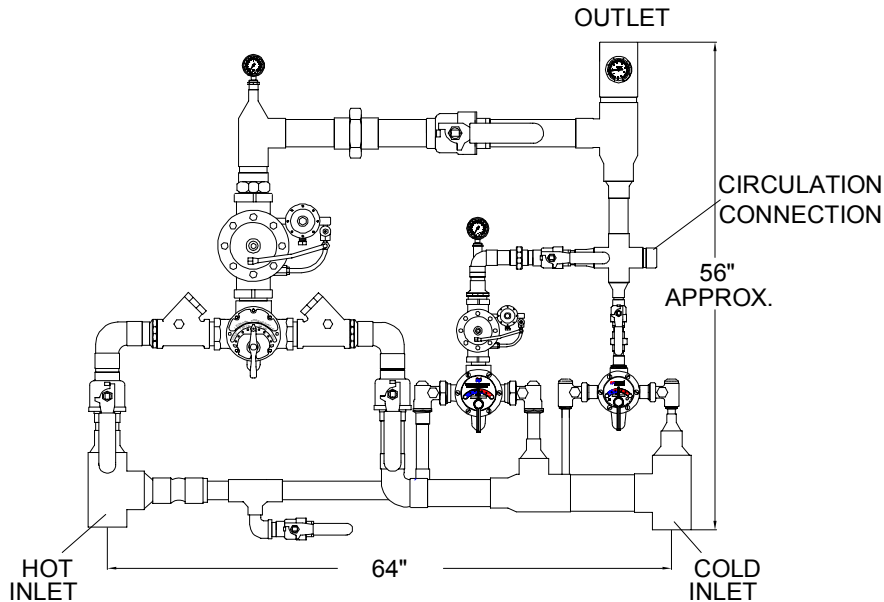




# INSTALLATION ADJUSTMENT SERVICE HIGH CAPACITY MANIFOLD SYSTEM TM-186-30015050-PRV

IMPORTANT! Provide valve serial numbers (stamped on cover of valves) when ordering parts!!



## INSTALLATION

- |  |   |
|--|---|
| <ol style="list-style-type: none"><li>1. Type TM manifold systems are factory pre-assembled and tested and include large and small thermostatic water mixing valves which function as a system to meet both high and low demand for tempered water.</li><li>2. System should be installed at a location where it can easily be cleaned, adjusted or repaired.</li><li>3. System supplies must be connected as shown (Hot-left, Cold-right). Exercise caution when soldering.</li></ol> | <ol style="list-style-type: none"><li>4. Flush pipes thoroughly after system has been connected.</li><li>5. If this assembly is installed on a recirculated hot water system it <b>MUST</b> be piped according to a <b>REQUIRED PIPING METHOD</b> (see page 4).</li><li>6. Refer to page 3 of this bulletin for correct Setup Instructions.</li></ol> |
|--|---|

**Maximum Operating Pressure 125 PSI (8.6 BAR)**

### CAUTION

All thermostatic water mixing valves have limitations. They will not provide the desired accuracy outside of their flow capacity range. Consult the capacity chart on page 9. Minimum flow must be no less than as shown.

**REMEMBER! THIS IS A CONTROL SYSTEM WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS (SEE MAINTENANCE GUIDE AND RECORD MGR-1000).**

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Web Site: <http://www.leonardvalve.com>

# ADJUSTMENT AND SERVICE

Leonard Type TM Thermostatic Water Mixing Valves are simple in design and may be easily cleaned, adjusted and repaired. If the installation is accessible, servicing may be completed without disconnecting the valves.

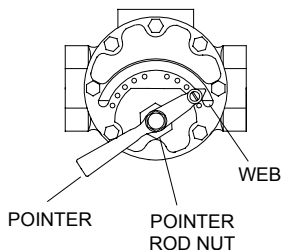
**NOTE:** High Low Manifold Systems include Thermostatic Water Mixing Valves, which must be regularly maintained to provide best performance. Frequency of cleaning depends on quality of local water conditions and usage. See Maintenance Guide and Record MGR-1000.

