MicronView®

BioAerosol Monitoring System | BAM®S

User Manual

Version: 1.2.1
Mar 2020
Doc No. YM1108112

Disclaimer

1. This instrument must be operated by trained laboratory personnel only.

2. Please power off the instrument when an exception occurs.

3. Read all instructions in this user manual carefully before unpacking and operating the instrument.

The MICRON VIEW LIMITED is not liable for any responsibility of system malfunction and its safety and effectiveness caused by violating the above disclaimer.

Content

Chapter 1 Introduction

1.1 Overview

The BioAerosol Monitoring System (BAM®S) is used to detect both inert and microbial particles in real-time, primarily in clean room environments. It is appropriate for use across many industries, such as aerospace, biopharmaceutical, medicine & health, electronics, food, and optics. Its main applications are clean class classification, clean room validation, contaminant source tracking, indoor-air quality monitoring, contaminant trend analysis, etc. The instrument provides the real-time feedback of air quality in clean rooms by monitoring both inert and microbial particles and can run 24x7. Contaminants can therefore be found early because of the continuous and real-time monitoring. BAM®S saves users time and enables more immediate action and resolution. Without traditional culturing methodology and consumables, BAM®S helps reduce both costs and reaction times.

General BAM®S characteristics and specifications

- Particluate size ranges measured: 0.5μm to 25.0μm
- Simultaneous detection of 6 channels
- Inert and microbial particle counts in real-time, without cultivation
- 24x7 continuous monitoring
- On-screen, real-time data curves
- Easy data review and printing
- Reporting standards: ISO/EUGMP/CHINESEGMP/Fed Std
- Minimalism design, weighing only 12.8lbs (5.8Kg)

1.2 Notes

1. The power supply requires AC 100-240V, 50/60Hz. The regulated power supply is recommended if the local power grid does not meet the requirements.

2. The device should be stored away from direct sunlight.

3. Do not allow corrosive gases, fume and liquid into the inlet.

4. Make sure the sample tubing is free from obstruction when connecting.

5. Only use in clean room environments to avoid inner contamination.

6. BAM®S and the inlet must be placed in the same pressure, temperature and humidity.

7. The USB flash drive is only used for system software upgrade and storage of BAM®S technical documents. We recommend that it is not for any other use.

8. If not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, or remove the equipment to the other place.

1.3 FCC Part 15 – Instruction

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The product model and approval code are displayed on the back of the device by laser engraving.

Produce name: BioAerosol Monitoring System

Model: M110

Manufacturer: Micron View Limited

Address: Suite 1, 3rd Floor,11-12 St. James's Square, London, SW1Y 4LB, United Kingdom

Chapter2 Specifications

2.1 Parts List

1. BioAerosol Monitoring System (BAM®S) Part No: MACHM110	2. Isokinetic probe Part No: J26A020004a
3. Adapter for filter Part No: J05A020008a	4. HEPA filter Part No: W0204000001
5. AC adapter Part No: BD14010002	6. Power cord Part No: XA1106081(CN), XA1106082(EU), XA1106083(US)
7. Sample tubing (3 meters) Part No: W0302000002	8.Rechargeable lithium battery Part No: BD14020004
9. USB flash drive (include User Manual) Part No: BD17030001	10. Carry case Part No: W0701050001
11. Documents: a. Quick start guide, b. Certificate of calibration	

2.2 Technical specification

Specification	BioAerosol Monitoring System
Size range	0.5μm - 25μm
Size channels	0.5μm, 1.0μm, 2.0μm, 3.0μm, 5.0μm, 10.0μm
Laser source	Long life laser
Size resolution	<15% @ 0.5μm (meets ISO 21501-4)
Count efficiency	50% ±20% for 0.5μm, 100% ±10% for >0.75μm (meets ISO 21501-4 and JIS B9921)
Flow rate	5LPM±3%
Flow rate control	Electronic, automatic closed-loop
Zone/Location	20,000 rooms and 200,000 locations
Sampling time	0.1 seconds to 999 hours 59 minutes 59 seconds
Delay	0-99 hours 59 minutes 59 seconds
Cycles	1000 samples on one location
Interval	0-99 hours 59 minutes 59 seconds
Sampling mode	Manual, auto, beep, cumulative count Σ/ differential count Δ or concentration
Zero count	<1count/5min
Concentration limit	4,000,000 particles/ft^3 at 10% coincidence loss
Exhaust	Internal HEPA filter (>99.997%@0.3μm)
Display	8" LCD capacitive touch screen
Language	Chinese, English
Communication	RJ45, USB, SENSER-HUB, WIFI
Capture the biological Contamination sample	Connect the BioAerosol Sampler (BAS) via WIFI/USB to collect the biological contamination sample in real time
Reports	Compliant with ISO/EUGMP/CHINESEGMP/Fed Std
Export file	PDF file or EXCEL file
Data storage	119G
Data security	Authority management, authority level divide into admin, operator and supervisor
Data reliability	Compliant with 21 CFR Part 11
Print	Auto or Off-line

Alarm	Audible built-in alarm
Calibration frequency	Recommend once a year
Dimensions (HxWxD)	10x7.87x10.39 in/255x200x264mm (with handle and foot mat)
Weight	12.8lbs/5.8Kg (without battery)
Enclosure	316L Stainless Steel and anodized aluminum
Power	AC 100-240V, 50 Hz/60 Hz
Battery	10.8V, 9Ah, rechargeable lithium battery
Power consumption	AC 32W
Operating conditions	Temperature: 5°C -35° C / 41°F - 95°F Relative humidity: 5-90% non-condensing
Storage conditions	Temperature: 0°C -40° C / 32°F - 104°F Relative humidity: 5-90% non-condensing
Safety	EN 61010-1:2010, EN 61326-1:2013, EN 61326-2:2:2013, EN 60825-1:2014, EN 61000-6-1:2007, EN 61000-6-3:2007+A1, FCC Part 15, Subpart B, EN 300 328 V2.1.1: 2016, ETSI EN 301 489-1 V2.2.0: 2017, ETSI EN 301 489-17 V3.2.0: 2017, EN 62311:2008, EN 62479: 2010
Warranty	One year after activation

Chapter3 Safety Instructions

3.1 Installation

Caution
Do not use the device near ethyl alcohol, paint thinners or any other inflammable materials. If inflammable materials come into contact with the electrical components inside the device, it could be a fire hazard.
Do not place any containers with water or liquid on the device. Shut down the device immediately when any liquid falls into or splashes into the device. In addition, if the power cord or any cables are connected, disconnect immediately. Unplug the power cord entirely.
Do not place the device on an unstable location (such as an unstable platform or sloped surface). Do not place the device where is vulnerable to severe vibration. Any of these conditions can result in damage to the device or personal injury for those nearby.
The rear exhaust ensures the proper gas path function. Blockage the exhaust could cause overheating and malfunction, potentially creating a fire hazard.
Do not place the device on the following location, or it could be a fire hazard. · Direct sunlight · Locations susceptible to high temperatures. · Close to any open flame.

