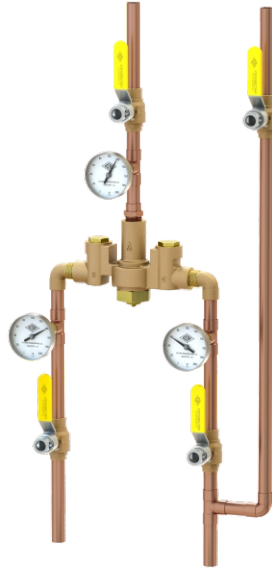




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**UNITED STATES OF AMERICA**  
[WWW.ACORNENG.COM](http://WWW.ACORNENG.COM)

## **INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS**

### **SFST THERMOSTATIC MIXING VALVE SUPPLY FIXTURE**



Patent #9,898,017



**Model SFST Series**

**FOR TECHNICAL ASSISTANCE**

**1.800.743.8259**

**fieldservice@acorneng.com**

#### **NOTES TO THE INSTALLER:**

- 1. Please leave this documentation with the owner of the fixture when finished.**
- 2. Please read this entire booklet before beginning the installation.**
- 3. Check your installation for compliance with plumbing and other applicable codes.**

#### **LIMITED WARRANTY** **UNITED STATES AND CANADA**

Acorn Controls warrants that its products are free from defects in material or workmanship under normal use and service for a period of one year from date of shipment. Acorn's liability under this warranty shall be discharged solely by replacement or repair of defective material, provided Acorn is notified in writing within one year from date of shipment, F.O.B. Industry, California.

This warranty does not cover installation or labor charges and does not apply to materials, which have been damaged by other causes such as mishandling or improper care or abnormal use. The repair or replacement of the defective materials shall constitute the sole remedy of the Buyer and the sole remedy of Acorn under this warranty. Acorn shall not be liable under any circumstances for incidental, consequential or direct charges caused by defects in materials, or any delay in the repair or replacement thereof. This warranty is in lieu of all other warranties expressed or implied. Product maintenance instructions are issued with each unit and disregard or non-compliance with these instructions will constitute an abnormal use condition and void the warranty.



**WARNING:**

You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

**FAILURE TO READ AND FOLLOW PROPER INSTALLATION AND MAINTENANCE INSTRUCTIONS MAY RESULT IN PRODUCT FAILURE WHICH CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY AND/OR DEATH.**

Acorn Controls is not responsible for damages resulting from improper installation and/or maintenance. Installation of this valve shall be in accordance with **Uniform Plumbing Code**.

**TO ENSURE ACCURATE AND RELIABLE OPERATION OF THIS PRODUCT, IT IS ESSENTIAL TO:**

- Properly design the system to minimize pressure and temperature variations.
- Implement an annual maintenance program to ensure proper operation and temperature setting of valve(s).
- This valve is factory preset. However, it can be adjusted. It is the responsibility of the installer and or facility maintenance personnel to make sure valve outlet temperature does not exceed 115°F (46°C) after installation, maintenance or repair.

**SUPPLIES REQUIRED:**

(Not provided by Acorn)

1. Wall anchors, screws nuts and washers as required.
2. Lead free solder and flux for sealing water connections.
3. Pipe fittings.
4. 5/8" wrench and 1/8" Allen wrench.



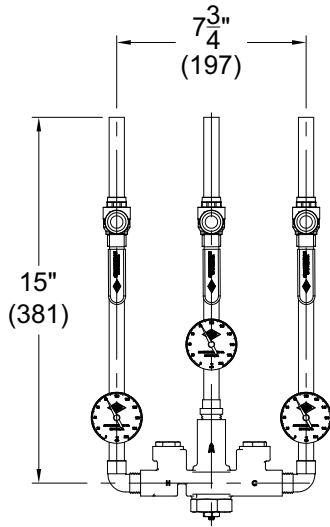
**IMPORTANT**

- Flush supply lines of all foreign material such as pipe dope, chips or solder prior to connecting to mixing valve.
- To ensure proper installation, review the Manual thoroughly to verify rough-ins before beginning any work.
- Installation and field adjustment are the responsibility of the installer.
- Maximum water pressure is 125 psi (8.62 bars). Maximum inlet hot water temperature is 180°F (82°C). Temperature adjustment range\* is 90°C-115°F (32°C-46°C). Valve assembly must be drained prior to being subjected to freezing temperatures. Valve includes integral check valves.

