



AquaSense® AV™ ZR Series

Sensor-Operated,
Battery-Powered Flushometer

Installation, Operation,
Maintenance and Parts Manual

Patented and Patents Pending



ZR6000AV



ZR6003AV

**Sensor-Operated, Battery-Powered
Closet/Urinal Systems**

- ZR6000AV**
- ZR6000AV-WS**
- ZR6000AV-WS1**
- ZR6001AV**
- ZR6001AV-WS**
- ZR6001AV-WS1**
- ZR6003AV-WS**
- ZR6003AV-WS1**

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

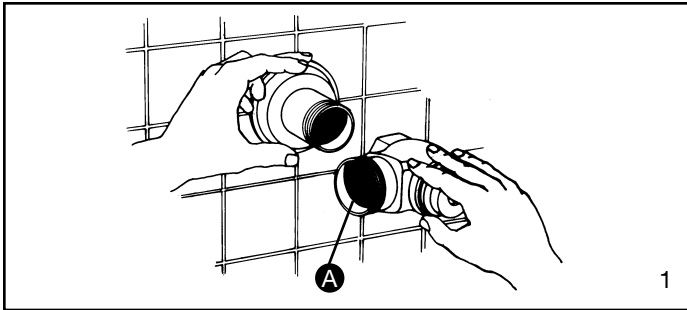
Prior to installing the AquaSense "AV" Flushometer, install the items listed below:

- Closet or urinal fixture
- Drain line
- Water supply line

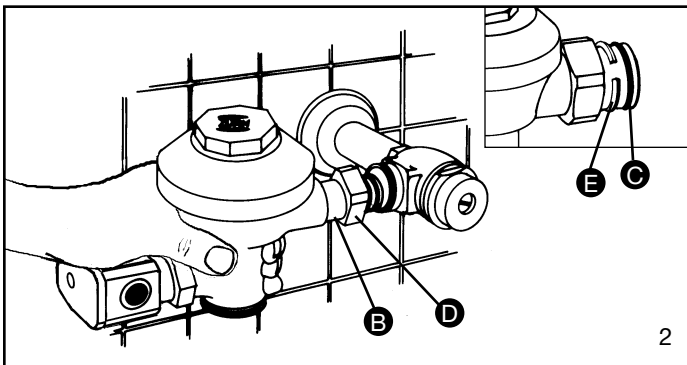
IMPORTANT:

- 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 OPERATION (See Step 9).

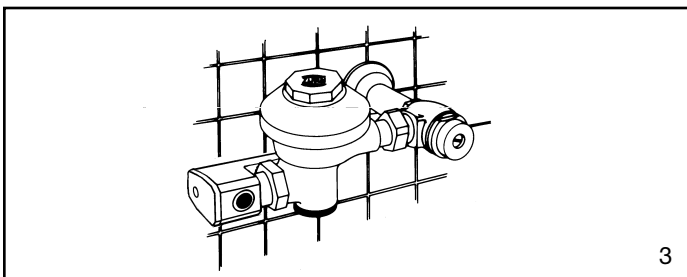
The AquaSense "AV" is designed to operate with 20 to 80 psi (138 to 552 kPa) of water pressure. THE MINIMUM PRESSURE REQUIRED TO THE VALVE IS DETERMINED BY THE TYPE OF FIXTURE SELECTED. Consult fixture manufacturer for pressure requirements. Protect the chrome or special finish of this flushometer. DO NOT USE TOOTHED TOOLS TO INSTALL OR SERVICE THE VALVE.



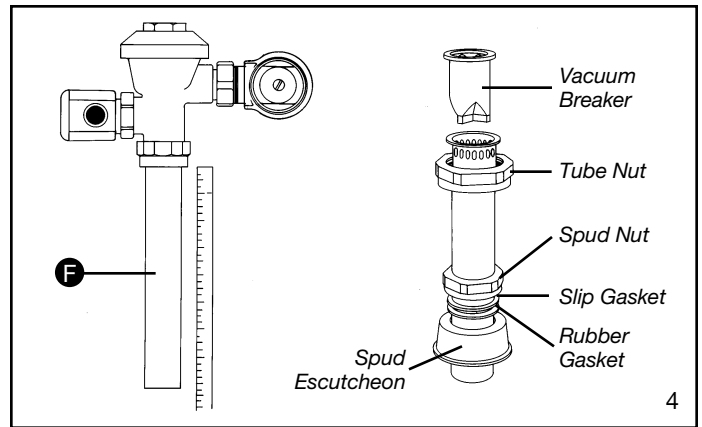
- 1** Install stop valve assembly **A** using proper size supply escutcheon and sweat solder adapter kit if applicable. Thread sealing compounds should be used on male NPT threads only.



- 2** Prior to inserting the flush valve tailpiece **B** into stop valve, be certain that the O-ring seal **C** is located in O-ring seal groove at the end of the tailpiece and the locking nut **D** and locking snap ring **E** are located as shown. Care should be taken not to damage the O-ring when inserting the tailpiece into the stop valve. If lubrication is needed, wetting the O-ring with water will be sufficient.

