



## Technical Bulletin

### RMLD-CS™

The RMLD-CS firmware has been updated to version 1.57-2.39-10 to incorporate changes related to security. The Operator's Manual is currently being updated and Rev E will be posted on our website soon. In lieu of Rev E, this addendum includes information about how security is now supported in firmware 1.57-2.39-10.

System Access Levels – Tiered Permissions, as referenced on page 22, is now selectable. The default "Out of the Box" mode is no security or Security - Disabled. This means all users, including the Default User, have full access to data, controls and instrument configuration similar to Admin. The selection of Security is now included in the Menu and the choices are either Enabled or Disabled. Once Enabled, the Tiered Permissions and full description as described in the Operator's Manual will be supported. Additionally, reverting back to Disabled requires Admin privileges only. The selection of Security supports the choice of implementing security or not in accordance with Company policy.

The following screenshot shows the default Menu with Security Disabled:



If you have any questions or concerns, please contact us at 713-844-1300.

# RMLD CS™

Remote Methane Leak Detector Complete Solution

## OPERATOR'S MANUAL



Your Safety...Our Commitment

[www.heathus.com](http://www.heathus.com)  
[info@heathus.com](mailto:info@heathus.com)  
713-844-1300



# Table of Contents

<b>PROPRIETARY NOTICE</b>	<b>5</b>
<b>OVERVIEW</b>	<b>6</b>
<b>WARNINGS &amp; DEFINITIONS</b>	<b>7</b>
SAFETY AND WARNING INFORMATION	7
HAZARDOUS SAFETY AND WARNING INFORMATION	8
SAFETY LABELS ON THE INSTRUMENT & BATTERY PACK	8
SYMBOLS USED	9
DEFINITIONS	10
<b>SPECIFICATIONS</b>	<b>11</b>
<b>RMLD-CS INSTRUMENT AND ACCESSORIES</b>	<b>13</b>
<b>BATTERY PACK, CHARGER AND CHARGING PROCEDURE</b>	<b>15</b>
BATTERY PACK	15
DUAL BAY BATTERY PACK CHARGER	15
CHARGING PROCEDURE	16
<b>OPERATING THE RMLD-CS</b>	<b>18</b>
TURNING INSTRUMENT ON/OFF	18
BUTTON CONTROLS	19
SCREEN MODE – SURVEY	20
SCREEN MODE – GRAPH	20
<b>SYSTEM ACCESS LEVELS</b>	<b>22</b>
TIERED PERMISSIONS	22
BEFORE LOGIN	23
ADMIN PROFILE	24
FIRST METHOD	24
SECOND METHOD	29
<b>WORKING WITH THE MENU ITEMS</b>	<b>31</b>
AVAILABLE MENU FEATURES FOR FIRMWARE 1.40-2.33-8 OR EARLIER	31
AVAILABLE FEATURES - OPERATOR'S ACCESS LEVEL MENU FOR FIRMWARE 1.54-2.38-10 OR LATER	31
INSTRUMENT SELF-TEST	32
AUDIO INDICATIONS AND MODES	33
ALARM LEVEL	35
SPOTTER CONTROL	36

<b>USB</b>	<b>37</b>
	<b>38</b>
<b>USB FILE TRANSFER IN FILE MODE</b>	<b>39</b>
<b>BLUETOOTH BLE</b>	<b>40</b>
<b>WI-FI</b>	<b>41</b>
<b>DATA LOGGING</b>	<b>46</b>
<b>LANGUAGE</b>	<b>47</b>
<b>TIMEZONE OFFSET</b>	<b>47</b>
<b>DISPLAY BACKGROUND</b>	<b>49</b>
<b>USER PROFILES</b>	<b>49</b>
<b>ABOUT SCREEN</b>	<b>53</b>
<b>ADMIN SPECIFIC COMMANDS VIA USB COMMAND MODE</b>	<b>54</b>
<b>3<sup>RD</sup> PARTY APPLICATION SUPPORT</b>	<b>55</b>
	<b>55</b>
<hr/>	
<b>HOW DOES THE RMLD-CS MEASURE GAS?</b>	<b>56</b>
<hr/>	
<b>SURVEYING WITH THE RMLD-CS</b>	<b>58</b>
<b>LONG RANGE SCANNING</b>	<b>60</b>
<b>DEALING WITH FALSE DETECTIONS</b>	<b>61</b>
<b>SCANNING THROUGH WINDOWS</b>	<b>61</b>
<b>COMMON VENTING LOCATIONS</b>	<b>62</b>
<b>TROUBLESHOOTING</b>	<b>63</b>
<hr/>	
<b>MAINTENANCE</b>	<b>65</b>
<hr/>	
<b>NOTES</b>	<b>66</b>
<hr/>	
<b>WARRANTY AND REPAIR</b>	<b>67</b>
<hr/>	
<b>RETURN PROCEDURE</b>	<b>68</b>
<hr/>	
<b>CONTACT INFORMATION</b>	<b>69</b>
<hr/>	



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# OPERATOR'S MANUAL

## **Proprietary Notice**

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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.

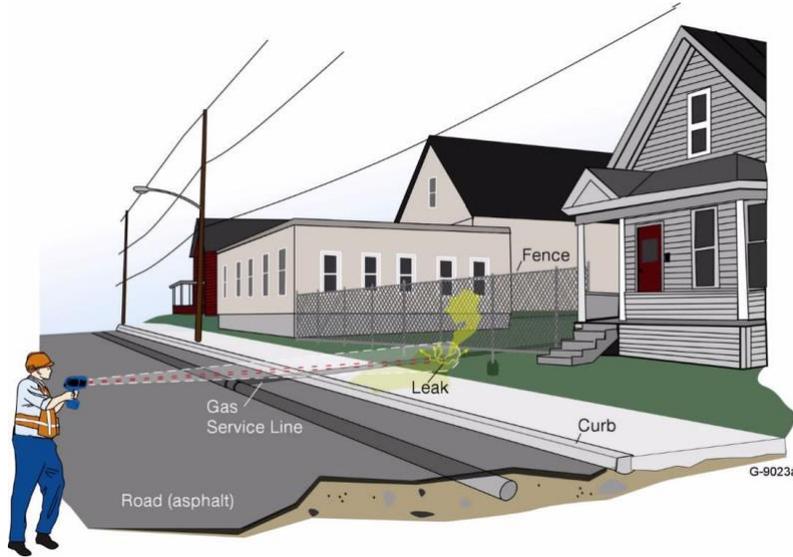
Doc No. 105408 Rev D, RMLD-CS Operator's Manual  
Date: May 14, 2021

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# Overview

The HEATH Remote Methane Leak Detector - Complete Solution (RMLD-CS) is a highly advanced technology, capable of detecting methane leaks from a remote distance. This technology makes it possible to detect leaks without having to walk the full length of the pipe line, thus creating safer surveys in areas that may be difficult to reach such as busy roadways, yards with dogs, fenced off areas, and other hard to access places.

The RMLD-CS employs the same technology as the field proven legacy RMLD, known as Tunable Diode Laser Absorption Spectroscopy (TDLAS). 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 type, moisture, temperature, wind, venting and leak rate.



The RMLD-CS operates under a variety of field conditions including a wide temperature range, light rain and fog. Its rugged design will stand up to normal field use and operating conditions. Its sensitivity or range is not affected by reasonable amounts of dust on the instrument's window. The RMLD-CS includes many new features which reduce costs and improve usage. These advanced features include, but are not limited to:

User Interface	Light-Weight
Internal Data Logging	Rechargeable and Replaceable Battery
Wi-Fi	Dual Bay Charger
GNSS	Mobile App / 3 <sup>rd</sup> Party App Support
Bluetooth BLE	Ergonomic Housing
Color Camera	Spotter Laser
Color Display	Self-Test

# Warnings & Definitions

## Safety and Warning Information

It is essential that users of this instrument read, understand and follow the instructions for operation and maintenance. The precautions contained in this manual are to ensure that the instrument is used in a proper and safe manner.



### WARNING

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



### CAUTION

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

**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. 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:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous 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.

## Hazardous Safety and Warning Information

**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 Heath 105727 Battery Pack. Battery Charger is not part of the hazardous safety certification.

**WARNING:** Do not disassemble or open or modify this instrument including the 105727 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 ( $\geq 60\text{ C}/140\text{ F}$ ) 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

**105354 RMLD-CS**  
 REMOTE METHANE LEAK DETECTOR - Complete Solution  
 Class I, Zone 2, AEx ic op is IIA T4 Gc -17°C ≤ Tamb ≤ +50°C  
 Class I, Division 2, Group D Intrinsically Safe  
 USB Port Max Rating: Um = 5V, In = 5A IP54  
 FCC ID:Z64-CC3120MOD IC ID:451I-CC3120MOD  
 Complies with 21 CFR 1040.10 and 1040.11 except  
 for deviations pursuant to Laser Notice No. 50, dated June 24, 2007  
**SN:**



**WARNING - DO NOT CONNECT TO USB PORT IN A HAZARDOUS AREA**



[www.heathus.com](http://www.heathus.com)  
 (713) 844-1300  
 MANUFACTURED BY: HEATH CONSULTANTS INCORPORATED  
 9030 MONROE RD, HOUSTON, TX 77061



**CLASS 2 LASER PRODUCT**



**VISIBLE AND INVISIBLE LASER**

Maximum Output: <1 mW  
 Emitted Wavelength(s): 510-530 nm IEC60825-1:2014

**WARNING - DO NOT CHARGE, REPLACE BATTERY OR OPEN IN HAZARDOUS LOCATION. USE ONLY REPLACEABLE HEATH 105727 BATTERY PACK.**




**USER MUST REFER TO OPERATOR MANUAL FOR PROPER USE, WARNINGS & CAUTIONS**

MADE IN USA

**LITHIUM BATTERY PACK**  
**DANGER: DO NOT DISASSEMBLE, DO NOT SHORT CIRCUIT, DO NOT BURN OR EXPOSE TO HIGH TEMP ( $\geq 60\text{C}/140\text{F}$ ). USE DESIGNATED CHARGER ONLY IN NON HAZARDOUS ENVIRONMENT. USE ONLY ON HEATH 105354 INSTRUMENT.**

## Symbols Used

---

	Caution
	Information
	Consult Instructions for use
<b>IP54</b>	Ingress protection
	Do not dispose of this product in the unsorted municipal waste stream. Dispose of this product according to local regulations.
	Measurement IR Laser Radiation: Class I Visible (Green) Laser Radiation: Class 2(II)  Do not stare into beam. Avoid direct eye exposure.

### NOTE:

The manual captures information applicable to both firmware releases: 1.40-2.33-8 and 1.54-2.38-10. The new firmware release 1.54-2.38-10 added security level features and new menu options not available on earlier versions. These new features are highlighted in blue as shown below.

Firmware 1.54-2.38-10 and newer only

## 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-CS 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.

**Real Time:** An audible mode that will continuously emit a variable beep rate relative to the concentration of gas. The response range covers 10 – 1000 PPMM.

**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.

# Specifications

Detection Method	Tunable Diode Laser Absorption Spectroscopy (TDLAS)
Measurement Range	0 to 50K PPM-M. Concentration units shift at 10000 PPM-M and higher to K PPM-M; example 9999, 10K, 12K, 20K, 50K
Sensitivity	5 PPM-M at distances from 0 to 100 ft (30m)
Hazardous Location Safety	Class I, Zone 2, AEx ic op is IIA T4 Gc Class I, Division 2, Group D Intrinsically Safe
Detection Distance	100 ft (30m) nominal. Actual distance may vary due to background type and conditions.
Beam Size	Conical in shape with a 22" diameter at 100 ft (55cm at 30m)
Detection Alarm Modes	Digital Methane Detection (DMD): Audible and visual alerts when the alarm level is exceeded. Adjustable Alarm Level from 1 to 999 PPM-M. Real Time (RT): Continuous audio beep rate relative to concentration from 10 – 1000 PPM-M.
System Fault / Warning	Audible alarm and visual indication on the display.
Self-Test	Built-in Self-Test function verifies operation and adjusts laser wavelength for maximum sensitivity. Cal gas cell integrated within carrying case.
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
Laser Eye Safety	IR Laser: Class I Visible Laser: Class II Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Do not stare into beam or view directly with optical instrument
Communications	USB Dual Mode – flash drive and communications USB Port Max Rating: Um = 5V, In = 5 A Bluetooth 4.2 BLE Wi-Fi b/g
Display	3.5" LCD Color 320 x 240
Operational Power on Battery	3.1 W typical at 25° C

Operating Temperature	0° to +122° F (-17° to 50° C)
Humidity	5 to 95 % RH, non-condensing
Ingress Protection	IP54 (water splash and dust resistant)
Altitude	Up to 2000 meters
Environment of Use	Pollution degree 2 or better, Outdoor use
Instrument Weight	3 lbs. (approx.)
Color Camera	Aperture f/2.6 FOV 94 DEG (at 6.0mm image circle)
GNSS	Compatible with GPS, GLONASS, Beidou, Galileo
Green Spotter	Class 2(II) < 5mW @ 510-530 nm Spot size is 7mm at 15M
Carry Case	21" x 17.5" x 9.5"
Battery Pack	Removable, rechargeable Li Ion pack 10.8 Vdc at 3.2Ah
Battery Run Time	8 hours at 32 °F (approx.)
Battery Charger	External, 110-240 Vac, 50/60 Hz Universal, Dual Bay, Delivers 12W at 25° C per battery typically
Charge Time	2-3 hours full charge (approx.)
LED Charging Indicator	Integrated into Dual Battery Charger

# RMLD-CS Instrument and Accessories

## Complete Kit Assembly - HPN 105301

(Includes Carry Case, Instrument, Test Cell, Carry Strap, Battery Charger, Battery Pack, USB Cable)

## Instrument - HPN105354

This is the primary component of the RMLD-CS. In addition to the gas detection capability, it contains the user interface, data logging interface, battery, power connector.



## Carrying Case - HPN 105355

The carrying case provides protection for the instrument during storage and/or transportation. It also has a built-in cal cell (HPN 106024) for calibration. The instrument should be kept in the case while not in use.



**Battery Pack - HPN 105384**

1 rechargeable Li-Ion battery is supplied with instrument. The RMLD-CS has a removable, rechargeable Lithium-ion battery that provides the main power to the instrument. This battery is designed to provide up to eight (8) hours of operating time when fully charged. The battery must be recharged between uses to assure no interruption in use.

**Battery Charger - HPN 105358**

The battery charger is provided to recharge the instrument's battery after use. It has 2 slots for dual battery charging. The charger is universal 100 - 240 VAC, 50-60 Hz with charger indicator on the front of the housing. While charging, the LED light will blink green. Once a full charge is reached the LED light will turn solid green.

**USB Cable**

The USB 2 A to USB micro cable is used for downloading data from the instrument to a computer and for serial communications.

**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.

# Battery Pack, Charger and Charging Procedure

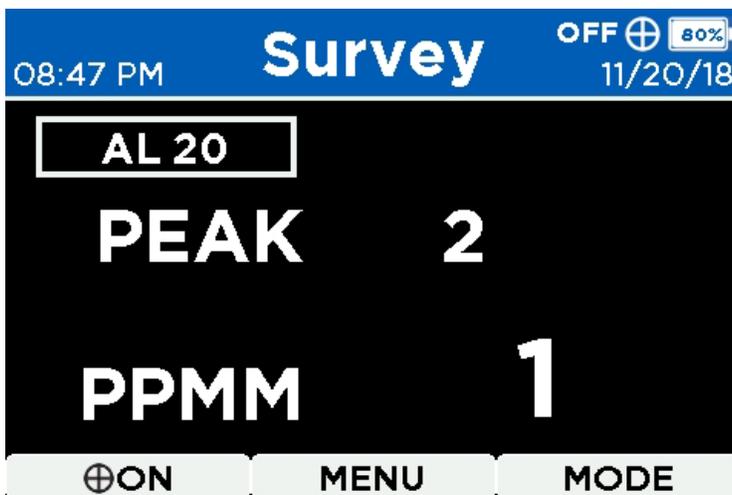
## Battery Pack

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The RMLD-CS has a removable, rechargeable Li-Ion battery pack that provides power to the instrument. This battery pack is designed to provide up to 8 hours of run time when fully charged. The battery pack must be recharged between use to assure no interruption in use.



The display features a remaining battery pack capacity (in percent) indicator in the top right of the screen. The battery pack capacity indicator will turn red when the capacity gets low around 10 % and the instrument will prompt the operator for acknowledgement on the display.



## Dual Bay Battery Pack Charger

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The dual bay battery pack charger supplied with the instrument can charge two battery packs simultaneously. An integrated metal bracket is included on the bottom of the charger to allow for wall mount or fixed mounting options. For wall mounted or mobile applications, HEATH recommends securing the battery pack to the charger using the captive screws attached to the battery pack.

