

SENSIT[®] VMD

VEHICLE METHANE DETECTOR

SET UP & OPERATING INSTRUCTIONS

Read and Understand Instructions prior to use



Manufactured by:

SENSIT Technologies

851 Transport Drive • Valparaiso, IN 46383 (USA) • www.gasleaksensors.com

SENSIT[®] VMD

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Sensit VMD

Vehicle Methane Detector – Open Path IR

Set up and operating instructions

General Description

The Sensit VMD is a vehicle mounted methane gas detection system. The principle of operation is open path Infrared absorption spectroscopy technology. As the beam of light passes through a methane (natural gas) plum some of the light is absorbed between the IR Transmitter and IR Receiver . This is measured using specialized electronics and software. The information is sent to a computer for processing and displaying real-time information for the operator.



Parts and Accessories

Emitter assembly

Tablet computer

Mounting assembly (for use with front mount 2" Reese style hitch, NOT INCLUDED)

Blue tooth module (wireless connection to computer)

General Specifications

Sensitivity: 0.1 PPM / meter CH4 at 25 MPH

Measurement Range: 1.0 to 1000 PPM / meter

Display Ranges: Automatic

System test: Automatic during turn on

Response Check: Operator initiated; pass/fail determined by preset software limits

Calibration Adjustment: Field performed with calibration cell and on-board operator selection via PC.

Data connection: Bluetooth

Operator Interface and Display: Backlit 7" touchscreen weatherproof notebook.

Alarms: Audible with adjustable set point

Error indications: Low Light Detection failure, Communication failure, Zero Fail, Test Fail, Cal Fail

System Power: 60 watts @ 12 VDC

System Voltage: 10-16 VDC

Mechanical Mounting: bracket mount

Installation Time: <2 hours (typical)

External Housing Rating: IP 54

Display Housing Rating: Waterproof tablet style PC

External Sub-System Materials: Aluminum and plastic

Operating Temperature Range: -22 o F to 122 o F

Operating Humidity Range: 5 to 100% RH



Warnings

Clean the lenses prior to each days use for best results.

Use extreme caution when monitoring the computer when driving. Any adjustments should be made only when the vehicle is safely stopped away from traffic.

When not in use refer to transport position recommendation to prevent potential damage.

Installation

Mounting; two brackets on pipe; 10" minimum clearance from light transmitter and receiver.
Electrical; 5A 250v fuse; Red wire positive; Black wire negative;
Computer; Electrical connection; serial connection; External Bluetooth module.

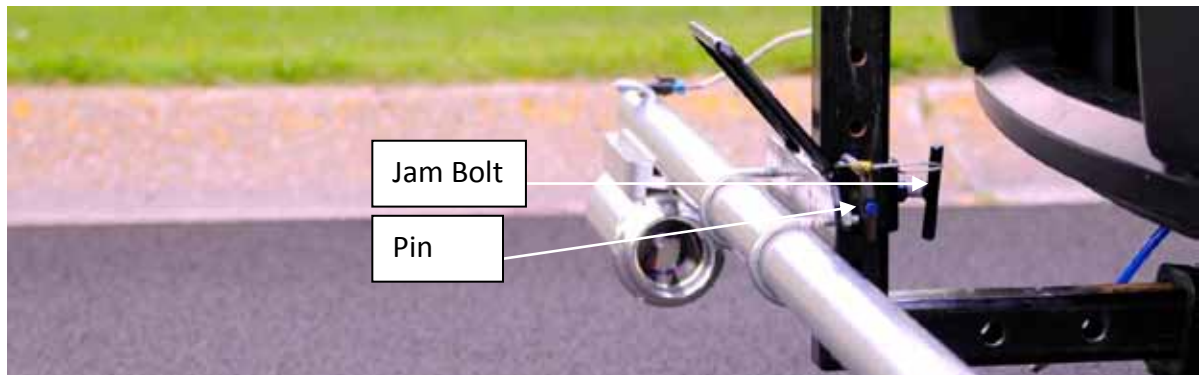
1. Install a 2" front mount hitch on the front of the vehicle. If a bolt on hitch cannot be sourced, a local welding shop should be able to mount one for you as pictured below.



2. Insert the short end of the "L" bracket into the hitch with the long side up. There are several adjustment holes for distance in and out from the bumper. Insert the pin and tighten the hitch stabilizer.



