microAeth® AL30

# Quick Start Guide

AETHLABS


https://aethlabs.com
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## Introduction

Thank you for your purchase of an AethLabs microAeth® AL30 Black Carbon monitor. This guide is a short introduction to setting up and using your microAeth instrument. Please refer to the AL30 Manual for more detailed information.

Carefully unpack the instrument and accessories from their packaging. Check to identify that all items are present and that there is no damage. Retain original packaging for safe storage and shipping of the instrument.

The small size and light weight of the microAeth AL30 instrument will allow you to gather data in a wide range of mobile or stationary applications. The AL series filter strip needs to be changed on a regular basis. Optimization of performance across applications requires an understanding of operational settings, precautions, and maintenance procedures. The following recommendations provide general guidelines.

The model and serial number of the microAeth AL30 is located on the bottom and back of the instruments adjacent to the USB-C port. Refer to the full serial number whenever you contact AethLabs for service.


## Charging the microAeth

Before using the instrument, the internal battery can be charged by plugging it into external power using the USB-C power adapter. Battery runtime varies with settings and age of the pump and battery.

The yellow LED charging indicator on the back panel of the instrument is illuminated when the instrument is connected to an external power source and is charging using the USB-C port.


**Charging time with instrument turned off:** Approximately 2.2 hours to full charge

## Important Information Before Getting Started

**1) Always make sure that a filter strip is installed in the microAeth AL30 when it is operating.**

**2) The microAeth interface webpage** is a locally hosted webpage that can be accessed using any web browser when connected directly to the microAaeth hosted WiFi network or when connected to the common local WiFi network that the microAeth is also connected to. The microAeth interface webpage can be used to modify all instrument settings, control the instrument, and download data,

**3) Timebase:**
The microAeth AL30 can acquire data on timebase settings of 1, 10, 30, 60, 150, or 300 seconds. The 1 and 10 second timebases should only be used under special circumstances where a decreased signal-to-noise ratio is acceptable. At these settings, instrumental noise is larger and typically requires the highest flow rate and/or post-processing.

**4) Flow Rate:**
The AL30 pump can operate at flow rate settings of 50, 75, 100, 125, 150, 175, 200, 225, or 250 ml/min. A higher flow rate can contribute to greater measurement sensitivity but will use more filter tape and more power.

**5) Measurement Wavelength:** IR (880 nm)

**6) Spot Size:** 3mm diameter

**7) Protect the instrument and the inlet and outlet ports from water and other contaminates.**

**8)** Verify flow rates using on-board test flow menu and external flow calibration kit before calibrating flows. The instruments are initially calibrated at sea level. Only calibrate the flow system if there is an error in the measured flow when using the test flow menu. If sampling at a high elevation compared to sea level then a calibration may be required to compensate for the change in altitude.

**9)** To get the best data from the microAeth AL30, we highly recommend that the instrument warm up for approximately 30 minutes so that it can equilibrate.

**10)** If you change sampling settings, you must stop the instrument measurement before being allowed to make a change.



## Installation & Environmental Considerations

The microAeth instrument is specifically designed to be used in a wide range of measurement scenarios. Each research deployment will require its own specific considerations for protecting the instrument and ensuring the integrity of your data. The included sample tubing assembly with threaded insert should be installed into the inlet of the instrument. Obstruction of either the inlet or outlet port should be prevented as this will affect the flow of air into the instrument.

**IMPORTANT:** Be sure that the aerosol inlet to the microAeth is at atmospheric pressure and that there is no differential pressure between the aerosol inlet and the operating environment of the microAeth. For example, if sampling from a plenum or chamber, the plenum or chamber must be at the same pressure as the instrument itself. If other instrumentation is measuring in parallel, we always recommend that microAeth instruments have their own sampling line so there is no impact from other devices that might have large flow rates. Failure to meet this requirement may cause sampling and/or measurement errors.

In personal monitoring applications, the included lapel clip can assist in positioning the sampling inlet near to the person's breathing zone, care must be taken to ensure the inlet, or microCyclone inlet, are free from obstruction.

**For outdoor deployments, protection of the instrument and the inlet and outlet ports must be considered.**

The AL30 requires protection from rapid temperature changes and moisture / precipitation. In addition to potentially having signal-to-noise impact on your data, rapidly changing environmental conditions can harm your instrument without proper protection. The instrument should be shielded from solar radiation to reduce impact of rapid heating from the sun.

**Temperature:**
The AL30 is specified to operate between 5 ~ 40 °C. Furthermore, rapid changes in temperature can impact data. Such effects are inversely proportional to timebase and flow rate settings.

**Humidity:**
As with many other types of particle measurement instrumentation, changes in relative humidity can change the size and optical properties of particles. For locations with high RH variability, an external sample dryer or heater may be used to condition the sample. AethLabs offers a portable aerosol dryer for this application. Moving between a dry, air conditioned environment, to a high humidity environment can impact the data while the device equilibrates. Selecting a higher flowrate and longer timebase will help to reduce these effects.

**Contamination:**
Preventative maintenance for your deployment and sampling apparatus are important for protecting your instrument. Keeping the microAeth and its air passageways, internal

components, and optical chambers clean is critical for maintaining the instrument and producing quality measurements. **We recommend, at a minimum, Standard Maintenance Service at AethLabs or an authorized service center on at least an annual basis.**

Typically, Black Carbon particles are smaller than one micron in diameter. In some sampling conditions where the aerosol is primarily composed of light scattering particulate matter, such as dust or smoke from biomass fuels, there can be a prevalent fraction of larger-diameter particles. Contamination of the instrument can cause increased measurement noise, poor sealing of the analytical area and degraded operational lifetime of some components.

For these applications, and to add contamination protection for your microAeth in high concentrations, AethLabs offers a microCyclone™ size selective inlet that will limit the size of the particles entering the microAeth to less than 2.5 microns in diameter when used at at the specified flow rate. Contact AethLabs for more information.



## Recommendations and Best Use Practices

**Instrument Settings:** We recommend getting started using the 60 seconds timebase and 100mlpm flow rate settings, After using the instrument in your application and collecting some data, these settings can be easily changed depending on your requirements.

The timebase, flow rate, and WiFi settings will have the greatest impact on battery run time. NOTE: Battery life will start to gradually diminish after many cycles (~ 1 year of use). Runtimes can vary based on individual AL30 instruments.

**Individual Data Point Noise:**
Instrumental noise contributes a random perturbation to the 'ideal' BC data. Its magnitude is inversely proportional to the operational parameters of timebase and flow rate. Data collected on a 1 second timebase should always be smoothed or averaged over longer periods, unless measuring high concentrations where the instrumental noise is negligible.

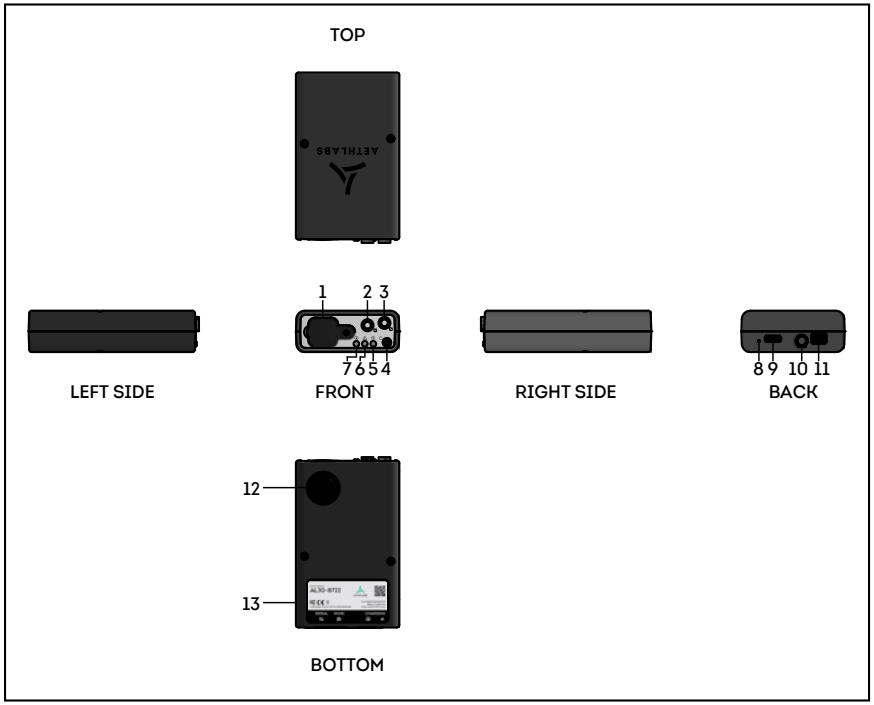
**Effects of Contamination, Vibration, and Impact:** Primarily affected by timebase setting. Increased flow rate will also reduce the effect.

| 1 second | 5 seconds | 10 seconds | 30 seconds | 60 seconds | 300 seconds |
|---|---|---|---|---|---|
| very large | large | large | moderate | low | least |

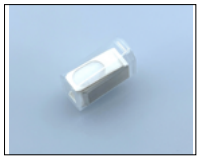
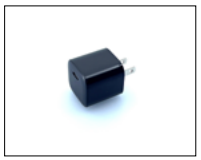
**Choosing the ATN Threshold for changing the filter strip for your application:**
Choosing the right ATN threshold for changing the filter strip, helps ensure the integrity of your measurement by reducing possible loading effects. Loading effects are variable, aerosol dependent, and are not always present. The lower the ATN value, the lower the impact of loading effects.

