

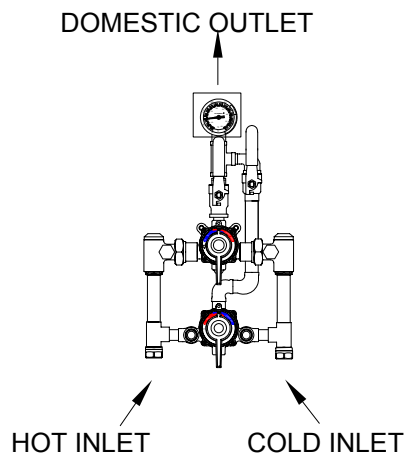
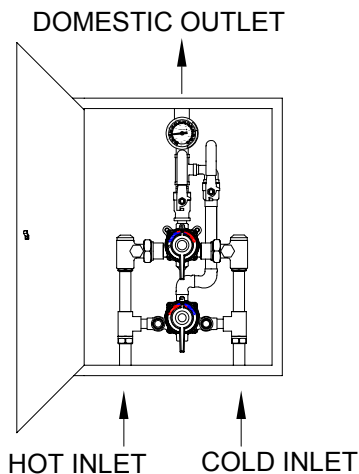
# INSTALLATION ADJUSTMENT SERVICE HIGH-LOW MANIFOLD SYSTEMS

## TM-420

ASSE 1017 LISTED



IMPORTANT! Provide serial numbers for both 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 **REQUIRED PIPING METHOD #2** (see page 4).
6. Refer to page 3 of this bulletin for correct Setup Instructions.

**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).**

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# 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.

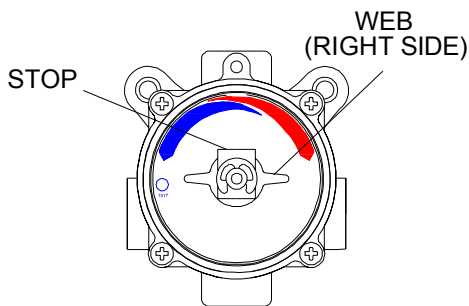
**NOTE:** High Low Manifold Systems include Thermostatic Water Mixing Valves, which must be regularly maintained to provide best performance. Frequency of cleaning depends on quality of local water conditions and usage. See Maintenance Guide and Record MGR-1000.

## 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!**

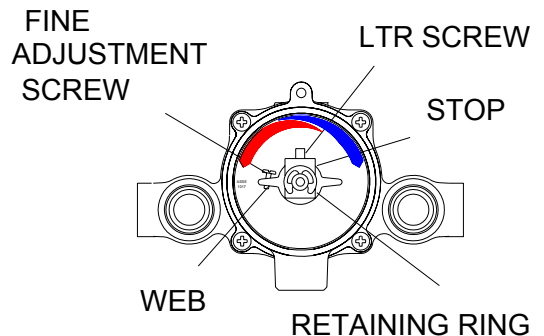
## TO RESET ADJUSTABLE HIGH TEMPERATURE LIMIT STOP:

TM-28



1. Remove SNAP CAP, SCREW & WASHER & POINTER.
2. Loosen LTR screw, and remove, retaining ring and stop
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 STOP 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.
5. Replace stop, retaining ring.
6. Replace POINTER so that it is pointing to the extreme HOT position. 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 SNAP CAP, SCREW & WASHER & POINTER
2. Loosen LTR screw, and remove retaining ring and stop.
3. Temporarily place POINTER on the spline rod, adjust to desired temperature, and remove the pointer.
4. Push stop on rod so that its LEFT edge is resting against the fine adjustment screw on cover
5. Turn, fine adjustment screw if necessary, (clockwise for slightly higher temperature, counter clockwise for slightly lower temperature). (TM-20 only).
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.

