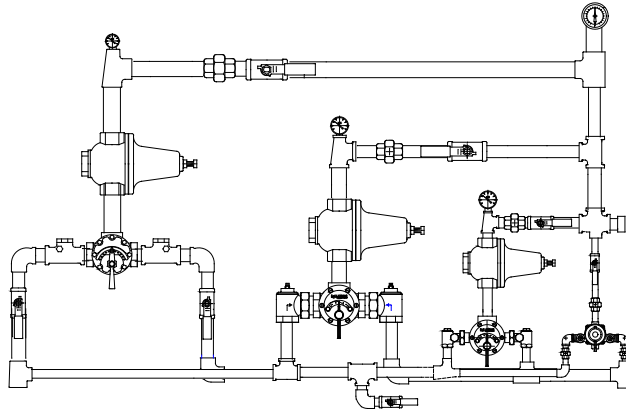


INSTALLATION ADJUSTMENT SERVICE HIGH CAPACITY MANIFOLD SYSTEM



WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer. For more information, go to www.P65Warnings.Ca.gov

TM-186-30020015020-PRV

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

INSTALLATION

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.
2. System should be installed at a location where it can easily be cleaned, adjusted or repaired.
3. System supplies must be connected as shown (Hot-left, Cold-right). Exercise caution when soldering.
4. Flush pipes thoroughly after system has been connected.
5. If this assembly is installed on a recirculated hot water system it **MUST** be piped according to a **REQUIRED PIPING METHOD** (see page 4).
6. Refer to page 3 of this bulletin for correct Setup Instructions.
7. Please see page 8 troubleshooting pressure regulating valve **FOR OPERATING PRESSURES BELOW 30 PSI AND ABOVE 80 PSI**

Maximum Operating Pressure 125PSI (860 KPA) for Hot and Cold Water.

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 8. 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).

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.

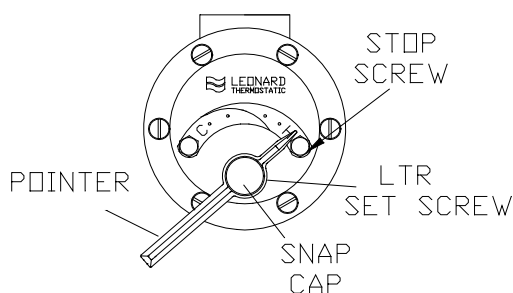
NOTE: High Low Manifold Systems include Thermostatic Water Mixing Valves, which must be regularly maintained to provide best performance. Frequency of cleaning depends on quality of local water conditions and usage. See Maintenance Guide and Record MGR-1000.

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!**

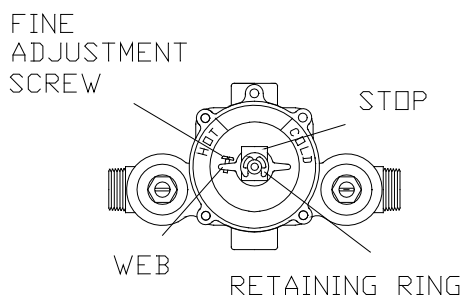
TO RESET ADJUSTABLE HIGH TEMPERATURE LIMIT STOP:

TM-150



1. Loosen LTR set screw.
2. Remove SNAP CAP, SCREW & WASHER. Remove 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.
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.

TM-20

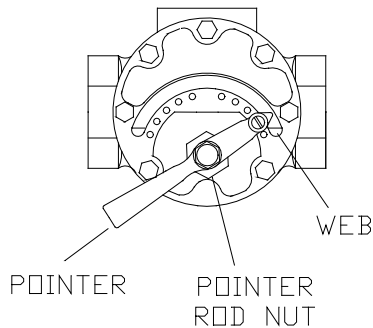


1. Remove HANDLE, RETAINING RING and STOP
2. Temporarily place POINTER on the spline rod. turn LEFT for warmer temperature, turn RIGHT for cooler temperature. When valve is delivering warmest temperature desired, remove the pointer.
3. Push stop on rod so that its LEFT edge is resting against the fine adjustment screw on cover.
4. Turn fine adjustment screw, if necessary (clockwise for slightly higher temperature, counter clockwise for slightly lower temperature).
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.

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

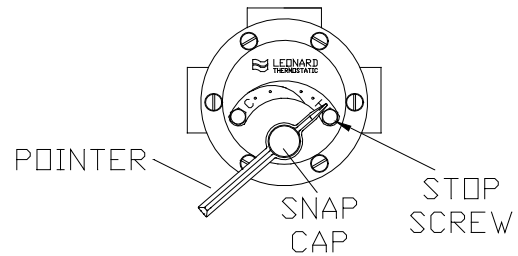
TO RESET ADJUSTABLE HIGH TEMPERATURE LIMIT STOP CONTINUED:

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.

