuator (Diversion) Seals:

Note: If this step is not needed, skip ahead to step 7.8.5.

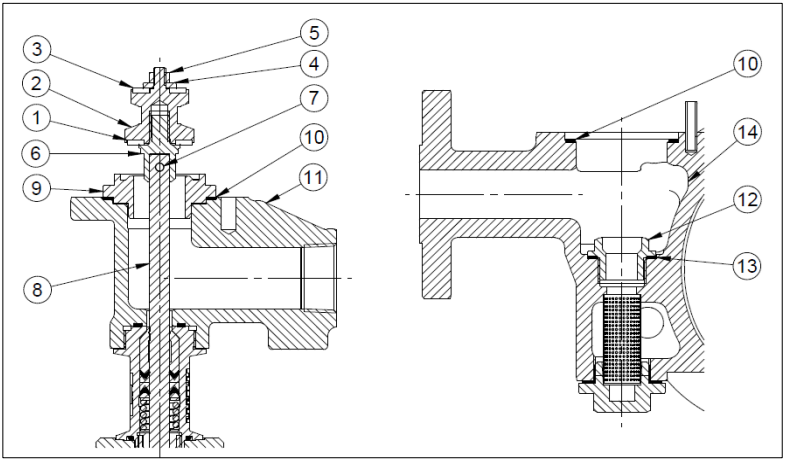


Fig. 7.10 DN 25 Actuator (Diversion) Valve

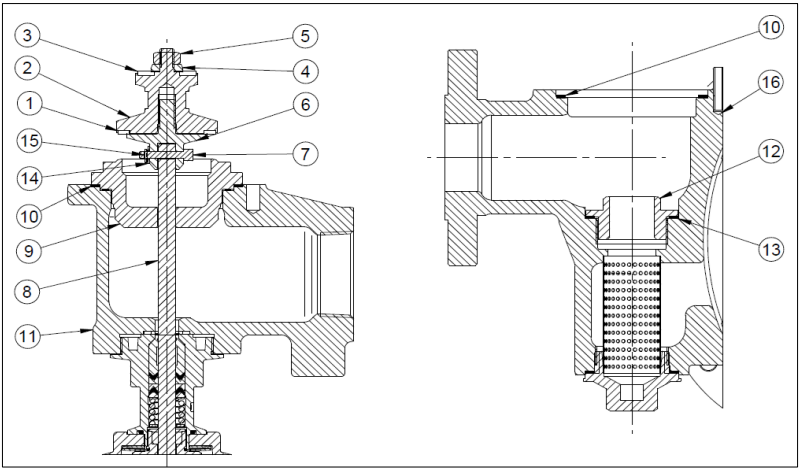


Fig. 7.11 DN 40/50 Actuator (Diversion) Valve

Refer to the checklist below for inspection, replacement, and maintenance procedures, along with corresponding item numbers as shown in Figures 7.10 and 7.11.

Comp. No.	Description	How to Inspect	Where to Inspect	Replacement / maintenance Procedure
1	Bypass Seat Gasket	Visually	In place	Follow – A
2	Bypass Seat	Visually	In place	Follow – A, then B

3	Top (Bypass) Plug Seal	Visually	In place	Follow – A, then C
4	Bottom (Trap) Plug Seal	Visually	In place	Follow – A, then D
5	Trap Seat	Visually	In place	Follow – A, then E

Note: The bypass Seat Gasket (10) must be replaced each time the actuator Assembly is opened and reassembled.

A. Steps to replace Bypass Seat Gasket (1):

For DN25 (refer fig 7.10):

1. Using the appropriate tools, unscrew the central plug sub-assembly (which includes items 1, 2, 3, 4, and 5) from the top seal retainer (6).
2. Remove the bypass seat (9) from the bypass manifold (11). At this point, you can take out the bypass seat gasket (10).
3. Thoroughly clean the gasket seating surfaces on both the bypass manifold (11) and bypass seat (9).
4. Hold the bypass seat (9) and position the new bypass seat gasket (10) in its designated location.
5. Reassemble the bypass seat (9) with the bypass manifold (11), ensuring the bypass seat gasket (10) is properly in place.
6. Clean and then apply Loctite 620 to the threaded part of the top seal retainer (6) and central plug (2).
7. Use the appropriate tools to carefully fasten the central plug sub-assembly (which includes items 1, 2, 3, 4, and 5) into the top seal retainer (6). Ensure all components are properly aligned and tighten to the specified torque value as per the torque table.

For DN40/50 (refer fig 7.11):

1. Gently grip the larger diameter end of the stepped pin (7) with pliers and use a nose plier to unbend the split pin (15) at the other end.
2. Remove the split pin (15) from the stepped pin (7), then take off the washer (14).
3. Pull the stepped pin (7) out of the top seal retainer (6), which will allow the central plug sub-assembly (consisting of items 1, 2, 3, 4, 5, and 6) to separate from the stem (8).
4. Remove the bypass seat (9) and bypass seat gasket (10) from the stem (8) and bypass manifold (11).
5. Clean the gasket seating surfaces on the bypass manifold (11) and bypass seat (9).

6. Hold the bypass seat (9) and position the new bypass seat gasket (10) in its proper location.
7. Reassemble the bypass seat (9) with the bypass manifold (11) and stem (8), ensuring the bypass seat gasket (10) is correctly placed.
8. Position the central plug sub-assembly (comprising 1, 2, 3, 4, 5, and 6) over the stem (8) and align the hole to insert the stepped pin (7).
9. Insert the stepped pin (7) through the top seal retainer (6) and stem (8), ensuring the top seal retainer (6) can move freely with respect to the stem (8).
10. Place the washer (14) onto the other end of the stepped pin (7).
11. Insert the split pin (15) into the hole of the stepped pin (7).
12. Secure the larger diameter end of the stepped pin (7) with pliers and use a nose plier to bend the split pin (15) at the other end. This will complete the assembly of the central plug assembly (consisting of items 1, 2, 3, 4, 5, and 6) with the stem (8).

