AimSafety™ PM$_{100}$ Bump Test & Calibration Station

Bump Test and Calibration Station for PM$_{100}$
User Instructions

IMPORTANT: Keep these user instructions for reference.

1 General Safety Information

1.1 List of warnings

<table>
<tr><td colspan="1">⚠️WARNING</td></tr>
<tr><td>Each person using this equipment must read and understand the information in this user manual before use. Use of this equipment by untrained or unqualified persons or use that is not in accordance with this user manual, may adversely affect product performance.</td></tr>
<tr><td>This equipment may not function effectively below 41°F or above 104°F (5°C or above 40°C). Using the equipment outside of this temperature range may adversely affect product performance.</td></tr>
<tr><td>This equipment helps ensure gas monitors can accurately test for the presence and concentration level of a certain specified airborne gas. Misuse may produce an inaccurate reading, which means that higher levels of the gas being monitored may be present and could result in overexposure and cause serious injury or death. For proper use, see supervisor or User manual, or contact Technical Support at 1-844-325-3050.</td></tr>
<tr><td>Do not disassemble unit or attempt to repair or modify any component of this instrument. This instrument contains no user serviceable parts, and substitution of components may impair product performance.</td></tr>
<tr><td>Using a certified gas with a concentration other than the one listed for this equipment when conducting a calibration verification test (bump test) will produce inaccurate readings. This means that higher levels of the gas being monitored may be present and could result in overexposure. For proper use, see supervisor or User manual, or contact Technical Support at 1-844-325-3050.</td></tr>
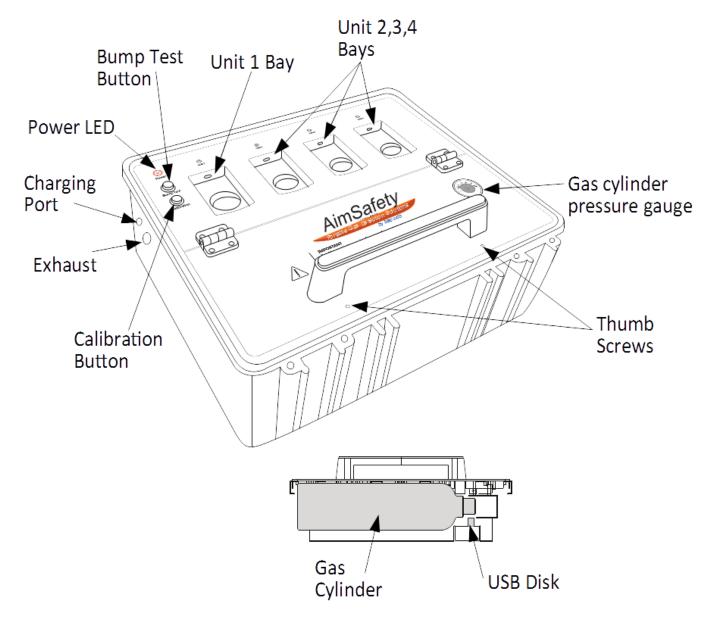<tr><td>The following steps must be performed when conducting a calibration verification test (bump test) to ensure proper performance of the monitor. Failure to do so may adversely affect product performance.
• When performing a calibration verification test (bump test) only use certified calibration gas at the required concentration level.
• Do not test with expired calibration gas.
• Do not cover or obstruct display or visual alarm cover.
• Ensure sensor inlets are unobstructed and are free of debris
Failure to follow instructions outlined in this user manual can result in sickness or death.</td></tr>
</table>

2 Use Instructions and Limitations

2.1 Use For

The AimSafety Bump/Calibration Station for PM_{100} is an all-in-one testing/calibration station for PM_{100} portable gas monitors. The Bump-Calibration Station utilizes the IR communication of the PM_{100} Monitors to perform testing and calibration by pressing only a single button. Operation of the station only requires the use of two buttons. Learning to use the station takes only minutes.

It is designed to quickly perform bump tests/calibration for multiple PM_{100} monitors. It can test/calibrate up to four detectors simultaneously, which reduces the testing time and gas usage. The Bump-Calibration Station will work with PM_{100} H_2S, CO, and O_2 monitors.

