BLUESKY™
AIR QUALITY MONITOR

OPERATION AND MAINTENANCE MANUAL

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Buyer further agrees that purchase of TSI's BlueSky™ Monitors Buyer agrees to the Terms and Conditions of Use and the Privacy Policy located at www.tsilink.com.

Service Policy

Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI's Customer Service department at (800) 680-1220 (USA) or (001 651) 490-2860 (International) or visit www.tsi.com.

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Cloud Software End User Licensing Agreement and Privacy Policy

Go to tsilink.com/terms-of-use and click on **TERMS OF USE & PRIVACY POLICY** link.

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Safety Information

Description of Caution/Warning Symbols

Appropriate caution/warning statements are used throughout the manual and on the instrument that require you to take cautionary measures when working with the instrument.

Caution

CAUTION
Failure to follow the procedures prescribed in this manual might result in irreparable equipment damage. Important information about the operation and maintenance of this instrument is included in this manual.

Warning

WARNING
Warning means that unsafe use of the instrument could result in serious injury to you or cause damage to the instrument. Follow the procedures prescribed.

Caution and Warning Symbols

The following symbols may accompany cautions and warnings to indicate the nature and consequences of hazards:

	Warns that the instrument contains a laser and that important information about its safe operation and maintenance is included in the manual.
	Warns that the instrument is susceptible to electro-static discharge (ESD) and ESD protection should be followed to avoid damage.
	Indicates the connector is connected to earth ground and cabinet ground.

WARNINGS

- Use of components other than those specified by TSI® Incorporated (TSI®) may impair the safety features provided by the equipment.
- When mains power adapters are used, the equipment should be positioned so the mains plug will remain accessible for emergency disconnect.
- When using outdoors, the BlueSky™ monitors power adapter should be connected to a weatherproof “in use” resistant/IP 68 rated outdoor receptacle enclosure.

CAUTIONS

- The BlueSky™ monitors enclosure is designed to be water resistant to rain or spray. It is not designed to be waterproof when immersed. Setting it in a pool of water will result in flooding the inner compartment with water. This will severely damage your BlueSky™ monitor. **DO NOT** install the BlueSky™ monitor less than 1.2 meters or 4 feet from the ground (TSI® recommends 3 meters or 10 feet)! Setting the bottom of BlueSky™ monitor too close to a surface will result is water splashing back in to the inlet and may result in damage to the PM sensor.
- **DO NOT** mount the BlueSky™ Monitor upside down. To increase sampling efficiency, the PM sensor is covered by a porous screen but is not splash proof or water proof. The BlueSky™ monitor has an ingress protection rating of IP 44. Direct injection of water in to the BlueSky™ is likely to damage it.
- Power adapter provided with the BlueSky™ monitor is rated for outdoor use (IP 68). **DO NOT** use any other power supply with the BlueSky™ monitor.

1. The input A/C voltage to the power supply should be between 100 to 240 V with a frequency between 50 to 60 Hz.
2. The power required to run the BlueSky™ monitor is 5W (5.0 VDC and 1 Amp). The BlueSky™ monitor is powered

through the mini-USB connector and there are no outputs available from the BlueSky™ monitor.

3. The power supply adapter provided is rated for outdoor use with an ingress protection rating of IP 68. It can be used outdoors or indoors under wet conditions in rain or snow.
4. The power supply is rated to operate between – 30°C to 80°C (–22°F to 176°F) with humidity ranging from 0% to 95% non-condensing but the BlueSky™ monitor is rated to operate between –10°C to 60°C (14°F to 140°F). TSI® recommends running the BlueSky™ monitor within these temperature limits.
5. The BlueSky™ monitor can be used at altitudes up to 3000 meters (10,000 feet).
6. The BlueSky™ monitor is designed to be used outdoors in highly polluted areas where particulate concentrations can be as high 1000 $\mu g/m^3$.

NOTE

Installation videos can be found on our website tsi.com.

NOTE

The safety of any system incorporating the BlueSky™ monitor is the responsibility of the assembler of the system.

Laser Safety

- Model 8143 BlueSky™ monitors are Class 1 laser-based instruments.
- During normal operation, you will not be exposed to laser radiation.
- **DO NOT** open the BlueSky™ monitor when it is powered **ON**.
- You will not be exposed to the laser radiation when the BlueSky™ monitor is disassembled.
- The PM sensor has a laser inside it. **DO NOT** open the PM sensor inside BlueSky™ monitor when the BlueSky™ monitor is powered.

Take these precautions:

- **DO NOT** remove any parts from the BlueSky™ monitor unless you are specifically told to do so in this manual.

WARNING

The use of controls, adjustments, or procedures other than those specified in this manual may result in exposure to hazardous optical radiation.

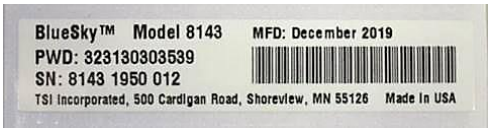
WARNING

If the BlueSky™ monitor is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

When operated according to the manufacturer's instruction, this device is a Class 1 laser product as defined by U.S. Department of Health and Human Services standards under the Radiation Control for Health and Safety Act of 1968. A certification and identification label like the one shown below is affixed to each instrument.

Labels

Advisory labels and identification labels are attached to the instrument.

1. Serial Number Label (Bottom)	
2. Laser Radiation Label (internal, on the PM sensor)	
3. CE Safety Details	FCC ID: 2AC7Z-ESPWROOM32D Contains IC ID: 21098-ESPWROOM320
4. European symbol for non-disposable item. Item must be recycled.	