The RMLD-CS power cord on the charger can be changed to fit the type of receptacle used in your location. Non-US power cords must be specified when ordering.



## Charging Procedure

---

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

**WARNING:** Only use the HEATH supplied RMLD-CS battery pack charger to recharge the battery pack. Use of any other charger may cause severe damage to the battery pack or electrical circuits.

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

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**NOTE:** 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. When storing the instrument or the battery pack for more than a month, charge the battery pack to 40-50 % and store at cool to room temperatures (about 60-70 °F). To obtain full battery pack capacity, charge the battery pack when the ambient temperature is above 50 °F (10 °C).

---

**To charge the battery, perform the following procedure:**

1. Turn instrument OFF.
2. Unscrew the two captive screws located on the bottom of battery pack. Remove from the instrument.
3. Insert the battery pack into the charger, ensuring it seated.

- a. Optional: Fasten captive screws into charger housing to prevent the battery pack from dislodging.
  - b. LED panel will illuminate to show the status of the battery pack charging.
4. Charging Modes (The charger station displays charging legend):
- a. Flashing Green – Battery pack charging
  - b. Solid Green - Battery pack fully charged
  - c. No light – Battery pack not present or not connected properly
  - d. Red – Fault, replace battery pack
    - i. Position battery pack into the other bay, if still red, try another battery pack.
    - ii. If the light is still red send to repair or replace.



5. Once the battery pack is fully charged, power up the instrument and verify the battery pack capacity on the screen displays.

**NOTE:** Full charge time is approximately 2-3 hours.

# Operating the RMLD-CS

## Turning Instrument On/Off



**NOTE:** On all screens, the middle button shuts down the instrument when pressed and held for at least 3 seconds.

The instrument will start booting up. The display sequence is - starting logo, “Running diagnostics...” at the bottom of the screen, the upper screen auto populates the User: Default along with other information like the firmware version, time and day. When done the display will show a “Self Diagnostics Ok”.

FW 1.54-2.38-10 or later

The first thing the instrument then checks for is a valid passing Self-Test file for the day. If not found, a pop-up window appears informing the operator to conduct a Self-Test. The Self-Test prompt must be acknowledged.

**NOTE:** Boot-up Self Diagnostics is not the same as Self-Test.

**WARNING:** The visible green Spotter laser is a class (II) 2 laser product. Do not stare into the 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 the instrument.

## Button Controls

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

The available button functions vary depending upon the active screen.



After instrument is powered ON, the control buttons will be as shown below:



- First function (⊕ON) enables/disables the spotter
- Second function (MENU) displays the available features according to the access level
- Third function (MODE) displays the three (3) screen mode options (Survey, Graph, and Image)

### Menu Buttons

When Menu is selected, the buttons change to the ones below letting you view and select available features in the Menu.



- First button (↓), scrolls down through the Menu options
- Second (SELECT), selects the option highlighted
- Third, back arrow (↶) returns to the previous level and it also works like an “enter/return” when entering PIN and User Name.

### Other Buttons

There are two more button configurations. One to use the camera under the Image screen and a second the Login Buttons for entering credentials. These are covered in, “Screen Mode – Image” and “Before Login-in” sections.

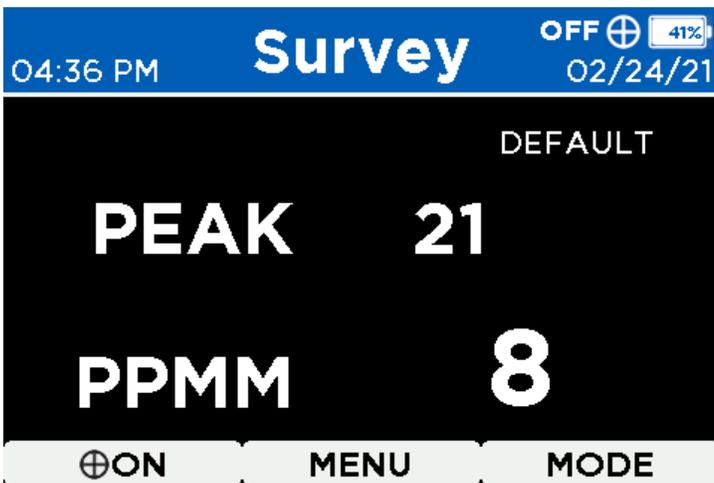
Login Buttons and System Access Levels are not applicable to FW 1.40-2.33-8 (and earlier) and can be skipped.

## Screen Mode – Survey

---

The Survey screen mode will display a numerical readout of PPM-M readings. This allows the operator a no-clutter screen to survey with the instrument.

During DMD Audio Mode, the Peak and PPM-M values will turn red while methane is detected above the alarm level. The Peak value is held for two seconds before resetting to a lower current reading. The Peak value will instantly change if a higher reading is obtained by the instrument.



FW: 1.54-2.38-10 or later

The maximum PPMM value displayed is 50K PPM-M. Any measurement above 50K PPM-M will display **ORNG** (over-range reading). Readings from 10,000 PPM-M and higher are rounded to the nearest thousand and appended with a "K", i.e., 10 K, 12 K, 20K.

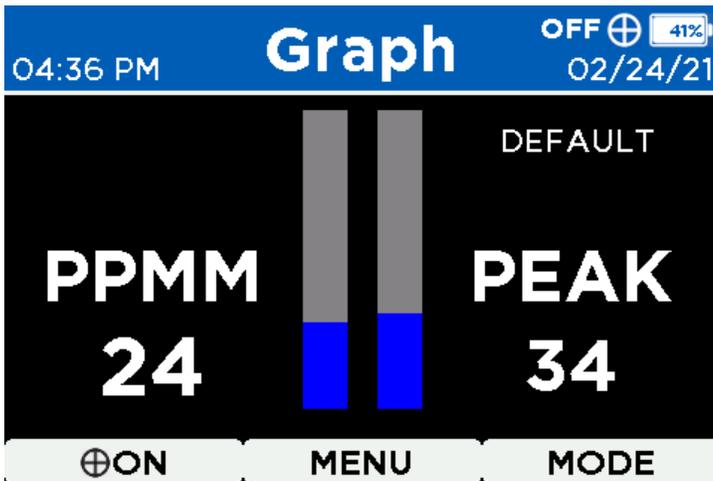
The active operator (DEFAULT, ADMIN, CUSTOM USERS) will be displayed in the top right corner below the date.

## Screen Mode – Graph

---

The Graph screen mode will display a bar graph in addition to the numerical readout of PPM-M readings. This allows the operator to easily see the changing values while surveying with the instrument.

During DMD Audio Mode, the Peak and PPM-M values will turn red while methane is detected above the alarm level. The Peak value is held for two seconds before resetting to a lower current reading. The Peak value will instantly change if a higher reading is obtained by the instrument.



FW: 1.54-2.38-10 or later

The maximum PPM-M value displayed is 50K PPM-M. Any measurement above 50K PPM-M will display **ORNG** (over-range reading). Readings from 10,000 PPM-M and higher are rounded to the nearest thousand and appended with a “K”, i.e., 10 K, 12 K, 20K.

The active operator (DEFAULT, ADMIN, CUSTOM USERS) will be displayed in the top right corner above PEAK.

### Screen Mode – Image

The IMAGE mode allows the operator to view a live image of where the RMLD-CS is pointed as well as current and peak PPM-M readings. This feature is especially useful in bright sunlight when the green spotter laser may be hard to see.

NOTE: The center reticle is a general representation of where the IR beam is located. The beam may not be located at the exact center of the circled image and the operator should always sweep the area of interest to ensure beam coverage.



Pressing the center CAMERA icon button while in image mode will take an image snapshot that is recorded to the internal SD card. A text file will also be recorded onto the SD card, capturing the current instrument readings, timestamp, GPS, and other information. The image snapshot will be held for 2 seconds before returning to live images.

## System Access Levels

### Tiered Permissions

For security reasons, a tiered system of access is used. These new features are available for firmware version 1.54 – 2.38 – 10 and later. The DEFAULT operator has the lowest tier and no data access or communications control. A CUSTOM USER has mixed access while ADMIN has full access to data, control of communications and limited instrument configuration permissions.

	DEFAULT	CUSTOM USER	ADMIN
Intended for	Anyone	Field Operator	IT or Authorized personnel
Streaming Access (USB, Wi-Fi, BLE)	X	✓	✓
File Access (USB + Wi-Fi)	X	✓	✓
Web Access (File Server, Configuration Portal)	X	File Server	✓
Command Options	Help, Command Access Level	Same as Default + Telemetry System	Same as User + Set: Wi-Fi SSID & Password, Update Wi-Fi, Display Fault Record, Clear Fault Record, System Time

### Access Level Profiles

**DEFAULT** – The instrument boots-up in DEFAULT mode. For data protection, all electronic communication ports (USB, Wi-Fi and BLE) are disabled. To access data and many of the features, operators needs to log in as an Admin or Custom User with permissions.

**CUSTOM USER** – Primary profile for authorized field surveyors to operate and use the wired USB, Wi-Fi, and Bluetooth interfaces. Limited internal data is available. The RMLD-CS can hold up to 19 custom user profiles.

**ADMIN** – Primarily used to create, delete, and modify user's credentials. ADMIN can access all data, control communications and configure the instrument.

## Before Login

Identify the operators per instrument and their tier level access. Only the ADMIN profile has permission to create, setup credentials and delete / add new USER profiles.

### Required Credentials

The table below describes the credential requirements applicable to all account profiles (ADMIN and all CUSTOM USER profiles), except for the "User Name" credential, which is only available for USER profiles. The ADMIN and DEFAULT operator profiles are not editable.

File Type	Access Level	Max Length	Supported Characters
<b>User Name</b>	User	20	Space, Uppercase Letters and Numbers
<b>ID</b>	ADMIN/User	4	Numbers
<b>PIN</b>	ADMIN/User	12	Space, Uppercase Letters, Numbers and Symbols
<b>Wi-Fi SSID</b>	ADMIN/User	32	All printable characters
<b>Wi-Fi PASS</b>	ADMIN/User	63	All printable characters

### Terms

User Name = visible identifiers of USER profiles

ID = number-based identifier for their instruments or any company preference (e.g. employee number)

PIN = same as password

Wi-Fi SSID =Service Set Identifier, available for both AP and Station Mode. They will typically differ.

Wi-Fi Pass = password for both AP and Station Mode. They will typically differ.

### Login Buttons Usage

When entering credentials using the buttons, the process can be easier using a set of secondary buttons for navigation. This set of secondary buttons help with features that require an operator to enter any set of information (credentials). To activate these secondary buttons, *press and hold the left button of the standard button layout* to perform the functions below:



Standard button layout



Secondary buttons

- First button (↓), activates the secondary Login Buttons by pressing and holding the button. Once it is released the Login Button functions will change back to the standard button layout (Menu Buttons). Be careful when entering PIN and User Name not to release the button and hit the back arrow, otherwise all entry is lost and they will need to be re-entered.
- Second button (↑), cycles backwards through the available characters. This is useful when accidentally passing through the desired character.
- Third button (⇓), jumps to the next character set boundary in the available character sets. The sequence of characters sets are: Space ( ), Letters (A-Z), Numbers (0-9), Special

Characters (!, ", #,...). For the ID request, only numerical values are acceptable.

### Special symbols



Represents the space character; this helps differentiate between space character and an empty/no character.



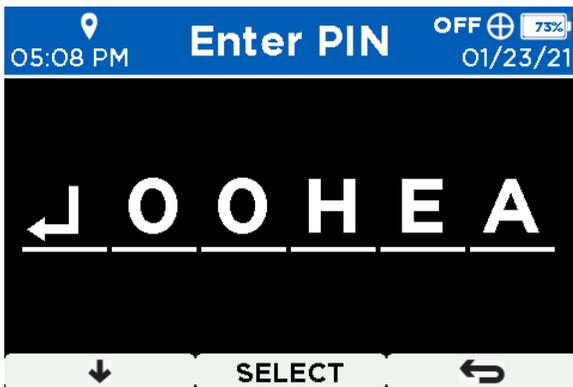
Represents the empty or null character.



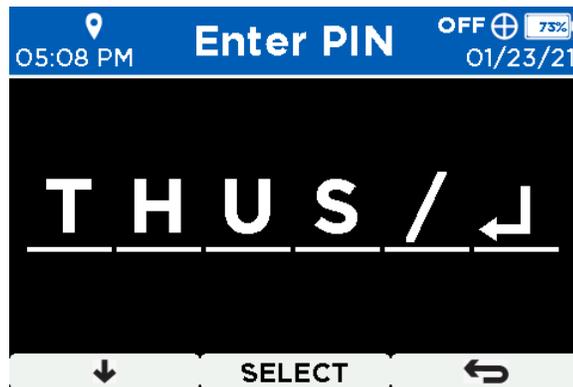
Deletes all the characters to its right side and keeps the rest of the left side characters. This symbol is available under the Login Buttons.

Short cut for the symbol: Press ↓ button and hold, also press the ↓↓ button until you get the space \_ character, while still holding the ↓ button press the up arrow ↑ twice until you get the delete symbol.

Examples below when you highlight ← and then press SELECT:



Left image - All entries will be deleted.



Right Image – Only the last rightmost character will be deleted.

## ADMIN Profile

---

There are two methods for login as ADMIN (FW 1.54-2.38-10 and later). One is through the instrument buttons / MENU and the second method, which is easier, involves Tera Term (or suitable terminal program), a Wi-Fi connection and the Configuration Portal.

### First Method

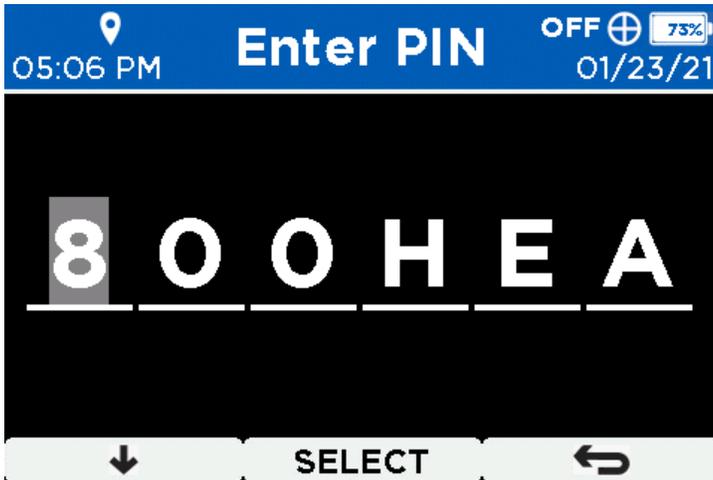
---

Only requires the RMLD-CS. All configurations are made using the buttons explained earlier. It is an easier setup than the Second Method, but it will take longer working with the buttons, especially if the credentials are composed of many characters.

## Login

From the Survey or Graph screen mode, select MENU, scroll down to USERS and then select ADMIN. The next screen will ask for your PIN (password) credentials. Enter the PIN. (Reference the control buttons section for more details.)

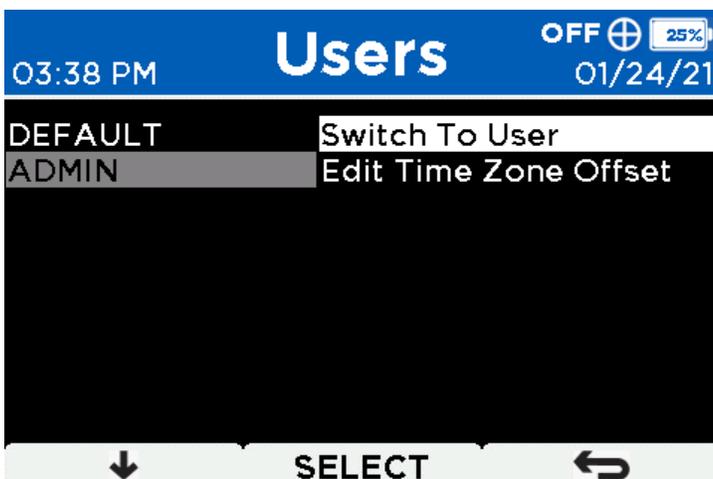
The default PIN for ADMIN is: **800HEATHUS/\$**. You will need it for first time login. **It is highly recommended to change the password.**



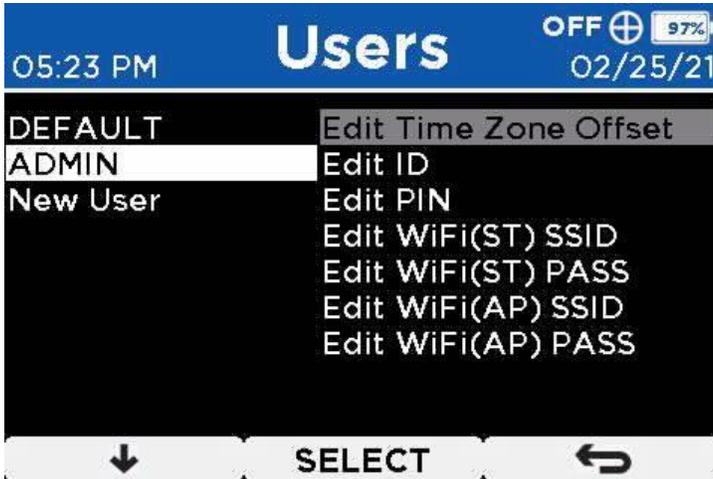
When done, press the back arrow. This will take you back to the USERS screen with the SWITCH TO USER highlighted. ***Make sure to press SELECT or the credentials will not be processed.***

**NOTE:**

Firmware 1.40-2.33-8 User profile configurations are covered under the Menu feature User in the manual. This section is applicable for firmware 1.54-2.38-10 or later.



