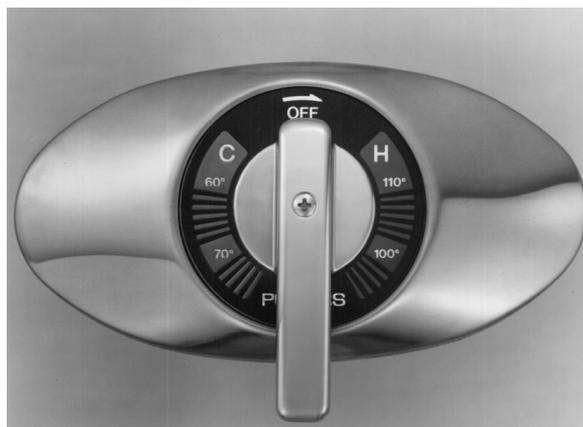


#### DESCRIPTION

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, all parts of the e420 Series valve are accessible from the front of the valve and are corrosion resistant. The unit also features a concealed handle rotation stop to guard against overadjustment of the handle, 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) (see page 4 for details).

#### SPECIFICATIONS

**Valve Construction:** Thermostatic mixing valve, with heavy cast bronze body and brass stem. Concealed handle rotation stop. Available with acrylic handle, chrome-plated metal tri-handle, or ADA-compliant lever handle.

<b>Connections: Type 421, 423, 425 (3-port):</b> 1/2" NPT Inlets 1/2" NPT Top Outlet	<b>Type 422, 426 (4-port):</b> 1/2" NPT Inlets 1/2" NPT Top Outlet 3/4" NPT Bottom Outlet
-----------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------

<b>Capacity</b> .....	5.0 gpm ± .25 @ 45 psi ΔP 50/50 mix
<b>Maximum Hot Water Supply Temperature</b> .....	190°F (88°C)
<b>Minimum Hot Water Supply Temperature</b> .....	5°F (2.8°C) above set point
<b>Maximum Operating Pressure</b> .....	125 psig (862 kPa)
<b>Temperature Ranges</b>	
<b>ASSE 1016 Type T/P</b> .....	90 - 110°F (32 - 43°C)
<b>ASSE 1016 Type T</b> .....	65 - 115°F (18 - 46°C)
<b>Temperature Limit Stop</b> .....	Adjustable (factory set at 110°F [43°C])
<b>Maximum Static Pressure</b> .....	125 psig (862 kPa)
<b>Minimum Flow and Pressure Differential:</b>	
<b>Standard Capacity</b> .....	<b>Minimum Flow</b> 1 gpm (3.781 L/min)
<b>Wall Seal Gasket</b> .....	Furnished with Dial
<b>Dial Plate</b> .....	Color-Coded Temperature Scale
<b>Shipping Weight</b> .....	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)].

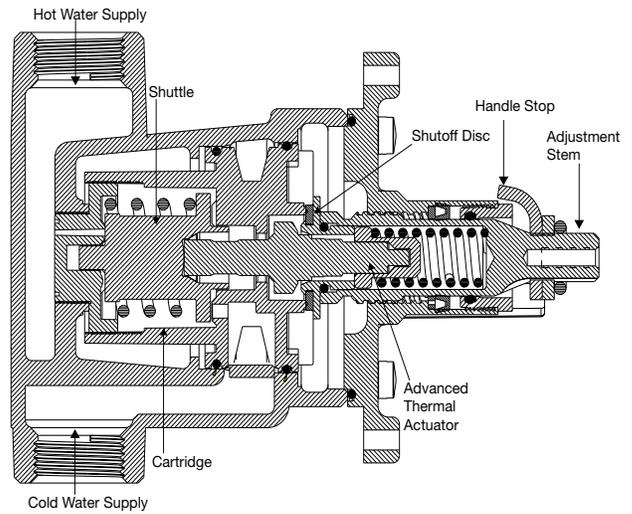
If your operating conditions vary from those stated in the standard, performance may vary as well. Consult your local sales representative or a Powers factory engineer to discuss your specific application. All Powers thermostatic mixing valves perform to the requirements of standards ASSE 1016 and CSA 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 controls the valve assembly.

Rotating the adjustment handle repositions the shuttle in the cartridge assembly to produce the desired temperature. The mixed water passes over the shut-off disc 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 shut-off disc closes the mixing chamber from the outlet.

A handle rotation 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].