## WARNING

These mixing valves are equipped with an adjustable high temperature limit stop factory set at approximately 120°F (49°C) with an incoming hot water supply temperature of 150°F (65.5°C). If the hot water supply temperature of the job is greater than 150°F (65.5°C), the valves when turned to full HOT will deliver water in excess of 120°F (49°C) and the limit stops **MUST BE RESET BY THE INSTALLER!**

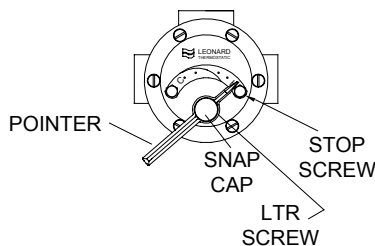
## TO RESET ADJUSTABLE HIGH TEMPERATURE LIMIT STOP:

### LARGER MIXING VALVE (TM-300)



1. Remove POINTER ROD NUT and POINTER.
2. Temporarily place POINTER on the spline rod. Turn RIGHT for warmer temperature, turn LEFT for cooler temperature. When valve is delivering warmest temperature desired, remove the pointer.
3. Replace POINTER on the spline rod so that its RIGHT edge is resting against the top side of the WEB which is cast on the RIGHT side of the cover.
4. The new maximum temperature has now been set. Test this temperature by holding a thermometer under the flow of water to be certain it is as desired.

### SMALLER MIXING VALVES (TM-150, TM-50)



1. Loosen LTR screw.
2. Remove SNAP CAP, SCREW, WASHER and POINTER.
3. Temporarily place POINTER on the spline rod. turn RIGHT for warmer temperature, turn LEFT for cooler temperature. When valve is delivering warmest temperature desired, remove the pointer.
4. Replace POINTER on the spline rod so that its RIGHT edge is resting against the STOP SCREW located on the RIGHT SIDE OF THE COVER. REASSEMBLE.
5. The new maximum temperature has now been set. Test this temperature by holding a thermometer under the flow of water to be certain it is as desired.

**IMPORTANT! ALL THREE MIXING VALVES MUST BE SET AT THE SAME OPERATING TEMPERATURE.**

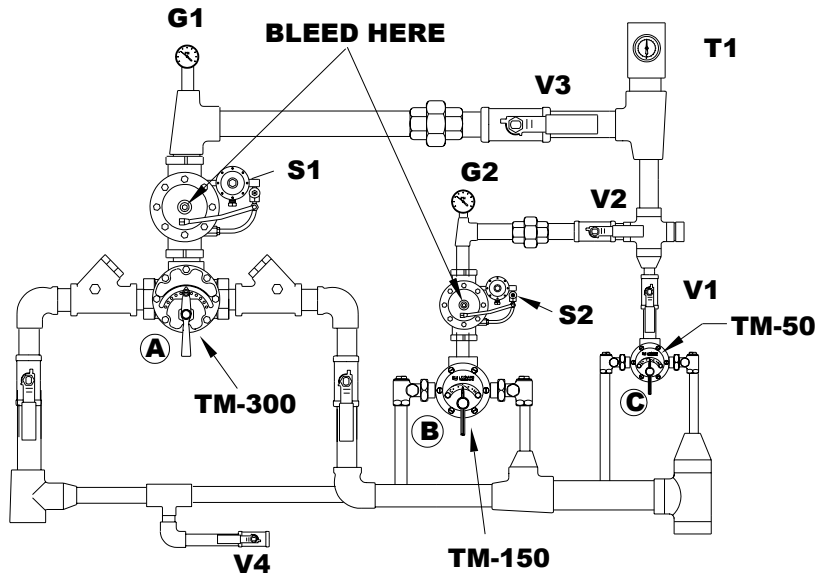
**SEE PAGES: 7 & 8 FOR COMPLETE PARTS BREAKDOWNS**

Check for significant variations in outlet flow. Thermostatic valves will NOT provide the desired accuracy outside of their flow capacity range. Minimum flows must be no less than shown (see Flow Capacities, page 9).

If installed on a recirculated hot water system, make certain the valve is piped according to a Required Piping Method (see page 5).

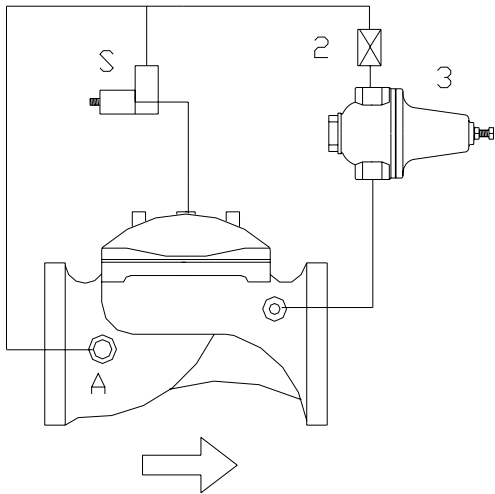
**REMEMBER! THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS. (SEE MAINTENANCE GUIDE AND RECORD, MGR-1000)**