3.2 Power supply

Caution
Do not disassemble or modify the cable.
Do not place the heavy objects on the cable. Keep the cable away from heat source. Otherwise, the insulating layer of the cord may melt and could be an electric shock hazard or a fire hazard.
Do not stretch the cable, or it may become loose, overheating and could be a fire hazard.
The cable may be damaged if it is placed under strain. Using a damaged cable may result in accidents such as fire or electric shock.
Do not handle the power cord or cable with wet hands, or it could be an electric shock hazard.
Do not place any items on the AC adapter. It could cause overheating and result in fire or electric shock.
Do not use an AC adapter that is not supplied by MicronView, or it could be a fire hazard.
Do not use the supply voltage out of range of AC adapter, or it could be a fire hazard or an electric shock hazard.
To unplug, always grasp the power cord. Do not stretch the cable, as it may expose the core of the cable or damage the insulation. It may result in electric leakage, and it could be a fire hazard or an electric shock hazard.

3.3 Operation

Caution
Do not disassemble or modify the device. Exposure to the high temperature parts, mechanical parts and laser inside the device could result in personal injuries such as burns, blindness, etc.

If abnormal noise, fume, overheat or strange odors are detected, shut down the device and disconnect the attached cords or cables immediately. Contact the local distributor. If continue to use, it may result in fire.

Do not use the inflammable spray near the device. If the inflammable materials contact the electrical components, it may result in a fire hazard or electric shock hazard.

3.4 Maintenance and Inspection

Caution
Use only MICRONVIEW-supplied battery when the battery needs replacement. Shut down the device and disconnect the attaching plug to avoid the electric shock.
To avoid fierce collision and keep from source of heat, or it could be a fire hazard or an explosion hazard.
Wet the clean wiper with 70-80% ethyl alcohol or isopropyl alcohol and clean the device surface. Do not allow the ethyl alcohol or isopropyl alcohol to have contact the electrical components inside the device, or it may result in malfunction.

Chapter4 Installation

External view of BAM®S.

Sample inlet

Exhaust

Battery cabin

Port panel

Power button
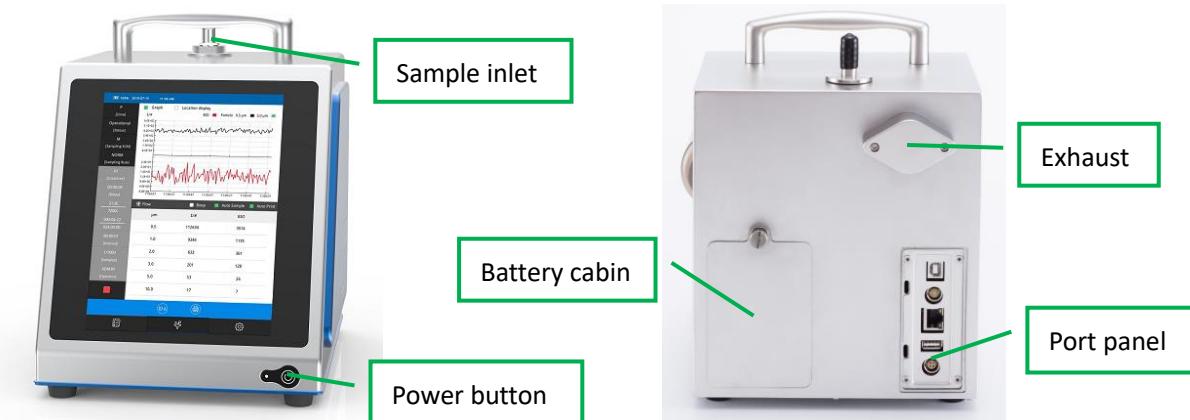
4.1 Battery installation

(1) Remove the battery cover at the rear of the device and insert the battery (note the installation direction). See chart 4-1.

(2) Close the battery cover.

Chart 4-1 Battery installation

4.2 Isokinetic probe installation

(1) Connect the isokinetic probe and sample inlet with a sample tubing. See chart 4-2.

(2) Fix the isokinetic probe on the adjustable tripod mount (optional), and connect the isokinetic probe and sample inlet with a sample tubing.

Chart 4-2 Isokinetic probe installation

4.3 Communication interface

The applications of interfaces on the back of the device are described as blow.

Title	Description
TEST	For calibration
SENSER HUB	External sensor, beep sensor controller and other communication application
RJ45	Network connection
USB A	For data export and software upgrade
POWER	24V AC adapter input

Chapter5 Operation

5.1 Startup

Press the power button in the lower-right corner of the front of the device. The white indicator lights up to indicate the device is switched on and the login interface appears. See chart 5-1-1. Input the username and password to enter the sampling interface. (The factory default username is "ADMIN", and password is "0".) There are three functional tabs on the bottom of the screen: data, sampling and setting, respectively. Touch any tab to enter the corresponding functional interface. See chart 5-1-2. If ADMIN password is forgotten, please contact us to retrieve the password by 【Forgot your password】 icon.
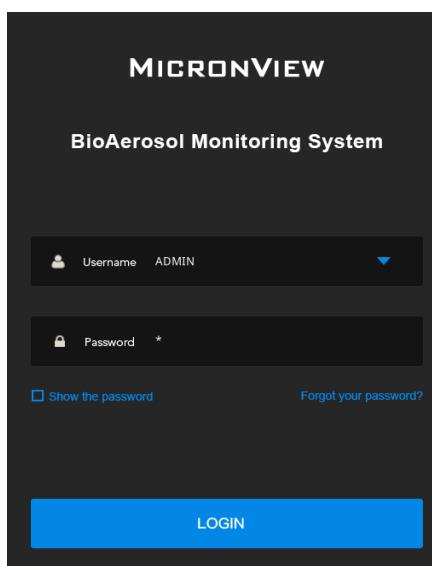
Chart 5-1-1 Login

Chart 5-1-2 Functional tabs

5.2 Function keypad

Touch an input area to activate the soft keyboard. Touch 【OK】 icon and the soft keyboard will be hidden. See chart 5-2-1.
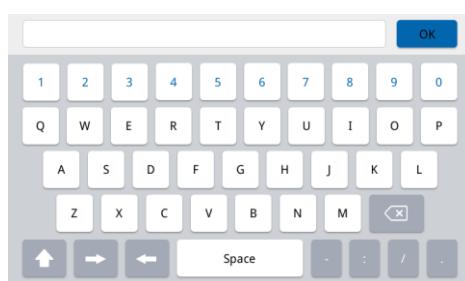

Chart 5-2-1 Soft keyboard

When inputting the time, the time keyboard will be activated. Select the number via the up arrow/down arrow, or directly input the number with the number keyboard on the right side. Touch 【OK】 icon and the number keyboard will be hidden. See chart 5-2-2.
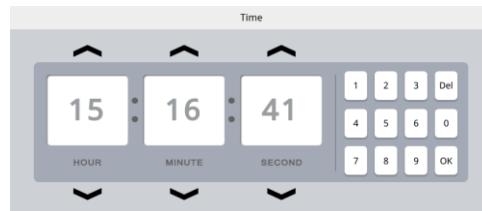
Chart 5-2-2 Time keyboard

The function and interface of the date keyboard are similar to the time keyboard. See chart 5-2-3.