**Note: The handle rotation stop must be adjusted by the installer.**

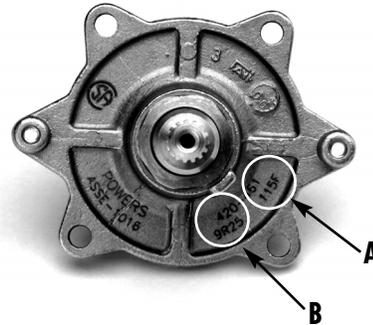
## MODEL IDENTIFICATION

To be sure you order and install the appropriate parts into your valve, first determine the correct model number and temperature range of your valve.

The temperature range of the valve is stamped on a nameplate (A). In the example, "115" is shown.

The model number is the first digit of the four-digit date code stamped on the nameplate (B).

In the example, the date code starts with an 9, so the model number is 9.



**Nameplate Stamp**

## INSTALLATION

### Before installation of any HydroGuard e420 valve:

- Flush all piping thoroughly.
- Rotate the stem (or handle if attached) of the valve to its full clockwise position (OFF).

### Positioning the Valve:

Note the following differences:

**3-Port Valves (421, 423, 425):** All ports are 1/2" NPT.  
 INLETS: Piped to hot and cold water supply.  
 OUTLET: Piped to the showerhead  
 (see illustration on page 4).

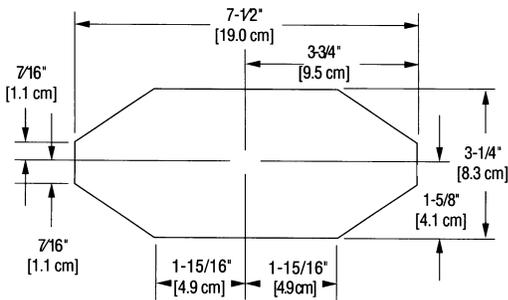
### 4-Port Valves (422 & 426):

BOTH INLETS AND TOP OUTLET: 1/2" NPT.  
 BOTTOM OUTLET: 3/4" NPT, and is piped directly to a diverter-type tub spout (see illustration on page 4).

1. Mount the rough-in guide, Powers Part #420-202, to the mixing valve.

**INSTALLATION (continued)**

*Wall Opening Dimensional Data*

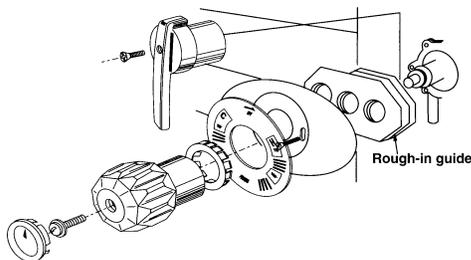


2. Use rough-in guide to position valve 2-3/4" ± 1/4" [7.0 cm ± 0.6 cm] from center line of inlets to face of finished wall (see Dimensional Data section).
3. Facing front of mixer, connect hot water to left side (marked HOT) and cold water to right side (marked COLD). Inlet and outlet connections must be piped correctly for proper operation of valve. Be certain connections are made exactly as described above. If hot and cold inlets are reversed, valve will not function properly.

**Solder Piping**

Excessive heat from soldering can damage the internal parts of the valve. If you use copper tubing, flare fittings must be installed within 12" (30.5 cm) of the valve or triple duty checkstops) to protect the valve. If flared fittings cannot be installed, remove the internal parts of the valve and checkstops before soldering.

**Finish Rough-In**



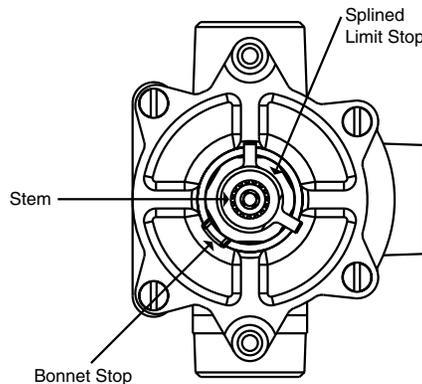
4. After finished wall is complete, remove rough-in guide to allow installation of the dial handle.
5. Peel off backing of dial gasket and attach it to inside top edge of dial plate. Allow approximately 1/8" [0.3 cm] of gasket to protrude past dial edge.
6. Install dial and handle and secure with screws provided.

**Test the System**

Before final assembly, test the system and check the maximum temperature setting.

7. Verify that the valve is in the OFF position (fully clockwise position).
8. Turn on water supply, and then rotate the valve handle counterclockwise. Water should come through the spout/showerhead.

