

- Review the settings of the sensor to make sure that the measuring mode is set correctly (pH vs. ORP).
- Clean the sensor and attempt a new calibration.

Cleaning guide

Contamination	Cleaning
Gross contamination at the reference junction	Carefully brush off contamination under running water using a soft-bristled brush (ie, a toothbrush).
Membrane contamination	Splash the electrode with water, then blot it dry using a moist paper towel (do not rub).
Fat, oil, or protein-containing coatings and similar substances	Remove by soaking for 10-15 minutes in a solution of clean water and household liquid dish soap. Rinse thoroughly with clean water.

Restoring the last valid calibration

In some cases it may be appropriate to restore the last valid calibration. This makes it possible to continue with measurements when a calibration failed or it is assumed that optimal calibration conditions were not met.

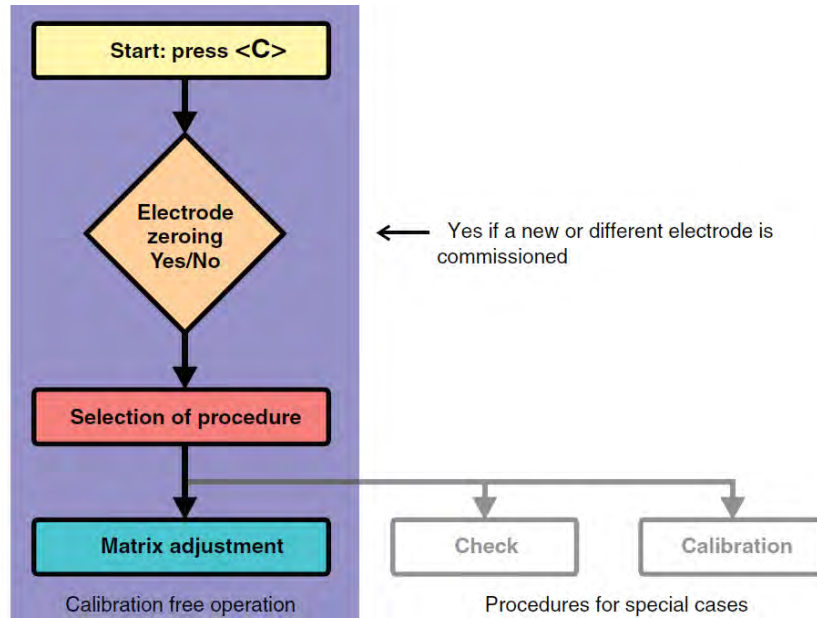
Note

The reactivation of the last valid calibration is only a temporary solution. When the last valid calibration is restored it is very likely that inaccurate measurement values will be produced. The sensors performance should be evaluated as soon as possible by performing a new user calibration.

1. Adjust settings: ; [Settings of sensors and differential sensors]; ; [Measuring range]; ; [Select SensoLyt]; ; [Select Calibration]; ; [Select last valid]; ; [Save and quit];

VARiON, AmmoLyt, NitraLyt – ISE electrodes

The VARiON® 700 IQ, AmmoLyt® 700 IQ, and NitraLyt® 700 IQ combination sensors are ready to measure after being equipped with electrodes and completion of a matrix adjustment. The measuring characteristics of the electrodes remain stable for their entire service life of 12 to 24 months. Thus, calibration of each electrode in the laboratory using standard solutions is not required. Instead, a matrix adjustment calibration in the field is necessary to adjust the electrodes to the sample matrix during initial commissioning and thereafter when the sample matrix changes. Additionally, a matrix adjustment provides information on the state of the electrodes. A matrix adjustment is performed in situ without removing the sensor from the measuring location. The matrix adjustment will need to be repeated in the event of a change in the sample matrix or when an unacceptable difference between the concentration reported by the monitoring system and suitable reference measurements are observed.



Matrix adjustment

This procedure adjusts the online measurement to an independently determined reference value ("lab value") without adjusting the slope. To determine the reference values, a sample is taken from the measuring solution and the relevant concentrations are measured by a commercial lab or on-site using a photometer, e.g. YSI pHotoFlex or lab meter, e.g. YSI TruLab or MultiLab with TruLine electrodes .

Note

Careful handling of samples is required. Microbial activity will quickly alter the concentration of ammonium and nitrate in the sample. For best results, immediately filter samples through a 0.45 µm syringe filter and transport to the measurement device on ice to stop microbial activity. Acidify sample to a pH < 2.0 for storage in excess of 24 hrs, i.e. for transport to a commercial lab.

