

AimSafety™

PORTABLE GAS DETECTION SOLUTIONS

by Macurco

AimSafety™ PM₄₀₀ Multi-Gas Personal Monitor User Instructions



IMPORTANT: Keep these user instructions for reference.

- 1 General Information** 4
 - 1.1 Key Features 4
 - 1.2 Programmable options (PM Link)..... 4
 - 1.3 Difference Between PM₄₀₀ P and PM₄₀₀ IR 5
 - 1.3.1 Over Range Alarm Function..... 5
 - 1.3.2 Catalytic Bead technology (PM₄₀₀ P) Overview 5
 - 1.3.3 Non-Dispersive Infra-Red (NDIR) technology (PM₄₀₀ IR) Overview 6
- 2 Specifications** 7
- 3 Product Overview** 8
 - 3.1 Monitor Overview 8
 - 3.2 Display Overview 8
 - 3.2.1 LCD display symbols 9
- 4 Charging, Powering Up and Powering Down**..... 10
 - 4.1 Charging the Device..... 10
 - 4.2 Power On the Monitor 10
 - 4.3 Powering Off the Monitor 11
 - 4.4 User Interface 11
 - 4.4.1 Display Modes 11
 - 4.5 Menu Screens 12
 - 4.6 Alarm and Alerts..... 14
 - 4.6.1 Alarm and Alert indication chart 15
 - 4.7 Default Alarm Set Points 16
 - 4.8 Bump Test Reminder 16
- 5 Bump Test** 17
- 6 Calibration**..... 20
 - 6.1 Accessing the Calibration Menu 20
 - 6.2 Fresh Air Calibration 20
 - 6.3 Span Calibration 22
 - 6.4 Exiting the Calibration Menu 24
- 7 Logging** 25
- 8 Maintenance and Cleaning**..... 26
 - 8.1 Maintenance..... 26
 - 8.2 Cleaning 26
- 9 Disposal** 26
- 10 Certificates** 27
- 11 Appendix A – Table of Figures** 28
- 12 Product limited warranty** 29
 - Technical Support Contact Information 29
 - General Contact Information 29

⚠ WARNING

Any unauthorized attempt to repair or modify the product, or any other cause of damage beyond the range of the intended use, including damage by fire, lightning, or other hazard, voids liability of the manufacturer.
Activate this product only if sensor, visual, detection, and audible cover are clear from contaminants such as dirt and debris that could block the area where gas is to be detected.
Do not clean and rub the LCD screen of the products with a dry cloth or hands in hazardous environment to prevent static electricity.
Perform cleaning and maintenance of the products in fresh air that is free of hazardous gases.
Test the response of the sensor regularly with a gas concentration exceeding the alarm set point.
Test LED, audio, and vibration manually.
Gas concentration measurements by the sensor can vary based on the environment (temperature, pressure and humidity). Therefore, calibration of PM ₄₀₀ should be performed in the same (or similar) environment of the device's actual use.
If the temperature changes sharply during use of the device (e.g., indoors vs outdoors), the value of the measured gas concentration can suddenly change. Please use the PM ₄₀₀ after the gas concentration value has stabilized.
Severe vibration or shock to the device may cause a sudden reading change. Please use PM ₄₀₀ after the value of gas concentration has stabilized. Excessive shock to PM ₄₀₀ can cause the device and/or sensor to malfunction.
Alarm values are set based on the alarm standard that are required by international standards. Therefore, alarm values should be changed only under the responsibility and approval of the administration of the work site where the instrument is used.
Use IR communications in the safety zone which is free of hazardous gases.
Do not attempt to replace the battery and sensor as PM ₄₀₀ is designed to be disposable. Changing the battery and sensor may impair intrinsic safety and the attempt will void warranty.

CAUTIONS

Before operating this device, please read the manual carefully.
This device is not a measurement device, but a gas detector.
If calibration and self-test fails continuously, please do not use the device.
For the O ₂ detector, perform calibration every 30 days in the fresh air environment.
Before use, please check the activation date, and if the activation date has passed, please do not use the device.
Clean detectors with a soft cloth and do not use chemical substances for cleaning.
To maintain a 24-month lifetime, avoid the below activities except in necessary cases to check events (Max/Min), lifetime/concentration, and alarm set points. Otherwise, the frequent use of the button will deplete the battery lifetime less than 24 months. <ol style="list-style-type: none"> 1. Push the button frequently without valid reasons. 2. Frequent alarm operation or alarms are remained for a long time. *Normal Alarm Use: 1 time and 2 minutes per day. 3. Connect with the PM Link frequently except the bump testing.
View a serial number on the label at the back side of the device. (ex, 20170101) <ol style="list-style-type: none"> 1. The serial number indicates below. ex: <u>SG</u> <u>01</u> <u>01</u> <u>001</u> 2017(Year) 01(Months) 01(Day) 001(Manufacture Order) <div style="margin-left: 40px;"> </div>

1 General Information

The innovative new AimSafety PM₄₀₀ 4-gas portable monitor brings enhanced convenience and flexibility to gas detection in hazardous environments. The ergonomic PM₄₀₀ diffusion gas monitor simultaneously detects up to four gases, including hydrogen sulfide (H₂S), carbon monoxide (CO), oxygen (O₂) and combustibles (LEL). AimSafety's PM₄₀₀ is easy to use and delivers continuous visibility of gas concentrations for faster, more informed decisions that help protect workers and operational assets which can increase revenue and productivity.

