



## Guidelines for Amperometric Sensor and Flow Cell Operation (V1.1)

### 1. General System Operation

- It is recommended that the water sample should be plumbed from the main process to a side stream sample line, and have the sample flow run consistently 24/7.
- This should be plumbed to a regulator which can deliver up to 15 PSI pressure max, then through a filter, and then to the flow cell. See the diagram on the last page.
- The outlet water sample from the flow cell should discharge to atmospheric if a membrane probe is used, example the EMEC Amperometric sensor models SCL2, 3, and 8.

### 2. Amperometric Cell Assembly, Installation, and Maintenance:

- Please watch the relevant video (either membrane style or self-cleaning style) at: <https://realtechcontrols.com/water-treatment/chlorine-analyzer-control-system/>
- If replacing old electrolyte, flush the existing electrolyte off the probe and end cap carefully with clean, distilled, or de-mineralized water, and be careful to not damage the membrane.
- Make sure to let dry completely, so no water will be mixed with electrolyte when filling.
- Tips:
  - a. Try to minimize air bubbles as much as possible by filling the cap with electrolyte slowly, and by keeping the bottle nozzle close to the electrolyte in the cap while filling.
  - b. Before the probe is inserted, check the elastic band is secure over the hole in the cap, ensuring the electrolyte does not spill out.
  - c. As with Amperometric Cell technology the electrolyte typically needs replacement every 2-4 months. As a rule of thumb, the constant lowest reading of PPM present in the water compared to the maximum probe specification should be around 10%. For example, if a Chlorine probe is a 0-20ppm probe, then around a 2ppm minimum constant Chlorine level is recommended to be present in the water for a 2-4 month electrolyte replacement schedule. Any lower than this, and electrolyte replacement could be required as often as weekly (except 0.5ppm, and possibly 2ppm probes depending on the water chemistry).
  - d. Electrolyte and/or membrane replacement is required if the controller reads "Calibration Failure", or if the readings drift or are too far from the actual reading – typically within around 10-30% upon startup, after a few minutes to an hour.
  - e. After the system has been running for 24 hours and then calibrated, it is advised to record the mV value in the service menu for the ppm reading, to give an indication of what the correctly calibrated working mV vs PPM's should be for the actual chlorine ppm present in the water.
  - f. For membrane style probes, it is recommended to replace the membranes around 1-2 times a year, depending on the chemistry of the water.
  - g. Always keep the sensor submerged in water, even without flow, as if left dry, the electrolyte may harden inside the membrane and the membrane will need replacement.**



- h. For self-cleaning probes, when replacing the electrolyte, very gently rub the electrodes a few times, with the purple round abrasive sheet included, until relatively shiny.

### 3. Water Pressure and Flow:

- The Flowrate through the cell should be around 0.25 GPM (1 LPM), consistently 24/7.
  - a. For membrane probes, the flow should be discharged to atmospheric pressure or not more than 15 PSI (1 Bar).
  - b. For self-cleaning probes, the discharge pressure should not exceed 116 PSI (8 Bar), and should be a constant, non-pulsing pressure.
- The silver bullet should activate the flow switch which represents the correct amount of flow, and is recommended to be positioned about 1/8" (3mm) above the black line on the flow cell.
- Slight variations in flow rate should not cause much deviation in readings.

### 4. Commissioning Response Time:

- When the probe is inserted into the flow cell, and water is flowing with a stable flow rate, typically within a few minutes the readings should increase to somewhat close to the actual value. However, depending on the chemistry of the water, this could take anywhere from 1 hour to 24 hours.

### 5. Calibration:

- With EMEC's new technology digital probe, the Zero (P1) value is not able to be calibrated, as it does not drift. This is factory pre-calibrated once, and does not need calibration as with older style analog probes.
- Use the sample port on the flow cell to obtain water for calibration verification.
- Use the FAST CALIBRATION function to calibrate to the desired value.
- Tips for hand-held reader calibrations:
  - a. When determining the sample value from a colorimetric hand-held reader, for example for total or free Chlorine, remember that time is an important factor, and that the reading on the hand held could vary, even up to 1ppm, per reading taken.
  - b. As a rule of thumb, if the reading on the controller is within around 5-10% compared to the hand held, calibration is not really necessary, as this could be the expected deviation of hand-held colorimetric readers.

### 6. Controller Setup:

- When the probe cable is connected to the probe, the controller will automatically detect the correct probe after powering up. If it is powered before the probe is connected, simply cycle the power to the controller.
- In the SERVICE menu, you are able to see the mV of the Probe, and this can be used as a starting reference for ppm readings, and future calibrations.



### 7. Trouble Shooting:

- If the controller does not read, or cannot be calibrated, this could be a fault with the electrolyte having air bubbles (typically more common with self-cleaning probes).
- If the controller is reading, but the readings are way off, the electrolyte most likely needs replacement.
- If everything seems correct, but still not reading: Reset the controller in the RESET menu, exit, and cycle power to the unit.
- If this fails, contact us.

### 8. Typical Installation example:

