

USER MANUAL
PDM
Single gas detector

we watch gas where you can't

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DESCRIPTION

The PDM is a portable single gas monitor designed to warn the user about the presence of dangerous concentrations of oxygen, combustible, or toxic gases in the atmosphere. It is simple to operate. The PDM alerts the workers to danger through acoustic alarm, flashing LEDs, and vibration when the concentration exceeds the safety gas levels. The PDM shows the gas concentration in real time and identifies the maximum and minimum concentration. The settings values can be modified through the optional WatchGas IR-Link.

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, lightening, or other hazard, voids liability of the manufacturer.
- Before each day of use preform a test using a known concentration of target gas above the alarm threshold(s), to ensure proper sensor response and alarm functionality.
- 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 the static electricity.
- Perform cleaning and maintenance of the products in fresh air that is free of hazardous gases.
- Test the response of a sensor regularly by the gas concentration exceeding alarm set point.
- Test LED, audio and vibration manually.
- Gas concentration measurements by the sensor can vary based on the environment (pressure and humidity) Therefore, calibration of PDM 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 PDM after the gas concentration value has stabilized.
- Severe vibration or shock to the device may cause a sudden reading change. Please use PDM after the value of gas concentration has stabilized. Excessive shock to PDM can cause the device and/or sensor to malfunction.
- All alarm value is set based on the alarm standard that is required by international standard. 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 PDM is designed to be disposable. Changing the battery and sensor may impair intrinsic safety and the attempt will void warranty.

CAUTION

- 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 O₂ detector, perform calibration every 30 days in the fresh air environment.
- Before use, please check the activation date, and if the activation date is past, please do not use the device.
- Clean detectors with a soft cloth and do not use chemical substances for cleaning.
- To maintain 24 months life time, avoid the below activities except the 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.
 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 PDM IR Link frequently except the bump testing
- View a serial number on the label at the back side of the device.

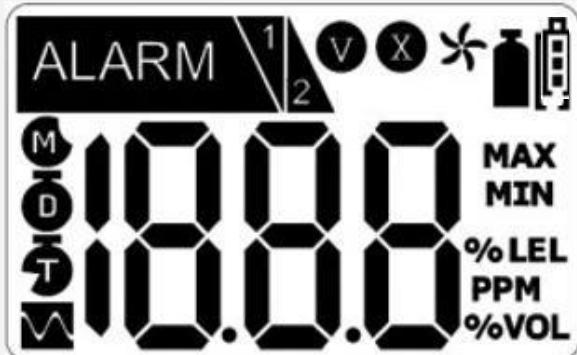
1. PRODUCT OVERVIEW



DETECTOR COMPONENTS

1. Gas sensor
2. Gas type sticker
3. LCD display
4. Button
5. Buzzer
6. Optical alarm LEDs
7. IR communication port

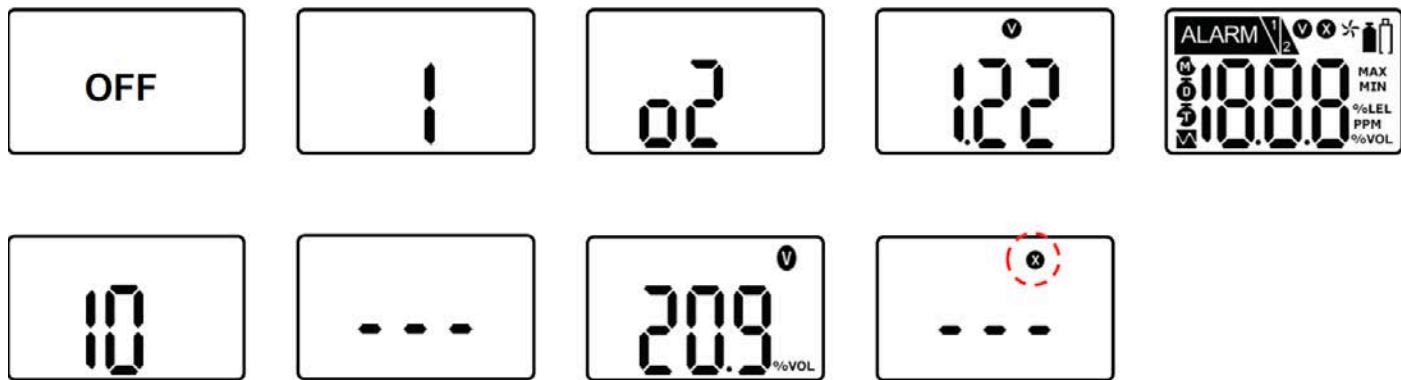
DISPLAY SYMBOLS



ALARM	Alarm
1	Low Alarm
2	High Alarm
V	Stabilization Success
X	Failure
*	Fresh Air Calibration
gas cylinder	Standard Gas Calibration
M	Remaining Months
D	Remaining Days
T	Remaining Hours
MAX	Max Concentration Value
MIN	Min Concentration Value
%LEL PPM %VOL	Unit of Measurement
empty battery	Lifetime less than 30 days or low battery

