



AquaSense® AV™ Urinal ZEMS Series

Automatic Systems Sensor-Operated
AquaVantage Flushometer

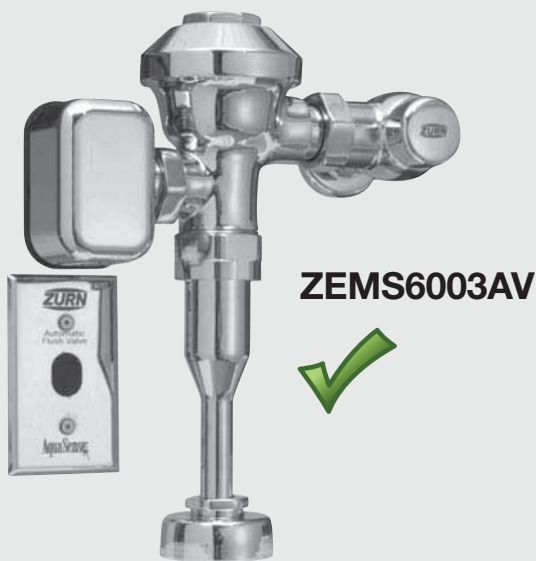
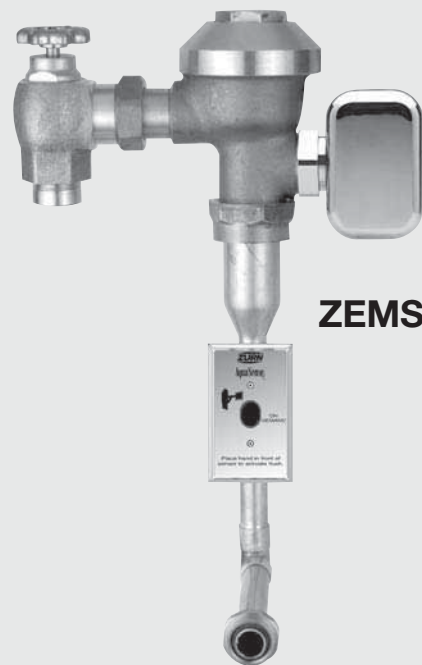
Installation, Operation,
Maintenance, and Parts Manual

Patented and Patents Pending

Sensor-Operated Concealed Systems

ZEMS6190AV

ZEMS6195AV



Sensor-Operated Exposed Systems

ZEMS6001AV

ZEMS6003AV ✓

LIMITED WARRANTY

All goods sold hereunder are warranted to be free from defects in material and factory workmanship for a period of three years from the date of purchase. Decorative finishes warranted for one year. We will replace at no cost goods that prove defective provided we are notified in writing of such defect and the goods are returned to us prepaid at Sanford, NC, with evidence that they have been properly maintained and used in accordance with instructions. We shall not be responsible for any labor charges or any loss, injury or damages whatsoever, including incidental or consequential damages. The sole and exclusive remedy shall be limited to the replacement of the defective goods. Before installation and use, the purchaser shall determine the suitability of the product for his intended use and the purchaser assumes all risk and liability whatever in connection therewith. Where permitted by law, the implied warranty of merchantability is expressly excluded. If the products sold hereunder are "consumer products," the implied warranty of merchantability is limited to a period of three years and shall be limited solely to the replacement of the defective goods. All weights stated in our catalogs and lists are approximate and are not guaranteed.

PRIOR TO INSTALLATION

Prior to installing the Zurn Automatic Sensor-equipped Flushometer, install the items listed below as illustrated in Figures 1 through 4.

- 2-gang electrical box (4 x 4 x 2-1/8 use Steel City #52171-N box and #52-C-14 reducing device cover or equivalent for sensor); see paragraph entitled "Sensor Location."
- Single-gang electrical outlet for plug-in power converter.
- Electrical wiring to the power converter outlet (120 VAC, 35 watts service required for each power converter used).
- Urinal fixture.
- Zurn carrier system, Z1200 series or equal.
- Single-gang box for Low Battery Indicator Light (optional).

IMPORTANT:

- All electrical wiring is to be installed in accordance with National/Local codes and regulations.
- All plumbing is to be installed in accordance with applicable codes and regulations.
- Water supply lines must be sized to provide an adequate volume of water for each fixture.
- Flush all water lines prior to making connections.
- Sensor units should not be located across from each other or in close proximity to highly reflective surfaces.

The Zurn AquaVantage is designed to operate over the entire pressure range recommended by plumbing fixture manufacturers and will produce a metered flush when activated.

Protect the chrome or special finish of this AquaVantage. **Do not use toothed tools to install or service the valve.** Also, see "Care and Cleaning" section of this manual.

SENSOR LOCATION (Figures 1 and 2)

(Use Steel City #52171-N box and #52-C-14 reducing cover or equivalent.)

Models ZEMS6001 and ZEMS6003

Locate the centerline of the 2-gang electrical box 3-1/4" to the left of the Flushometer centerline and 4" above the top of the fixture.

Models ZEMS6190 and ZEMS6195

Locate the centerline of the electrical box on the centerline of the Flushometer and 4" above the top of the fixture.

NOTE: Install reducing cover so screw holes are on top and bottom of box. Trim tiles to allow screw holes in plaster ring to show.