If the PIN was processed the screen will change its features to the options below.



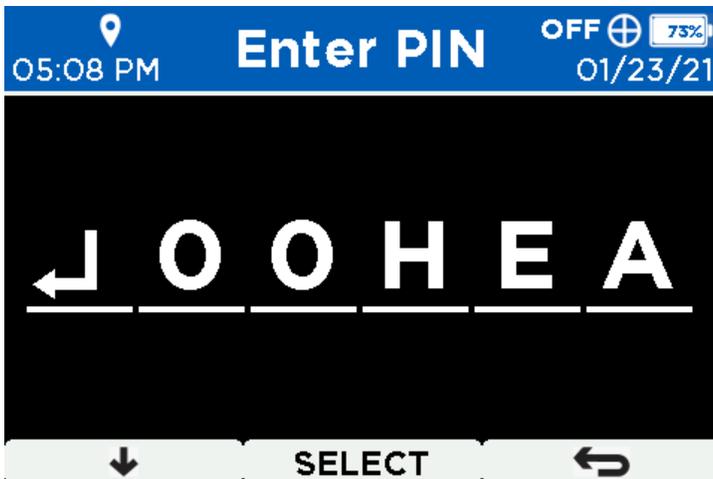
### Setting up Credentials

After login-in as ADMIN, new features to modify your profile account as well as others will appear. Before creating New Users, it is recommended to change you ADMIN PIN first and ID. The steps below will apply to User profiles as well.

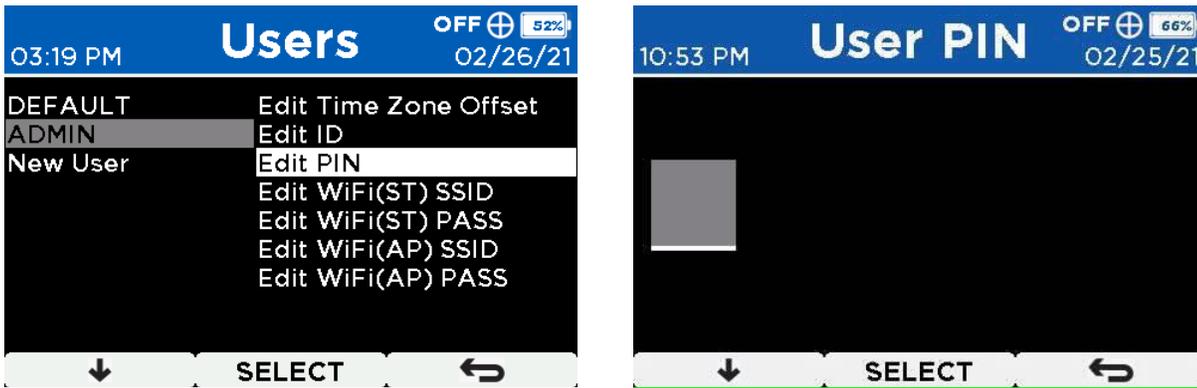
#### Changing PIN:

From the MENU screen, select USERS. Select appropriate account profile, then press EDIT PIN. To delete the current PIN, use the delete character  (Check *Login Button* section).

**Tip:** To delete the old PIN entirely, make sure the delete symbol is at the far left.

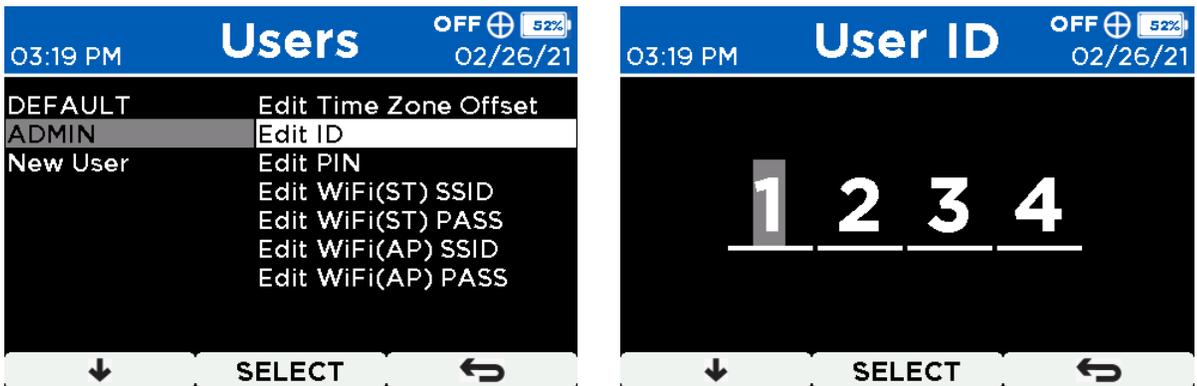


The screen will have an empty space. Enter your new PIN following the guidelines from the Supported Characters table. Pressing the **BACK ARROW** button will return to the previous menu and accept the PIN entered.



### Edit ID:

Select the profile account from the MENU and scroll to EDIT ID. Press select and use the down arrow button to scroll through the numeric options- referencing the supported characters table in the “Before Log-in” section. Pressing SELECT will accept the change and move to the next place holder. When done press the BACK ARROW button to accept the changes and return to the previous menu.



### Edit Wi-Fi credentials:

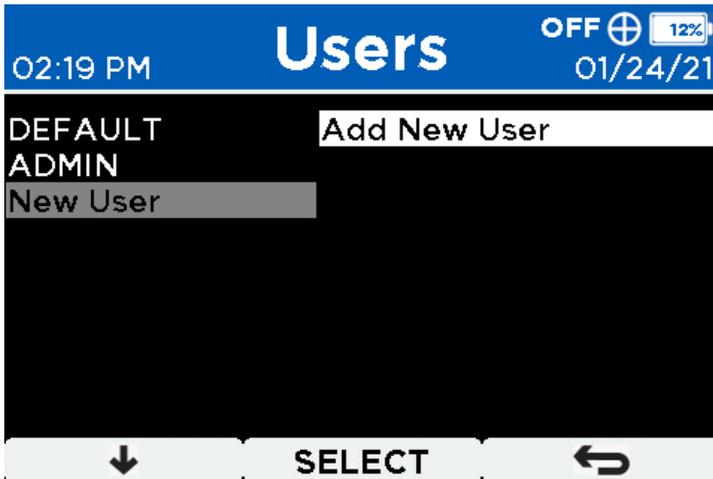
Both the Users and Wi-Fi features under the Menu screen allow an ADMIN to change their and other Users' Wi-Fi credentials.

**NOTE:** It is required to create credentials before enabling Wi-Fi, otherwise a prompt will appear asking for SSID or password information.

Choose from Station or AP mode and their SSID and Password options. Press select and use the down arrow button to scroll through the character options. Pressing SELECT will accept the change and move to the next character place holder. When done, press the BACK ARROW button to accept the changes and return to the previous menu.

## Creating New Users, Credential Setup and Deleting New Users

The ADMIN profile allows you to create up to 19 users. For each user a Name, ID, and PIN need to be created.



### Creating a New User:

Under the Menu option select USERS, scroll down to New User and SELECT Add New User. Automatically, the instrument will add a new user under the name NEW. It is highly recommended to change the name.

### Editing User's Name:

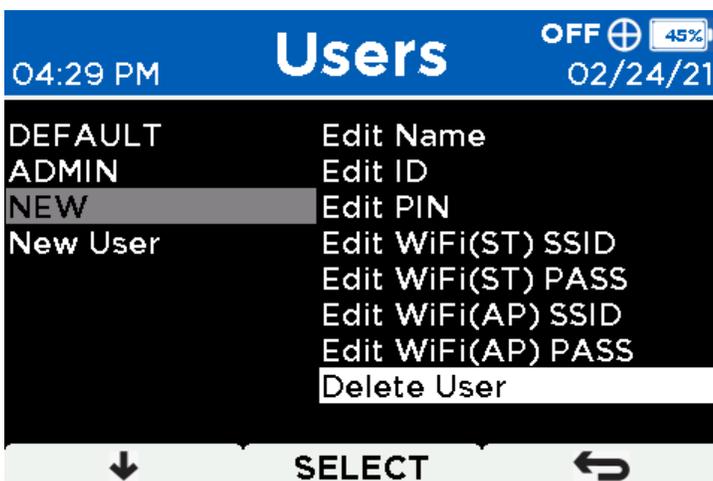
Select NEW and scroll down to Edit Name. Delete the NEW name using the delete symbol and change the name like changing the PIN. When done, select the Back Arrow.

To change the ID, PIN, and Wi-Fi credentials:

This is the same process as with the ADMIN profile. Select the User profile and credentials to change.

### To delete Users:

Select the user profile and scroll down and press Select to Delete User.



## Second Method

ADMIN can use USB Command Mode. This mode provides more comprehensive access to the instrument for monitoring and configuration purposes. Using this mode allows you to login into an instrument through Tera Term and access the Configuration Portal (edit profiles) after a Wi-Fi connection is established (details are covered in other sections in this manual). Other features to access files are covered on the File Access section.

### Tera Term Requirements

1. Micro USB to USB2 A cable, ~ 2m long, included with the RMLD-CS.
2. A serial terminal program such as Tera Term. A link for Tera Term version 4.105 <https://osdn.net/projects/ttssh2/releases/>  
A newer version may be available.

### Enabling Command Mode

With power off, press and hold the right button and then press and hold the center button for a few seconds and then release both buttons. The instrument's power sequence is the same, but when starting it will display a "Command Mode Enabled" at the bottom of the display for acknowledgement.

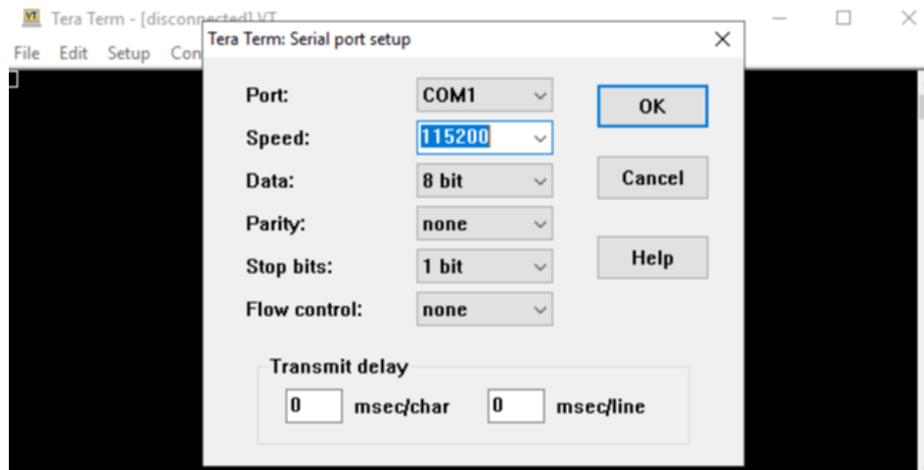
### Login Using Tera Term

1. Attach the micro USB cable to the RMLD CS and the USB2 A end to the PC's USB port. Wait for the driver to load when first connecting to a PC.
2. Run Tera Term. Select the respective COM port.

**NOTE:** You may need to go to PC's Settings under "Device Manager" to find the assigned com port.

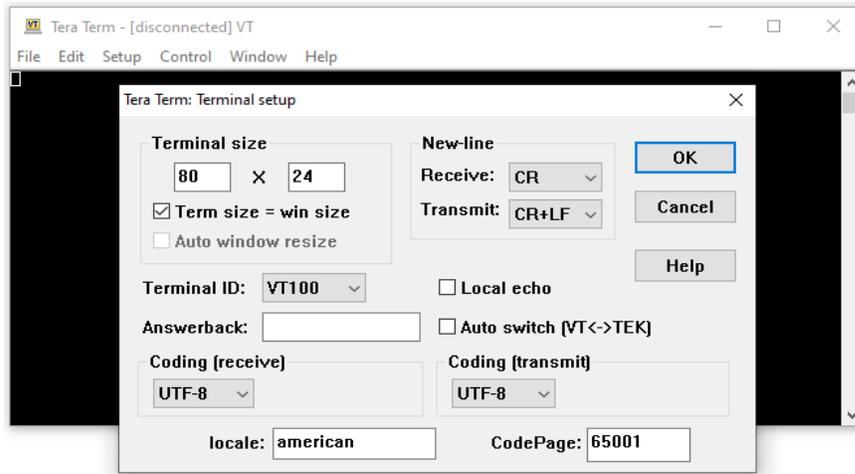
The RMLD CS com port is typically named: **USB Serial Device** in Device Manager

3. Click "Setup" tab then "Serial Port". Set the serial port configuration to: 115200, 8, N, 1, N (as shown below). The com port used may differ from what's shown. Click "OK".

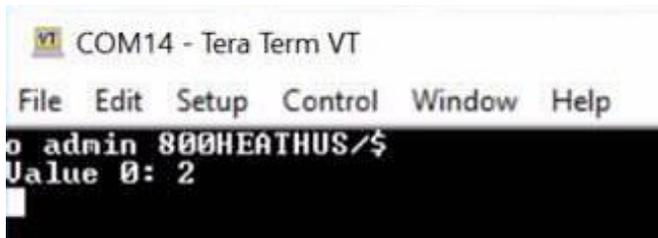


**NOTE:** The dialog box may display "Open New" instead of "OK".

- Click "Setup" tab then "Terminal". A Dialog box "Tera Term: Terminal setup" will appear. Under "Transmit:" select "**CR+LF**" then "OK" as shown below.



- Type the command **o admin 800HEATHUS/\$** (the password will differ if changed) and press enter. This command starts by using the small letter "o" and not the number "0". The return should be "Value 0:2". Now you are logged in as ADMIN and you can exit the Tera Term program and disconnect the USB cable from the instrument. On the instrument screen modes Survey / Graph, it should display ADMIN in the upper right.



**NOTE:** Once you are logged in as an ADMIN (covered in this section) go to the Wi-Fi section under the Menu features to establish connection and then review the Configuration Portal section for more details on credentials and CUSTOM USERS arrangement.

## Working with the Menu Items

### Available Menu Features For Firmware 1.40-2.33-8 Or Earlier

	DEFAULT
<i>Self-Test</i>	✓
<i>Audio Mode</i>	✓
<i>Alarm Levels</i>	✓
<i>Spotter Control</i>	✓
<i>USB</i>	✓
<i>Bluetooth</i>	✓
<i>Wi-Fi</i>	✓
<i>Data Logging</i>	✓
<i>Time Zone Offset</i>	✓
<i>Users</i>	✓
<i>About</i>	✓

### Available Features - Operator's Access Level Menu For Firmware 1.54-2.38-10 Or Later

	DEFAULT	CUSTOM USER	ADMIN
<i>Self-Test</i>	✓	✓	✓
<i>Audio Mode</i>	✓	✓	✓
<i>Alarm Level</i>	✓	✓	✓
<i>Spotter Control</i>	✓	✓	✓
<i>USB</i>	✗	✗	✓
<i>Bluetooth</i>	✗	✓	✓
<i>Wi-Fi</i>	✗	✓	✓
<i>Data Logging</i>	✓	✓	✓
<i>Timezone Offset</i>	*	*	✓
<i>Language</i>	✓	✓	✓
<i>Display Background</i>	✓	✓	✓
<i>Users</i>	✓	✓	✓
<i>About</i>	✓	✓	✓

\* For the User/Default access level, the Timezone Offset feature is under the Users feature.