2.2 Features

- Simultaneously test four PM$_{100}$ gas monitors
- Rechargeable internal battery lasts up to 1000 bump tests on a single charge
- Internal gas cylinder regulator and pressure gauge
- USB flash drive for bump test and event log storage
- Configuration using the Docking Manager software
- Firmware updates using the docking manager software
- Rugged case
- Computer not required for normal operation

⚠ WARNING
Each person using this equipment must read and understand the information in this user manual before use. Use of this equipment by untrained or unqualified persons or use that is not in accordance with this user manual, may adversely affect product performance.

2.3 Specifications

- Size: 18.50" x 16.14" x 8.66" (47 x 41 x 22cm)
- Weight: 18 Lbs. (8.2kg) Without cylinder
- Operating Temperature: 41° to 104°F (5° to +40°C)
- Warranty: 2-years
- Battery Type: Rechargeable Lithium Ion
- Battery life: ~1000 Bump Tests
- LEDs: 5 red/green/orange LEDs (1 for each bay, 1 for power indicator)
- Memory: USB 8GB Standard
- Log Capacity: Approximately Up to 10 million tests (with 8GB removable USB memory)
- Functions performed: Bump Test and Calibration
- Information Stored: Bump/Cal Logs, Individual Monitor Event Logs, Firmware and Unit Configurations
- Gases Available: CO, H2S and O2
- Gas Cylinder: Compatible with 58L cylinders
- Charging Adaptor: 12V DC @ 3A

3 Operation

The Bump-Calibration Station is operated using only two buttons.

3.1 Power

To turn on the power,

1. Press either the **Bump Test** or the **Calibration** button for one second.
2. The Power LED will initially turn on to orange, then switch to green when the unit is ready. If the unit has a low battery, the power LED will switch to red.
3. If the USB is full or is not detected, the power LED will initially flash orange for five seconds.

To turn off the power,

1. Press and hold the **Bump Test** and **Calibration** button simultaneously for one second.
2. The power LED will shut off indicating the unit has been switched to sleep mode.
   NOTE: The unit will automatically switch to sleep mode after 5 minutes of inactivity.

3.2 LEDs

There are 5 LEDs on the Bump-Calibration Station which indicate the operation status.

LED	Color	Description	Operation Status
Unit LEDs	🟠	On	Testing
	🔴	On	Test Failed
	🟢	On	Test Passed
	🟢	Blinking (5 sec.)	Communicating
Power LED	🟢	On	Ready
	🟠	Blinking (5 sec.)	No USB/USB Full
	🔴	On	Low Battery

3.3 Charge Battery

The charging port is located on the left side of the unit. The unit comes with a DC adapter which can be used to charge the unit using a 110V power supply. A full charge will take approximately 3 hours and will last for approximately 1000 bump tests.

3.4 Gas Cylinder Installation

Gas cylinders are available in single gas and multi-gas concentrations. They must have the C10 fitting on them. Gas cylinders are available through local distribution or from AimSafety.

To install a new gas cylinder,

1. Remove the two thumbscrews located between the handle and the edge of the case.
2. Lift the handle to open the gas cylinder compartment.
3. Attach the cylinder to the gas regulator by threading the bottle into the fitting until tight.
4. Secure the cylinder with the three cylinder straps.
5. Close the cylinder compartment.
6. Check the pressure gauge to confirm adequate pressure.
7. Replace the two thumbscrews.

The Gas Expiration date and Gas Bottle Lot # can be recorded using the Bump-Calibration Station Manager software (See Section 5.3.1.1 Station Info).

3.5   Exhaust Port

The exhaust port is located on the left side of the unit next to the charging port. During an active test, the test gas will exit the unit through this port. Optionally, tubing can be attached to the exhaust port to direct the used test gas to a suitable location.

4   Testing

Place up to four activated monitors in the bays for testing. Confirm that the installed test gas cylinder matches the gas types required by the monitors being tested. The Bump-Calibration Station can test monitors with different gas types at the same time if using a multi-gas cylinder.

