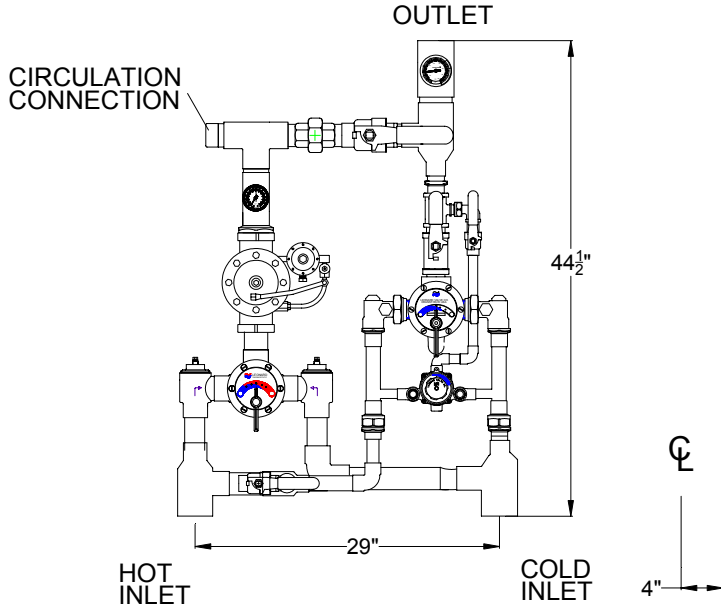


INSTALLATION ADJUSTMENT SERVICE HIGH CAPACITY MANIFOLD SYSTEM

TM-186-20015020-PRV

IMPORTANT! Provide serial numbers for all valves when ordering parts!!!
Small valve manufactured after July 2007 starting with serial # TM2039272



- | | |
|--|---|
| <ol style="list-style-type: none"> 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. | <ol style="list-style-type: none"> 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. |
|--|---|

Maximum Operating Pressure 125PSI (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).

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.

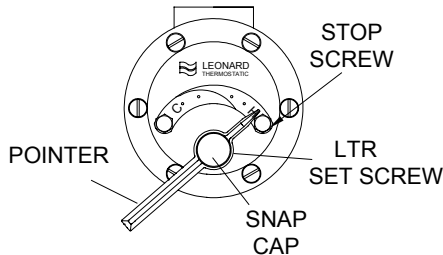
NOTE: High Low Manifold Systems include Thermostatic Water Mixing Valves, which must be regularly maintained to provide best performance. Frequency of cleaning depends on quality of local water conditions and usage. See Maintenance Guide and Record MGR-1000.

!!! 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!**

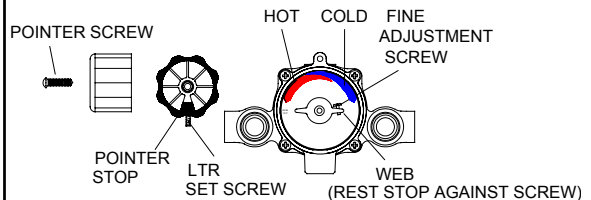
TO RESET ADJUSTABLE HIGH TEMPERATURE LIMIT STOP:

LARGE MIXING VALVE (TM-200 OR 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.
- * **LIMIT STOP MUST BE RESET AND RECHECKED EACH TIME HANDLE IS REMOVED.**

SMALL MIXING VALVE (TM-20)