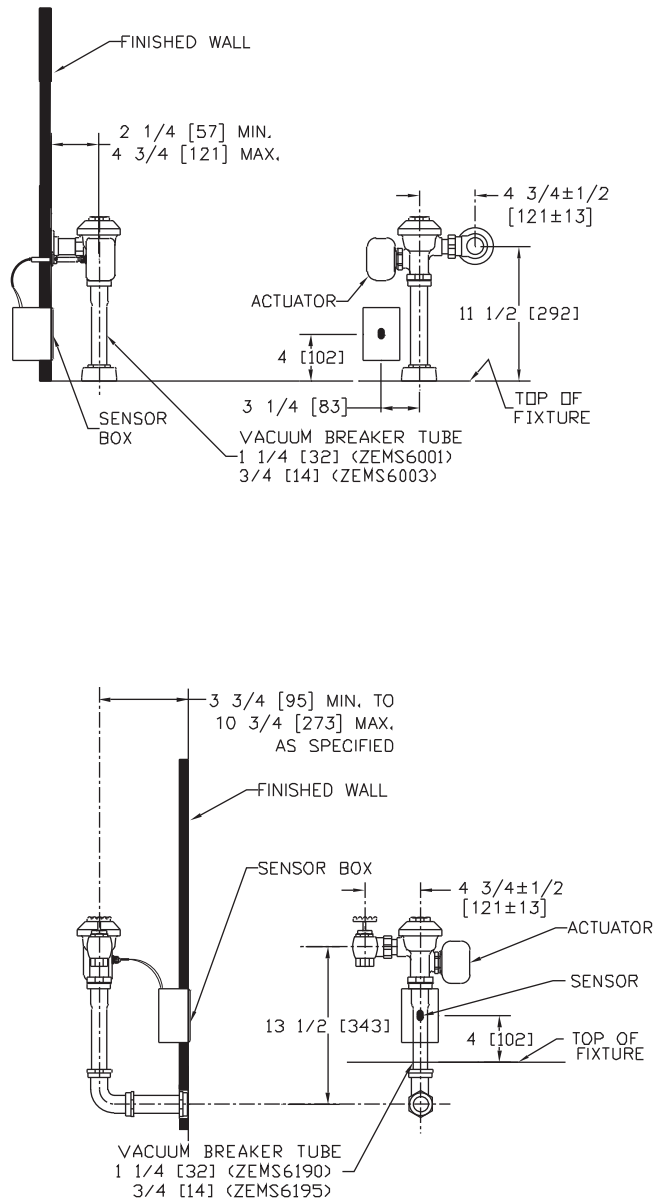


Figure 1

Electrical Box Installation

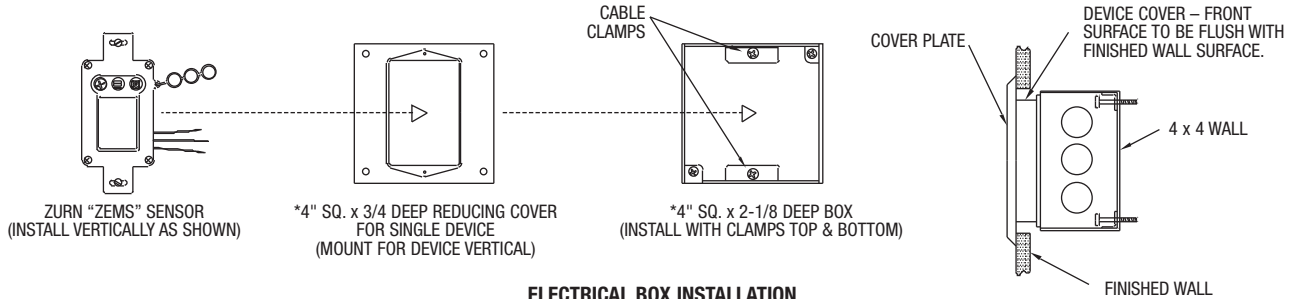


Figure 2

OPTIONAL BATTERY BACKUP and LOW BATTERY INDICATOR LOCATION (Figure 3)

All Models

Install the single-gang electrical box in an area that is convenient for visibility of the Low Battery Indicator Light. This can be located either close to the fixture or in a remote area such as the maintenance area or engineering room.

- The battery backup will supply power to a maximum of eight flush valves for an approximate three-day period during a power failure.
- The Low Battery indicator will come on when the batteries have reached a "caution level." The Flushometers will function when the light is illuminated until the batteries are completely discharged.
- The Low Battery light will illuminate even if the main power has not failed but the batteries have dropped to the "caution level."

INSTALLATION

STEP 1 – Install Receptacle (Figure 4)

Install Receptacle for the Zurn Power Converter in a convenient location. An optional mini junction box (P 6000-MJ) is recommended to distribute power to each sensor location. It is also recommended that brown wire be used for the positive (+) of the supply and blue wire be used for the negative (-) of the supply. This matches the sensor and actuator wire colors.

