

MONITOR SYSTEMS

A common topic of conversation is the holding tank monitor panel system used in Winnebago Industries manufactured motor homes. Our service administration department receives many calls and letters asking about monitor panel function, maintenance, adjustment, and repair. This information should be helpful to those with questions about their vehicle's monitor panel system.

Monitor Panel Systems

The "Two wire" monitor system is commonly used to monitor holding tank levels, battery charge levels and LP gas levels in recreational vehicles. This technology offers the consumer a convenient method for determining status of the above from a central location. Monitor systems are commonly located in a wall mount panel, or furnished as part of the galley range exhaust hood. Regardless of the

location or style of monitor, the basic purpose and function of all monitor systems are the same.

Components

Monitor Panel – The monitor panel consists of a metal or plastic chassis to which the printed circuit board, switching and printed overlay are attached. The panel can be wall-mounted with screws or mounted to the range exhaust hood using various methods. Holding tank levels are typically displayed in 1/3 tank increments. The monitor panel is generally equipped with a single test switch and individual lighted status displays for each status point being monitored.

Tank Resistor Harness – The tank resistor harness combines color-coded wiring with encapsulated electronic components. Each tank resistor harness will have a wire dedicated to each tank level being monitored as well as a common

wire that provides an input to the circuit board through the wiring harness.

Holding Tank Sensors – The holding tank sensors are located in the sidewall of the holding tanks at various locations corresponding with the levels being monitored. Sensors may be permanent or removable. The relative location of these sensors will vary with the configuration of the holding tank.

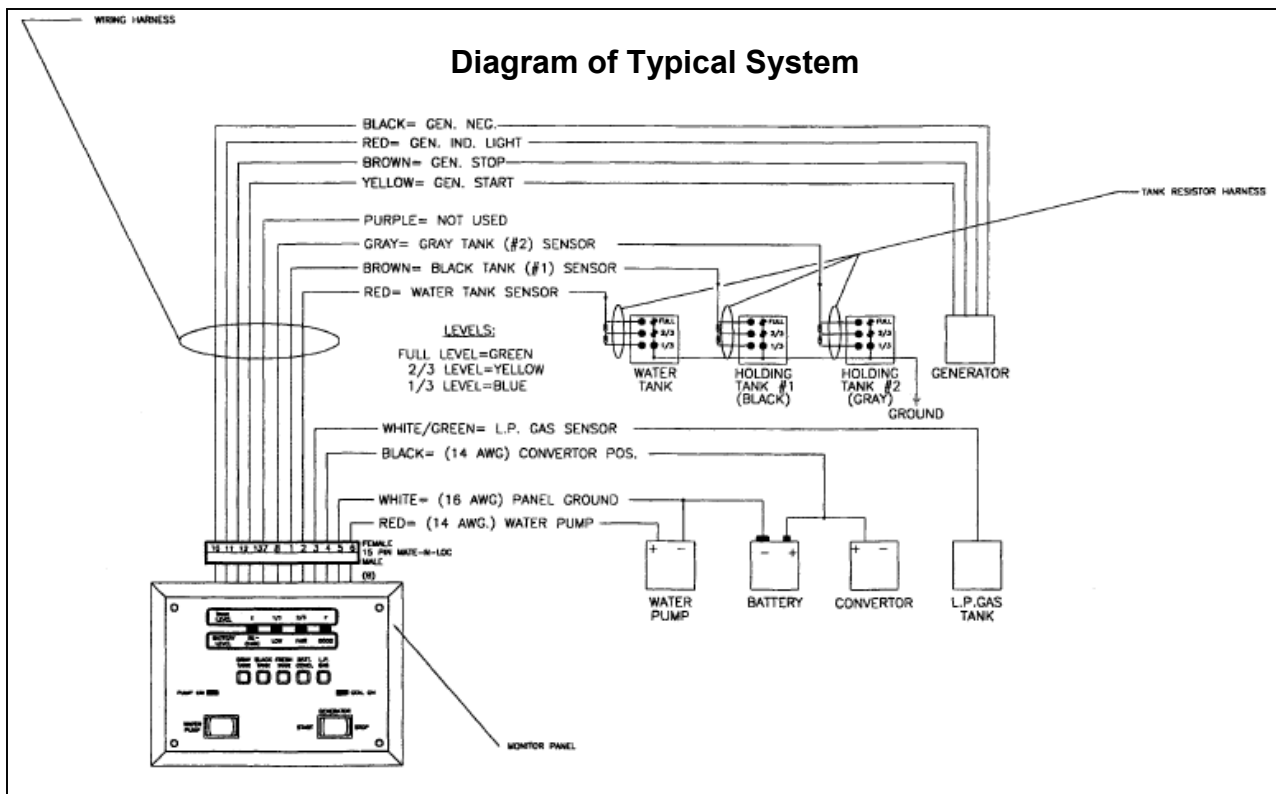
Operation Overview

Test Switch – The system uses a "test" switch and multiple lighted displays. When the "test" switch is pressed the status of the function being monitored will be displayed.

Troubleshooting

When troubleshooting a monitor system, there are four basic components to consider:

1. The monitor panel assembly, which includes the



circuit board, lights and switching.

2. The wiring harness, which includes wires and connectors that connect the monitor panel to 12 volt DC power, ground, tank resistor harnesses, LP sensors and switching.

3. The tank resistor harness, which includes the wires, connectors and encapsulated electronic components.

4. The holding tank sensors.

Verify the following:

- The 12 VDC power source is present
- The chassis ground is present and has a good connection.
- The monitor panel assembly is free from damage.
- The wiring harness is connected properly and is free from damage.
- The tank resistor harnesses are connected properly and are free from damage.
- The tank level sensors are properly located and are free from damage.