*After Rough-In and Testing of System:  
Maximum Temperature Setting (Handle Rotation Stop)*



**Maximum Temperature Setting/Handle Rotation Stop**

The handle rotation setting must be adjusted to limit the distance the user can rotate the handle towards the full hot water position.

**CAUTION:** Any repair or modification of the valve may affect the high temperature setting. The maximum temperature setting must be checked by the installer before use.

9. Remove the valve handle and both splined stops.
10. Adjust the valve to the desired maximum outlet temperature. Install the splined limit stop with its tab against the **bottom** of the bonnet stop.
11. Turn the stem clockwise until the water stops. Install the second splined limit stop with the tab against the **top** of the bonnet stop.
12. Replace handle. Repeat steps 8 through 14 until desired maximum outlet temperature is reached. Remove handle before final assembly.

**CAUTION:** Resetting of the splined stop can result in temperatures higher than 110°F [43°C].

**CALIFORNIA PROPOSITION 65 WARNING**

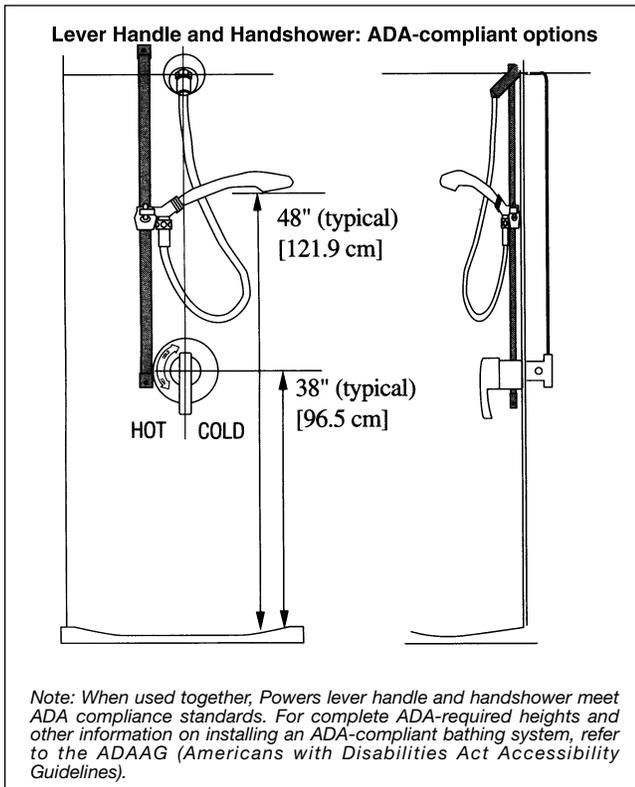
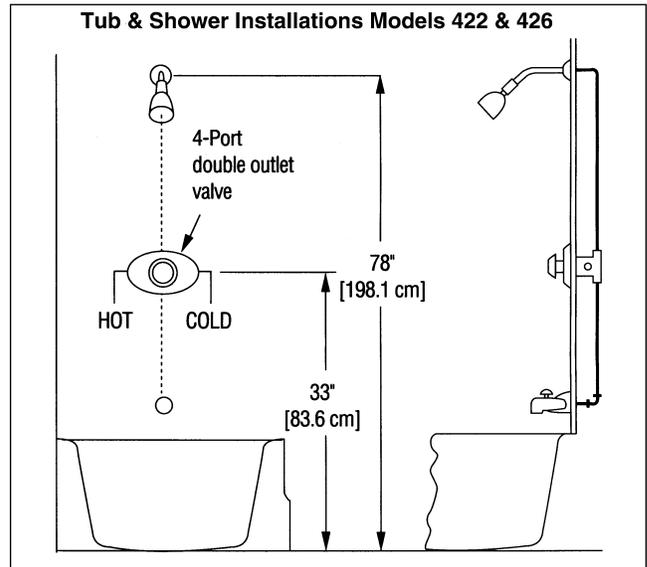
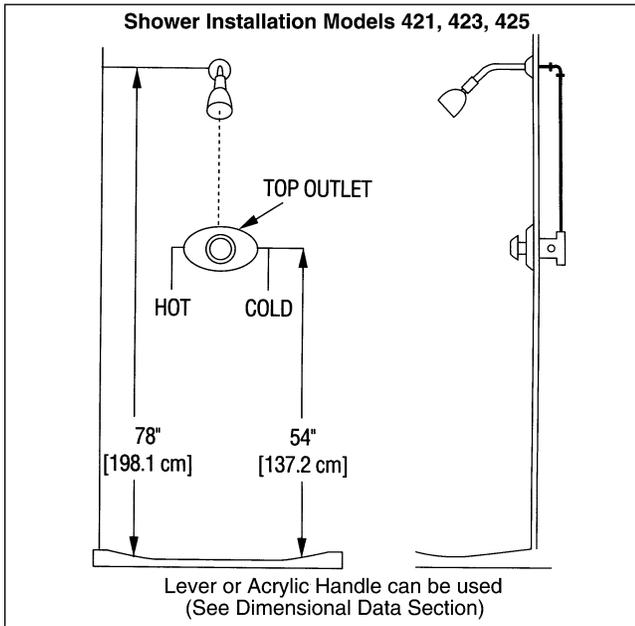
**WARNING:** This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires this warning to be given to customers in the State of California.) For more information: [www.wattsind.com/prop65](http://www.wattsind.com/prop65)

