AEROCET 532
MANUAL

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AEROCET 532 Manual

Technical Support

This manual is structured by customer feedback to provide the required information for setup, operation, testing, maintaining, and troubleshooting your AEROCET 532. Should you still require support after consulting your printed documentation, we encourage you to contact one of our expert Technical Service representatives during normal business hours of 7:00 a.m. to 4:00 p.m. Pacific Time, Monday through Friday. In addition, technical information and service bulletins are often posted on our website. Please contact us and obtain a Return Authorization (RA) number before sending any equipment back to the factory. This allows us to track and schedule service work and to expedite customer service. Please have your instrument serial number available when contacting the manufacturer.

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NOTICE

CAUTION—Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

WARNING—This product, when properly installed and operated, is considered a Class I laser product. Class I products are not considered to be hazardous.

There are no user serviceable parts located inside the cover of this device.

Do not attempt to remove the cover of this product. Failure to comply with this instruction could cause accidental exposure to laser radiation.

Table of Contents

1. Introduction

The AEROCET 532 is a full–featured, battery operated, handheld particle counter or mass monitor.

In count mode, the unit will measure particle counts at eight fixed sizes (0.3 µm, 0.5 µm, 1.0 µm, 2.5 µm, 4.0 µm, 5.0 µm, 7.0 µm, and 10.0 µm).

In mass mode the unit will measure PM1, PM2.5, PM4, PM7, PM10 and TSP mass concentration levels.

This instrument can store up 15,000 sample events including data from the ambient temperature (AT) / relative humidity (RH) probe. Sample history events can be viewed on the LCD display and downloaded to a computer.

2. Setup

The following sections cover unpacking, layout and performing a test run to verify operation.

2.1. Unpacking

Unpack and inspect the contents of the shipping container. Standard items (included) are shown in Figure 1 – Standard Accessories. Optional accessories are shown in Figure 2 – Optional Accessories. Contact the supplier if any items are missing. Any damages incurred during shipping are the responsibility of the carrier. If any damage to the shipment is noticed before unpacking, a claim must be filed with the commercial carrier immediately. You should follow any special unpacking instructions provided by the carrier as you then carefully remove all items from the containers and inspect each component. It is recommended to document and photograph all damaged packages and items before, during, and after unpacking them. Contact Met One Instruments (see the Technical Support section at the beginning of this manual) to arrange for any replacement items needed.

ATTENTION:
A Silicon Labs CP210x Driver for the USB connection must be installed before connecting to the USB Type C port.

Driver download weblink: https://metone.com/usb-drivers/

AEROCET 532 Standard Equipment

AEROCET 532
PN AEROCET-532

Manual
AEROCET-532-9800

Calibration Certificate
AEROCET 532-9600

USB Cable
PN 502116

Battery Charger
PN 390031

Power Cord
PN 400113

ISO-Kinetic Probe
PN 83117

Zero Count Filter
PN G3111

Carrying Case
PN 550537

Rubber Boot
PN 83549

Figure 1 – Standard Accessories

Flow Meter
PN 9801

Flow Meter
PN Swift 6.0

Docking Station

Figure 2 – Optional Accessories

2.2. Layout

The following figure shows the layout of the AEROCET 532 and provides a description of each of the components.

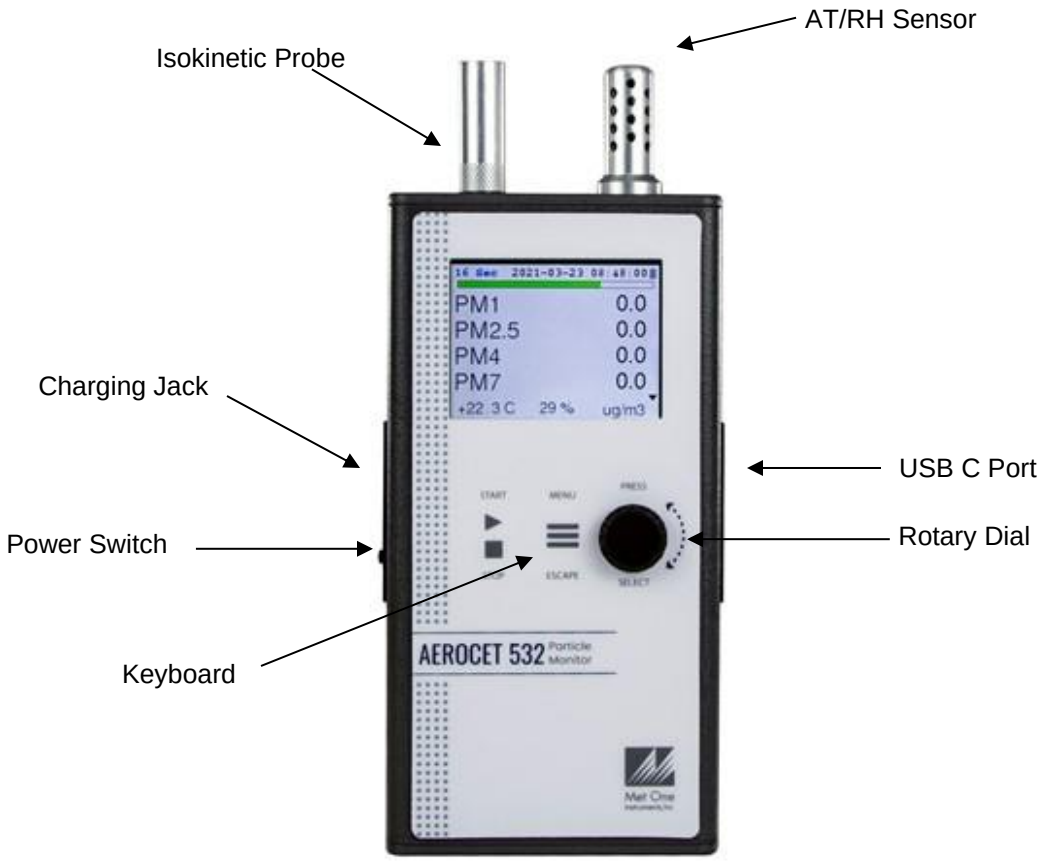

Figure 3 – AEROCET 532 Layout

Component	Description
Power Switch	Switch that turns the AEROCET 532 on or off. Slide up (towards inlet nozzle) to turn on and slide down to turn off.
Charging Jack	Input jack for the battery charger. This connection charges the internal battery pack and provides continuous operating power for the unit.
Keyboard	2 key membrane keypad.
USB C Port	For USB serial communication.
Rotary Dial	Multifunction dial (rotate and press).
AT/RH Sensor	Integrated sensor that measures ambient temperature and relative humidity.
Isokinetic Probe	The isokinetic probe reduces turbulence in the air sample. It attaches over the air inlet nozzle.

2.3. Default Settings

The AEROCET 532 comes with the user settings configured as follows.

Parameter	Value
Sample Type	Mass (µg/m^3)
Sample Mode	Continuous
Count Mode	Cumulative
Sample Time	1 Min
Sample Hold Time	0 seconds
Volume (concentration)	CF (particles / ft^3)
Temperature Units	C
USB Baud Rate	115200

2.4. Initial Operation

Before operating the AEROCET 532 for the first time, it is recommended that the unit be fully charged. Information regarding charging the battery is found in section 6 of this manual.

Complete the following steps to verify proper operation.

1. Slide the power switch up to turn on the power.
2. Observe the Startup screen for 2 seconds then the Operate screen (Section 4.3)
3. Press **START/STOP** key. The AEROCET 532 will begin sampling.
4. Observe the PM levels on the display.
5. Turn the rotary dial to view other PM levels.
6. The unit is ready for use.

3. User Interface

The AEROCET 532 user interface is composed of a rotary dial, 2 button keypad, and an LCD display. The following table describes keypad functionality. Note some keys have more than one function.

Key	Description
	• Sample Screen: Starts or stops a sample. • Settings Menu: Return to Sample screen. • Edit Setting: Cancel edit mode and return to Sample screen.
	• Sample Screen: Display the Settings menu. • Settings Menu: Return to Sample screen. • Edit Setting: Cancel edit mode and return the Settings menu.

	**Press Function** • Sample Screen: Display the Settings menu. • Settings Menu: Navigate to the highlighted menu item selection. • Edit Setting: Enter setting edit mode. **Dial Function** • Sample Screen: dial to scroll parameter list. • Settings Menu: dial to move/scroll highlight to menu item. • Edit Setting: dial to change picklist and numbers parameters

4. Operation

The following sections cover the basic operation.