B. Steps to replace Bypass Seat (2) :

For DN25 (refer fig 7.10):

1. Use appropriate tools to unscrew the central plug sub-assembly (which includes items 1, 2, 3, 4, and 5) from the top seal retainer (6).
2. Remove the damaged bypass seat (9) from the bypass manifold (11), along with the bypass seat gasket (10).
3. Replace the existing top plug seal (1) on the central plug (2) with a new one.
4. Thoroughly clean the gasket seating area on the bypass manifold (11).
5. Hold the new bypass seat (9) in one hand and position the new bypass seat gasket (10) in its designated location.
6. Reassemble the bypass seat (9) with the bypass seat gasket (10) onto the bypass manifold (11).
7. Clean and apply Loctite 620 to the threaded portion of the top seal retainer (6).
8. Secure the central plug sub-assembly (comprising items 1, 2, 3, 4, and 5) to the top seal retainer (6) using the appropriate tools and torque, referring to the torque table for specifications.

For DN40/50 (refer fig 7.11):

1. Gently grip the larger diameter end of the stepped pin (7) with pliers and use a nose plier to unbend the split pin (15) at the other end.
2. Remove the split pin (15) from the stepped pin (7), which will also allow you to take off the washer (14).
3. Pull the stepped pin (7) out of the top seal retainer (6), separating the central plug assembly (comprising items 1, 2, 3, 4, 5, and 6) from the stem (8).
4. Remove the bypass seat (9) and bypass seat gasket (10) from the stem (8) and bypass manifold (11).
5. Clean the gasket seating area of the bypass manifold (11).

6. Hold the new bypass seat (11) in one hand and position the new bypass seat gasket (10) in its designated location.
7. Assemble the bypass seat (9) with the bypass seat gasket (10) onto the bypass manifold (11) and stem (8).
8. Guide the central plug assembly (comprising items 1, 2, 3, 4, 5, and 6) over the stem (8) and align the hole to insert the stepped pin (7).
9. Insert the stepped pin (7) through the top seal retainer (6) and stem (8), ensuring that the top seal retainer (6) can move freely in relation to the stem (8).
10. Place the washer (14) onto the other end of the stepped pin (7).
11. Insert the split pin (15) into the hole of the stepped pin (7).
12. Secure the larger diameter end of the stepped pin (15) with pliers and use a nose plier to bend the split pin (9) at the other end. This will complete the assembly of the central plug assembly (comprising items 1, 2, 3, 4, 5, and 6) with the stem (8).

C. Steps to replace Top (Bypass) Plug Seal (3):

1. Use appropriate tools to unscrew the central plug (2) from the top seal retainer (6).
2. Replace the existing damaged top plug seal (1) with a new one.
3. Clean and apply Loctite 620 to the threaded portion of the top seal retainer (6).
4. Secure the central plug (2) to the top seal retainer (6) using the appropriate tools and torque, referring to the torque table for specifications.

D. Steps to replace Bottom (Trap Side) Plug Seal (4):

1. Use appropriate tools to unscrew the hex nut (5) from the central plug (2).
2. Remove the bottom seal retainer (4).
3. Replace the existing damaged bottom plug seal (3) with a new one.
4. Reattach the bottom seal retainer (4).
5. Clean and apply Loctite 620 to the threaded portion of the central plug (2).
6. Secure the new hex nut (5) to the central plug (2) using the appropriate tools and torque, referring to the torque table for specifications.

E. Steps to replace Trap Seat (5):

1. Use appropriate tools to unscrew the trap seat (12) from the cover (refer fig 7.11& 7.12, DN25 – 14, DN40/50 – 16).
2. Remove the trap seat gasket (13).
3. Clean the gasket seating area on the cover.
4. Place the new trap seat gasket (13) into the cover.
5. Hold the new trap seat (12) in one hand and Loctite LB 8150 Silver Anti-seize to the threaded portion.
6. Secure the trap seat (12) to the cover using the appropriate tools and torque.

7.8.4. Procedure For Replacement / Maintenance of Actuator (Mechanism) Seals:

Note: If this step is not needed, skip ahead to step 7.8.5.

A. Procedure for Replacement / Maintenance of DN25 Actuator Seals

(Whenever grease is mentioned, use Molykote 33 light (Silicone based).)

