RESPO®
Responsive Detection

Explosion-Proof

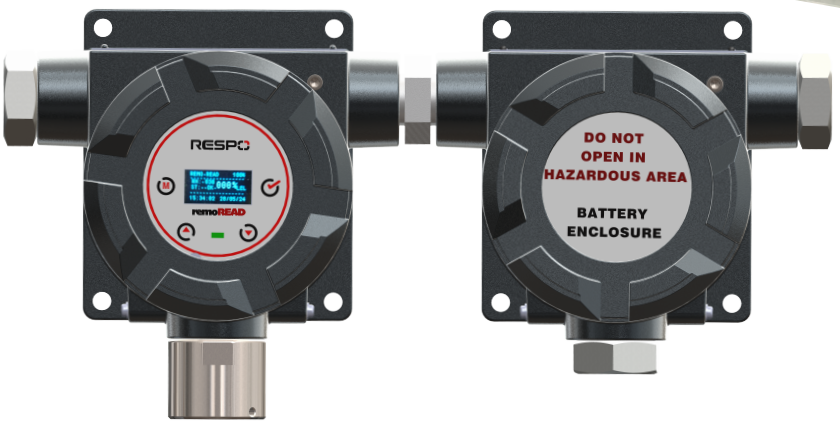
Battery Operated

Combustible IR

Electrochemical

4G Wireless

ATEX/PESO



INSTRUCTION MANUAL V2.0

remoREAD

⚠ CAUTION

WARNING – EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 1, OR EQUIVALENT AS STATED IN USER MANUAL

AVERTISSEMENT – RISQUE D'EXPLOSION-LA SUBSTITUTION DE COMPOSANTS PEUT RENDURE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION

CAUTION: FOR SAFETY REASONS, THIS EQUIPMENT MUST BE OPERATED AND SERVICED BY QUALIFIED PERSONNEL ONLY. READ AND UNDERSTAND THE INSTRUCTION MANUAL COMPLETELY BEFORE OPERATING OR SERVICING.

ATTENTION: POUR DES RAISONS DE SECURITE, CET ÉQUIPEMENT DOIT ETRE UTILISE ENTRETENU ET REPARER UNIQUEMENT PAR UN PERSONNEL QUALIFIE. ETUDIER LE MANUEL D' INSTRUCTIONS EN ENTIER AVANT D' UTILISER, D' ENTERETENIR OU DE RÉPARER L' ÉQUIPEMENT.

CAUTION: THIS AREA MUST BE FREE OF FLAMMABLE GASES DURING CALIBRATION.

ATTENTION : CETTE ZONE DOIT ETRE EXEMPTE DE GAZ INFLAMMABLES PENDANT L'ETALONNAGE.

CAUTION:TO PREVENT IGNITION OF EXPLOSIVE ATMOSPHERES, REMOVE FROM EXPLOSIVE ATMOSPHERE BEFORE SERVICING

⚠ DANGER

DANGER: remoREAD-LEL IS AN AMBIENT AIR COMBUSTIBLE GAS SENSOR ASSEMBLY AND ONLY MONITORS IN THE IMMEDIATE VICINITY OF THE SENSOR HOUSING. A SITE SURVEY IS REQUIRED IN ORDER TO DETERMINE THE BEST PLACEMENT AND QUANTITY OF SENSOR ASSEMBLIES. IMPROPER INSTALLATION CAN LEAD TO AN UNDETECTABLE GAS LEAK WHICH COULD RESULT IN PERSONAL INJURY OR LOSS OF LIFE.

Table of Contents

1. PRODUCT OVERVIEW
1.1 INTRODUCTION

The Respo Products remoREAD-LEL Explosion-Proof Ambient Air Combustible Gas Detector is designed to detect a wide range of hydrocarbon gases in potentially hazardous environments. This product's enclosure is CSA certified as Class I, Division 1, Groups C and D. The RemoREAD-LEL features non-intrusive magnetic switches that allow for complete system configuration, regular calibration, and product maintenance to be performed in the field, without opening the enclosure and breaking the seal, thereby compromising the explosion-proof rating. Non-intrusive interface with the RemoREAD-LEL is made possible by use of the Magnetic Tool included in the purchase of the device.

The RemoREAD-LEL continuously monitors the gas level of the surrounding environment and reports once every day (Healthy Condition), the reporting rate will increase to once every five seconds when the detected gas is above the Background Gas set- point. This set-point is adjustable to account for sites that may have a constant low level of gas always present allowing the RemoREAD-LEL to maintain a long battery life. When the gas level drops below the set-point the reportingrate will return to once every minute. The RemoREAD-LEL display screen will always show the present concentration of gas being detected by the sensor assembly. More information about the Background Gas Set-point is found later in this manual.

This document is an operation manual containing diagrams and step-by-step instructions for the proper and safe installation, start-up, configuration and settings, normal operation, and product maintenance of the RemoREAD-LEL.

To apply the Magnetic Tool, hold thetool to the side of the device enclosure adjacent to the push-button that you wish to activate. When the magnetic switch is toggled, an on-screen indicator will appear on the display screen, signifying that a connection was made.

