LEONARD®
WATER TEMPERATURE CONTROLS

CLASSIC HIGH LOW MANIFOLD SYSTEMS

TM-186-5015-PRV

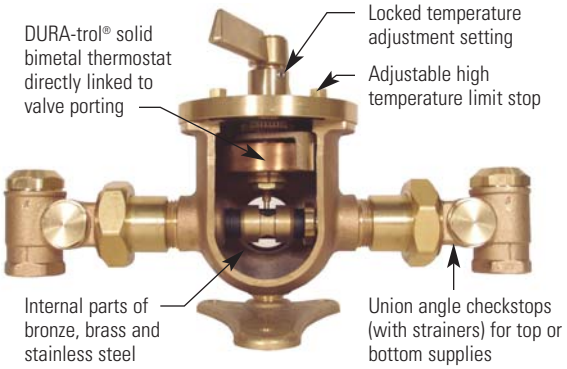
LEONARD CLASSIC HIGH LOW MANIFOLD SYSTEMS control water temperature for domestic hot water systems, shower rooms and other commercial, institutional and industrial applications

- Dual thermostatic water mixing valves provide precise water temperature control of both high and low mixed water flow ranges
- DURA-trol® solid bimetal thermostatic control (Seven Year Limited Thermostat Warranty)
- Adjustable high temperature limit stops set for 120°F (49°C)
- Mixed water capacities up to 155 GPM (587 l/min)
- Bronze, brass, and stainless steel construction
- Factory preassembled and tested systems
- CASPAK® Sizing Program
- Toll-free technical support

Classic High Low Manifold Systems

All Classic High Low Systems are furnished factory assembled and tested with:

Large and small TYPE TM thermostatic water mixing valves function as one system to meet high and low demands for mixed water



TYPE TM valves, powered by the DURA-trol® solid bimetal thermostats with Leonard's exclusive Seven Year Limited Thermostat Warranty

TM valves with 8°F (4°C) minimum differential between supply and outlet temperatures

TM valves with integral hot and cold supply checkstops, wall supports and locked temperature regulators

Pressure regulating valve set to adjust to variable flow requirements, opening to allow flow from the large TYPE TM valve as demand for mixed water increases

Outlet pressure gauges, dial thermometer, and ball valve shutoff, pre-piped inlet manifold

Install at any location in the piping system, regardless of pressure differentials

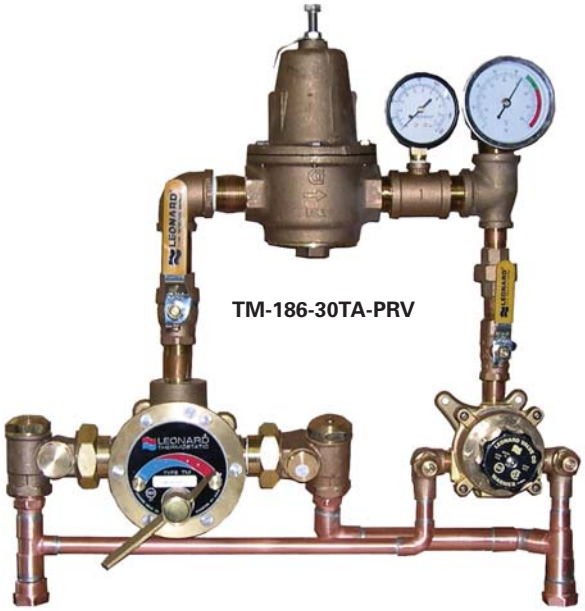
Full time standby service eliminates downtime should one mixing valve require maintenance

Selection/Specification Guide

HIGH CAPACITY SYSTEM – (MODEL#) – (FINISH#) – (MOUNTING#) - (OPTION#)

MODEL

TM-186-30TA-PRV	3/4" inlets, 1" outlet, 0.5-35 GPM (1.9-132 l/min)
TM-186-5015-PRV	3/4" inlets, 1" outlet, 1-50 GPM (3.8-189 l/min)
TM-186-8015-PRV	1" inlets, 1-1/4" outlet, 1-80 GPM (3.8-303 l/min)
TM-186-12520-PRV	1-1/4" inlets/outlet, 1-125 GPM (3.8-473 l/min)
TM-186-15020-PRV	1-1/4" inlets, 1-1/2"outlet, 1-155 GPM (3.8-587 l/min)