Chart 5-2-3 Date keyboard

5.3 Setting
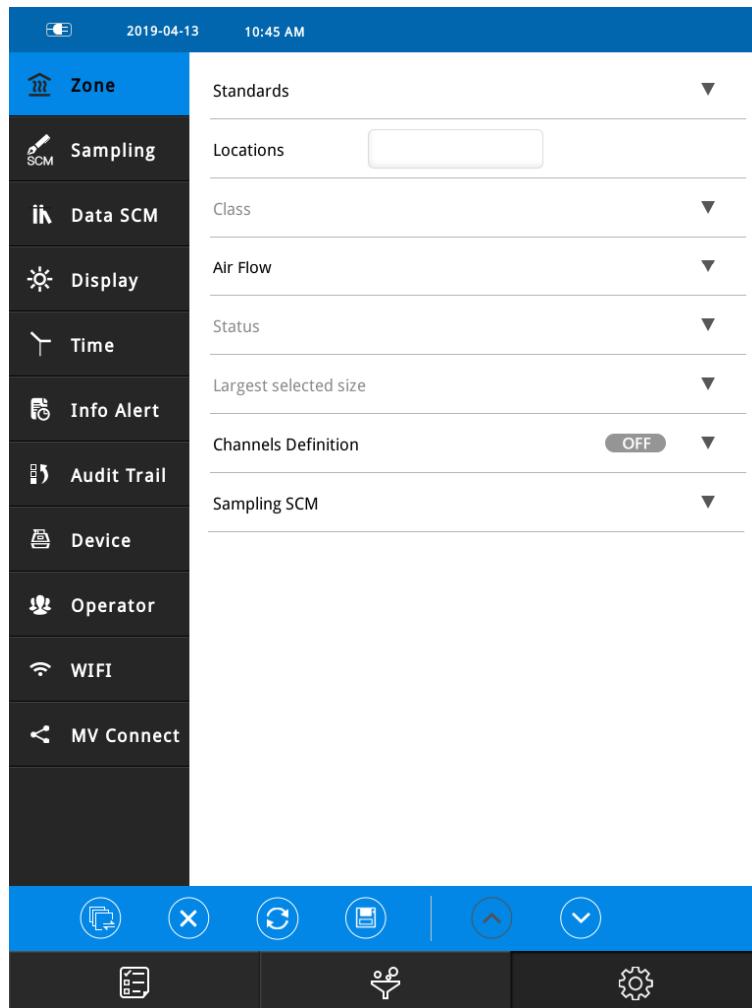
Chart 5-3-1 Setting

5.3.1 Zone

Zone is used for setting up and managing the room where the sample is being taken. The information can be added, amended or removed in this menu. The sampling scheme can be associated with the room here. Touch 【Zone】icon of the left menu in the setting interface to set up the room information. See chart 5-3-2.

Name		▼
Area		m²
Standards		▼
Locations		
Class		▼
Air Flow		▼
Status		▼
Largest selected size		▼
Channels Definition	OFF	▼
Sampling SCM		▼

Chart 5-3-2 Zone

Title	Description
Name	The name of the room where the sample is being taken. Touch the input area to enter a new room and add room information, touch 【🖫】icon to save the settings. Touch 【▼】icon to select an existing room from the pull-down menu. Touch 【🔍】icon to find a room, and touch 【OK】icon to confirm. The room "default" is a system default room. It can be modified, but it cannot be deleted. See chart 5-3-3.
Area	The area of the sampling room.
Standards	Select the standard from the pull-down menu. The standards include ISO 14644-1: 1999, ISO 14644-1: 2015, EUGMP-ISO: 1999, EUGMP-ISO: 2015, Chinese GMP 2010-ISO: 1999, Chinese GMP 2010-ISO: 2015, Fed Std 209E F, Fed Std 209E M.
Locations	The number of locations in the sampling room. If the area is entered, locations will be calculated automatically depending on the selected standard. The number can be modified. The minimum value is 1.
Class	Select the class from the pull-down menu. If the standard is changed, the class will change, accordingly.
Air Flow	The direction of the air flow in the sampling room. The options are Non-unidirectional and Unidirectional.
Status	The status of the sampling room. The options are Operational, At-Rest and As-Built.
Largest selected size	The size channel, according to the standard, is used to calculate the minimum sampling volume.
Channels Definition	Turn on/off the display and alert of the size channel and set the threshold of the alert value. See chart 5-3-4.
Sampling SCM	Select an existing sampling scheme from the pull-down menu, or touch 【⊕】icon to add a new

	scheme. One room can be associated with several schemes. See chart 5-3-5.
(export/import icon)	Export zone information and sampling scheme as db files to USB flash drive, or import it from the USB flash drive to the device. When importing the exported db files to the device, the contents of zone information and sampling scheme in the file will overwrite the original content in the device. Note: When the software version of the device changes, such as the Settings of the zone information and sampling scheme, it may cause import and export failures, or cause device crashes.
(save icon)	Save new or modified rooms.
(X icon)	Delete current room.
(refresh icon)	Empty the current content.

Chart 5-3-3 Zone name

Chart 5-3-4 Channels Definition

Chart 5-3-5 Sampling SCM

When modify a room settings, touch 【 】 icon to select the save method. Select "Cover the original zone" to save the changes in the original room. And select "Save as a new zone" to create a new room. See chart 5-3-6
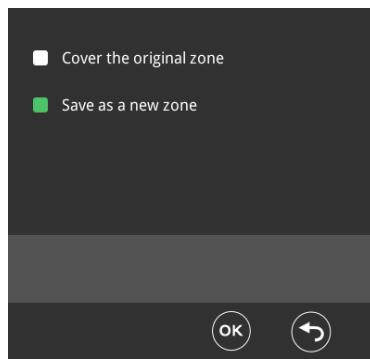
Chart 5-3-6 Save options

5.3.2 Sampling SCM

Sampling SCM is used for setting up the scheme for sampling. The scheme consists of volume, sample time, delay, etc. It can be added, amended or removed in this menu. The sampling SCM can be associated with zoom here. Touch【Sampling】icon of the left menu in the setting interface to set the scheme. See chart 5-3-7.