3. Ensure that the “Jam Bolt” is backed out from the VMD bracket. Slide the VMD (with mounting bracket) over the “L” bracket and lower the VMD until it bottoms out on the “L” bracket (DO NOT INSERT THE PIN).



4. Route the power wires (red+ and black-) through the grill and engine compartment to the battery. Allow a little bit of slack to allow for full range of adjustment. The wires will have stripped ends. Use of crimp connectors can be used at the end of the wires to attach to the battery. Be sure to use dielectric grease on connections to prevent corrosion. CAUTION: RED wire attaches to the positive (+) of the battery and the BLACK wire attaches to the negative (-). Plug in the power connector to the VMD.



5. Raise the VMD up the highest position on the “L” bracket, referred to as the “transport position”, and insert the pin.

Note: Raise to the highest position without obstructing headlights, turn signals, etc.



Transport Position

6. The computer can be mounted to the dash or floor of the vehicle. Mounting options can be found at the link below.

http://downloadt.advantech.com/ProductFile/PIS/9668TREK37E/Product%20-%20Datasheet/Accessories%20for%20TREK%20Series_DS_010912_A-DLoG20120111094933.pdf

7. Plug power cord into the computer and the other end into 12 volt outlet.



NOTE: We always recommend when vehicle is not being used for an active survey that the VMD is locked into the “Transport Position”. When being used for an active survey, the “Survey Position”, the VMD sensor/detector should be no higher than the bottom of the vehicle bumper. If used in lower positions caution must be taken not to allow the VMD to impact the ground or road surface. The “Jam Bolt” should be tightened in all positions.



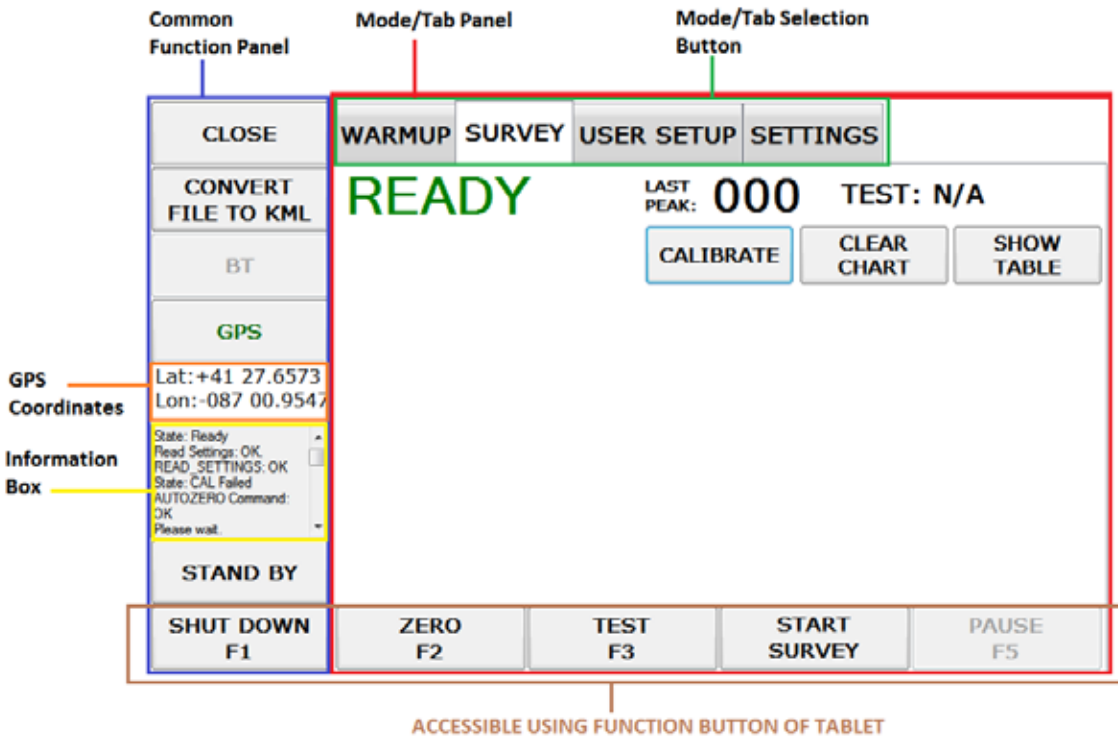
Transport Position



Survey Position

User Interface

The user interface of the Sensit VMD is controlled by a tablet computer with touch screen and “hot key” operation. Using a stylus or your finger in the button areas will activate the function. The “hot keys” F1 thru F5 also control the bottom row of functions. Only those functions with darkened commands are active in the particular operation mode.



