TELEDYNE
GAS MEASUREMENT INSTRUMENTS
Everywhereyoulook™

User Manual

PS200-LMP

PORTABLE GAS MONITOR

64171LMP Revision 3.1

WARNING: ALL INDIVIDUALS WHO HAVE, OR WILL HAVE, RESPONSIBILITY FOR USING, MAINTAINING, OR SERVICING THIS PRODUCT, MUST READ THIS ENTIRE MANUAL CAREFULLY. FAILURE TO USE THIS EQUIPMENT PROPERLY COULD RESULT IN SERIOUS INJURY OR DEATH.

LEGAL STATEMENT

Teledyne, the Teledyne Logo, Gas Measurement Instruments, GMI, and PS200-LMP are registered and/or unregistered marks of Teledyne Gas Measurement Instruments Ltd, also referred to as "the Company."

All rights reserved. No part of this documentation may be reproduced in any form or by any means or used to make any derivative work (such as translation, transformation, or adaptation) without written permission from the Company.

Microsoft, Windows, Windows 2000, Windows Me, Windows XP, Windows NT, Windows Vista, Windows 7, Internet Explorer and MS-DOS are either trademarks or registered trademarks of Microsoft Corporation in the United States and other countries. Solaris and JAVA are either trademarks or registered trademarks of Sun Microsystems, Inc. All other products or service names are the property of their respective owners.

DESCRIPTION

This User Manual provides information for use only with the PS200-LMP Portable Gas Monitor (or "the monitor").

LIABILITY

Every care has been taken in the preparation of this User Manual, but the Company does not accept any responsibility for errors or omissions and their consequences. Information in this user guide is subject to change without notice. This User Manual does not constitute a specification or basis for a contract.

MODIFICATION NOTICES

The Company aims to notify customers of relevant changes in the product operation and maintain this user guide up to date. Due to continuous product improvement, there may be operational differences between the latest product and this user guide.

This User Manual is an important part of the monitor, and it should be referred to for the life of the product.

SOFTWARE

Any software supplied must only be used in this product and may not be copied without the written permission of the Company. Reproduction or disassembly of such embodied programs or algorithms is prohibited. Ownership of such software is not transferable, and the Company does not warrant that the operation of the software will be error free or that the software will meet the customer's requirements.

DISPOSAL ADVICE

Dispose of the monitor carefully and with respect for the environment. the Company will dispose of the monitor without charge if the monitor is returned to the Company.

AREAS OF USE

Exposure to certain chemicals can result in a loss of sensitivity of the flammable sensor. Where such environments are known or suspected it is recommended that more frequent response checks are carried out. Chemical compounds that can cause loss of sensitivity include silicones, lead, halogens and sulphur.

Environmental factors may affect sensor readings. This includes changes in pressure, humidity and temperature. Note that both pressure and humidity changes can also affect the amount of oxygen present in the atmosphere.

Do not use the monitor in potentially hazardous atmospheres containing greater than 21% oxygen.

SPECIAL CONDITIONS OF USE

The monitor is designed for use in harsh environments. The monitor is sealed to IP67 and, if not subjected to misuse or malicious damage, will provide many years of reliable service.

The monitor may contain electrochemical sensors. Under conditions of prolonged storage, these sensors should be removed. These sensors contain potentially corrosive liquid and care should be taken when handling or disposing, particularly when a leak is suspected.

Table of Contents

1. About This Guide 1
1.1. Guide Conventions 1
1.2. Certifications and Approvals 1
1.3. Performance 1
1.4. General Safety Information 2
1.5. Warnings and Cautions 2
2. Introduction 4
2.1. General Description 4
2.1.1. Features 5
2.2. Data Logging 5
2.3. Filters 5
2.4. Construction 5
2.5. Identification Label 5
2.6. Toxic Cell Integrity 5
3. Operation 6
3.1. Operating Procedure 6
3.2. Switching the Monitor On 7
3.2.1. Instrument Identification 7
3.2.2. Filter Check/Flow Fault Test (Daily Check Only) 7
3.2.3. Date and Time 8
3.2.4. Calibration Due Date 9
3.2.5. Sensor Confirmation Check 9
3.2.6. Enter Bin 11
3.2.7. Memory Fault 11
3.3. Battery Status 12
3.4. Switch the Display Backlight On/Off 12
3.5. Datalogging 12
3.5.1. Timed Logs 12
3.5.2. Session Logs 12
3.5.3. Calibration Logs 13
3.5.4. Datalogging Capacity/date Format 13
3.5.5. Datalogging Extraction 13
3.6. View Maximum Recorded Values Since Switch ON 13
3.7. Alarms Reset or Acknowledge 14
3.7.1. Confidence Signal 15
3.8. Probe Connection and Use 15
3.9. Switching the Instrument OFF 15
3.10. Modes 16
3.10.1. Building Identification Number (BIN) 16

3.10.2. Display 17
4. Inspect (INSPT) Mode 18
4.1. General 18
4.2. Button Functions 18
4.3. Operation 18
4.3.1. Range 18
4.3.2. Alarms 19
4.3.3. Pump 19
4.3.4. Maximum Gas Values 19
4.3.5. Datalogging 19
5. Personal Surveyor (PS) Mode 21
5.1. General 21
5.2. Button Functions 21
5.3. Operation 21
5.3.1. Range 21
5.3.2. Alarms 22
5.3.3. Pump 22
5.3.4. Maximum Gas Values 22
5.3.5. Datalogging 22
6. PURGE Mode 24
6.1. General 24
6.2. Button Function 24
6.3. Operation 24
6.3.1. Range 24
6.3.2. Alarms 24
6.3.3. Pump 25
6.3.4. Maximum Gas Values 25
6.3.5. Datalogging 25
7. Bluetooth 27
7.1. General 27
7.2. Bluetooth (BT) Connection 27
7.2.1. Establishing Bluetooth Communications 27
8. Recharging the Batteries 29
8.1. General 29
8.2. Recharge Monitor Using the Charging / Comms Clip 29
9. Operator Maintenance 32
9.1. Cleaning 32
9.2. Replace Instrument Filters 32
9.2.1. Hydrophobic Filter Replacement 32
9.2.2. Sample Inlet (Dust) Filter Replacement 34

9.3. Replace Probe Filters 35
10. Calibration 36
10.1. General Description 36
10.2. Automatic Calibration 36
10.3. Calibration Validity 36
11. Accessories 37
A. Typical Operating Parameters 38
B. Setting the Date and Time 40
B.1. Accessing the Configuration Menu Mode 40
B.2. Configuration Menu Screen 40
B.2.1. Normal 41
B.2.2. Clock 41
C. Technical Support 42

1. About This Guide

WARNING: READ, UNDERSTAND AND FOLLOW THE ENTIRE CONTENT OF THIS GUIDE PRIOR TO USE. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.

This guide instructs gas detection personnel on the features and usage of the PS200-LMP Gas Monitor (or "the monitor"), including information on configuration, operation, maintenance, specifications and troubleshooting.

This user guide assumes the reader has a basic knowledge of gas detection procedures.

1.1. Guide Conventions

The following visual elements are used throughout this guide, where applicable:

WARNING: THIS ICON AND TEXT INDICATE A POTENTIALLY HAZARDOUS SITUATION, WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR INJURY.

Caution: This icon and text indicate an action or situation, which, if not avoided, could result in damage to the equipment.

Note: This icon and text designates information of special note to the operator.

1.2. Certifications and Approvals

The monitor has been tested and complies with the following:

Mark	
CSA US	Class I, Div.1 Groups C and D T4 Class I, Zone 0 AEx ia IIB T4 Ga

1.3. Performance

This apparatus conforms to ANSI/ISA S12.13.01 - 2000 (Combustible)

1.4. General Safety Information

WARNING: ALL INDIVIDUALS WHO HAVE OR WILL HAVE RESPONSIBILITY FOR USING OR TESTING THIS PRODUCT MUST READ AND UNDERSTAND THE CONTENTS OF THIS MANUAL. THE PRODUCT WILL PERFORM AS DESIGNED ONLY IF USED AND TESTED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. FAILURE TO FOLLOW MANUFACTURER'S INSTRUCTIONS WILL RENDER THE WARRANTY AND APPROVALS NULL AND VOID. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY ALSO RESULT IN SERIOUS INJURY OR DEATH.

The Company can take no responsibility for use of its equipment if it is not used in accordance with these instructions. If further operational or maintenance details are required but not provided in this guide, contact the Company or their agent. The Company shall not be liable for any incidental or consequential damages in connection with any modifications, errors or omissions in this guide.

All pertinent state, regional, and local safety regulations must be observed when using this product. For reasons of safety and to assure regulatory compliance, repairs should only be performed by the manufacturer.

Additionally, industry standards, codes, and legislation are subject to change. Updated copies should be obtained by users to ensure the most recently issued regulations, standards and guidelines are available.

All pertinent state, regional, and local safety regulations must be observed when handling and disposing of hazardous material, Toxic (E-Chem) Sensors, batteries and other similar items that may fall under the classification of hazardous material.

The monitor must be regularly serviced and calibrated by fully trained personnel in a safe area.

Only use Company approved replacement parts.

Instrument must be re-charged in a safe area before use. Refer to Section 8. Recharging the Batteries.