4.1. About the Measurement

The AEROCET 532 counts and sizes particles in 8 different size ranges then uses a proprietary algorithm to convert count data to mass measurements (µg/m^3). Fundamentally, the AEROCET 532 calculates a volume for each detected particle then assigns a standard density for the conversion.

The standard density value is augmented by the K-Factor setting to improve measurement accuracy. The AEROCET 532 provides a separate K-Factor setting for each measurement range (PM1, PM2.5, PM4, PM7, PM10, and TSP). These K-Factors can be modified on the K Factor screen as discussed in section 5.3.3, with serial commands, or with Comet software.

K-Factor values should be empirically derived via comparison with a reference unit.

4.2. Power Up

AEROCET 532 power is controlled by a slide switch located on the left hand side of the unit. Move the power switch to the on position (towards the top of the case) to power up the unit.

The first screen shown on power up is the Startup screen. This screen displays the company logo for 2 seconds before loading the Operate Screen.

4.3. Operate Screen

The Operate screen displays the count or mass measurement. It is determined by the `Mode` setting. The Operate screen displays the sample status, date and time, battery status, sample data, location, temperature, and relative humidity. Figure 4 and Figure 5 shows the Mass and Count screens. Four size channels are displayed. Rotate the dial to display additional sizes and the location.

When sampling in mass mode, the size selection represents the upper threshold of your sample. For example, when you read the value for PM10 it contains all mass that is size PM10 and lower. Conversely, when sampling in count mode, the size selections represent the lower threshold of your sample. An example would be that the 1.0 µm cumulative size contains all particulate that are 1.0 µm and larger.

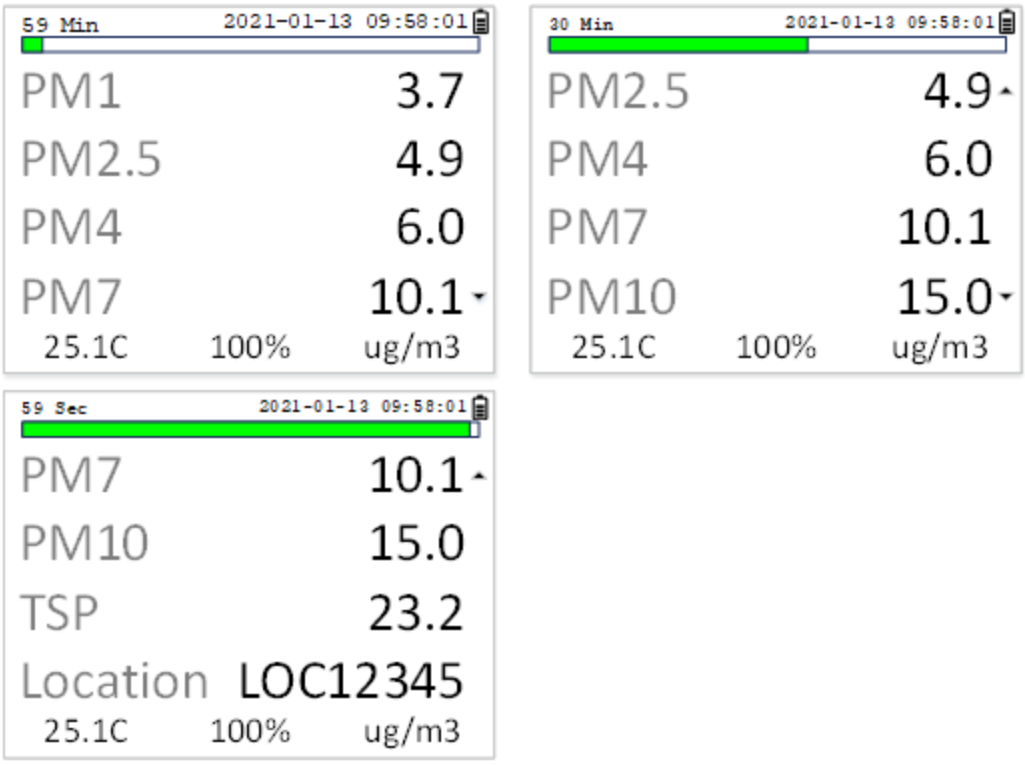

Figure 4 – Mass Operate Screen

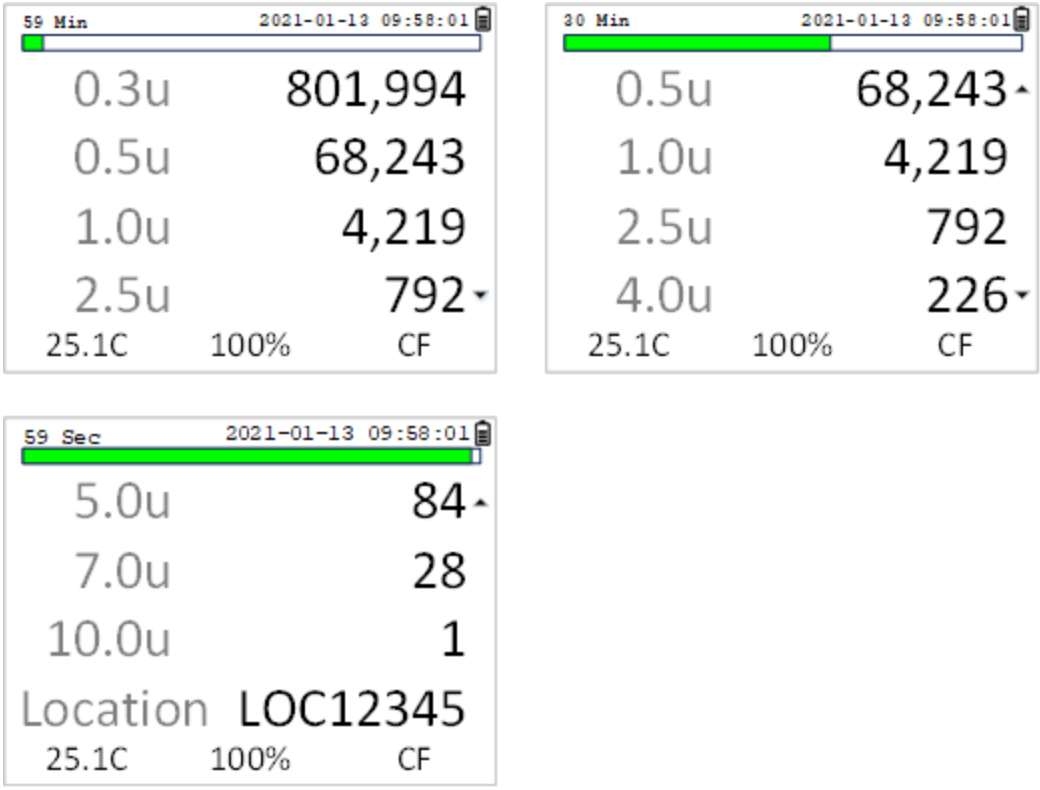

Figure 5 – Count Operate Screen

4.3.1. Sampling

The Operate screen displays current sample information when the unit is sampling (real time data). Concentration values are time dependent so these values may fluctuate early in the sample; however, after several seconds the measurement will stabilize.

4.3.2. Sample Status

The top of the Operate screen displays the status of the AEROCET 532 while the unit is sampling. The time remaining is shown at the top left of the screen. A status bar fills with green as time progresses. If a hold time is entered, the status bar will fill yellow during the hold time.

4.3.3. Sample History

Sample history (previous data) can be viewed on the Operate screen when the unit is stopped or sampling. Pressing the knob puts the operate screen in History Mode. History mode allows you to scroll through previously recorded samples and view the historical data. Once in history mode, press the knob to toggle between record scroll and data scroll. Record scrolls allows you to scroll between historical records (arrows at the top indicate history scroll mode). Data scroll allows you to scroll the data up and down and view each's channels data (arrows on the right indicate data scroll mode). Press **START** at any time to start a new sample. Figure 6 and Figure 7 show the history screen in both modes. Press ESC to exit history mode.

