SENSIT® PMD

PORTABLE METHANE DETECTOR

INSTRUCTION MANUAL

READ AND UNDERSTAND INSTRUCTIONS BEFORE USE

Warnings:

- To prevent ignition of flammable or combustible atmospheres disconnect power before servicing.

- Remove and charge battery pack in an area known to be free of combustible gases.

- Use only Sensit Technologies battery pack.

- Service may only be performed by factory authorized service technicians

- Not for use in environments greater than 21% oxygen.

Safety Precautions:

- Read and understand instructions prior to use.

- Always start the PMD in an area known to be gas free.

- Tampering with this product may void the warranty.

- Use only Sensit Technologies approved parts and accessories.

- Never use an instrument known to be damaged, operating unusually, or out of calibration.

For further information contact Sensit Technologies.

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General Description

The Sensit® PMD, referred to as the "PMD", is designed to detect methane gas from 1ppm up to 100% volume. The PMD may be used for walking surveys and vehicle surveys (when properly installed) for underground natural gas piping systems. Other applications include landfill monitoring and checking piping systems where other interfering gases may provide inaccurate readings.

The PMD senses gas using Infrared (IR) Absorption Spectroscopy in combination with an electronic narrow band pass filter. This technology utilizes an infrared light source with an output that is changed when certain gases absorb the light output. The filter only allows specific light wavelengths to be monitored and measured. The concentration of gas is proportional to the amount of specific IR light absorbed and is displayed in PPM, %LEL and/or %Vol.

The PMD has a large display indicating concentration and other instrument functions such as battery charge and performance. An internal pump provides rapid sampling into the detection chamber. Audible and visual alarms indicate when preset alarms are exceeded. Bluetooth data transmission provides communication of real time and stored data. Optional GPS and Data Logging allow for further recording of time, date and location data.

Accessories

Standard Accessories

Telescopic Survey Probe	Part # 883-00029
Shoulder (Carrying) Strap	Part # 360-00238
Lithium Rechargeable Battery Pack	Part # 871-00017
Universal Wall Charger	Part # 871-00025
Battery Door Removal Tool	Part # 360-00249
Instruction Manual	Part # 750-00045
Hydrophobic Filter Ring Assembly (10 Pack)	Part # 873-00033
Survey Probe Filter (Blue) (1 Filter)	Part # 360-00064

Optional Accessories

Fiberglass Bar Hole Probe	Part # 883-00019
Brass Bar Hole Probe	Part # 883-00018
HD Fiberglass Bar Hole Probe	Part # 883-00021
PMD Manual Calibration Kit	Part # 881-00070
Bump Gas Cylinder (50ppm CH4)	Part # 315-03000 4
Delux Hard Carrying Case	Part # 872-00010
Compact Carrying Case	Part # 872-00013
Shipping Box and Foam	Part # 872-00017
Hot Swap Vehicle Battery	Part # 871-00030
Removable Memory Card	Part # 360-00243
PMD Harness	Part # 870-00046

Replacement Parts

Shoulder (Carrying) Strap	Part # 360-00238
Filter Cap Assembly "O" Rings	Part # 870-00034
Survey Probe Filter (Blue) (1 Filter)	Part # 360-00064

Product Specifications

Operational Specifications

Temperature:	-4 to 122F
Duty Cycle:	~7hours
Response time:	T50 < 3 seconds
Alarms:	Audible - 95db @ 15 inches
	Visual – Red backlight on display
	Visual – Display info
	Visual – Failure indicators
	Settings – PPM and LEL
Power:	Lithium Ion Rechargeable battery pack
	Optional Vehicle power adapter
Pump Flow:	1 lpm
Detection Range:	0-5000ppm
	10–100% LEL
	5-100% V/V

Physical Specifications

Size:	11" x 4.5" x 6.5" (Approximate)
Weight:	6.1Lbs
Construction:	Cast Aluminum/ABS Plastic

Sensor Specifications

IR Sensor:	Wavelength – 3.4m
	Detection Range 1ppm – 100% v/v
	Warm up < 10 min
	Calibration required - 3 months

Product Features
- The PMD is constructed of durable ABS plastic
- The housing is designed to meet IP54 protection
- The PMD is designed to meet Cat 3 Intrinsic Safety requirements
- Battery pack is designed for easy field replacement
- Field or Smart Cal calibration is easily performed
- External filters are inexpensive easy to change
- The LCD display is easy to read
- The PMD uses a simple "Sensit Style" user interface
- Communication with other devices is easy with Bluetooth interface
- Real time GPS is optional
- Real time Data logging with removable storage option

Electronic Features

User Interface

The user interface includes the following features:
• Three button operation
• LED Status indicators
• Sounder
• Photo cell (automatic backlighting)
• IR communication port
• LCD

Button Operation

The Sensit PMD is operated with the use of three buttons below the display.