If the monitor detects gas, follow your own organization’s procedures and operational guidelines.

Gas can be dangerous and care should always be taken in its presence.

Any right of claim relating to product liability or consequential damage to any third party against the Company is removed if the above warnings are not observed.

1.5. Warnings and Cautions

WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

WARNING: DO NOT CHARGE IN A HAZARDOUS AREA. UM = 6V.

Note: CSA have only assessed the LEL combustible gas detection portion of this monitor for performance.

Note: The monitor contains internal checking of sensor sensitivity, which during calibration will prevent the monitor being calibrated if it has been contaminated or reached its end of life.

2. Introduction

2.1. General Description

Working collaboratively with Con-Edison, National Grid, and the New York City Licensed Master Plumbers (LMPs), the Company developed the PS200-LMP to provide a fit-for-purpose gas detector that meets the evolving needs of plumbing technicians. The Company designed this multi-use detector specifically to address the gas monitoring practices of the plumbing and HVAC communities and to enhance gas safety.

With three modes of operation, LMPs and their technicians can use this monitor to conduct regulatory compliant leak surveys of gas piping inside buildings. They can then transfer the results from leak surveys, via Bluetooth, to applications running on tablets, allowing the survey data to be visualized and then stored in the cloud for regulatory reporting purposes by a utility.

The monitor also assists with daily duties including purging of interior piping and providing atmosphere monitoring for both flammable gas and carbon monoxide (CO).

With only two push buttons, the monitor provides the user with a simple to use gas detector (Figure 1: PS200-LMP Portable Gas Detector).

The monitor features high visibility LED's, a display that changes color from green to red when an alarm is present, a sounder with a 90dB minimum output and a vibrating alarm. If gas levels exceed configured limits or a monitor fault exists, there will be a clear and unmistakable indications.

Figure 1: PS200-LMP Portable Gas Detector

2.1.1. Features

- 3 operating modes:
  - Inspection (INSPT)
  - Personal Survey (PS)
  - Purge
- BIN number entering
- % Volume Gas and PPM Carbon Monoxide (CO) gas detection
- Audible and visual alarms
- Data logging, including leak surveys
- Bluetooth communication
  - Mobile app pairing
- Internal pump
- Rechargeable battery
- Easy maintenance
- Probe and filters included
- Certified for use in hazardous environments
- Switches off if calibration is overdue
- Blue rubber boot for added protection

2.2. Data Logging

Data logging is a standard feature on the monitor and allows both manual and automatic storage of gas measurements, event logs, bump tests, and calibration details for subsequent downloading.

2.3. Filters

Filters in both the monitor and the probe protect the monitor from water and dust ingress.

Check these filters regularly, and replace them if necessary (refer to Section 9.2. Replace Instrument Filters).

2.4. Construction

The monitor is housed in a tough, impact-resistant, molded case. Sealed to IP67, it can withstand physical impact testing to EN 60079 section 1-5.

2.5. Identification Label

The label on the rear of the monitor includes serial number and important certification information.

2.6. Toxic Cell Integrity

The monitor continually monitors the CO toxic sensor and alerts the user if the sensor is not fitted or responding.

3. Operation

Figure 2: Function Buttons

3.1. Operating Procedure

NOTE: Throughout this document, the buttons will be referred to as L Button and R Button.

Check the following before use:

- The monitor is clean and in good condition.
- The hydrophobic filter and inlet filter for the monitor and probe are clean and in good condition.
- The sample line and any other accessories used are in good condition and leak-free.
- Switch monitor ON in fresh air and check that the battery is fully charged.
- Verify there are no faults.
- Attach probe, as required.
- All ranges are operational and the monitor is zeroed.
- The monitor is within the calibration period.
- Switch the monitor OFF, in fresh air, after use.

Additional:

- Perform a daily leak check when prompted by placing your thumb over the end of the sample probe and ensuring the monitor displays FLOW FAULT TEST SUCCESFUL.
- Perform regular bump tests using either the Auto Bump/Calibration Station or by performing manual bump tests.

3.2. Switching the Monitor On

Press and hold the R Button for one second to switch the monitor ON (refer to Figure 2: Function Buttons). The flash screen appears (as shown in Figure 3: Flash Screen) and the monitor begins its warm-up routine, which lasts approximately 30 seconds. During the warm-up, a countdown timer appears in the top right corner of the display.

NOTE: The LCD backlight illuminates green and remains ON during warm-up. At the completion of the warm-up cycle, the LCD backlight automatically switches off.

Figure 3: Flash Screen

3.2.1. Instrument Identification

During warm-up, the LCD identifies the serial number, software version, battery status, and calibration gas information. The monitor will also indicate the number of completed leak inspections ready to be transferred to the tablet application. These are shown as INS JOBS, as illustrated in Figure 4: Monitor Identification Display.

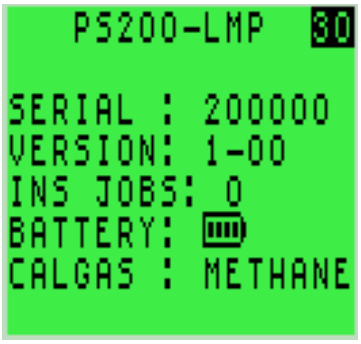


Figure 4: Monitor Identification Display

3.2.2. Filter Check/Flow Fault Test (Daily Check Only)

To ensure the monitor operates properly, always make sure the filters are in place and in good condition, and perform a regular leak check. The monitor will prompt the user once every day to perform these checks before it completes the warm-up sequence.

3.2.2.1. Filter Check

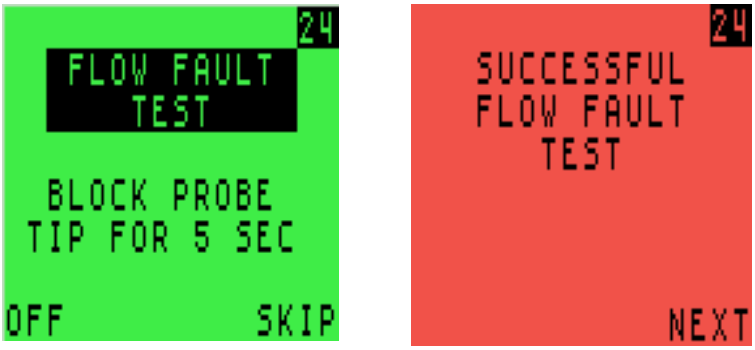
First, the Filter Check screen (see Figure 5: Filter Check) prompts the user to check the filters. If filters have been checked, press **YES** to continue the monitor's warm-up sequence. If **NO** is selected, the monitor will automatically enter the 'switch off' sequence. Once the monitor shuts down, check the filters and restart the monitor.

Figure 5: Filter Check

3.2.2.2. Flow Fault Check

Next, the FLOW FAULT TEST prompt screen appears (see Figure 6: Flow Fault Test). Select **SKIP** to continue without performing a Flow Fault Test. If **OFF** is selected, the monitor will automatically enter the 'switch off' sequence.

To perform a flow fault test, block probe tip with your finger for approximately 5 seconds. The pump should flow fault, and the screen will turn red. Press **NEXT** to continue the monitor's warm-up sequence.



Flow Fault Test Prompt Screen

Flow Fault Test Successful

Figure 6: Flow Fault Test

3.2.3. Date and Time

The LCD displays the date and time during warm-up, as illustrated in Figure 7: Date and Time.

Figure 7: Date and Time

3.2.4. Calibration Due Date

The calibration due date appears on the display, as illustrated in Figure 8: Calibration Due Date.

Figure 8: Calibration Due Date

If the calibration due date has expired, the following is displayed:

Figure 9: Calibration Overdue

The monitor must be switched off. The monitor cannot be used until a successful calibration is completed.

3.2.5. Sensor Confirmation Check

The ✓ symbol appears adjacent to each sensor type to confirm that the sensor has been zeroed correctly, as shown in Figure 10: Sensor Check Displays.

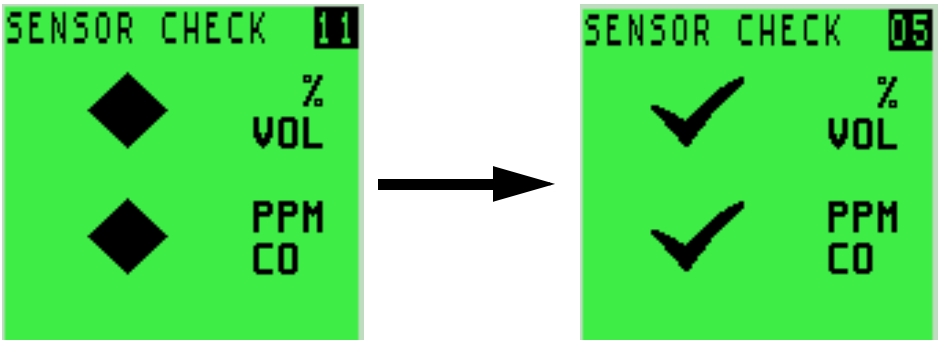


Figure 10: Sensor Check Displays

If a sensor fails to zero correctly, the display will turn red, the audible/visual alarms will activate and a wrench symbol will appear next to the faulty sensor, as illustrated in Figure 11: Failed Sensor.

