

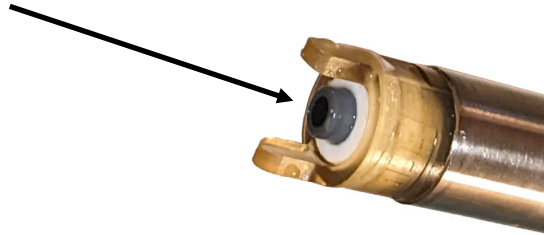


Ion Selective Sensor (Pion) Addendum V3.0

Please read carefully for proper understanding and operation of S80 Ion selective sensors, connected to ETX model controllers:

1. Sensor Preparation:

- Carefully remove the cap containing a KCL (Sodium Chloride) salt solution and sponge. This is to keep the sensor tip wetted during storage. Keep this safe for storage, or future transportation.
- **Remove the small red cap off the sensor tip.** (Also keep safe for storage / transportation).

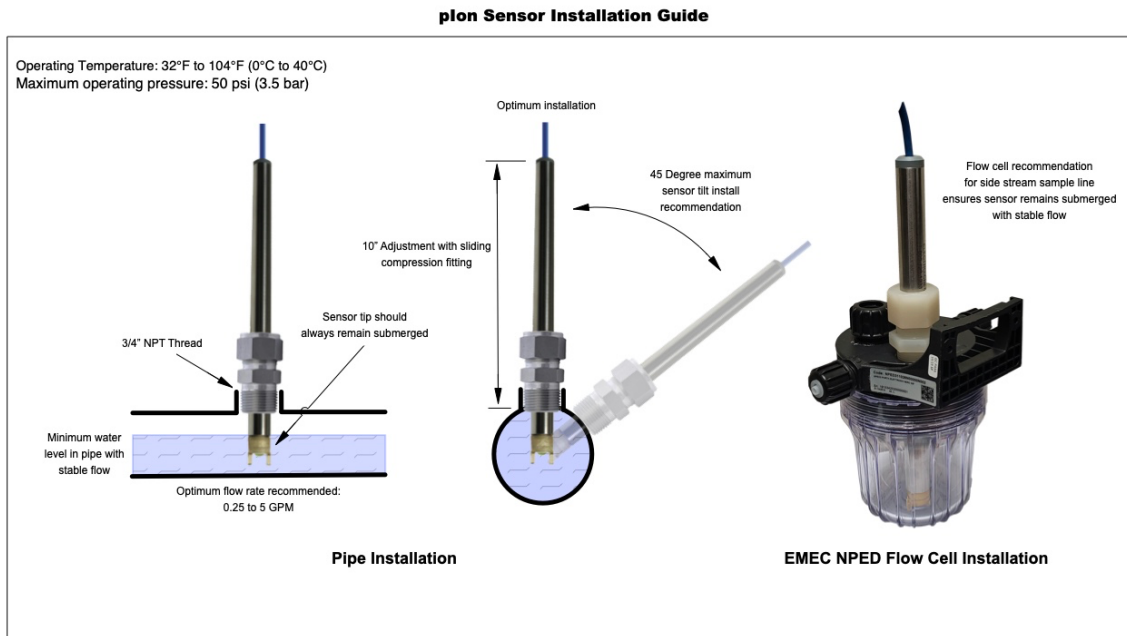


- After the storage caps have been removed, it is important to swirl (recommended) or at least leave the sensor in clean water for a few minutes prior to installation in order for the sensor to polarize, and before calibration.

