Airpointer calibration – NOx zero and span

1 Tools you will need

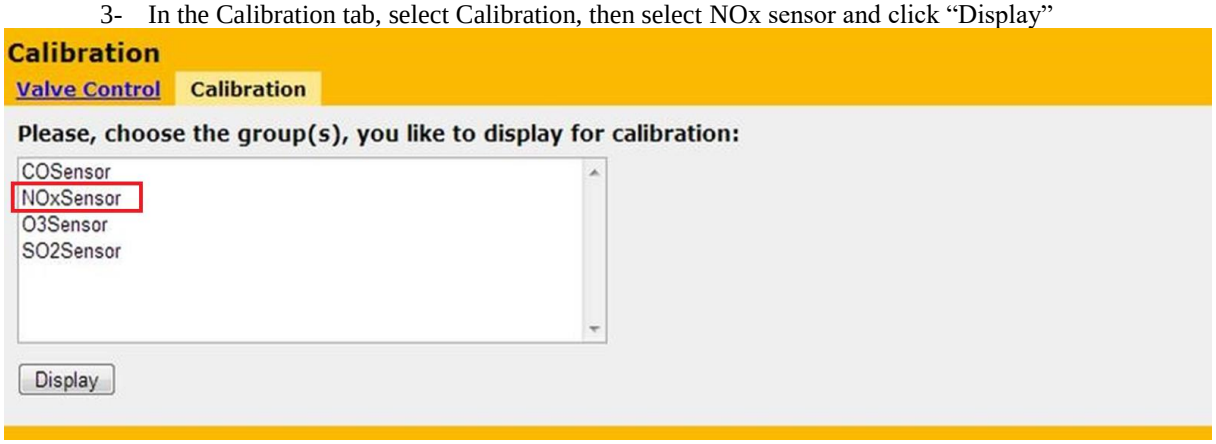
- A NOx-free zero air canister or a zero air generator (we recommend using the AirQrate GPT-mobile from MLU-Recordum)
- A Gas-Phase Titration (GPT) system including a NO cylinder, an ozone generator, and a dilution system. The GPT system must capable of generating up to 5 L/min of O3 and NO at 400 ppb each for a total flow of up to 5 L/min (we recommend using the AirQrate GPT-mobile from MLU-Recordum)
- 9/16” wrench

2 NO & NOx Zero calibration (offset)

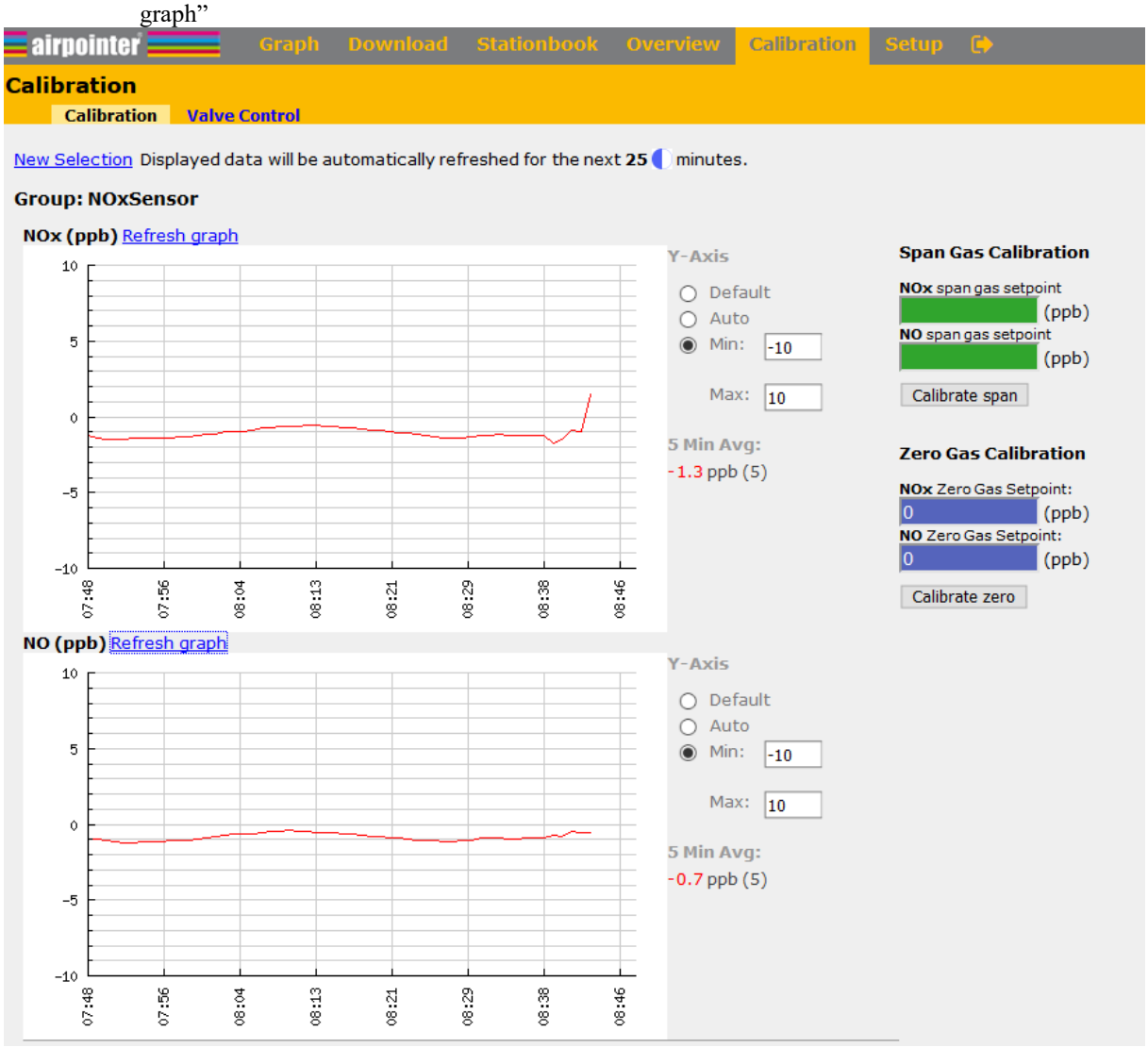
1- Connect a calibrator equipped with a zero air generator to the calibration inlet of the Airpointer (as explained in the procedure CAL1)

