



FOSSIL AQUARIAN ELECTRONIC LEVEL GAUGE TROUBLESHOOTING

Notes:

1. This procedure applies equally to SPAM, AQ1000P, and AQ3000M systems. However, The AQ3000M and other multi-probe systems with remote displays(s) may require additional testing to evaluate display errors.
2. The voltage to the probes is +/- 5 VDC. Therefore, troubleshooting can be normally performed with the systems energized. However, use precaution not to touch any of the line voltage terminals.
3. Do not plug-in or remove the SPAM module or any circuit cards (AQ3000C) with the equipment energized. This will damage the electronics.
4. The AQ1000P and AQ3000M have switches that can easily be used to de-energize the circuit card.

1. Remove the probe wire at the probe. Confirm:
 - a. The local indicator shows "steam"
 - b. The corresponding NO and NC relay outputs are correct (check resistance across contacts).
 - c. Confirm that the remote display shows "steam"
2. Ground the probe wire to the probe connector. Confirm:
 - a. The local indicator shows "water"
 - b. The corresponding NO and NC relay outputs are correct (check resistance across contacts).
 - c. Confirm that the remote display shows "water"
3. If these two tests above are correct, then the problem is with the probe. If the tests above are not correct, then the problem is with the probe to electronics wiring, or in the electronics itself.
4. Probe Testing:
 - a. Remove the probe from the column
 - b. Clean with cleanser, and dry.
 - c. Check the probe resistance across the tip to the body. Resistance should be greater than 5 meg ohms. If it is not, probe must be replaced.
5. Probe wire/Electronics testing.
 - a. Disconnect the probe input wire at the electronics terminals. Confirm:
 - i. The indicator shows "steam".
 - ii. The corresponding NO and NC relay outputs are correct (check resistance across contacts).
 - iii. Confirm that the remote display shows "steam"



- b. Obtain a one foot piece of 18-22 ga insulated wire.
- c. Short across the “P” terminal to “G” ground. On the SPAM this is terminals number #9 and #10. Confirm:
 - i. The indicator shows “water”.
 - ii. The corresponding NO and NC relay outputs are correct (check resistance across contacts).
 - iii. Confirm that the remote display shows “water”
- d. If the tests in this section above are correct, then the problem is with the wiring from the probe to the electronics enclosure.
- e. If the tests in this section above are not correct, then the problem is with the electronics.
 - i. If the local indicator is correct, but the relay output is not correct, the electronics must be returned for repair
 - ii. If the local indicator is not correct:
 1. For the AQ1000P and AQ3000M, use the channel maintenance kit and replace the IC chips for the defective circuit.
 2. The SPAM must be returned to the factory for repair.

TROUBLESHOOTING REMOTE DISPLAYS

The Aquarian 3000 M (mini), P (plus) and C (classic) systems all use one or more Red/Green LED remote displays. The remote display uses a nominal 15 VDC voltage to light the individual LED. Since there is a “Red” and “Green” LED indicator for each probe level, there is a separate electrical circuit for each. If, during the tests above, the remote display readings do not correspond with the local indicator display on the electronics circuit card, then further tests must be performed.

1. At the electronics circuit board, for the probe level under test, at the remote display output terminals:
 - a. measure the voltage from the (+) terminal, to the probe level under test. This measurement must be made for both the “Steam” and “Water” outputs for each probe level.
 - b. If the output voltage is correct (Water/Steam is On/Off as appropriate), then the problem is with the wiring going to the display, or the display itself.
 - c. If the output voltage is not correct, the circuit board must be returned for repair.
2. At the remote display:
 - a. measure the voltage from the (+) terminal, to the probe level under test. This measurement must be made for both the “Steam” and “Water” outputs for each probe level.
 - b. If the signal voltage is correct (Water/Steam is On/Off as appropriate), then the problem is with display itself. The display must be returned for repair.
 - c. If the signal voltage is not correct (missing), then the problem is with the display wiring.



3. Additional remote display tests:
 - a. It is also possible to easily test the remote display independent of the electronics and display wiring.
 - b. First, check for 15 VDC at the (+) "A" and (+) "B" terminal on the display.
 - c. At the remote display, using a short piece of insulated wire, sequentially jumper from the (+) "A" or (+) "B" terminal to the individual numbered probe levels. The LED for that level (Red or Green) should light.
 - d. If the LED for any level does not illuminate as required, the display must be returned for repair.

ADDITIONAL CONSIDERATIONS

1. The probe levels are normally set to "energize" on water. This means that when the probe detects water, the relay will change state from the "de-energized" power off condition. However, the electronics can be configured to "energize" on steam. This configuration is sometimes used to obtain the required "loss of power" failure position for the relay contacts.
2. "Level Fault" relay. This energizes if a water over steam condition is detected.
3. "Electronics Fault" relay. When there are NO fault conditions THIS RELAY IS ENERGIZED. When a fault occurs, this relay DE-ENERGIZES. This relay detects the fault conditions of power supply failure, clock fault, continuity fault
4. "Continuity Fault". This feature detects a broken probe wire. To use this feature, TWO wires must be run to the center post terminal of each probe. If either wire breaks, a "continuity fault" will be indicated. If this feature is not desired, a jumper from "P" to "C" must be installed for each probe to disable this fault feature.

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8 April 2005