

# *Service and Troubleshooting*

- Locating Toilet Model Number
- Noisy Pump Fix
- Finding Vacuum Leak
- Malodor Diagnosis
- Troubleshooting

## Toilet Model is listed on Product ID Label



Product ID labels are located in different places on different toilets. Refer to toilet owner's manuals for specific locations.

# Noisy Pump Fix

## New W-Pump & New Bellows = Whisper Quiet Pumps

Reduces  
vacuum pump  
noise by over  
50%!



The new whisper W motor kit includes:  
a W motor, eccentric, shoulder bolt, bellows  
and two bellows clamps. The W motor kit  
numbers are:

12-volt: 385311423

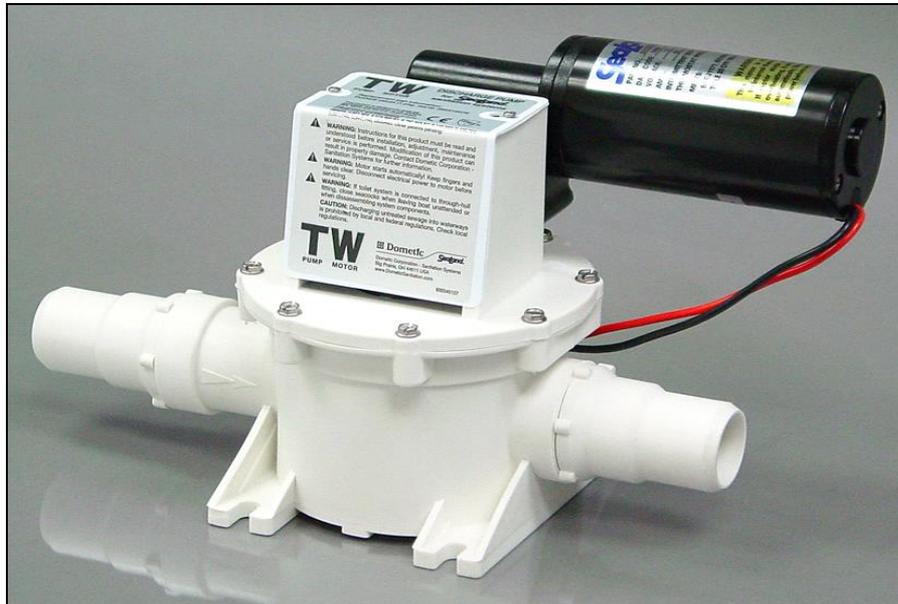
24-volt: 385311424

Refer to the following "Quick Reference" for more information.

Note New Quick Reference Pump and Motor Two Letter Code for Easy Identification of motors and valves.

Quick Reference Pump Identification:						
Label Identifier		Photo	Item Number	Description	Duckbill Valves (kit part number)	Replacement Motor (kit part number)
PUMP	MOTOR					
T	S		317301200 <small>(12-volt TS changed to TW 11/15/06)</small>	Pump T12	385310076 <small>(two 1 1/2" valves)</small>	385311423 <small>(conversion to W motor kit)</small>
			317302400 <small>(24-volt TS changed to TW 11/15/06)</small>	Pump T24		385311424 <small>(conversion to W motor kit)</small>
T	W		317301200	Pump T12	385310076 <small>(two 1 1/2" valves)</small>	385311065 <small>(W motor only)</small>
			317302400	Pump T24		385311066 <small>(W motor only)</small>
S	S		317201200	Pump S12	385310076 <small>(two 1 1/2" valves)</small>	385311423 <small>(conversion to W motor kit)</small>
			317202400	Pump S24		385311424 <small>(conversion to W motor kit)</small>
S	Q		317205012	Pump S12	385310076 <small>(two 1 1/2" valves)</small>	385311423 <small>(conversion to W motor kit)</small>
			317202400	Pump S24		385311424 <small>(conversion to W motor kit)</small>
S	W		317201200	Pump S12	385310076 <small>(two 1 1/2" valves)</small>	385311065 <small>(W motor only)</small>
			317202400	Pump S24		385311066 <small>(W motor only)</small>
J	S		317780012	VG4/JS12 Standard	385311208 <small>(two 2" valves)</small>	385311423 <small>(conversion to W motor kit)</small>
J	Q		317780112 <small>(Replaced with 317780012 08/06)</small>	VG4/JQ12 Standard	385311208 <small>(two 2" valves)</small>	385311423 <small>(conversion to W motor kit)</small>
			317780024	VG4/JQ24 Standard		385311424 <small>(conversion to W motor kit)</small>
J	W		317780012	VG4/JW12 Standard	385311208 <small>(two 2" valves)</small>	385311065 <small>(W motor only)</small>
			317780024	VG4/JW24 Standard		385311066 <small>(W motor only)</small>

## Operating a T-Pump against a Closed Valve is Operator Error



Typical symptoms of this operator error are:

- Inverted duckbill valves.
- Circuit breaker popping.
- Damage to the pump motor.