2- Generate zero air at the required flow (as explained in the procedure CAL1)

3- In the Calibration tab, select Calibration, then select NOx sensor and click “Display”



4- Adjust the view of the Y-Axis for both graphs (NOx and NO) to see the evolution of the signals better: choose either “Auto” or manually by entering “Min” and “Max” values, and click “Refresh graph”



5- Wait for a stable measurement signal (about 10 to 15 minutes). Check that the 5 minutes average (“5 Min Avg”) displayed on the right side of the graph matches the current value of the curve

6- Fill in the setpoint of the external zero gas in “NOx zero gas setpoint” and “NO zero gas setpoint” in given concentration. This value is typically 0 ppb for both NOx and NO

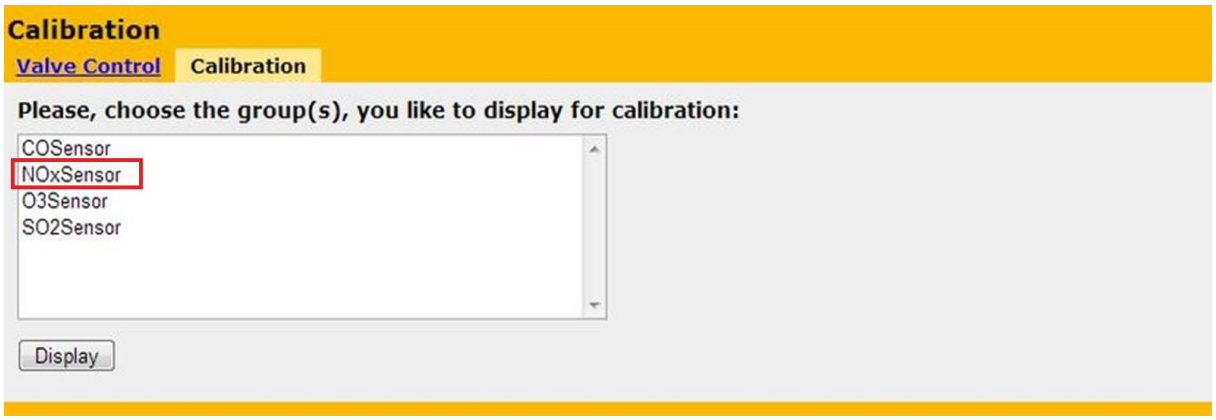
7- Click “Calibrate zero”, and confirm. Check that the values displayed in the graphs are updated to the setpoints you entered