# SETUP INSTRUCTIONS



- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. TM-186-30015050PRV High-Low Unit <b>Must</b> be piped in accordance with appropriate Piping Method shown on page 5.</li> <li>2. Shut down circulator pumps, close valve V3 &amp; V4. Adjust screw S1 on the reducing pilot fully clockwise and record water pressure reading on gauge G1.</li> <li>3. Carefully adjust screw S1 on the reducing pilot fully counter-clockwise (CCW) until all spring tension is relieved.</li> <li>4. Close outlet valve V1 and V2. Open outlet valve V3 and make sure it is in the full open position.</li> <li>5. Open enough fixtures to flow at least 50 GPM downstream of this assembly (no water will flow at this time). Vent trapped air in the PRV cover above the valve labeled A by loosening highest point of tube fitting and on cover. Retighten both fittings.</li> <li>6. Carefully adjust screw S1 to 20 PSI less than the pressure recorded in step 2 (read pressure on gauge G1). Water should now be flowing at 50 GPM.</li> <li>7. Set outlet temperature of mixing valve A to the safe required level (read temperature on gauge T1).</li> <li>8. Turn off enough fixtures to flow 25 GPM downstream of the assembly.</li> </ol> | <ol style="list-style-type: none"> <li>9. Carefully adjust screw S2 on the reducing pilot fully counter-clockwise (CCW) until all spring tension is relieved. Open V2 and close outlet V3 (V1 should remain closed) (no water will flow at this time). Vent trapped air in the PRV cover by loosening highest point of tube fitting and on cover. Retighten both fittings.</li> <li>10. Carefully adjust screw S2 to 10 PSI less than the pressure recorded in step 2 (read pressure on gauge G2). Water should now be flowing at 25 GPM.</li> <li>11. Set outlet temperature of mixing valve labeled B to the same temperature as step 7. (Read temperature at gauge T1).</li> <li>12. Turn off enough fixtures to flow 5 GPM downstream of the assembly.</li> <li>13. Open outlet valve V1 and close valve V2.</li> <li>14. Set outlet temperature of mixing valve labeled C to the same temperature as step 7. (Read temperature at gauge T1).</li> <li>15. Turn circulator pump on. Open outlet valves V2 and V3. System is operational.</li> <li>16. Important! Now proceed to balance recirculated tempered water system (see page 5).</li> </ol> |
|--|---|

# PRESSURE REDUCING VALVE



## PARTS LIST

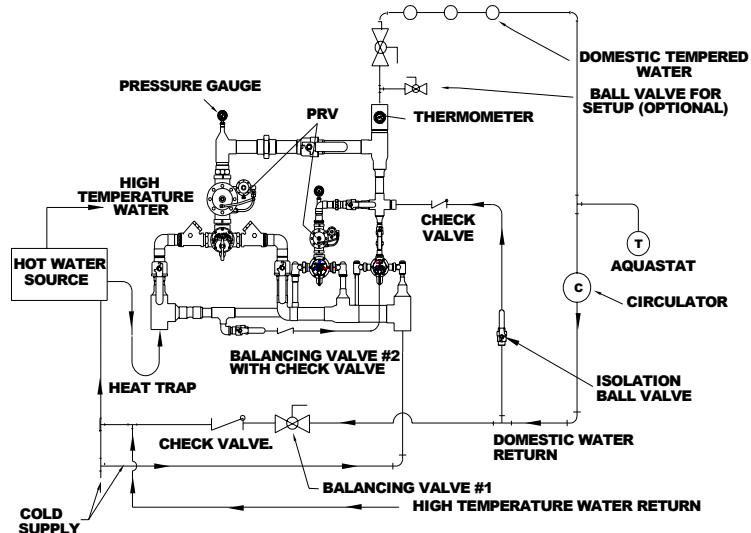
- A In line, Filter
- 2 Control Orifice
- 3 Pressure Reducing Pilot
- S Opening Speed Control

## TROUBLESHOOTING

<b><u>SYMPTOM</u></b>	<b><u>CAUSE</u></b>	<b><u>REMEDY</u></b>
<b>Valve fails to open</b>	<ul style="list-style-type: none"> <li>Insufficient inlet pressure</li> <li>No downstream demand</li> <li>Insufficient spring compression on pressure reducing pilot</li> <li>Trapped air</li> </ul>	<ul style="list-style-type: none"> <li>Check/create inlet pressure</li> <li>Create demand/flow</li> <li>Turn adjusting screw on pressure reducing pilot 3 clockwise</li> <li>Bleed air from cover and bleed air from tubing at highest point</li> </ul>
<b>Valve Fails to Close or Regulate</b>	<ul style="list-style-type: none"> <li>Filter A plugged</li> <li>Orifice fitting 2 plugged</li> <li>Regulated pressure pulsates or hunts</li> <li>Debris trapped in main valve / Diaphragm in main valve Leaking / Scale on stem</li> <li>Pressure reducing pilot 3 not serviceable</li> </ul>	<ul style="list-style-type: none"> <li>Remove in-line filter A and clean screen</li> <li>Remove orifice fitting 2 and clean</li> <li>Bleed air from cover and bleed air from tubing at highest point</li> <li>De-pressurized the system and remove valve cover and diaphragm to inspect/remove debris.</li> <li>Replace pressure reducing pilot</li> </ul>

## METHOD #4

NOTE: THIS PIPING METHOD IS USED FOR MODERATE FLOW SYSTEMS WHERE THE CIRCULATED FLOW IS EIGHT (8) TO TWENTY FIVE (25) GPM.



