RMLD-FR

Operator's Manual

HEATH CONSULTANTS

Your Safety...Our Commitment

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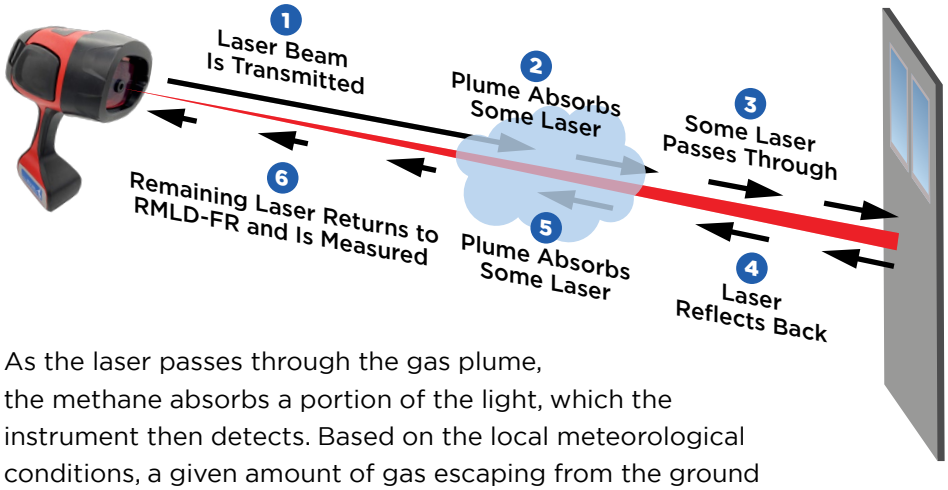
Overview

Remote Detection for Increased Safety

The RMLD-FR uses highly advanced technology to detect natural gas plumes from a remote distance. This makes it safer to scan in areas that may be difficult to reach such as busy roadways, yards with dogs, fenced off areas, and other hard to access places.

Tunable Diode Laser Absorption Spectroscopy (TDLAS)

The RMLD-FR employs Tunable Diode Laser Absorption Spectroscopy (TDLAS) technology.



As the laser passes through the gas plume, the methane absorbs a portion of the light, which the instrument then detects. Based on the local meteorological conditions, a given amount of gas escaping from the ground will produce a plume that varies in size and uniformity of concentration levels. The plume, by nature, is variable and dependent on the soil conditions, temperature, wind, and leak rate.

Features

The RMLD-FR includes many features which reduce costs and improve usage. These advanced features include, but are not limited to:

- User Interface - highly optimized for First Responders
- Internal Data Logging
- WiFi
- GPS
- Bluetooth BLE
- Color Camera
- Color Display
- Spotter laser
- Self Test
- Light Weight
- Rechargeable and Replaceable Battery
- Dual Charger
- Ergonomic Housing

Safe scanning from distances of 100' and 50', using a vehicle and tree for a shield as an extra precaution.

Operates under a variety of field conditions including:

- wide temperature range,
- light rain and fog.

Rugged design stands up to normal field use and operating conditions.

Sensitivity or range is not affected by reasonable amounts of dust on the instrument's window.

Proprietary Notice

The contents of this instruction manual are proprietary to Heath Consultants Incorporated. Reproduction of this manual, in whole or in part, is prohibited without the express written consent of Heath Consultants Incorporated.

Heath Consultants Incorporated operates under a continual product improvement program and reserves the right to make improvements and / or changes without prior notification.

This manual supersedes all previous manuals for this instrument.

Doc No. 16086 Rev B, RMLD-FR Operator Manual | Date: October 21, 2021 |

Warnings & Definitions

Safety and Warning Information

Read this manual before using the RMLD-FR instrument and accessories. Users must read, understand and follow the instructions for operation and maintenance. Failure to do so can result in serious injury.

This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

NOTICE indicates practices not related to physical injury.

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which if not avoided, could result in minor or moderate injury.

SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS indicates specific safety-related instructions or procedures.

WARNING

WARNING: Read and understand this manual fully before use.

WARNING: Follow the manual instructions and testing methods.

WARNING: The visible green Spotter laser is a Class 2 (II) laser product.

WARNING: Do not stare into beam or view directly with optical instruments.

WARNING: Avoid direct eye exposure to the laser and do not point in the direction of others. Visible and Invisible Lasers are deployed by this instrument.

CAUTION

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.

CAUTION: No attempt should be made to repair the instrument. Should the instrument not work properly, or indicate a fault or warning, refer to the troubleshooting section of this manual.

Avertissements et définitions

Informations sur les dangers, la sécurité et les avertissements

Lisez ce manuel avant d'utiliser l'instrument RMLD-FR et ses accessoires. Les utilisateurs doivent lire, comprendre et suivre les instructions d'utilisation et d'entretien. Le non-respect de cette consigne peut entraîner des blessures graves.

Il s'agit du symbole d'alerte de sécurité. Il est utilisé pour vous alerter des risques potentiels de blessures physiques. Respectez tous les messages de sécurité qui suivent ce symbole pour éviter des blessures ou la mort.

AVERTISSEMENT

AVERTISSEMENT indique une situation dangereuse qui, si elle n'est pas évitée, peut entraîner la mort ou des blessures graves.

AVIS

AVIS indique des pratiques non liées à des blessures physiques.

DANGER

DANGER indique une situation dangereuse qui, si elle n'est pas évitée, entraînera la mort ou des blessures graves.

ATTENTION

ATTENTION indique une situation dangereuse qui, si elle n'est pas évitée, pourrait entraîner des blessures mineures ou modérées.

INSTRUCTIONS DE SÉCURITÉ

INSTRUCTIONS DE SÉCURITÉ indique des instructions ou des procédures spécifiques liées à la sécurité.

AVERTISSEMENT

AVERTISSEMENT : Lisez et comprenez entièrement ce manuel avant l'utilisation.

AVERTISSEMENT : Suivez les instructions du manuel et les méthodes d'essai.

AVERTISSEMENT : Le Laser de repérage vert visible est un produit laser de classe 2 (II).

AVERTISSEMENT : Ne jamais fixer le faisceau ni le regarder directement avec des instruments optiques.

AVERTISSEMENT : Évitez l'exposition directe des yeux au laser et ne le pointez pas vers d'autres personnes. Des lasers visibles et invisibles sont déployés par cet instrument.

ATTENTION

ATTENTION : L'utilisation de commandes ou d'ajustements ou l'exécution de procédures autres que celles précisées ici peut entraîner une exposition dangereuse aux rayonnements laser.

ATTENTION : Il ne faut en aucun cas essayer de réparer l'instrument. Si l'instrument ne fonctionne pas correctement, ou indique un défaut ou un avertissement, reportez-vous à la section de dépannage de ce manuel.

Warnings & Definitions

Hazardous Safety and Warning Information

⚠ WARNING

WARNING: Do not use the instrument in hazardous areas except those areas and zones for which it is approved.

WARNING: To reduce the risk of ignition of a flammable or explosive atmosphere, batteries must be removed, inserted and recharged only in a location known to be non-hazardous. Use only replaceable 105756 Battery Pack. Battery Charger is not part of the hazardous safety certification.

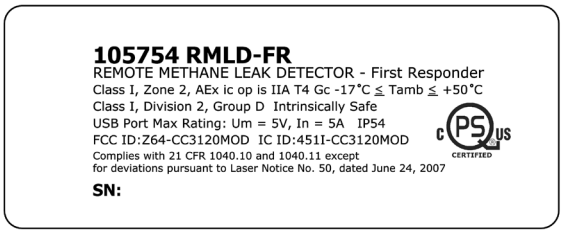
WARNING: Do not disassemble or open or modify this instrument including the 105756 battery pack. All repairs must be done only by an authorized facility as listed in this manual.

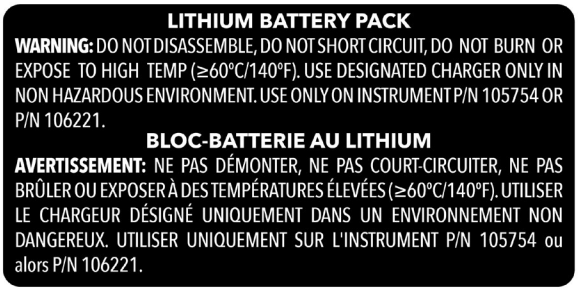
WARNING: Do not disassemble, do not short, do not burn or expose to high temperature (≥ 60° C/140° F) the Lithium battery pack used with this instrument. Use the designated charger to charge the battery only in non-hazardous area.

WARNING: Do not connect to USB port in a Hazardous area. Only connect to a USB equipment certified to appropriate safety standards such as IEC 61010-1 or equivalent in a non-Hazardous area.

WARNING: Substitution of components may impair intrinsic safety. No user serviceable components contained within this instrument.

Safety Labels on the Instrument & Battery Pack





Symbols Used

Caution

Consult instructions for use

IP54 Ingress Protection

Do not dispose of this product in the unsorted municipal waste stream. Dispose of this product according to local regulations.

Li-ion

Lithium Ion battery

Measurement IR Laser Radiation: Class I Visible (Green) Laser Radiation: Class 2(II)

Do not stare into beam. Avoid direct eye exposure.

Avertissements et définitions

Informations sur les dangers, la sécurité et les avertissements

⚠ AVERTISSEMENT

AVERTISSEMENT : N'utilisez pas l'instrument dans des zones dangereuses, à l'exception des surfaces et des zones pour lesquelles il est approuvé.

AVERTISSEMENT : Pour réduire le risque d'inflammation d'une atmosphère inflammable ou explosive, les batteries doivent être retirées, insérées et rechargées uniquement dans un endroit réputé non dangereux. Utilisez uniquement un bloc-batterie 105756 remplaçable. Le chargeur de batterie ne fait pas partie de la certification de sécurité dangereuse.

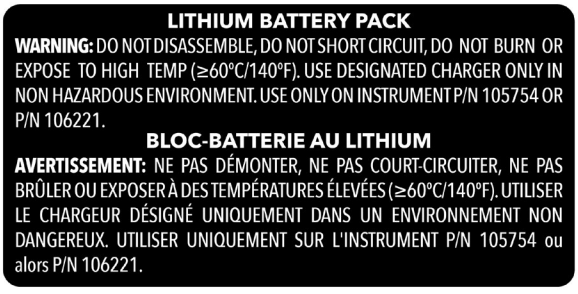
AVERTISSEMENT : Ne démontez pas, n'ouvrez pas et ne modifiez pas cet instrument, y compris le bloc-batterie 105756. Toutes les réparations doivent être effectuées uniquement par un établissement agréé, comme indiqué dans ce manuel.

AVERTISSEMENT : Ne démontez pas, ne court-circuitez pas, ne brûlez pas ou n'exposez pas à une température élevée (≥ 60° C/140° F) le bloc-batterie au lithium utilisé avec cet instrument. Utilisez le chargeur désigné pour charger la batterie uniquement dans une zone non dangereuse.

AVERTISSEMENT : Ne vous connectez pas au port USB dans une zone dangereuse. Connectez-vous uniquement à un équipement USB certifié conforme aux normes de sécurité appropriées telles que IEC 61010-1 ou équivalent dans une zone non dangereuse.

AVERTISSEMENT : La substitution de composants peut nuire à la sécurité intrinsèque. Aucun composant réparable par l'utilisateur n'est contenu dans cet instrument.

Étiquettes de sécurité sur l'instrument et le bloc-batterie



Symboles utilisés


Attention


Consulter le mode d'emploi

IP54 Indice de protection


Ne jetez pas ce produit dans le flux des déchets municipaux non triés. Jetez ce produit conformément aux réglementations locales.

Batterie au lithium-ion


Laser IR de mesure Rayonnement : Classe I Laser visible (vert) Rayonnement : Classe 2(II)


Ne pas fixer le faisceau. Éviter l'exposition directe des yeux.

Specifications

General

RMLD-FR Weight
3 lbs (approx.)