3 NO&NOx Span calibration (slope)

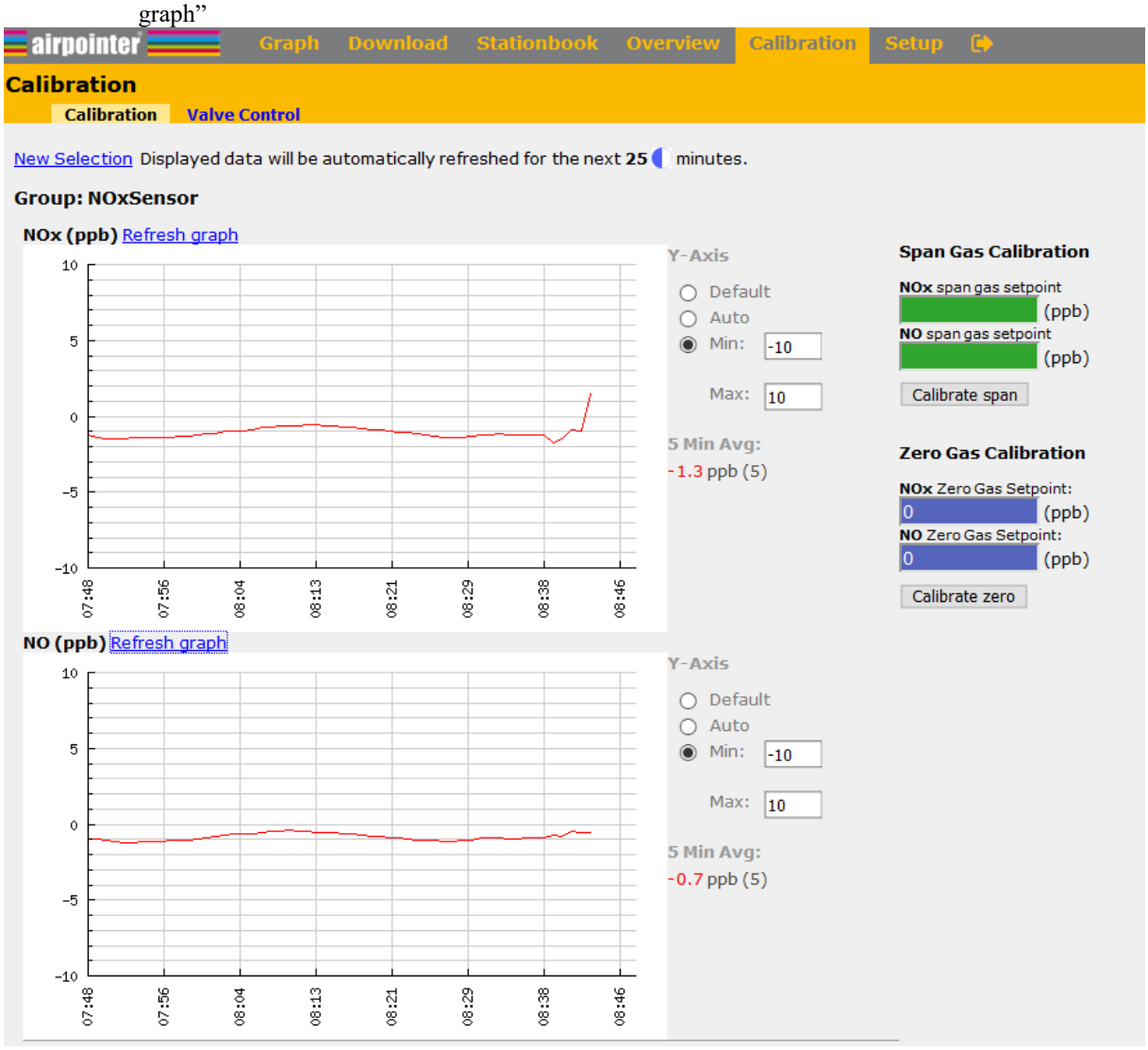
1- Connect a NO cylinder to the calibration inlet of the Airpointer (as explained in the procedure CAL1), either directly or through a GPT, a calibrator, or a dilution system

2- Generate 400 ppb of NO at the required flow (as explained in the procedure CAL1)

3- In the Calibration tab, select Calibration, then select NOx sensor and click “Display”



4- Adjust the view of the Y-Axis for both graphs (NOx and NO) to see the evolution of the signals better: choose either "Auto" or manually by entering "Min" and "Max" values, and click "Refresh graph"



5- Wait for a stable measurement signal (about 10 to 15 minutes). Check that the 5 minutes average ("5 Min Avg") displayed on the right side of the graph matches the current value of the curve