Chart 5-3-7 Sampling SCM

Title	Description
Name	The name of sampling SCM. Touch the input area to enter a new scheme, touch 【▤】 icon to save the settings. Touch 【▼】 icon to select an existing scheme from the pull-down menu. Touch 【🔍】 icon to find a scheme, and touch【OK】icon to confirm. The scheme named "default" is a system default sampling scheme. It can be modified, but it cannot be deleted. See chart 5-3-8.
Volume	The volume of air collected in each sampling.
Sample Time	The time of each sampling.
Delay	The time period before the first sampling is being taken.
Samples	The number of samples on one location.
Interval	The time period between the samples on one location.
Pumping Mode	Select Auto or Manual from the pull-down menu. Auto: on one location, the sampling will stop after all the samples are finished. Manual: on one location, the sampling will continue after pressing the start icon, when one

	sample is completed.
Zone Info	Select an existing room from the pull-down menu. One sampling scheme can be associated with several rooms.
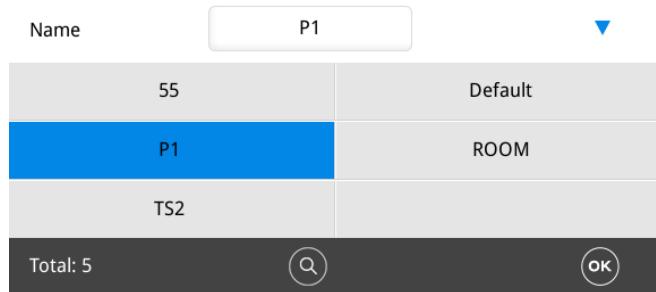
Chart 5-3-8 Sampling SCM name

5.3.3 Data SCM

Data SCM is used for configurating the data for reviewing, printing, exporting, print language and storing.

Chart 5-3-9 Data SCM

Title	Description
Counting Mode	REC rate: the recording rate of real-time data. The minimum is "00:00:05". Real-time data is recorded every 5 seconds. Touch the time area to activate the time keyboard and input the time. Setting the differential/cumulative count mode, particle unit and size channel for the data displaying during the sampling. See chart 5-3-10. Cumulative count: the number of particles in and above the selected channel. Differential count: the number of particles between the selected channel and adjacent channel. Particle unit: #, #/ft^3, #/m^3. Size channel: 0.5/1.0/2.0/3.0/5.0/10.0μm. All of the particle size channel or part of the particle size channel can be selected to display.
Data Review	Data Review is used for setting review mode in the data interface. The function and interface of the data review are similar to the counting mode.
Auto Print	The data will be printed automatically after each sampling is completed. If NORM mode is selected, data of one location will be printed when sampling(s) of this location are all completed.

	If the Custom mode is selected, data of each sample will be printed when this sample is completed. 【ON】indicates the auto-print is turned on.【OFF】indicates the auto-print is turned off. The print information such as Device Model, Calibration Date, Serial NO and statistics (Average, 95%UCL) can be set. The settings of differential/cumulative count mode, particle unit and size channel are the same as Counting Mode.
OffLine Print	The function and interface of the OffLine Print are similar to the Auto Print.
Export Data	The function and interface of the Export Data are similar to the Auto Print.
Print Language	Chinese and English are supported.

Chart 5-3-10 Counting Mode

5.3.4 Display

Chart 5-3-11 Display

Title	Description
Sampling Standby	If there is no operation within the set time, the device will be in standby during the sampling. If a password is selected, username and password should be entered to wake up the device.
Leisure	If there is no operation within the set time, the device will be in standby. If a password is selected,

Standby	username and password should be entered to wake up the device.
Auto Shutdown	In standby mode, if no operation is performed on the device within the set time, the device will be shut down automatically.
Brightness	Move the progress bar to adjust the brightness of the screen.
Language	Chinese and English are supported.

5.3.5 Time

Time is used for setting up the system time on the device. Touch the input box on the right of the date and enter the current date. Touch the pull-down menu and select the date format of YY-MM-DD, DD-MM-YY, MM-DD-YY. Touch 【⊞】 icon to save the settings. The setting of the time is the same as the date. See chart 5-3-12.

Date	2018-09-04	
Date Format	YY-MM-DD	▼
Time	10:38:38	
Time Format	12 Hour	▼

Chart 5-3-12 Time

5.3.6 Info Alert

CAL. Remind	15	day	OFF
Error Alarm			⊲))
Counting Alarm			⊲))

Chart 5-3-13 Info Alert

Title	Description
CAL. Remind	The reminder starts reminding when the next calibration date is a certain number of days away. If it is less than the set days, " ** days since the last calibration" will display upon startup. 【ON】 indicates reminder is turned on. 【OFF】 indicates reminder is turned off.
Error Alarm	⊲)): Audible alarm is turned on. ⋪): Audible alarm is turned off. If laser or flow error occurs during sampling, the alarm will buzz when the audible alarm is turned on.
Counting Alarm	⊲)): Audible alarm is turned on. ⋪): Audible alarm is turned off. If the number of particles is over the threshold during the sampling, the alarm will buzz when audible alarm is turned on.

5.3.7 Audit Trail

An audit trail is a security-relevant chronological record, set of records that provide documentary evidence of the sequence of activities that have affected at any time a specific operation, procedure, or event. All the operations from login to logout can be recorded. It consists of setting, sampling, export data, etc. Each line of

the record shows the operator's ID and the login time. The records are listed in chronological order. The first line is the latest one. Touch the 【▼】 icon to review the details. See chart 5-3-14, 5-3-15.

86	2019-04-13 18:53:01	ADMIN
85	2019-04-13 18:47:24	ADMIN
84	2019-04-13 18:39:39	ADMIN
83	2019-04-13 10:44:42	ADMIN
82	2019-04-13 10:42:42	ADMIN
81	2019-04-13 10:34:35	ADMIN
80	2019-04-13 10:34:20	unknown
79	2019-04-13 10:29:53	unknown
78	2019-04-12 16:31:08	ADMIN
77	2019-04-12 16:30:28	unknown
76	2019-04-12 16:23:21	ADMIN
75	2019-04-12 16:20:54	ADMIN
74	2019-04-12 16:12:33	ADMIN

Chart 5-3-14 Audit Trail

Date/Time	Log
2019-04-13 18:53:01	Login
2019-04-13 18:55:52	Add sampling SCM:
2019-04-13 18:56:15	Save display
2019-04-13 18:56:55	Modify zone:

Chart 5-3-15 Detailed Audit Trail

5.3.8 Device

Device is used for displaying the information of the software and firmware. It includes device name, model, serial number, firmware version, software version, etc. The software can be upgraded on this interface. See chart 5-3-16.

Update is used for upgrading the software version. BAMS supports continuous version upgrades and cross version upgrades. Insert the MicronView USB into the USB A port on the back of the device. Touch the 【Update】icon, search and select the upgrade file, touch 【√】icon to confirm. See chart 5-3-17.

Chart 5-3-16 Device
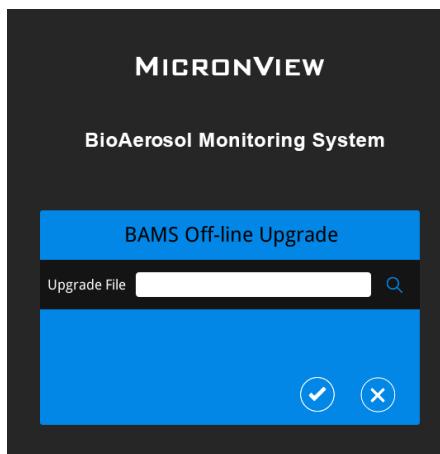
Chart 5-3-17 Upgrade

5.3.9 Operator

Operator is used to create and modify accounts. Only the ADMIN account has the right to enter this interface for relevant settings.

