

5 STAGE WASH CHEMICAL CONTROLLER OPERATING PROCEDURE

Attachments

- 3671 Jenco pH Controller
- 627E Great Lakes Conductivity Controller

3671 JENCO PH CONTROLLER OPERATION

Objective

The 3671 Jenco pH Controller is designed to automatically adjust the pH of a solution to maintain a predetermined and set range of pH (i.e.: 4.0 - 4.5 pH).

The 3671 pH Controller is used because precise and accurate monitoring of pH levels is very critical.

Theory of Operation

The pH adjust feed pump is controlled based on the range or window of acceptable pH levels for a given solution. This range is controlled by the “hi” and “low” pH buttons inside the controllers. If the pH level goes out of the set range a pH indicator light will come on. If the pH level goes below the set range, Enprox 714 needs to be added manually (refer to troubleshooting guide). If the pH level goes above the set range, Adjust OX will be pumped in automatically at a rate determined by an on/off timer. If the system does not correct the problem within 18 minutes then the alarm will go off. This alarm is set to go off only if the pH stays above the acceptable range for a specific length of time. The amount and speed that the adjusting chemical is added is controlled by an on/off timer.

Maintenance and Calibration

Maintenance of 3671 is very important because of the pH range. Careful monitoring of the pH reading is essential. The reading must be double checked with a manual calibrated pH meter every shift. This is called grab sample verification. The grab sample **must** be taken from the valve on the same circulation line as the pH probe. When this is not possible a large enough process sample should be taken and both probes submerged in the one process sample either at the same time or one immediately after the other. It is critical to take the readings close together. If the difference between the two readings is > 0.1 adjust the 3671 as per grab sample calibration procedure.

Chemical Addition Timers

When the controller calls for chemical a cycle time is activated with on and off times. The cycle time is 18 minutes. If the controller is not satisfied within 18 minutes an alarm will sound.

Press the reset button and the cycle will start over. Be sure to check why the bath did not come back into parameters (i.e.: tote tank empty, broken feed hose, pump turned off, etc.).

The pH Controller for the model 3671 iron phosphate control system has been precalibrated to 7 and 4 buffer solutions.

The following is required to calibrate the pH Controller.

- 100 ml pH 7 buffer
 - 100 ml pH 4 buffer
 - Activate the controller by plugging it into a 110 volt, 15 amp electrical connection.
1. Immerse the pH electrode into the pH 7 buffer solution. DO NOT ALLOW ELECTRODE TO TOUCH THE BOTTOM OR SIDES OF CONTAINER as this will cause incorrect readings.
 2. The LED display on the controller should read (7 ± 0.10) . If not adjust the calibration screw until the meter reads (7 ± 0.10) .
 3. Rinse the electrode with deionized water and immerse it into the 4 buffer solution. DO NOT ALLOW THE ELECTRODE TO TOUCH THE BOTTOM OR SIDES OF CONTAINER as this will cause incorrect readings.
 4. The LED display on the controller should read (4 ± 0.10) . If not adjust the SLOPE control screw until the meter reads 4 ± 0.10 pH.
 5. Rinse the probe.

Grab Sample Calibration

Note: Never consider an 3671 probe calibrated without doing a grab sample calibration. You must do this if accuracy and repeatability are desired. Depending on the probe and solution that it lives in it may not respond well to buffers due to the potential for buffer contamination and reactions between chemicals in the process, sensors and the buffers.

THE GRAB SAMPLE IS THE ULTIMATE AUTHORITY.

- **This calibration must take place at process temperature. If the grab sample is unstable (i.e.: pH reading will not stabilize) or is allowed to cool down it should be discarded and a new sample used. Take a large sample - it will be more temperature stable.**
- **An accurate hand held pH meter with a temperature compensation is required - ensure that this meter is calibrated and verified accurately.**
- **Before proceeding with the grab sample calibration the probe should be put back into its proper home where it normally takes readings.**

1. Take a process sample right beside the 3671 probe (using the valve that the probe is hooked up to) record the reading when the sample is taken.
2. Immediately measure the pH of the sample using the hand held pH meter.
3. If the reading on the manual hand held pH meter is different from the Jenco reading the Jenco Controller will have to be adjusted to read the same as the manual hand held meter. The adjustment is done by adjusting the slope.

