ACTEON 5000-STACSENSE : Calibration procedure for CODeq, BODeq, TOCeq parameters

1. Reference Optical Signal

1.1. Generalities:

This is a measurement in clear, pollution-free water, without bubbles or particles in suspension, at stabilized temperature.

1.2. Detailed Calibration of SAC254 with ACTEON5000:

Clear water: SAC254 Calibration (UV and GR Transmittance calibration)					
Step	**Modbus Name**	**Calibrated Parameter**	**Description**	**Sensor conditions**	**Reference Input Value**
1	Coeff 1	SAC254 (Param. 1)	UV User Clear Water Tx Comp Slope	Clear water	0
2	Coeff 3	SAC254 (Param.1)	GR User Clear Water Tx Comp Slope	Clear water	0

Step 1:
Zero adjustment of the UV light source (UV absorbance at 0, UV transmittance at 1)
Place the sensor under the following conditions: clear water stabilized at temperature T, degassed.
The coefficient required to adjust the UV zero of the sensor is calculated automatically by the sensor.

Step 2:
Zero adjustment of the green light source (Green absorbance at 0, Green transmittance at 1)
The coefficient needed to set the sensor's Green zero is calculated automatically by the sensor.

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Calibration guide STACSENSE

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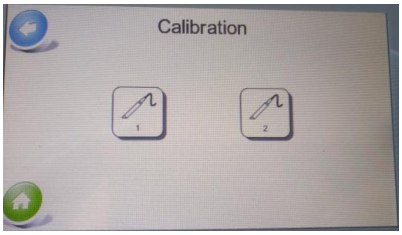
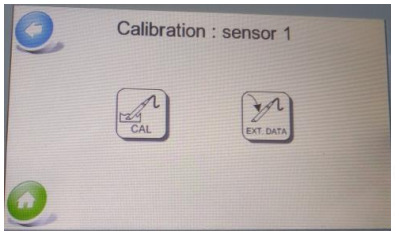
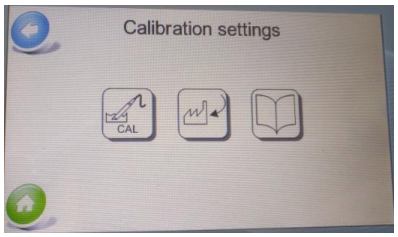
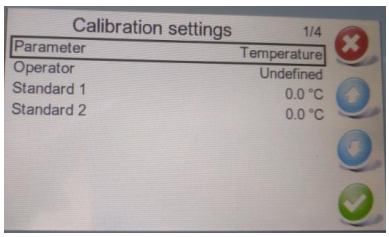
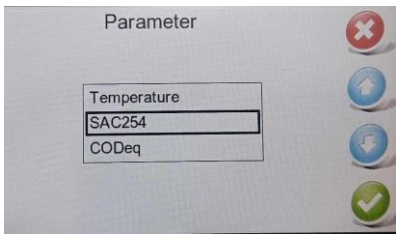
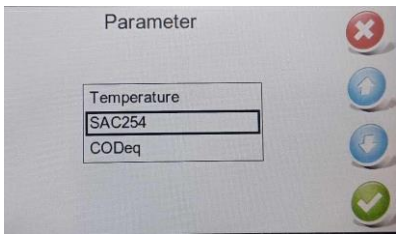