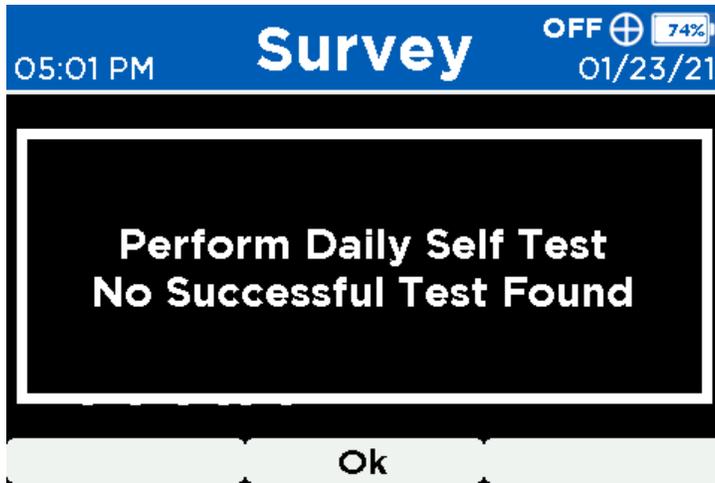
## Instrument Self-Test

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The RMLD-CS has a built-in function to perform a Self-Test of the laser wavelength. The Self-Test feature should be performed daily before survey to ensure that the instrument is operational. A Self-Test log file is recorded and stored on the RMLD-CS instrument.

### FW: 1.54-2.38-10 or later

A pop-up screen will appear after the Self Diagnostic reminding the operator to perform a daily Self-Test if one has not been successfully performed. Acknowledgement by clicking "OK" is required.



**NOTE:** No yearly factory calibration required unless the instrument fails the Self-Test (repeatedly) or presents other problems.

**NOTE:** The Self-Test takes approximately one to three minutes to perform.

---

To perform the Self-Test, the following procedure should be followed:

1. Press the **MENU** button and select the **SELF-TEST** option.
2. The screen will display and guide the next steps for the operator to follow within 10 seconds (enough time for the steps).
3. Place the instrument in its designated area in the carrying case, making sure it is all the way in place and flat.
4. Status of test will be present on the display and by audible tones.
  - a. A single beep every second means the instrument passed the Self-Test. A pop-up will display.
  - b. If the instrument fails the Self-Test, it will make two beeps every second and the operator should repeat Self-Test. A pop-up will display.



### ***What if the instrument failed the Self-Test?***

Most often, the causes are due to the instrument not being properly positioned in the case, the case was moved during the test or the battery level is too low to perform the test. Ensure sufficient battery charge before attempting the 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:** Should the instrument not pass after several attempts, do not use the instrument for survey work until the problem is corrected. Contact HEATH for further assistance.

**NOTE:** Laser wavelength drift is a normal characteristic of the RMLD-CS. The rate of drift is low and Self-Test will sweep the laser's wavelength range to determine the optimum wavelength. Survey work conducted with an instrument which has drifted and was not Self-Tested regularly may need to be redone. If the instrument is still not able to successfully perform a Self-Test after three attempts, contact HEATH for assistance.

## **Audio Indications and Modes**

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### **Audio Warning Indications**

A continuous alarm will indicate a warning and / or fault such as an infrared laser low signal level condition, instrument fault or low battery capacity. The warnings and faults will also be displayed via pop-ups on the display.

If low light, the operator needs to move in closer to get in range.

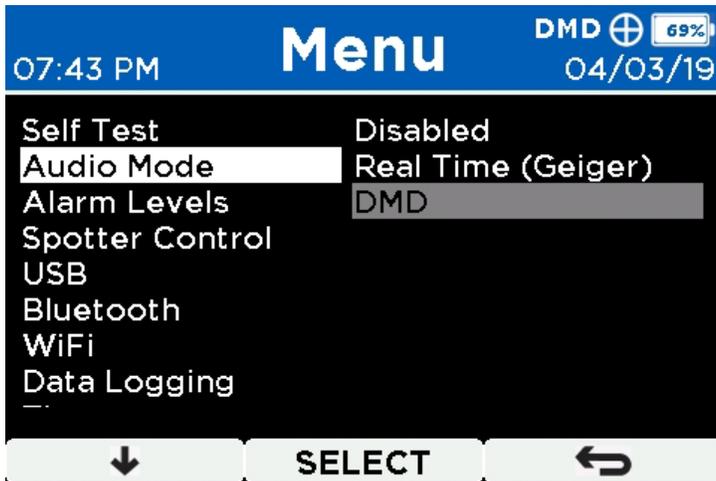
If over saturation, the operator should back up from the target or point the instrument at a less reflective surface.

Should the warning(s) persist, it could be due to a fault in the instrument. Check the display and follow the instructions in the troubleshooting guideline.

## Audio Modes

### DMD (Digital Methane Detection)

The Digital Methane Detection (DMD) mode is a highly sophisticated detection algorithm that greatly enhances the use of the RMLD-CS. In most situations, the operator should survey with the DMD mode turned on. To turn on the DMD mode, press the MENU button, select AUDIO MODE, then select DMD.



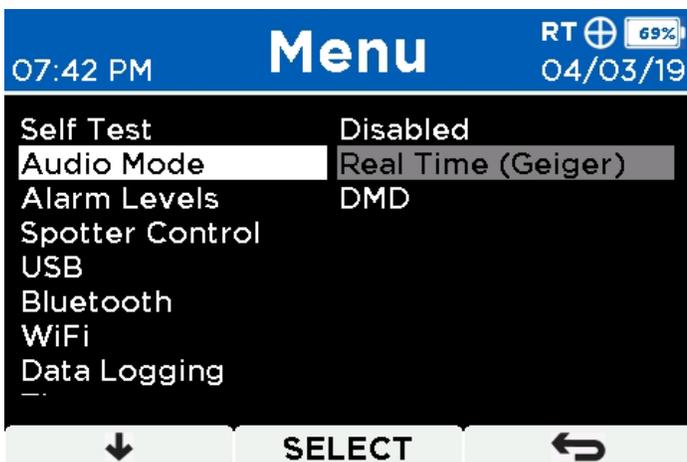
While using the DMD, no gas detection sound will be heard and the display will not respond until a detection of methane above the alarm level occurs. When methane is detected, the audible alarm will sound and the display readings / bar graph will change color to red.

DMD detection is possible when the PPM-M reading is high and there is a low light warning. While the low signal warning is sounding, the RMLD-CS may still be able to detect high gas concentrations.

The Alarm Level controls the response of the DMD. The operator can adjust the Alarm Level. Your company's survey 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.

### Real Time (Geiger)

The Real Time mode of the RMLD-CS emits a continuous yet variable beep rate that is relative to the concentration reading. The faster the instrument beeps, the higher the methane concentration level. Note that the beep frequency increases as you scan at a further distance due to the ambient amount of methane in the air. The usable concentration range used by Real Time is 10 – 1000 PPM. Real Time is very convenient to use for leak spread and leak centering.



The Real Time mode is most effective when used at shorter distances to help verify a low level detection or to help isolate the highest gas concentration location.

**To verify a low level leak, the following procedure should be used:**

1. Stand back about 10 feet from the leak with the wind to your back if possible.
2. Sweep the laser back and forth across the leak while maintaining a constant distance.
3. Listen for a consistent increase in beep frequency as the beam sweeps through the leak. Very small leaks will have just a slight increase in beep rate.

**To isolate the spot with the highest concentration, the following procedure should be used:**

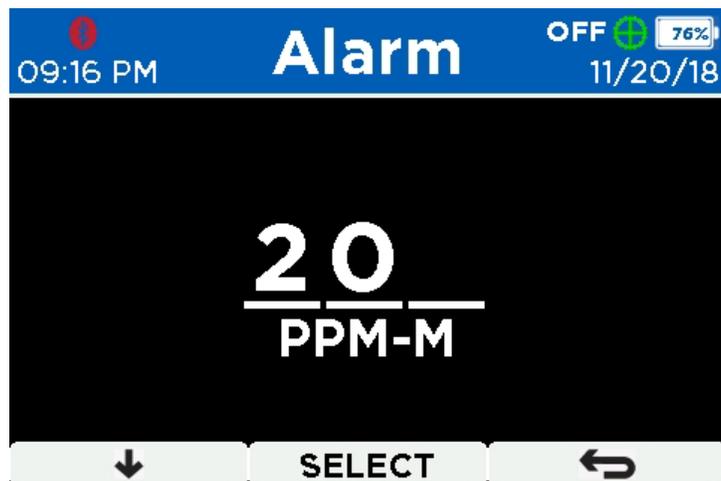
1. Stand back about 10 feet from the leak with the wind to your back if possible.
2. Sweep the laser starting from the up-wind side, in and around the leak area.
3. Listen for the fastest beep frequency.
4. Change your angle slightly and re-scan the leak zone.
5. If the location with the fastest beeping is consistent, then the location of the surface leak is at that spot.
6. If the beeps are not consistent then keep working the area. The gas plume may be drifting around causing inconsistent readings. In some cases, the gas plume may be large enough that localization is not very accurate.

## Alarm Level

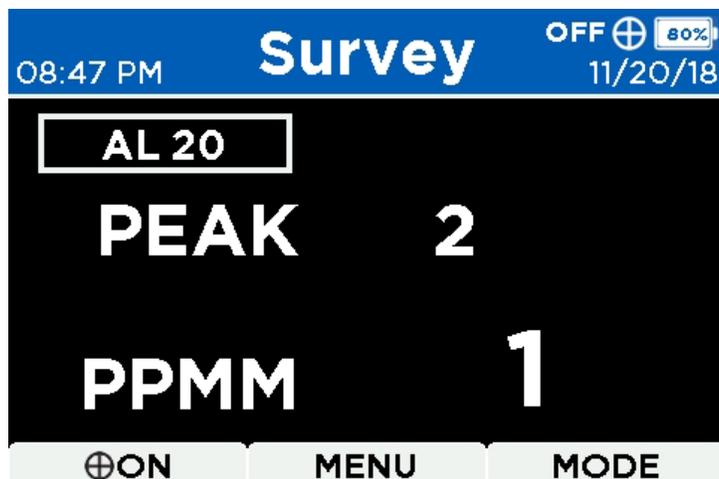
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To change the Alarm Level, press the MENU button, scroll down and select ALARM LEVEL. Press the down arrow button to increase the digit value. The values are circular and will wrap around. When the digit value is as desired, press SELECT to move to the next digit position. When done, press the return or back button.

**NOTE:** The higher the Alarm Level setting is, the higher the concentration of methane that will be needed to trigger the DMD alarm.



The alarm level setting is shown on the display within a rectangle (AL 20).



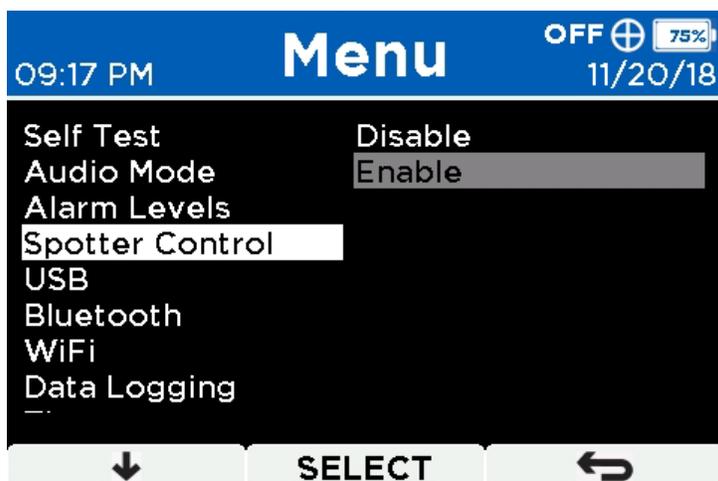
## Spotter Control

The green spotter laser is under the control of the operator and will be on for two minutes when the spotter "ON" button has been pressed and when enabled. The green spotter laser will automatically shut off after two minutes, requiring the operator to press the "ON" button again for use if needed. While using the green spotter laser, be careful to not point it towards people's eyes or automobile windshields causing vehicle drivers to be distracted. **Under no circumstances should the spotter laser be pointed at flying aircraft or used near airports.**

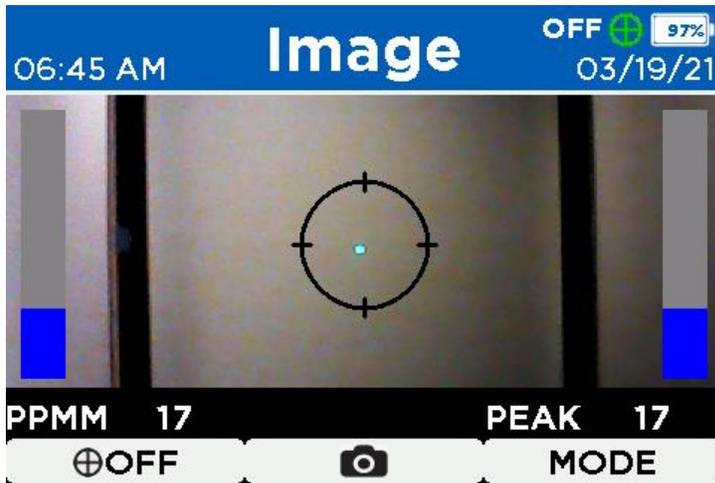
**WARNING:** The visible green spotter laser is a Class II (2) laser product. Do not stare into beam or view directly with optical instruments.

### To use the spotter laser

1. Select MENU, scroll down to SPOTTER CONTROL, then select ENABLE. The Spotter Laser is enabled by default.



- The spotter icon will now be visible in the top menu bar as a white crosshair.



- The left menu button will now display the spotter ON option. Pressing the left button (on/off) will activate the spotter for 2 minutes. When the spotter laser is turned ON, the icon will change from white to green (ON).

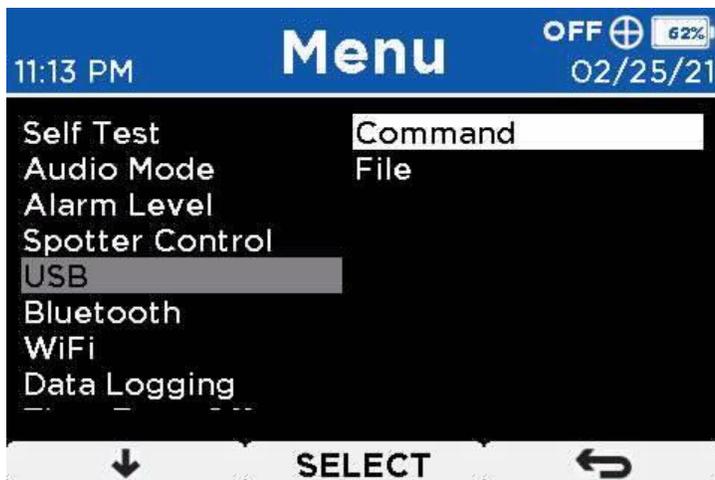
## USB

### FW: 1.54-2.38-10 or later

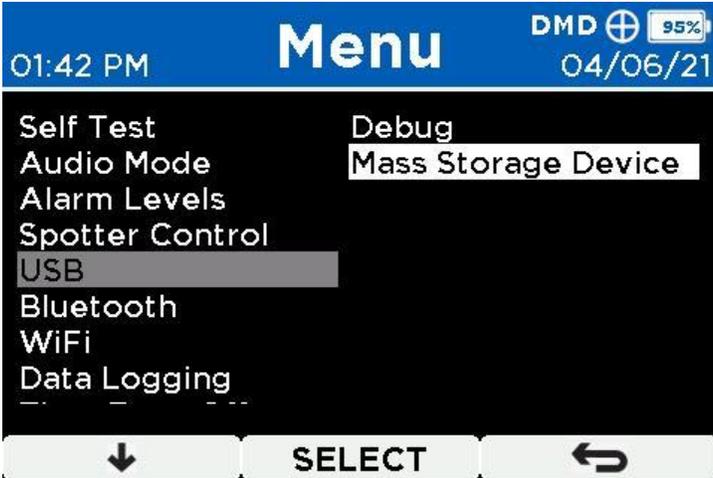
This Menu feature is not available for the DEFAULT and CUSTOM USER profiles. However, the ADMIN profile has two configurations to choose from:

**Command Mode** – Select to use the USB port as a communication port. Communications settings are 115200, 8, 1, N. This is typically used by ADMIN for instrument configuration.

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



For firmware 1.40-2.33-8 or earlier, the Menu feature is as shown below. Every User has access to both Debug and Mass Storage Device.