They are labeled A, B, C.

The "A" button:
• activates/deactivates the instrument
• mutes the audible alarms
• access Smart-Cal communication

The "B" button:
• Accesses the quick menu and user menu
• Digitally adjusts the TICK sound for leak locating

The "C" button:
• Saves displayed readings to the internal memory
• Performs a manual zero.

Display Features

The display provides all information including:
- Gas concentration in PPM, LEL AND %Vol
- Battery voltage status
- Pump Status
- GPS activation and coordinates
- Bluetooth operation
- Data logging operation
- Warning indication
- Tick operation
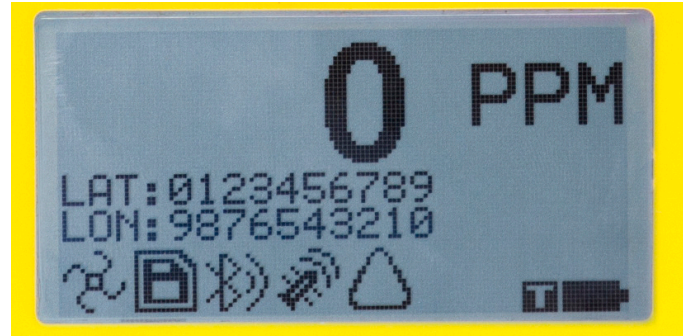
Icons on the display indicate the status of various functions.

 - Flow OK

 - Flow blocked

 - Alarm not muted

 - PPM alarm muted

 - %LEL alarm muted

 - %GAS alarm muted

 - Warning/trouble/failure symbol

 - Bluetooth On and Connected

 - Bluetooth on but not connected

 - Tick ON

 - Data logging on – flash once for data save

- Data Saved – flash once for manual data save

 - GPS Connected

 - GPS enabled-not connected

Alarm settings

There are 3 adjustable alarm settings.

1. PPM
   a. Default: 10ppm
   b. Low Limit: 0
   c. High limit = 500
   d. Disable PPM alarm: Set the PPM alarm to 0
   e. Alarm: Audible, LED, Red backlight if unit in dark

2. %LEL
   a. Default: 50% LEL
   b. Low Limit: 10% LEL
   c. High limit = 90% LEL (If no autorange to %gas)
   d. Disable LEL alarm: Can not disable this alarm (mute only)
   e. Alarm: Audible, LED, Red backlight if unit in dark

3. %GAS
   a. Default 17% Vol
   b. Low Limit: 5% Vol
   c. High Limit: 50% Vol
   d. Disable %GAS alarm: Can not disable this alarm
   c. Alarm: LED, Red backlight if unit in dark

Adjustment of the ppm alarm is covered in the User Menu portion of this manual.

Housing Features

Battery Pack

The battery pack is located on the back side of the instrument housing. The batteries are Lithium Ion rechargeable. The batteries are only available from Sensit Technologies.

To remove the battery pack turn the retaining screws ¼ turn. Pull the bottom of the pack away from the main housing. Recharging of the battery pack requires removal from the main housing.

To replace slide the top tabs of the battery pack into the retainers at the top of the main housing. Push the bottom into place and turn and lock the retaining screws.