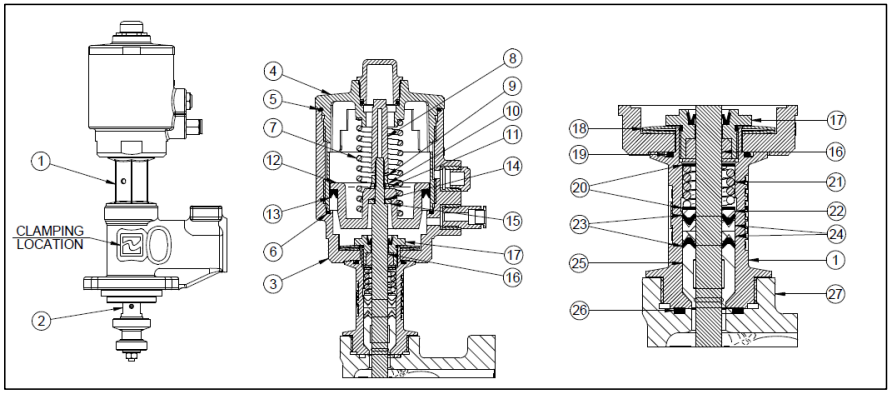


Fig. 7.12 DN 25 Actuator Valve

1. Secure the bypass manifold (27) in a bench vice.
2. Using the special tool, separate the actuator cylinder (4) from the actuator housing (3), which will also remove the O-ring (5).
3. Remove the spring (7) from the piston (12).
4. Hold the top seal retainer (2) by It's a/F and unscrew the red indicator pin (8) and hex nut (9) with the appropriate tools.
5. Remove the spring washer (10) and plain washer (11) from the stem (16).
6. Take the piston (12), along with the lip seal (13), off the stem (16).
7. Remove the O-ring (14) from the stem (16).
8. Access and replace the O-ring (6) with a new one. Before replacing, apply grease to the new O-ring (6). Ensure it is seated properly in the actuator housing (3) groove, without any part of it protruding.
9. Clean any debris or residue from the inside of the actuator housing (3) and apply grease to the threaded section.
10. If required to replace retainer nut assembly (17) and actuator assembly along with seals (19 to 26) follow the below procedure, else skip to next step 11:
    a. Remove Spacer (15) from stem (16).
    b. Unscrew the retainer nut assembly (17).
    c. Remove the disc washer (18).
    d. Detach the actuator housing (3).
    e. Pull out the stem (16) from the actuator bonnet (1) from the bottom side.
    f. Unscrew the actuator bonnet (1) from the bypass manifold (27).

g. Replace the stem spacer (20), stem spring (21), steam seal-3 (22), stem lip seal (23), stem seal-2 (24) & stem seal-1 (25), ensuring the correct orientation as per the reference figure. While replacing, apply the grease to ID & OD of the stem seals.
h. Replace the bonnet washer (26).
i. Assemble the actuator bonnet (1) back onto the bypass manifold (27) and temporarily fasten the retainer nut assembly (17) onto the bonnet.
j. Apply grease to the stem (16) and insert the stem into the bonnet assembly (1) from the bottom side.
k. Remove the temporarily mounted retainer nut assembly (17) and verify that all seals are correctly positioned.
l. Replace the O-ring (19).
m. Assemble the actuator housing (3).
n. Place the disc washer (18) ensuring the correct orientation as per the reference figure. (Concave surfaces facing each other).
o. Check the retainer nut assembly (17) for damaged. If found, replace.
p. Apply the grease & then reassemble the retainer nut assembly (17).
q. Mount the spacer (15) on stem.

11. Remove the Loctite residue from the threads of the stem (16).
12. Apply grease to the new O-ring (14) and insert it on the stem (16) at the correct location above spacer (15).
13. Replace the lip seal (13) on the piston (12) as per the specified orientation, applying grease to the new lip seal (13).
14. Reassemble the piston (12) with the newly mounted lip seal (13) onto the stem (16) according to the correct orientation.
15. Place the plain washer (11) and spring washer (10) onto the piston (12).
16. Clean the threads of the stem (16) to remove any grease and apply Loctite 620 to the threads.
17. Fasten the hex nut (9).
18. Hold the top seal retainer (2) by its A/F and tighten the hex nut (9) onto the stem (16) using the appropriate tools and torque as per the torque table.
19. Wipe away any excess Loctite left on the stem threads (16).
20. Hold the top seal retainer (2) by its A/F and tighten the red indicator cap (8) onto the stem (16).
21. Place the spring (8) onto the piston (12).
22. Replace the old O-ring (5) on the actuator cylinder (4) with a new one. Apply grease to the new O-ring (5) and to the outer threaded section of the actuator top lid (4).
23. Thoroughly clean the inside of the actuator cylinder (4) to remove any dirt or residue and apply grease to the piston guide area.
24. Use a special tool to fasten the actuator cylinder (4) to the actuator housing (3).

B. Procedure for Replacement / Maintenance of DN40/50 Actuator Seals

(Whenever grease is mentioned, use Molykote 33 light (Silicone based).)

