



INSTALLATION AND MAINTENANCE INSTRUCTIONS

June 2017

**SAVE AND DISPLAY PROMINENTLY WHERE THIS EQUIPMENT IS BEING USED**

**W A R N I N G**

**HIGH PRESSURE AND HOT LIQUID SPRAYS CAN CAUSE SERIOUS BODILY INJURY**

**NEVER**

- Never allow children or unauthorized personnel to handle equipment.
- Never put your hand or fingers in front of nozzle.
- Never point nozzle at your body – or anyone else.
- Never leave washdown station unattended without releasing pressure.
- Never use mechanical means to hold trigger in open position.

**BEFORE  
spraying and during  
spraying**

**ALWAYS**

- Before pulling trigger hold nozzle firmly.
- Adopt a proper body stance to anticipate high recoil force by spray nozzle.
- Exercise care and caution when spraying.
- When spraying hot liquids avoid body contact with non-insulated parts of the nozzle.
- Wear protective clothing including heavy-duty insulated gloves, boots, aprons, and safety glasses.

**BEFORE removing nozzle - OR -  
attempting service or maintenance**

**ALWAYS**

- Shut off steam and water supplies.
- Discharge contents of hose and nozzle to eliminate pressure.
- Reference section 3.3 of the STVM® IMI for proper shutdown procedures.

- Follow the manufacturers recommendations for maximum pressures, periodic cleaning, maintenance and parts replacement procedures.
- Do not operate the equipment if there are any leaks from spray nozzle, fittings, or hoses. High pressure leaks can penetrate the skin causing serious injury

**STAY SAFE!**



## INSTALLATION AND MAINTENANCE INSTRUCTIONS

STVM-1

June 2017

# STVM<sup>®</sup> Washdown Station

## Safety Operation

### Installation and Maintenance Instructions

These instructions should be read by the Company Safety Officer

## 1. General

### WARNING

#### 1.1 Safety

This product must only be installed and commissioned by qualified personnel.

The washdown station includes a safety device called a thermal element located in the valve cartridge. This thermal element is designed to throttle steam flow once the set temperature is exceeded and will completely shut down at 15°F over the set temperature to limit the discharge of elevated water temperatures or steam in the event of a system fault. Always operate the washdown station as instructed on the warning notice sent out with the equipment; particularly regarding protective clothing. A warning notice must be displayed by the mixing valve.

#### QUALIFIED PERSONNEL

For the purposes of these operating instructions qualified personnel are persons who are experienced in the installation, commissioning and operation of this product and who are suitably qualified to perform their duties, e.g.

- Have received training or instruction in the maintenance and use of appropriate safety equipment according to current safety standards.
- Have received training in first-aid.

#### SAFETY TEST PROCEDURE

A safety check undertaken by qualified personnel must be carried out each time the unit is used.

The safety test and subsequent maintenance procedure ensures that live steam cannot be discharged from the nozzle, which would happen in the event of e.g. a seized cartridge.

Due to the possible presence of steam, please ensure due care and attention are observed when undertaking this task. Wear protective clothing, especially heavy-duty insulated gloves, boots, aprons and safety glasses.

Operate the unit as instructed in section 3 of this manual. Before pulling the trigger, hold the nozzle firmly in both hands and adopt a body position which will prevent loss of balance due to recoil from the hose nozzle.

Turn off the cold water with the globe valve on the washdown station, allowing only steam to enter the mixing valve. There should be no flow observed at the nozzle after a few seconds for remaining hot water to evacuate from the hose. If steam flow is detected during the test the unit must be taken out of service immediately. Please refer to section 4 on maintenance.

Following any maintenance to the valve, the above test must be repeated.

#### DANGER OF INJURY

Should you intend to use our products for new or not tested fluids or for applications not described in our product information please contact the Therm-Omega-Tech applications department or our local sales engineer for written advice prior to attempting such use.

In addition to the safety procedure mentioned above, all hose and nozzle assemblies are to be inspected for visual damage or wear. If damage occurs the hose and/or nozzle assemblies must be immediately replaced for safe working prior to operation.

The same constant vigilance should also be applied to the valve and its fittings and the washdown nozzle.

#### 1.2 Use

##### Design

The Therm-Omega-Tech steam / water mixing station is designed to provide hot water economically by blending steam and cold water quickly to the required user temperature. Adjusting the globe valves can attain this temperature.

##### Operation

The mixing valve employs a thermal element to modulate the steam valve. If the cold water supply stops the thermal element will close the steam valve.