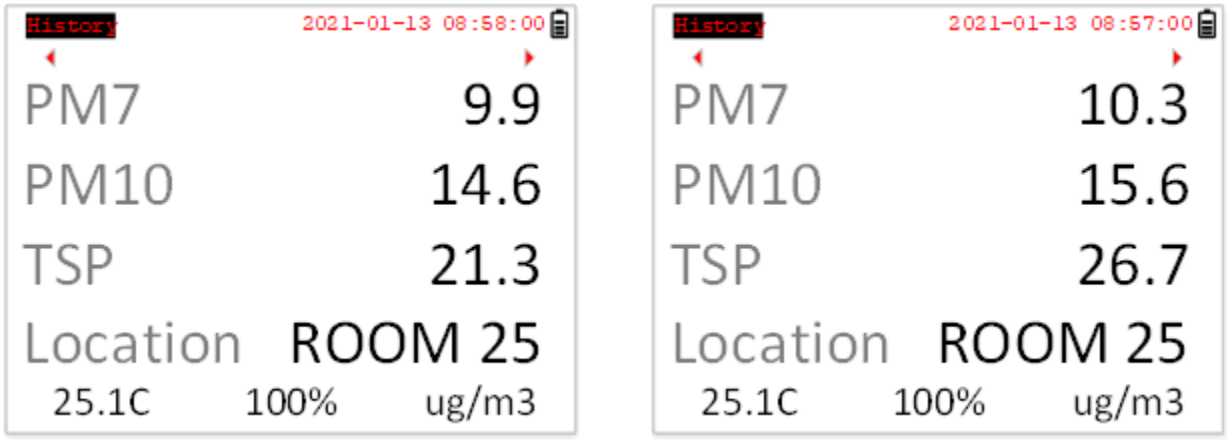

Figure 6 – History Record Scroll Screen

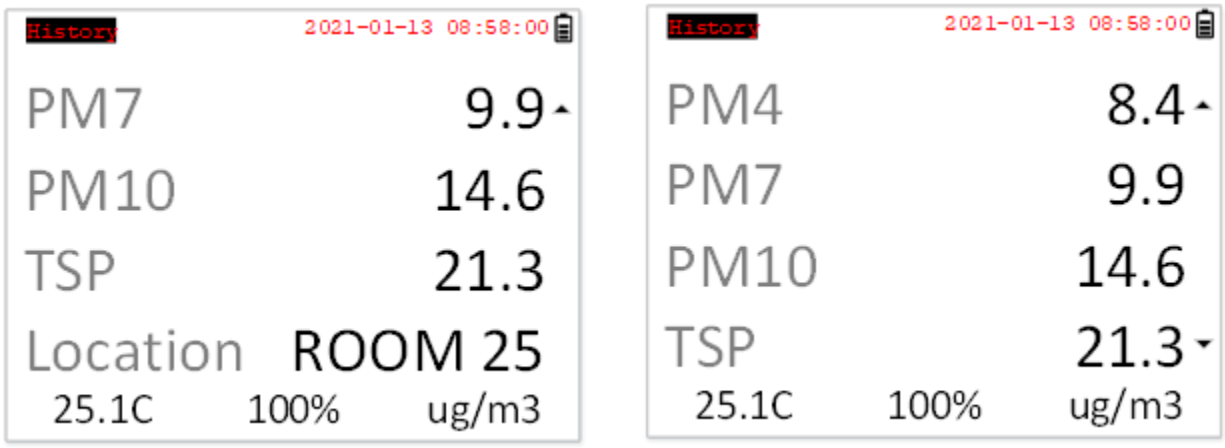

Figure 7 – History Data Scroll Screen

4.4. Sample Related Functions

The following sub-sections cover sample related functions.

4.4.1. Starting/Stopping

To start or stop a sample, press the **START/STOP** key. A sample event can be manually started or stopped from either the Operate screen or the menu.

4.4.2. Measurement Type

The measurement type determines if the instrument reports mass (µg/m^3) or particle concentration (particles/volume). Measurement type is discussed in section 5.2.

4.4.3. Sample Mode

The sample mode controls single sample or continuous sampling. The `Single` setting configures the unit for a single sample. The `Continuous` setting configures the unit for continuous sampling. Sample modes are discussed in section 5.2.3

4.4.4. Count Mode

The count mode determines if particle counts are displayed in `Cumulative` or `Differential` mode. Count modes are discussed in section 5.2.4

4.4.5. Sample Time

The sample time is the length of time the unit will sample for. In `Single` mode the unit will stop sampling after this period and in `Continuous` mode the unit will continue to sample at the sample time interval. The sample time is user selectable for 1, 2, 5, 10, 15, 30, or 60 minute samples.

4.4.6. Hold Time

The hold time is used when the sample mode is set to auto (continuous sample). The hold time represents the time from the completion of the last sample to the start of the

next sample. The hold time is user settable from 0 – 9999 seconds and is discussed in section 5.2.6.

4.4.7. Sample Timing

The following figures depict the sample timing sequence for both manual and auto sampling modes. Figure 8 shows the timing for manual sample mode. Figure 9 shows the timing for auto sample mode.

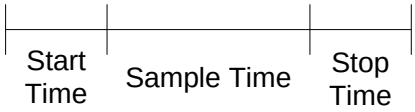

Figure 8 – Manual Mode Sample

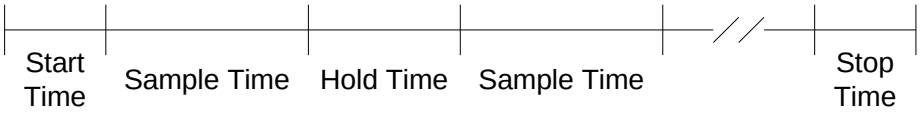

Figure 9 – Auto Mode Sample

5. Menu Selections

The Main Menu is accessible by pressing the **MENU** key on the Operate screen. The table below and Figure 10 show the Main Menu items. Rotate the dial to navigate to a menu item then press the dial to display a screen where you can view or change item setting(s).

Menu Item	Description	Press the dial to navigate to…
`Sample Setup`	View / change location ID, Mass / count mode, single or continuous mode, cumulative or differential count mode, sample time and hold time.	Sample Setup screen
`Toolbox`	View / change units, memory, K-factors, flow, and display.	Toolbox screen
`Initial Setup`	View / change serial settings, clock, and locations.	Initial Setup screen
`About`	Display firmware version, serial number, service contact, calibration date, and run time.	About screen

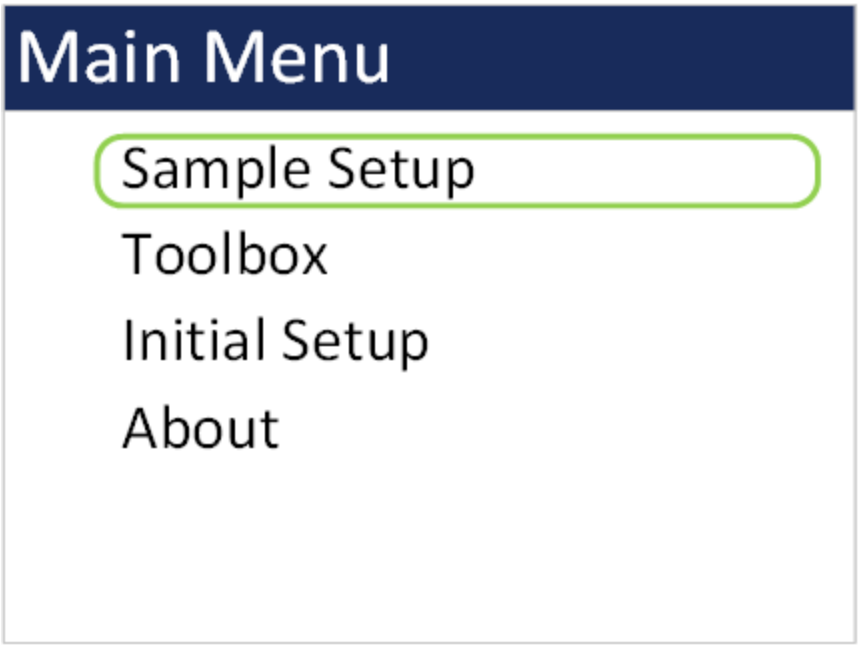

Figure 10 – Main Menu Screen

5.1. Edit Menu Items

To change settings, press **MENU** to display the Main Menu, rotate the dial to navigate to the desired item and press the dial to display the item view/edit screen.