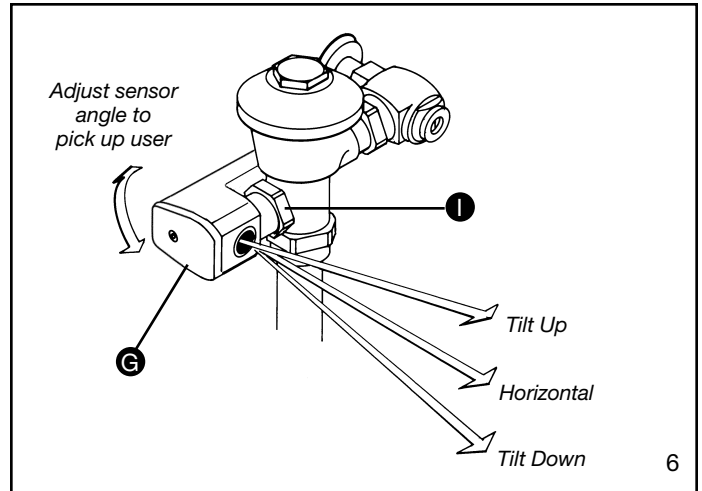


- 3** Insert the flush valve tailpiece **B** into the stop valve **A** and hand tighten the lock nut **D** to the stop valve. Plumb the entire unit.

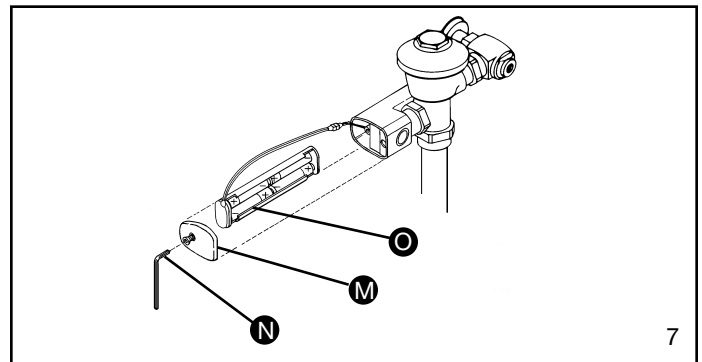


- 4** Determine the length of vacuum breaker tube **F** required to join the flush valve and fixture spud. Cut the vacuum breaker tube, if required, to this length. Assemble the vacuum breaker tube assembly and spud nut assembly to the flush valve and fixture spud.

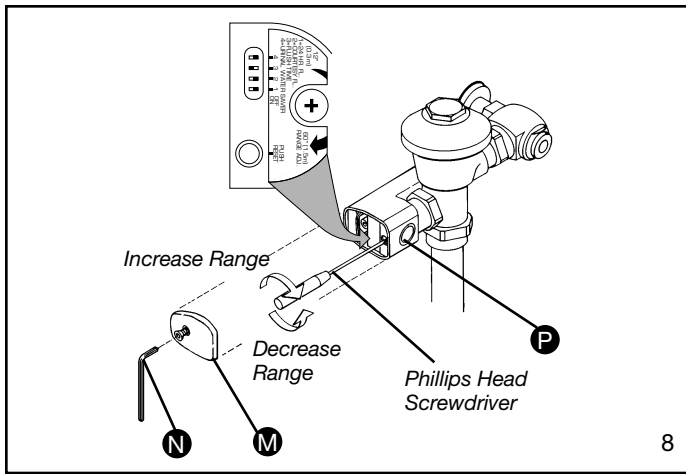
- 5** Hand tighten spud nut and vacuum breaker tube nut to fixture and flush valve. Adjust the valve assembly for plumb. Tighten fixture spud nut, vacuum breaker tube nut and lock nut with a wrench. **Do not turn water on until batteries are inserted** – see 7.



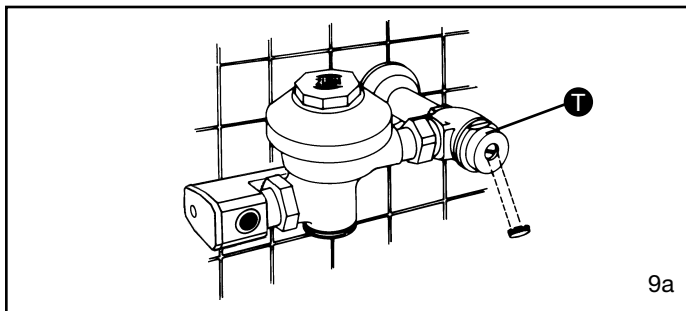
- 6** Loosen handle nut, aim sensor **G** at desired tilt angle (horizontal, tilt up, or tilt down), hold in place and tighten handle nut **L**.