NOTE: One Zurn Power Converter can operate as many as eight Automatic Sensor-equipped Flushometers. The Power Converter is supplied with a six-foot cord. If additional wire is needed from the Power Converter to the Flushometer(s), use #18 AWG for this (by others). **Do not supply power** to the Power Converter until installation of actuator, sensor and Flushometer is completed and checked. **Proper polarity must be observed or damage to one or all components will result.**

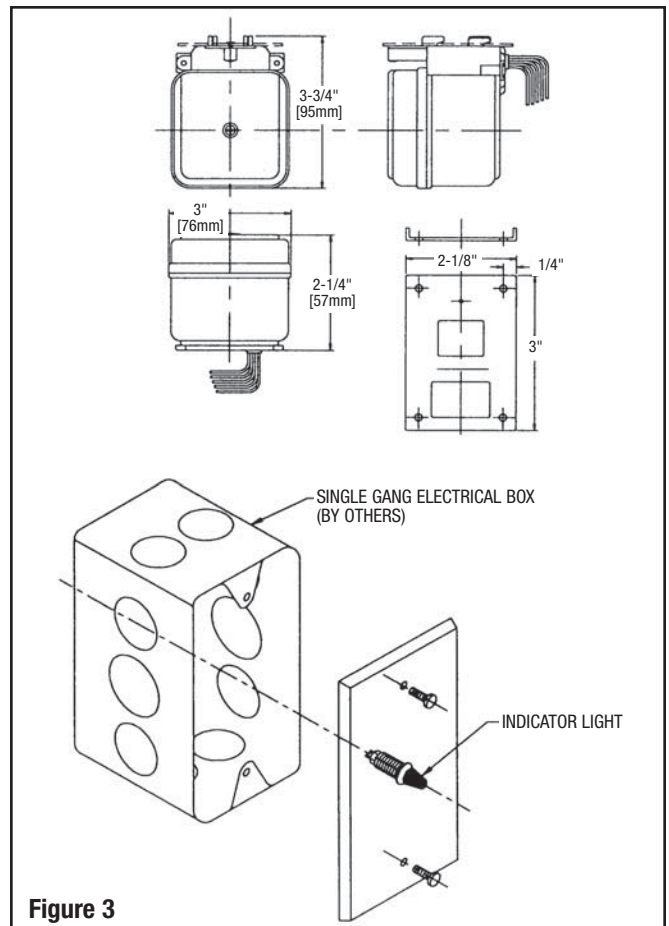


Figure 3

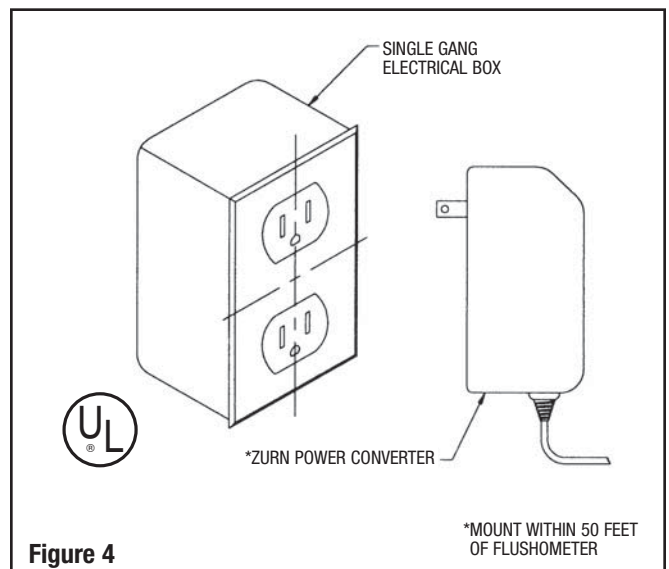


Figure 4

STEP 2 – Optional Battery Backup and Low Battery Indicator Light Installation

- If the battery backup option is being utilized, it is necessary to install the battery pack mounting plate and the battery pack close to the power converter in a convenient location for battery replacement when needed.
- Mount the battery pack mounting bracket.
- Clip the battery pack into location and secure the battery pack to the bracket with the securing screw.

NOTE: Do not install the batteries until the Flushometers are completely installed and operating. The batteries do not have to be installed for the system to function.

STEP 3 – Control Stop Installation (Figure 5)

Install the Zurn control stop valve with “Siphon Gard” back check protection (and wall escutcheon on exposed Flushometer installations) to the water supply line with the outlet positioned as required.

NOTE: For sweat solder applications, see recommended instructions included in the Zurn sweat solder kit.

STEP 4 – Install Vacuum Breaker Flush Connection

Models ZEMS-6001 and ZEMS-6003 (Figure 6)

Slide the tube nut, slip washer, rubber gasket and spud escutcheon over the vacuum breaker tube and insert tube into fixture spud. Hand tighten spud coupling into fixture spud.

Models ZEMS-6190 and ZEMS-6195 (Figure 7)

NOTE: When cutting scoriated pipe, leave a minimum of 1-1/4" of scoriation to ensure engagement with compression coupling.

Assemble pipe, elbows, couplings, slip washers, rubber gaskets and flanges as illustrated in Figure 7. Hand tighten all couplings. Once installation is completed, tighten all connections.

