

BioAerosol Sampler-Remote | Remote BAS

(Remote Active Biological Air Sampler)

Model C530BS C530B C530



User Manual

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Designed & Manufactured by **MICRONVIEW**

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Foreword

PMT's BioAerosol Sampler-Remote (Remote BAS), also known as Remote Active Biological Air Sampler system is an active air sampler system. The system is widely used in pharmaceutical, food, electronics or other industries that need to maintain a stable environment in cleanrooms or other zones to undertake environmental monitoring and early warning functions. These systems are applied in critical zones of aseptic processes or in various cleanrooms or clean zones where environmental stability must be maintained. The most common application is integration within various barrier systems, as outlined below:

1. Weighing and Dosing Systems (Restricted Access Barrier Systems - RABS or isolators)
2. Aseptic Process Systems (RABS or isolators), include but are not limited to the following aseptic processes: lyophilization, cartridge filling, cell culture or purification, etc. It is also used in Blow-Fill-Seal Technology (open-type parison processes, etc.), pre-filled syringes and ready-to-use stoppers processes.
3. Aseptic Inspection Systems (isolators)
4. Other zones that need to be identified as high-risk zones by risk assessment

The Rules Governing Medicinal Products in the European Union Volume 4

EU Guidelines for Good Manufacturing Practice for Medicinal Products for Human and Veterinary Use Annex 1
Manufacture of Sterile Medicinal Products

9.1 The site's environmental and process monitoring programme forms part of the overall CCS and is used to monitor the controls designed to minimize the risk of microbial and particle contamination.

9.24 Continuous viable air monitoring in grade A (e.g. air sampling or settle plates) should be undertaken for the full duration of critical processing, including equipment (aseptic set-up) assembly and critical processing. A similar approach should be considered for grade B cleanrooms based on the risk of impact on the aseptic processing.

As everyone knows, Viable particulate determinations are critical in monitoring air quality in controlled environments. As an important part of the Contamination Control Strategy (CCS), the importance of airborne active particulate matter (total airborne aerobic microbial count), i.e. air sample, is self-evident.

Current regulatory agencies generally require active air sampling (air sample) of the environment on a routine basis to demonstrate control of airborne active particulate matter. In general, when active sampling is used, the indicator of microorganisms per unit volume of air should be clear. Both active and passive sampling methods may be used together to gain knowledge and understanding of changes and trends in the cleanroom environment.

An effective continuous active microbial monitoring system can reflect the true level of microorganisms in the clean zone, confirm whether the environment meets the requirements of regulations, and give effective feedback on contamination control measures to identify potential sources of contamination for continuous

improvement. PMT's Remote BAS system is developed, manufactured and applied through the principles of risk and lifecycle management to meet global quality compliance.

PMT's Remote BAS System provides active air sampling solution. The system consists of Biological Air Sampler with constant flow rate and pre-installed operating system software. Remote BAS can be connected to a central pump for sampling and monitoring (C530), an external independent power unit can also be used to perform monitoring tasks (C530B or C530BS). The monitoring system is equipped with a high-precision differential pressure flow meter, and there are two versions available for users: one with a built-in pump (C530B or C530BS) and another compatible with a central air supply (C530). The flow rate of each model is 28.3 LPM. Display screen of the Remote BAS can be configured with a touchscreen for easy operation. The device can store up to 20,000 sampling data records.

The enclosure is made of 316L stainless steel, resistant to cleaning and disinfection agents commonly used in cleanrooms. The monitoring system includes an audible and visual alarm module for flow rate excursion, communication failure, and device failure, ensuring timely and effective notifications. The sampling method can be configured with a robotic arm for automated plate replacement, achieving fully unmanned operation.

The pre-installed EMC System which is an environmental monitoring software includes functions such as setting monitoring objects, risk assessment, plan management, task management, task execution, real-time monitoring, data management, and device management. It uses trend analysis to evaluate the performance of various control factors over a specific time period, promptly identifying potential contamination risks, and helps users implement comprehensive contamination control through a holistic approach.

Disclaimer

1. This device should be operated by trained personnel only.
2. In case of any abnormalities, please power off and shut down the device.
3. Before installing or operating this device, operators are required to carefully read this "Operation Manual."
4. This confidential document contains proprietary information owned by PMT, with all rights reserved.
5. No part of this document may be copied, distributed, or transmitted in any form without prior written permission from PMT.
6. The information contained in this document is subject to change without notice.
7. Any system failures or consequences regarding safety and effectiveness resulting from violating the above statements are the sole responsibility of the user.

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Chapter 1 Safety Instructions

This document introduces the Remote BAS, that is Active Biological Air Sampler system Remote BAS. This document includes sections on Safety Instructions, General Information, Installation Environment, Unpacking and Installation, Operation, Communication Configuration and Remote Operation, Troubleshooting and Maintenances, and Warranty.

This device complies with relevant local laws and safety regulations. The following safety precautions must be strictly followed. The user assumes responsibility for any accidents caused by non-compliance.

1.1 Installation

Caution
Do not use the device near ethyl alcohol, paint thinners or any other flammable materials. If flammable materials come into the device and contact with electrical components inside the devices, 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.
Do not place the device in the following location, or it could be a fire hazard. - Locations susceptible to high temperatures. - Close to any open flame.

1.2 Power supply

Caution
Do not disassemble or modify the cable.
Do not place any heavy objects on the cable. Keep the cable away from heat sources. Otherwise, the cord's insulating layer may melt and could create an electric shock hazard or a fire hazard.
Do not stretch the cable, or it may become loose, overheat and create a fire hazard.
The cable may be damaged if it is placed under strain. Using a damaged cable may create a fire hazard or electric shock hazard.
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 PMT, or it could be a fire hazard.
Do not use the supply voltage out of range of the 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.

1.3 Operation

Caution

Do not disassemble or modify the device.

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

Do not use any flammable sprays near the device. If the flammable materials contact the electrical components, it may create a fire hazard or electric shock hazard.

This device must be properly disposed of by authorized personnel at the end of its service life.

1.4 Maintenance and Inspection

Caution

Before performing any maintenance, shut down the device and disconnect the attaching plug to avoid an electric shock 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 contact with the electrical components inside the device, or it may result in malfunction.