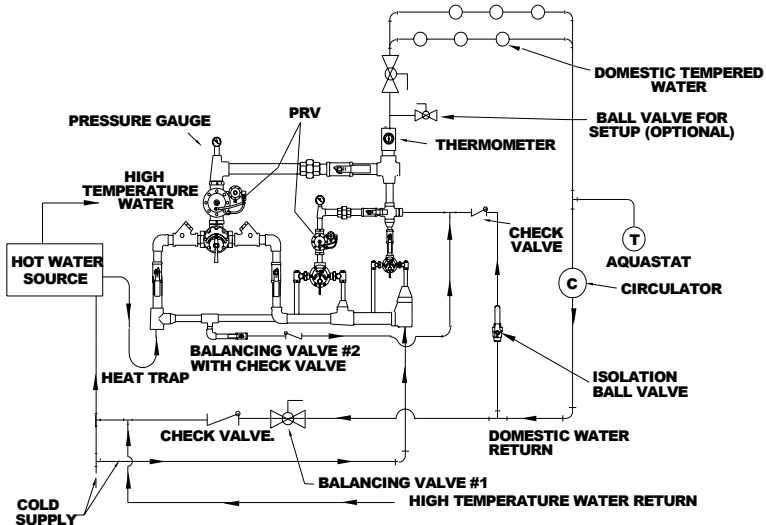
\* MODERATE FLOW SYSTEM MAY BE DEFINED AS THOSE IN WHICH A RECIRCULATION FLOW OF EIGHT (8) TO TWENTY FIVE (25) GALLONS PER MINUTE IS REQUIRED TO MAINTAIN A GIVEN TEMPERATURE

### PROCEDURE TO BALANCE SYSTEM:

1. MAKE SURE NO WATER IS BEING DRAWN IN THE BUILDING. OPEN BALANCING VALVE #1 APPROXIMATELY HALF WAY AND START CIRCULATOR. KEEP BALANCE VALVE #2 CLOSED AT THIS TIME.
2. OBSERVE TEMPERATURE UNTIL IT STABILIZES.
3. CLOSE BALANCING VALVE #1 SLIGHTLY IF TEMPERATURE IS TOO HOT, OR OPEN IT SLIGHTLY IF TEMPERATURE IS TOO COLD. ALLOW TEMPERATURE TO STABILIZE, REPEAT UNTIL DESIRED CIRCULATION TEMPERATURE IS SET.
4. IF UNABLE TO REACH DESIRED TEMPERATURE WITH VALVE #1 IN THE FULL OPEN POSITION, OPEN BALANCE VALVE #2 IN SMALL INCREMENTS (i.e. 1/8, 1/4, 3/8, ETC) UNTIL DESIRED TEMPERATURE IS ACHIEVED.

## METHOD #5

NOTE: THIS PIPING METHOD IS USED FOR HIGH FLOW SYSTEMS WHERE THE CIRCULATED FLOW IS TWENTY FIVE (25) GPM OR GREATER.



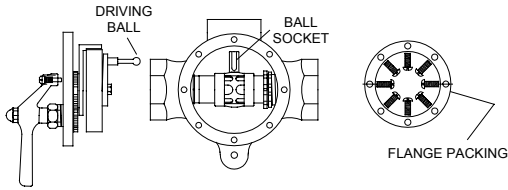
\*HIGH FLOW SYSTEMS INCLUDE THOSE WHICH ARE REQUIRED TO RECIRCULATE A FLOW GREATER THAN (25) TWENTY FIVE GALLONS PER MINUTE SUCH SYSTEMS REQUIRE PIPING WHICH MAY INTRODUCE SIGNIFICANTLY MORE "HOT" WATER INTO THE SYSTEM DURING PERIODS OF NO DRAW