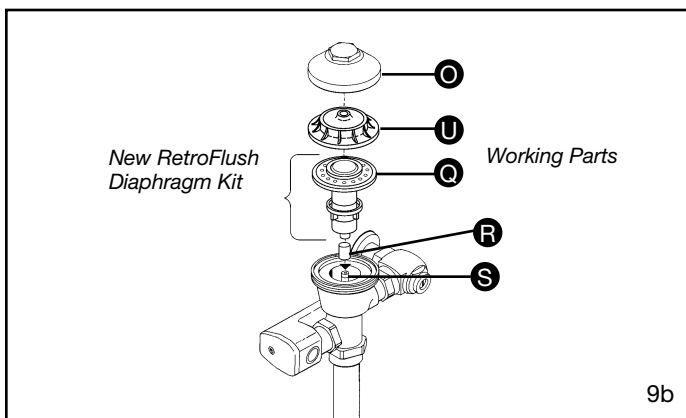
- 7** Remove electronics access cover **M** with vandal-resistant hex wrench **N** provided. Insert preassembled battery holder **O** into electronics compartment. Connect battery cable connector to electronics cable connector. **(Important: Insert non-connector end of battery holder first, as shown.)**



8 Adjust feature settings as desired. The sensor range is factory set. If adjustment is necessary, use a phillips head screwdriver and turn **GENTLY**. **SEE SENSOR RANGE ADJUSTMENT**. Replace electronics access cover **M** and tighten securely with vandal-resistant hex wrench **N**.



Before the supply water is turned on, be sure all stop valves to the flush valves are closed off tight. The stop valves can be opened and closed by using the adjusting screw located at the center of the stop valve cap **T** (shown in 9a), behind the adjusting screw cover if already installed. Stop valve adjustments can only be made by using the adjusting screw. **It is not necessary to remove the stop valve cap when making adjustments. If for any reason it becomes necessary to remove the stop valve cap, be certain the water is shut off at the main supply valve.**

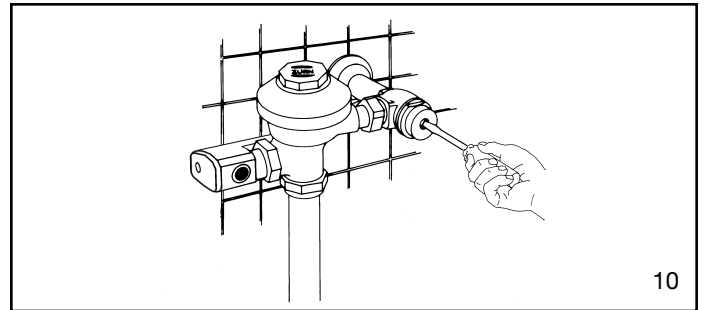


9 When all flush valves are connected to the fixtures and water pressure is available, it is recommended that the supply piping be flushed to remove dirt, pipe chips, etc., from system. Use the following procedure to flush out the supply piping:

- Remove the main valve body cover **O**.
- Remove the working parts from the flush valve **U** and **Q** (shown in 9b).
- Place tube cap **R** over riser tube **S**. Replace the plastic cover **U** and main body cover **O** without reinstalling the working parts **Q**.

- Open the stop valve by using the stop adjusting screw and flush out all debris from pipe and connections.
- Shut stop, open cover, remove tube cap, replace the working parts, replace and tighten both covers.

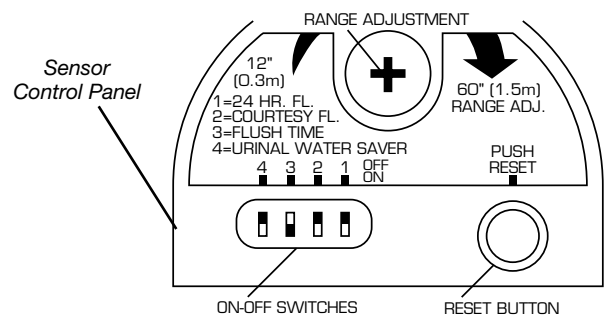
This procedure should also be repeated when the system is drained for seasonal use, as occurs in athletic fields, recreation parks, etc.



10 The AquaSense "A" flush valves are preset for fixture volume as marked on the valve cartons. The valve does not require regulation for variation in water pressure within its operating range. To set the flush valve for proper operation, open the stop valve completely by using the adjusting screw and flush the AquaSense "AV" several times. Gradually adjust the stop valve closed, using the adjusting screw, so that the rate of water flow into the fixture is not excessive, yet is sufficient to adequately evacuate the waste. The final setting for closets should provide a rate of water flow sufficient enough to evacuate thirty sheets of toilet paper from the fixture. The final setting for urinals should be such that the fixture will not overflow when the valve is actuated twenty times in succession. The stop cap screw cover should be replaced after final adjustments have been made.

Sensor Range Adjustment

The range is factory set for urinal or closet applications. If necessary, the sensor range can be adjusted. Pressing the reset button will initiate a ten minute set-up period. During these ten minutes a red light will flash through the sensor lens **P** when an object is in view of the sensor. Use this feature to properly set the sensor range. Slowly rotate the range adjustment clockwise to increase range and counterclockwise to decrease range. The range adjustment will stop at minimum and maximum settings. Do not turn beyond these stops. For an additional ten minutes of blinking, push reset button. Stand in front of sensor (minimum 10 seconds) and move forward and backward to determine range.



Option Setting

- Switch 1 - Automatic Flush** - The unit will automatically flush 24 hours after the last user. On position = activate, Off position = deactivate.
- Switch 2 - Courtesy Flush** - When an object has been detected for two seconds, the unit flushes then goes into normal mode. On position = activate, Off position = deactivate. (Always press reset button after changing switches.)
- Switch 3 - Flush Time** - Factory setting.
- Switch 4 - Urinal Water Saver** - Reduces flush volume by 40% during periods of continuous use. (Note: Always press reset button after changing switches.)