Chapter 2 General Information

2.1 Introduction

The PMT's Remote BAS (Remote Active Biological Air Sampler) utilizes the impact principle for monitoring. This forces microbial particulates to uniformly impact on an agar plate containing designated nutrients at a specific velocity. After sampling for a set time, the microorganisms are counted following incubation under specified conditions. The Remote BAS is designed for fixed-point installation and is an automated device that assists users in active air sampling at critical locations. It also serves as a trend analysis and early warning system. The installation and sampling locations must be confirmed by the user following a risk assessment.

Main Features:

- Optional versions with a built-in blower (C530B, C530BS) or central air supply version (C530)
- Supports immediate and customized monitoring tasks
- Real-time data transmission to the EMC System monitoring system (an embedded pre-installed operating system provided by PMT) or compatible with other management systems supporting Modbus protocol (see Appendix A)
- Optional stainless steel protective enclosure are available to enhance functionality, as listed in the optional parts list.

Performance Features:

- Built-in high-precision differential pressure flow meter
- 316L stainless steel enclosure, resistant to disinfectants commonly used in cleanrooms
- LED indicators for flow rate excursion, communication failure, and device failure, with audible and visual alarms
- Optional robotic arm for automated plate replacement, enabling fully unmanned operation
- Complies with ISO14698-1 standard and EU GMP Annex 1 regulations

Storage Performance:

- Store up to 20,000 sampling data records
- Data transmission, archiving, backup, etc. are all safe and reliable
- Audit trail

2.2 Model and Technical Specification

Parameter	Remote Active Biological Air Sampler (Remote BAS)		
	C530BS	C530B	C530
Model Differences	With a blower and	With a blower, without a	Without a blower or screen

	screen	screen	
Flow Rate	28.3LPM ± 4%		
Flow Rate Control	Built-in mass flow sensor, closed-loop auto control.		Fixed flow orifice
Exhaust	Internal HEPA filter（>99.999%@0.3μm）		N/A
Blower	Built-in blower		N/A
Display	4" LCD capacitive touch screen	status indicators	
Language	Chinese, English	N/A	
Calibration Frequency	Recommended once a year		
Dimensions (H×W×D)	192×117×117 mm/ 7.56×4.61×4.61 in	158×123×110 mm/ 6.22×4.84×4.33 in	117×120×55 mm/ 4.61×4.72×2.16 in
Weight	1.41 kg/ 3.11 lbs	1.35 kg/ 2.98 lbs	0.66 kg/ 1.46 lbs
Enclosure	316L stainless steel		
Power	100-240V, 50Hz/60Hz AC to 24V DC input, plug compatible with standard interface types		
Communication	RJ45, USB		
Transmission Protocol	ModBus TCP		
Data Storage	20,000 sampling records		
Alarm	Audible built-in alarm, external sound and light alarm		
Operating Conditions	Operating temperature: 5℃-35℃ (41°F-95°F); Relative humidity: 5%-90%, non-condensing.		
Storage Conditions	Storage temperature: 0℃-40℃ (32°F-104°F); Relative humidity: 5%-95%, non-condensing.		
Safety	EN 61010-1:2010, EN 61326-1:2013, EN IEC 61326-1:2021		
Warranty	24 months (calculated from the date of product activation or six months after the date of manufacture, whichever comes first).		
Sampling Head	Φ0.32mm*280 holes		
D50	0.79μm		
Sampling Head Material	316L stainless steel		
Sampling Head Weight	0.93 kg/ 2.05 lbs		

The appearance of different models of the Remote BAS is shown below:



Chart 2-1 C530BS



Chart 2-2 C530B



Chart 2-3 C530

2.3 Optional Parts List

Part Name	Part No.	Figure
AC adapter	E1.G901	

Part Name	Part No.	Figure
Power cord	E1.CN01	
	E1.EU01	
	E1.UK01	
	E1.US01	
Sampling head	S2.S312	
Sample tubing	T1.B341	
Sample tubing	T1.B381	
Sample tubing (pressure resistant)	T1.H081	
Wireless adapter	E3.0002	
Remote sensor protective enclosure	U2.S001	
	U2.0001	

Chapter 3 Installation Environment

The Remote BAS is shipped with packaging materials that include shock-absorbing features. The device is wrapped in a bubble wrap bag and surrounded by cushioning materials, all of which are placed inside a double-layered cardboard box to ensure protection during transport.

The sampling head is an optional accessory. If a sampling head is purchased, it will be packed together with the main device using shock-absorbing and sealed packaging.

The installation environment for the Remote BAS depends on the user's requirements. Users must consider the specific characteristics of their products and production processes when confirming the installation environment, ensuring that it does not negatively affect the installation and use of the device, while also avoiding any interference with production operations or quality risks.

The Remote BAS system does not come with plates containing specific media for sampling. This system is compatible with 90mm round plates, which must be provided by the user during installation or testing.

In general, the following environmental conditions are recommended for installation:

Table 3-1 Installation environment requirement

Maximum Operating Altitude	6,652 ft (2000m)
Installation Requirements	Indoor use only. Contact your local regulatory authority to determine pre-installation restrictions and requirements regarding the use of cables. Ensure that there is no electromagnetic field noise interference around the site. If there is a strong magnetic field or a large microwave transmitter station around the site, shielding measures should be taken. The power supply system must be well grounded. If there are dangerous factors such as water and fire in the environment where the equipment is installed, appropriate waterproof and fire prevention measures should be taken. Operating Temperature: 5 °C -35 °C (41 °F -95 °F); Relative humidity: 5%-90%, non-condensing.
Water Resistance	IP65

Chapter 4 Unpacking and Installation

Unpacking and installation should be carried out by authorized personnel.

4.1 Unpacking

Carefully open the packaging of the Remote BAS, remove the device from the box, and check the contents against the packing list below. If any components are missing or damaged, please contact PMT immediately. Retain the packaging for possible future return shipping.

Table 4-1 Packing List

Quantity	Product Name	Part No.	Reference Figure
1	Remote BAS	MACHC530BS	
		MACHC530B	
		MACHC530	
1	USB flash drive (including Operation Manual)	E3.0001	
1	Calibration Certificate	N/A	

Note: If additional accessories were purchased, they will be included with the above items.

4.2 Installation

If the installation zone undergoes routine cleaning and disinfection, it is recommended to install the Remote BAS outside the room, with only the sampling head and air inlet tube inside the cleanroom. As an alternative, the Remote BAS can be placed inside a remote sensor protective enclosure (optional accessory). The enclosure connects to all piping and cables. The enclosure is made of 316L stainless steel, thus resisting common disinfectants used in cleanrooms.

