

## TECHNICAL SERVICES BULLETIN #19

**Date: March 01, 2011**

**To: All Manufacturers, Dealers and Installers.**

**SeeLevel RV Tank Monitor Equipment Technical & Installation Tips**

**Subject: Models 705, 707, 709, 710, 711, 712 and 713**

We have had instances where the system will indicate residual water even though the tank is drained completely. This can be due to convex tank bottom, sloped tank bottom or metal proximity. In the case of the convex bottom tank a ring of water may remain after draining. In the case of the sloped bottom (to the drain valve side) the indication of level will be immediate with a very small amount of water.

**Temporary installation of the sender board using duct tape or masking tape will allow the installer to check level before committing to final board position. Tape down both sides of the board to eliminate airgaps between the sender and tank surface.**

### **Sender Board Installation:**

After trimming the board to the correct length for the applicable tank, we suggest connecting the wires and **using a piece of masking tape or duct tape at the sides of the board.** Position the board on the tank in its optimal position. Try to have no air gap on the sides of the sender boards to eliminate a low signal strength and unpredictable performance.

### **System Test:**

With the console installed you can check level on each tank, **if you get an indication of 10% to 20% and you know this is indication is too high, reposition the sensor board as follows:**

- 1. In the case of a convex tank bottom, usually found on large flat tanks, raising the sensor board is the best solution to accomplish a "0" reading, this may result in shortening the board one more segment.**
- 2. On sloped tanks, which promote complete cleanout, an alternative is to measure is the opposite end to the drain valve if the drain valve side is not practical or possible, you may have to extend the wire harness. The best choice is to elevate the sensor board to eliminate the potential for a puddle at the drain valve.**
- 3. Another cause of false indications is due to brackets or straps in close proximity to the sensor board, you may have to move the board away more. Trial fitting is necessary until the problem disappears; note the shop manual comments on ducts and use of rubber.**
- 4. Fresh tanks have a potential to not be able to use all the water in the tank, we suggest you elevate the fresh sender 1 inch off the tank bottom and position the top of the sender allowing for vent position (if the vent is on the side of the tank). This way you should see '0' before the pump starts to suck air. Some tanks have a sump style draw system, in this case there is no concern with unusable water, just allow for the wall thickness when positioning the sender board (usually 1/2 - 3/4 inch margin from the outer shell).**

## **Metal Issues**

The technology of capacitance measurement will be influenced by close proximity of *ferrous* metal brackets or frame components. We recommend a minimum of 2 inches clearance from any metal *lying across the face of the sender board*. There is no problem with butting up to metal.

Covering the metal with rubber may help this issue, but we recommend staying well away from large metal components, also metal plates or covers which will end up in close proximity will affect the performance, usually showing residual values, when tank is in fact empty. Temporary installation using tape will be a good way to determine interference.

## **Protection of Sender boards from Road Spray and Debris**

On installations where the holding tank is exposed to under chassis road spray and flying rocks etc. we recommend the use of Body Undercoat easily purchased in Auto Parts Supply Houses. This tar based material clings well to the sender boards and protects from water and debris. 3M makes a product that has worked well called "Rubberized Undercoat".

After the system is completed and tested apply the undercoat over the complete board using 2 coats. Do not use Lacquer, Enamel paint or Plastic paint (for auto bumpers) as these chemicals will dissolve the conformal coating on the board and cause malfunction of sensing properties.

## **Wiring Harness Installation Issues and Interference with Measurement Accuracy**

We have had a few instances where 125VAC interference has caused the readings to stall and create a gap where readouts would skip from 50% to 70% and then begin to function again. The cause was wiring between consoles and sender boards being tied too close to entrance boxes for shore power or bundled with other high AC voltage lines or junction boxes.

Be sure to support all connecting harnesses; do not let the board support the harness, this will in time cause delamination of the board from the tank.

**Always ground the senders and the console to the same ground plane, this is very important, RV's can have several ground planes with resistance between them. We have had instances where 2 consoles are installed with a different ground for the service bay console, if you see different levels from each console on the same tank, the ground source is not common, you must use the same ground plane, back to the breaker panel ground point.**

## **Delaminating of Sender Boards from Holding Tanks**

We have had reports of the Sender boards literally falling off the tanks or showing serious delamination. This is simply caused by a lack of tank surface prep, which is very simple, wipe the area to be adhered to with products like, Pro Bond, alcohol or acetone. Do Not Use Thinners because they leave residues, which attack the adhesive.

Remember ambient temps of less than 60 degrees F are not acceptable for the bonding agents in the adhesive, use a heat gun to warm the tank surface if necessary. Be sure the surface is also dry; again a heat gun is the best way to dry the bonding area.

The surface of the tank must be smooth, the adhesive works much better on smooth surfaces, if necessary we recommend an orbital sander with fine grit paper (220 grit) will quickly accomplish the desired smoothness.

Recommended methods of wire harness support from sender: Make sure that the wire harness to the tank senders are supported to make sure the sender wires are not loaded. One simple way is to use Gorilla tape across the top of the sender at a 90 degree angle to the sender board placement.

## **A word about Tank Wall Thickness**

We test each sender board on an actual tank with 3/8 inch wall thickness, the process is to fill and empty the tank once and a computer analyzes the performance of the sender board, the board passes or fails at this point.

If you encounter an excessively thick tank wall the symptom will be a '0' reading, the cross check would be that if other tanks work normally stick the board on another tank that works with tape, if it

now works the tank wall thickness is well over 3/8 inch. You can always use a 1 gallon jug or a 5 gallon pail as a test tank to crosscheck operation of the sender.

A second symptom we have seen is the sender will not indicate 100%, this is because of a tank wall thickness issue that may occur at the corners or edges of the tank, this has not been a common issue, and the only correction you can make is to move the board slightly lower, away from the thick area.

### **Black Tank Issues**

We get calls occasionally about older coaches, that have been in service a few years, which the black tank will indicate a level even though it is empty, this is solid evidence that the tank has a significant build-up, probably exceeding 1/2 inch thick!!

Redex is not an acceptable chemical to promote clean tank walls; it is far too slow to get the breakdown action started. Use an RV type of liquid chemical, we suggest Tissue Digester or Sensor Cleaner, the next time you take a trip, leave with a high concentration of the chemical in the tank and approximately 30% full of fresh water, hopefully you drive for 2-3 days allowing the tank levels to rise through normal use, we would recommend that you eventually exceed the level that you see the system report when the tank in fact is empty. After the sloshing and the soaking hopefully the build-up will be flushed away when the tank is drained and flushed. If you still have symptoms the treatment may required a few more times. The build-up did not stick to the tank wall in one day and it may not dissolve in one treatment.

The build-up looks to the system just water does, it holds water in the build-up area and fools the system by bending the signal just like water does, it takes more than a film or piece of tissue to cause the error.

### **Water Pump Switch Circuit Limitations**

Please be aware that the water pump switch circuit has a *limitation on current draw of 7.5 amps*, some large pumps can draw over 10 amps, these *must use a relay or the console printed circuit will overheat and damage the console permanently.*

*Please install, in line (red wire) the supplied fuse assembly with the supplied 7.5 amp automotive style fuse if you cannot connect to your existing panel with the same capacity fuse.*

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