**INSTALLATION (continued)**

**Final Assembly**

13. Place the graphic insert [9] into the dial plate [11], snap the retaining ring [8] into place in the valve hole.
14. **For tri-handle:** slide the brass collar over the stem. Place the tri-handle on stem [22], and secure with retaining washer [3b] and screw [3c] using the 3/32" wrench (included). Snap the plug button into place.

15. **For lever handle:** fit handle (with sleeve) [1] onto stem and secure in place with screw [2] (provided).
16. **For acrylic knob:** install insert [7] into knob [6a]. Install knob onto valve and secure with screw and washers provided [4 & 51]. Install plug button [3].



**PREVENTIVE 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 the valve, turn off the water supply upstream OR close the optional check-stops. 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). Refer to steps 8-14 of the Installation section.

## 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 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 for (1) any sign of motor wear or (2) motor failure (refer to the Thermostatic Motor Testing section). The above conditions in the thermostatic motor can cause the valve to pass full hot water.**

**3. Note: The handle rotation setting must be adjusted to limit the distance the user can rotate the handle towards the full hot water position.**

4. 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 thermostatic motor from damage.
5. Position the 420 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 (required for this retrofit)
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.

**IMPORTANT:** After completing any maintenance/repairs, reset the maximum discharge temperature by resetting the handle rotation stop as necessary (refer to Maximum Temperature Setting section).

### 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 the body or remove any obstructions. Repeat this step until the cartridge installs easily.
3. Remove the cartridge and install the 2 "O" rings. One is slightly larger than the other. The larger one goes closest to the front (fins). 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 clock-wise, 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. Your valve should now be set properly. Verify proper operation by rotating the stem from the off position, counter-clockwise, to the high temperature position. Verify the temperature does not exceed your desired maximum temperature. Rotate stem back to the off position.
9. Replace trim plate and handle.

**TROUBLESHOOTING**

**What to look for if:**

**The maximum temperature cannot be obtained...**

- a. Lime deposits may have accumulated in the hot water pipes, restricting the hot water supply.
- b. The hot water supply temperature may be too low.
- c. The handle rotation setting may be too low. Remove valve handle, and readjust the handle rotation stop (see Setting the Handle Rotation Stop).

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

- a. The upstream supply valves may not be fully open.
- b. The inlet supply pressure(s) may be low.
- c. Lime deposits may have accumulated in cartridge, restricting water flow.
- d. The showerhead may be clogged. Remove and clean.
- e. The checkstops may be clogged. Refer to Preventive Maintenance section and Form #129-028.

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

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

**The tempered water is too cold, although motor has been replaced, OR the hot water temperature is below 115°F...**

- a. Raise the temperature of the hot water supply.

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

- a. The upstream supply valves may be completely closed.
- b. The hot or cold water supply pressure may have failed. The HydroGuard 420 valve is designed to close down upon cold water failure.
- c. The checkstops may be closed. Access the checkstops and open by turning the adjustment screw fully counter-clockwise.

**PARTS LIST - E420 Model 1**

- This parts list is for the E420 Model 1 only. To be certain you are installing the correct parts, refer to Model Identification on page 2.
- Select Individual Parts from “Part#” column. Select Kits from “Kit#” column.