### PROCEDURE TO BALANCE SYSTEM:

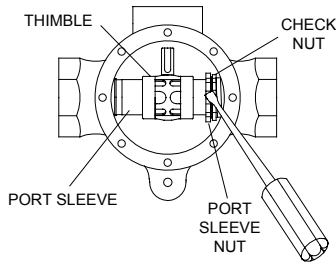
1. MAKE SURE NO WATER IS BEING DRAWN IN THE BUILDING. OPEN BALANCING VALVE #1 APPROXIMATELY HALF WAY AND START CIRCULATOR. KEEP BALANCE VALVE #2 CLOSED AT THIS TIME.
2. OBSERVE TEMPERATURE UNTIL IT STABILIZES.
3. CLOSE BALANCING VALVE #1 SLIGHTLY IF TEMPERATURE IS TOO HOT, OR OPEN IT SLIGHTLY IF TEMPERATURE IS TOO COLD. ALLOW TEMPERATURE TO STABILIZE, REPEAT UNTIL DESIRED CIRCULATION TEMPERATURE IS SET.
4. IF UNABLE TO REACH DESIRED TEMPERATURE WITH VALVE #1 IN THE FULL OPEN POSITION, OPEN BALANCE VALVE #2 IN SMALL INCREMENTS (i.e. 1/8, 1/4, 3/8, ETC) UNTIL DESIRED TEMPERATURE IS ACHIEVED.

CONTACT LEONARD FOR ADDITIONAL PIPING METHODS DESIGNED FOR HIGHER FLOW RECIRCULATED SYSTEMS AND FOR OTHER SPECIAL INSTALLATIONS.

## INSTRUCTIONS FOR SERVICING LARGER TM VALVE

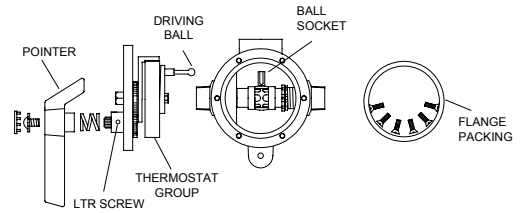


1. Remove pointer rod nut, friction spring and pointer. Shut off hot and cold supplies to this valve.
2. Remove, cover screws and cover, to which the thermostat group is attached.

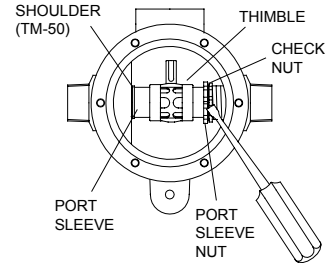


3. To clean port sleeve assembly (the thimble must slide freely on the port sleeve): unscrew the check nut as far as it will go, then screw the port sleeve nut into the base. The port sleeve and thimble may then be lifted out.
4. Clean with a non-corrosive cleaning solution. **DO NOT USE ABRASIVES!** The port sleeve should be reassembled in the valve with the shoulder to the left.
5. To Clean thermostat group, remove pointer rod nut and pointer. Remove coil sleeve stud (8) and take off thermostat group (TG-2/300).
6. Clean with a non-corrosive cleaning solution. **DO NOT USE ABRASIVES.**
7. Replace pointer rod with gear and re-assemble.
8. When reassembling, make sure driving ball of thermostat group engages the ball socket of the port sleeve assembly.

## INSTRUCTIONS FOR SERVICING SMALLER TM VALVES



1. Loosen LTR screw.
2. Remove snap cap, screw and washer, friction spring and pointer. Shut off hot and cold supplies to this valve.
3. Remove, cover screws and cover, to which the thermostat group is attached.



4. To clean port sleeve assembly (the thimble must slide freely on the port sleeve): unscrew the check nut as far as it will go, then screw the port sleeve nut into the base. The port sleeve and thimble may then be lifted out. There is no shoulder for the TM-150 Port Sleeve.
5. Clean with a non-corrosive cleaning solution. **DO NOT USE ABRASIVES!** The port sleeve should be reassembled in the valve with the shoulder to the left.
6. To Clean thermostat group, remove coil sleeve stud and take off thermostat group.
7. Clean with a non-corrosive cleaning solution. **DO NOT USE ABRASIVES.**
8. Replace pointer rod with gear and re-assemble.
9. When reassembling, make sure driving ball of thermostat group engages the ball socket of the port sleeve assembly.