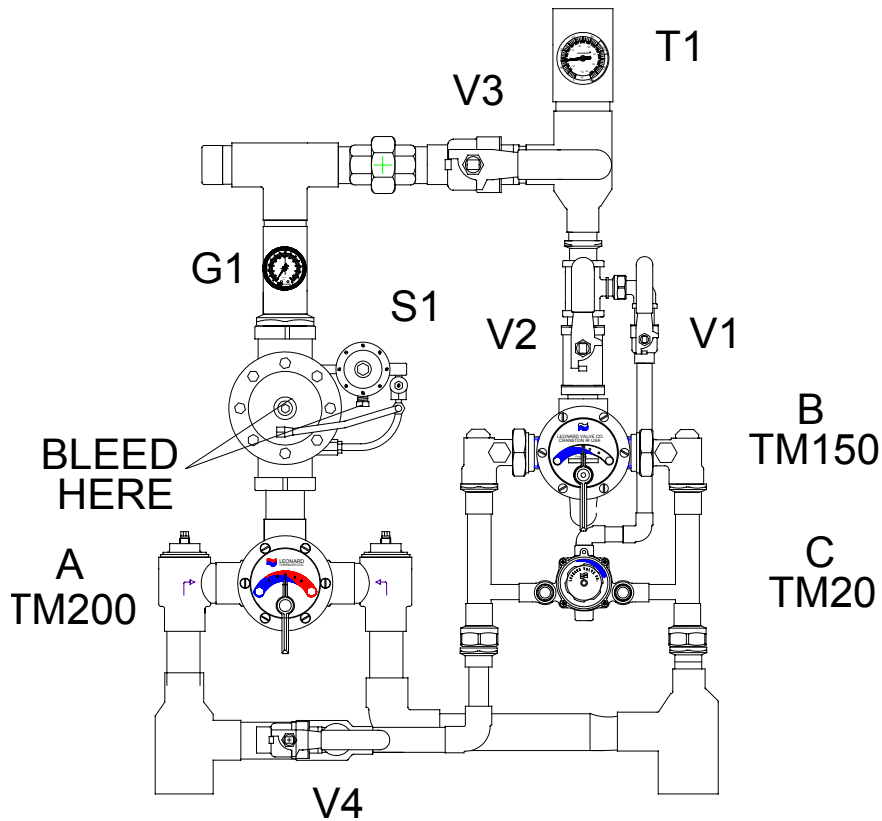
1. Loosen LTR SET SCREW, remove POINTER SCREW.
 2. Adjust POINTER to maximum desired temperature.
 3. Remove POINTER, replace POINTER on spline rod with STOP (which is cast into the underside on the pointer), resting against the BOTTOM side of the WEB on the FINE ADJUSTMENT SCREW.
 4. If fine adjustment is needed, adjust FINE ADJUSTMENT SCREW on the cover, loosen for hotter or tighten for cooler temperature.
 5. Replace POINTER and check temperature, if set to desired temperature replace POINTER SCREW, and tighten LTR SET SCREW.
 6. 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.
- * **LIMIT STOP MUST BE RESET AND RECHECKED EACH TIME HANDLE IS REMOVED.**

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 Leonard Required Piping Method (see page 4).