The battery pack has LED's to indicate charge status. Charging should only be performed in an area know to be free of combustible gases.
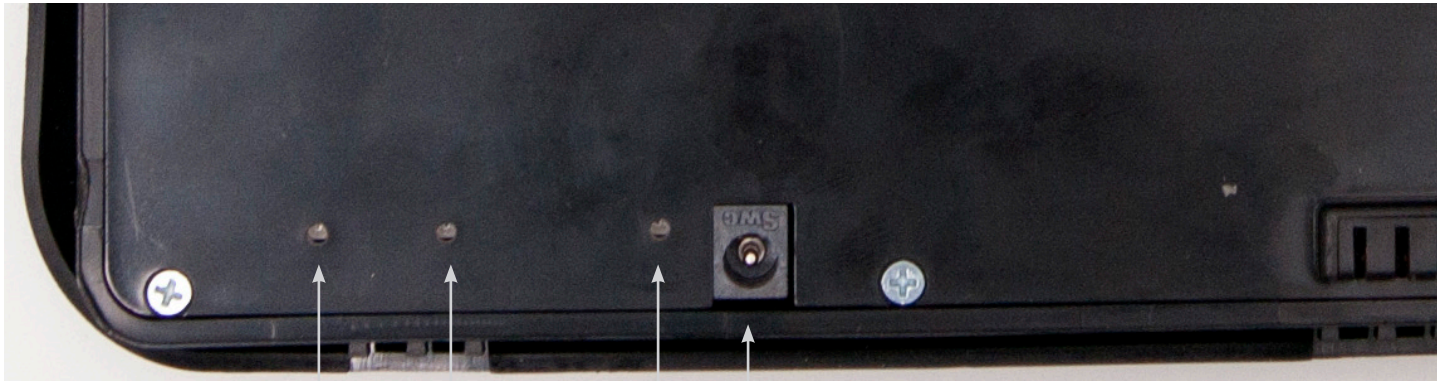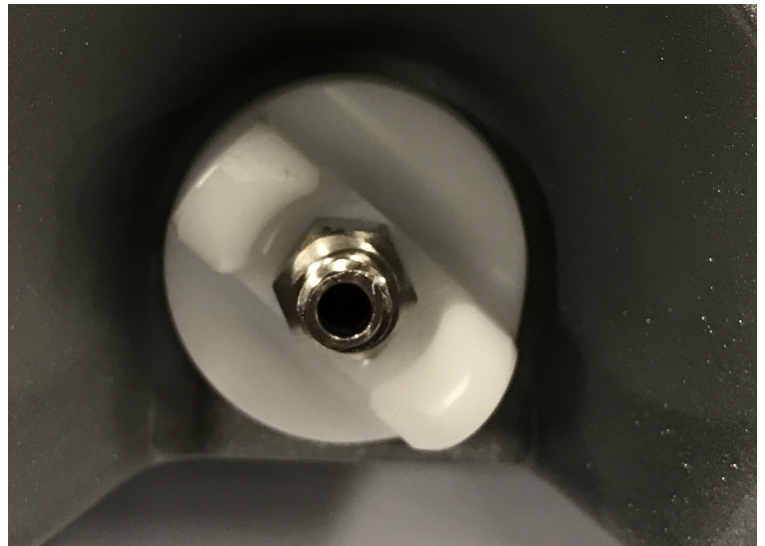

Charge   Charging   Status   Charger
Complete   Connection

(Green)   (Red)   (Yellow)

Gas Inlet and Outlet

Located on the front of the main housing is the gas inlet and outlet. Both are fitted with luer-style connections for easy connection to probe accessories.

The center connection is the gas inlet. To the right is the outlet. Do not block gas outlet.

Shoulder Strap attachment

"D" rings are located on each side of the main housing for shoulder strap attachment. Clips on the strap will attach securely.

Hydrophobic Filter Assembly

WARNING: Do not operate without proper filter. Damage may occur to the pump and other internal parts. Only change filter with pump or instrument off.

The gas inlet is protected by a hydrophobic filter.

It is accessed by:
1. Detach any probe assembly
2. Twist and remove filter cap
3. Remove and replace filter disc
4. Check "O" ring inside cap
5. Replace filter cap
6. Performed flow block test

Additional filters are located in each of the accessory probe assemblies.

Operation and Field Use

To activate instrument push POWER button. The following warm-up sequence will occur:

1. Warm-up sequence (a-i) with info below.

    a. Logo
    b. Serial Number
    c. Revision
    d. System Check
        i.   LED check
        ii.   Backlight check
        iii. Date/Time
    e. Cal due (upcoming) or Cal Past Due
    f. Activation Acknowledgments
        i.   Pump
        ii.   Dataglog
        iii. GPS
    g. Sensor warm-up (7-10Min) and "Please Wait"
    h. Autozero
    i. Working display

2. Attach the appropriate probe assembly and perform a flow block check. An alarm sound, display indication and flow icon will indicate a failed test.

3. Follow company procedures for performing leak survey/investigation

4. If the alarm setting has been exceeded press and release the "A" button to disable the alarm. The alarm sound will automatically reset when the concentration has gone below the threshold value. Secondary alarms at higher concentration will activate when values are exceeded. Press and release the "A" button again to mute secondary alarms. During any alarm, the display back light will be RED in color.