VMD User Interface is divided onto 2 sections.

1. General Function Panel:

This section contains the following general function that are always accessible.

- CLOSE:** Close VMD application without turning VMD off. If you do not open application again and power on VMD, VMD will shut down after 10 min.
- CONVERT FILE TO KML:** This function creates a file that can be used with google earth to plot the survey logs.
- BT:** If DataStream is activated in USER SETUP, the Bluetooth function is activated. Color of button text indicates the status of data stream. If button text is green, streaming is on. If button text is red, streaming is off. If DataStream is disabled, this button is grayed out and not usable.
- GPS:** Color of button text indicates the status of GPS.
 - Green:** GPS module is connected and acquiring data.
 - Gray:** GPS module is connected but satellite signal is not strong enough to received GPS data.
 - Red:** If GPS module is not connected. You can click button to scan again to see if module is connected.
- Information Box:** This display status of operation performed.

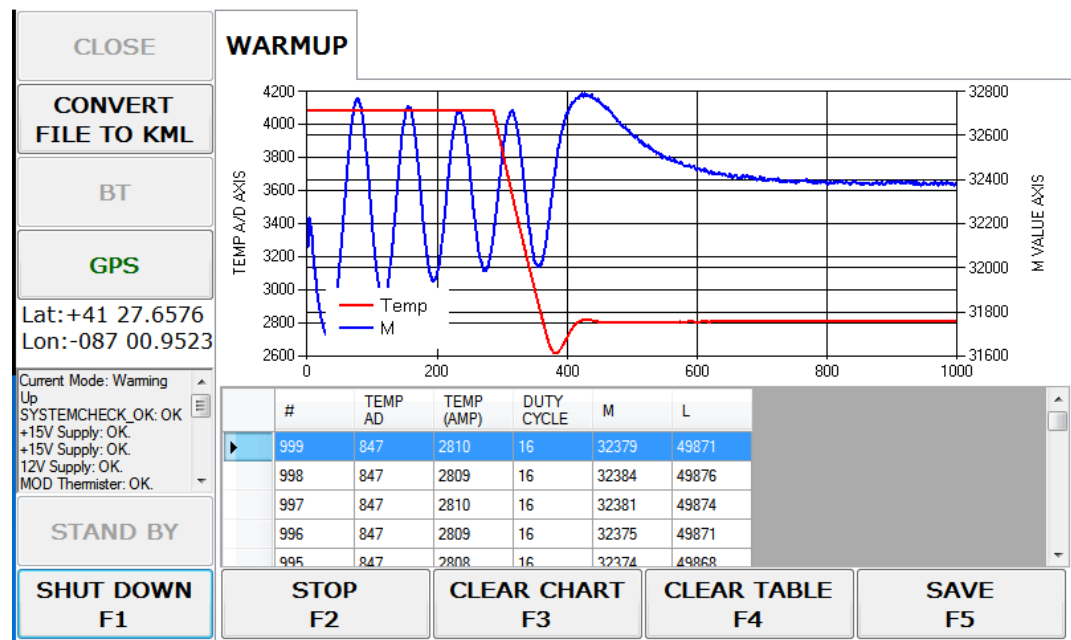
- f. **STAND BY/WAKEUP:** Standby disables the lamp and places the VMD in standby mode to conserve power when unit is not in use. After unit goes in standby mode, this button changes function and is displayed as WAKEUP. Use WAKE UP button to start using the VMD again. This enables the lamp. A 120 second wait period will be displayed for the lamp to power on and stabilize.
- g. **POWER ON/SHUTDOWN:** It establishes the communication between the computer and VMD, turns on VMD, and connects to GPS if connected. After power on, this button changes function and is displayed as SHUTDOWN. Clicking SHUTDOWN will turn instrument off.

2. Mode/Tab Panel:

This panel provides 4 different modes. Not all modes are displayed all the time.

a. WARMUP Mode:

This is initial screen for VMD application. After pressing POWER ON the VMD will begin the warm up process.