Carry Case Dimensions
21" x 17.5" x 9.5"

Display
3.5" color LCD

Storage
Internal SD card (not removable)

Power

Battery
Removable
Rechargeable
Lithium-ion pack, 10.8 VDC 3.2Ah

Battery Run Time
8 hours at 32° F (approx.)

Battery Charger
External
110-240 VAC, 50/60 Hz Universal

Charge Time
2-3 hours full charge (approx.)

Charging Indicator
Integrated into Dual Battery Charger

Detection/Measurement System

Detection Method
Tunable Diode Laser Absorption Spectroscopy (TDLAS)

Detection Distance
100 ft (30m) nominal - may vary due to background type and conditions

Measurement Range
0 to 50K PPM-M

Sensitivity
5 PPM-M at distances from 0 to 100 ft (30m)

Beam Size
Conical in shape with a 22" diameter at 100 ft (55cm at 30m)

Display

Resolution
320x240

Camera

Color

Aperture
f/2.6

FOV
94DEG (at 6.0mm image circle)

Lasers

IR Laser
Class I

Spotter Laser
On time duration is 2 minutes
Class 2 (II) <2mW @ 532nm
Spot size is 7mm at 15M

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

Eye Safety Warning
Do not stare into beam or view directly with optical instrument

Avertissement de sécurité des yeux
Ne jamais fixer le faisceau ni le regarder directement avec des instruments optiques.

GPS

Compatible With
GPS
GLONASS
Beidou
Galilieo

Communication

Bluetooth 4.2 BLE
(to support future features and mobile applications)

WiFi
USB Dual Mode
USB Port Max Rating:
UM = 5V, IN = A

Alarms

Digital Methane Detection (DMD)
Audible tone and visible color border when detection threshold exceeded

Adjustable Detection Alarm Level
50'
1 to 200 PPM M

100'
1 to 400 PPM M

System Fault & Warnings
Audible alarm and visual indication on the display

Testing

Built-In Self Test
Verifies operation and adjusts laser wavelength for maximum sensitivity

Test Gas Cell
Integrated within carrying case

Data Logging

Saves to Internal Memory
FAULT logs
Self Test logs
Captures

Data Collected
Includes, but not limited to:
CH4 PPM-M measurement
GPS location
Timestamp
Battery level
Battery voltage
Serial number of the instrument

Operating Conditions

Operating Temperature
0° to +122° F (-17° to 50° C)

Humidity
5 to 95% RH, non-condensing

Altitude
Up to 6560 ft (2000 m)

Environment of Use
Pollution degree 2 or better
Outdoor use

Regulatory

Instrument Protection
IP54 (water splash and dust resistant)

Compliance
EMC (EN61000-6-2, EN6100-6-4)

Radio Equipment Directive
(2014/53/EU)

ETSI EN 301 489-1 v2.2.0

EN 61326-1:2013

47 CFR Part 15 & ICES-003

Ordinary Location Safety

UL 61010-1
CAN/CSA-C22.2 No 61010-1-12

Hazardous Location Safety

Class I, Zone 2, AEx ic op is IIA T4 Gc

Class I, Division 2, Group D
Intrinsically Safe

DEFINITIONS

Beam Skip

Occurs when the IR beam jumps between a near object and a far object. This may cause a false detection. This can also occur on highly reflective surfaces (windows, water, ice, etc.).

Dark Zone

An area not being scanned due to an obstruction. This may be an elevation change, the side of a building, behind a curb, etc.

DMD (Digital Methane Detection)

An advanced detection mode which, when activated, will only alert the operator when there is a probable detection of methane.

Footprint

The surface area covered by the IR beam, which increases with distance. At 100 ft., this area is 22" in diameter when shined against a vertical background.

Infrared (IR)

Optical radiation with wavelengths longer than those of the visible spectrum.

Laser Calibration Drift

A normal characteristic of tunable diode lasers is that the wavelength calibration can drift slowly over time. The RMLD-FR has a built in Self-Test/Calibration feature to automatically maintain proper calibration.

PPM-M (Parts Per Million Meter)

The product of the methane concentration times the thickness of the plume.

Spotter Laser

The green, blinking laser which guides the operator as to the location of the IR beam. This laser can be activated through the left button located on the keypad.

Tunable Diode Laser Absorption Spectroscopy

A method of gas detection that utilizes a laser that, when directed through a cloud of methane, will be partially absorbed by the gas and the return signal can then be analyzed for gas concentration.

Instrument and Accessories

A Complete Kit Assembly

HPN 105755

Includes:

- RMLD-FR Instrument
- Rechargeable Li-Ion Battery Pack
- Battery Charger
- USB Cable
- Carry Case

RMLD-FR Instrument

HPN 105754

B

- Methane gas detection up to 100' away
- Modern user interface
- Data logging
- Battery and power connectors

C Battery Pack

HPN 105756

- Rechargeable Li-Ion battery
- Provides power to the instrument
- Charges independently of the instrument
- Up to eight (8) hours of operating time on a full charge
- Recharge between uses to assure no interruption in use
- Use only with HPN 105753 Battery Charger

D Battery Charger

HPN 105753

- Universal 100 - 240 VAC
- Two (2) slots for dual battery charging
- Recharge the instrument's battery after use
- LED on the front indicates charging status
- Use only with HPN 105756 Battery Pack

E USB Cable

- USB2 A to micro cable for downloading data from the instrument to a computer

F Carrying Case

HPN 106071

- Protects the instrument during storage and transport
- Built in test gas cell for calibration
- Keep instrument in the case while not in use

G Power Supply (AC Adapter)

HPN 105359

- Replaces the original from Complete Kit/Battery Charger

H Test Gas Cell

HPN 106024

- Replaces the original from Complete Kit/Carrying Case

Battery Pack

- Provides the power to the instrument
- Removable
- Rechargeable
- Lithium-ion
- Up to 8 hours of operating time when fully charged.

NOTICE

NOTICE: Must recharge between uses to assure no interruption in use.

NOTICE: The prolonged storage of the battery pack inside or outside the instrument can lead to battery chemistry being irreversibly damaged leading to permanent failure of the battery pack.

NOTICE: Do not dispose of this product in the unsorted municipal waste stream. Dispose of this product according to local regulations.

Li-ion

WARNING

WARNING: To reduce the risk of ignition of a flammable or explosive atmosphere, battery pack must be removed, inserted and recharged only in a location known to be non-hazardous.

WARNING: Only use the HEATH supplied RMLD-FR battery pack charger to recharge the battery pack. Use of any other charger may cause severe damage to the battery pack or electrical circuits. Battery Charger is not part of the hazardous safety certification.

AVERTISSEMENT

AVERTISSEMENT : Pour réduire le risque d'inflammation d'une atmosphère inflammable ou explosive, bloc-batteries doivent être retirées, insérées et rechargées uniquement dans un endroit réputé non dangereux.

AVERTISSEMENT : Utiliser uniquement le chargeur de bloc-batterie RMLD-FR fourni par HEATH pour recharger le bloc-batterie. L'utilisation de tout autre chargeur peut endommager gravement le bloc-batterie ou les circuits électriques. Le chargeur de batterie ne fait pas partie de la certification de sécurité dangere-use.

Dual Bay Battery Charger

- Charge two batteries simultaneously
- Includes a universal AC adapter and power cord
- An integrated metal bracket included on the bottom of the charger allows for wall or fixed mounting options.

To wall mount charger use four 8-32 screws to thread into self-clinching nuts on charger chassis. Thread dept is 0.060in, max screw intrusion is .150in.

NOTICE

NOTICE: Access to both sides of the mounting wall are needed.

NOTICE: For wall mounted or mobile applications, HEATH recommends securing the battery to the charger using the captive screws attached to the battery pack.

Charging Procedure

When storing the instrument or battery for more than a month:

- Charge battery to 40-50%

- Store at 60-70° F

⚠ WARNING

WARNING: To reduce the risk of ignition of a flammable or explosive atmosphere, battery pack must be removed, inserted and recharged only in a location known to be non-hazardous.

WARNING: Only use the HEATH supplied RMLD-FR battery pack charger to recharge the battery pack. Use of any other charger may cause severe damage to the battery pack or electrical circuits. Battery Charger is not part of the hazardous safety certification.

⚠ AVERTISSEMENT

AVERTISSEMENT : Pour réduire le risque d'inflammation d'une atmosphère inflammable ou explosive, bloc-batteries doivent être retirées, insérées et rechargées uniquement dans un endroit réputé non dangereux.

AVERTISSEMENT : Utiliser uniquement le chargeur de bloc-batterie RMLD-FR fourni par HEATH pour recharger le bloc-batterie. L'utilisation de tout autre chargeur peut endommager gravement le bloc-batterie ou les circuits électriques. Le chargeur de batterie ne fait pas partie de la certification de sécurité dangere-use.

⚠ CAUTION

CAUTION: To prevent damage to the battery or electrical circuits, always plug the charger into a surge-protected outlet.

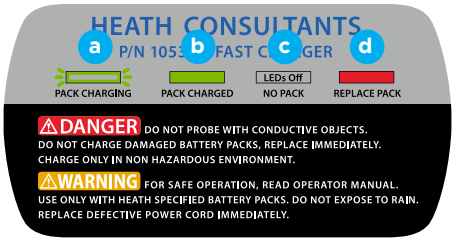
Charge in ambient temperature above 50° F (10° C) to obtain full battery capacity

1. Turn instrument OFF.
2. Unscrew the two captive screws located on the bottom of battery pack. Remove battery from instrument.

3. Insert battery into the charger, ensuring it is all the way down. Optional: Fasten captive screws into charger housing to prevent battery from dislodging.

4. LED panel of charger illuminates to show charging status of the battery.

- a Green flashing = charging
- b Green solid = fully charged
- c No light = battery not present or not connected properly
- d Red = fault
  - i. Position battery into the other bay, if still red, then try another battery.
  - ii. If the light is still red send to repair or replace.



Charging legend displayed on charger

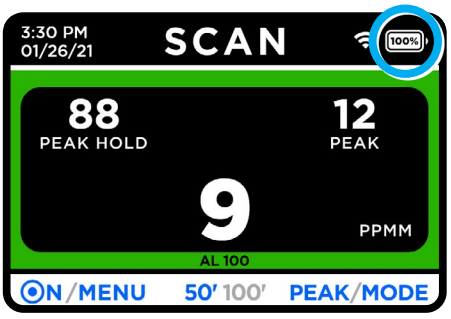
5. When fully charged in 2-3 hours, power up the instrument to verify the battery capacity on the screen.

Remaining Battery Capacity

Remaining battery capacity (in percent) is indicated in the top right of the screen.

White icon indicates sufficient capacity remaining

Red icon indicates low capacity remaining/ time to charge



Turn On/Off the Instrument

Button Controls

Simple 3-Button Control

Navigate through screens and control features of the RMLD-FR using three (3) buttons which are located below the screen.

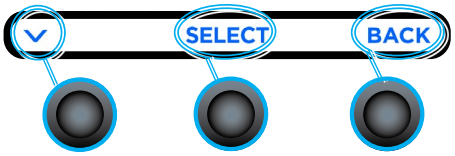
Press and hold the middle button for 3 seconds to turn the instrument on/off

Quick & Long Press Functions

Each button functions with either a **quick press** and release, or a **long press** (hold for 1 second) and release. The available functions vary, depending upon the active screen.

A **quick press** activates:

- the only function shown for a button, when only one function is available (shown below).

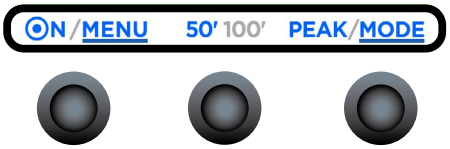


- the left-most or first function shown for a button, when two (2) functions are available (shown at right).

A single beep will sound upon release to indicate a successful press activation.

A **long press** activates the right-most or second function shown for a button, when two (2) functions are available (shown below).

A blue line under the second function indicates a successful long press activation.