5. Check filters daily for best results.

6. Battery power is displayed using a battery voltage icon. Full battery is 12.0v. BAT LOW VOLT will be displayed at 8v when insufficient battery power is available.

7. To turn off or put into standby mode push and hold the "A" button. It will display "SHUT DOWN" on left side and "STAND BY" on right side of the display. Press the 'A' button to turn the instrument off. Press 'C' to put unit in standby mode which will reduce power consumption and will allow you to reduce the warm up time to approximately two minutes. We recommend using stand by mode for less than 1 hour.

QUICK MENU

Press and release 'B' button. This will provide access to the following functions. Press the "C" button to scroll through the options. Use 'B' button to select. Use 'B' button again to turn it OFF or 'C' button to turn ON. Press 'A' button to select your choice and exit menu.

1. TICK – Audible leak detection mode. NOTE: Activating the tick will disable sound alarm.

   a. When activated a tick will be heard every second. Frequency of tick will increase as gas concentration increase.
   b. Press and release 'B' button will reset the tick frequency to 1 tick per second.   The tick frequency will increase if gas concentration increase from that concentration.
   c. To turn the tick off, press and release 'A' button. Press and release 'A' button again to activate the alarm sound.

When viewing the following selections Use 'B' button to select. Use 'B' button again to turn it OFF or 'C' button to turn ON. Press 'A' button to select your choice and exit menu.

2. BH Test – Bar hole test function
3. PUMP - Use 'B' button to select. Use 'B' button again to turn it OFF or 'C' button to turn ON. Press 'A' button to select your choice and exit menu.
4. GPS – Real time GPS X/Y coordinates
5. SmartLink - Use Bluetooth to download logs (Calibration, Quick Cal, Session, Barhole, Autologs)
6. Warning - Use this feature to list current failure mode.

Bluetooth Activation

When the Bluetooth is activated the display readings can be transmitted to any device capable of receiving Bluetooth data. The data may also be viewed by using "Hyper Terminal". The website is www.lgraeve.com

Bluetooth Passkey: 5 Digit Serial Number

Serial Communications Settings:
Bits Per Second: 57600
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None

DataStream can be adjusted to send data every 1-10 sec. you can find settings to change this in Expert Menu -> DataStream. You need to turn DataStream ON in User Menu.

Once connected to the Bluetooth device, PMD sends the 7 digit PPM reading.

USER MENU

To access the user menu push and hold the "B" button until USER MENU is displayed. From this menu the following features can be viewed by pressing the "C" button to scroll through the options. Enter the selection by pressing the "B" button and adjusting by using the "C" button or the onscreen prompts. Pressing the "A" button repeated will return you to the working display.

Date and Time View the date and time.
       Time is in 24 hour format. Date is mm/dd/yy format.

Print Menu   Allows access to print menu for calibration and operational sessions.

Bump Test   Perform timed test for gas response in ppm range. Pump may be
       selected ON or OFF for this function.

Calib Menu   Calibration to Zero Air, 1000ppm, 2.5% and 100% methane gas concentrations.
       For instruction refer to CALIBRATION section of this manual.
       • Zero Air - To Set Zero Point
         Pump On / Off
         Onscreen Instruction
       • 1000PPM - To calibrate 1000ppm level only
        (Zero Air calibration required first - automatic)
       • 2.5% V/V - to Cal 2.5% (50 LEL) CH_4 Only
        (Zero Air calibration required first - automatic)
       • 100% V/V - to Cal 100% (100 LEL) CH_4 Only
        (Zero Air calibration required first - automatic)
       • Full Calib - Automatically sequence zero, 1000, 2.5% V/V, 100% V/V
        (This updates Cal Due)

Datalog   Activates the data logging system. (If Activated w/memory card)

Data Stream Activates real time data streaming of display readings every second to
       another recording device using Bluetooth. Settings on page 13.

Alarm PPM   Adjustment for PPM alarm value.
       Setting at 0 disables alarm.
       Range is 0-500ppm

Set Clock   Adjust date and time.
View Sess Log View manually saved data.
View BHLOG View the bar hole test logs (If Activated).
View Auto   View Autolog data of operational peak values.
View Cal Log   View calibration log.
QCal Log   View recording of individual calibration (Not Full Calib)

Calibration Check

To verify the proper operation of this instrument apply a known concentration of 50-1000ppm methane to the sample system prior to use.