Figure 11: Failed Sensor

To acknowledge this fault, press the R Button once. This will clear the audible/ visual alarm and display a flashing wrench . A faulty % VOL sensor zero reading is shown in Figure 12: Acknowledge Alarm.

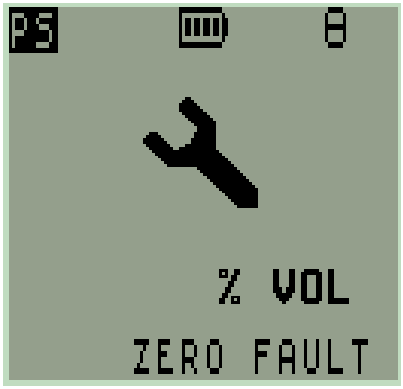


Figure 12: Acknowledge Alarm

NOTE: If a sensor fault is detected during normal operation of the monitor, the backlight illuminates red, an audible/visual alarm is activated immediately and a wrench symbol is shown adjacent to the faulty sensor type in the display.

3.2.6. Enter Bin

If no faults occur, the monitor will complete its warm-up sequence and the BIN screen will appear (see Figure 13: BIN Screen).

Figure 13: BIN Screen

3.2.7. Memory Fault

During warm-up, if the 'MEMORY FAULT' screen is displayed (see Figure 14: Memory Fault), the monitor has detected a memory fault.

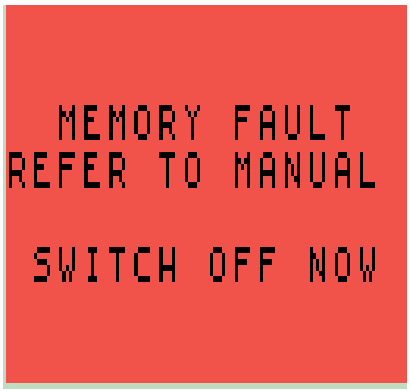
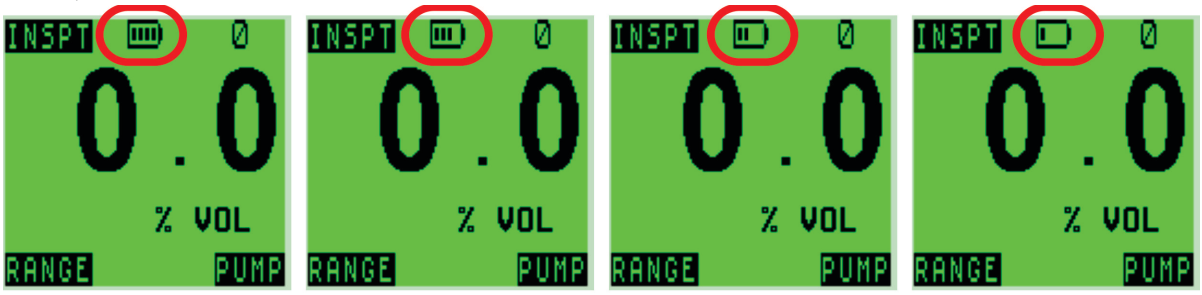


Figure 14: Memory Fault

The monitor must be returned for service.

3.3. Battery Status

The monitor provides the user with a continuous battery charge level indicator. The indicated consists of a battery symbol showing 100%, 75%, 50% and 25% charge (see Figure 15: Battery Status).



Battery at 100% | Battery at 75% | Battery at 50% | Battery at 25%

Figure 15: Battery Status

3.4. Switch the Display Backlight On/Off

The display screen backlight can be manually switched ON when working in poor lighting conditions. Press the R button once to switch the screen backlight ON. It remains ON for 20 seconds and then automatically switches OFF.

3.5. Datalogging

The monitor logs 3 types of data:

1. Timed logs
2. Session logs
3. Calibration logs

3.5.1. Timed Logs

Timed logs are either manual or automatic. For both, the monitor stores the following data:

- TIME and DATE of log
- % Gas and/or ppm CO reading (mode dependent)

The monitor automatically logs data at 1 minute intervals.

The user can initiate a manual log at any time by pressing the L button once.

3.5.2. Session Logs

A session is defined as the time the instrument operates in a particular mode. The data logged is mode dependent.

3.5.3. Calibration Logs

For each calibration, the monitor logs the following:

- Calibration TIME and DATE
- Calibration method (ABC)
- Before Zero gas reading for % Volume Gas and ppm CO
- After Zero gas reading for % Volume Gas and ppm CO
- Before Span gas reading for % Volume Gas and ppm CO
- After Span gas reading for % Volume Gas and ppm CO

3.5.4. Datalogging Capacity/date Format

- Timed logs:24 hours at 1 log per minute
- Session logs:Minimum of 180
- Calibration logs:Minimum of 8

If the datalogging memory is full, the monitor prompts the user. Also:

- User **CANNOT** enter INSPT mode
- User can still enter PS and PURGE modes

3.5.5. Datalogging Extraction

Results from leak surveys (INSPT Mode) can be transferred via Bluetooth to applications running on tablets, allowing the data to be visualized and then stored to the cloud for regulatory reporting purposes by a Utility.

3.6. View Maximum Recorded Values Since Switch ON

The monitor records the maximum values for each sensor since switch on. To view the maximum values in any mode:

1. From the normal operating display, press the R button once to switch the monitor backlight ON
2. Press the R button again, while the screen light is ON, to view the stored maximum % VOL reading (see Figure 16: Maximum Gas Values - % VOL). Note that MAX is displayed at the bottom center of the display.

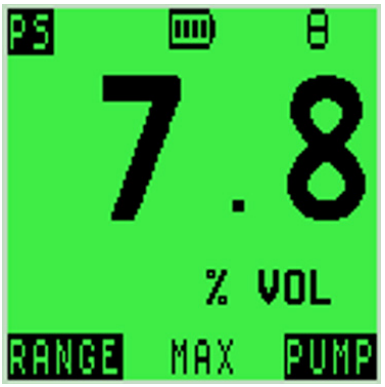


Figure 16: Maximum Gas Values - % VOL

3. Select **RANGE** (press and hold the L button) to view the maximum CO reading (refer to Figure 17: Maximum Gas Values - PPM CO).

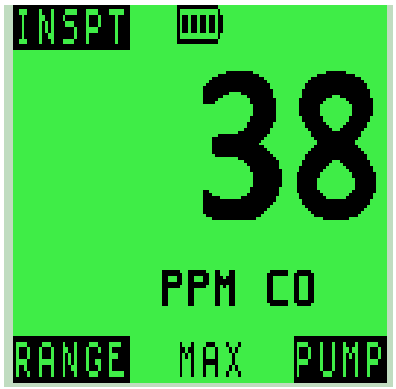


Figure 17: Maximum Gas Values - PPM CO

To reset the maximum readings, press and hold the R button for 2 seconds while MAX is displayed. The monitor will return to the normal operating screen.

3.7. Alarms Reset or Acknowledge

When an alarm set point has been reached, the audible, visual and vibrating alarm will be activated to alert the user, as shown in Figure 18: Alarm Screen.

Figure 18: Alarm Screen

Alarms are latching and will stay on until the user resets by pressing and holding the R button after the gas reading has returned to a safe level. The audible alarm on each preset alarm can be

muted for 60 seconds by pressing and holding the R button. After this period, the audible alarm will become active again, regardless of gas value.

3.7.1. Confidence Signal

During normal operation, the monitor sounds a confidence beep and illuminates the green LED's briefly every 15 seconds. This function makes the user aware that the monitor is operating correctly.

3.8. Probe Connection and Use

The monitor has an internal pump for use with the probe. Connect the sample line probe tubing to the sample connector at the bottom of the monitor, as shown in Figure 19: Sample Line Connected to Monitor. The pump is OFF after start-up.

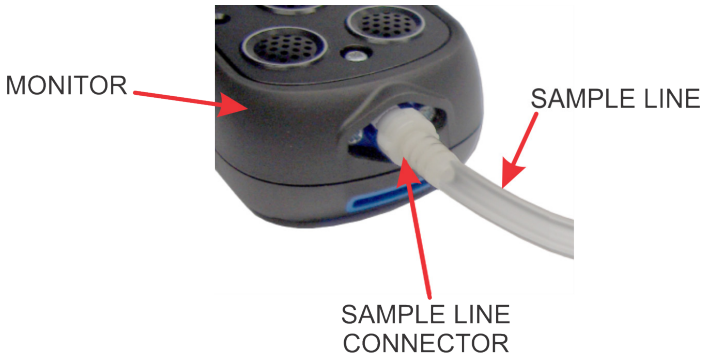


Figure 19: Sample Line Connected to Monitor

Press and hold the R button (PUMP) to start or stop the pump. When the pump is running, a pump symbol, illustrated in Figure 20: Pump Symbol Displayed, rotates in the display.