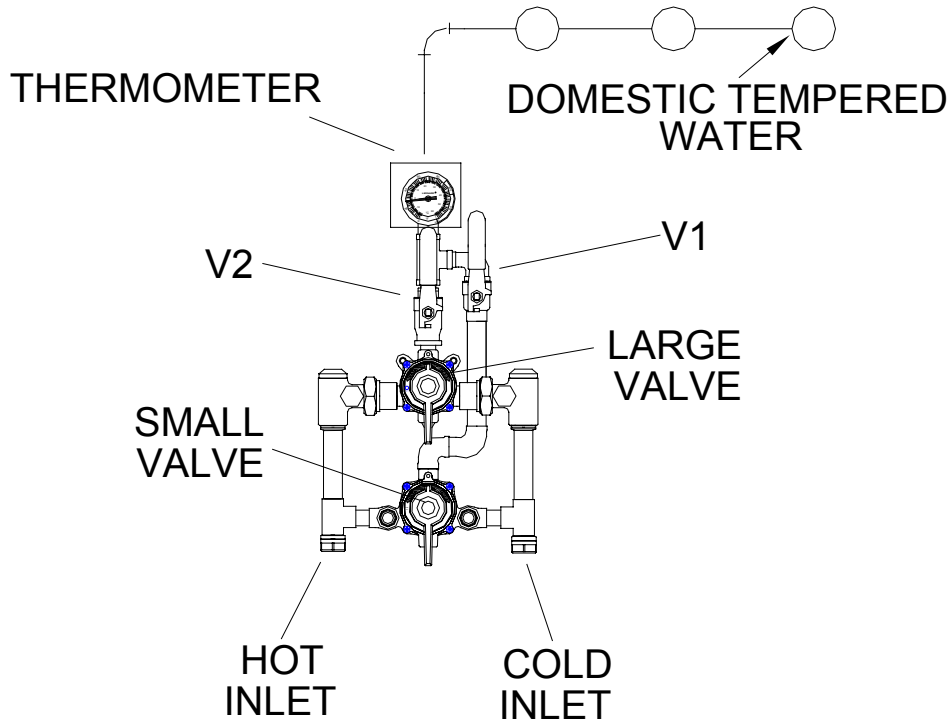
**IMPORTANT! BOTH MIXING VALVES MUST BE SET AT THE SAME OPERATING TEMPERATURE.  
SEE PAGES: 6 & 7 FOR COMPLETE PARTS BREAKDOWN**

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 8).

If installed on a recirculated hot water system, make certain the valve is piped according to Leonard Required Piping Method #2 (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

