REALTECH Controls
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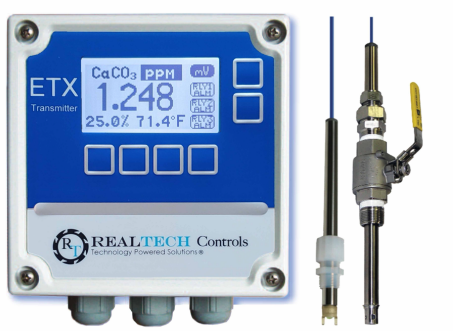
S80 Calcium / Water Hardness Sensor Care and Calibration Addendum v1.4
(PLEASE READ – VERY IMPORTANT FOR CORRECT OPERATION)



Precautionary Sensor Notes

1. The packaging of the S80 sensors comes with a cap filled with KCl solution for sensor storage. The storage of the sensor or spare electrode is recommended for no longer than 6 months, and can be used after this for approximately another 6 months to 1 year in process. The sensor electrode (replaceable) which is the sensor tip, screws off via a bayonet style fitting from the stainless-steel shaft for easy replacement. (There are slots on the end for use with a wrench / spanner).
2. The **sensor tip should always remain submerged** as if left dry for even a few hours, the electrolyte will harden inside the membrane and render the sensor faulty.
3. Be aware of the maximum temperature and pressure specifications, and we recommend operation to be well within these ranges for 32°F to 104°F (0°C to 40°C), at 0-50 PSI (0 - 3.5 bar).
4. The flow rate past the sensor is recommended to be around 0.1 to 5 GPM. The EMEC NPED3 flow cell is recommended to stabilize the flow past the sensor, and ensures the sensor tip is constantly submerged. This can be installed in-line or in a side stream sample line.

Installation / Commissioning Notes

1. Remove the main sensor cap carefully, and also remove the red / orange small sensor tip protection cap prior to installation in the water line.
2. Keep these items in a safe place, in case of future sensor storage / transportation.
3. Be careful not to damage the tip by colliding this with other parts of the installation.
4. Always keep the sensor tip submerged in water, or else this will dry out and fault.
5. The sensor is designed to work with flowing water. If the sensor sits in stagnant water, the reading will steadily decrease over time. (Calcium ions in the water constantly flow past the sensor to provide a stable reading).

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ETX Transmitter Configuration (see instruction manual for menu navigation and complete procedures)

1. You are able to set the "Sensor Type" to either Water Hardness (CaCO3) or Calcium (Ca++) for either measurement.
2. It is recommended to set the "Range Lock" in the ETX controller to PPM, as the controller's default is auto-range and switches between PPB and PPM for lower ranges, and could be confusing to view readings.
3. It is recommended to set the "DAMP" (damping) on the controller to 100, to stabilize the reading, if need be, as the sensor reads instantaneous values and the reading on the ETX controller may fluctuate rapidly depending on the process.
4. If this is a dual channel transmitter and you are only using one sensor, the controller will look for sensor 2 continuously. Press any lower button twice to enter the menu, and select sensor quantity to 1. You can change this to 2 when another sensor is added.

Calibration Notes

1. After initial installation into a process, sensor polarization time is required and could be anywhere from 5-30 minutes to achieve stable readings.
2. After this time, replacing the sensor in and out of the process or calibration solutions is specified to reach 90% of the actual value within 10 seconds and increase in accuracy thereafter.
3. When calibrating the sensor, alternating from having the sensor tip in air and then inserted into a calibration solution or process will result in the readings varying on the screen. This is normal, and a few seconds are required to stabilize the readings in the various solutions.
4. When readings are stable in a process, accurate readings should be more or less instantaneous with changes in the process water hardness.
5. Calibration frequency is generally determined by the process, and as water chemistry varies with all processes, the effect on the reading will also vary over time. A general rule of thumb would be to initially check the calibration the next day, and decrease calibration frequency based on how the values correlate to the lab test. Typical calibration frequencies are anywhere from weekly in harsh processes to once every 2 months for clean water applications. Start/stop, and unstable flow rates slightly affect the repeatability.
6. The sensor calibration is stored inside the sensor, so you are able to calibrate this on a lab / bench ETX transmitter, and then remove and install the sensor in the field on another ETX transmitter if required.

STAND, AUTO, and MANUAL Calibration Tips

7. The sensor is normally supplied pre-calibrated. If necessary, after the sensor has stabilized in the process (around 5-30 minutes), firstly perform a "STAND" calibration to match with your actual process reading from your lab or hand-held tester. This is an offset calibration, and will affect the slope of the calibrated values.
8. It is recommended to perform an "AUTO" calibration which is a two-point calibration performed with a low and high value solution of known PPM (either as Ca or CaCO3). Calibration should always be performed with the low value solution first (CAL1), and thereafter with the high value solution (CAL2),

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always being a decade (x10) from the low value solution. For example, if you calibrate with 25ppm solution for the low range, the high range solution should be 250ppm etc. See the instruction manual for how to calibrate. To tweak the calibrated reading, always use "CAL2" for the high range.

9. The time it takes for a full "AUTO" calibration by gently swirling the sensors in your calibrations solutions is typically around 2 minutes. Always rinse the sensor tip in de-ionized, distilled or clean water prior to switching calibration solutions, so as not to contaminate the solutions, and for increased accuracy.

Important Calibration Values in the ETX Controller

10. It is recommended, once successfully calibrated (or supplied from the factory), to note down the values in the ETX Controller under the "INFO", "SENSOR" "Log1" menu for the "Slope", "mV", and "Offset" values as these can be manually entered into the controller, if a user error occurs from incorrect calibration.
11. The "MANUAL" calibration feature is to manually input Slope and Offset values, if calibration solutions are not available or to reset the controller to its initially calibrated default values. (generally supplied on a separate document with the purchase of an ETX Controller with S80 sensor). These are the readings as per point 10 above, and should be noted down for future reference if required.
12. If you select "New Sensor" under the "Calibration" menu, this erases the previous calibration logs, and an "AUTO" calibration might be necessary thereafter.
13. Please contact us for your buffer solution requirements, which will depend on your measurement range of either Calcium, or Water Hardness. The low and high range calibration solutions should always be a decade (x10) apart (example 1ppm low and 10ppm high, 25ppm low and 250ppm high etc.)

Interfering Ions

1. Lead ions strongly interfere with the measurement, 2 Lead ions = 1 Calcium ion. This means for every 2 ppm Lead ions; the Calcium reading will be affected by 1ppm error on the measurement.
2. Mercury, Iron, Copper, Nickel, and Ammonium interfere at 1000–3000 : 1 so generally this is a very low / non-consequential interference.
3. The pH also interferes with low level measurements, keep the pH > 4 for concentrations < 1ppm Ca++. Hydroxide, carbonates, fluorides, phosphates, sulfates all complex with calcium ions. Adjusting the pH < 7 eliminates carbonate and hydroxide issues.

Please contact us for your application, and we can assist further.