## AL30 Included Items

microAeth AL30 Instrument Diagram




1. Filter strip front cover
2. Inlet port
3. Outlet port
4. Power button
5. Operation Indicator
6. Warning Indicator
7. Notification Indicator
8. Charging Indicator
9. USB-C Charging port
10. WiFi Mode button
11. 4-pin 3.3V TTL serial port
12. Filter strip release button
13. Serial number label

| Quantity | Part Number | Description |
|---|---|---|
| 1 | AL30 |  microAeth AL30 |
| 1 | ALX-FS30 |  AL30 Filter Strip,<br>1 Sampling location each,<br>Pack of 30 and 1 installed in instrument |
| 1 | AC-ALX-USBC-PS-<cc> |  Territory-specific USB-C AC wall adapter: where <cc> is either US, EU, or UK |
| 1 | USBC-C-ALX-10 |  USB-C power cable |
| 1 | MASH-40 |  Sampling Hose with Barb Fitting Swivel Connector,<br>40 inches (1 meter) |
| 1 | MALC |  Lapel clip for sampling hose |
| Download | | Quick Start Guide (download via AethLabs website) |
| Download | | Manual (download via AethLabs website) |

## Operation

**IMPORTANT**:
**-Always make sure that a filter strip is installed in the microAeth AL30 when it is operating.**

**-Do not install previously used filter strips.**

**Turn On:**
1) Turn on the AL30 by depressing the power button on the front panel for 2 seconds until the instrument beeps and the ⚠ Warning red LED and ⏵ Operation green LED illuminate together. The instrument will automatically start sampling and making measurements.

**Turn Off:**
1) Turn off the AL30 by depressing the power button on the front panel for 2 seconds. The front panel LEDs will turn off.

**Configuration and Control:**
By accessing the microAeth interface webpage through a local WiFi connection, the user is able to download data and operate and configure the instrument.

**Front and Back Panel Indicator LEDs:**

| Symbol | Indicator Name | Description |
|---|---|---|
| ⓘ | Notification Indicator | RGB LED |
| ⚠ | Warning Indicator | Red LED |
| ⏵ | Operation Indicator | Green LED |
| ⚡ | Charging Indicator | Yellow LED |

**LED Indicator Status:**

| Symbol | Color | Illumination | Description |
|---|---|---|---|
| **Run Mode** | | | |
| ⏵ | Green | 1 blink every 3 sec | Sampling and acquiring data |
| **Warnings during Run Mode (see above)** | | | |
| ⚠ | Red | 1 blink every 1 sec | Warning - Change filter strip, Filter has reached ATN threshold user setting |
| ⚠ | Red | 2 blinks every 1 sec | Warning - Battery low |
| ⚠ | Red | 3 blinks every 1 sec | Warning - Flow warning (out of range +/- %) |
| ⏵ & ⚠ | Green & Red | Synchronous 1 blink every 1 sec | Startup - Beeping, Not collecting data until ready<br>Idle - No Beeping, Not collecting data until restart of device or sampling |
| ⚠ | Red | Solid | **Sampler stopped after logging error**<br>Critical hardware error:<br>• Main supply voltage too high or too low<br>• Light source current too high or too low<br>• Light source feedback circuit error |
| **Notifications** | | | |
| ⓘ | Green | Solid | WiFi network mode |
| ⓘ | Blue | Solid | WiFi access point mode |
| ⚡ | Yellow | 1 blink every 1 sec | Charging |
| ⚡ | Yellow | Solid | Charged |
| **Notifications when ⚙ WiFi Mode button is depressed** | | | |
| ⓘ | Blue | Blinking | WiFi mode button is depressed for less than 2 seconds - user is pressing button but no change to WiFi Mode |
| ⓘ | Blue | Solid | WiFi mode button is depressed for 2-6 seconds - Access Point mode has been enabled and button should be released to use Access Point mode |
| ⓘ | Red & Blue | Alternate Blinking | WiFi mode button is depressed for 6-10 seconds - Warning user that RESET of WiFi / Access Point password will happen if button continues to be depressed |
| ⓘ | Red | Solid | WiFi mode button is depressed for more than 10 seconds - WiFi / Access Point password have been reset to factory default |

**Other Symbols:**

| Symbol | Name | Description |
|---|---|---|
| | Inlet Port | Sample Inlet, 10-32 UNF imperial (inch) threaded port |
| | Outlet Port | Outlet, 10-32 UNF imperial (inch) threaded port |

| Symbol | Name | Description |
|---|---|---|
| ⏻ | Power On/Off Button | Front panel button for turning on and off |
| ⏻ | USB-C Charging Port | USB-C port for charging only |
| ⚙ | WiFi Mode Button | Back panel button for enabling WiFi Access Point even if disabled and factory reset of all settings |
| | Serial Port | 4-pin 3.3V TTL serial port for automatic flow calibration only - currently unavailable |

## Filter Strip Installation/Exchange

The AL30 uses the ALx Filter Strip (ALX-FS), each with 1 sampling location.