TM-186-30TA-PRV

FINISH

RF	Rough Bronze
CP	Chrome Plated

MOUNTING

O	Exposed Assembly
STSTL REC	Stainless Steel Recessed Cabinet
STSTL EXP	Stainless Steel Exposed Cabinet
BWE REC	Baked Enamel Recessed Cabinet
BWE EXP	Baked Enamel Exposed Cabinet

OPTIONS

TC	Test Connection Piping on Outlet
TOP	Top Inlets (Cabinet models only)

Classic High Low Manifold Systems

SAMPLE SPECIFICATION

Leonard Model TM-_____

_____" inlets, _____ "outlet

_____ GPM minimum flow capacity (see chart, page 5)

_____ GPM maximum flow capacity @ _____ PSI system pressure drop

Large TYPE TM thermostatic water mixing valve, small TYPE TM valve, DURA-trol® solid bimetal thermostat with Seven Year Limited Warranty, color coded dials, locking temperature regulator handles, adjustable limit stops set for 120°F (49°C), integral hot and cold supply checkstops

Outlet pressure regulating valve, ball valve shutoff, pressure gauges and color coded dial thermometer, inlet piping manifold

Factory preassembled and tested, rough bronze finish

System shall provide full time standby service should one mixing valve require maintenance and shall be piped according to Leonard's required piping method

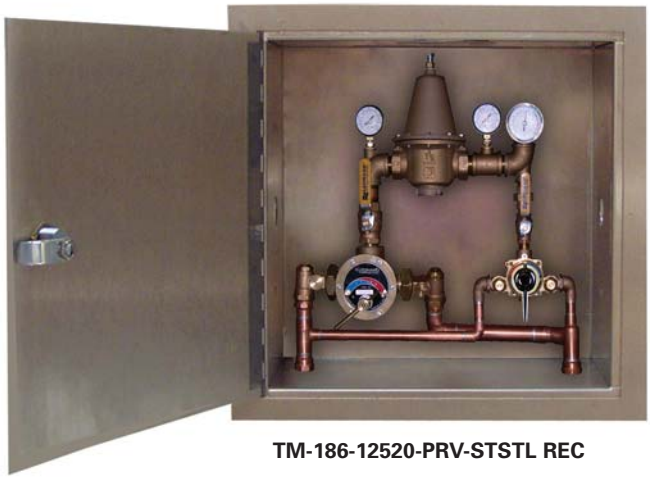
For Cabinet Assembly Systems add:

System shall be mounted in a recessed stainless steel cabinet with hinged door and lock (see cabinet options, page 2 in Selection/Specifications Guide).

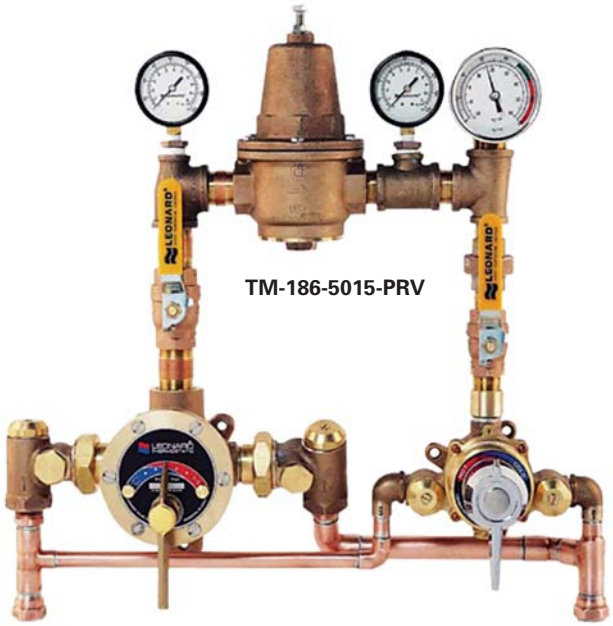
Classic High Low Systems are not dependent upon a circulating pump for minimum flow performance