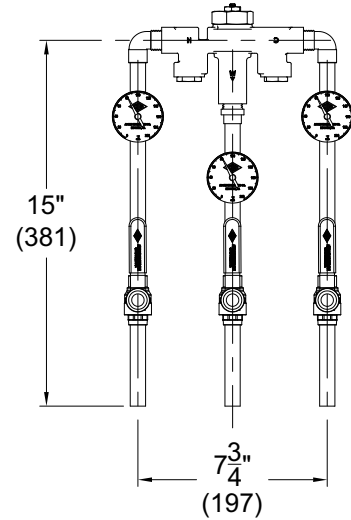
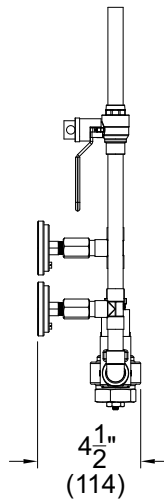
*\*In accordance with ASSE 1070 and ASSE 1069*

PRESSURE DROP PSID (kPa)	Cv	5 (34)	10 (69)	15 (103)	20 (138)	30 (207)	45 (310)	60 (414)
FLOW RATE GPM (LPM)	1.8	4 (15)	5.7 (21.4)	7 (26.2)	8 (30.2)	9.8 (37)	12 (45.4)	13.8 (52.4)