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

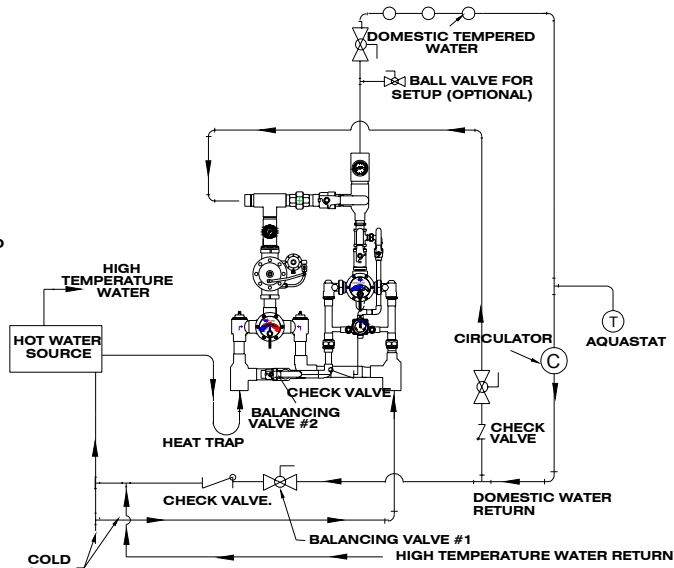
SETUP INSTRUCTIONS



- | | |
|---|---|
| <ol style="list-style-type: none"> 1. TM-186-PRV High-Low Unit Must be piped in accordance with appropriate Piping Method shown on page 4. 2. Shut down circulator pumps, close valve V3 & V4. Adjust screw S1 on the reducing pilot fully clockwise and record water pressure reading on gauge G1. 3. Carefully adjust screw S1 on the reducing pilot fully counter-clockwise (CCW) until all spring tension is relieved. 4. Close outlet valve V1 and V2. Open outlet valves V3 and make sure it is in the full open position. 5. Open enough fixtures to flow at least 40 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. 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 40 GPM. 7. Set outlet temperature of mixing valve A to the safe required level (read temperature on gauge T1). | <ol style="list-style-type: none"> 8. Turn off enough fixtures to flow 20 GPM downstream of the assembly. 9. Open outlet valve V2, close V3, (V1 should remain closed). 10. Set outlet temperature of mixing valve labeled B to the same temperature as step 7. (Read temperature at gauge T1). 11. Turn off enough fixtures to flow 2 GPM downstream of the assembly. 12. Open outlet valve V1 and close valve V2, (V3 should remain closed). 13. Set outlet temperature of mixing valve labeled C to the same temperature as step 7. (Read temperature at gauge T1). 14. Turn circulator pump on. Open outlet valves V2 and V3. System is operational. 15. Important! Now proceed to balance circulated tempered water system (see page 4). |
|---|---|

METHOD #4

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



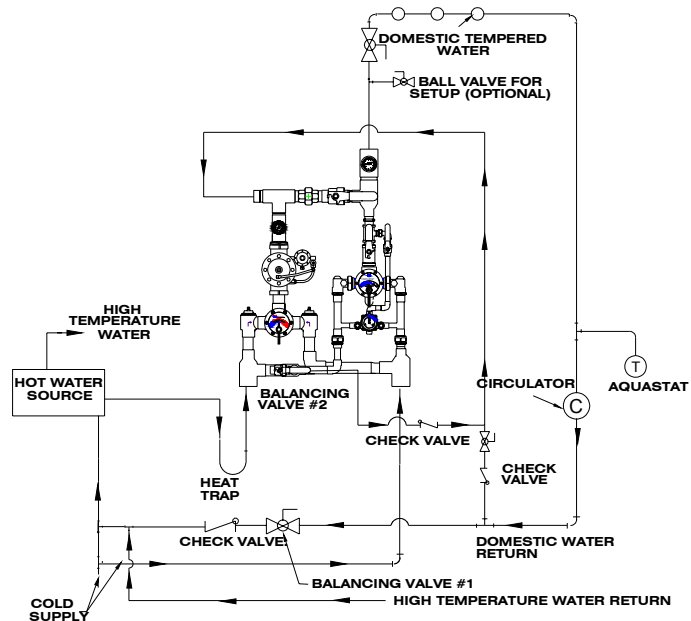
* MODERATE FLOW SYSTEM MAY BE DEFINED AS THOSE IN WHICH A RECIRCULATION FLOW OF EIGHT (8) TO TWENTY FIVE (25) GALLONS PER MINUTE IS REQUIRED TO MAINTAIN A GIVEN TEMPERATURE

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.



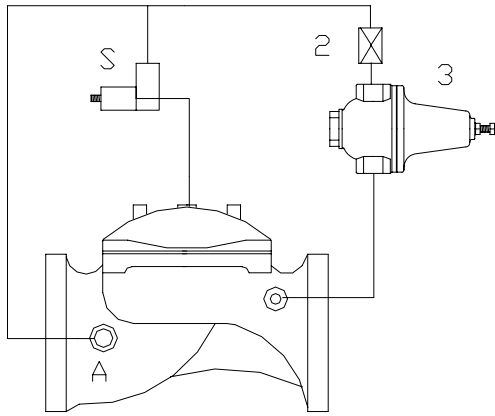
*HIGH FLOW SYSTEMS INCLUDE THOSE WHICH ARE REQUIRED TO RECIRCULATE A FLOW GREATER THAN (25) TWENTY FIVE GALLONS PER MINUTE SUCH SYSTEMS REQUIRE PIPING WHICH MAY INTRODUCE SIGNIFICANTLY MORE 'HOT' WATER INTO THE SYSTEM DURING PERIODS OF NO DRAW

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 LOWER FLOW RECIRCULATED SYSTEMS AND FOR OTHER SPECIAL INSTALLATIONS.