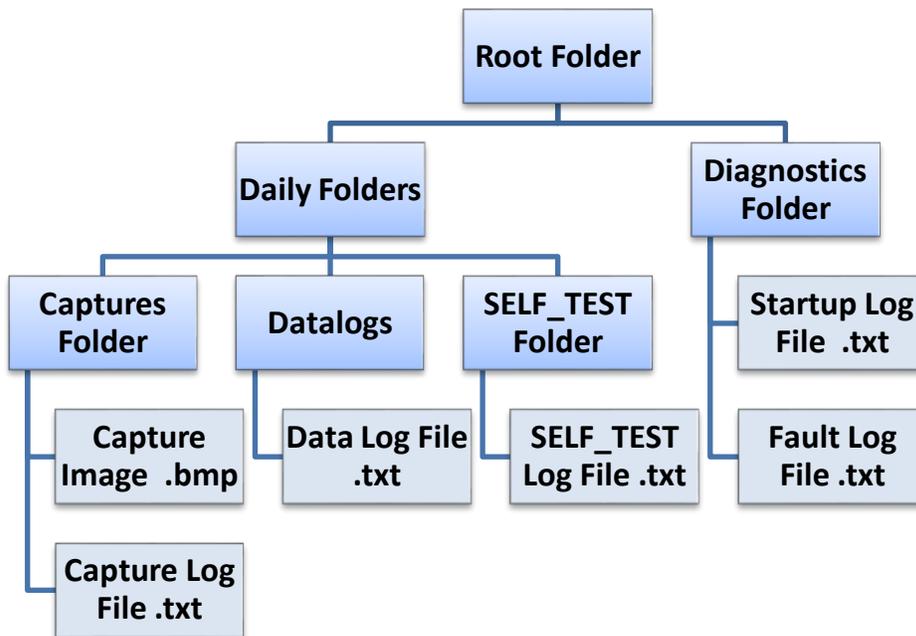


### File Access

File access is available via USB in File Mode (or Mass Storage Device) and File Server via Wi-Fi. File access via Wi-Fi is discussed later in this manual.

**FW: 1.54-2.38-10 or later**  
 ADMIN has access to the Configuration Portal via Wi-Fi only.

### RMLD CS Folder and File Structure



## File Name Conventions:

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

**Serial** – serial number of instrument

**Date** – of file creation (YYMMDD -OR- DDMMYY)

**Time** – of file creation (12 -OR- 24 hour)

**Username** – of logged user (Admin or User access level)

**Filetype** – the file type name: Capture (Log), Self-Test, Datalog, Startup, Fault

**EXT** – file extension

.**bmp** – for Capture images

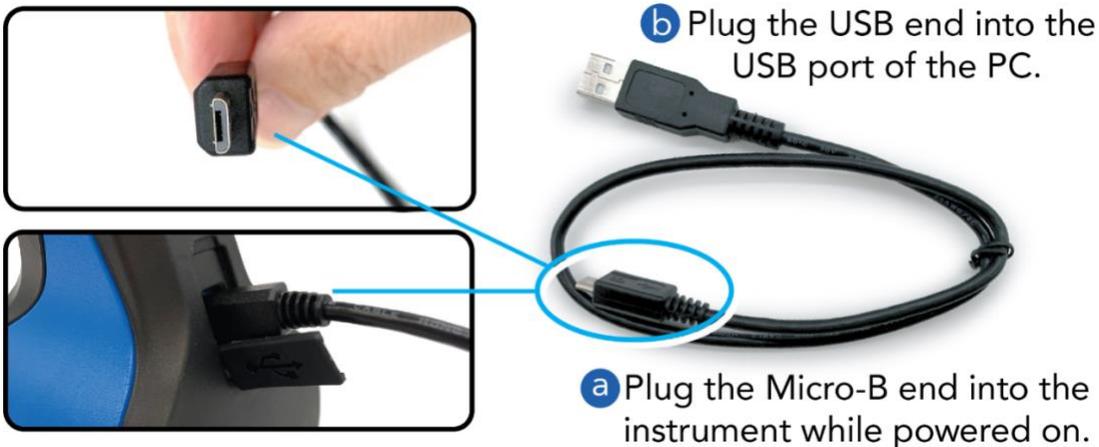
.**txt** – for log files

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

## USB File Transfer in File Mode

To access recorded / stored data in File Mode (or “Mass Storage Device”):

1. Turn on the instrument.
2. Use the provided USB 2.0 A to Micro-B cable to connect the instrument to 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 browse the PC's devices and drives to locate the instrument's USB drive.
4. Use File Explorer or similar to browse the folders for the files or interest. Windows file explorer tools are supported (copy / paste).

## Bluetooth BLE

The Bluetooth feature within the RMLD-CS allows operators to connect with the RMLD CS Mobile App or 3<sup>rd</sup> party applications and stream data. The RMLD CS Mobile App is available for both Apple and Android mobile devices and is available at the Apple and Google app stores.

FW: 1.54-2.38-10 or later

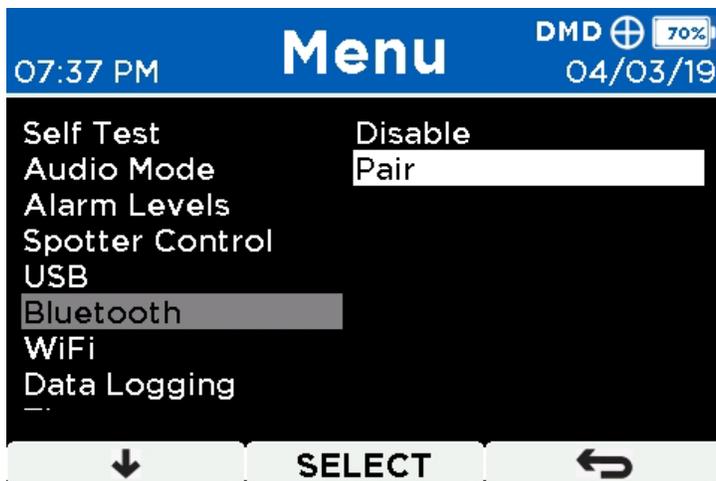
Only ADMIN and CUSTOM USERS have access to Bluetooth.

The instrument streams readings, warnings, faults, timestamp, battery level and various supporting data for usage. Instrument files and datalogs are not accessible using BLE.

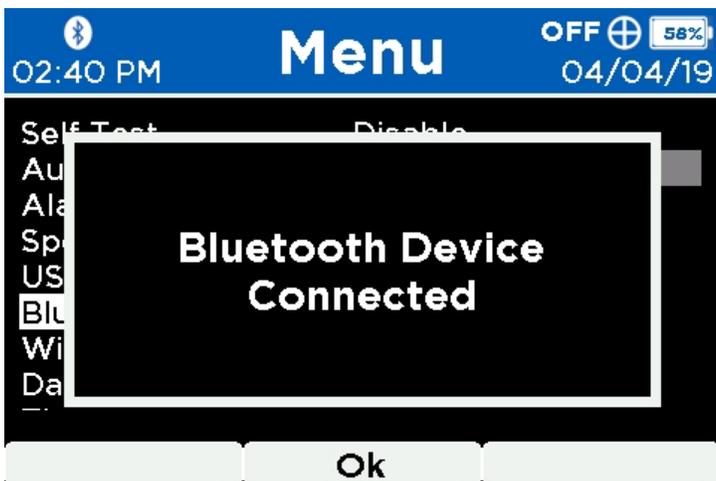
To enable Bluetooth streaming, the instrument must be paired with a Bluetooth (BLE) capable device. To pair with a Bluetooth capable device:

- Press MENU and scroll down to BLUETOOTH. Select and then select PAIR. The Bluetooth connection “RMLD CS <serial number>” is now broadcasting for discovery.

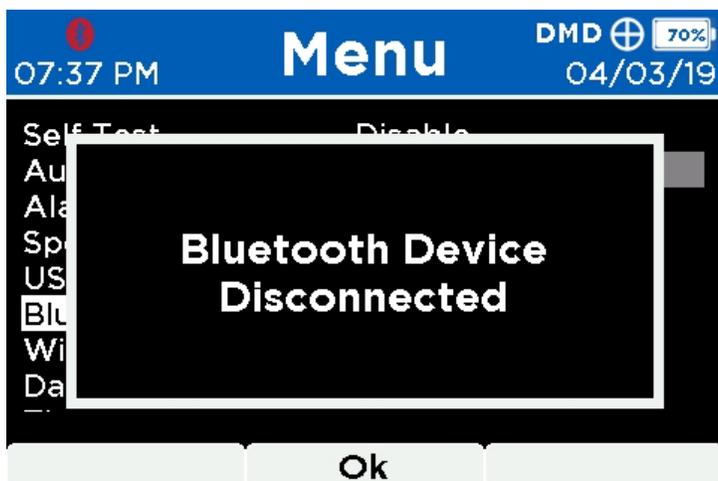
**NOTE:** Some devices may not be able to discover the RMLD-CS using the default Bluetooth connection manager on the operator's device. The operator may need to install a compatible Bluetooth manager on their device for successful pairing.



A white Bluetooth icon will be present in the status bar of the display screen once a successful pairing has connected.



The Bluetooth icon will turn red and a pop up window will be displayed when the connection is lost or not present.



## Wi-Fi

The Wi-Fi feature within the RMLD-CS allows operators to communicate with the RMLD CS using a web browser such as Chrome, FireFox or Edge. Instrument files access and streaming telemetry are supported. The instrument can stream out real time warnings, errors, and data (instrument readings). Connecting via Wi-Fi will also allow the operator to access useful information stored on the instrument's SD card such as Self-Test logs, data logging, fault codes, and screen captures.

FW: 1.54-2.38-10 or later

Only ADMIN and CUSTOM USERS have access to Wi-Fi. ADMIN can also configure the instrument through the Configuration Portal.

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

To enable the Wi-Fi feature, scroll to Wi-Fi in the menu and select either AP or STATION mode as needed. AP mode is most common. General use of these two modes are:

### AP Mode

The Access Point (AP) mode will broadcast a wireless network directly from the RMLD-CS instrument. The operator must search for this network and connect directly to the instrument using the AP Wi-Fi SSID network name and password. **It is highly recommended to change the default AP SSID and password.**

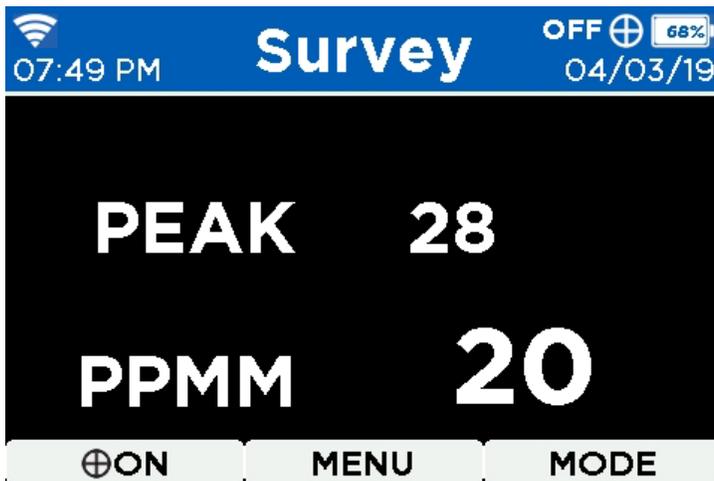
### Station Mode

The Station mode will communicate with a wireless router to achieve general network connectivity. Specific Station mode credentials must be entered and saved prior to usage.



For AP mode, a pop-up will confirm that Wi-Fi is broadcasting with the IP address 10.123.45.1. The IP address of the RMLD-CS is displayed on the About screen when AP mode is successfully enabled. In AP mode, the RMLD-CS is actively broadcasting and accepting connections. When connected, the Wi-Fi icon will be displayed in the status bar and will be white in color.

**NOTE:** For FW 1.40-2.33-8 or earlier will display “WiFi Broadcasting IP:10.123.451”.



From your PC or mobile device, check the wireless Network connections available and select the appropriate AP SSID (RMLD-CS is default). The AP default password, **changeme2**, is required for connection (this applies to new PC/laptops and password changes). **It is highly recommended to change this password.** The PC or mobile device should now be connected to the RMLD-CS.

## File Server / Configuration Portal

The web page-based File Server and Configuration Portal can now be accessed. File server provides access to stored files on the SD card while the portal allows for the creation of new users, the modification of various credentials and file access. Only ADMIN (FW 1.54-2.38-10) can access the Configuration Portal.

### *File Access via File Server*

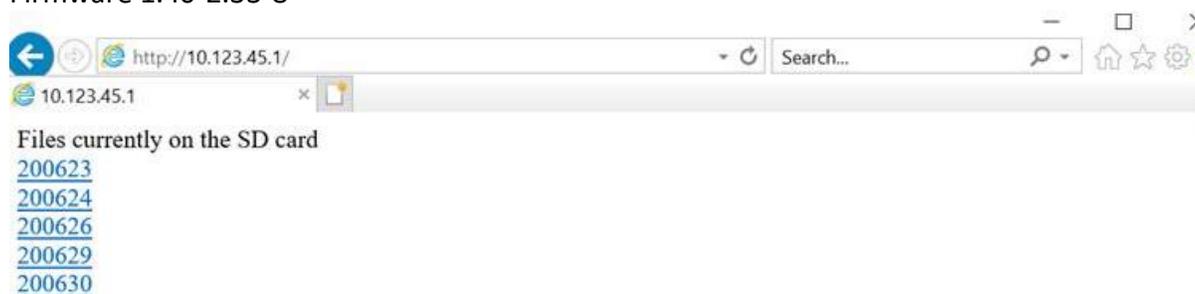
The RMLD-CS web page-based File Server grants operators the ability to download files presented using the same internal folder structures that are accessible through the USB port. To access File Server, enter the URL address: <http://10.123.45.1/>

FW: 1.54-2.38-10 or later

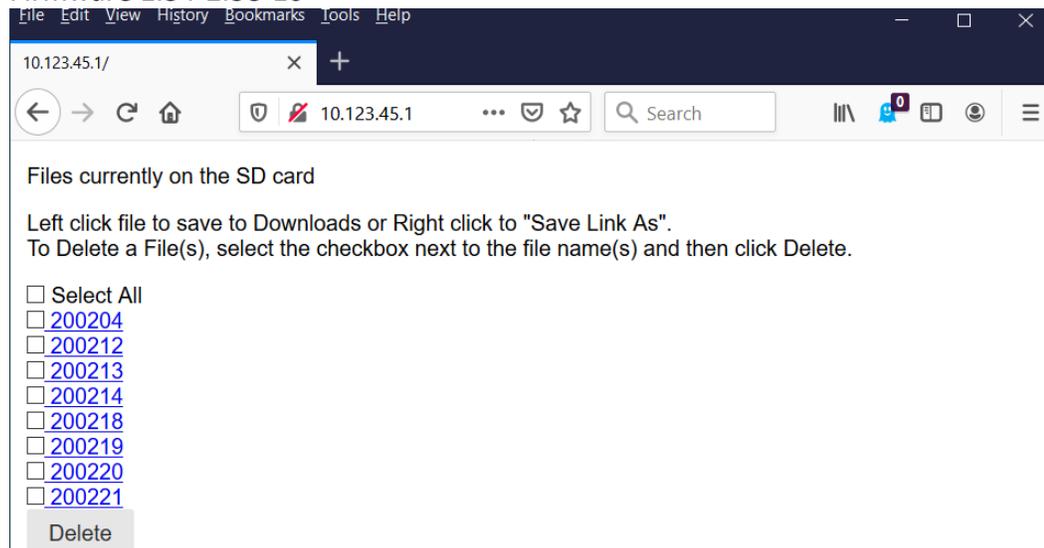
Only ADMIN and CUSTOM USERS have access to File Server. Files can be downloaded and deleted.

The browser will display the date stamped folders on the SD card.

### Firmware 1.40-2.33-8



### Firmware 1.54-2.38-10



From here, an operator may select and open date stamped folders to then select and download individual files by either left clicking directly on the filename to save to Downloads or by right clicking on the filename to “Save Link As”. Additionally, operators may delete date stamped folders or individual files using the checkboxes and the Delete button.