**\*Inverted duckbill valves are almost always caused by (improperly) closed valves on output.**

# **Vacuum Leak Detection**

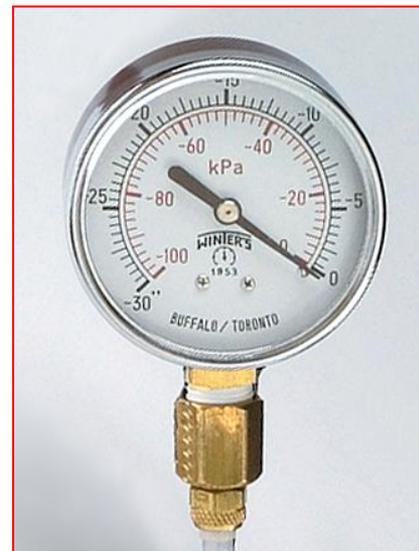


## Vacuum Tester Gauges

- **Digital Vacuum Gauge (P/N 318530003)**



- **Analog Vacuum Gauge (P/N 318530002)**



# Determine the System Leak Rate

**Use SeaLand's Digital Vacuum Gauge (P/N 318530003) to confirm the system leak rate and find the leak.**

1. Be sure that water has circulated through the system and the **duckbill valves are wet**. Turn off water to toilet.
2. Follow the instructions included with the vacuum gauge to determine the leak rate.



Digital gauge measures vacuum in 1/100 Hg in.

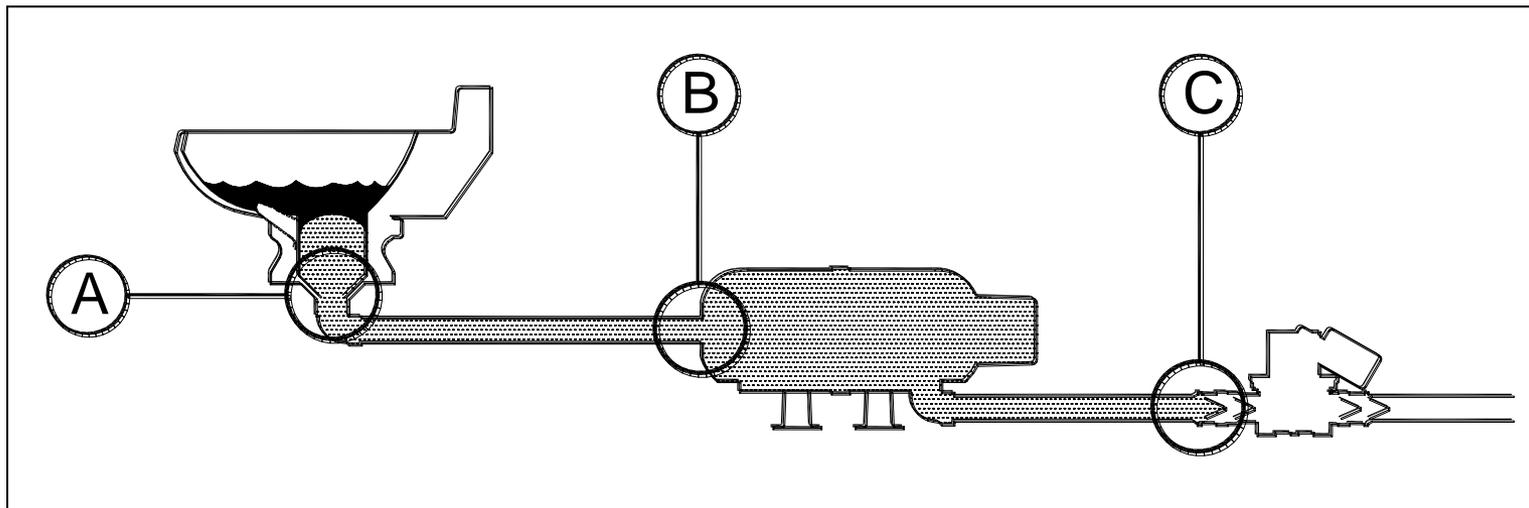
Reads 10-hour leak rate in 15 minutes!



Drop in Vacuum (15 min)	Extrapolated time between pump cycles
> .2" Hg (not acceptable)	2.5 hours
.15" Hg (marginal)	3.3 hours
.10" Hg (good)	5.0 hours
.05" Hg (very good)	10.0 hours

## Vacuum Tester Usage

**System can be isolated at toilet (above funnel orifice);  
at vacuum tank; or at vacuum pump.**



**When checking the leak rate of a new VacuFlush installation,  
remember to be certain the system is primed with water.**

# Locating Odor Source

## **Locating Odor Source**

- **Less than half of the reported odor failure installations are toilet system related!**
- **Your nose knows!**
- **Follow procedure in CWNB No. 5.**  
**Available at [www.dometicsanitation.com](http://www.dometicsanitation.com)**

# Detecting Permeated Hose

- Go aboard boat just before searching for failed hose so that your nose is not desensitized.
- Wipe all sanitation hoses, including the holding tank vent hose with a paper towel. Smell the towel for waste odor. Do not smell the hose directly. This will desensitized your nose.
- Use a new paper towel for each hose.
- The permeated hose will transfer the odor to the paper towel.

## **Nature of Microbial Malodor**

- **Untreated wastewater is an ideal microbiological medium.**
- **High BOD of untreated wastewater provides a strongly anaerobic environment.**
- **Anaerobic fermentation can produce very strong acids and other very malodorous compounds.**

**(BOD is the amount of oxygen used by microorganisms to decay.)**

**(Anaerobic is the absence of free oxygen.)**

# Major Causes of Malodor:

Malodor Cause:	Possible Sources:
Not toilet system related.	Frequently malodors are from source other than toilet or holding tank. For example: AC or Refrigerator Condensate Drains Fuel System Leaks Vinyl Adhesives Shower or Sink Traps and Sumps
Improper materials selected.	Improper holding tank materials, such as aluminum, stainless steel or flexible.  Using non-odor resistant hose in runs with standing sewage.  Not including a vent filter in the holding tank vent line.
Improper system layout.	Installing wye valve in a fashion which causes sewage to be retained in unused hose run.  Mounting holding tank at other than lowest point in the system.  Connecting hose to bottom of holding tank side wall.  Keeping hose runs and overall layout as simple as possible.
Improper installation technique.	Fasteners from blind side of bulkhead penetrating sanitation hose.  Low points in vent hose which form traps.  Incorrect piping connections, such as loosing threaded fittings while turning hose on fitting at opposite end.
Improper usage.	Allowing waste to remain in holding tank for very long period, i.e. over the winter.