PRESSURE REDUCING VALVE



PARTS LIST

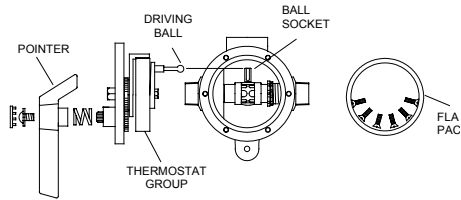
- A In line, Filter
- 2 Control Orifice
- 3 Pressure Reducing Pilot
- S Opening Speed Control

TROUBLESHOOTING

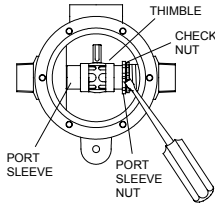
<u>SYMPTOM</u>	<u>CAUSE</u>	<u>REMEDY</u>
Valve fails to open	Insufficient inlet pressure No downstream demand Insufficient spring compression on pressure reducing pilot Trapped air	Check/create inlet pressure Create demand/flow Turn adjusting screw on pressure reducing pilot 3 clockwise Bleed air from cover and bleed air from tubing at highest point
Valve Fails to Close or Regulate	Filter A plugged. Orifice fitting 2 plugged Regulated pressure pulsates or hunts. Debris trapped in main valve / Diaphragm in main valve Leaking / Scale on stem Pressure reducing pilot 3 not serviceable	Remove in-line filter A and clean screen Remove orifice fitting 2 and clean Bleed air from cover and bleed air from tubing at highest point De-pressurized the system and remove valve cover and diaphragm to inspect/remove debris. Replace pressure reducing pilot

INSTRUCTIONS FOR SERVICING

LARGER TM VALVES



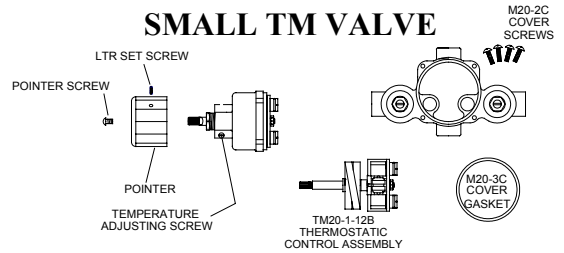
1. Shut off hot and cold supplies to this valve. Remove snap cap, screw and washer, loosen LTR set screw, then remove friction spring and pointer.
2. Remove cover screws, and cover, to which the thermostat group is attached.



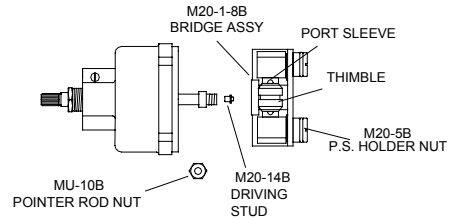
3. To clean port sleeve assembly (the thimble must slide freely on the port sleeve): unscrew the check nut as far as it will go, then screw the port sleeve nut into the base. The port sleeve and thimble may then be lifted out. There is no shoulder for the TM-150 port sleeve.
4. Clean with a non-corrosive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

SMALL TM VALVE



1. Turn off hot and cold supplies at screwdriver checkstops. Loosen LTR set screw, pointer screw, pointer. 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).