Title	Description
Account	The default account is ADMIN, and the password is 0. The password can be changed, but the ADMIN account cannot be deleted. When creating a new account, enter the account name.
Group	The level of account is classified as admin, supervisor and operator.
Enabled	**ON**: indicates the current account is enabled.**OFF**: indicates the current account is disabled.
Access Authority	The operator account can be configured for different access authority. Access authority include zone, sampling SCM, data SCM, display, time, info alert, device, WIFI,MV connect, audit trail, offline print, export data and clear samples.

Password/ Re-Confirm	Set and confirm the password, the two passwords must be the same.

Chart 5-3-18 Operator

5.3.10 WIFI

WIFI is used for connecting with the wireless network. Touch【Scan】icon to search the wireless network nearby, select the wireless network need to be connected and enter the password. Touch【Connect】icon to connect to the internet. The icon on the top right corner of the screen means the network is connected. See chart 5-3-19.

Chart 5-3-19 WIFI

When connecting to the Data Acquisition system of MicronView, enter the IP address of the device. Touch 【**Connect**】 icon to connect to the device. See chart 5-3-20.
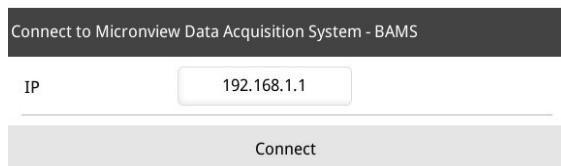
Chart 5-3-20 Connect MicronView Data Acquisition system

Connect to an external device is used for setting IP address of an external device which is ready for receiving the data from the device in the same LAN. The data can be transferred when the IP is set and tested. See chart 5-3-21.
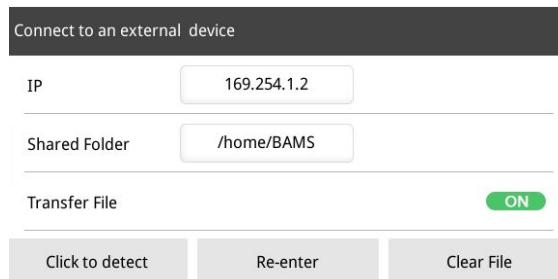
Chart 5-3-21 Connect to an external device

Title	Description
IP	Input the IP address. IP indicates the IP address of the external device (Linux systems) which is ready for receiving the data from the BAM®S in the same LAN.
Shared folder	Input the NFS (Network File System) shared directory of the external device (Linux systems). (Note: The share function of the associated device should be turned on.)
Transfer file	Touch this icon to open or close the file transfer function. If "on" is selected, it is divided into two cases. (a) With external device is connected, the sample data will be transferred to shared directory during sampling. (b) With no external device is connected, the sample data will be transferred to temporary directory of BAM®S during sampling.
Click to detect	Touch this icon to detect if the BAM®S can connect with the external device in this LAN. If touched, the message "Detecting…" appears. If the connection is correct, the message "Communication successful. Please save the setting." is displayed. Otherwise, the message "Link failed" is displayed. When connection failed and **Transfer File** icon is on, the files can also be saved, but the files cannot be transferred.
Re-enter	Touch this icon to clear the current content.
Clear File	Touch this icon to clear all the junk files locally cached in the BAM®S. (Note: sample data will not be affected.

5.3.11 MV Connect

MV connect is used for the collaborative work of BAM®S and BAS by network interconnection. Need to connect the BAM®S and BAS in the same wireless network. Enter the IP address of BAS that need to be connected. Set the threshold of the particle/BIO, the threshold can be concentration limit and particle in unit time, set the time unit and sampling volume. See chart 5-3-21. Touch 【**Connect**】 icon to connect the BAM®S

and BAS, the ⮜ icon will display on the upper-right of the screen after successfully connecting. When BAM®S start sampling, the BAS will start sampling automatically when the particles exceed the threshold.