- i. The chart will show the methane sensitivity and the temperature of the VMD.
- ii. Clicking STOP will disable the data logging and allow access to other modes.
- iii. Clicking Clear Chart will clear chart.
- iv. Clicking Clear Table will clear data in table.
- v. Clicking SAVE will save the warm up data to a file that can be viewed by a Sensit technician for troubleshooting purposes.

b. SURVEY Mode:

After WARM UP and Auto Zero are successful the display will show READY in the SURVEY tab.

CLOSE	WARMUP	SURVEY	USER SETUP	SETTINGS
CONVERT FILE TO KML	READY		LAST PEAK: 000	TEST: N/A
BT			CALIBRATE	CLEAR CHART
GPS			SHOW TABLE	
Lat: +41 27.6590 Lon: -087 00.9537				
State: Ready Read Settings: OK READ_SETTINGS: OK State: CAL Failed AUTOZERO Command: OK Please wait.				
STAND BY				
SHUT DOWN F1	ZERO F2	TEST F3	START SURVEY	PAUSE F5

- i. LAST PEAK: This is highest detection peak for the last running 120 seconds
- ii. CALIBRATE: Initiates the calibration procedure. External calibration cell required.
- iii. CLEAR CHART: This clear the chart data and clears the Last Peak reading.
- iv. SHOW TABLE/CHART: Use this button to alternate the survey mode from chart to table or from table to chart.
- v. ZERO: Initiates a manual zeroing procedure
- vi. TEST: Inserts an internal test vial into the light path to test detection function. Reaction of cell will vary depending on bar length. Software has preset limits for pass/fail.
- vii. START SURVEY: Starts the survey and the recording of the readings.
- viii. STOP SURVEY: Stops the survey and closes the data file used for logging. Starting the survey will create a new data file.
- ix. PAUSE: Pause's the survey and the recording function.
- x. RESTART: Restarts the survey and use the same data file for continuous logging.

c. USER SETUP Mode:

- i. X-AXIS (TIME) (Default: 120): Sets how many seconds data should be displayed on chart. The CHART displays the running results for specified time in this setting. (adjustable 30-300 seconds)
- ii. Y-AXIS (PPM) (Default: 0): Sets the maximum scale (ppm reading) for Y-Axis of chart. Setting 0 will make chart to auto scale. (adjustable 0-1000ppm)
- iii. Activate Alarm Beep (Default: ON – 10 PPM): Activates audible alarm on tablet PC. (adjustable 0-1000ppm)
- iv. Filtering Band : Reduce the noise of the system to make chart and reading easy to interpret for leaks. Password protected.
- v. LDL (Lower Detection Limit): The lowest gas reading that can be displayed. Password protected.
- vi. Perform Advance Cal (Default: Off): Activating this will cause the VMD to perform an additional advanced calibration process. This will require 5 to 15 minutes.
- vii. Path to Save Logs: Select the folder you wish to store all the survey logs. By default, the VMD stores to the desktop. .
- viii. ACTIVATE STREAMING: You can activate streaming of data out to any device that is serially connected to the computer running VMD Application. If you activate Bluetooth streaming, you need to select the COM PORT and baud rate for the communication and SAVE using the SAVE button. By default, it streams PPM readings. To include GPS

coordinate streaming along with PPM (Comma separated), check STREAM GPS COORDINATE checkbox.

- ix. INTEGRATE PMD: You can stream PMD readings to be displayed simultaneously with the VMD readings on the computer. You must check "INTEGRATE PMD" box, select the COM PORT and baud rate. PMD readings are logged and displayed on the graph or chart. If the PMD crosses the alarm threshold set for the VMD, the alarm will sound.
- x. GET CAL LOG: You can view history of last 5 calibration log.

d. SETTINGS Mode:

This mode provides access to the factory level settings. Please contact Sensit customer service department if you need to access this.

Operation

1. Activate computer by pressing the button located on the lower right hand side of the housing. The system will boot up.