4.2.1 Indicator Lights & Touch Screen

The front of the Remote BAS has 4 LED indicator lights, which provide operational status indicators (the C530BS model does not have indicator lights), as shown below:



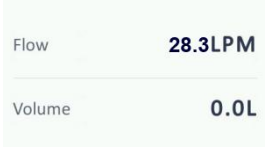
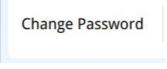
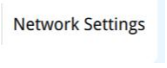
Chart 4-1 Indicator lights

No.	Indicator	Status	Function
1	Service	Red flashing	Flow or laser alarm
		Green flashing	Device is operating normally
2	Sampling	Off	No sampling
		Green flashing	Device is sampling
3	Network	Off	No network connection
		Red	Network failure
		Green	Network operating normally
4	Power	Off	Device is powered off
		Green	Device is powered on and running

The C530BS model features a touch screen on the front panel with no indicator lights. The touch screen displays alarm information and operational status and allows device operation. See below for the functions displayed on the touch screen:



Chart 4-2 The touch screen of C530BS

No.	Icon	Function
1		Start Sampling
2		Stop Sampling
3		Network Status
4		Sampling Data Display
5		Modify Account Password
6		Enter Network Configuration

Note: Once the device begins sampling, the flow rate will automatically adjust to the preset rate of 28.3 LPM, with no need for manual adjustment or locking.

4.2.2 Electrical Interface

The Remote BAS supports various communication and electrical connection options. The electrical interface of C530BS and C530B is located on the side of the device. The electrical interface of C530 is located on the bottom of the device. Below is a brief description of each electrical port:

Electrical port of C530BS:

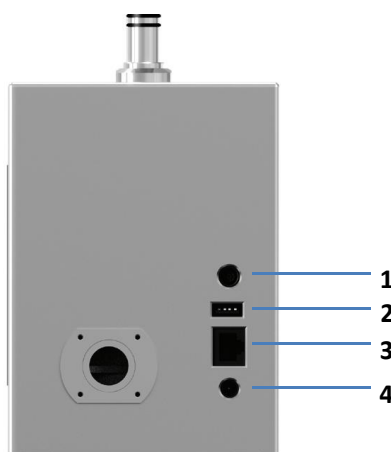


Chart 4-3 Communication and electrical ports of C530BS

No.	Name	Function
1	Multifunction Port	Connect to indicator lights of the remote sensor protective enclosure. Power and control external indicator lights.
2	USB Port	Connect to a WiFi card for wireless network capabilities.

3	Network Port	Standard RJ45 port for data transmission, device interconnection, network management, and remote control.
4	Power Port	Requires a 24V DC power adapter provided by PMT or approved by PMT engineers.

Electrical port of C530B:

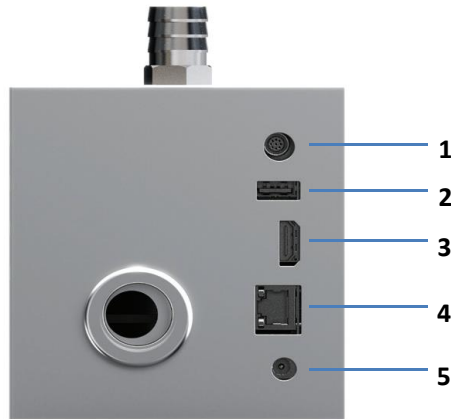


Chart 4-4 Communication and electrical ports of C530B

No.	Name	Function
1	Multifunction Port	Connect to indicator lights of the remote sensor protective enclosure. Power and control external indicator lights.
2	USB Port	Power the remote sensor protective enclosure screen and provide touch control functionality, can also connect to a WiFi card for wireless network capabilities.
3	HDMI Port	Supports HDMI display for data communication. Insert both USB and HDMI cables into the corresponding ports on the touch screen before powering on for normal operation.
4	Network Port	Standard RJ45 port for data transmission, device interconnection, network management, and remote control.
5	Power Port	Requires a 24V DC power adapter provided by PMT or approved by PMT engineers.

Electrical port of C530:

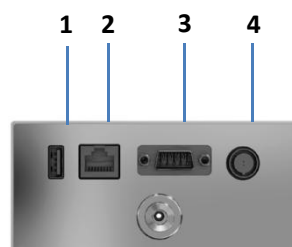


Chart 4-5 Communication and electrical ports of C530

No.	Name	Function
1	USB Port	Power the remote sensor protective enclosure screen and provide touch control functionality, can also connect to a WiFi card for wireless network capabilities.
2	Network Port	Standard RJ45 port for data transmission, device interconnection, network management, and remote control.
3	External Drive Port	Used to connect external electric valves and peristaltic pumps, providing control signals for these external devices.
4	Power Port	Requires a 24V DC power adapter provided by PMT or approved by PMT engineers.

4.2.3 Airflow Connection

The sampling air inlet at the top of the device includes a side-sealed fitting (C530BS), a pagoda fitting (C530B), and a quick-connect fitting (C530), used for sampling or connecting sampling tubes, as shown in chart 4-6.

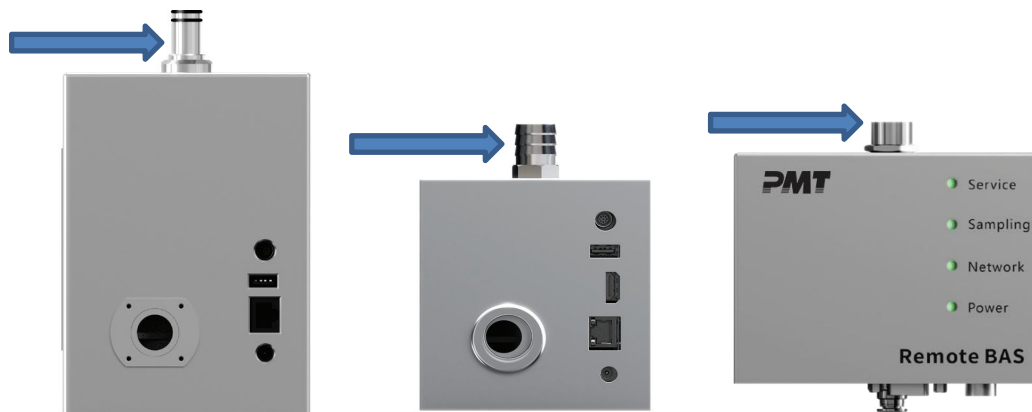


Chart 4-6 Sampling air inlet connection

The exhaust outlet of the C530 model is equipped with a quick-connect fitting for connecting pressure-resistant sampling tubes, as shown in chart 4-7. It should be connected to a vacuum pump or central vacuum supply that can provide a vacuum of 15 inches of mercury (38 cm Hg).