Reusing and Recycling

As part of TSI® Incorporated's effort to have a minimal negative impact on the communities in which its products are manufactured and used:

- If instrument becomes obsolete, return to TSI® for disassembly and recycling.

Chapter 1

Product Overview

TSI® Incorporated's BlueSky™ Air Quality Monitor is a real-time Particulate Matter (PM) sensor that is designed to provide accurate mass concentration measurements of PM1, PM2.5, PM4, PM10 as well as temperature and humidity. The monitor is designed to be deployed in less than ten minutes and can be used in both indoor and outdoor applications.

Data from the sensor is available at www.tsilink.com. All you need is an internet connection and web browser. The BlueSky™ monitor connects to the internet using wireless technology (Wi-Fi®). There is no need to install an app on your smartphone. Logged data is also available on the internal mircoSD card.

The BlueSky™ monitor also comes with factory calibration, whose standards adhere to the same standards that are applied to other high-quality monitors like the DustTrak™ and AM520 models. The BlueSky™ monitors also come with self-diagnostics to enable you to run the monitor with greater than 95% up-time and empowers you to be proactive so that the data obtained is very high quality.

Figure 1: Front View of BlueSky™ Air Quality Monitor

® Wi-Fi is a registered trademark of Wi-Fi Alliance.

Unpacking

Compare all the components you received with those listed in the table below.

NOTE
Most of these components are pre-installed at the factory. Spare parts of some of the components can be purchased directly from the manufacturers, which are listed below. If any parts are missing, contact TSI®.

Item	Part Number	Qty	Description
	8143	1	BlueSky™ Air Quality Monitor
	N/A	1	Mounting Bracket
	N/A	1	Screw
	N/A	1	IP68 Rated 5V Power Supply
	N/A	2	Zip Tie

BlueSky™ Monitor Replacement Parts

Listed below are replacement items for the BlueSky™ Air Quality Monitor. Contact TSI® for purchase information.

Item	Part Number	Description
	814304*	Single PM sensor* replacement
	814305	5 pack PM sensors
	814306*	Replacement Mounting Bracket*
	814307	Maintenance kit—Screws, Screw Driver and PM Sensor screens
	814301*	Replacement Power Supply—NA style plug*
	814302*	Replacement Power Supply—EU style plug
	814303*	Replacement Power Supply—UK style

Item	Part Number	Description
	814308*	Replacement microSD card*

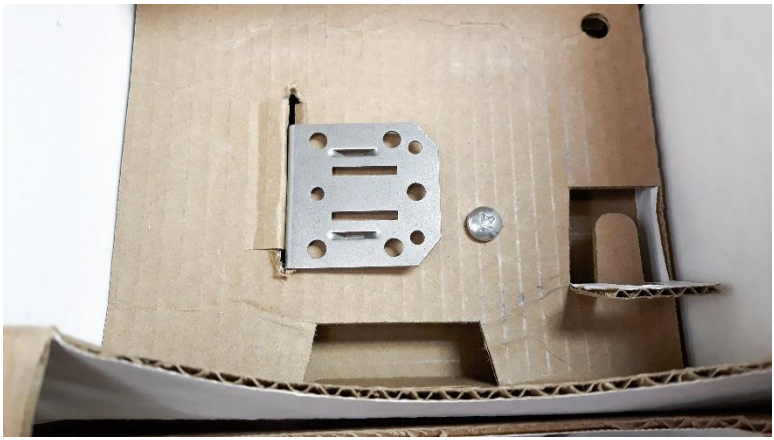
*Indicates pre-installed factory item or ships with initial purchase, but is also available as a spare or if replacement is needed.

Chapter 2

Setting Up

The BlueSky™ Air Quality Monitor is very easy to set up. The monitor comes fully assembled except for the mounting bracket. Start by unpacking the device and its contents from the shipping package.

A quick start guide is shipped with each instrument. It provides the necessary steps to configure the Wi-Fi® settings for connecting the device to a local Wi-Fi® network and will also guide you through installation. A digital copy of the Quick Start Guide can also be found at www.tsi.com as well as www.tsilink.com.



There are only two reasons why a BlueSky™ monitor would need to be dismantled:

1. To remove the SD card to download data.
2. To replace the PM sensor. The sensor comes pre-installed, in addition to the microSD card.

NOTE

The BlueSky™ monitor will store data on the SD card under all conditions whether or not the unit is connected to Wi-Fi®. The BlueSky™ monitor does not need Wi-Fi® to function normally. When Wi-Fi® is not available, data can always be found on the SD card.

NOTE

The BlueSky™ monitor cannot read data from the SD card and upload the data to the cloud when Wi-Fi® is available. However, an internal data buffer will store about a week's worth of data (logged at 15 min. intervals), which will then be uploaded to the cloud. Data older than a week will be available only on the SD card. Currently, customers cannot read the SD card data and upload it to the cloud.

NOTE

The 16 GB SD card is user-accessible by removing the two screws that hold the top and bottom halves of the monitor. Data is always logged to the SD card, regardless of whether or not the device is connected to the Wi-Fi®. TSI® is not liable for corrupt data on the SD card. There will be a warning on the cloud data if the BlueSky™ monitor has trouble writing to the SD card.

