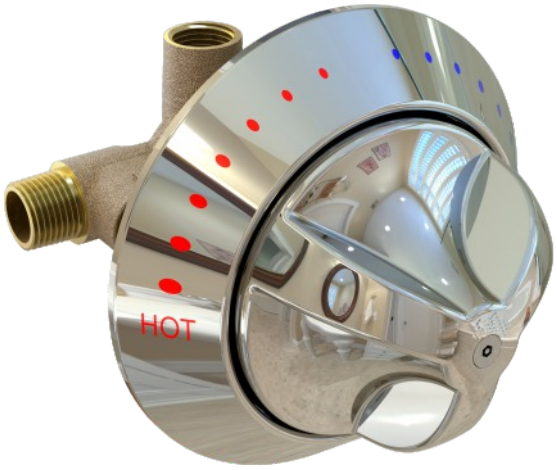
CONTROLS®
42 Sherwood Terrace, Suite #5
Lake Bluff, IL 60044
Phone: (847) 604-4773
www.WaterControlValves.com

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

SV16 TEMPERATURE/PRESSURE BALANCING MIXING VALVE



SV16
US PATENTS - US 10,474,170 B2 & US D697,591

SV16-LVR
US PATENT - US 10,474,170 B2

FOR TECHNICAL ASSISTANCE
1-(847)-604-4773

Pb Federal Public Law 111-380 (No Lead)

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.

WARNING:

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.

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 **CONTROLS®**)

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.

PRESSURE DROP PSID (kPa)	Cv	5 (34)	10 (69)	15 (103)	20 (138)	30 (207)	45 (310)	60 (414)
FLOW RATE GPM (LPM)	0.6	1.3 (5)	1.9 (7.1)	2.3 (8.7)	2.7 (10)	3.3 (12.4)	4 (15.1)	4.6 (17.5)

ROUGH-IN DIMENSIONS:

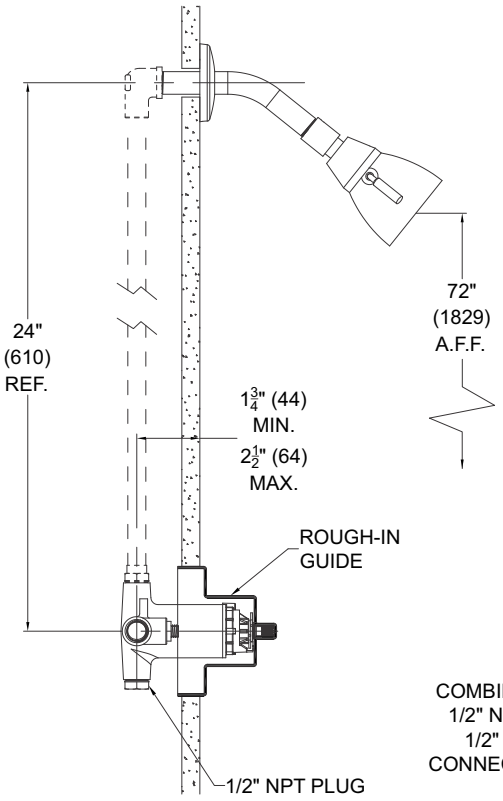
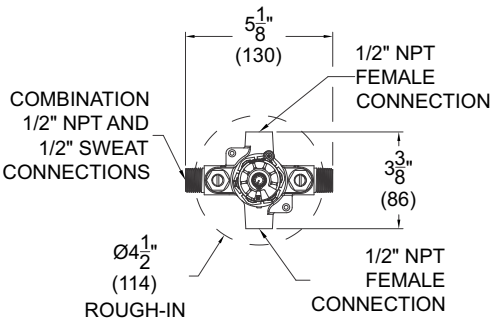


FIGURE 1



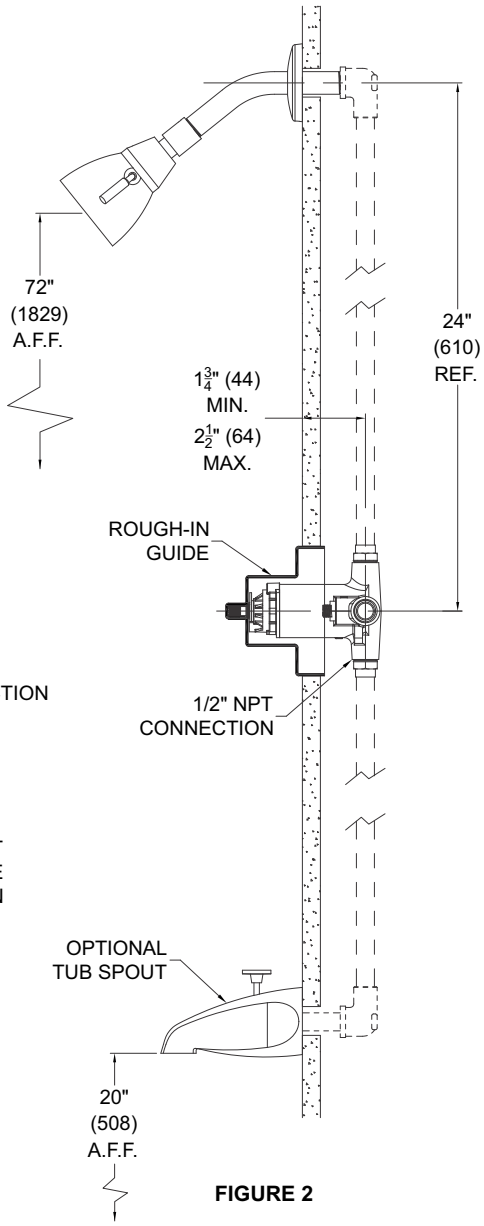


FIGURE 2

Patent Pending

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) Differential

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).