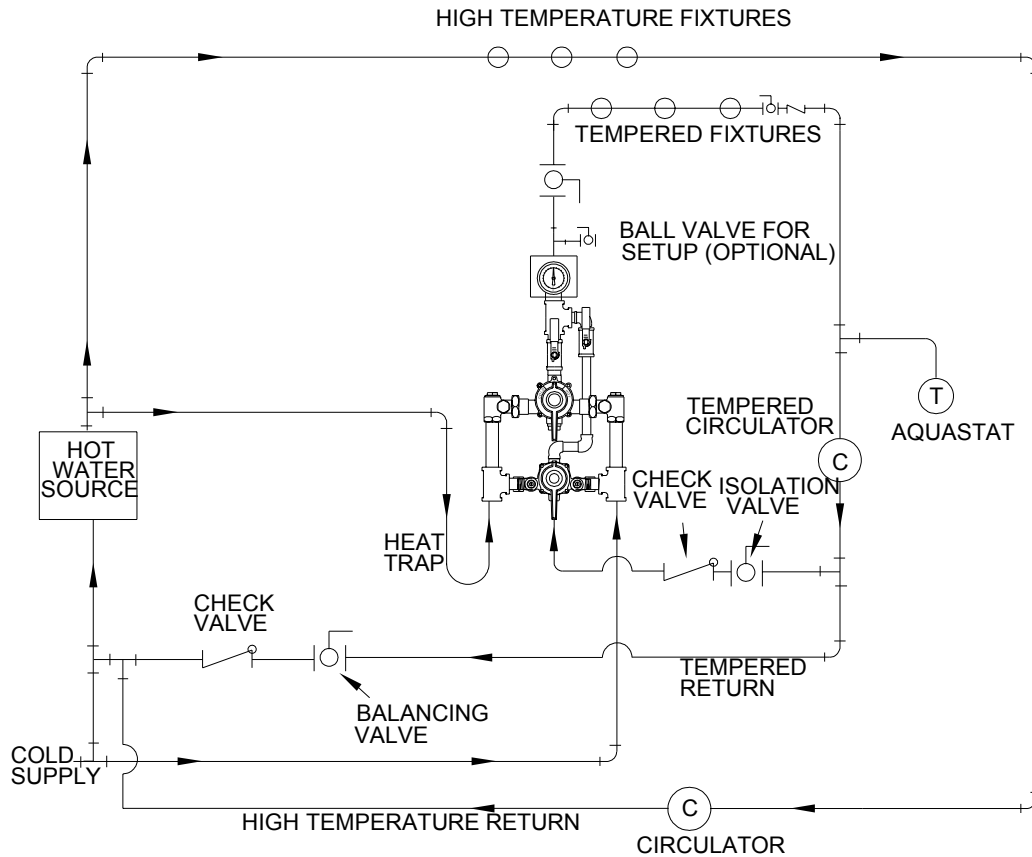


1. TM-186 High-Low Unit MUST be piped according to Method #2 (see page 4).
2. Make sure full hot and cold supplies to this assembly are operating. The temperature of the hot water source must be properly set and maintained
3. The circulator (if used) must be turned OFF before setup.
4. Turn on enough fixtures for a flow of at least 2 GPM downstream from this system. Make sure each fixture is set to deliver full "HOT" water.
5. Close outlet Valve V1 at the smaller Type TM Valve
6. Make sure Valve V2 at the large Type TM Valve is in the full open position.
7. Set outlet temperature of the large Type TM Valve to the required level.
8. Open outlet Valve V1 at the small TM Valve.
9. Shut outlet Valve V2 at the large TM valve.
10. Turn on enough fixtures for a flow of at least 2 GPM downstream from this system. Make sure each fixture is set to deliver full "HOT" water.
11. Set outlet temperature of the small TM valve to the same temperature as the large TM Valve.
12. Open outlet Valve V2. System is operational.
13. IMPORTANT!! See page 4 to balance recirculation system.

\* NOTE! FOR OPTIONAL OUTLET SETUP PIPING ARRANGEMENT, SEE PAGE 8

# REQUIRED METHOD OF PIPING (RECIRCULATED DOMESTIC WATER SYSTEMS)

## METHOD #2



THIS PIPING METHOD IS NOT TO BE USED FOR MORE THAN ONE BUILDING

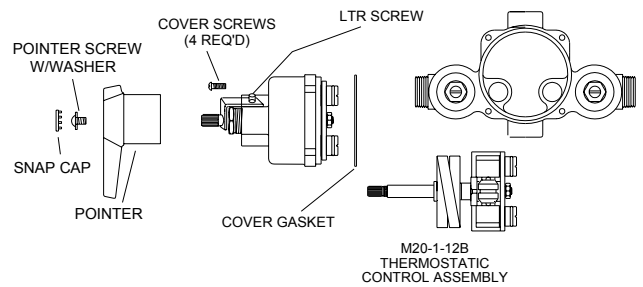
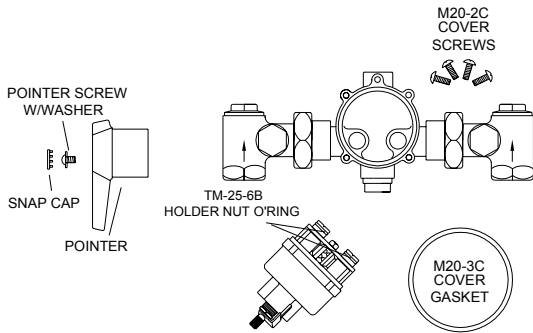
### PROCEDURE TO BALANCE RECIRCULATION SYSTEM

1. MAKE SURE NO WATER IS BEING DRAWN IN THE BUILDING. OPEN BALANCING VALVE, APPROXIMATELY HALF WAY AND START CIRCULATOR.
2. OBSERVE TEMPERATURE UNTIL IT STABILIZES.
3. CLOSE BALANCING VALVE SLIGHTLY IF TEMPERATURE IS TOO HOT, OR OPEN IT SLIGHTLY IF TEMPERATURE IS TOO COLD AND ALLOW TEMPERATURE TO STABILIZE. REPEAT UNTIL DESIRED RECIRCULATED TEMPERATURE IS SET.

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

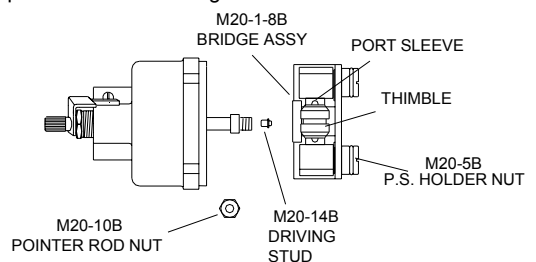
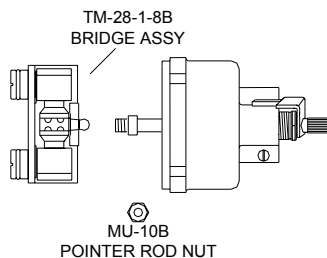
# INSTRUCTIONS FOR SERVICING LARGER TM VALVE

# INSTRUCTIONS FOR SERVICING SMALLER TM VALVE



1. Remove snap cap, screw, washer and handle.
2. Loosen LTR set screw
3. Turn off hot and cold supplies at screwdriver checkstops. Remove M20-2C (CP) cover screws to release cover and thermostatic control assembly.
4. To remove bridge assembly, TM28-1-8B, remove pointer rod nut (M20-10B) and pull bridge assembly off control rod.