The PM₄₀₀ LCD display provides real-time gas concentrations and allows plant managers or workers to set high and low alarm set-points for each sensor, and STEL, and TWA alarm set-points for toxic gases. The PM₄₀₀'s audible, visual and vibrating alarms alert the user of unsafe gas concentrations. Standard sensors include: Carbon Monoxide, Hydrogen Sulfide, Oxygen, and either Catalytic Bead (PM₄₀₀ P) or Infrared (PM₄₀₀ IR) for combustible gases (LEL). The PM₄₀₀ IR will operate continuously for up to 60 days on a single battery charge.

1.1 Key Features

- Easy-to-Read LCD display
- Single button operation
- Rugged, high visual housing
- IP67 dust tight & water resistant
- 60-day continuous runtime (IR version)
- IR sensor is immune to poisoning
- IR sensor detects LEL gases in inert (O₂ deficient) applications
- Sensor options: CO, H₂S, O₂, LEL
- Event logging
- Visual alarm with bright flashing LEDs
- Distinct audible alarm
- Vibrating alarm
- Durable weather resistant case
- Rugged clip

1.2 Programmable options (PM Link)

- Stealth Mode
- Go/No Go display
- Bump Test due
- Calibration due
- Calibration gas concentrations
- Alarm levels
- STEL and TWA levels
- Firmware upgrades

For a full list of programmable options, please consult the PM Link software manual.

1.3 Difference Between PM₄₀₀ P and PM₄₀₀ IR

The PM₄₀₀ P and the PM₄₀₀ IR are identical units with one exception: The Combustible gas (LEL) sensors are different in each model. The PM₄₀₀ P is equipped with a **Catalytic Bead (Pellistor) sensor**. The PM₄₀₀ IR is equipped with a **Non-Dispersive Infra-Red (NDIR) sensor**. Be sure to understand the strengths and limitations of the sensor that's inside the unit (see below). They directly affect the usage and the lifespan of your detection device.

1.3.1 Over Range Alarm Function

Because of the nature of each sensor, the device will behave differently when exposed to high gas levels which exceed their sensor ranges this is known as an Over Range Alert.

1.3.1.1 PM₄₀₀ P

In the event of an Over Range alarm, the Catalytic Bead sensor will prompt Over Range alarms and then turn off the sensor to avoid damaging the sensor elements.

If an Over Range Alarm sounds, exit to a safe area immediately.

The alarm will continue to sound because the sensor is disabled. To silence the alarm, the monitor will need to be turned off and back on again, thus re-enabling the sensor.

1.3.1.2 PM₄₀₀ IR

In the event of an Over Range alarm, the NDIR sensor continues to function normally.

If an Over Range Alarm sounds, exit to a safe area immediately.

A simple press of the [Function] key acknowledges and silences the alarm. The sensor continues to stay active even though the level has exceeded 100% LEL.

1.3.2 Catalytic Bead technology (PM₄₀₀ P) Overview

1.3.2.1 Advantages of Catalytic Bead technology

- **The Catalytic sensor detects a wide range of combustible (LEL) gasses:** The PM₄₀₀ P is the device that should be used if hydrogen and acetylene are among the gases in your environment that require detection.

Make careful note of the disadvantages of this sensor listed below; they have a direct effect on user safety and on the function of the device.

1.3.2.2 Disadvantages of Catalytic Bead technology

- **The Catalytic sensor can be “poisoned”:** Certain chemicals will damage the internal elements and cause the sensor to lose sensitivity. Common poisons are chemicals which contain silicon (found in hand lotions and industrial lubricants) and Sulfur compounds, which can be released with gases. Chlorine (found in many cleaning products) and heavy metals can also poison a catalytic sensor. This list is by no means comprehensive.
- **The Catalytic Bead sensors require oxygen to detect gases:** Because a Catalytic Bead sensor burns the sample of gas, oxygen is required for the monitor to detect the presence of combustible gases.
- **The Catalytic Bead sensor can burn out:** Exposure to high concentrations of gas can completely disable the sensor. See section 1.3.1 Over Range Alarm Function.