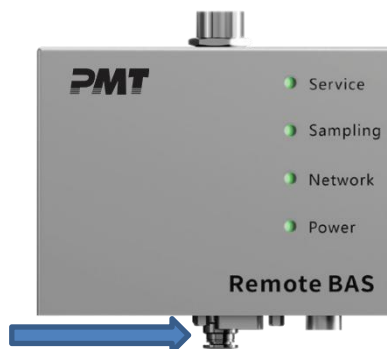


Chart 4-7 C530 exhaust outlet quick-connect fitting

The C530BS and C530B models have a built-in blower, eliminating the need to connect to an external vacuum pump or central vacuum supply. The exhaust outlet should be connected to a HEPA filter.



Chart 4-8 The exhaust outlet of the C530B model connected to a HEPA.

4.2.4 Sampling Head Connection

Before installing the impact sampling head, appropriate protective measures should be taken to prevent contamination. After all other components have been installed, cleaning should be done. If necessary, the installation environment and location need to be disinfected before installing the sampling head. The installation personnel should comply with the user's specific installation conditions when installing the sampling head.

The sampling head bracket must be secured to the sampling pipeline bracket using a clamp, as shown in chart 4-9.



Chart 4-9 Clamp fixation method for sampling head bracket

Rotate the sampling head on the sampling head bracket counterclockwise to remove it. Place the plate on the bracket, and use an allen wrench to adjust the hex screws on the sides of the three clamping jaws on the bracket to secure the plate, as shown in chart 4-10.



Chart 4-10 Plate bracket adjustment

Rotate the sampling head clockwise to install it onto the sampling head bracket, as shown in chart 4-11.



Chart 4-11 Sampling head installation

4.2.5 Device Installation

4.2.5.1 Determining the Installation Location

The installation and sampling locations of the Remote BAS should be determined based on the principles of

quality risk management and lifecycle management. It is recommended to establish an environmental monitoring scheme on the basis of a formal risk assessment report, including sampling location, sampling method and sampling frequency.

The risk assessment needs to establish the location of sampling locations, monitoring frequency and sampling methods in the environmental monitoring program based on the criticality of the production process and final product, facility, equipment, specific processes and process steps, the operations involved, the routine monitoring data, the data at the time of the Environmental Monitoring Performance Qualification (EMPQ), the information on the typical microbial flora isolated in the environment, and the study of the airflow pattern. Quality risk management methods and tools can be found in "Quality Risk Management" (ICH Q9 (R1)). The commonly used risk assessment tools for environmental monitoring risk assessment include Failure Mode Analysis (FMEA), Hazard Analysis and Critical Control Points (HACCP) methods, etc. The commonly used risk assessment tools for environmental monitoring risk assessment include Failure Mode Effect and Criticality Analysis (FMECA), Hazard Analysis and Critical Control Points (HACCP) methods, etc.

The selection of installation location should be considered in order to find the most valuable sampling location and thus obtain representative data to evaluate the distribution of microorganisms in the measured environment. Viable particle (air sample) sampling locations should be defined as part of the environmental monitoring risk assessment.

Personnel is considered as a major contributor of particulates, especially microorganisms, to the environment in aseptic zones. Analyzing the trends and frequencies of microorganisms is a key indicator for understanding human behavior and the impact of process activities on the environment. The methods and frequencies of remote active air sample monitoring will depend on manufacturing process needs and should be risk-based.

Viable particle monitoring should also be performed within the cleanrooms when normal manufacturing operations are not occurring (e.g. post disinfection, prior to start of manufacturing, on completion of the batch and after a shutdown period), in order to detect potential incidents of contamination which may affect the controls within the cleanrooms. Sampling of active particles at-rest can be used on site as part of an environmental monitoring (EM) risk assessment document, as should be the Remote Active Biological Air Sampler System. Although human activity and material transfers (the primary sources of microbial contamination) are not evaluated in the at-rest state, the associated sampling locations will provide valuable information about the intrinsic microbes of the cleanroom prior to starting the qualification under in operational conditions. All necessary measures should be taken to minimize the impact of personnel during at-rest monitoring.

For Grade A zones, Remote BAS system should provide continuous monitoring throughout the entire

production process. In particular, during critical operations, including equipment assembly, Remote BAS system should be used to conduct active microbial air sampling in the Grade A clean zone. The frequency and number of samples for monitoring Grade A zones should be sufficient to detect any human interventions, incidental events, and any impact of the system on environmental quality. The selection of the continuous monitoring system should also consider any risks posed by the materials used in production, such as the presence of viable organisms or radioactive substances.

For Grade B zones, which serve as background zones for Grade A, If Remote BAS system is employed, careful consideration should be given to the sampling interval, but the number of samples must be sufficient to provide a statistically significant data set.

4.2.5.2 Device Installation

The installation of sampling head (optional) must be secured, either in a vertical or horizontal position (supports both horizontal and vertical sampling).

The Remote BAS has a tripod screw interface at the bottom, allowing it to be compatible with various mounting brackets and installation options. PMT provides an optional mounting bracket (H1.0006), which allows the Remote BAS to be easily installed and removed from surfaces (see chart 4-12).