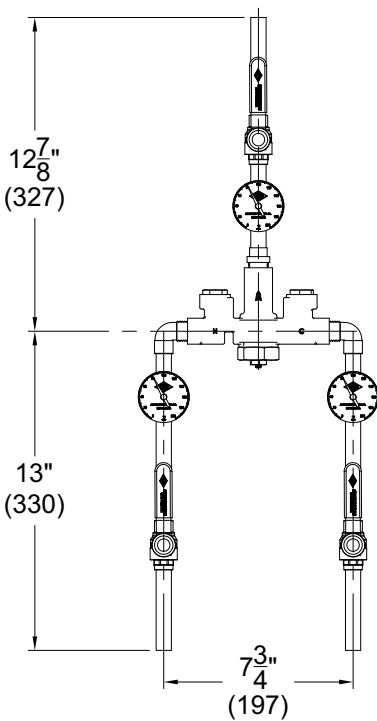
**ROUGH-IN DIMENSIONS:**



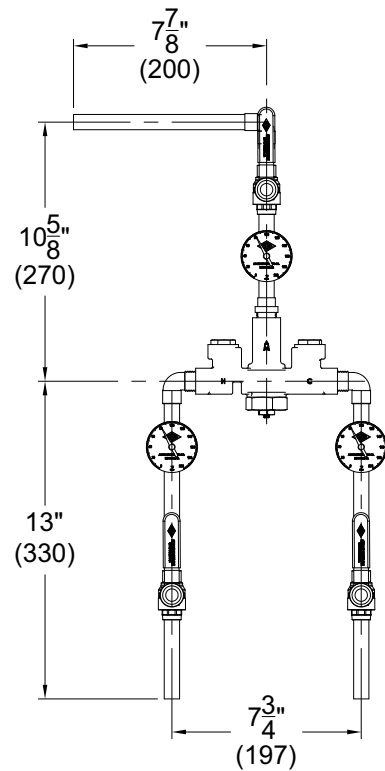
**SFST-T-OT-ITG**



**SFST-B-OB-ITG**



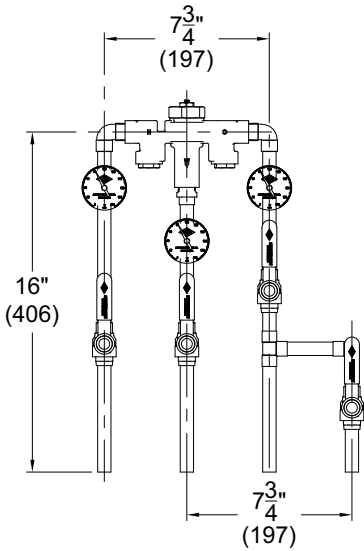
**SFST-B-OT-ITG**



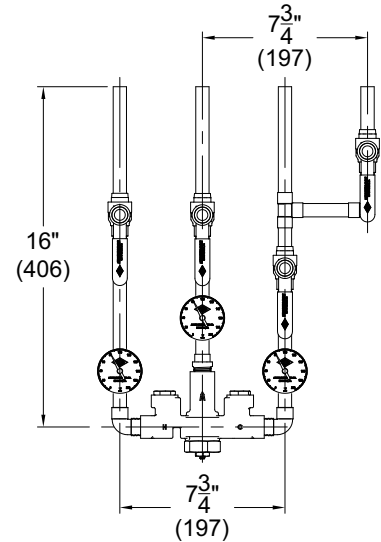
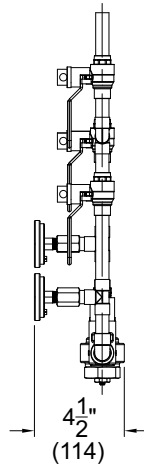
**SFST-B-OSL-ITG**