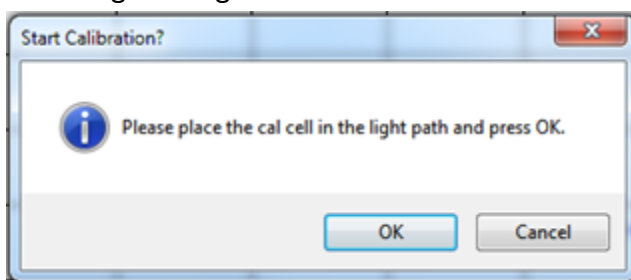
- a. If the VMD application does not automatically begin double click the icon on the desktop screen.
2. Click POWER ON to begin VMD warm up process (see Screen Figure 3.)
 - a. The graph below will begin activity.
 - b. The chart will show the light level/methane sensitivity and the temperature of the VMD.
 - c. The warm up takes 8-12 minutes typically
 - d. The VMD is optimizing light levels and temperature during WARM UP prior to zeroing.
3. After WARM UP and Auto Zero are performed SURVEY MODE is activated.
4. When Autozero is successful the display will show READY in the SURVEY mode.
 - a. If Autozero failed, ZERO FAIL is displayed. Please check the light path and make sure there are no obstructions, lenses are clean, and lamp is on. Try performing a Zero using the ZERO (F2) button.
5. Go to the area where you want to perform the survey.
6. Lower the VMD from the "Transport position" (all the way up) to the "Survey position", the mount allows for a broad range of height adjustment. Adjust as needed and tighten the "Jam Bolt".
7. Click on TEST to check for response.

- a. A TEST can be performed at any time during a SURVEY as well. It will be logged along with your survey data as Test.
 - b. If TEST fails, please perform calibration (see Operation Calibration). A Failed TEST pause's the survey. You can restart the survey by clicking RESTART (F5) button.
8. Select TABLE or CHART preference (default is chart)
9. Click on START SURVEY
10. STOP or PAUSE SURVEY as needed.
11. If the light path is obstructed at any time during a survey, the survey will stop and "LOW LIGHT" will be displayed along with audible tone and warning message. Check for obstructions and that the lenses are clean. Try to zero the unit by pressing the "ZERO" on the display or (F2) button.

Operation Calibration:

Note: Failed Calibration will disable the VMD unusable until successfully calibrated.

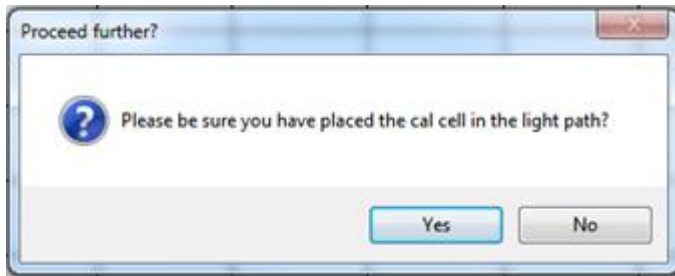
1. Calibration cannot be performed during a survey. The survey must be "stopped", and not "paused".
2. Hang and tighten the thumbscrew of the external calibration cell into the light path against the lens of the receiver or transmitter of the VMD . Click the CAL button. It will display following message.



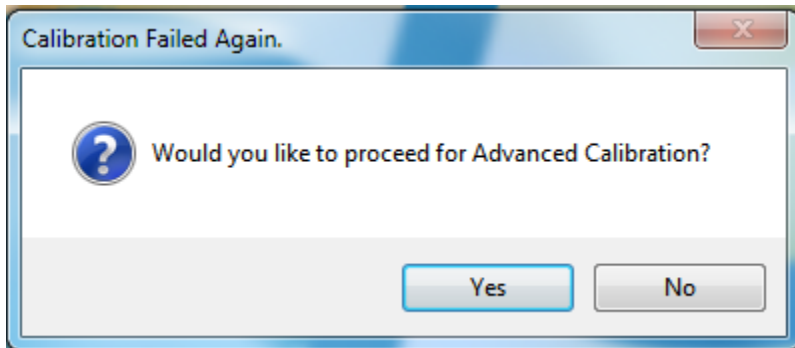
3. Click OK to start calibration if you already inserted calibration cell.



4. Successful calibration will be indicated by READY shown on the display. REMOVE CALIBRATION CELL. Do not leave the cell attached during vehicle operation.
5. Failure of calibration will be displayed by the following message box.



6. Visually confirm the calibration cell is properly positioned in the light path and click Yes.
7. If unit fails calibrating for the 2nd time, it will display following message box asking you to proceed with Advanced calibration. Advanced calibration can take up to 5-15 min.



8. Click YES, if you would like to proceed further.
9. If you click no, it will display CAL FAIL in the SURVEY MODE. Instrument will not be able to be used until calibration is successful.
10. If calibration still fails, please contact Sensit customer service for technical help.