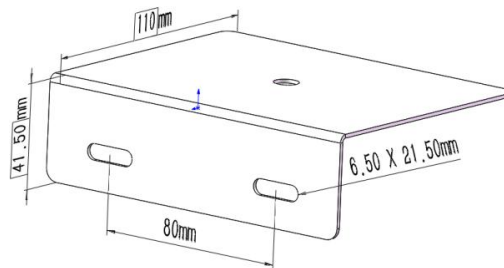


Chart 4-12 Diagram of bracket

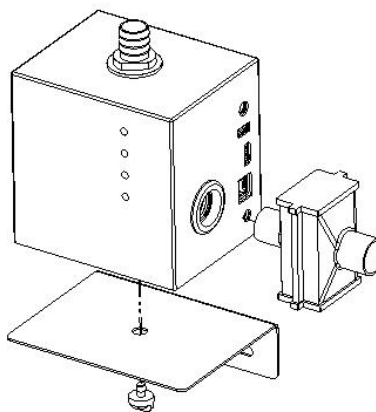


Chart 4-13 Installation

Bracket Installation Method:

- a. The bracket provides two holes with a diameter of 0.169 inches (4.30 mm), suitable for #6 or M4 screws. Use appropriate screws to secure the bracket to the mounting surface.
- b. Place Remote BAS on the top of the bracket, align the tripod mounting hole with the circular hole at the top of the bracket, and tighten the tripod screw into the tripod mounting hole of the online airborne microorganism sampler, as shown in chart 4-13.

4.2.6 Protective Enclosure Installation

When using the Remote BAS in environments that undergo frequent disinfection procedures, the use of a remote sensor protective enclosure can prolong the life of the device.

Secure the remote sensor protective enclosure to the mounting surface using four M4 collision screws, as shown in chart 4-14.

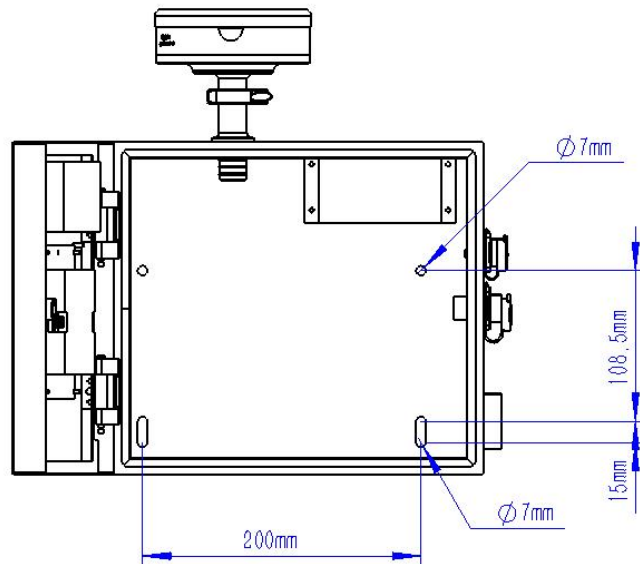


Chart 4-14 Mounting hole of the remote sensor protective enclosure

Place the Remote BAS inside the protective enclosure, pass the mount screw through the pre-drilled hole at the bottom of the protective enclosure, and tighten it into the bottom mount hole of Remote BAS, as shown in chart 4-15.

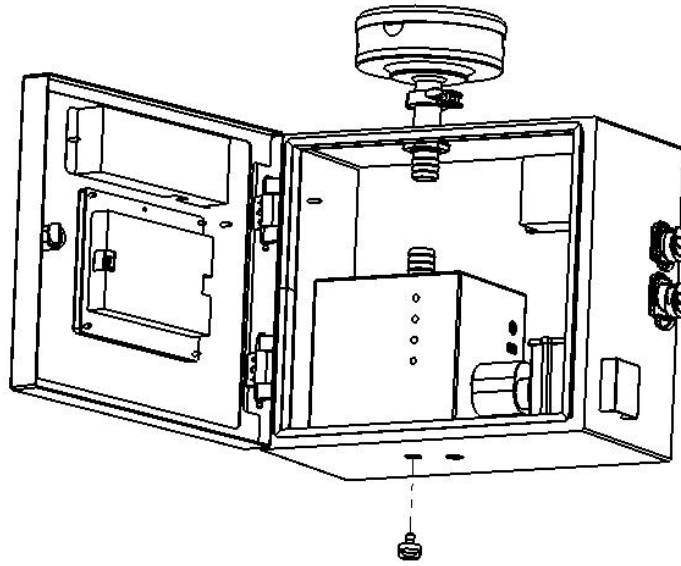


Chart 4-15 Install Remote BAS inside protective enclosure

Before installing the impact sampling head, appropriate protective measures should be taken to prevent contamination. After all other components have been installed, cleaning should be performed. If necessary, the installation environment and installation location should be disinfected before installing the sampling head. The installation personnel should comply with the specific installation conditions set by the user when installing the sampling head.

Use a sample tubing to connect the Remote BAS and the sampling head, and use a multi-function cable, USB cable, and HDMI cable to connect the light panel and the screen, as shown in chart 4-16. When installing the screenless version of the remote sensor protective enclosure, only the multi-function cable is needed to connect the light panel.

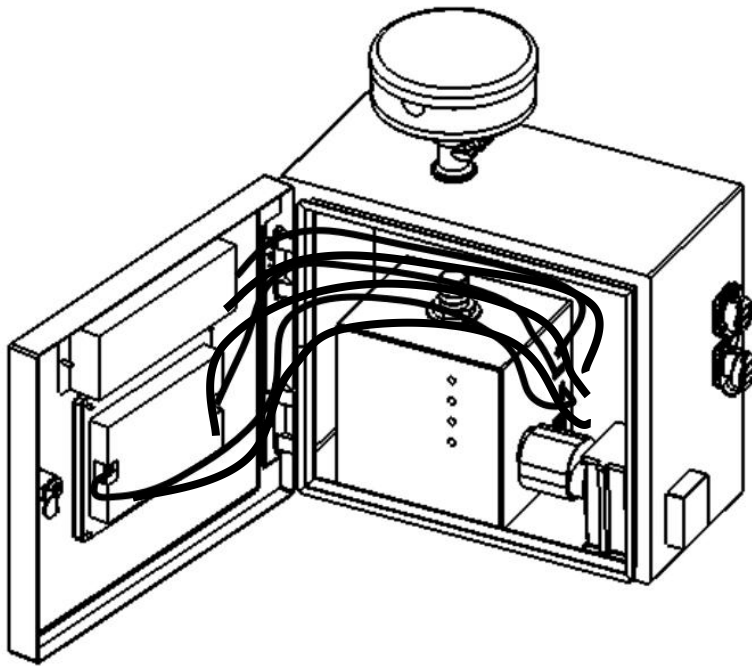


Chart 4-16 Wiring diagram inside the remote sensor protective enclosure

4.2.7 Wiring Preparation

For the Remote BAS to function properly, RJ45 data cable and power cable must be connected. These cables need to be prepared on-site after the device position is secured.