**IMPORTANT**:
**-Always make sure that a filter strip is installed in the microAeth AL30 when it is operating.**
**-Do not install previously used filter strips.**

**To install/exchange filter strip:**
1) Make sure that the microAeth is not sampling. It is prefered that the intrument is off.
2) Hold the AL30 in one hand, with the release button on the bottom.
3) Loosen the rubber front cover on the front of the AL30 by pulling the tab away from the instrument. This will expose the filter strip slot.
4) If there is a filter strip already installed, depress the circular release button on the bottom of the instrument with your thumb and pull the filter strip out of the sampling head.
5) Install a new filter strip by pressing and holding the circular release button on the bottom of the instrument and then inserting the new filter strip into the sample chamber opening.
6) Make sure to push the new filter strip all the way into the slot.
7) Release the button.
8) Replace the rubber front cover. A tight fit is essential to prevent the entry of contamination and stray light into the sample chamber.





## Performing Measurements

The inlet and outlet ports are 10-32 UNF imperial (inch) threaded ports.

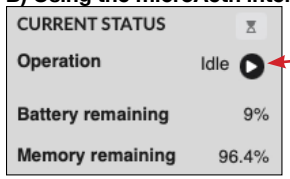
**The inlet port, outlet port, and all connections to the inlet port must be properly protected from the environment.** There must be limited restriction to flow while protection from water, insects, bugs, and other objects that can block or infiltrate the instrument air pathway through both the inlet and outlet ports of the instrument. Extra precaution must be taken as the internal pump of the instrument is pulling air into the instrument through the inlet port.



**To Start Sampling and Measurements:**
**A) Using the front panel power button:**


1) Ensure there is a filter strip uinstalled in the microAeth AL30.
2) Turn on the AL30 by depressing the power button on the front panel for 2 seconds until the instrument beeps and the ⚠ Warning red LED and ⏵ Operation green LED illuminate together.
3) Release the power button and wait for a few seconds. The pump will turn on and the ⚠ Warning red LED and ⏵ Operation green LED will then begin to blink on and off in unison about every second until the beginning of the next minute.
4) When the LEDs stop blinking, the instrument will beep and the ⏵ Operation green LED will blink indicating the start of data collection.
5) While the unit is operating, the ⏵ Operation green LED will blink once every 3 seconds.

**B) Using the microAeth interface webpage:**

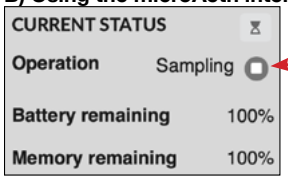



1) Ensure there is a filter strip uinstalled in the microAeth AL30.
2) When the AL30 is Idle, click the ⏵ Start button next to the Operation Idle in the Current Status section of the microAeth interface webpage

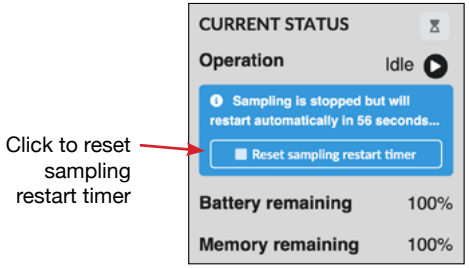
**To Stop Sampling and Measurements:**
**A) Using the front panel power button:**


1) Turn off the AL30 by depressing the power button on the front panel for 2 seconds until the instrument beeps and the front panel LEDs turn off.

**B) Using the microAeth interface webpage:**




1) When the AL30 is Sampling, click the Stop button next to the Operation Sampling in the Current Status section of the microAeth interface webpage.
2) When Samping is stopped using the microAeth interface webpage, the Operation status will change to 'Idle' and a notification will appear showing a 15 minute count down until the AL30 will restart sampling automatically.
3) To Reset the automatic sampling restart timer, click the 'Reset sampling restart timer' button.
4) The notification will update with the reset count down timer.






## Initial Setup and WiFi Communications

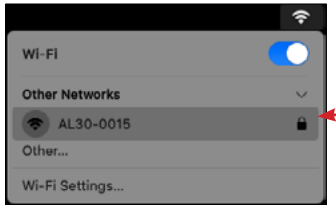
The microAeth instrument hosts an interface webpage over WiFi which allows the user to download data and configure and operate the instrument.

**SSID:** The microAeth WiFi SSID is always its serial number (ID). "AL30-<xxxx>" where <xxxx> matches the unique 4 digits of the AL30 serial number. Example: "AL30-0001"

**Default Password:** "AL30-<xxxx>pass" where <xxxx> matches the unique 4 digits of the AL30 serial number. Example: "AL30-0001pass"

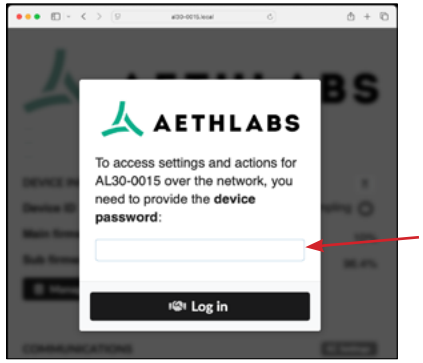
**NOTE:** The microAeth Access Point WiFi mode is enabled by default for initial setup or when reset to default factory settings.