##### Maintenance

Over time, scale may seize the cartridge and the valve must be maintained and cleaned regularly to prevent scale build up and ensure safe valve operation. Refer to section 4 for maintenance and cleaning instructions.

## Ancillaries

Each steam/ water mixing station is supplied with globe valves, check valves, interlocking ball valves, thermometer and a combined steam/water mixing valve with integral thermal element to shut off over-temperature water. It is recommended that 3/4", 20-mesh strainers are fitted upstream of the station on both the steam and water supply lines (see Fig. 1) to prevent damage to the valve cartridge.

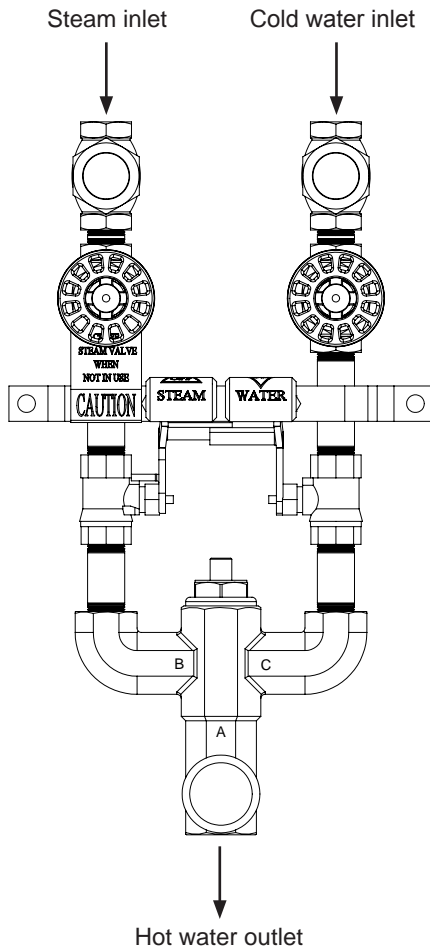


Fig. 1

## 1.3 Technical data

1.3.1 Steam Pressure: 150 PSIG maximum

1.3.2 Water pressure: 150 PSIG maximum

1.3.3 Steam pressure must be at least 10 PSI greater than water pressure

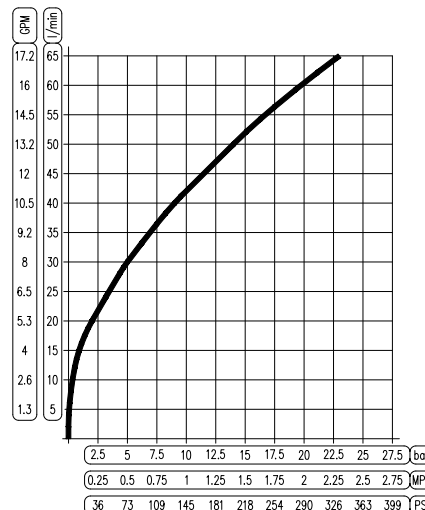
## Hose Specifications

Hose Color	<b>Black</b>
Tube	EPDM
Reinforcement	Wire, 1 braid
Cover	EPDM
Working Pressure	200 PSIG
Temperature Range	+388°F
Nominal I.D.	3/4" (19.1 mm)
Nominal O.D.	1-3/16" (30.2 mm)
Approximate weight	40 lb. (18.2 Kg.)
Hose available in 25 ft., 50 ft., 75 ft. and 100 ft. lengths.	

## Nozzle Specifications

Maximum Pressure	350 PSI
Maximum Flow	16 GPM
Maximum Temperature	195°F (90.6°C)
Inlet Port	1/2" BSP-F
Dimensions	9.75"x6.75"
Materials	Brass, Buna-N, Plastic
Nozzle	Variable 0°-60°, Built-in
Weight	2 lbs.

## Nozzle Flow Rate - Pressure



## 2. Installation

### 2.1 General

The steam/water-mixing unit should be carefully unpacked and the contents checked against the packing list. The installation should be completed so as to comply with all local and/or national laws pertaining to this type of appliance. Laws in some areas prohibit the use of this equipment directly off the main water supply line.

### 2.2 Mounting

The factory recommends mounting the unit vertically using the supplied wall-mount bracket. If other mounting hardware is used both the water and steam lines should be rigidly supported. The unit should be mounted so ample room is available for adjusting of the globe valves and for servicing the mixing valve and valve cartridge.

### 2.3 Piping

Pipe work should be assembled with a suitable thread sealing medium.