6- Fill in the setpoint of the external zero gas in "NOx span gas setpoint" and "NO span gas setpoint" in given concentration. This value is typically 400 ppb for both NOx and NO

7- Click “Calibrate span” and confirm. Check that the values displayed in the graphs are updated to the setpoints you entered

8- Connect a calibrator equipped with a zero air generator to the calibration inlet of the Airpointer (as explained in the procedure CAL1)

9- Generate zero air at the required flow (as explained in the procedure CAL1) and check that the signal goes down back to zero within a few minutes

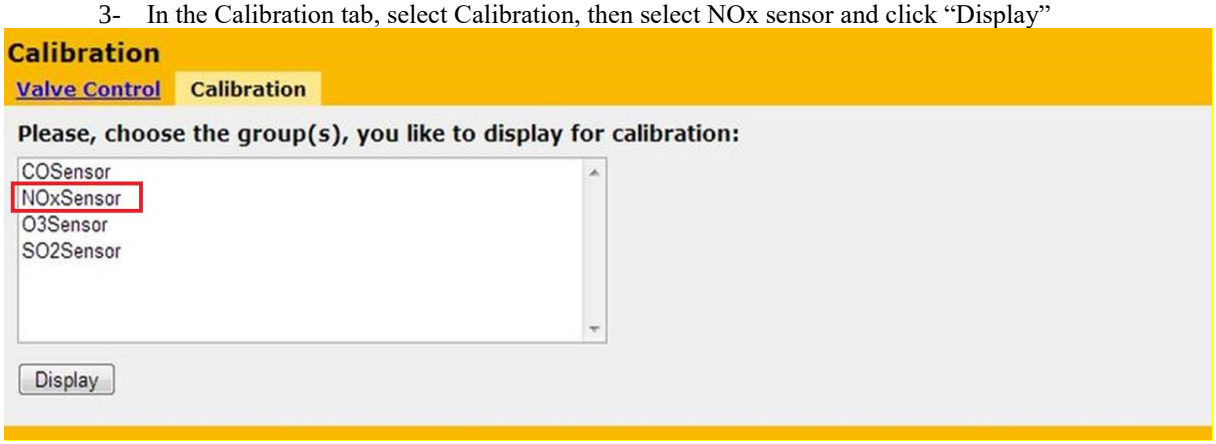
NB: If the message “Calibration failed” appears, it means that the difference between the expected and actual values is too big. Offset can have values between -50 and +50, and Slopes values between 0.3 and 3. This is a feature preventing human errors (such as clicking on “calibrate span instead of calibrate zero) or preventing calibrating a defective analyser. In this case, check in Linsens if the preventive maintenance is due or if errors are present in the module you are trying to calibrate.

4 Moly converter efficiency test

1- Connect the GPT system to the calibration inlet of the Airpointer (as explained in the procedure CAL1)