**Access the microAeth interface webpage by connecting directly to the microAeth WiFi Access Point (for initial setup and when Access Point WiFi is enabled):**
1) Turn on the AL30.
2) Open the WiFi Settings or available WiFi networks viewer on your computer, tablet, or phone.
3) Browse the available WiFi networks and select the WiFi SSID that matches the serial number of the instrument. "AL30-<xxxx>" where <xxxx> matches the unique 4 digits of the AL30 serial number. Example: "AL30-0001"




4) When asked for a password for the WiFi SSID that matches the serial number of the AL30:
i) Initial Setup with factory default password: "AL30-<xxxx>pass" where <xxxx> matches the unique 4 digits of the AL30 serial number. Example: "AL30-0001pass"
OR
ii) The unique AL30 WiFi password that the user set for the device after initial setup.

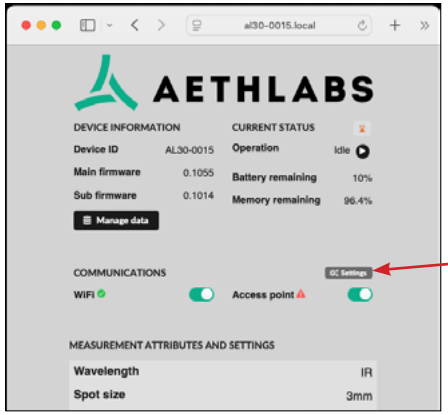
5) Once a WiFi connection is established, open a web browser with URL: “http://AL30-<xxxx>.local” where <xxxx> matches the unique 4 digits of the AL30 serial number. Example: “http://AL30-0001.local”
6) The microAeth interface webpage will ask for the Device password (same as the Access Point password), which is the same password as the microAeth Access Point WiFi SSID password.




Enter Default or User Set Password

7) The microAeth interface webpage will load and can be used for configuration and control of the microAeth and data download.

**Configure the microAeth WiFi network communications and Access Point password:**
1) Once the microAeth interface webpage is loaded, click the “Settings” button in the Communications section.




WiFi Settings

2) The “WiFi & Access Point settings” pop-up window will appear.



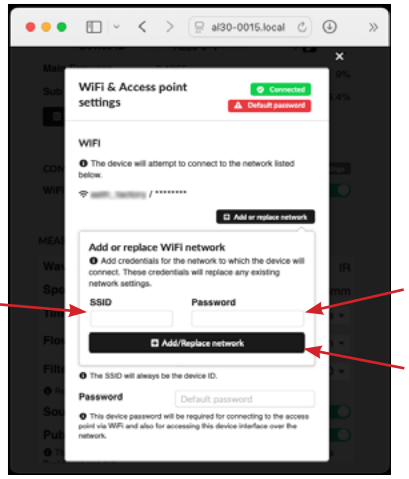

Current WiFi network

Add or replace network

AL30 Access Point SSID (cannot be changed)

AL30 Access Point Password **(SET YOUR PASSWORD)**

3) **STRONGLY ADVISED:** In order to change the AL30 Access Point network password and the interface webpage password, enter a new password in the ‘Password’ field in the ‘Access Point’ section.
4) In order to add a WiFi network to the microAeth, click the “Add or replace network” button in the “WiFi” section.




Enter WiFi network SSID

Enter WiFi network password

Add/Replace network button

5) Enter the WiFi network SSID and Password into the corresponding fields
6) Click the “Add/Replace network” button
7) The pop-up window will close and the SSID and Password will be added to the list of WiFi networks (currently only 1 WiFi SSID is allowed)
8) Click the “X” at the top right corner to close the “WiFi & Access Point settings” window.
9) Once the microAeth connects to the local WiFi networks using the user entered SSID and Password, the microAeth interface webpage can also be accessed over the local WiFi network as long as the “WiFi” setting in the Communications section is enabled.