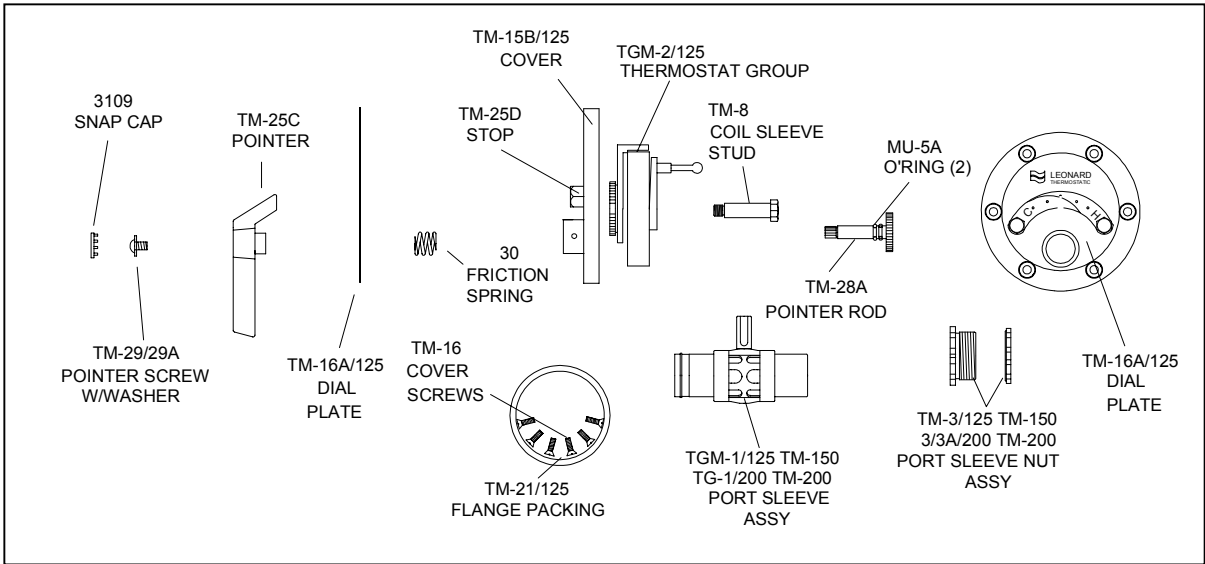
TROUBLESHOOTING INSTRUCTIONS

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

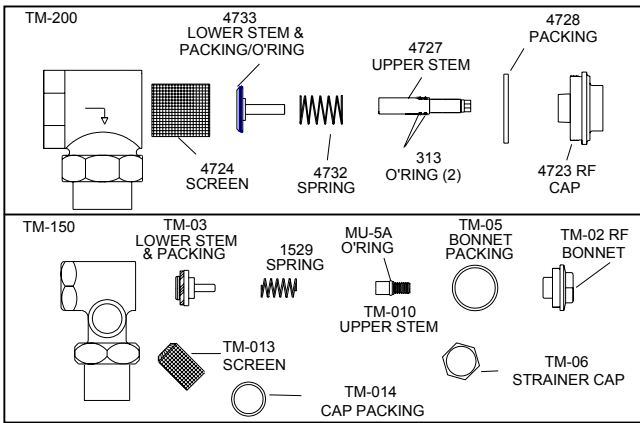
		TM-200	TM-150	TM-20
PACKING & GASKETS	<ol style="list-style-type: none"> 1. Leaks at stem. 2. Leak between valve cover and base. 	Kit # 1/200C	Kit # 1/50Y	Kit # 1/M20 (Packings & Gaskets)
PORT SLEEVE/BRIDGE ASSEMBLY	<ol style="list-style-type: none"> 3. Valve delivers either all hot or all cold water, or will not mix consistently. 	Kit # R/200N TG-1/200	Kit # R/125 or TGM-1/125	Kit # R/M20 or M20-1-8B Bridge assembly
THERMOSTAT GROUP	<ol style="list-style-type: none"> 4. After cleaning or replacing port sleeve/bridge assembly, valve performance is not consistent. 	TGM-2/125	TGM-2/125	Kit #R/M20 (Rebuilding Kit) or M20-G2 Thermostat Group
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. 	Kit #2/200C	Kit #2/50Y	Kit #4/M20 (Checkstop Kit)