Zurn RetroFlush System Features

- **Main Flush**

The sensor will provide a main flush after a user is in range for eight or more seconds. The eight-second delay prevents actuation of the flush valve by a person walking past the sensor.

- **Automatic 24-Hour Flush**

The sensor will provide an automatic flush 24 hours after the last flush. The automatic flush feature can be manually switched on or off in the field, depending on owner preference. The option is controlled by switch number one.

- **Courtesy Flush**

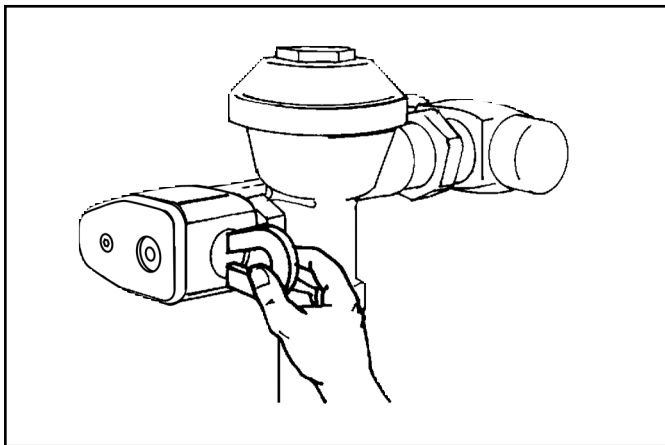
The sensor will provide a courtesy flush within two seconds after a person is first detected. The courtesy flush freshens the bowl and removes any residue from the fixture. The main flush will occur when the user steps away from the fixture. The courtesy flush feature can be manually switched on or off in the field, depending on owner preference. The option is controlled by switch number two.

- **Maintenance Override**

One may initiate an immediate flush by placing a magnet in front of the sensor window for one-half to three seconds. This feature is typically used by the cleaning staff who do not wish to stand in front of the sensor to cause actuation.

One may prevent operation of the flush valve by placing a magnet in front of the sensor window for longer than three seconds. This feature is typically used by maintenance or cleaning staff who wish to prevent automatic actuation of the valve. This feature is automatically defeated after ten minutes.

If one wishes to defeat the feature prior to the ten-minute time out, simply place a magnet in front of the sensor window for one-half to three seconds.



Maintenance Override Feature

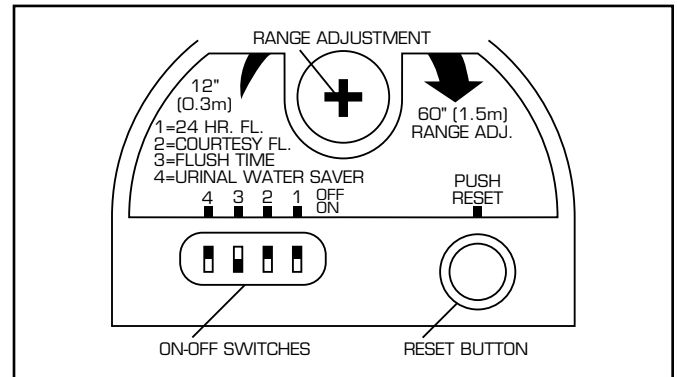
- **Indicator Light**

The sensor unit includes a red indicator light having three functions:

1. **Range Adjustment:** For the first ten minutes of operation, the red light will flash when an object is detected.
2. **Low Battery Indication:** When the batteries have reached the caution level, the red light will flash when an object is detected.
3. **Abnormal Reflection Indicator:** When a reflective surface is present for longer than 30 minutes, the red light will flash indicating that an object is being continuously detected.

- **Adjustable Range**

The detection distance is field adjustable from 12 to 60 inches. Slowly rotate the range adjustment clockwise to increase range and counterclockwise to decrease range. The range adjustment will stop at minimum and maximum settings. Do not turn beyond these stops. For ten minutes after battery installation, a blinking red light in the sensor window will appear when an object is in view. For an additional ten minutes of blinking, push the reset button. Stand in front of the sensor and move forward and backward to determine range.