**NOTE:**  
ALL DIMENSIONS ARE IN INCHES (MM).

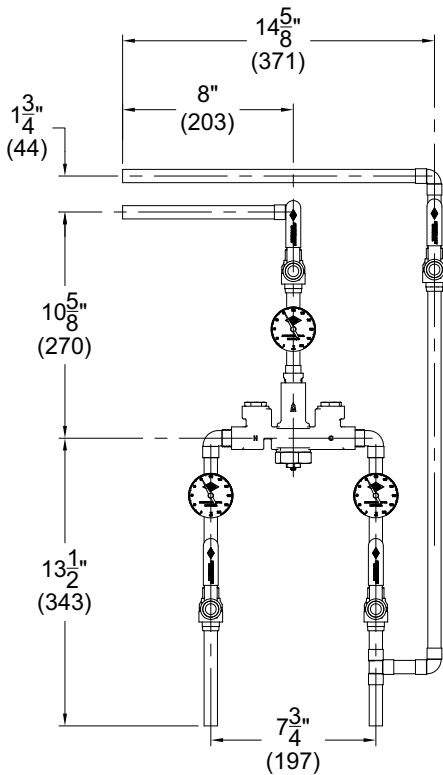
**ROUGH-IN DIMENSIONS:**



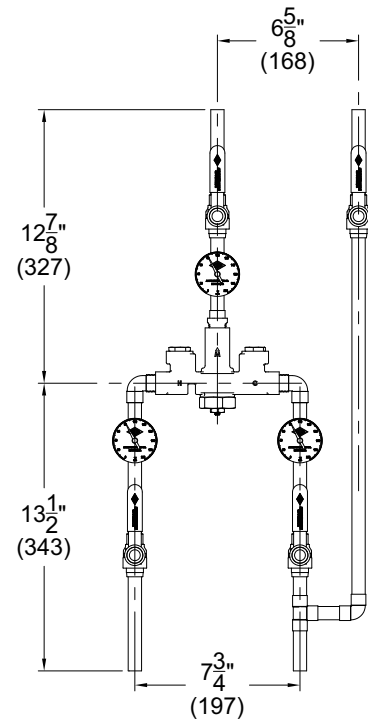
SFST-B-OB-CWB-ITG



SFST-T-OT-CWB-ITG



SFST-B-OSL-CWB-ITG



SFST-B-OT-CWB-ITG

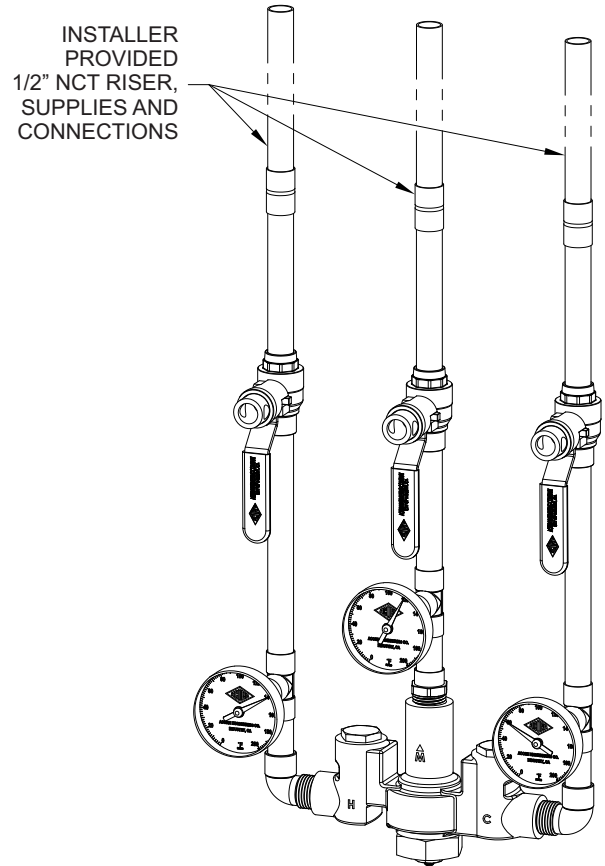
**NOTE:**  
ALL DIMENSIONS ARE IN INCHES (MM).

## INSTALLATION:

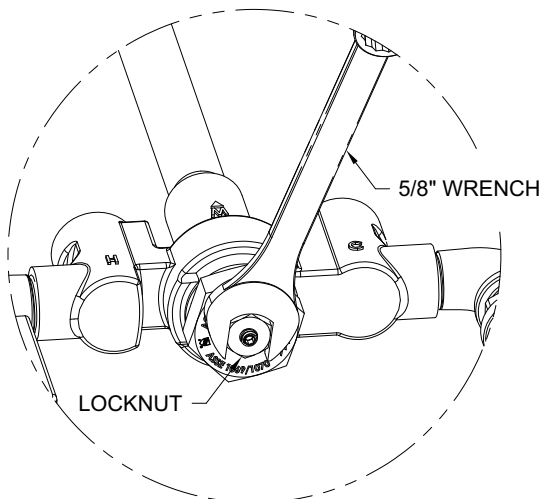
1. Locate mixing valve fixture in a suitable place accessible for servicing and adjusting. Valve fixture should be as close as possible to point of use.
2. Thoroughly flush supplies.
3. Connect Hot and Cold supplies to mixing valve inlets and outlet to fixture(s). Valve fixture connections are 1/2" NCT, for supply lines by others.
4. Turn on supplies and inspect for leaks. Tighten connections if leak(s) are detected.
5. Turn on fixture and allow to run until water temperature stabilizes. Measure water temperature. If water is not at desired temperature adjust as needed, (refer to adjustment section below). Maximum recommended outlet temperature is 115°F (46°C).

## TEMPERATURE ADJUSTMENT:

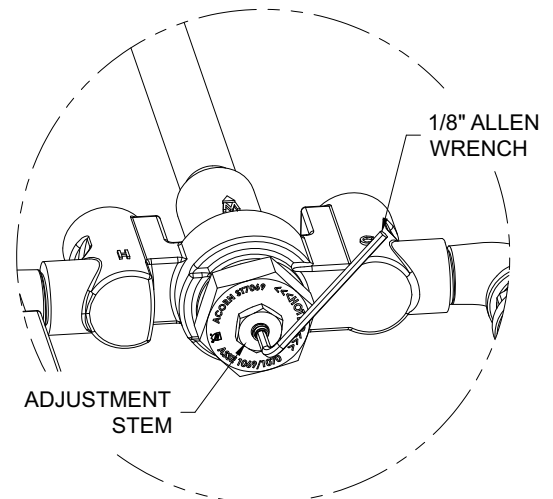
1. Loosen locknut. *Detail A*
2. Turn on fixture so temperature can stabilize.
3. Using 1/4" allen wrench turn adjustment stem counter-clockwise for hotter or clockwise for colder outlet temperature. *Detail B*
4. Tighten locknut to prevent any unauthorized or accidental temperature adjustment.
5. Re-check temperature.



