

### Technical Instructions

#### Description ■

The Series e420 HydroGuard® T/P automatically mixes hot and cold water to deliver blended water within a specified range. Using an advanced thermal actuator, the Series e420 quickly compensates for temperature fluctuations induced by water temperature and pressure changes. In the event of cold water failure, the thermostatic motor virtually shuts off the flow of hot water.

Featuring heavy, cast-brass construction and integral checkstops, all parts of the e420 Series valve are accessible from the front of the valve and are corrosion resistant. The unit also features a metal to metal temperature limit stop, and all Series e420 valves open in the cold water position to ensure maximum bather safety and comfort.

The accuracy, reliability and water economy of the Series e420 HydroGuard® make it preferable for applications that require precise, consistent water control: showers, baths, hospital hydrotherapy and residential areas.

Many HydroGuard® Series e420 valves and shower systems can be selected to meet the Americans with Disabilities Act (ADA).

#### Specifications ■

**Valve Construction:** Thermostatic mixing valve, with heavy cast bronze body, metal to metal temperature limit stop, integral checkstops and brass stem. Available with ADA-compliant lever handle.

Connections:	1/2" NPT inlets/outlets 1/2" sweat inlets/outlets
Capacity	5.0 gpm [19.0 L/min]* (±0.25 gpm [0.90 L/min])
Checkstops	Integral to casting
Maximum Hot Water Supply Temperature	190°F (88°C)
Minimum Hot Water Supply Temperature	10°F (6°C) above set point
Maximum Operating Pressure	125 psig (862 kPa)
Temperature Ranges	
ASSE 1016 Type T/P	90 - 110°F (32 - 43°C)
ASSE 1016 Type T	65 - 115°F (18 - 46°C)
Temperature Limit Stop	Adjustable (factory set at 110°F [43°C])
Maximum Static Pressure	125 psig (862 kPa)
Minimum Flow:	1 gpm (3.781 L/min)
Certification	CSA B125
Compliance	ASSE 1016 Type T/P
Shipping Weight	5 lbs. (2.3 kg)

All HydroGuard® Series e420 thermostatic mixing valves meet above performance specifications based on typical operating conditions as stated in ASSE 1016 [45 psi pressure differential, hot water supply between 140°-180°F (60°-82°C), cold water supply less than 70°F (21°C)].

If your operating conditions vary from those stated in the standard, performance may vary as well. Consult your local sales representative or the Powers technical support department @ 1.800.669.5430, Press "2" to discuss your specific application. All Powers thermostatic mixing valves perform to the requirements of standards ASSE 1016 Type T/P and CSA B125.

#### Operation ■

Hot and cold water enter respective ports in the valve and mix in a chamber containing an advanced thermal actuator (refer to cutaway view). This actuator senses and maintains the set point of the valve.

Rotating the adjustment handle repositions the shuttle in the cartridge assembly to produce the desired temperature. The mixed water passes over the shutoff disc

\* At 45 psi differential [310 kPa], with hot water supply between 140°-180°F [60-82°C].



Advanced Thermal Activation

#### ⚠ WARNING

**FAILURE TO COMPLY WITH PROPER INSTALLATION AND MAINTENANCE INSTRUCTIONS COULD CONTRIBUTE TO THE VALVE FAILURE, RESULTING IN INJURY AND/OR DEATH.**

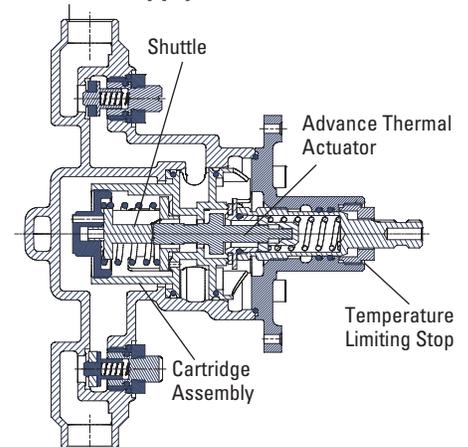
**TO ENSURE THE ACCURATE AND RELIABLE OPERATION OF THIS PRODUCT, IT IS ESSENTIAL TO:**

- Properly design the system to minimize pressure and temperature variations.
- Conduct an annual maintenance program to ensure proper operation of all critical components.
- **Check outlet temperature to ensure it does not exceed 110°F (43°C).** Make sure temperature limit stop is properly re-set to maximum 110°F (43°C) following valve maintenance or repair. Tampering with limit stop in any way may result in scalding temperature causing serious bodily harm and/or death.

