# USER

# MANUAL

**Modular Portable Multi-Gas Detector**

**with Internal Pump**

Contents

Ch 1. Introduction ..... 5
1.1. Product Registration ..... 5
1.1.1. Standards and Certifications ..... 5
1.1.2. IMPORTANT! BUMP TEST THE MONITOR BEFORE EACH DAY'S USE ..... 7
1.1.3. Special Notes ..... 7
Ch 2. General Information ..... 7
2.1. Key Features ..... 8
2.2. Physical Description ..... 8
Ch 3. Charging the device ..... 8
3.1. The Battery Pack ..... 8
3.2. Charging Mode Selection ..... 9
3.3. Normal Charging Mode ..... 9
3.4. Green Charging Mode ..... 10
3.5. Measuring Charging Mode ..... 10
3.6. Real Time Clock Battery ..... 10
3.7. Data Protection while power is off. ..... 11
Ch 4. Basic Operations ..... 12
4.1. Turning the instrument ON ..... 12
4.2. Turning the instrument OFF ..... 12
4.3. Alarm Check ..... 12
4.4. IntelliFlash™ and Comfort Beep ..... 13
4.5. User ID and Login ..... 13
4.5.1. Guest Access ..... 13
4.5.2. Login Requirement ..... 14
4.5.3. Login Methods ..... 14
Ch 5. User Interface ..... 15
5.1. Status Bar ..... 15
5.1.1. Battery Status Icons ..... 15
5.1.2. Data logging Status Icons ..... 16
5.1.3. Pump Status Icons ..... 16
5.1.4. Man-Down Alarm Icons ..... 16
5.1.5. Panic Alarm or SOS alarm Icons ..... 16
5.1.6. BLE Status Icons ..... 16
5.1.7. Wireless Module Status Icons ..... 17
5.1.8. GNSS Status Icons ..... 17
5.1.9. Other Status Icons ..... 17

5.2. Screen Display ..... 17
5.2.1. Normal View ..... 18
5.2.2. Focus View ..... 18
5.2.3. Alarm Normal and Focus View ..... 18
5.2.4. Sensor Fault ..... 18
5.2.5. Over Range and negative Drift Alarms ..... 19
Ch 6. Operating The Instrument ..... 19
6.1. Turning the Instrument ON ..... 19
6.2. Turning the Instrument OFF ..... 19
6.3. Auto-Zero at Startup ..... 19
6.4. Operating the built-in flashlight ..... 19
6.5. Leakage Check ..... 20
6.6. Calibration Status ..... 20
6.7. Bump Status ..... 20
6.8. Glance Mode ..... 21
6.9. Policy Enforcement ..... 21
6.9.1. Setting Policy Enforcement ..... 22
Ch 7. Operation Modes ..... 23
7.1. Safety Mode ..... 23
7.1.1. Switching between Health and Safety Modes ..... 23
7.1.2. User Interface ..... 24
7.1.3. Survey Measurement in Safety Mode ..... 24
7.1.4. Object Measurement ..... 25
7.1.5. Compound Specific Measurement ..... 25
7.1.6. Separation tube preparation ..... 26
7.1.7. Inserting the separation tube ..... 26
7.2. Integrated Sampling Pump ..... 27
7.3. Datalogging ..... 27
Ch 8. Standard Kit and Accessories ..... 29
8.1. Standard Kit ..... 29
8.1.1. AC adapter (battery charger) ..... 29
8.1.2. External Filter ..... 29
Ch 9. Calibration ..... 30
9.1.1. Zero Calibration ..... 30
9.1.2. Span Calibration procedure ..... 30
9.1.3. Calibration Settings ..... 31
9.1.4. Three Point Calibration ..... 32
9.2. Bump Test Procedure ..... 32

Ch 10. Device settings ..... 34
10.1. General Settings ..... 34
10.1.1. Date & Time Settings ..... 34
10.1.2. Language Settings ..... 35
10.1.3. Exit Duration ..... 35
10.1.4. Display Behaviour settings ..... 35
10.1.5. Flashlight ..... 35
10.1.6. Policy Enforcement ..... 36
10.1.7. Battery Settings ..... 36
10.2. Battery Specifications ..... 37
10.3. Device Specifications ..... 37
10.4. Sensor Specifications ..... 37
10.5. Appendix ..... 37
10.5.1. Table of Figures ..... 37

# CH 1. INTRODUCTION

## 1.1. Product Registration

Register your product online by visiting.

https://sps.honeywell.com/us/en/support/safety/hgas-product-registration

By registering your product, you can:

1. Receive notification of product upgrades or enhancements
2. Be alerted to Training classes in your area
3. Take advantage of Honeywell special offers and promotions

### 1.1.1. Standards and Certifications

***Intrinsic Safety placeholder***

***FCC Information placeholder***

***Read Before Operating***

This manual must be carefully read by all individuals who have or will have the responsibility of using, maintaining, or servicing this product. The product will perform as designed only if it is used, maintained, and serviced in accordance with the manufacturer's instructions. The user should understand how to set the correct parameters and interpret the obtained results.

**CAUTION!**

***To reduce the risk of electric shock, turn the power off before opening this instrument or performing service. Never operate the instrument when the instrument is open. Service this product only in an area known to be non-hazardous.***

**WARNING!**

***ATEX: To reduce the risk of electrostatic ignition, do not use the instrument without the rubber boot in place.***

***STATIC HAZARD: Clean only with damp cloth.***

***For safety reasons, this equipment must be operated on and serviced by qualified personnel only. Read and understand instruction manual completely before operating or servicing.***

***USE ONLY HONEYWELL BATTERY PACKS, PART NUMBERS XXX-XXXX-XXX. THIS INSTRUMENT HAS NOT BEEN TESTED IN AN EXPLOSIVE GAS/AIR ATMOSPHERE HAVING AN OXYGEN CONCENTRATION GREATER THAN 21%. SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY. RECHARGE BATTERIES ONLY IN NON-HAZARDOUS LOCATIONS.***

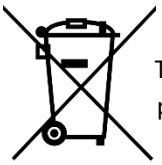
***DO NOT MIX OLD AND NEW BATTERIES OR BATTERIES FROM DIFFERENT MANUFACTURERS.***

***THE CALIBRATION OF ALL NEWLY PURCHASED HONEYWELL INSTRUMENTS SHOULD BE TESTED BY EXPOSING THE SENSOR(S) TO KNOWN CONCENTRATION CALIBRATION GAS BEFORE THE INSTRUMENT IS PUT INTO SERVICE.***

***FOR MAXIMUM SAFETY, THE ACCURACY OF THE INSTRUMENT SHOULD BE CHECKED BY EXPOSING IT TO A KNOWN CONCENTRATION CALIBRATION GAS BEFORE EACH DAY'S USE.***

***DO NOT USE USB/PC COMMUNICATION IN HAZARDOUS LOCATIONS.***

### *Proper Product Disposal at End of Life*



**EU Directive 2012/19/EU: Waste Electrical and Electronic Equipment (WEEE)**

This symbol indicates that the product must not be disposed of as general industrial or domestic waste. This product should be disposed of through suitable WEEE disposal facilities. For more information about disposal of this product, contact your local authority, distributor, or the manufacturer.

## CAUTION

***FCC compliance statement:***
***This device complies with Part 15 of the FCC Rules / Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.***

***IC (ISED) compliance statement:***
***This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:***
***(1) This device may not cause interference.***
***(2) This device must accept any interference, including interference that may cause undesired operation of the device.***
***L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.***
***L'exploitation est autorisée aux deux conditions suivantes :***
***1) L'appareil ne doit pas produire de brouillage;***
***2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.***

***Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:***

- ⚠ ***Reorient or relocate the receiving antenna.***
- ⚠ ***Increase the separation between the equipment and receiver.***
- ⚠ ***Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.***
- ⚠ ***Consult the dealer or an experienced radio/TV technician for help.***

***Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotopically radiated power (e.i.r.p.) is not more than that necessary for successful communication.***

### 1.1.2. IMPORTANT! BUMP TEST THE MONITOR BEFORE EACH DAY'S USE

Prior to each day's use, every gas detection monitor should be bump tested to confirm the response of all sensors and activation of all alarms by exposing the monitor to a concentration of target gas that exceeds the low alarm set point. A bump test is also recommended if the monitor has been subjected to physical impact, liquid immersion, an Over Limit alarm event, or custody changes, or anytime the monitor's performance is in doubt. To ensure greatest accuracy and safety, only bump test and calibrate in a fresh air environment. The monitor should be calibrated every time it does not pass a bump test, but no less frequently than every six months, depending on use and exposure to gas and contamination,

and its operational mode.

- ⚠ Calibration intervals and bump test procedures may vary due to national legislation.
- ⚠ Honeywell recommends using calibration gas cylinders containing the gas that is appropriate to the sensor you are using, and in the correct concentration.

### 1.1.3. Special Notes

When the instrument is taken out of the transport case and turned on for the first time, there may be some residual organic or inorganic vapor trapped inside the detector chamber. The initial PID sensor reading may indicate a few ppm. Enter an area known to be free of any organic vapor and turn on the instrument. After running for several minutes, the residual vapor in the detector chamber will be cleared and the reading should return to zero.

The battery of the instrument discharges slowly even if it is turned off. If the instrument has not been charged for 5 to 7 days, the battery voltage will be low. Therefore, it is a good practice to always charge the instrument before using it. It is also recommended to fully charge the instrument for at least 10 hours before first use. Refer to this User Guide's section on battery charging for more information on battery charging and replacement.

Standard Package Content

- Instrument
- Wrist Strap
- Water Trap (45mm)
- NFC Tag Keyring
- Type C to Type C cable with magnetic adapter
- Type C power adapter (US, UK, Europe, ANZ, China)
- Porous metal filters
- PID Lamp Cleaning Kit
- Organic Vapor Zeroing Kit
- T-tube with Tygon Tube
- Screwdriver

***Scan QR Code on the peel-off screen protection for the quick start guide and User Manual***

# CH 2. GENERAL INFORMATION

The modular instrument serves as a broadband VOC gas monitor and datalogger suitable for hazardous environments. It detects Volatile Organic Compounds (VOC) using a photoionization detector (PID) equipped with a 9.8eV, 10.6eV, or 11.7eV gas-discharge sensor. The device features a sensor cartridge containing the PID sensor, a microcontroller, and electronic circuitry. Its rugged enclosure houses a 3.5-inch TFT color LCD screen and three keys for straightforward user operation. Additionally, it includes a built-in flashlight to facilitate use in dark conditions.

## 2.1. Key Features

**Modular Design**

4. Highly modular and versatile multi-threat gas detector.
5. Rugged and compact design with built-in draw pump.

**Advanced Connectivity**

6. Real-Time monitoring using advanced wireless connectivity
7. Datalogging capabilities with automated data upload

**User-friendly**

8. Preset alarm thresholds for STEL, TWA, low- and high-level peak values.
9. Audio buzzer and flashing LED display are activated when the limits are exceeded.

## 2.2. Physical Description

The main components of the portable VOC monitoring instrument include:

10. Easy replaceable sensors cartridge with quick release buttons
11. Three contextual keys for user interaction with the instrument
12. 3.5inch TFT colored LCD display with ambient light sensor for optimizing the display readability
13. Built-in flashlight for illuminating testing points in dark environments
14. Buzzer, vibrator and red LEDs for alarm signaling whenever exposures exceed preset limits
15. USB type C charging and communication port for PC interface
16. Standard BLE and NFC reader with pre-programmed NFC tags for easy user assignment
17. Independent external wireless module for advanced connectivity and easy upgrade and exchange
18. Gas entry and exit ports
19. Multi color Protective rubber cover
20. Easy-to-use separation tube holder
21. Wrest strap and hand strap

# CH 3. CHARGING THE DEVICE

The device has three charging modes explained below. Ensure the battery is fully charged before operating the instrument.

## 3.1. The Battery Pack

The device is equipped with 5700mAh 3.7V polymer Li-Ion rechargeable battery. Battery packs can be charged individually via the supplied charger or while it is installed in the device. To charge the instrument's Li-ion battery, connect the supplied USB Type-C cable to the battery This flexibility allows users to recharge the battery according to their operational needs and convenience.

The battery's LED indicates the status as show in Table 1below.

*Table 1: Battery LED*

| | |
|---|---|
| Flashing green means charging | |
| Solid green indicates fully charged | |
| Solid red signals a charging error | |

If the red light appears, unplug the cable and contact your service provider, as errors may result from temperature issues, low or high voltage, poor connections, or insufficient input power.

*Figure 1: ModRAE Battery*

**Please note**: The provided cable is a two-piece design featuring a magnetic connection. Ensure the smaller segment is correctly inserted into the battery. The cable does not require a specific orientation. While a standard non-magnetic USB Type-C cable may be used, this will leave the battery port exposed; therefore, it is recommended to use the supplied cable to maintain proper seal of the battery port. You can use either Type-C to Type-C cable or Type-A to Type-C cable for charging. Please refer to section 10.2 in the appendix for battery pack specifications.

## 3.2. Charging Mode Selection

The device is initially set to normal charging mode. Users may select their preferred charging mode from the settings menu, as illustrated in Figure 2 below.