TM-200



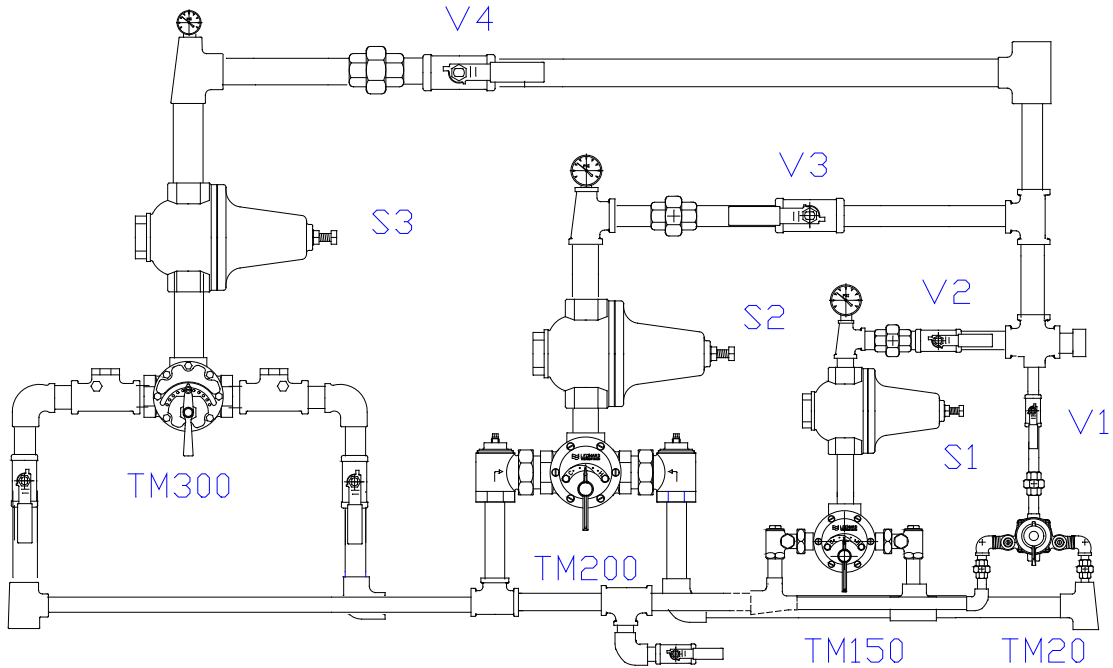
- 1) Loosen LTR screw
- 2) Remove SNAP CAP, SCREW & WASHER. Remove POINTER.
- 3) Temporarily place POINTER on the spline rod. turn RIGHT for warmer temperature, turn LEFT for cooler temperature. When valve is delivering warmest temperature desired, remove the pointer.
- 4) Replace POINTER on the spline rod so that its RIGHT edge is resting against the STOP SCREW located on the RIGHT SIDE OF THE COVER.
- 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 FOUR MIXING VALVES MUST BE SET AT THE SAME OPERATING TEMPERATURE.

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).

If installed on a recirculated hot water system, make certain the valve is piped according to Leonard Required Piping Method.