**Confirm that hose has failed by rubbing with a clean cloth or paper towel. When odor transfers to cloth, failure is confirmed**

# Vacuum System Troubleshooting

## VacuFlush Pedal Toilet Troubleshooting

Problem	Possible Cause	Service Instructions
<b>1. Water will not stay in bowl.</b>	<ul style="list-style-type: none"> <li>a. Loose clamp ring.</li> <li>b. Improper seal around flush ball due to dirt or debris on flush ball.</li> <li>c. Worn or damaged seal.</li> <li>d. Worn or damaged flush ball.</li> </ul>	<ul style="list-style-type: none"> <li>a. Tighten clamp ring adjusting nut.</li> <li>b. Inspect flush ball and seal for foreign debris. Clean flush ball and seal if needed.</li> <li>c. Replace seal.</li> <li>d. Replace flush ball.</li> </ul>
<b>2. Plastic flush ball will not close completely.</b>	<ul style="list-style-type: none"> <li>a. Too much friction between flush ball and ball seal.</li> <li>b. Water valve screws are too tight.</li> <li>c. Defective spring cartridge.</li> </ul>	<ul style="list-style-type: none"> <li>a. Lubricate between flush ball and ball seal with furniture polish (e.g. Pledge® furniture polish).</li> <li>b. Loosen screws slightly.</li> <li>c. Check spring tension by pushing flush lever down, then release it suddenly. If lever does not snap back into original position, replace spring cartridge.</li> </ul>
<b>3. Flush ball will not open.</b>	<ul style="list-style-type: none"> <li>a. Broken shaft.</li> <li>b. Shaft not fully engaged in the spring cartridge.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace shaft.</li> <li>b. Put pressure on shaft from under the flush ball (pushing into spring cartridge) until it engages. You may have to rotate flush ball slightly until shaft lines up with square in spring cartridge.</li> </ul>

## VacuFlush Pedal Toilet Troubleshooting

Problem	Possible Cause	Service Instructions
<p><b>4. Water does not shut off in toilet (toilet overflows).</b></p>	<p>a. Not enough clearance between cam strap and top of water valve cap. b. Dirt lodged in water valve seal.</p>	<p>a. Adjust cam strap to have .02" (.5mm) minimum clearance with top of valve cap. b. Disassemble and clean water valve.</p>
<p><b>5. Water does not enter toilet bowl properly.</b></p>	<p>a. Insufficient water flow rate at toilet. b. Water valve clogged. c. Plugged rim wash holes in toilet.</p>	<p>a. Check water flow rate at toilet. Rate should be 2 gpm (7.6 lpm) at toilet. b. Remove and clean screen located at inlet of water valve. c. Clean holes. If still a problem, replace the toilet bowl.</p>
<p><b>6. Lifting foot pedal does not add water to the bowl.</b></p>	<p>a. Too much clearance between the cam strap and water valve.</p>	<p>a. Adjust cam strap so clearance is .06 inches (1.5mm) maximum.</p>
<p><b>7. Water leaking from water valve.</b></p>	<p>a. Worn or defective vacuum breaker. b. Loose vacuum breaker. c. Cracked or defective toilet bowl.</p>	<p>a. Remove white cap from vacuum breaker. Flush toilet. If water leaks during flush, vacuum breaker needs to be replaced. b. Secure vacuum breaker connection. c. Replace toilet bowl.</p>

## VacuFlush Pedal Toilet Troubleshooting

Problem	Possible Cause	Service Instructions
<p><b>8. Water leaking from rear of toilet bowl.</b></p>	<p>a. Worn or defective vacuum breaker.                      b. Loose vacuum breaker.                      c. Cracked or defective toilet bowl.</p>	<p>a. Remove white cap from vacuum breaker. Flush toilet. If water leaks during flush, vacuum breaker needs to be replaced.                      b. Secure vacuum breaker connection.                      c. Replace toilet bowl.</p>
<p><b>9. Water is leaking from the base/toilet connection.</b></p>	<p>a. Clamp ring may be loose.                      b. Ball seals may be worn or defective.</p>	<p>a. Remove plastic base cover (on applicable models) and tighten the clamp ring.                      b. Replace ball seals.</p>
<p><b>10. Vacuum pump running too often between flushes.</b></p>	<p>a. Water leaks out of bowl between flush ball and ball seal.                      b. Vacuum line leak.</p>	<p>a. Leave small amount of water in bowl. If water is sucked from bowl, see problems 1 and 2.                      b. Tighten all connections at toilet, vacuum generator or vacuum holding tank (including hose clamps and threaded spin nuts). If leaks persists, contact SeaLand Product Customer Service.</p>