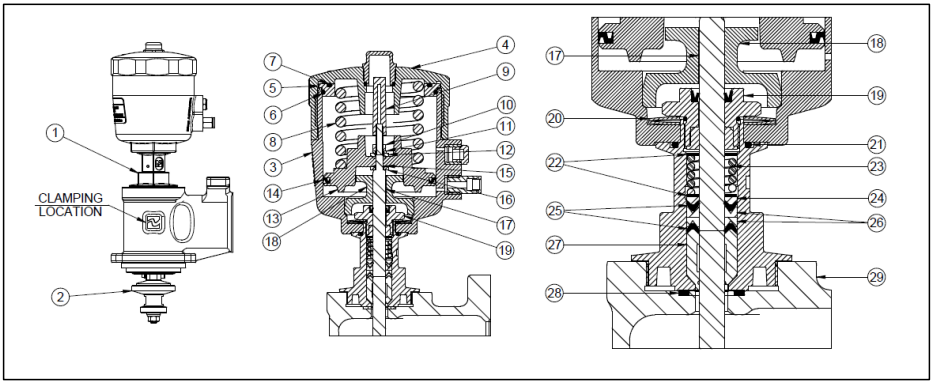


Fig. 7.13 DN 40/50 Actuator Valve

1. Secure the bypass manifold (29) in a bench vice at the location.
2. Use the special tool to unscrew the actuator top lid (4) from the actuator housing (3).
3. Remove the spacer (5), O-ring (6), and O-ring (7) from the actuator housing (3).
4. Take out the spring (8) from the piston (13).
5. Hold the top seal retainer (2) by It's a/F and unscrew the red indicator pin (9) and hex nut (10) using the appropriate tools.
6. Remove the spring washer (11) and washer (12) from the stem (17).
7. Remove the piston (13) along with the lip seal (14) from the stem (17).
8. Take out the O-ring (15) from the stem (17).
9. Clean any dirt or debris inside the actuator housing (3) and apply grease to the piston guide area (13).
10. If required to replace retainer nut assembly (19) and actuator assembly along with seals (21 to 28) follow the below procedure, else skip to next step 11:
    a. Remove spacer (16) from stem (17).
    b. Remove the guide bush (18). Unscrew the retainer nut assembly (19).
    c. Remove the disc washer (20).
    d. Detach the actuator housing (3).
    e. Pull out the stem (17) from the actuator bonnet (1) from the bottom side.
    f. Unscrew the actuator bonnet (1) from the bypass manifold (29).
    g. Replace the stem spacer (22), stem spring (23), steam seal-3 (24), stem lip seal (25), stem seal-2 (26) & stem seal-1 (27), ensuring the correct orientation as per the reference figure. While replacing, apply the grease to ID & OD of the stem seals.
    h. Replace the bonnet washer (28).
    i. Assemble the actuator bonnet (1) back onto the bypass manifold (29) and temporarily fasten the retainer nut assembly (19) onto the bonnet.
    j. Apply grease to the stem (17) and insert the stem into the bonnet assembly (1) from the bottom side.

k. Remove the temporarily mounted retainer nut assembly (19) and verify that all seals are correctly positioned.
l. Replace the O-ring (21).
m. Assemble the actuator housing (3).
n. Place the disc washer (20) ensuring the correct orientation as per the reference figure. (Concave surfaces facing each other).
o. Check the retainer nut assembly (19) for damaged. If found, replace.
p. Apply the grease & then reassemble the retainer nut assembly (19) using the appropriate tools and torque as per the torque table.
q. Mount the spacer (16) on stem.

11. Remove any loctite deposits from the threads of the stem (17).
12. Apply grease to the new O-ring (15) and insert it into the correct position on the stem (17) above the spacer (16).
13. Replace the existing lip seal (14) on the piston (13), ensuring it is oriented correctly, and apply grease to the new lip seal (14).
14. Reassemble the piston (13) with the mounted lip seal (14) onto the stem (17) in the correct orientation.
15. Mount the plain washer (12) and spring washer (11) onto the piston (13).
16. Clean any grease from the threads of the stem (17) and apply Loctite 620.
17. Mount the hex nut (10).
18. Hold the top seal retainer (2) by its A/F and fasten the hex nut (10) onto the stem (17).
19. Remove any excess loctite from the threads of the stem (17).
20. Hold the top seal retainer (2) by its A/F and fasten the red indicator cap (9) onto the stem (17).
21. Place the spring (8) onto the piston (13).
22. Remove the old O-rings (6) and (7) from the spacer (5), clean off any dirt or debris, and apply grease to the O-ring grooves.
23. Apply grease to the new O-rings (6) and (7).
24. Install the O-rings (6) and (7) onto the spacer (5).
25. Mount & press the spacer (5), with the O-rings (6) and (7), into the designated location by hand.
26. Clean and apply grease to the threads of the actuator lid (4).
27. Use the special tool to fasten the actuator top lid (4) to the actuator housing (3), following the torque specifications from the torque table.

7.8.5. Procedure To Re-Assemble the Actuator Assembly:

After diagnosing and repairing the actuator, follow the procedure outlined below to reassemble the diversion unit assembly (13) with the cover (14) (refer fig 7.8 unless specified):

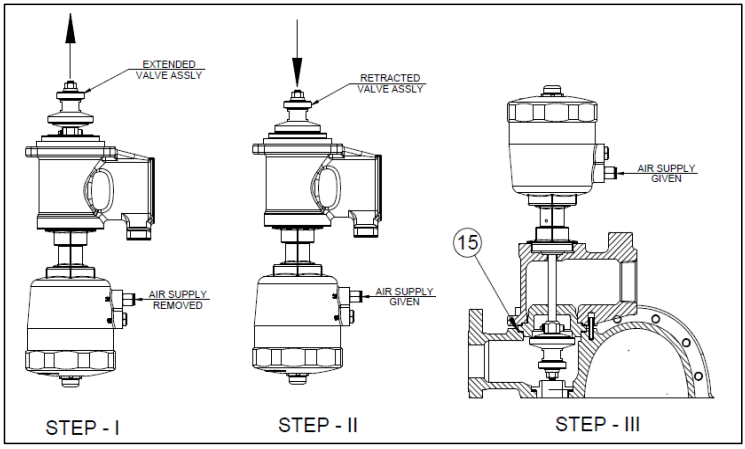


Fig. 7.14

1. Position the actuator assembly (13) in a vertical upright orientation as shown in Fig. 7.15 and locate bypass seat in the bypass manifold properly.
2. Give air supply to the actuator NC port to retract the diversion valve.
3. Remove the old bypass seat gasket (15) (refer fig. 7.14) and thoroughly clean the gasket seating areas on both the cover (14) and the bypass seat.
4. Install a new bypass seat gasket (15) (refer fig. 7.14).
5. With the diversion unit assembly in the retracted position, carefully mount it onto the trap cover (14).
6. Reinstall and tighten the socket head bolts (12).
7. Disconnect the air supply from the actuator NC port.