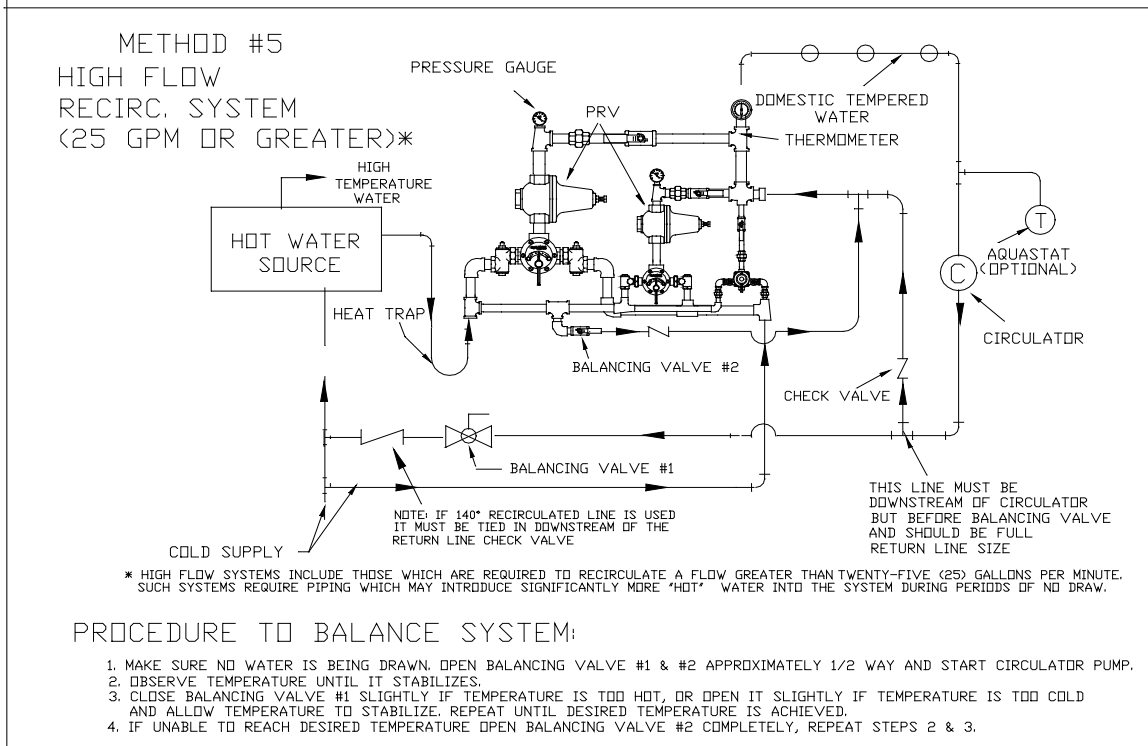
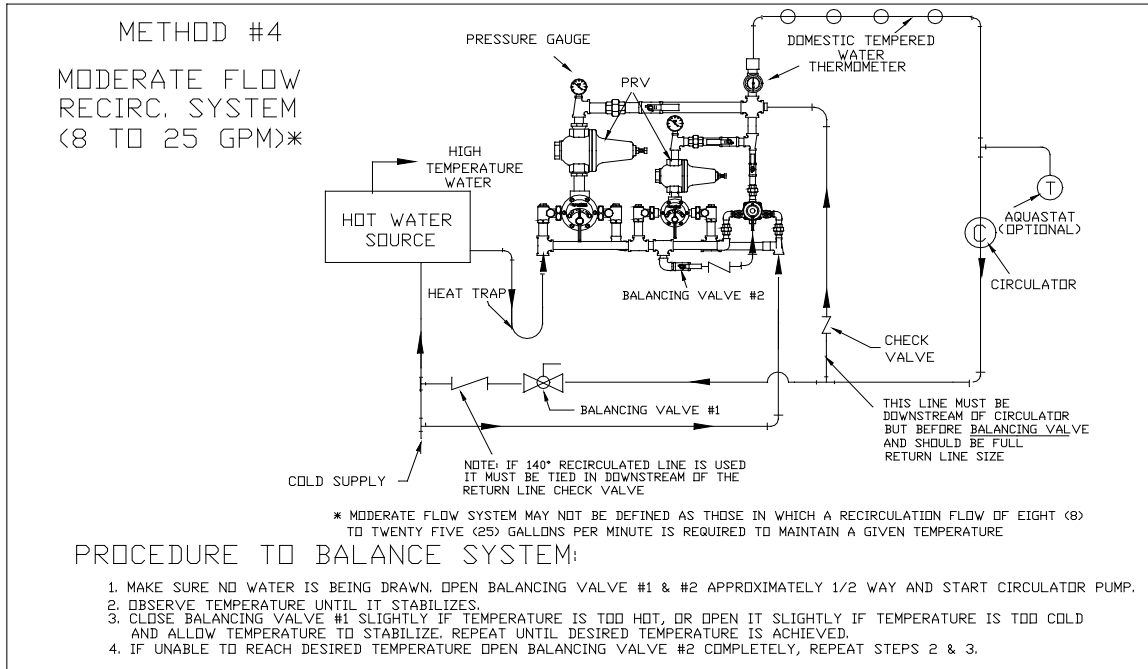
SETUP INSTRUCTIONS



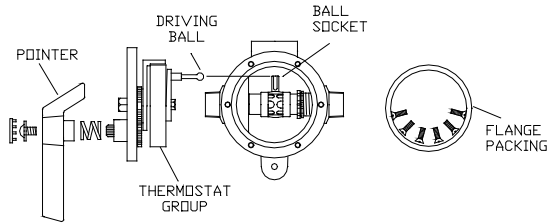
1. TM-186-PRV High-Low Unit **Must** be piped in accordance with appropriate Piping Method (see page 5), if installed within a recirculated system.
2. Make sure hot and cold supplies to this assembly are fully operational.
3. Open enough fixtures to flow 80 GPM, downstream of this assembly.
4. Close outlet valves V1, V2, and V3.
5. Make sure outlet valve V4 on thermostatic water mixing valve is in the full open position.
6. Set the desired outlet temperature of the TM300
7. Set the thermostatic water mixing valves TM200, TM150, TM20 to the full 'COLD' position.
8. Reduce the flow to 50 GPM downstream of the assembly.
9. Open outlet valve V3 (V4 should still be open) and note the temperature.
10. Carefully adjust nut S3 at the PRV (pressure regulating valve) until the temperature drops approximately 20°F. Turn nut S3 clockwise if temperature dropped more than 20°F or turn nut S3 counterclockwise if temperature dropped less than 20°F.
11. Shut outlet valve V4.
12. Set the desired outlet temperature of the TM200
13. Reduce the flow to 20 GPM downstream of the assembly.
14. Open outlet valve V2 (V3 should still be open) and note the temperature.
15. Carefully adjust nut S2 at the PRV (pressure regulating valve) until the temperature drops approximately 20°F. Turn nut S2 clockwise if temperature dropped more than 20°F or turn nut S2 counterclockwise if temperature dropped less than 20°F.
16. Shut outlet valve V3.
17. Set the desired outlet temperature of the TM150
18. Reduce the flow to 5 GPM downstream of the assembly.