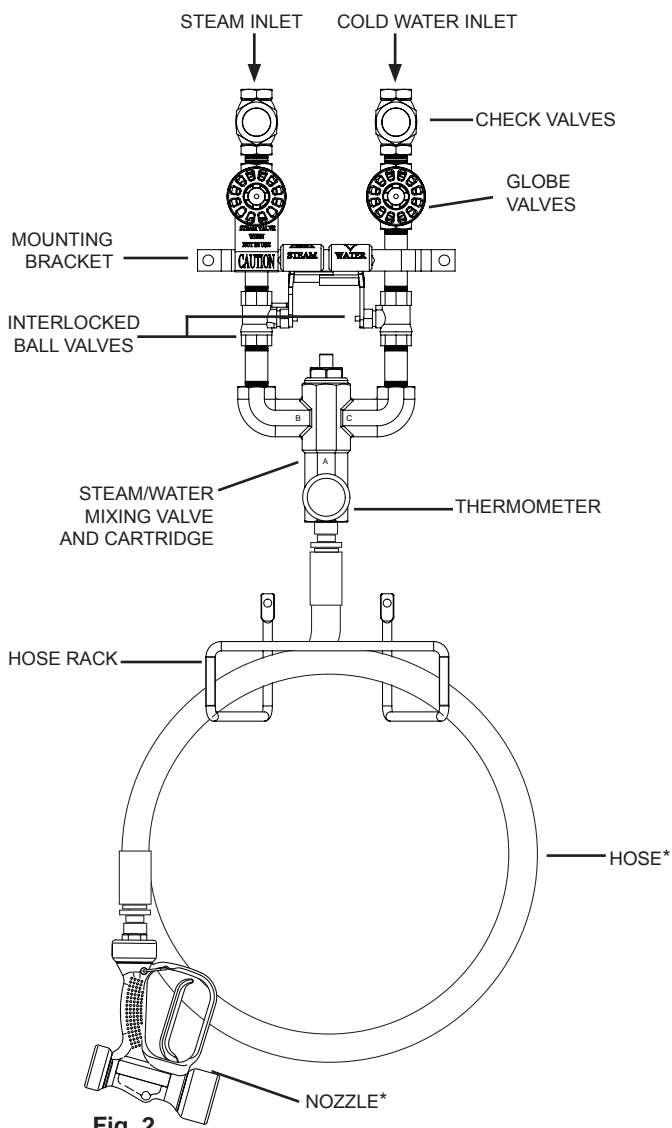
**Steam Supply-** Steam supply pipe work should be sized according to standard practice. It is recommended to install a steam trap to prevent excessive condensate backup and ensure faster start up.

**Water Supply-** Cold water supply pipe work should take into account pressure, pipe length and acceptable pressure drop. For outdoor applications or where the unit is susceptible to freezing, precautions should be taken such as heat tracing or draining after each use.

**\*Note:** It is recommended that the supply lines contain shut-off valves that isolate the unit to facilitate maintenance.

### 2.4 Hose and Nozzle

Hose fittings should be assembled with a suitable thread sealing medium. Using appropriate wrenches, disconnect the dead swivel from the hose, and screw the swivel into the outlet of the washdown unit and then reassemble the hose onto the swivel. The hose may then be coiled onto the hose rack (if used) for storage. Attach the spray nozzle to the swivel at the other end of the hose. All hose and nozzle thread connections should be tightened to 37 ft-lbs.



\*SUPPLIED SEPARATELY

### 3. Operation

#### 3.1 Start-up Procedures

Follow the safety test procedure in section 1. If the unit passes this test it is ready for normal operation. Do not point the spray nozzle at your body or anybody else, and hold with protective gloves. Before pulling the trigger hold the spray nozzle firmly in both hands and adopt a body position which will prevent loss of balance due to recoil from the washdown nozzle. Open water side ball valve by pulling downward. Then open the steam side ball valve by pulling handle downward.

#### 3.2 Setting Temperature

After verifying proper over temperature shutdown (reference Safety Test Procedures under section 1) the unit can be adjusted to the desired operating temperature. The temperature can be adjusted as follows:

- Turn both globe valve handles fully clockwise (off).
- Open both interlocked ball valves by pulling handles downward.
- Pull the trigger on the nozzle, and start to turn the water globe valve handle counter-clockwise until the desired flow is achieved.
- Slowly turn the steam globe valve handle counter-clockwise until the desired temperature is reached or it is fully opened.
- To increase temperature, slowly turn the water globe valve handle clockwise until the desired temperature is reached.

Note: The thermal element within the cartridge assembly is designed to begin throttling steam flow if the set temperature is exceeded and should be shut off if the temperature rise is 15°F above the set point. The set point temperature is engraved on top of the cartridge hex cap.