This is not a required process but is recommended if the product has not been used for more than 30 days.

Calibration

The PMD requires calibration every 3 months. An automatic reminder will notify the user that calibration is due at start up.

Calibration can only be performed if the instrument has been operational for 30 minutes.

To calibrate the area must be known to be gas free. If there is methane in the area a bottle of zero air will be necessary. Other gases required include 1000ppm, 2.5% and 100% methane (pipeline gas is also acceptable). Some gases can be calibrated individually. Contact SENSIT Technologies Service Department for more information.

Calibration is performed with the pump off if there is no access to demand flow regulators for the calibration bottles. Turn-off is selected prior to calibration.

Calibration is performed through the User Menu. Using the "B" button access the User Menu. Use the "C" button to scroll to "Calib Menu".

To begin press the "B" button. If the instrument has not operated for 30 minutes a countdown timer in seconds will be displayed. When the proper amount of time has been met the display will show "Proceed". Press any button. A beep will be heard.

Select Cal Type and follow on-screen prompts. Full Calib is reccomended.

Apply zero ppm methane or clean air. Press "C" button to begin zero air calibration. Display will show "waiting for stability" followed by "success" when completed. Press any button to continue.

Display will read "please apply 1000ppm methane". Attach and apply 1000ppm methane. The process requires 1-5 minutes. Searching OPT TEMP will be displayed, then display will show "waiting for stability" followed by "success" when completed.

Display will read "please apply 2.5% methane". Attach and apply 2.5% methane. The process requires 1-5 minutes. Display will show "waiting for stability" followed by "success" when completed.

Display will read "please apply 100% methane". Attach and apply 100% methane. The process requires 1-5 minutes. Display will show "waiting for stability" followed by "success" when completed.

Upon completion press any key to exit to working display. Activate the pump and allow to clear prior to turning off. The calibration reminder will automatically update after successful calibration.

Adjustable Features (password protected)

Contact Sensit Technologies to gain access to the following adjustable features not in the user menu.

Service

Contrast:
Adjust the display contrast as needed.

Quick Scan:
Optimum Temp Adjust (1000ppm required)

Orientation Cal:
Calibration of lamp output in different positions.

Cal Flow:
Setting flow alarm

Tick SENS   Lo, Med, or High

Alarm %LEL   Adjust the LEL alarm value. Default is 50%.

Alarm %V/V   Adjust the point when the alarm deactivates. Default is 17%.

Show SESS   Allow display of manually saved data. Default is off.

Show BHLOG   Allow display of BH tests. Default is off

Show AUTO   Allow display of Autolog data. Display is off.

BH Time   Set the time in seconds for duration of the bar hole test.
Default is 15 seconds.

Purge Time   Set purge time for instrument prior to shut down.
Default is 10 seconds.

Standby   Time of inactivity or lack of motion in minutes that will cause the
instrument to automatically go into low power mode. Default is off.

Shutdown   Time in minutes that shut down will occur when in standby mode.
Default is 60.

Bump Limit   Concentration of gas to be acceptable when performing a bump test.
Range is 5 – 1000ppm. Default is 800. Set Lower and Upper Limit.

Bump Time   Time required in seconds for unit to pass a bump test.
Range is 10-60. Default is 45.

Log Period   Time between Datalog points in seconds. Range 1-60. Default is 1.

Data Stream   Time in seconds for data to be streamed through
Bluetooth communication. Default if 1 second.

Adjustable Features (Continued)

Rest UCal   Reset cal data to factory settings (Password Protected)

Set Cal Due   Time Interval (90 Default)

Cal Due Ack   Requires button push after Cal Due reminder (default off)

DISP Callog   Last 5 calibration records

PPM Option: PPM Auto range to LEL. Default is on.

PPM Handoff: Handoff from PPM to LEL or %V/V setting. (default 5000)

% LEL Option: LEL from 0.1-100%. Default is On

100% LEL Equiv: Set LEL limits from 4.0 – 5.0% gas volume. Default is 5%.

