NOTES TO THE INSTALLER:
1. Please leave this documentation with the owner of the fixture when finished.
2. Please read this entire booklet before beginning the installation.
3. Check your installation for compliance with plumbing and other applicable codes.

LIMITED WARRANTY
UNITED STATES AND CANADA

Acorn Controls warrants that its products are free from defects in material or workmanship under normal use and service for a period of one year from date of shipment. Acorn’s liability under this warranty shall be discharged solely by replacement of repair of defective material, provided Acorn is notified in writing within one year from date of shipment, F.O.B. Industry, California.

This warranty does not cover installation or labor charges and does not apply to materials, which have been damaged by other causes such as mishandling or improper care or abnormal use. The repair or replacement of the defective materials shall constitute the sole remedy of the Buyer and the sole remedy of Acorn under this warranty. Acorn shall not be liable under any circumstances for incidental, consequential or direct charges caused by defects in materials, or any delay in the repair or replacement thereof. This warranty is in lieu of all other warranties expressed or implied. Product maintenance instructions are issued with each unit and disregard or non-compliance with these instructions will constitute an abnormal use condition and void the warranty.
Thoroughly read all installation instructions and product safety information before beginning the installation of this product.

FAILURE TO READ AND FOLLOW PROPER INSTALLATION AND MAINTENANCE INSTRUCTIONS MAY RESULT IN PRODUCT FAILURE WHICH CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY AND/OR DEATH.

Acorn Controls is not responsible for damages resulting from improper installation and/or maintenance. Installation of this valve shall be in accordance with Uniform Plumbing Code.

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

- Properly design the system to minimize pressure and temperature variations.
- Implement an annual maintenance program to ensure proper operation and temperature setting of valve(s).
- This valve is factory preset however, it can be adjusted. It is the responsibility of the installer and or facility maintenance personal to make sure valve outlet temperature does not exceed 115°F (46°C) after installation, maintenance or repair.

**SUPPLIES REQUIRED:**

(Not provided by Acorn)

1. Wall anchors, screws, nuts and washers as required.
2. Teflon tape for sealing water connections.
3. Allen wrenches for lever handle and bonnet set screws.
4. Copper pipe adapters as required.
5. Snap-ring pliers with pins less than 0.03”

**IMPORTANT**

- Flush supply lines of all foreign material such as pipe dope, chips or solder prior to connecting to mixing valve.
- To ensure proper installation, review the manual thoroughly to verify rough-ins before beginning any work.
- Installation and field adjustment are the responsibility of the installer.
- Maximum water pressure is 125 PSI (8.62 bars). Maximum inlet hot water temperature is 180°F (82°C). Temperature adjustment range is 85°F-115°F (29°C-46°C). Valve assembly must be drained prior to being subjected to freezing temperatures. Valve includes integral check- stops.

<table>
<thead>
<tr>
<th>PRESSURE DROP (PSID)</th>
<th>Cv</th>
<th>5 (34)</th>
<th>10 (69)</th>
<th>15 (103)</th>
<th>20 (138)</th>
<th>30 (207)</th>
<th>45 (310)</th>
<th>60 (414)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cv</td>
<td>0.6</td>
<td>1.3 (5)</td>
<td>1.9 (7.1)</td>
<td>2.3 (8.7)</td>
<td>2.7 (10)</td>
<td>3.3 (12.4)</td>
<td>4 (15.1)</td>
<td>4.6 (17.5)</td>
</tr>
</tbody>
</table>
**ROUGH-IN DIMENSIONS:**

- 24" (610) REF.
- 1 1/8" (44) MIN.
- 2" (64) MAX.
- 72" (1829) A.F.F.

**SPECIFICATIONS:**

- **Connections:** Combination 1/2" NPT and 1/2" sweat Inlet Connections
- **Riser Connection:** 1/2" NPT
- **Flow Rate:** 4 GPM (15 LPM) @ 45 PSI (310 kPa)
- **Hot Water Supply Temp.:** 110°F-180°F (43°C-82°C)
- **Cold Water Supply Temp.:** 35°F-80°F (1.7°C-27°C)
- **Approach Temperature*:** 5°F (2.8°C) Above Set Point
- **Maximum Operating Pressure:** 125 PSI (862 kPa)
- **Temperature Ranges*:** 85°F-115°F (29°C-46°C)
- **Minimum Flow:** 1.25 GPM (4.7 LPM)

*Please refer to ASSE 1016-2011 for other test conditions which may or may not equal installed conditions.