To edit pick list items (e.g. `Sample Setup: Single` or `Continuous`), rotate the dial to navigate to the item. Press the dial to select the item. Rotate the dial to change the setting. Press the dial to save the setting or **ESCAPE** to cancel and return to the main value.

To edit alpha-numeric and numeric values (e.g. `Location`), rotate the dial to navigate to the item. Press the dial to select the item. Rotate the dial to increment or decrement a value. Press the dial to select the next character. Press the dial for all remaining characters to save the value or **ESCAPE** to cancel and return to the main value.

5.2. Sample Setup Screen

Figure 11 shows the `Sample Setup` Screen. The 6 parameters are covered in the following sections.

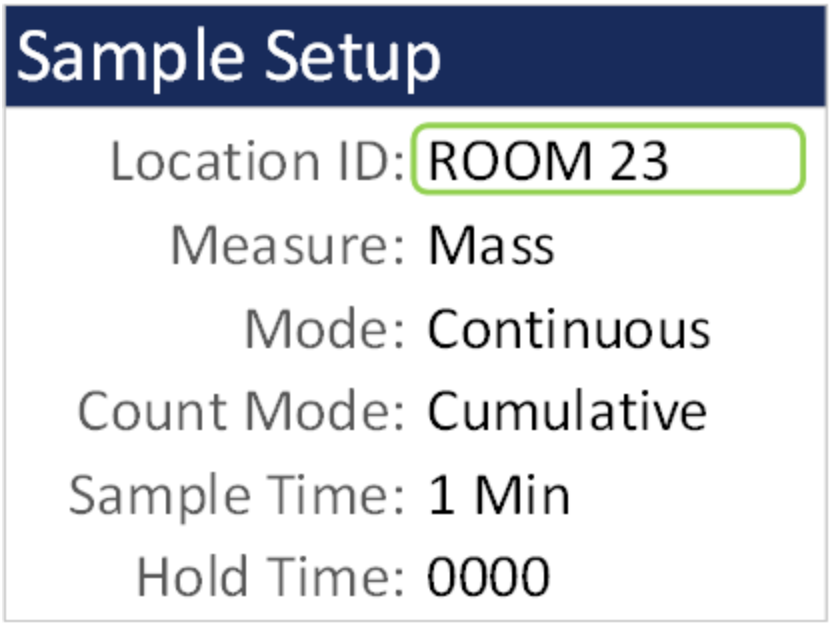

Figure 11 – `SAMPLE SETUP` Screen

5.2.1. Location ID

The `Location ID` is used to assign a unique name to a location or area. This important field is included in sample data records (display and csv output). Use the dial to scroll through a list of custom location IDs. To edit the list, see toolbox location ID in section 5.4.3.

5.2.2. Measure

The `Measure` is either `Mass` or `Counts` concentration.

Selection	Description
`Mass`	When `MASS` is selected the unit will report PM levels PM1, PM2.5, PM4, PM7, PM10 and TSP in µg/m^3.
`Counts`	When `COUNTS` is selected the unit will report fixed particle sizes: 0.3 µm, 0.5 µm, 1.0 µm, 2.5 µm, 4.0 µm, 5.0 µm, 7.0 µm, and 10.0 µm.

5.2.3. Mode

The sample `Mode` controls single sample or continuous sampling as illustrated below.

Selection	Description
`Single`	The `Single` setting configures the unit for a single sample.
`Continuous`	The `Continuous` setting configures the unit for continuous sampling.

5.2.4. Count Mode

The count mode determines if particle counts are displayed in `Cumulative` or `Differential` mode. `Cumulative` mode displays the particles as all sizes greater than the selected size. `Differential` mode displays the counts as all particles between the selected size and the next larger size channel. This setting is only valid for count measurement type and will not appear on the Sample Setup screen if `Mass` measure is selected.

5.2.5. Sample Time

The `Sample Time` is the length of time the unit will sample for. In `Single` mode the unit will stop sampling after this period and in `Continuous` mode the unit will continue to sample at the sample time interval. The sample time is user selectable from 1 minute, 2 minutes, 5 minutes, 10 minutes, 15 minutes, 30 minutes, or 1 hour.

5.2.6. Hold Time

The `Hold Time` is the time between samples when sampling in `Continuous` mode. The `Hold Time` is user settable from 0 – 9999 seconds. The pump will remain on during the hold period if the `HOLD` time is 60 seconds or less. The pump will stop after each sample, and start a few seconds before the next sample, if the `Hold` time is greater than 60 seconds. `Hold` times greater than 60 seconds will increase pump life, as well as increase operating time because of lower battery usage. This setting will not appear on the Sample Setup screen if `Single` mode is selected.

5.3. Toolbox Screen

Figure 12 shows the `Toolbox` screen.

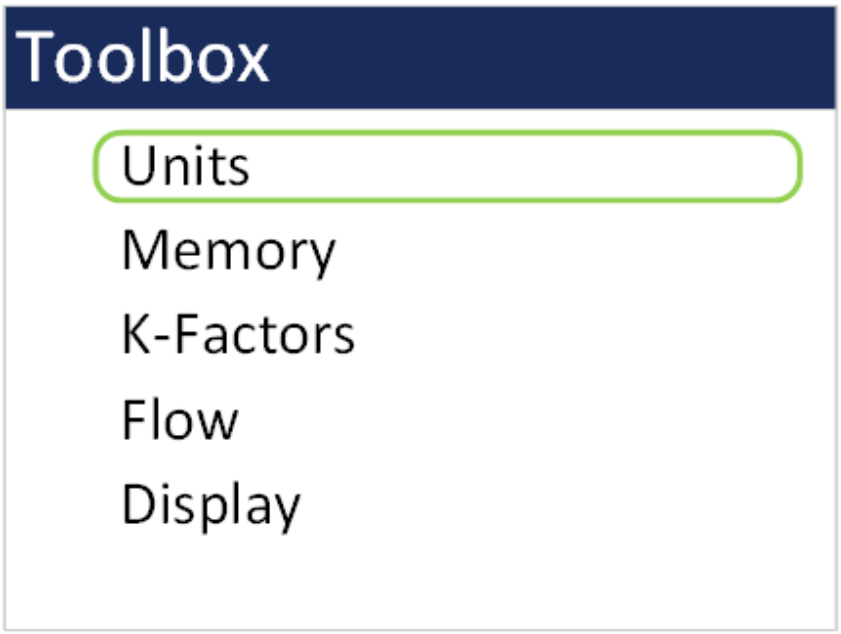

Figure 12 – `Toolbox` Screen

5.3.1. Units

The `Units` setting allows the volume and temperature units to be selected.

`Volume:` The AEROCET 532 supports total counts (TC), particles per liter (/L), particles per cubic foot (CF), and particles per cubic meter (M3). Particle count information updates while the unit is sampling. Concentration values (/L, CF, M3) are time dependent so these values may fluctuate early in the sample; however, after several seconds the measurement will stabilize.

`AT:` The AEROCET 532 displays ambient temperature (AT) in Celsius (C) or Fahrenheit (F).

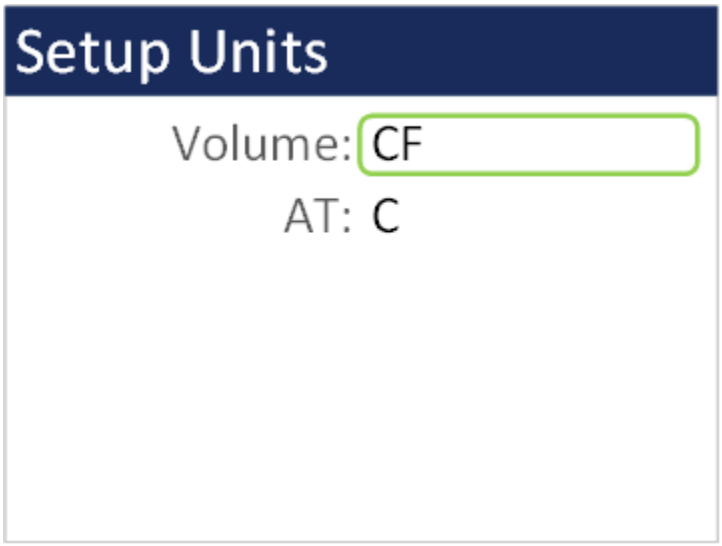

Figure 13 - `Units` Setup Screen

5.3.2. Memory

The `Memory` screen allows the user to view available memory or to clear the memory. The AEROCET 532 memory is circular, meaning when the memory is full, the unit will start overwriting the oldest saved samples with new samples. `Free` shows the percent of space available for data storage. When 0% is displayed, memory is full and the oldest data will be overwritten by new data. Viewing sample history is described in section 4.3.3. Select CLEAR to clear the unit's memory and return to the `Memory` screen. Select CANCEL to return to the `Memory` screen.