NOTICE

NOTICE: The **50′ 100′** button is a toggle function, and requires only a quick press to activate.

NOTICE: On all screens, the middle button shuts down the instrument when pressed and held for 3 seconds.

WARNING

WARNING: The visible green Spotter laser is a Class 2 (II) laser product.

WARNING: Do not stare into beam or view directly with optical instruments.

WARNING: Avoid direct eye exposure to the laser and do not point in the direction of others. Visible and Invisible Lasers are deployed by this instrument.

AVERTISSEMENT

AVERTISSEMENT : Le Laser de repérage vert visible est un produit laser de classe 2 (II).

AVERTISSEMENT : Ne jamais fixer le faisceau ni le regarder directement avec des instruments optiques.

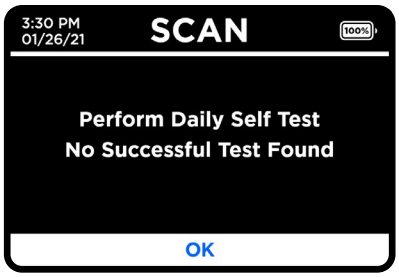
AVERTISSEMENT : Évitez l'exposition directe des yeux au laser et ne le pointez pas vers d'autres personnes. Des lasers visibles et invisibles sont déployés par cet instrument.

Self Test

The instrument has a built-in function to perform a Self Test of the laser wavelength. Perform the Self Test daily before scanning to ensure the instrument is operational.
A Self Test log file is recorded and stored on the instrument.
To access the stored files, refer to pages 22-24.

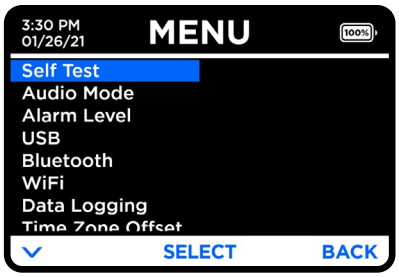
Self Test takes 1-3 minutes

1. Turn on the instrument and allow it to successfully boot up. If the instrument does not find a successful Self Test report for the day, a pop-up message appears on screen. Press the OK button to continue. (There is no pop-up message if a successful Self Test report is found for the day.)

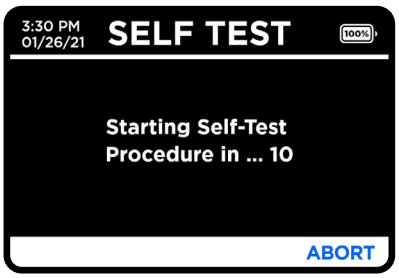


2. Press (long press) and release the MENU button.

3. Select the Self Test option.



The screen will display and guide the next steps for the Operator to follow within 10 seconds (enough time for the steps).

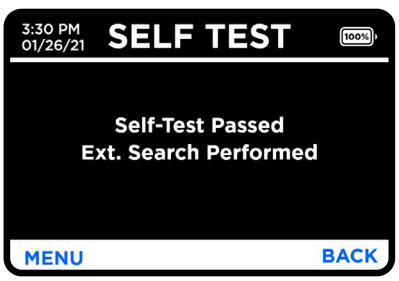


4. Place the instrument in its designated area in the carrying case, making sure it is all the way in place and flat.

5. Result of Self Test is indicated by audible tones:

✓ One (1) beep every second means instrument passed.
X Two (2) beeps every second means instrument failed, and Self Test should be repeated.
! If instrument fails on a third attempt, contact Heath Consultants Factory Service.

Result of Self Test is indicated on the display. A Self Test file is also created.



No yearly factory calibration required unless instrument repeatedly fails the Self Test or presents other problems.

What if the instrument failed the Self Test?

The cause is most often due to:
- instrument not properly positioned in the case
- case was moved during test
- laser wavelength has drifted
- battery level is too low

Ensure sufficient battery charge before attempting Self Test procedure.

Make sure the instrument is in its proper position, all the way down, and flat.

After rechecking the above, repeat the Self Test procedure.

⚠ CAUTION

CAUTION: Should the instrument not pass after several attempts, do not use the instrument for scan work until the problem is corrected.

CAUTION: Do not attempt to repair the instrument. Should the instrument not work properly, or indicate a fault or warning, refer to the troubleshooting section of this manual.

NOTICE

NOTICE: Laser wavelength drift is a normal characteristic of the RMLD-FR. The rate of drift is normally low and will not affect the Self Test if performed on a regular basis. Scan work conducted with an instrument which has drifted and was not Self Tested may need to be redone. If instrument does not successfully perform a Self Test after three attempts, contact HEATH for assistance.

Scan Screen Mode

The no-clutter Scan Mode displays large numerical readouts of PPMM and PEAK detections.

Scan mode is the default screen mode when not in MENU mode.

Quick Press Features

ON Turn green spotter laser ON. Will automatically shut off after two (2) minutes.

OFF Turn green spotter laser OFF

50′ 100′ Set distance alarm to 50’

50′ 100′ Set distance alarm to 100’

PEAK Add current Peak Hold value to Peak History List. Peak History List of recently held peaks can be viewed and saved to a data file through MENU.

A single beep sound indicates a successful short press.

Long Press Features

MENU Opens MENU screen.

MODE Opens IMAGE screen mode.

A “long press” is achieved by pressing and holding until a blue line appears underneath.

GPS Indicator

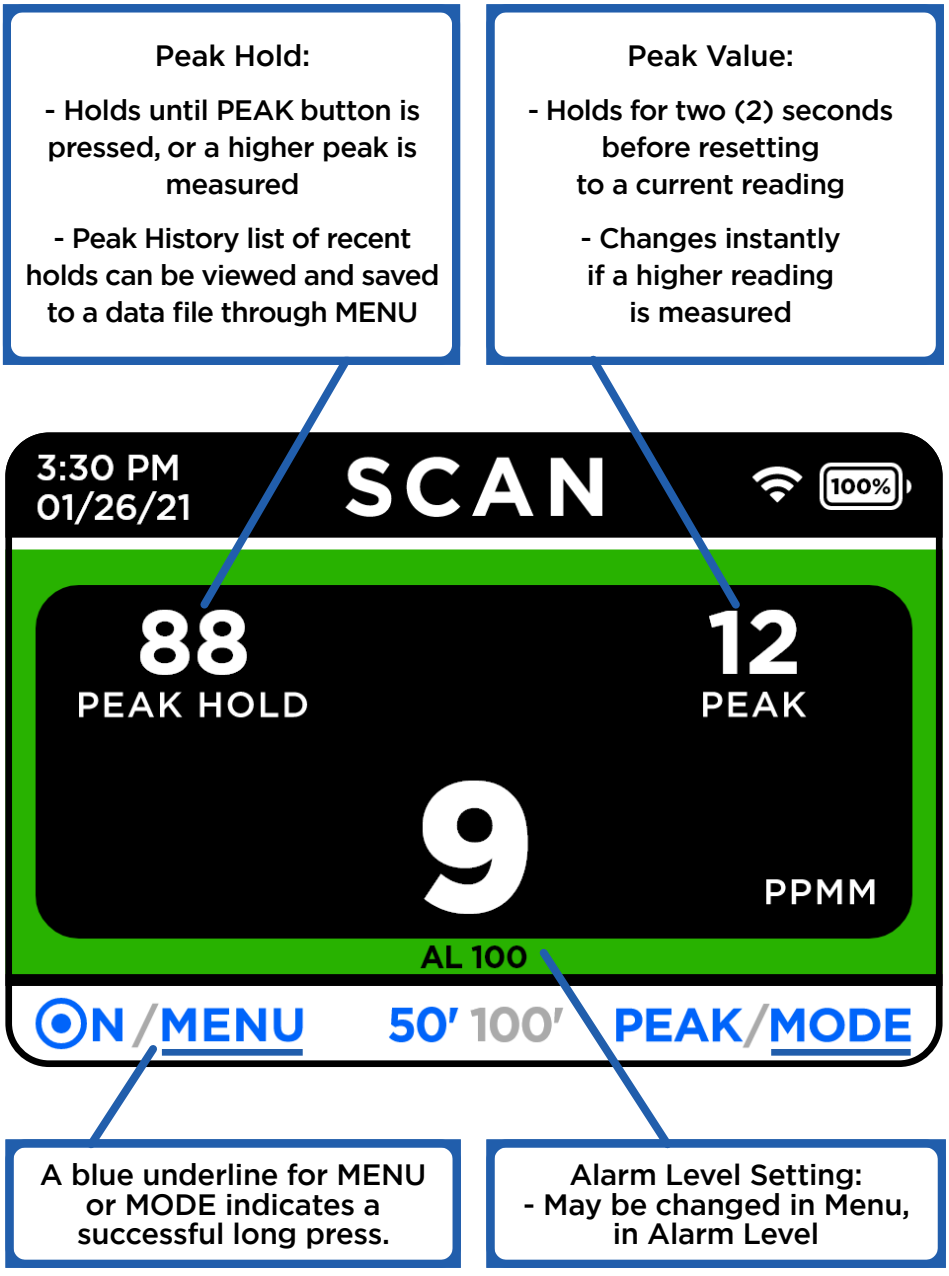
GPS in the instrument is always enabled. The GPS icon is only visible if a GPS signal is locked.

Border Color Indicators

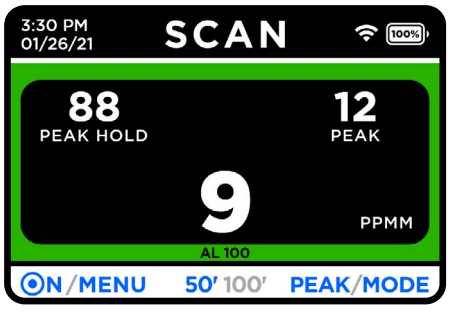
Screen border color indicates detection status:

- Green, no flashing – no detection above the alarm level.
- Red, fast flashing – detection exceeds alarm level methane detected.

Operator may disable flashing through the MENU.



NOTICE NOTICE: Border color will not appear while DMD Alarm is disabled.



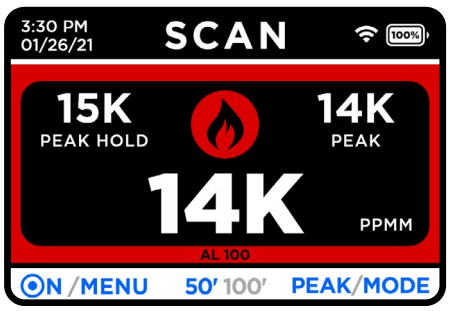


Image Screen Mode

Displays a live image of where the RMLD-FR is pointed, as well as current and peak PPMM readings.

This feature is especially useful in bright sunlight when the green spotter laser may be hard to see.

Quick Press Features

- **ON** Turn green spotter laser ON. Will automatically shut off after two (2) minutes.
- **OFF** Turn green spotter laser OFF
- **50′ 100′** Set distance alarm to 50′
- **50′ 100′** Set distance alarm to 100′
- **PEAK** Add current Peak Hold value to Peak History List. Peak History List of recently held peaks can be viewed and saved to a data file through MENU.

A single beep sound upon release indicates a successful press.

Long Press Features

- Saves snapshot and text file of related data to internal SD memory. See pages 22-24 for file access instructions.
- **MODE** Opens IMAGE screen mode

A "long press" is achieved by pressing and holding until a blue line appears underneath.

GPS Indicator

GPS in the instrument is always enabled. The GPS icon is only visible if a GPS signal is locked.

Border Color Indicators

Screen border color indicates detection status:
- Green, no flashing – no detection above the alarm level.
- Red, fast flashing – detection exceeds alarm level methane detected.