System can be installed at any location in the domestic water system

TM-186-30TA-PRV	0.5-35 GPM (1.9-132 l/min) 3/4" inlets, 1" outlet
TM-186-5015-PRV	1-50 GPM (3.8-189 l/min) 3/4" inlets, 1" outlet
TM-186-8015-PRV	1-80 GPM (3.8-303 l/min) 1" inlets, 1-1/4" outlet
TM-186-12520-PRV	1-125 GPM (3.8-473 l/min) 1-1/4" inlets/outlet,
TM-186-15020-PRV	1-155 GPM (3.8-587 l/min) 1-1/4" inlets, 1-1/2"outlet,



TM-186-12520-PRV-STSTL REC



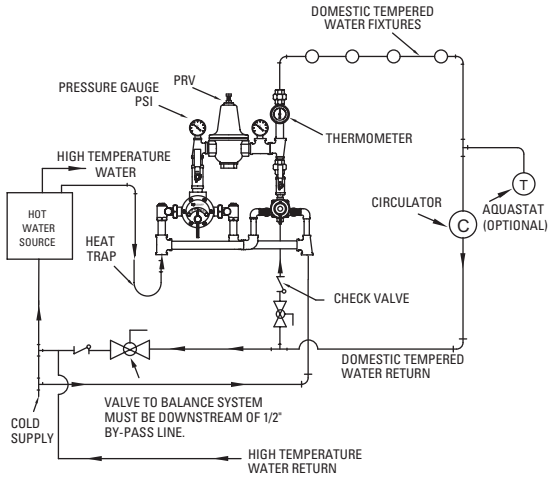
TM-186-5015-PRV

Required Piping Methods

Required Piping Method #2

For systems recirculating up to 8 GPM

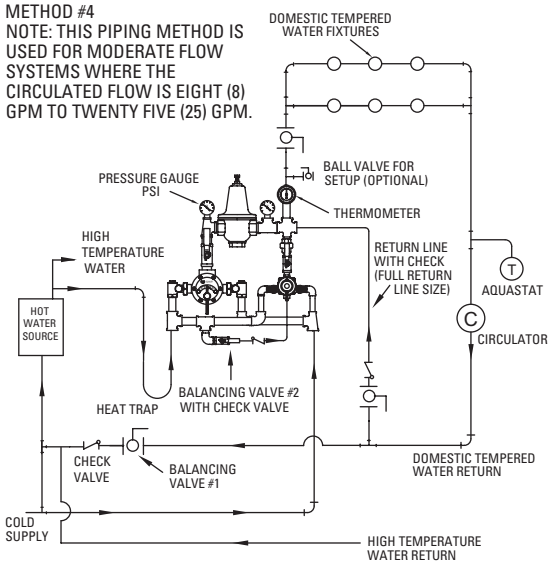
METHOD #2
NOTE: THIS PIPING METHOD IS USED FOR MODERATE FLOW SYSTEMS WHERE THE CIRCULATED FLOW IS EIGHT (8) GPM OR LESS.



Required Piping Method #4

For systems recirculating 8 to 25 GPM

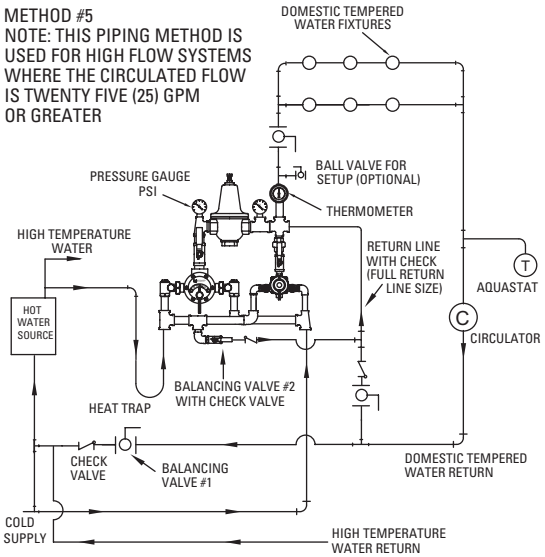
METHOD #4
NOTE: THIS PIPING METHOD IS USED FOR MODERATE FLOW SYSTEMS WHERE THE CIRCULATED FLOW IS EIGHT (8) GPM TO TWENTY FIVE (25) GPM.