Every test (Bump test and Calibration) can also automatically perform the following optional operations (See Section 5.3.1.2 Enable/Disable Function):

- Upgrade each monitor's firmware (if required)
- Test each monitor's beeper
- Configure each monitor's user options (as required)
- Download each monitor's logs and save them to the USB memory
- Record the test to the USB memory

NOTE: All empty bays must have a rubber cap installed before a test can be performed. Without the rubber cap installed, excess test gas will leak out of the empty bay.

4.1   Bump Test

All monitors need to be periodically tested with a known concentration of gas to verify the sensor is responding correctly to the target gas. This test is called a bump test.

To perform a bump test,

1. Place the monitor(s) into the bays.
2. With the Bump-Calibration Station powered on, press the Bump Test button for one second to start the test. The unit LED will turn Orange when the test has started.
3. The unit LED will remain Orange while the test is in progress. A bump test will take approximately 20 seconds.
4. When the test is complete, the unit LED will turn Green for a successful test or Red if it fails.
5. Remove the monitor from the bay.

NOTE: Any monitors that fail a bump test will require calibration before use.

4.2   Calibration

Calibration is the process of adjusting the sensor's response by using a specific concentration of calibration gas. Sensors will lose accuracy over time for a variety of reasons. Therefore, it is important to perform a full calibration periodically to ensure the sensors response to the target gas are accurate.

A proper calibration requires a Zero Calibration (also called a Fresh Air Calibration) and a Span Calibration.

The Bump-Calibration Station performs the Span Calibration but does not perform the Zero Calibration.

It is recommended to perform a Zero Calibration prior to performing the Span Calibration using the Bump-Calibration Station. A Zero Calibration can be done using the PM_{100} monitor interface or with the assistance of the PM Link.

To perform a Span Calibration,

1. Place the monitor(s) into the bays.
2. Press the calibration button for one second to start the test. The unit LED will turn Orange when the test has started.
3. The unit LED will remain Orange while the calibration is in progress. The calibration will take approximately 60 seconds for 0_2 and 90 seconds for CO and H_2S.
4. When the calibration is complete, the unit LED will turn Green for a successful calibration or Red if it fails.
5. Remove the monitor from the bay.

NOTE: Do not use a monitor that fails a calibration.

4.3   Test Troubleshooting

4.3.1   Unit LED does not turn on or test is not performed
- Clean monitor IR window
- IR interference (bright lights/sunlight)
- Monitor in gas alarm state

4.3.2   All tests fail
- Gas cylinder empty – Check pressure gauge. Gas pressure should read at least 100 psi for proper operation.
- Gas Expired – Gas expiration date is located on the gas cylinder.
- Wrong gas concentration(s).
- Wrong gas type.
- If a monitor fails 3 consecutive test attempts, please contact AimSafety Technical Support.

4.3.3   Test results not stored
- USB drive not installed or corrupted – Power LED will flash orange for five seconds during startup.
- USB drive full – Power LED will flash orange for five seconds during startup.

5   Station Manager Software

The Bump-Calibration Station Manager software is used to configure the Bump-Calibration Station. The software can make changes to the Bump-Calibration Station settings using a PM Link device or the included USB Disk.

Not all software features are available when using the USB Disk. The table below shows the available features:

Feature	Available with PM Link?	Available with USB Disk?
PM_{100} configuration	Yes	Yes
Update PM_{100} firmware files	Yes	Yes
Update Bump-Calibration Station firmware files	Yes	Yes

Add test gas information	Yes	Yes
Retrieve log files	Yes	Yes, using file explorer
Set time and date	Yes	No

5.1   Download and Installation

5.1.1   Download the software

Download the Bump-Calibration Station Manager software from the following link:
https://www.macurco.com/?ddownload=2090