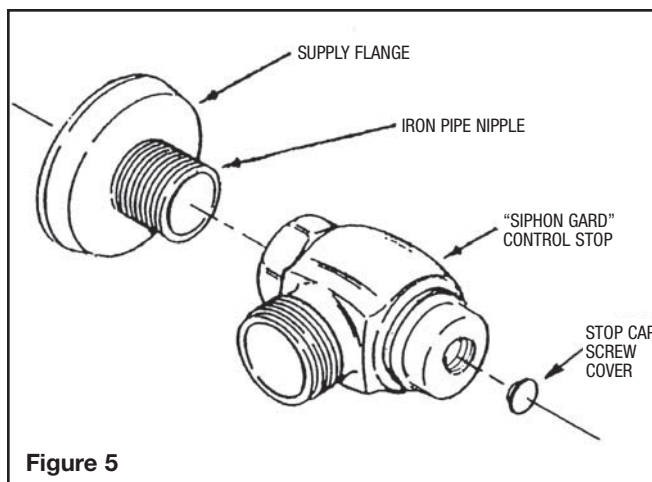


Figure 5

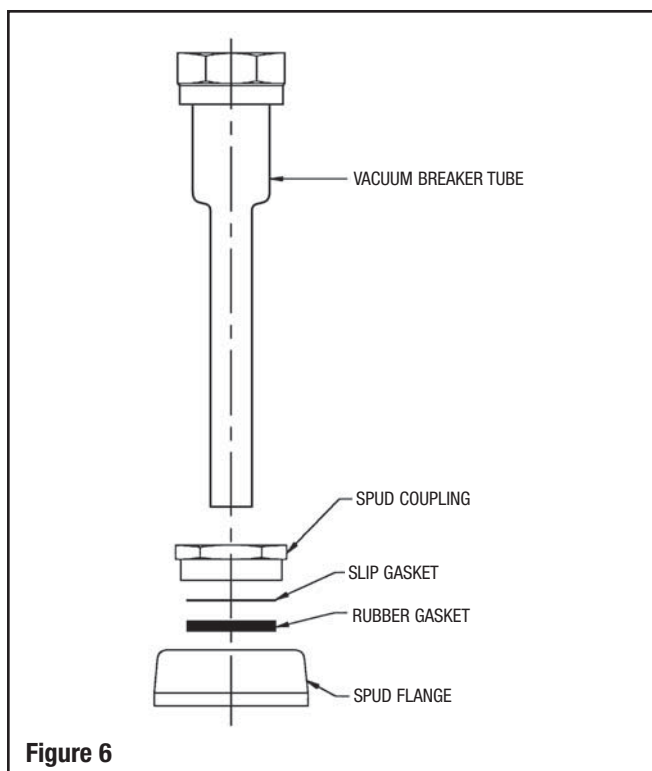


Figure 6

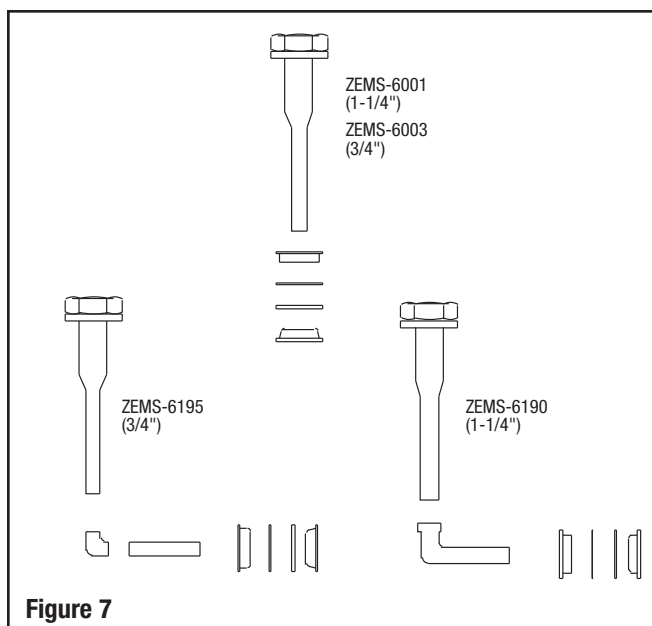


Figure 7

1. Drill 1-3/4" diameter hole per Figure 8.

- NOTE:** See Figure 9 for typical installation including optional mini junction box.

Be certain power is off to prevent damage to electrical components. Connect the sensor to the actuator and power converter exactly as shown in Figure 10A, Figure 10B if battery backup is being used. Also, the wiring diagram on the battery backup may be used. ***Double check that power converter polarity is correct.***

Install the Zurn Automatic Sensor into the reducing device cover using two (2) long screws provided. Ensure that wires from sensor case point to the right. The rubber push caps will be at the top. The sensor lens faces outward from the finished wall.

Make sure the control stop is closed. Remove Flushometer cover. Lift out the trip mechanism. Install the Flushometer cover wrench tight and open control stop. Turn on water supply to flush line of any debris or sediment.

After completion, shut off control stop, remove cover and reinstall the trip. Install Flushometer cover wrench tight.

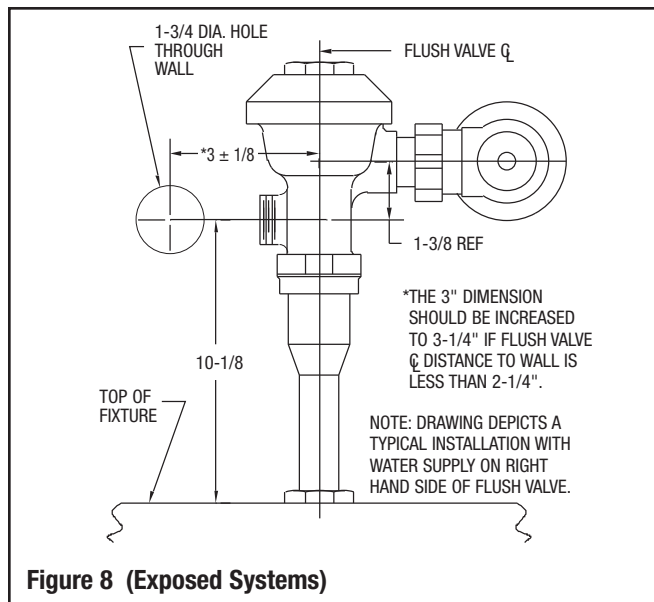


Figure 8 (Exposed Systems)