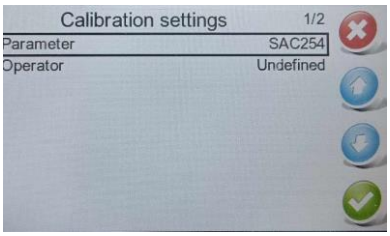


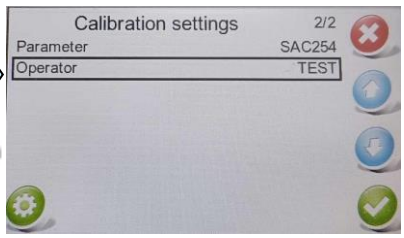


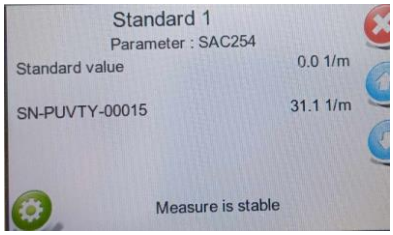






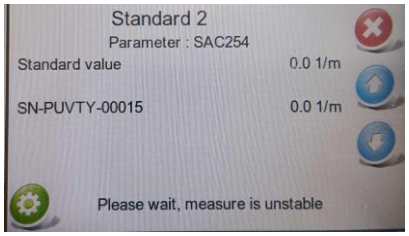






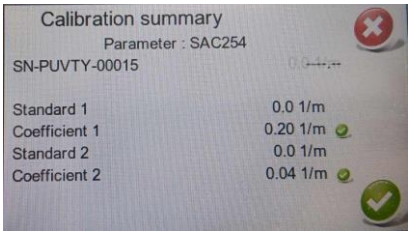
Measure is stable

STEP 1 : In distilled water

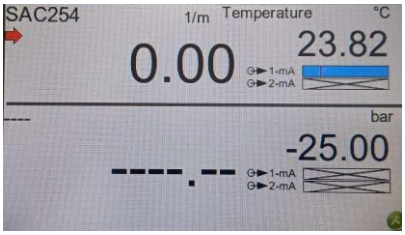


Measure is stable

STEP 2 : In distilled water



Back to main screen



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2. Equivalence COD, BOD or TOC:

SAC254 is a parameter for organic substances dissolved in water that absorb UV radiation. It provides information on water contamination.
Despite the similarities, the parameters can not always be inter-converted.
However, a correlation can be established between the SAC254 parameter and another parameter such as TOC or COD. The STACSENSE sensor then provides equivalence data.

To obtain the correlation, it is recommended to measure the SAC for a few days on samples of polluted water.
The conditions for obtaining useful data for efficient conversion represent daily monitoring with periods of low and high loads, as in the case of urban effluent. During these peak periods, you must:

• Read the SAC254 value delivered by the STACSENSE sensor (in Abs/m). (noted **SAC254 STACSENSE**),
• Take a representative fluid sample from the sensor location,
• Stabilize and store successive samples at 4°C until the time of analysis,
• Perform laboratory analyses of the COD parameter to be correlated; (noted **laboratory COD in mg/L**),
• Record the results in an excel file (SAC254 from STACSENSE, COD concentration from laboratory)
• Place the points obtained in a graph (vertical axis SAC254 STACSENSE, horizontal axis COD laboratory)
• Draw the linear regression line and display the corresponding equation & and the coefficient of determination (R2)

Example for COD adjustment:

	SAC254 STACSENSE (Abs/m)	COD labo (mg/l)
Sample 1	0	0
Sample 2	1,75	2
Sample 3	2,35	2,8
Sample 4	2,72	3
Sample 5	2,68	3,2
Sample 6	9,52	10,5
Sample 7	10,95	12
Sample 8	16,42	19,7
Sample 9	22,73	25
Sample 10	21,92	26,3
Sample 11	22,05	26,7
Sample 12	25,4	27,3
Sample 13	26,22	28
Sample 14	30,79	35,4