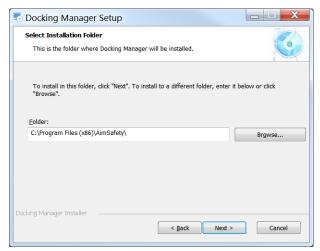Save the file to a place you will remember.
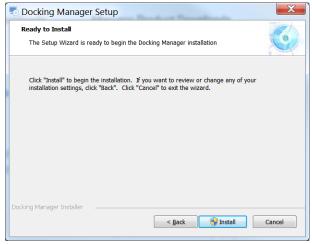
5.1.2   Install the software

To install the software,

1. Navigate to the saved file.
2. Double-click the file to run the installer.
3. You may receive a security warning. Click **Run** or **Run Anyway** to continue with the installation.
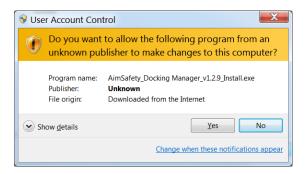4. The Docking Manager Setup wizard will start. Click **Next**.

5. Now select the installation folder. The default folder is the best option for most people. Click **Next**.

6. The installation is ready to begin. Click **Install**.

7. You may receive a warning. Click <u>Yes</u> to continue.

8. When the installation is complete, click **Finish** to exit the Setup Wizard.
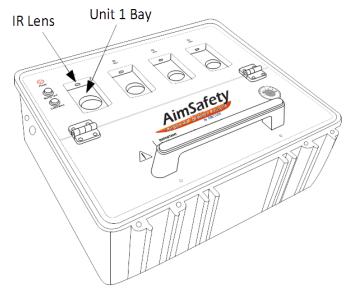

5.2   Connect to the Calibration Station

When the Bump-Calibration Station Manager software is first opened, the fields are grayed out. The software must be connected to the Bump-Calibration Station before it can be used. There are two methods to connect the software to the Bump-Calibration Station: A PM Link or the included USB Disk can be used.

5.2.1   Connect Using PM Link

The Bump-Calibration Station can be conveniently configured using the PM Link device. The unit can communicate with the PM Link device using the IR communication in Unit 1 bay.

To connect using the PM Link,

1. Plug the PM Link device into a USB port on your computer.
2. Place the PM Link device in Unit 1 bay with the IR lens of the PM Link facing the IR lens of the Unit 1 bay.

3. Make sure the Bump-Calibration Station power is on indicated by the green Power LED.
4. Open the Bump-Calibration Station Manager software.
5. Make sure the "IR" option at the top of the software interface is selected.

6. Press **OPEN** in the upper right corner of the software interface.
   NOTE: If the software is opened before the PM Link device is plugged into the computer, a "Port open fail" message may popup. If this occurs, close the software and reopen it.
7. The communication light on the PM Link device will begin to flash rapidly.
8. After several seconds, the current Bump-Calibration Station settings will be displayed on the interface and a "Read complete" message will be displayed.

If the PM Link device fails to communicate with the Bump-Calibration Station after 20 seconds, a "Send timeOut" message will be displayed. Check to make sure the Bump-Calibration Station power is on, and that the PM Link IR screen is aimed at the IR screen of Unit 1 bay.

5.2.2   Connect Using USB Disk

Alternatively, the Bump-Calibration Station can be configured using the included USB Disk. The USB Disk will need to be removed from the Bump-Calibration Station and plugged into a USB port on the computer.
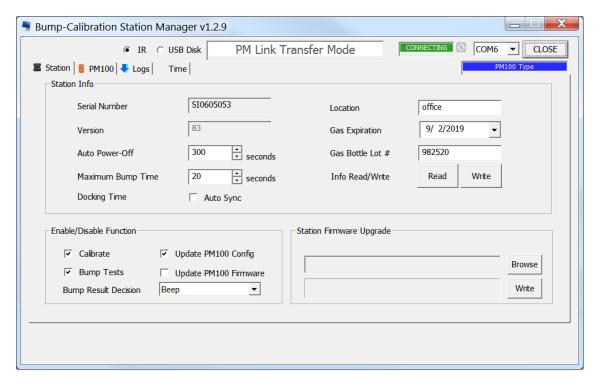
To connect the USB Disk to the Bump-Calibration Station Manager software,

1. Turn off the power to the Bump-Calibration Station by pressing the Bump Test and Calibration buttons simultaneously.
2. Remove the two thumbscrews located between the edge of the case and the handle.
3. Lift the handle to open the gas cylinder compartment.
4. The USB Disk is located on the right side of the bottom of the compartment. Remove the USB Disk by simply pulling it out.
5. Plug the USB Disk into a USB port on your computer.
6. Open the Bump-Calibration Station Manager software.
7. Select the USB Disk option at the top of the software interface.
8. Navigate to the location of your USB Disk. Click **OK**.