The Catalytic Bead sensor is more prone to sensor drift: These sensors typically require more frequent calibration. See

- **The Catalytic sensor requires more power:** Due to the sensor design, the Catalytic Bead sensor requires more power to operate, thus shortening the runtime of the monitor.

1.3.3 Non-Dispersive Infra-Red (NDIR) technology (PM₄₀₀ IR) Overview

1.3.3.1 *Disadvantages of NDIR technology*

- **Doesn't detect certain combustible (LEL) gasses:** Gases such as hydrogen and acetylene go undetected by NDIR sensors.

Be sure the safety of your users isn't dependent on detecting hydrogen and/or acetylene. The PM₄₀₀ IR does NOT detect these gases.

1.3.3.2 *Advantages of NDIR technology*

- **The NDIR sensor does not require oxygen to detect gases:** Because the NDIR sensor uses absorbed light spectrum technology to detect combustible gases, the sensor does not require oxygen to operate, making it ideal for inert and oxygen deficiency applications.
- **The NDIR is more durable:** Cannot be inhibited, poisoned by external chemicals and gases.
- **The NDIR sensor is more stable:** Requires minimal recalibration and is typically stable even after extended storage.
- **The NDIR sensor has a longer lifespan:** The sensor has a life expectancy of up to 10 years.
- **The NDIR sensor requires less power:** Due to the sensor design the NDIR sensor requires less power to operate, thus allowing for extended runtimes compared to the Catalytic Bead sensor.

2 Specifications

Model	PM ₄₀₀			
Gas Type	LEL	O ₂	CO	H ₂ S
Detecting Method	Diffusion			
Measure type	Catalytic Bead (PM ₄₀₀ P), Infrared (PM ₄₀₀ IR)	Electrochemical Cell	Electrochemical Cell	Electrochemical Cell
Range	0-100 %LEL	0-30 % by Volume	0-500 ppm	0-100 ppm
Sensor life	PM ₄₀₀ P > 2 years, PM ₄₀₀ IR > 5 years	2 years	> 2 years	> 2 years
Resolution	1%LEL	0.1% by Volume	1 PPM	1 PPM
User Settings	User Selectable via PM Link and PC Software or Bump Test-Calibration Station			
Display	Backlit digital LCD display			
Alarm display	RED, Flashing LEDs (Light-Emitting Diode)			
Audible alarm	90 dB at 4 inches (10 cm)			
Vibrating alarm	Vibration Alarm			
Alarm level set	User Selectable via PM Link and PC Software or Bump Test-Calibration Station			
Event Logging	Data logging: Two months - Continuous at 1 - minute intervals, 24 hours a day, 7 - days a week			
	Event logging: 30 events, Calibration logging: 30 calibrations, Bump Test logging: 30 bump tests			
Mounting type	Clip			
Program set mode	User Selectable via PM Link and PC Software or Bump Test-Calibration Station			
Operating temperature	-4°F to 122°F (-20°C to 50°C)			
Operating humidity	10 to 95% RH (Non-condensing)			
Battery	Rechargeable 3.7V Li-ion			
Battery Runtime	PM ₄₀₀ P: 24 hours, PM ₄₀₀ IR: 60 days			
Material	Polycarbonate and rubber			
Dimensions	4.6" (L) x 2.4" (W) x 1.6" (H) (11.8 cm x 6 cm x 4 cm)			
Weight (Battery, clip included)	8.4 oz. (238 g.) – Catalytic Bead model 8.0 oz. (227 g.) – Infrared model			
Approval	See Section 10 Certificates			
Ingress Rating	IP67 dust tight & water resistant			
Compliance	Electromagnetic Compatibility Directive 2014/30/EU			
Manufacturing Approval	The detector manufacturer is certified compliant with ISO 9001:2000 provisions			
Options	PM Link, PM ₄₀₀ Bump Test-Calibration Station			
Warranty	2 years			

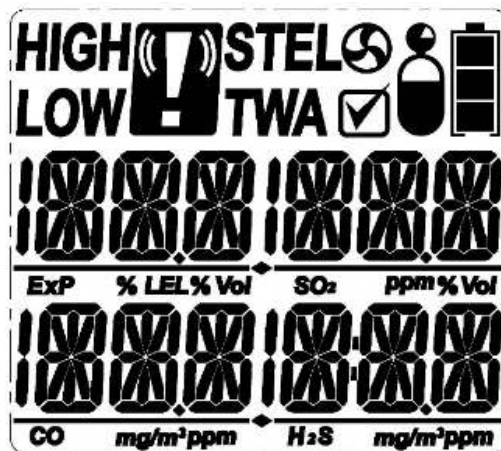
3 Product Overview

3.1 Monitor Overview








3-1 PM₄₀₀ Monitor

3.2 Display Overview



3-2 PM₄₀₀ Display Screen

3.2.1 LCD display symbols

HIGH	High Alarm Display		Zero Calibration Display
LOW	Low Alarm Display		Device Stabilization & Calibration Succeeded
	Alarm Condition		Standard Gas Calibration Display
STEL	STEL Alarm Display		Remaining Battery Display
TWA	TWA Alarm Display		

4 Charging, Powering Up and Powering Down

4.1 Charging the Device

The PM₄₀₀ ships with a power supply that plugs into a standard wall socket and with all common international interfaces. The other end connects to the device.