PPM+%LEL: Display both PPM and %LEL. Default is Off

NG Factor: Automatic calculation for low methane pipeline gas. (default 100)

UCal Date   Date of last full user calibration

Erase Auto   Erase Autolog

Erase Sess   Erase manually saved data Log

Erase BHLog   Erase bar hole test log

SCal Pump   On/Off During Cal (for each gas type) when calibrating on the cal-station

Rezero REQD   Downdrift Alert, On/Off, Value 5 Default

Language   Select language for display

Auto Bump   Require bump test before use (default off, adjustable 1-30 days)

Erase Bump   Erase Auto Bump Log

Saving SD Card Data Log Information

Remove SD Memory Card from inside the battery compartment.
Install SD Memory Card in computer.
Save File in desired format and location. Preferred format is .kml

GPS Data Conversion & Coordinate Mapping

GPS Data conversion and mapping can be accomplished using Smart-Link Data Viewer Software and Google Earth or gpsvisualizer.com

1. Using SmartLink select the desired reports.
   (See "How to use" and "Reports" section of SmartLink Help file for more information.)

2. Click "Save Report" button. Save report as format .kml format.
   This format will only save log information for which valid GPS coordinate information is available.

3. Google Earth must be installed (Free Download).
   Double click the .kml file.
   It will open Google Earth and load the map.

   Note: If Google Earth is not installed, proceed to number 4.

4. Go to: **http://www.gpsvisualizer.com/**
   Select "**Google Maps**".
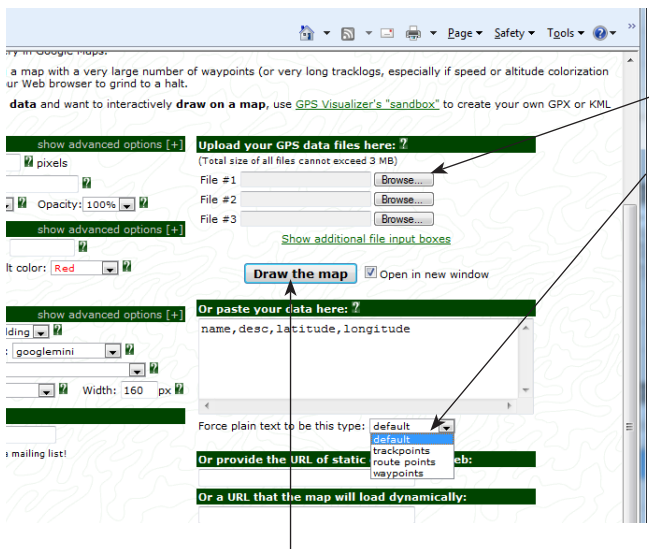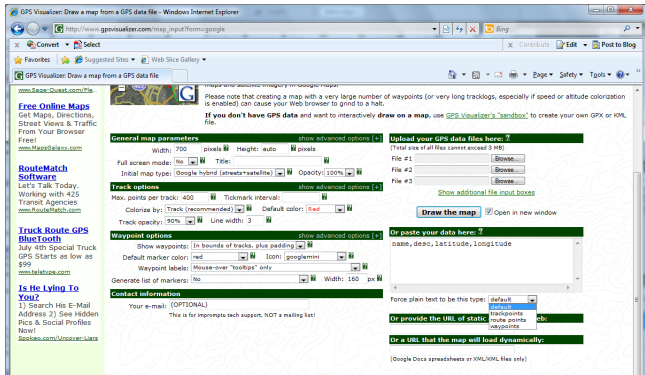
Import your .kml file:

1. Using browse button, select the file you wish to view.

2. Select the map type.

Way-points: To display coordinates, gas concentration detected and time at specific locations. It is best to use with Session-log, Bar-hole log and Auto-log.

Route points: The "route" would represent the road, trail, path, etc. that you have taken. It also display gas concentration detected and time at specific locations. It is best to use with Data-log to view area surveyed.