**NOTE:** The deletion of files/folders is irreversible as they are permanently deleted.

## Configuration Portal

### For FW 1.54-2.38-10 and later only

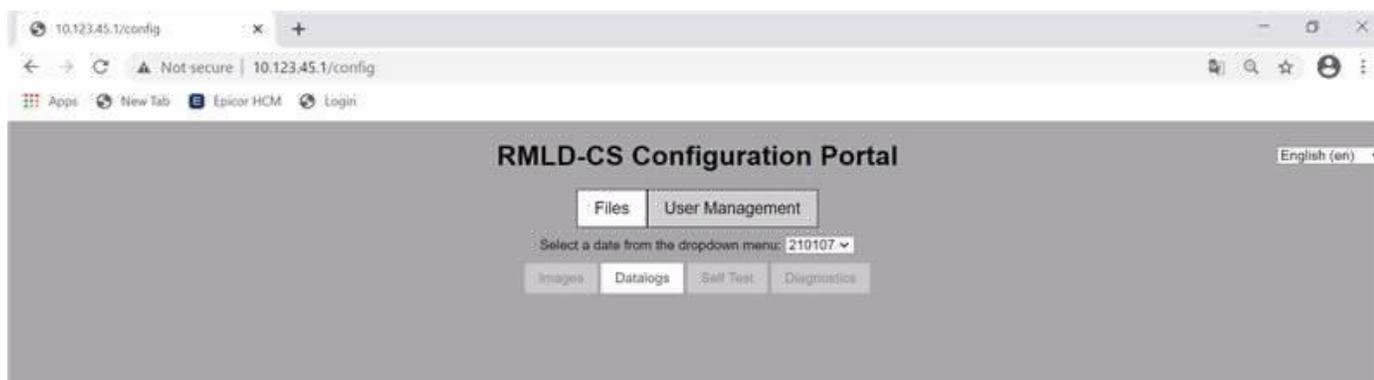
The Configuration Portal provides **ADMINS** with an easy interface for accessing files and managing custom user profiles (ADMIN only). The German language is supported as an option.

To access: The **ADMIN** must first log in on the RMLD-CS instrument, connect using Wi-Fi AP mode and then enter on a web browser the Configuration Portal URL: <http://10.123.45.1/config>

The browser will display the Configuration Portal. The portal is divided between two tabs or buttons:

- **Files** is the default, used for accessing / downloading data and images saved on the instrument's internal SD card. Usage is the same as for USB File Access.
- **User Management** provides editable fields that identify the operator, timezone offset and Wi-Fi information. Both AP and Station mode credentials are supported.

For file access, the Files button must be clicked. The operator must then select a date stamped folder using the drop-down box selection.



For a chosen date, any stored files that exist in sub-folders can be readily identified by the sub-folder buttons' color. Empty folders are gray while folders with files are shown in white. For the image above, only Datalogs are saved for the chosen date.

Once a sub-folder has been selected, the contents are shown in the same format as for USB File Access.

### Setting-Up Credentials and Instrument Configuration

To change credentials or to configure the instrument, click the User Management tab. All fields are editable except the user DEFAULT and ADMIN's name. In the "System Users" form you can modify DEFAULT Timezone Offset and for ADMIN you can modify the ID, PIN (Password), Timezone Offset and Wi-Fi credentials which include SSID and passwords for both AP and Station Mode applications. Created CUSTOM USERS will be displayed in the form for editing purposes as well. **It is highly recommended to change the ADMIN password and default AP SSID and password.**

**RMLD-CS Configuration Portal**

Files User Management

**System Users**

Name  
DEFAULT

Timezone Offset  
UTC -06:00

Name	ID	Password
ADMIN	1234	800HEATHUS/\$

Timezone Offset  
UTC -06:00

WiFi Station Mode SSID  
WiFi Station Mode Password

WiFi AP Mode SSID  
WiFi AP Mode Password

RMLD-CS  
changeme2

**Custom Users**

Add User Load Users from RMLD Save Users to RMLD Download Users to File Load Users from File

When edits are done, click the **“Save Users to RMLD”** button on the bottom row or the changes won't be saved. A confirmation message will pop up.



**NOTE:** Should the created ADMIN password be lost or forgotten, please contact Heath Customer Service for support.

Additionally, the bottom row of buttons allows the configuration to be saved, read, loaded and stored.

**Load Users from RMLD** will read the existing data from the RMLD CS and populate the System Users form with that data. This is helpful to validate recent changes.

**Download Users to File** will allow the System Users data to be saved to a PC as a JSON formatted text file. It is highly recommended to Download Users to File for archival purposes.

**Load Users From File** will allow a previously saved System Users file to populate the form and configure the RMLD-CS. This is very useful when managing multiple instruments as only specific changes would then be made from a template. **“Save Users to RMLD”** must then be clicked to save the edits to the instrument.

**Add User** allows for the creation of new users as shown in the next section.

## Creating, Credential Setup and Deleting New Users

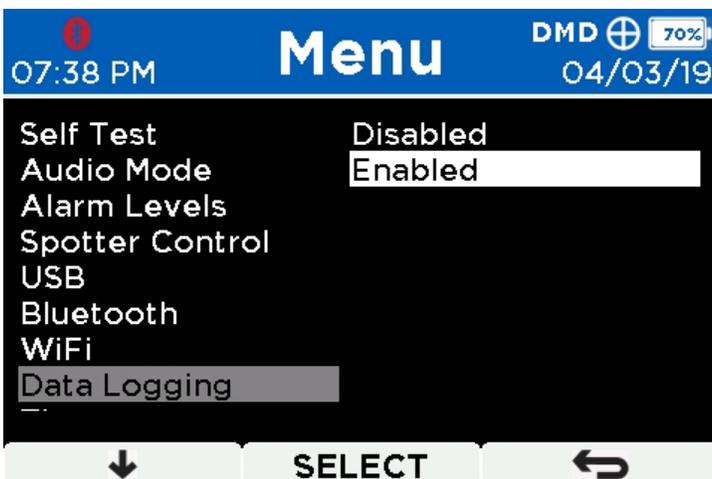
Scroll down and click on the **“Add User”** button at the bottom of the window. The **“Custom Users”** block will expand with the factory default settings.

It is recommended to change all the credentials, especially the new user's name to help distinguish each User profile. If not, each new user will be named **“NEW”**. Each User can have different credentials if chosen. This is helpful with Wi-Fi networks and Timezone Offset for remote operators.

To delete a chosen user, click on the **“Delete User”** button in the Custom Users form for that user. Remember to **“Save Users to RMLD”** to update the changes.

## Data Logging

The RMLD-CS data logging feature allows the instrument to store complete telemetry records of the instrument, while powered on, to an internal SD memory card. This feature defaults to **ENABLED** when powered on. To disable this feature, select **DATA LOGGING** from the **MENU**, then select **DISABLED**.



To enable this feature, select **DATA LOGGING** in the **MENU**, then select **ENABLED**.

**NOTE:** Data logging *does not* need to be enabled for the instrument to record FAULT logs, SELF-TEST logs, or screen captures.

Data telemetry is recorded as a date and time stamped file. The following measurements are some of the information contained within the log files:

- CH4 PPM-M measurement
- Battery level
- Battery voltage
- GPS location
- Timestamp
- Serial number of the instrument

The log file also contains various system status fields and values that can be used to help evaluate instrument performance or aid in troubleshooting if a fault condition occurs.

## Language

**For FW 1.54-2.38-10 and later only**

The RMLD-CS supports both the English and German languages.

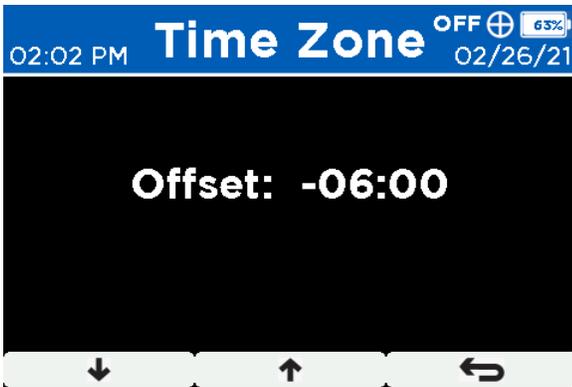
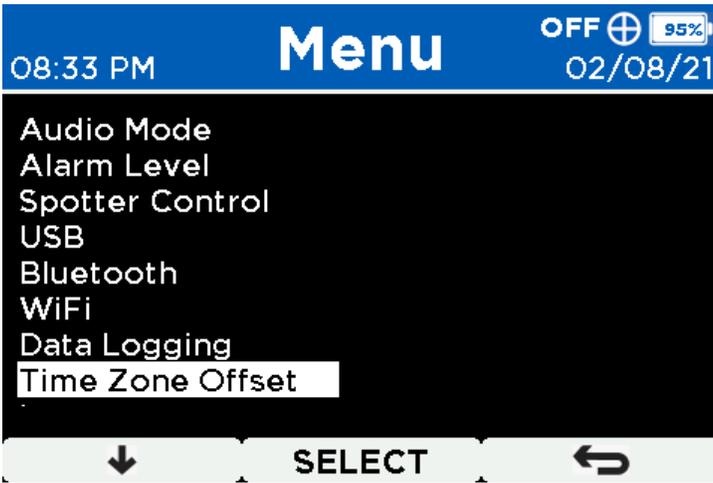
English as the default language. To change setting go to MENU, select LANGUAGE, then select the desired language. Select the back arrow button when complete.



## Timezone Offset

The Timezone Offset menu option will allow the user to select the desired offset from UTC time acquired by the GNSS.

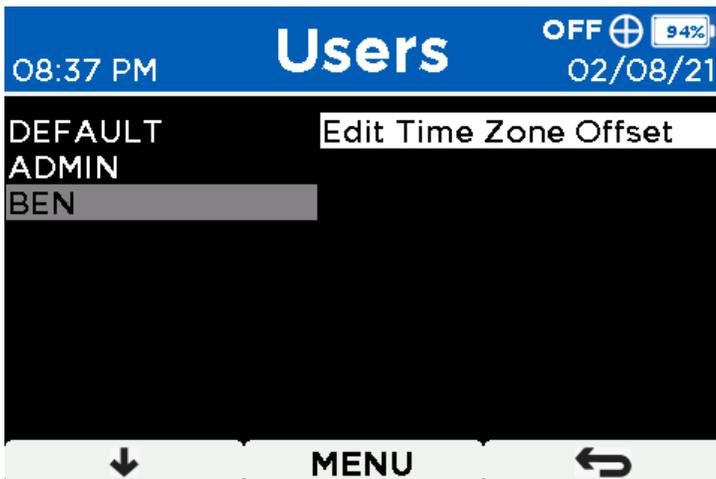
In the menu, select Timezone Offset (FW 1.40-2.33-8 "Timezone"), then use the arrow buttons to select the desired offset. Press the back arrow button when complete.



Firmware 1.54-2.38-10 to the left and firmware 1.40-2.33-8 on the right.

**FW 1.54-2.38-10 or later**

For CUSTOM USERS accounts, the Timezone Offset can be modified by going to MENU, select the Users feature and Edit Timezone Offset, like the example below for CUSTOM USER Ben. The next screen will be Timezone Offset.



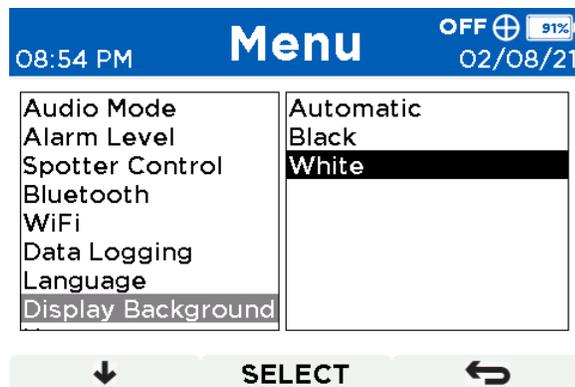
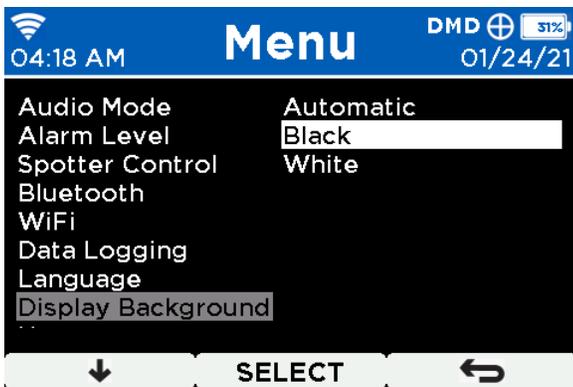
## Display Background

For FW 1.54-2.38-10 and later only

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

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

To change color, go to MENU, scroll down to DISPLAY BACKGROUND, then select your choice and press the back arrow button when complete. The Automatic option displays color according to the Timezone Offset configured.

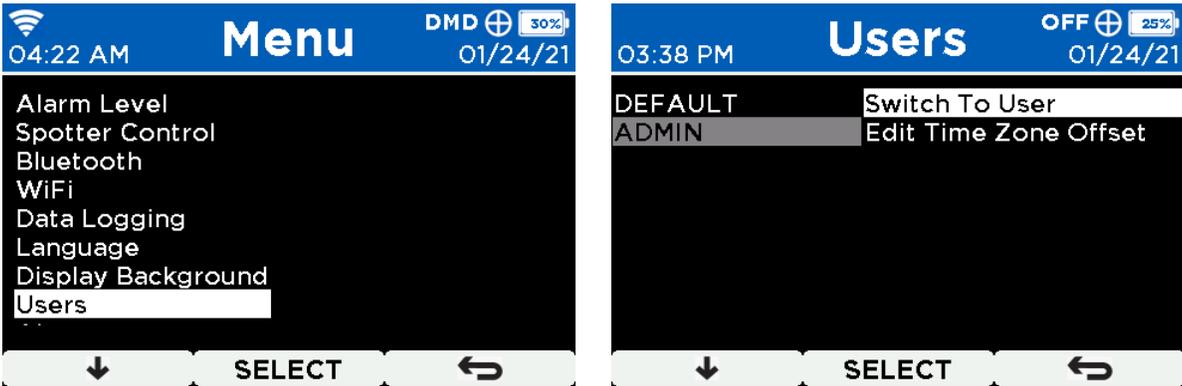


## USER Profiles

User profiles allows multiple operators to utilize the RMLD-CS instrument with customized settings and unique PIN / password protection to enable use.

### FW: 1.54-2.38-10 or later

From the Survey or Graph screen mode, select MENU, then scroll down to USERS, then select the desired User profile name. Enter the PIN or password by pressing the down arrow to select each character and press select to accept and move to the next character. When done, press the back arrow button to accept and return back to the Users screen. Select the **“Switch To User”** otherwise it keeps the previous profile and will not switch to the new user's profile.



**For Firmware 1.40-2.33-8**

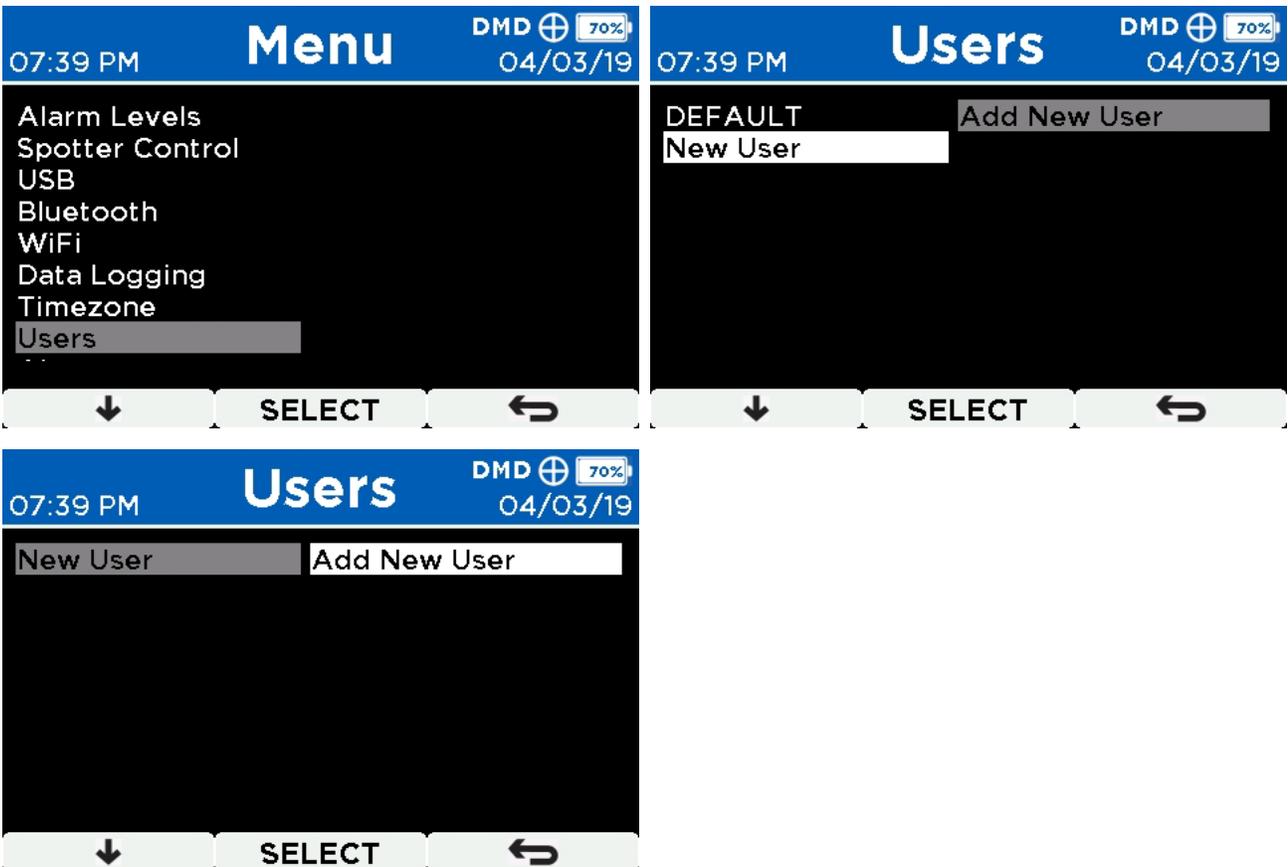
**Required Credentials**

The table below describes the credential requirements applicable

File Type	Max Length	Supported Characters
User Name	20	Space, Uppercase Letters and Numbers
ID	4	Numbers
PIN	4	Numbers