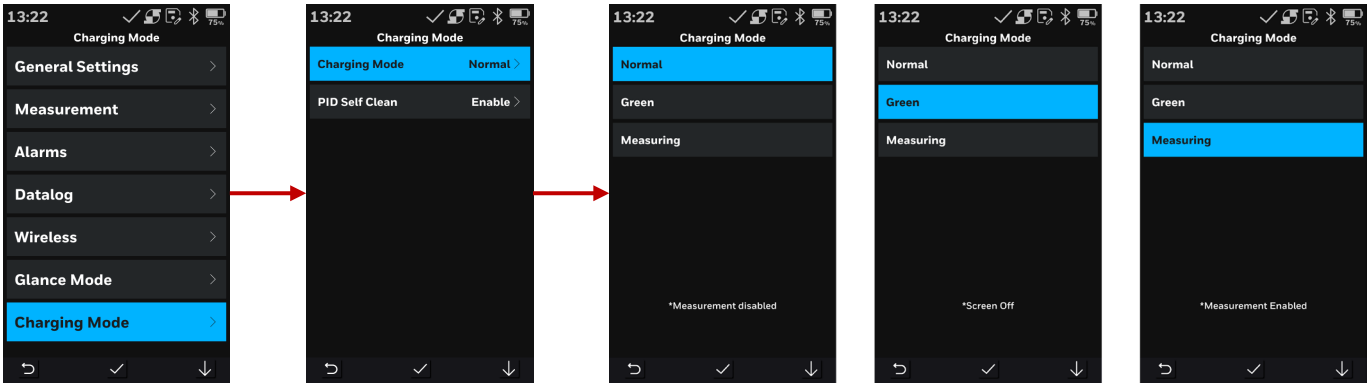



*Figure 2: Charging Mode Selection*

## 3.3. Normal Charging Mode

The instrument may be switched to the standard charging mode. In this mode, measurement functions are disabled, and both the MCU and display switch their power to decrease battery charging time. USB communication remains active, while IntelliFlash™ and other non-essential features are deactivated to expedite the charging process. The charging screen, illustrated in **Error! Reference source not found.**, presents the current charging percentage and estimates the runtime based on the previous 24 hours of operation and power consumption, which varies with the functions used during that period.

When power is connected to the device, charging will begin whether the instrument is powered on or off. If the device is off when charging commences, the display will indicate charging status as depicted in **Error! Reference source not found.**, and all other functions, such as the pump and sensors, will remain disabled. Upon disconnecting the device from the power source, the screen will turn off automatically.

If the device is powered on during charging, the screen will display charging status as shown in **Error! Reference source not found.**, and both the pump and sensors will shut down. Once disconnected from power, the device will revert to its pre-charging state.

When fully charged, the screen will show a full charge indication as seen in **Error! Reference source not found.**. If a charging fault occurs, the device will display an error message as illustrated in Figure 5.

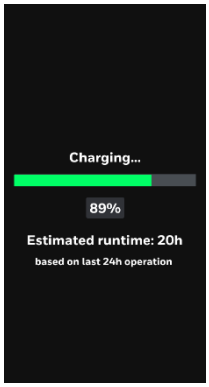



*Figure 3: Charging in Progress*

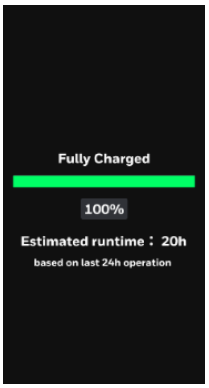



*Figure 4: Fully Charged*

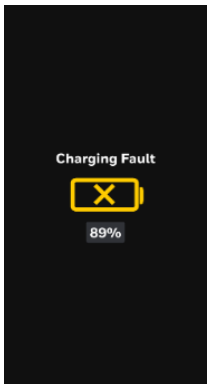



*Figure 5: Charging Error*

**WARNING!**

***To reduce the risk of ignition of hazardous atmospheres, recharge and replace batteries only in areas known to be non-hazardous. Remove and replace batteries only in areas known to be non-hazardous.***

## 3.4. Green Charging Mode

When the device is configured to green charging mode and connected to power while powered off, only the LED indicators display the charging status; the screen remains inactive. If the device is powered on with green charging mode enabled and plugged in, it will operate identically to normal or standard charging mode.

## 3.5. Measuring Charging Mode

When the device is operating in measuring charging mode, users can continue measurements while the device charges. This mode is intended for situations where prolonged operation is required beyond the available battery capacity. During measuring charging mode, the display will continuously show measurement data, with only the charging icon indicating active battery charging. Upon selecting this mode and connecting power to charge the battery, the device will display a notification stating that measuring charging mode does not comply with hazardous area requirements as shown in Figure 6. Users must acknowledge this notification, and their acknowledgment will be recorded in the device's data log.

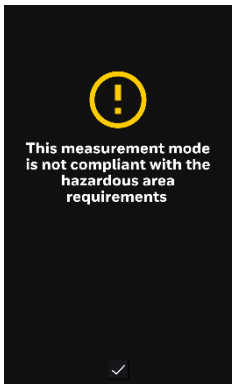



*Figure 6: Measuring Charging Mode*

## 3.6. Real Time Clock Battery

An internal Real Time Clock (RTC) battery is installed on the instrument's printed circuit boards. This high-quality, long-lasting battery preserves settings in memory when the Li-ion battery is removed. The backup battery has an estimated lifespan of five years and should be replaced exclusively by an authorized Honeywell service technician. User replacement is not permitted.

## 3.7. Data Protection while power is off.

Upon turning off the instrument, all real-time information, including the most recent measurements, is cleared. Nonetheless, data log and event log entries remain securely stored in non-volatile memory. The data log and event log data will be retained even if the battery is removed or replaced.

# CH 4. BASIC OPERATIONS

## 4.1. Turning the instrument ON

1. Ensure the battery pack is inserted properly and the instrument is switched off.
2. Press and hold the power button ⏻ until the display activates, then release the button.
3. The device will power on, the LED will flash and the busser will sound.
4. The instrument is now operating and performs self-tests. Once the self-tests are complete, the login screen will appear, prompting the user to log in. There are multiple methods available for accessing the device—please refer to section 0 below for further details.

Upon initial activation of the instrument, the user is required to select the language, date, and time. Figure 7 below illustrates the initial setup screens that the user must proceed through before beginning use of the device. The instrument will also perform several functionality checks like the RTC check, Accelerometer check, Microphone check, Ambient light sensor check, THP sensor check, BLE module check, Wireless module checks and flow rate check and adjustment.

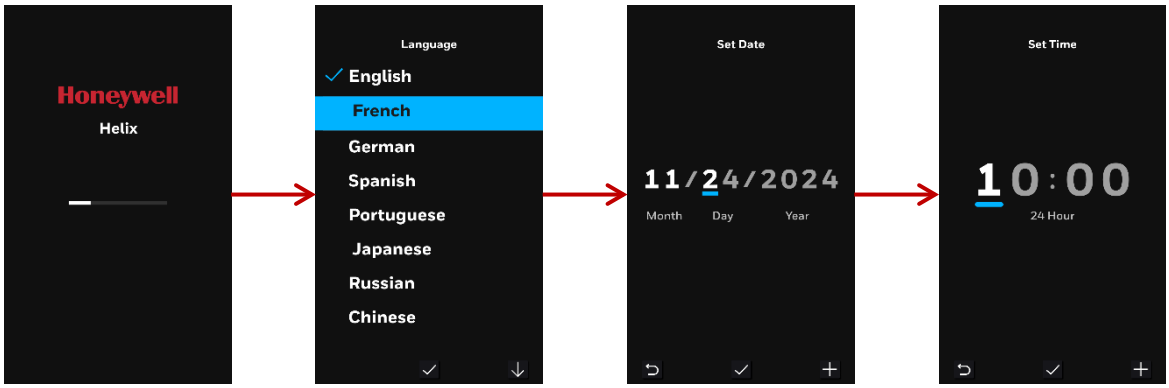



*Figure 7: Out of The Box Screens*

## 4.2. Turning the instrument OFF

1. Press and hold the power button ⏻ key for 3 seconds.
2. A 3-second countdown to shutoff begins.
3. Once the countdown stops, the buzzer will sound again, and the LED will flash red and the instrument will shut down. Release the power button.

**Note:** You must hold your finger on the key for the entire shutoff process. If you remove your finger from the key during the countdown, the shutoff operation is canceled, and the instrument continues normal operation.

## 4.3. Alarm Check

Upon each activation, the device conducts an automatic check of all alarms—including the buzzer, LED, and vibrator—to verify proper functioning. Users also have the option to manually test the alarms and can adjust the pass criteria via threshold confirmation. The instrument's verification process utilizes a light sensor for the LED, an acceleration sensor for vibration, and a microphone for the buzzer. If any component fails the automatic alarm check, the instrument will display one or more screens as shown in Figure 8, prompting the user to

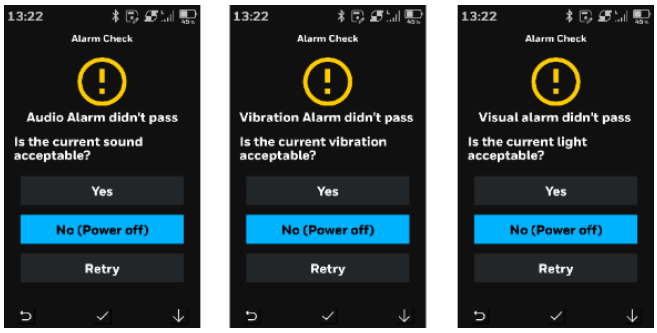



*Figure 8: Alarm Check Message*

either accept the alarm status or repeat the test. If the user opts to retry, the unit will perform the test again, continuing this cycle until the alarms pass. Once all tests are successfully completed, normal device operation may proceed.

## 4.4. IntelliFlash™ and Comfort Beep

The IntelliFlash™ and Comfort Beep are designed to offer visual and audible confirmations that the ModRAE™ device is operating correctly and remains compliant. The IntelliFlash™ utilizes four distinct colors within ModRAE™, as illustrated in Figure 9 below. The accompanying table provides detailed explanations of each color.

*Table 2: Intuitive IntelliFlash™ Colors*

| | |
|---|---|
| Green | 22. The detector is functioning correctly to monitor gas levels<br>23. The comfort beep operates in conjunction with the green LED flash. |
| Red | 24. Instrument is in Alarm |
| Yellow | 25. Detector can't measure gas when in special status<br>26. Instrument or sensors has a specific error and requires the attention of the user. |
| Blue | 27. A new incoming message is in the Inbox<br>28. BLE pairing mode. |

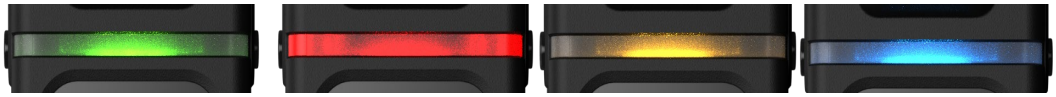


*Figure 9: IntelliFlash*

**Note**: The IntelliFlash™ interval can be configured by the user between 1 and 60 seconds, with a default setting of 5 seconds and a flash duration of 20 milliseconds. The comfort beep is also user configurable within the same range, defaulting to 5 seconds and featuring a beep duration of 20 milliseconds.

## 4.5. User ID and Login

For all gas monitoring applications and measurement data logging must be associated with a user ID. Before an instrument can be used for monitoring, a user must log in after the device is powered on.

### 4.5.1. Guest Access

For certain applications, a guest role which appears in the user list as "Guest" can be used to log in. Guest logins are anonymous and do not require authentication credentials. Figure 10 below illustrates the process of logging in as a Guest. The "Guest" account has the following characteristics:

29. Always appears in the user list as "Guest" and can't be deleted.
30. User type: Basic
31. **Application mode**: Health & Safety
32. Measurement data recorded under Guest login is anonymous.

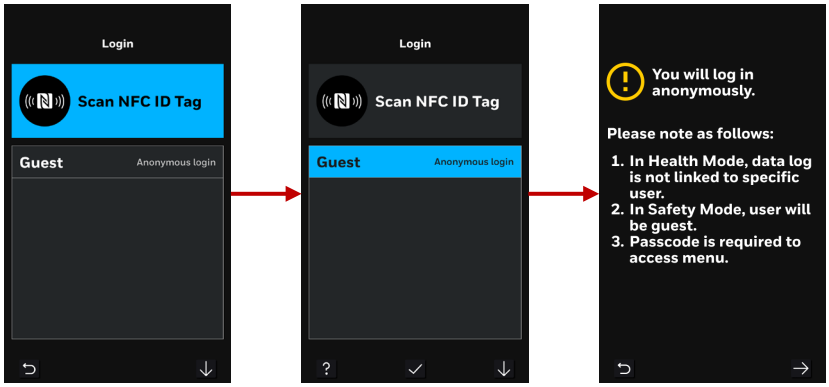



*Figure 10: Guest User Login*

## 4.5.2. Login Requirement

User login is a mandatory standard process and cannot be enabled or disabled. Users are categorized with Basic or Advanced privileges, which determine available functions and application modes.

