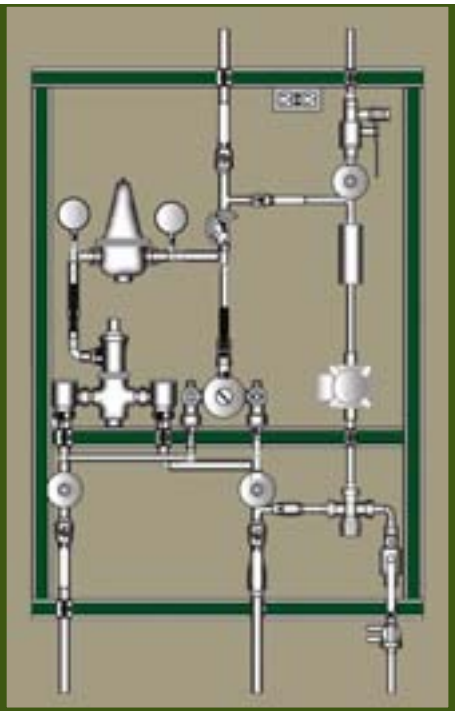
POWERSTATION™
Water Tempering Recirculation Systems



Two-Valve, High Capacity PowerStation

Flow to 225 gpm

POWERS™
Water Tempering Innovation Since 1891

Description ■

PowerStations are complete, fully assembled water tempering systems, designed to provide safe water throughout commercial and institutional facilities. PowerStations feature the HydroGuard® series e420, series e430 and/or series 1430 tempering valves with advanced paraffin-based thermal actuation technology. Each PowerStation is mounted on a heavy-duty, welded struts and is factory tested as a complete system. It also includes an engineer specified circulator, GFCI outlet, combination temperature/pressure gauges, Powers' triple-duty checkstops and internal by-pass loop for fast and easy set-up. Optional equipment includes an Aquastat and/or Powers' exclusive automatic balancing valve.

Specifications ■

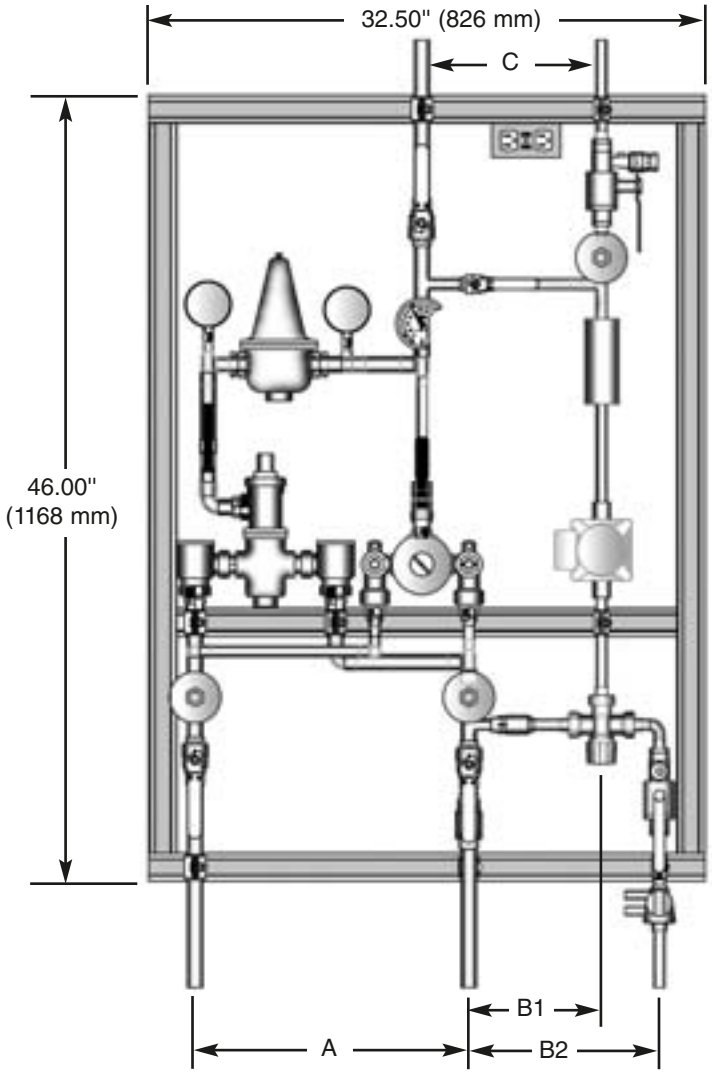
Maximum Pressure Differential	100 psi (689 kPa)
Maximum Static Pressure	125 psi (861 kPa)
Maximum Hot Water Temperature	200°F (93°C)
Minimum flow*	0.5 gpm (1.89 lpm)
Minimum flow at which valve will control to ASSE 1017 requirements.	
431HL	1.0 gpm (4 lpm)
432HL	1.0 gpm (4 lpm)
433HL	2.5 gpm (10 lpm)
434HL	2.5 gpm (10 lpm)
435HL	4.0 gpm (15 lpm)
1432HL	1.5 gpm (6 lpm)
1432DV	6.5 gpm (25 lpm)
1434HL	5.0 gpm (19 lpm)
1434DV	10.0 gpm (38 lpm)
Approach Temperature	15°F (8°C) above set point
Temperature Adjustment Range	40° - 160°F (4° - 71°C)