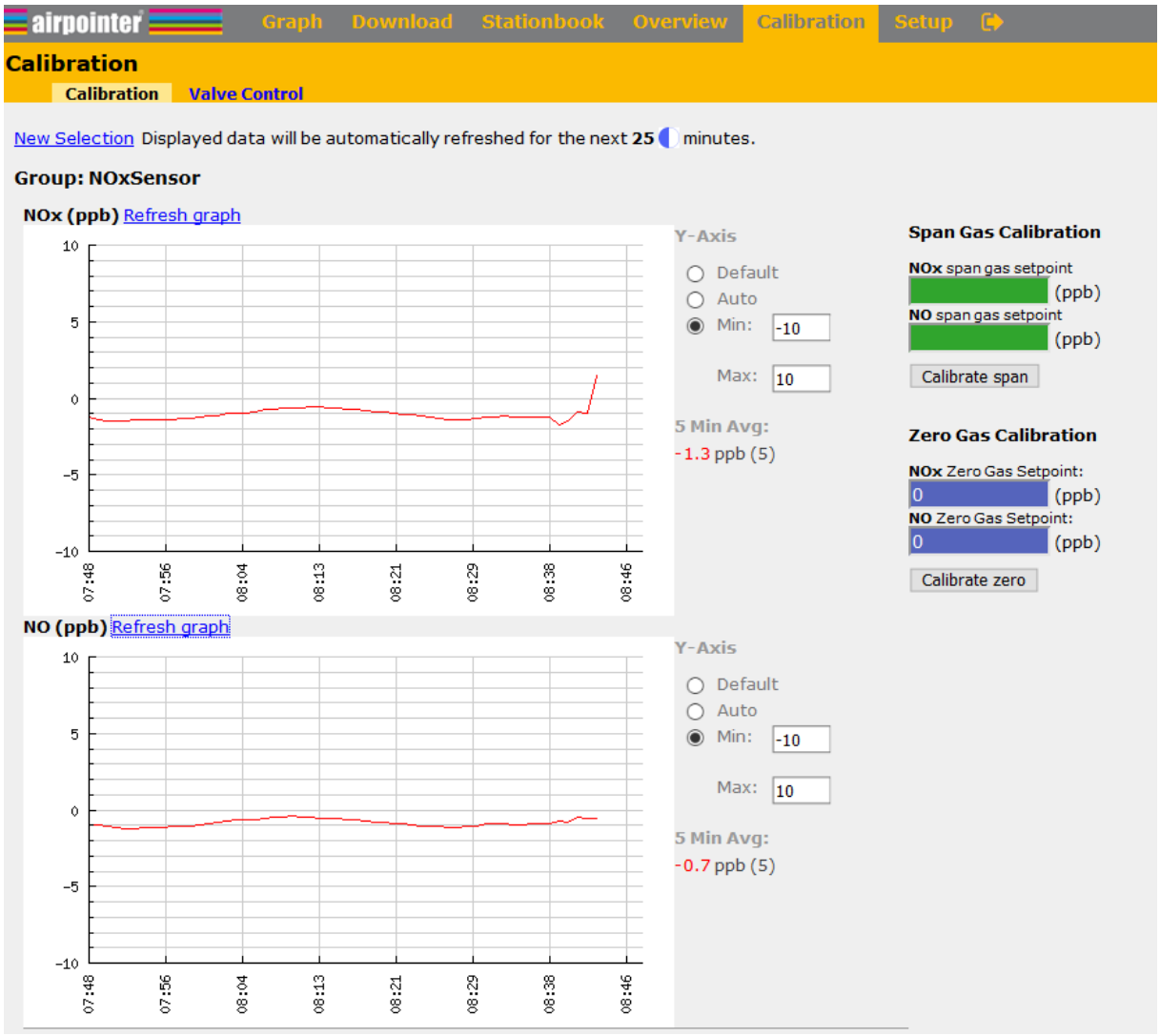
2- Generate 400 ppb of NO at the required flow (as explained in the procedure CAL1)

3- In the Calibration tab, select Calibration, then select NOx sensor and click “Display”



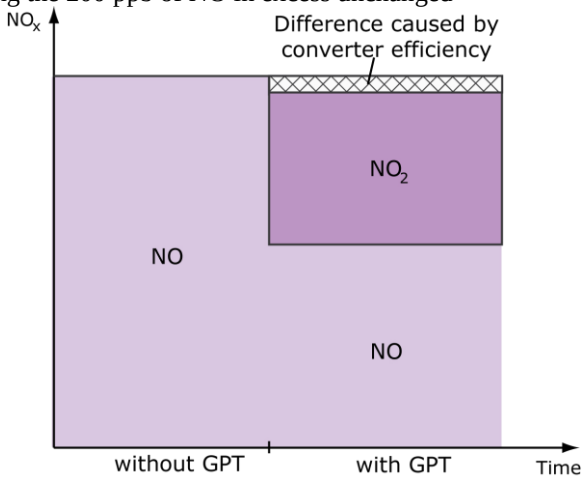
4- Adjust the view of the Y-Axis for both graphs (NOx and NO) to see the evolution of the signals better: choose either “Auto” or manually by entering “Min” and “Max” values, and click “Refresh graph”

5- Wait for a stable measurement signal (about 10 to 15 minutes). Check that the 5 minutes average (“5 Min Avg”) displayed on the right side of the graph matches the current value of the curve



6- Once the concentration value is stable, go to Setup/System Info/Service Interface, and open Linsens. Click on "Actual" and write down the value of the NOx concentration

7- Leave the NO generation unchanged and generate 200 ppb of O3 at the same total flow as in step 2. With a theoretical 100% efficiency, all the ozone would react with the NO, forming 200 ppb of NO2, and leaving the 200 ppb of NO in excess unchanged



8- Repeat steps 4, 5, and 6

9- Calculate the converter efficiency CE using the following equation:

$$CE = \frac{\text{DisplayedValueNOx with GPT} - \text{DisplayedValueNO with GPT}}{\text{DisplayedValueNOx without GPT} - \text{DisplayedValueNO without GPT}}$$

10- Go to Setup/Configuration/NOx sensor, and write the calculated CE value in the field CE, and click "Save"