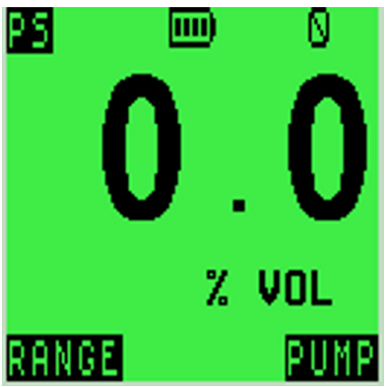


Figure 20: Pump Symbol Displayed

3.9. Switching the Instrument OFF

Press and hold both the L button and the R button to switch the monitor OFF. The monitor display starts a countdown from three (3) to OFF, as shown in Figure 21: Switch OFF. Both buttons must be pressed together until the display goes blank.

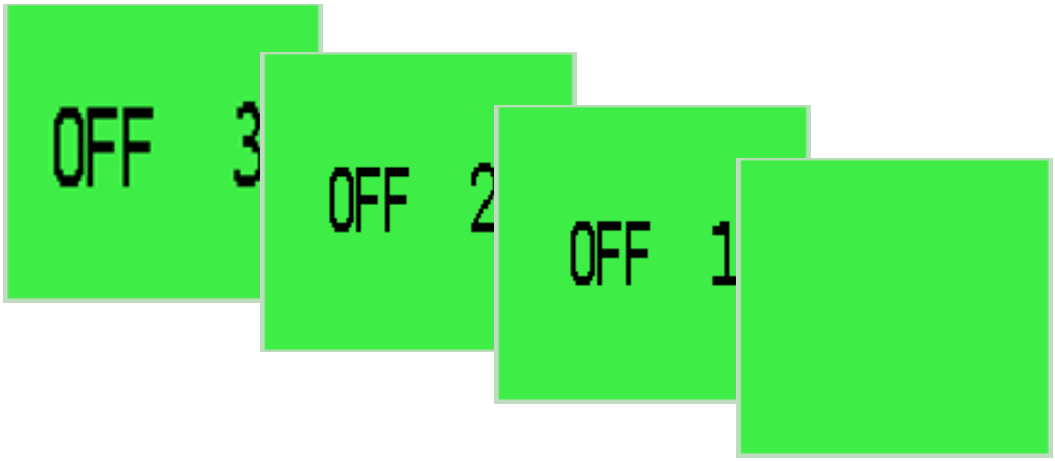


Figure 21: Switch OFF

The audible alarm sounds every second to alert user that the monitor is switching OFF.

3.10. Modes

The monitor has 3 modes of operation:

1. Inspection (INSPT)
2. Personal Surveyor (PS)
3. Purge

3.10.1. Building Identification Number (BIN)

At the end of the warm-up sequence, the monitor displays the INSPECT MODE ENTER BIN screen (see Figure 22: BIN Screen).

NOTE: You cannot enter INSPT mode until you input a valid BIN.

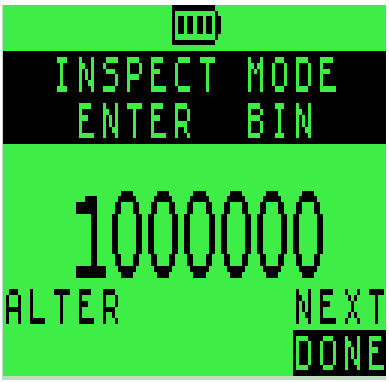


Figure 22: BIN Screen

At this stage, before you input a BIN, you can switch between PS mode, PURGE mode, and the BIN ENTER screen by pressing both buttons simultaneously.

Once you input a BIN, you enter INSPT mode. Once entered, you cannot switch from INSPT mode to another mode.

On the BIN ENTER screen, input a BIN using the monitor's 2 buttons.

- Pressing the L button once alters each digit
- Pressing the R button once moves to the next digit of the BIN
- Pressing and holding the R button completes the BIN

3.10.2. Display

During normal user operation, the monitor will only show 1 gas reading in large font. The monitor will indicate the current mode at the top of the display ("INSPT", "PS" or "PURGE") (see Figure 23: Display).

The LCD will indicate the press & hold button functions at the bottom of the display.

NOTE: Single press button functions are not shown on the display.

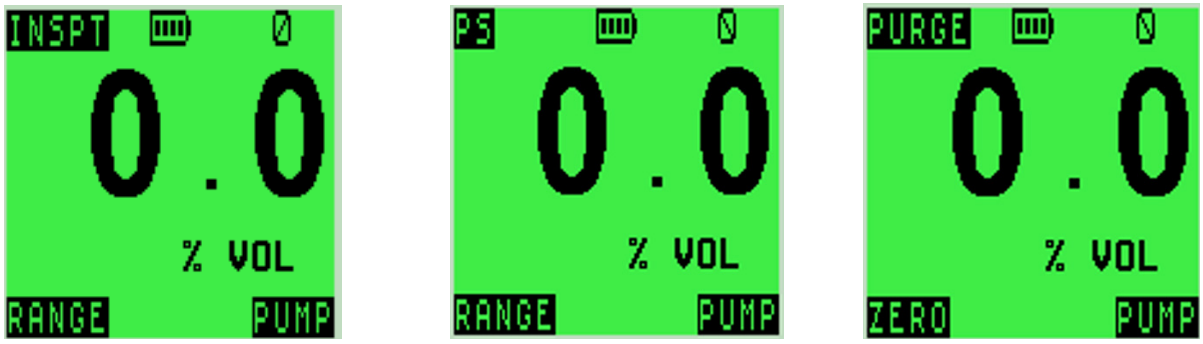


Figure 23: Display

4. Inspect (INSPT) Mode

4.1. General

Inspect (INSPT) mode records the % Volume Gas readings during an inspection. This data can be transferred, via Bluetooth, to an app running on a smart device.

Table 4-1: INSPT Mode Key Features

Ranges	Alarm Set-points	Datalogging Options	Ranges Logged
% Gas	0.1% Gas	Manual	% Gas
ppm CO	35ppm CO	Auto	

4.2. Button Functions

Table 4-2: Button Function

Action	L Button	Both	R Button
Single Press	Manual Log	—	Light/Max/Live
Press & Hold	Range	OFF (3 seconds)	PUMP Toggle Alarm Acknowledge

4.3. Operation

To enter INSPT mode, press both buttons until the INSPT screen appears.

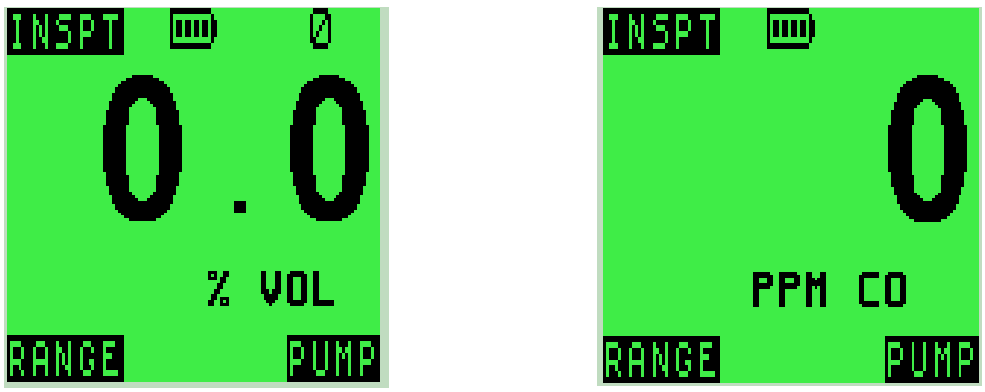


Figure 24: INSPT Mode

4.3.1. Range

INSPT mode can display either the % Volume Gas or the PPM CO readings. INSPT mode opens in the % VOL range. To switch to the PPM CO range, press and hold the L button (RANGE). The PPM CO range will appear. To switch back to % VOL range, press and hold the L button (RANGE) again.

4.3.2. Alarms

Both the % VOL and PPM CO ranges have alarms. The default factory settings are:

- 0.1% VOL
- 35ppm CO

4.3.3. Pump

When the monitor enters INSPT mode, the pump is automatically on, and the pump icon is present in the upper, right-hand corner of the LCD. To turn the pump off, press and hold the R button. The pump icon will disappear, indicating that the pump is off. Press and hold the R button again to turn the pump back on. The pump icon reappears.

4.3.4. Maximum Gas Values

To see the maximum gas value recorded since switching the monitor on, press the R button once. MAX will appear at the bottom, center of the LCD and the maximum reading is displayed.

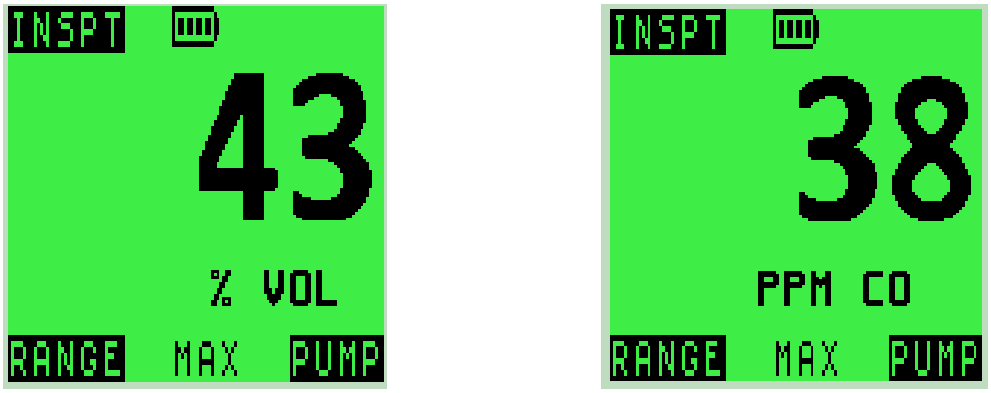


Figure 25: Maximum Gas Values

Press and hold the L button (RANGE) to view the maximum CO reading.

