Microsensor In Situ Amplifier System

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Introduction

The Microsensor In Situ Amplifier System consists of the following elements (see Figure 1):

- Relevant microsensor
- Sensor in situ connectors/adapters
- In Situ Amplifier for the relevant microsensors on a 15 m cable with current signal output.
- Microsensor In Situ Amplifier System with power supply for the in situ amplifier, port for pre-activation of N₂O microsensor and USB connectivity for data acquisition. The Microsensor In Situ Amplifier System is powered by a DC power supply or by batteries.
- DC power supply
- PC software for data acquisition (see software manual)

The user must provide a windows compatible PC with the following minimum specifications: Pentium class processor, 133 MHz clock frequency, 32 MB RAM, 600 x 800 display, 50 MB free space on the harddisk, Windows XP or higher.

General description

An amplified voltage signal will be produced inside the In Situ Amplifier when the microsensor is connected to the In Situ Amplifier with the in situ connector, and the In Situ Amplifier is powered by connection to the Microsensor In Situ Amplifier System. The voltage signal is transformed to a current signal for transferring the signal through the long cables without signal loss. The Microsensor In Situ Amplifier System transforms this signal to a digital signal, which can be acquired via the USB port of the Microsensor In Situ Amplifier System, using the SensorTrace Basic software.

Figure 2. Schematic overview of the Microsensor In Situ Amplifier System.
1. Install the SensorTrace Basic software
See SensorTrace Basic software manual for installation details.

2. Mount sensors
   a) Mount the microsensor in the in situ connectors (see separate instruction)
   b) Connect the mounted sensors to the In Situ Amplifier or, if you are using the N₂O microsensor, the pre-activation port on the Microsensor In Situ Amplifier System.

3. Prepare the Microsensor In Situ Amplifier System
   a) Apply power to the Microsensor In Situ Amplifier System, either with the provided DC power supply or with batteries. NOTE: the USB connection only provides data transfer, not power to the Microsensor In Situ Amplifier System.
   b) Connect the USB cable between the Microsensor In Situ Amplifier System and PC and start the SensorTrace Basic software. The software will automatically detect the Microsensor In Situ Amplifier System. See the software manual for details.

4. Connect the sensor amplifier
   Connect the In Situ Amplifier cable to the in situ amplifier port of the Microsensor In Situ Amplifier System. The In Situ Amplifier will now be powered, and keep the microsensor polarised. This results in a warm-up curve for the sensor signal.

5. Pre-activation of the sensor
   The N₂O microsensor needs to be pre-activated before calibration and measurements. Consult the N₂O sensor manual for details on the sensor and pre-activation.
   For pre-activation, connect the sensor mounted on the in situ connector to pre-activation port on the Microsensor In Situ Amplifier System and turn the on/off
button on (green indicator goes on). The N2O microsensor is now being pre-activated.

6. Calibrate

Consult the relevant microsensor manual for details on the sensor and its calibration and the software manual for how to calibrate in the SensorTrace software. Please note that the Microsensor In Situ Amplifier Box has a 10x amplification, so the signal after full polarization should stabilize below 200 mV and not 20 mV as given in the sensor manuals.

7. Make measurements

After calibration make measurements and log the data in the SensorTrace BASIC software. Note that the N2O microsensor should preferably be pre-activated (i.e. connected to the powered-up Microsensor In Situ Amplifier System for 10 minutes to an hour before calibrations and measurements). Consult the N2O manual for details on the sensor and the software manual for how to log data in the software.

7. Change batteries

The Microsensor In Situ Amplifier System uses approx. 35 mA, which means that the system can run approx. 60 hours on two batteries. However, it can run on just one battery, which allows the user to change the batteries one at a time without powering the system down.

While using the N2O sensor pre-activation output the system uses approx. 120mA, thus it is important to turn off the pre-activation function, while not using this, to extend the battery lifetime.

It is recommended to change the batteries at 50% of the expected lifetime to avoid that the system shuts down and thus loses the polarisation of the sensor. If mains power is available, this can be used via the DC power supply, but the batteries will allow the user to move the system without losing power.
8. System specification

- sensor response: approx. 3 pA/micromolar H2S
- output: 1 mV per picoampere
- batteries: 2 pieces, type: 6LR61 / PP (9V)
- power consumption 35 mA (30 hours per battery)