iMETOS MobiLab

troubleshooting

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The iMETOS MobiLab device is a sensitive analytical instrument. Be careful and circumspect when operating it. Thus you guarantee the
quality of your measurements and a long lifetime of the instrument.

It can happen that you encounter bad measurements. In this case there are several factors you should exclude before going on. You will soon get the hang of it and troubleshooting, if it becomes necessary at all, will be a rather quick endeavor.

In the following 11 chapters, the following three signs will show which problems could appear and on which points you should focus on to solve them.

If you face problems, covered or not covered in the sections below, please contact us. We are always here to help you!

1. Air bubble check in the containers

Why do bubbles affect your measurement?
You need to have one uninterrupted stream of Solution A **from the left container to the right container**. Bubbles interrupt this stream! This in turn blocks a part of the voltage the machine needs to apply for analysis and this **becomes visible on the baseline**.

How to solve the air bubble problem:

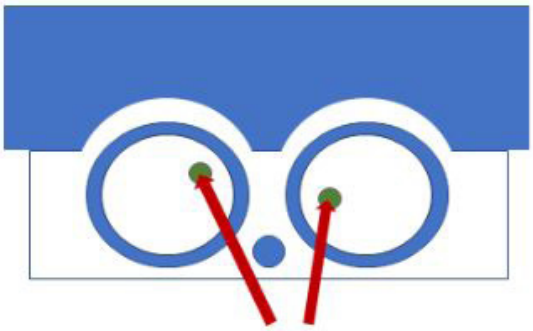


Fig a1: Schematic view of the containers from above

Fig a2: Photo of the containers from above

Make sure that there is no air bubble in the **small green holes**.Take the (thin) **1 ml syringe** (included in your set), place the **blunt needle inside the small green hole** (Fig a1) and take up roughly half a ml of Solution A. Try to suck the bubble into the syringe! Then return the Solution A to the container, but this time **away from the green holes** and close to the surface.

2. Battery status/connection

Sometimes baselines/measurements deviate for no obvious reason. The most common problem is that the battery in the HUB is low! This can lead to big result deviations.

To avoid an empty battery always plug in the wall adapter! In case you are unsure if the battery is full, leave it for around 30 minutes plugged to the socket to charge it again.

The iMETOS MobiLab device is highly sensitive, this means that all the connections have to be correct so that the system can work perfectly. It is very important to mention that touching the cables during a measurement can already disturb your measurements. **Do not touch the USB cables or the device during a measurement!**

3. Chip rinsing (dirty chip channel)

If you have a **curvy baseline** like shown below ("mountains"), the likely reason is there are residues or dirt inside the chip channel. This means last time cleaning was not good enough. Such a baseline causes a big result deviation and should be avoided!

How to get rid of the curvy baseline:
You have to clean the chip by rinsing it. This time take solution A, mix it 1:1 with distilled water. This will mobilize and remove all the residues from the channel.

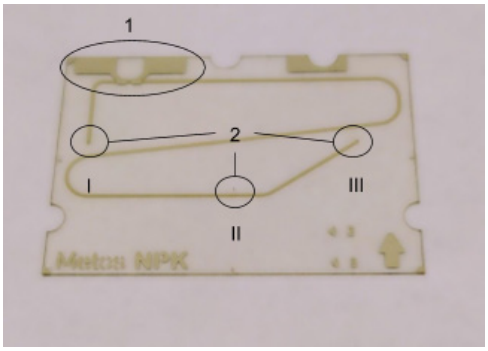
1. Take up 1000 µl (1 ml) Pipette solution A, put it in an empty tube and add the same amount of distilled water. Fill this “rinsing solution” now to the left container of the iMETOS MobiLab device. Click on the pump symbolin the instrument control and leave it on for around 5 minutes. This will rinse the chip nicely. Remove this solution and start again with the normal Initialization and using undiluted solution A.

VIDEO: iMETOS MobiLab - Chip rinsing

4. Chip quality test

There are 2 kinds of contact zones which have to be intact for a chip to work properly.

1. The printed electrodes
2. The chip-channel with the 3 inlets



1. When you have a look at your chip, the **2 printed electrodes [1] should not be scratched**.
If you remove your chip several times and put it back again, the electrodes may suffer frictions. Once they are scratched they are irreversibly damaged. The chip has to be changed then.

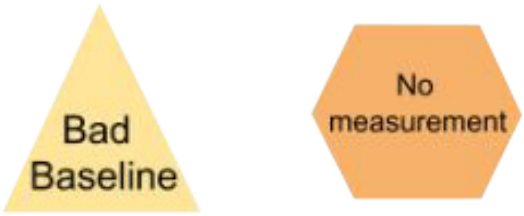
2. The **chip channel and its inlets [2] have to be cleaned** from Solution A after usage. The cleaning step in the software explains to you how.

- In case you did not clean the chip properly after usage, solution A dries on air and clottes the channel and the inlets. The chip has to be changed if this is the case.