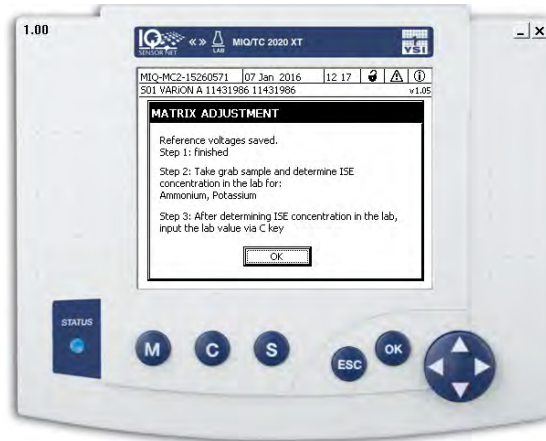
Materials required

- long-handle dipper
- 30 mL syringe w/ Luer lock fitting
- 0.45 µm syringe filter w/ Luer lock fitting
- clean sample bottles free of detergent and residues
- iced cooler
- pipettes
- spectrophotometer
- test kits for ammonium, nitrate, potassium, and chloride

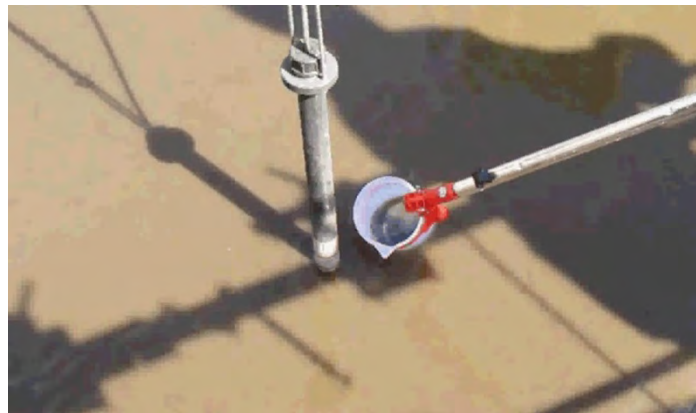
Time required

- Conditioning: 30 minutes to 24 hours
- Sample collection/processing: 15 minutes
- Measurement: 15 minutes
- Programming instrument: 10 minutes

8. The reference voltages will be saved and you can then take your grab sample to be analyzed. The screen will indicate what concentrations the lab will need to process.



9. Sampling & measuring: Using the sample dipper, take a sample as near as possible to the sensor by scooping and inverting several times before withdrawing the sample.



Note

A concentration in the sample < 1.0 mg/L increases the potential for inaccuracy and reduces the quality of the matrix adjustment. Therefore, plan to sample at a time when actual concentrations of all parameters are anticipated to be > 1.0 mg/L. Matrix adjustment can be canceled at any time by pressing



10. Filter the sample. Equip the syringe with a filter and pull sample into it using the plunger. Remove the filter and evacuate the syringe into a clean, dry sample bottle. Put a lid on the bottle and place in cooler.

Note

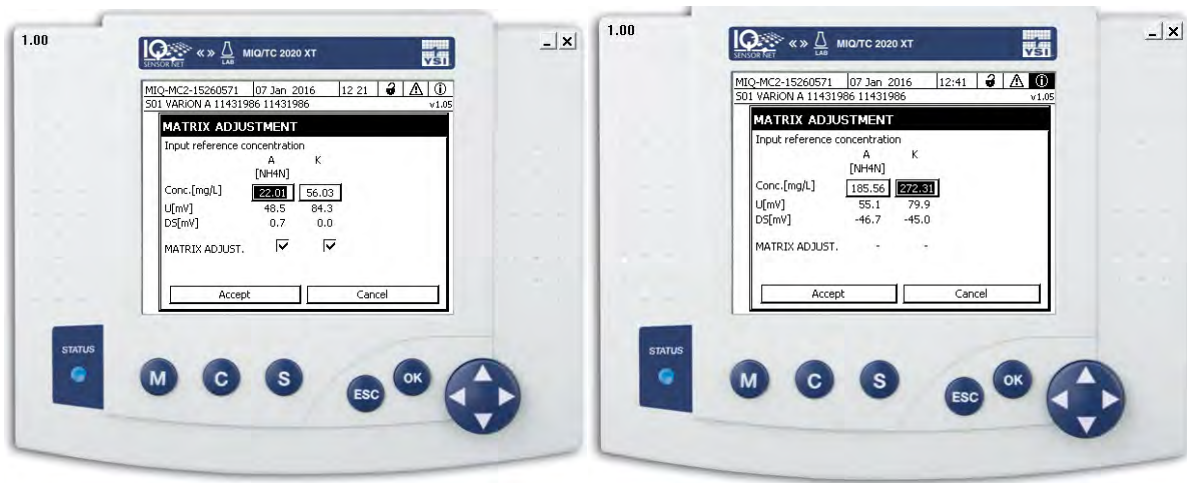
While determining the reference concentrations, continue using the sensor for control purposes again by switching the maintenance condition off and releasing the linked outputs. The sensor continues to use the data of the previous matrix adjustment (or calibration). The reference voltages determined in step 1 will not be lost. They remain stored until step 3 of the matrix adjustment is completed. Matrix adjustment can be canceled at any time by pressing