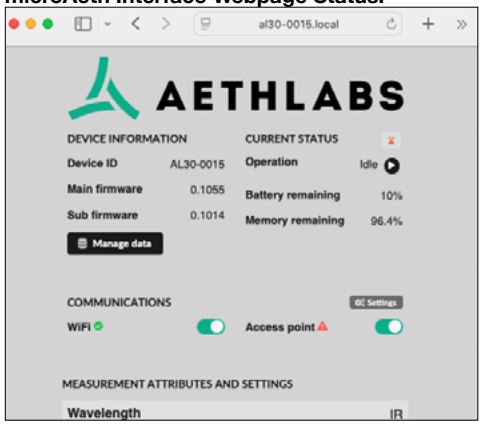
**Access the microAeth interface webpage by connecting to the common local WiFi network that the microAeth is also connected to.**
1) Turn on the AL30.
2) Open the WiFi Settings or available WiFi networks viewer on your computer, tablet, or phone.
3) Browse the available WiFi networks and select the WiFi SSID of the network that the microAeth is also connected to.
3) When asked, enter the corresponging password for the WiFi network.
4) Once a WiFi connection is established, open a web browser with URL: “http://AL30-<xxxx>.local” where <xxxx> matches the unique 4 digits of the AL30 serial number. Example: “http://AL30-0001.local”
5) The microAeth interface webpage will ask for the instrument password, which is the same password as the microAeth Access Point WiFi SSID password.
6) The microAeth interface webpage will load and can be used for configuration and control of the microAeth and data download.

## Configuration

**Configure the microAeth using the microAeth interface webpage:**
The microAeth interface webpage is a locally hosted webpage that can be accessed using any web browser when connected directly to the microAeth hosted WiFi network or when connected to the common local WiFi network that the microAeth is also connected to.

**Connect to the microAeth interface webpage:** See instructions in the previous Section: Initial Setup and WiFi Communications.

**microAeth Interface Webpage Status:**

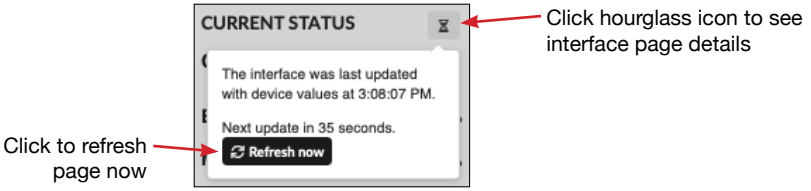



This page will refresh with the latest device information:
1) Whenever a setting is changed or a button is clicked.
2) Automatically every 60 seconds (hourglass icon will turn orange when a refresh will occur within the next 5 seconds).
3) When the ‘Refresh now’ button is clicked.

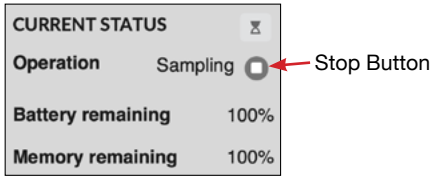


| | |
|---|---|
| ⧗ | >5 seconds until interface page refresh |
| ⧗ | ≤5 seconds until interface page refresh |

To see details when the page was last refreshed with the latest device information, the user can click on the Current Status hourglass icon. A pop-up will show the following:
1) Time of last page refresh
2) Count down until next automatic page refresh
3) Button to refresh page now




**IMPORTANT:** In order to change instrument settings, the AL30 must stop sampling:




1) When the AL30 is Sampling, click the Stop button next to the Operation Sampling in the Current Status section of the microAeth interface webpage.
2) When Samping is stopped using the microAeth interface webpage, the Operation status will change to ‘Idle’ and a notification will appear showing a 15 minute count down until the AL30 will restart sampling automatically.
3) To Reset the automatic sampling restart timer, click the ‘Reset sampling restart timer’ button.
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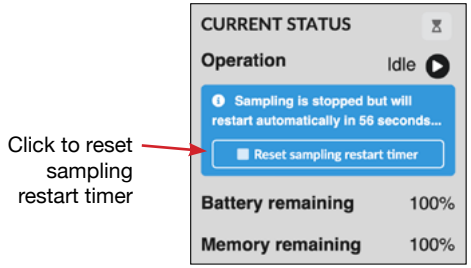
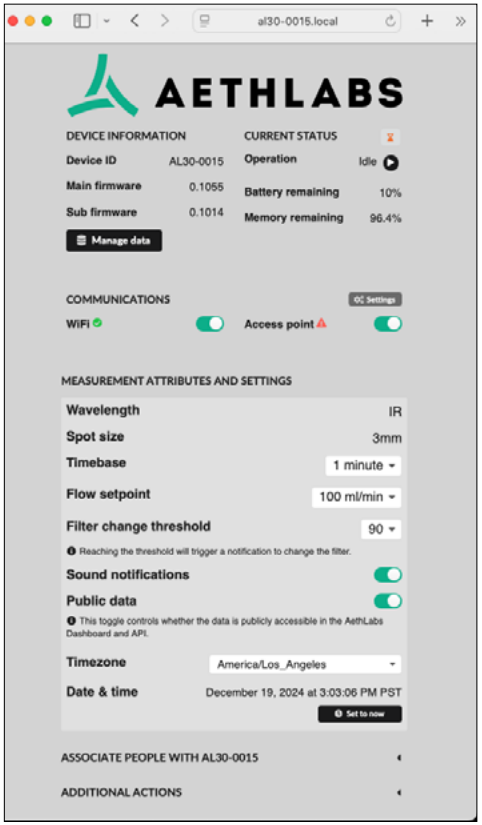