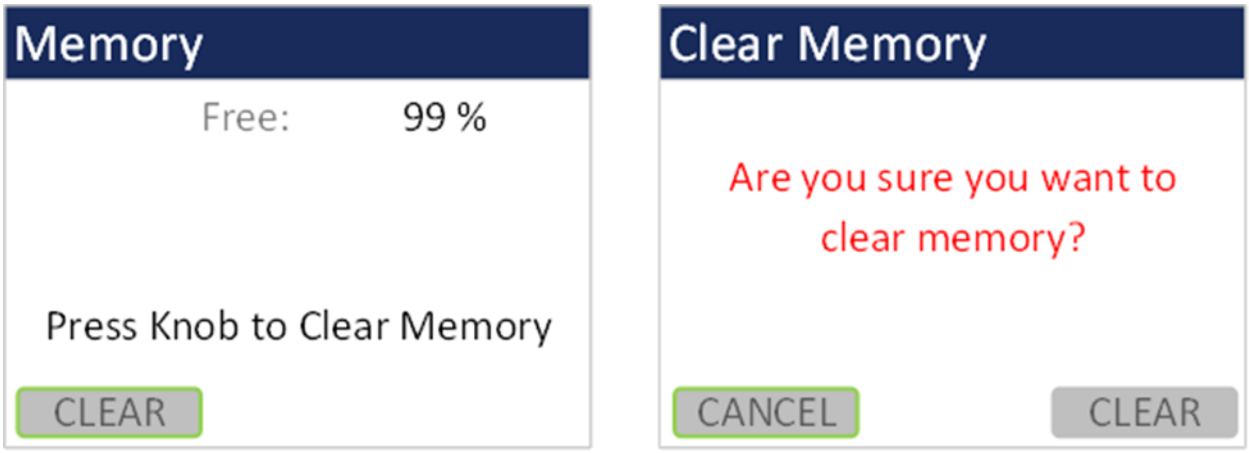

Figure 14 - `Memory` Screens

5.3.3. K-Factors

The K-Factor for each PM mass fraction can be set in the `K-Factor` screen. A K-Factor is a multiplier that is related to the specific gravity of the air being measured. It improves the accuracy of the mass measurement when derived from a reference or gravimetric device, because not all air is created equal.
The individual user k-factors for each mass channel can be set from 0.1 to 20.0.

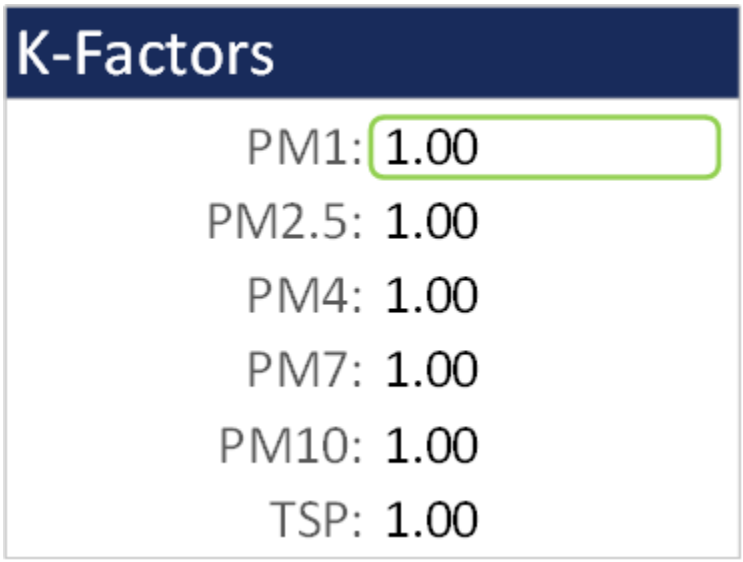

Figure 15 - `K-Factor` Screen

The AEROCET 532 calibration is performed using ideal polystyrene latex (PSL) spheres, which provide a powerful tool for assessing the sensitivity, accuracy, resolution, and false count level. The particle detector is compared to a reference mono-dispersed (single size) suspension of PSL spheres in clean filtered air for both calibration and certification of performance specifications. This calibration technique

provides a standard traceable reference and a measure of how well the unit maintains its reproducibility.

Calculate the K-Factor for each particulate size fraction as the reference concentration divided by the AEROCET 532 light scatter concentration over the same time period. For example, if the reference total concentration was 51 µg/m^3 and the AEROCET total concentration was 38 µg/m^3, then the K-Factor would be 51 divided by 38 or 1.34. The K-Factor is only valid at the same site and for the same particulate type. If the local particulate source changes, the K-Factor may no longer be valid. The accuracy of the mass output can be affected by variations in size, color, shape, and index of refraction of the sampled particles.

5.3.4. Flow

The `Flow` screen is where a flow calibration is performed. When this screen is selected, a warning will appear to use an external flow meter to adjust the AEROCET 532 flow to 2.83 LPM. Select OK to proceed or CANCEL to exit.
The pump will start automatically when you enter the `Flow` screen and stop when you leave the screen. Use the following procedure to adjust the flow rate when a periodic flow rate check (Section 8.3) indicates a flow rate error greater than +/- 5%.

1. Remove the isokinetic inlet.
2. Connect a reference flow meter to the inlet fitting on the top of the unit and allow the flow to stabilize.
3. Twist the dial clockwise to increase the flow rate and turn the dial counterclockwise to decrease the flow rate until the flow rate is 2.83 LPM (0.1 CFM) ± 5%.
4. Press the dial to save the calibration. Press ESCAPE to cancel without saving.

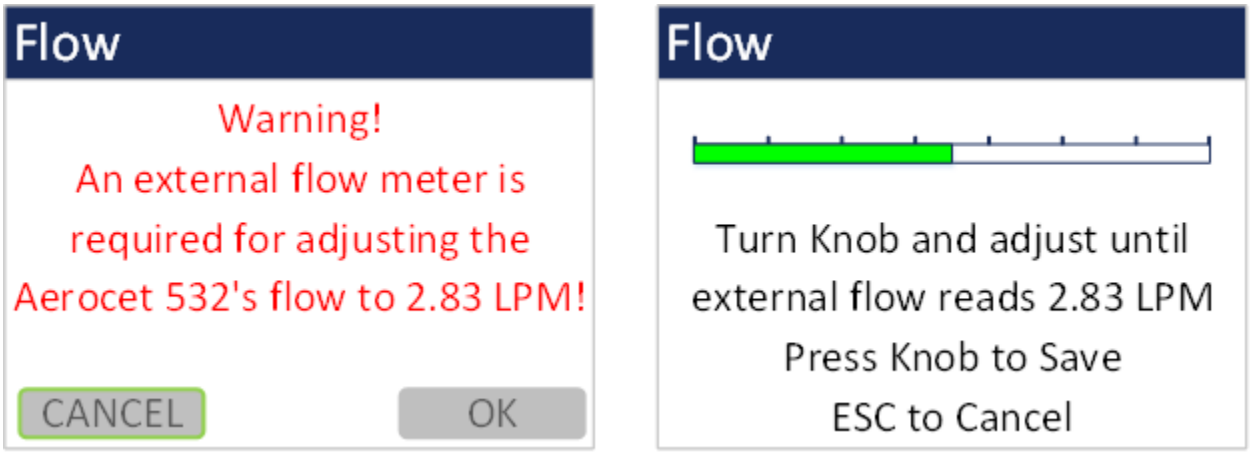

Figure 16 - `Flow` Screen

The progress bar shows the pump pulse width modulation (PWM) as a percentage. A green progress bar means the PWM is in a good place. An orange progress bar indicates the filter is getting close to needing to be replaced. A red progress bar indicates the filter needs to be replaced.