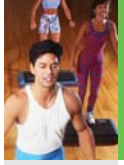
Required Piping Method #5

For systems recirculating over 25 GPM)

METHOD #5
NOTE: THIS PIPING METHOD IS USED FOR HIGH FLOW SYSTEMS WHERE THE CIRCULATED FLOW IS TWENTY FIVE (25) GPM OR GREATER



See page 6 for calculating the size of the hot water bypass line.



Flow Capacities

MODEL	IN	OUT	MIN. FLOW GPM L/MIN	SYSTEM PRESSURE DROP (PSIG) 5	10	15	20	25	30	35	40	45	50	PSI
				.3	.7	1.0	1.4	1.7	2.1	2.4	2.8	3.1	3.4	BAR
TM-186-30TA-PRV	3/4"	1"	0.5	13	19	25	30	34	37	41	45	47	49	GPM
	19mm	25mm	1.9	49	72	95	114	129	140	155	170	182	185	L/MIN
TM-186-5015-PRV	3/4"	1"	1.0	19	29	38	45	51	56	62	68	72	75	GPM
	19mm	25mm	3.8	72	110	144	170	193	212	235	257	272	284	L/MIN
TM-186-8015-PRV	1"	1 1/4"	1.0	26	40	48	58	63	68	74	79	84	89	GPM
	25mm	32mm	3.8	98	151	182	220	238	257	280	299	318	337	L/MIN
TM-186-12520-PRV	1 1/4"	1 1/4"	1.0	48	65	80	95	112	120	130	140	158	165	GPM
	32mm	32mm	3.8	182	246	303	360	424	454	492	530	598	625	L/MIN
TM-186-15020-PRV	1 1/4"	2"	1.0	53	72	88	103	117	133	147	150	170	185	GPM
	32mm	51mm	3.8	210	273	333	390	443	503	556	567	644	700	L/MIN
Maximum Flow Capacity														

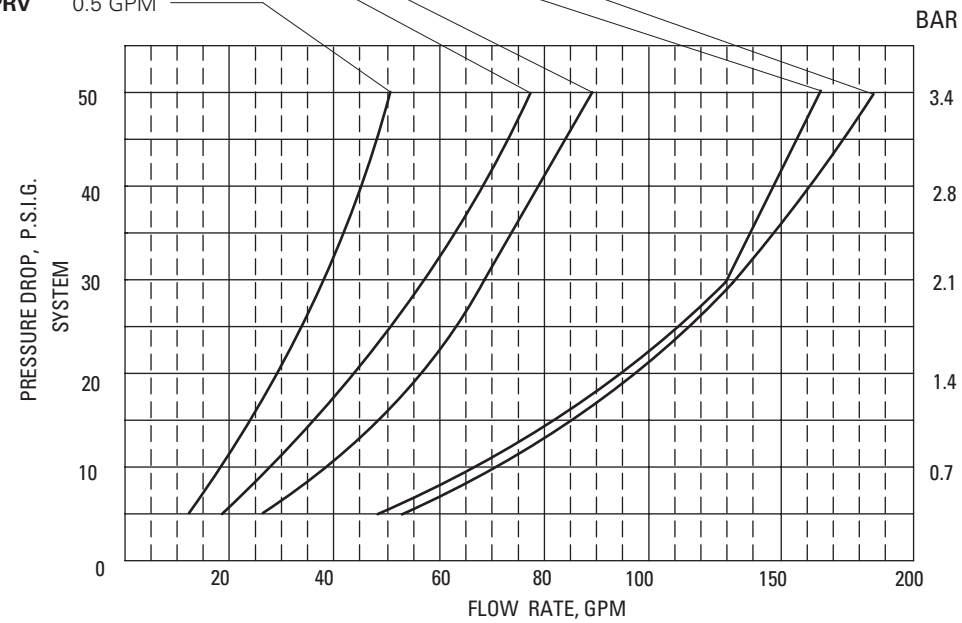
Note: The Classic High Low model must be selected based upon the following:

– Maximum system demand for mixed water
– System pressure drop**
– Designer's estimated minimum mixed water flow requirement