SETUP INSTRUCTIONS CONTINUED

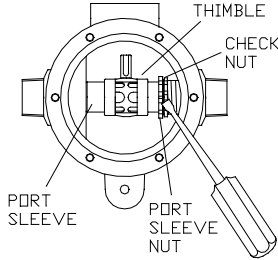
19. Open outlet valve V1 (V2 should still be open) and note the temperature.
20. Carefully adjust nut S1 at the PRV (pressure regulating valve) until the temperature drops approximately 20°F. Turn nut S3 clockwise if temperature dropped more than 20°F or turn nut S1 counterclockwise if temperature dropped less than 20°F.
21. Shut the outlet valve V2
22. Set the outlet temperature of the TM20 to the same temperature as TM300, TM200, TM150 mixing valves.
23. Open valves V2, V3, and V4, the system is operational.
24. Important! Now proceed to balance the recirculated tempered water system (see below).



INSTRUCTIONS FOR SERVICING TM150 VALVE

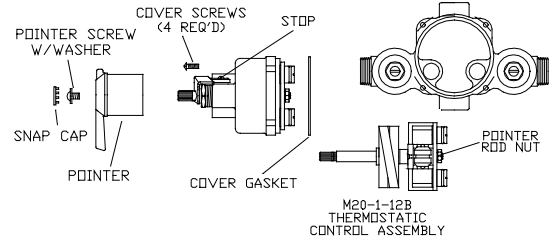


1. Shut off hot and cold supplies to this valve. Remove snap cap, screw and washer, friction spring and pointer.
2. Remove cover screws and cover, to which the thermostat group is attached.

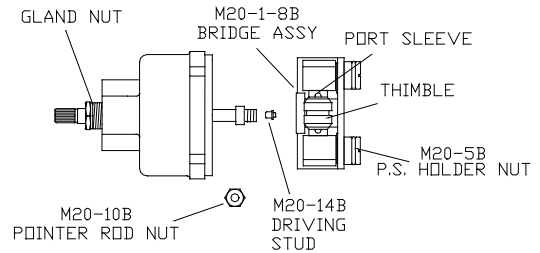


3. To clean port sleeve assembly (the thimble must slide freely on the port sleeve): unscrew the check nut as far as it will go, then screw the port sleeve nut into the base. The port sleeve and thimble may then be lifted out. There is no shoulder for the TM-150 port sleeve.
4. Clean with a non-corrosive 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 brush in a non-corrosive cleaning solution.
6. When reassembling, make sure driving ball of thermostat group engages the ball socket of the port sleeve assembly.

INSTRUCTIONS FOR SERVICING TM20 VALVE



1. Turn off hot and cold supplies at screwdriver checkstops. Remove snap cap, screw, washer, pointer, and stop. Remove M20-2C cover screws to release cover and thermostatic control assembly.



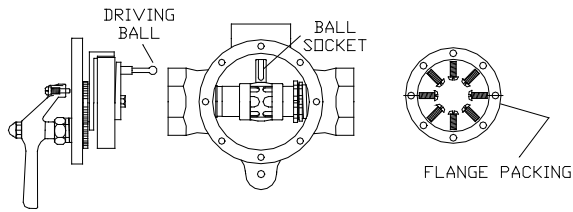
2. To remove bridge assembly, M20-1-8B, remove pointer rod nut (M20-10B) and pull bridge assembly off control rod. Do not misplace M20-14B driving stud.
3. To clean, submerge bridge assembly in clean water or non-corrosive cleaning solution. **Do not use abrasives!** Be certain thimble moves freely on port sleeve. Note! Driving stud (M20-14B) must engage slot in thimble when reassembling.
4. To clean thermostat group, loosen gland nut and remove cover. Brush in a non-corrosive cleaning solution.
5. To disassemble bridge assembly, see drawing page 7 (remove M20-5B holder nuts with screwdriver in slots provided).

TROUBLESHOOTING INSTRUCTIONS

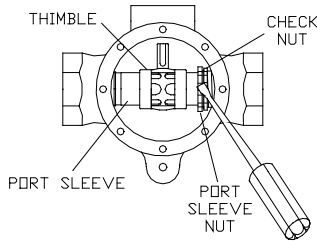
Note: Provide valve serial number when ordering parts for either valve!

		TM150 Valve:	TM20 Valve:
PACKING & GASKETS	1. Leaks at stem. 2. Leak between valve cover and base.	Kit # 1/125 (Packings & Gaskets)	Kit # 1/M20 (Packings & Gaskets)
PORT SLEEVE/BRIDGE ASSEMBLY	3. Valve delivers either all hot or all cold water, or will not mix consistently.	Kit # R/125	Kit #R/M20 (Rebuilding Kit) or M20-1-8B Bridge Assembly
THERMOSTAT GROUP	4. After cleaning or replacing port sleeve/bridge assembly, valve performance is not consistent.	Kit # R/125	Kit #R/M20 (Rebuilding Kit) or M20-G2 Thermostat Group
CHECKSTOPS	5. Hot water by-pass into cold line (or cold into hot). 6. Supplies cannot be shut off completely. Supplies leak at checkstop bonnets.	Kit # 2/125	Kit #4/M20 (Checkstop Kit)