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 twinell.
6. Remove rough-in guide ***1***.
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: Ensure that outer gasket ***4*** gap is positioned facing towards bottom of escutcheon ***5*** (See NOTE).

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"***.

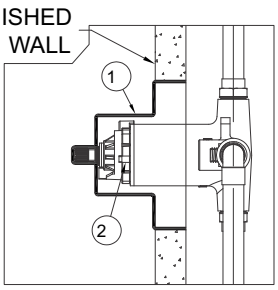


FIGURE 3

NOTE: Position gasket ***4*** opening gap as shown and align directly with bottom of escutcheon ***5*** (Position at 6 o'clock)

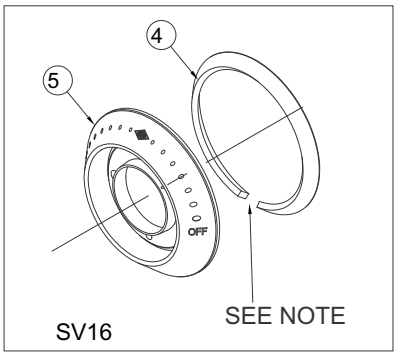


FIGURE 4

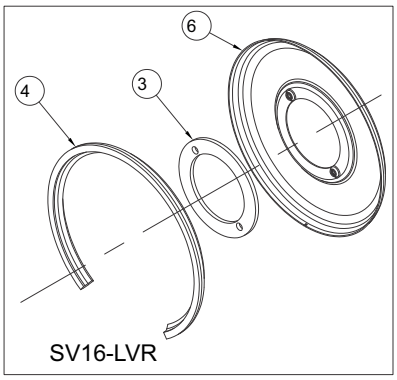
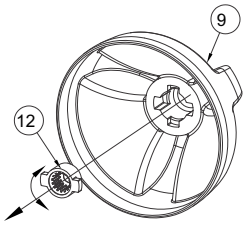


FIGURE 5



DETAIL "A"

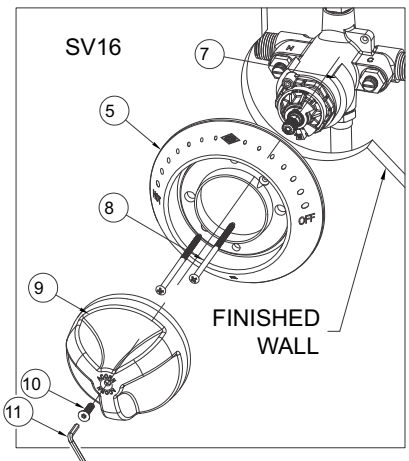


FIGURE 6

VALVE TRIM INSTALLATION CONTINUES:

9B. **SV16-LVR Valve Trim Installation:** Figure ***7***.
   a. Slide valve sleeve ***13*** over valve body.
   b. Place escutcheon with gaskets ***6*** over valve sleeve ***13*** and against finished wall and secure with screws ***8***.
   c. Push handle ***14*** onto valve stem and secure with set screw ***15***.

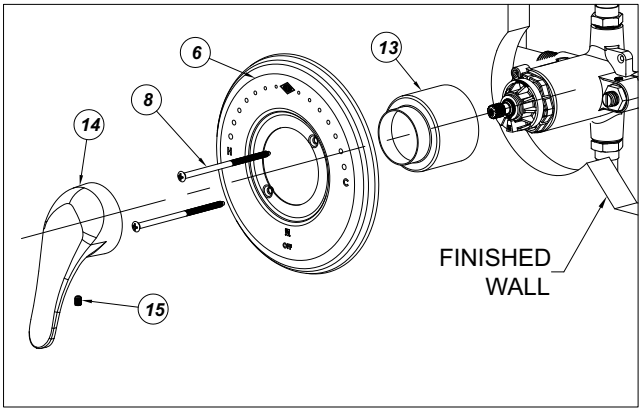


FIGURE 7

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***.

IMPORTANT

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

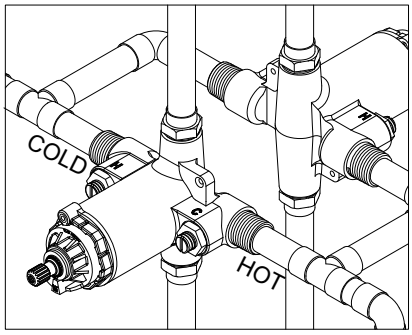
IMPORTANT

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.