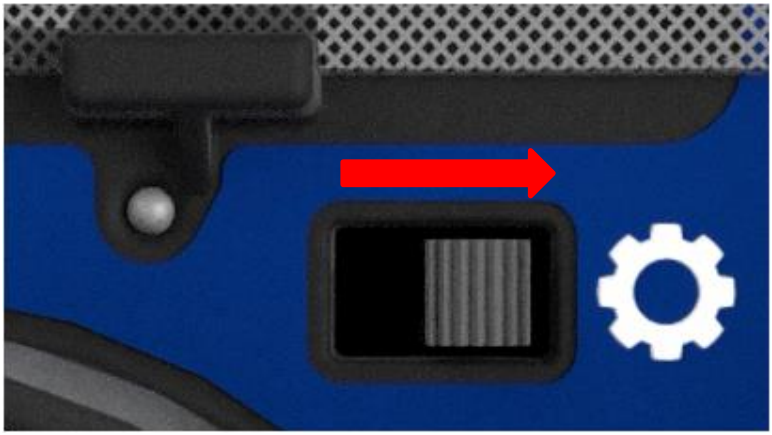
Connecting the BlueSky™ Monitor to a Wi-Fi® Network

NOTE

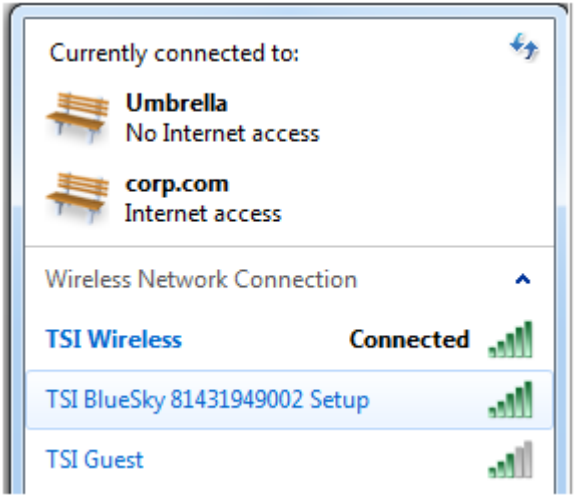
It is recommended that the process of configuring the wireless network settings and connecting the instrument to the internet be performed in an office or a lab environment.

1. Remove the power supply from its packaging and connect it to a nearby power outlet. Connect the other end of the power supply to USB port on the bottom of the monitor.

2. After the monitor has powered on, slide the switch on the bottom of the monitor, toward the settings gear. The green LED should blink once per second. The monitor is now like a Hotspot to which a Wi-Fi® device, such as your laptop or mobile device, can connect to. This will allow you to configure the devices Wi-Fi® settings.

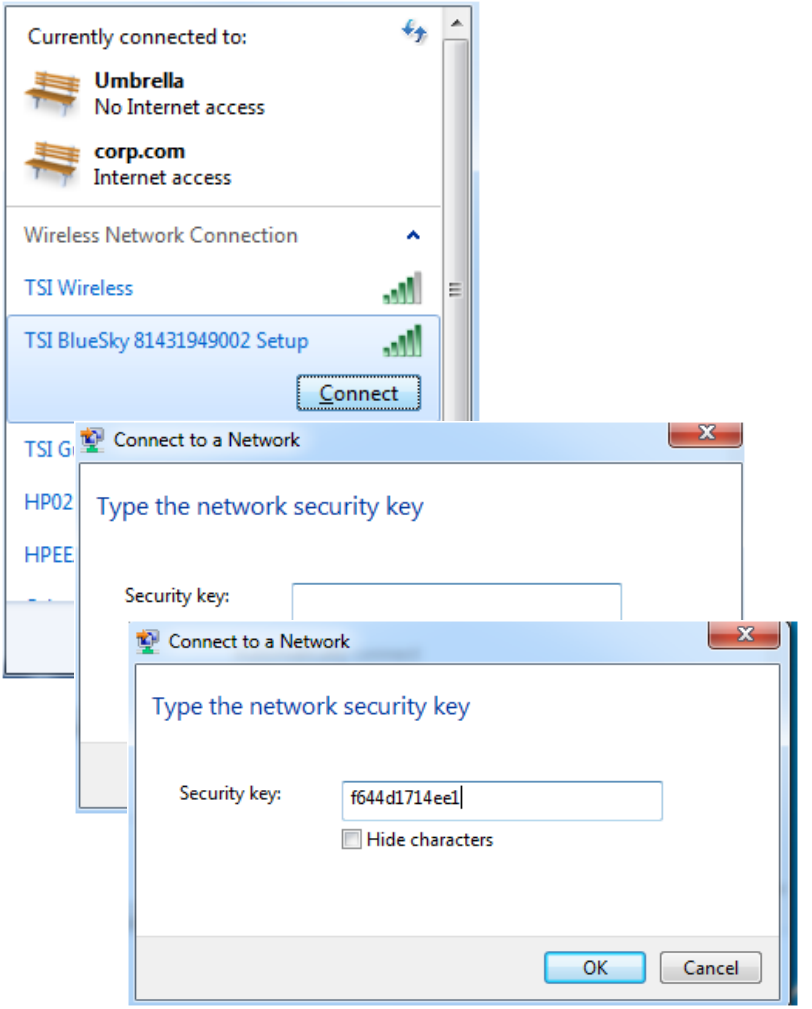


3. Using a laptop, tablet or a smartphone, look for the BlueSky™ Wi-Fi® SSID (Service Set Identifier). The SSID is indicated as **TSI BlueSky 8143YYWWXXX Setup**, which includes the monitor's serial number.