INSTRUCTIONS FOR SERVICING TM300 VALVE

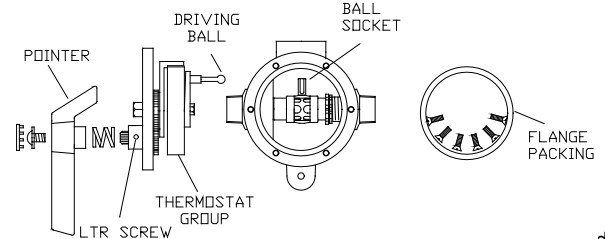


1. Remove pointer rod nut, tension spring and pointer stem on hot and cold supplies to this valve.
2. Remove cover screws and cover, to which the thermostat group is attached.

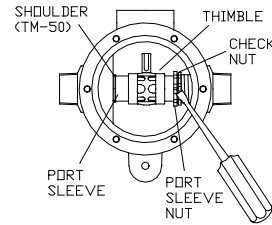


3. To clean port sleeve assembly (the thimble must slide freely on the port sleeve): unscrew the check nut as far as it will go, then screw the port sleeve nut into the base. The port sleeve and thimble may then be lifted out.
4. Clean with a non-corrosive cleaning solution. **DO NOT USE ABRASIVES!** 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 TM200 VALVE



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



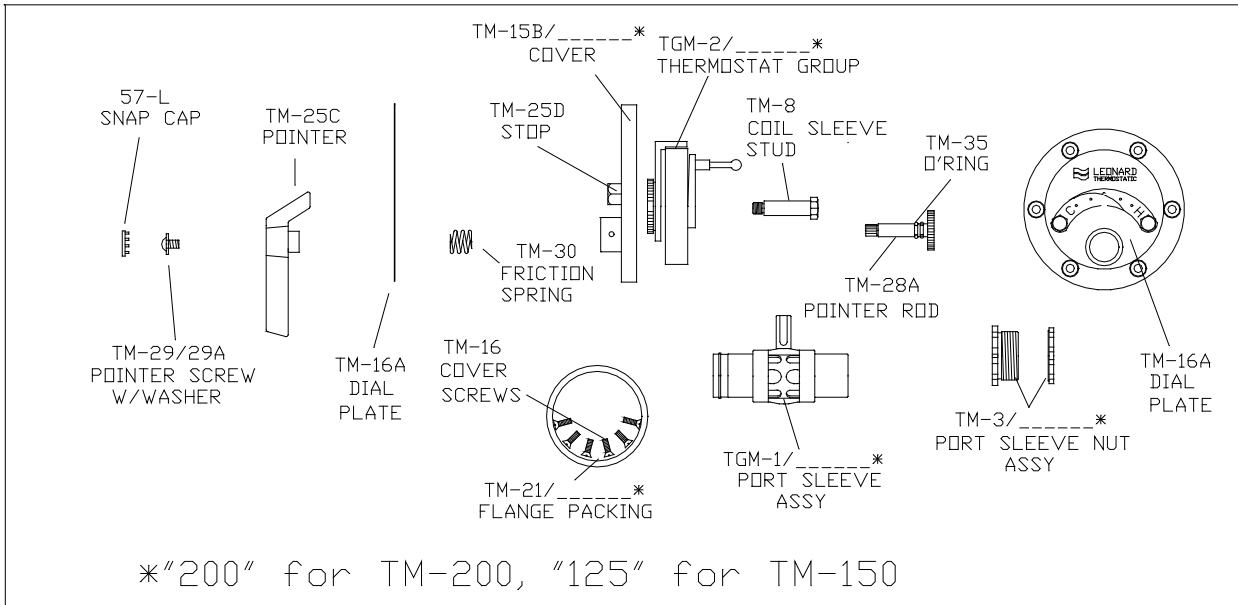
3. To clean port sleeve assembly (the thimble must slide freely on the port sleeve): unscrew the check nut as far as it will go, then screw the port sleeve nut into the base. The port sleeve and thimble may then be lifted out. There is no shoulder for the TM-150 Port Sleeve.
4. Clean with a non-corrosive 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 coil sleeve stud and take off thermostat group (TG-2).
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.

TROUBLESHOOTING INSTRUCTIONS

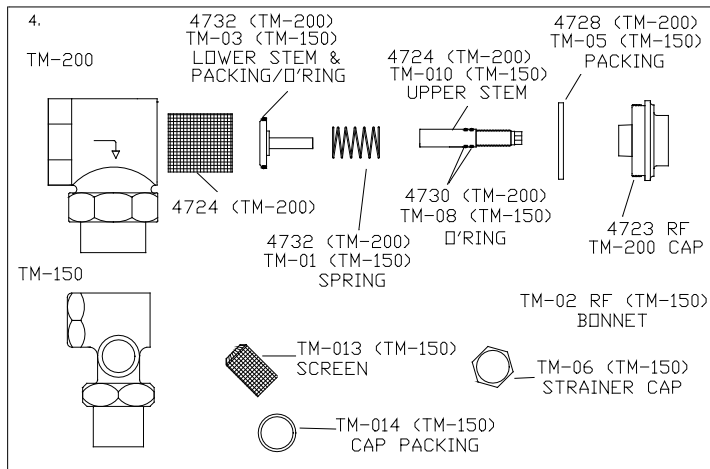
Note: Provide valve serial number when ordering parts for either valve!