Inaccurate Holding Tank Level Readings

The accuracy of holding tank monitoring systems can be adversely affected by dirty tanks, unusual mineral content in the water or improper holding tank probe location. These conditions can cause the monitoring system to have oversensitive (reads higher than actual level) or undersensitive (reads lower than actual level) readings.

Oversensitive readings:

Oversensitive readings can occur as a result of scum buildup on the tank walls, abnormally high mineral content in the water or incorrectly located holding tank probes. In these situations, the monitoring system indicates higher levels than are actually present in the holding tanks. Certain cleaning products and food by-products can build up on the inside walls of the holding tank producing a layer of scum that can cause the monitoring system to read higher than the actual level. To correct this problem, the holding tanks should be cleaned periodically.

Undersensitive readings:

Undersensitive readings can occur if the mineral content of the water is abnormally low or if the holding tank probes are located incorrectly. In this case, the monitoring system indicates lower levels than are actually present in the holding tank.

Some systems have an adjustable circuit board that allows for field adjustments to monitor sensitivity. As tank conditions or water mineral content changes, the monitor circuitry may be made more or less sensitive as required. (See bulletin included in this article.)

Some or All Holding Tank Level Lights Not Coming On

Possible Cause And Correction Action

No Power – Verify 12 volt DC power is available and present at the circuit board.

Poor ground at monitor panel or at holding tank ground probe – Verify ground panel and ground probe with a continuity tester.

Wire to tank resistor harness disconnected or damaged – Verify wire is connected and free of damage. Replace if necessary. (With the tank resistor harness correctly installed and free from damage, a jumper wire containing a 47Kohm resistor placed between the holding tank ground probe and any tank level probe should cause the respective tank level lights to illuminate.)

Short circuit on circuit-board – If the above test fails to illuminate the level lights, repeat the test at the monitor panel. Refer to the wiring diagram for the correct wires to jump together. If lights illuminate, replace the wiring between the panel and the tank resistor harness. If lights do not illuminate, replace the circuit board.

Some or All Holding Tank Level Lights on Continuously

Possible Cause and Correction Action

Foreign substance on interior of holding tank causing false readings – Clean holding tanks.

Tank sensor wire from panel to tank resistor harness shorted to ground – Disconnect wire from panel and tank resistor harness. Verify wire is not shorted to ground with continuity tester. Replace wire if shorted.

Tank resistor harness shorted internally – Disconnect the tank resistor harness from the tank sensors and from the wire connected to the monitor panel. Check resistance between tank sensor wires with an Ohmmeter. Specific resistance will vary based on resistor harness model, but at no time should you detect a dead short or an open circuit. If a short or open is detected, replace the tank resistor harness.

Short circuit on circuit board – If the above steps fails to pinpoint the specific problem, replace circuit board and retest.

LP Gas Levels Not Reading Accurately

Possible Cause and Corrective Action

Open circuit between panel and LP sensor causes tank to incorrectly read full. Short circuit between panel and LP sensor causes tank to incorrectly read empty – Disconnect the wire running from the monitor panel to the LP sensor. Check the wire for damage and with a continuity tester to verify the wire is OK. If OK, reconnect and check operation. If circuit is open or shorted replace the wire and re-test.

Defective LP sensor provides incorrect signal to monitor panel causing incorrect readings. Replace the LP sensor and re-test.

Ventline Engineering Bulletin

Date: June 5, 2001

From: Ventline Engineering Department

Subject: Field Adjustment of monitor circuitry

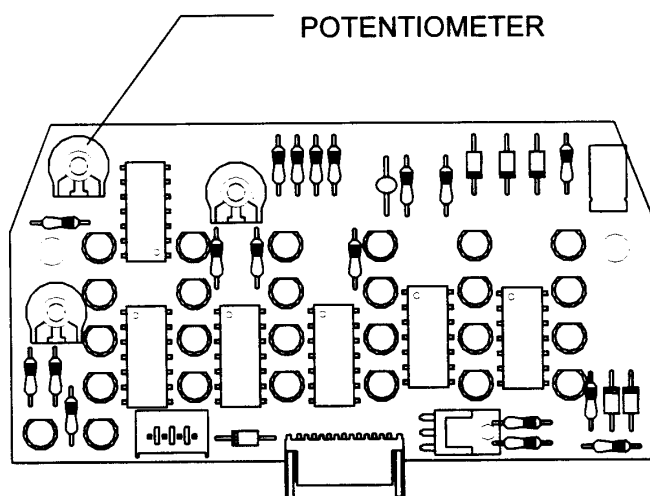
In response to requests from the field for a means to adjust monitor sensitivity without relocating holding tank probes, Ventline has developed the Ventline Adjustaboard™ (patent pending). This adjustable circuit board allows for field adjustments to vary monitor panel sensitivity. As tank conditions change over time, the monitor circuitry may be made more or less sensitive as required to achieve accurate readings. While these adjustments are not a substitute for correct monitor panel and tank probe installation or regular holding tank maintenance, they do offer the RV owner the convenience of a simple solution to minor level display inaccuracies.

In the event the monitor is not reading correctly, and prior to replacing the circuit board as a diagnostic step, attempt to calibrate the monitor circuitry.

To calibrate the circuitry use the following procedure:

- 1) Locate the appropriate adjusting potentiometer using the illustration shown below
- 2) To prevent short circuits, use only a non-conductive adjusting tool (plastic) when making adjustments.
- 3) If the holding tank in question reads a higher level than is actually present, reduce the sensitivity by rotating the potentiometer counterclockwise with a non-conductive tool until the level indication matches the actual level.

If the holding tank in question reads a lower level than is actually present, increase the sensitivity by rotating the potentiometer clockwise with a non-conductive tool until the level indication matches the actual level.



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