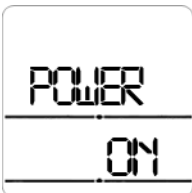
To Charge the Device:

1. Ensure that the power supply is equipped with the interface that matches your wall’s power outlet. You can change these by pushing the button at the rear of the power supply and clicking the correct one into place.
2. Locate the charging socket at the bottom-rear of the device.
3. Align the guides of the adapter to the plastic slot on the device and push until the top of the adapter is completely inserted.
4. Plug the other end into a standard wall socket. The battery meter appears on the right side of the display and repeatedly cycles upward to the top and the LEDs will flash continuously.
NOTE: If your device is set to Stealth Mode, the LEDs will not flash during charging.
5. The device is fully charged when the battery stops cycling.

4.2 Power On the Monitor

To power on the monitor:

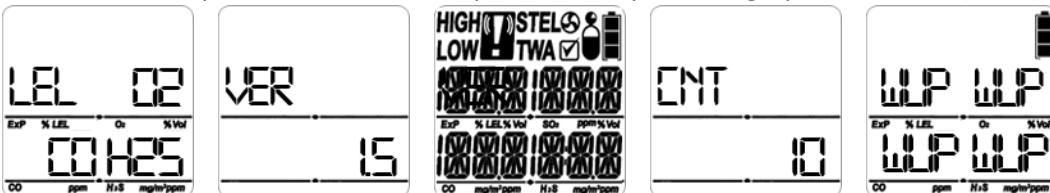
1. Press and hold the [Function] key. A three second count-up displays.



NOTE: Release the [Function] key at any time during the count-up to prevent it from powering up.

2. Release the [Function] key when Power On displays.

The display cycles through gas types: LEL, O₂, CO, H₂S, firmware version: VER #.#, display tests, and alarm tests, followed by a ten-second count-up, followed by Warming Up notifications (WUP) for each sensor.



NOTE: The IR LEL sensor takes approximately an extra 90 seconds to warm up, during which time, the unit continues to display WUP in the upper-left (LEL) quadrant of the display (see below).



3. After the warm-up, real-time gas readings are displayed.



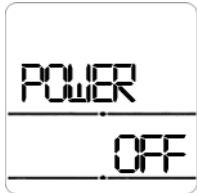
NOTE: If your device is in Safe Zone mode, the display will read SAFE ZONE when it is ready. See Section 4.4.1 Display Modes for more information.



4.3 Powering Off the Monitor

To power off the monitor:

1. From the main screen (Measurement or Safe Zone), press and hold the [Function] button. A three-second countdown timer displays.
NOTE: Release the button during the countdown to prevent it from powering down.
2. When Power Off displays, release the button.



4.4 User Interface

The PM₄₀₀ has two operational modes:

- **Measuring Mode** – Standard display operation with real-time gas readings always displayed.
- **Safe Zone Mode** – Displays Safe Zone unless one or more gas concentrations exceeds an alarm set point.

Gas concentrations are displayed with gas specific units of measure based on the type of gas to be detected. Combustible (LEL) concentrations are displayed in % LEL, oxygen concentrations are displayed in percent by volume (%Vol), and toxic concentrations are displayed in parts per million (PPM).

4.4.1 Display Modes

1. **Measuring Mode** is the default mode. Once the monitor is activated the meter displays the battery level and gas concentrations in real-time unless gas concentrations exceed an alarm setpoint. Should this happen, alarms will activate.

WARNING: In the event of an alarm, exit the area and proceed to clean air immediately.



2. **Safe Zone Mode** enables use as a go/no-go monitor. SAFE ZONE is displayed, unless gas concentrations exceed an alarm setpoint. Should this happen, alarms will activate normally.

WARNING: In the event of an alarm, exit the area and proceed to clean air immediately.



4.5 Menu Screens

From the Measurement screen, pressing the [Function key] will step to the next screen.

NOTE: If you do not press the [Function key] within 10 seconds, the display reverts to the main screen.

NOTE: Pressing the [Function] key too quickly may not advance the screen.



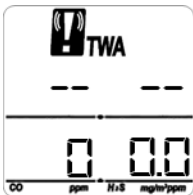
Stealth Mode: Press the [Function key] to advance to Stealth Mode (if enabled). Stealth Mode is added to the menu to indicate that the audible and vibrating alarms are disabled. Display flags function normally.