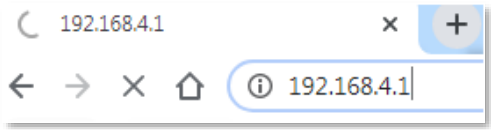


4. Click on the monitor's network and click **Connect**. You will be prompted to enter a security key. The security key can be found on the label of the monitor or on the other label that was placed on the quick start guide. Enter the security code and click **OK**.

NOTE
Your computer or phone may indicate that there is no internet connection present. This is common, because the BlueSky™ monitor is not connected to the internet.

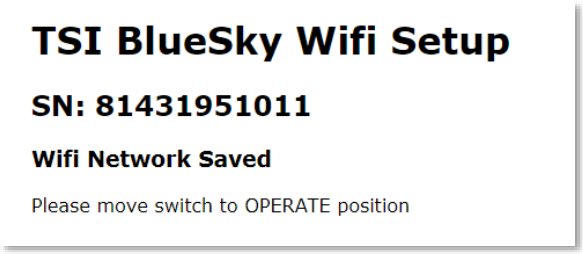


5. After you are connected to the monitor's network, open a web browser on your laptop, tablet or a smartphone and enter the following IP address **192.168.4.1** as shown. Click **Enter** on the keyboard.



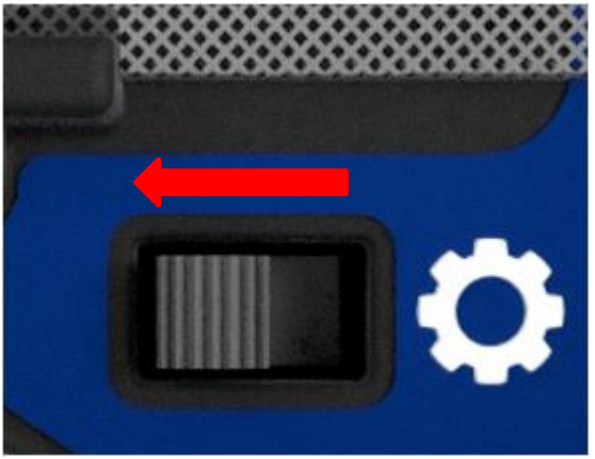
6. The browser will prompt you to enter the SSID (network name) and password of the network you want the BlueSky™ monitor to connect to. This network should be connected to the internet, which will be used by the BlueSky™ monitor to connect to the cloud. Click **SAVE** after entering the information.

7. The browser should let you know that the Wi-Fi® SSID (network name) and password were saved successfully onto the monitors shown below.



The device is now ready to communicate to the Wi-Fi® network. It is recommended that you configure the monitor with the network credentials, which will be present at the final installation location. Then when you connect power to the monitor after installation, it will connect to that network and start transmitting data to the cloud.

8. Finally, move the Wi-Fi® switch back into the operate position so it can connect to the local Wi-Fi® network.



The BlueSky™ monitor will start uploading data to the cloud once it connects to the Wi-Fi® network. After successful communication with the local Wi-Fi® network and the cloud has been established, the green LED should flash once every two seconds.

If the LED is flashing twice every second, with a pause in-between, the monitor is trying to connect to the Wi-Fi® network, but cannot. Try repeating the process for entering the Wi-Fi® network information to fix the problem.

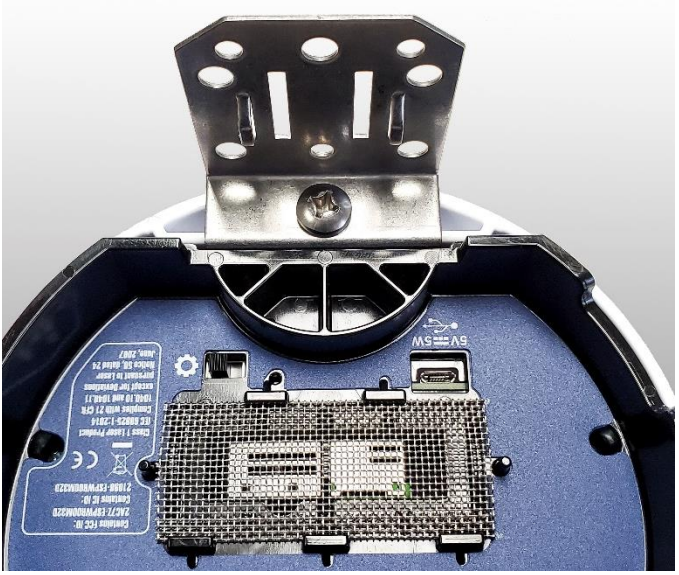
If the LED is blinking three times every second, with a pause in-between, it is has established connection to the Wi-Fi® network successfully, but it cannot connect the cloud. This is most likely due to no internet being present on the Wi-Fi® network. Try connecting to a separate Wi-Fi® network, with a known working internet connection.

NOTE
The monitor does not have the capability to connect to public Wi-Fi® networks that requires a second step of browser authentication, such as a free public hotel or airport network. A different network will need to be chosen.

Refer to the troubleshooting guide to debug any problems.

Installing the BlueSky™ Air Quality Monitor

1. The BlueSky® monitor comes with the mounting bracket and zip ties to secure the instrument to a pole or a wall.
2. Start by attaching the mounting bracket to the bottom of the monitor.