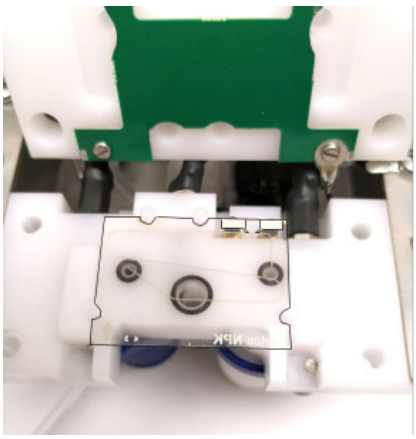
You can check the channels conductivity by doing a normal initialization:

- Put in your chip, close the chip clamp, fill in 4 ml in the left buffer container and close it. Start the Initialization and during the pump runs, **check if a droplet is appearing in the other container [III] and the sample hole [II]**. It should become visible after maximum 1 minute of pumping time.
- If no droplet appears in the right container, the chip has to be changed. (The measurement would stop at the status: “offset correction” because the chip is damaged)
- If there is **no droplet becomes visible in the sample hole**, you should rinse the sample container several times with distilled water by using the pipette during the pumping procedure and check it again afterwards.

5. Leakage check

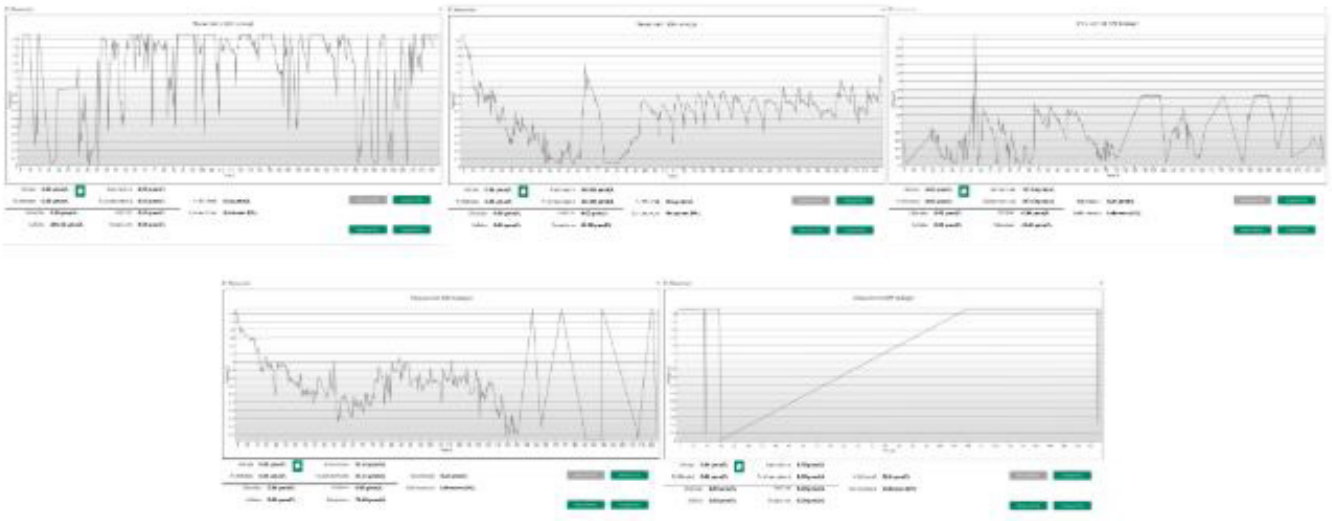


What is leakage and why does it appear?



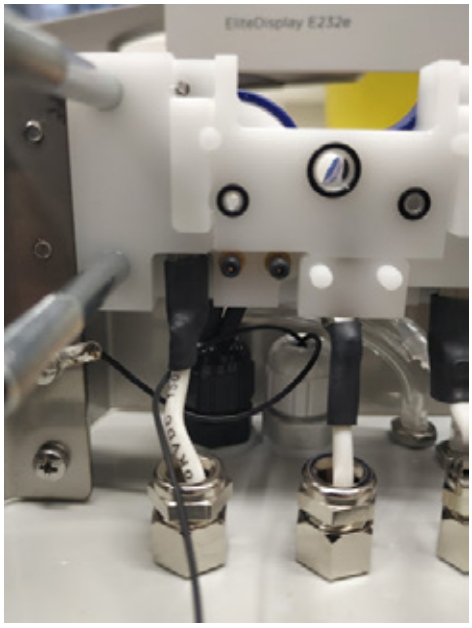
The chip is tightly kept inside the chip clamp by 4 springs. The pressure from those springs presses the chip firmly against 3 o-rings. As the sample and the Solution A are filled in on top those **o-rings need to be dense**.

There are 2 reasons for leakages: 1) Occasionally the o-rings become porous and their surface can’t hold the liquid back anymore and 2) the spring was not mounted well. A leakage will spill all over the chip and effect the measurement electrodes resulting in **typical baseline patterns**.



Above are examples of what a possible Leakage-Baseline looks like.

What to do in case of leakage:



Disconnect the device, open the chip clamp and check if you can spot wetness outside the zones of the chip corresponding to the 3 O-rings. If yes, there was a leakage and you have to clean the chip clamp.