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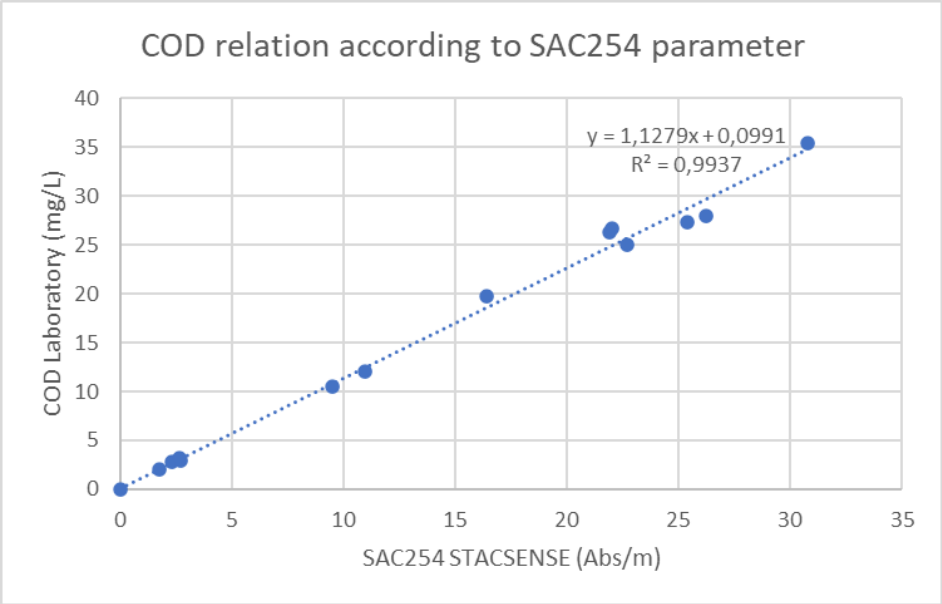


The linear regression line proposes a new relationship between the UV absorption at 254 nm (CAS254) and the CODeq -> CODeq = 1.1279 * CAS254 + 0.0991.

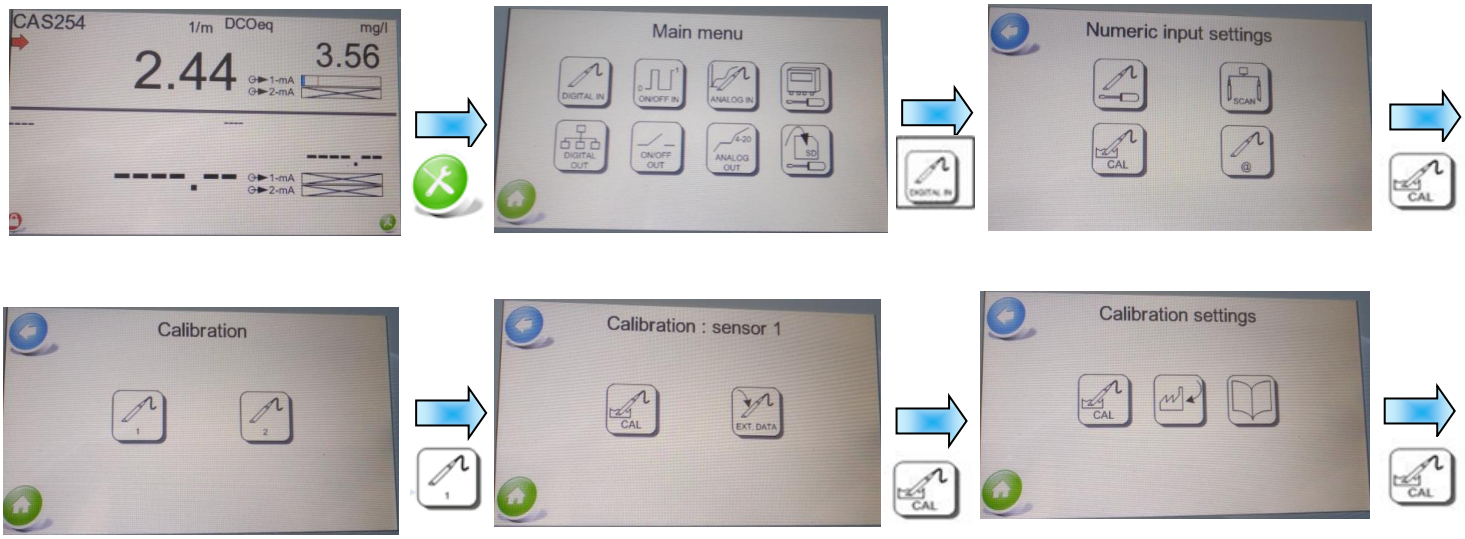
Since the coefficient of determination R2 is close to 1 (R2= 0.9937), this relationship is considered reliable.

The new slope is therefore equal to 1.1279 and the new offset to + 0.0991.