Sensor Control Panel

- **Urinal Water Saver**

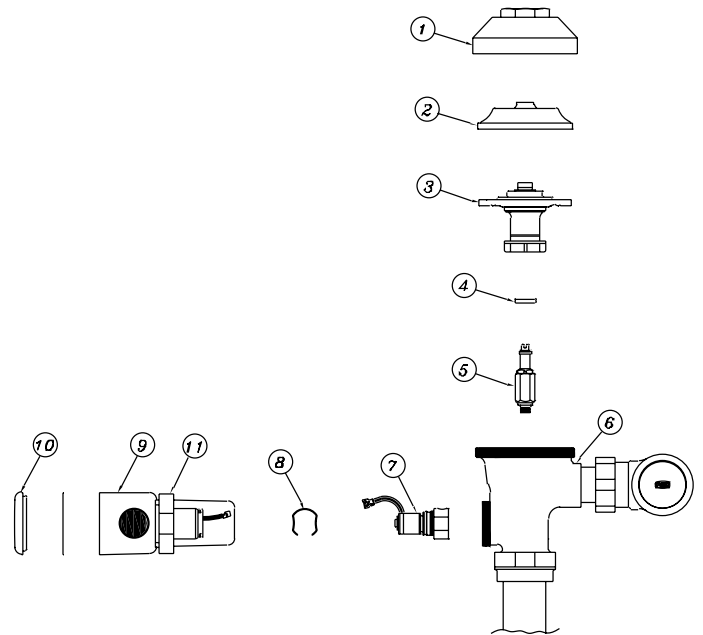
This feature is intended for a high-use application, such as a stadium or civic arena, where a continuous line of users wait to use a urinal. When a sensor-operated urinal is used continuously, water consumption can be significantly reduced. Water is conserved by flushing a partial volume of water after two consecutive users have been sensed and a new user enters the range of the sensor within five seconds of the previous user leaving. This partial flush clears the urinal and allows for the next repetitive flush to continue to move the waste water through the drain line. This feature is automatically defeated if a user does not enter the sensor range within five seconds of the previous user leaving. The urinal water saver feature can also be manually switched on or off in the field, depending on owner preference. The option is controlled by switch number four.

ZR Flush Valve/ZRK Retrofit Kit

Solenoid Replacement Instructions

Removing The Old Solenoid

1. Turn off water supply to flush valve at shut off (S.O.).
2. Cycle the valve once – flush it to relieve pressure holding the valve closed.
3. Remove the main valve body cap (Item #1) from the flush valve (Item #6) using a wrench.
4. Remove the plastic diaphragm cover (Item #2) from the top of the diaphragm assembly.
5. Remove the diaphragm assembly (Item #3) from the flush valve (Item #6).
6. Using a screwdriver, remove the riser tube (Item #5) from the solenoid (Item #7).
7. Remove the RetroFlush sensor assembly (Item #9) from the flush valve handle port using a wrench on the handle nut (Item #11).
8. Remove the solenoid retaining clip (Item #8) and gently pull the solenoid (Item #7) out of the housing.
Note: Pay special attention to the position of the retaining clip ends to ensure proper reassembly into the proper slots.
9. Disconnect the sensor cable connector from the solenoid. **Note: If the white connector is not fully accessible, then see the special instructions on page 6.**