#### ⚠ WARNING

**Need for Periodic Inspection: Periodic inspection by a licensed contractor is recommended. Corrosive water conditions, and/or unauthorized adjustments or repair could render the valve ineffective for service intended. Regular checking and cleaning of the valve's internal components and check stops helps assure maximum life and proper product function. Frequency of cleaning and inspection depends upon local water conditions.**

#### Cold Water Supply



#### Hot Water Supply

## Operation cont. ■

to the outlet. If the hot or cold supply water temperature or pressure changes, the thermal actuator will contract or expand. This movement repositions the shuttle to maintain the desired temperature. With the adjustment handle in full clockwise (OFF) position, the shutoff disc closes the mixing chamber from the outlet.

## Installation ■

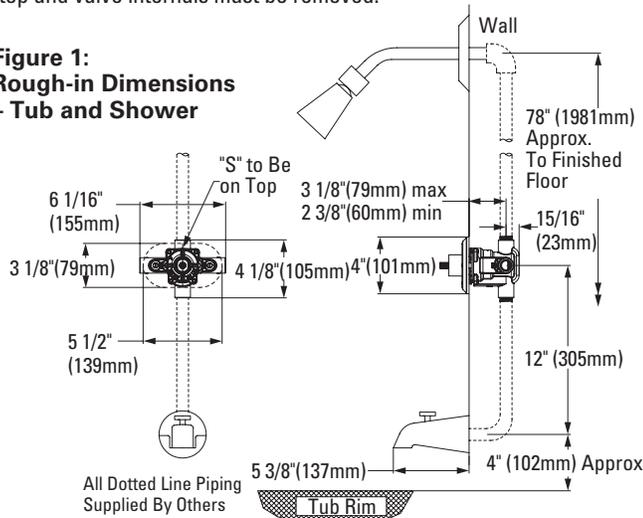
**NOTE:** Installation should be in accordance with accepted plumbing practices. Flush all piping thoroughly before installation. Failure to do so can result in a valve malfunction.

### TO INSTALL

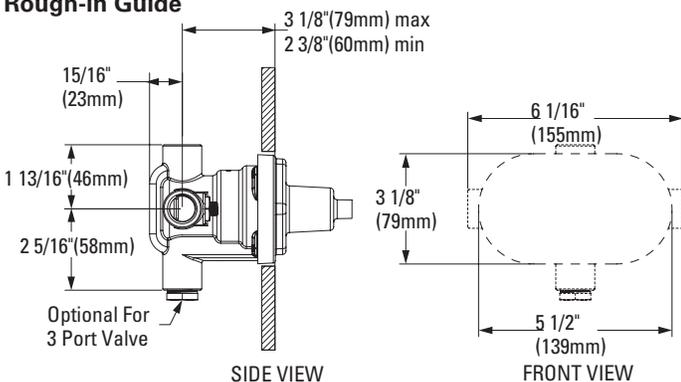
1. Position mixing valve  $2\frac{3}{4} \pm \frac{3}{8}$ " (69mm  $\pm$  10mm) from inlet center to finished wall surface. For reference a rough-in guide is provided, ensure it is pushed on fully and the valve is closed when positioning valve. The tub outlet port is marked "TUB" and should face down. Facing the front of the mixing valve, connect hot water to left side and connect cold water to right side. The mixing valve has "C" and "H" cast into the body near the appropriate ports. Inlets and outlet connections must be piped correctly for proper operation of valve. If hot and cold water connections are reversed, valve will not function properly.
2. **For tub and shower installations**, see Figure 1. Pipe bottom outlet port "TUB" directly to the diverter tub spout. The mixing valve is designed to operate without the use of a twin ell. Pipe top outlet port "S" to the showerhead.
3. **For shower only installation**, see Figure 2. Pipe top outlet port "S" directly to the showerhead and plug bottom port.

**CAUTION:** When soldering during the installation process, do not heat the valve any higher than the temperature required to flow solder. Excessive overheating of the valve may cause damage to the valve internals. By following this recommendation, you will be able to solder the valve without removing either the cartridge or the checkstops internals. If either brazing or resistance (electric) solder is used, all check-stop and valve internals must be removed.