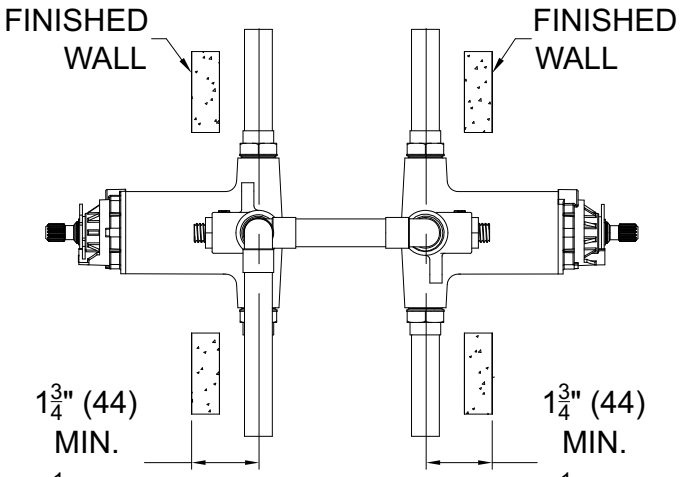
IMPORTANT

Upon completion of installation check all points of connection for leakage.

BACK TO BACK DETAIL



VIEW FROM REVERSED SIDE



2" X 6" BACK-TO-BACK INSTALLATION

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.***

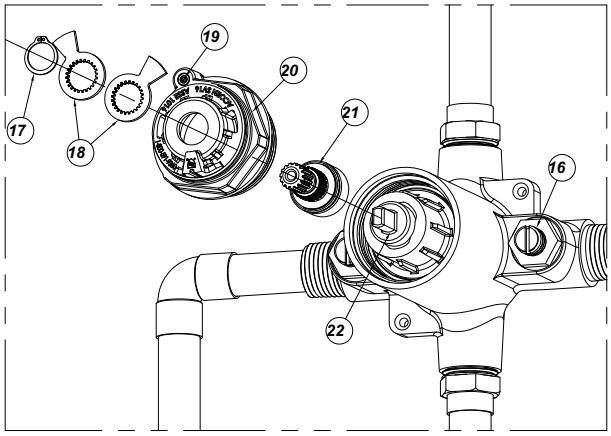


FIGURE 8

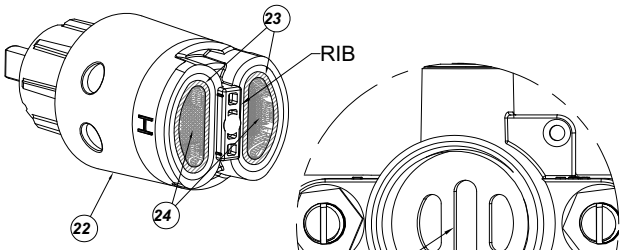


FIGURE 9

FIGURE 10

VIEW FROM REVERSED SIDE

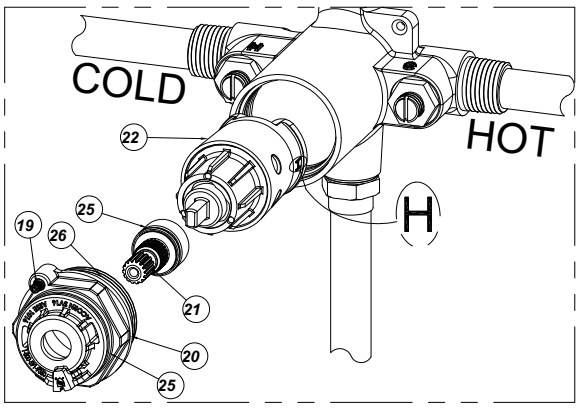


FIGURE 11

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 counter-clockwise 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 counter- clockwise 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 counter-clockwise 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***.

IMPORTANT

Upon completion of installation check all points of connection for leakage.