Press the R button again to switch back to the current % VOL reading.

To reset, press and hold the L button. The reading will return to 0.0% VOL.

4.3.5. Datalogging

Both manual and automatic datalogging are available in INSP mode. The monitor automatically logs data at 1 minute intervals (configurable between 1s and 10 mins). To log the data manually, press the L button once. LOG will briefly appear in the bottom center of the LCD, indicating that the data has been logged.

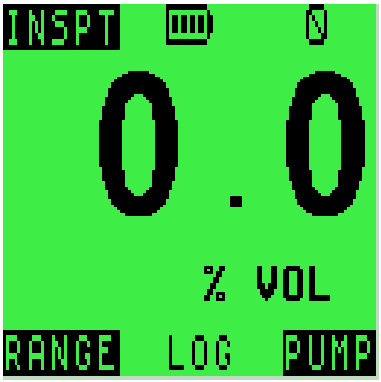


Figure 26: Datalogging Indicator

NOTE: Readings for both % VOL and PPM CO will be recorded regardless of the range currently displayed.

INSPT mode logs following data for both % VOL and PPM CO:

- Monitor Serial Number
- ON Time/Date
- BIN
- Last Cal Date
- Cal Due date
- Soundness Check result
- Pump status
- Max Reading: % Gas
- Auto Log Readings: % Gas
- Manual log Readings: % Gas
- OFF Time/Date

The data logged in INSPT mode can be uploaded to applications running on tablets (refer to Section 7. BLUETOOTH).

5. Personal Surveyor (PS) Mode

5.1. General

Personal Surveyor (PS) mode alerts the user to the presence of flammable gas and/or carbon monoxide while carrying out normal plumbing duties.

Ranges	Alarm Set-points	Datalogging Options	Ranges Logged
% Gas	0.1% Gas	Manual	% Gas
ppm CO	35ppm CO	Auto	ppm CO

5.2. Button Functions

Action	L Button	Both	R Button
Single Press	Manual Log	Change Modes	Light/Max/Live
Press & Hold	Range	OFF (3 seconds)	PUMP Toggle Alarm Acknowledge

5.3. Operation

To enter PS mode, press both buttons until the PS screen appears.

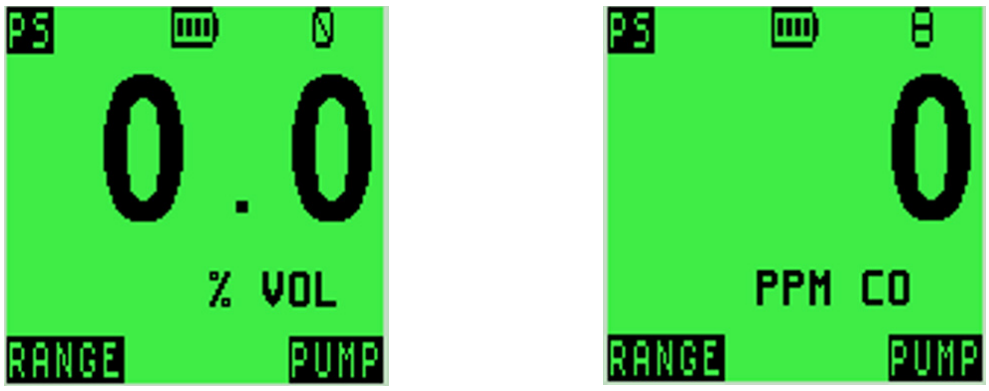


Figure 27: PS Mode

5.3.1. Range

PS Mode can display either the % Volume Gas or PPM CO readings. PS Mode opens in the % VOL range.

To switch to the PPM CO range:

1. Press and hold the **L** button. The PPM CO range will appear.
2. To switch back to % VOL range, press and hold the **L** button again.

5.3.2. Alarms

Both the % VOL and PPM CO ranges have alarms. The default factory settings are:

- 0.1% VOL
- 35ppm CO

Caution: Alarm set-points are preset at the factory. Do not attempt to alter the ALARMS settings.

5.3.3. Pump

When the monitor enters PS Mode, the pump is automatically on, and the pump icon is present in the upper, right-hand corner of the LCD.

To turn the pump off:

1. Press and hold the **R** button. The pump icon will disappear, indicating that the pump is off.
2. Press and hold the **R** button again to turn the pump back on. The pump icon reappears.

5.3.4. Maximum Gas Values

To see the maximum gas value recorded since switching the monitor on:

1. Press the **R** button once. MAX will appear at the bottom, center of the LCD and the maximum reading is displayed.

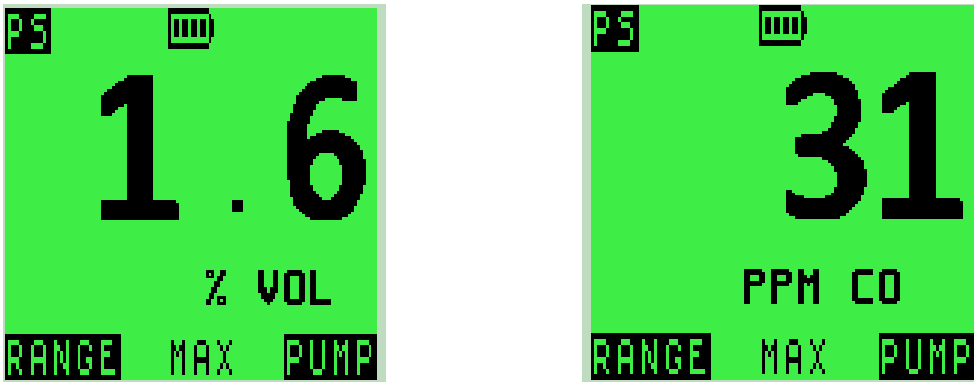


Figure 28: Maximum Gas Values

2. Press and hold the **L** button (RANGE) to view the maximum CO reading.
3. Press the **R** button again to switch back to the current % VOL reading.
4. To reset, press and hold the **L** button. The reading will return to 0.0% VOL.

5.3.5. Datalogging

Both manual and automatic datalogging are available in PS mode. The monitor automatically logs data at 1 minute intervals (configurable between 1s and 10 mins).

To log the data manually, press the **L** button once. LOG will briefly appear in the bottom center of the LCD, indicating that the data has been logged.

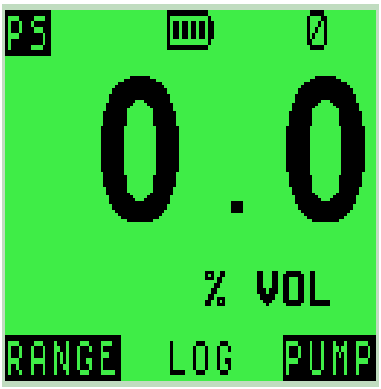


Figure 29: Datalogging Indicator

NOTE: Readings for both % VOL and PPM CO will be recorded regardless of the range currently displayed.

The following data is logged in PS mode:

- Monitor serial number
- Mode entered time/ date
- Cal Due date
- Soundness check result
- Pump status
- Max readings: % Gas, ppm CO
- Alarm set-points: %Gas, ppm CO
- Alarms activated:
  - Time/Date
  - Readings for alarm range
- Auto log readings: % Gas, ppm CO
- Manual log readings: % Gas, ppm CO
- OFF time/date

6. PURGE Mode

6.1. General

PURGE mode is intended for natural gas-to-air or air-to-natural gas applications (i.e. direct purging).

Ranges	Alarm Set-points	Datalogging Options	Ranges Logged
% Gas	None	Manual	% Gas

6.2. Button Function

Action	L Button	Both	R Button
Single Press	Manual Log	Change Modes	Light/Max/Live
Press & Hold	Range	OFF (3 seconds)	PUMP Toggle

6.3. Operation

To enter PURGE mode, press **BOTH** buttons until the PURGE screen appears.

Figure 30: PURGE Mode

6.3.1. Range

PURGE mode only displays the % Volume Gas reading.

6.3.2. Alarms

There are no alarms in PURGE mode.

6.3.3. Pump

When the monitor enters PURGE mode, the pump is automatically on, and the pump icon is present in the upper, right-hand corner of the LCD.

To turn the pump off:

1. Press and hold the **R** button. The pump icon will disappear, indicating that the pump is off.
2. Press and hold the **R** button again to turn the pump back on. The pump icon reappears.

6.3.4. Maximum Gas Values

To see the maximum gas value recorded since switching the monitor on:

1. Press the **R** button once. MAX will appear at the bottom, center of the LCD and the maximum reading is displayed.

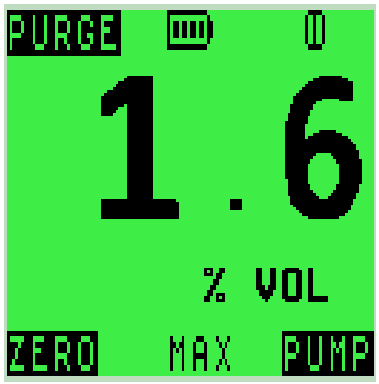


Figure 31: Maximum Gas Values

2. To reset, press and hold the **L** button. The reading will return to 0.0% VOL.

6.3.5. Datalogging

Only manual datalogging is available in PURGE mode. To log the data, press the **L** button once. LOG will briefly appear in the bottom center of the LCD, indicating that the data has been logged.