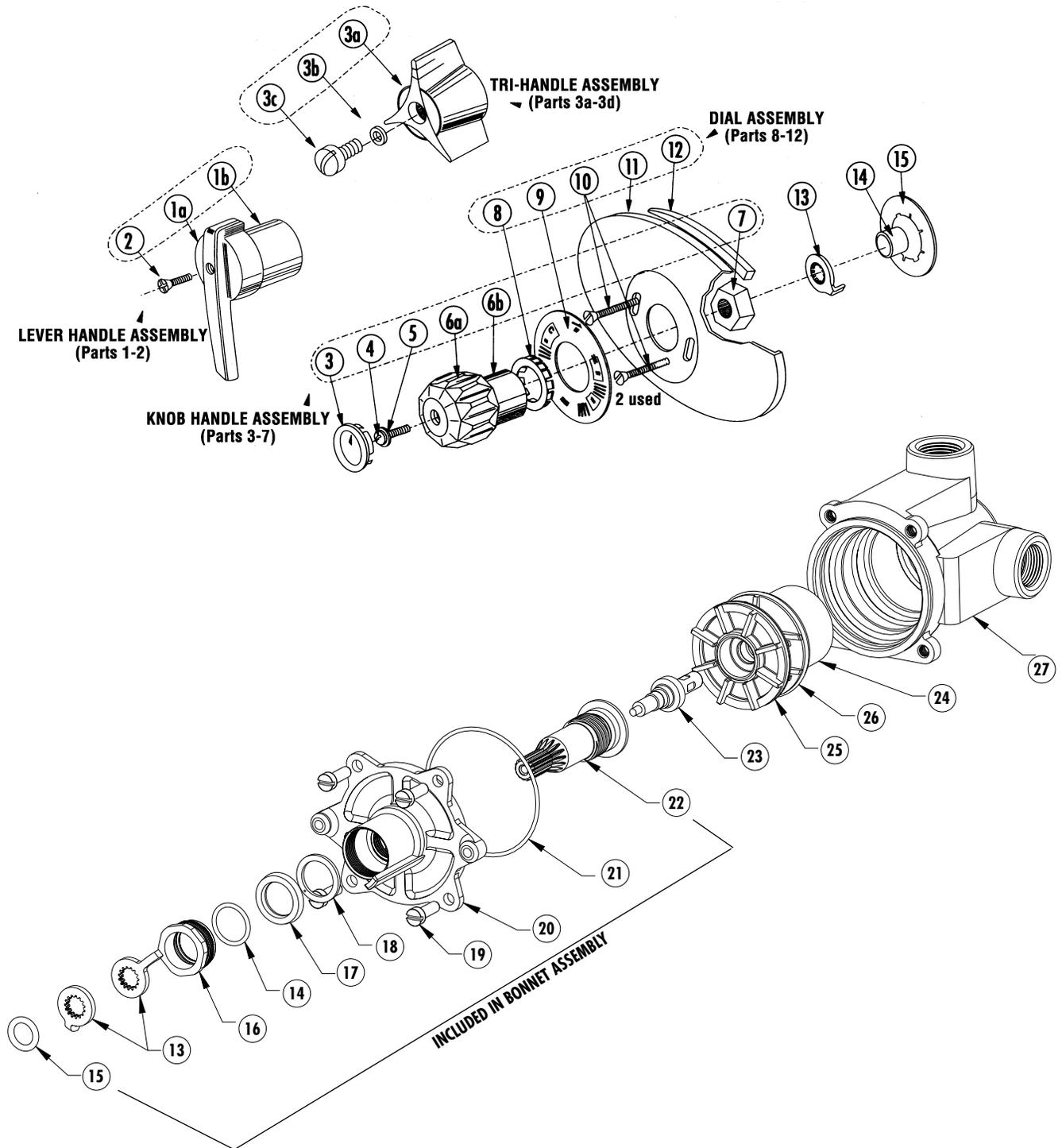
Item	Part Description	Part #	Qty.	Kit #	Qty.	Individual Parts Material
<b>1-2</b>	<b>Lever Handle Assembly</b> (Models 8 & 9)			<b>420-336</b>	<b>1</b>	
1a	Lever Handle --	--		420-336	1	C.P. Zinc
1b	Sleeve	--	--	420-336	1	C.P. Brass
2	Lever Handle Screw	410-365	10		1	C.P. Brass
<b>3a-3d</b>	<b>Tri-Handle Assembly (All Models 1-9)</b>			<b>410-565</b>	<b>1</b>	
3a	Tri-Handle	410-191	1	410-565	1	C.P. Brass
3b	Washer	046-008K	1	410-565	1	C.R. Steel
3c	Screw	030-070	1	410-565	1	Stainless Steel
3d	Plug Button (NS)	410-195	1	410-565	1	
<b>3-7</b>	<b>Acrylic Handle Assembly</b>			<b>420-337</b>	<b>1</b>	
3	Plug Button and Insert	420-314	1	420-337	1	C.P. Brass
4	Handle Screw 8-32 x 3/4"	034-515K	1	420-337	1	C.P. Brass
5	Washer	227-197	1	420-337	1	Neoprene
6a	Acrylic Handle Knob	--	--	420-337	1	Acrylic
6b	Sleeve	227-196	1	420-337	1	Brass
7	Knob Insert	420-213	2	420-337	1	
<b>8-12</b>	<b>Dial Assembly (Models 8 &amp; 9)</b>			<b>420-335</b>	<b>1</b>	
8	Retaining Ring 227-166		1	420-335	1	C.P. Brass
9	Dial Graphic Insert (F°)	420-308	1	420-335	1	Aluminum
10	Dial Plate Screws: (Concealed) 8-32 x 1-1/2" (2)	080-013	2	420-335	1	Brass
11	Dial Plate (Oval) 420-166		1	420-335	1	Stainless Steel
12	Dial Gasket	410-284	1	420-335	1	Buna-N
13	Temp. Stop	420-212	2	420-451	--	Stainless Steel
14	O Ring	084-014	1	420-451	--	Buna-N
15	O Ring	047-010	1	420-451	--	Buna-N
16	Packing Gland 420-578		1	420-451	--	Brass
17	Huva Cup	225-404	1	420-451	--	Buna-N
18	Packing Stop Ring	420-508	1	420-451	--	Brass
19	Bonnet Screws 030-887		4	420-451	--	Stainless Steel
20	Bonnet	420-210	1	420-451	--	Brass
21	O-Ring	047-128	1	420-451	--	Buna-N
22	Adjustment Stem	420-139	1	420-451	--	Brass
23	Thermal Actuator	--	1	420-451/453--	--	Brass/Stainless Steel/EPPM
24	Cartridge Assembly	--	1	420-451/452--	--	Noryl/Stainless Steel
25	O Ring	047-029	1	420-451	--	Buna-N
26	O Ring	047-129	1	420-451	--	Buna-N
27	Valve Body	N/A	1	N/A	--	Brass
(Part of 22)	Shutoff Disc 420-130		1	420-451	--	EPPM
	Bonnet Stem Assembly	--	--	420-454		
	Soft Part Kit	--	--	420-102		