**microAeth Interface Webpage Information and Settings:**




**Device Information**
- **Device ID:** Serial number of the device
- **Main firmware:** Firmware version of the communications hardware
- **Sub firmware:** Firmware version of the measurement hardware

**Current Status**
- **Operation:** Shows if the device is Sampling or Idle (not making measurements)
- **Operation Button:**
  - When the AL30 is Sampling, click the Stop button to stop measurements.
  - When the AL30 is Idle, click the Start button to start measurements.
- **Battery remaining:** Percentage amount of battery remaining
- **Memory remaining:** Percentage amount of data storage remaining



**Manage Data:** Click this button to open the data management window where data can be downloaded or erased

**Communications**
- **Settings:** Click this button to open the WiFi & Access point settings window where associated WiFi network can be configured and device WiFi access point password can be modified (see instructions in the previous Section: Initial Setup and WiFi Communications)
- **WiFi:** Toggle to enable/disable connection to local WiFi network
- **Access point:** Toggle to enable/disable micoAeth access point hosted WiFi network for direct WiFi connection to the microAeth

**Measurement attributes and settings**
- **Wavelength:** IR (880 nm)
- **Spot size:** 3mm diameter
- **Timebase:** Select 1, 10, 30, 60, 150, or 300 seconds measurement interval
- **Flow setpoint:** Select 50, 75, 100, 125, 150, 175, 200, 225, or 250 ml/min flow rate
- **Filter change ATN threshold:** Select 1-100 ATN unit sampling notification threshold
- **Sound notifications:** Toggle to enable/disable sound notifications from the device
- **Public data:** Toggle to enable/disable if data collected is publicly accessible in the AethLabs Dashboard website and API (makes data public)
- **Timezone:** Select local timezone to use as offset from UTC recorded date and time
- **Date & time:** Displays current date & time on device
- **Set to now:** Click this button to set device date & time to current time of the viewing device (e.g. computer, tablet, phone).

**Associate people with AL30-<xxxx> (expandable menu item):** Use this section to invite people to manage this device and view data on the AethLabs Dashboard website.
- **Your name:** Input your name and organization to inform the invitee(s) who their invitation is from.
- **Email(s):** Input the email address(es) of the invitee(s) that you would like to manage this device and view data on the AethLabs Dashboard website.

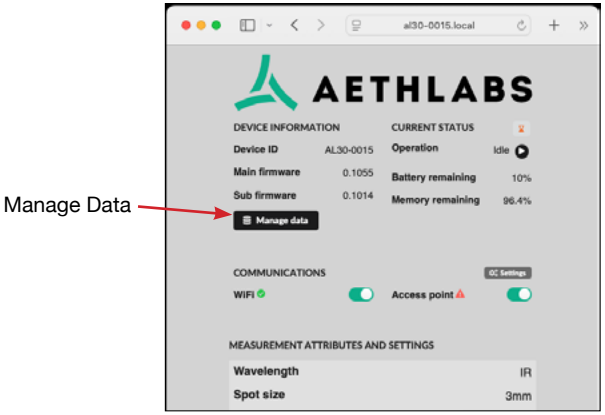
**Additional actions (expandable menu item)**
- **Reboot:** Click this button to restart the device. Sampling and measurements will automatically start after the device is restarted.
- **Calibrate flow:** Click this button to open the Calibrate flow window where the flow calibration process can be conducted.
- **Erase memory:** Click this button to delete all data stored on the device. **CAUTION: This action cannot be reversed.**

## Data Download & Management

**Manage data collected and stored on the microAeth by using the microAeth interface webpage:** The microAeth interface webpage is a locally hosted webpage that can be accessed using any web browser when connected directly to the microAaeth hosted WiFi network or when connected to the common local WiFi network that the microAeth is also connected to. Data files are downloaded to the local device over WiFi in .json or .csv file format.