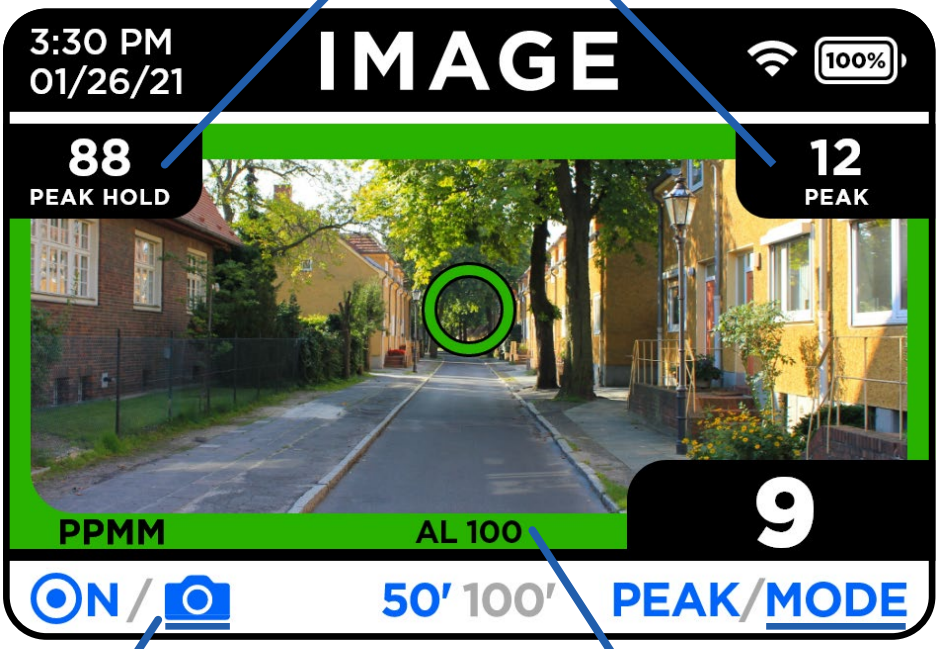
Operator may disable flashing through the MENU.

NOTICE

NOTICE: Reticle is a general representation of IR beam location. Beam may not be at exact center. Operator must sweep the area of interest to ensure beam coverage.

Peak Hold:
- Holds until PEAK button is pressed, or a higher peak is measured
- Peak History list of recent holds can be viewed and saved to a data file through MENU

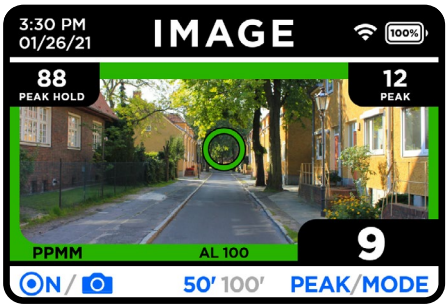
Peak Value:
- Holds for two (2) seconds before resetting to a current reading
- Changes instantly if a higher reading is measured

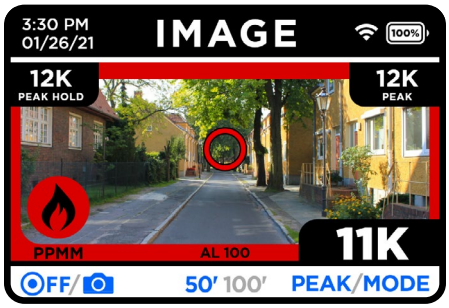


A blue underline for Camera icon or MODE indicates a successful long press.

Alarm Level Setting:
- May be changed in Menu, in Alarm Level

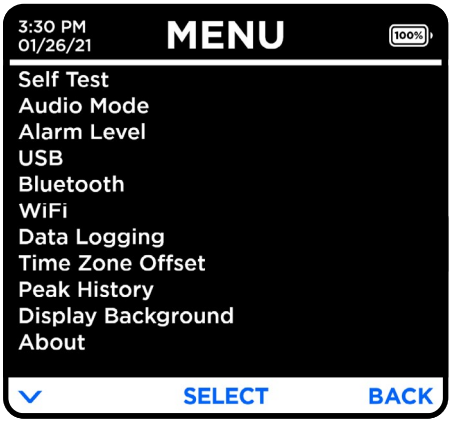
NOTICE NOTICE: Border color will not appear while DMD Alarm is disabled.





Working With Menu Items

Please refer to list shown here for the page number location of each menu item.



Self Test

Please refer to page 14 for detailed instructions on performing a Self Test.

Audio Mode

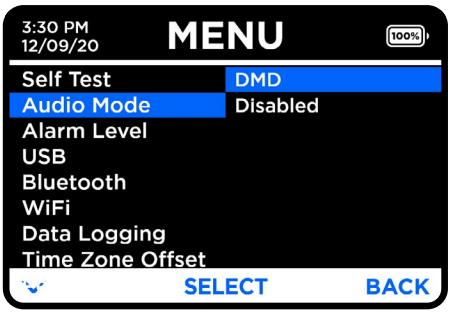
DMD (Digital Methane Detection)

Digital Methane Detection (DMD) is a highly sophisticated detection algorithm that greatly enhances the use of the RMLD-FR. The factory default setting for DMD is Enabled (on).

While using DMD mode, an audio alarm will be heard, and on-screen indicators (flashing/color-changing readings and screen border) will be seen when methane detection occurs.

DMD will indicate detection when the PPM-M exceeds the Alarm Level, or when the reading is excessive. While the low light warning is sounding, the RMLD-FR may still be able to detect very large gas concentrations, indicated by frequent, fast beeps.

The adjustable Alarm Level controls the DMD. Your department's scanning procedure may require the use of a specific value or procedure to set it. Set the Alarm Level such that the false detection rate is low, while not too high that leaks are missed.



To turn off DMD mode:

- Press the MENU button
- Select AUDIO MODE
- Select Disabled

NOTICE

NOTICE: DMD Mode will enable automatically after 5 minutes, enabling audible and color border indicators.

⚠ WARNING

WARNING: When DMD is disabled, the instrument will not alarm with audible or visible indicators.

⚠ AVERTISSEMENT

AVERTISSEMENT: Lorsque le DMD est désactivé, l'instrument ne déclenchera pas l'alarme avec des indicateurs sonores ou visibles.

Audio Warning Indications

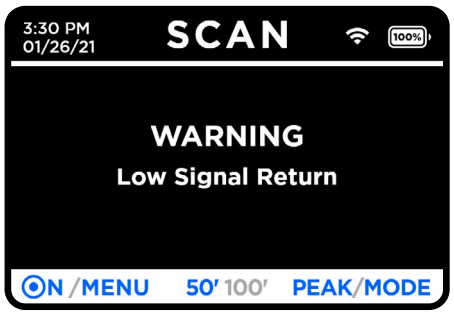
The instrument emits a constant beep to indicate instrument-level warnings and/or fault conditions. A warning will also be displayed on screen. The most common warnings are:

- Low signal return/low light level
- Over saturation of signal
- Low battery

If low signal return/low light occurs, then change angle or move in closer to get in range.

If over saturation, then back up from the target or point the device at a less reflective surface.

Should the warning(s) persist in the instrument, check the display and follow the instructions in the troubleshooting guide on page 29.



Alarm Level

Factory Default Settings

The instrument is preprogrammed with two (2) distance-based alarm level thresholds for the operator to easily toggle between. The factory default setting is 100' to alarm at 200 PPM-M. A quick press on the button shown below will:

50' 100' Set 50' distance alarm at 100 PPM-M

50' 100' Set 100' distance alarm at 200 PPM-M

Custom Alarm Presets

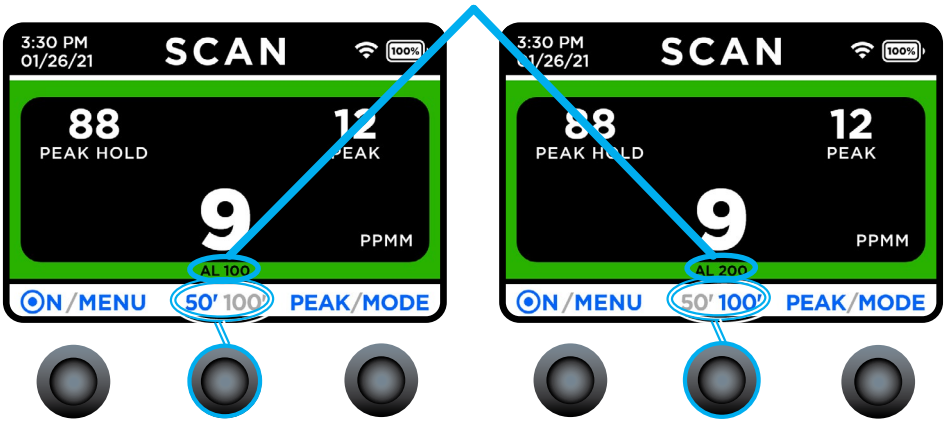
The operator may customize the alarm level threshold for the 100' and/or 50' setting. The custom settings replace the factory defaults, and become the alarm presets for future sessions.

To change the Alarm Detection Threshold:

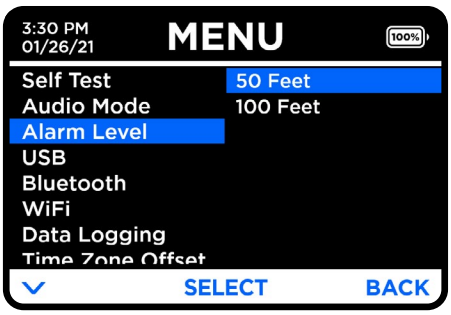
1. Press (long press) the MENU button
2. Press the down arrow to scroll through the list and highlight Alarm Level.
3. Press SELECT.
4. Select 50' or 100'.
5. Press the down arrow to increase the number.
6. Press SELECT to advance to the next digit.
7. Press BACK when done with settings.

NOTICE NOTICE: A higher Alarm Level setting will require a higher concentration of methane to alarm.

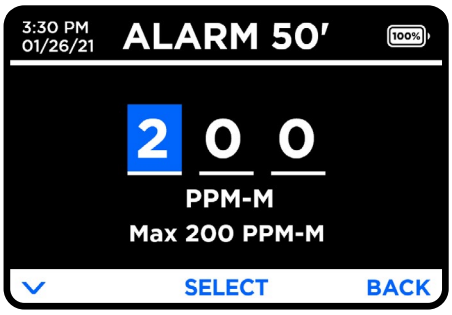
Alarm level threshold setting is shown on the screen.



A quick press on the 50' 100' button toggles between the two (2) distance-based pre-sets.

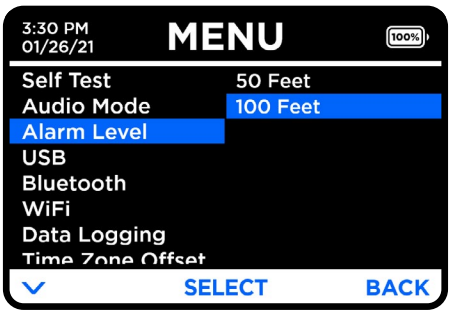


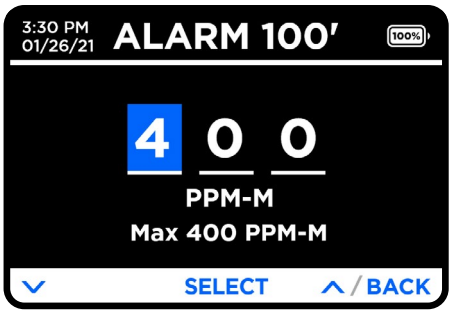
Step 2-4



Step 5-7

(50' selection shown above, 100' selection shown below.)





USB

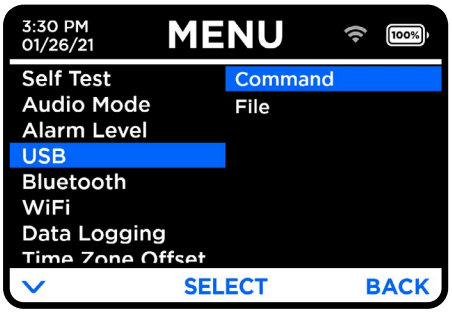
The RMLD-FR instrument is equipped two USB settings:

Command Mode

Select to use the USB port as a communications port.

