SENSIT® IRED

INFRARED ETHANE DETECTOR

Instruction Manual

For use with methane gas only.

Read and understand instructions before use.

Patented

SENSIT Technologies

851 Transport Drive
Valparaiso, IN 46383-8432

Phone: 888 4SENSIT
888 473 6748
219 465 2700

Fax: 219 465 2701
www.gasleaksensors.com

MADE IN USA

SENSIT Technologies
is in compliance with ISO 9001:2008

Warnings:

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

Tips:

- Be sure battery is charged before each days use.
- Check probe for damage before each use.
- Check filters before each days use.

For further information contact Sensit Technologies.

Sensit Technologies
851 Transport Drive
Valparaiso, Indiana
46383
USA

Tel: 219/465-2700
Fax: 219/465-2701

Email: info@gasleaksensors.com
Web: www.gasleaksensors.com

TABLE OF CONTENTS

General Description

The Sensit® Infrared Ethane Dectector, referred to as “IRed”, is designed to detect the presence of ethane in a methane sample. The IRed can detect 250 parts per billion (ppb) up to 1000ppm ethane. The IRed is used to determine if methane detected in the range of 50-2000ppm is of similar make-up to that of pipeline gas (which contains ethane) or is naturally occurring methane from other sources such as organic decay. The IRed is not designed for high concentrations or determining actual ethane content from within a pipeline.

The IRED 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 PPB or PPM.

The IREDhas 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.

Patented

CE

TO OPERATE:

1. **Press Power**
2. **Wait for Automatic Zeroing**
3. **Begin to Use**

Accessories

Standard Accessories

Compact Carrying Case	Part # 872-00021
Telescopic Survey Probe	Part # 883-00029
Shoulder (Carrying) Strap	Part # 360-00238
Hot Swap Vehicle Battery	Part # 871-00030
Universal Wall Charger	Part # 871-00025
Battery Door Removal Tool	Part # 360-00249
Instruction Manual	Part # 750-00061
Hydrophobic Filter Disc 0.75” (10 Pack)	Part # 873-00024
Survey Probe Filter (Blue) (1 Filter)	Part # 360-00064

SENSIT® IRED Calibration Kit

IRED Calibration Kit Part # 881-00100

Kit includes:
(1) Regulator
(1) Cal Adapter
(1) 100pm Ethane/Nitrogen 58L

SENSIT® IRED Replacement Cylinders

100ppm Ethane/Nitrogen 58L Part # 315-120010

SENSIT® IRED Bump Test Kit

IRED Bump Test Kit Part # 881-00101

Kit includes:
(1) Regulator
(1) Cal Adapter
(1) 1000ppm CH4/10ppm Ethane 58L

SENSIT® IRED Replacement Cylinder for Bump Test

1000ppm CH4/10ppm Ethane 58L Part # 315-120005

Product Specifications

Operational Specifications

Temperature:	-4 to 122F
Duty Cycle:	6 hours
Test time:	45 seconds (After warm up and zeroing)
Display:	Visual – Backlight display
	Visual – Concentration, Test Status, Instructional Prompts
	Visual – Failure indicators
Power:	Lithium Ion Rechargeable battery pack
	Optional Vehicle charger adapter
Pump Flow:	1.0 lpm
Sample Type Range:	50-2000ppm Methane

Physical Specifications

Size:	11.625” x 5.25” x 8.375” (Approximate)
Weight:	7.41Lbs
Construction:	Aluminum/ABS Plastic

Sensor Specifications

IR Sensor:	Method: Advanced Infrared Absorption Spectroscopy
	Detection Range 250ppb – 1000ppm
	Warm up < 30 min
	Calibration required - 3 months