7.8.6. Procedure To Assemble Electronic Housing

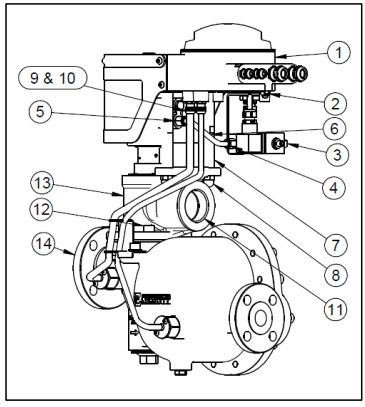


Fig. 7.15

1. Position the electronics housing assembly (1) along with the support rod (7) onto the manifold (13) and secure the dome nut (7) at both locations as shown in Fig. 7.15.
2. Tighten the dome nuts (7).
3. Reconnect the pipeline to the product bypass outlet.
4. Attach one end of the pneumatic tube to the actuator NC port (5) and the other end to the solenoid outlet port (4).
5. Provide air supply to the solenoid inlet port (3).
6. Connect the sensor cables, power cable, and modbus cables along with their glands to the appropriate ports, then tighten them.
7. Follow steps 1 to 5 from section 7.1.2 to reassemble the electronics board and metal lid assembly.
8. Connect the earthing cable (2) from the electronics housing and then power up the electronics.
9. Open the inlet isolation valve.

7.9. Strainer maintenance

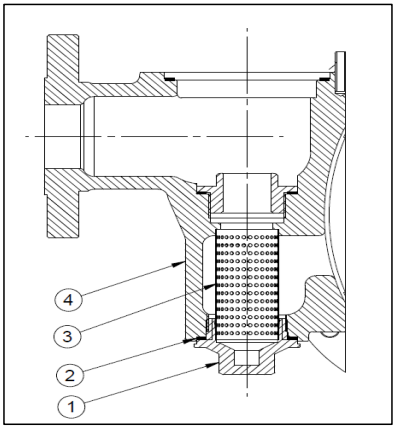


Fig. 7.16

1. Make sure the inlet isolation valve is closed, and the system is fully depressurized before proceeding.
2. Use appropriate tools to unscrew the Strainer Cap (1) from the cover (4).
3. Remove the strainer screen (3) and inspect it for any necessary repairs or replacement.
4. Replace the strainer gasket (2) and thoroughly clean the gasket seating areas on the cover (4) and strainer cap (1).
5. Position the new strainer screen (3) in the strainer cap (1).
6. Apply Loctite 8150 Silver Anti-seize to the threads of the strainer cap (1) and secure it to the cover (4).

7.10. Trap Mechanism Maintenance

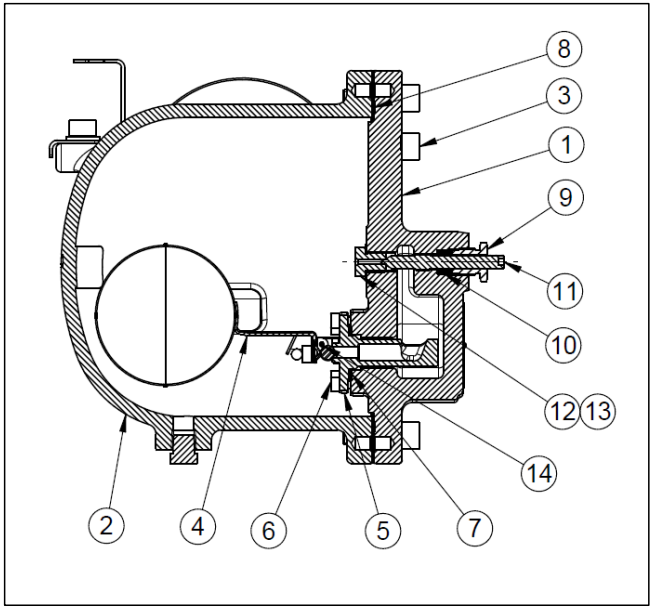


Fig. 7.17

Note: The cover gasket includes a thin stainless steel support ring that can cause injury if not handled and disposed of carefully. Refer to Fig. 7.17 before following the steps below.

a. Float Lever Replacement:

1. Loosen and remove the cover bolts (3), then lift off and remove the base (2) along with the internal mechanism (4).
2. Detach the float lever assembly (4) by pulling out the pivot pin (14) from the seat (5).
3. Assemble the new float lever assembly (4) and pivot pin (14) with the seat (5).
4. Clean the gasket seating area of cover (2) and base (1).
5. Apply anti-seize compound to the cover bolts (3) and reassemble the base (1 using a new cover gasket (8).

b. Mechanism Replacement:

1. Loosen and remove the cover bolts (3), then lift off and remove the base (2) along with the internal mechanism (4).
2. Detach the complete float lever assembly (4), seat (5), and gasket (7) by unscrewing the allen bolt (6).
3. Clean the mechanism gasket seating surface of base (1) thoroughly.

4. Install and securely fasten the new mechanism assembly (4, 5, and 7), applying Loctite 222 thread locker compound to the screw (6) during assembly.
5. Clean the gasket seating area of cover (2) and base (1).
6. Apply anti-seize compound to the cover bolts (3) and reassemble the base (1) using a new cover gasket (8).

7.11. Steam Lock Release (SLR) Maintenance

Refer fig. 7.17

1. Loosen and remove the cover bolts (3), then lift off and remove the base (2) along with the internal mechanism (4).
2. Disassemble SLR seat (12), SLR seat gasket (13), gland nut (9), gland packing (10), and SLR stem (11) from base (1). Clean the gland packing mounting area.
3. Mount new SLR seat (12) and SLR seat gasket (13) from inside of the base (1).
4. Screw new SLR stem (11) on base (1) till it touches SLR seat (12) from outside of base (1).
5. Mount the gland packing (10) guiding over the SLR stem (11).
6. Assemble the gland nut (9) on base (1).
7. Rotate the SLR stem (11) clockwise to move it towards the SLR seat (12). Once the SLR stem (11) touches the SLR seat (12), rotate it anticlockwise by 1/4 of a turn (90°) to set the SLR.
8. Clean the cover gasket seating surfaces of base (1) and cover (2) thoroughly.
9. Apply anti-seize Rocol compound to the cover bolts (3) and reassemble the base (1) using a new cover gasket (8).