-- Item not available as individual commercial part OR item not available as a commercial kit.

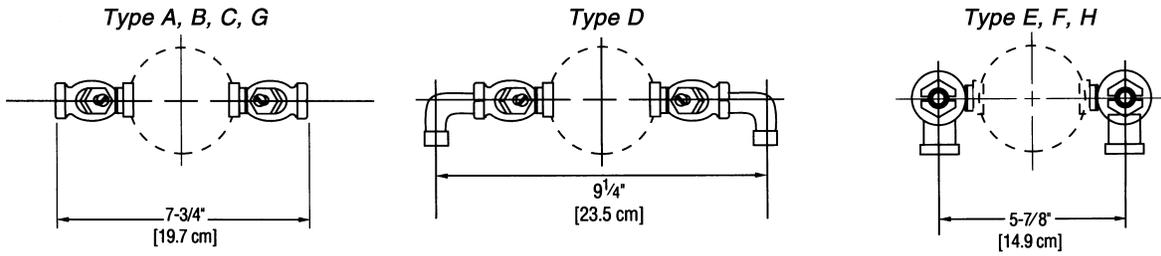
**EXPLODED VIEW - e420 Model 1**

This illustration is for **e420 Model 1**.

To be certain you install the correct parts, refer to the **Model Identification** section on page 2.

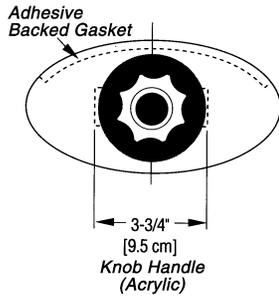
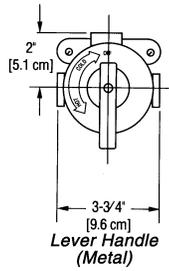


**CHECKSTOPS**



**DIMENSIONAL DATA**

*Front Views*



*Side Views*