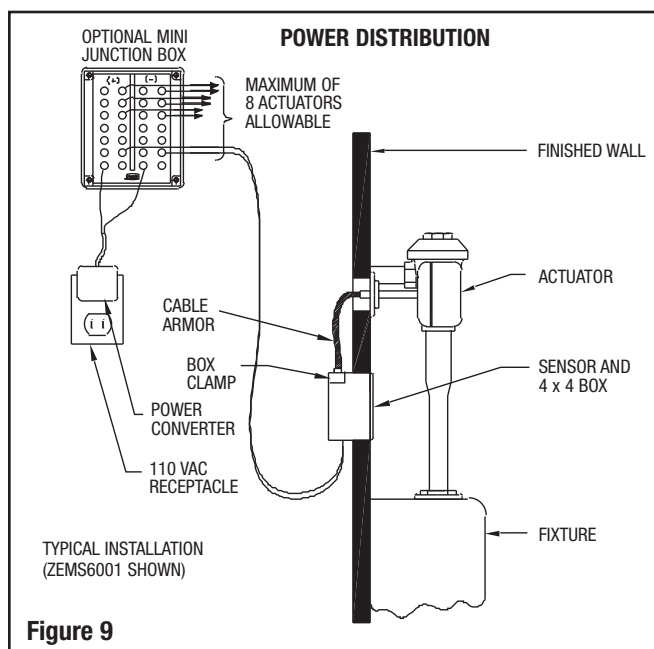


Figure 9

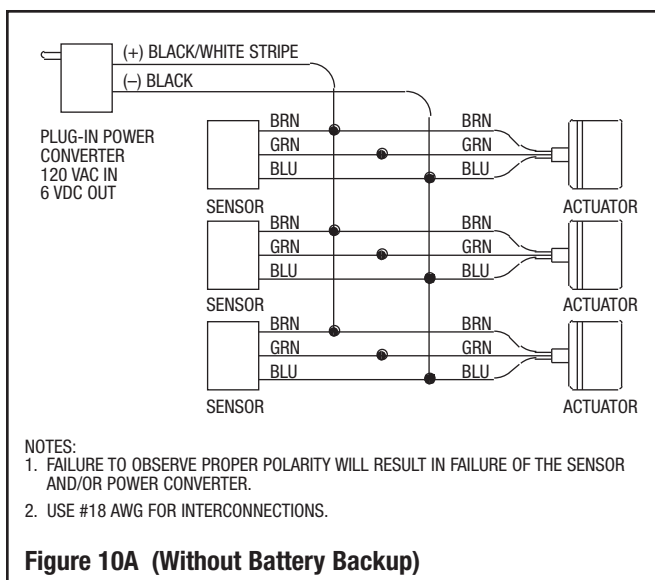


Figure 10A (Without Battery Backup)

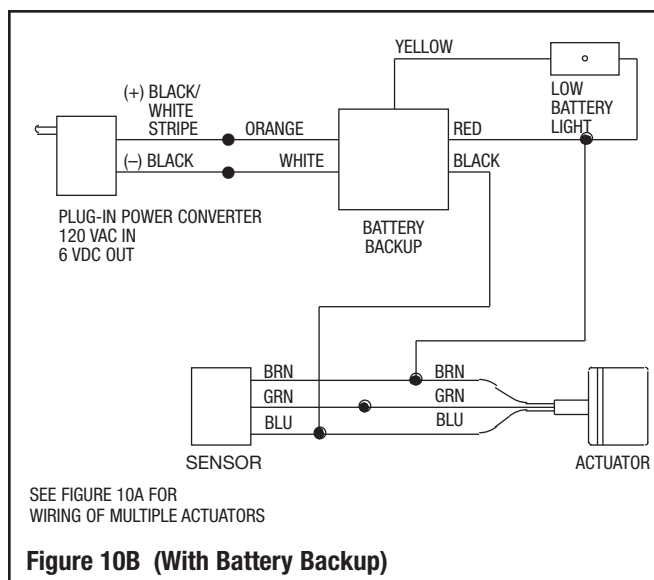


Figure 10B (With Battery Backup)

STEP 9 – Test and Adjustment (Figure 12)

(Also see “Sensor Features” on Page 7.)

Zurn Automatic Sensors are preset at the factory and provide the user with selectable options as follows:

Switch 1 – Automatic Flush (Factory setting is on.)

Switch 2 – Red/Green LED (Factory setting is on.)

Switch 3 – Courtesy Flush (Factory setting is off.)

- **Red/Green LED** – With power applied the red light will illuminate when an object is detected. The green light will illuminate after the object has been detected for a minimum of 8 seconds then leaves. The green light indicates the flushing sequence.
- **Range Adjustments** – The Zurn Automatic Sensors are factory set to operate at a range of 30". This range should be satisfactory for most installations. If the range is too short (i.e., not detecting the user) or too long, adjust the range.
- **To Make A Range Adjustment** – Remove the rubber push caps. The range adjustment is shown in Figure 12. Using a small screwdriver, turn the range adjustment clockwise to increase range (maximum range is 60") or counterclockwise to decrease range (minimum range is 12").

CAUTION: Range adjustment rotates only 1/2 turn total from min. to max. Do not exceed this or sensor will be damaged.

Stand in front of the Zurn Automatic Sensor at the desired distance; the red light will illuminate when you are within range.

Repeat adjustment procedure until the desired range is obtained.

• Switch Settings (Figure 12)

The three switches control the following options. They can be activated or deactivated by means of the switches (left is on, right is off).

