# How to Use the Y-Pod
## Standard Operating Procedure

## How to Turn On the Monitor

1) Power the monitor by plugging in the power connector to a wall outlet or battery - see Power Options on next page.

2) Check to make sure the pod has power available by checking light 1 (see diagram on pg. 3). It should be illuminated.

3) Power the monitor 'on' by flipping the left silver power switch (see diagram on page 3).

4) Check the monitor function:

    a. Is **light 1** illuminated? *(see Pod Feature Diagram on Page 3)

    b. Are the fans/pump turned on according to the configuration of the right locking switch? (see diagram on page 3)

        i. Fans on for gas-phase ONLY

        ii. Pump on for BOTH gas-phase and PM

    c. Is **light 2** red all the time and is **light 3** blinking green approximately once per every 4-30 seconds? (the exact frequency will depend on the monitor's programming)

    d. If the answers to the above questions are 'yes', then the monitor is collecting data. Data collection will continue until the monitor is powered off.

    e. If the answers to the above questions are *no,* the pod is not working correctly. **ERROR CODES** – the pod is not working correctly if you see either of the following occur:

        i. *Lights 2 & 3 are both on all the time*

            1. SD card error – the pod is not recognizing the SD card.

            2. Try removing and replacing the same SD card.

            3. If that doesn't work, try inserting a new SD card.

        ii. *Light 3 not blinking*

            1. Pod is not logging – either no power to the board or another issue.

            2. If light 1 is off, there is no power to the board – make sure the black A/C adapter wire is attached to the board or loose wires are not causing a short.

            3. If none of the above work, press the reset button on the pod.

        iii. *Fans and/or pump not working but Light 3 is blinking*

            1. Fans and pumps not receiving power from green screw terminal (see diagram on Page 3) - issue with wire connections to board or with intermediate wire connections

            2. Requires removing main circuit board and examining connections - should be done by AQIQ technical team

# Power Options

Option 1: Standard Power Cord

- Plug the A/C adapter into a wall outlet

Option 2: Hybrid Power Cord

- Plug the A/C adapter into a wall outlet
  **OR**
- Plug the round end into the "OUTPUT" receiver on the battery



- Press the button on the main surface of the battery to turn it on. The blue circles should light up.
- Ensure that the red light on front reads "12V". If it reads "9V", flip the switch on the side of the battery.
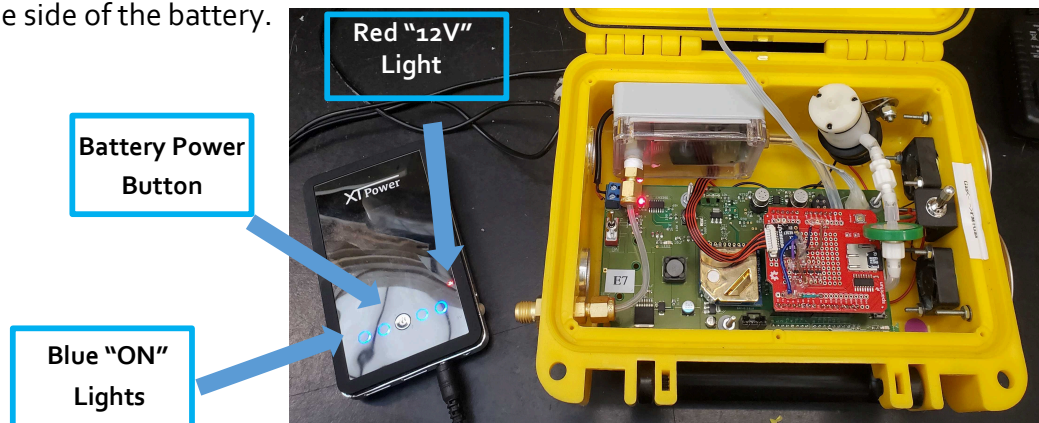


- **DO NOT PLUG THE POD IN TO BOTH THE WALL AND BATTERY AT THE SAME TIME!**

Charging the Battery

- To charge the battery, plug the small end of the A/C adapter labeled "Battery Charger" into the "INPUT" receiver on the battery. Plug the other end into a wall outlet.
- The lights blue lights will light up as the battery is charging.
- All of the blue lights will remain on when the battery is fully charged.
- DO NOT USE THE HYBRID CORD TO CHARGE THE BATTERY! It will not work.