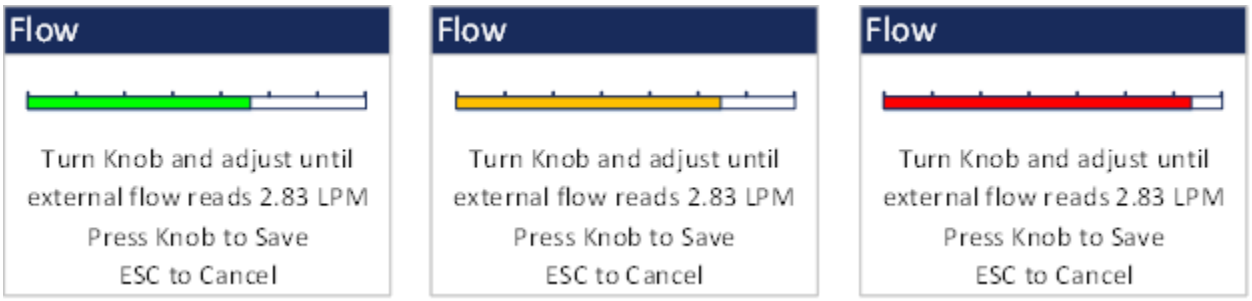

Figure 17 - `Flow` Screen Progress Bar Color Changes

5.3.5. Display

The `Display` screen allows the user to change the backlight brightness from 0-100% and select the display timeout to dim the screen for none, 1, 5, or 10 minutes.

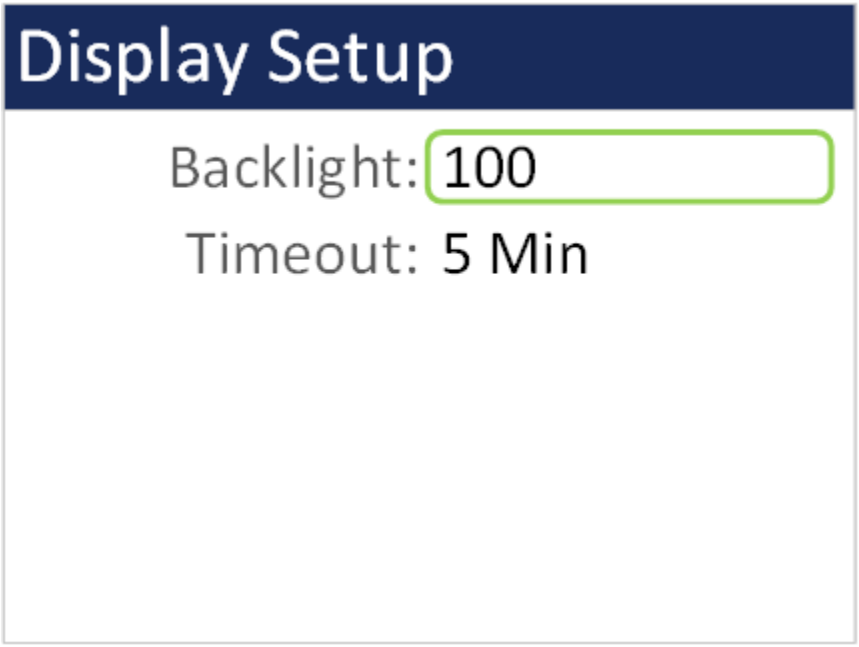

Figure 18 - `Display` Setup Screen

5.4. Initial Setup Screen

Figure 19 shows the `Initial Setup` screen.

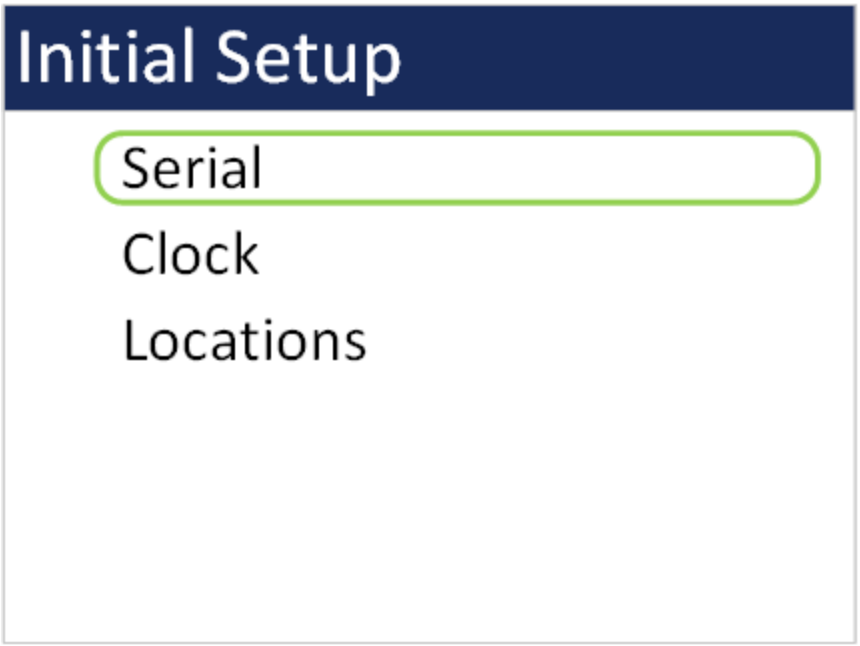

Figure 19 – `Initial Setup` Screen

5.4.1. Serial

The `Serial` setting controls the behavior of the AEROCET 532 RS-485 serial output hardware available on the optional docking station. The following table lists the `Serial` settings and describes their meanings.

Selection	Description
`Network ID`	Unique ID assigned to each device for networking mode (1 – 999)
`Modbus Addr`	This is the modbus address (1 – 247)
`485 Baud`	Baud rate for the 485-serial port. The baud rate list includes 2400, 4800, 9600, 19200, 38400, 57600, and 115200.

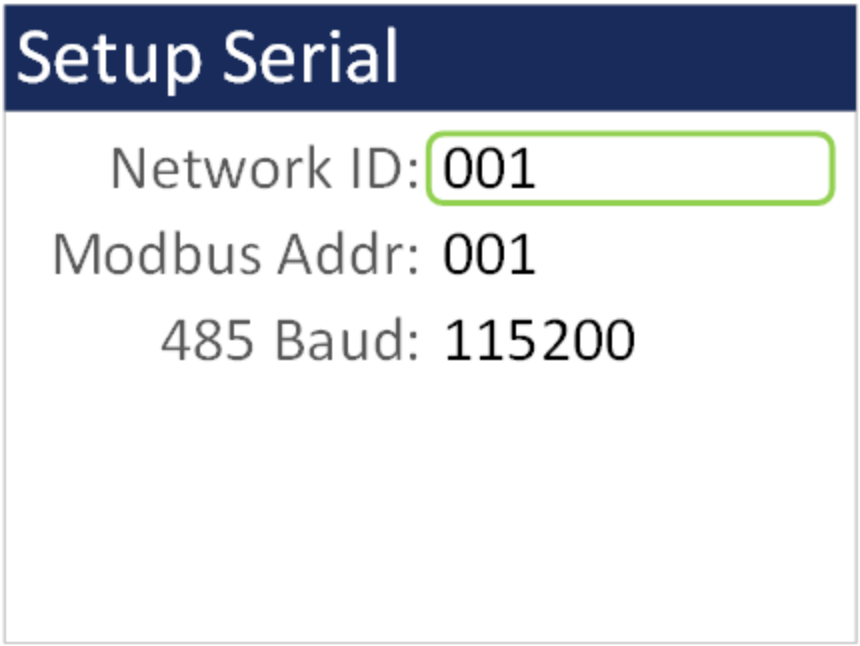

Figure 20 - Serial Setup Screen

5.4.2. Clock

Use the `Clock` selection to set the date and time. Turn the dial to select year/month/date/hour/minute/second to change. A green box will surround the selection. Press the dial to edit. Turn the dial to change, then press to confirm the change. Press the dial on the SET box to change the settings and return to the Initial Setup screen.