Switch 1 – Automatic Flush – The unit will automatically flush 24 hours after last user.

Switch 2 – Red/Green LED – When an object is detected the Red LED illuminates. The Green LED illuminates while flushing.

Switch 3 – Courtesy Flush – When an object has been detected for two seconds, the unit flushes and goes into the normal mode. This is repeatable after 90 seconds.

NOTE: After the options have been selected the reset button **must** be pushed for sensor to accept selections. Make sure rubber push caps are securely installed after making adjustments to protect sensor from moisture.

STEP 10 – Adjust Control Stop (Figures 5 and 11)

Adjust the control stop to meet the flow rate required for proper cleaning of the fixture. Open control stop counterclockwise one-half turn from closed position. Activate Flushometer simulating a user. Adjust the control stop after each flush until the rate of flow delivered properly cleanses the fixture.

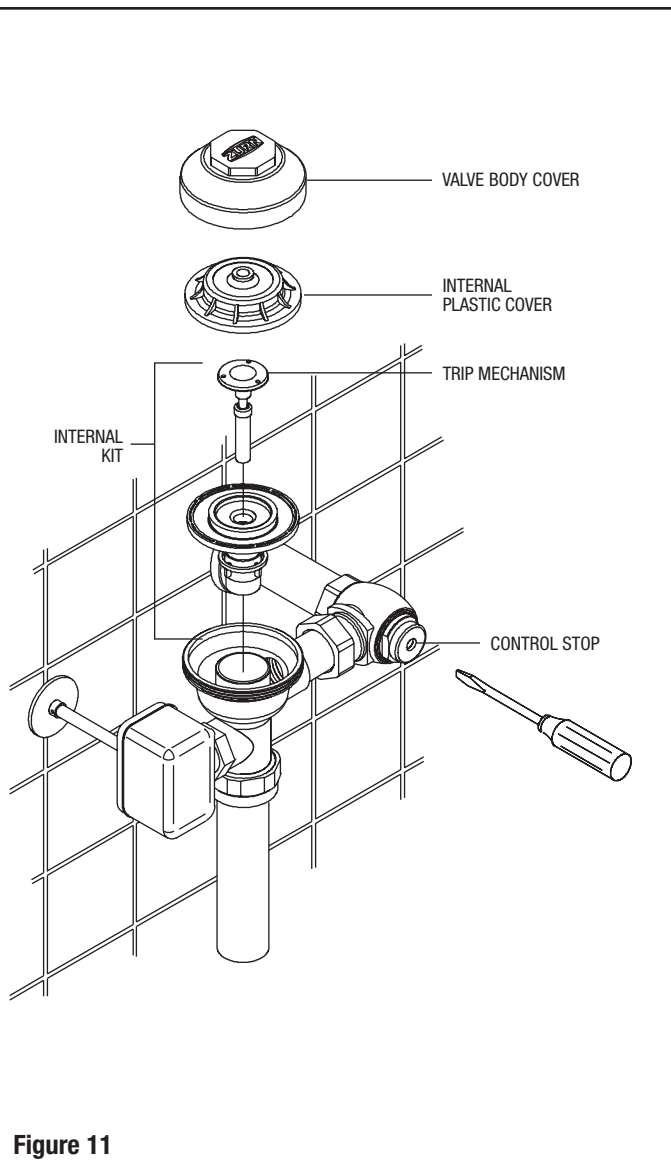


Figure 11

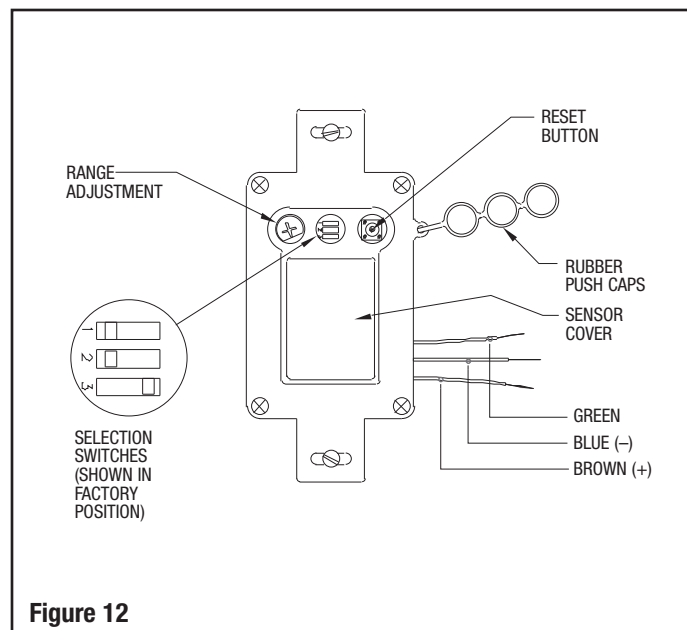


Figure 12

IMPORTANT NOTE: Excessive water flow creates noise, while too little flow will not satisfy the needs of the fixture. Proper adjustment is made when:

1. The plumbing fixture is cleansed after each flush without splashing water out from the lip.
2. A quiet flushing cycle is achieved.

After adjusting, replace the Zurn stop cap screw cover.

NOTE: The final setting for urinals should be such so that the fixture will not overflow with continuous flushing.

CARE AND CLEANING INSTRUCTIONS

Do not use abrasive or chemical cleaners to clean Flushometers and actuators as they may dull the luster and attack the chrome or special decorative finishes. Use only mild soap and water, then wipe dry with a clean cloth or towel.

