



General Installation & Calibration Guide to Installation & Calibration of Conductivity Sensors with the 3TX-CON Transmitter

Before turning on the 3TX transmitter, please read the recommendations and warnings on page 1 & 2 of the 3TX FAQ write-up at the link below:

http://www.astisensor.com/3TX-FAQ-pH_ORP_Ion_Selective_ISE_Conductivity_Transmitter_Controller_Application_Notes.pdf

Before starting, if you suspect that any settings have been modified you can reset the unit back to factory default by turning P01 to 'Off' (disables the software lock) and toggle over to P20 to do a reset (set value to 'Def' and press Mode key to save the change).

A general checklist for installation and calibration of a contacting conductivity cell on the 3TX-CON follows:

1) Confirm correct wiring. When used with our own conductivity sensors this is indicated on the 3TX-CON instruction sheet and also with the supplied sensor. For third-party sensors you will need to confirm that the lead colors for the equivalent functions are wired to the corresponding terminals. There may be lead wires that are unused for some 3rd party sensors (simply push these back and tape-off each bare lead). This presumes that there exists no unusual bridged wiring schemes in the third party OEM sensor used. For example, the 3TX-CON transmitter expects a single value for each terminal lead (one color is inner electrode ONLY, another color is the outer electrode ONLY, yet another color is ONLY the shield,...and so forth). If multiple values have been tied together in some unusual or proprietary framework, we cannot supply such special end of cable terminations. The wiring details are provided on page 3 of the 3TX-CON document as well as the stand-alone wiring schematic at these links:

<http://www.astisensor.com/3TX-CON.pdf>

http://www.astisensor.com/ASTI_3TX-CON_Conductivity_Wiring_Schematic.pdf

2) Wait for the conductivity sensor to reach temperature equilibrium removed from the process, dry, and lying or suspended in air. Calibrate the temperature displayed on the transmitter. Verify that you have a reasonable reading displayed before proceeding. There are three settings related to the temperature value that will be displayed:

P03 - Sets TC element as either Pt100 (shows 100 in this case) or as Pt1000 (shows 999 in this case)

P07 - Selects the wire gauge of the leads

P08 - Set to match the actual cable length of the sensor in feet

Once these three setup parameters are correct you should get a temperature reading at least close to the actual value. The calibration of the temperature reading to be more precise can be done by turning off the P01 software lock and toggling to the temperature display LED mode. The 'Up' and 'Down' keys can be used to adjust the temperature reading until it exactly matches the desired value as measured with a good thermometer or other temperature reference device.

3) Zero the the connected conductivity sensor while it is dry and in air. This is done with setup parameter P14. Disable the P01 software lock and proceed to P14. Using the 'Up' and 'Down' keys, adjust the displayed value until it reads zero. This calibration should be done slowly as it is sensitive and rather difficult to redo if you allow the displayed value to drop below zero (going slowly avoids this issue). PLEASE SEE NOTE ABOUT STEP CHANGE SENSITIVITY NEAR THE END OF THIS GUIDE.



4) The conductivity sensor is now ready for wet calibration to determine the effective cell constant. This can be done by using a conductivity solution of an exact known conductivity value (a.k.a. conductivity standard). It is important to carefully note that the standard solution conductivity value varies with temperature and this must be accounted for during calibration. Contact the ASTI factory if you plan to use a conductivity standard solution to perform a wet Gain calibration to determine the effective (apparent) cell constant. Another option is to install the sensor into field service, allow it to equilibrate and to use the Gain calibration to adjust the displayed conductivity to the number determined from a grab sample reference determination. Both methods are commonly used for field calibration.

The Gain calibration on the 3TX-CON is accomplished by first disabling the P01 software lock and the toggling over to the 'Gain' LED mode. The display value can be adjusted using the 'Up' or 'Down' keys until the desired number is shown. There is some time averaging dampener running in both the calibration and measurement modes so adjust the displayed value slowly to avoid overshooting. The effective/apparent cell constant after calibration can be determined by multiplying the value displayed for parameter P15 (working gain) and parameter P22 (nominal cell constant). If you had a working gain of 0.95 and a nominal cell constant of 10.0 then your effective calibration cell constant is 9.50 (simply the product of these two values). In addition to showing the result of a wet gain calibration, parameter P15 also lets you adjust the working gain directly using the 'Up' and 'Down' keys (again, with P01 software lock disabled). PLEASE SEE NOTE ABOUT STEP CHANGE SENSITIVITY BELOW.

STEP CHANGE SENSITIVITY:

The sensitivity each time the 'Up' or 'Down' button (a.k.a. step change) is depressed is determined by parameter P13. The default is 0.5% (displays as "2"). This sensitivity can be modified if desired to be other values. Changing the setting to "0" makes the step change 0.1% (ultrafine), while changing the setting to "1" makes the step change 0.2% (fine). The default setting is "2" which is 0.5% (standard). In only a few cases will the step change need to be changed to the very coarse setting of "3" which is 1.0%.

As always, the conductivity sensor should be cleaned prior to calibration and free from air bubbles inside the measuring cell to ensure proper results. The following cleaning procedure is for our AST10 and AST51 sensor but many of the concepts are generally applicable to a range of contacting cells:

http://www.astisensor.com/General_Cleaning_Instructions_for_Contacting_Conductivity_Sensors.pdf

Contact the ASTI factory if you have any difficulties pairing an OEM 3rd party conductivity sensor to the 3TX-CON after having gone through the procedures outlined in this document.

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