#### 3.3 Important Safety Shut Down Procedure

The washdown unit should never be left unattended with the ball valves in the open position. The proper shutdown procedure is as follows:

##### STVM®-iLoc

- While pulling the trigger, push the “steam” ball valve handle upward, leaving the “water” ball valve handle in a downward position.
- Allow unit to run on water only for a short time to allow the unit to cool (approximately 30 seconds).
- Push the “water” handle upwards to shut the water off until flow stops.

#### 3.4 Trouble shooting

Before investigating further it is always advisable to check the following. Ensure that the steam and water supplies are turned on and have proper running condition pressures. Steam pressure must be at least 10 psi greater than water pressure. The fitting of pressure gauges prior to the washdown station will show whether the expected supply pressures are reaching the mixing valve.

The following **Cartridge Test & Inspection Procedure** is a useful source in determining the operating health of the washdown station and is referenced several times throughout this troubleshooting guide. Please familiarize yourself with this procedure thoroughly before committing any maintenance practices.

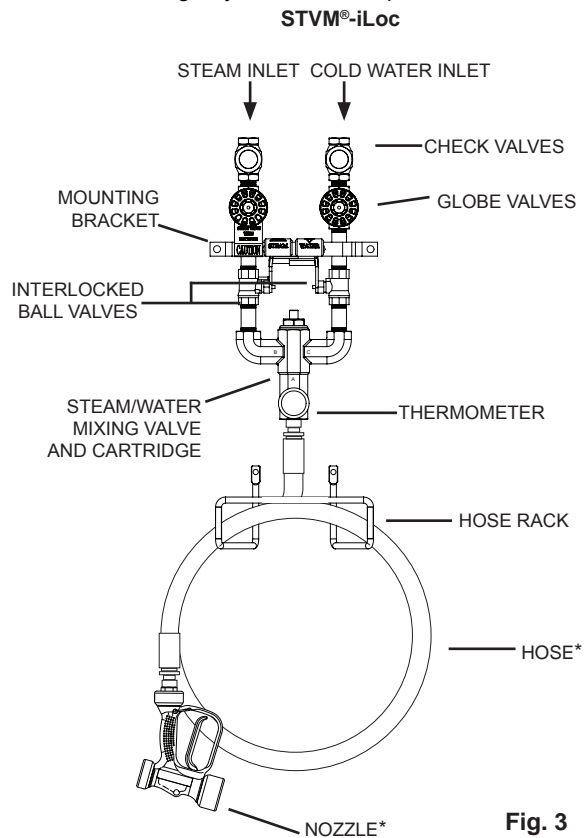


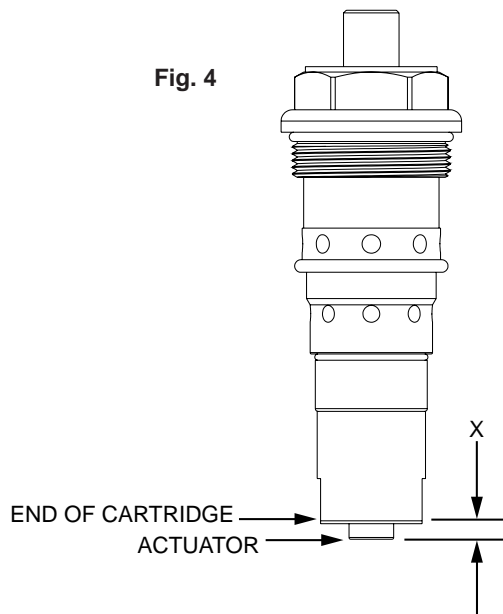
Fig. 3

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## CARTRIDGE TEST & INSPECTION PROCEDURE:

First follow Shut Down procedure as specified in section 3.3. Then perform the instructions as follows:

- a) Disassemble the cartridge assembly from the valve body as specified in section 4.3.2.
- b) At room temperature, measure the distance from the end of the actuator to the end of the cartridge using a dial caliper or a depth gage. This is shown as dimension "X" in figure 4. Note this dimension.
- c) Using caution and wearing appropriate PPE, immerse the cartridge in a bath of boiling water making sure the actuator at the outlet end of the cartridge is fully immersed for a period of at least one minute.
- d) Remove the cartridge from the bath and, within one minute, re-measure distance X. Compare this dimension to the dimension taken before placing the cartridge in the bath.
  - The actuator should have moved about  $\frac{1}{4}$ " for 150°F cartridges and about .220" for 185°F cartridges. If it moves less than specified, or no movement is noted, it is likely that mineral deposits have seized the internal spool in place. Follow Cleaning Procedure, section 4.3.
- e) If assembly operates normally, inspect valve body seal and replace if necessary (reference section 4.3.4). Reinstall cartridge assembly as specified in section 4.3.5. Follow Installation and Operation procedures as specified in sections 2 and 3.