Chart 5-3-21 MV Connect

5.4 Sampling
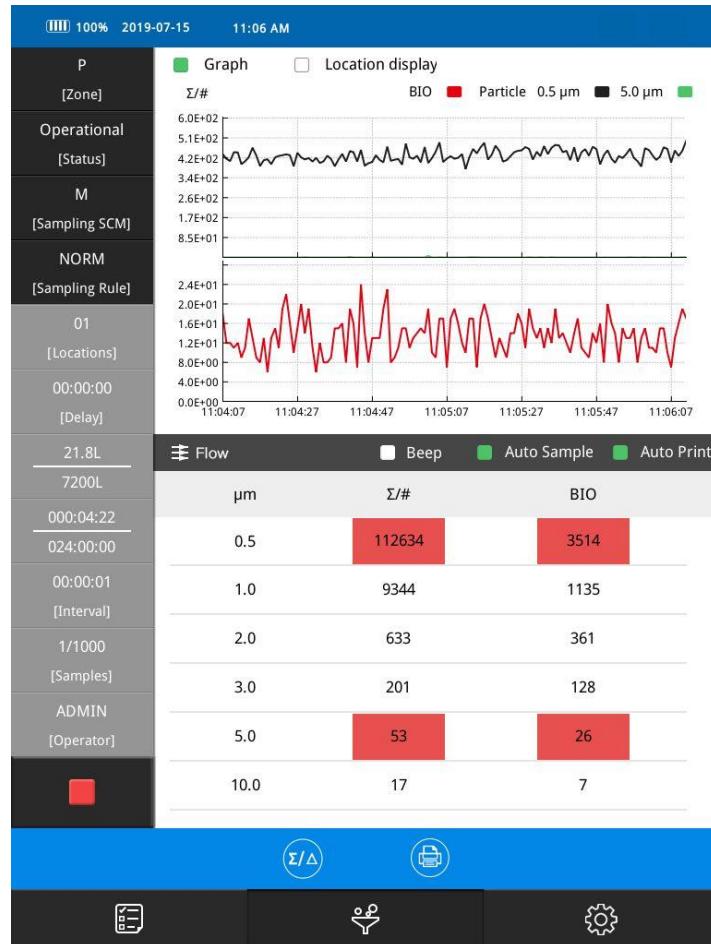
Chart 5-4-1 Sampling

Title	Description
Zone	Touch【Zone】icon to open the room list, and select the sampling room.
Status	Touch【Status】icon to select the status of the sampling room. The options are Operational, At-Rest and As-Built.
Sampling SCM	Touch【Sampling SCM】icon to open the sampling scheme list, and select the sampling scheme.
Sampling Rule	Sampling rule consists of NORM mode and Custom mode. The NORM mode is used for the samplings per ISO/EUGMP/CHINESEGMP/Fed Std. Under this mode, parameters cannot be modified after the room and sampling scheme are selected (the background of sampling conditions turn to grey.) If the sampling process is stopped, the result of the standard report is invalid. The Custom mode is used for sampling for other purposes. Under this mode, sampling parameters such as location, volume, sample time can be modified and a sampling can be stopped at any moment.
Locations	The location cannot be changed under the NORM mode. It can be a selection list option under the Custom mode.
Delay/ Interval	In auto mode, the first sample of each location complies with the delay. The following samples comply with the interval. In the case of manual mode, all samples comply with the delay. The sampling can be stopped during delay and interval. Press the start icon again to continue the sampling. In the case of custom mode, delay and interval can be changed at any moment. The countdown mode is used for delay and interval.
Volume	This shows the current sampled volume (above the line) and total volume of the sample (below the line). In NORM mode, the volume cannot be changed.
Sample Time	This shows the current sampled time (above the line) and total time of the sample (below the line). In NORM mode, the sample time cannot be changed.
Samples	This shows the number of samples which are being taken in the current location (left of the split) and the total number of the samples (right of the split).
Operator	The operator's account.
Beep	BEEP Mode: a beep will emit when sampling value of preset particle size range reaches the threshold. Touch【Beep】icon to select the beep mode, and the parameter menu will display. See chart 5-4-2. Set the particle type, particle range and threshold.
Auto Sample	If checked, the sampling will stop after all the samples on one location are finished.
Auto Print	If checked, the data will be printed automatically after each sampling is complete. If NORM mode is selected, data of one location will be printed when sampling(s) of this location are all completed. If manual mode is selected, data of each sample will be printed when this sample is completed.
Graph	The curves show the instantaneous data of the 0.5μm particle, 5.0μm particle and bioparticle channel in real time.
Location display	It shows the number of locations in the sampling room. Flashing green light indicates the sampling is underway in this location. Green light indicates the location which the sampling has completed. Flashing red light indicates alarm appears during the sampling, and this location should appear in red. In NORM mode, the location will appear in red light if sampling is artificially terminated. See chart 5-4-3.
(Σ/Δ)	Set the counting mode, counting unit and size channel for the data displaying during the sampling. Counting mode consists of ∑ cumulative count and Δ differential count. Cumulative count: the

	number of particles in and above the selected channel. Differential count: the number of particles between the selected channel and adjacent channel. Counting unite: #, #/ft^3, #/m^3. Size channel: 0.5/1.0/2.0/3.0/5.0/10.0µm. All of the particle size channel or part of the particle size channel can be selected to display
[printer icon]	Print the sample data.
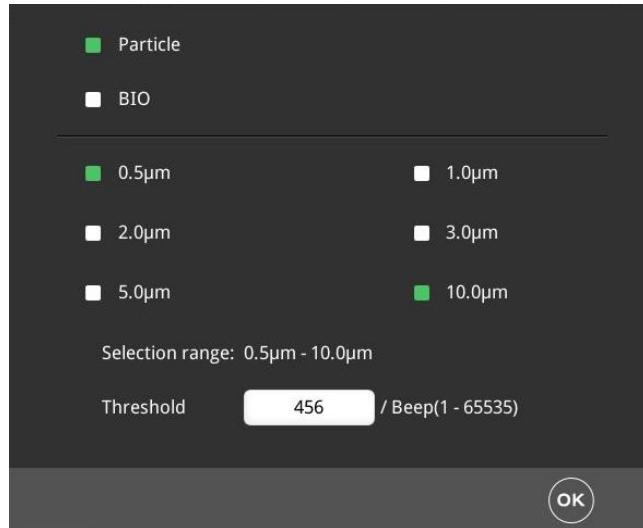
Chart 5-4-2 Beep mode

Chart 5-4-3 Location display

When all the sampling conditions are set, touch【▶】icon to start sampling. Touch【■】icon to stop sampling. If over-limit alarm occurs during the sampling process, the background of over-limit value will turn to red. If the audible alarm is turned on, the buzzing alarm will be continuous. Touch red area to turn it off.

5.5 Data

Data is used for reviewing, exporting and printing the sampling records and alarm records. See chart 5-5-1.
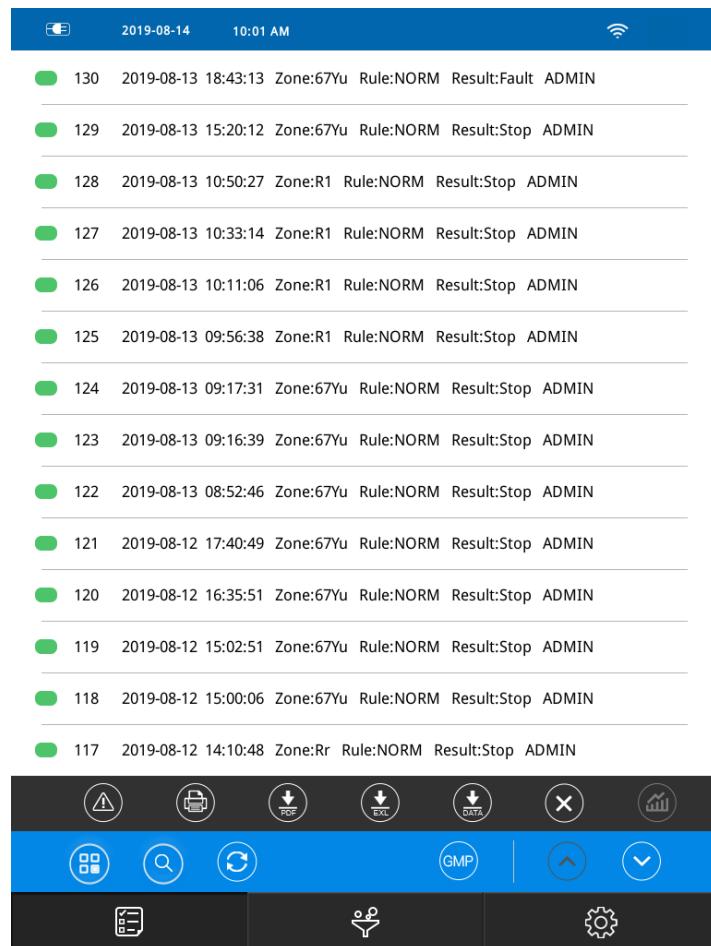
Chart 5-5-1 Data

| Title	Description
⊞	Touch【**More function**】icon to open the extended menu bar, touch again to close it. The extended function includes Error RECs, Print Data, Export Data, Delete Data and Graphs. Touch the corresponding function icon to open the function interface. See chart 5-5-2.
⚠	To review the list of error records. The errors consist of flow errors and laser errors. Touch any record to view all the content for that record. When there are more records than shown on the screen, touch the up arrow or down arrow to move up and down the screen.
🖨	Print the data, touch【**OK**】icon to print out.
PDF	Export PDF file is used for exporting the period records to a USB flash drive as PDF files. One or multiple period records can be exported.
EXL	Export Excel file is used for exporting the period records to a USB flash drive as Excel files. One or multiple period records can be exported.
DATA	Export data file is used for exporting the data source (db file) of period records to a USB flash drive.
✕	【**Delete**】icon, touch it and the prompt "According to data management, all sample data of this device will be deleted" will pop up, touch【**OK**】icon to delete.
📊	【**Graph**】icon, touch it to gathering the real time data in graphical form. See chart 5-5-3.