**Minimum flow when POWERSTATION is installed at or near hot water source with re-circulated tempered water with a properly sized continuously operating re-circulating pump.*

Table 1 — Flow Capacity When Tested To ASSE 1017 Standard ■

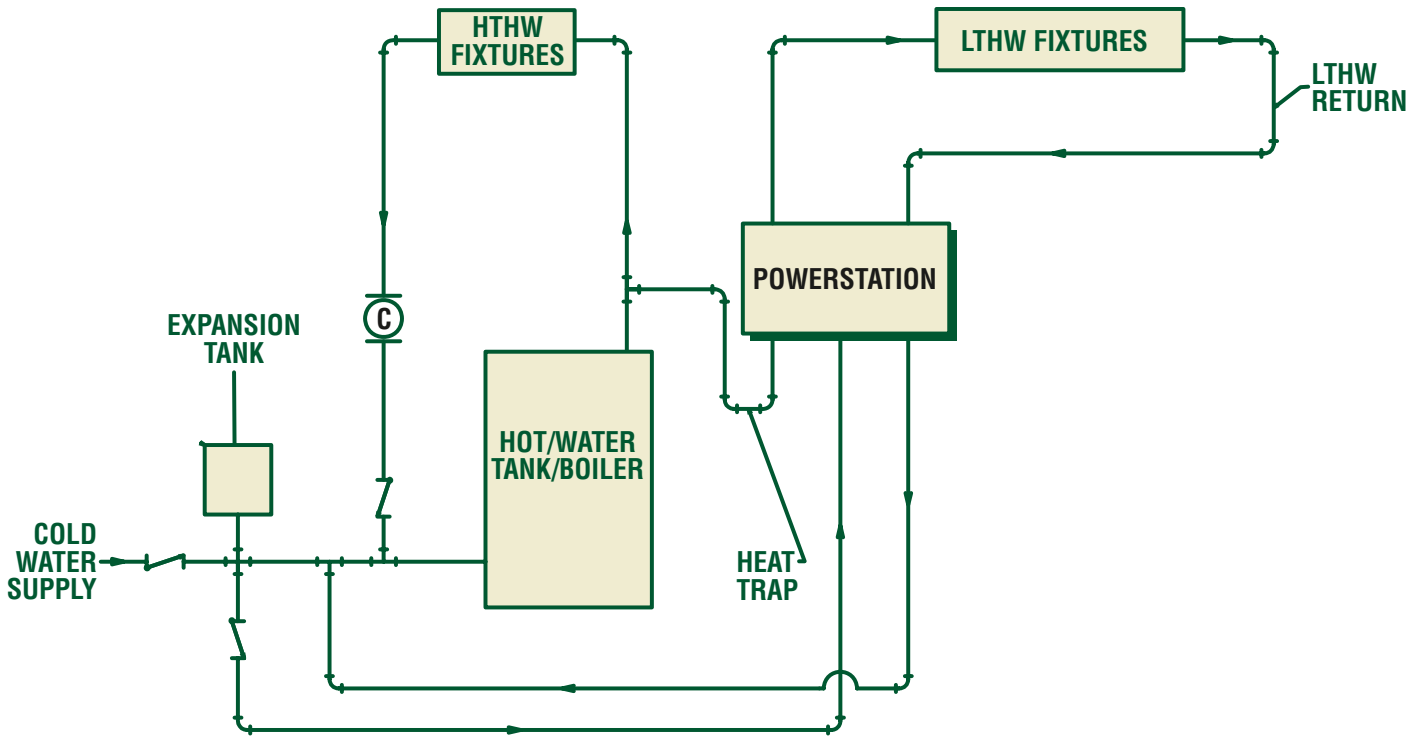
Model	Min. Flow to ASSE 1017	Pressure Differential					
		5 psi (34 kpa)	10 psi (69 kpa)	20 psi (138 kpa)	30 psi (207 kpa)	45 psi (310 kpa)	60 psi (414 kpa)
431HL	1.0 gpm (4 lpm)	10.0 gpm (38 lpm)	14.1 gpm (53 lpm)	20.0 gpm (76 lpm)	24.5 gpm (93 lpm)	30.0 gpm (114 lpm)	34.6 gpm (132 lpm)
432HL	1.0 gpm (4 lpm)	16.7 gpm (63 lpm)	23.6 gpm (89 lpm)	33.3 gpm (126 lpm)	40.8 gpm (154 lpm)	50.0 gpm (189 lpm)	57.7 gpm (218 lpm)
433HL	2.5 gpm (10 lpm)	31.3 gpm (118 lpm)	44.3 gpm (167 lpm)	62.6 gpm (237 lpm)	76.8 gpm (290 lpm)	94.0 gpm (356 lpm)	108.6 gpm (410 lpm)
