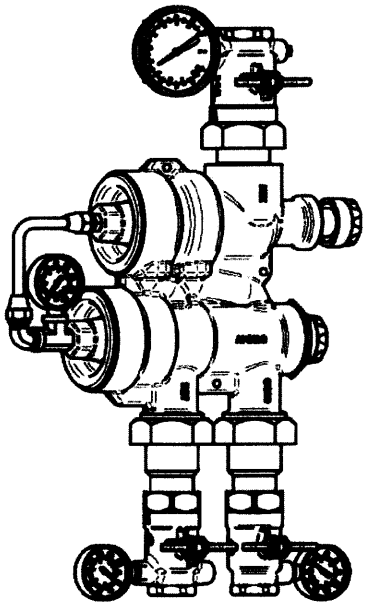
"Apollo" Valves Made in U.S.A.
MANUFACTURED BY CONBRACO IND.

MODEL MVHL
(34HL SERIES)
AUTOMATIC TEMPERATURE CONTROLLER
US Patent 6,929,188

The "Apollo" MVHL Automatic Temperature Control (ATC) is an advanced thermostatic mixing valve capable of maintaining safe, consistent temperature control of water at low and high flows to within ± 5°F. The MVHL will provide consistent temperature control at flow rates as high as 60 GPM and as low as 1.5 GPM, including mid range flow between high and low. This high quality "Apollo" valve performs its function without a need for recirculation pumps that other systems require in order to achieve comparable performance. Integral strainers and checks are provided for greater reliability and performance. This valve is factory tested and set to deliver years of satisfactory performance with minimal maintenance.



Maintenance Record								
Date	Init	Inlet PSI C	Inlet PSI H	Low Flow Temp.	Knob Setting	High Flow Temp.	Knob Setting	Repair or Clean

This product meets the requirement of the EPA Safe Drinking Water Act.

WARNING! This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires that this warning be given to the consumers in the State of California.). For more information visit www.apollovalves.com.

MAINTENANCE / INSPECTION

SETTING THE MAX TEMPERATURE LIMIT STOP

The Apollo MVHL comes with maximum temperature limit stops. If use of the limt stops is desired, the limit stops must be set before the desired mixed water temperature is adjusted as follows:

1) Turn the cold water supply on (turn it on first to avoid damage to the thermostatic element). Next, turn the hot water supply on.
2) Adjust the flow rate until the differential pressure (read on the pressure gauges at position A and position B on the diagram) is approximately 5 psi.
3) Set the mixed water temperature to max desired temperature by adjusting the yellow knob marked "LOW" on the valve. Let the water run until the outlet temperature is consistent. Use the temperature gauge down stream of the mixed water outlet to check the water temperature.
4) Adjust the flow rate so that the pressure differential at the pressure gauges at point A and point B (shown on the diagram) is approximately 15 psi.
5) Remove the yellow adjusting knob marked "HIGH" on the valve. Adjust the mixed water temperature to max desired temperature by adjusting the brass neck (see diagram).
6) Once the mixed water temperature stabilizes at max desired temperature, tighten the set screw using the allen wrench provided. Reassemble the yellow knob.
7) Close all three shutoff valves (hot, cold, and mixed outlet).
8) Remove the retainer and yellow temperature adjustment knob from the side of the valve marked "LOW" using a wrench being careful not to distort the valve body.
9) Tighten the temperature limit stop (small brass hex retainer) by hand or with a wrench until it bottoms out on the adjustment stem. It only needs to touch the top of the adjustment stem. DO NOT OVERTIGHTEN THE STOP!
10) Tighten the locking retainer with a 1/2" drive socket extension to lock the temperature limit stop in place. DO NOT OVERTIGHTEN THE LOCKING RETAINER.
11) Re-assemble the low flow retainer and knob.
12) Open the cold shutoff valve and then open the hot water shutoff valve (cold first). Open the mixed water outlet shutoff valve.

ADJUSTING THE DESIRED MIXED WATER OUTLET TEMP

The Apollo MVHL is designed to provide safe, reliable hot water to multiple fixtures without additional downstream adjustment. Valve should be installed by a licensed contractor in accordance with these instructions and local plumbing codes. The desired mixed water outlet temperature of the valve can be adjusted as follows:

1) Adjust the flow rate of the valve until the differential pressure read on the pressure gauges at position A and position B (shown on the diagram) is approximately 5 psi by throttling downstream fixtures or using the throttle valve.
2) Set the desired mixed water outlet temperature by adjusting the yellow knob marked "LOW" on the valve. Press in on the knob while adjusting to ensure stem engages properly.
3) Read the outlet temperature on the gauge downstream of the mixed water outlet (marked "T" on the diagram).
4) Let the water run until the outlet temperature is stable at the desired value.
5) After this is accomplished, adjust the flow rate until the differential pressure between A and B is approximately 15psi by throttling downstream fixtures or using the throttle port.
6) Set the desired mix water temperature by adjusting the yellow knob marked "HIGH" on the valve, using temperature gauge marked "T" on the diagram.