- An industrial RJ45 connector is required to connect the Remote BAS to the network. The cable pinout should follow the ANSI/TIA/EIA-568-B.1 standard for commercial building wiring.
- Requires a 24V DC power adapter provided by PMT or approved by PMT engineers.
- If using a remote sensor protective enclosure, a waterproof quick-connect plug must be prepared for the power cable and RJ45 data cable.

4.2.7.1 RJ45 Data Cable Preparation

Tools and Materials: Crimping tool, RJ45 connectors, wire tester.

1. Strip the Outer Jacket: Use the crimping tool to strip the outer jacket of the cable, exposing about 1.5-2 cm of the internal wires.
2. Arrange the Wires: Arrange the 8 wires according to the T568B standard (white-orange, orange, white-green, blue, white-blue, green, white-brown, brown).
3. Cut the Wires: Use the crimping tool to cut the wires to the correct length (about 1.4 cm).
4. Insert the Wires into the RJ45 Connector: Insert the arranged wires into the RJ45 connector, ensuring the

correct sequence.

5. Crimp the Connector: Use the crimping tool to securely crimp the connector, ensuring proper contact between the wires and the connector.
6. Test the Cable: Use the wire tester to check the continuity of the cable and ensure all wires are properly connected.

4.2.7.2 Waterproof Quick-Connect Power Cable Preparation

Feed the 3-core power cable through the seal and quick connector, connecting it to the power plug. Ensure the neutral, live, and ground wires are correctly identified. Use a wire stripper to remove 3-5 mm of insulation from the copper wires. Using a soldering iron and solder, connect the neutral, live, and ground wires to the appropriate terminals on the plug. See chart 4-17.



Chart 4-17 Waterproof quick-connect power cable preparation

4.2.7.3 Waterproof Quick-Connect RJ45 Data Cable Preparation

Feed the 8-core RJ45 data cable through the seal. Follow the procedure for RJ45 cable preparation, then place the prepared RJ45 connector into the quick connector, as shown in chart 4-18.



Chart 4-18 Waterproof quick-connect RJ45 data cable preparation

4.2.8 Wiring Safety Guidelines

When connecting any wiring to the instrument, follow the warnings and precautions below. Make sure to follow all safety guidelines outlined in this installation section. For additional safety information, please refer to

Chapter 1.

Important Notice: Before making any electrical connections, the device power supply must be disconnected.

Anti-Static Precautions: To minimize static discharge hazards and avoid static buildup, power off the device during maintenance. Internal electronic components can be damaged by static electricity, which may lead to decreased device performance or failure. To prevent static electricity from damaging the device, follow these steps.

1. Discharge any static from your body by touching a grounded metal surface (such as the device chassis or metal piping) before handling electronic components.
2. Minimize static buildup by avoiding excessive movement. Use anti-static containers or packaging for static-sensitive components.
3. Wear a grounded wrist strap to prevent static buildup on your body.
4. Handle all static-sensitive components in a designated anti-static zone, and, if possible, use anti-static floor and workbench mats.

Chapter 5 Communication Configuration and Remote Operation

The Remote BAS supports Ethernet communication, with options for automatic or manual network address configuration. When no external DHCP server is available to automatically assign a network address, the default IP address for the device is: 192.168.19.100.

When setting up the network configuration for Remote BAS, ensure that all devices are configured with the planned network addresses. Incorrect network addresses may cause conflicts or prevent communication with the management software server.

Remote BAS models with touch screens (model: C530BS) support both device-side and remote network configuration. Models without touch screens (models: C530B&C530) must be configured remotely. The configuration methods are as follows:

- a. Device-side Configuration:** Click the network settings icon to enter the network configuration page, where automatic or manual connection methods can be selected, as shown in chart 5-1.

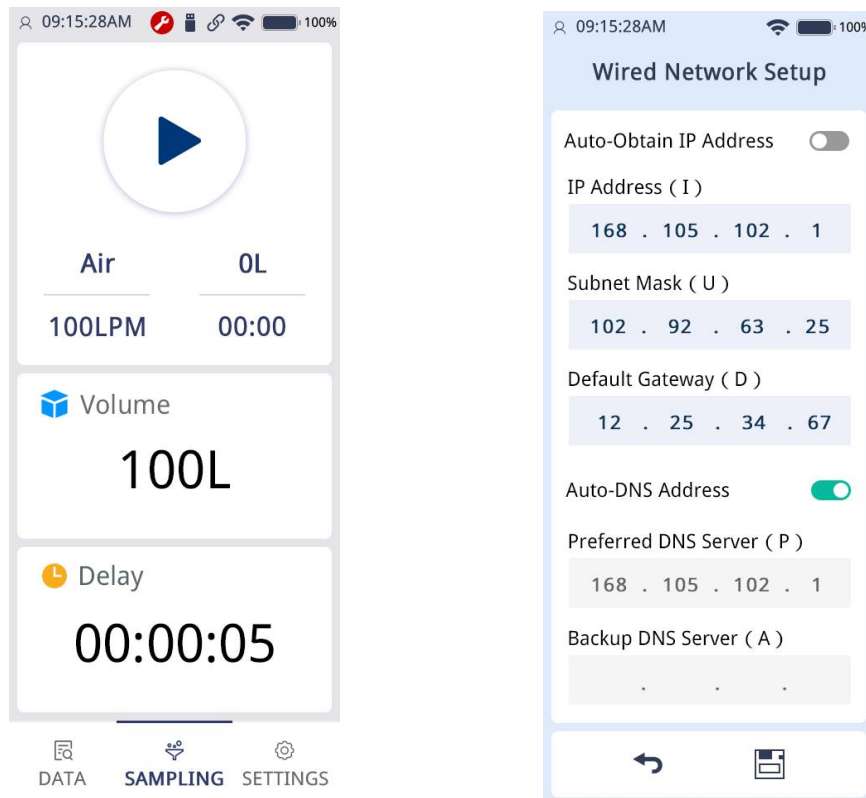


Chart 5-1 C530BS network configuration on device-side

- b. Remote Configuration:** Use the MODBUS configuration protocol to configure the network address remotely via the EMC system or another compatible system (detailed in Annex A: Modbus Protocol).

For instructions on adding, viewing, and configuring devices, refer to the "**EMC System For Remote Devices User Manual**" section 2.5, **Device Management**. If the Remote BAS cannot be detected by the system, check

the following settings:

- a. The Remote BAS is operating correctly by checking the operation and network indicator lights.