7.12. Trap Checking

In a closed return system, a test tee and valve are required to monitor the trap's operation.

The trap should adjust the condensate discharge based on the process load and pressure.

7.13. Routine and preventive maintenance:

Refer to the maintenance schedule outlined in the table below for performing routine maintenance on the MuPT

Sr. No.	Parameters to be checked	Frequency for checking various parameters						
		Immediate	Daily	Weekly	Monthly	Quarterly	Half yearly	Annually
1	Test steam traps (Inspection) (below 8 bar g)			Y				
2	Repair / Replace steam traps - when testing shows leaks	Y						
3	Clean strainers				Y			
4	Visual Inspection for leakages			Y				
5	Arresting any other leaks	Y						
6	Test Actuator pressure		Y					
7	Clean Diversion valve internals							Y
8	Sensor Cleaning						Y	
9	Test bypass seat leakage (Inspection via test valve)				Y			
10	Test trap seat leakage (Inspection via test valve)				Y			

7.14. Tool Kit & Recommended Tightening Torque :

SR. NO.	COMPONENTS	BOLT	TOOL USED	TORQUE
1	Base	M10	8 mm Allen Key	45 - 50 Nm
2	Bypass Manifold	M10	8 mm Allen Key	45 - 50 Nm
3	SLR Gland Nut		Spanner 21 mm (A/F)	
4	SLR Stem		Flathead Screwdriver (8 X 1,2 Tip Dimension)	
5	Mechanism Valve Seat (DN 40-50)	M5	4 mm Allen Key	4 - 5 Nm
6	Mechanism Valve Seat (DN 25)	M4	3 mm Allen Key	3 - 4 Nm
7	Drain Plug	1/4" BSPT	Spanner 14 mm (A/F)	30 - 35 Nm
8	Strainer Cap (DN 40-50)		Spanner 26 mm (A/F)	38 - 40 Nm
9	Strainer Cap (DN 25)		Spanner 26 mm (A/F)	70 - 80 Nm
10	Sensor		Spanner 32 mm (A/F)	70 - 80 Nm
11	Acorn Nut	M10	Spanner 17 mm (A/F)	45 - 50 Nm
12	Actuator Bonnet (DN 40-50)		Spanner 30 mm (A/F)	60 - 65 Nm
13	Actuator Bonnet (DN 25)		Spanner 30 mm (A/F)	50 - 55 Nm
14	Connector M20		Spanner 25 mm (A/F), 2 Nos	40 Nm
14	Earthing		Flathead Screwdriver (6 mm Tip Dimension)	
16	PCB		Philips Screwdriver	1.5 - 2 Nm
17	Connectors		Flathead Screwdriver (1.6 and 3 mm Tip Dimension)	
18	Actuator Cap (DN 40-50)		Special Tool With 11 0 mm A/F	70 - 80 Nm
19	Actuator Cap (DN 25)		Special Tool With 80 mm A/F	50 - 55 Nm
20	Actuator Housing (DN 40-50)		Special Spanner 61 mm (A/F)	
21	Actuator Housing (DN 25)		Special Spanner 65 mm (A/F)	
22	Stem Nut	M6	Long Socket Spanner 10 mm With Extension	12 - 15 Nm

23	Retainer Nut Assembly (DN 40-50)		Long Socket Spanner 36 mm	50 - 55 Nm
24	Retainer Nut Assembly (DN 25)		Long Socket Spanner 30 mm	50 - 55 Nm
25	Bottom Seal Retainer Nut (DN 40-50)	M8	Spanner 13 mm (A/F)	12 - 15 Nm
26	Bottom Seal Retainer Nut (DN 25)	M6	Spanner 10 mm (A/F)	7 - 9 Nm
27	Central Plug (DN 40-50)		Spanner 21 mm (A/F), Spanner 17 mm (A/F)	12 - 15 Nm
28	Central Plug (DN 25)		Spanner 16 mm (A/F), Spanner 18 mm (A/F)	12 - 15 Nm
29	Bottom Seat (DN 40-50)		Socket Spanner with Extension 32 mm (A/F)	70 - 80 Nm
30	Bottom Seat (DN 25)		Socket Spanner with Extension 24 mm (A/F)	45 - 50 Nm
31	Top Lid		Socket Spanner, 27 mm	5 Nm
32	Indicator Pin		Socket Spanner, 8 mm	1.5 - 2 Nm
33	M12 Cable Gland, Polyamide		Spanner 15 mm (A/F)	1.5 Nm
34	M20 Cable Gland, Polyamide		Spanner 24 mm (A/F)	4.5 Nm
35	PG 9 Cable Gland, Polyamide		Spanner 19 mm (A/F)	2 Nm
36	Solenoid Valve Assembly	M5	4 mm Allen Key	6 - 7 Nm

8. Troubleshooting

If the expected performance is unachievable after installation MuPT, check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
No Condensate Discharge at-all at trap outlet	Inlet pipe is clogged with rust or scale.	Flush the inlet pipe and clean it; if rusted replace it with a new pipe.
	End connection of the steam trap installed in the reverse direction.	Check the installation according to the flow direction arrow on the nameplate.
	The isolation valves on the upstream or downstream side are closed	Check and open the isolation valves on the upstream/downstream side.
	Mechanism damage (Float puncture, mechanism stuck)	Open the base and check the mechanism for any damages. If found, replace the mechanism
	Differential pressure is insufficient to discharge condensate	Check if the actual differential pressure (ΔP) is higher than the design ΔP, the steam float trap would have failed in the closed position, as the float buoyancy will not be adequate to open the valve seat.
	The trap is getting steam locked	Adjust the steam lock release (SLR) setting by first closing it fully and then opening it by 1/4th turn if present.