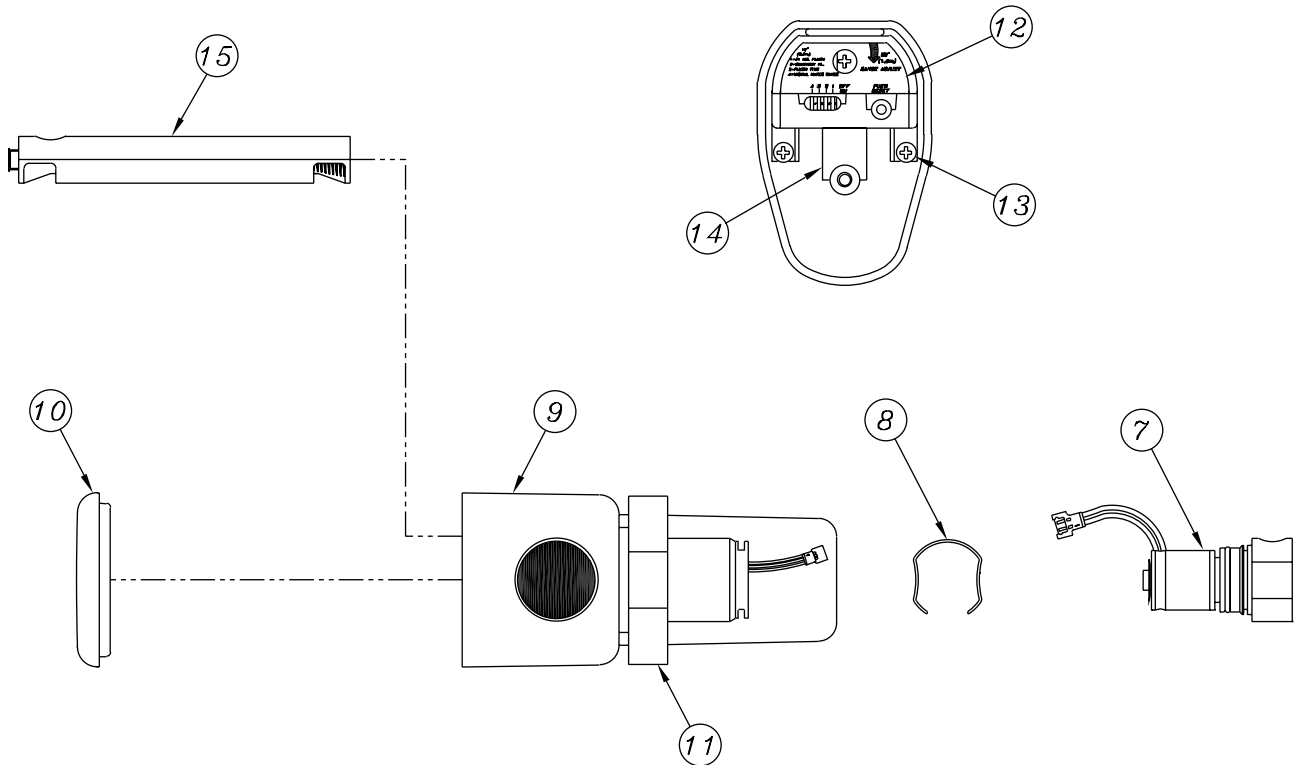


Installing The New Solenoid

1. Connect the cable connector on the solenoid (Item #7) to the sensor cable connector.
2. Lightly lubricate the solenoid O-ring seal with silicone grease provided to prevent damage while reassembling the unit. Insert the solenoid (Item #7) into the housing and install the solenoid retaining clip (Item #8). When installed properly, the end of the solenoid housing is free to rotate. **Note: Be careful not to crimp the battery wires while inserting the solenoid into the housing.**
3. Reinstall the RetroFlush sensor assembly (Item #9) onto the flush valve using a wrench. Be sure the solenoid inlet (threaded hole) is facing upward when installed in the flush valve. If not, remove Item #9 and rotate the solenoid for proper position.
4. Remove old O-ring (Item #4) from the upper part of the riser tube (Item #5). Install new quad ring (Item #4) onto the riser tube (Item #5) making sure the quad ring is not twisted. Lightly lubricate the quad ring with the silicone grease provided.
5. Reinstall the riser tube (Item #5) onto the solenoid (Item #7). Tighten snug with screwdriver, do not overtighten.
6. Reinstall the original diaphragm assembly (Item #3) onto the flush valve (Item #6).
7. Reinstall the original plastic diaphragm cover (Item #2) on top of the diaphragm assembly (Item #3).
8. Reinstall the main valve body cap (Item #1) onto the flush valve (Item #6) using a wrench. Tighten properly.
9. Remove battery cover (Item #10) from RetroFlush sensor assembly (Item #9) with the hex key wrench provided and press reset button located on the sensor module case. Reinstall cover (Item #10).
10. Turn on water supply and cycle flush valve for normal operation. Adjust stop valve for optimal flow to the fixture.

ZR Flush Valve/ZRK Retrofit Kit

Solenoid Replacement Instructions



Special Note On #9 – Removing Old Solenoid Valve

1. If the white connector is not fully accessible then the sensor module must be removed from the case in order to reassemble the solenoid connector to the sensor connector.
2. Remove the battery cover (Item #10) from the RetroFlush sensor assembly (Item #9).
3. Remove the battery case (Item #15) and disconnect from the sensor.
4. Remove the sensor module (Item #12) held in place by two screws (Item #13) and rubber plug (Item #14).
5. Lightly lubricate the solenoid O-ring seal with silicone grease provided to prevent damage while reassembling the unit. Insert the solenoid (Item #7) into the housing and install the solenoid retaining clip (Item #8). When installed properly, the end of the solenoid is free to rotate. **Notes: Be careful not to crimp the battery wires while inserting the solenoid into the housing. Also, be sure the blue and gray wires of the solenoid valve extend into the sensor module cavity of the housing (Item #9).**
6. Connect the sensor module blue and gray wires to the solenoid valve blue and gray wires and reinstall the sensor module. **Note: Be very careful not to crimp the wires when reinstalling the sensor module. Replace the two screws (do not overtighten) and rubber plug holding the sensor module in place.**
7. Replace the battery pack and reconnect to the sensor.
8. Continue with Step 3 and beyond under "Installing The New Solenoid" on reverse side of this page.

Parts Replacement Guide

Covers

Outside Cover – Chrome Plated (11)
 Inside Cover (12)

Product No.

P-6000-LL
 P-6000-L

Replacement Kits

Closet Replacement Kit (14-18, 25, 26, 27)
 Water-Saving Closet Replacement Kit (14-18, 25, 26, 27)
 Low-Consumption Closet Replacement Kit (14-18, 25, 26, 27)
 Urinal Replacement Kit (14-18, 25, 26, 27)
 Water-Saving Urinal Replacement Kit (14-18, 25, 26, 27)
 Low-Consumption Urinal Replacement Kit (14-18, 25, 26, 27)

Product No.

PR-6000-EC
 PR-6000-EC-WS
 PR-6000-EC-WS1
 PR-6000-EU
 PR-6000-EU-WS
 PR-6000-EU-WS1

Replacement Parts – Inside Components

Riser Tube (13)
 Closet Volume Control - 4.5 GpF (25)
 Water-Saving Closet Volume Control - 3.5 GpF (25)
 Low-Consumption Closet Volume Control - 1.6 GpF (25)
 Urinal Volume Control - 3.0 GpF (25)
 Water-Saving Urinal Volume Control - 1.5 GpF (25)
 Low-Consumption Urinal Volume Control - 1.0 GpF (25)
 Diaphragm (15)

Product No.