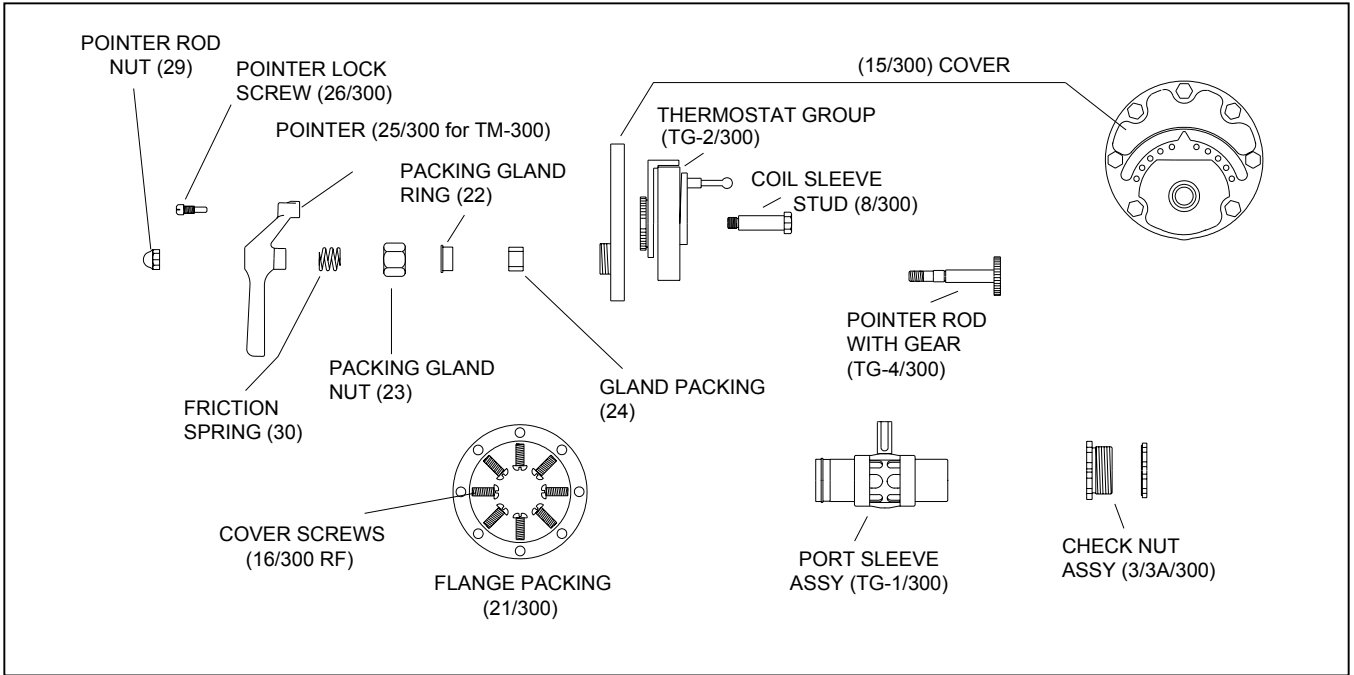
## TROUBLESHOOTING INSTRUCTIONS

Note: Provide valve serial number when ordering parts for either valve!

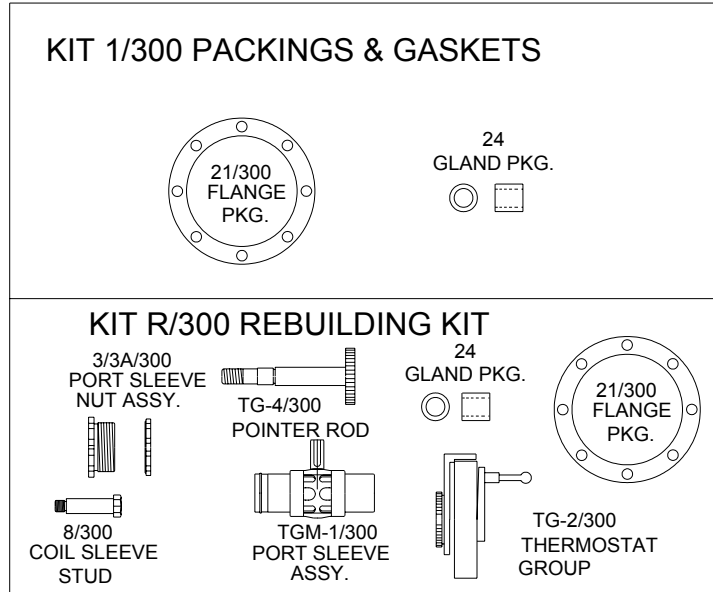
		TM-300	TM-150	TM-50
PACKING & GASKETS	<ol style="list-style-type: none"> <li>1. Leaks at stem.</li> <li>2. Leak between valve cover and base.</li> </ol>	Kit # 1/300 Packing & Gaskets	Kit # 1/125 Packing & gaskets	Kit # 1/50 Packing & Gaskets
PORT SLEEVE/BRIDGE ASSEMBLY	<ol style="list-style-type: none"> <li>3. Valve delivers either all hot or all cold water, or will not mix consistently.</li> </ol>	Kit # R/300 Rebuilding Kit	Kit # R/125 Rebuilding Kit	Kit # R/50 Rebuilding Kit
THERMOSTAT GROUP	<ol style="list-style-type: none"> <li>4. After cleaning or replacing port sleeve/bridge assembly, valve performance is not consistent.</li> </ol>	Kit # R/300 or TG-2/300	Kit # R/125 TGM-2/125	Kit #R/50 TGM-2/50
CHECKSTOPS	<ol style="list-style-type: none"> <li>5. Hot water by-pass into cold line (or cold into hot).</li> <li>6. Supplies cannot be shut off completely. Supplies leak at checkstop bonnets.</li> </ol>	NA	Kit #4/125	Kit #4/50