Peak MIN: Press the [Function key] again to advance to Peak MIN indicated by the LOW! icons on the display with the numerical value displayed. The Peak MIN is the lowest concentration of gas that the oxygen sensor has detected since the peaks were last cleared.

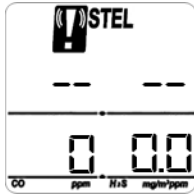


Peak MAX: Press the [Function key] to advance to Peak MAX indicated by the HIGH! icons on the display, with the peak max concentration displayed. The Peak MAX is the highest concentration of gas that each sensor has detected since the peaks were last cleared.



TWA: Press the [Function key] to advance to the TWA (Time Weighted Average) screen. The TWA screen displays the average level of concentration of each toxic gas for the past eight hours.

Menu Flow Chart



STEL: Press the [Function key] to advance to the STEL (Short Term Exposure Limit) screen. The STEL screen displays the average level of concentration of each gas for the past 15 minutes.



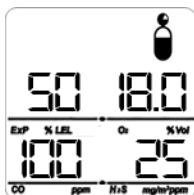
Clear Peaks: Press the [Function key] to advance to Clear Peaks indicated by “CLR” on the display. To clear the peaks, press and hold the [Function key] for three seconds. The unit will beep once, then display OK. Peaks are now cleared. Press the [Function] key to continue through the menu screens or wait ten seconds for the unit to return to Measuring mode.



Alarm Values: Press the [Function key] to advance to the Setpoints screen. The Alarm Values screen displays the low alarm, high alarm, TWA, and STEL thresholds (Setpoints) for each gas. Press and hold the [Function] key for the seconds to enter the Alarm Values menu. Press the [Function] key to advance the display through each of these in order.



Firmware: Press the [Function key] to advance to the Firmware screen. Press and hold the [Function] key for three seconds to initiate a self-test. The device tests audible alarm, LEDs, LCD, vibration, memory, and temperature. When complete, the device returns to Measuring mode. See Self-Test for more details. Also displays LEL sensor type: N (NDIR) or P (Pellistor, aka Catalytic Bead)



Calibration: Press the [Function key] to advance to the Calibration screen. Press and hold the [Function] key for five seconds to enter the Calibration menu where you can perform Zero calibrations, Span calibrations, and Bump tests. Press the [Function] key to advance through each of these in order.



Date/Time: Press the [Function key] to advance to the Date/Time screen. Press and hold the [Function] key for three seconds to toggle back and forth between the Date and the Time.

Menu Flow Chart












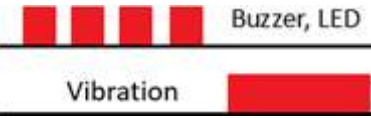

4.6 Alarm and Alerts



When the gas concentration exceeds an alarm set point the alarms will activate: The display will show the appropriate alarm icon(s) – High, Low, TWA, STEL, Over Range (OVL) -- and the gas level. The monitor will vibrate, the buzzer will sound, and the LEDs will flash.

Immediately exit the area to clean air.

The alarms will clear once the gas concentrations go below the alarm set points.

4.6.1 Alarm and Alert indication chart

Alarm	Alarm Standard	LCD Display	Alarms and Alerts
Low Alarm	Exceeds 1st alarm set point	 Icons and gas concentration	
High Alarm	Exceeds 2nd alarm set point	 Icons and gas concentration	
TWA Alarm	Exceeds TWA alarm set point	 Icons and gas concentration	
STEL Alarm	Exceeds STEL alarm set point	 Icons and gas concentration	
Over Range Alarm	Detected gas(es) exceed maximum sensor range.		 Press the [Function] key or re-start your device to clear. See Section 1.3.1 Over Range Alarm Function for more information.
Bump test	Bump test due. Displays the specific sensor(s) which require a bump.		Perform a successful bump test to clear.

Alarm	Alarm Standard	LCD Display	Alarms and Alerts
Calibration	Calibration due Displays the specific sensor(s) which require calibration.		Perform a successful calibration to clear.
Calibration Failed	Failed calibration Displays the specific sensor(s) which failed calibration.		Perform a successful calibration to clear

4.7 Default Alarm Set Points

NOTE: Alarm levels can only be changed using the PM Link and software, or the Bump Test-Calibration Station.

Gas Type	Combustible (LEL)	CO	H ₂ S	O ₂
Low Alarm	10% LEL	35 PPM	10 PPM	19.5%
High Alarm	20% LEL	100 PPM	20 PPM	23.5%
TWA Alarm		35 PPM	10 PPM	
STEL Alarm		200 PPM	15 PPM	

4.8 Bump Test Reminder

The Bump Test due reminder option can be enabled using the PM Link and software or the Bump Test-Calibration Station. The Bump Test reminder can be configured from n/a (Off) to 365 days. The default configuration is set to “Off”, no Bump Test reminder will be displayed.