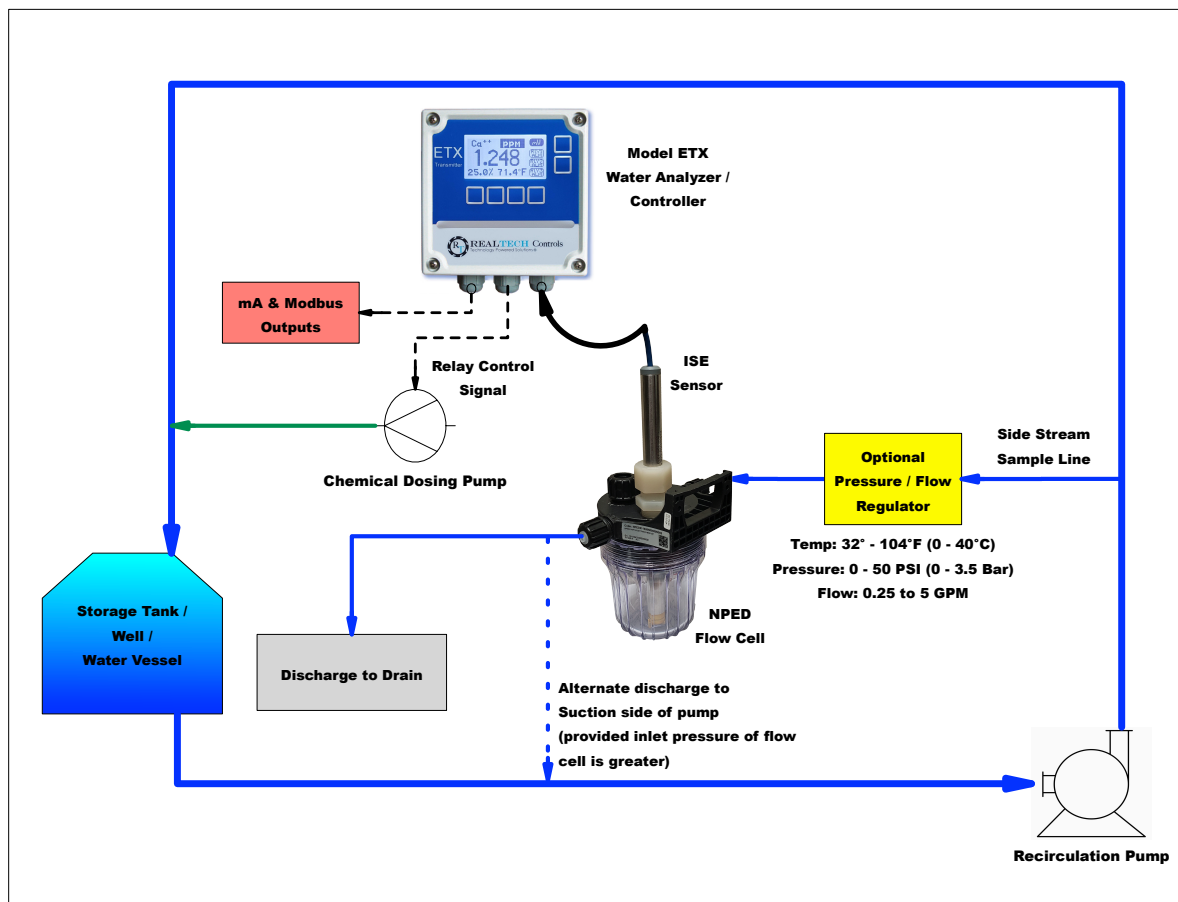
2. Sensor Operation: (time is required for polarization)

- Generally, around 1-2 hours is required for complete polarization when the sensor is placed into water from the storage solution. However, if swirled in clean water or installed in process in the EMEC NPED3 flow cell, the readings should start stabilizing after a few minutes.
- Do not perform a calibration immediately upon installing the sensor in process, as when the sensor is removed from the clean water, exposed to air and then placed into process water, a few minutes is required for re-polarization.
- **Whenever the sensor tip is exposed to air and then placed into a solution, a few seconds to a few minutes is always required for re-polarization in the solution.**
- In stagnant / non-flowing water, the readings will slowly decrease if ions sink to the bottom of the pipe or flow cell.
- Be careful not to damage the sensor tip during installation from impact on any equipment.
- Do not exceed the temperature specification for sensor: 0° C to 40° C (32° F to 104° F)
- Do not exceed the pressure specification for sensor: 0 - 50 psi (0 - 3.5 bar)
- **Always keep the sensor head submerged in water during normal operation.**
- Do not let the sensor head stay in air / dry for longer than around 30 minutes.
- An EMEC flow cell is recommended to keep the sensor head permanently submerged, and can be incorporated in a side-stream sample line (recommended), or in-line with the flow if not greater than 5 GPM. A minimum of 0.25 GPM flow rate past the sensor tip is recommended.
- The life span of the sensor in process is specified for a 6-12 month operation life.
- Only the electrode part of the sensor requires replacement (screws off from a bayonet fitting).