434HL	2.5 gpm (10 lpm)	46.3 gpm (175 lpm)	65.5 gpm (248 lpm)	92.7 gpm (350 lpm)	113.5 gpm (429 lpm)	139.0 gpm (525 lpm)	160.5 gpm (607 lpm)
435HL	4.0 gpm (15 lpm)	50.5 gpm (191 lpm)	70.7 gpm (268 lpm)	100.0 gpm (378 lpm)	122.5 gpm (463 lpm)	150.0 gpm (568 lpm)	175.0 gpm (662 lpm)
1432DV	6.5 gpm (25 lpm)	46.0 gpm (174 lpm)	63.0 gpm (238 lpm)	93.0 gpm (352 lpm)	113.0 gpm (428 lpm)	140.0 gpm (530 lpm)	163.0 gpm (617 lpm)
1432HL	1.5 gpm (6 lpm)	54.0 gpm (204 lpm)	73.0 gpm (276 lpm)	109.0 gpm (413 lpm)	134.0 gpm (507 lpm)	165.0 gpm (625 lpm)	192.0 gpm (727 lpm)
1434DV	10.0 gpm (38 lpm)	64.0 gpm (242 lpm)	90.0 gpm (341 lpm)	132.0 gpm (500 lpm)	160.0 gpm (606 lpm)	200.0 gpm (757 lpm)	234.0 gpm (886 lpm)
1434HL	5.0 gpm (19 lpm)	72.0 gpm (273 lpm)	100.0 gpm (379 lpm)	148.0 gpm (560 lpm)	181.0 gpm (685 lpm)	225.0 gpm (852 lpm)	263.0 gpm (996 lpm)