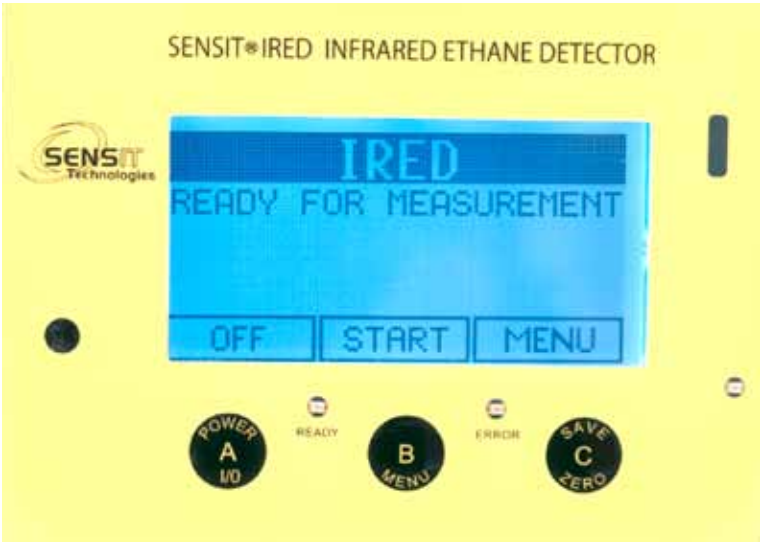
Product Features

- The IRED is constructed of durable ABS plastic
- The housing is designed to meet IP54 protection
- 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 IRED uses a simple “Sensit Style” user interface
- Communication with other devices is easy with Bluetooth interface
- Real time GPS is optional
- Data logging of results for download to printer or computer
- Blue Tooth and infrared communication

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 IRED is operated with the use of three buttons below the display.

They are labeled A, B, C.

The “A” button:
- Activates/Deactivates the instrument
- Acknowledge Test Fuction
- Access Smart-Cal Calibration Functions

The “B” button:
- Starts Operation Functions

The “C” button:
- Access Menu
- Print Results
- Activates/Deactivate Pump

Display Features

The display provides all information including:

- Gas concentration in PPB and PPM
- 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

 - Warning/trouble/failure symbol

 - Bluetooth On and Connected

 - Bluetooth on but not connected

 - Data logging on – flash once for data save

- Data Saved – flash once for manual data save

 - GPS Connected

 - GPS enabled-not connected

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.

The battery pack may also be charged while operating in a vehicle. Connect the 12vdc adapter into the vehicle power outlet and the external port on the battery housing. This can be connected and disconnected while the IRED is operating.

When the charger is disconnected, the words "WARM UP", "PLEASE WAIT" (flashing) are displayed and a 180 second countdown is started/displayed. During the 180 second countdown, the user can not perform a measurment until the countdown expires. The instrument will only operate when on battery power.

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

1. To activate the instrument push the POWER (A) button until the display illuminates. The following warm up sequence will occur on the display (a-g):

    a. Sensit Logo will appear

    b. System Check
        i. Failures will be listed
            1. Pressing the A button will turn off the instrument
            2. Pressing the B button will display the next error if more than one has occurred
            3. Pressing the C button will skip past the error to continue warm up. A password is required to skip the error message. Wrong password will cause the error message screen to be displayed.
        ii. Use the B and/or C button to ajdust the password.
        iii. Press the A button to accept the entry.

    c. Serial number, Software Revision, Date and Time.

    d. Warm up is indicated “PLEASE WAIT” with a 600 second countdown timer. The countdown timer will begin after an initial warm up of 5-10 minutes.

    e. Calibration due date indicating when calibration will need to be done or PAST DUE indicating calibration date has been exceeded. If calibration is required:
        i. Pressing the A button will turn off the instrument
        ii. Pressing the B button will begin the calibration process
        iii. Pressing the C button will skip past the calibration required message to continue warm up.

    f. Auto Bump test function to validate sensitivity to ethane (if option is activated)
        i. Pressing the A button will turn off the instrument.
        ii. Pressing the B button will begin the bump test process.
        iii. Pressing the C button will skip past the bump test requirement to continue warm up.

    g. Working mode display indicated by “READY FOR MEASUREMENT” on the display and ready LED illunimated.