## Pod Feature Diagram

Use the diagram below to turn on the monitor and make sure it is working correctly.
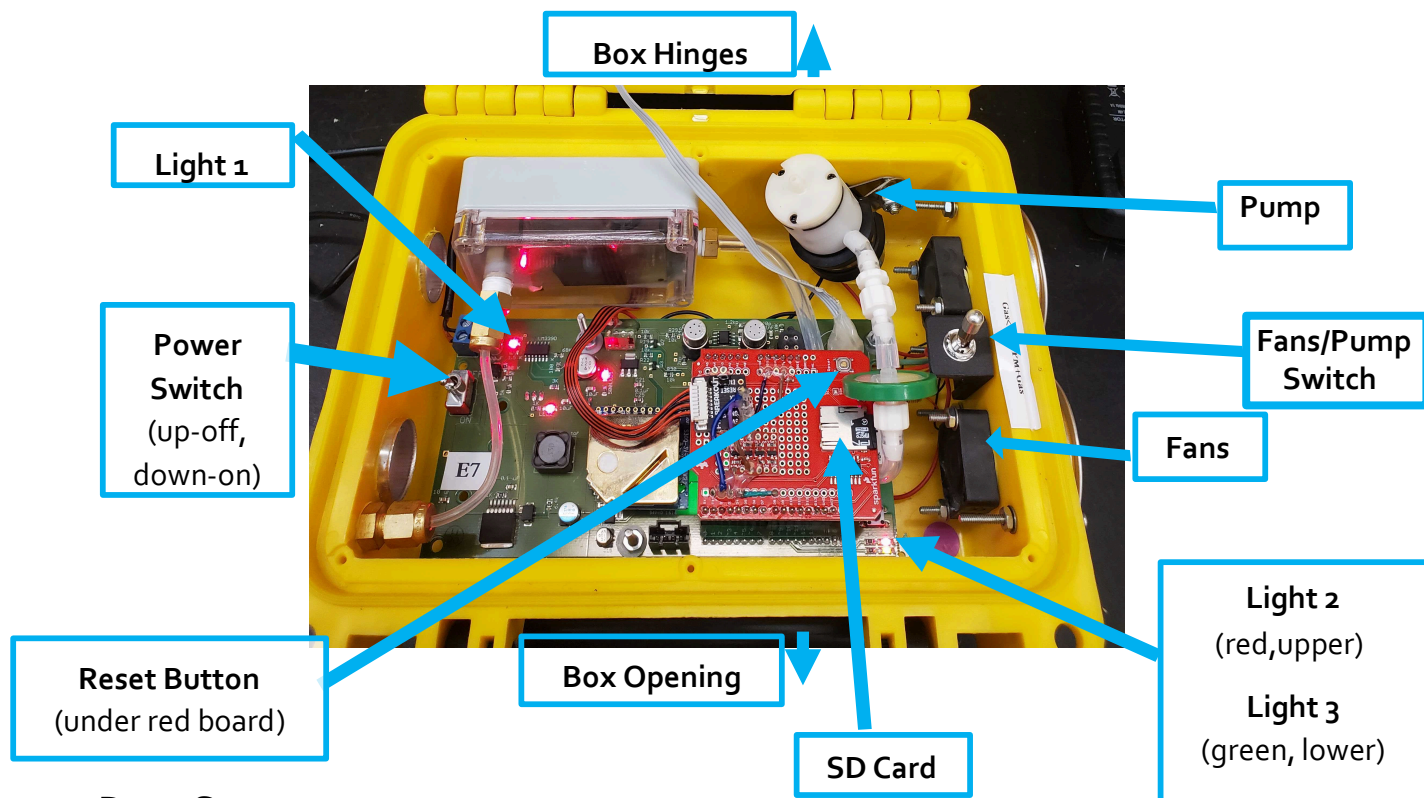