**Figure 1:**  
Rough-in Dimensions  
– Tub and Shower



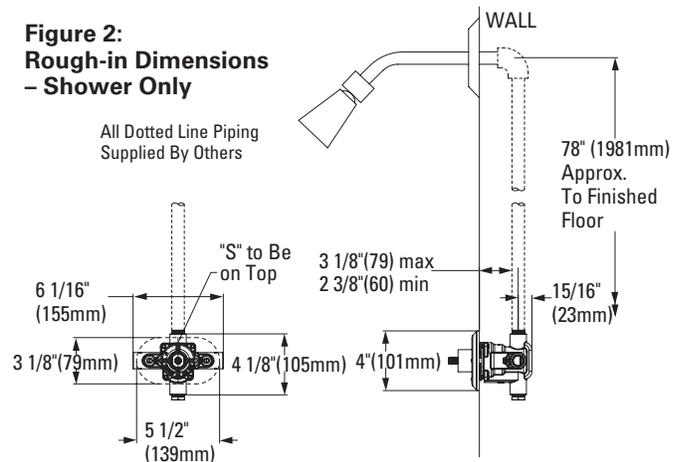
**Figure 3:**  
Rough-in Guide



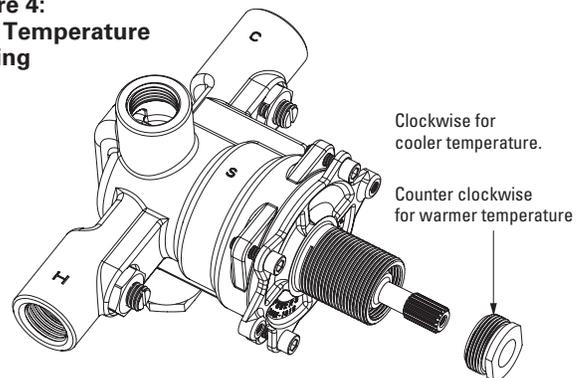
A temperature limit stop limits the movement of the control handle. The standard HydroGuard® e420 valve is factory set to deliver tempered water up to 110°F [43°C] with equal supply pressures, with hot water temperature 140°F [60°C], cold water temperature 60°F [15.6°C]

4. Turn hot and cold water supplies on and verify there are no leaks.
5. Rough-in guide installation
  - a. Before strapping the pipes and before completing the finished wall, slide rough-in guide onto the mixing valve stem and press fit into place, see Figure 3. (valve stem must be rotated fully clockwise).
  - b. The rough-in guide will insure the proper size opening and location of the finish wall.
6. After finished wall is completed, remove rough-in guide to allow installation of the trim.
7. Peel off backing of dial gasket and attached it to the inside top edge of dial plate. Make sure gasket is approximately 1/16" beyond the plate edge.
8. Hold plate firmly against the wall. Thread sleeve on the bonnet making sure that the cut away on the sleeve is towards you and is in the bottom position when tightened. Do not use any tool to tighten which will scratch the sleeve surface.
9. Install handle with the screw provided.
10. Maximum temperature setting adjustment (Figure 4) must be set on the job. The high temperature limit stop is threaded into the bonnet and is turned counter clockwise for an increased setting and clockwise for a decreased setting. Powers recommends a maximum setting of 110°F (43°C). To adjust temperature, rotate handle to the maximum desired outlet temperature, screw temperature limit stop until it touches stem's shoulder. Close valve and open it to verify setting.

**Figure 2:**  
Rough-in Dimensions  
– Shower Only



**Figure 4:**  
Max Temperature  
Setting



## Preventative Maintenance ■

**NOTE:** Before servicing checkstops or piping, always turn off the upstream water supply.

### **EVERY 12 MONTHS:**

Open up the checkstops and check for free movement of the poppet. To access the checkstops, remove the valve handle assembly and dial plate.

Before servicing, turn off the water supply upstream.

To close the checkstops, turn the adjustment screw fully clockwise on each checkstop.

Remove the valve bonnet and rinse all grit and impurities from the internal components.

Winterize valves that are used outdoors. Remove and store the internal components and drain all water from the valve.