File Mode

Select to use the USB port for file access as a flash drive. This is the instrument's default mode.



Bluetooth (BLE)

The RMLD-FR instrument is equipped with Bluetooth 4.2 BLE to support future features and mobile applications.

WiFi

The WiFi option enables Apple/Android/PC devices to connect to the Configuration Portal through a web browser.

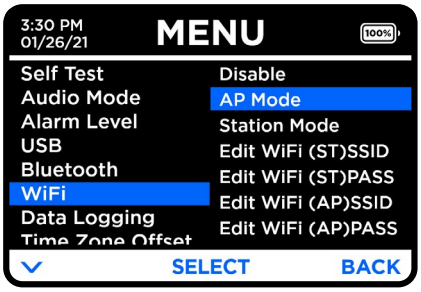
The Operator can use the Configuration Portal to:

- Retrieve data and images stored on the device, such as Self Test logs, data logging, fault codes, and image captures (see page 24)
- Configure the instrument

To enable the WiFi feature:

1. Press and hold the MENU button until a blue line appears under MENU. Release the button.

2. Press the down arrow to scroll down to WiFi, and press SELECT.
3. Scroll down to and select AP Mode.
4. Press BACK when done.



A message on screen will confirm that the WiFi is broadcasting.

WiFi Broadcasting
IP: 10.123.45.1

White WiFi icon in the status bar indicates a connection.

Red WiFi icon indicates no connection or the instrument is attempting a connection

Access Point (AP) Mode

AP Mode broadcasts a wireless network directly from the RMLD-FR instrument. Operator must search for this network and connect directly to the instrument using the WiFi (AP) network name and password.

1. After turning on the WiFi network and selecting AP Mode (steps 1-3 at left), connect a computer or smartphone to the FR's WiFi network. The WiFi (AP)SSID network name will be set as "RMLD-FR" at the factory. An operator can see/change it by going to the RMLD-FR Menu – WiFi – Edit WiFi (AP)SSID (shown at right), or through the Configuration Portal (see page 24 for details).
2. Enter the WiFI (AP) password. The WiFi password will be set as "changeme2" at the factory. An operator can see/change it by going to the RMLD-FR Menu – WiFi – Edit WiFi(AP) PASS, or through the Configuration Portal (see page 24 for details).
3. Once connected, open a web browser and enter the address for either the file server or the configuration page.

   File Server address:
   http://10.123.45.1/
   Configuration Page address:
   http://10.123.45.1/config

File Access

See pages 22-24 for details on accessing files through a WiFi connection to the Configuration Portal.

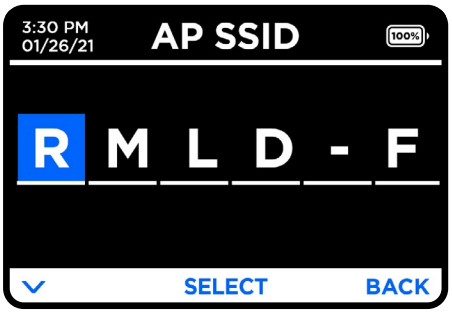
Change SSID or Password

Go to MENU - WiFi settings.
Scroll to and select either
Edit WiFi (AP)SSID for name, or
Edit WiFi (AP)PASS for password.

Press the down arrow to scroll through characters:

- lowercase a-z
- uppercase A-Z
- numbers 0-9
- symbols/punctuation

Press SELECT to choose.
Press BACK when done.



Additional controls are revealed when you press and hold the down arrow.

While continuing to press/hold the down arrow, the up arrow will go back in sequence (i.e. from R to Q); the double down arrow will skip to the next set of characters (i.e. from an uppercase letter to the number 0.

NOTICE

NOTICE: SSID and Password can be set using the Configuration Portal (see page 24).
Changing the factory default AP SSID and AP Password is recommended.

Data Logging

The data logging feature allows the instrument to store complete telemetry records of the instrument, while powered on, to an internal SD memory card.

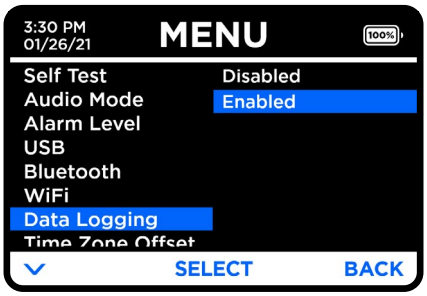
Data telemetry is recorded into log files during operation.
The following measurement information is saved:

- CH4 PPM-M measurement
- Battery level
- Battery voltage
- GPS location
- Timestamp
- Serial number of the instrument
- Various system status fields and values that can help evaluate instrument performance or aid in troubleshooting if a fault condition occurs

To access stored data logs, refer to the various methods outlined on pages 22-24.

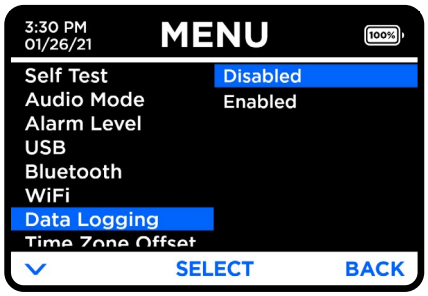
To enable Data Logging:

1. Press MENU
2. Scroll down to DATA LOGGING and press Select
3. Scroll down to and select ENABLED



To disable Data Logging:

1. Press MENU
2. Scroll down to DATA LOGGING and press Select
3. Scroll down to and select DISABLED



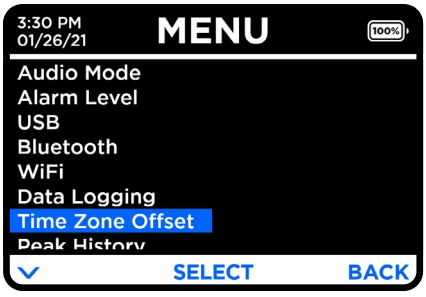
Data logging does not need to be enabled in order for the instrument to record:

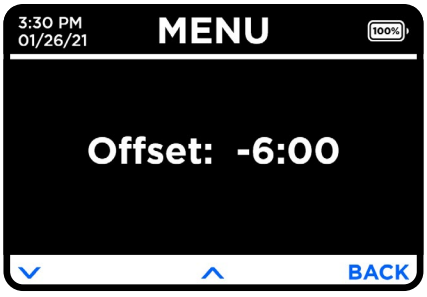
- FAULT logs
- SELF TEST logs
- Screen captures

Time Zone Offset

The time zone offset menu option allows the user to select the desired offset from UTC time acquired by the GPS.

1. In the menu, select TIME ZONE OFFSET
2. Use the arrow buttons to adjust the desired offset
3. Select the BACK button when complete





NOTICE NOTICE: Time Zone Offset can be set using the Configuration Portal (see page 24).

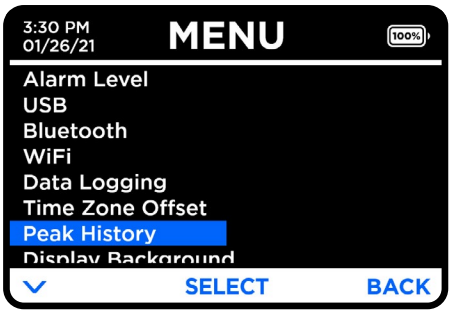
Peak History

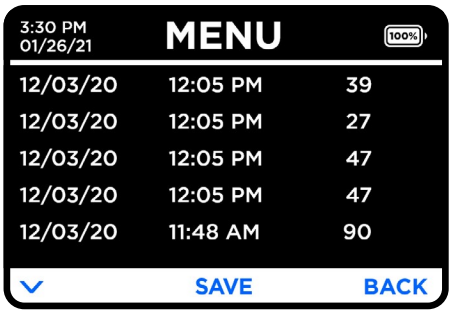
A Peak History list of recent peak holds can be viewed and saved through the MENU.

NOTICE

Operator must save peak file before turning instrument off. A downloadable file is created when saved.

To access saved peak files, refer to pages 22-24.





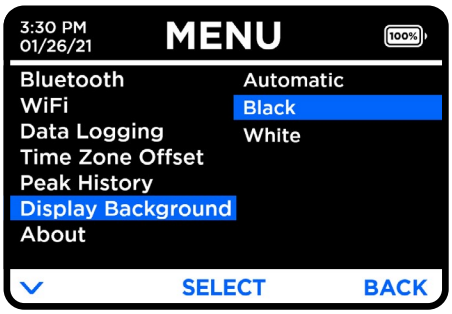
Display Background

The RMLD-FR offers three (3) choices for the display background color:

- Black (factory default)
- White
- Automatic
  Displays white from 8AM - 8PM
  Displays black from 8PM - 8AM

The factory default setting is Black, but the operator can change this in the MENU, DISPLAY BACKGROUND settings.

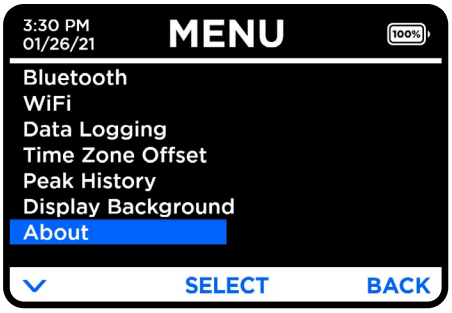
1. Press (long press) to open MENU.
2. Press the down arrow to highlight Display Background, and then press SELECT.
3. Press the down arrow to highlight your choice of Automatic, Black, or White, and then press SELECT.
4. Press BACK when done.

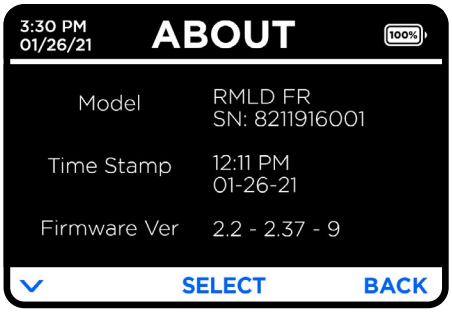


About Screen

The ABOUT menu item displays real-time information about the instrument. Press the MENU button, scroll down to ABOUT and press SELECT.

Use the down arrow button to scroll through the available information:





- Model (name, serial number)
- Time Stamp (time, date)
- Firmware Version
- GPS Status
- Battery (% remaining)
- Storage (% remaining on internal SD card)
- Self Test (status)
- Bluetooth Status (off/on)
- WiFi (AP) SSID (name)
- WiFi (AP) SSID (name)
- WiFi Status (on/off)
- Contact Information for Heath Consultants Incorporated

File Access

The RMLD-FR stores data on an internal SD memory card. The data files can be downloaded or accessed in the following ways:

- USB File Transfer (details below)
- WiFi connection to Configuration Portal (see page 23)

USB File Transfer

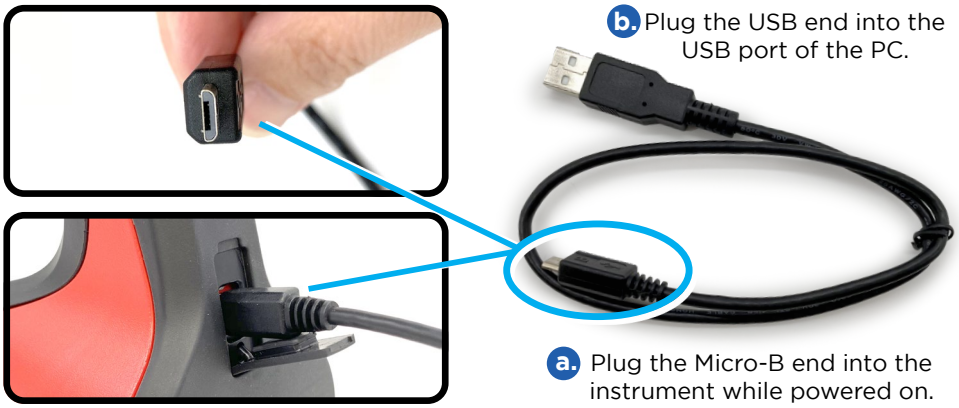
To access recorded/captured data:

1. Turn on instrument.

2. Use the provided USB 2.0 A to Micro-B cable to connect the instrument to the PC.

   a. Plug the Micro-B end into the port on the instrument while powered on.
   b. Plug the USB 2.0 A end into the USB port of the PC.