2. ACTIVATION

In a safe environment, press and hold down the button (●) for three seconds, after the three second countdown the monitor will turn on. Gas type and firmware version (eg. 1.2.6) will be displayed. During a 10 seconds countdown, the device will stabilize itself. After stabilization is complete, **V** will appear on the display screen and the device will move to the Measuring mode.



In the event that stabilization of the device fails, **X** will appear on the display and gas measurement mode will not be entered. In this case, perform calibration or contact authorized reseller for repair / return information.

CAUTION

Appropriate calibration of the device is required prior to operation. Always ensure that the device makes the proper detection response to the pertinent gas. Verify that debris that could interfere with the detection of gas are not blocking the area where gas is to be detected.

3. MODE

3.1 MEASURING MODE



When activated, in the detection mode, gas concentration or remaining life appears on the screen. Oxygen concentration is displayed in percent by volume (%Vol) and toxic concentration is displayed in parts per million (ppm). per million (ppm).

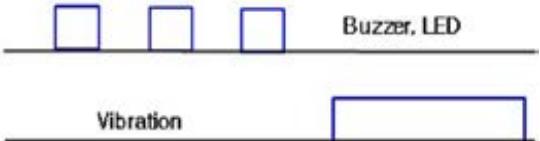
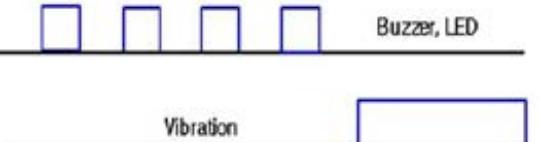
3.2 DISPLAY MODE

In the Detection Mode, by pressing push the button for one second, the following icons will appear in order: **MIN** (only for oxygen) -> **MAX** -> CLR -> Remaining Life time(**M** , **D** , **T**) -> Low alarm set point -> High alarm set point -> Firmware version -> Calibration Concentration

At the last step, if you press the key or do not push any button for a second, the PDM will return to Measuring mode.

3.3. ALARMS / BATTERY / TEST FAILURE DISPLAY

When a gas concentration exceeds alarm set points, **1** or **2** will be displayed and the device will vibrate, flash its LEDs, and beep. To stop alarms, evacuate immediately to a clean air location. The gas concentration will decrease and the alarm will stop.

Alarm	Alarm standard	LCD Display	Alarm and Vibration
1st Alarm	Exceeds 1st alarm	1 Icon & concentration	
2nd Alarm	Exceeds 2nd alarm	2 Icon & concentration	
Remaining Life	Below 30 days		
End of life	Past 24 months		Lifetime is over. Replace PDM.
Test Failure	Failure of sensor test, calibration or self-test		
Battery Low	Low Power		
Bump Test Due	Bump test period		Preform a bump test
Calibration Due	Calibration period		Preform a calibration

CAUTION

The alarm limits are set based on international standards. Only change these levels to make them conform to local rules and regulations.

3.4. ALARM SET POINTS

Gas	O ₂	CO	H ₂ S	H ₂	SO ₂	NH ₃	NO ₂
Low alarm	19%	25 ppm	5 ppm	100 ppm	1 ppm	20 ppm	5 ppm
High Alarm	23%	25 ppm	5 ppm	100 ppm	1 ppm	20 ppm	5 ppm

NOTE: Alarm setpoints can be changed using via WatchGas IR link.

3.5. DEFAULT CALIBRATION CONCENTRATIONS

Gas	O ₂	CO	H ₂ S	H ₂	SO ₂	NH ₃	NO ₂
Concentration	18.0% Vol.	50 ppm	10 ppm	500 ppm	5 ppm	50 ppm	5 ppm

4. EVENT LOG

Last 30 events are stored on the PDM. Once 30 events are stored, the oldest log events get overwritten. Stored log events can be transferred via WatchGas-IR Link.

Each alarm event is recorded as follows:

- Types of alarms
- Alarm concentration in ppm or %
- Peak concentration

5. CALIBRATION

CAUTION

Initial calibration is performed on all devices prior to shipment. Once received, calibration should be regularly depending on frequency of use.