**VacuFlush Pedal Toilet Troubleshooting**

Problem	Possible Cause	Service Instructions
<p><b>11. Vacuum pump will not shut off.</b></p>	<ul style="list-style-type: none"> <li>a. A vacuum leak exists.</li> <li>b. Insufficient vacuum (pump creates less than 10 inches Hg).</li> <li>c. Faulty vacuum switch (pump creates more than 10 inches Hg).</li> <li>d. Improper wiring.</li> <li>e. Bellows not pumping.</li> </ul>	<ul style="list-style-type: none"> <li>a. See problem 9b.</li> <li>b. Isolate pump and use vacuum gauge to check vacuum levels. Could be a plugged discharge line or worn duckbill valves.</li> <li>c. Replace vacuum switch.</li> <li>d. Refer to wiring diagram to check for proper wiring.</li> <li>e. Tighten set screw in eccentric to motor shaft. Otherwise, check for damage to bellows and motor shaft. Replace if necessary.</li> </ul>
<p><b>12. Vacuum pump will not run.</b></p>	<ul style="list-style-type: none"> <li>a. No electrical power.</li> <li>b. Loose or broken electrical wiring.</li> <li>c. Improper electrical connections.</li> <li>d. Faulty vacuum switch.</li> <li>e. Faulty motor.</li> <li>f. Shut-down relay prevents pumping.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check input power, circuit breaker and fuse.</li> <li>b. Tighten or reconnect wires at vacuum pump and tank, vacuum generator, or vacuum holding tank.</li> <li>c. Make certain wires at vacuum switch are connected to the "B" terminals.</li> <li>d. To check vacuum switch, short across "B" terminals with jumper wire.</li> <li>e. Replace motor.</li> <li>f. Empty the holding tank.</li> </ul>

## VacuFlush Pedal Toilet Troubleshooting

Problem	Possible Cause	Service Instructions
<p><b>13. Vacuum pump is running too slow, overheating, blowing fuses or circuit breaker.</b></p>	<p>a. Gear motor is worn or defective.                      b. Plugged vent line or vent filter.                      c. Blockage in discharge line.                      d. Improper wire size.                      e. Improper voltage.                      f. Vacuum pump bellows clogged with tissue.</p>	<p>a. Check motor and replace if necessary.                      b. Disassemble and clean out vent line. Replace vent filter if necessary.                      c. Disassemble and clean discharge line. Be certain that in-line valves (duckbill valves) and seacock are in proper position.                       d. Wire size too small. Check electrical diagram for proper wire size for voltage of pump used.                      e. Check input power for low voltage.                      f. Remove and clean bellows assembly. (When flushing toilet, using more water may alleviate this problem.)</p>
<p><b>14. Toilet will not flush. (No vacuum.)</b>                      See problems 3 and 15 if necessary.</p>	<p>a. There is a blockage in the system.                      b. Pump will not run.                      c. Duckbill valves in vacuum pump are inverted due to blocked discharge line or an attempt to pump out against closed seacock.</p>	<p>a. Open flush ball and check the 1-inch (25mm) orifice at the bottom of the base for blockage and dislodge it. Never use drain-opening or other household plumbing chemicals. If blockage is not in base, it may be found in these locations:</p> <ul style="list-style-type: none"> <li>• outlet of vacuum tank</li> <li>• inlet of vacuum generator</li> <li>• diptube of vacuum generator</li> <li>• inlet of vacuum pump</li> </ul> <p>b. See problem 12.                      c. Replace duckbill valves, making sure they point in the correct direction.</p>

## VacuFlush Pedal Toilet Troubleshooting

Problem	Possible Cause	Service Instructions
<p><b>15. Blockage between toilet and vacuum generator.</b></p>	<ul style="list-style-type: none"> <li>a. Collapsed vacuum line.</li> <li>b. Sharp bends or kinks in vacuum hose.</li> <li>c. Improper operation of toilet.</li> <li>d. Foreign objects were flushed down toilet.</li> </ul>	<ul style="list-style-type: none"> <li>a. Inspect vacuum line for collapsed condition and replace line if needed.</li> <li>b. Inspect vacuum hose for kinks or bends. If less than 8.5-inches (216mm) radius on any bend, reposition hose to achieve minimum 8.5-inch bend radius.</li> <li>c. Make sure each person using toilet knows correct procedure.</li> <li>d. DO NOT flush any non-dissolving items (i.e. sanitary napkins, facial tissue, wet strength tissue, paper towels, etc.) or excessive toilet tissue down toilet. Rapid-dissolving SeaLand brand toilet tissue is best.</li> </ul>
<p><b>16. Pump emits odor.</b></p>	<ul style="list-style-type: none"> <li>a. Loose or defective hose connection on pump.</li> <li>b. Loose intake or discharge fittings on pump.</li> <li>c. Worn, torn or punctured pump bellows (vacuum generator) or diaphragm (vacuum holding tank).</li> </ul>	<ul style="list-style-type: none"> <li>a. Tighten connections or replace hose and make new connections.</li> <li>b. Tighten intake or discharge fittings on pump. Replace nipples or adapters if necessary.</li> <li>c. Replace pump bellows or diaphragm.</li> </ul>

# Designer Toilet Troubleshooting

## Service Procedures - 4800

**Symptom: The flush ball gets stuck in the partially open position. (New Installations)**

**Cause:** Interference of the flush mechanism with the flexible water line connected to the water valve. The interference causes the toilet to malfunction.

**Fix:** Lift toilet and reroute hose.



**Symptom: The toilet will not flush. Blockage at funnel on floor.**

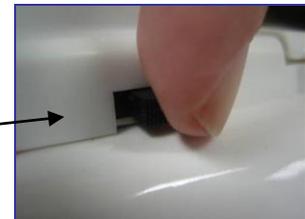
**Cause:** Tissue or foreign object in 2.5 cm orifice in funnel.

**Fix:** Turn off water to toilet. Flush toilet and while flush ball is open, turn off power at circuit breaker. With flush ball open, penetrate blockage with probe (See photo.)

Simple Unblocking Tool:  
Length of ½-inch PEX tube cut with a 45° angle. **Also, a long screw driver works well.**



Note: After January 1, 2007, each 4800 unit will be equipped with a service mode switch located on the rear of the seat hinge which will hold the flush ball in a open position.