TYPICAL INSTALLATION

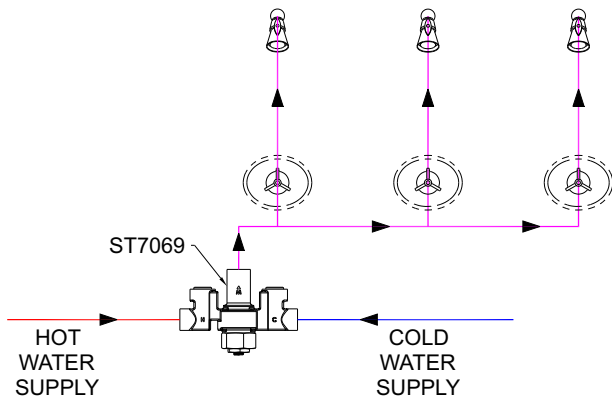


DETAIL A

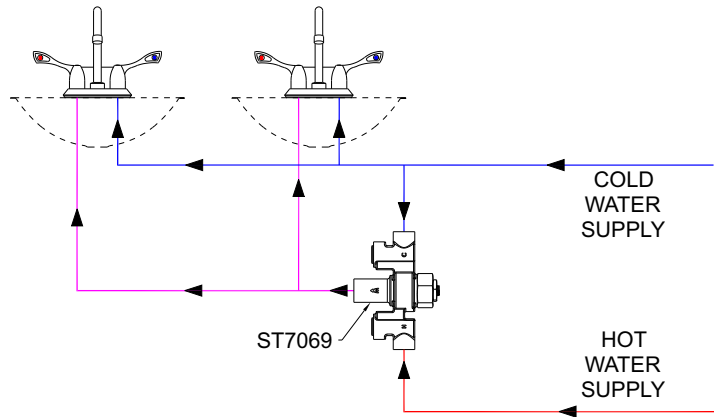


DETAIL B

**PIPING DETAILS:**



TYPICAL 1069 APPLICATION PIPING DETAIL



TYPICAL 1070 APPLICATION PIPING DETAIL

**Valve Specifications:**

- Maximum Operating Pressure: ..... 125 PSI (862 kPa)
- Maximum Hot Water Supply Temp: ..... 180°F (82°C)
- Minimum Hot Water Supply Temp.\*\*: ..... 10° F (6° C)  
Above Set Point
- Outlet Temp. Range\*: ..... 90°F-115°F (32°C-46°C)
- Flow Rate: ..... 12 GPM (45 LPM) @ 45 PSI (310 kPa)  
Differential
- Minimum Flow\*: ..... 0.5 GPM (1.9 LPM)