3. Next, mount the instrument to a pole or wall using the mounting bracket for stability. Additionally, connect the power cable to the USB port on the bottom of the monitor. Make sure the power cable has some strain relief as shown below in the pole mount example. This prevents the power cable from becoming disconnected during operation.

   Mounting options are shown below.

   a. Pole mount.

WARNING

DO NOT install the BlueSky™ monitor too close to the ground! Minimum distance from ground should be 1.2 meters or 4 feet to prevent water from splashing from the ground to the bottom of the BlueSky™ monitor. TSI® recommends 3 meters or 10 feet.

NOTE

Use 1/4” screws or #10 screws to mount the bracket to a surface like a wall. The type of screw used depends on the type of the material the surface is made up of.

b. Wall mount.

c. Tripod mount (The bracket needs to be removed to use the Tripod). The thread on the bottom of the device should fit most camera tripods.

4. Plug the other end of the power supply into a weatherproof “in use” resistant/IP 68 rated outdoor receptacle enclosure, an example is shown below.

Figure 2: Water resistant / waterproof outdoor receptacle enclosure

WARNING

Improper outdoor installation could result in equipment damage and/or electrical shock. Installation must follow local electrical codes.

WARNING

DO NOT install the BlueSky™ monitor upside down. The bottom of the device is designed to allow for aerosol to enter the PM sensor. The bottom of the instrument is not water proof. However, if installed upright, it can withstand rain and snow due to the protection from the drip edge.

Chapter 3

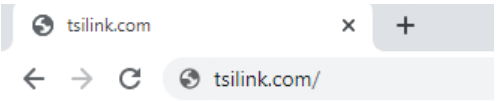
Operation

Overview

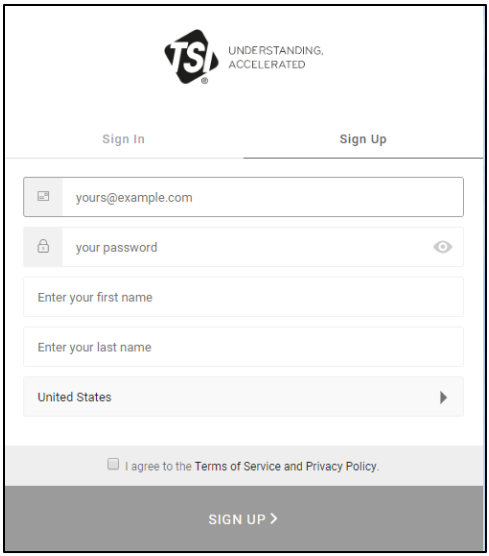
The BlueSky™ Air Quality Monitor's primary use is in outdoor applications. It is designed to operate 24/7 when powered off a standard outdoor power outlet. Once you have setup your monitor(s) and connected them to a local wireless (Wi-Fi®) network, you can log into the new TSI® platform, www.tsilink.com, and see the air quality around your monitors in real time. It will give you insights into how the air quality varies over time and from monitor to monitor. It allows you to start seeing trends, which can lead to making more informed decisions, benefiting the entire project/community and share more air quality information with your community.

How to Register your BlueSky™ Monitor(s) and Account Onboarding

1. After the unit is powered on, check to make sure the green LED at the bottom is flashing once every 2 seconds. If not, go to the troubleshooting guide to fix connectivity issues.
2. From any location (not necessarily by the BlueSky™ monitor), open any web browser and enter the BlueSky™ monitor landing page (www.tsilink.com) as shown below.



3. On the landing page click the [**Sign In**/**Sign Up**] button.
4. Click on the [**Sign In**/**Sign Up**] and choose **Sign Up**. Then enter the following information and click **Sign Up**.
    - Your email address
    - Password
    - First Name
    - Last Name
    - Select Country
    - Agree to [Terms of Service and Privacy Policy]

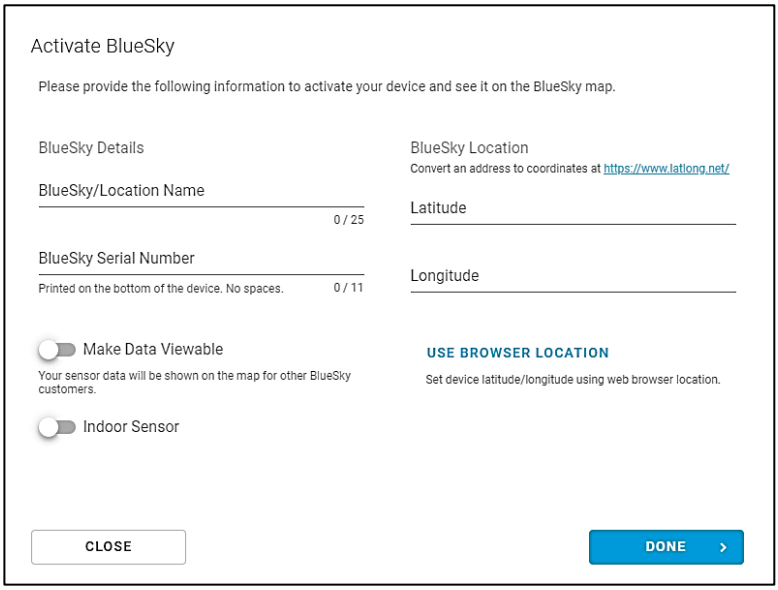


5. You will receive an email from TSI® to verify your email address. Once you receive this email click on the **Verify Link**.
6. Go back to the web browser and click **Done** on the BlueSky™ screen.