How to plot Survey Logs on Google Earth?

STEP 1: COVERT SURVEY FILE TO KML FILE FORMAT:

1. Click on CONVERT FILE TO KML button from common function panel.
2. Following screen will be displayed.

DEFINE PPM READ VS PIN COLOR

SELECT FILE TO CONVERT

ROUTE = BLUE LINE

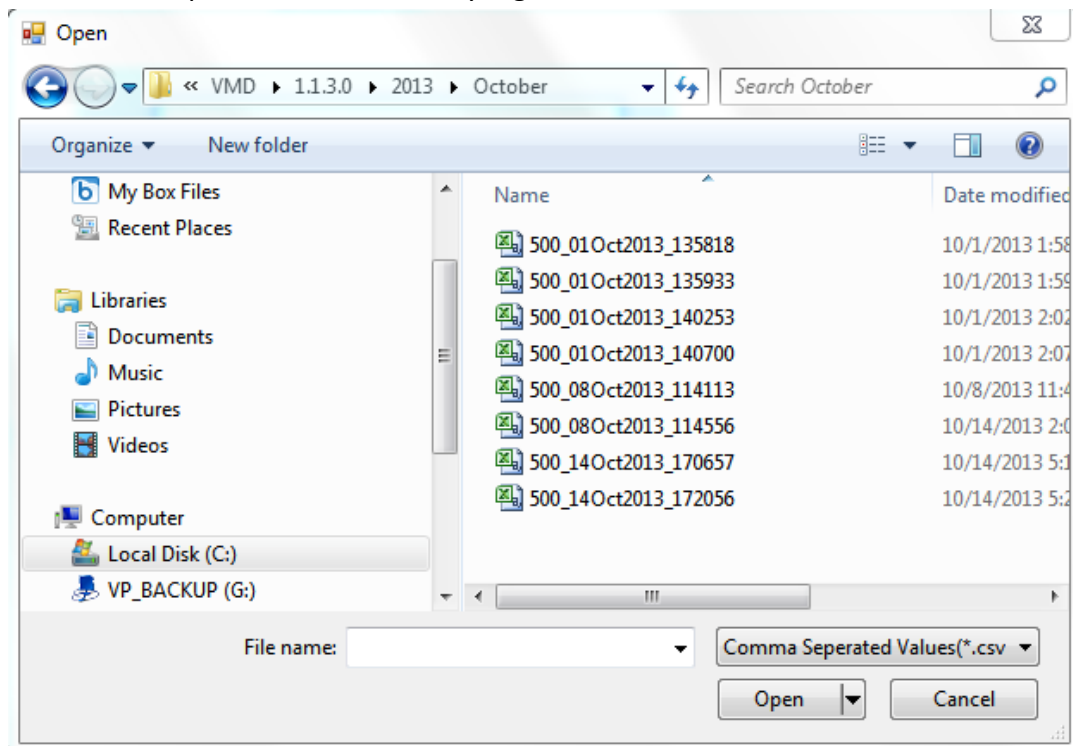
PPM READ >= 1 = YELLOW PIN

PPM READ >= 10 = RED PIN

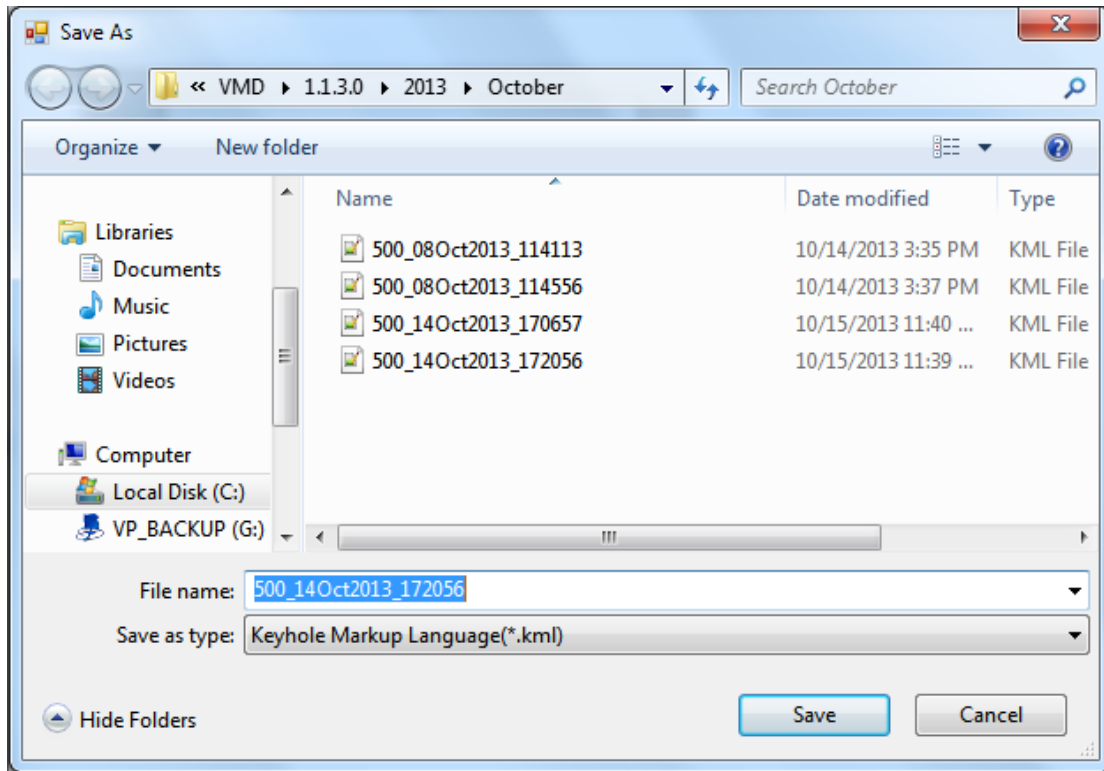
TEST PPM READ = ORANGE PIN

CLOSE **CONVERT**

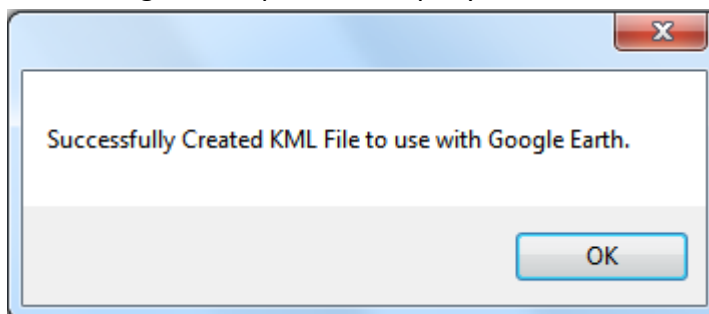
3. Click SELECT FILE TO CONVERT to select the Survey log files. By default file browser window will open the default survey log file folder.



4. Open the survey file. Survey files are “.csv” files and organized as YEAR/Month/srno_ddMMMyyyy_hhmmss.csv. Multiple files can be converted at the same time
5. Please select the appropriate value for PPM to identify the leak detection area on the map.
6. Click CONVERT button. Following screen will be displayed.



7. Select the appropriate file name and click Save. By default program uses the same file name as source file name and will save at the same location as the source file.
NOTE: Please make a note of the file/folder you saved this KML file as you will need this when you plot on Google earth.
8. If conversion is successful, application will display a following message. Acknowledge the message and repeat the step if you would like to convert more files.



STEP 2: PLOT KML FILE ON GOOGLE EARTH:

1. Open Google Earth Program. (Google Earth should be installed on your computer. If not you can download it from <http://www.google.com/earth/>).
2. Using File menu open the file saved in KML format in STEP 1.

Warranty

Your Sensit VMD is warranted to be free from defects in materials and workmanship for a period of two years after purchase. If within the warranty period the instrument should become inoperative from such defects the instrument will be repaired or replaced at our option. This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect or improper maintenance. Proof of purchase may be required before warranty is rendered. Units out of warranty will be repaired for a service charge. Internal repair or maintenance must be performed by a Sensit Technologies authorized technician. Violation will void the warranty. Units must be returned postpaid, insured and to the attention of the service department for warranty or repair.

The computer is covered by its own manufacturer's warranty. Sensit Technologies has no additional warranty on this device.

This warranty gives you specific legal rights and you may have other rights which vary from state to state.



MADE IN USA

851 Transport Drive
Valparaiso, IN 46383-8432

Phone: 888 4SENSIT
888 473 6748
219 465 2700

Fax: 219 465 2701
www.gasleaksensors.com