The network configuration of the Remote BAS is correct. Once the physical network connection is confirmed, use the server-side ping function to check for network address errors.

With the Remote BAS connected to EMC system, the software interface will display the following prompts before and after sampling to ensure proper device usage and accuracy of the sampling process:

- a. Before sampling starts:

Please confirm that the plate has been placed and positioned correctly.

- b. After sampling ends:

Please confirm that the plate has been removed.

Please confirm whether the sampling head needs to be cleaned.

Chapter 6 Maintenance and Performance Inspection

The Remote BAS has no user repairable components. However, you can clean the device enclosure, repair or replace cables and connectors if needed.

6.1 Cleaning the Enclosure

The Remote BAS can be installed as a standalone unit or within a protective enclosure. The device is designed for long-term, trouble-free operation. Regularly wipe the enclosure surface using a lint-free cloth moistened with 70-80% ethanol or isopropanol to extend the operational lifespan of the device.

6.2 Cable Connectors

Cable connectors can sometimes be damaged due to accidents. Ethernet connections, in particular, are prone to damage. If a connector is damaged, do not forcibly insert it into the port. Instead, repair or replace the damaged connector.

6.3 Performance Inspection

Regular performance checks should be conducted to verify that the Remote BAS is functioning properly.

6.3.1 Gas Flow Rate Inspection

The flow rate control in the C530 model is managed using a fixed flow orifice, which is non-adjustable. If the flow decreases by 15%, there may be a blockage in the flow control or inlet port.

The C530B and C530BS models regulate flow rate using a built-in flow meter that adjusts the blower speed. If the flow rate deviation exceeds $\pm 4\%$, the flow meter or blower may be malfunctioning.

Steps to Check Air Flow:

- a. Disconnect all sampling tubes and probes.
- b. Attach a portable flow meter to the inlet port.
- c. Perform a sampling operation and monitor the flow meter reading. Verify that the flow deviation is within $\pm 4\%$.

Chapter 7 Troubleshooting and Maintenance

7.1 Common Issues and Solutions

Table 7-1 Common Issues and Solutions

No.	Common Problem	Possible Cause	Solution
1	Device screen does not light up	System malfunction	Power off and restart the device.
		Internal damage to the device	Return for repair or send to the distributor.
2	Device fails to power on	Internal short circuit	Use a power adapter to supply power to the device. Check the power adapter indicator light; if off, return for repair; if on, the internal short circuit is unlikely.
		Power adapter malfunction	Reconnect the power adapter; if the issue persists, replace the power adapter.
		Device internal malfunction	Return for repair or send to the distributor.
		Button malfunction	Return for repair or send to the distributor.
		Battery is low	Connect the power adapter and restart the device.
		Battery is damaged	Replace the battery.
3	Power cuts out during operation	Power adapter failure	Replace the power adapter; if the issue persists, return for repair.
4	Abnormal flow during sampling	The device not operating under the specified conditions	Ensure the device is used under the specified conditions.
		Clogged air inlet and outlet/bent lines for remote sampling.	Check the air inlet and outlet for obstructions, if none, return for repair or send to the distributor.
		Internal airflow malfunction	Return for repair or send to the distributor.
		Sensor malfunction	Return for repair or send to the distributor.
5	Device enclosure overheats	Internal component malfunction	Power off the device, let it cool, and restart; if the issue persists, return for repair.
6	Touchscreen malfunction or unresponsive	Touchscreen partially malfunctioning	Restart the device; if the issue persists, return for repair or send to the distributor.

		Touchscreen damaged	Return for repair or send to the distributor.
7	Display splash screen while the device is working	System malfunction	Power off and restart the device; if the issue persists, return for repair.
		Display screen lost connection or damaged	Return for repair or send to the distributor.

7.2 Routine Maintenance

Maintenance	Frequency	Procedure
Surface Cleaning	As needed or based on the operating environment	Use a lint-free cloth moistened with 70-80% ethanol or isopropanol to wipe the surface.
Calibration	Recommended once per year	Send the device to the manufacturer or a certified calibration facility.

7.3 Return for Repair

If the device encounters a malfunction and needs to be returned for repair, please contact PMT.

Chapter 8 Warranty

We provide a 24-month warranty for the main unit (hardware and software), starting from the date of product activation or 6 months after shipment (whichever comes first). The product is considered activated after 10 sampling operations or 40 cumulative minutes of sampling. For repair services or replacement parts, we offer a 6-month warranty from the date of shipment.

The warranty will be void under the following conditions:

- a. If the device is repaired or disassembled by a company or individual not authorized by PMT, the after-sales agreement will be voided immediately.
- b. Any damage caused by improper handling or abnormal operation will not be covered under warranty.

If an upgrade is needed during product usage life, we offer lifetime remote upgrade services free of charge.

The Remote BAS is a precision device and must be operated by trained personnel.

Annex A: Modbus Protocol

1. Port Connection

The Modbus communication settings for the Remote BAS are as follows:

Port: 1502

IP: The address assigned to the Remote BAS

2. MODBUS Protocol

2.1 Holding Register

The device settings are stored in the holding registers (4xxxx series), most of which are read/write. Currently, we only use the write function, primarily for configuring the device and setting sampling parameters.

Table A-1 Holding Register Configuration

Register	Data Type	Function	Description
40011	unsigned short	Set Time/Date	32-bit Unsigned Big-Endian Seconds
40012	unsigned short		
40013	unsigned short	Set Sampling Delay	Unit: sec
40014	unsigned short	Set Sampling Interval	Unit: sec
40015	unsigned short	Set Sampling Volume	Unit: mL
40016	unsigned short	Set Sampling Cycles	
40022	unsigned short	Set Current Flow Rate	Fixed at 28.3LPM
40023	unsigned short		
40044	unsigned short	Configure Network IP	1-255
40045	unsigned short		0-255
40046	unsigned short		0-255
40047	unsigned short		0-255
40048	unsigned short	Configure Network Subnet Mask	1-255
40049	unsigned short		0-255
40050	unsigned short		0-255
40051	unsigned short		0-255
40052	unsigned short	Configure Network Gateway	1-255
40053	unsigned short		0-255
40054	unsigned short		0-255
40055	unsigned short		0-255

2.2 Input Register

Device information and sampling data are stored in the input registers (3xxxx series), which are read-only. The byte and word order follow big-endian format. Therefore, data items are formed by placing the high byte before the low byte.