5.3   Use the Software

Once connected, the software interface will display the current settings of the connected Bump-Calibration Station and fields that can be edited will no longer be grayed out. It should look similar to the image below.

NOTE: The Logs and Time tabs will not be available if connected using the USB Disk.
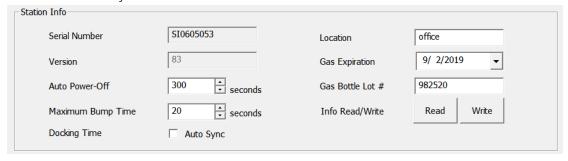
5.3.1 Station Tab

The Station tab is displayed when the software opens (as shown above). It shows information about the Bump-Calibration Station, information about the installed gas cylinder, configuration of the operation of the Bump-Calibration Station, and the Bump-Calibration Station firmware upgrade interface.

NOTE: No changes will be saved to the Bump-Calibration Station until the **Write** button is pressed (see 5.3.1.1).

5.3.1.1 Station Info

Serial Number – Cannot be changed. It uniquely identifies the Bump-Calibration Station unit.

Version – The firmware version installed on the Bump-Calibration Station.

Auto Power-off – Determines the idle time before the Bump-Calibration Station automatically switches to sleep mode. Can be set from 1-3600 seconds. Default is 300 seconds.

Maximum Bump Time – Determines the maximum time allowed for a Bump Test. If the PM_{100} device fails to properly respond before the time expires, the test will stop, and the device will fail the test. Can be set from 20-120 seconds (default is 20 seconds).

Docking Time Auto Sync – If checked, the time on the Bump-Calibration Station will be synced to the computer time. If unchecked, the time can be manually adjusted within the Time tab.

Location A custom location can be added up to 12 alphanumeric characters. This can be useful to keep data from multiple Bump-Calibration Stations organized.

Gas Expiration – Displays the expiration date of the installed gas cylinder. Update this field when a new gas cylinder is installed. Gas expiration date can be found on the gas cylinder.

Gas Bottle Lot # - Displays the lot number of the installed gas cylinder. The gas cylinder lot number can be found on the gas cylinder. Update this field when a new gas cylinder is installed.

Info Read/Write – Press **Read** to download and display the current settings of the Bump-Calibration Station. Pressing Read will discard any unsaved changes in the Station tab. Press **Write** to upload the settings currently displayed on the software to the Bump-Calibration Station. No changes will be saved to the Bump-Calibration Station until the **Write** button is pressed.

5.3.1.2   Enable/Disable Function

When the Bump-Calibration Station performs a bump test or calibration on a PM_{100} device, it can optionally perform other maintenance tasks simultaneously.

Calibrate – If the Calibrate box is unchecked, the calibrate function of the Bump-Calibration Station will be disabled. With the calibrate function disabled, pressing the Calibrate button will not calibrate the monitor, but it will update configuration or firmware if the option is enabled. The power LED will turn orange for 5 seconds, then return to green.

Bump Tests – If the Bump Tests box is unchecked, the Bump Test function of the Bump-Calibration Station will be disabled. With the Bump Test function disabled, pressing the Bump Test button will not test the monitor, but it will update configuration or firmware if the option is enabled. The power LED will turn orange for 5 seconds, then return to green.

Update PM100 Config – If this box is checked, the Bump-Calibration Station will update the PM_{100} configuration settings (See Section 5.3.2.1 PM100 Configuration Options) when the Bump Test or Calibration button is pressed.