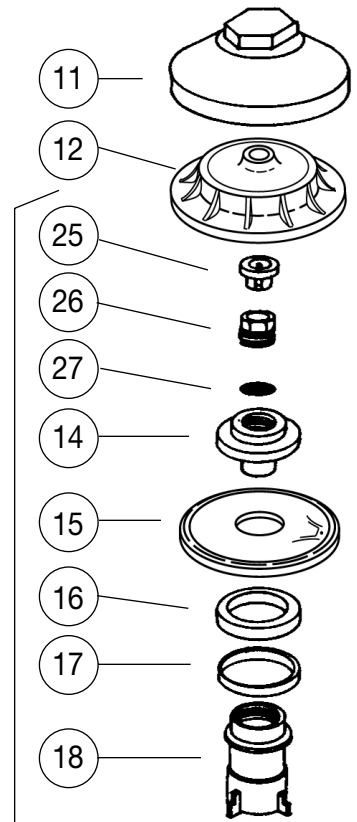
PR-6000-E13F
 PR-6000-EC25
 PR-6000-EC25-WS
 PR-6000-EC25-WS1
 PR-6000-EU25
 PR-6000-EU25-WS
 PR-6000-EU25-WS1
 P-6000-E15

Sensor Module Replacement Kits

Solenoid Valve Replacement Kit (8, 9, 10)
 Sensor Lens Kit (6)
 High Volume Sensor (3, 4, 5, 6)
 Low Volume Sensor (3, 4, 5, 6)
 Battery Holder with Connecting Cable (1)
 Metal Housing (7)
 Metal Cover with Screw and Seals (20, 21, 22, 23)
 Vandal-Resistant Cover Wrench (24)

Product No.

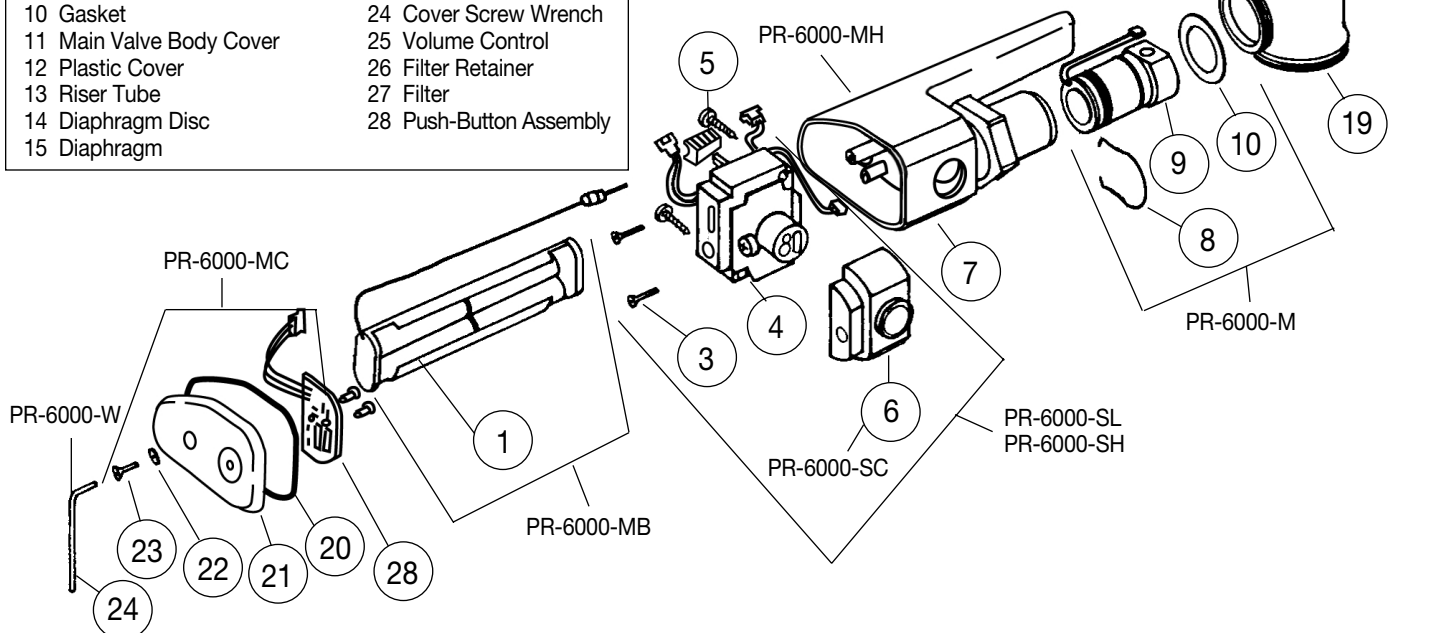
PR-6000-M
 PR-6000-SC
 PR-6000-SH
 PR-6000-SL
 PR-6000-MB
 PR-6000-MH
 PR-6000-MC
 PR-6000-W



PR-6000-EC
 PR-6000-EC-WS
 PR-6000-EC-WS1
 PR-6000-EU
 PR-6000-EU-WS
 PR-6000-EU-WS1

PR-6000-E13F

- | | |
|---|------------------------------------|
| 1 Battery Holder and Battery Connecting Cable | 16 Flow Ring |
| 3 Sensor Screws - 2 | 17 Guide Ring |
| 4 Sensor Electronics | 18 Cylinder Slide (with Tailpiece) |
| 5 Sensor Lens Screws - 2 | 19 Main Valve Body |
| 6 Sensor Lens | 20 O-Ring |
| 7 Metal Housing | 21 Metal Housing Cover |
| 8 Solenoid Valve Retainer Clip | 22 O-Ring |
| 9 Solenoid Valve | 23 Cover Screw |
| 10 Gasket | 24 Cover Screw Wrench |
| 11 Main Valve Body Cover | 25 Volume Control |
| 12 Plastic Cover | 26 Filter Retainer |
| 13 Riser Tube | 27 Filter |
| 14 Diaphragm Disc | 28 Push-Button Assembly |
| 15 Diaphragm | |