1. Remove, snap cap, screw, washer and handle.
2. Loosen LTR set screw
3. Turn off hot and cold supplies at screwdriver checkstops. Remove M20-2C (CP) cover screws to release cover and thermostatic control assembly.
4. To remove bridge assembly, M20-1-8B, remove pointer rod nut (MU-10B) and pull bridge assembly off control rod. Do not misplace M20-14B driving stud.



5. To clean, submerge bridge in clean water or non-corrosive cleaning solution. **DO NOT USE ABRASIVES!** Be certain thimble moves freely on port sleeve. Note! Driving ball must engage slot in coil bracket when reassembling.
6. To clean thermostat coil, remove retaining ring and stop, loosen gland nut. Push rod through cover. Be careful not to pull coil out of shape.
7. Clean with a non-corrosive cleaning solution. **DO NOT USE ABRASIVES!**

5. To clean, submerge bridge 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.
6. To clean thermostat coil, remove retaining ring and stop, loosen gland nut. Push rod through cover. Be careful not to pull coil out of shape.
7. Clean with a non-corrosive cleaning solution. **DO NOT USE ABRASIVES!**

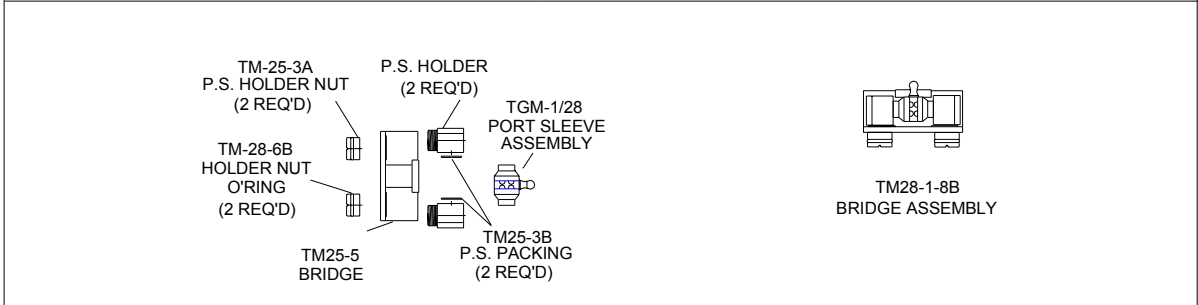
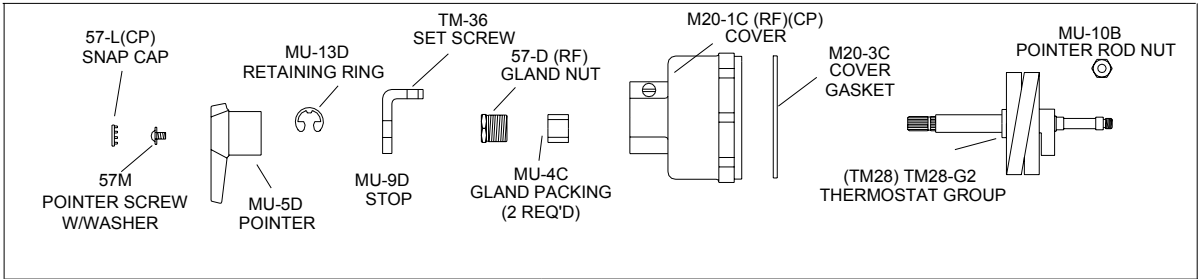
## TROUBLESHOOTING INSTRUCTIONS