Service Procedures - 4800

**Symptom: Toilet does not hold water in bowl.**

**Cause:** Debris between flush ball seal and ball.

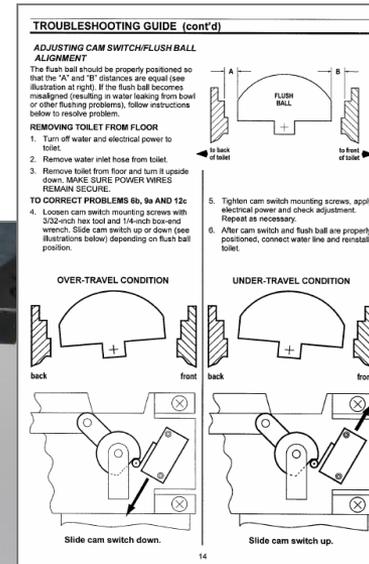
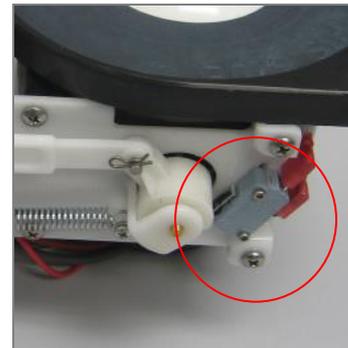
**Fix:** Clean seal surface in contact with ball or replace seal. If problem not resolved after cleaning, limit switch is out of position, see next symptom and fix.

**Symptom: The flush ball will not fully close or continues to cycle open and closed.** **Cause:** A limit switch out of position causing the toilet to continually cycle.

**Fix:** Replace base assembly.



Page 14,  
4800  
Owner's  
Manual

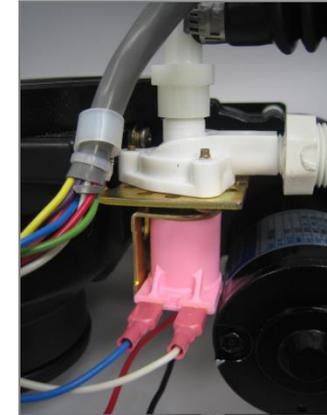


## Service Procedures - 4800

**Symptom:** Water continues to enter the bowl after the flush is complete. Cause: Water valve fouled and keeps allowing water into the bowl.

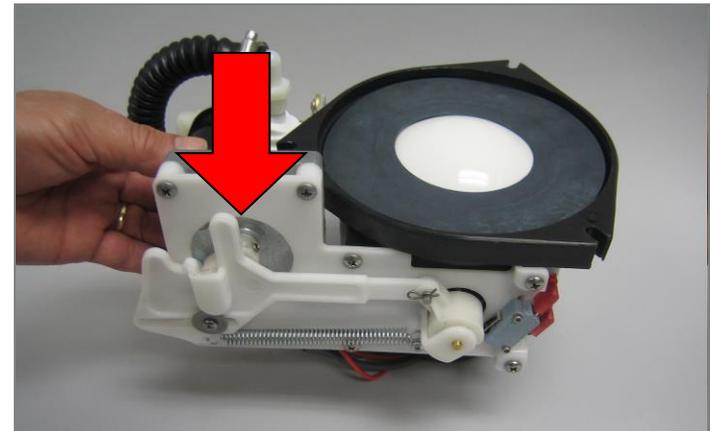
**Fix:** Replace water valve.

Water Valve  
Assembly



**Symptom:** Flush ball only returns half closed and then pops back open. Cause: Cracked plastic drive arm at the set screw or defective base.

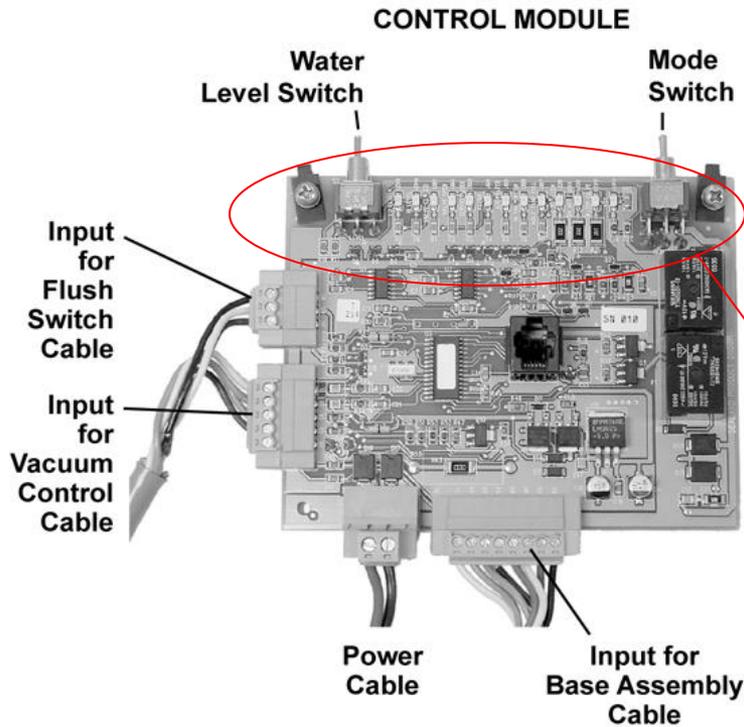
**Fix:** Replace base assembly.



Note: The plastic drive arm was replaced with a metal arm in September, 2006 that will not crack.

