MODEL HI 943500B HANNA
CONDUCTIVITY/TDS CONTROLLER

Objective

The goal of measuring total dissolved solids (TDS) is to control contamination in wash solution. If a wash solution is too dirty it will simply replace dirt with dirt as it "cleans" or "rinses". Rinse waters and sealers are the most sensitive to contamination. The lower the TDS the "cleaner" the solution is (see theory of operation for explanation). The TDS of incoming tap water is 170-220 parts/million PPM. Different wash solutions have different acceptable levels of contamination - refer to the wash parameters for specific guidelines.

Theory of Operation

Total dissolved solids (TDS) is determined by measuring the conductivity of a solution. Conductivity is the ability of a solution to conduct an electric current. TDS measurement therefore expresses the concentration of dissolved solids that conduct electricity such as inorganic dissolved solids (chloride, nitrate, phosphate, iron, aluminum, etc.). Organic materials such as oils etc. do not carry an electric current well and therefore can not be measured using conductivity.

Visual inspections are essential to assist in determining contamination. TDS is determined by using a multiplying factor of .5 from conductivity. Because phosphate conducts an electric current it is not possible to accurately determine contamination levels in phosphate wash solutions: Therefore it is not necessary to take a TDS reading of phosphate.

Conductivity and TDS measurement are greatly affected by temperature. Model HI943500B is equipped to a temperature probe which automatically compensates and adjusts the measurement. The standard temperature reference point is 25°C.

Calibration Procedure

1. With the conductivity probe held in the air, press the measure key to set the meter to measure mode.

2. If the LCD does not show zero, turn the OFF SET screw until the controller reads zero.

3. Pour enough conductivity solution (HI7030) into a beaker to achieve at least 3 ¼" of depth. The level of the solution must be high than the holes of the PVC sleeve.

4. Immerse the probe in the beaker with the conductivity solution. The level of the solution must be higher than the holes on the PVC sleeve.

5. Tap the probe repeatedly on the bottom of the beaker and stir it to ensure that no air bubbles are trapped inside the sleeve.

6. If the temperature of the probe is close to that of the solution the display will stabilize quickly if the temperature difference is 5EC (9EF) or more, wait a few minutes to let the ATC circuitry to compensate completely.

7. When the reading has stabilized, turn the SLOPE set screw on the front of the meter until the LCD reading is the same as the calibrated solution at 25EC (77EF). The calibration solution for the HI94300B is HI7030 and should read 12.88 milli seimen.

8. The calibration is now complete and the meter is ready for use. All future measurements will be compensated to 25EC (77EF).

> **Note: If the instrument will not calibrate, refer to the "Probe Maintenance" section.**

Operating Information

The HI943500B controller is designed to control the TDS level in Stage 2 rinse water. When the TDS exceeds the set point fresh water will be added to the tank. This will keep the water level consistent and keep the TDS below the set point

1. The parameters are set through the front panel keys and adjusting screws.

2. When each key is pressed the corresponding LED is lit, this will indicate that the function is operational.

3. The meter and probe must be calibrated before using the instrument for measurements.

Set Point

1. To set the working point of the instrument, press the SET key. The display will indicate the set valve.

2. Use a small screwdriver to adjust the set screws. The course set screw is used to get close to the desired set point. The fine set screw is used to get the set point right on your parameter target. Adjust the screws until the desired set value is displayed.

3. If the TDS of the bath exceeds the set value the fresh water valve will open. When the TDS drops below the set value the fresh water valve will close.

> **Note: The set point should not need to be adjusted once it has been set to its target. If the target changes, the set point will then have to be adjusted to new target. The wash operator is to make this adjustment.**
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> **If at anytime the value exceeds the target, for example if a part is hung the wrong way and the solution from stage one is drained into stage two, it might be necessary to open up the water main intake lever. Do not adjust the flow rate meter valve. Keep checking the controller and when the reading is below its target close the main intake valve.**

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Diagnostic Testing

The HI943500B controller is designed with a built in diagnostic function to enable the user to check and troubleshoot the instrument. The checks performed are through the front panel keys and can be used to isolate the cause of the malfunction.

1. Press the MEASURE key before preceding the following tests.

    a)   Test the off set.
Press the OFF SET key and display should indicate the value of 0.00 (milli seimens) $\forall$ 0.50 (milli seimens).

    b)   Test the slope.
Press the SLOPE key and the display should indicate the following value of 10.00 ms (milli seimens) $\forall$ 0.50 (milli seimens).

Note:

- **If the above OFF SET and SLOPE do not indicate the above value, the probe must be re-calibrated.**

- **The readings obtained by these functions will vary if the off set and slope set screws on the front panel are adjusted.**

Probe Maintenance

All cleaning and calibration must be recorded on "Log Sheet" provided.

Proper maintenance of the probe will improve both accuracy as well as life span. The probe should be cleaned once a week by dipping the probe into a 1:1 solution of hydrochloric acid (Oakite 32) and deionized water. The probe then should be rinsed thoroughly in deionzied water.

Probe Replacement

Contact maintenance and they will replace the probe for you.

Trouble Shooting

1. Readings fluctuate wildly   -   Clean probe.

2. Meter will not calibrate   -   Reclean probe and try again.
                                       -     Call Maintenance

3. Meter damaged or does not function at all   -   Call maintenance

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