## 4. Maintenance

### 4.1 Safety

#### 4.1.1 Components

The mixing valve must always be operated with a valve cartridge properly assembled to the valve body. Serious bodily harm or injury can occur in the event that the washdown station is used without the cartridge properly installed. Additionally, the cartridge is designed to remain intact and must not be modified or taken apart for any reason. Replacement cartridge assemblies can be purchased from Therm-Omega-Tech. Therm-Omega-Tech will not accept any consequential liability for the operation of the washdown station if these precautions are not observed.

Before and after operation of the washdown station, the hose and washdown nozzle should be inspected for any sign of wear or damage. The washdown station should form part of a regular maintenance program, appropriate to the operating conditions and environment.

#### 4.1.2 Pressure

Before attempting any maintenance of any component of the Steam/Water Mixing Station consider what is or may have been in the pipeline. Ensure that any pressure is isolated and safely vented to atmospheric pressure before attempting to maintain any component, eg. mixing valve, hose etc. It is highly recommended that a lock out-tag out procedure be implemented for this process. Discharge contents of hose and station by pulling nozzle trigger and eliminate pressure until water flow stops. Do not assume that the system is depressurized even when a pressure gauge indicates zero.

#### 4.1.3 Temperature

For personal protection wear protective clothing, especially heavy-duty insulated gloves, boots, aprons, and safety glasses. To prevent burn hazards it is recommended to insulate all components of the steam supply side of the washdown station as well as the mixing valve.

#### 4.1.4 Disposal

This product is recyclable. No ecological hazard is anticipated with disposal of this product providing due care is taken.

### 4.2 Importance of Cleaning

Over time, any steam and water mixing valve may foul or seize due to the buildup of mineral deposits. The time between seizures depends on the level of mineral deposits in your water and the frequency of use. The valve cartridge assembly has been designed to resist mineral buildup through the scouring effect of its unique Vortex design. It has also been designed for easy maintenance and cleaning when the effects of mineral deposits limit the valves ability to operate at peak performance. To service the mixing valve and keep it in peak operating condition, assign this product to your Preventative Maintenance program and perform the cleaning procedure as outlined in section 4.3.

### 4.3 Cleaning Procedure

Cleaning should only be carried out by suitably qualified personnel.

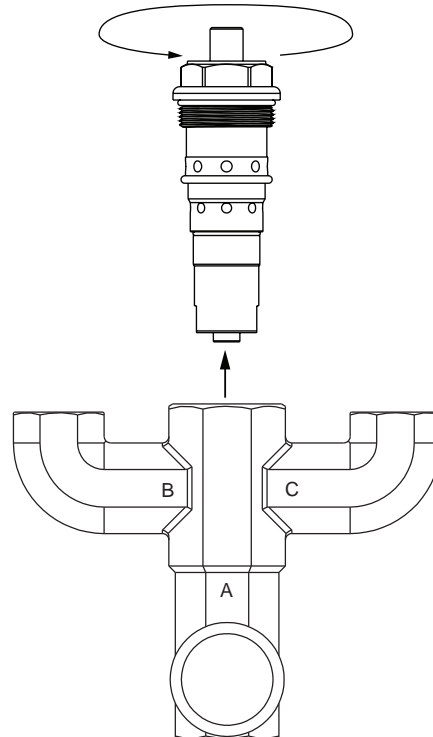
#### 4.3.1 Isolate Mixing Valve

- While pulling the nozzle trigger, turn off all steam valves leading to the washdown station. Begin with the valve closest to the steam main and ending with the steam ball valve handle on the washdown station interlocked handles.
- Allow unit to run for a short period of time with water so as to cool the mixing valve (approx. 30 seconds).
- Pull the water ball valve handle fully closed.
- Continue holding the trigger to discharge the contents and vent the pressure from within the hose and unit until the water flow stops.
- Once the mixing valve has been isolated from the steam and water supplies, perform a lock out-tag out procedure to prevent unintentional use of the station during this maintenance procedure.

#### 4.3.2 Cartridge Disassembly

Using a 1 1/2" open-ended wrench, unscrew the cartridge from the mixing valve body in a counter-clockwise direction. Reference figure 5.