Operation and Field Use (Continued)

2. From the IRED", "READY FOR MEASUREMENT" display press and release the B button to "START" a measurement.

    a. The instrument will perform a zeroing process
        i. Apply air known to be free of methane gas
        ii. Press the B button "OK" to accept
        iii. "SAMPLING CLEAN AIR" will be displayed with information showing the outputs for methane (M) and light level (L) sensors. A stable reading must occur before the process automatically continues.
        iv. A cell containing methane is introduced to the light path internally as displayed by " METHANE CELL-IN". Also displayed is information showing the outputs for methane (M) and light level (L) sensors. A stable reading must occur before the process automatically continues.
        v. If the reading is not stable the zeroing process will automatically re-initiate indicated by a "RE-ZEROING" message. This process requires and addition 120-180 seconds as indicated by a countdown timer.
        vi. A stable reading is indicated by a displayed message "PLEASE BEGIN SAMPLING"

    b. Attach the probe and place the probe in the area to be tested. Press the B button "START" within the time indicated on the countdown timer.

    c. The measuring of ethane is indicated by the "MEASUREMENT" heading and the ppb/ppm readings. During a measurement, 4 consecutive 10 second readings are taken. Each reading is averaged over the 10 second period before it is displayed. The display will be updated with the reading every 10 seconds until the 40 second period has elapsed. The final reading is indicated when the "RESULT" heading is displayed.

        i. If the methane concentration is too high a message will be displayed indicating the need to re-zero and attempt measuring again.
        ii. For high readings move the probe slightly away from the previous source. Ideally methane concentrations less than 2000 ppm is desired.

    d. Ethane concentration is indicated on the display showing "RESULT" and the reading. The information is also stored in the "MEASUREMENT LOG" for later download and/or review.

    e. Pressing the A button "EXIT" will return to the main screen displaying "IRED", "READY FOR MEASUREMENT".

3. Pressing and holding the A button will activate the standby mode or shut down sequence. The display will show "SHUT DOWN" on the left side and "STAND BY" on the right. Press the A button to turn the instrument off. Press the C button to place into standby mode to reduce battery consumption. This will also reduce the warm up time to a few minutes. Standby mode should only be used for up to two hours.

Bump Test

From the work display (READY FOR MEASUREMENT) press and release the C Button until BUMP TEST is displayed. Press the B Button to START the bump test. The instrument will perform the zeroing process.

1. Apply air known to be free of methane gas

2. Press the B button “OK” to accept

3. “SAMPLING CLEAN AIR” will be displayed with information showing the outputs for methane (M) and light level (L) sensors. A stable reading must occur before the process automatically continues.

4. A cell containing methane is introduced to the light path internally as displayed by “METHANE CELL-IN”. Also displayed is information showing the outputs for methane (M) and light level (L) sensors. A stable reading must occur before the process automatically continues.

5. If the reading is not stable the zeroing process will automatically re-initiate indicated by a “RE-ZEROING” message. This process requires and addition 120-180 seconds as indicated by a countdown timer.

6. A stable reading is indicated by a displayed message “BUMP TEST”, 10 PPM ETHANE, 30 SECONDS.

7. Attach the bump test gas of 10ppm ethane/1000ppm methane/balance air

8. Press the B button to start the measurement

9. If passed the result will display. Press the A button to return to the USER MENU.

10. If Failed, press the A button to exit to USER MENU or press the C button to RETRY beginningwith the zeroing process.

11. Bump test results are logged for later viewing and/or download.

12. Several failed bump tests indicates calibration or repair may be necessary. See calibration portion of this manual next.

Calibration

From the work display (READY FOR MEASUREMENT) press and release the “C” Button until CALIBRATION is displayed. Press the “B” Button to START the CALIBRATION. The instrument will perform the zeroing process.