	No power supply to solenoid valve	Check the electronics housing for open connection or connectors. Fix the connections if broken. If the connections are ok, contact service engineers to check the electronics module.
	No / low air supply to solenoid valve	Check the air supply isolation valve and pressure should be according to the specifications.
	Defective solenoid coil	Replace the solenoid coil.
Condensate discharge inadequate at trap outlet	The isolation valves in upstream or downstream lines are closed.	Check and open the isolation valves on the upstream/downstream side.
	Differential pressure is very low	Check the pipe size of the inlet line
		Check downstream pressure of the steam trap is higher.
		Size the steam trap with a larger condensate discharge capacity or option for steam operated pumping trap.
	The steam trap is undersized	Replace the trap with a larger one i.e. size the steam trap with a higher condensate discharge capacity.
Steam leak at the trap outlet	Valve seat damage	Check mechanism valve and seat assembly for dirt deposition, then clean and lap the valve seating area. *Seat stamping is to be done by lightly stamping an S.S. ball of similar size on the valve seating.
		Check valve seat and seat assembly is leaking or worn, replace with a new one.
A steam leak from the trap body	Cover gasket deterioration or damage	Ensure to replace with a new one during each service period.
	Improper tightening of mounting nuts.	Tighten the mounting nut to suitable torque to avoid fluid leakage.
	The steam trap body has been damaged by corrosion or erosion.	Check the pressure rating of the steam trap, and the resistance of the body material for the fluid used. A steam trap made from a material that is suitable for the fluid should be used.
	The steam trap has been damaged by frost.	Replace the steam trap with a new one. During the shutdown period make sure that the condensate lines and the steam trap are completely drained.
		Suitable lagging may be sufficient to overcome this problem if conditions are not too severe.
Actuator valve leakage	Bonnet seat damage	Check the Bonnet seat for any visible damages. If found, replace the same.
	Top plug Seal (PTFE soft) damage	Check the Top plug seal for any damages or flaring. Seat impression should be complete circle. Replace the damaged PTFE soft seal
	Valve assembly fail	Check for detachment of valve assembly from stem, if found replace entire valve stem assembly, bonnet seat and bottom seat.
Actuator valve getting stuck	Solenoid valve damage	Remove the solenoid valve and check for damages. Provide rated supply to check for any coil failures. Replace the damaged solenoid valve.

	Spindle stuck inside	Open and check the actuator housing for any damage to the seal stack around the spindle. If found ok, open and check the diversion valve bonnet for a stuck spindle. Replace spindle and assembly in case the components are damaged.
	No power supply to solenoid valve	Check the electronics housing for open connection or connectors. Fix the connections if broken. If the connections are ok, contact service engineers to check the electronics module.
	No air supply to solenoid valve	Check the air supply isolation valve.
Contaminated Condensate at Trap outlet (in bypass mode)	Bottom seat damage	Check the Bottom seat for any visible damage. If found, replace the same.
	Bottom plug Seal (PTFE soft) damage	Check the bottom plug seal for any damage or flaring. Seat impression should be complete circle. Replace the damaged PTFE soft seal
	Valve assembly fail	Check for detachment of valve assembly from stem, if found replace entire valve stem assembly, bonnet seat and bottom seat.
Not switching to bypass mode in process cooling cycle / inadequate cooling rate	Continuous air supply from solenoid valve to actuator assembly	Replace the solenoid valve.
	No exhaust through solenoid valve	Disassemble the valve body of solenoid valve and remove ant debris stuck at exhaust port of solenoid valve. Reassemble and check for exhaust during working conditions. If exhaust is not happening, replace the solenoid valve.
	No process cooling signal from relay	Check the relay connection for 0V when process cooling signal is ON. If connections are ok and still signal is not coming till product, replace the relay.

9. Available Spares

MuPT DN 25 Spare List		
Sr. No.	**Spare Codes**	**Spare Description**
1	SPARE-25MUPT-GKIT (Gasket Kit)	Spare Consists of Cover Gasket, Mech. Seat Gasket, Bypass Seat Gasket, Trap Seat Gasket, Strainer Gasket (Pack Of 5 No's)
2	SPARE-25MUPT-FKIT4.5 (Float Kit)	Spares Consist of Float and Lever Assembly, Cover Gasket
3	SPARE-25MUPT-FKIT8 (Float Kit)	Spares Consist of Float and Lever Assembly, Cover Gasket
4	SPARE-25MUPT-SFKIT4.5 (Mechanism Kit)	Spares Consist Of 4.5 Bar Seat, Float and Lever Assembly, Pivot Pin, Cover Gasket, Mech. Seat Gasket (Pack Of 1 Each), M4 Bolt (Pack Of 5)