## Data Storage



While the monitor is running, data is being recorded to the micro SD card. The device makes one file named with the date of the first day that the pod is turned on. If the pod is turned off and on during the same day, the data will continue to be recorded on the same file. If the pod is turned on again on a different day, the data will be written to a new file named with the date of the new day it was turned on.
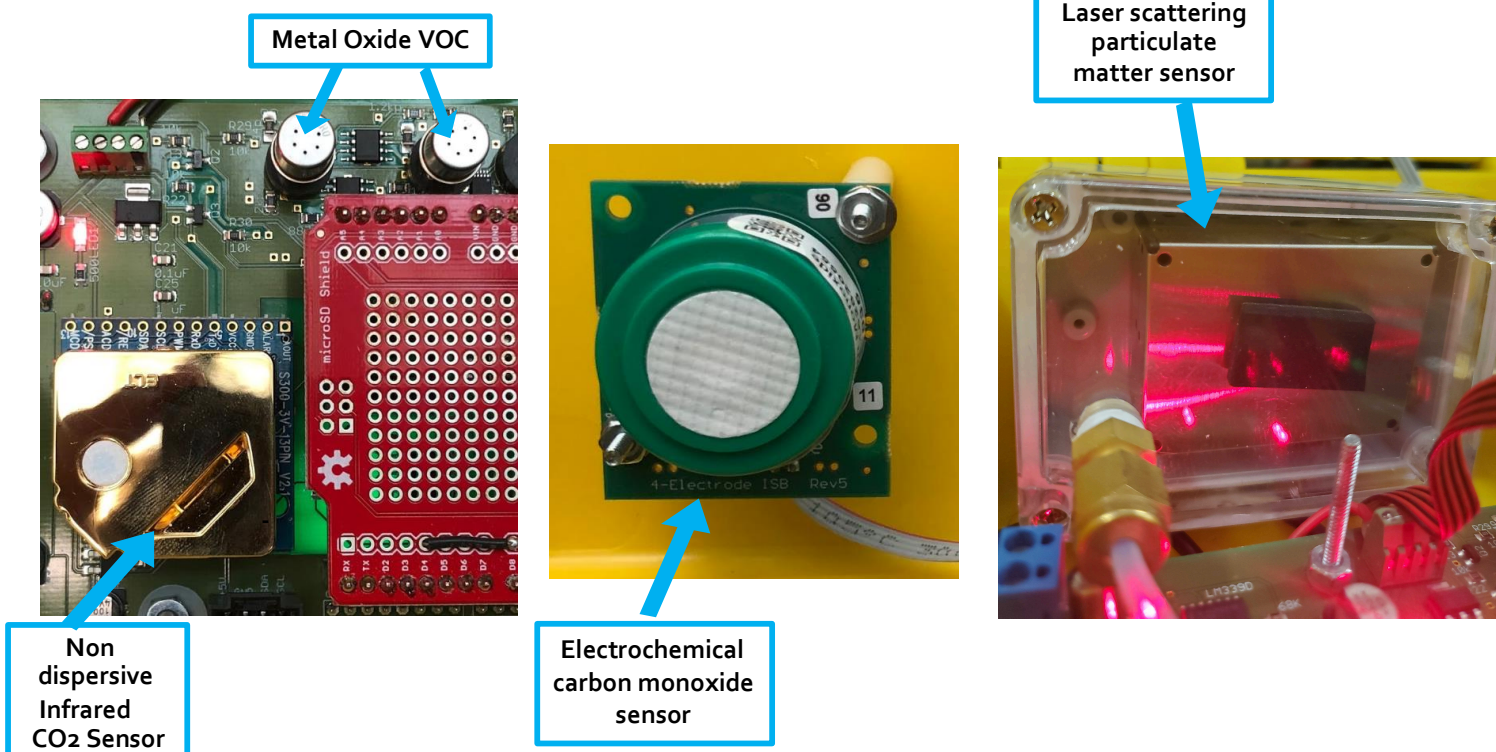
Note: The text files take up very little space, so do not worry about running out of space (we could probably fit a year's worth of continuous data on a card).

# Saving/Accessing Data

- Remove mini SD card, gently push it in and when you release you should hear a click, then wiggle it out of the holder. To reinsert, gently push it in until you hear a click.
- Use the SD card adapter provided to load the data onto a computer
- The raw data is written to text files in a CSV (comma separated value format), and it is split up by day, the naming convention will tell you what data is in the file (e.g., YPODD8_2016_8_27 is data from pod D8 that started running on 8/27/2016)

# Gas- Phase and Particulate Species Sensors

Use the quide below to determine the type of sensor you have.



**Metal Oxide VOC**

**Laser scattering particulate matter sensor**

**Non dispersive Infrared CO2 Sensor**

**Electrochemical carbon monoxide sensor**

The picture above shows the locations of each sensor on the board. The Figaro VOC sensors have silver caps. The Figaro VOC 2602 is sensitive to heavy hydrocarbons only, whereas the Figaro VOC 2600 is sensitive to both light and heavy hydrocarbons. The $CO_2$ sensor is a gold square, and the CO sensor is green and located on the lid of the pod.

## Sampling Frequency

The sensors are continuously running, but data is written to the SD card each time light 3 blinks green (approximately once every 4-30 seconds); therefore you likely have somewhere between 2 and 15 data points per minute. When processing the data, our group typically takes the average of the 2-15 raw data points per minute to create a "minute average" for data analysis.

If you would like to adjust the sampling frequency, the device will need to be re-programmed and you will need to contact the Air Quality group at CU Boulder for help.

## Some Notes on Sampling

- Keep in mind that the sensors do not respond instantly and that they require a warm-up period to reach a baseline and adjust to ambient temperature. A good rule of thumb is to give the monitors 30-60 minutes to warm up before sampling.
- When sampling be sure to give the sensors time to respond to a stimuli. A good rule of thumb is to have the monitor close to the stimuli (e.g. car tailpipe) for 5-10 minutes.
- Keep in mind the direction of flow of the monitor (see diagram).



## Important Notes

- AQIQ MCEN4228/5228 pods use MDT time. The time will need to be corrected for analysis after daily savings ends.
- All other monitors use GMT/UTC time. The time will need to be corrected for analysis (UTC-6 hrs during the summer, UTC-7 hrs during the winter to reach MST, the correct time in Colorado).
- If you choose to analyze raw data, REMEMBER that the data is in the form of raw electronic signal, or voltages. This means that only qualitative analysis of trends is possible, but quantitative data will not be accurate.