

# **Aquadyne Tech Tip**

**Title:** Fluctuations in Conductivity Readings

Article # 121800-01

**Keywords:** Probes, Conductivity, Readings, Fluctuations, LCD Arrows

## **Products Affected**

Octopus, Aquanode, AquaGuard

## **Symptoms**

Conductivity reading does not settle and is in a constant state of flux (changing) or displays either “<<<<“ Or “>>>>”

## **Possible Causes**

Improper placement of probe during calibration procedure

Improper placement of probe

Induced voltage into the water

Induced voltage into the probe cables

Damaged probe cable

Non-Aquadyne probe being used

Probe has outlived its useful life

Computer connected to the Octopus causing a ground loop (See Tech Tip on Ground Loops)

## **Resolution**

Troubleshoot the probe installation

## **Procedure**

- 1) Improper placement of probe during calibration procedure: Hold the probe in the middle of the calibration solution container and a minimum of 1/2" off the bottom and sides. The probe should also enter the solution 1/4", minimum. This placement allows for full expansion of a three-dimensional electric field around the end of the probe. (See manual for specific calibration procedure.)
- 2) Improper placement of probe: The conductivity probe is NOT to be located close to the other probes; it should be located at least 24 in-line inches away from the other probes. The conductivity probe must be installed into a controlled volume of water, called a “conductivity cell”. See your manual for specific “conductivity cell” installation instructions.
- 3) Induced voltage into the water: Induced voltage is caused from an electrical device such as a pump, electronic ballast, or a high-energy lighting system leaking voltage into the water. This is both a bad situation for the instrument and a potentially dangerous situation for the person working on the system. If you suspect that you do have a induced voltage situation in the environment you should perform the following tests:

- A) Remove a cup of water from the system and place the probe into the cup. If the measurement stabilizes or returns to a normal value, then there is induced voltage in the system.
  - B) Observe the readings on the unit as you perform the following steps. Take note of when the readings stabilize as you perform each step. Turn off each electrical device on the system (i.e., pumps, lights, ozone generators, etc.). Disconnect each electrical device from its AC power source. Reconnect each electrical device, one at a time, to its AC power source. Turn on each electrical device, one at a time, to determine which device is generating the voltage leak.
  - C) When you have identified the offending device you should either replace it with a new device or have the unit repaired by a qualified technician.
  - D) If the induced voltage leak is determined to be small, then you can add a separate grounding probe to the system. The placement of the grounding probe is critical and should be placed such that the display value of the probe matches that of the probe in an isolated cup of system water.
- 4) Conductivity probe failure: After verifying Steps 1) and 2) above, a temperature reading display of “<<< or >>>” would indicate that either the measurement is out of the range of the instrument or that the probe has failed. If the probe is defective then contact your dealer and order a replacement probe. Be sure to indicate your unit’s model type (i.e. Octopus 3000, Aquanode ES, AquaGuard, etc) AND, if you have the AquaNode, indicate whether you are monitoring fresh or salt water. Some probe types are interchangeable; but SOME ARE NOT. If further information is required to determine correct probe replacement, contact Aquadyne Technical Support.
  - 5) Induced voltage into the probe cables: Voltages may be induced into the probes and probe leads when they are placed close to electronic devices such as electronic ballasts. Electronic ballasts, as well as other devices such as UV sterilizers, are commonly used in high-energy lighting systems. To isolate this source of interference, turn the suspected device on and off, and observe the readings on the instrument. If readings fluctuate as a result, reinstall the probe in a location away from the device and its components. Route the probe cables so that they maintain as much distance from the device as possible. In extreme cases, where the interference cannot be eliminated by this method, it may be necessary to shield the probe leads. This is done by, routing the leads through a metal conduit. The conduit must be grounded to the third wire ground on an AC outlet. If conduit is not available, then aluminum foil can be molded around the leads to form a shield. The foil must be grounded to the third wire ground on an AC outlet.
  - 6) Damaged probe cable: Damaged probe cables can cause intermittent signals to the instrument, making the readings fluctuate. Do a visual inspection by, removing the probe from the instrument and installation, and checking the entire length for cuts or breaks in the cables outer jackets and inner conductors. If damage has occurred, then replace the probe.
  - 7) Non-Aquadyne probes being used: Aquadyne instruments must be used with Aquadyne probes. Other manufacturers’ probes, when used on Aquadyne instruments, may cause fluctuations or inaccurate readings. Check your probes to assure that Aquadyne supplied them, if Aquadyne did not supply them, replace them with Aquadyne probes.
  - 8) Probes have outlived their useful life: Conductivity probes have an average life expectancy of two years. Life expectancy will vary depending on the environmental factors of each installation. Probes operating in hot liquids at very high or very low pH values will have a shorter life than those

operating at neutral pH and ambient temperature. Probes operating in environments with high stray voltages will have shorter lives than those operating in low or no stray voltages will.

- A) Probe Date Code: The Conductivity probe has the date stamped into the probe body, close to the cable entry end of the probe. There are four numbers that encode the date manufactured. The numbers are in a format MMY, where MM is the month number and Y is the year number. The numbers are very small and may need to be magnified under a high intensity lamp to be observed.
- B) Probe Shelf Life: The conductivity probe shelf life is indefinite when stored at ambient room temperature.

## **More Information:**

See TechTip Article # 111497-1 on Ground loop problems when operating a Controller with a PC connected via a direct RS-232 connection.

Prior to contacting Aquadyne Technical Service please read the appropriate manual sections relevant to your problem, and also consult the trouble-shooting guide located at the back of the user manual.

If you have completed any tests or experiments to isolate and diagnose your system please make notes and have them available to help our technicians troubleshoot and answer your questions.

When Contacting Aquadyne Technical Service please be ready to provide the following information so that we may help you in the quickest, most effective manner.

- 9) Who are you: Your complete name address, daytime phone number, and an e-mail address if you have one.
- 10) Which Aquadyne product is involved? The Aquadyne product involved, the product part number, the part number revision letter, the system serial number and the software version number. The software version number is displayed each time the power-up sequence is initiated.

On the Octopus 3000, AquaGuard and Aquanode ES the serial number and software version are available in the NEW PASSWORD menu. Entering the new password AQDYN will also display the serial number and software version. After observing and recording the Software Version and Serial Number, press ENTER four times to return to the Status Screen.

Technical Support is available from 9:00 AM to 5:00 PM, PST, Monday through Friday. The phone number is (858) 569-2082 X135. You may also send mail to [support@aquadyne.com](mailto:support@aquadyne.com).

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