1. Apply air known to be free of methane gas

2. Press the “B” button “OK” to accept

3. “SAMPLING CLEAN AIR” will be displayed with information showing the outputs for methane (M) and light level (L) sensors. A stable reading must occur before the process automatically continues.

4. A cell containing methane is introduced to the light path internally as displayed by “METHANE CELL-IN”. Also displayed is information showing the outputs for methane (M) and light level (L) sensors. A stable reading must occur before the process automatically continues.

5. If the reading is not stable the zeroing process will automatically re-initiate indicated by a “RE-ZEROING” message. This process requires and addition 120-180 seconds as indicated by a countdown timer.

6. A stable reading is indicated by a displayed message “CALIBRATING”, PLEASE APPLY 100 PPM ETHANE, 30 SECONDS.

7. Attach the calibration gas of 100ppm ethane/balance nitrogen

8. Press the B button to start the measurement

9. If passed the result will display. Press the A button to return to the USER MENU.

10. If Failed, press the A button to exit to USER MENU or press the C button to RETRY beginning with the zeroing process.

11. Calibration results are logged for later viewing and/or download.

12. Several failed calibrations indicate service or repair may be necessary. Contact Sensit Technologies for assistance.

USER MENU

To access the menu press and release the “C” button. 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 repeatedly will return you to the working display.

No.	Name	Description
1	WARNINGS	1. SD Card not inserted 2. Blue Tooth not communicating 3. GPS not communicating 4. BUMP Test skipped 5. Calibration Skipped
2.	SET TIME	Allow user to set time.
3.	SET DATE	Allow user to set date.
4.	BUMP TEST	Allow user to perform Bump Test
5.	CALIBRATION	Allow user to perform Calibration
6.	VIEW BUMP LOG	Allow user to scroll and view bump log including autobump log.
7.	VIEW CAL LOG	Allow user to scroll and view calibration log including skipped log.
8.	VIEW MEAS LOG	Allow user to view measurement log
9.	ERASE MEAS LOG	Allow user to erase measurement log. This will erase all measurement logs.
10.	VIEW SETTINGS	Allow user to view settings of device.
11.	EXPERT MENU	Provide access to expert menu
12.	FACOTRY MENU	Provide access to factory menu
13.	TEST MENU	Provide access to test menu

EXPERT MENU

To access the expert menu from the work display (READY FOR MEASURENT) press the release the “C” button until EXPERT MENU is displayed. This menu is password protected. The “C” Button will increase and “B” Button will decrease the number. Once password is set press “A” Button to enter the menu.

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.

No.	Name	Description
1	CONTRAST	Set contrast of display
2.	LANGUAGE	Allow user to select language of the system
3.	GET C-CONST	This process finds the constant value with the internal methane cell. Perform this whenever you refill or replace the cell.
4.	CAL INTERVAL	Set how often calibration should be performed.
5.	BUMP INTERVAL	Set how often bump test should be performed.
6.	BUMP PPM-C2H6	Allow you to set what PPM you would like to use for manual bump test.
7.	BUMP LO LIMIT	This is in %. Define minimum bump test response required to pass test.
8.	BUMP HI LIMIT	This is in %. Define maximum bump test response required to pass test.
9.	ALARM PPB	This is not implemented.
10.	ALARM PPM	This is not implemented.
11.	PURGE TIME	Time in Sec unit should purge system before shutting down.
12.	ERASE BUMP LOG	Allows you to erase bump logs.
13.	ERASE CAL LOG	Allows you to erase calibration logs.
14.	ERASE MEAS LOG	Allows you to erase measurement logs.

Warranty

Your Sensit IRED 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.

Sensit Technologies
851 Transport Drive
Valparaiso, Indiana
46383
USA

Tel: 219/465-2700
Fax: 219/465-2701

Email: info@gasleaksensors.com
Web: www.gasleaksensors.com