Dimensions ■



	A	B1	B2	C
431HL	16.00″ (406 mm)	7.75″ (197 mm)	11.13″ (282 mm)	10.50″ (267 mm)
432HL	16.00″ (406 mm)	7.75″ (191 mm)	11.13″ (282 mm)	10.50″ (267 mm)
433HL	20.00″ (508 mm)	7.75″ (191 mm)	11.13″ (282 mm)	10.50″ (267 mm)
434HL	20.00″ (508 mm)	7.75″ (191 mm)	11.13″ (282 mm)	10.50″ (267 mm)
435HL	22.00″ (559 mm)	7.75″ (191 mm)	11.13″ (282 mm)	12.50″ (318 mm)
1432HL	10.25″ (260 mm)	7.75″ (191 mm)	11.13″ (282 mm)	26.13″ (665 mm)
1432DV	10.25″ (260 mm)	7.75″ (191 mm)	11.13″ (282 mm)	26.13″ (665 mm)
1434HL	10.25″ (260 mm)	7.75″ (191 mm)	11.13″ (282 mm)	26.13″ (665 mm)
1434DV	10.25″ (260 mm)	7.75″ (191 mm)	11.13″ (282 mm)	26.13″ (665 mm)

Diagram 1. Continuous Aquastat *Recirculation Diagram.*



*USE AQUASTAT CONTROL ONLY WHEN REQUIRED MINIMUM FLOW IS GREATER THAN OR EQUAL TO THE VALVE MINIMUM FLOW (REFER TO LITERATURE).

T TEMP/PRESSURE GAUGE
FLOW DIRECTION
CHECK VALVE
BALL VALVE
AUTOMATIC BALANCING VALVE
C CIRCULATOR

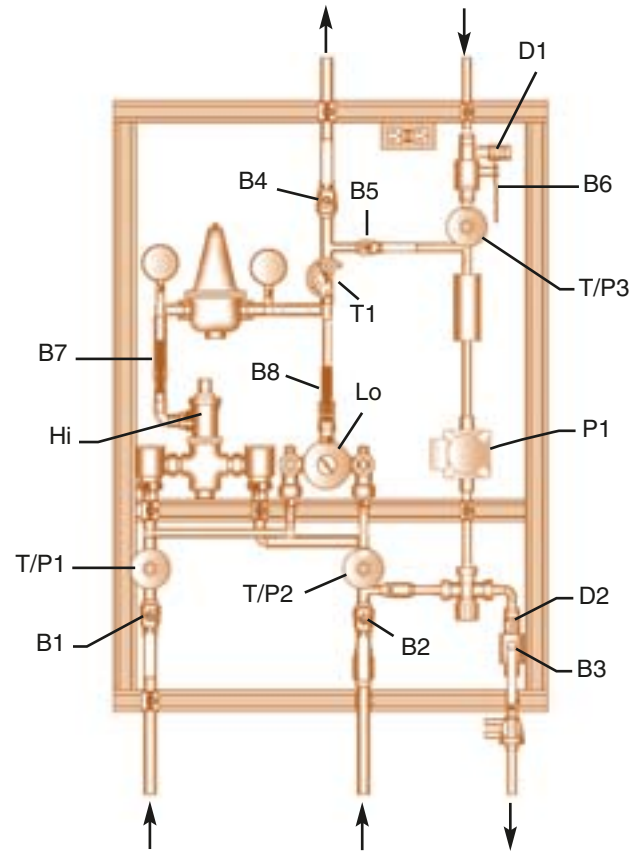
Installation & Set up ■

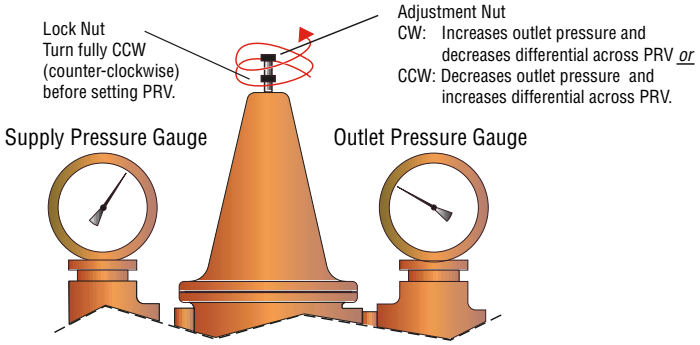
1. Flush all piping thoroughly before installing.
2. Follow piping diagram 1 or 2 to connect the Powerstation.
3. Check for leaks.
4. Set up is as follows:

For all systems ■

Note: Perform all 24 steps before moving on to next section. Steps 1 – 17 are to set valve temperature and PRV differential setting.

1. Close B3, B4 and B6.
2. Close D1 and D2.
3. Open B1, B2, B5, B7 and B8.
4. Connect hose to D2 and run to a drain.
5. Open D2 with a screwdriver and verify flow to drain is greater than minimum flow shown in Table #1.
6. For systems with an automatic balancing valve, adjust the knob to the full hot position (forces the water through the hose).
7. If flow rate is less than in Table 1, turn pump P1 on.
8. Let valve run until readings on inlet gauges T/P1 & T/P2 is steady.
9. Close the low flow valve B8 by turning the ball valve handle fully clockwise.
10. Set temperature of the high flow valve (refer to TI430 or TI1430HiLo).
11. For "HL" valves set the PRV as follows for a 15 psi differential for "DV" valves skip to #12.
    a). Loosen the locknut at the top of the PRV. This must be all the way out or you will be limiting the range of the adjustment
    b) Adjust the PRV so the outlet pressure gauge (right) reads 15 psi less than the supply pressure gauge (left). Turning the adjustment nut counter-clockwise will increase the differential across the PRV (allowing the PRV to open later).
12. Close B7 ball valve at the discharge of the high flow valve and open B8 ball valve by rotating the handle fully counter-clockwise.
13. Set the temperature for the low flow (refer to TIe427 or TIe420)
14. Open B7 ball valve at the discharge of high flow valve.
15. Increase total flow.
16. Verify temperature remains at set point at T1.
17. Gradually start to close D2 to verify that the temperature remains constant through the full range of flow.
18. Turn off pump P1.
19. Open B4 and close B5.
20. Open enough fixtures in the building to meet minimum flow for the valve system (refer to table 1).
21. Open D1 to purge air out of recirculation line.
22. Close D1 when you begin to get water.
23. Open B6 and wait until T/P3 reaches the upper recirculation temperature (must be less than the mixing valve set point).
24. Skip to the type of recirculation used below.





AquaStat ■

1. Close D2 and open B3.
2. Apply power to pump P1.
3. Set the pump on and off temperatures.
4. As the recirculation temperature was already set to its' maximum, the pump/aquastat will remain off until the temperature cools to the low trip point.
5. Wait until the recirculation line cools to the low point.
6. Verify the pump turns on at this point.
7. Verify recirculation line heats back up and turns pump off at the maximum setting from step 3.
8. The system is now set.

Continuous Recirculation ■

1. Close D2.
2. Open B3 approximately 10%.
3. Allow time for recirculated water to travel around the loop.
4. If the temperature at T/P3 begins falling, you will need to open B3 another 10%.
5. If the temperature at T/P3 begins to rise, you will need to close the handle 5%.
6. Repeat steps 4-6 until the temperature at T/P3 is stable (less than the set point of the mixing valve).
7. The system is now set.

Continuous Recirculation with Automatic Balancing Valve ■

1. For systems with a automatic balancing valve, adjust the knob to the full cold position (restricts the flow of water through the hose to a trickle).
2. Slowly turn the automatic balancing valves knob towards the hot position until you just start to get water through the hose. At this point it is set to the temperature shown on T/P3.
3. Close D2.
4. Open B3.
5. The system is now set.

In all cases, verify the system maintains temperature before leaving the mechanical room. You must allow for the system to reach the steady state condition.