NOTICE

This document should be read in its entirety before the initial operation of the product.

Should a question arise during the use of the product, this document will serve as a first reference for the end-user. For inquiries beyond the information and instructions provided within this manual, contact the sales representative of this product for assistance.

1.2 PRODUCT SPECIFICATIONS

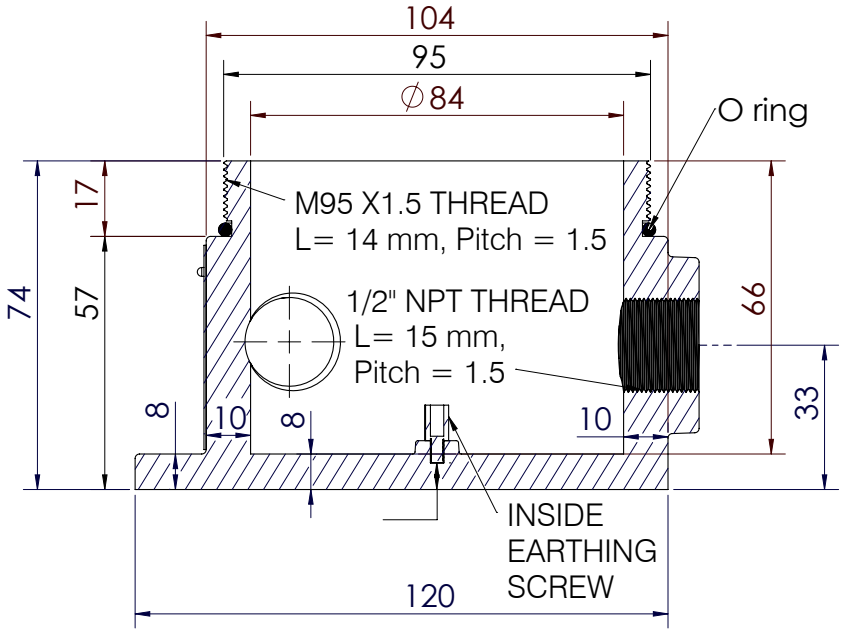
remoREAD Sensor Specifications
Enclosure: Cast Aluminum Alloy LM6
Sensor Enclosure: SS-316
Ingress Protection: IP 67 or better
Cable Entry: M20 or 1/2” NPT or 3/4” NPT
Output: Digital via dual 4G SIM Modem Model: Quectel EC200U-CN
Display: 128x64 Graphical Display or Electrophoretic Display (Always On)
Calibration & Settings: Non-Intrusive
Relays: Configurable Relay AL1, AL2 5A ~ 9-24VDC/220VAC
Power: 7.4V~23.2Ah rechargeable Li-Ion Battery
Sampling Method: Natural Diffusion
Sensor: NDIR for Combustibles Electrochemical for Toxics
Sensor Range: 0-100% LEL for Combustibles
Working Temperature: -40°C to +70°C
Working Humidity: 0~95% RH
Response Time: < 5 Sec
Accuracy: ± 1% for Full Scale Readings
Repeatability: ± 3% Full Scale
Approvals: Ex dB IIC Gb T5 -40°C to 85°C ATEX/IECEx/PESO

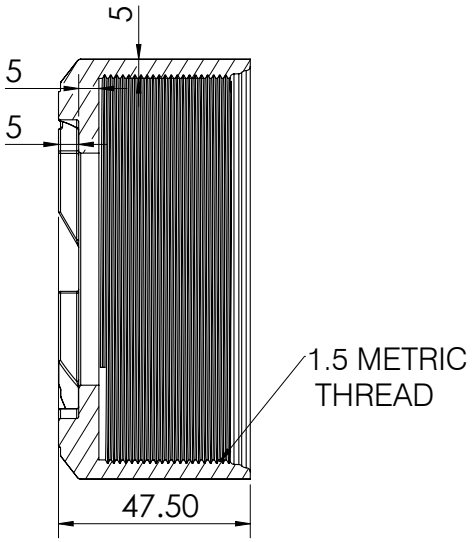
1. **Rechargeable Li-Ion Battery.**
2. **6+ months battery life*.**
3. **1 Transmission/ Day.**
4. **Never Sleeps.**
5. **4G Connectivity.**
6. **Redundant Dual 4G SIM Slots.**
7. **Transmits Real Time Readings, Battery Status and Alarm Alerts.**
8. **Configurable Alarms with SMS and E-Mail alerts.**
9. **LCD/LED Display of Gas Concentration.**
10. **LED Status Indication @ 2 min**
11. **ATEX approved.**
12. **Sensor Life > 5 Years.**
13. **5 Sec Response Time.**
14. **Non-Intrusive Calibration.**

* Battery Life is Calculated at 0°C and 0% RH with no Alarms in the interval of 6 months.