### **EVERY 3 MONTHS:**

Every three months, check the maximum temperature setting (handle rotation setting).

#### **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](http://www.watts.com/prop65)

#### **WARNING**

**Always verify the maximum temperature setting of the valve when any changes are made to the safety program.**

## Safety Guidelines - All Models ■

Adherence to these guidelines and recommendations promotes safe product use and ensures proper valve performance.

1. Thermostatic water mixing valves are control devices which must be cleaned and maintained on a regular basis. Powers specifies periodic maintenance at least once a year or immediately after any changes are made to the plumbing system. Annual cleaning and inspection is recommended, however, frequency of cleaning depends on quality of local water conditions. Refer to the Preventive Maintenance section for recommended cleaning procedure.

2. **WARNING:** To prevent injury to the user, it is important to periodically check the maximum temperature adjustment on the valve.

3. Quick closing valves may cause damage to the mixing valve by creating shock waves. When the HydroGuard® supplies tempered water to self-closing and/or solenoid valves, Powers recommends installing a shock absorber (Powers Part #460-353) on the discharge line, which will protect the HydroGuard® from damage.
4. Position the e420 valve as close as possible to outlet fixture to avoid waste of energy and water (except in applications where the valve is used as a primary mixing valve).

## Servicing ■

### **To Disassemble:**

1. Turn off hot & cold water supply-stops
2. Remove the handle and trim plate
3. Remove 4 bonnet screws and bonnet assembly
4. Remove all internal components from valve body
5. At this point you should have an empty valve body.

**WARNING:** After completing any maintenance/repairs, reset the high temperature limit stop.

### **To Reassemble:**

1. Ensure the inside of the valve body is free of deposits and debris. Clean as necessary.
2. Push the cartridge into the body without the "O" rings installed. The cartridge should slide in easily, and bottom out with its large fins just inside the front surface of the casting. If the cartridge is difficult to install, or does not go in all the way, remove the cartridge and clean the body or remove any obstructions. Repeat this step until the cartridge installs easily.
3. Remove the cartridge and install the 2 "O" rings. Lubricate the "O" rings with silicon lubricant.
4. Install the cartridge back into the body. The cartridge should go in until the large fins are just inside the front surface of the casting (same position as in step 2). If you cannot push it in all the way due to O-rings, use bonnet and two (2) screws to force in.

5. Place the wax element into the stem assembly, stem side first, and place this bonnet-stem-motor assembly into/onto the valve body. Rotate the bonnet assembly to line up the bonnet screw holes and reinstall and tighten the four bonnet screws.
6. With handle, rotate the stem assembly clockwise, until it bottoms out on the cartridge. At this point your valve is in the off position.
7. Turn the hot and cold water supplies back on and verify there is no leakage.
8. Verify proper operation by rotating the stem from the off position, counterclockwise, to the high temperature position. Verify the temperature does not exceed your desired maximum temperature. Rotate stem back to the off position.
9. Leave the adjusting stem in the full hot position to determine the high temperature limit stop is set properly. If not, rotate clockwise or counterclockwise, decrease or increase the high temperature limit stop respectively. Powers recommends a maximum setting of 110°F (43°C).
10. Install handle with the screw provided onto the stem and tighten in place. Ensure that the set screw lines up with the groove on the adjustment stem.

## Troubleshooting ■

*What to look for if:*

### The maximum temperature cannot be obtained...

- Lime deposits may have accumulated in the hot water pipes, restricting the hot water supply.
- The hot water supply temperature may be too low.
- The temperature limit stop setting may be too low. Remove valve handle, and readjust the temperature limit stop.

### Flow of water is less than desired...

- The upstream supply valves may not be fully open.
- The inlet supply pressure(s) may be low.
- Lime deposits may have accumulated in cartridge, restricting water flow.
- The showerhead may be clogged. Remove and clean.
- The checkstops may be clogged. Clean check stops.