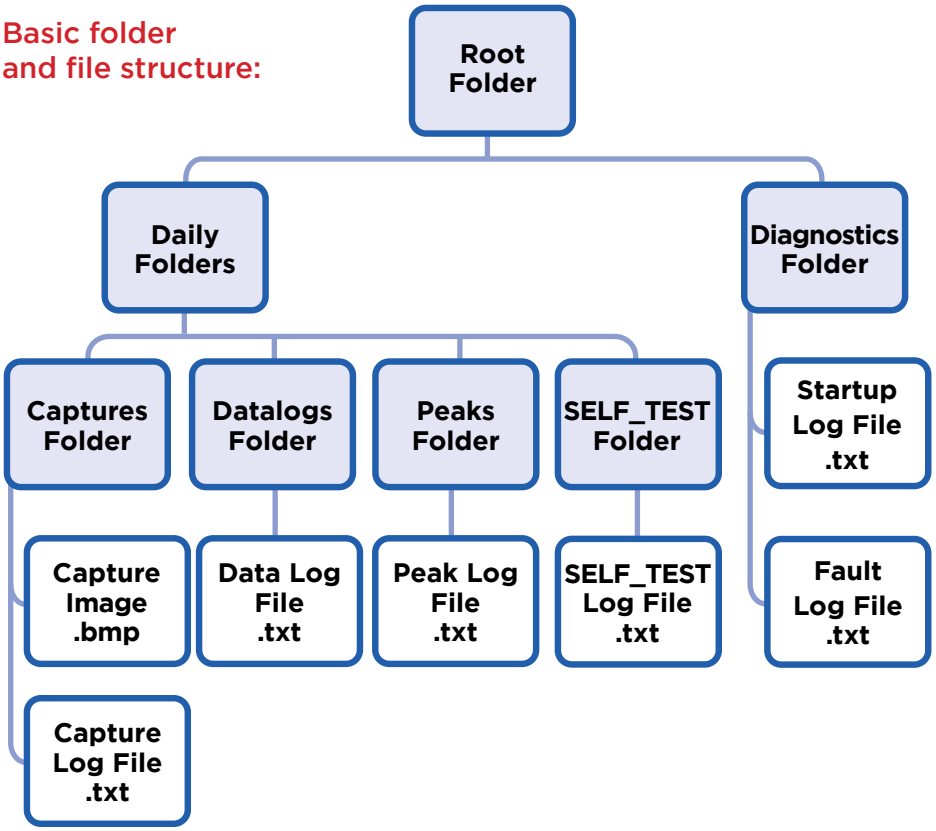
3. A file explorer window should open automatically when the device is ready for access, or simply browse the PC's devices and drives to locate the instrument's USB drive.



NOTICE

NOTICE: Recognition of RMLD-FR may take some time on first plug in as the required drivers are installed. Please allow time for this initial process to complete.

Basic folder and file structure:



File Name Conventions

<SERIAL>-<DATE>-<TIME>-<USERNAME>-<FILETYPE>.<EXT>

SERIAL number of instrument

DATE of file creation (YYMMDD)

TIME of file creation (HHMMSS)

USERNAME of user that was logged on (always ADMIN for FR)

FILETYPE is the file type name:
- Capture(Log)
- Selftest
- Datalog
- Peaks
- Startup
- Fault

EXT is the file extension
- **.bmp** for Capture images
- **.txt** for log files

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File Access (continued)

WiFi

The WiFi option enables Apple/Android/PC devices to connect to the Configuration Portal through a web browser.

Please refer to page 19 for step-by-step instructions to enable WiFi and AP Mode.

The RMLD-FR only supports protected networks with WPA-2 security. The SSID and password may be entered manually through options provided in the main menu.

The IP address of the RMLD-FR unit is displayed on the about screen when AP mode is successfully enabled. In AP mode, the RMLD-FR instrument is actively broadcasting and accepting connections. The IP address is used to access the RMLD-FR from a client device on the same network.

The RMLD-FR provides a file server and configuration web portal. One can access these web pages by navigating to their respective URLs in any modern web-browser on a device connected to the same network as the RMLD-FR.

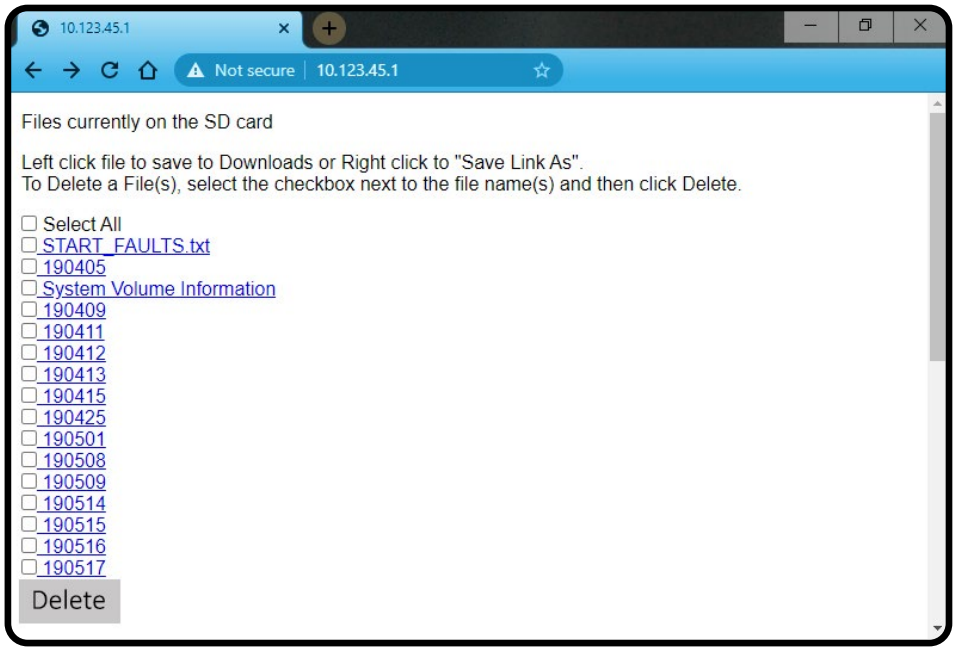
File Server

The RMLD-FR file server grants users the ability to download and delete files presented using the same internal folder structures that are accessible through the wired USB port (shown on page 20).

After enabling WiFi and AP Mode on the RMLD-FR (see page 19 for step-by-step instructions to enable WiFi and AP Mode), one can access the file server in any modern web-browser on a device connected to the RMLD-FR network.

File Server address: http://10.123.45.1/

From here, an operator may download individual files by clicking directly on the filename. Additionally, operators may delete date folders or individual files using the check boxes and Delete button.



NOTICE

NOTICE: The deleting of files/folders is irreversible.

File Access (continued)

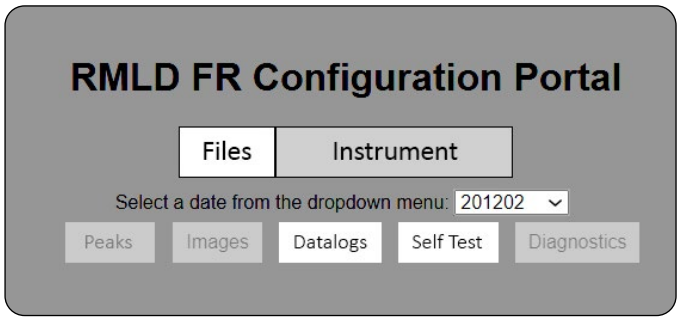
Configuration Portal

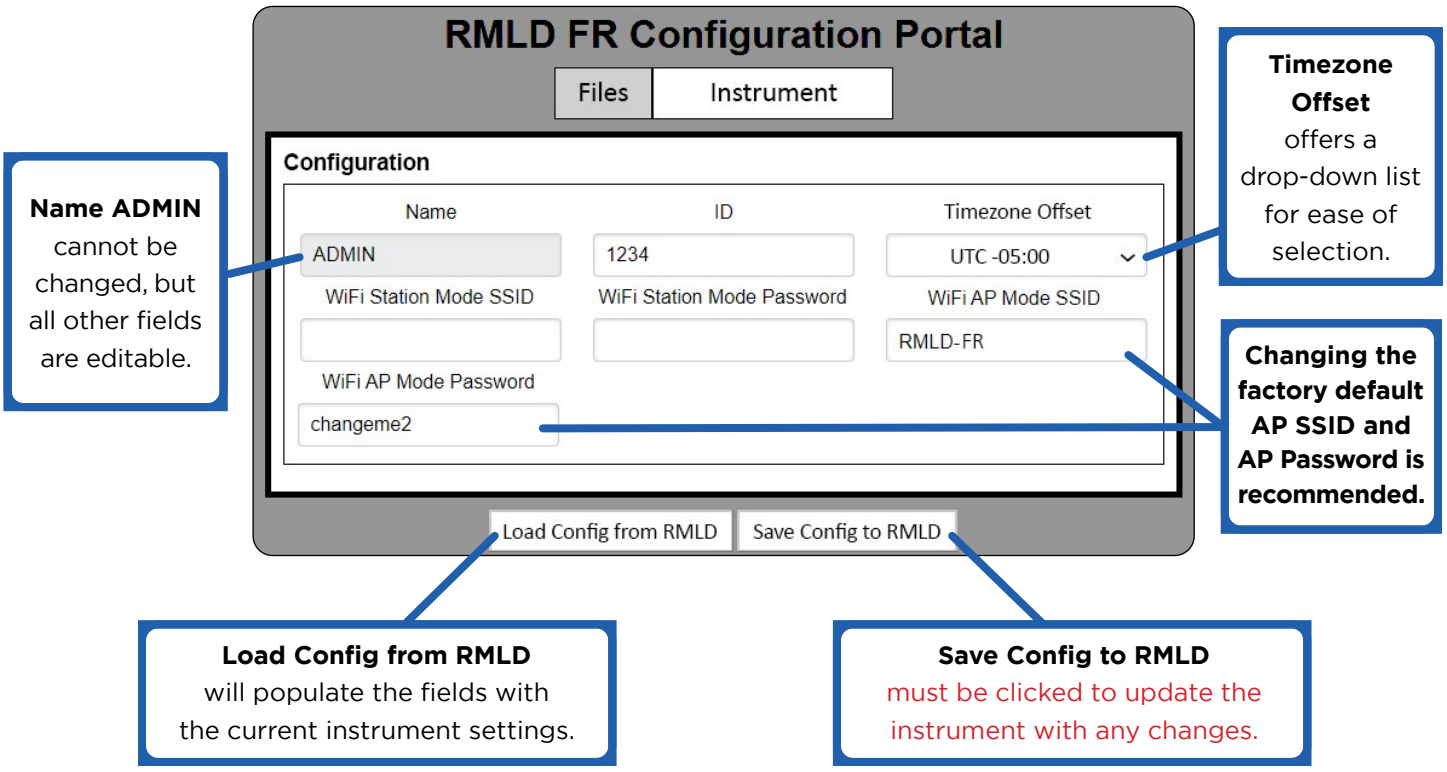
The Configuration Portal provides users with an easy interface for accessing files and configuring the instrument.

Navigating to http://10.123.45.1/config will return the Configuration Portal page.

The configuration portal is divided between two tabs:

- **Files** is the default tab (shown at right), used for accessing/downloading data and images saved on the instrument's internal SD card.
- **Instrument** (shown below) is the tab that provides editable fields that identify the operator, timezone offset, and WiFi information. Both AP and Station mode credentials are supported.





NOTICE

When Finished With Configuration Portal:

- Close the web browser
- Disable WiFi AP Mode

How Does the RMLD-FR Measure Gas?