	【Return】icon ,return to the previous menu.
	【Search】icon, find the required records via search criteria such as start/end date, operator and zone.
	【Clear】icon, clear the current content.
	Set the counting mode, counting unit and size channel for the data displaying during the sampling.
	To generate the standard report compliance with ISO, EUGMP, CHINESEGMP and Fed Std. The data will be analyzed statistically to determine if the samples meet the requirements according to the selected standard. The result shows "Pass" when the requirements are met, otherwise the result shows "Fails". If the sampling conditions do not meet the minimum requirements, the result shows "Invalid".

Chart 5-5-2 More function
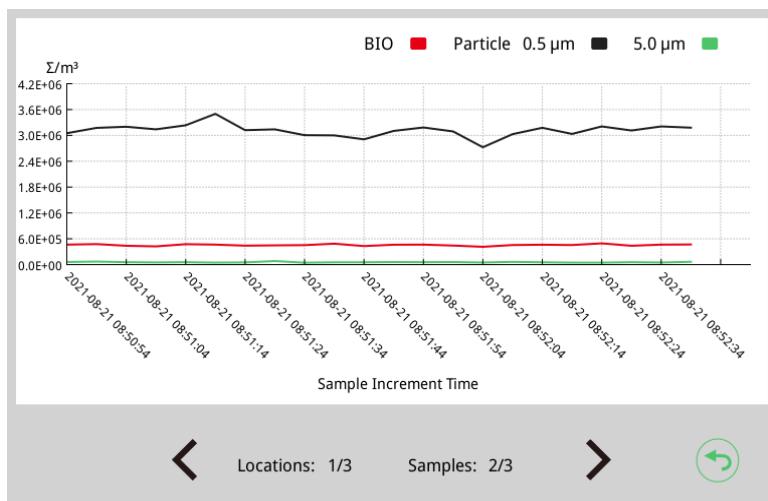
Chart 5-5-3 Graph

Touch any data to open the detailed data table. See chart 5-5-4. Touch【▼】icon to review the real time data. See chart 5-5-5.

	2019-04-13	10:45 AM				
	2018-08-21 04:03:24 Zone:56 Operator:ADMIN Rule:NORM					
	Result:Stop Standards:ISO14644-1:2015 Status:Operational Laser:OK Flow:OK					

	Locations	Samples	0.5µm		5.0µm	
			B	P	B	P
AVE	01	2	42078	1019877	4060	4413
Total-AVE			42078	1019877	4060	4413
SD			-	-	-	-
UCL			-	-	-	-
MAX			84092 ID: 7	2038203 ID: 7	8119 ID: 7	8823 ID: 7
MIN			64 ID: 8	1551 ID: 8	2 ID: 8	3 ID: 8

ID: 7	Locations: 01		Samples: 1/2	Time:	04:03:24 - 04:21:23	
Δ/#	0.5µm	1.0µm	2.0µm	3.0µm	5.0µm	10.0µm
▼ B	84092	44828	19913	12877	8119	442
P	2038203	191464	29480	15178	8823	807

ID: 8	Locations: 01		Samples: 2/2	Time:	04:21:24 - 04:21:24	
Δ/#	0.5µm	1.0µm	2.0µm	3.0µm	5.0µm	10.0µm
▼ B	64	32	19	13	2	0
P	1551	143	27	16	3	1

ALL	Total RECs: 10	Samples: 12	Used space: 0.01G/119.2G
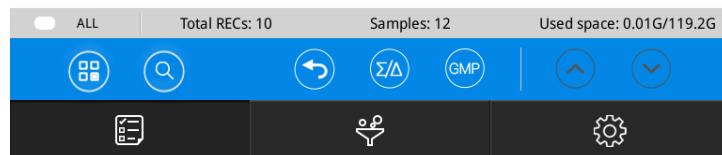
Chart 5-5-4 Detailed data

ID: 7	Locations: 01		Samples: 1/2	Time:	04:03:24 - 04:21:23	
Δ/#	0.5µm	1.0µm	2.0µm	3.0µm	5.0µm	10.0µm
▼ B	84092	44828	19913	12877	8119	442
P	2038203	191464	29480	15178	8823	807
04:03:24 B	487	205	100	72	42	4
P	11503	968	140	82	46	5
04:03:29 B	451	207	90	70	44	2
P	11269	977	132	77	45	3
04:03:34 B	475	247	101	64	42	2
P	11419	981	147	71	48	4

Chart 5-5-5 Real time data

5.6 Shutdown

Press the power button, and the shutdown prompt appear.
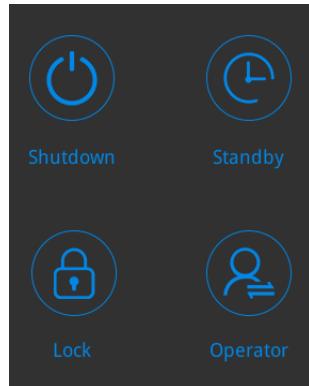
Chart 5-6-1 Shutdown

Title	Description
Shutdown	Shut down the device.
Standby	The screen dims and goes into standby mode. Touch the screen to light up again.
Lock	If the screen is locked, no operation can be performed. Touch the screen to login again, and unlock it.
Operator	Login screen pop up to change the user's account.

Chapter 6 Printer

6.1 External Dimensions
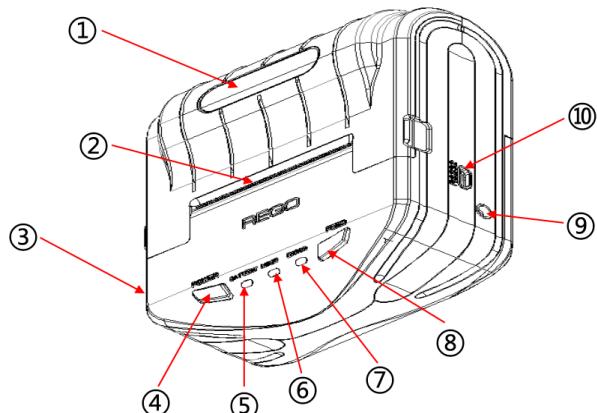
Dimensions (length×width×height)	120mm × 97mm × 49mm
Part Name	
1. Paper Cover	2. Paper Exit
3. USB Port	4. Power Button
5. Battery Indicator	6. Mode Indicator
7. Error Indicator	8. Feed Button
9. Power Port	10. RS232 Port

6.2 Operating Procedure

1) Press the **POWER** button to turn on the printer.
2) Touch 【**WIFI**】 icon in the settings interface of BAM®S, then touch 【**Scan**】 icon, select the WIFI named RG-MDP58B, touch【**Connect**】icon (no password needed). After the connection is successful, the WIFI logo will appear in the upper right corner of the screen.
3) Make sure the paper has been installed. Print the data via BAM®S's print function.
4) Press the **POWER** button to power off after printing is completed.

6.3 Install paper roll

To install the paper roll into the printer, pinch each end of the paper cover to open it, and insert the paper roll (the glossy side of the paper face down). Pull out a small amount of paper, then close the cover.
In the power-on state, press the **Feed** button to feed the paper and release it to stop.