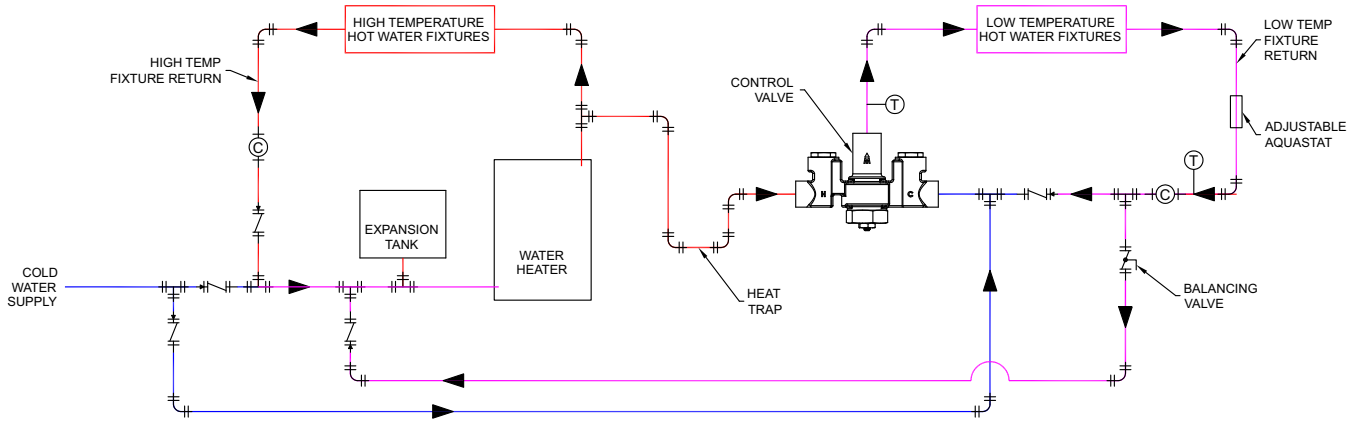
**TROUBLESHOOTING:**

\*In accordance with ASSE 1070 and ASSE 1069  
\*\*Inlet Supply Pressure Variation Up to 20%

PROBLEM	CAUSE	SOLUTION
1. SET POINT DIFFICULT TO SET OR CANNOT BE REACHED	<ul style="list-style-type: none"> <li>• SUPPLY TEMPS NOT WITHIN SPECIFIED LIMITS</li> <li>• HOT AND COLD SUPPLIES ARE REVERSED</li> </ul>	<ul style="list-style-type: none"> <li>• CHECK DIFFERENTIAL TEMPERATURE BETWEEN SUPPLIES AND OUTLET</li> <li>• REINSTALL VALVE WITH SUPPLIES CONNECTED TO MARKED INLETS</li> </ul>
2. DOES NOT MAINTAIN OUTLET TEMPERATURE OR CHANGES OVER TIME	<ul style="list-style-type: none"> <li>• FLUCTUATION IN SUPPLY PRESSURES</li> <li>• CHECK VALVE/FILTERS BLOCKED WITH DEBRIS</li> </ul>	<ul style="list-style-type: none"> <li>• CHECK DIFFERENTIAL TEMPERATURE BETWEEN SUPPLIES AND OUTLET</li> <li>• CLEAN CHECK VALVES/FILTERS</li> </ul>
3. DISCHARGE TEMPERATURE TOO HOT OR TOO COLD	<ul style="list-style-type: none"> <li>• VALVE NOT ADJUSTED PROPERLY</li> </ul>	<ul style="list-style-type: none"> <li>• READJUST VALVE TEMPERATURE PER INSTALLATION INSTRUCTIONS</li> </ul>
4. CROSS FLOW	<ul style="list-style-type: none"> <li>• CHECK VALVES FOULED</li> </ul>	<ul style="list-style-type: none"> <li>• CLEAN CHECK VALVES/FILTERS</li> </ul>
5. NO FLOW FROM VALVE	<ul style="list-style-type: none"> <li>• HOT OR COLD SUPPLY FAILURE OR SHUTOFFS CLOSED</li> <li>• CHECK VALVE/FILTERS BLOCKED WITH DEBRIS</li> </ul>	<ul style="list-style-type: none"> <li>• OPEN SHUTOFFS OR RESTORE HOT AND COLD SUPPLIES</li> <li>• CLEAN CHECK VALVES AND FILTERS</li> </ul>