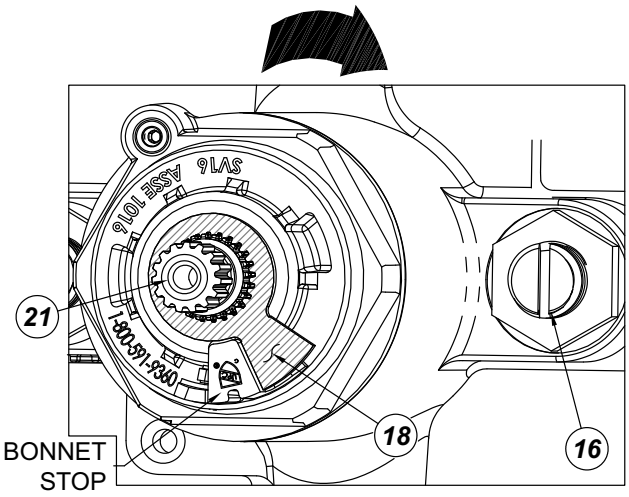


FIGURE 12

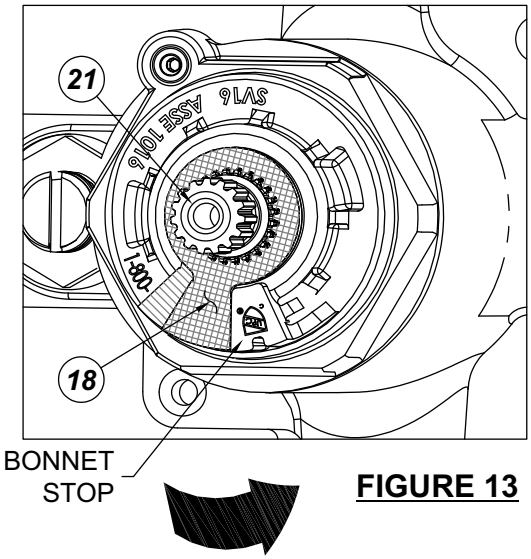


FIGURE 13

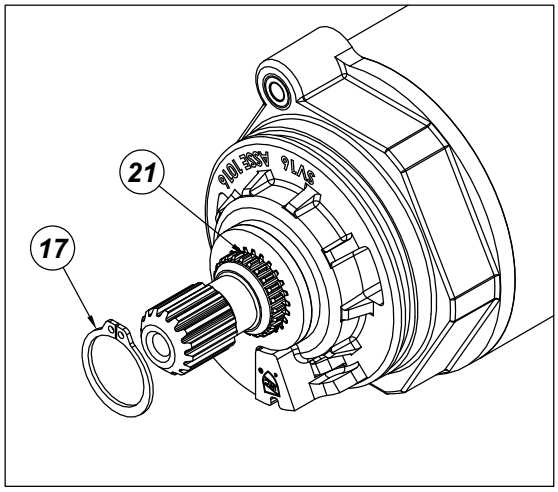
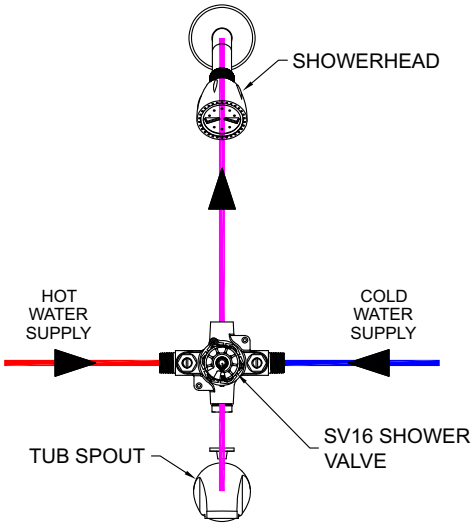
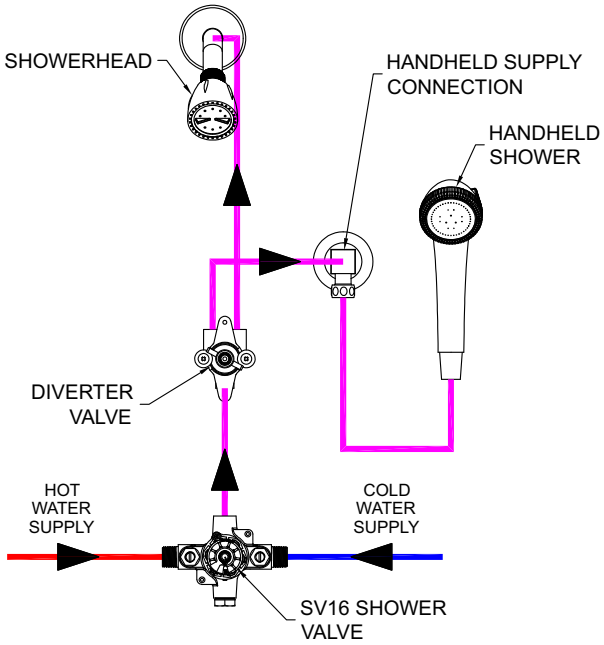


FIGURE 14



TYPICAL PIPING w/ TUB SPOUT



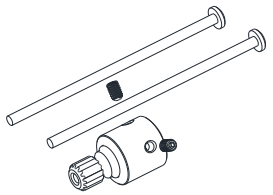
TYPICAL PIPING w/ HANDHELD SHOWER

TROUBLESHOOTING:

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

REPAIR PARTS:

STEM EXTENSION KIT:
P.N. 7800-057-001
Stem Extension and longer Screws (replaces Item #10) Adds 5/8" Stem Length.