Update PM100 Firmware – If this box is checked, the Bump-Calibration Station will upgrade the PM_{100} firmware when the Bump Test or Calibration button is pressed. It is not necessary to upgrade the PM_{100} firmware every time the monitor is tested. It is only necessary when a newer version of the firmware is available. To update the firmware file saved on the Bump-Calibration Station, see Section 5.3.2.4 PM100 Firmware Upgrade.

Bump Result Decision – The dropdown list is selectable for "Beep", "Concentration", or "Beep + Concentration".

The "Beep" option will run the bump test until the alarm condition is met and the audible alarm is detected.

The "Concentration" option will run the bump test until the test gas concentration is verified. If the units are in Stealth Mode, the Concentration option will be required for a successful bump test.

The "Beep + Concentration" option will run the bump test until the audible alarm is detected and the test gas concentration is verified.
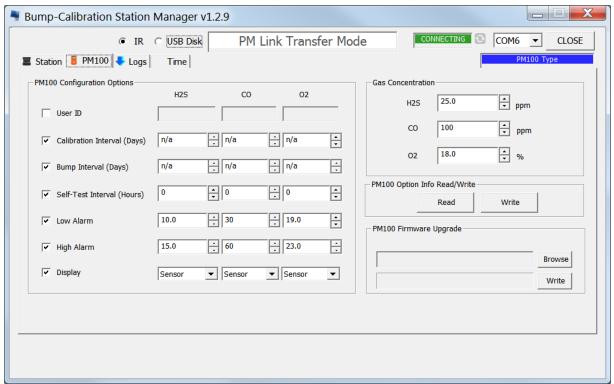
5.3.1.3 Bump-Calibration Station Firmware Upgrade

To upgrade the Bump-Calibration Station firmware,

1. Click **Browse**.
2. Navigate to the location of the firmware file.
3. Click **Open**.
4. The software interface will show the file path of the new firmware in the Station Firmware Upgrade field. Click **Write** to write the new firmware to the Bump-Calibration Station.

5.3.2 PM100 Tab

The Bump-Calibration Station and Bump-Calibration Station Manager software can be used to quickly make configuration changes for multiple PM$_{100}$ detectors. The PM100 tab in the Bump-Calibration Station Manager

software shows the available configuration options for PM_{100} devices. All configuration settings can be set to be simultaneously updated during each bump test or calibration (see Section 5.3.1.2 Enable/Disable Function).

5.3.2.1 PM100 Configuration Options

Each configuration option can be enabled/disabled using the checkbox on the left side. Disabling the option will not disable the feature in the PM_{100} monitor. It will only prevent the Bump-Calibration Station from changing the existing setting in each PM_{100} monitor.

Note: Although the software will perform a "Read" operation when opening, If the device is not in place, the "Read" operation may need to be performed once the software is opened to display the configuration of the device.

User ID – The User ID field can be used to add a custom message.

Calibration Interval (Days) – The Calibration reminder can be configured from n/a (Off) to 365 days.

Bump Interval (Days) – The Bump Test reminder can be configured from n/a (Off) to 365 days.
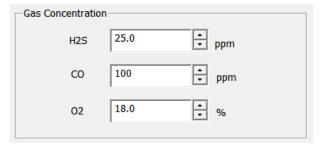
Self-Test Interval (hours) – The Self-Test reminder can be configured to n/a (Off) or between 8 hours to 20 hours.

Low Alarm – This is the first (low for O_2) set point that activates the monitor's alarms.

High Alarm – This is the second (high for O_2) set point that activates the monitor's alarms.
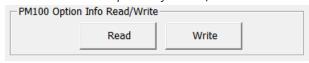
Display – Choose whether the monitor display shows the current gas reading or the remaining sensor life.

5.3.2.2 Gas Concentration

This field allows you to enter the gas concentration(s) of the test gas cylinder installed in the Bump-Calibration Station. This is necessary for proper testing and calibration of PM_{100} monitors. There are fields available for H2S, CO, and O2.

5.3.2.3   PM100 Option Info Read/Write

IMPORTANT: Any changes made to the PM100 tab will not be saved to the Bump-Calibration Station until the "Write" button is clicked.