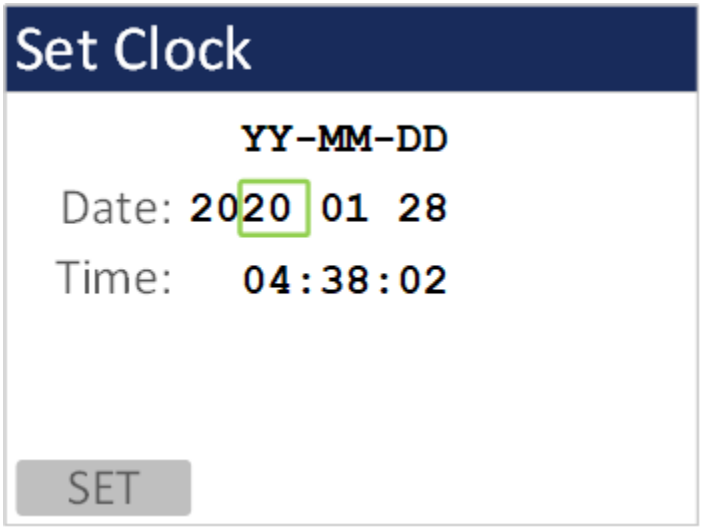

Figure 21 - Clock Screen

5.4.3. Locations

The `Locations` screen allows the user to set up to 10 predefined alpha numeric locations. Each location can use up to 7 characters. To enter a new location, press the dial on the location to change. Rotate the dial to scroll through alpha/number/space options for each character. Press the dial to select each character. All 7 characters must be selected to save the location ID. It is suggested to use spaces for a location with less than 7 characters.

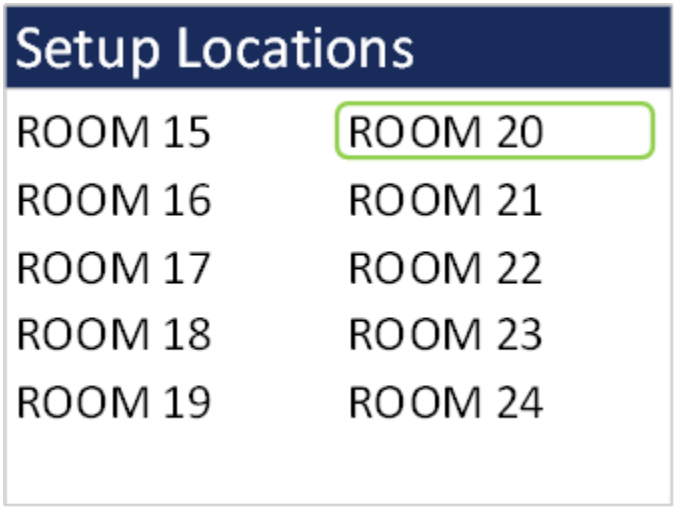

Figure 22 - `Locations` Screen

5.5. About Screen

Figure 23 shows the `ABOUT` screen. The `ABOUT` screen shows the manufacturer's serial number, the firmware version, Met One Instruments, Inc. service email and phone number, date of last calibration, and run time.

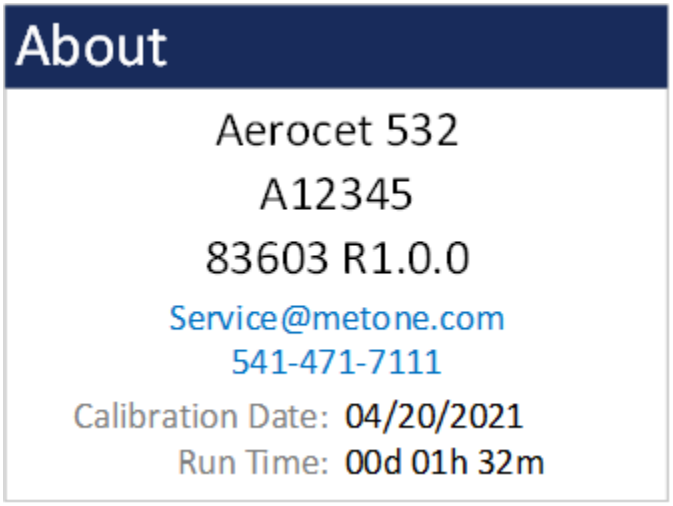

Figure 23 – About Screen

6. Charging the Battery

Caution:
The provided battery charger is designed to work safely with this device. Do not attempt to connect any other charger or adapter to this device. Doing so may result in equipment damage.

To charge the battery, connect the battery charger to an AC power outlet and the DC barrel connector to the socket on the left side of the AEROCET 532. The battery charger is universal and will work with power line voltages of 100 to 240 volts, 50 to 60 Hz. A discharged battery pack will take approximately 2.5 hours to fully charge.

When fully charged the battery inside the AEROCET 532 will power the unit for over 8 hours of continuous sampling. For continuous operation, operate the unit with the battery charger attached. Charge the battery before storing the AEROCET 532. Storing a discharged battery will degrade its performance.

7. Serial Communications

AEROCET 532 provides serial communications via the USB connector located on the right hand side of the unit. The following sections discuss the various serial communications available with AEROCET 532.

ATTENTION:
A Silicon Labs CP210x Driver for the USB connection must be installed before connecting to the USB Type C port.

Driver download weblink: https://metone.com/usb-drivers/

7.1. Commands

AEROCET 532 provides serial commands for accessing stored data and settings. All commands are terminated by a carriage return. These commands are not case sensitive. The following table lists the available commands. These commands are available via USB, WiFi, ethernet, and RS-485 hardware interfaces. The settings (baud rate, parity and stop bits) must match the computer setting for proper communication regardless of the hardware interface type.

Settings (must match computer settings):

- Baud Rate = 115200 (USB Default); 9600 (RS-485 Default)
- Parity = None
- Stop Bits = 1
- Flow Control = None

The following table lists the available commands:

Command	Description
?	Help command
1	Report settings
2	Report all the data
3	Report the new data
4	Report the last record(s)
A	Network address command
C	Clear the data file
E	Stop sample
H	Help Menu
Q	Exit Terminal Mode
S	Start sample
X	Exit Terminal Mode
BL	Back Light (%)
CM	Count Mode: CM 0=Cumulative, CM 1=Differential
CU	Count Units: CU 0=CF, CU 1= /L, CU 2= TC, CU 3=M3
DS	Report data log channel descriptors
DT	Date / Time
ID	Location ID
MA	Modbus Address (1-247)
MM	Measure Mode MM 0=Counts, MM 1=Mass
NW	Network On/Off
OI	Output Interval OI 0=Off, OI 1=On
PR	Print File
QH	Report data record header
RQ	Report (ReQuest) data record readings
RV	Report Firmware Revision
RZ	Report Measurement Sizes
SB	Get/Set USB Baud Rate. 3=2400, 4=4800, 5=9600, 6=19200, 7=38400,8=57600,9=115200.
SH	Hold Time (0-3600)
SK	Set PM K Factors. K Factor range is 0.1-20.0. PM1=1, PM2.5=2, PM4=3, PM7=4, PM10=5, TSP=6
SM	Sample Mode. SM 0=Single, SM 1=Continuous
SS	Serial Number
ST	Sample Time. ST 0=1-min, ST 1=2-min, ST 2=5-min, ST 3=10-min, ST 4=15-min, ST 5=30-min, ST 6=1-hour.
TU	Temperature Units. TU 0=C, TU 1=F
DISPTO	Manual Display Timeout. 0=None, 1=1-min, 2=5-min, 3=10-min.

7.2. Comma Separated Value (CSV)

The CSV report will be generated for each data inquiry. The CSV format for `Mass` and `Counts` is determined by the `Measure` setting. Both formats are fixed field length.