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

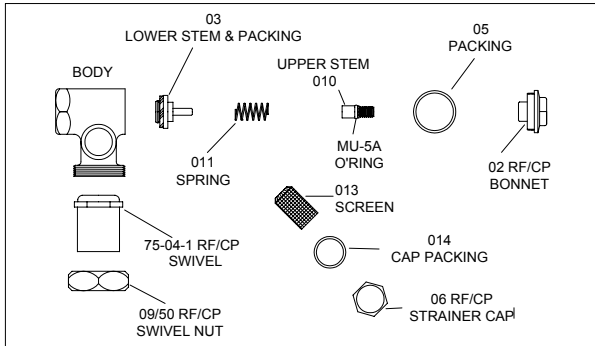
PACKING & GASKETS	<ol style="list-style-type: none"> <li>1. Leaks at stem.</li> <li>2. Leak between valve cover and base.</li> </ol>	Large Valve: Repair Kit # 1/28	Small Valve: Repair Kit #1/M20 (Packings & Gaskets)
PORT SLEEVE/BRIDGE ASSEMBLY	<ol style="list-style-type: none"> <li>3. Valve delivers either all hot or all cold water, or will not mix consistently.</li> </ol>	Repair Kit # R/28 (Rebuilding Repair Kit) or TM-28-1-8B Thermostat group	Repair Kit #R/M20 TM-20 (Rebuilding Kit) or M20-1-8B Bridge Assembly
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>	Repair Kit # R/28 or TM-28G2 Thermostat group	Repair Kit #R/M20 (Rebuilding Kit) or M20-G2 Thermostat Group
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>	Repair Kit #2/50	Repair Kit #4/M20 (Checkstop Kit)