3. Click "Draw the map" button.

GPS Data Conversion & Coordinate Mapping

Sample of the data log report is displayed below.
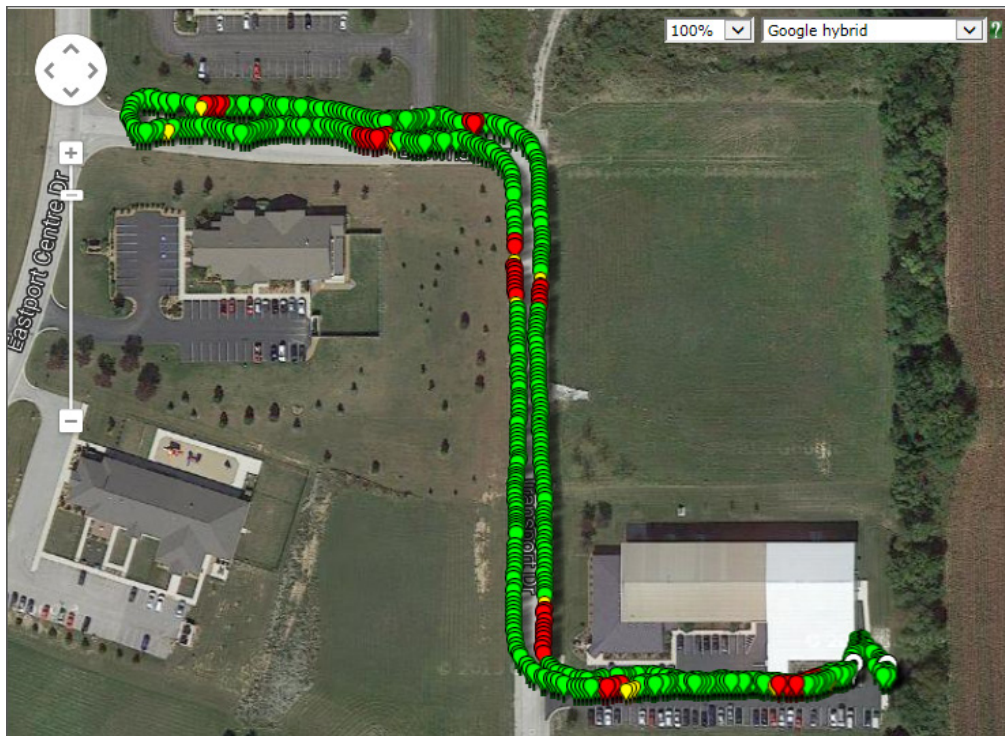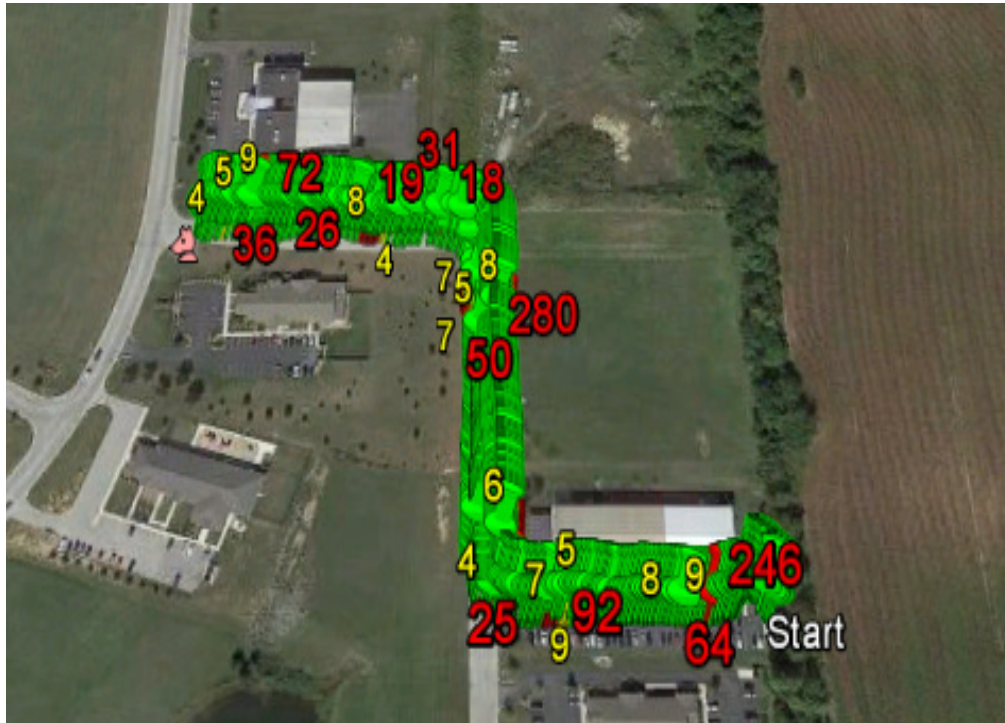
Warranty

Your Sensit PMD is warranted to be free from defects in materials and workmanship for a period of two years after purchase (excluding calibration). 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 requireds 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.

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

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