# Troubleshooting 3000 and 3600 Toilets

3600 toilet circuit boards are equipped with diagnostic LED array.



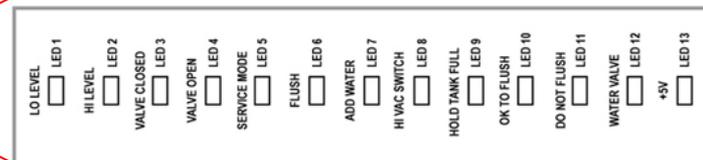
### Status Light

Status Light	Function
1 Low Level	Water Level Switch in "Low" position.
2 High Level	Water Level Switch in "High" position.
3 Valve Closed	Flush valve Closed Limit Switch engaged.
4 Valve Open	Flush valve Open Limit Switch engaged.
5 Service Mode	Mode Switch in "Service" position.
6 Flush	Flush Switch on control panel engaged.
7 Add Water	Add Water Switch on control panel engaged.
8 High Vac Switch	High vacuum in system (allows toilet to flush).
9 Holding Tank Full	Full holding tank (prevents toilet from flushing).
10 OK to Flush	Signal to "OK TO FLUSH" light on control panel.
11 Do Not Flush	Signal to "DO NOT FLUSH" light on control panel.
12 Water Valve	Electric water valve energized.
13 +5V	Input power present.

### ERROR CODES

Status Light	No. of Flashes	Pause	Condition
10 OK to Flush	1	.5 sec.	Mode Switch in SERVICE position
11 Do Not Flush	1	2 sec.	VALVE OPEN Limit Switch problem
11 Do Not Flush	2	2 sec.	VALVE CLOSED Limit Switch problem
11 Do Not Flush	3	2 sec.	Insufficient vacuum in system
11 Do Not Flush	4	2 sec.	Flush valve motor relay failure

### CONTROL MODULE STATUS LIGHTS



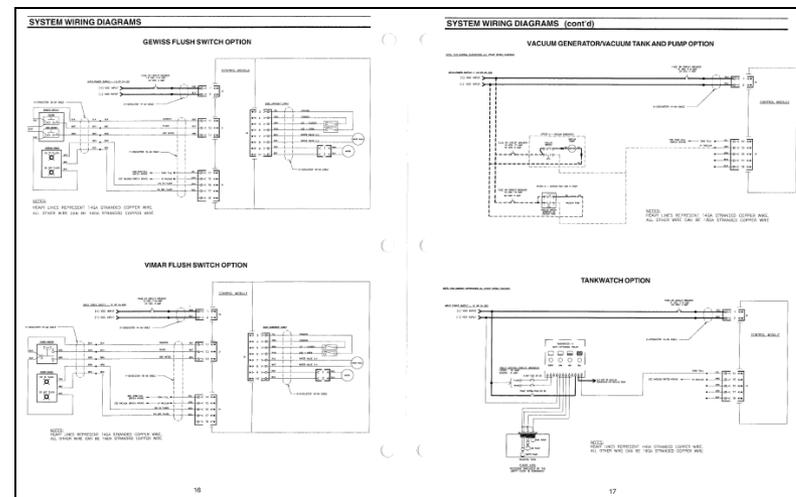
See owner's manual for details.

## Service Procedures – 3000 and 3600

**Symptom:** The circuit board flashes **DO NOT FLUSH (LED 11)** even if the board is reset with the toggle switch on top of the right hand side. (New Installations)

**Cause:** Improper wiring. No input signal from vacuum switch to circuit board.

**Fix:** Check wiring diagram in Owner's Manual (Pages 16 & 17).



**Symptom:** The flush ball only partially opens and then immediately re-closes. (New Installations)

**Cause:** Interference between water line and drive arm or bent metal motor bracket causing a bind of the drive arms.

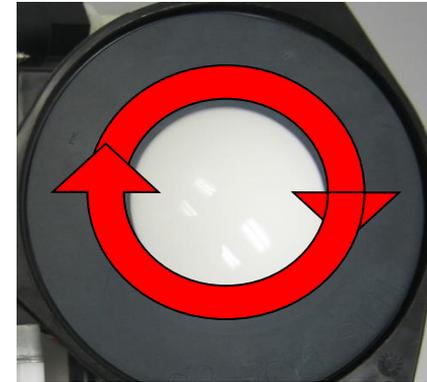
**Fix:** Lift toilet and determine cause of interference with drive mechanism.

## Service Procedures – 3000 and 3600

**Symptom: Toilet does not hold water in bowl.**

Cause: Debris between flush ball seal and ball.

Fix: Clean seal surface in contact with ball or replace seal.



**Symptom: The toilet will not flush. Blockage at funnel inside toilet.**

Cause: Tissue or foreign object in 2.5 cm orifice in funnel.

Fix: Switch Mode Switch on circuit board to service position. With flush ball open, penetrate blockage with probe.