5	SPARE-25MUPT-SFKIT8 (Mechanism Kit)	Spares Consist Of 8 Bar Seat, Float and Lever Assembly, Pivot Pin, Cover Gasket, Mech. Seat Gasket (Pack Of 1 Each), M4 Bolt (Pack Of 5)
6	SPARE-25MUPT-SLRKIT (SLR Kit)	Spares Consist of Gland Nut, SLR Stem, SLR Seat, SLR Seat Gasket, Cover Gasket (Pack Of 1 Each), Gland Packing (Pack Of 3)
7	SPARE-015FMSTR31-SGKIT (Strainer Kit)	Spare Consists Of: Screen & Strainer Cap Gasket Kit For [Pack Of 5 Each]
8	SPARE-25MUPT-PSSKIT (Plug Seal & Seat Kit)	Spares Consist of Bypass Seat, Top Plug Seal, Trap Seat, Trap Seat Gasket, Bottom Plug Seal (Pack Of 1), Hex Nut (Pack Of 3), Bypass Seat Gasket (Pack Of 2)
9	SPARE-25MUPT-ACTSKIT (Actuator Seal Kit)	Spares Consist of Plug Seals, Bypass Seat Gaskets, O-Ring, Stem Seals, Lip Seals, Retainer Assly, Belleville Washer (2), Hardware (Pack Of 1 Each)
10	SPARE-25MUPT-ACTPKIT (Actuator Piston Kit)	Spares Consists of Bypass Seat Gasket, Piston, Lip Seal, O-Ring, Hardware (Pack Of 1 Each)
11	SPARE-254050MUPT-INDKIT (Indicator Spare Kit)	Spares Consists of Indicator, Top Lid, O-Ring (Pack Of 1 Each)
12	SPARE-25MUPT-SPRGKIT (Actuator Spring Kit)	Spares Consists of Spring Kit

MuPT DN 40/50 Spare List		
Sr. No.	**Spare Codes**	**Spare Description**
1	SPARE-4050MUPT-GKIT (Gasket Kit)	Spare Consists of Cover Gasket, Mech. Seat Gasket (Pack Of 5 Each), Bypass Seat Gasket, Strainer Gasket (Pack Of 10 Each)
2	SPARE-4050MUPT-FKIT4.5 (Float Kit)	Spares Consist of Float and Lever Assembly, Cover Gasket
3	SPARE-4050MUPT-FKIT8 (Float Kit)	Spares Consist of Float and Lever Assembly, Cover Gasket
4	SPARE-4050MUPT-SFKIT4.5 (Mechanism Kit)	Spares Consist Of 4.5 Bar Seat, Float and Lever Assembly, Pivot Pin, Cover Gasket, Mech. Seat Gasket (Pack Of 1 Each), M4 Bolt (Pack Of 5)
5	SPARE-4050MUPT-SFKIT10 (Mechanism Kit)	Spares Consist Of 8 Bar Seat, Float and Lever Assembly, Pivot Pin, Cover Gasket, Mech. Seat Gasket (Pack Of 1 Each), M4 Bolt (Pack Of 5)
6	SPARE-4050MUPT-SLRKIT (SLR Kit)	Spares Consist of Gland Nut, SLR Stem, SLR Seat, SLR Seat Gasket, Cover Gasket (Pack Of 1 Each), Gland Packing (Pack Of 3)

7	SPARE-025FMSTR31-SGKIT (Strainer Kit)	Spare Consists Of: Screen & Strainer Cap Gasket Kit For [Pack Of 5 Each]
8	SPARE-4050MUPT-PSSKIT (Plug Seal & Seat Kit)	Spares Consist of Bypass Seat Gasket (Pack Of 2), Bypass Seat, Top Plug Seal, Trap Seat, Trap Seat Gasket, Bottom Plug Seal, Split Pin (Pack Of 1 Each), Hex Nut, Step Pin, Washer (Pack Of 3 Each)
9	SPARE-4050MUPT-ACTSKIT (Actuator Seal Kit)	Spares Consist of Plug Seals, Bypass Seat Gaskets, O-Ring, Stem Seals, Lip Seals, Retainer Assly, Belleville Washer (2), Hardware (Pack Of 1 Each)
10	SPARE-4050MUPT-ACTPKIT (Actuator Piston Kit)	Spares Consists of Bypass Seat Gasket, Piston, Lip Seal, O-Ring, Hardware (Pack Of 1 Each)
11	SPARE-254050MUPT-INDKIT (Indicator Spare Kit)	Spares Consists of Indicator, Top Lid, O-Ring (Pack Of 1 Each)
12	SPARE-4050MUPT-SPRGKIT (Actuator Spring Kit)	Spares Consists of Spring Kit

Electronics Spare List		
Sr. No.	**Spare Codes**	**Spare Description**
1	SPARE-MUPT-PCBKIT (Electronics Board Kit)	Spare Consist Of-PCB Kit (1), Mounting Hardware (3), Pack Of 1
2	SPARE-MUPT-LIDKIT (Housing Lid Kit)	Spare Consist Of-Plastic Lid (1), O-Ring (1), Pack Of 1
3	SPARE-MUPT-SEN1KIT (Sensor 1 Kit)	Spare Consist Of-Sensor 1 Assembly (1)-530 Mm, Sensor Mounting Gasket (1), Pack Of 1
4	SPARE-MUPT-SEN2KIT (Sensor 2 Kit)	Spare Consist Of-Sensor 2 Assembly (2)-630 Mm, Sensor Mounting Gasket (1) Pack Of 1
5	SPARE-MUPT-SOVKIT (Solenoid Kit)	Spare Consist Of- Solenoid Valve (1), Cable (1), Pg9 Gland (2), M20 Aramid Gasket (1), Hardware (2) Pack Of 1

How to order Spares: -

Always order spares by using description given in the column headed 'available spares' and state the size, type of trap and pressure range.

Example: 1 no. Mechanism Kit for DN 25 Multi-utility Process Trap – 4.5.

10. Warranty Period

As per ordering information and agreements in the contract.

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