Fresh Air Calibration



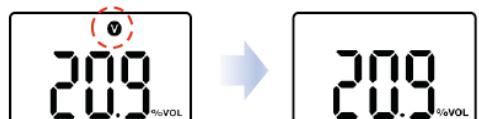
Standard Gas Calibration

5.1. FRESH AIR CALIBRATION

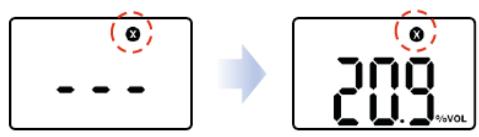
To enter the calibration menu press the button x times until the calibration concentration is displayed. Then hold down the button for 3 seconds. Press and hold the key for 5 seconds to enter the calibration mode (gas cylinder icon). The 'CAL' mark will appear on the LCD.

Press the key for three seconds to initiate calibration. When calibration begins, a countdown

(starting at 10) will appear on the screen.



Once completed, **v** will appear on the LCD.



If calibration fails, **x** will appear on the LCD. Check that the air is clean and that no contaminants are blocking the sensor opening and try again. If fresh air calibration fails repeatedly, contact WatchGas.

CAUTION

Calibration should be performed in a fresh-air environment that is free for any contaminants and other gases. Preferably, do not perform calibration in a confined space.

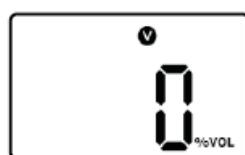
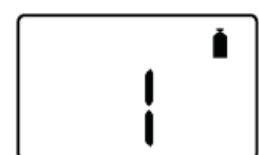
5.2. STANDARD GAS CALIBRATION

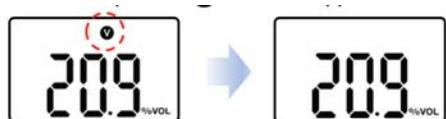
Attach the calibration adapter to the PDM and to a gas cylinder with a concentration matching the calibration concentration. Check 3.1. Display Mode to check the calibration concentration.

Press and hold the key for 5 seconds to enter calibration mode (gas cylinder icon), ***** icon and 'CAL' mark will appear on the LCD. Press the key again for a second, to switch to standard gas calibration, **gas cylinder icon** appears.

Start the flow of the gas cylinder by opening the regulator.

Press the key for three seconds to initiate calibration. When calibration begins, a countdown will appear on the screen. The duration of the countdown depends upon the sensor type and can be changed using the WatchGas IR link.





Once completed, **✓** will appear on the LCD. After a few seconds, the PDM will return to Measuring mode.



If calibration fails, **✗** will appear on the LCD. Check that the gas cylinder is not empty and that it has not expired. Also make sure that no contaminants are blocking the sensor opening and try again. If standard gas calibration fails repeatedly, contact WatchGas.

CAUTION

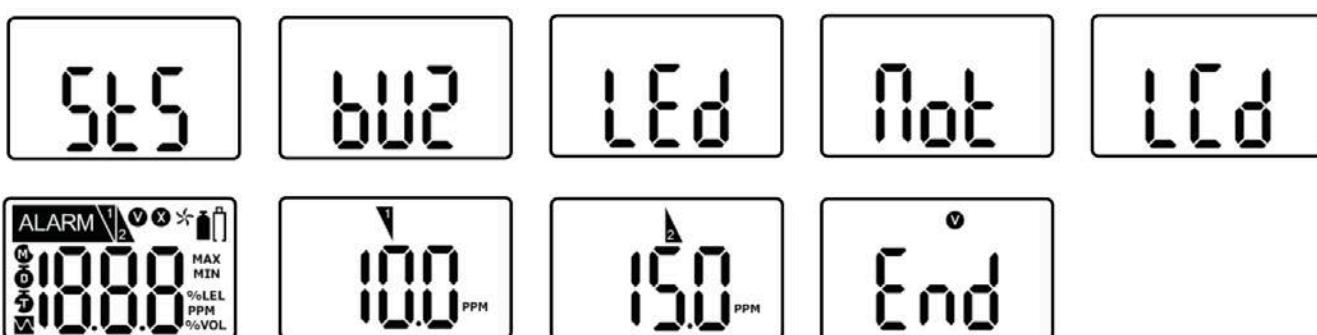
After calibration always verify sensor response and alarm functionality prior to using the detector by applying a known concentration of gas from another gas cylinder.

5.3 REMAINING CALIBRATION DAY

In the standard calibration mode , press the key for a second to toggle fresh air calibration, standard calibration, and ESC. In the ESC mode, press the key for 3 seconds, the PDM will get out of the calibration mode and return to detection mode.



6. SELF TEST & BUMP TEST



6.1 SELF TEST

The default interval of the Self-Test is 20hr, meaning the PDM will ask for a self test after each 20 hours of use.