## Service Procedures – 3000 and 3600

**Symptom:** The toilet circuit board says **OK TO FLUSH (LED 10)**, but the flush ball does not open when flushed. **The flush ball cannot be rotated by hand.** (R)

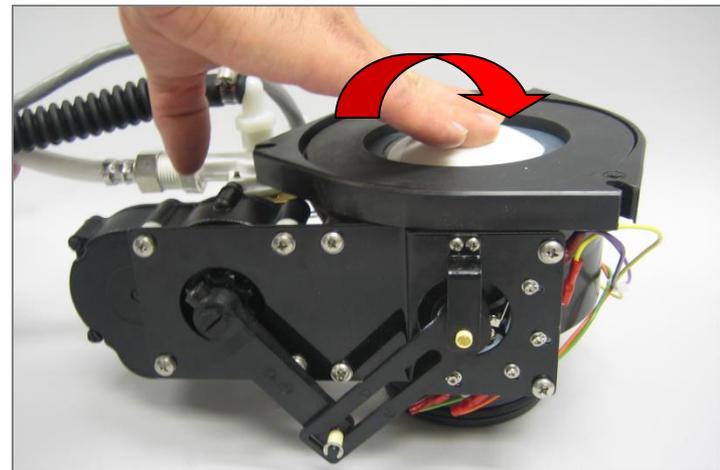
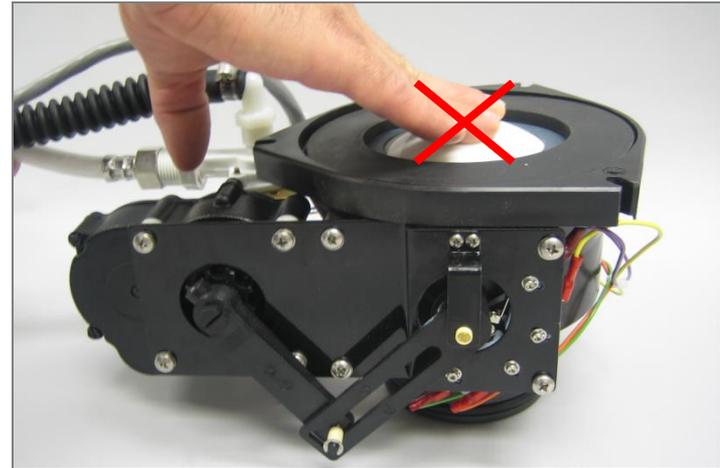
**Cause:** Sticking flush ball to the old style ball seal.

**Fix:** Lift toilet. Replace flush ball seal with new PTFE coated seal. If seal, not readily available, use lubricant, such as spray lubricant (do not use grease).

**Symptom:** The toilet circuit board says **OK TO FLUSH (LED 10)**, but the flush ball does not open when the toilet is flushed. **The flush ball can be rotated easily by hand.** (R)

**Cause:** Broken drive arm or follower arm.

**Fix:** Lift toilet. Replace with arm



## Service Procedures – 3000 and 3600

**Symptom: External leak between the china bowl and base assembly. (R)**

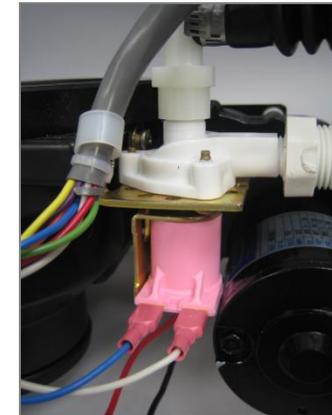
**Cause:** 1) Water supply connection is not tight (new installations). 2) Improper torque of the (3) L-bolts securing the base to the china. Probably the result of improper prior servicing.

**Fix:** 1) Check water supply connection. 2) Lift toilet, reinstall base and tighten L-brackets tighten to 22 - 25 lbf-in (2.5 – 2.8 N-m).

**Symptom: Water continues to enter the bowl after the flush is complete. (R)**

**Cause:** Water valve fouled and keeps allowing water into the bowl.

**Fix:** Turn off water supply. Lift toilet. Replace water valve.



Water Valve  
Assembly

## Service Procedures – 3000 and 3600

**Symptom:** The flush ball fully opens and then immediately re-closes or the ball closes and then immediately re-opens and stays open. (R)

**Cause:** Out of position limit switch allowing over or under travel of drive arms.

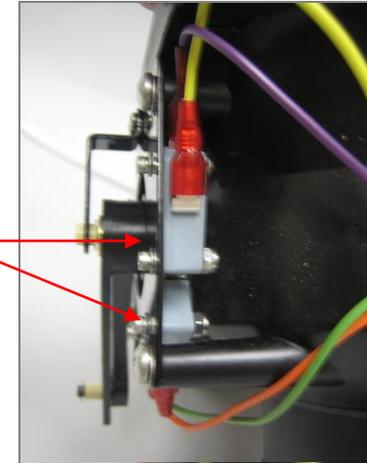
**Fix:** Lift toilet. Replace base assembly.

**Symptom:** Intermittent improper operation of the toilet, such as the flush ball only opens partially or little water will enter the bowl during the flush. (VR)

**Cause:** Malfunctioning circuit board causing intermittent problems.

**Fix:** Replace circuit board.

Limit Switches are not easily set in field – Replace base.