PACKING & GASKETS	<ol style="list-style-type: none"> 1. Leaks at stem. 2. Leak between valve cover and base. 	TM300 Kit # 1/300 Packing & Gaskets	TM200 Kit # 1/200N Packings & Gaskets
PORT SLEEVE/BRIDGE ASSEMBLY	<ol style="list-style-type: none"> 3. Valve delivers either all hot or all cold water, or will not mix consistently. 	Kit # R/300 Rebuilding Kit	Kit #R/200 Rebuilding Kit
THERMOSTAT GROUP	<ol style="list-style-type: none"> 4. After cleaning or replacing port sleeve/bridge assembly, valve performance is not consistent. 	Kit # R/300 or TG-2/300	Kit #R/200
CHECKSTOPS	<ol style="list-style-type: none"> 5. Hot water by-pass into cold line(or cold into hot). 6. Supplies cannot be shut off completely. Supplies leak at checkstop bonnets. 	Not available	Kit#2/200N

TM 200 & 150 VALVE PARTS

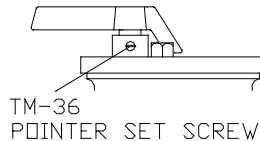


CHECKSTOP PARTS

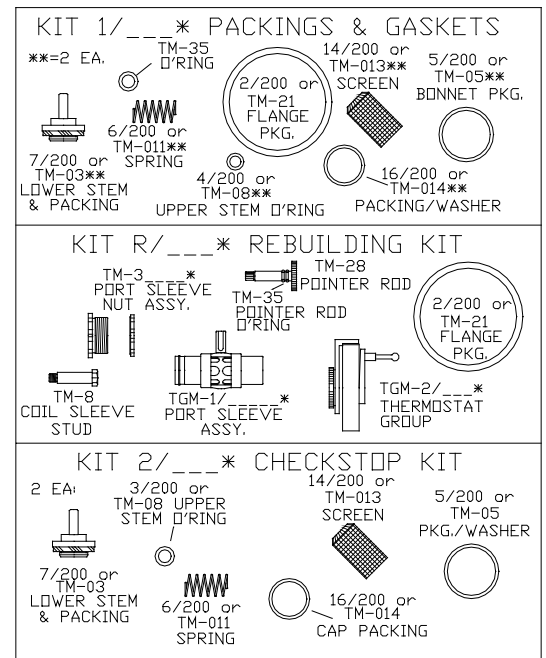


LOCK TYPE POINTER

TM valves are furnished with lockable pointers.



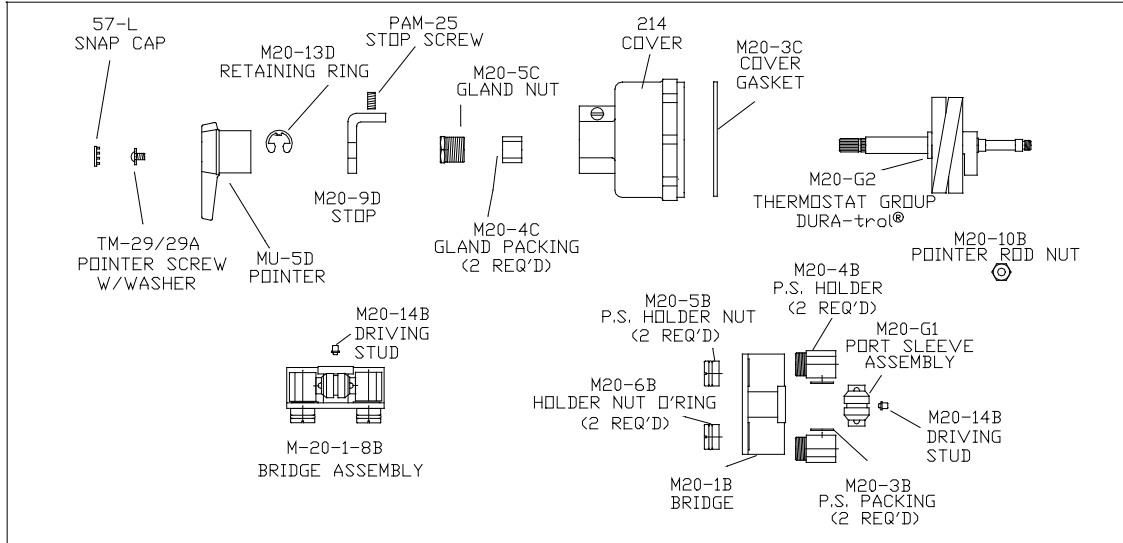
REPAIR KITS * "200" FOR TM-200 "125" FOR TM-150