## 4.5.3. Login Methods

*Figure 11: NFC Tag*

### *Approach 1: NFC Tag Login*

The instrument is supplied with three NFC tags with administrator rights:

33. Username: Admin
34. Passcode: 1111
35. **User type**: Advanced
36. **Application mode**: Health & Safety

When the instrument displays the login screen, hold an authorized NFC tag near the reader to log in. NFC tags are:

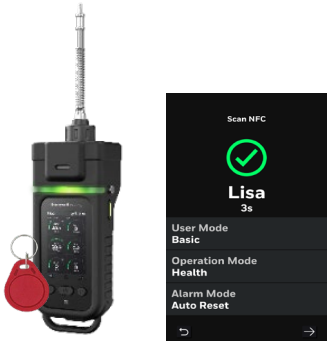



*Figure 12: Scan NFC to Log in*

37. Assigned by an Administrator
38. Rewritable using Device Configuration (DC) app.
39. NFC login does not require a passcode.
40. The NFC tag must be specifically configured for instrument login.

### *Approach 2: Username and Password Login*

Users can also log in by selecting their name from a user list and entering a passcode as shown in Figure 13 below. The user list is created from:

41. NFC-based logins
42. Safety Suite Software or DC app.

The list supports up to 10 users and is managed automatically using a Last-In, First-Out (LIFO) order. Each user record includes:

43. **Username** (up to 12 characters)
44. **Passcode** (required for list-based login only)
45. **User type**: Basic or Advanced
46. **Operation Mode**: Health Mode, Safety Mode, or Health & Safety Modes

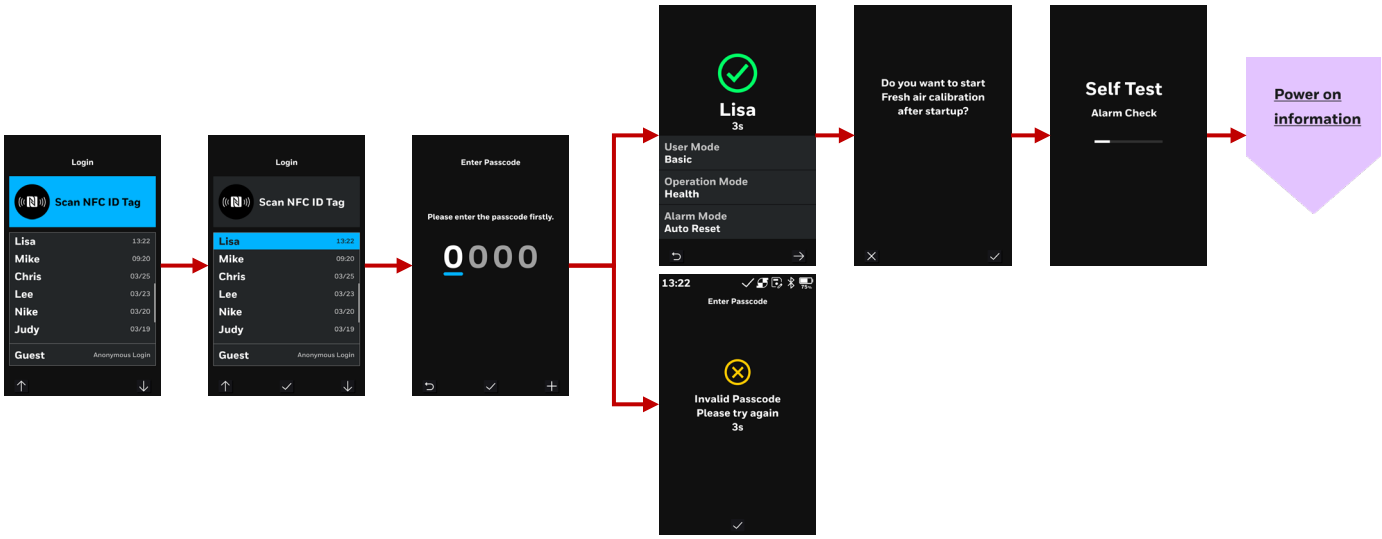



*Figure 13: User Login with Passcode*

# CH 5. USER INTERFACE

The user interface of the instrument is comprised of a 3.5inch display, LED indicators, an alarm transducer, and four keys. Three keys are located on the front panel, while the fourth is positioned on the side of the device and is distinctly labeled with a high-visibility color.

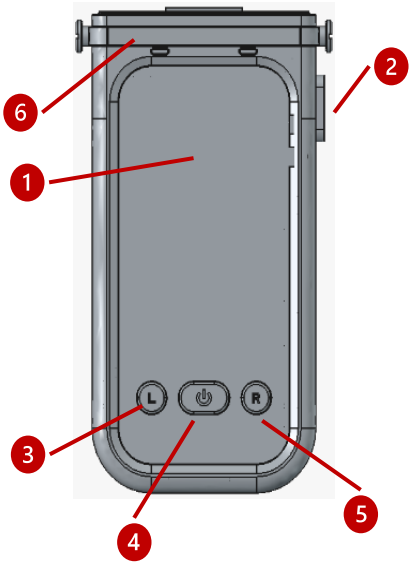



*Figure 14: ModRAE Front Panel*

*Table 3: ModRAE front panel*

| | |
|---|---|
| 1 | LCD screen |
| 2 | Programmable Button/key (SOS/Panic Alarm by default) |
| 3 | Left contextual button/key |
| 4 | Power Button/key |
| 5 | Right contextual button/key |
| 6 | IntelliFlash™ LED |

The front panel features three buttons, each identified by embossed letters: "L" for the left button, "R" for the right button, and ⏻ mark for the middle button referred to as the "Power" button. These buttons are contextual; their functions vary depending on the current display screen. Please refer to the icon shown on the bottom part of the display, which denotes the specific functionality of each button for that particular screen. Figure 15 displays various contextual menu icons that may appear above the buttons on the display screen. The functions of these icons will be described in detail within subsequent sections as they become relevant.

*Figure 15: Contextual Button Icons*

## 5.1. Status Bar

The upper section of the display serves as the status bar (Figure 16), presenting various icons that indicate the status of functions such as time, battery level, pump operation, wireless module status, and more. The following sections will detail each icon that may appear in the status bar and provide an explanation of its significance.

*Figure 16: Status Bar*

### 5.1.1. Battery Status Icons

The battery status icons are described in the table below and are prominently displayed on the status bar using distinct colors to ensure users can easily identify the battery's status without referencing numerical values. A white icon signifies standard battery operation; green indicates that the device is charging; amber denotes that the battery requires attention; and red signals a critically low battery level.

*Table 4: Battery Status Icons*

| | |
|---|---|
| 20h30m | The device is functioning within standard parameters. Battery runtime is presented in hours and minutes, based on the consumption rate monitored over the preceding 24-hour period. |
| 75% | Battery operating normally. Battery charge capacity is indicated as a percentage. |
| 30m | Battery level is low, with limited runtime remaining. |
| 20% | Battery Low status indicating remaining charge capacity as a percentage. |
| 5% | Battery level is critically low, with remaining percentage indicated. |
| 28% | Battery charging status with indicated percentage |
| 8% | The battery is unable to charge (Error) |

### 5.1.2. Data logging Status Icons

The data log status icon is presented in two colors: white signifies normal operation, whereas amber indicates that user attention is required for this feature.

*Table 5: Data log Status Icons*

| | |
|---|---|
| | The data log is operational and functioning as expected. |
| | A data log error has occurred. |
| | The data log has reached its capacity (full) |
| | If the data log feature is not enabled, the corresponding icon will not appear on the screen. |
| | Please be advised that the data log is nearing capacity (Prewarning) |

### 5.1.3. Pump Status Icons

The integrated pump status icons utilize two distinct colors for indication. A white icon signifies normal pump operation, while an amber icon denotes a blocked pump, as demonstrated in the following table.

*Table 6: Integrated Pump Status Icons*

| | |
|---|---|
| | Integrated pump operating under standard conditions |
| | The integrated pump is experiencing a blockage. |
| | When the pump is deactivated, the corresponding icon will not be shown. |
| | Pump Alert: The flow rate is currently below the specified requirement. |

### 5.1.4. Man-Down Alarm Icons

The man-down alarm is consistently displayed in red to indicate its alert status. Two distinct icons are used to signify transmission via wireless communication if the device includes a wireless module and is connected to the system.

*Table 7: Man-Down Alarm Status Icons*

| | |
|---|---|
| | The Man-Down alarm is currently active. If the device is connected, this indicates that the alarm has been successfully transmitted. |
| | A Man-Down alarm is currently being transmitted. |

### 5.1.5. Panic Alarm or SOS alarm Icons.

Panic alarm icons consistently appear in red to signify their alarm status. These icons reflect whether a panic alarm has been sent, provided that the device is equipped with a wireless module and connected to the system.

*Table 8: SOS/Panic Alarm Status Icons*

| | |
|---|---|
| | The Panic/SOS alarm is currently active. If the device is connected, the alarm has been transmitted successfully. |
| | A panic or SOS alarm is currently being transmitted. |

### 5.1.6. BLE Status Icons

The BLE status icon appears in either blue or white to indicate the module's current state. The table below provides an overview of the various icons associated with the BLE module.

*Table 9: BLE Status Icons*

| | |
|---|---|
| | BLE is ON but it is disconnected |
| | BLE is ON and connected |
| | BLE is OFF |

### 5.1.7. Wireless Module Status Icons

The device may be fitted with a wireless module supporting various protocols, such as LTE or LoRa. The icons displayed in the status bar will reflect the current state of the wireless module and its connectivity.

*Table 10: Wireless Status Icons*

| | |
|---|---|
| LTE | LTE is ON but disconnected |
| LTE | LTE is ON and connected |
| LTE | LTE is OFF |
| LoRa | LoRa is ON but disconnected |
| LoRa | LoRa is ON and connected |
| LoRa | LoRa is OFF |
| | Mesh is ON and disconnected |
| | Mesh is ON and connected. Signal Strength indicated with the number of bars shown |
| | Mesh is OFF |
| | Wi-Fi is ON and disconnected |
| | Wi-Fi is ON and connected |
| | Wi-Fi is OFF |
| | If a wireless module is not installed, the corresponding icon will not be displayed. |

### 5.1.8. GNSS Status Icons

Each wireless module option for ModRAE™ is equipped with a GNSS module, enabling precise positional coordination of the device. The operational status of the GNSS module functions independently of the wireless module's connectivity, necessitating a dedicated icon to convey GNSS status information to users.

*Table 11: GNSS Status Icons*

| | |
|---|---|
| | GNSS is ON, no satellite is found |
| | GNSS is ON and satellite is found and connected |
| | GNSS is OFF |
| | If a GNSS module is not installed, no icons will be displayed. |

### 5.1.9. Other Status Icons

Additional icons are utilized to present information on the device screen. The following table provides an overview of the various icons that may appear on the device display.

| | |
|---|---|
| | The message has been received but remains unread. |
| | Policy Compliance Indicator (Device adheres to the specified policy) |

## 5.2. Screen Display

The screen offers two display modes: normal view and focus view. When an alarm is triggered, the display can remain in normal view, presenting the status of all sensors, or switch to focus view, which highlights only the sensors in alarm. The default setting for Alarm Normal View or Alarm Focus View can be configured within the settings menu.

## 5.2.1. Normal View

The Normal view provides a dashboard like view for all the installed and activated sensors where the user can see the measured gas, the real time concentration of the gas and the unit of measure.

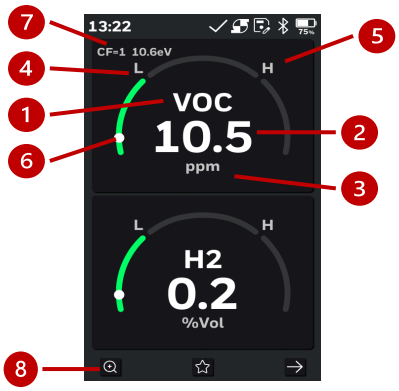



*Figure 17: Normal View*

*Table 12: Normal View*

| | |
|---|---|
| 1 | Measured Gas Symbol |
| 2 | Real Time Reading |
| 3 | Units of measure |
| 4 | Low Alarm Setpoint |
| 5 | High Alarm Setpoint |
| 6 | Gas Level Indicator |
| 7 | Additional Information |
| 8 | Switch to Focus View |

## 5.2.2. Focus View

In normal view, clicking the left button allows the user to switch to focus view. In this mode, each installed and active sensor is presented individually on a dedicated screen with supplementary information, as illustrated in Figure 18.