Note


IQ SensorNet electrodes detect only ammonium (NH_4^+), the ionized form of ammonia. The ammonium proportion of the total ammonia is dependent on pH and temperature. Laboratory reference methods measure total ammonia. Therefore, an apparent discrepancy between the IQ SensorNet and the lab reference value will be observed in samples with a pH > 7.5. Please contact YSI Technical Support for a convenient worksheet that can be used to calculate the ammonium portion of total ammonia in your sample before entering reference concentrations into the matrix adjustment.

11. Enter reference values. C
- a. Use the up and down arrows to input your concentrations. If the DS[mV] range is outside of the range of +45mV to -45mV, the check box below the parameter will turn into a “-” symbol. Below is an example of a good matrix adjustment followed by a bad matrix adjustment.
 - b. You will not be able to hit “Accept” if the concentrations are out of range.



- c. Once you hit Accept you will see the below screen.



12. Matrix adjustment report can be seen in the Calibration History on the sensor.
 - a. Select ISE Sensor from main screen and select  → [CALIBRATION HISTORY OF SELECTED SENSOR]
13. The matrix adjustment is successful (**+ in the Res column**) if the drift voltage (**DV**) is -45 mV to +45 mV. If you zeroed the electrode, the DV will be 0. The slopes (**S**) are marked by a star (*) as they were not changed by the matrix adjustment.



14. There will also be a log book message stating the sensor was successfully calibrated.

Troubleshooting

Routine comparison of measured values with reference values measured in the laboratory is recommended.


Measurement of potassium and chloride using a suitable reference method is required at commissioning and should also be checked regularly to verify proper compensation. Inaccuracies in the compensation electrodes will have the greatest effect at low concentrations (less than 10 mg/L).

The drift voltage reported in the calibration history can provide clues as to which electrode, if any, might need replacement. A faulty reference electrode will cause all drift voltages to trend similarly.

Sensor check

The check procedure is performed to check the function of the sensor by determining the slope in standard solutions.

Note

Strict conditions for conditioning and cleanliness must be observed. Make sure the temperature of all components (sensor, standard solutions, containers, accessories etc.) is similar and constant. Use containers and accessories (beaker, stirring rod) that are absolutely clean and without detergent residues. Detergent residues can seriously affect the function of the electrodes. Check can be canceled at any time by pressing .

Materials required

- Standard solutions ES-1 and ES-2
- Beakers (250 mL or larger)
- Stirring mechanism
- Ring stand

Time required

- Conditioning: 20 minutes (10 minutes each for ES-1 and ES-2)
- Sample collection/processing: not required
- Measurement: 2 minutes
- Programming instrument: 5 minutes

Procedure

1. Clean the electrodes. Remove the protective hood, if installed. Inspect the electrodes and clean using a soft bristle brush and treated effluent if necessary. Rinse multiple times in standard solution ES-2.
2. Select the sensor.
 - a. **M**; **[Select ISE sensor]**
3. Put the sensor into maintenance condition.
 - a. **C**; **OK**
4. Select the Check procedure from the drop-down menu. **[CHECK]**
 - a. Select which electrodes you want to test (recommended to do all listed)
 - b. Select Start




- c. Continue through prompts to rinse/clean electrode.

5. Condition electrode and start measurement (ES-2): Immerse sensor in Standard **ES-2** to a minimum depth of 5 cm. Continue to start conditioning process. A progress bar will display. Continue to start measurement in fresh standard solution after a stable value is found.



6. Condition electrode and start measurement (ES-1): Immerse sensor in Standard ES-1 to a minimum depth of 5 cm. Continue to start conditioning process. A progress bar will display. Continue to start measurement with fresh standard solution after a stable value is found.

Note

If values are not stable or within an expected range, you will be prompted to repeat conditioning and measurement steps before moving on to the next step. Sensor Check can be canceled at any time by pressing .

7. Result: At the end of the check, the result for the combination electrodes is shown on the display with + (**successful**) or – (**unsuccessful**) and the result is entered in the log book as an info message. There is no entry in the calibration history.

Calibration

VARiON electrodes are calibration free. In special cases, if electrode measurements appear to be in error even after a careful matrix adjustment, a calibration in standard solutions can be performed to alter the slope of the electrode. Please contact YSI Technical Support to determine if a calibration is appropriate and for guidance on executing a calibration.