When enabled, the monitor will prompt the user to perform the test by displaying “btS” on the display when the test is due.

5 Bump Test

A bump test is used to test that the monitor is working properly. During a bump test, a known concentration of gas is applied to the sensor to verify that the sensor responds to the gas, and the alarms activate. This is the only way to effectively confirm that all characteristics of the monitor and the sensor are working correctly.

⚠ WARNING	
A bump test should be conducted before each day's use.	
Ensure that you are in a clean environment before performing a Bump Test.	
The monitor must be calibrated if it fails a Bump Test.	

To perform a Bump Test:

1. On the Measuring screen, make sure the oxygen sensor reads 20.9 and the other gases read zero.



2. Clip the calibration cap to the unit. The cap attaches to the recesses in either side of the unit. You should hear a click when the cap is secure.

NOTE: Be sure that the word "Calibration" is right-side-up.



5-1 Calibration Hood

3. Ensure that the regulator is firmly attached to the gas bottle and that the hose is securely attached to the regulator and to the calibration cap.
NOTE: Do not turn on the gas at this time.
4. From the Main screen, press the [Function] key to advance to the Calibration screen. The calibration icon and the Calibration gas settings are displayed. Typical readings clockwise from the upper left are 50,18.0,25, and 100.

NOTE: Pressing the key too quickly may not advance the display.



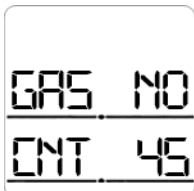
- Press and hold the [Function] key for three seconds to enter the Calibration menu. CAL ZERO displays



- Press the [Function] key twice to advance to the Bump Test screen. Bump test displays.



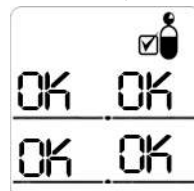
- Press and hold the [Function] key for three seconds to initiate the bump test. GAS NO and a 45-second countdown timer are displayed.



- Turn on the gas regulator. A new 45-second countdown timer appears in the lower-right corner while the rest of the display alternates between GAS IN and real-time gas measurements.



- Watch the display as the timer counts down. Results should appear within roughly 20 seconds. If the test is successful, OK appears in all four corners of the display.



- Turn off the gas regulator, disconnect the calibration cap, and wait for the gas to dissipate.
- Clear peaks before proceeding. See **Clear Peaks** in Section 4.5 Menu Screens for instructions.

If the test fails, the gas(es)/sensor(s) that failed are displayed. This failed bump test message continues to flash on the display until a successful bump test or calibration is performed.



Check the calibration gas concentrations, cylinder expiration date, and the monitor gas settings and re-test the unit. If everything looks correct and the unit fails, perform a Zero calibration followed by a Span calibration. Do not use the monitor until the reason for the discrepancy for the test has been determined and corrected.

⚠ WARNING

If the Bump Test fails, do not use the monitor until a successful Bump Test or Calibration is performed.

6 Calibration

Calibration is the process of adjusting the sensor’s response by using a specific concentration of calibration gas. Sensors will drift for a variety of reasons, so it is important to perform a full calibration periodically to ensure that the sensors response to the target gas are accurate. A full calibration consists of two points, a Fresh Air Calibration and a Span Calibration.

Fresh Air Calibration adjusts the zero offset of the toxic and LEL sensors or sets the oxygen sensor to 20.9% Vol.

Span Calibration adjusts the sensors’ response to gas to account for sensor drift. It is recommended to perform a Fresh Air Calibration prior to a Span Calibration.

CAUTION	
For O ₂ units: Initial calibration is performed on all devices prior to shipment. Once received, calibration should be performed monthly (or quarterly) depending on frequency of use.	
All alarms are muted during calibration.	

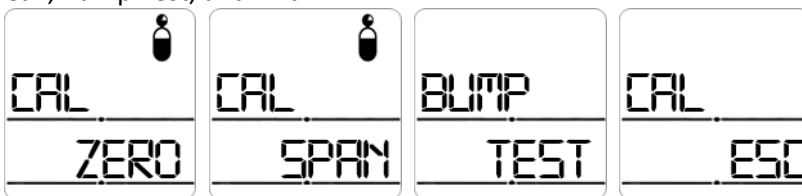
6.1 Accessing the Calibration Menu

To access the calibration menu:

1. Press the [Function key] to navigate to the Calibration screen.
2. While the Calibration screen is displayed, press and hold down the [Function key] for 5 seconds to access the Calibration mode.



3. Press the [Function] key to cycle through the menu. The calibration menu has four items: Fresh Air Cal., Span Cal., Bump Test, and Exit.



6.2 Fresh Air Calibration

Fresh Air calibration adjusts the zero offset of the toxic and LEL sensors and sets the oxygen sensor to 20.9% Vol.