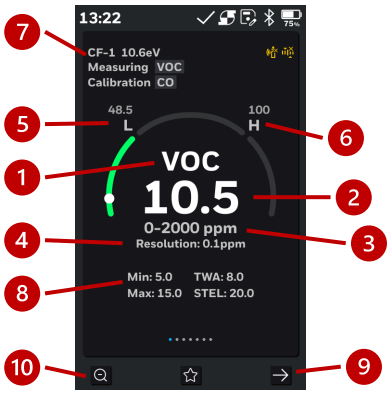



*Figure 18: Focus View*

| | |
|---|---|
| 1 | Measured Gas Symbol |
| 2 | Real Time Reading |
| 3 | Sensor Resolution and the Units of measure |
| 4 | Sensor Resolution |
| 5 | Low Alarm Setpoint Value |
| 6 | High Alarm Setpoint Value |
| 7 | Additional Information |
| 8 | The Minimum, Maximum, TWA, and STEL data updated in real time |
| 9 | Next Sensor Button |
| 10 | Back to Normal View |

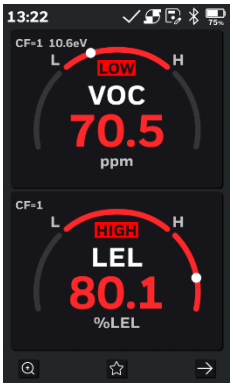



*Figure 19: Alarm Focus View*

## 5.2.3. Alarm Normal and Focus View

The alarm normal and focus views operate similarly to the standard normal and focus views. However, users can configure the device's default response in the event of an alarm. If the device is set to switch to Alarm Focus, Figure 19 will display when an alarm occurs where only the sensors in alarm are displayed and all other sensors are not displayed. If the user selects Alarm Normal View as the default setting, Figure 20 will be displayed during an alarm event in which all sensors in alarm status are shown in red, while sensors not in alarm remain green and are visible on the screen. An icon above the gas symbol indicates whether the alarm is classified as "LOW," "HIGH,"" STEL," or "TWA" based on the established setpoints or thresholds.

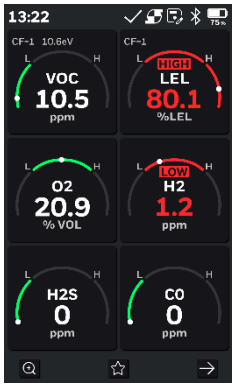



*Figure 20: Alarm Normal View*

## 5.2.4. Sensor Fault

When the sensor enters a Fault status, a sensor fault icon will display in the normal view, while a "Sensor Fault" message appears in the focus view; both indicators will appear in amber as shown in Figure 21. Please check the sensor or consult your Honeywell authorized service center for sensor replacement.

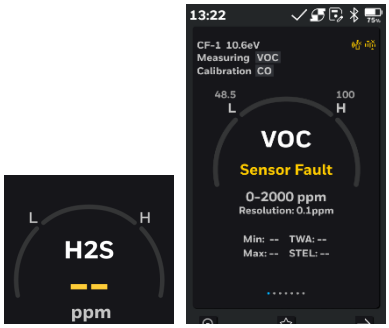



*Figure 21: Sensor Fault*

### 5.2.5. Over Range and negative Drift Alarms

If the sensor detects gas concentrations exceeding its specified range, an over-range alarm is triggered. Likewise, should the sensor drift negatively, a negative drift alarm will be activated. Figure 22 below illustrates the sensor over-range and under range alarms.

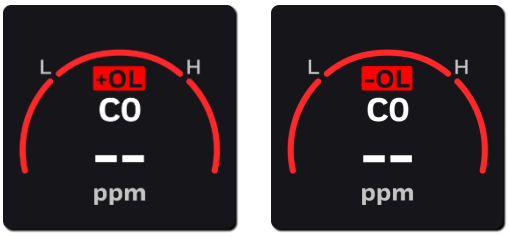



*Figure 22: Sensor +OL and -OL Alarms*

# CH 6. OPERATING THE INSTRUMENT

The instrument functions as a broadband VOC gas monitor and datalogger specifically engineered for operation in hazardous environments. It provides real-time readings and triggers alarm notifications when exposure levels surpass predefined thresholds. Prior to shipment, default alarm limits are established at the factory, and the sensor is calibrated using standard calibration gas. Nonetheless, it is essential to test the instrument and confirm calibration accuracy before initial deployment. Once fully charged and calibrated, the instrument is ready for operational use.

## 6.1. Turning the Instrument ON

Please refer to section 4.1 above " Turning the instrument ON" for details. The primary display may indicate ppb, ppm, or other relevant information depending on the instrument model. The Honeywell logo should initially appear; if it does not, please contact your distributor or Honeywell Technical Support as this may signal an issue. Once activated, the instrument conducts self-test. Should any tests—including sensor or memory checks—fail, consult the Troubleshooting section of this guide. Upon completion of startup procedures, a numerical reading screen accompanied by icons will be shown, signifying that the device is fully operational and ready for use.

## 6.2. Turning the Instrument OFF

Please refer to section 4.2 above "Turning the instrument OFF" for details. You must hold your finger on the key for the entire shutoff process. If you remove your finger from the key during the countdown, the shutoff operation is canceled, and the instrument continues normal operation.

## 6.3. Auto-Zero at Startup

The Honeywell Safety Suite software and DC App enable users to configure the instrument for automatic zero calibration following self-testing at startup. It is important to note that this feature is not enabled by default. When deactivated, the instrument completes its self-test and proceeds directly to reading mode. The zeroing process can be aborted by pressing the "L" key at any time during the process, and the instrument will go directly to normal reading mode.

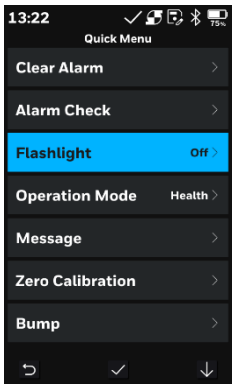



*Figure 23: Flashlight*

## 6.4. Operating the built-in flashlight

The instrument incorporates an integrated flashlight to facilitate illumination of dark environments during operation. To enable the flashlight, access the quick menu by pressing the power button while the instrument is in standard operating mode. If the instrument is powered off, the flashlight

can be activated by pressing the “L” button. Additionally, when the instrument is operating in normal mode and enters a dimly lit area, the ambient light sensor will detect the reduced light and automatically activate the flashlight. This automatic functionality may be disabled via the settings menu.

**Note**: Prolonged use of the flashlight will decrease the battery’s operational duration prior to requiring recharge.

## 6.5. Leakage Check

Upon startup, the device initiates a leakage test by requesting the user to block the probe. The system then checks any potential leakage. If the test is successful, the device will indicate that the leakage check has been passed. Conversely, if the leakage check fails, the device will display a prompt as illustrated in the figure below.

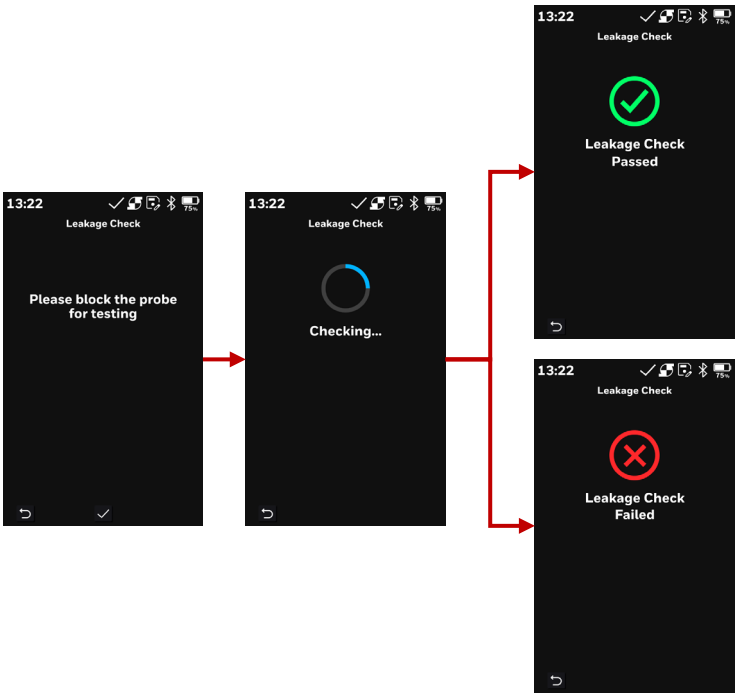



*Figure 24: Leakage Check*

## 6.6. Calibration Status

The instrument displays the icon shown Figure 25 below in amber color when calibration is required. Calibration is required, and this icon is displayed under the following conditions:

*Figure 25: Calibration Due and Fault Icons*

- The sensor has been replaced.
- The user-defined calibration interval has been exceeded.
- The calibration gas type has been changed without recalibrating the instrument.
- The instrument fails a bump test

*Figure 26: Bump Due and Fault Icons*

## 6.7. Bump Status

Sensor(s) should be tested periodically using a bump test. The instrument displays the icon in Figure 26 when a bump test is required under the following conditions:

- The defined interval between bump tests has been exceeded (bump test overdue).
- The sensor failed a previous bump test.

## 6.8. Glance Mode

Glance Mode allows you to get vital information without turning on the instrument. You can check information such as the instrument's model and serial number, installed sensor types, calibration, and bump data, etc. Glance Mode menu components can be activated or deactivated using the device's menu as shown in Figure 27

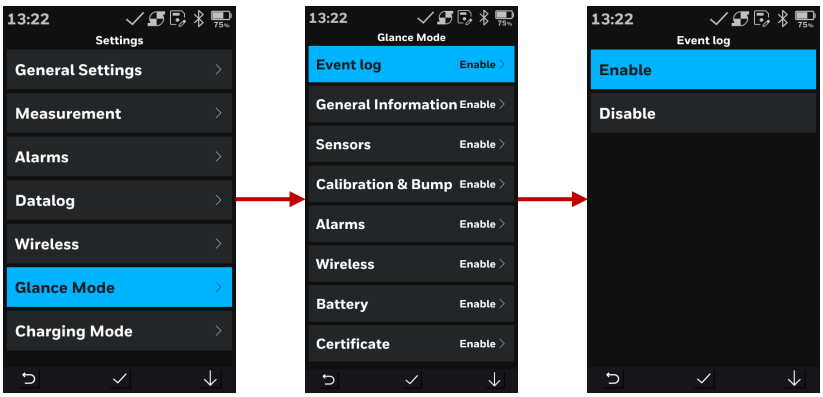



*Figure 27: Glance Mode Settings*

When the device is OFF press and hold the power and "R" buttons for 3 seconds to enter the glance mode as shown in Figure 28

*Figure 28: Entering Glance Mode*

When activated, users can exit glance mode by pressing the power button once more. By default, glance mode displays all relevant information below; however, users have the option to customize the displayed data via the Device Menu, Safety Suite software, or the DC App. The exit duration is set to 60 seconds, but this interval may be adjusted in the device settings.

- Event Log
- General Information
- Sensors Information
- Calibration and Bump information
- Alarms
- Data Log information
- Wireless Information if installed
- Battery and Charge information
- Certification information
- Literature QR-Code

## 6.9. Policy Enforcement

*Figure 29: Policy Tick*

The instrument can be configured to enforce a facility or company's requirements for calibration and bump testing at designated intervals, prompting users when such procedures are necessary. Depending on the configuration of Policy Enforcement features, users may be required to conduct a bump test or calibration before operating the instrument. The system can restrict normal operation until calibration or bump testing is successfully completed. When compliance with policy settings is

achieved through proper bump testing and calibration, a check-mark icon (Figure 29) will appear in the status bar. If Policy Enforcement is enabled, the instrument displays a notification after startup indicating that a bump test or calibration is required; if both are necessary, they will be presented sequentially. Please note that Policy Enforcement features are disabled by default.

### 6.9.1. Setting Policy Enforcement

Users may adjust the policy enforcement setting by utilizing either the Device Configurator App or Honeywell Safety Suite. For detailed guidance on modifying these settings, please consult the respective software and application manuals. Alternatively, to change policy enforcement directly through the device's native menu, navigate to Device Settings, select General Settings, and then choose Policy Enforcement.

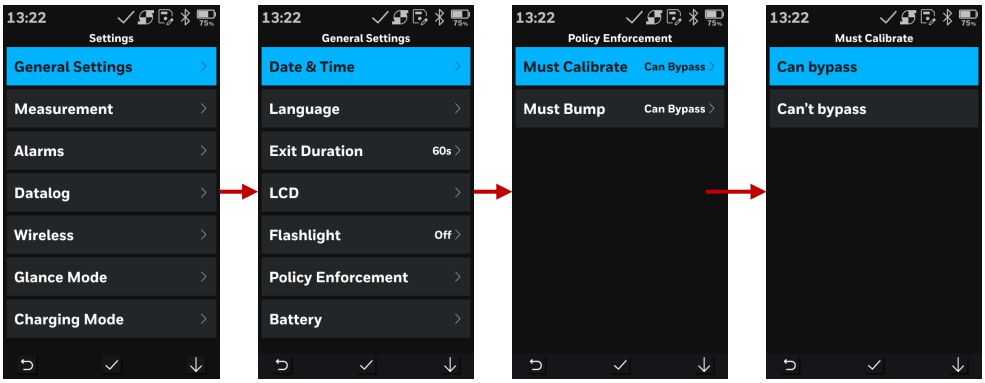



*Figure 30: Policy Enforcement*

The following policy options can be enabled or disabled from this screen:

- Must Calibrate
- Must Bump
- Can Bypass calibration
- Can Bypass bump

These settings control whether bump testing and calibration are required and whether the user is allowed to bypass them.

#### *Must Calibrate*

The user is prompted to calibrate the instrument when calibration is due, as defined by the calibration interval. Two programmable options are available:

- Cannot Bypass

Calibration must be performed and successfully completed before the instrument can be used. If calibration is not performed, the only available option is to turn off the instrument.

- Can Bypass

If calibration is due but the user chooses not to perform it, the instrument may still be used. In this case, the instrument records the bypass event in a Policy Violation report.