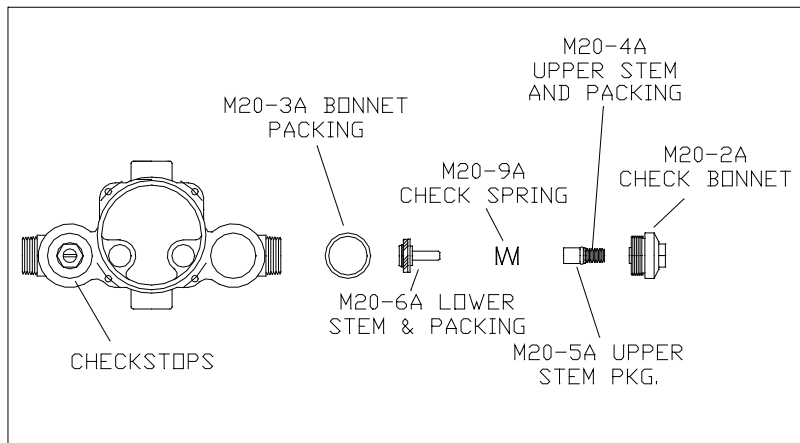
REMEMBER! THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS (SEE MAINTENANCE GUIDE AND RECORD, MGR-1000).

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

TM20 VALVE PARTS

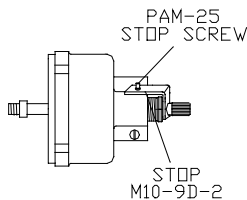


CHECKSTOP PARTS

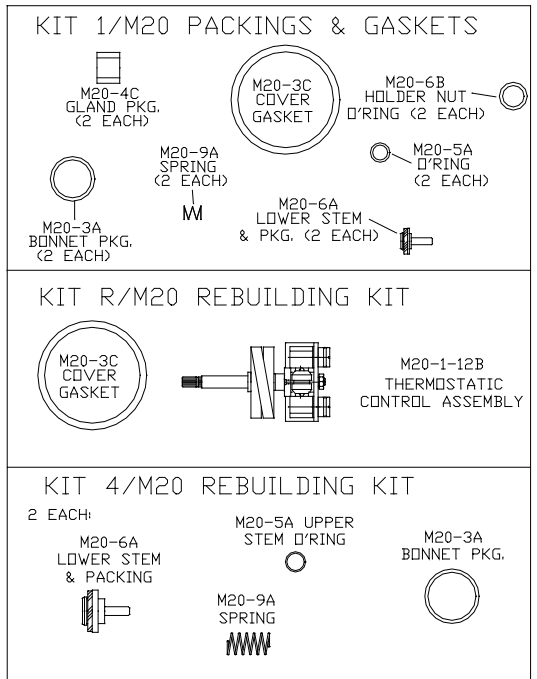


LOCK-TYPE POINTER

TM valves are furnished with lockable pointers. See part noted.