Fig. 5 Rotate Counter Clockwise to Disassemble





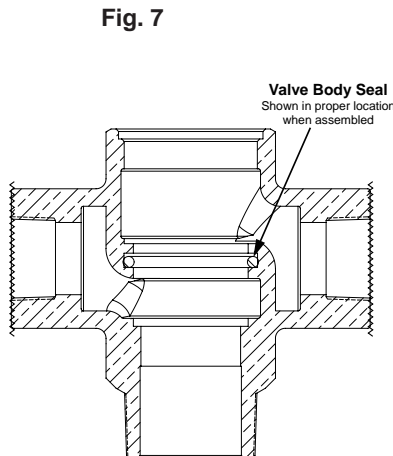
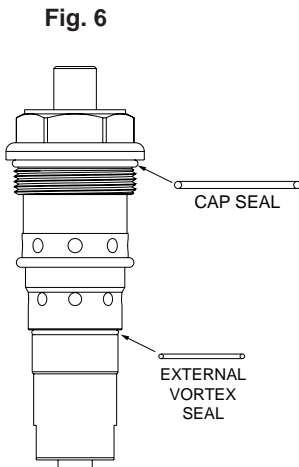
### 4.3.3 Acid Wash

Clean the cartridge by soaking it in a weak acid solution. Agitating the acid solution will enhance the cleaning effect. A 5% solution is a safe and effective choice. The amount of soak time depends on the amount of mineral buildup. When cleaned frequently, use a 5% oxalic acid solution. Flush the cartridge to purge any remaining acid. Clean at regular intervals. When using acids, follow the manufacturers safety precautions, handling instructions, and MSDS sheets.

*Note:* Seized cartridges are the result of mineral deposits hard fastened to the internal components of the cartridge. Such mineral build-up cannot be seen and only the cleaning instructions detailed in this section may be used to remove said mineral deposits. Under no circumstance should the cartridge be modified or taken apart for any reason. Therm-Omega-Tech will not accept any consequential liability for the operation of the washdown station if this precaution is not observed. If mineral deposits are observed on the exterior surfaces of the cartridge, use a stiff non-metallic brush to remove any heavy, stubborn or visible mineral buildup, taking care not to damage seals. Metal scrapers should not be used as this may cause permanent damage to the components.

### 4.3.4 Seal Inspection

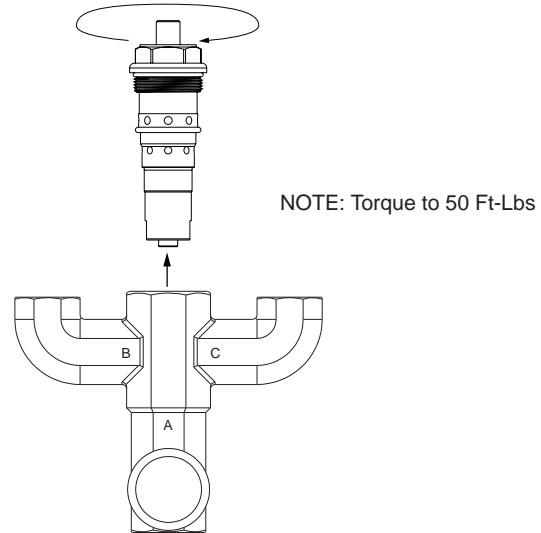
Additionally, visually inspect the condition of the cap seal and external Vortex seal on the cartridge. Visually inspect the valve body seal. Renew the seals if there is any evidence of wear or damage. Replacement seals can be purchased from Therm-Omega-Tech. Reference figure 6 for the location of the cartridge seals, and figure 7 for the location of the valve body seal. The cap seal can be easily removed by rolling or slipping it off of the cartridge. The external Vortex seal is more difficult to remove, and may be detached by cutting it off with a sharp knife. Secure new seals by rolling or slipping them in place. Remove the valve body seal via use of a pointed tool such as an awl. Take care not to scratch the machined surface of the seal groove. Replacement of the valve body seal is easily accomplished with your fingers. No tools are required. All seals should be coated with a lubricant such as Krytox® or other EPDM compatible type.



### 4.3.5 Cartridge Re-assembly

Using 1 1/2" open-ended wrench, screw the cartridge into the mixing valve body in a clockwise direction. Tighten to 50 ft-lbs. Reference figure 8.

Fig. 8 Rotate Clockwise to Disassemble



### 4.3.6 Re-Test

Follow installation and operation instructions, sections 2 and 3.

If the valve does not operate properly decommission the unit and call Therm-Omega-Tech for a replacement cartridge.

### 4.4 Cartridge Replacement Kit

Cartridge replacement should only be carried out by suitably qualified persons.