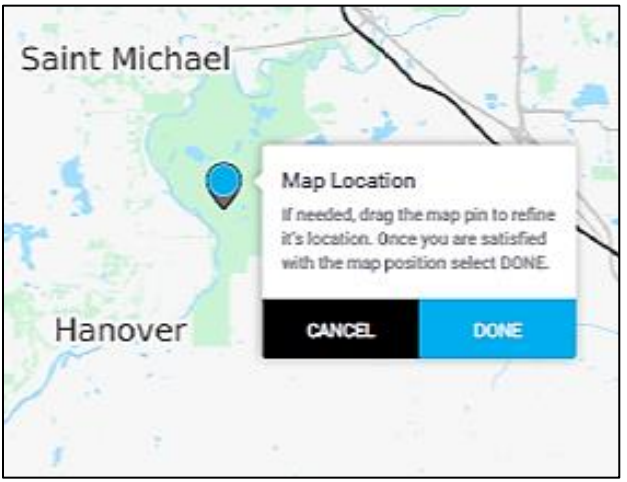
7. Wait for the 10-second count down then log in with your new online BlueSky™ login credential.

8. Register your device by entering in the following information and click **Done**. If you do not see the Device Registration screen, click + on bottom right of the map.

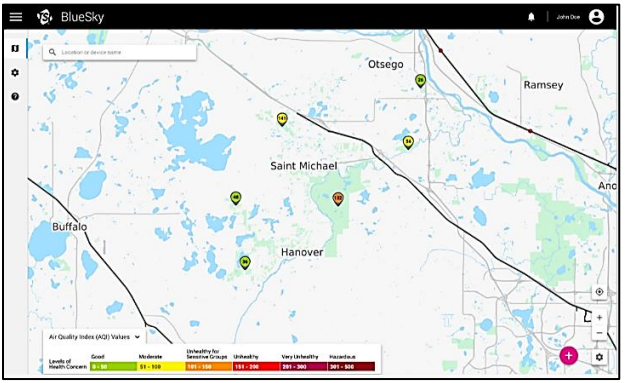
   - Location Name
   - Serial Number
   - Enable/Disable Data Viewable feature for public map
   - Select if this device will be outdoor or indoor
   - Enter Latitude and Longitude using the browser location or the tool by going to https://www.latlong.net/



9. Adjust the device pin location if needed and/or click **Done**.



10. Verify your device pin is displaying PM2.5 measurements to confirm you successfully signed up for an online account and registered your device.



How to View Data from one or more BlueSky™ monitors

1. Go to www.tsilink.com and log In.
2. Click on the map and zoom in to the area where your BlueSky™ device pin is located.
3. Click on the device pin to view the current values.

4. Please note to view data on the cloud right after you installed the BlueSky™ monitor, powered it ON and connected it to the TSI® cloud, please wait at least 15 minutes before you see a data point in the cloud.

How to Download Data from one or more BlueSky™ Monitors

1. Go to www.tsilink.com. and log In.
2. Click on the map and zoom in to the area where your BlueSky™ device pin is located.
3. Click on the device pin.
4. Click on the history button.
5. Click on the three dots in the top left corner and select **Export CSV**.

How to Download Data from the microSD Card in the BlueSky™ Monitor

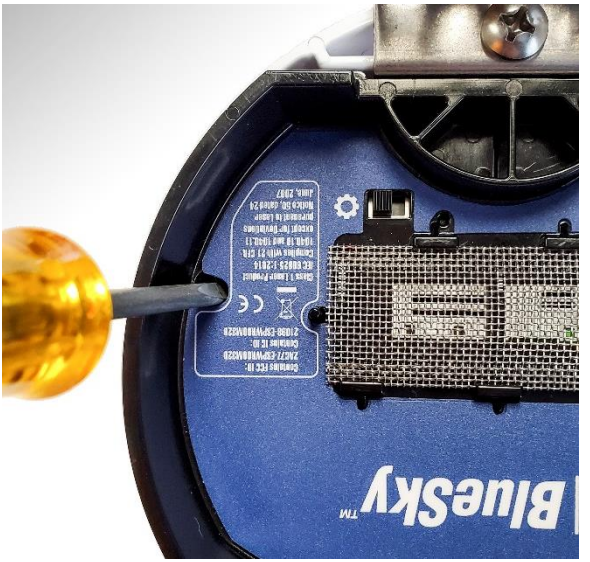
1. Disconnect the power to the unit by disconnecting the USB cable from the power adapter.
2. The 16 GB microSD card is located inside the monitor, which for security reasons, needs to be opened to access the SD card. To do this, separate the white top from the black bottom.

CAUTION

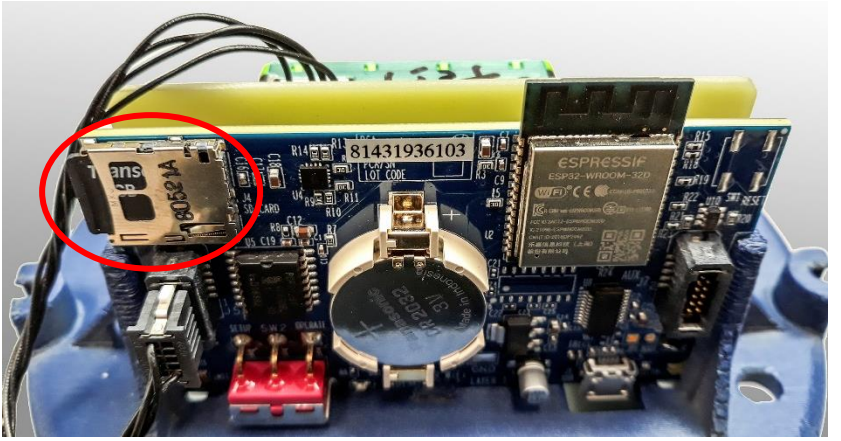
NEVER open the unit when the unit is powered on or connected to the power adapter!