#### *Must Bump*

The user is prompted to perform a bump test when a bump test is due, as defined by the bump test interval. Two programmable options are available:

- Cannot Bypass

A bump test must be performed and successfully completed before the instrument can be used. If the bump test is not performed, the only available option is to turn off the instrument.

- Can Bypass

If a bump test is due but the user chooses not to perform it, the instrument may still be used. In this case, the instrument records the bypass event in a Policy Violation report.

# CH 7. OPERATION MODES

ModRAE™ offers several operational modes tailored to the specific task and customer requirements. Below is an overview of these modes:

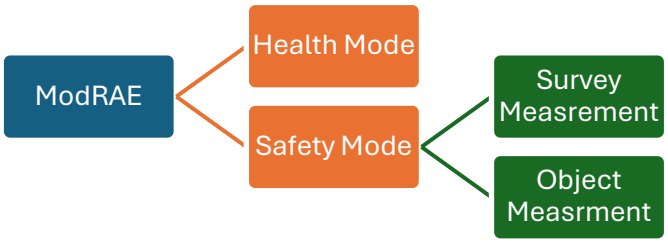



*Figure 31: ModRAE Operation Modes*

**Health Mode:** Designed for occupational exposure measurement, this mode emphasizes the accuracy of gas concentration measurements near Occupational Exposure Limit Values (OELV). For health monitoring purposes, data logging should be associated with worker names, dates, and measurement data types. The worker's name serves primarily as the index for merging data.

**Safety Mode:** Is intended for general gas detection applications, such as safety warnings and leak detection. Here, performance requirements focus on alarm signaling, and the measuring range is determined by the manufacturer. For safety monitoring, data logging should be linked to the measurement object (such as equipment or specified location), operator, date, and measurement data type. The measurement object acts as the primary index for data merging. In safety mode users can perform Object measurement or survey measurement which will be explained in detail later.

## 7.1. Safety Mode

Safety Mode is intended for general gas detection purposes, including safety alerts and leak identification. Its principal objectives are the prompt localization of leakage sources and the efficient acquisition of gas concentration data. The measurement range is specified by the manufacturer. Safety Mode offers Real Time Measurement, Survey Measurement, and Object Measurement to address requirements in field applications. Benzene and $O_2$ inert measurements are excluded from the scope of object measurement. Alarm thresholds may differ from those established in Health Mode.

### 7.1.1. Switching between Health and Safety Modes

There are two methods for switching between Health and Safety modes. Users may select either Health or Safety mode based on their login credentials; if no relevant property is assigned, the system will default to

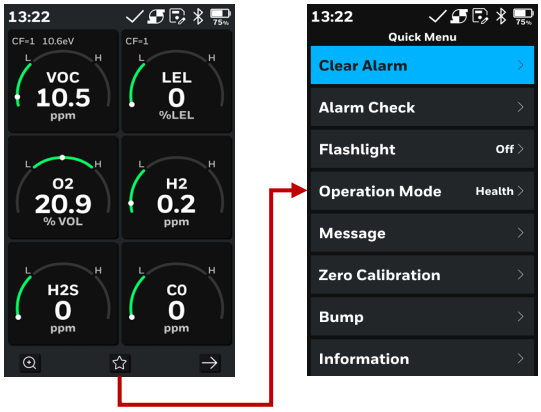



*Figure 32: Quick Menu Switch*

Health mode. Alternatively, users can switch between Safety and Health modes within measurement mode by accessing the quick menu as shown in Figure 32. In safety mode users can perform

47. Real Time Measruement
48. Survey Measurement
49. Object Measurement

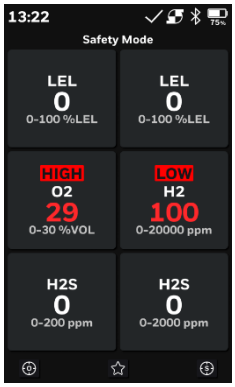



*Figure 33: Safety Mode UI*

## 7.1.2. User Interface

To help differentiation between the safety mode and health mode in ModRAE™, switching to safety mode presents users with a modified user interface. While the core logic and menus remain unchanged, the readings interface is adjusted to provide a subtle yet noticeable indication that the system is operating in safety mode. Figure 33 shows an example of the user interface in safety mode.

## 7.1.3. Survey Measurement in Safety Mode

Survey measurement enables swift identification of irregular gas concentrations. Users may conduct a comprehensive survey that incorporates all installed sensors or opt for a targeted survey by selecting individual sensors.

### *Focus Survey Measurement*

Follow the steps below and refer to Figure 34:

1. From the main menu, select Focus Survey.
2. Select the sensor to be used for the focus survey monitoring.
3. The device will automatically perform the focus survey three times and will provide summary information for all three measurement rounds upon completion.
4. During the focus survey monitoring, observe the graphical representation of the concentration and the measurement duration. The measurement duration is fixed at 20 seconds. You can abort at any time.
5. After all measurement rounds are completed, the device will display the results along with a graphical representation of the collected data.

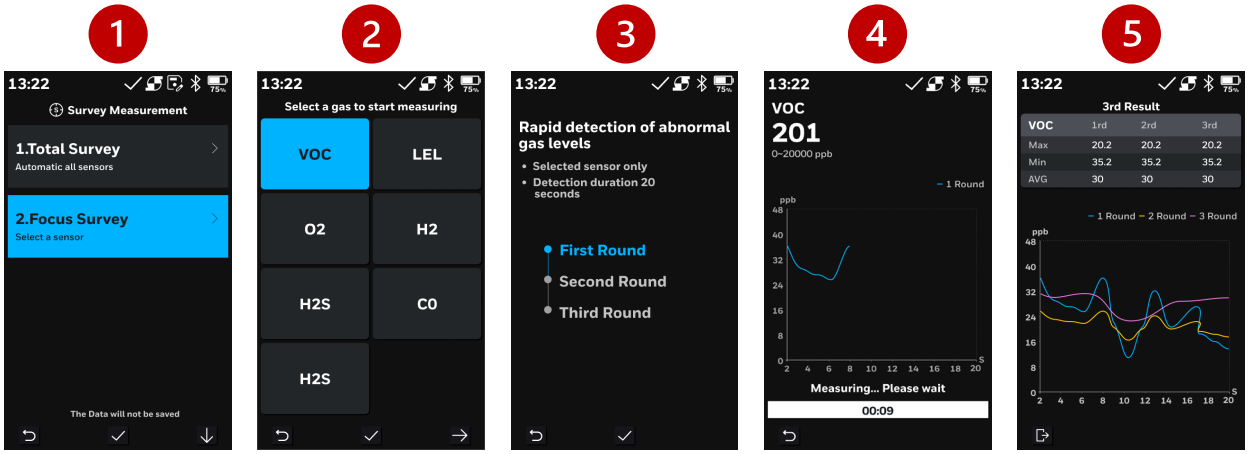



*Figure 34: Focus Survey*

### *Total Survey Measurement*

Follow the steps below and refer to figure 33

1. From the main menu, select Total Survey.
2. Read the instructions and confirm to start the process.
3. The device will automatically perform the total survey three times and will provide summary information for all three measurement rounds upon completion.
4. After each round the device will provide the results and will request the user to proceed or abort.
5. After all measurement rounds are completed, the device will display the results.

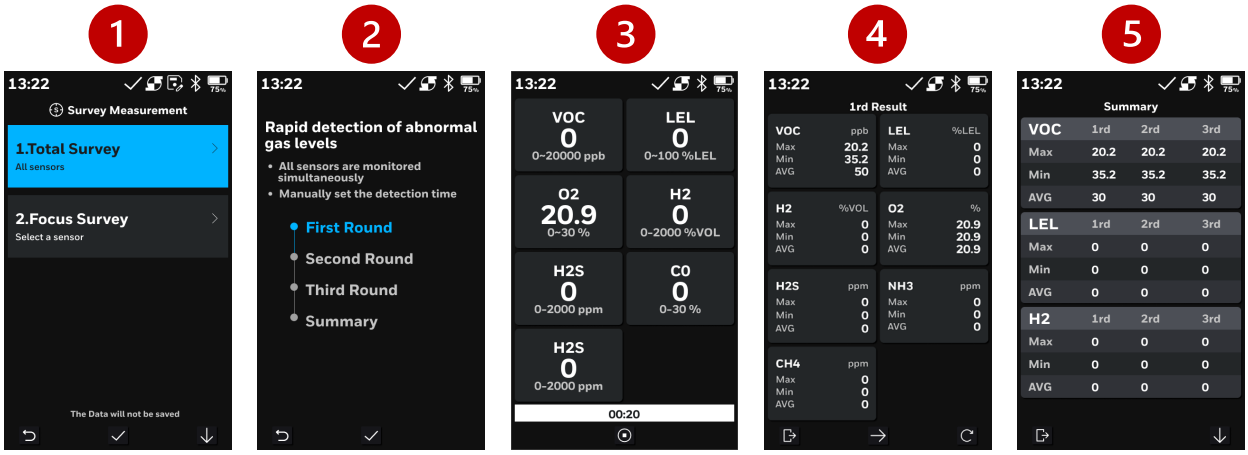



*Figure 35: Total Survey*

## 7.1.4. Object Measurement

Object measurement encompasses both routine spot detection and temporary point detection. In routine spot detection, the measurement objects are identified, and procedures are specified. For temporary point detection, the objects may be uncertain, but procedures remain defined. Within the instrument, the "Object List" contains routine spot detection items, while the "Temporary Object List" pertains to temporary point detections; corresponding procedures are predefined in Honeywell Safety Suite and DC App.

The object measurement procedure is determined by selecting the object name from either the "Object List" or the "Temporary Object List." Upon completion of each measurement, a summary result is presented to the user for confirmation, allowing them to save or discard the data. Total measurement results are displayed on screen when possible.

In Honeywell Safety Suite and DC App, procedures for both routine spot detection and temporary point detection are referred to as "Class." Both the Object List and Temporary Object List must be established in Honeywell Safety Suite or DC app, then moved to the instrument for field applications. Honeywell Safety Suite and DC app can retrieve the Object List and temporary object list from the instrument for editing and then send back the changes back to the instrument.

## 7.1.5. Compound Specific Measurement

In addition to general VOC measurement, the ModRAE™ supports compound-specific measurements. This function requires the use of an appropriate Separation Tube (Butadiene, Benzene, or Halocarbons) and operation in Object Measurement Mode with a 9.8 eV lamp installed. To perform a Benzene-specific measurement, follow the steps shown in Figure 36:

1. From the main menu, select Object Measurement, then choose the appropriate object from the list.
2. Verify that all configuration parameters are correct, including hose length and other class-specific information, then confirm to proceed.

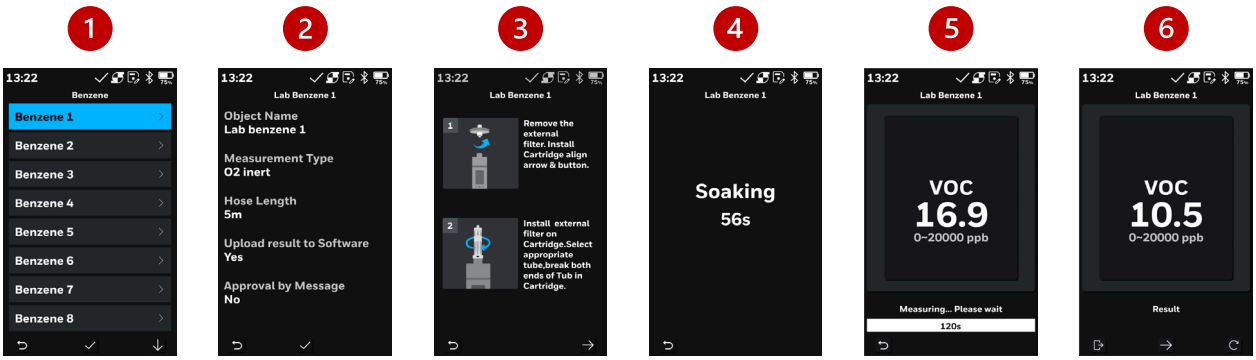



*Figure 36: Compound Specific Measurement*

3. The device will display a step-by-step wizard guiding the user through the correct installation of the separation tube and any additional steps required to ensure successful measurement.
4. Based on the hose length and other configured parameters, the device will initiate the soaking process and display a countdown timer.
5. Upon completion of the countdown, the device will automatically begin the sampling process.
6. After the measurement process is completed, the user may choose to repeat the measurement or abort the operation.

Note: If the device identifies that the user has installed a sensor incompatible with Benzene detection, the system will issue a notification as illustrated in Figure 37.

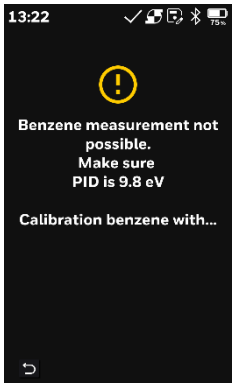



*Figure 37: System Notification*

**WARNING!**

***Do not begin sampling yet! Before you start sampling, you must insert a separation tube into the inlet/holder. Follow the Separation tube preparation and placing a tube into the ModRAE™ instructions before pressing any buttons on the ModRAE™. Once the tube is in place, then proceed to measuring.***

**IMPORTANT!**

***Once a tube's ends are broken off, the material inside is exposed. Therefore, use the tube for sampling as soon as possible. It is recommended to use it within 15 minutes.***

### 7.1.6. Separation tube preparation

**CAUTION!**

***Wear hand and eye protection when breaking tube tips. Use caution in handling tubes with broken ends. Keep away from children. Separation tubes should be disposed of according to local regulations. See footnotes of data sheets for disposal information. Only use Honeywell RAE Systems tubes. Handle tubes with care. Tube ends are sharp after ends are broken off.***

1. Open a package of RAE-Sep separation tubes and remove one.
2. Place the tip in the package's tube tip breaker (the small hole on the front) and snap off the tip.
3. Turn the tube around and snap off the other end.