The cartridge replacement kit includes the cartridge assembly and a separate valve body seal. Prior to placing the replacement cartridge in the mixing body, perform the following functions

- Follow instructions for isolating the mixing valve as specified in section 4.3.1.
- Follow instructions for disassembly of the cartridge from the mixing valve body as specified in section 4.3.2.
- Ensure that the cap seal and external Vortex seal are present on the new cartridge.
- Remove the valve body seal via use of a pointed tool such as an awl. Take care not to scratch the machined surface of the seal groove. Install the new valve body seal.
- Follow instructions for reassembly of the cartridge to the mixing valve body as specified in section 4.3.5.
- Follow operation instructions as described in section 3.
- If the valve does not operate properly, decommission the unit and call Therm-Omega-Tech for technical assistance.



## 4.5 Hose & Nozzle

Prior to replacing or servicing hose, nozzle and or hose couplings, follow instructions in section 4.3.1 for isolating the mixing valve and all other safety precautions as specified in this manual.

### 4.5.1 Hose

The hose should be inspected before use for evidence of wear. If there are breaks, cracks, abrasions or cuts in the outer cover whereas the reinforcement layer can be seen, the hose must be replaced immediately. In any case hoses should be replaced after 12 months of service. This is due to the natural degradation of rubber under hot water working conditions.

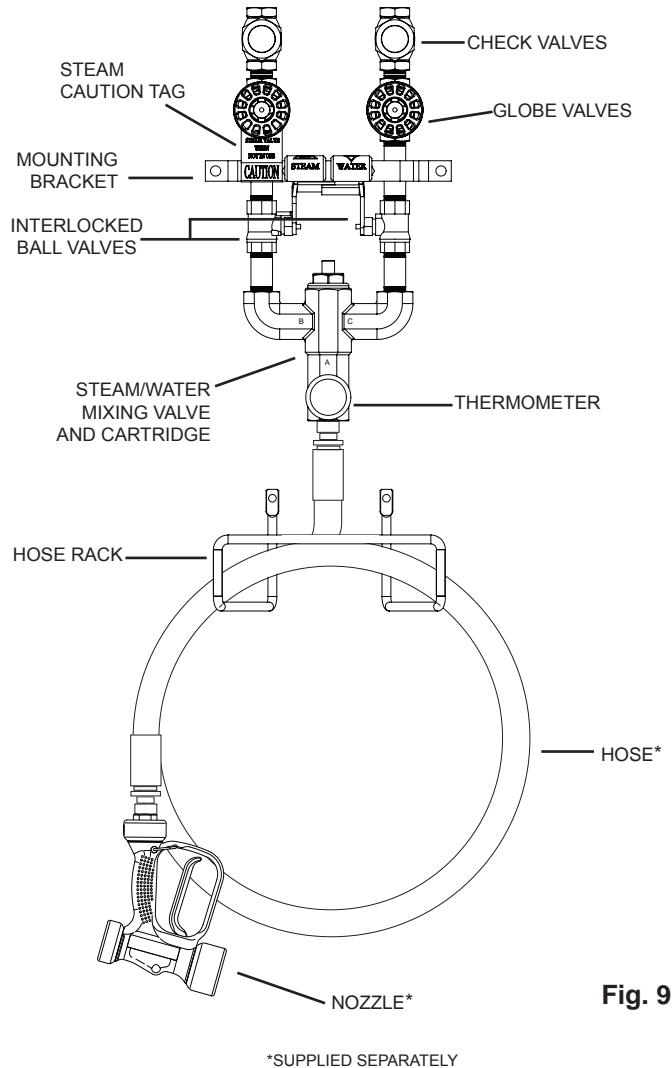
### 4.5.2 Nozzle

The same policy should be followed for the nozzle. A leaking nozzle should be repaired or replaced immediately. Refer to the instructions supplied with the nozzle on how to maintain and disassemble.

## 5. Spare Parts

All parts shown in figure 9 are replaceable items and can be purchased from Therm-Omega-Tech.