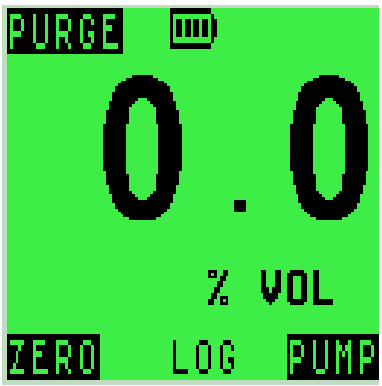


Figure 32: Datalogging Indicator

PURGE mode logs only the % Gas range.

The following data is logged in PURGE mode:

- Monitor serial number
- Mode entered, time, & date
- CAL DUE date
- Soundness Check result
- Pump status
- Max readings: % Gas
- Manual log readings: % Gas
- OFF time & date

7. Bluetooth

7.1. General

The PS200-LMP communicates Inspect Mode (INSPT) data to the utility apps using Bluetooth BLE 5.0.

NOTE: Bluetooth range is 3' (1m).

The monitor will indicate during warm-up if there are any completed inspections to be transferred to the tablet application.

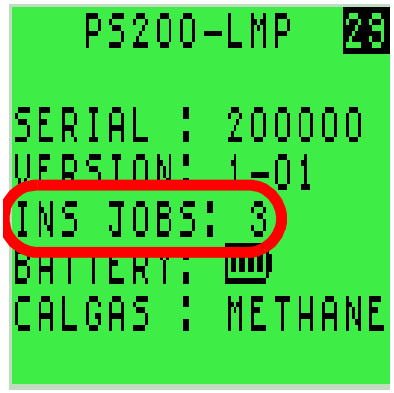


Figure 33: Completed Inspections Ready to be Transferred

7.2. Bluetooth (BT) Connection

7.2.1. Establishing Bluetooth Communications

Bluetooth pairing is only possible during the instrument warm-up sequence (approximately 30 seconds). If Bluetooth communications are not established during warm-up, they will not be possible during the current instrument session.

If a tablet running the appropriate application is held close to the monitor during warmup, they will automatically connect. No action is required by the user. Once the monitor establishes Bluetooth communications, the bottom line of the display will indicate CONNECTED as shown in Figure 34: Bluetooth Connection Notification.

Figure 34: Bluetooth Connection Notification

CONNECTED will remain on the bottom line during warm-up, while a BT connection is active. If warm-up finishes and the Bluetooth transfer is still in progress, then the last warm-up screen is maintained until the Bluetooth is disconnected (see Figure 35: Bluetooth Connection Notification, cont.).

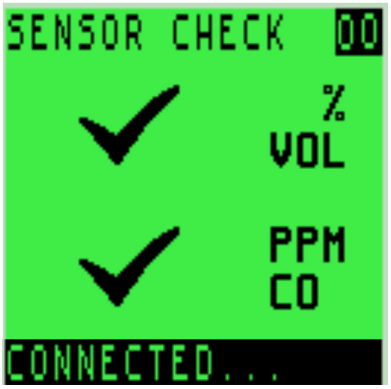


Figure 35: Bluetooth Connection Notification, cont.

The app running on the smart phone/tablet controls the data transfer. When it is complete, it will disconnect from the monitor. Several seconds later (up to 20 seconds), CONNECTED disappears from monitor's display, and the monitor continues as normal from the end of warm-up (i.e. the INSPECT MODE ENTER BIN screen).

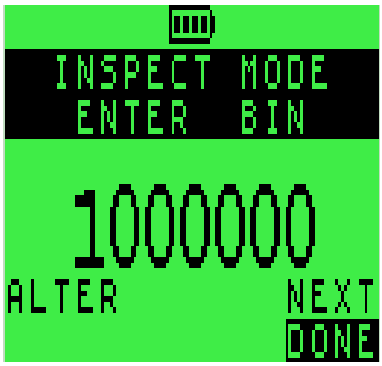


Figure 36: BIN Screen

8. Recharging the Batteries

8.1. General

Use only Company approved chargers to recharge monitor.

WARNING: ONLY CHARGE THE BATTERY IN A NON-HAZARDOUS AREA.

Caution: Switch the monitor off when charging the internal battery.

Recharge the battery in the following situations:

- The low battery icon appears on the display.
- The monitor will not switch ON.

When the low battery icon appears on the display, approximately 30 minutes of operation at normal temperatures remain. The monitor will then switch OFF automatically.

8.2. Recharge Monitor Using the Charging / Comms Clip

1. Connect the supplied charging/comms clip to the monitor. To ensure the contact nodes on the charging/comms clip engage the monitor's contact pads, slide the locking tongue on the charging/comms clip fully into the monitor's locating slot and ensure the locking pins on the charging/comms clip firmly click into the monitor's locking pin slots (refer to Figure 37: Charging/Comms Clip Connection).