# 4800 Toilet Troubleshooting

## Service Procedures - 4800

**Symptom: Toilet develops an exaggerated “pop” when flushed.**

**Cause: Slide mechanism is out of alignment.**

**Fix: Add new alignment bracket.**

New Alignment  
Bracket

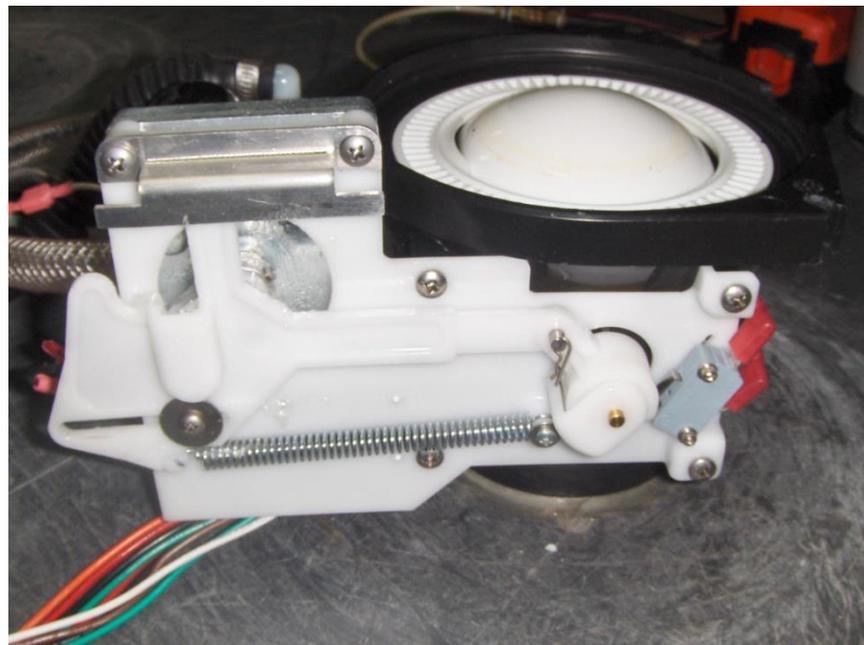


## Service Procedures - 4800

**Symptom: Toilet continuously flushes.**

**Cause: Rotor cam has moved in relation to the flush ball brass shaft.**

**Fix: Replace flush ball brass shaft kit.**

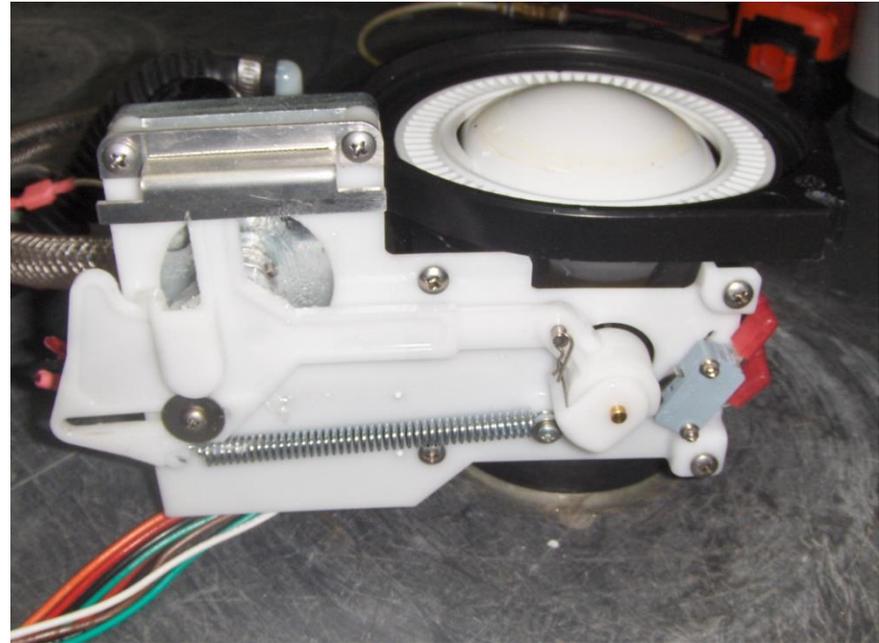


## Service Procedures - 4800

**Symptom: Bowl does not hold water.**

**Causes:** 1. Debris between seal and ball.  
2. Limit switch out of adjustment not allowing ball to fully close.

**Fix:** 1. Clean or replace seal.  
2. Adjust limit switch so ball fully closes.

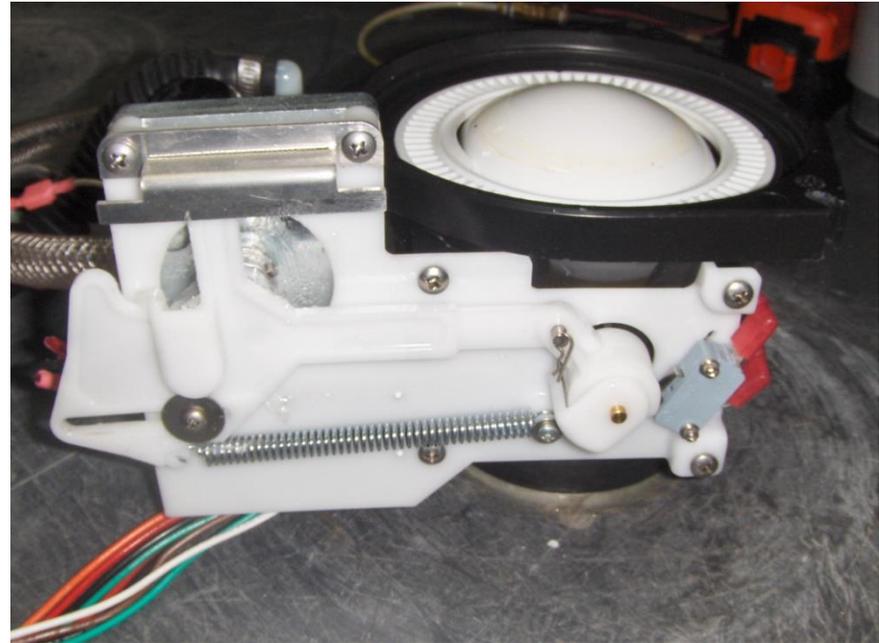


## Service Procedures - 4800

**Symptom: No GREEN light on wall switch.**

**Cause:** No voltage to the green wire at pin #6 on circuit board.

**Fix:** Review wiring and vacuum switch .



**Service Procedures - 4800**

**Symptom: Flush ball remains open.**

Cause: Toilet in SERVICE mode.

Fix: Switch out of SERVICE mode.