IMPORTANT

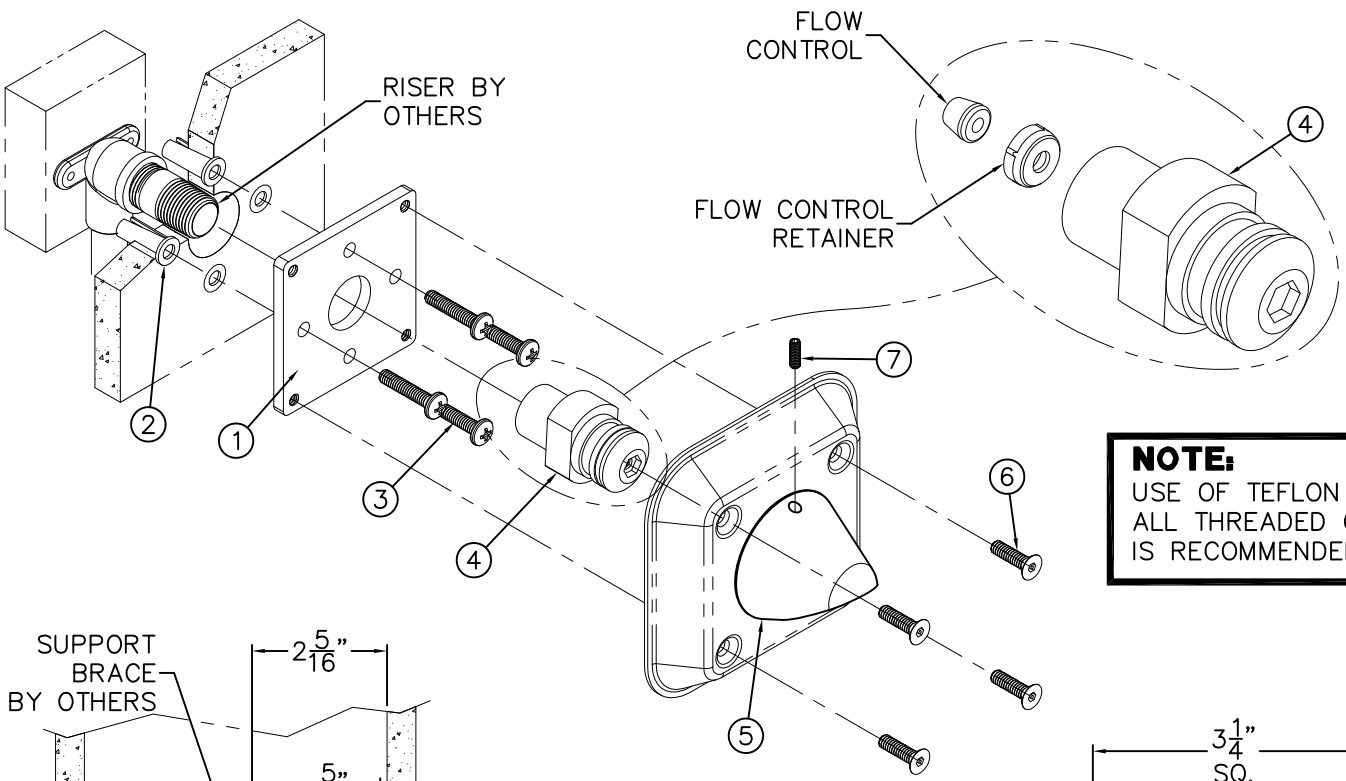
O-RINGS SHOULD BE LUBRICATED WITH AN NSF APPROVED LUBRICANT. CARE SHOULD BE EXERCISED WHILE INSERTING COMPONENTS INTO VALVE BODY DURING RE-ASSEMBLY.

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

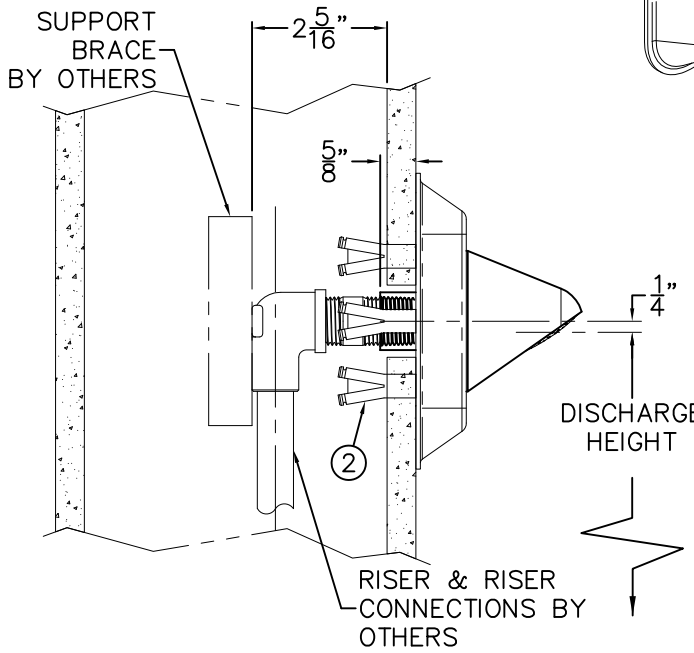
ITEM	KIT NUMBER	DESCRIPTION	ITEM	KIT NUMBER	DESCRIPTION
1	7800-503-001	TRIM REPLACEMENT, LEVER HANDLE	4	7800-502-001	CARTRIDGE & BONNET REPLACEMENT
2	7800-186-001	TRIM REPLACEMENT, LIGATURE RESISTANT	5	7800-175-001	CARTRIDGE REPLACEMENT
3	7800-500-001	COMPLETE REBUILD KIT	6	7800-504-001	CHECK-STOP REBUILD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