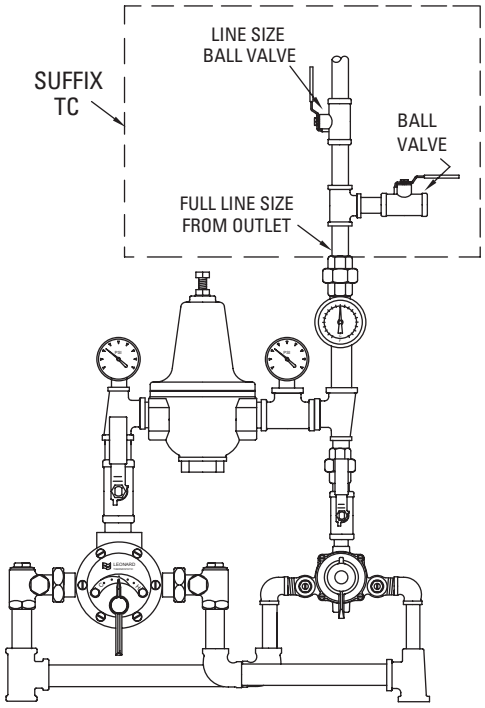
** System pressure drop = the pressure available at the inlet of the mixing valve minus the pressure required to operate the farthest fixture, i.e., shower valve, in the building

Minimum Flow:

TM-186-15020-PRV 1.0 GPM
TM-186-12520-PRV 1.0 GPM
TM-186-8015-PRV 1.0 GPM
TM-186-5015-PRV 1.0 GPM
TM-186-30TA-PRV 0.5 GPM



Caution: All thermostatic water mixing valves have limitations. They will not provide the desired accuracy outside of their flow capacity range. Consult the above chart and graph and make certain minimum flow is greater than as shown above.



SUFFIX TC Test Connection Piping

Eliminates the need to turn distant showers and sinks on and off throughout the building during setup. The required setup flows are established using the Test Connection Ball Valve (with hose connection) while the additional Ball Valve is in the closed position. This optional piping is furnished as part of the Classic High Low System (Exposed Assemblies only).

Classic High Low Systems

Classic High Low Systems are powered by Leonard's DURA-trol® solid bimetal thermostats, highly responsive, not subject to puncture or fatigue, and not damaged when temporarily exposed to excessive temperatures. DURA-trol® thermostats used in Classic High Lows carry Leonard's exclusive Seven Year Limited Warranty

Leonard's Classic High Low Systems provide dependable control of water temperature for and within domestic hot water systems when correctly sized, installed and maintained.

Sizing the Hot Water ByPass Line For Required Piping Method #5

The following information is needed to size this line properly:

1. Flow of the recirculated water (Flow)
2. Temperature of the hot water (T hot)
3. Return temperature (T return)
4. Outlet temperature of the mixing valve (T outlet)

Calculate the amount of hot water needed to restore the outlet recirculated water temperature to the original setting and select the line size needed to accomplish this using the formula below. Use the Type "L" table to determine the size. A properly sized Hot Water ByPass Line will prevent the possibility of the system reaching full hot water at any time.

$$\frac{\text{T outlet} - \text{T return}}{\text{T hot} - \text{T return}} \times \text{Flow} = \text{Gallons of Hot Water Required}$$

GPH hot water req'd	Type "L" line size
5	1/2"
8	3/4"
14	1"
20	1-1/4"
30	1-1/2"

Note: This chart is based upon flow at 5 ft/sec max.

Once a draw occurs (i.e., a faucet is opened) the pump "deadheads" and cold and hot water are introduced into the system. At this point recirculation is virtually nonexistent.

This hot water bypass line will be needed when more than 8-10 GPM of additional hot water is needed to maintain the recirculated water temperature.

WARNING! No two piping systems are alike! The Piping Methods detailed in this bulletin serve only as a guide to assist the specifier in the design of a hot water piping system. The specific characteristics of each installation must be considered by the design professional.

Note: All specifications are subject to change without notice!

LEONARD®
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1360 Elmwood Avenue
Cranston, RI 02910 USA
800.222.1208
t 401.461.1200
f 401.941.5310
info@leonardvalve.com
www.leonardvalve.com

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