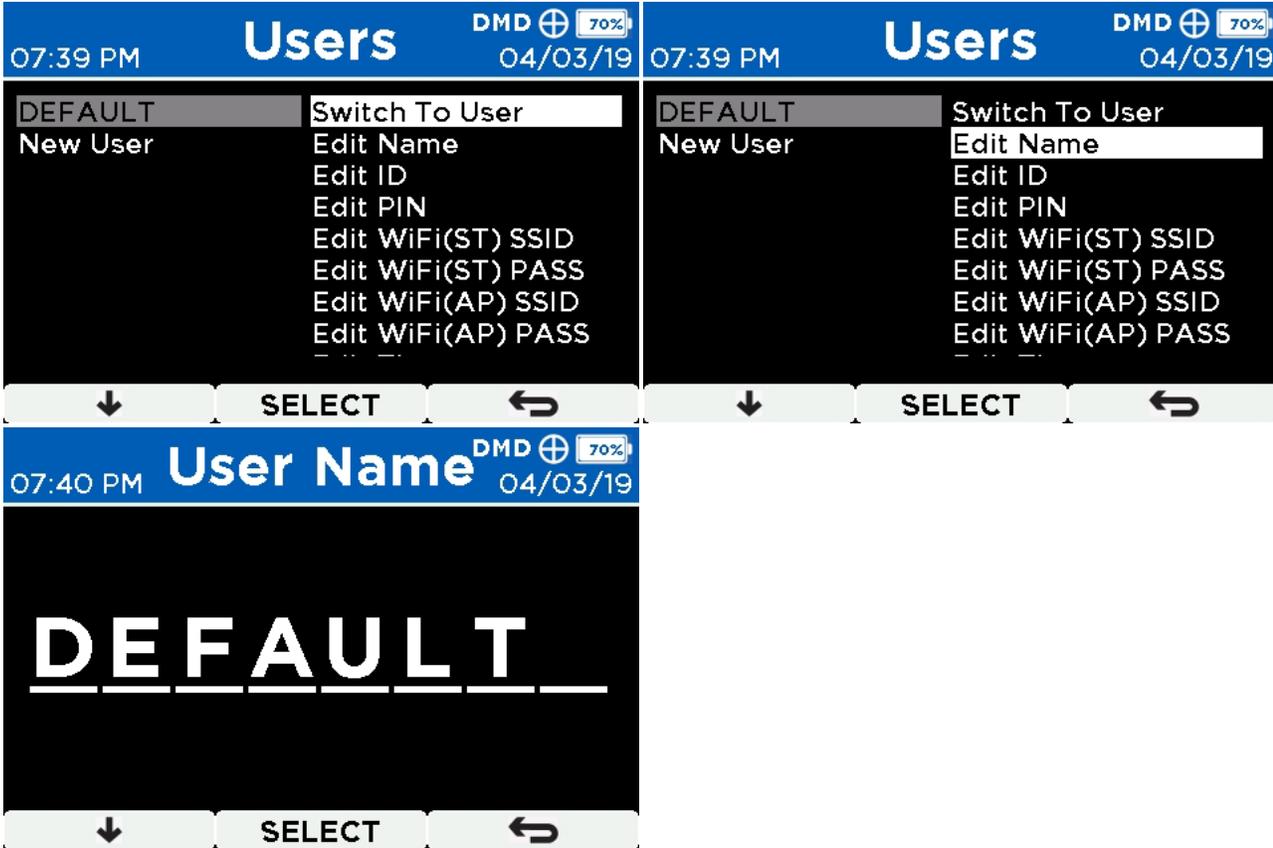
**Adding a New User**

Press the MENU button and scroll down to select USERS from the menu. Select NEW USER, then select ADD NEW USER.



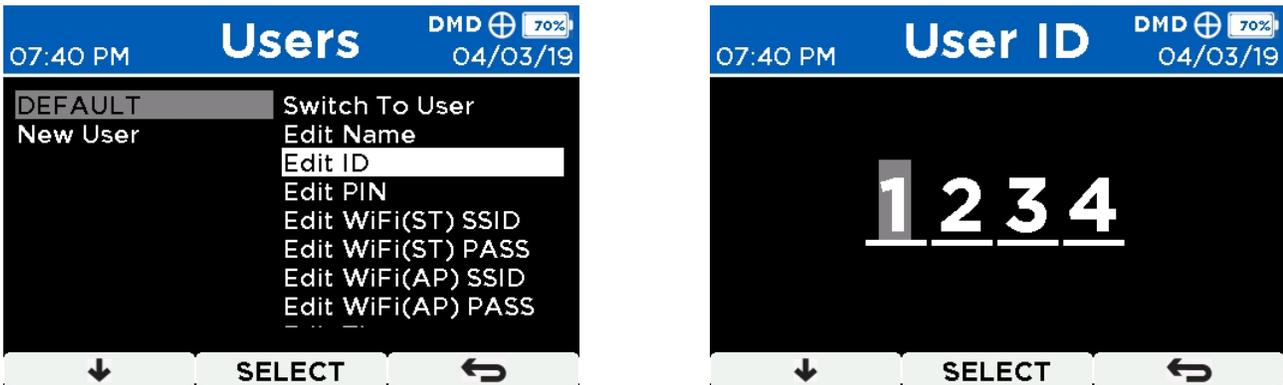
### Renaming a User

Select the user to be renamed. Scroll down the sub menu and select EDIT NAME. Use the down arrow button to scroll through each letter. Pressing SELECT will accept the change and move to the next place holder. Pressing the BACK ARROW button will return to the previous menu and accept the name shown.



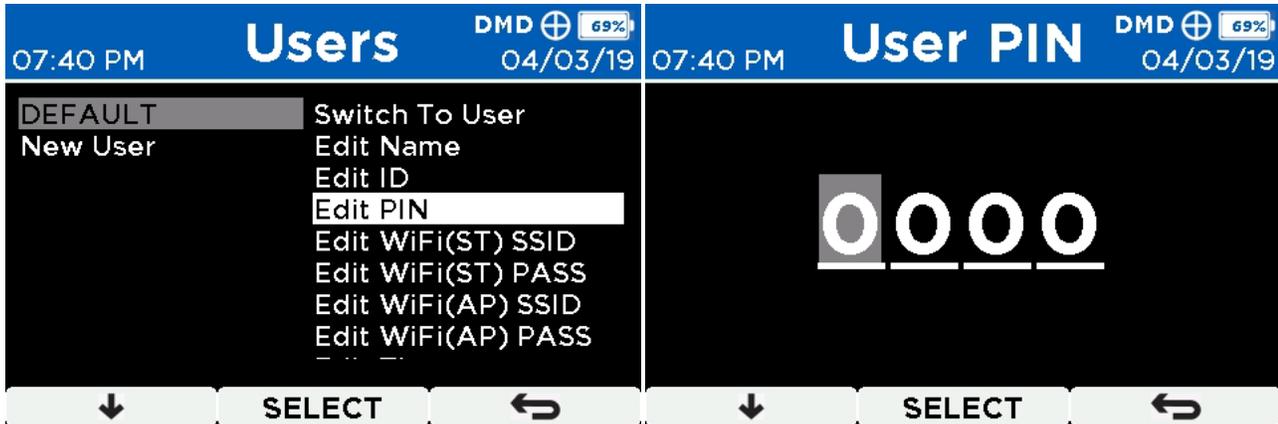
### Changing User ID

Select the user from the menu and scroll to EDIT ID. Press select and use the down arrow button to scroll through the numeric options. Pressing SELECT will accept the change and move to the next place holder. Pressing the BACK ARROW button will accept the change in user ID and return to the previous menu.



## Setting User PIN

Select the user from the menu and scroll to EDIT PIN. Press select and use the down arrow button to scroll through the numeric options. Pressing SELECT will accept the change and move to the next place holder. Pressing the BACK ARROW button will accept the change in user PIN and return to the previous menu.



## Deleting a User

Press the MENU button and scroll down to select USERS from the menu. Select the user to be deleted, then select DELETE USER.

## About Screen

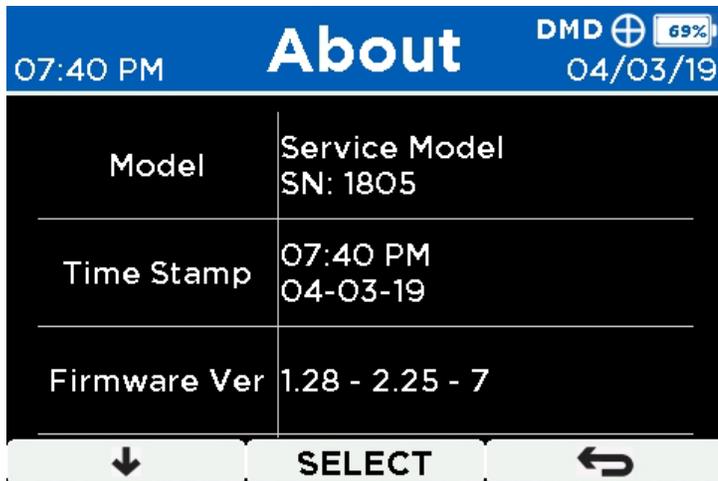
The ABOUT menu item will display information relative to the current state of the instrument. Press the MENU button, scroll down to ABOUT and press SELECT.

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

- Model Name and Serial Number (10 digit number)
- Time Stamp (HH:MM PM; MM-DD-YY)
- Firmware Version (x.xx- y.yy – z)
- GPS (latitude and longitude or “GPS location not locked”)
- Battery Percent Remaining
- Internal SD Card Storage Remaining
- Error Codes
- Bluetooth Status (off; on (not connected); connected)
- Wi-Fi Status
- Heath Consultants Incorporated Contact Information

### FW: 1.54-2.38-10 or later

- Time Stamp (12 -OR- 24 hr; MM-DD-YY -OR- DD-MM-YY)
- Self-Test (passed or failed)
- Wi-Fi (AP) SSID
- Wi-Fi (ST) SSID



## ADMIN Specific Commands via USB Command Mode

For FW 1.54-2.38-10 and later only

The ADMIN user profile supports commands only available to ADMIN. These commands are typically used for instrument configuration. Once logged in as ADMIN, the available commands may be seen using Tera Term by issuing the “h” or help command as shown below. Several of the command functions are also available via the Menu or Portal Configuration.

```

COM7 - Tera Term VT
File Edit Setup Control Window KanjiCode
o admin 800HEATHUS/$
Value 0: 2
h
Supported Commands
h      Help Text
o      Privilege level
d      Data Stream
b      Read Build Code
va     Set Alarm level
vns    Set WiFi SSID
vnp    Set WiFi Password
vnu    Update WiFi
vnc    WiFi status
vna    WiFi mode control
vul    Change Language
vut    Change Time Format
vts    Bluetooth State
vtp    Bluetooth Pairing
  
```

Commands use letters and the arguments may be letters and / or numbers. Usage is as follows:

Command	Description	Entry followed by the “Enter” key
h	Help Text	h
o	Privilege level	o admin 800HEATHUS/\$ (default password) o <username> <userpassword>
d	Data Stream	d 1 Stream on d 0 Stream off
b	Read Build Code	b
va	Set Alarm level	va 0 Read alarm level va 1 20 Set alarm level to 20 va 1 <alarmlevel> Set to <alarmlevel>
vns	Set WiFi SSID	vns a NEWSSID Set AP mode SSID vns s NEWSSID Set Station mode SSID
vnp	Set WiFi Password	vnp a NEWPSWD Set AP mode password vnp s NEWPSWD Set ST mode password
* Reboot or Update WiFi command (vnu) required to become active		
vnu	Update WiFi	vnu
vnc	WiFi status	vnc
vna	WiFi mode control	vna 0 Disable WiFi module vna 1 Enable AP Mode

vul	Change Language	vna 2 vul 0 vul 1	Enable Station Mode English (default) German
vut	Change Time Format	vut 0 vut 1	Month/Day/Year 12 hour Day/Month/Year 24 hour
vts	Bluetooth State	vts 0 vts 1 vts 2	Disable Bluetooth Reset Bluetooth pairings Enable Bluetooth
vtp	Bluetooth Pairing	vtp 1 1	Enable pairing for 2 minutes

### **3<sup>rd</sup> Party Application Support**

The RMLD-CS supports 3<sup>rd</sup> party applications. Technical documentation is available upon request from Heath Customer Service that defines and documents the setup requirements. There are two such documents available:

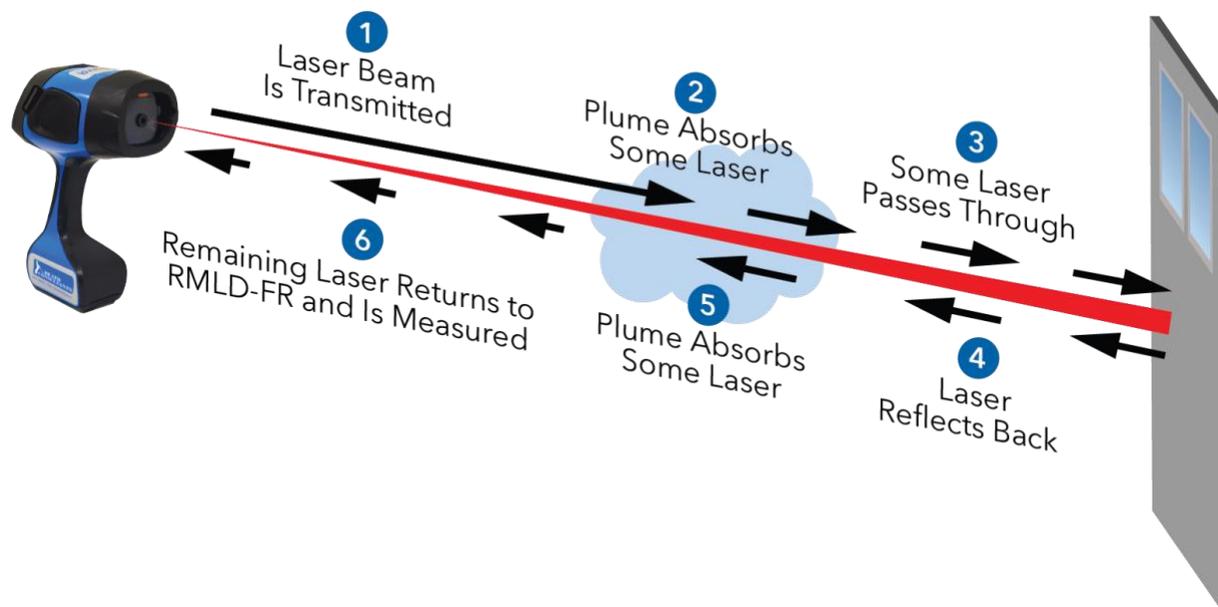
1. RMLD-CS Communications Interface Manual. This manual describes the telemetry and its format.
2. RMLD-CS DFU Firmware Update. This document describes how to update the RMLD-CS firmware and perform the required steps when making changes to the configuration due to a major firmware update.

The RMLD-CS App can also be used as a tool to stream and log data. This phone app is available in Apple App Store and Google Play Store.

## How Does the RMLD-CS Measure Gas?

With the RMLD-CS it is now possible to survey areas that are hard to reach or not easily accessible. The RMLD-CS does not have to be within the gas plume because it uses laser technology known as Tunable Diode Laser Absorption Spectroscopy. As the laser passes through a gas plume, the methane absorbs a portion of the light, which the RMLD-CS then detects. This technology makes it possible to detect leaks along the sight line without always having to walk the full length of the service line.

The invisible Infrared (IR) detector laser beam is transmitted from the launch port. With a normal background, such as brick, concrete, and grass, it has a maximum distance of up to 100 ft. away (actual distance may vary due to surface condition).