The RMLD-FR uses infrared (IR) laser technology known as Tunable Diode Laser Absorption Spectroscopy (TDLAS).

TDLAS enables the Operator to safely scan:

- Hard to reach areas
- Plumes up to 100' away (actual distance may vary due to surface condition)
- Through windows

⚠ WARNING

WARNING - The RMLD-FR is capable of scanning through windows to possibly detect methane gas. However, scanning through windows is not guaranteed. False positives and negatives may occur.

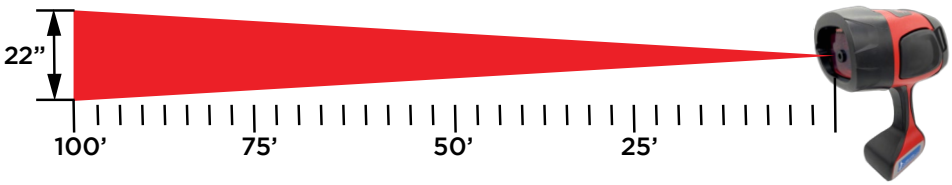
⚠ AVERTISSEMENT

AVERTISSEMENT : Le RMLD-FR est capable de balayer les fenêtres pour éventuellement détecter du méthane. Cependant, le balayage des fenêtres n'est pas garanti. Des faux positifs et des faux négatifs peuvent être obtenus.

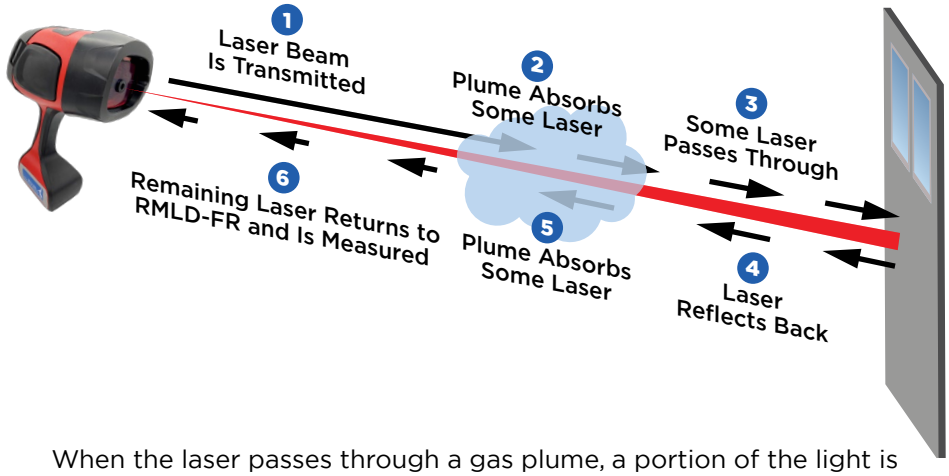
NOTICE

NOTICE: There is always a small amount of methane in the air. This natural methane background is also measured by the RMLD-FR. The PPM-M reading will then increase as the scanning distance increases.

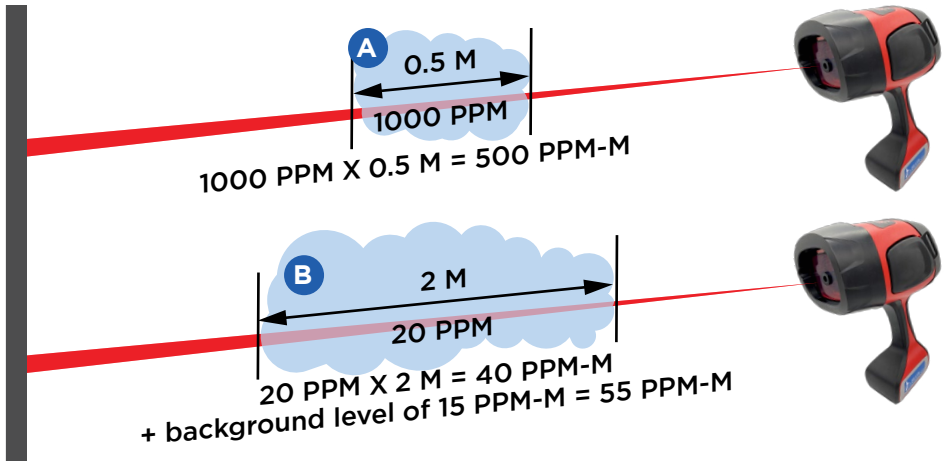
NOTICE: The nature of a gas plume is highly variable. The above/right illustrations are intended to convey the basic theory. Some leaks may have a high surface concentration with little to no measurable plume above the surface.



Infrared beam width is about 22" at 100 feet. It is important to note that the laser beam "footprint" width increases as the distance increases. This is why it is much easier to detect natural gas from a distance of 10 to 15 feet and beyond.



When the laser passes through a gas plume, a portion of the light is absorbed by methane, while some of the light is reflected back to the RMLD-FR. The reflected light is collected and processed so the RMLD-FR can report methane concentrations in parts-per-million-meter or PPM-M.



A Gas cloud of 1000 PPM is about ½ meter in width (the distance the infrared beam passes through the plume). RMLD-FR measures 500 PPM-M.

B Average concentration of gas cloud is 20 PPM and is about two (2) meter in width. RMLD-FR measures 40 PPM-M, plus 15 PPM-M background level, displaying a total value of 55 PPM-M.

Scanning With The RMLD-FR Instrument

Refer to your company's specific training and procedures for being qualified for leak surveying.

WARNING

WARNING: The visible green Spotter laser is a Class 2 (II) laser product.

WARNING: Do not stare into beam or view directly with optical instruments.

WARNING: Avoid direct eye exposure to the laser and do not point in the direction of others. Visible and Invisible Lasers are deployed by this instrument.

WARNING - The RMLD-FR is capable of scanning through windows to possibly detect methane gas. However, scanning through windows is not guaranteed. False positives and negatives may occur.

AVERTISSEMENT

AVERTISSEMENT : Le Laser de repérage vert visible est un produit laser de classe 2 (II).

AVERTISSEMENT : Ne jamais fixer le faisceau ni le regarder directement avec des instruments optiques.

AVERTISSEMENT : Évitez l'exposition directe des yeux au laser et ne le pointez pas vers d'autres personnes. Des lasers visibles et invisibles sont déployés par cet instrument.

AVERTISSEMENT : Le RMLD-FR est capable de balayer les fenêtres pour éventuellement détecter du méthane. Cependant, le balayage des fenêtres n'est pas garanti. Des faux positifs et des faux négatifs peuvent être obtenus.

NOTICE

NOTICE: Spotter laser is about 1.25" to the right of the IR laser beam.

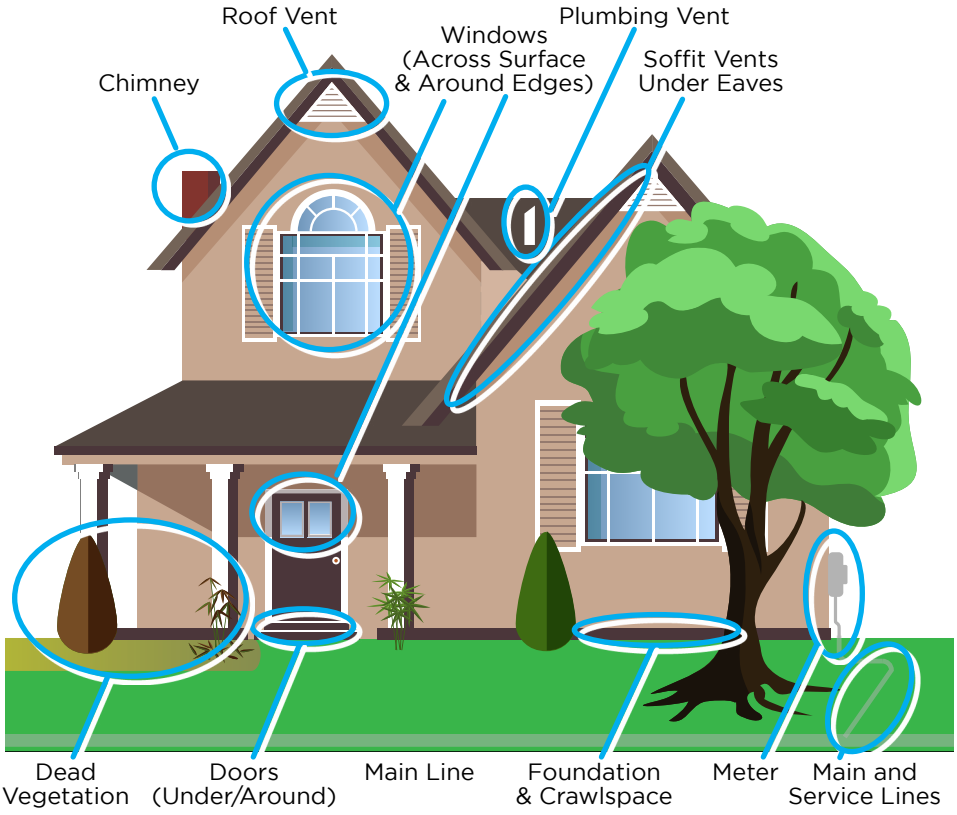
The first thing you will need to learn when scanning with the RMLD-FR is to control the aiming of the laser and rate of sweeping. Radical or abrupt motion may cause false detections due to rapidly changing distance or background that the laser detects. Radical or abrupt motion may cause the IR beam to not thoroughly scan the area. Here are a few tips for scanning:

Detection Through a Window

- Do not aim straight into a window. Keep to an angle and sweep across the window slowly.
- The laser may not penetrate certain window types effectively, such as, tinted, double pane, stenciled, etc.
- If there is no gas reading indicated do not assume there is no gas within the structure, ie. houses office buildings. Continue scanning common venting points.

Common Venting Points

The RMLD-FR may be used to scan any structure or place that has gas service. Some of the common venting points of a house are shown below.



In order for the RMLD-FR to detect gas, three conditions must be met. (see visual representation on page 25)

1. Gas plume concentration and size must be greater than the alarm level of the instrument.
2. Infrared beam must pass through the plume.
3. Background target (i.e., ground, building, etc.) must reflect the infrared beam back.

Scanning With The RMLD-FR Instrument (continued)

⚠ WARNING

WARNING: The visible green Spotter laser is a Class 2 (II) laser product.

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AVERTISSEMENT : Évitez l'exposition directe des yeux au laser et ne le pointez pas vers d'autres personnes. Des lasers visibles et invisibles sont déployés par cet instrument.

AVERTISSEMENT : Le RMLD-FR est capable de balayer les fenêtres pour éventuellement détecter du méthane. Cependant, le balayage des fenêtres n'est pas garanti. Des faux positifs et des faux négatifs peuvent être obtenus.

NOTICE

NOTICE: Spotter laser is about 1.25" to the right of the IR laser beam.

Meter

- Maintain at least 10 feet from the meter so the beam width is not too small.
- Thoroughly scan the ground around the meter fittings.
- Use the best angle to the meter that provides a good background behind the meter.
- If the meter is out in the open, or the angle is limited such that there is no background right behind the meter; scan the meter in a horizontal "Z" pattern maintaining a constant distance as you sweep across.

Leak Is Near/On Meter - Determine if Underground or On Meter

- Keep the wind to your back
- Stand 5 to 10 feet from meter
- Start by aiming low on the ground
- Work beam up and around piping

Service Line/Meter - Location Known

- Use the advantage of the beam by sweeping wider around the line location.
- Work the beam up the line in an "S" pattern.
- Scan the meter area.
- Re-scan down the line using the "S" pattern.
- Move in closer if the range is too far or ground elevation causes the beam to not come into contact with the ground (dark zones).

Service Line/Meter - Location Unknown

- Use an "X" pattern (or similar) to thoroughly scan the area.
- Target typical vent areas i.e., along the street or sidewalk edges.
- Target locations where valves may be placed.
- Scan along the foundation of the structure.
- Move in closer if the range is too far or ground elevation causes the beam to not come into contact with the ground creating dark zones (shadow).