*Please see list on the following page.*



**Fig. 9**

## TROUBLE SHOOTING

Leak at valve cartridge	Follow isolation procedure as specified in section 4.3.1. Replace cap o-ring on valve cartridge as specified in section 4.3.4. Reinstall cartridge assembly as specified in section 4.3.5. Follow Installation and Operation procedures as specified in sections 2 and 3.
Nozzle delivers cold water only	Make sure steam supply valves are open and normal steam pressure is available. If still no hot water is flowing, follow isolation procedure as specified in section 4.3.1. Perform Cartridge Test & Inspection Procedure above. If mineral buildup is present, follow cleaning procedure, section 4.3. Repeat Cartridge Test & Inspection procedure. Follow Installation and Operation procedures as specified in sections 2 and 3.
Steam escapes from hose nozzle	Make sure cold water supply is on and normal water pressure is available. If steam still exits from nozzle, follow isolation procedure as specified in section 4.3.1. Perform the cleaning procedure as specified in section 4.3. Next follow Cartridge Test & Inspection Procedure. If the valve still does not operate properly, decommission the unit and call Therm-Omega-Tech for a replacement cartridge. When the replacement cartridge is received, follow instructions for Cartridge Replacement, section 4.4.
Hot water outlet temp too high	First check to make sure water supply is on and normal water pressure is available. Check for normal steam supply pressure. Note: steam pressure should normally be 10 to 50 PSI higher than water pressure. If water and steam supply are normal, turn off the globe valves by rotating the handle clockwise. Pull nozzle trigger several times to allow cold water to flow. Turn on the globe valves by rotating them counter clockwise. If outlet water temperature is still too high, follow cleaning procedure, section 4.3. Next follow Cartridge Test & Inspection Procedure. If outlet temperature is still too high, follow instructions for Cartridge Replacement, section 4.4.
Hot water outlet temp too low	First make sure steam supply valves are open and proper steam pressure is available. Steam pressure must be at least 10 psi greater than water pressure. If steam supply is normal, follow cleaning procedure, section 4.3. Next follow cartridge test & inspection procedure. If outlet temperature is still too low, follow instructions for cartridge replacement, section 4.4.
Outlet pressure is too low or non-existent	<ul style="list-style-type: none"> <li>• Ensure all steam and water valves leading to and including the washdown station are fully open. Re-adjust globe valves to desired temperature and check pressure again.</li> <li>• Check temperature rating on top of mixing valve cartridge and compare to actual operating temperature on the thermometer. The washdown station will begin to modulate closed once the set temperature is exceeded and will completely shut down at 15°F over the set temperature. If operating temperature exceeds set temperature, adjust operating temperature via use of the globe valves.</li> <li>• Follow Shut Down procedure as specified in section 3.3 and check supply lines, strainers, etc. for blockage.</li> <li>• Valve cartridge may need to be inspected or cleaned. Follow Maintenance instructions, section 4.</li> </ul>
Hose and/or nozzle is leaking or damaged	Immediately decommission washdown station and replace hose and/or nozzle with properly rated factory replacement components. Reference Hose and Nozzle instructions, section 2.4.
Fittings on washdown station are leaking	<ul style="list-style-type: none"> <li>• Decommission washdown station and repair leaks at fittings.</li> <li>• Contact Therm-Omega-Tech applications department or our local sales engineer for advice prior to attempting repair.</li> </ul>

**NOTES:** \_\_\_\_\_

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## **STVM® WASHDOWN STATION SPARE PARTS LIST**

<b>Description</b>	<b>Part Number</b>
¾" STVM® Washdown Station (150°F) with Interlocking Ball Valves	377-111000-150
¾" STVM® Washdown Station (185°F) with Interlocking Ball Valves	377-111000-185
¾" STVM® SS Washdown Station (150°F) with Interlocking Ball Valves	377-111100-150
¾" STVM® SS Washdown Station (185°F) with Interlocking Ball Valves	377-111100-185
Valve Cartridge Assembly (150°F)	374-010000-150
Valve Cartridge Assembly (185°F)	374-010000-185
Valve SS Cartridge Assembly (150°F)	374-011000-150
Valve SS Cartridge Assembly (185°F)	374-011000-185
25ft Black Steam Rated Hose Assembly	940-000000-025
50ft Black Steam Rated Hose Assembly	940-000000-050
75ft Black Steam Rated Hose Assembly	940-000000-075
25ft White Steam Rated Creamery Hose Assembly	940-110130-025
50ft White Steam Rated Creamery Hose Assembly	940-110130-050
75ft White Steam Rated Creamery Hose Assembly	940-110130-075
Mixing Valve/Cartridge Seals	941-001300-000
Wall Mount Bracket Kit, Stainless Steel	941-010100-000
STVM® Blue Spray Nozzle w/Swivel	941-410110-000
¾" Bronze Globe Valve	92-030
¾" Bronze Lift Check Valve	92-031
1¼"x¾"x¼" Bronze Tee	92-080
Stainless Steel Hose Rack	94-129
STEAM CAUTION Tag	94-154
Temperature Gauge (50-300°F)	94-210



353 IVYLAND RD. WARMINSTER, PA 18974-2205  
Phone 1-877-379-8258 • 215-674-9992  
Email: valves@thermomegatech.com  
www.ThermOmegaTech.com