### 7.1.7. Inserting the separation tube

1. Unscrew the front of the sampling probe from the base.
2. Slip the tube into the rubber holder in the front portion. Make sure the arrow on the side of the tube points toward the instrument.
3. Insert the other end of the tube into the middle of the base while turning the front portion to tighten it onto the base's threads

Note: When the ModRAE™ is used for VOC monitoring, no tube is inserted.

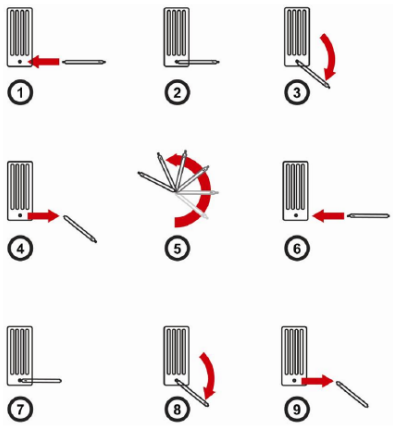



*Figure 38: Separation Tube Preparation*

**IMPORTANT**

***Do not overtighten any portion of the sampling assembly.***

***To ensure that there are no leaks, periodically test the seals:***

***With the ModRAE™ running, place your finger over the end of the inlet probe. The alarm should sound and the pump-stall icon should flash on the display. This indicates that all seals are good. Stop the alarm by pressing "L" key. If the pump does not alarm, then check that all inlet parts are tight and inspect the O-ring for damage (replace it if necessary).***

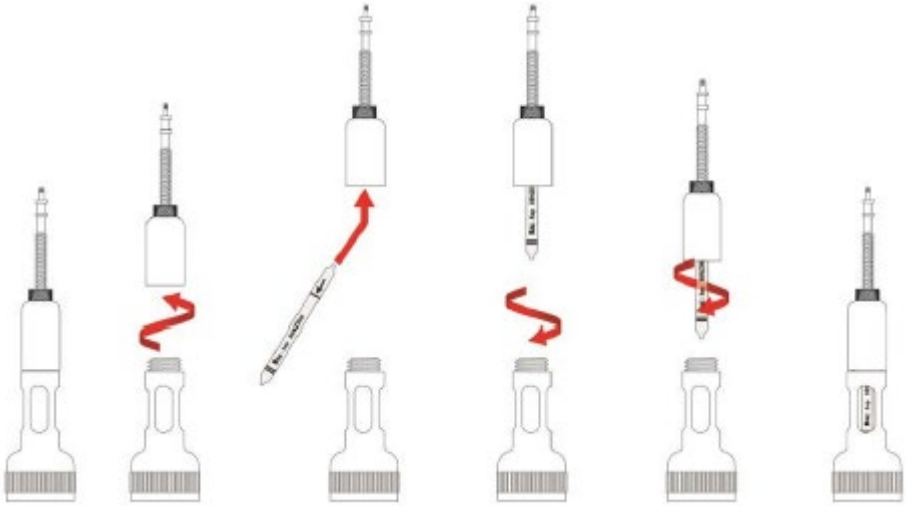


*Figure 39: Inserting the separation tube*

## 7.2. Integrated Sampling Pump

The instrument features an integrated diaphragm-type sampling pump capable of delivering a flow rate between 450 and 550 cc per minute. By connecting Teflon or metal tubing with a 1/8" inside diameter to the gas inlet port, the pump can draw air samples from distances up to 140 feet (~45 meters), either horizontally or vertically. In Search Mode, the pump is activated upon initiation of a sample measurement and deactivated when the sampling is manually halted. Should liquid or foreign objects enter the inlet port filter, the instrument will detect the obstruction, immediately shut down the pump, trigger an alarm, and display a flashing pump icon. The device will perform pump check upon startup, there is no need to block the pump inlet, the device will alert the user if the pump inlet is blocked.

## 7.3. Datalogging

Datalogging is enabled by default but can be deactivated or adjusted through the device settings. Users may navigate to the settings menu, select datalogging, and modify the relevant parameters as needed. Figure 33 below demonstrates the available options, which include clearing the log, setting the action for when memory is full (such as wrapping around or stopping datalogging), uploading data to the software, and adjusting the data log interval. Please note that the selected interval will determine the number of recorded points and, consequently, affect memory usage. Choosing a longer interval results in fewer data logs, thereby allowing the memory to store information over a longer period.

When datalogging is active, the instrument displays a disk icon to signify that this feature is enabled. For further details regarding the icon, please refer to section 5.1.2 above. The instrument records gas concentration measurements at the conclusion of each sample period while datalogging is enabled. Additionally, it logs relevant information including user ID,

site ID, serial number, last calibration date, and alarm limits. All data are preserved in non-volatile memory—even after the device is powered off—so they can be retrieved later.

*Figure 40: Datalogging Settings*

# CH 8. STANDARD KIT AND ACCESSORIES

## 8.1. Standard Kit

The ModRAE™ standard kit is supplied with the following accessories (Table 13) in a recyclable carton box. To access the manual, quick start guide, and other relevant materials, please activate Glance Mode as shown in section 6.8 and scan the provided QR code.

*Table 13: Standard Accessories*

| | |
|---|---|
| Wrist Strap | 1 |
| External Filter (45mm) | 3 |
| NFC Tag Keyring (Advanced) | 3 |
| Type-C to Type-C cable with magnetic adapter | 1 |
| Type-C power adapter (US, UK, Europe, ANZ, China) | 1 |
| Porous metal filters | 3 |
| PID Lamp Cleaning Kit | 1 |
| Organic Vapor Zeroing Kit | 1 |
| T-tube with Tygon Tube | 1 |
| Adapter without probe | 1 |
| Screwdriver | 1 |

### 8.1.1. AC adapter (battery charger)

A battery charging circuit is built into the instrument battery. Connect the supplied power adaptor to the wall socket and charge the device. Please refer to chapter Ch 3 above for details.

**WARNING**

***To reduce the risk of ignition of hazardous atmospheres, recharge battery only in areas known to be non-hazardous. Remove and replace battery only in areas known to be non-hazardous.***

An instrument that has been fully discharged can achieve complete recharging within an 8-hour period. Batteries experience gradual depletion even when the instrument is powered off. Consequently, if the instrument has been stored or left uncharged for several days or longer, it is advisable to verify the battery level prior to operation. The factory-supplied battery is rated for up to 16 hours of standard use (without alarm activation) under optimal conditions with a new battery. However, battery performance will diminish over time or when exposed to challenging environments, such as low temperatures.

### 8.1.2. External Filter

The external filter consists of a PTFE (Teflon®) membrane with a 0.45 micron pore size, effectively preventing dust and other particles from entering the sensor manifold and potentially causing significant instrument damage. This filter enhances the sensor's operational longevity. For installation, attach the external filter directly to the instrument's inlet tube.

**WARNING**

***Always use an external filter on the instrument. This prevents contaminants and debris from clogging the sample pathway and protects the sensor from damage***

# CH 9. CALIBRATION

The following process explains the calibration process

## 9.1.1. Zero Calibration

Follow the steps below to perform a zero calibration (Figure 41: Zero Calibration):

1. Navigate to the main menu and select Calibration.
2. Choose Zero Calibration and confirm your selection.
3. Select the sensor(s) for which zero calibration is to be performed. At least one sensor must be selected; all sensors may be selected if required.
4. When prompted by the device, apply the appropriate calibration gas.
5. Once the gas is applied, the zero calibration process will begin automatically.
6. Upon completion, the device will display the zero calibration results.

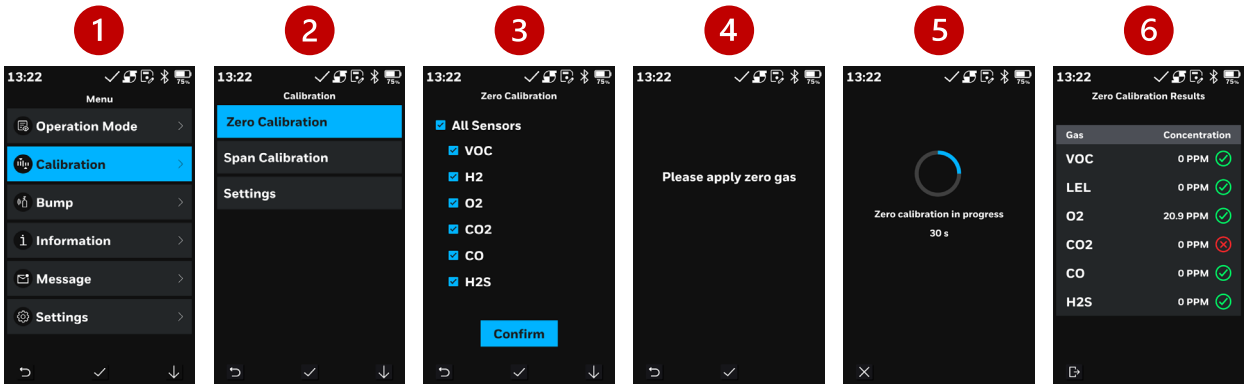



*Figure 41: Zero Calibration*

## 9.1.2. Span Calibration procedure

Follow the steps below to perform a span calibration:

1. Navigate to the main menu and select Calibration.
2. Choose Span Calibration and confirm your selection.
3. Review and consider the cross-sensitivity of the sensors prior to calibration.
4. Select the sensor(s) for which span calibration is to be performed. Sensors that are due for calibration are indicated by a Calibration Due icon. At least one sensor must be selected.
5. When prompted by the device, apply the appropriate calibration gas and confirm.
6. Once the calibration gas is applied, the span calibration process will begin automatically.
7. Upon completion, the device will display the span calibration results.
8. After the calibration gas is disconnected, the device will automatically begin the purging process.

Following this step, users may choose to continue calibrating additional sensors, recalibrate any sensors that failed, or abort the calibration process.

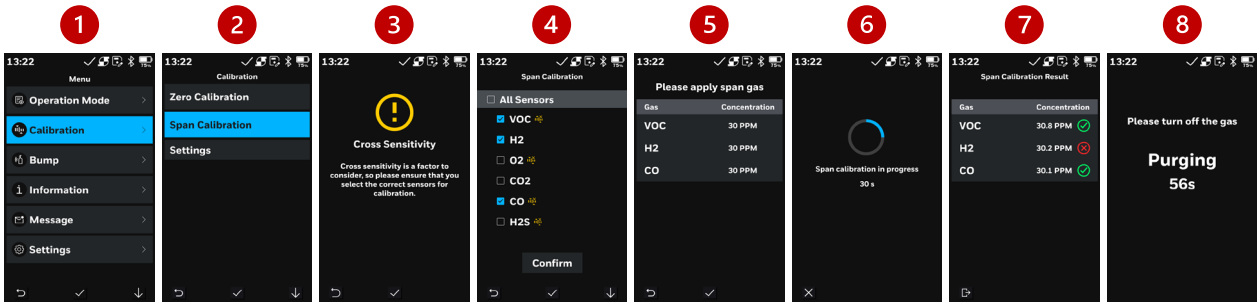



*Figure 42: Span Calibration*

## 9.1.3. Calibration Settings

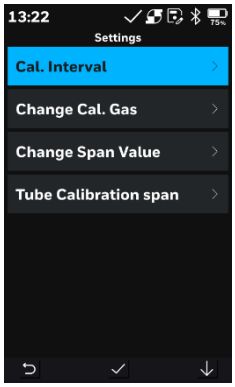


*Figure 43: Calibration Settings*

The above procedure establishes the second point of the sensor calibration curve. The most straightforward method involves using a cylinder of standard reference gas (span gas) equipped with a 500 cc/min flow-limiting or flow-matching regulator. Select the 500 cc/min regulator only if its flow rate matches or slightly exceeds that of the instrument pump. Alternatively, the span gas may be introduced into a Tedlar bag or supplied via a demand-flow regulator. Attach the calibration adapter to the instrument's inlet port, then connect the tubing to either the regulator or the Tedlar bag. Another option involves employing a regulator with a flow rate greater than 500 cc/min, permitting any excess flow to escape through a T or an open tube. With this approach, the span gas exits through an open tube marginally larger than the probe, allowing the probe to be inserted into the calibration tube. Access the Span Calibration menu to perform the Span calibration; you may also return to the Zero calibration menu or the initial Calibration menu to exit the calibration process.

Figure 43 shows the calibration settings, user can select the calibration interval, change the calibration gas, change the span value for each installed sensor and modify the tube calibration settings:

### *Change the Calibration Interval*

To adjust the calibration interval for each installed sensor, select the desired interval from the calibration settings. Then, as shown in the Figure 44 below, choose the calibration interval option, select each sensor individually, and enter the appropriate calibration interval. The maximum allowable interval is 365 days, while the minimum is zero days.