Maintenance and Troubleshooting ■

What to look for:

1) Flow of water is less then desired……..
- a) Stop valves or supply to the tempering valve not fully open.
- b) Clogged checkstop strainer screen.
- c) Accumulation of lime deposits around valve seats.
- d) Low supply pressure or unusual supply temperature.

2) The flow of water is completely shut off……..
- a) Stop valves or supply valve completely closed.
- b) Valves downstream from tempering valve completely closed.
- c) Loss of either hot or cold water temperature.

3) Discharge temperature varies……
- a) Very large restriction in the outlet flow.
- b) Very large drop in inlet pressure.
- c) Very large fluctuation of hot water supply temperature.
- d) Worn valve seat.
- e) Minimum flow requirement not achieved.

Parts Kits ■

See enclosed TI e420, TI e427 and/or TI 430 and/or TI1430.

Ordering Information ■

PS □ □ □ □ □ □

Valve	Capacity	Inlet	Outlet	Order Code
431HL	1.0–30.0 gpm	3/4″	3/4″	**H**
432HL	1.0–50.0 gpm	3/4″	1″	**J**
433HL	2.5–94.0 gpm	1-1/4″	1-1/4″	**K**
434HL	2.5–139.0 gpm	1-1/4″	1-1/2″	**L**
435HL	4.0–150.0 gpm	1-1/4″	1-1/2″	**M**
1432HL	1.5–165.0 gpm	1-1/2″	2″	**P**
1434HL	5.0–225.0 gpm	2″	2-1/2″	**Q**
1432DV	6.5–140.0 gpm	1-1/2″	2″	**S**
1434DV	10.0–200.0 gpm	2″	2-1/2″	**T**
1434TV	5.0–350.0 gpm	2-1/2″	3″	**W**

Controls

None	**0**
Aquastat	**A**
AquaSentry2	**B**
Aquastat & AquaSentry2	**C**

Balancing Valves

None	**0**
Circuit Setter	**A**
Automatic Balancing Valve	**B**
Circuit Setter & Automatic Balancing Valve	**C**

Return Pipe Size

1/2″	**A**
3/4″	**B**
1″	**C**
1-1/4″	**D**
1-1/2″	**E**

Assigned by Factory

Pump Information:

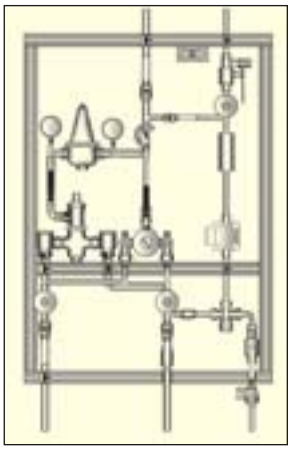
Pump Manufacturer: _____

Their Part No # * _____

** If the pump is not selected or if you are using an automatic balancing valve you must provide the following:*

System Head Loss _____

Required Flow to Maintain Recirculating Temp. _____



Typical Specification ■

Water temperature control system should include thermostatic mixing valves capable of maintaining water temperature to 15°F (8°C) above set point within the range of 40° to 160°F (7° to 71°C). Valves must compensate for temperature fluctuations due to inlet temperature or pressure changes. Valve will be of bronze body with triple-duty check stops and must have an advanced, paraffin-based thermal actuator to guarantee precise control when tested in accordance with ASSE 1017 and CSA B125.

Control system will be mounted on a heavy-duty welded struts with corrosion resistance coating, and factory tested as a complete unit. System will include an internal by-pass loop for fast and easy set-up. It will also includes GFCI protection, engineer specified circulator and combination temperature/pressure gauges. The system will feature optional aquastat and thermostatically controlled balancing valve to maintain system balance. The control system will be a Powers' POWERSTATION series PS. Any alternate must have a written approval prior to bidding.

CALIFORNIA PROPOSITION 65 WARNING

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires this warning to be given to customers in the State of California.)

For more information: www.watts.com/prop65

Engineering Approval

Project _____

Contractor _____

Architect/Engineer _____

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