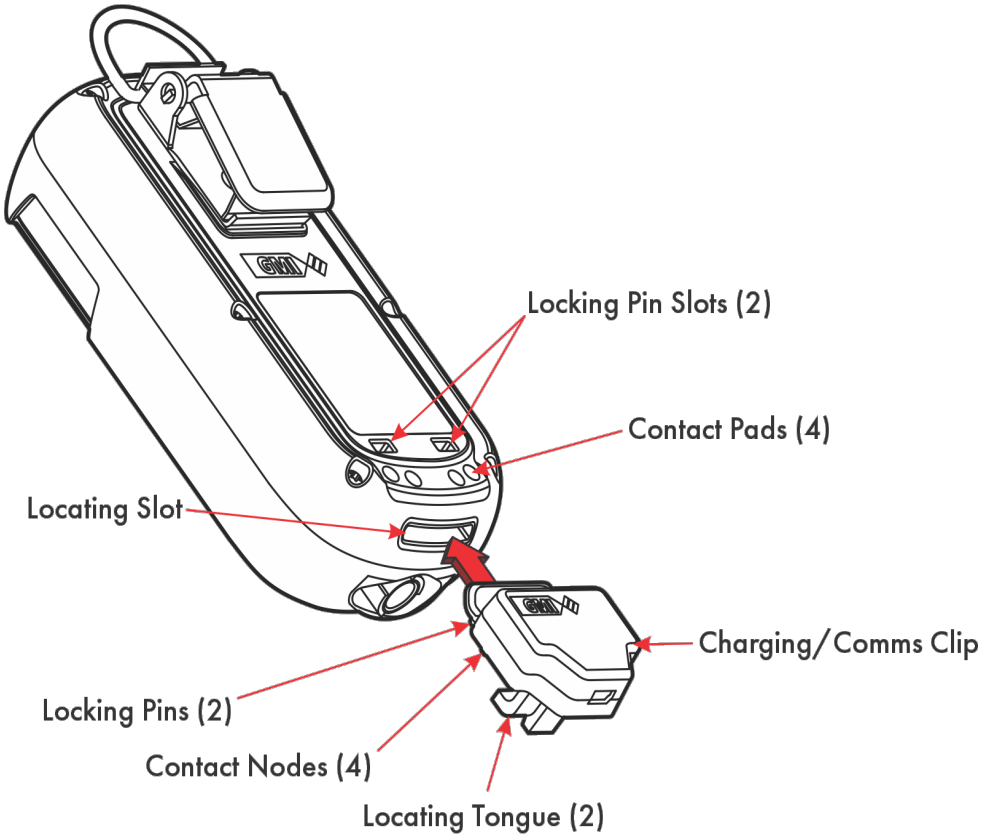


Figure 37: Charging/Comms Clip Connection

2. Connect the supplied MINI-USB to USB Cable to the Charging/Comms Clip.

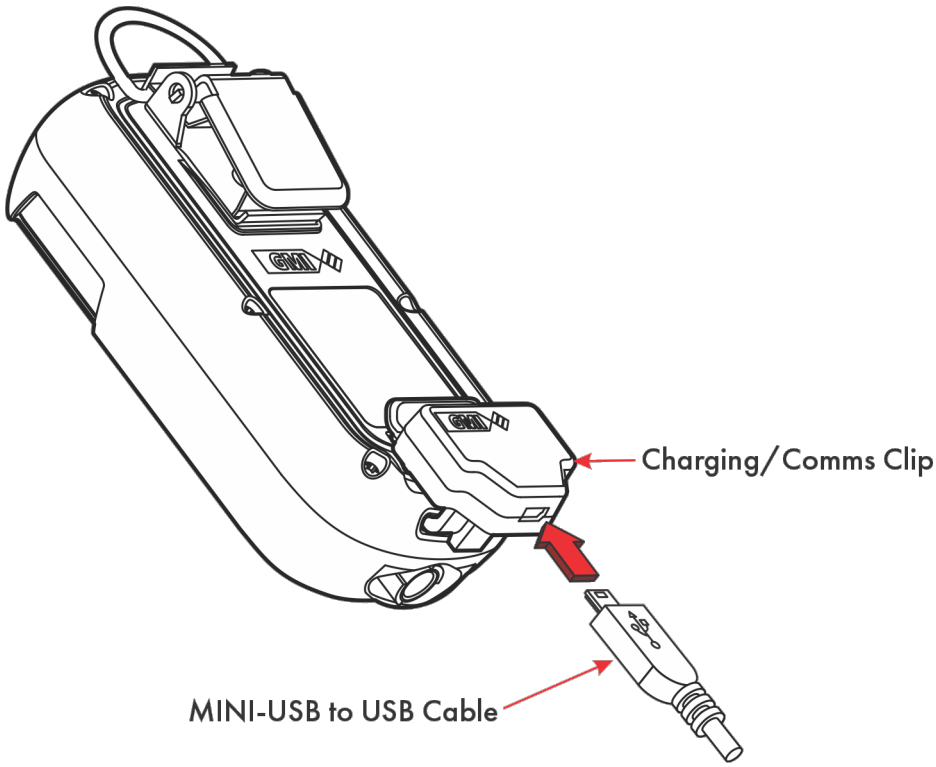


Figure 38: Connect Cable to Charging/Comms Clip

3. Connect the other end of the charging cable to the USB Power adapter (or suitable USB socket).

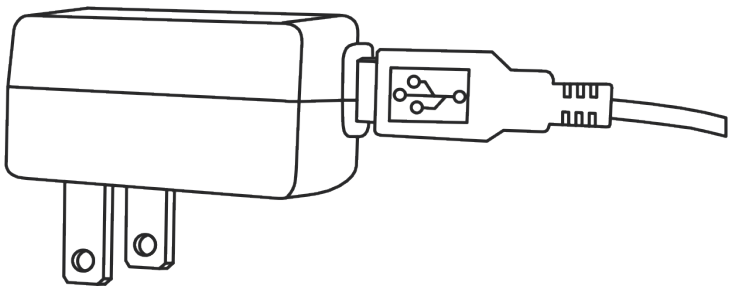


Figure 39: Connect Cable to USB Power Adapter

4. When charging is in process, the battery symbol and the word *CHARGING* flash in the display.
5. When charging is complete, the full battery symbol and the word *CHARGED* are displayed.
6. Disconnect from the power source.
7. To remove the charging/comms clip, pull up and back on the charging/comms clip's release tab and firmly pull it away from the monitor.

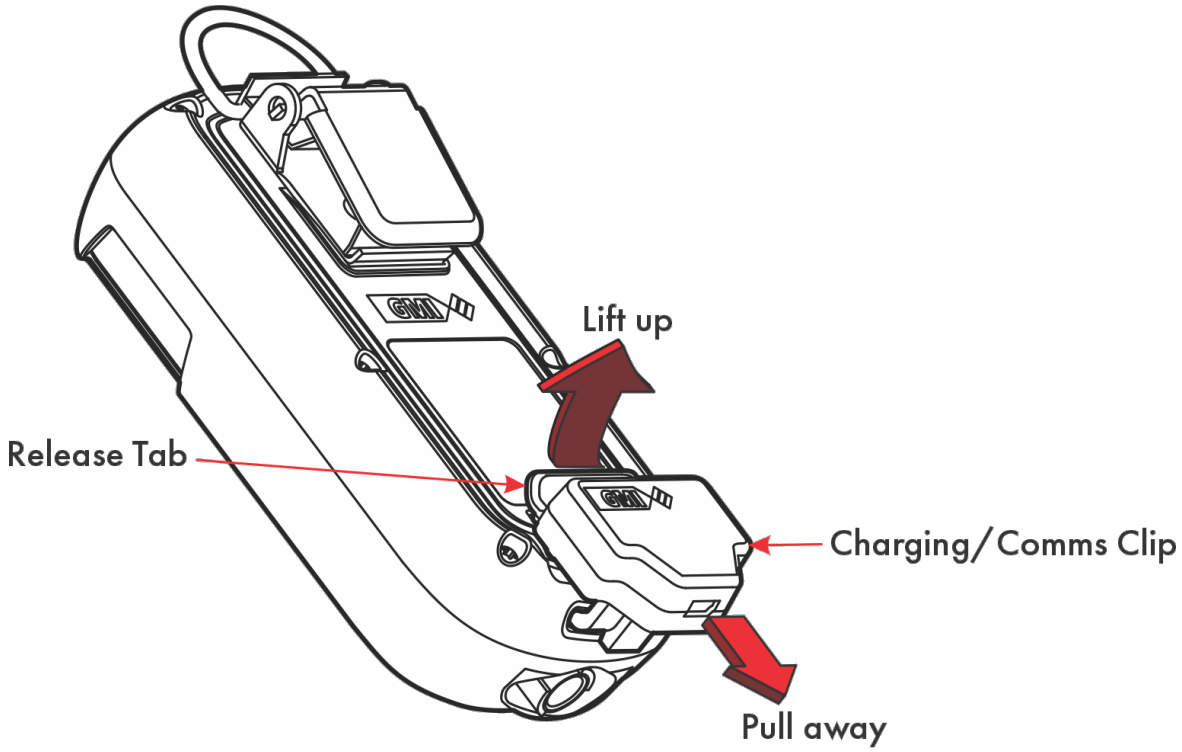


Figure 40: Removing the Charging/Comms Clip

NOTE: It will not damage the monitor to leave it connected to the charger.

9. Operator Maintenance

9.1. Cleaning

Caution: Do not use polishes that contain silicon or solvent to clean the monitor as these may damage the flammable gas sensor (if fitted). Do not use abrasive chemicals or strong, volatile chemical solutions as these could damage the impact-resistant casing.

Only use a moist, non-abrasive cloth to clean the outer, impact-resistant casing of the monitor. Rub the cloth over the outer casing to remove any dirt and grime. In extreme cases, use a mild soap solution with a non-abrasive cloth to remove any stubborn marks.

9.2. Replace Instrument Filters

The monitor has 2 filters:

- hydrophobic (water) filter - located behind the filter cover on the front face of the monitor;
- sample inlet (dust) filter - located in the sample inlet connector at the bottom of the monitor.

Inspect these filters periodically for contamination or damage.

9.2.1 Replacing the Hydrophobic (Water) Filter

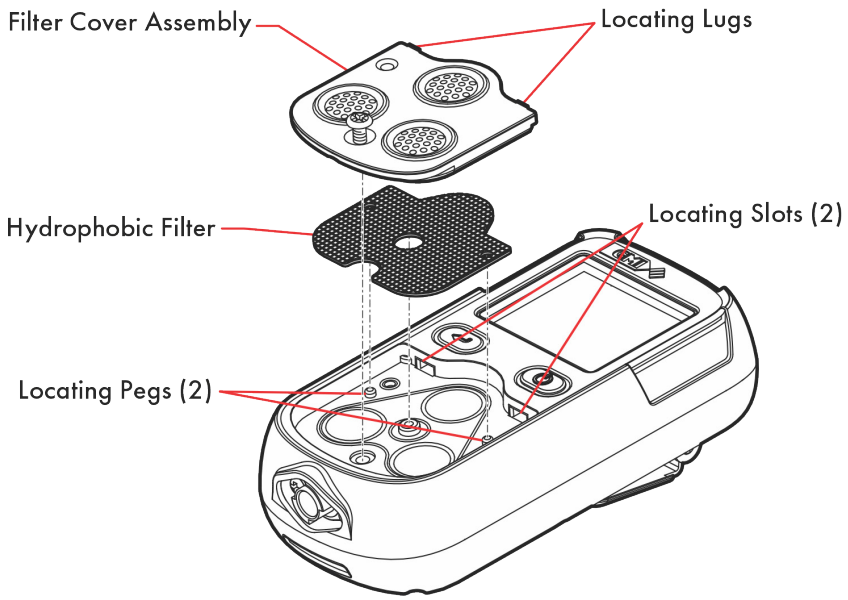


Figure 41: Hydrophobic Filter Replacement

1. Using a No. 1 Pozidriv® screwdriver, unscrew the screw.
2. Slide the filter cover away from the display until the locating lugs disengage from the locating slots.
3. Lift the cover away from the monitor.
4. Remove the hydrophobic filter.

5. Insert a new hydrophobic filter.

Note: Make sure that the locating pegs in the monitor filter recess align with the mating pinholes in the hydrophobic filter.

6. Place the filter cover over the recess and slide it towards the display until the locating lugs engage in the locating slots.
7. .Using a No. 1 Pozidriv® screwdriver, tighten the screw.

Note: Do not overtighten the screw.