While cleaning the bathroom tile, the Flushometer and actuator should be protected from splattering of cleaner. Acids and cleaning fluids can discolor or remove chrome plating.

SENSOR FEATURES (See Step 9 for instructions.)

Courtesy Flush: The Sensor will provide a courtesy flush two seconds after a person is first detected. The courtesy flush removes any residue from the fixture. The main flush will occur when the user steps away from the fixture. The courtesy flush can be manually activated/deactivated at any time.

Automatic 24-Hour Flush: The sensor will provide an automatic flush 24 hours after the last user. The automatic flush can be manually activated/deactivated at any time.

Indicator Lights: The sensor unit has two operation lights, red and green. The red light is lit when an object is detected. The green is lit when the unit is flushing. The indicator lights can be manually activated/deactivated at any time.

Maintenance Override (For Maintenance Purposes):

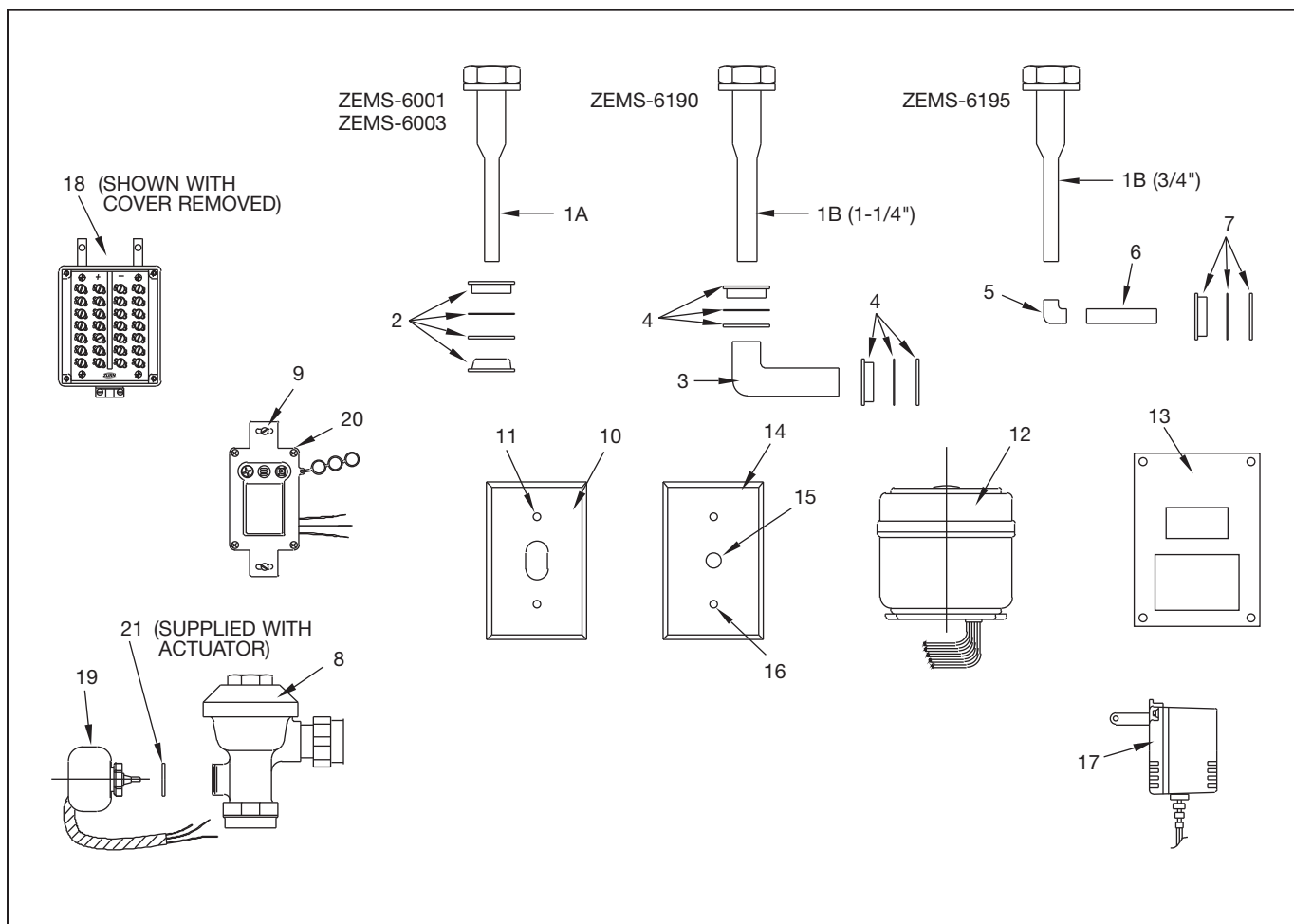
The sensor may be disabled for 10 minutes by placing a magnet on the sensor lens for 3 to 5 seconds. After 10 minutes the sensor will automatically resume functioning. Placing a magnet on the sensor for one second will restore normal operation and also provide a flush. These features are often desired for cleaning purposes.

Adjustable Range: The viewing distance is adjustable from 12" to 60".

Function Light: If an object is in the viewing range for more than 30 minutes the red LED will blink. Range readjustment may be required.