See pages 6 & 7 for Parts Breakdowns

# TM 28 VALVE PARTS

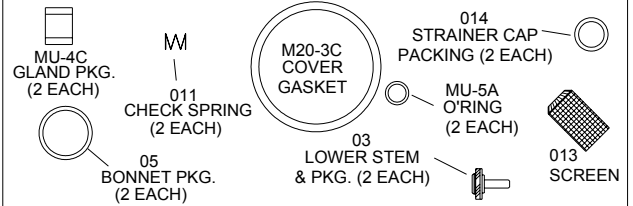


## CHECKSTOP PARTS

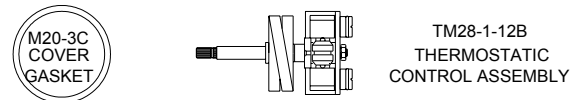


## REPAIR KITS

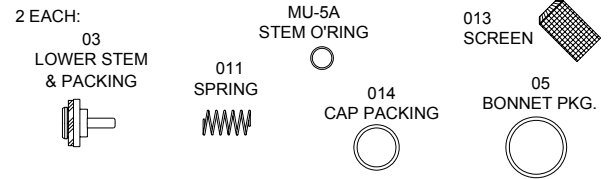
### REPAIR KIT 1/28 PACKINGS & GASKETS



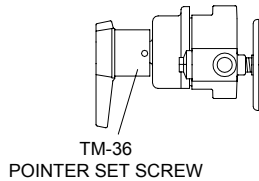
### REPAIR KIT R/28 REBUILDING KIT



### REPAIR KIT 2/50 CHECKSTOP KIT



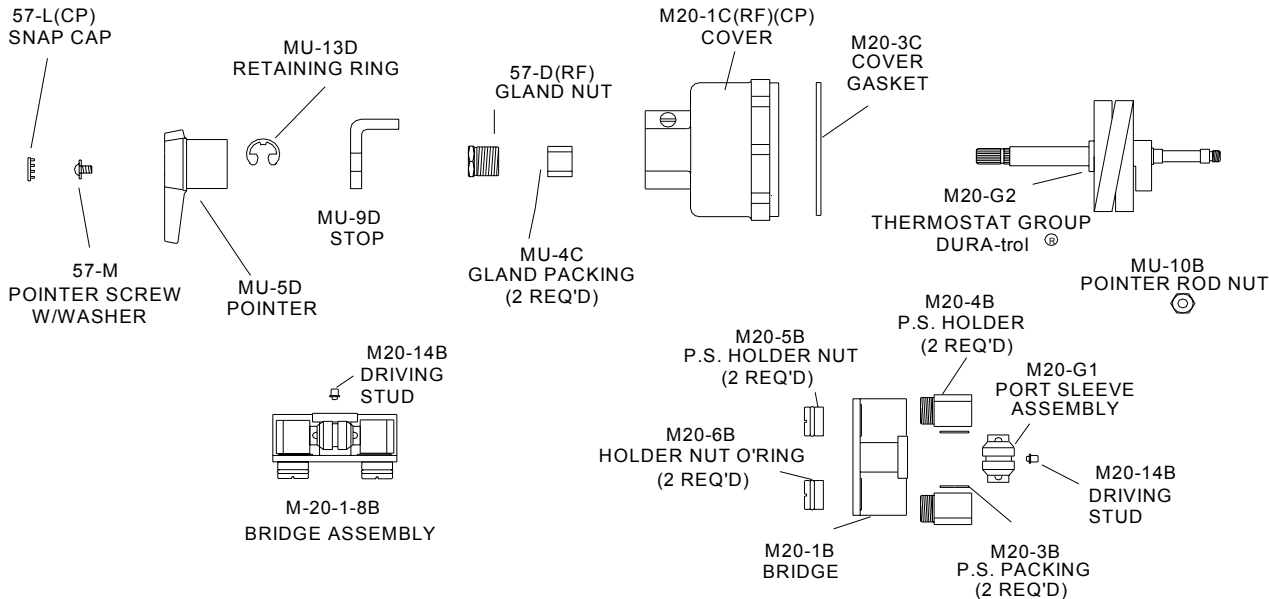
## LOCK-TYPE POINTER



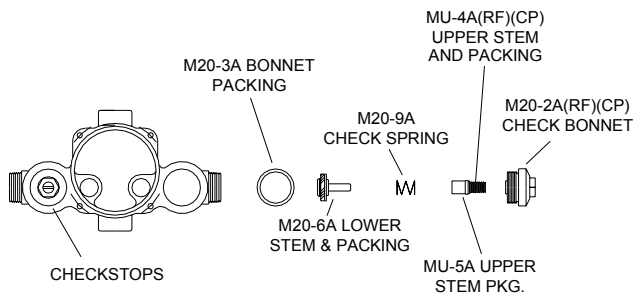
**REMEMBER!** THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS. SEE MAINTENANCE GUIDE AND RECORD.

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

# TM-20 VALVE PARTS



## CHECKSTOP PARTS



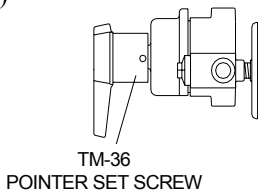
## GROUP

Push rod through cover. Be careful not to pull coil out of shape. If a deposit has collected on the thermostat group (M20-G2) brush in a non-corrosive cleaning solution.

## REPAIR KITS

### LOCK-TYPE POINTER (SUFFIX LTR)

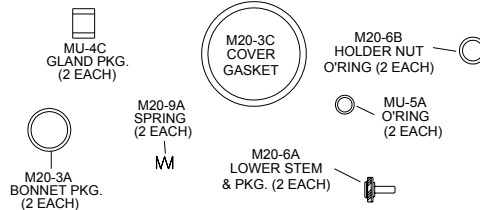
Some TM valves are furnished with lockable pointers. See part noted



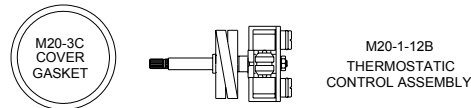
**REMEMBER!** THIS IS A CONTROL DEVICE WHICH MUST BE CLEANED AND MAINTAINED ON A REGULAR BASIS (SEE MAINTENANCE GUIDE AND RECORD, MGR-1000).

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

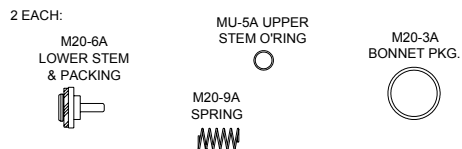
### REPAIR KIT 1/M20 PACKINGS & GASKETS



### REPAIR KIT R/M20 REBUILDING KIT



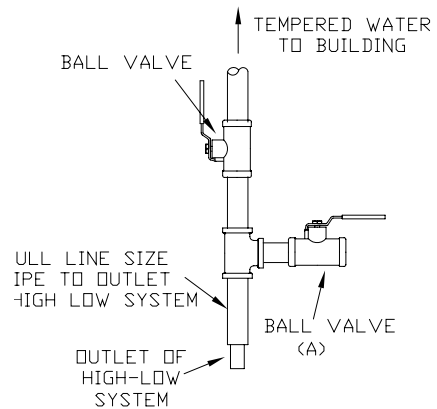
### REPAIR KIT 4/M20 REBUILDING KIT



## 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.**

## FLOW CAPACITIES

MODEL	IN	OUT	MINIMUM FLOW (GPM) (l/min)	SYSTEM PRESSURE DROP (PSIG)										PSI BAR
				5	10	15	20	25	30	35	40	45	50	
TM-420	3/4"	1"	1.0 (3.7)	.3 45	.7 68	.97 83	1.4 98	1.7 114	2.1 125	2.4 136	2.8 148	3.1 159	3.4 167	GPM 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.