**RECIRCULATING PIPING DIAGRAM:**

TYPICAL RECIRCULATION WITH AQUASTAT

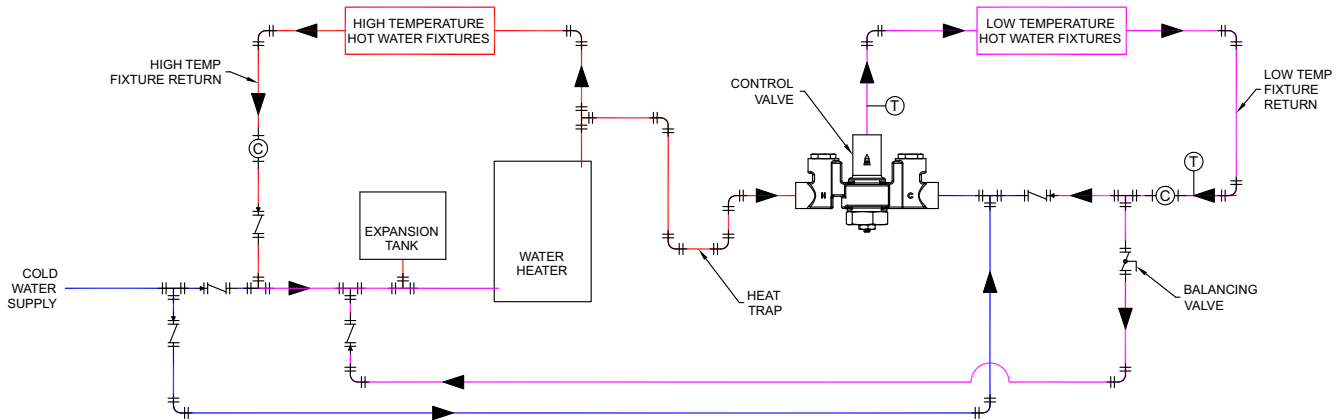


Ⓢ SELECT FLOW RATE NECESSARY TO ENSURE MIXING VALVE IS OPERATING AT AN ASSE 1017 MINIMUM CERTIFIED FLOW RATE. SEE LITERATURE.

NOTE: TO BALANCE THE SYSTEM, BEGIN WITH DIVERTING 80% OF THE RETURN WATER TO COLD SIDE OF THE TEMPERING VALVE (20% OF THE HOT WATER SOURCE). CONTINUE ADJUSTING UNTIL SYSTEM IS FULLY BALANCED. A HEAT TRAP IS RECOMMENDED IF THE MIXING VALVE IS ABOVE THE WATER HEATER.

- ⊘ CHECK VALVE
- ⊘ BALANCING VALVE
- Ⓢ TEMP/PRESSURE GAUGE
- Ⓢ CIRCULATOR
- ▶ FLOW DIRECTION

TYPICAL CONTINUOUS RECIRCULATION



Ⓢ SELECT FLOW RATE NECESSARY TO ENSURE MIXING VALVE IS OPERATING AT AN ASSE 1017 MINIMUM CERTIFIED FLOW RATE. SEE LITERATURE.