You have to replace the slope value 1.81 by 1.1279 and Offset value 0 by 0.0991
COD, BOD or TOC equivalences are calculated directly in the sensor according to a first-degree law.
This pair of coefficients (offset and slope) is specific to each parameter.

ACTEON 5000 calibration menu. Example for CODeq parameter

In order to access the menu to adjust the Offset and the slope of each parameter from the SAC254 please follow the following path example for the slope):



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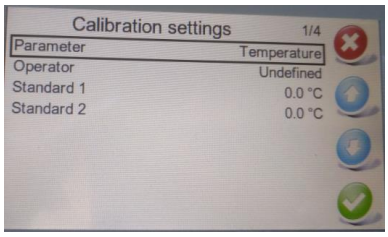
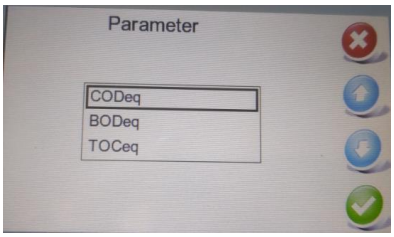
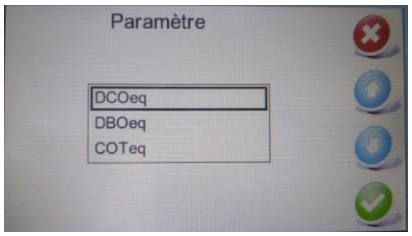
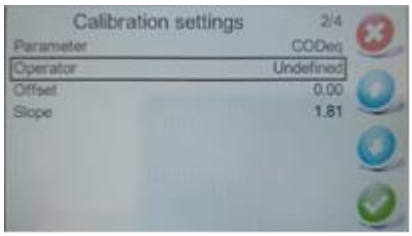


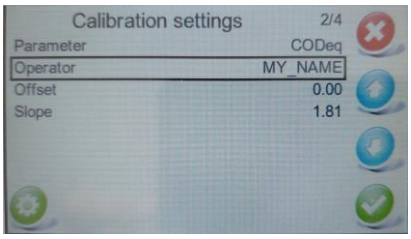


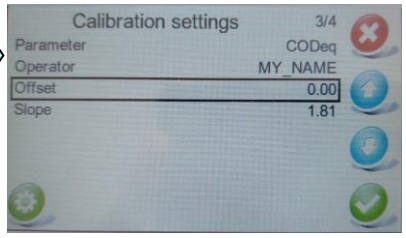




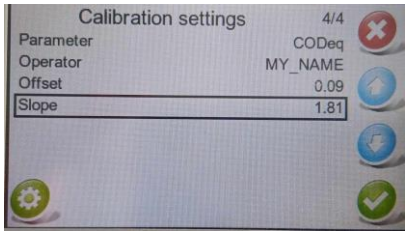
Enter an operator name and validate with the icon

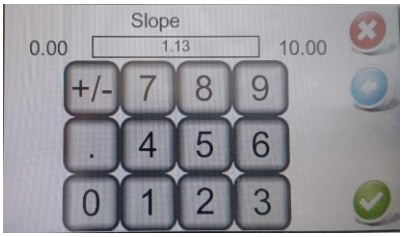
On the screen corresponding to the calibration management a new icon at the bottom left appears

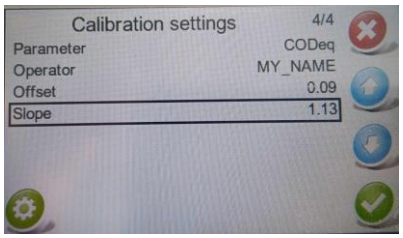




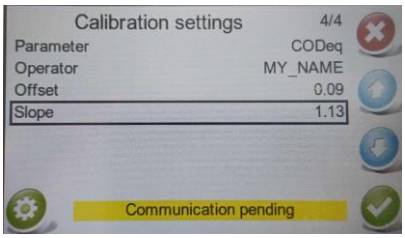
Enter the OFFSET value
0.0991 in our example -> **0.09**







Enter the SLOPE value
1.1279 in our example -> **1.13**



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The message "Communication pending" indicates that the calibration process is in progress.

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