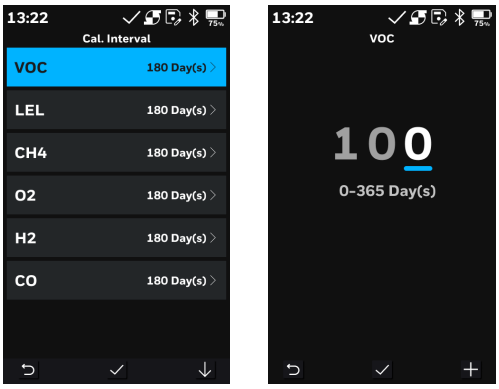


*Figure 44: Calibration Interval*

### *Change the calibration gas*

To change the calibration gas, navigate to the calibration settings and select "Change Calibration Gas" from the menu. Then, choose the appropriate calibration gas for the installed sensors as illustrated in the Figure 45 below.

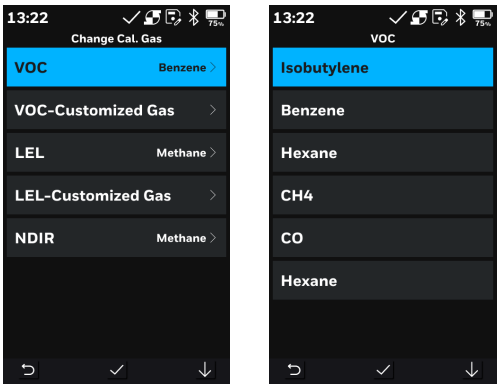


*Figure 45: Change Calibration Gas*

### *Change Span Value*

To adjust the span value for each installed sensor, access the calibration menu settings and select "Change Span Value." As shown in Figure 47 below, then, choose each sensor and modify its span value as required.

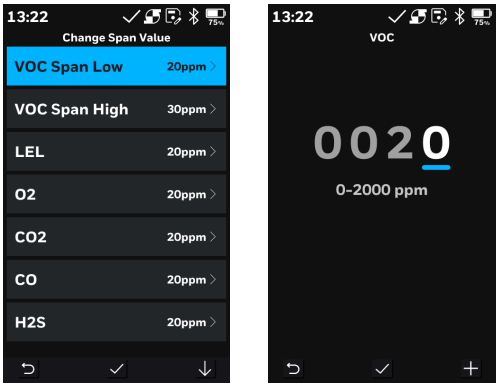



*Figure 47: Change Span Value*

### *Tube Calibration*

When operating in Safety Mode, users may choose to calibrate the device using the Tube calibration method as shown in Figure 46. The configuration options for tube calibration are displayed exclusively in safety mode. Additionally, three tubes are accessible solely within safety mode or for object measurement purposes.

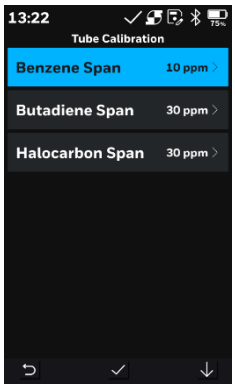



*Figure 46: Tube Calibration*

### 9.1.4. Three Point Calibration

To improve measurement accuracy, a secondary Span calibration may be conducted in addition to the standard Zero and Span calibrations described previously. Prior to performing this third calibration, the instrument must be configured to permit this option. This requires utilizing the Safety Suite software or the DC App and employing a higher concentration of calibration gas. Please refer to the instructions provided below.

Initiate the Zero and Span calibrations as usual. After completing the initial Span calibration (Span 1), the system will display the option for a second Span calibration (Span 2), which follows the same procedure as the first. As with Span 1, users may exit or return to the Zero calibration screen if they opt not to proceed or wish to abort the process.

The minimum concentration for Span 2 gas should be 1000 ppm. When accuracy at low concentrations is the primary objective, utilizing a two-point calibration method with Span 1 set at 100 ppm is sufficient; this approach minimizes reading error at 10 ppm. If Span 1 is calibrated to 10 ppm, the measurement error below 100 ppm—as well as between 100 ppm and 1000 ppm—will increase. The most straightforward procedure involves using a cylinder of standard reference gas (span gas) equipped with either a 500 cc/min flow-limiting regulator or a flow-matching regulator. Span 2 gas should be of a higher concentration than span 1 gas.

Select the 500 cc/min regulator only if its flow rate aligns with or slightly surpasses that of the instrument pump. Alternatively, the span gas may be transferred to a Tedlar bag or delivered via a demand-flow regulator. Attach the calibration adapter to the inlet port of the instrument, then connect the tubing to either the regulator or Tedlar bag. Another option involves utilizing a regulator with a flow rate greater than 500 cc/min and permitting any excess flow to exit through a “T” connector or an open tube(T connector is included in the standard kit). With this technique, the span gas passes through an open tube marginally wider than the probe itself, allowing for the insertion of the probe into the calibration tube.

## 9.2. Bump Test Procedure

Honeywell strongly recommends conducting a bump test prior to each day’s operation. The bump test is designed to ensure that the instrument’s sensors are responsive to the target gas, and to confirm that all alarms activate and function correctly during exposure. This routine check helps guarantee both sensor performance and user safety.

For ModRAE™, calibration is required in specific circumstances: if a bump test fails, after installing a new sensor, following sensor maintenance, or at least every 180 days. The exact frequency depends on how often the device is used and the

sensor's exposure to possible poisons or contaminants. It is important to note that the intervals and procedures for calibration and bump testing may vary according to national legislation and company policy.

To perform a bump test in ModRAE™, follow the steps outlined below, as demonstrated in **Error! Reference source not found.**.

1. Navigate to the menu and select the bump test option.
2. Choose the sensors you wish to include in the bump test. At least one sensor must be selected to proceed.
3. The device will prompt the user to apply calibration gas to the unit.
4. Once the device detects the gas, the bump test will automatically begin. The bump test process is then initiated.
5. After the bump test is complete, the device will display the test results.
6. pon disconnecting the gas, the device will automatically perform a purging process.
7. If the bump test is initiated manually in step 3 above by pressing the tick mark at the bottom, the device will anticipate the flow of gas to conduct the test. Should the gas not be detected within 10 seconds, a warning will appear as indicated in the **Error! Reference source not found.** screen 7 below, and the user will be prompted to choose whether to continue with the bump test or abort the process.
8. If the user opts to cancel the bump test in step 4, a confirmation message will be displayed, as shown in screen 8 below, prompting the user to confirm whether they wish to abort the bump test or proceed.

**IMPORTANT**

***If the instrument does not pass a bump test, perform a full calibration. If calibration also fails, the PID sensor or lamp may require cleaning or replacement. If the instrument repeatedly fails to calibrate, turn it off and refer it for servicing.***

**WARNING!**

***A bump test can only be performed manually in ModRAE™. When a bump test is done manually, the instrument makes a pass/fail decision based on sensor performance, but the user still has the responsibility to make sure all the alarms are enabled and functional.***

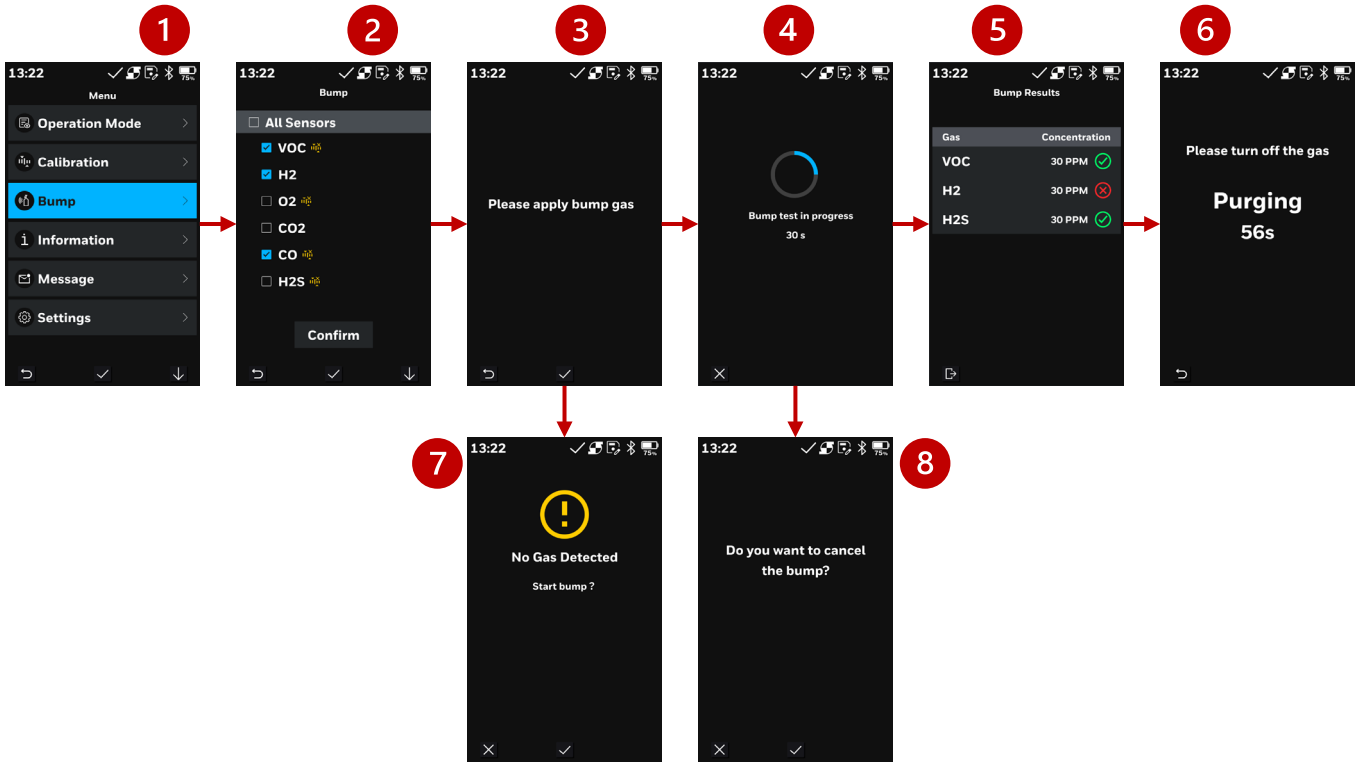



*Figure 48: Bump Test*

# CH 10. DEVICE SETTINGS

The settings menu of ModRAE™ provides users with a flexible and comprehensive way to tailor the device to their specific operational requirements. Whether you are adjusting alarm parameters, configuring sensor thresholds, or setting up data logging preferences, the system is designed to be user-friendly and highly customizable. In the following sections, we will guide you through the details of each setting and show you how to personalize ModRAE™ to best fit your unique needs and applications.

## 10.1. General Settings

Within the General Settings section of ModRAE™, users have the ability to configure key aspects of device operation. Here, you can set the date and time, select your preferred language, adjust the flash, etc. These options ensure that the device is not only tailored to your usage environment but also supports compliance and operational continuity.

### 10.1.1. Date & Time Settings

The date and time settings enable users to modify the date format, select between 12-hour and 24-hour time displays, and adjust the time and date, as illustrated in Figure 49 below.