**Data file format:** .json or .csv file formats

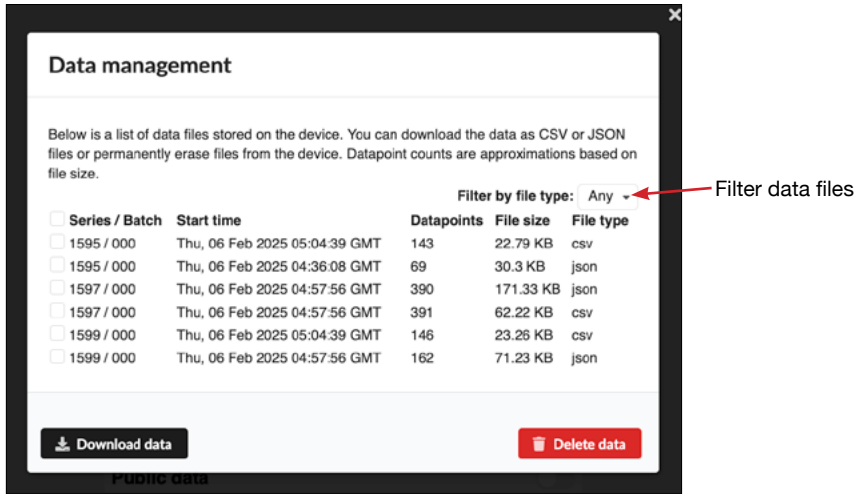
**1) Connect to the microAeth interface webpage:** See instructions in the previous Section: Initial Setup and WiFi Communications.
2) Click the 'Manage data' button to open the data management window where data can be downloaded or erased.



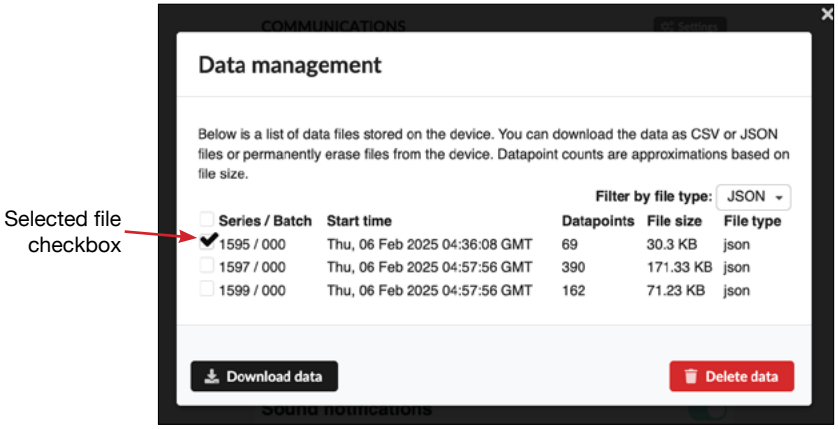

3) The data files stored on the instrument are listed in the new window that opens.



4) If desired, the Filter by file type dropdown can be used limit the file types shown.




5) Select the checkboxes of any or all Series / Batch data files to either download or erase.




6) Once the data files are selected:
   i) Click the 'Download data' button to download the files over WiFi from the AL30 to the local device.
   OR
   ii) Click the 'Delete data' button to delete the data files on the AL30. **CAUTION: This action cannot be reversed.**
7) Click the "X" at the top right corner to close the "Data management" window.

## Flow Calibration

All microAeth instruments are flow calibrated at approximately standard atmospheric pressure and room temperature to ensure accurate flow rates at the time of production. Local operating conditions vary around the world. Before instrument deployment, we suggest that the flow rates at the inlet of your microAeth instrument are checked.

In general, and especially for sampling at higher elevations, AethLabs suggests calibrating the flow of your microAeth in the location at which you plan to use it. This will ensure that the internal mass flowmeter is calibrated for the in-situ atmospheric pressure.
If re-calibration is needed, it is possible to calibrate to within 1-2% on average using the AethLabs MAx/ALx Series Flow Calibration Kit. Only the external mass flowmeter provided in the AethLabs MAx/ALx Series Flow Calibration Kit is compatible with the AL30.

**IMPORTANT:** Use the AethLabs MAx/ALx Series Flow Calibration Kit along with the Calibrate flow window of the microAeth Interface Webpage to conduct a flow calibration of the AL30.

## Cleaning & Maintenance

If the microAeth is exposed to any liquids or other damaging contaminants, immediately turn off the instrument, disconnect all cables, and remove any foreign substances in contact with the instrument. Do not use liquids or other cleaning products on the instrument. Wait until the microAeth is completely dry before charging or turning on the instrument. Only AethLabs authorized service personnel should clean the air passageways and internal components of the microAeth.

AethLabs recommends sending your instrument for annual service, or more frequent service depending on use and operating conditions. Cleaning intervals will vary based on the sampling environment and concentrations.

In addition to any necessary repairs, AethLabs offers flow calibration service and standard maintenance service (including full diagnostics, cleaning, flow calibration, and instrument testing) at the AethLabs San Francisco office. AethLabs also has authorized repair locations in Europe and South America.



## Status / Error Codes

| Code Value | Readable status | Status Description |
|---|---|---|
| 1 | Battery Low | Battery is low |
| 2 | PCB Power Supply 5V5 Error | PCB Power Supply 5V5 Error |
| 4 | PCB Power Supply Reference Error | PCB Power Supply Reference Error |
| 8 | Flow Unstable | Flow unstable during sampling and measurement period. Flow deviates from target flow setpoint by more than ±5%. |
| 16 | Optical Calibration Error | Starting optical values are out of range |