Along the Main

- Use a smooth sweeping motion.
- Keep the beam pointed out 15 to 20 feet. This allows for the beam footprint on the ground to be large enough to provide good coverage, and control over the path of the beam.
- Scan service tap and valve areas as you approach them.
- Target probable vent locations such as cracks, vegetation damage, etc.

In order to detect gas, three conditions must be met.
(see visual representation on page 25)

1. Gas plume concentration and size must be greater than the alarm level of the instrument.
2. Infrared beam must pass through the plume.
3. Background target (i.e., ground, building, etc.) must reflect the infrared beam back.

Factors which influence gas plume size and concentration:

- Low-flowing leaks may produce small to non-measurable plumes.
- Surface types (i.e., concrete spread the leak and create spot leaks through surface cracks and holes.
- Weather conditions dissipate the plume faster (i.e., high winds, higher temperatures).
- Weather conditions change the venting conditions and spread of gas (i.e., heavy rain and moisture in the soil, frost conditions in winter).

Long Range Scanning

RMLD-FR can detect methane up to 100' away.

Actual distance may vary due to target surface and environmental conditions.

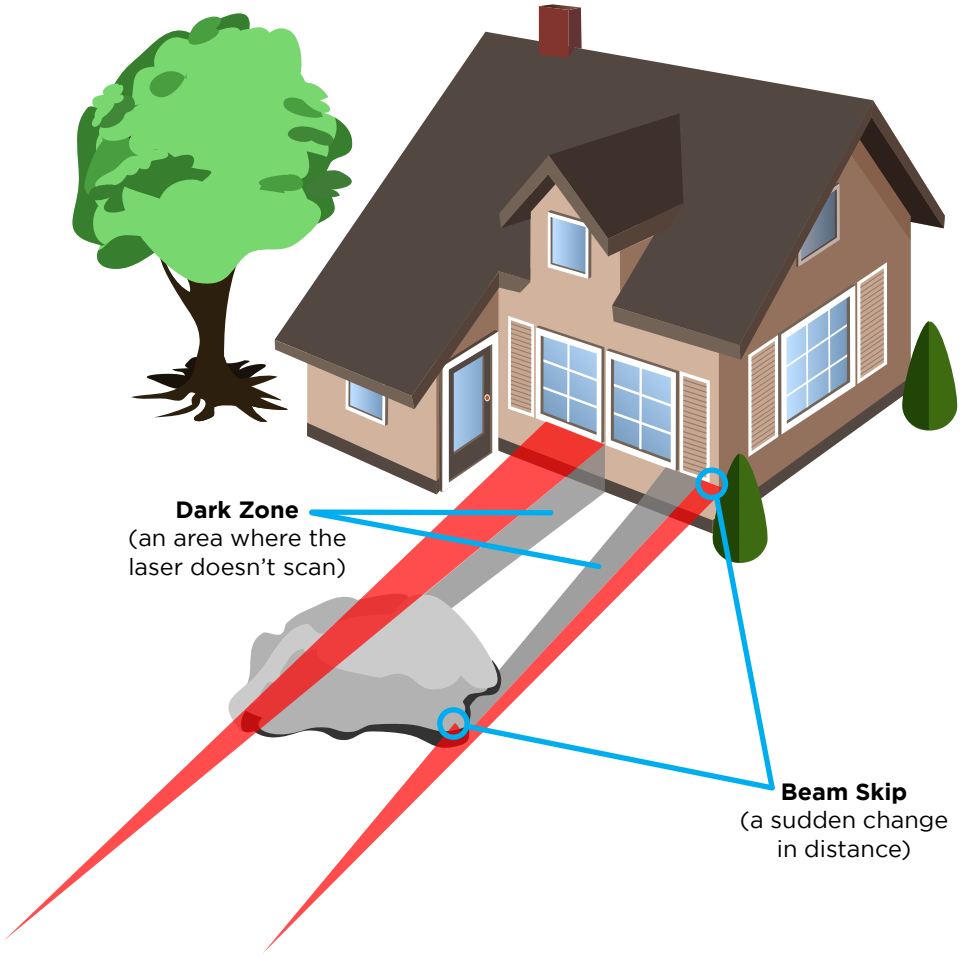
As scanning distance increases, the returning laser light level decreases. As the maximum distance is approached, a "low return signal" tone is heard. You will need to move in closer.

Scanning Distance of 50'+

- Slow down the scanning rate.
- Take care in pointing the laser.
- Use the spotter laser or IMAGE mode to ensure proper scanning of the target area.
- Be aware of the ground elevation. Scanning across the top of a knoll or past the edge of a structure can result in **beam skip** (a sudden change in distance) which may give you a false detection.
- Obstructions or variations in the landscape can cause a **dark zone** (an area where the laser doesn't scan). Look for the best angle to thoroughly scan these areas. Scanning up a hillside may cause beam skip or dark zones around the foundation of a structure.

- Beam Skip is a sudden change in distance.
- Dark Zone is an area where the laser doesn't scan.

They are caused by obstructions such as rocks, trees, structures, and uneven landscape.



Dealing With False Detections

Several conditions may occur that will cause the algorithm to give a detection indication. The most common are:

- Abrupt or jerky motions cause the scanning distance to rapidly change.
- Overly strong returns due to strong reflectors.

False detection most commonly occurs in the 50 feet (15 m) range, due to the beam footprint becoming very large. Abrupt motion, and change in terrain or distance to an object may cause the DMD to give a short low detection. To verify if the detection is due to a leak, pause at this distance, aim off to the side, and re-sweep across the area to determine if gas is present.

Scanning from a long range to short range will also minimize false detection.

Strong reflections off certain surfaces (e.g., black garbage bags, water droplets, glass, polished surfaces, stones, license plates, reflectors, etc.) may give a false detection. Re-scan the area from a slightly different angle.

The laser light is selective to methane, and will not false-alarm on other hydrocarbons.

Troubleshooting

With its advanced design, the RMLD-FR is one of the most reliable methane detection instruments available. Should you experience problems, there is most likely a simple cause. The following table provides a list of common problems, cause and solution.

Should you have a problem not listed, or the recommended solution doesn't work, please contact HEATH CUSTOMER SERVICE for further assistance. **Do not use the instrument for scan work until the problem is resolved.**

CAUTION

CAUTION: Only a qualified RMLD-FR repair technician should attempt repairs/adjustments.

CAUTION: Make no attempt to repair the instrument. There are no user serviceable components within the RMLD-FR.

Symptom	Probable Cause(s)	Solution
Higher than normal short range, and lower than normal long range readings	Laser calibration has drifted	Run Self Test
Concentration reading is low and will not pass the Self Test	Laser calibration has drifted	Run Self Test up to three (3) times and then contact Heath Customer Service
Unit will not turn on	Low battery	Replace or recharge battery pack
Continual warning sound or screen notification when scanning	Scanning at distance beyond RMLD-FR range	Move closer to the target
	Background surface is absorbing or reflecting the IR light level	Change angle to target to get a better reflecting background
	Low battery	Check battery level and recharge if necessary
Excessive false detection while scanning at longer distances	Scanning too fast	- Slow down the scanning rate - Pause at the long range and sweep towards you
	Alarm detection threshold set too low	Increase the Alarm detection threshold
	Scanning at the instrument's range limit	Move in closer
Excessive false detection while scanning at closer distances	Scanning too fast	Avoid making abrupt motions while scanning
	Alarm detection threshold set too low	Increase the Alarm Detection Threshold
Excessive false detection or loss of sensitivity	Laser output not optimized	Perform Self Test procedure
	Alarm Detection Threshold is too high or low for conditions	Check the Alarm Detection Threshold
Error message or Warning icon on continuously	Low battery	Check battery level and recharge if necessary
	Moisture condensation on mirror due to rapid change in temperature	Allow for the instrument temperature to stabilize
	Internal component failure	Note error message and contact HEATH
Reduced run time	Battery not fully charged	Charge battery pack until solid green light on charger is on
	Diminished battery capacity	Replace battery pack, and properly dispose of exhausted battery pack
Low Signal or Low Light	Background surface is absorbing or reflecting the IR light level	Change angle to the target for a better background
	Scanning at the range limit of the instrument	Move in closer
Saturated	Background surface is reflecting the IR light level	Change angle to the target for a better background
No WiFi connection	Incorrect credentials	Verify credentials
	Outside of WiFi range	Place unit closer to WiFi point
	WiFi disabled in menu	Enable WiFi in menu
No Bluetooth connection	Bluetooth is disabled	Enable Bluetooth in menu
	Device not paired	Pair device with instrument
USB not recognized	USB cable does not work	Use another USB cable
	Port is not working	Try another USB port or allow computer to load drivers
	Low battery	Charge or replace battery pack
	Driver did not install properly	Uninstall device driver and allow to reinstall
	IT restrictions	Contact local IT support

Maintenance

In order to maintain the RMLD-FR in good working condition, the following maintenance should be performed as indicated:

Maintenance Item	Frequency
Clean outer surfaces with damp rag	As needed
Clean instrument window with damp Kim-Wipe™ or equivalent non-abrasive lens tissue	As needed to prevent dust or water stain build up
Self Test	Daily to ensure the instrument is functioning properly
Recharge battery pack	Recharge to full capacity after each use
Replace battery pack	As needed
When storing a battery pack for one month or more leave a storage capacity	As needed

CAUTION

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CAUTION: Make no attempt to repair the instrument. There are no user serviceable components within the RMLD-FR.

Warranty and Repair

Instruments and products manufactured by Heath Consultants Incorporated are warranted to be free from defects in material and workmanship for one (1) year from the date of shipment.

Furthermore, the warranty on authorized repairs in the Houston Factory Service Center (FSC) and other regions is ninety (90) days materials and thirty (30) days labor. This repair warranty does not extend any other applicable warranties.

Warranty covers only failures due to defects in materials or workmanship which occur during normal use. It does not cover failure due to damage which occurs in shipment, unless due to improper packing, or failures which result from accident, misuse, abuse, neglect, mishandling, misapplication, alteration, modification, or service by anyone other than a Heath warranty repair location.

Batteries and damage from battery leakage and all expendable items such as filters and tubing are excluded from this warranty.

Heath's responsibility is expressly limited to repair or replacement of any defective part, provided the product is returned to an authorized warranty repair location, shipped prepaid, and adequately insured. Return shipping charges and insurance will be paid by Heath warranty expense.

We do not assume liability for indirect or consequential damage or loss of any nature in connection with the use of any Heath product. There are no other warranties expressed, implied, or written except as listed above.

Heath warrants only that the parts manufactured by it will be as specified and free of defects. Heath makes no other warranties or representations of any kind whatsoever, express or implied, and any and all implied warranties including any warranty of merchantability and fitness for a particular purpose or use are hereby disclaimed.

Contact Information

Houston Factory Service Center

9030 Monroe Road
Houston, TX 77061

Phone: 713.844.1300
Fax: 713.844.1384

www.heathus.com

Return for Repair Procedure

Follow these steps to initiate repair of your instrument:

1. Repair Form

- For a single instrument, find online at **https://heathus.com/assets/uploads/Primary-Instrument-Repair-Form-Fillable-1.pdf**
- For multiple instruments, find online at **https://heathus.com/assets/uploads/Primary-Instrument-Repair-Form-Fillable.pdf**
- Complete the form by providing all information requested, such as:
  - full shipping and billing addresses
  - instrument or product name, model number and serial numbers
  - brief description of the problem you are experiencing
  - the person and phone number to be contacted for additional information and approvals

Primary Instrument Repair Facility

9030 Monroe Road
Houston, TX 77061
Tel: 713-844-1300
Fax: 713-844-1384
fsc@heathus.com

2. Package Your Return Carefully

- Use the original shipping carton and cushions if available
- Include all components
- Include the repair form
- Address your package to the repair facility specified on your form