⚠ WARNING	
Fresh Air Calibration must be performed in a clean environment that is free from other gases (calibration is assumed to be performed in an environment with an Oxygen concentration of 20.9% Vol.). Fresh Air Calibration should not be performed in a confined space.	

To perform a Fresh Air Calibration:

1. From the Main screen, press the [Function] to cycle to the Calibration screen. The calibration icon and the Calibration gas settings are displayed. Typical readings clockwise from the upper left are 50, 18.0, 25, and 100.



2. Press and hold the [Function] key for five seconds to enter the Calibration menu. The first item in the submenu is Fresh Air (Zero) calibration; CAL ZERO displays.



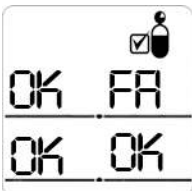
3. Press and hold the [Function] key for five seconds to begin calibrating. A ten-second countdown displays in the lower-right corner of the display while the device cycles through displaying detected gas levels.



4. Upon a successful calibration, your device displays the Calibration Success screen (OK displays in each corner of the screen) for five seconds, then returns to the Calibration submenu. Press the [Function] key to cycle through the Calibration menu or wait ten seconds for the device to return to the Main screen.



5. If calibration fails, the gas(es)/sensor(s) that failed are displayed. This failed calibration message continues to flash on the display until a successful calibration is performed.



If calibration continues to fail, discontinue use and contact AimSafety Technical Support at support@aimsafety.com or 844-325-3050.

6.3 Span Calibration

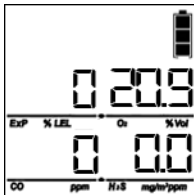
Span calibration adjusts the sensors response to gas to account for sensor drift. It is recommended to perform a Fresh Air calibration prior to a Span calibration.

⚠ WARNING

When performing a Span Calibration only use certified calibration gas at the required concentration level. Do not use expired calibration gas.

To perform a Span Calibration:

1. On the Measuring screen, make sure O₂ reads 20.9 and the others read 0, 0, and 0.0. If the measuring screen does not display the correct values, the user should perform a fresh air calibration (see section 6.2 Fresh Air Calibration).



2. Clip the calibration cap to the unit. The cap attaches to the recesses in either side of the unit. You should hear a click when the cap is secure. Be sure you have the cap right-side up when attaching it.

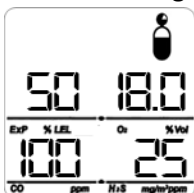


6-1 Calibration Hood

NOTE: The cap should be removed for a Fresh Air Calibration unless using a cylinder of zero air.

3. Ensure that the regulator is firmly attached to the gas bottle and that the hose is securely attached to the regulator and to the calibration cap.
4. From the Main screen, press the [Function] key to advance to the Calibration screen. The calibration icon and the Calibration gas settings are displayed. Typical readings from left to right are 50, 18.0, 100, and 25.

NOTE: Pressing the key too quickly may not advance the display.



5. Press and hold the [Function] key for three seconds to enter the Calibration menu. CAL ZERO displays.



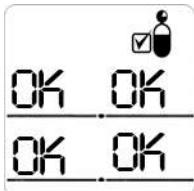
6. Press the [Function] key once to advance to the Span Calibration screen. CAL SPAN displays.



7. Press and hold the [Function] key for five seconds to begin Span calibration. A 90-second countdown timer appears in the lower right corner while the display cycles through detected values of each gas.

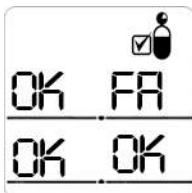


8. Turn on the regulator and wait for the timer to reach zero.
9. After a successful calibration, the Calibration Success screen displays.



10. After the calibration is complete, be sure to turn off the calibration gas.

If calibration fails, the gas(es)/sensor(s) that failed are displayed. This failed calibration message continues to flash on the display until a successful calibration is performed.



Clear the peak values, perform a Zero calibration and try again. If calibration continues to fail, please contact your sales representative or AimSafety Technical Support at support@aimsafety.com or 844-325-3050.

WARNING

All alarms are muted for approximately one minute after a successful span calibration.

Default Calibration gas concentrations.

Default calibration gas concentrations can be changed using the PM Link and PC software or with the Bump Test – Calibration Station.

Gas Type	O ₂	CO	H ₂ S	LEL
Concentration	18.0% Vol	100 ppm	25 ppm	50% LEL

6.4 Exiting the Calibration Menu

To exit the Calibration menu:

1. Press the [Function key] until “ESC” is displayed on the screen.
2. Press and hold the [Function key] for 5 seconds, the monitor will return to the Calibration screen.
3. Press the [Function key] again and the unit will return to the Measurement screen.

NOTE: If you do not press the [Function key] within 20 seconds, the display reverts to the main screen.