SPECIFICATIONS

Sensor Range:	12" to 60" (adjustable)
Battery Type :	AA Duracell Alkaline – Model MN-1500
Battery Life:	3 years at 4,000 flushes per month
Flush Volume:	ZR-6000 – 4.5 gallons per flush ZR-6000-WS – 3.5 gallons per flush ZR-6000-WS1 – 1.6 gallons per flush ZR-6001 – 3.0 gallons per flush ZR-6003-WS – 1.5 gallons per flush ZR-6003-WS1 – 1.0 gallons per flush
Voltage:	6 VDC
Operating Water Pressure:	20-80 psi
Courtesy Flush:	Flush at the beginning of the detection cycle (switchable)
Automatic Flush:	Flush 24 hours after the last use (switchable)
Maintenance Override:	Magnetic flush triggering or inhibiting switch
Indicator Light:	Range Adjustment (first ten minutes) Low Battery Indication Reflective surface in view for greater than 30 minutes
Reset Switch:	To restart ten-minute range adjustment cycle To enter option changes in the electronics after repositioning switches
Operating Temperature:	35° F to 104° F (2° C to 40° C)
Outside Case and Cover:	Chrome-Plated Die Casting

OPERATION

1. Invisible light rays are continually emitted from the Retro-Flush sensor.
2. When the user comes into range of the sensor's detection zone (range 12 to 60 inches), the beam is reflected back to the sensor's receiver and changed into a low voltage electrical signal that activates an eight-second time delay circuit. This time delay prevents the unit from activating from passerby in the restroom. Once this circuit is completed, the output circuit is signaled and continues in a "hold" mode for as long as the user remains within range of the sensor. User must be in sensor range for at least 10 seconds.
3. After the user moves away from the sensor, the absence of reflected light starts an electrical "one-time" signal that operates the solenoid operator (6 VDC) and activates the flushing cycle to flush the fixture. The circuit then automatically resets for the next user.


IMPORTANT NOTE: The Zurn AquaVantage is engineered for quiet operation. Excessive water flow creates noise, while too little water flow may not satisfy the needs of the fixture. Proper adjustment of stop valve is made when:

1. The plumbing fixture is cleaned after each flush without splashing water out from the lip.
 2. A quiet flushing cycle is achieved.
- After adjustment of the stop adjusting screw: replace the Zurn stop cap screw cover.

CARE AND CLEANING INSTRUCTIONS

DO NOT use abrasive or chemical cleaners to clean Flushometers 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 should be protected from splattering of cleaner. Acids and cleaning fluids can discolor or remove chrome plating.

TROUBLE SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
Valve will not operate	Water supply shut off	Turn on water supply, check control stop and supply
	Sensor range adjustment set too short	Increase sensor range adjustment
	Expired batteries	Replace batteries
	Difficulty with electronic control module	Check batteries. If problem continues, consult factory.
	Solenoid problem	Replace solenoid
Red light flashes when user is not present	Obstruction in front of the sensor	Remove the obstruction
	Sensor range set too long	Shorten sensor range
	Sensor is detecting opposite wall	
Red light flashes when user comes into view	Batteries about to expire	Replace batteries
	Unit is in start-up mode	Light will stop in 10 minutes
	Range adjustment reset button was pressed	Light will stop in 10 minutes
Valve does not shut off	Dirt in diaphragm bypass hole	Clean bypass hole
	Dirt or debris at valve seat or sealing area	Clean valve seat and clean diaphragm kit
	Riser tube filter plugged	Clean filtered riser tube 
	Solenoid problem	Replace solenoid
Not enough water to fixture	Wrong RetroFlush unit installed	Check fixture requirements. Install proper RetroFlush unit.
	Control stop improperly adjusted	Adjust control stop
	Diaphragm damaged	Replace diaphragm
	Solenoid problem	Replace solenoid
Too much water for fixture	Wrong RetroFlush unit installed	Install proper RetroFlush unit. Check fixture requirements.
	Control stop improperly adjusted	Adjust control stop
	Dirt in diaphragm bypass hole	Clean or replace diaphragm
Water drips from chrome cap	The plastic cover has been cracked by freezing or abuse	Replace plastic cover
	The chrome cap is not tight	Tighten chrome cap

Note: For more detailed trouble shooting refer to FV1138 or call customer service at 1-800-997-3876.

ZURN PLUMBING PRODUCTS GROUP COMMERCIAL BRASS OPERATION, 5900 ELWIN BUCHANAN DRIVE, SANFORD, NC, U.S.A. 27330
PHONE: 1-800-997-3876 FAX: 919/775-3541 WEBSITE: www.zurn.com

ZURN INDUSTRIES LIMITED 3544 NASHUA DRIVE, MISSISSAUGA, ONTARIO L4V 1L2 PHONE: 905/405-8272 FAX: 905/405-1292