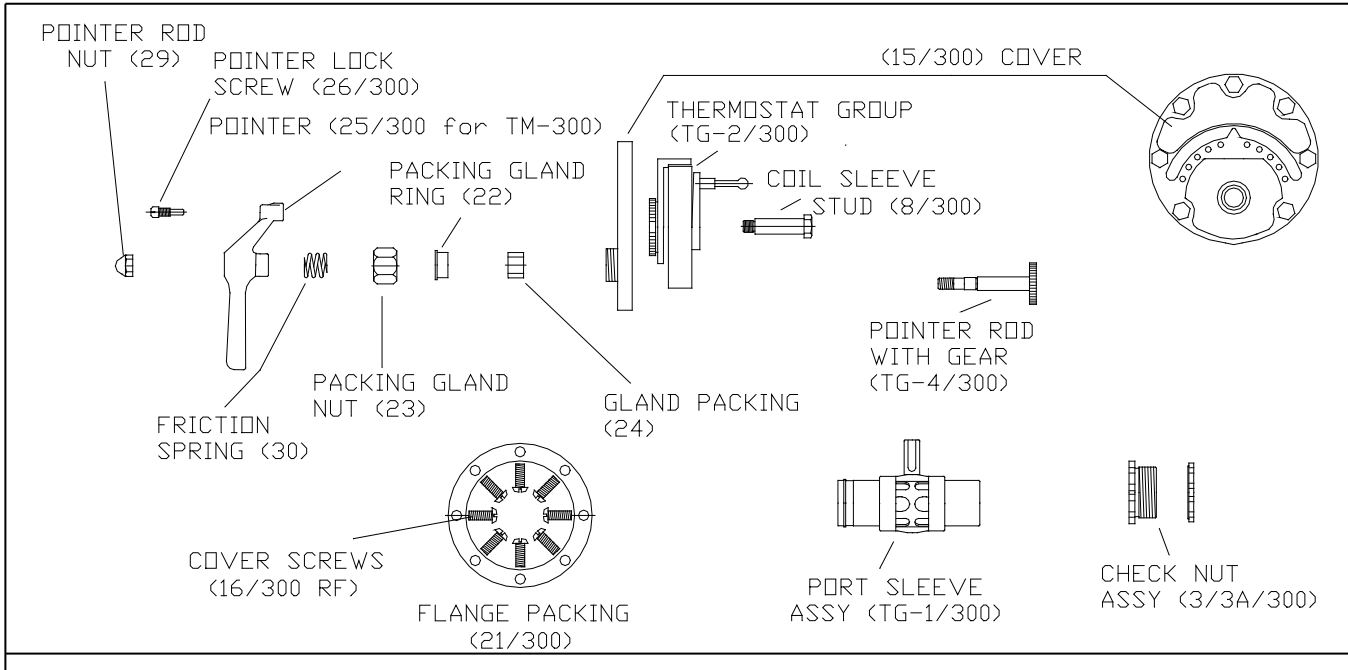
REPAIR KIT



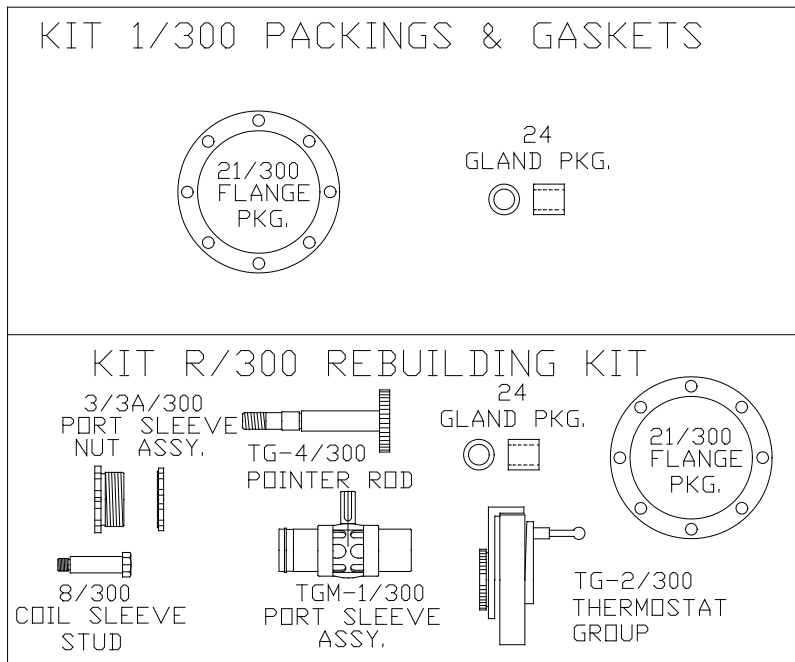
REMEMBER! THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS (SEE MAINTENANCE GUIDE AND RECORD, MGR-1000).

NOTE: AFTER INSTALLING NEW PARTS IT WILL BE NECESSARY TO RESET THE ADJUSTABLE HIGH TEMPERATURE LIMIT STOP ON EACH VALVE (SEE PAGE 2&3).

TM300 VALVE PARTS



REPAIR KITS

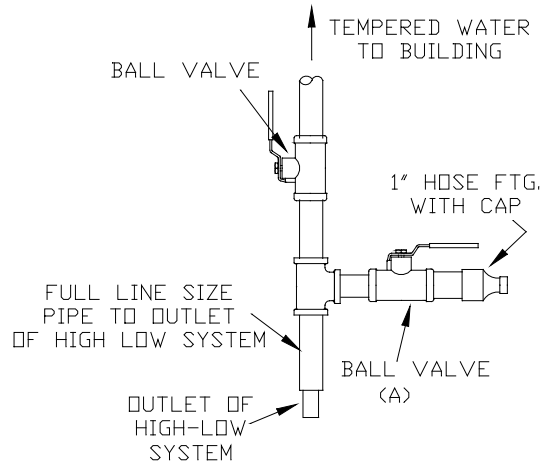


REMEMBER! THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS (SEE MAINTENANCE GUIDE AND RECORD, MGR-1000).

NOTE: AFTER INSTALLING NEW PARTS IT WILL BE NECESSARY TO RESET THE ADJUSTABLE HIGH TEMPERATURE LIMIT STOP ON EACH VALVE (SEE PAGE 2&3).

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

The addition of this piping arrangement (extra tee and ball valve) eliminates the need to turn showers (or equivalent flow) 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.

FLOW CAPACITIES

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- 30020015020PRV	6"	6"	1.0	320	500	530	545	570	590	610	620	642	650	GPM
			3.8	1211	1893	2006	2063	2158	2233	2309	2347	2430	2460	L/MIN

TROUBLESHOOTING PRESSURE REGULATING VALVE

When replacement parts are required for the pressure regulating valve, the following information must be given:

Manufacturer of PRV: _____
 Type: _____
 Serial number: _____

(This information is found on the tag attached to the adjusting screw).

SYMPTOM:

1. If PRV leaks by adjusting screw or if no pressure adjustment is possible.
2. If low pressure in building
3. If outlet pressure has to be 70 to 100 PSI

Repair Kit:
Kit R/PRV

Low Pressure Spring LP/PRV
High Pressure Spring HP/PRV

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.