The instrument is susceptible to electro-static discharge (ESD) and ESD protection should be followed to avoid damage.

3. Remove the two screws that attach the top and bottom halves of the BlueSky™ monitor together.



4. The microSD card holder is located on the top left corner as shown below.



5. Remove the card and download the data. You have the options to put the card back in, insert a new card, or choose to not install an SD card. TSI® recommends using an 8 GB or 16 GB card. At 15-minute logging intervals, the memory consumed is about 500 kb/week. A 16 GB card can run for many years before the memory is full. If the BlueSky™ monitor has any issues writing to the card, an error flag will be activated on the cloud that action needs to be taken.

Interpreting the Data Downloaded from the SD Card

Data downloaded from the BlueSky™ Air Quality Monitor will be in the following format:

A	B	C	D	E	F	G	H	I
Timestamp	PM1	PM2.5	PM4	PM10	PM Sensor Status	Temperature	Relative Humidity	Device Status
UTC	µg/m3	µg/m3	µg/m3	µg/m3		Celsius	%	

The number below represent bit positioning. You need to convert from Hex.

Column A	Date in Universal Time Coordinated (GMT)
Column B	PM1.0 Mass concentration data in µg/m^3
Column C	PM2.5 Mass concentration data in µg/m^3
Column D	PM4 Mass concentration data in µg/m^3
Column E	PM10 Mass concentration data in µg/m^3
Column F	PM Sensor Status Blank = “no errors” 0 = "Uncalibrated" 1 = "Cleaning occurred" 2 = "Initialization error" 3 = "Internal error" 4 = "Timeout" 5 = "Communication error" 6 = "Checksum error" 7 = "Data error" 8 = "Fan error"
Column G	Temperature data in °C
Column H	Humidity data in %
Column I	Device Status blank = “no errors, all OK” 0 = "Device rebooted" 1 = "SDCARD Write Failed" 2 = "Cloud Disconnected" 3 = "Case Sensor Error" 4 = "PM Sensor Error" 5 = "Realtime Clock Battery Low" 6 = "Timestamp Stale" 7 = "Timestamp Time Invalid"

Interpreting the Data Downloaded from the Cloud

Data downloaded from the BlueSky™ Cloud will include the following:

A	B	C	D	E	F	G
Timestamp	PM2.5	PM10	PM Sensor Status	Temperature	Relative Humidity	Device Status
UTC	µg/m3	µg/m3		Celsius	%	

The number below represent bit positioning. You need to convert from Int.

Column A	Timestamp in Coordinated Universal Time (UTC)
Column B	PM2.5 Mass concentration data in µg/m^3
Column C	PM10 Mass concentration data in µg/m^3
Column D	PM Sensor Status Blank = “no errors” 0 = "Uncalibrated" 1 = "Cleaning occurred" 2 = "Initialization error" 3 = "Internal error" 4 = "Timeout" 5 = "Communication error" 6 = "Checksum error" 7 = "Data error" 8 = "Fan error"
Column E	Temperature data in °C
Column F	Humidity data in %
Column G	BlueSky™ Status blank = “no errors, all OK” 0 = "Device rebooted" 1 = "SDCARD Write Failed" 2 = "Cloud Disconnected" 3 = "Case Sensor Error" 4 = "PM Sensor Error" 5 = "Realtime Clock Battery Low" 6 = "Timestamp Stale" 7 = "Timestamp Time Invalid"

Chapter 4

Maintenance

Bi-Annual Maintenance Checks

NOTE
For extreme conditions it is recommended that more frequent maintenance be performed every month.

1. Check the metal screen at the bottom of the BlueSky™ monitor. If it is dirty, remove the screen and clean it with compressed air, soap and water.
2. Make sure there are no cracks on the top cover. Cracks can cause water to leak into the device, which may damage the electronics inside.
3. Make sure the mounting bracket is rigidly mounted to the mounting pole, wall or tripod. Tighten screws if necessary.
4. Check to make sure zip ties are tight and replace them, if necessary, as they can degrade when exposed to direct sunlight or exposed to the elements over a prolonged period of time.
5. Inspect the power supply and the cable to make sure they have not degraded due to exposure to the elements. Replace if you find any cracks in the power supply or the cable as it might cause shorting.

Annual Maintenance Checks

NOTE
For extreme conditions it is recommended that more frequent maintenance be performed every month.

1. Any maintenance should be performed only after powering the unit down by disconnecting the USB cable from the power adapter.
2. TSI® recommends replacing the PM sensor once a year. The PM sensor is easy to replace. It is mounted on a carrier board that can be removed from the base of the unit. Disconnect the cable between the sensor and the PC board before you replace the PM sensor.

3. The replacement sensor and the carrier board and the cable are to be replaced as one assembly. Replacement sensor kit can be purchased from TSI®.

Chapter 5

Troubleshooting the BlueSky™ Monitor

Detailed troubleshooting and frequently asked questions can be found on TSI® website.