PDM

Single gas detector

The interval is configurable via IR-Link between 8~20 hours. The self test can also be switched off via IR-Link.

When the interval is activated, STS message will flash. The message will flash until users perform the Self test.

Once you press the button, it will test buzzer, LED, Vibration, LCD, and show alarm thresholds. After the test is completed, END message with  icon will be displayed. (Users are required to check the test processes.)

6.2 BUMP TEST



The interval of Bump test is 1~365days, and the default is switched off. To initiate the bump test, set the bump test interval. Once the bump test interval expires, Bts message will flash.

Put the PDM in the docking station with a valid and full gas cylinder. Alternatively, attach the calibration adapter to PDM and a valid and full gas cylinder. Press and hold the key for 3 seconds, the TST message will be displayed for 45 seconds (To cancel, press the button for one second). Within the 45 seconds, start the flow from the gas cylinder. If no gas is applied, the bts message will flash again.

If the test is successful, SUC message with  will be displayed for 30 seconds. Stop the flow, remove the calibration adapter. If the test fails, FA message with  will be displayed and BTS message will be flashing until the test is successful. If the bump test repeatedly fails, contact WatchGas.

NOTE: Calibration can be done with the Docking Station.

7. SPECIFICATIONS

SIZE	48mm(W) x 85mm(H) x 22mm(D) (Sensor and clip excluded)
WEIGHT	93g (Toxic), 104g (O ₂) (Battery, clip included)
SENSOR TECHNOLOGY	Electrochemical Cell
TEMPERATURE	-40°C ~ +50°C (for Toxic) / -35°C ~ +50°C (for O ₂)
HUMIDITY	5% ~ 95% RH (Non-condensing)
ALARM TYPE	High Alarm, Low Alarm, Over range alarm, Battery Alarm
ALARM SIGNAL	Acoustic: 95dB @ 30cm Visual: Red flashing LED's Vibration alarm
DISPLAY	LCD Display
CALIBRATION	2-point calibration, zero and span
EVENT LOG	30 most recent events
BATTERY	Lithium Primary Battery SB-AA02(P) 3.6V, 1.2Ah
MEASUREMENT	Diffusion
HOUSING	Polycarbonate and rubber
ACCURACY DEVIATION	2-3%
IP-RATING	IP67
SAFETY CERTIFICATIONS	ATEX: II 1G Ex ia IIC T4 Ga CSA: Class 1, Zone 0, Ex ia IIC T4 Ga INMETRO: Ex ia IIC T4 Ga IECEx: Ex ia IIC T4 Ga CE: Conformité Européenne
SENSOR LIFE	24 months with Normal Alarm Use 1 time and 2 minutes per day
WARRANTY	24 months

SENSOR SPECIFICATIONS

MODEL	DETECTABLE GAS RANGES	RESOLUTION	ARTICLE NUMBER
PDM O ₂	0-30% vol	0.1% vol	7181411
PDM CO	0-500 ppm	1 ppm	7181412
PDM H ₂ S	0-100 ppm	0.1 ppm	7181413
PDM SO ₂	0-50 ppm	0.1 ppm	7181414
PDM NH ₃	0-100 ppm	1 ppm	7181415
PDM H ₂	0-1000 ppm	1 ppm	7181416
PDM NO ₂	0-20 ppm	0.1 ppm	7181417

8. CERTIFICATES

Intrinsic Safety:

The detector is in conformity of the following standards

IECEx: **Ex ia IIC T4 Ga**

IECEx KTL 15.0018

Ex ia IIC T4 Ga

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:  2198 Ex II 1 G Ex ia IIC Ga IP67

KRH16ATEX1048

Directive 2014/34/EU

KCS: Ex ia IIC T4

KT16-KA2BO-0457

INMETRO Ex ia IIC T4 Ga

BVC16.5919/02

Compliance: **Electromagnetic Compatibility Directive 2014/30/EU**

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

Manufacturing Approval:

The detector manufacturer is certified compliant with ISO 9001:2000 provisions

9. LIMITED WARRANTY

WatchGas warrants this product to be free of defects in workmanship and materials-under normal use and service-for two years from the date of purchase from the manufacturer or from the product's authorized reseller.

The manufacturer is not liable (under this warranty) if its testing and examination disclose that the alleged defect in the product does not exist or was caused by the purchaser's (or any third party's) misuse, neglect, or improper installation, testing, or calibrations. 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, lightening, water damage or other hazard, voids liability of the manufacturer.

In the event that a product should fail to perform up to manufacturer specifications during the applicable warranty period, please contact the product's authorized reseller or WatchGas service center at info@watchgas.com for repair/return information.

FOR MORE INFORMATION

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