Table A-2 Input Register Reading

Register	Data Type	Function	Description
30012	unsigned short	Product Name	ASCII code
30013	unsigned short		
30014	unsigned short		
30015	unsigned short		
30016	unsigned short		
30017	unsigned short		
30018	unsigned short		
30019	unsigned short		
30022	unsigned short	Flow Rate	Unit: mL
30023	unsigned short		
30161	unsigned short	Activation Date	Year
30162	unsigned short		Month
30163	unsigned short		Day
30164	unsigned short	Device Status	Not Sampling: 0 In Delay: 0x100 Sampling: 1 In Interval: 0x200 In Cleaning: 0x300 In Disinfection: 0x4
30165	unsigned short	Sampling Cycles	Not Used
30166	unsigned short	Serial No.	ASCII code
30167	unsigned short		
30168	unsigned short		
30169	unsigned short		
30170	unsigned short		
30171	unsigned short		
30172	unsigned short		
30173	unsigned short		
30176	unsigned short	Location	Not Used
30177	unsigned long	Sampling Time	Unit: sec
30178	unsigned short		
30181	unsigned short	Sampling Volume	
30182	unsigned short		
30230	unsigned short	Software Version	1.0.0
30231	unsigned short		
30232	unsigned short		
30233	unsigned short	Hardware Version	2.0.0
30234	unsigned short		
30235	unsigned short		
30256	unsigned short	Alarm Status	1: Alarm 0: No Alarm
30270	unsigned short	Upgrade Status	0: Upgrading 1: Upgrade successful 2: Upgrade

Register	Data Type	Function	Description
			failed 3: Initial Default Status
30290	unsigned short	Network Status	1: In Connection 0: Disconnected
30300	unsigned short	Current Time	Read using 64-bit Unsigned Big-Endian, the value read should be offset.
30301	unsigned short		
30302	unsigned short		
30303	unsigned short		
30304	unsigned short		
30305	unsigned short	IP Address	X.X.X.X
30306	unsigned short		
30307	unsigned short		
30308	unsigned short		
30309	unsigned short	Subnet Mask	X.X.X.X
30310	unsigned short		
30311	unsigned short		
30312	unsigned short		
30313	unsigned short	Gateway	X.X.X.X
30314	unsigned short		
30315	unsigned short		
30316	unsigned short		
30317	unsigned short	MAC Address	X.X.X.X.X.X
30318	unsigned short		
30319	unsigned short		
30320	unsigned short		
30321	unsigned short		
30322	unsigned short	Please Connect to The Air Source Alarm	1: Alarm 0: No Alarm
30323	unsigned short	Firmware Version Number	

2.3 Coil

Table A-3 Coil Write

Register	Data Type	Function	Description
2	unsigned bool	Sampling Control	1: Start Sampling 0: Stop Sampling
5	unsigned bool	Reset Total Run Time	
9	unsigned bool	Cleaning Control	1: Start cleaning 0: Stop cleaning
10	unsigned bool	VHP Disinfection	1: Start disinfection 0: Stop disinfection
11	unsigned bool	Disinfection Pump	1: On 0: Off
12	unsigned bool	Disinfection Valve	1: On 0: Off
13	unsigned bool	Sampling Valve	1: On 0: Off

Register	Data Type	Function	Description
15	unsigned bool	Cancel Alarm	1: Cancel alarm status
16	unsigned bool	Power Off	1: On 0: Off

Remote BAS CE Certification -LVD



Verification of Conformity

According to Low Voltage Directive 2014/35/EU

Certificate Number	IN-QD-5805-230763-S1
Licence Holder	Micron View Ltd.
Address	1st Floor, 41 Chalton Street, London England NW1 1JD
Machinery Description	BioAerosol Sampler-Remote
Model/Type	C530B, C510, C520, C530, C510B, C520B
Technical File No.	IN-QD-5805-TF230763-S
Applicable Standards	EN 61010-1:2010+ A1:2019 +AC:2019
Date of Issue	January 11, 2024

Declaration: In the Opinion of SGS the Submitted Technical File IN-QD-5805-TF230763-S and Sample Satisfies the Requirements of the Low Voltage Directive 2014/35/EU.

Conclusion
Based upon review of the Technical Construction File and assessment of Sample, the apparatus is deemed to meet the requirements of the above standards and hence fulfils the requirements of:

Low Voltage Directive 2014/35/EU

Note: This certificate is only valid for the equipment and configuration described and in conjunction with the technical data detailed above.
This certificate is valid until unless the directive or standards in question has been amended or superseded.
The CE mark as shown below can be used under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.

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Remote BAS UKCA Certification -EMC

SGS

Verification of Conformity

According to Electromagnetic Compatibility Regulations 2016

Certificate Number	IN-QD-5805-230763-E2
Licence Holder	Micron View Ltd.
Address	1st Floor, 41 Chalton Street, London England NW1 1JD
Machinery Description	BioAerosol Sampler-Remote
Type Identification	C510, C520, C530, C510B, C520B, C530B
Technical File No.	IN-QD-5805-TF230763-E
Applicable Standards	EN 61326-1:2013, EN IEC 61326-1:2021
Date of Issue	Feb. 01, 2024

Declaration: In the Opinion of SGS the Submitted Technical File IN-QD-5805-TF230763-E and Sample Satisfies the Requirements of the Electromagnetic Compatibility Regulations 2016.

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Remote BAS UKCA Certification - Electrical Equipment (Safety))

SGS

Verification of Conformity

According to Electrical Equipment (Safety) Regulations 2016

Certificate Number	IN-QD-5805-230763-S2
Licence Holder	Micron View Ltd.
Address	1st Floor, 41 Chalton Street, London England NW1 1JD
Machinery Description	BioAerosol Sampler-Remote
Model/Type	C530B, C510, C520, C530, C510B, C520B
Technical File No.	IN-QD-5805-TF230763-S
Applicable Standards	EN 61010-1:2010+ A1:2019 +AC:2019
Date of Issue	January 11, 2024

Declaration: In the Opinion of SGS the Submitted Technical File IN-QD-5805-TF230763-S and Sample Satisfies the Requirements of the Electrical Equipment (Safety) Regulations 2016.

Conclusion
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