**NOTE:**
ALL DIMENSIONS ARE IN INCHES (MM).

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**IMPORTANT**

Excessive overheating of valve during soldering may damage the cartridge and checkstops. Do not heat valve any higher than needed to flow solder. If a higher temperature method is being used, all internal components must be removed. See figures 8 for cartridge removal and 9 and 10 for temperature limit setting.
**INSTALLATION:**

1. With installation guide 1 on the valve, position shower valve 2 so that center of inlet ports are 2” ± 3/8” (51mm ± 9.5mm) from finished wall ensuring the outlet port marked “T” is facing down.

   **NOTE:**
   After the valve has been piped and before starting finished wall, the rough-in guide will insure proper size opening in finished wall for valve, access to checkstops and for repairs.

2. Make up connections to the appropriate inlet ports, marked “H” and “C”. Inlet connections are combination 1/2” NPT and 1/2” sweat.

3. Valve is set-up for standard inlets. If reversed inlets are required for back-to-back installation, see “Back-To-Back Installation” page 5.

4. For shower only installation, see Figure 1 on page 3. Pipe directly from top outlet port to showerhead and leave plug in bottom port. Outlet port connection is 1/2” NPT female.

5. For tub and shower installation, see Figure 2 on page 3. Remove plug and pipe directly from bottom outlet port to diverter tub spout and top outlet port to showerhead. Outlet ports connections are 1/2” NPT female. Valve is designed to be used without the use of a twin ell.


7. Prior to installing valve trim, check for proper operation of valve, on/off, flow and high temperature limit. If temperature is not satisfactory, refer to **TEMPERATURE ADJUSTMENT page 6 step 4**.

8. Prior to installing valve trim, attach escutcheon gasket 4 to the back of escutcheon 5 and gaskets 3 and 4 to the back of escutcheon 6 by removing adhesive protection film and attaching as shown in Figure 4 and 5.

   **NOTE:** Insure that outer gasket 4 gap is towards bottom of escutcheon 5.

9A. **SV16 Valve Trim Installation:** Figure 6
   a. Remove adhesive protective film from foam gasket 7 and wrap around valve body as shown.
   b. Place escutcheon with gaskets 5 over valve and against finished wall and secure with screws 8.
   c. Push handle 9 onto valve stem and secure with screw 10 using provided Allen Wrench 11.

   **NOTE:** If handle 10 does not sit properly in escutcheon, remove stem insert 12 and rotate so it sits on upper or lower ledge. Detail “A”.

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Date: 09/22/17
Chapter 5: Back-to-Back Installation

1. For 2” x 6” wall construction, position shower valve so that center of inlet ports are 2-1/8” ± 3/8” (54mm ± 9.5mm) from finished wall, ensuring the outlet port marked “T” is facing down.

2. For 2” x 4” wall construction position, shower valve so that center of inlet ports are 1-3/8” ± 1/4” (35mm ± 6mm) from finished wall, ensuring the outlet port marked “T” is facing down.

3. Make up connections to the appropriate inlet ports, marked “H” and “C” on one valve and reverse on the other, cold supply to “H” and hot supply to “C”. Inlet connections are combination 1/2” NPT and 1/2” sweat. Refer to page 6 for cartridge removal and reversal.