To write the data from the PM100 tab to the Bump-Calibration Station, press **Write**.

To read the current PM_{100} configuration options saved in the Bump-Calibration Station, press **Read**.

NOTE: Pressing **Read** will cause any unsaved changes on the PM100 tab to be lost.
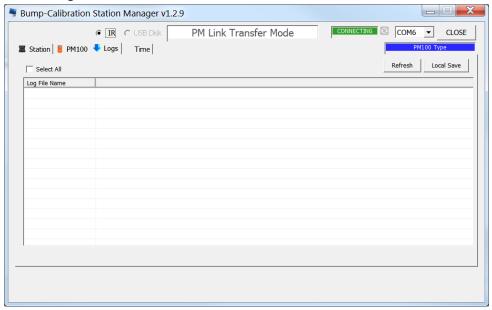
5.3.2.4   PM100 Firmware Upgrade

The Bump-Calibration Station can be used to upgrade the PM_{100} firmware. The Bump-Calibration Station can keep a copy of the PM_{100} firmware saved on its USB Disk. PM_{100} monitors require a firmware file that is specific to the monitor's gas type. If there is a new firmware version, the file can be found at https://macurco.com/downloads/.

To update the PM_{100} firmware file,

1. Press Browse to open the file explorer.
2. Navigate to the PM_{100} firmware file.
3. Press Open.
4. Press **Write**. The PM_{100} firmware file will be saved to the USB Disk of the Bump-Calibration Station.
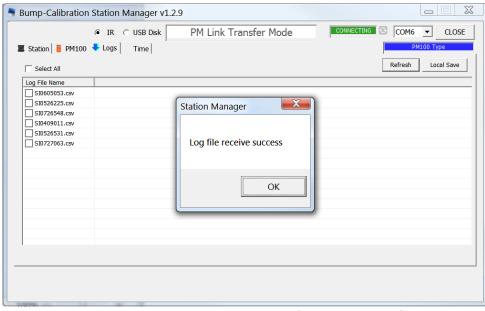
5.3.3   Logs Tab

Logs are stored on the USB Disk and can be viewed on a computer using the Bump-Calibration Station Manager software. The log files will be formatted as .csv files (comma separated values) for easy viewing and manipulation with spreadsheet software. A log file will be created for each PM_{100} monitor used in the Bump-Calibration Station. A single log file will be created for the Bump-Calibration Station.

NOTE: The Logs tab is not available if connected via USB Disk. Instead, the log files can be viewed and saved directly by navigating to the "Logs" folder in the USB Disk.

5.3.3.1   View Log Files

To view a list of the log files, click **Refresh** while connected to the Bump-Calibration Station. The log file names will appear in the list box and a "Log file receive success" message will pop-up when the list is complete. Log file names are based on the serial number of the device.

www.aimsafety.com   1-844-325-3050   support@aimsafety.com   3601 N St. Paul Ave
Sioux Falls, SD 57104

5.3.3.2 Save Logs to Computer

The log files can be saved to the computer.

To save the log files to the computer,

1. Select the desired log files to save. Click the **Select All** check box to select or deselect all log files at once. Individual log files can be selected by clicking on their respective check box.
2. Click **Local Save**.
3. A Browse window will open. **Navigate** to the desired save location. If saving many log files, it may be advisable to create a folder for the log files.
4. Press **OK**. The download will start.
5. When the download is complete, a "Log data save success" message will pop-up.

5.3.3.3 Log Information

The log files are saved in a .csv file format. They can be opened by any spreadsheet software.

Each time a test is performed, a log similar to the image below will be created in the Bump-Calibration Station log file.