TROUBLE SHOOTING

Problem	Cause*	Corrective Action*
Valve will not operate.	<ol style="list-style-type: none"> 1.) Stop valve is closed. 2.) Supply valve is closed. 	<ol style="list-style-type: none"> 1.) Open stop valve. 2.) Open supply valve.
Insufficient volume of water to adequately siphon fixture.	<ol style="list-style-type: none"> 1.) Stop valve is not open enough. 2.) Urinal trip mechanism installed in wrong kit, urinal for closet. 3.) Insufficient volume or pressure at supply. 	<ol style="list-style-type: none"> 1.) Open stop valve for desired volume of water. 2.) Replace urinal part with proper closet valve part. 3.) If gauges are not available to measure supply pressure or volume of water at the valve, completely remove the working parts and open the stop valve to allow water to pass through the empty valve. If the supply is adequate to siphon the fixture, the guide ring may be removed from the guide assembly to provide additional flow. Should this prove unsatisfactory, steps should be taken to increase the pressure and/or supply.
Flush valve shuts off too quickly.	<ol style="list-style-type: none"> 1.) Damaged or punctured diaphragm. 2.) Enlarged by-pass orifice. 	<ol style="list-style-type: none"> 1.) Install new P6000-EUA or P6000-ECA replacement kit to remedy the problem. 2.) Install new P6000-EUA or P6000-ECA replacement kit to remedy the problem.
Valve is short flushing.	<ol style="list-style-type: none"> 1.) Diaphragm kit is not matched to the fixture. 2.) Urinal trip mechanism (black) is in the closet flush valve. 	<ol style="list-style-type: none"> 1.) Install the proper P6000-EUA or P6000-ECA replacement kit to remedy the problem. 2.) Install closet trip mechanism (white).
Valve is flushing too long or not shutting off.	<ol style="list-style-type: none"> 1.) Trip mechanism not seating properly due to foreign material between trip mechanism and retainer disc. 2.) By-pass orifice is plugged or partially plugged. 3.) Line pressure is not adequate to force trip mechanism to seal. 4.) Cracked cover. 	<ol style="list-style-type: none"> 1.) Disassemble parts and rinse thoroughly. 2.) Examine by-pass orifice and clean if necessary being certain not to enlarge orifice opening. 3.) Pressure is inadequate or has dropped below minimum operating range. Steps should be taken to increase the line pressure. 4.) Replace cover with new one.
Water splashes out of fixture.	<ol style="list-style-type: none"> 1.) Supply volume is more than is necessary. 2.) Lime accumulation on vortex or spreader holes of fixture. 	<ol style="list-style-type: none"> 1.) Adjust downward on control stop. 2.) Remove the lime build up.
Flush is not considered quiet.	<ol style="list-style-type: none"> 1.) Control stop may not be adjusted for quiet operation. 2.) Fixture may be contributing to noise. 3.) Piping system may be source of noise. 	<ol style="list-style-type: none"> 1.) Adjust the control stop for quiet operation keeping in mind the fixture evacuation requirements. 2.) Check noise created by fixture by placing a cover over the bowl opening to separate valve noise from bowl noise. If it is determined the fixture is too noisy consult with fixture manufacturer. 3.) High pressure in the system can sometimes be controlled by the stop valve. Other sources of noise may be the absence of air chambers and shock arrestors, loose pipes, improper size pipes, etc. In these cases the building engineer should be consulted.
Handle assembly leaking.	<ol style="list-style-type: none"> 1.) Handle assembly is not tight. 	<ol style="list-style-type: none"> 1.) Tighten handle assembly.



Item	Part No.	Description
1A	P6001-A-AA-CP	1 $\frac{1}{4}$ " x 9" Vacuum Breaker Assembly CP (Model ZEMS-6001)
	P6003-A-AA-CP	$\frac{3}{4}$ " x 9" Vacuum Breaker Assembly CP (Model ZEMS-6003)
1B	P6001-10-A-AA-RB	1 $\frac{1}{4}$ " x 10" Vacuum Breaker Assembly RB (Model ZEMS-6190)
	P6003-10-A-AA-RB	$\frac{3}{4}$ " x 10" Vacuum Breaker Assembly RB (Model ZEMS-6195)
2	P6001-H	1 $\frac{1}{4}$ " Spud Coupling Assembly CP (Model ZEMS-6001)
	P6003-H	$\frac{3}{4}$ " Spud Coupling CP (Model ZEMS-6003)
3	P6000-QE5-RB	1 $\frac{1}{4}$ " Elbow Connector RB
4	P6001-HN-RB	1 $\frac{1}{4}$ " Slip Joint Coupling Set
5	P6000-QE6-("L")-RB	$\frac{3}{4}$ " Elbow Connector RB (specify 'L' dim.)
6	P6000-QT5-("L")-RB	$\frac{3}{4}$ " Tube (specify 'L' dim.)

Item	Part No.	Description
7	P6003-HN-RB	$\frac{3}{4}$ " Slip Joint Coupling Set
8	Specify Series	Valve Body CP (specify valve type)
9	PESS6000-28	Sensor Screws (set of two)
10	PESS6000-22A	Sensor Cover Plate
11	PH6000-HY35	Screws (two required)
12	PESS6000-29	Battery Back-Up (optional)
13	PESS6000-30	Wall Bracket (optional)
14	PESS6000-31	Indicator Light Cover Plate (optional)
15	PESS6000-32	Indicator Light (optional)
16	PH6000-HY35	Screws (two required) (optional)
17	P6000-PC6	Power Converter
18	P6000-MJ	Mini Junction Box (optional)
19	PEMS6000-HYM	ZEMS Actuator
20	PEMS6000-26A	ZEMS Sensor
21	P6000-M10	Washer (supplied with Item 19)



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