7.2.1. Counts Format

```
Count Data Report
2021-05-10 08:53:10
Serial Number, B12561


Time,0.3(M3),0.5(M3),1.0(M3),2.5(M3),4.0(M3),5.0(M3),7.0(M3),10(M3),AT(C),RH(%),Location,Seconds,Status
2021-05-07 15:39:09,06768198,01445936,00022968,00003180,00001413,00000706,00000353,00000353,+024.9,030,LOC1
,0060,0000
```

CSV Fields		
Field	**Parameter**	**Example Value**
1	Date and Time	2021-05-07 15:39:09
2	Channel 1 Size 0.3 (TC, /L, CF, M3)	06768198
3	Channel 2 Size 0.5 (TC, /L, CF, M3)	01445936
4	Channel 3 Size 1.0 (TC, /L, CF, M3)	00022968
5	Channel 4 Size 2.5 (TC, /L, CF, M3)	00003180
6	Channel 5 Size 4.0 (TC, /L, CF, M3)	00001413
7	Channel 6 Size 5.0 (TC, /L, CF, M3)	00000706
8	Channel 7 Size 7.0 (TC, /L, CF, M3)	00000353
9	Channel 8 Size 10 (TC, /L, CF, M3)	00000353
10	AT (C, F)	+024.9
11	RH (%)	030
12	Location	LOC1
13	Seconds	0060
14	Status	0000

7.2.2. Mass Format

```
Mass Data Report
2021-05-10 08:40:14
Serial Number, B12561

Time,PM1(ug/m3),PM2.5(ug/m3),PM4(ug/m3),PM7(ug/m3),PM10(ug/m3),TSP(ug/m3),AT(C),RH(%),Location,Seconds,Status
2021-05-07 15:39:09,001.6,001.6,001.7,001.8,001.8,001.9,+024.9,030,LOC1    ,0060,0000
```

CSV Fields		
Field	**Parameter**	**Example Value**
1	Date and Time	2021-05-07 15:39:09
2	PM1 (µg/m3)	001.6
3	PM2.5 (µg/m3)	001.6
4	PM4 (µg/m3)	001.7
5	PM7 (µg/m3)	001.8
5	PM10 (µg/m3)	001.8
6	TSP (µg/m3)	001.9
7	AT (C, F)	+024.9
8	RH (%)	030
9	Location	LOC1
10	Seconds	0060
11	Status	0000

Status Bits		
Bit	**Value**	**Condition**
	0	OK (no alarms or errors)
0	1	Not used
1	2	IOP Alarm (Laser)
2	4	Not used
3	8	Not used
4	16	Temperature Sensor Alarm
5	32	Pressure Sensor Alarm

8. Maintenance

Due to the nature of the instrument, there are minimal customer serviceable components in the AEROCET 532. The case of the AEROCET 532 should never be removed or opened for any reason. ***Opening or removing the case of the AEROCET 532 voids the warranty and may result in exposure to laser radiation, which can cause eye injury.***

8.1. Service Schedule

Although there are no customer serviceable components in the AEROCET 532, there are service items which ensure the proper operation of the instrument. Table 1 shows the service schedule for the AEROCET 532.

Time Period	Item	Manual Section
Weekly	Zero Count Test	8.2
Monthly	Flow Rate Test	8.3
Yearly	Annual Calibration	8.4
Yearly/As required	Filter change	8.5

Table 1 Service Schedule

8.2. Zero Count Test

Air leaks or debris in the particle sensor can cause false counts which may result in significant count errors when sampling clean environments. Perform the following zero count test weekly to ensure proper operation:

1. Attach zero count filter to the inlet nozzle (PN G3111).
2. Configure the unit as follows: Measure = Counts, Mode = Single, Sample Time = 1 minute, Volume Units = Total Count (TC).
3. Start and complete a sample.
4. The smallest particle size should have a count <= 1.
5. Run this test multiple times to flush out particles in the air stream if the goal is not met.

8.3. Flow Rate Test

The flow rate test verifies the sample flow rate is within tolerance. The reference flow meter must be non-loading because the vacuum pump can be loaded down by external restrictions. Met One Instruments sells suitable flow meters (PN 9801 or Swift 6.0). The flow rate test is described in section 5.3.4.

8.4. Annual Calibration

The AEROCET 532 should be sent back to Met One Instruments yearly for calibration and inspection. The annual calibration cannot be performed by the customer because this calibration requires specialized equipment and a skilled technician. Met One Instruments maintains a calibration facility for calibrating particle counters according to industry accepted methods such as ISO and NIST. The annual calibration also includes inspection and preventative maintenance to improve product reliability.

8.5. Filter Change

The AEROCET 532 filter cartridge is located on the bottom back instrument panel. A 0.2 micron filter, MOI part number 580302, is used to prevent particles from entering the sample pump. It can be removed by unscrewing the black aluminum filter holders with a coin using the slot in the face of the holder. The frequency of filter changes depends on the particulate concentrations measured.

8.6. Flash Upgrade

AEROCET 532 is firmware upgradeable via the serial connection using a Met One Instruments flash burn program. Binary files and the flash program must be provided by Met One Instruments.

9. Troubleshooting

The following section covers some common failure symptoms, causes and solutions. It is important to note that there are no customer serviceable components in this product. The AEROCET 531S case should never be removed or opened for any reason. **Opening or removing the case will void the warranty and may result in exposure to laser radiation, which can cause eye injury.**

Symptom	Possible Cause	Solution
Display does not turn on	• Low Battery • Defective Battery	• Charge battery • Send to service center
Pump does not turn on when a sample is started	• Low Battery • Defective pump	• Charge battery • Send to service center
Flow rate does not reach 2.83 LPM setpoint	• Dirty filter • Defective pump	• Change filter • Send to service center
Keypad/dial does not work	• Loose connector • Internal hardware failure	• Send to service center
Sample result is lower than normal	• Flow rate is low • Optics may be contaminated	• Perform flow rate test • Send to service center
Sample result is higher than normal	• Flow rate is high • Optics may be contaminated	• Perform flow rate test • Send to service center
Battery does not hold a charge	• Defective or worn out battery • Defective charger	• Send to service center
Low battery	• Low Battery	• Charge battery – the unit can sample while running on the charger

10. Specifications

Performance

Particle Counter Sizes	0.3 µm, 0.5 µm, 1.0 µm, 2.5 µm, 4.0 µm, 5.0 µm, 7.0 µm 10 µm
Mass Ranges	PM1, PM2.5, PM4, PM7, PM10, TSP
Concentration Range	0 – 3,000,000 particles per cubic foot (105,900 particles/L)
Particle Size Accuracy	± 10% to calibration aerosol
Mass Concentration Limit	0-1,000 µg/m^3
Flow Rate	0.1 cfm (2.83 lpm)
Sample Time	1, 2, 5, 10, 15, 30, or 60 minutes, or 1 hour
Hold Time	Adjustable: 0 to 9999 seconds

Electrical

Light Source	Laser Diode, 90mW, 780 nm
Battery	7.4V Li-ion battery pack.
Battery Life	8 hours continuous operation
Battery Charge Time	Fully changed in 2.5 hours
AC Adapter/Charger	Li-ion battery charger, 100 – 240 VAC, 50/60Hz
Communications	USB (WiFi, Ethernet, and RS-485 available on optional docking station)

Interface

Display	2.8 inch TFT full-color LCD
Keyboard	2 button membrane keypad with rotary dial

Physical

Height	8.8” (22.35 cm)
Width	3.75” (9.53 cm)
Depth	2.25” (5.72 cm)
Weight	1.00 lb 13.5 oz (0.84 kg)

Environmental

Operating Temperature	0º C to +50º C
Storage Temperature	-20º C to +60º C

Accessories

Supplied	Operation Manual	
	USB Cable	
	Comet Software	
	AC Adapter/Battery Charger	
	Iso-kinetic Sample Probe	
	RH and Temperature Probe	
	Carrying Case	
	Rubber Boot	
	Zero Particulate Filter	
Optional	Flow Meter kit	(PN 9801)
	Digital flow meter	(PN Swift 6.0)
	Docking Station	(PN 83529)

Warranty

Products manufactured by Met One Instruments, Inc. are warranted against defects and workmanship for a period of one (1) year from the ship date.

Any product found to be defective during the warranty period will, at the option of Met One Instruments, Inc., be replaced or repaired. In no case shall the liability of Met One Instruments, Inc. exceed the purchase price of the product.

This warranty may not apply to products that have been subject to misuse, negligence, accident, acts of nature, or that have been altered or modified other than by Met One Instruments, Inc. Consumable items such as filters, bearings pumps and batteries are not covered under this warranty.

Other than the warranty set forth herein, there shall be no other warranties, whether expressed, implied or statutory, including warranties of fitness of merchantability.

Service

Any product being returned to Met One Instruments, Inc. for service, repair or calibration, including items sent for warranty repair, must be assigned a return authorization (RA) number. Please call (541) 471-7111 or send an email to service@metone.com requesting an RA number and shipping instructions.

All returns must be shipped to the factory, freight pre-paid. Met One Instruments, Inc. will pay the shipping charge to return the product to the end user after repair or replacement of an item covered by warranty.

All instruments sent to the factory for repair or calibration must be free of contamination resulting from sampling chemicals, biological matter, or radioactive materials. Any items received with such contamination will be disposed and the customer will be billed a disposal fee.

Replacement parts or service/repair work performed by Met One Instruments, Inc. are warranted against defects in material and workmanship for a period of ninety (90) days from the date of shipment, under the same conditions as stated above.

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