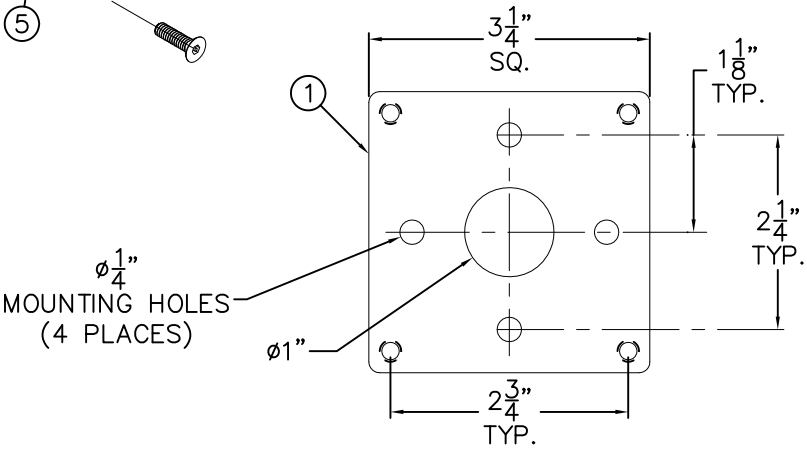
ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
7	CUP POINT SET SCREW	18	LIGATURE RESISTANT ESCUTHCHEON	29	STAINLESS STEEL SCREENS (x2)
8	LEVER HANDLE	19	SLEEVE GASKET (SV16 ONLY)	30	CARTRIDGE SCREEN O-RINGS (x2)
9	VALVE SLEEVE	20	RETAINING RING (x2)	31	CHECK CAP (x2)
10	OVAL HEAD SCREWS (x2)	21	TEMPERATURE STOP RINGS (x2)	32	CHECK CAP O-RING (x2)
11	ESCUTCHEON, LEVER HANDLE	22	EXTERNAL BONNET O-RING	33	CHECK ADJUST SCREW (x2)
12	TRIM PLATE CENTER GASKET	23	SET SCREW	34	CHECK ADJUST SCREW O-RING (x2)
13	ESCUTCHEON GASKET	24	VALVE BONNET	35	CHECK SPRING (x2)
14	5/32" CENTER REJECT ALLEN WRENCH	25	BONNET O-RING	36	CHECK PLUNGER (x2)
15	LIGATURE RESISTANT HANDLE SCREW	26	VALVE STEM	37	CHECK SEAL (x2)
16	LIGATURE RESISTANT HANDLE	27	VALVE STEM O-RING	38	
17	STEM INSERT	28	CARTRIDGE		

REPAIR PARTS	
SHOWERHEAD	9970–040–001



NOTE:
USE OF TEFLON TAPE ON ALL THREADED CONNECTIONS IS RECOMMENDED





ANCHOR PLATE DETAIL SCALED x 1–1/2

INSTALLATION INSTRUCTIONS:

A– PRIOR TO MAKING UP CONNECTIONS TO VALVE ASSEMBLY, FLUSH SUPPLY LINES THOROUGHLY.

B– USING ANCHOR PLATE (1) AS A TEMPLATE, LOCATE AND MARK MOUNTING POINTS TO INSTALL WALL ANCHORS (2) BY OTHERS FOR PROVIDED 1/4"–20 UNC x 1–1/4" LONG SCREWS (3).

C– SECURE ANCHORING PLATE (1) TO WALL USING SCREWS (3) PROVIDED.

D– MAKE UP SHOWER RISER CONNECTION FROM VALVE TO 1/2" NPT SHOWER ADAPTER (4).

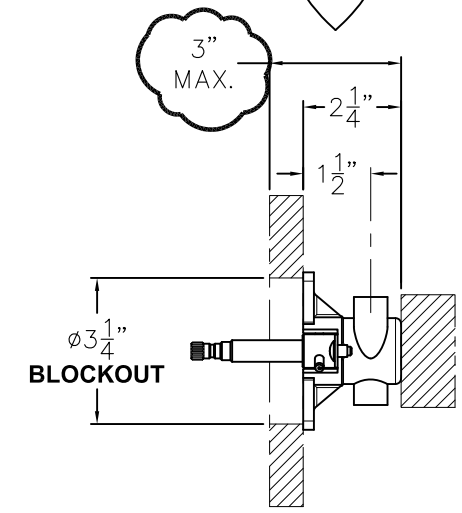
E– INSTALL AND SECURE SHOWERHEAD (5) ONTO WALL ANCHORING PLATE (1) USING SCREWS (6) AND SET SCREW (7) PROVIDED.

WHITEHALL MANUFACTURING
P.O. BOX 3527 Industry, CA 91744
15125 Proctor Ave Industry, CA 91746
(626) 968–6681 FAX (626) 855–4862

TITLE **LIGATURE RESISTANT CONICAL SHOWER HEAD**

MANUFACTURE DATE	DATE ISSUED	DRAWING NUMBER
OCTOBER 2012 TO PRESENT	**10/24/12**	**9918-036-001**
	DATE REVISED **07/10/14 C**	