3. Recommended Installation:



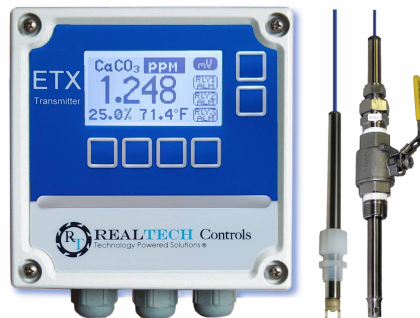
Recirculation Sensor Installation Recommendation for Ion Selective Electrodes



4. Sensor Cleaning and Storage / Transportation:

- Clean the sensor tip using alcohol or a light detergent (vegetable wash) and gently brush with a soft toothbrush, removing any debris or fouling build-up. Then rinse thoroughly with distilled or de-ionized water.
- To store, replace the originally supplied small red cap on the sensor tip.
- Carefully insert the sensor back into the cap containing the sponge and KCL solution. If this has dried, it is ok to drench with clean water and add a little salt. Replace the sensor into the cap and seal around the cap with water-proof tape.
- The shelf-life of the sensor in storage solution is recommended to be up to 6 months.

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



- The ETX controller will automatically detect which type of sensor is connected.
- You are able to set / override the “Sensor Type” in the controller for example to either display Water Hardness (CaCO₃), or Calcium (Ca⁺⁺) to obtain the appropriate readout required. The ETX will automatically detect S80 ion selective sensors, example Fluoride, Nitrate, Chloride etc.
- It is recommended to set the “Range Lock” in the ETX controller to PPM, as the controller’s default is auto-range and will switch between PPB and PPM for lower ranges, which could be confusing when viewing the readings on the controller.
- It is recommended to set the “DAMP” (damping) on the controller from 50 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.
- 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.

6. Calibration Notes

- After initial installation into a process, sensor polarization time is required, see note 1.
- After polarization, and placing the sensor in a process with sufficient, stable flow (0.25 to 5GPM), it is specified to reach 90% of the actual value within 10 seconds and increase in accuracy thereafter.
- When readings are stable in a process, accurate readings should be more or less instantaneous with changes measured in the process water parameter.
- When calibrating, exposing the sensor tip to air and then inserting it 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.

- 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 a lab test.
- Typical calibrations could be performed anywhere from weekly (in harsh processes) to once every 2 months for clean water applications. Start/stop flows or unstable flow rates slightly affect the repeatability.
- The sensor calibration data is stored inside the sensor, so the sensor is able to be calibrated on a lab / bench ETX transmitter, and then removed and installed in the field on another ETX transmitter.

7. STAND, AUTO, and MANUAL Calibration Tips

- The sensor is normally supplied pre-calibrated. After the sensor has stabilized in the process, (around 30 minutes to 2 hours) if necessary, perform a “STAND” calibration to match with your actual process reading from your lab or hand-held tester. This calibration will affect the offset value in the sensor calibration data, but the pre-calibrated slope should remain unchanged.
- If necessary, perform an “AUTO” calibration which is a two-point calibration used with low and high value calibration solutions of known PPM. **Calibration should always be performed with the low value solution first (CAL1), and thereafter with the high value solution (CAL2)**, 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 a process reading, always use “CAL2” for the high range.
- The time it takes for a full “AUTO” calibration by gently swirling the sensors in the calibration solutions is typically 2 minutes. Always rinse the sensor tip in de-ionized, distilled or clean water prior to switching calibration solutions, so as not to contaminate them and for increased accuracy.
- Try and minimize exposure time to air as much as possible when swapping solutions.

8. Important Calibration Data Values in the ETX Controller:

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

9. Interfering Ions

- Please see the relevant sensor datasheet for ions that may interfere with the measurement.

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