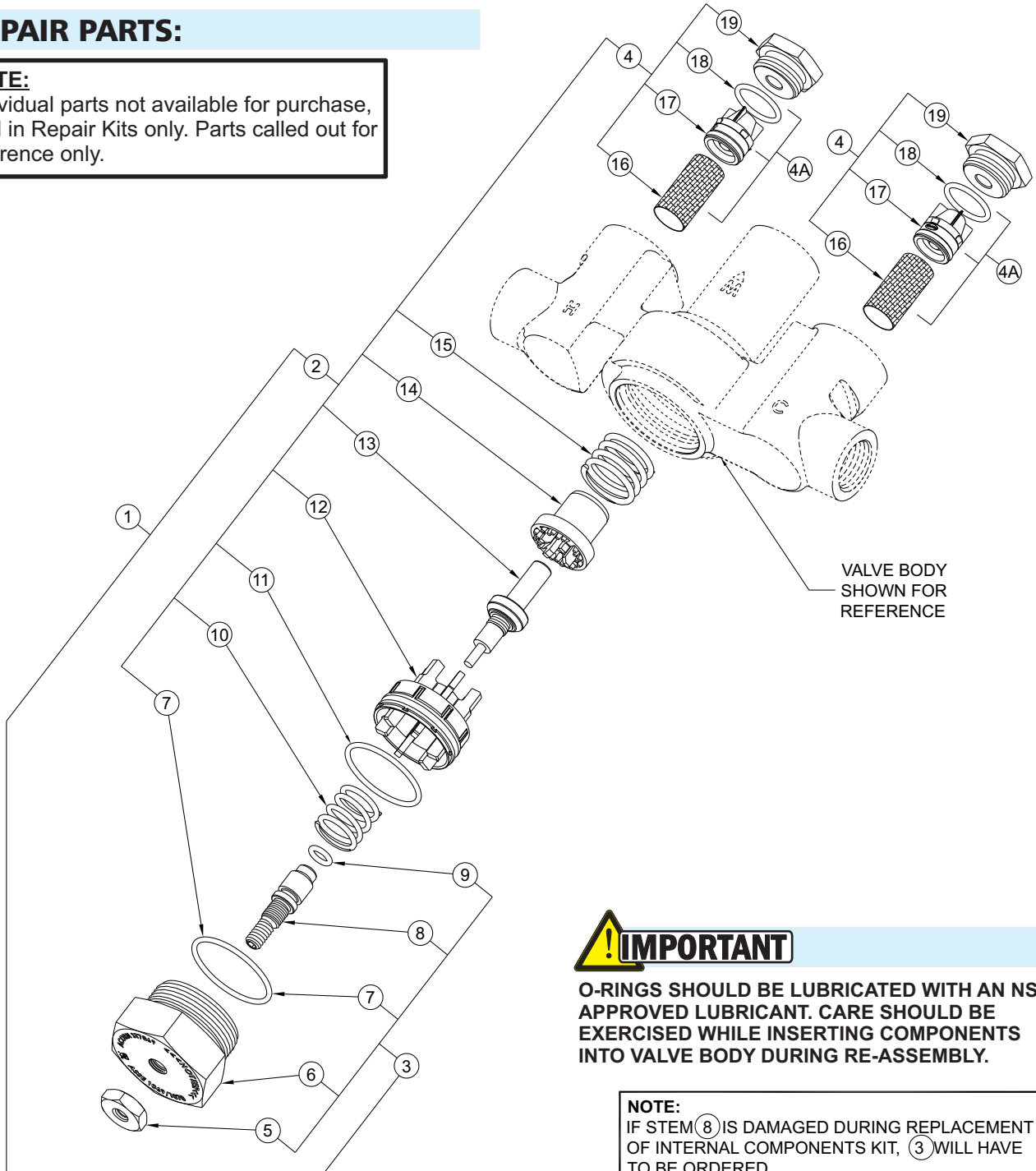
NOTE: TO BALANCE THE SYSTEM, BEGIN WITH DIVERTING 80% OF THE RETURN WATER TO COLD SIDE OF THE TEMPERING VALVE (20% OF THE HOT WATER SOURCE). CONTINUE ADJUSTING UNTIL SYSTEM IS FULLY BALANCED. A HEAT TRAP IS RECOMMENDED IF THE MIXING VALVE IS ABOVE THE WATER HEATER.

- ⊘ CHECK VALVE
- ⊘ BALANCING VALVE
- Ⓢ TEMP/PRESSURE GAUGE
- Ⓢ CIRCULATOR
- ▶ FLOW DIRECTION

**REPAIR PARTS:**

**NOTE:**

Individual parts not available for purchase, sold in Repair Kits only. Parts called out for reference only.



**! IMPORTANT**

O-RINGS SHOULD BE LUBRICATED WITH AN NSF APPROVED LUBRICANT. CARE SHOULD BE EXERCISED WHILE INSERTING COMPONENTS INTO VALVE BODY DURING RE-ASSEMBLY.

**NOTE:**

IF STEM (8) IS DAMAGED DURING REPLACEMENT OF INTERNAL COMPONENTS KIT, (3) WILL HAVE TO BE ORDERED

ITEM	KIT NUMBER	DESCRIPTION	ITEM	KIT NUMBER	DESCRIPTION
1	7803-500-001	COMPLETE REBUILD KIT	4	7801-503-001	CHECK VALVE / STRAINER KIT
2	7803-510-001	INTERNAL REPAIR KIT	4A	7801-503-002	CHECK / STRAINER KIT LESS BONNET
3	7803-502-001	BONNET / STEM REPLACEMENT			

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
5	ADJUSTMENT STEM LOCKNUT	10	UPPER SPRING	15	LOWER SPRING
6	VALVE BONNET	11	SHUTTLE O-RING	16	INLET SCREEN (x 2)
7	BONNET O-RING	12	SHUTTLE	17	CHECK VALVE (x 2)
8	ADJUSTMENT STEM	13	THERMOSTATIC MOTOR	18	CHECK VALVE BONNET O-RING (x 2)
9	ADJUSTMENT STEM O-RING	14	FUNNEL	19	CHECK VALVE BONNET (x 2)