The most sensitive part on which you should focus now are the **electrodes** which are connecting the chip with the electrical unit.

Take a **moist cloth and press several times on the electrodes** to release them from solution A residues (which is getting sticky and makes an electrical insulating layer).

Now remove the moist with a **dry cloth and let it dry** for some minutes on air. (There should not be any liquid inside these electrodes while switching on the device!!). Then clean the rest of the chip clamp to get rid of sticky areas. Dry them with a cloth afterwards as well.

In extreme cases the electrodes become sticky themselves, which means that they do not move when you press them with the finger. You have to press them in with a wet cloth until they can move again!

Take care not to remove the black rubber-cap on it!! There is no measurement possible without them.

(Please contact our support team if this is not possible.)

VIDEO: iMETOS MobiLab - Leakage

6. System cleanness

The cleaner you work with the device, the better the results!

To avoid deviations from measurement to measurement make a clean work style your habit. The iMETOS

MobiLab device can detect already small amounts of nutrients which means it can also react sensitively to carryover and contaminations of the sample hole.

To avoid carryovers, remove the sample and clean the sample hole twice with distilled water after a measurement. Use the pipette for this changing the pipette tip.

Furthermore, take the **cleaning after usage** seriously!

VIDEO: iMETOS MobiLab - System cleaning

7. Solution a quality check

After you have prepared solution A, it will be stable for **3 days** at room temperature, **1 week** in the fridge and **1 year** in the freezer.

8. Pump check

In rare cases, the pump can be damaged if it has to work against too much pressure over a long period of time.

Check if the pump is still working by opening the left container and start the pump in the instrument control.

Check with your finger if the air is blowing out from the cap!

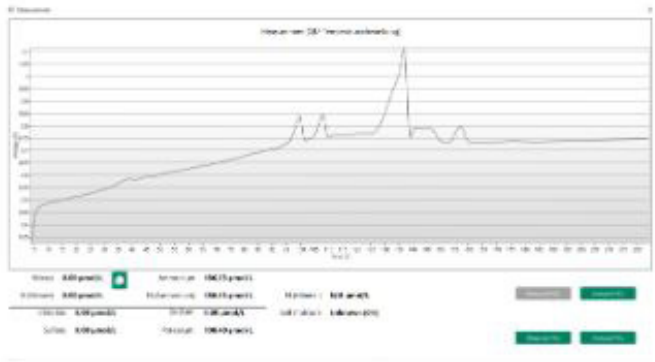
If this is not the case, the pump is damaged, please call our support!

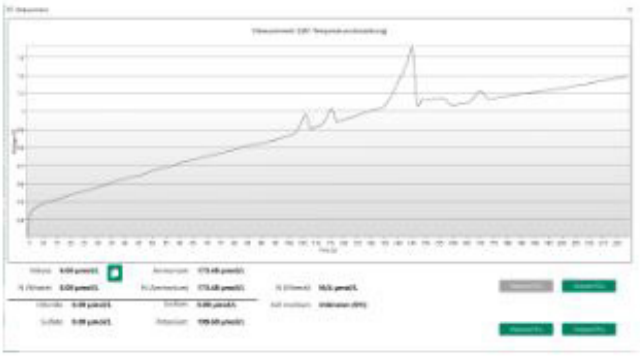
VIDEO: iMETOS MobiLab - Pump check

9. Temperature equilibration

The temperature has to be stable for at least 30 minutes before you start a measurement.

If you have a big temperature difference by entering or leaving a room just leave the device and solution A for at least 30 minutes in the very environment you intend to work. This is an example of how the graphs will look like when you come from a cold environment (typically from the trunk of your car to your shack):





10. Buffer level check

Why should you check the solution levels?

The buffer level (4 ml left/ 5 ml right) has an **impact on the measurement**. To be more specific, the levels can shift the peaks slightly forward or backward. The exactness of your result can moderately suffer if the buffer levels are too far from this ratio. Therefore check the level regularly (after every 20 samples as a rule of thumb).

How and when should you check the levels?

During every measurement cycle, fresh solution A gets pumped 30 seconds long from the left to the right buffer container. If you are planning to do **more than 20 measurements, you should start to monitor the containers**.

Just open both containers and take up with the 5 ml syringe the whole solution of the right container. Check the scale on the syringe and distribute solution A according to the initial recommendation. So that you end up again with **4 ml left and 5 ml right**.

VIDEO: iMETOS MobiLab - Buffer level check

11. Homogenization and time management of the sample

Why is homogenization so important?

Sampling errors affect the reproducibility of a measurement tremendously. Sieve it well, and homogenize the sieved sample for quite some time. Sampling errors result in misleading values.

Why is the time management of the sample preparation important?

After you take your soil sample from the field you should **cool the sample**. If temperature is too high and the sample is kept too long the **N value will degrade**! This affects especially ammonia!

Once you have prepared your sample and added it to the small vial with the filter paper, you have to **measure the sample immediately (within 10 min)**. Otherwise the values of the N nutrients might change.