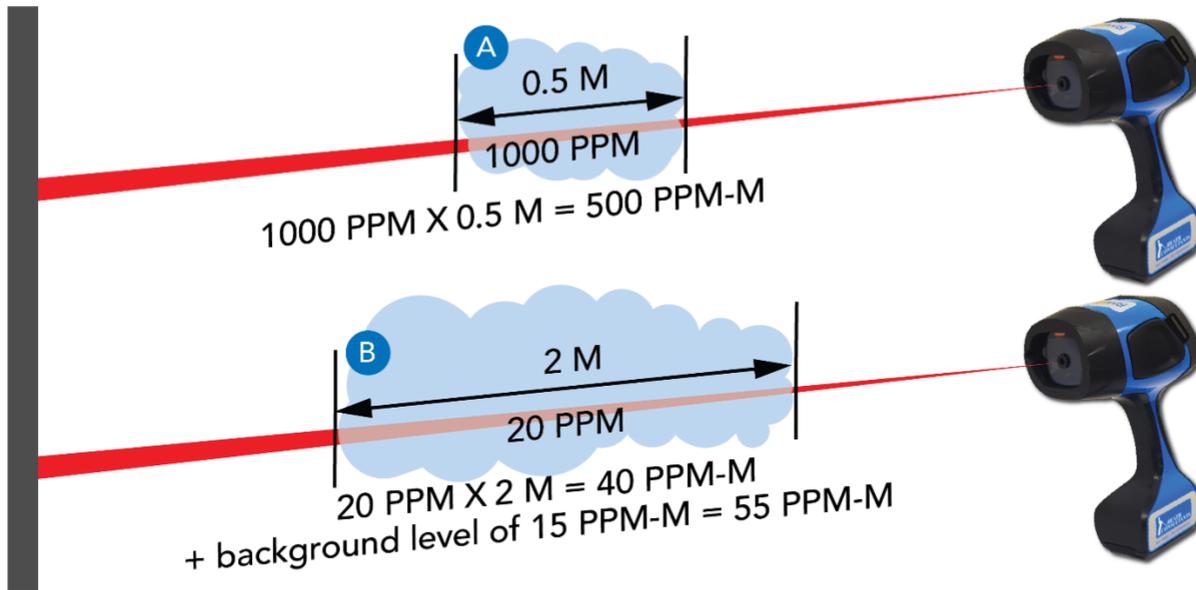
To detect leaks, as the above illustration depicts, when the infrared laser beam passes through a gas plume, and is reflected back, the reflected light is collected and converted to an electrical signal that carries the information needed to deduce the methane concentration.

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

This signal is processed so that methane concentrations can be reported in parts-per-million-meter or PPM-M.

PPM-M is the product of the methane concentration times the width of the plume. For example, if the leak is creating a gas cloud of 1000 PPM and is about  $\frac{1}{2}$  meter in width (the distance the infrared beam passes through the plume). The RMLD-CS will measure 500 PPM-M.

For another example, if the average concentration of the gas cloud is 20 PPM and is about two (2) meter in width, the RMLD-CS will measure 40 ppm-m, plus a background level of 15 PPM-M in this case, displaying a total value of 55 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.

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

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

**NOTE:** The nature of a gas plume is highly variable. The above 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.

## Surveying with the RMLD-CS

Refer to your company's specific training and procedures for being qualified for leak surveying. In order for the RMLD-CS to detect a gas leak, three conditions must be met:

1. The gas plume concentration and size must be greater than the minimum sensitivity of the instrument.
2. The infrared beam must pass through the plume.
3. The background target (i.e., ground, building, etc.) has to reflect the infrared beam back.

Several factors influence the gas plume size and concentration. First, very low flowing leaks may produce small to non-measurable plumes. Also, surface types such as concrete will spread the leak and create spot leaks through surface cracks and holes. Weather conditions like high winds and higher temperatures will cause the plume to dissipate faster. The operator must consider these factors and their effects throughout the survey. Consideration also must be taken for heavy rain and moisture in the soil that could change the spread of gas and venting conditions. The same applies to frost conditions in the winter.

The most important aspect to using the RMLD-CS is the proper control and aiming of the infrared beam. The first thing you will need to learn when surveying with the RMLD-CS is to control the aiming of the laser and rate of sweeping. Radical or abrupt motion may cause the RMLD-CS to give 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 surveying 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.

While scanning the service line/meter where the location is known, keep these tips in mind:

- 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 in contact with the ground (dark zones).

While scanning a service where the location is not known:

- Use an "X" pattern or similar pattern 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 in

contact with the ground creating dark zones (shadow).

When scanning the meter, keep the following considerations in mind:

- Maintain at least 10 feet from the meter so the beam width is not too small.
- Thoroughly scan the ground around the meter.
- 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.

If a leak is located near or on the meter, these tips help to determine if the leak is underground or on the meter:

- Try to keep the wind to your back.
- Stand about 5 to 10 feet from the meter. Use the *Real Time (Geiger)* audio mode to help pick out the strongest return.
- Start out aiming low on the ground.
- Work the beam up and around the piping (Note: The spotter laser is about 1.25" to the right of the IR laser beam).

If in doubt and if the leak is underground, bar hole the area.

Scanning during inclement weather, these types of conditions reduce the venting of the gas through the soil and the atmosphere. It is crucial to understand how inclement weather can affect a leak survey, corrective actions and/or postponement options. Scanning must be methodical and at a slower rate.

- This instrument can be a backup tool for the First Responder to assist with leaks that are difficult to locate and/or isolate.
- When raining, do not point instrument straight up into the air. Water entering the Laser port can damage the instrument. The RMLD instrument is water resistant not waterproof.
- The technician can inspect roof top vents, the sewer vent, through most windows, around the foundation, door frames, and building vents.
- Standing water are poor backgrounds and often give low light indications. You could pick up gas indications by raising the laser above the water and scanning the atmosphere with a better background.

***Use of the RMLD in inclement weather should be addressed in your company's O&M Manual.***

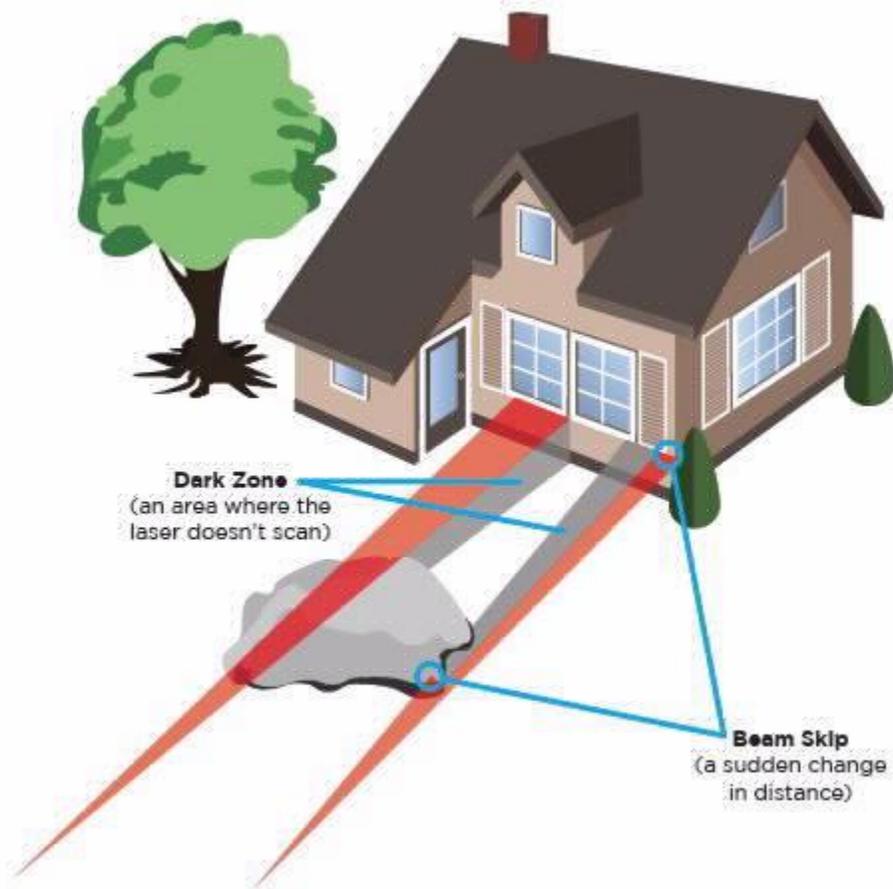
## Long Range Scanning

The RMLD-CS can detect leaks from up to 100 ft. away. Actual distance may vary due to target surface and environmental conditions. As the scanning distance is increased, the laser light level returned will decrease. As the maximum distance is approached, a “low return signal” tone is heard. You will need to move in closer.

For best results when scanning at distances greater than 50 feet, it is important to slow down the scanning rate and take care in pointing the laser. When taking aim, use the spotter laser or the camera feature 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 skips (a sudden change in distance) which may give you a false detection.

Obstructions or variations in the landscape can cause dark zones where the laser doesn't scan. Look for the best angle to thoroughly scan these areas. Scanning up a hillside may cause beam skipping or dark zones around the foundation of a structure.



## Dealing With False Detections

While using the DMD mode, several conditions may occur that will cause the algorithm to give a detection indication. The most common situations are:

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

The most common point that a false detection occurs is in the 50 feet (15 m) range. This is due to the beam footprint becoming very large. Abrupt motion, 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 a short range will also minimize false detection.

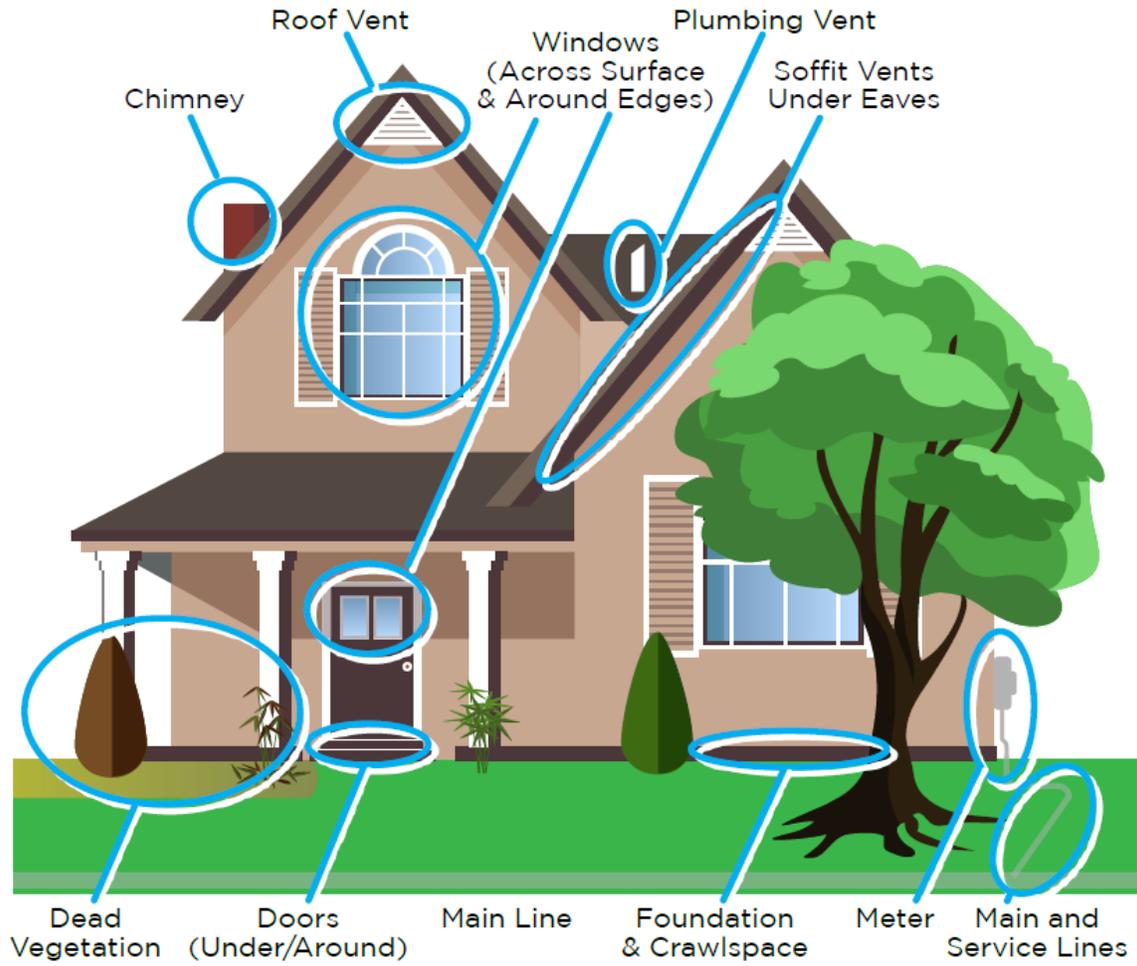
Strong reflections off certain types of surfaces (e.g., black garbage bags, water droplets, glass, polished surfaces, stones, license plates, reflectors, etc.) may give a false detection. Re-scan the area from a slightly different angle.

## Scanning Through Windows

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

Do not aim straight into a window. Keep to an angle, 30 – 60 degrees from direct is recommend 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. Continue scanning common venting points as referenced in the image below.

## Common Venting Locations



## Troubleshooting

The advanced design of the RMLD-CS makes it one of the most reliable leak survey instruments available. However, should you experience problems with the instrument or suspect that the instrument is not operating properly, do not use the instrument for leak survey work until the problem is resolved.

**CAUTION:** Only a qualified RMLD-CS repair technician should attempt to repair or adjust the instrument.

There are no user serviceable components within the RMLD-CS that can be repaired or replaced.

Most often, a problem has a simple cause. The following table provides a list of common problems, cause and solution. Should you have a problem not listed or the solution doesn't work, please contact HEATH CUSTOMER SERVICE for further assistance.

Symptom	Probable Cause(s)	Solution
Readings are higher than normal at short range and lower than normal for long range	Laser calibration has drifted	Run Self-Test
Concentration reading low and will not pass the Self-Test	Laser calibration has drifted	Run Self-Test up to three (3) times and then contact Primary Instrument Repair Facility
Instrument will not turn on	Low Battery	Replace or recharge battery pack
Continual warning sound or screen notification when scanning	Scanning at a distance beyond the RMLD-CS range	Move closer to the target, or
	Background surface is absorbing or reflecting the IR light level	Change angle to the 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 range limit of the instrument	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 set 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 Internal component failure	Allow for the temperature of the instrument 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 to get a better reflecting 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 to get a better background
No Wi-Fi connection	Incorrect credentials	Verify credentials
	Outside of Wi-Fi range	Place unit closer to Wi-Fi point
	Wi-Fi disabled in menu	Enable Wi-Fi 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 a different 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-CS 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 KimWipe™ or equivalent non-abrasive lens tissue	As needed to prevent dust or water stain build up
Self-Test	Daily to ensure that the instrument is functioning properly
Battery pack recharge	Recharge to full capacity after each use
Replace battery pack	As needed
When storing a battery pack for one month or more, partially charge (30-50 %) then store in cool dry location.	As needed

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

**CAUTION:** Make no attempt to repair the instrument. There are no operator / user serviceable components within the RMLD-CS



## Warranty and Repair

All 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.

Our 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.

# Return Procedure

Follow these steps to initiate repair of your instrument:

## 1. Repair Form

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

## 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

### **CORPORATE HEADQUARTERS**

9030 Monroe Road  
Houston, Texas 77061  
Phone: 713-844-1300  
Fax: 713-844-1309  
[www.heathus.com](http://www.heathus.com)

### **Primary Instrument Repair Facility**

9030 Monroe Road  
Houston, Texas 77061  
Phone: 713-844-1350  
Fax: 713-844-1384  
[fsc@heathus.com](mailto:fsc@heathus.com)

## Contact Information

### **Houston Factory Service Center**

#### **Manufacturing Division**

9030 Monroe Blvd

Houston, TX 77061

Phone: 713-844-1300

Fax: 713-844-1309

[www.heathus.com](http://www.heathus.com)

Technical Support

Phone: 713-844-1300



Authorized Distributor

APL ASIA CO., LTD.

11/129-132 Moo.5 Lamlukka Rd.,T.Kookut, A.Lamlukka, Pathumthani 12130 Thailand.

TEL. 0-2995-4461-3, FAX. 0-2995-4464

[www.apl-asia.com](http://www.apl-asia.com)

EMAIL : [sales@apl-asia.com](mailto:sales@apl-asia.com)

LINE@ : @APL-ASIA



*Your Safety...Our Commitment*

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