INSPECTION / CLEANING

1. Valve should be inspected/cleaned periodically to ensure optimum performance.
2. Close the hot water inlet shutoff valve, the cold water inlet shutoff valve, and the mixed water outlet shutoff valve in order to completely isolate the valve.
3. Fully loosen the union nuts from ends of each check valve assembly. Remove both check valve assemblies and both strainers. (See figure 2)
4. Clean/Replace the strainers.
5. Clean the check valve assemblies with fresh water only.
6. Remove bypass line with adjustable wrench being careful not to damage the line.
7. Remove the high and low mixing chamber retainers. USE CAUTION WHEN REMOVING THE RETAINERS - THE INNER SPRINGS ARE BEING COMPRESSED BY THE RETAINERS.
8. Clean the pistons and the mixing chambers with water and a clean towel.
9. Lubricate the o-rings with DowCorning 111 (or other non-petroleum based lubricant) and re-assemble the pistons, springs and retainers.
10. Reinstall the retainers and check valve assemblies and restore water pressure to the valve by opening the shutoff valves. Ensure the cold shutoff valve is opened first to avoid thermostatic element damage.

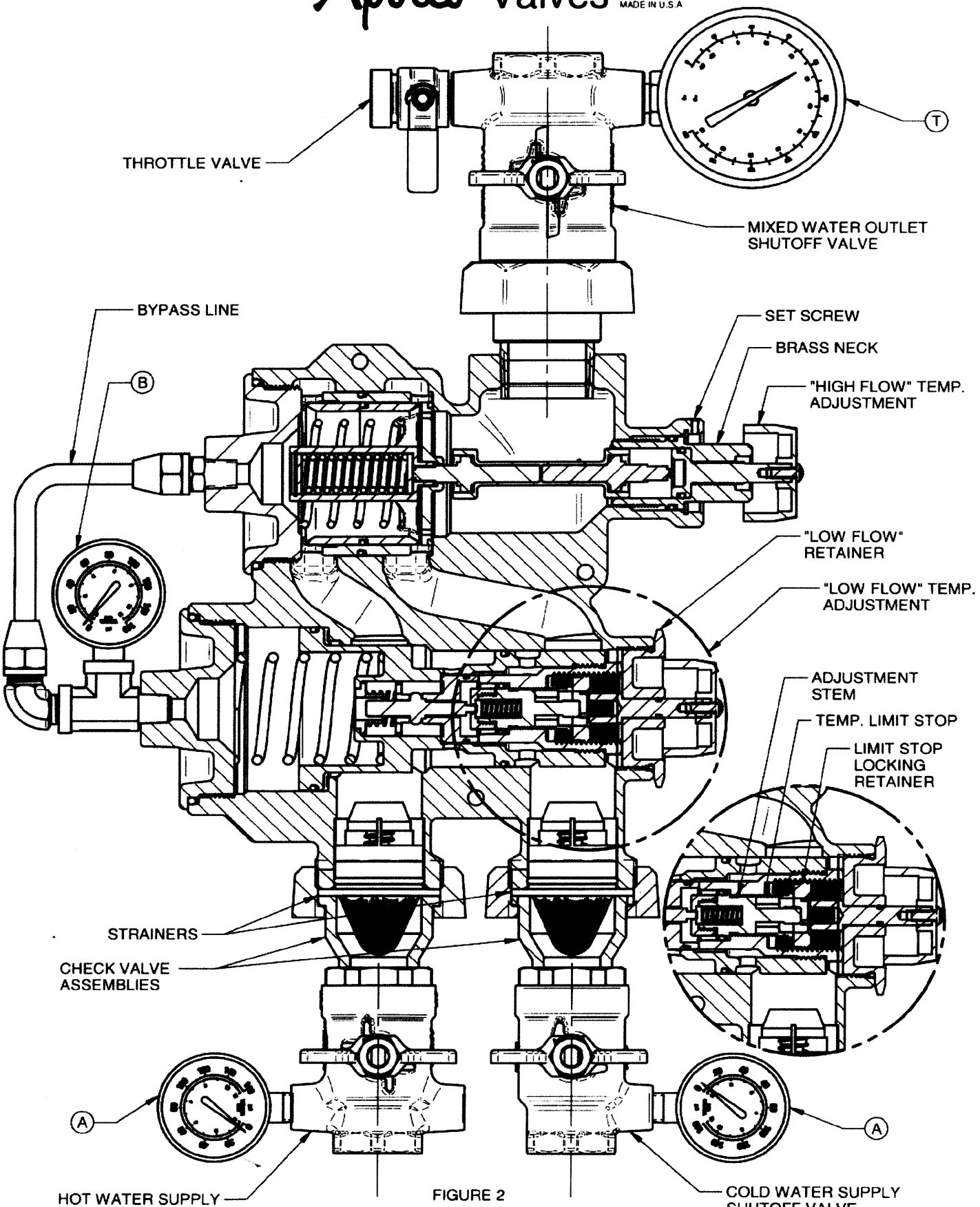

THROTTLE VALVE
T
MIXED WATER OUTLET SHUTOFF VALVE
BYPASS LINE
B
SET SCREW
BRASS NECK
"HIGH FLOW" TEMP. ADJUSTMENT
"LOW FLOW" RETAINER
"LOW FLOW" TEMP. ADJUSTMENT
ADJUSTMENT STEM
TEMP. LIMIT STOP
LIMIT STOP LOCKING RETAINER
STRAINERS
CHECK VALVE ASSEMBLIES
A
A
HOT WATER SUPPLY SHUTOFF VALVE
COLD WATER SUPPLY SHUTOFF VALVE

FIGURE 2

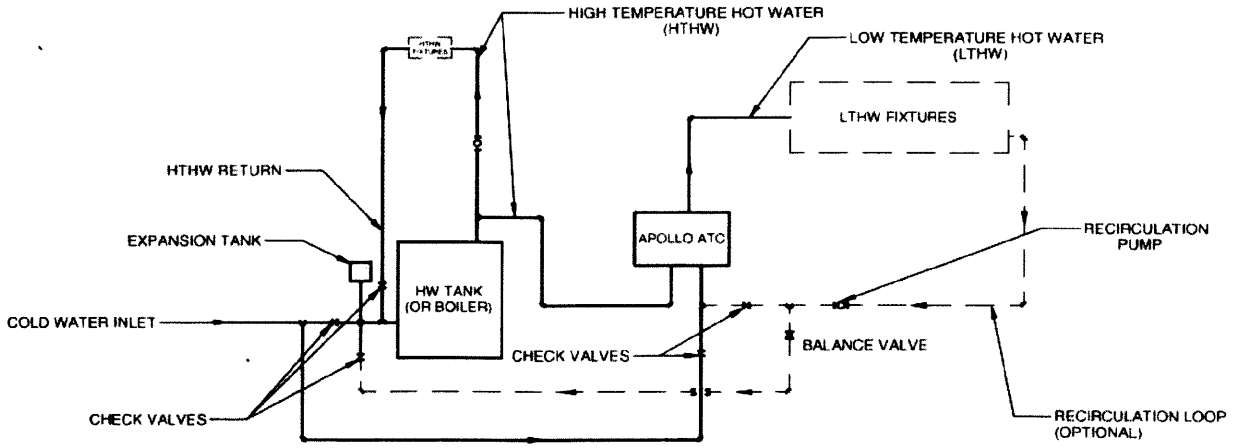


FIGURE 1: LOW TEMP RECIRCULATION DIAGRAM W/ A SEPARATE HIGH TEMP RECIRCULATION

TROUBLE SHOOTING GUIDE

PROBLEM & CAUSE	ANSWER