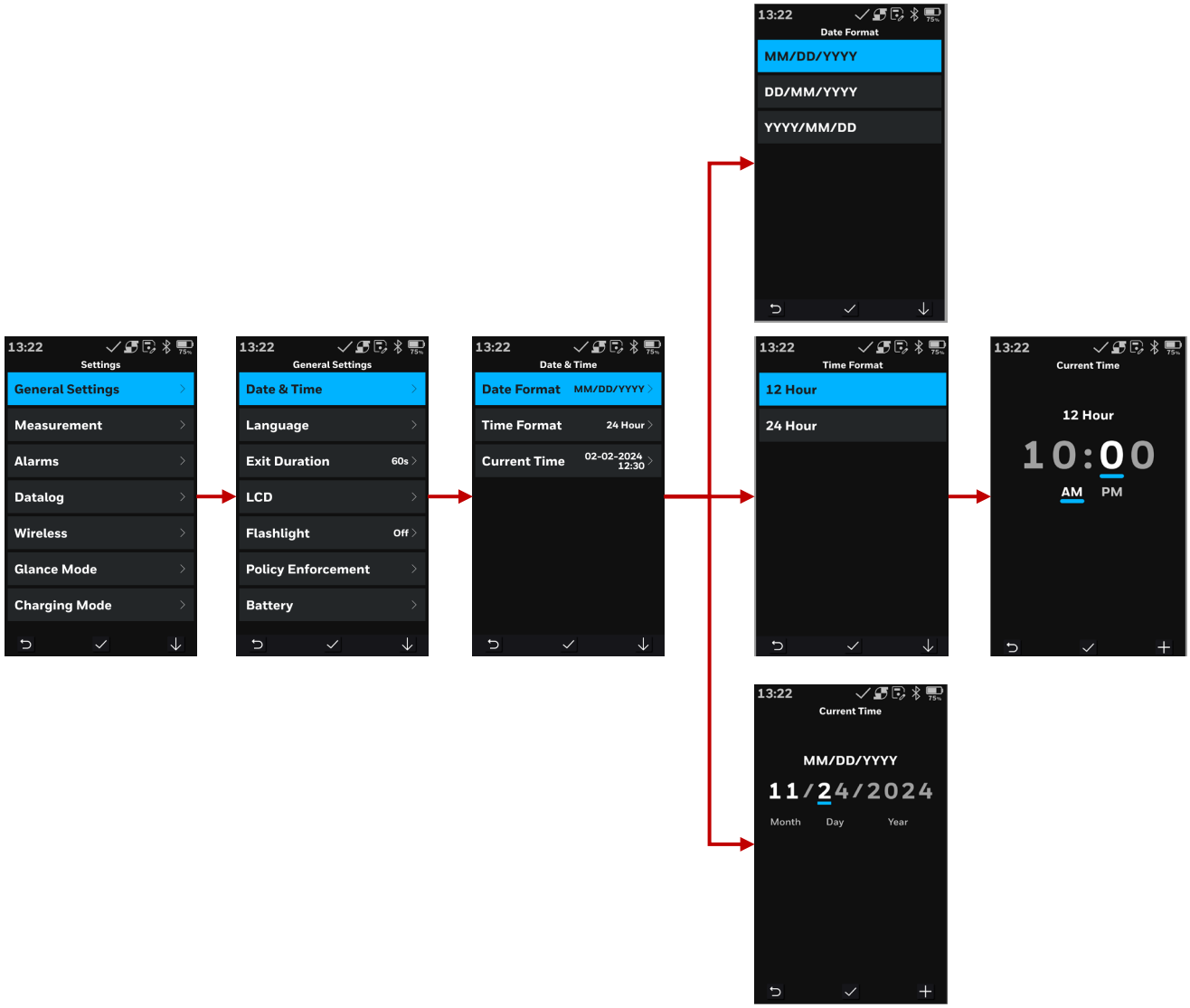



*Figure 49: Date & Time Settings*

## 10.1.2. Language Settings

The language settings enable users to choose their preferred user interface and device language. Eleven languages are supported: English, French, German, Spanish, Portuguese, Japanese, Russian, Chinese, Dutch, Korean, and Italian.

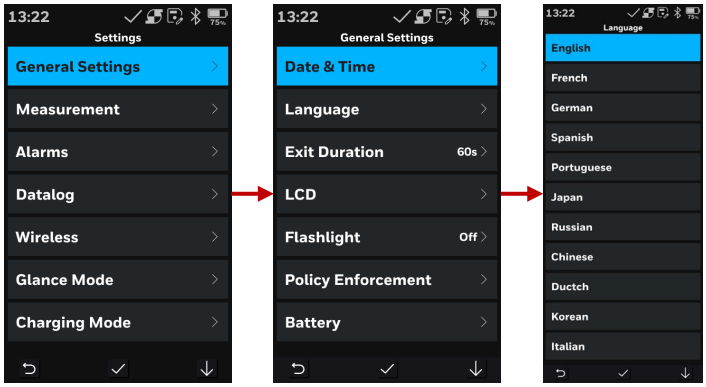



*Figure 50: Language Settings*

## 10.1.3. Exit Duration

The exit duration refers to the time interval during which the device remains on a single screen without user interaction before reverting to the standard reading display. If an invalid value is entered, the device will notify the user and subsequently return to the entry screen as shown in figure , allowing for the input of a new value. The permissible interval ranges from 10 to 120 seconds.

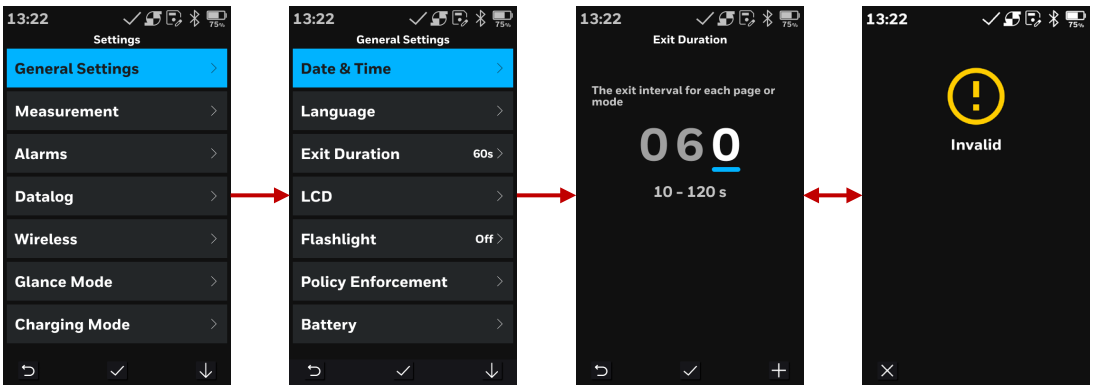



*Figure 51: Exit Duration Settings*

## 10.1.4. Display Behaviour settings

To adjust the display behavior settings, navigate to the device's settings menu and select "Display Settings." Here, you can customize the following options:

- **LCD Flip:** Choose whether the screen automatically rotates 180 degrees when the device is held upside down, or set it to flip manually as needed.

- **LCD Backlight:** Select between manual and automatic backlight control. In manual mode, you can adjust the backlight level by pressing the plus (+) and minus (–) keys located at the bottom of the screen. If you opt for automatic backlight, the device utilizes an ambient light sensor to detect surrounding light levels and automatically adjusts the LCD backlight for optimal visual comfort and clarity. Figure 53 below illustrates these display behavior settings options.

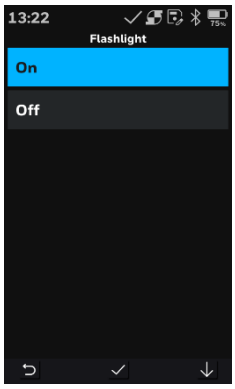



*Figure 52: Flashlight Settings*

## 10.1.5. Flashlight

The flashlight on the front of the device mounted on the sensors cartridge can be activated for dark areas from the settings menu, navigate to the settings menu, select the flashlight option and turn on or off as shown in Figure 52.

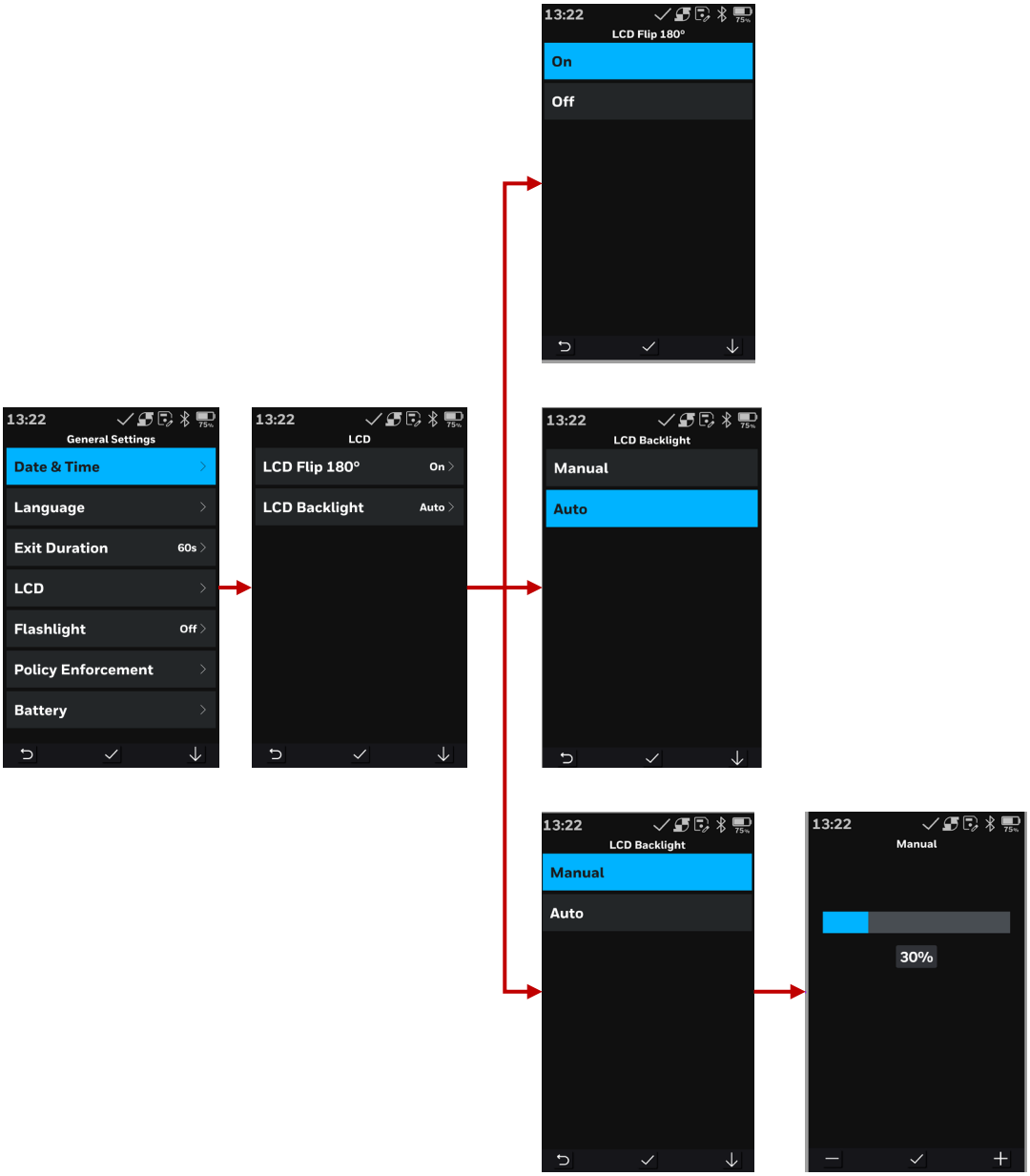



*Figure 53: Display Behavior Settings*

## 10.1.6. Policy Enforcement

The policy enforcement is explained in detail in section 6.9 above

## 10.1.7. Battery Settings

The battery settings provide the option to display either the battery capacity as a percentage or the remaining runtime in hours and minutes, as illustrated in the figure.

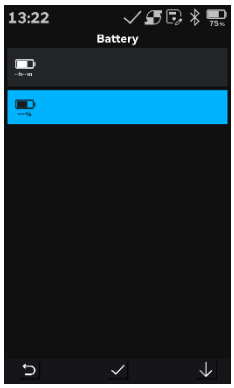



*Figure 54: Battery Settings*

## 10.2. Battery Specifications

Placeholder for battery specifications

## 10.3. Device Specifications

Placeholder for Device specifications

## 10.4. Sensor Specifications

Placeholder for sensors specifications

## 10.5. Appendix

### 10.5.1. Table of Figures


Figure 1: ModRAE Battery ..... 9
Figure 2: Charging Mode Selection ..... 9
Figure 3: Charging in Progress ..... 10
Figure 4: Fully Charged ..... 10
Figure 5: Charging Error ..... 10
Figure 6: Measuring Charging Mode ..... 10
Figure 7: Out of The Box Screens ..... 12
Figure 8: Alarm Check Message ..... 12
Figure 9: IntelliFlash ..... 13
Figure 10: Guest User Login ..... 13
Figure 11: NFC Tag ..... 14
Figure 12: Scan NFC to Log in ..... 14
Figure 13: User Login with Passcode ..... 14
Figure 14: ModRAE Front Panel ..... 15
Figure 15: Contextual Button Icons ..... 15
Figure 16: Status Bar ..... 15
Figure 17: Normal View ..... 18
Figure 18: Focus View ..... 18
Figure 19: Alarm Focus View ..... 18
Figure 20: Alarm Normal View ..... 18
Figure 21: Sensor Fault ..... 18
Figure 22: Sensor +OL and -OL Alarms ..... 19
Figure 23: Flashlight ..... 19
Figure 24: Leakage Check ..... 20
Figure 25: Calibration Due and Fault Icons ..... 20
Figure 26: Bump Due and Fault Icons ..... 20
Figure 27: Glance Mode Settings ..... 21
Figure 28: Entering Glance Mode ..... 21
Figure 29: Policy Tick ..... 21
Figure 30: Policy Enforcement ..... 22
Figure 31: ModRAE Operation Modes ..... 23
Figure 32: Quick Menu Switch ..... 23
Figure 33: Safety Mode UI ..... 24
Figure 34: Focus Survey ..... 24

Figure 35: Total Survey ..... 25
Figure 36: Compound Specific Measurement ..... 25
Figure 37: System Notification ..... 26
Figure 38: Separation Tube Preparation ..... 26
Figure 39: Inserting the separation tube ..... 27
Figure 40: Datalogging Settings ..... 28
Figure 41: Zero Calibration ..... 30
Figure 42: Span Calibration ..... 30
Figure 43: Calibration Settings ..... 31
Figure 44: Calibration Interval ..... 31
Figure 45: Change Calibration Gas ..... 31
Figure 46: Tube Calibration ..... 32
Figure 47: Change Span Value ..... 32
Figure 48: Bump Test ..... 33
Figure 49: Date & Time Settings ..... 34
Figure 50: Language Settings ..... 35
Figure 51: Exit Duration Settings ..... 35
Figure 52: Flashlight Settings ..... 35
Figure 53: Display Behavior Settings ..... 36
Figure 54: Battery Settings ..... 36