9.2.2 Replacing the Sample Inlet (Dust) Filter

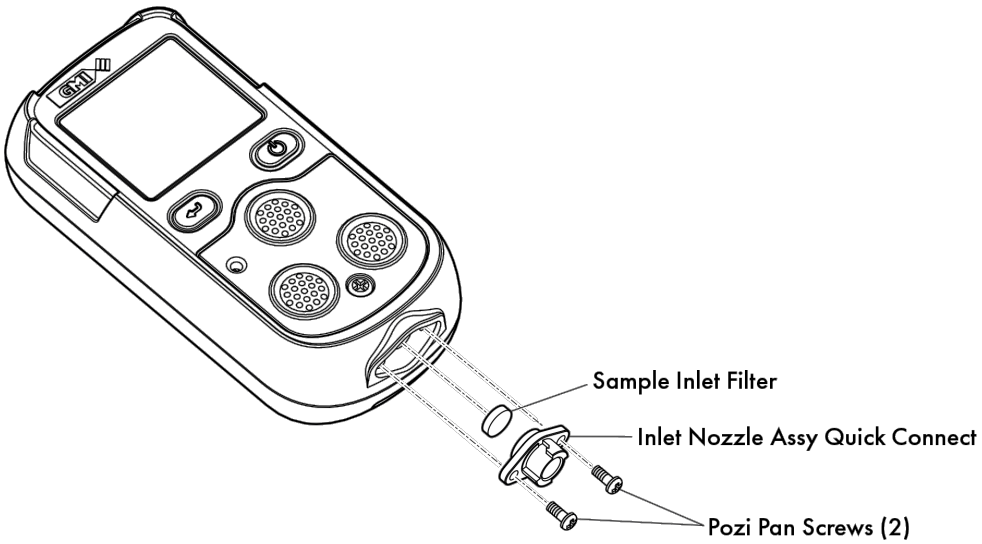


Figure 42: Replacing the Sample Inlet (Dust) Filter

1. Using a No.1 Pozidriv® screwdriver, remove the 2 Pozi Pan screws.
2. Remove the nozzle. The sample inlet filter is located at the rear of the inlet nozzle.
3. Push a matchstick, or similar, into the front of the inlet nozzle and remove the sample inlet filter from the rear of the inlet nozzle.
4. Insert a new sample inlet filter into the rear of the inlet nozzle. Ensure the "rough" surface faces the inlet filter (sample side).
5. Fit the inlet nozzle. The inlet nozzle will only fit in one direction.
6. Using a No.1 Pozidriv® screwdriver, insert the 2 Pozi Pan screws.

Note: Do not overtighten the screw.

10. Calibration

10.1. General Description

The monitor has been calibrated for particular gases. Where any doubt exists the product should be returned to the Company or an authorized distributor for calibration.

WARNING: THE INSTRUMENT MUST BE CALIBRATED AND CONFIGURED BY AUTHORIZED PERSONNEL ONLY.

10.2. Automatic Calibration

The Automatic Bump/Calibration Station, shown in Figure 43: PS200-LMP Auto/Bump Calibration Station, provides controlled delivery of gases permitting users to bump test and calibrate the monitor in a controlled manner whilst maintaining a record of calibration results.

For further details contact the Company or an authorized distributor.

Figure 43: PS200-LMP Auto/Bump Calibration Station

10.3. Calibration Validity

The monitor's calibration interval is 30 days.

Calibration validity remains the responsibility of the user.

11. Accessories

Part Number	Description
64135LMP	PS200LMP (c/w %Gas, PPM CO, Probe, Bluetooth, rubber boot)

Part Number	Description
64084	Sample Inlet Filter (Instrument)
64254	Hydrophobic Filter (Instrument)
64255	Pump Assembly
66750CC	% Vol. Gas Sensor
67176	CO Sensor

Part Number	Description
10077	Cotton Filters - box of 10 (Probe)
12358	Hydrophobic Filter (Probe)
64109	Probe (c/w filters and tubing)
66045	Tygon Tubing Connector
66118	Tygon Tubing

Part Number	Description
64172LMP	Quick Operating Instructions
64247	Universal Power Plug (Mains - USB)
64260	USB Charging/Comms Clip
64303BU	Rubber Boot (blue)

Part Number	Description
64138	5-Way Charger
64248	In-Vehicle Charging Adapter (12V/24V - USB)
64491	In-Vehicle Charging Cradle

Part Number	Description
64053	Automatic Bump & Calibration Station (Air, 2 Gas, Exhaust)
99118	On Demand Flow Regulator

Appendix A. Typical Operating Parameters

Gas	Sensor Type	Range	Resolution	Accuracy
% VOL Gas (Natural Gas)	Catalytic/Thermal Conductivity	0 to 100%	0.1%	±3%
Carbon Monoxide (CO)	Electrochemical	0 to 1000ppm	1ppm	±10% (of indication)

Physical Properties	
Dimensions (H x W x D):	4.8" x 2.3" x 1.3" (121mm x 59mm x 32mm)
Weight:	8 oz. (230 g)
Environment	
Operating Temperature Limits:	-4ºF to +122ºF (-20ºC to +65ºC)
Storage Temperature Limits:	-40ºF to +149ºF (-40ºC to +65ºC)
Humidity:	0 to 95% R.H non-condensing
Typical Flow Rate Information:	Nominal pump flow rate is 0.132 to 0.185 gals./min. (0.5 to 0.7 liters/min.) Max. 97 ft. (30m) sample line. Typ. flow fail rate = 0.026 to 0.053 gals./min. (0.1 to 0.2 liters/min.)
Response Times	
Vol Gas	T50: <10s (CSA 22.2 No. 152) T60: <12s (ANSI 12.13.01)
CO	T90: <20s
Warm-up/Stabilization Time	
<40 seconds	
Alarms	
Highly visible, flashing LED; piercing >90dB audible	
Display	
Green/Red LCD backlit display	
Power Source	
Battery:	Rechargeable Lithium-Ion
Runtime:	Up to 24 hours (12 hours pumped)
Charging Time:	Up to 4 hours
Construction	
High-impact, rubberized polycarbonate case	
IP Rating	
IP67	

Natural Gas Measurements

The monitor is used to accurately measure natural gas. The accuracy is ±3% of reading when the natural gas composition is as follows:

Methane (CH_4):	≥ 90%
Ethane (C_2H_6):	≤ 5%
Propane (C_3H_8):	≤ 1.4%
Butane (C_4H_{10}):	≤ 0.5%
Inert gas (e.g. Nitrogen (N_2)):	≤ 3%

Appendix B. Setting the Date and Time

The monitor's DATE and TIME are automatically corrected when connected to Tablets. Accessing the Configuration Menu Mode allows the user to manually alter the monitor's date and time.

B.1. Accessing the Configuration Menu Mode

1. Press and hold the **R** button for one second to switch the monitor ON.
2. As soon as the monitor identification display appears (see Figure 4: Monitor Identification Display), press the following buttons in sequence:
   - **L** button
   - **R** button
   - **L** button
   - **R** button

The monitor will continue through its warm-up sequence, which takes approximately 30 seconds. A countdown timer appears in the upper, right-hand corner of the LCD during the warm-up sequence. If you pressed the correct button sequence, the timer will alternate with the letter **M** (for Menu).

B.2. Configuration Menu Screen

When entered correctly, a sub-menu appears detailing four headings (see Figure 47: Menu Screen):

- NORMAL
- ALARMS
- DEFAULT
- CLOCK

Caution: NORMAL and CLOCK are the only two options the user should enter. Do not attempt to alter the ALARMS or DEFAULT settings.

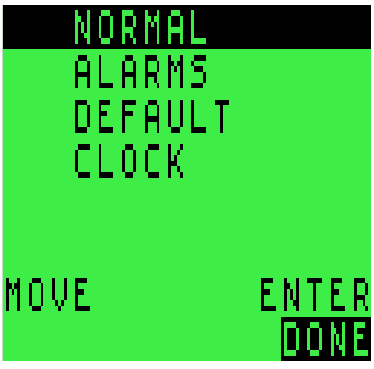


Figure 47: Menu Screen

Press the **L** button to move between menu options. Press the **R** button once to enter a menu option. Press and hold the **R** button to exit the menu and return to normal operation.

B.2.1. Normal

Pressing **NORMAL** returns the monitor to normal operation.

B.2.2. Clock

Pressing **CLOCK** opens the EDIT DATE AND TIME screen (see Figure 48: EDIT DATE AND TIME Screen). To change date and time:

1. Press **ALTER** to change the flashing parameter.
2. Press **ACCEPT** to advance to the next parameter.
3. Once you have input the desired time and date, press and hold the **R** button to return to the menu screen.

Figure 48: EDIT DATE AND TIME Screen

Appendix C. Technical Support

This product is designed to provide you with reliable, trouble-free service. Contact your regional technical support if you have technical questions, need support, or if you need to return a product. Details can be found at:

www.teledynegasandflamedetection.com

Note: When returning a product, contact Technical Support to obtain a Return MaterialAuthorization (RMA) number prior to shipping.

This page is intentionally left blank.

TELEDYNE
GAS MEASUREMENT INSTRUMENTS
Everywhereyoulook™

AMERICAS

4055 Technology Forest Blvd.
The Woodlands
TX 77381, USA
Tel.: +1-713-559-9200

EMEA

Inchinnan Business Park
Renfrew, PA4, 9RG
Scotland, UK
Tel.: +44 (0) 141 812 3211

ASIA PACIFIC

290 Guigiao Road
Pudang, Shanghai 201206
People's Republic of China
Tel.: +86-21-3127-6373

www.teledynegasandflamedetection.com

64171LMP
Revision 3.1

Copyright © 2020 Teledyne Gas and Flame Detection. All rights reserved.