The table below lists the symptoms, possible causes and recommended solutions for common problems encountered with the BlueSky™ Air Quality Monitor.

Possible Cause	Corrective Action
The BlueSky™ monitor does not turn on	
Bad Power Connection	Check all power connections from the outside of the Enclosure to the Monitor.
The BlueSky™ monitor has no data on the TSI® Cloud	
Check the LED status	
1 blink every 2 seconds	Everything is fine and the BlueSky™ monitor is sending data to the TSI® cloud after it was connected to the local Wi-Fi®. No issues.
2 blinks every 2 seconds	Trying to connect to Wi-Fi®. If this continues, it is unable to connect to the local Wi-Fi®. Re-enter the SSID and password. **NOTE:** Data will still be stored to the SD card even if there is no Wi-Fi® connection!
3 blinks every 2 seconds	Connected to Wi-Fi® but trying to connect to TSI® cloud. Check to make sure the Wi-Fi® router is connected to the Ethernet.
LED is off even when connected to a working power supply	Board is bad. Recommend replacing the board. Call TSI® for next steps.

Possible Cause	Corrective Action
Readings are unusually low	
Plugged screen.	Remove screen from the BlueSky™ monitor and blow out debris with compressed air. Rinse with clean air, if needed.
Replace sensor	Sensor may be past its recommended replacement cycle of once a year.
The BlueSky™ monitor is located near an object that obstructs the flow.	Move the BlueSky™ monitor into a more open area.
Readings are not correct	
Custom calibration factor is incorrect	Check the custom calibration factor. Is the value correct? Was it changed by mistake?
No custom calibration factor	Values can be corrected by using a custom calibration factor. The custom calibration factor can be changed in the cloud.

Detailed Error Code Description

Tiber Status			
Bit Position	Bit Label		
	1	0	Description
0	Device rebooted	No reboot	If set, device rebooted during this interval.
1	SDCARD write failed	SDCARD write OK	If set, data was NOT written to the SDCARD (it is either not present or write failed).
2	Cloud disconnected	Cloud connected	If set, connection Cloud was not operational during this interval.
3	Case sensor error	Case sensor OK	If set, an error occurred reading from the case temperature and relative humidity sensor.
4	PM sensor error	PM sensor OK	If set, an error occurred reading from the PM sensor. See PM Sensor Status for more details.
5	(FUTURE) Real-time Clock Battery low	(FUTURE) Real-time Clock Battery OK	If set, the onboard Real-time Clock Battery is low. Timestamp for data is valid if device is connected to the Cloud.
6	(FUTURE) Timestamp stale	(FUTURE) Timestamp OK	If set, the internal time has not been synced to the Cloud in the last 24 hours.
7	(FUTURE) Timestamp invalid	(FUTURE) Timestamp OK	If set, the onboard Real-time Clock contains invalid time. This can occur if its battery is low and device power is disconnected.
8-31	RESERVED		

PM Sensor Status (SPS30)			
Bit Position	Bit Label		
	1	0	Description
0	Data uncalibrated	Data calibrated	If set, sensor readings are uncalibrated in this interval due to missing calibration.
1	Cleaning occurred	Cleaning did not occur	If set, PM sensor performed a self-cleaning cycle during this interval.
2	Initialization error	OK	If set, an error occurred when attempting to initialize the PM sensor in this interval.
3	Internal error	OK	If set, PM sensor has reported an internal error in this interval.
4	Timeout	OK	If set, timeout occurred attempting to communicate with the PM sensor in this interval.
5	Communication error	OK	If set, a communication error occurred attempting to communicate with the PM sensor in this interval.
6	Checksum error	OK	If set, a checksum error occurred in the received data from the PM sensor in this interval.
7	Data error	OK	If set, one or more of the received data from the PM sensor exceeded limits in this interval.
8	(FUTURE) Fan error	OK	If set, a fan error was detected from the PM sensor in this interval.
9-31	RESERVED		

Appendix A

Specifications*

PM Sensor	
Sensor Type	Light scattering single particle counting
Aerosol Concentration Range.....	0 to 1000 µg/m^3
Measurements	PM1.0, PM2.5 PM4.0, and PM10 on SD Card and PM2.5, PM10 on Cloud
Measurement Resolution	1 µg/m^3
Counting Efficiency	50% at 0.3 µm and 98% at 0.5 µm
Accuracy	±10 % @ 100 – 1000 µg/m^3 when compared to a DustTrak™ DRX monitor
Zero Stability	±1 µg/m^3
Sample Flow Rate	~ 0.3 L/min
Response Time	1 second
Start-up Time	< 8 seconds
Operating Temperature Range ...	-10 to 60ºC
Operating Humidity Range.....	0 to 95% non-condensing
Storage Temperature .	-40 to 70ºC
Acoustic Emissions Level.....	25 dBA @ 0.2 m
Temperature Sensor	
Range.....	-40 to 125°C
Accuracy	±0.2°C
Response Time	5 to 30 seconds
Humidity Sensor	
Range.....	0 to 100% RH
Accuracy	±1.8 % RH
Response Time	8 seconds

Maintenance Requirements	
PM Sensor	Replace PM sensor every year (recommended)
AC and DC Power Requirements	
AC Power.....	100 to 240 VAC, 50/60 Hz
Power Consumption ...	< 5 W
Environmental/Installation Requirements	
Maximum Altitude	3000 meters (10,000 feet)
Pollution Degree	3
Installation Category	III

**Specifications are subject to change without notice.*

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