See pages 7 & 8 for Parts Breakdowns

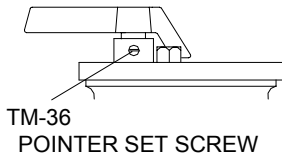
LARGE TM VALVE PARTS



CHECKSTOP PARTS



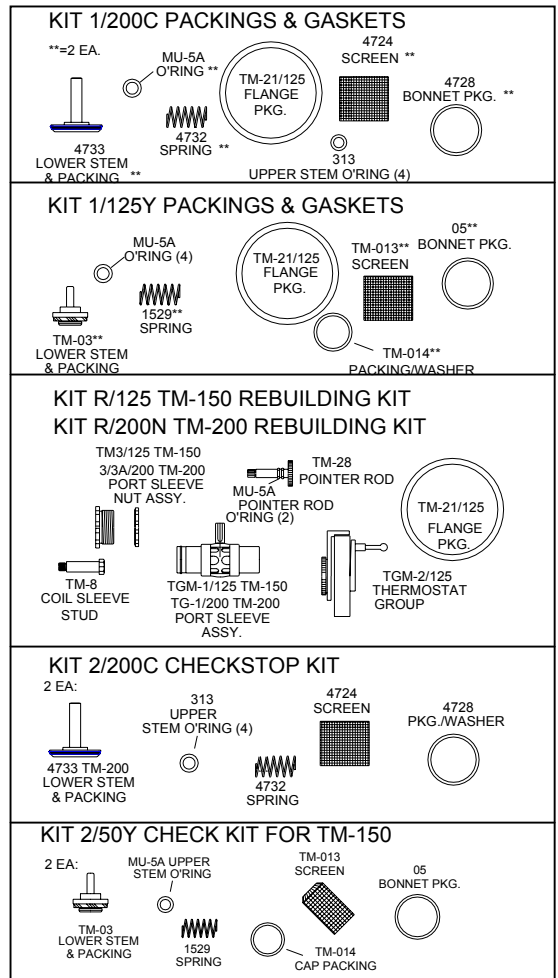
LOCK TYPE POINTER



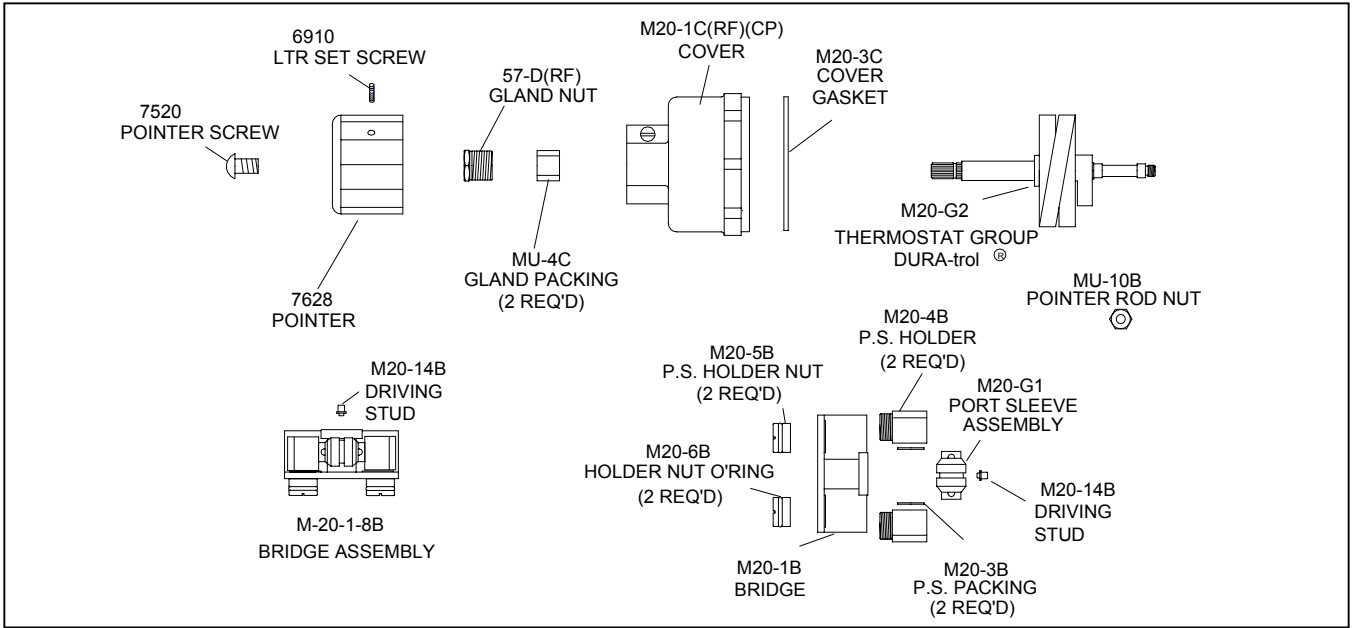
REMEMBER! THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS (SEE MAINTENANCE GUIDE AND RECORD, MGR-1000).