1. Fluctuating or erratic hot water temperature.	
A. Large demand for hot water	Large demands for hot water will cause the mixing valve to operate incorrectly. The valve is not designed to compensate for such conditions. When hotwater is removed faster than the heating source can reheat the water, the temperature will drop below the setting of the valve.
B. Unbalanced Pressures	If the pressure differential between the hot and the cold water lines is greater than 30 psi, a balancing or throttling valve may be needed on the cold water line to make up for the head loss in the heating source.
2. Hot water backing up in cold water line.	
A. City water pressure drops causing hot water pressure to override cold water pressure. (In normal operation this is prevented by integral check valves)	Integral check valves may need replacement.
3. Water temperature will not adjust to the desired temperature.	
A. Unbalanced pressures	If the pressure differential between the hot and the cold water inlet lines is greater than 30 psi, a balancing or throttling valve may be needed on the cold water line to make up for the head loss in the heating source.
B. Heating source inadequate	The heating source may not produce enough hot water to maintain the desired temperature.
4. Failure of thermostat	
A. Thermostat exposed to excessively high water temperatures	Thermostat on heating source may be set too high causing temperatures to exceed 210° F. Reduce water supply temp to <200° F.
B. Buildup of mineral deposits due to corrosive water conditions	Cleaning the thermostat and integral strainers periodically and removing the deposits will help prolong it's life.
C. Electrolysis	Electrically ground the piping system or install dielectric unions.