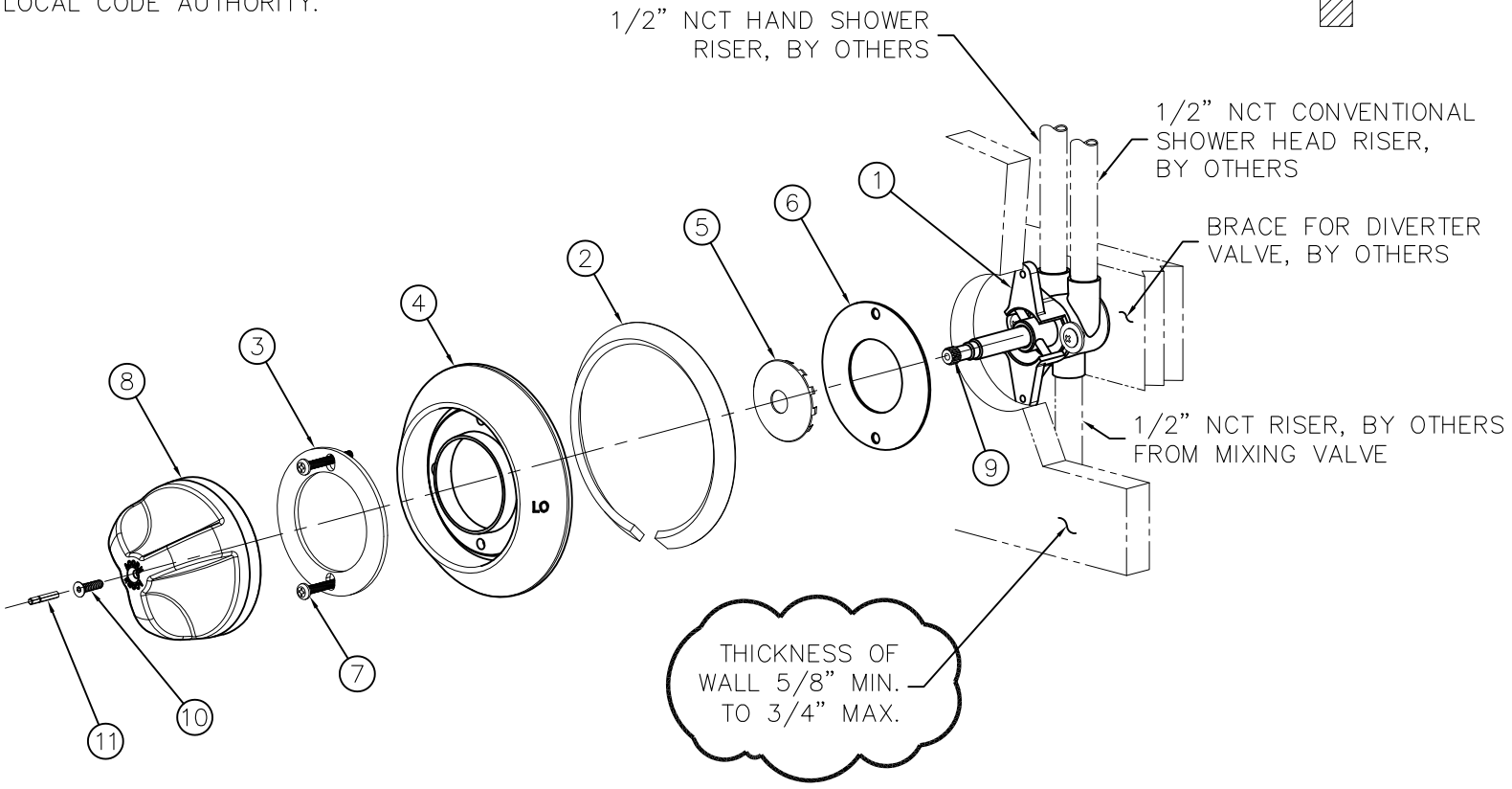
REFERENCE DRAWINGS	
DIVERTER PARTS	9975-080-W02



WARNING: PRIOR TO INSTALLATION, SUPPLY LINES MUST BE FLUSHED OF ALL FOREIGN MATERIAL SUCH AS PIPE DOPE, CHIPS, SOLDER ETC. VALVE MUST BE DRAINED PRIOR TO BEING SUBJECTED TO FREEZING TEMPERATURES.

NOTE: ENSURE DRAIN HOLE IS ON BOTTOM.

NOTE: ADA COMPLIANCE IS SUBJECT TO INTERPRETATION AND REQUIREMENTS OF LOCAL CODE AUTHORITY.



INSTALLATION INSTRUCTIONS:

A- ROUGH-IN AND PLUMB DIVERTER (1) IN DESIRED LOCATION.

B- REMOVE ADHESIVE FROM FOAM GASKETS (2) AND (3) AND ATTACH TO ESCUTCHEON (4) AS SHOWN.

C- ATTACH PLUG CAP (5) TO DIVERTER COVER PLATE (6).