4. To continue installations, follow steps 4-9A on page 4 or 9B on page 5.

![Diagram of Back-to-Back Installation](image-url)

**Important:** To avoid confusion, Hot and Cold inlets need to be re-identified for future maintenance.

**Important:** Excessive overheating of valve during soldering may damage the cartridge and checkstops. Do not heat valve any higher than needed to flow solder. If a higher temperature method is being used all internal components must be removed. See figures 8 for cartridge removal and 10 for temperature limit setting.
CARTRIDGE REMOVAL:

1. Bonnet Removal: Figure 8.
   a. Close Checkstops 16.
   b. Using snap-ring pliers with pins less than 0.03", by others, remove snap-ring 17.
   c. Remove both temperature limit washers 18.
   d. Loosen 1/16" hex set screw 19.
   e. Unscrew bonnet 20.
   f. Remove external valve stem 21.
   g. Pull cartridge 22 out.

2. Cartridge Reversal and Reassembly:
   a. Inspect valve cartridge 22 ensuring that 'D' shaped grooves have cartridge screen O-rings 23 in them and that stainless steel screens 24 are seated. See Figure 8.
   b. Insert cartridge 22 into valve body. Ensure the 'H' (see detail) on the side of cartridge housing is on the cold water supply side of valve casting. Take note of the rib on the bottom of cartridge 22 (between the screens) and the slot in the bottom of valve body are aligned. This is so when the cartridge is installed, it seats in the valve casting and cartridge will not rotate. See Figures 9 and 10.
   c. With valve stem O-ring 25 assembled onto valve stem 21, slide valve stem 21 onto cartridge stem while holding in place. See Figure 11.
   d. Inspect valve bonnet set screw 19 and ensure it is in the backed out position. Slide bonnet O-ring 26 over threaded area on bonnet 20 and seat in groove. See Figure 11. NOTE: For optional Lever Handle, slide O-ring 26 into groove on the top of bonnet 20.
   e. Thread valve bonnet 20 into valve casting turning clockwise. Apply pressure on top of stem while screwing valve bonnet 20 into place. This will keep cartridge from slipping out of slot while bonnet is threaded into place. Tighten valve bonnet 20 onto valve body firmly (180 In-Lbs). Tighten set screw 19 with 1/16" Allen wrench firmly (75 In OZ). This will prevent valve bonnet 20 from coming loose during use. See Figure 11.
OFF POSITION SETTING:

1. Turn on hot and cold water supply. Open both check stop assemblies by turning check adjustment screw 16 counterclockwise until screw tops out. Check for leaks around bonnet and stop assemblies at this time.

2. Using handle, rotate valve stem 21 clockwise two full turns. Continue to slowly turn handle clockwise until water flow stops. Then continue to rotate handle clockwise an additional 90 Deg. (1/4 turn) then stop. Turn back counterclockwise slowly until the water flow completely stops.

3. With the flow of water now shut off, place the first temperature stop washer 18 on the valve stem 21 keyed on the counterclockwise side as close to the bonnet stop as possible. See Figure 12.

4. Once temperature stop washer 18 is installed, slightly open valve by turning stem with handle counterclockwise and then back clockwise until first temperature stop washer 18 hits stop on valve bonnet. At this time, ensure that water is shut off completely to showerhead.

5. If not, rotate stop one tooth either way and repeat step 4 until the water flow is shut off and the temperature stop washer 18 is against the valve bonnet stop.

HIGH LIMIT TEMPERATURE SETTING:

1. Rotate external stem 21 with handle counterclockwise measuring water temperature with a thermometer until the high limit temperature is reached. (Recommend 105° to 110 °F)

2. Place the second temperature stop washer 18 on the valve stem 21 keyed on the clockwise side as close to the valve bonnet stop as possible. Rotate counterclockwise until it is fully against bonnet stop (full hot). See Figure 13.

3. At full hot, use thermometer to verify required high limit temperature is reached.

4. With valve in the “ON” position and water running install the retaining ring 17 with snap ring pliers. Confirm snap ring is inserted properly on groove of stem. (When water is running, the external stem 21 is pushed outward increasing the exposure of the snap ring groove.) See Figure 14.
### TROUBLESHOOTING:

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SET POINT DIFFICULT TO SET OR CANNOT BE REACHED</td>
<td>• SUPPLY TEMPS NOT WITHIN SPECIFIED LIMITS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• HOT AND COLD SUPPLIES ARE REVERSED</td>
<td>• CHECK DIFFERENTIAL TEMPERATURE BETWEEN SUPPLIES AND OUTLET</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• REINSTALL VALVE WITH SUPPLIES CONNECTED TO MARKED INLETS</td>
</tr>
<tr>
<td>2. DOES NOT MAINTAIN OUTLET TEMPERATURE OR CHANGES OVER TIME</td>
<td>• FLUCTUATION IN SUPPLY PRESSURES</td>
<td>• CHECK DIFFERENTIAL TEMPERATURE BETWEEN SUPPLIES AND OUTLET</td>
</tr>
<tr>
<td></td>
<td>• FILTERS BLOCKED WITH DEBRIS</td>
<td>• CLEAN FILTERS</td>
</tr>
<tr>
<td>3. DISCHARGE TEMPERATURE TOO HOT OR TOO COLD</td>
<td>• VALVE NOT ADJUSTED PROPERLY</td>
<td>• READJUST VALVE TEMPERATURE PER INSTALLATION INSTRUCTIONS</td>
</tr>
<tr>
<td>4. NO FLOW FROM VALVE</td>
<td>• HOT OR COLD SUPPLY FAILURE OR SHUTOFFS CLOSED</td>
<td>• OPEN SHUTOFFS OR RESTORE HOT AND COLD SUPPLIES</td>
</tr>
<tr>
<td></td>
<td>• CHECK FILTERS BLOCKED WITH DEBRIS</td>
<td>• CLEAN FILTERS</td>
</tr>
</tbody>
</table>

![Typical Piping with Tub Spout](image1.png)

![Typical Piping with Handheld Shower](image2.png)
REPAIR PARTS:

NOTE: Individual parts not available for purchase, sold in repair kits only. Parts called out for reference only.

O-RINGS SHOULD BE LUBRICATED WITH AN NSF APPROVED LUBRICANT. CARE SHOULD BE EXERCISED WHILE INSERTING COMPONENTS INTO VALVE BODY DURING REASSEMBLY.

ITEM | KIT NUMBER | DESCRIPTION | ITEM | KIT NUMBER | DESCRIPTION
--- | --- | --- | --- | --- | ---
1 | 7800-503-001 | TRIM REPLACEMENT, LEVER HANDLE | 4 | 7800-502-001 | CARTRIDGE & BONNET REPLACEMENT
2 | 7800-186-001 | TRIM REPLACEMENT, LIGATURE RESISTANT | 5 | 7800-175-001 | CARTRIDGE REPLACEMENT
3 | 7800-500-001 | COMPLETE REBUILD KIT | 6 | 7800-504-001 | CHECK-STOP REBUILD KIT

ITEM | DESCRIPTION
--- | ---
7 | CUP POINT SET SCREW
8 | LEVER HANDLE
9 | VALVE SLEEVE
10 | OVAL HEAD SCREWS (x2)
11 | ESCUTCHEON, LEVER HANDLE
12 | TRIM PLATE CENTER GASKET
13 | ESCUTCHEON GASKET
14 | 5/32" CENTER REJECT ALLEN WRENCH
15 | LIGATURE RESISTANT HANDLE SCREW
16 | LIGATURE RESISTANT HANDLE
17 | STEM INSERT
18 | SLEEVE GASKET (SV16 ONLY)
19 | TEMPERATURE STOP RINGS (x2)
20 | RETAINING RING (x2)
21 | EXTRA RETAINING RING PROVIDED. USE ONLY ONE DURING REASSEMBLY.
22 | BONNET O-RING
23 | SET SCREW
24 | VALVE BONNET
25 | BONNET O-RING
26 | VALVE STEM
27 | VALVE STEM O-RING
28 | CARTRIDGE
29 | STAINLESS STEEL SCREENS (x2)
30 | CARTRIDGE SCREEN O-RINGS (x2)
31 | CHECK CAP (x2)
32 | CHECK CAP O-RING (x2)
33 | CHECK ADJUST SCREW (x2)
34 | CHECK ADJUST SCREW O-RING (x2)
35 | CHECK SPRING (x2)
36 | CHECK PLUNGER (x2)
37 | CHECK SEAL (x2)