Controller Set Points

1. High Set Point
 - a) Press the HI SET switch on the front panel. The meter indicates the default value of the high set point.
 - b) Adjust the HI SET control screw on the front panel to the desired HI PH value for you process. Adjust 1 point lower than the maximum parameters (i.e.: Max parameter 4.5% adjust the HI SET to 4.4%).
 - c) Release the HI SET switch, the meter will indicate the process pH value.
2. Low Set Point
 - a) Press the LOW SET switch on the front panel. The meter indicates the default value of the low set point.
 - b) Adjust the LOW SET control screw on the front of panel to desired low pH value of your process. Adjust 1 point higher than the minimal parameter. (i.e.: Minimum Parameter 4.0% to adjust the LOW SET to 4.1 %.)
 - c) Release the LOW SET switch, the meter will indicate the process pH value.

The HI SET LED indicator light will be on when the pH is higher than the preset HI value. The light will go out when the pH is below the preset HI value.

The LOW SET LED indicator light will be on when the pH is below the preset low value. The light will go out when the pH is higher than the preset low value.

Alarm Testing

1. To test the pH alarms set the low set for 4.5 pH and the HI for 5.0 pH.
2. Immerse the probe in the 7 buffer solution. The pH adjust feed and phosphate circuit must be on.
3. The HI SET LED light should be on.
4. Remove the probe and rinse with deionized water.
5. Immerse the probe in the 4 buffer solution. The pH adjust feed and phosphate pump should be deactivated.
6. The HI SET LED light will go out.
7. The LOW SET LED light should be on and the pumps should be de-activated.
8. Adjust the HI and Low set points back to normal operating values.

The concentration pump will allow chemical additions to the bath if the pH of the solution is above the HI SET point, however the adjust ox pump will be activated to lower the pH.

If the pH goes below the low set point, there is no pH adjust pump to be activated. An indicator light comes on and Enprox 714 is added manually.

Once all set points have been checked, disconnect the 110 volt to the unit, remove the electrode from the solution and return it to its proper location.

627E GREAT LAKES CONDUCTIVITY CONTROLLER OPERATION

Conductivity - The conducting power of a specific material.

The conductivity is controlled based on the range or window of acceptable conductive levels for a given solution. This range is controlled by "HI" and "LOW" set points. If the percentage levels goes out of the set points the system will begin pumping the appropriate adjusting chemical to adjust the percentage back within the programmed set points. If the system does not correct the problem within 18 minutes then the alarm will go off. This alarm is set to go off only if the conductivity level stays below the acceptable range for a specific length of time. The amount and speed that the adjusting chemical is added is controlled by an on/off timer. It is necessary to titrate the solution everyday and calibrate the controller to the bath solution because the readings change as the bath gets old or the probe gets dirty.

The conductivity controller reads in MS/CM which is micro seimens per centimeter.

Conductivity is measured by how clean the wash bath is. Demineralized water is not conductive but as the water gets contaminated by salts, chlorine, iron phosphate the bath will become conductive because of these contaminants in the bath. The dirtier the bath the higher conductivity.

Conductivity Calibration

1. Turn the machine on; it will display the percent of concentration.
2. Press the "disp/var" button once. It will give you a MS/CM reading; record this reading on piece of paper.
3. Record your manual titration reading also.
4. Press the "exam/cancel" button once you will see "conc." press the "next" button until you see CNFG.
5. Press "enter", "zero" will appear. Press the "next" button until you see PE2 concentration, press "enter", you will see a value in percent concentration. Using the arrow keys change this value to match the manual reading you recorded earlier. Press "enter" This will save this new reading.
6. You will see a number in MS/CM. Using the arrow keys, put in the MS/CM value you recorded earlier. Press "enter" to save this value.
7. You will see PE3 concentration. There are 10 of these tables. Press "enter" until you get to PE2 concentration. Press "Exam/Cancel" two times and you will be at the % of concentration value of the bath.

Controller Set Point

Note: If at anytime the wash parameters are changed, the controller “HI” and “LOW” set points are to be adjusted by Maintenance only.

Note: It may be necessary to calibrate the meter everyday and change the ms/cm number and the percentage number depending on the titration reading as the bath gets old or the probe gets dirty.

Conductivity and pH Electrode Maintenance

The electrodes should be cleaned weekly. To clean probe, unplug controller and remove probe from the tank or line.

The Great Lakes conductivity controller probe should be cleaned with distilled water.

The Jenco pH probe should be cleaned with 0.1N HCL. (Testing solution #2)

If probe is still dirty, repeat the process.

DO NOT USE A HARD BRUSH TO CLEAN ELECTRODE.