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

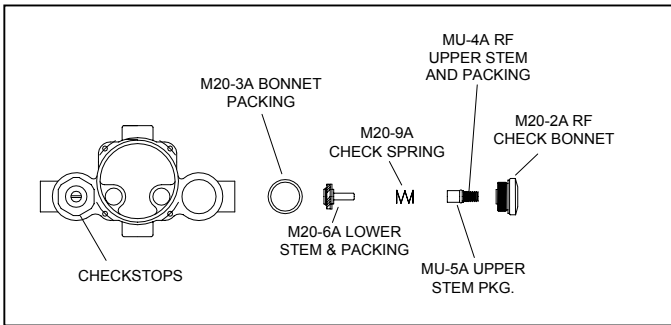
REPAIR KITS



TM 20 VALVE PARTS

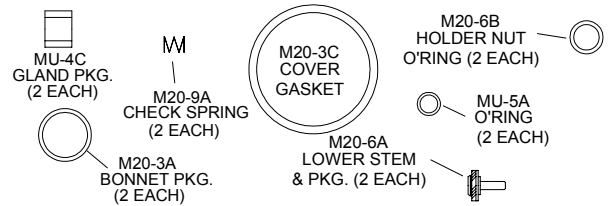


CHECKSTOP PARTS

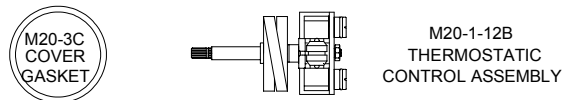


REPAIR KITS

REPAIR KIT 1/M20 PACKINGS & GASKETS



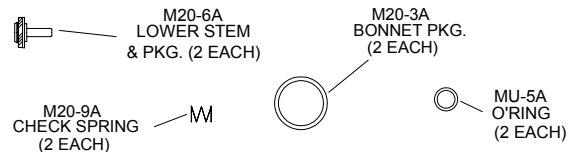
REPAIR KIT R/M20 REBUILDING KIT



REPAIR KIT 2/M20 PORT SLEEVE KIT



REPAIR KIT 4/M20 CHECKSTOP KIT

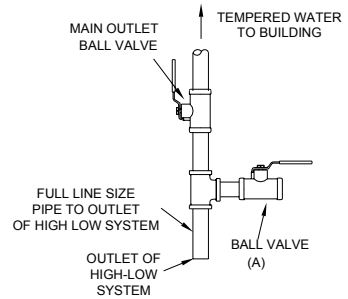


REMEMBER! THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS. SEE MAINTENANCE GUIDE AND RECORD.

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 (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- 20015020PRV	3"	3"	1.0	.3	.7	1.0	1.4	1.7	2.1	2.4	2.8	3.1	3.4	GPM
	76mm	76mm	3.7	606	795	946	1041	1154	1230	1287	1306	1317	1325	L/MIN

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.