6.4 Specifications

Printing method	Lattice stylus printing
Printing width	48mm
Resolution	127 dpi (5 dot/mm), 240 dot/line
Printing speed	6.6 mm/sec
Paper requirements	Width: 58mm, thickness: 60-85μm

Connection	WIFI
Supply mode	DC 12V 2A or 2000mAh, 7.4V rechargeable lithium battery.
Operating temperature/humidity	0°C~50°C/10~80% RH
Storage temperature/humidity	−20°C~70°C/10~95% RH
Weight	Approx. 250g ((without paper roll and battery)

Chapter 7 Troubleshooting and Maintenance

7.1 Troubleshooting

No.	Common Problem	Possible Cause	Corrective Action
Hardware and software			
1	"Communication fault, please see Section '6.1 Troubleshooting' of the BAMS user's manual" is displayed.	Severe electromagnetic interference or system malfunction.	Confirm to shut down the device and restart.
		Internal parts are damaged.	If the problem persists after restart, return to MicronView or the local distributor for service.
		AC adapter is not plugged or the battery is dead	Check the AC adapter and re-plug it,. Then re-start the device.
2	The loading bar is no response when export too much data.	Too much data is selected to export.	Too much data may cause long delays. If there is no response, touch the return button to export again.
		The USB flash drive is damaged.	Contact MicronView or the local distributor.
		The USB port is damaged.	Return to MicronView or the local distributor for service.
3	Battery information error; The remaining charge (available) time is in error; "Battery abnormal. Please shut down to check." is displayed.	System malfunction.	Shut down and restart the device.
		The battery is in poor contact.	Shut down the device. Reinstall the battery and restart.
		Internal parts are damaged.	Return to MicronView or the local distributor for service.
4	Unable to standby.	Standby is not turned on.	Turn on the standby in the setting interface.
		System malfunction.	Shut down and restart the device.
		Internal parts are damaged.	Return to MicronView or the local distributor for service.
5	Device does not turn on.	System malfunction.	Shut down and restart the device.
		Internal parts are damaged.	Return to MicronView or the local distributor for service.
6	Device does not shut down.	System malfunction.	Touch the shutdown icon repeatedly. If the problem persists, long press the power icon for 10 seconds to force a shutdown and restart.
		Internal parts are damaged.	Return to MicronView or the local distributor for service.
7	Wired or wireless network error	Network configuration settings are not in accordance with the user manual.	Set the network configuration in accordance with the user manual.

		Network cable is in poor contact.	Reconnect the network cable or replace with another one.
		Severe environment interference.	Move the device away from the metal shield of the environment.
		Internal parts are damaged.	Return to MicronView or the local distributor for service.
8	Blower does not work when sampling.	System malfunction.	Shut down and restart the device.
		Internal parts are damaged.	Return to MicronView or the local distributor for service.
9	Error alarm or counting alarm is without voice prompt.	Audible alarm is not turned on.	Turn on the audible alarm in the setting interface.
		System malfunction.	Shut down and restart the device.
		Internal parts are damaged.	Return to MicronView or the local distributor for service.
Hardware			
10	Device does not turn on.	Internal short circuit.	Observe the indicator light when supply with AC adapter. If the light is off, return to MicronView for service. If the light is on, an internal short circuit is not the issue.
		The AC adapter does not work.	If the problem persists after plugging in the AC adapter again, replace the AC adapter.
		Internal parts failure.	Return to MicronView for service.
		Power button failure.	Return to MicronView for service.
11	Battery cannot be charged when AC adapter is working properly.	Battery is in poor contact.	Check and plug in the battery again.
		Battery failure.	Contact the factory to replace the battery
12	Battery cannot be fully charged when AC adapter supply.	Battery aging.	Contact the factory to replace the battery
		Internal parts failure.	Return to MicronView for service.
13	Device suddenly power off when AC adapter is connected.	AC adapter failure.	If the problem persists after replacing another AC adapter, return to MicronView for service.
14	Device suddenly powers off when battery is connected.	Low battery	Plug in the AC adapter and restart the device.
		Battery failure.	Contact the factory to replace the battery
15	Flow error	Operating environment does not meet requirements.	Operate the device in the required environment.
		Inlet is blocked.	Check if there is any blockage inside the inlet. If not, Return to MicronView or the local distributor for service.
		Internal gas path failure.	Return to MicronView or the local distributor for service.

		Sensor failure.	Return to MicronView or the local distributor for service.
16	Enclosure of the device is overheating	Device has been in use for a long time.	This is a normal phenomenon. Operate the device in the specified environment in accordance with the user manual.
		Internal parts are damaged.	Shut down the device and do not operate for a period of time (can vary). If the problem persists after restart, return to MicronView for service.
17	Touch screen failure or insensitive touch	Touch screen needs adjusting.	Adjust the touch screen.
		Touch screen is damaged	Return to MicronView for service.
18	Counts are too low.	Temperature or relative humidity does not meet the requirements.	Operate the device in the required environment.
		Internal parts are damaged caused by high concentration sample or sample condensation.	Return to MicronView for service.
		Laser is damaged.	Return to MicronView for service.
		Device needs calibration.	Return to MicronView for service.
		Flow error.	Return to MicronView for service.
19	Fail to zero count when HEPA filter is connecting.	HEPA filter is not installed properly.	Check the connection of HEPA filter and the position of black O-ring seal.
		HEPA filter exceeds service time.	Replace the HEPA filter.
		Optical part is polluted.	Return to MicronView for service.
		Internal parts are damaged caused by collisions, or excessive vibration.	Return to MicronView for service.
		Internal gas path leak.	Return to MicronView for service.
20	Display screen is blurred.	System malfunction.	If the problem persists after shutdown and restart, return to MicronView for service.
		Touch screen is in poor contact or it is damaged.	Return to MicronView for service.

7.2 Maintenance

Item	Frequency	Operation
Zero count	After each use or as needed.	Connect the HEPA filter to the inlet using short tubing. Start sampling for 5 minutes. If the result <1count, the zero count is completed.
Clean the surface	According to operating conditions or as needed	Clean the device surface with a clean wipe wet with 70-80% ethyl alcohol or isopropyl alcohol.
Battery charging	Recommend once 3-5 month	Plug in the AC adapter for charging. If the battery is not in use for a long time, the battery will start self-protection. Connect the AC adapter to activate the battery.

Calibration	Once a year	Return the instrument to the factory or a qualified company.

7.3 Return for Service

If the instrument failure cannot be solved and needs to be returned to us, please contact.

Contact information: service@micronview.com.

Chapter 8 Warranty

We offer a one-year warranty for the **BAM®S** including hardware and software from the date of activation. It is considered activation when cumulative sampling for 30 minutes. The repair service and parts replacement are warranted for 6 months from the date of the shipment.

In these cases, the warranty is void.

a. The warranty is void if the **BAM®S** is repaired and disassembled by the company or person without authorization.

b. Damage is due to mishandling or operator misuse.

We offer the free remote upgrade service for life when the users require during use.

The **BAM®S** is a precision instrument. It must be operated by trained laboratory personnel only.