	A	B	C	D	E	F	G	H	I
1	Log Time	8/15/2018 11:40							
2	Docking Serial Number	SI0605053							
3	F/W Version	0.8.3							
4	H/W Version	1.0.0							
5	Place								
6	Gas Expiration Date	2000.1.1							
7	Gas Bottle Lot	0							
8									
9	Bay Num	Model	Gas Type	Test Type	Test Result	Serial Num	F/W Version	H/W Version	User ID
10	1	PM100	H2S	Bump	SUCCESS	SI0526225	1.2.5	1.1.0	
11									
12									

Each PM$_{100}$ monitor that is tested using the Bump-Calibration Station will generate its own log file. The image below shows the information in a sample log file with two test entries.
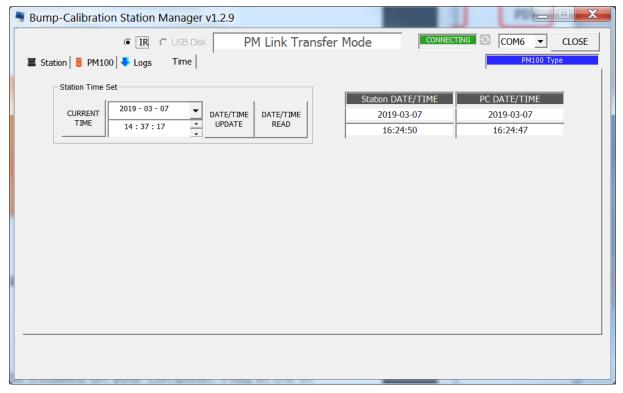
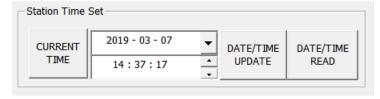|	A	B	C	D	E	F	G
1	Product Name	PM100					
2	Serial Number	SI0526225					
3	Version	1.2.5					
4	Life Remaining	13 months 28 days					
5	Total Number of Events	2					
6	Duration of Events	0:00:49					
7	Zero Cal Time	8/15/2018	11:38:53				
8	Span Cal Time	8/15/2018	11:38:53				
9	Low Alarm	10					
10	High Alarm	15					
11	GAS Type	H2S					
12							
13	Event Date	Event Time	Bump Test	Duration(s)	Sensor Reading	Alarm	
14	2018.08.15	11:40:18	Yes	0:00:26	23.6	HIGH Alarm	
15	2018.08.15	11:42:29	Yes	0:00:23	23.9	HIGH Alarm	
16							

5.3.4   Time Tab

The Bump-Calibration Station adds time data to all its logs. If the Bump-Calibration Station time is incorrect, it can easily be updated to the correct time using the Bump-Calibration Station Manager software. The time can only be set when connected using the PM Link.

5.3.4.1   Station Time Set

NOTE: If the Docking Time Auto Sync option is checked in Station Info, the option to manually set the Bump-Calibration Station time will not be available.

To manually set the Bump-Calibration Station time,

1. Update the date field to the desired time. Click **CURRENT TIME** to set the date field to the current computer time.
2. Click **DATE/TIME UPDATE**. The software will set the Bump-Calibration Station time to the time displayed in the date field.

6   AimSafety Product limited warranty

Macurco warrants the PM100 Bump/Cal Station gas detector will be free from defective materials and workmanship for a period of two (2) years from the date of manufacture (indicated on inside cover of the PM100 Bump/Cal Station), provided it is maintained and used in accordance with Macurco instructions and/or recommendations. If any component becomes defective during the warranty period, it will be replaced or repaired free of charge, if the unit is returned in accordance with the instructions below. This warranty does not apply to units that have been altered or had repair attempted, or that have been subjected to abuse, accidental or otherwise. The above warranty is in lieu of all other express warranties, obligations or liabilities. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED TO A PERIOD OF TWO (2) YEARS FROM THE PURCHASE DATE. Macurco shall not be liable for any incidental or consequential damages for breach of this or any other warranty, express or implied, arising out of or related to the use of said gas detector. The manufacturer or its agent's liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are the return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts.

AimSafety by Macurco

3601 N. St. Paul Avenue
Sioux Falls, SD 57104

Technical Support Contact Information

Phone: 1-844-325-3050
Fax: 1-605-951-9616
Email: support@aimsafety.com
Website: www.support.aimsafety.com

General Contact Information

Phone : 1-877-367-7891
Fax : 1-605-951-9616
Email : info@aimsafety.com
Website: www.aimsafety.com

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