See pages 7 & 8 for Parts Breakdown

# LARGE TM VALVE PARTS



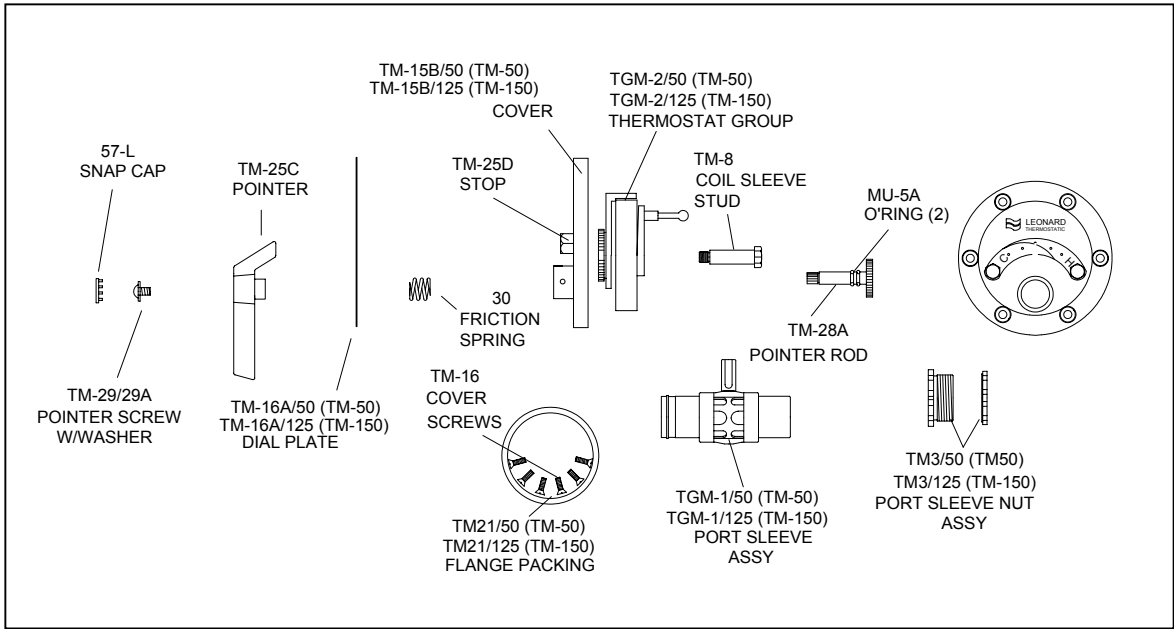
## REPAIR KITS



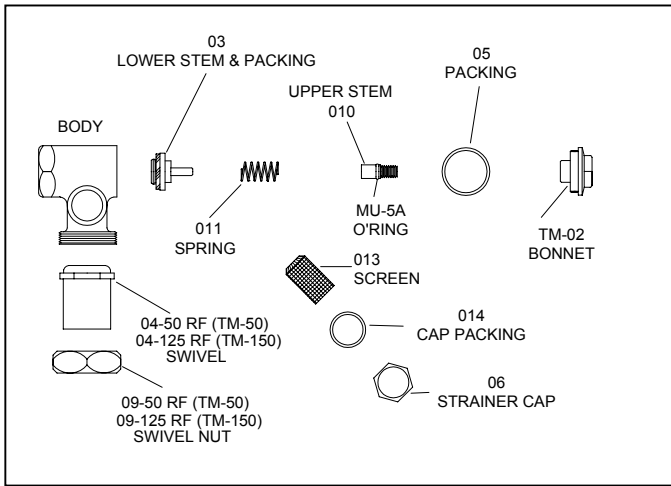
**REMEMBER!** THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS (SEE MAINTENANCE GUIDE AND RECORD, MGR-1000).

**NOTE:** AFTER INSTALLING NEW PARTS IT WILL BE NECESSARY TO RESET THE ADJUSTABLE HIGH TEMPERATURE LIMIT STOP ON EACH VALVE (SEE PAGE 2).