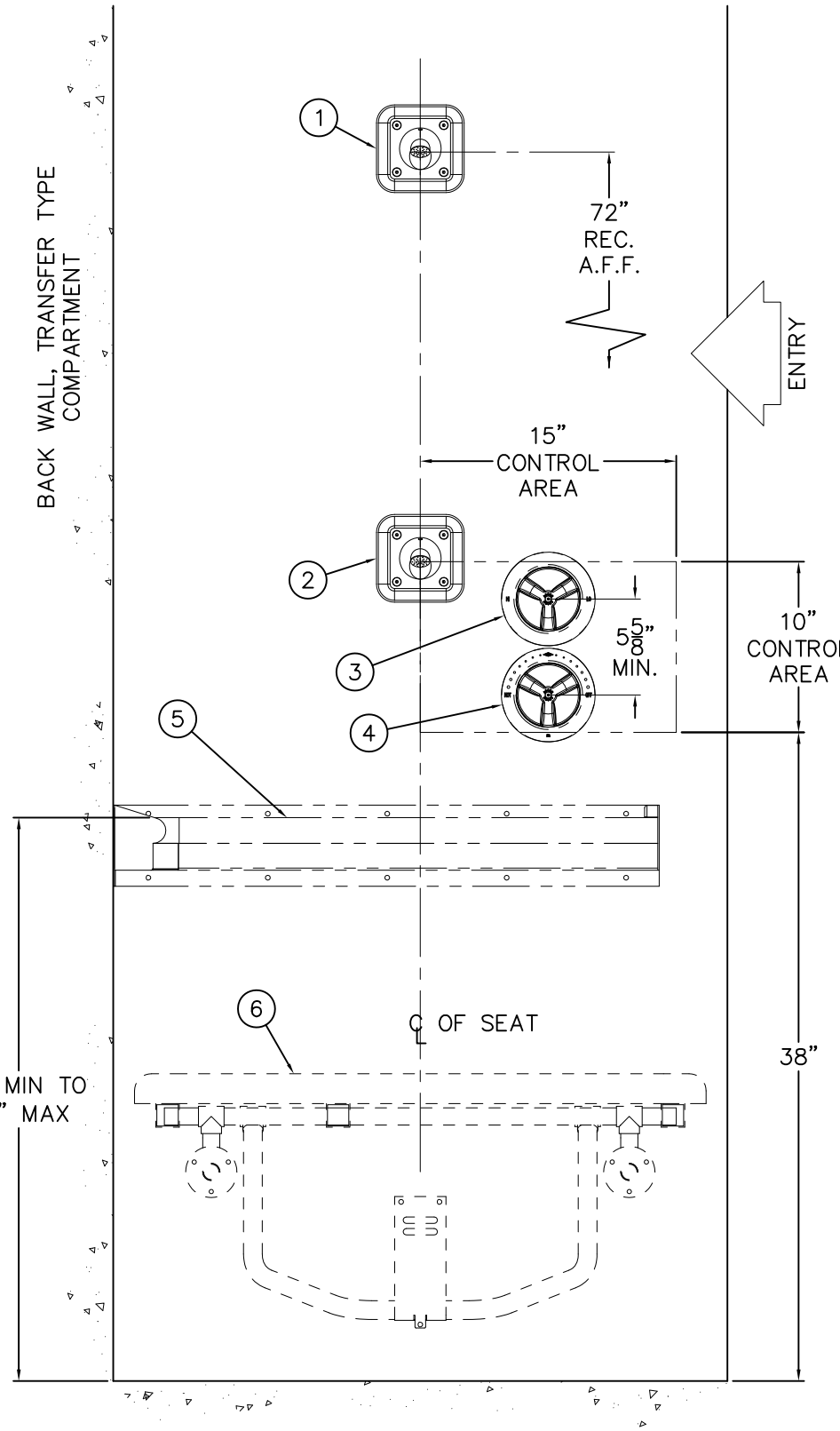
D- SECURE ESCUTCHEON (4) AND DIVERTER PLATE (6) TO DIVERTER VALVE (1) WITH SCREWS (7).

E- ATTACH HANDLE (8) TO DIVERTER VALVE STEM (9) WITH SCREW (10) AND TIGHTEN USING HEX BIT (11) PROVIDED.

WHITEHALL MANUFACTURING
P.O. BOX 3527 Industry, CA 91744
15125 Proctor Ave Industry, CA 91746
(626) 968-6681 FAX (626) 855-4862

TITLE **BEST CARE DIVERTER VALVE INSTALLATION FOR 1/2" NCT**

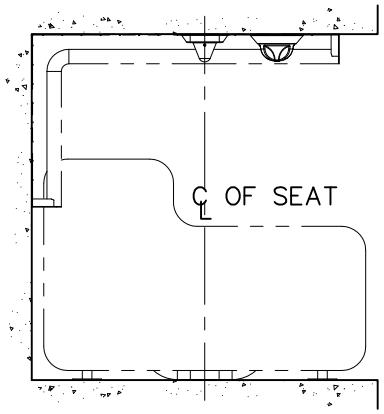
MANUFACTURE DATE	DATE ISSUED	DRAWING NUMBER
JUNE 2014 TO PRESENT	**07/10/14**	**9900-328-W02**
	DATE REVISED **07/11/22**	



36" x 36" TRANSFER TYPE COMPARTMENT SHOWN

1. —CSH CONICAL SHOWERHEAD.
2. —FH FIXED —CSH CONICAL SHOWERHEAD.
3. DIVERTER VALVE WITH PATENTED ADA COMPLIANT LIGATURE RESISTANT TRI—LEVER HANDLE.
4. T/P MIXING VALVE WITH PATENTED ADA COMPLIANT LIGATURE RESISTANT TRI—LEVER HANDLE.
5. #1110—3—R LIGATURE RESISTANT GRAB BAR, SHOWN FOR REFERENCE. SOLD SEPARATELY.
6. SEAT BY OTHERS, SHOWN FOR REFERENCE ONLY.

TOP VIEW
NOT TO SCALE



A— REFER TO ADA GUIDELINES OR LOCAL CODE AUTHORITY FOR COMPLETE INSTALLATION REQUIREMENTS FOR YOUR COMPARTMENT.

B— COMPLIANCE IS SUBJECT TO THE INTERPRETATION AND REQUIREMENTS OF THE LOCAL CODE AUTHORITY.

FYI: YOUR LOCAL CODE AUTHORITY MAY REQUIRE A DIFFERENT LAYOUT THAN SHOWN.

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TITLE **BEST CARE #WH538-FH-CSH-SRCH LAYOUT**

MANUFACTURE DATE	DATE ISSUED	DRAWING NUMBER
JUNE 2014 TO PRESENT	**06/06/14**	**9900-326-W02**
	DATE REVISED	