7 Logging

Event logging occurs anytime that an alarm condition is met. Once an alarm condition is met the monitor will automatically save that event in the memory. The stored log events can be downloaded from your unit and exported in .XLS format using the PM Link and PC software or **with the Bump Test-Calibration Station**.

The Event Log records the following:

- Date
- Time
- Duration of the event
- Sensor Readings
- Alarm Type
- Serial Number of the Device

The Bump Log records the following:

- Date
- Time
- Audible alarm
- Sensor Readings
- Alarm Type
- Alarm Pass/Fail
- Serial Number of the Device

The Calibration Log records the following:

- Date
- Time
- Calibration Type
- Readings for Each Sensor
- Pass/Fail for Each Sensor
- Serial Number of the Device

The data log tracks all of the above in addition (but not limited) to:

- Log Type
- Firmware version
- Alarm setpoints
- Latest Zero calibration date
- Latest Span calibration date
- Latest Bump Test date, and more

See the PM Link PC software and Bump Test-Calibration Station manual for more information on Event Log.

8 Maintenance and Cleaning

8.1 Maintenance

Do not disassemble unit or attempt to repair or modify any component of this instrument. Only use replacement parts from the supplier. Substitution of components may impair intrinsic safety which may adversely affect product performance.

8.2 Cleaning

WARNING

Do not attempt to clean the instrument in a hazardous environment. Cleaning with a dry cloth may generate a static charge and result in an explosion if located in a hazardous environment.

Occasionally clean the monitor with a soft cloth. Do not use detergents or chemicals. If necessary, use a damp cloth (water only). It is recommended to install the Calibration Cap before cleaning the monitor housing, to keep dirt, dust, or moisture away from the sensor openings and to help keep the sensor filter clean.





Visually inspect the monitor and the IR port window on the top of the monitor. Wipe it with a soft cloth as needed.

9 Disposal

Please dispose of this device in accordance with local Electronics Solid-waste disposal regulations.

10 Certificates

The PM₄₀₀ meets or exceeds the following certification standards:

IECEX:	Ex ia IIC T4 Ga	1: Explosion protected 2: Protection Concept 3: Gas Group 4: Temperature Classification 5: Equipment protection level
 	Class I, Zone 0, AEx ia IIC T4 Ga Class I, Division 1, Groups A, B, C, D, T4 C22.2 No. 60079-0:2015; C22.2 No. 60079-11:2014; C22.2 No. 61010-1-12:2010; UL 61010-1, Ed. 3; UL 913, Ed. 8; UL 60079-0, Ed. 6; UL 60079-11, Ed. 6	
ATEX:	CE 198 II G Ex ia IIC T4 Ga IP67 KRH 17 ATEX 0013 Directive 2014/34/EU	
KCS:	Ex ia IIC T4  KTL 16-KA2BO-0457	
INMETRO	Ex ia IIC T4 Ga BVC16.5919 Segurança 	
Standards:	The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards: IEC 60079-0: 2011 Ed. 6 IEC 60079-11: 2011 Ed 6 UL 61010-1, Ed. 3 UL 913, Ed. 8 UL 60079-0, Ed. 6 UL 60079-11, Ed. 6 C22.2 No. 60079-0:2015 C22.2 No. 60079-11:2014 C22.2 No. 61010-1-12:2012 EN 60079-0: 2012+A11:2013 EN 60079-11: 2012	
Compliance:	Electromagnetic Compatibility Directive 2014/30/EU	
Manufacturing Approval:	The monitor manufacturer is certified compliant with ISO 9001:2000 provisions	

11 Appendix A – Table of Figures

3-1 PM ₄₀₀ Monitor.....	8
3-2 PM ₄₀₀ Display Screen	8
5-1 Calibration Hood.....	17
6-5 Calibration Hood.....	22

12 Product limited warranty

AimSafety warrants this product will be free from defective materials and workmanship for a period of two (2) years from date of manufacture, provided it is maintained and used in accordance with AimSafety 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. AimSafety 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 monitor. Manufacturer or its agent's liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts.

Warranty Procedure

Contact the local AimSafety authorized reseller or AimSafety Technical Support to obtain a Return Materials Authorization (RMA). An RMA requires the following information:

- Company name, contact name, phone number, and email address
- Description and quantity of items to be returned
- Equipment serial number(s)
- Reason for return

No returns shall be accepted without an AimSafety RMA. Any returns received without an RMA will be rejected and returned to the sender.

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.aimsafety.com/service/

General Contact Information

Phone : 1-877-367-7891

Fax : 1-605-951-9616

Email : info@aimsafety.com

Website: www.aimsafety.com

Rev – 2.0

Issue Date: 3/17/2019

Document No: 34-2900-0206-2

© Aerionics 2019. All rights reserved.

Macurco is a trademark of Aerionics, Inc.