# SMALLER TM VALVE PARTS

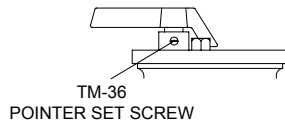


## CHECKSTOP PARTS



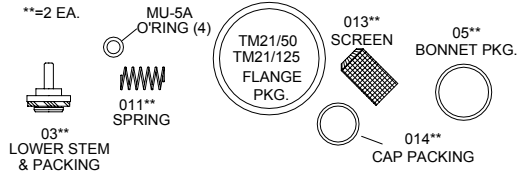
## LOCK-TYPE POINTER

TM valves are furnished with lockable pointers.

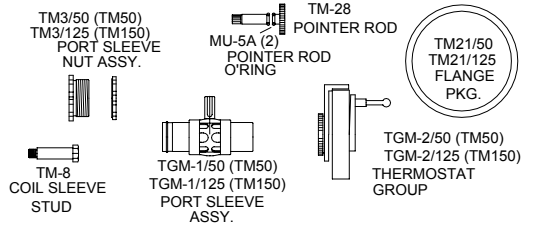


## REPAIRKITS

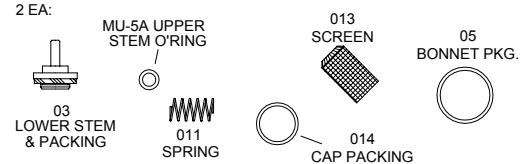
### KIT 1/50 (TM50) PACKINGS & GASKETS KIT 1/125 (TM150) PACKINGS & GASKETS



### KIT R/50 (TM50) REBUILDING KIT KIT R/125 (TM150) REBUILDING KIT



### KIT 2/50 (TM50) CHECKSTOP KIT KIT 2/125 (TM150) CHECKSTOP KIT



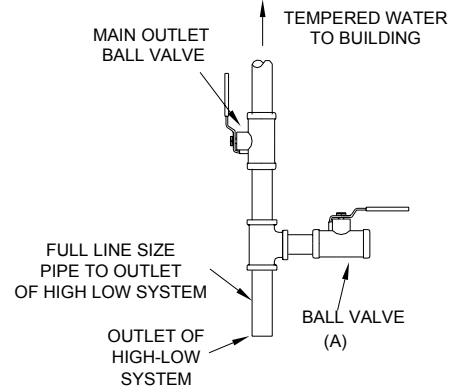
**REMEMBER!** THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS (SEE MAINTENANCE GUIDE AND RECORD, MGR-1000).

**NOTE:** AFTER INSTALLING NEW PARTS IT WILL BE NECESSARY TO RESET THE ADJUSTABLE HIGH TEMPERATURE LIMIT STOP ON EACH VALVE (SEE PAGE 2).



**OPTIONAL OUTLET SETUP PIPING  
(BY OTHERS)**

The addition of this piping arrangement (extra tee and ball valve) eliminates the need to turn showers on and off throughout the building at setup. The flows required in the setup instructions (page 3) are set by using Ball Valve A. (make sure main outlet ball valve is closed).



**CAUTION! ALL THERMOSTATIC WATER MIXING VALVES AND SYSTEMS HAVE LIMITATIONS! THEY WILL NOT PROVIDE THE DESIRED PERFORMANCE OUTSIDE OF THEIR FLOW CAPACITY RANGE! CONSULT THE CAPACITY CHART BELOW AND OBSERVE MINIMUM FLOWS SHOWN.**

MODEL	IN	OUT	MINIMUM FLOW (GPM) L/MIN	SYSTEM PRESSURE DROP											PSI BAR
				5	10	15	20	25	30	35	40	45	50		
TM-186-30015050PRV	4" 101mm	4" 101mm	5.0	.3	.7	1.0	1.4	1.7	2.1	2.4	2.8	3.1	3.4	GPM L/MIN	
			19	984	1173	1363	1514	1590	1628	1666	1692	1715	1741		

**LIMITED WARRANTY**

Leonard Valve Company warrants the original purchaser that products manufactured by them (not by others) will be free from defects in materials and workmanship under normal conditions of use, when properly installed and maintained in accordance with Leonard Valve Company's instructions, for a period of one year from date of shipment. During this period the Leonard Valve Company will at its option repair or replace any product, or part thereof, which shall be returned, freight prepaid, to the Leonard factory and determined by Leonard to be defective in materials or workmanship. There are no warranties, express or implied, which extend beyond the description contained herein. There are no implied warranties of merchantability or of fitness for a particular purpose. In no event will Leonard be liable for labor or incidental or consequential damages. Any alteration or improper installation or use of the product will void this limited warranty.