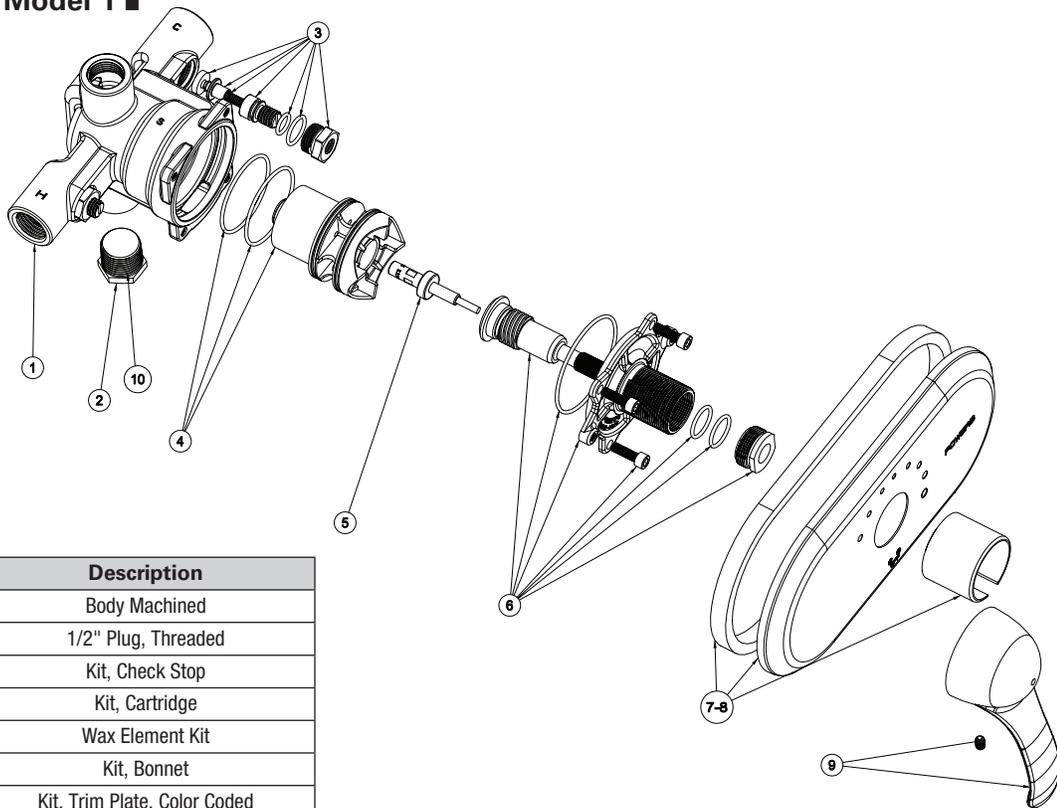
### The valve opens with hot water flow rather than cold water flow...

- The inlet water supplies are connected to the wrong ports. Remove the valve and reinstall.

### Flow of water is completely shut off...

- The upstream supply valves may be completely closed.
- The hot or cold water supply pressure may have failed. The HydroGuard® 420 valve is designed to reduce the flow of water upon either supply failure.
- The checkstops may be closed. Access the checkstops and open by turning the adjustment screw fully counterclockwise.

## Parts List - E420 Model 1 ■



Index	Part #	Description
1	N/A	Body Machined
2	200 046	1/2" Plug, Threaded
3	900 050	Kit, Check Stop
4	420 452	Kit, Cartridge
5	420 453	Wax Element Kit
6	420 457	Kit, Bonnet
7	420 046	Kit, Trim Plate, Color Coded
8	420 047	Kit, Trim Plate, Etched
9	420 049	Handle Kit, Dome
10	473 024	1/2" Plug, Sweat

**ATTENTION INSTALLER:** After installation, please leave this Instruction Sheet for occupant's information.  
**IMPORTANT:** Inquire with governing authorities for local installation requirements.

## Warranty ■

The Seller warrants that the equipment manufactured by it and covered by this order or contract is free from defects in material and workmanship and, without charge, equipment found to be defective in material or workmanship will be repaired, or at Seller's option replaced F.O.B. original point of shipment, if written notice of failure is received by Seller within one (1) year after date of shipment (unless specifically noted elsewhere), provided said equipment has been properly installed, operated in accordance with the Seller's instructions, and provided such defects are not due to abuse or decomposition by chemical or galvanic action. THIS EXPRESS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, GUARANTEES, OR REPRESENTATIONS, EXPRESS OR IMPLIED. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. The Seller assumes no responsibility for repairs made on the Seller's equipment unless done by the Seller's authorized personnel, or by written authority from the Seller. The Seller makes no guarantee with respect to material not manufactured by it.

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