1.3 SYSTEM DIAGRAMS

1.3.1 ENCLOSURE DRAWINGS





1.3.2 PRESURE TEST

Enclosure passed maximum water pressure test 55 bar. No routine test is required when referencepressure of final assembly (enclosure with additional volume come from thermowells, conduit, pipe,etc.) is not higher than 13,75 bar.

The content of the housing may be placed in any arrangement provided that an area of at least 40% (group IIC) or 20% (group I) of each cross-sectional area remains free to permit unimpended gas flow and, therefore, unrestricted development of an explosion. Separate relief areas may be aggregated, provided that each areas has a minimum dimension in any direction of 12,5mm.

1.3.3 TEMPERATURE CLASSES, AMBIENT TEMPERATURE, MAX. POWER DISSIPATION

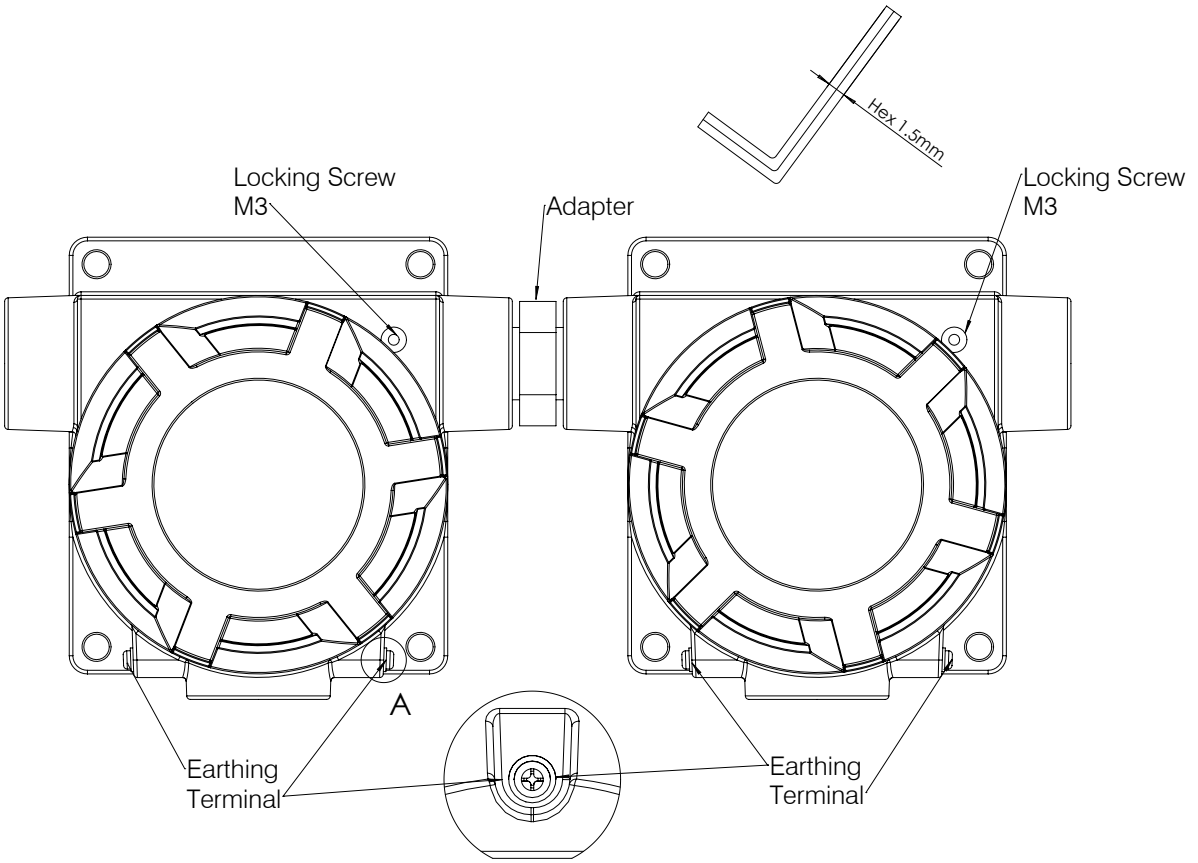
Maximum power dissipation [W]				
T_{amb}	**Temp. class T6, or surface temp. 85º C**	**For all variety of enclosures Position horizontally/ vertically**	**Temp. class T5, or surface temp. 100ºC**	**For all variety of enclosures Position horizontally/ vertically**
40ºC	Δ0 ≤ 40 K	22 / 17	Δ0 ≤ 55 K	32 / 26
55ºC	Δ0 ≤ 25 K	13 / 10	Δ0 ≤ 40 K	22 / 17
70ºC	Δ0 ≤ 10 K	4.5 / 3.5	Δ0 ≤ 25 K	13 / 10
85ºC	N/A	-	Δ0 ≤ 10 K	4.5 / 3.5

1.3.4 EARTH AND PROTECTION TERMINALS

Place	Type	Cable cross section [mm²]	
		Stranded wire	Solid wire
Inside	Protectionterminal	1.5	2.5
Outside	Earth terminal	4.0	6.0

1.3.5 COVER LOCKING

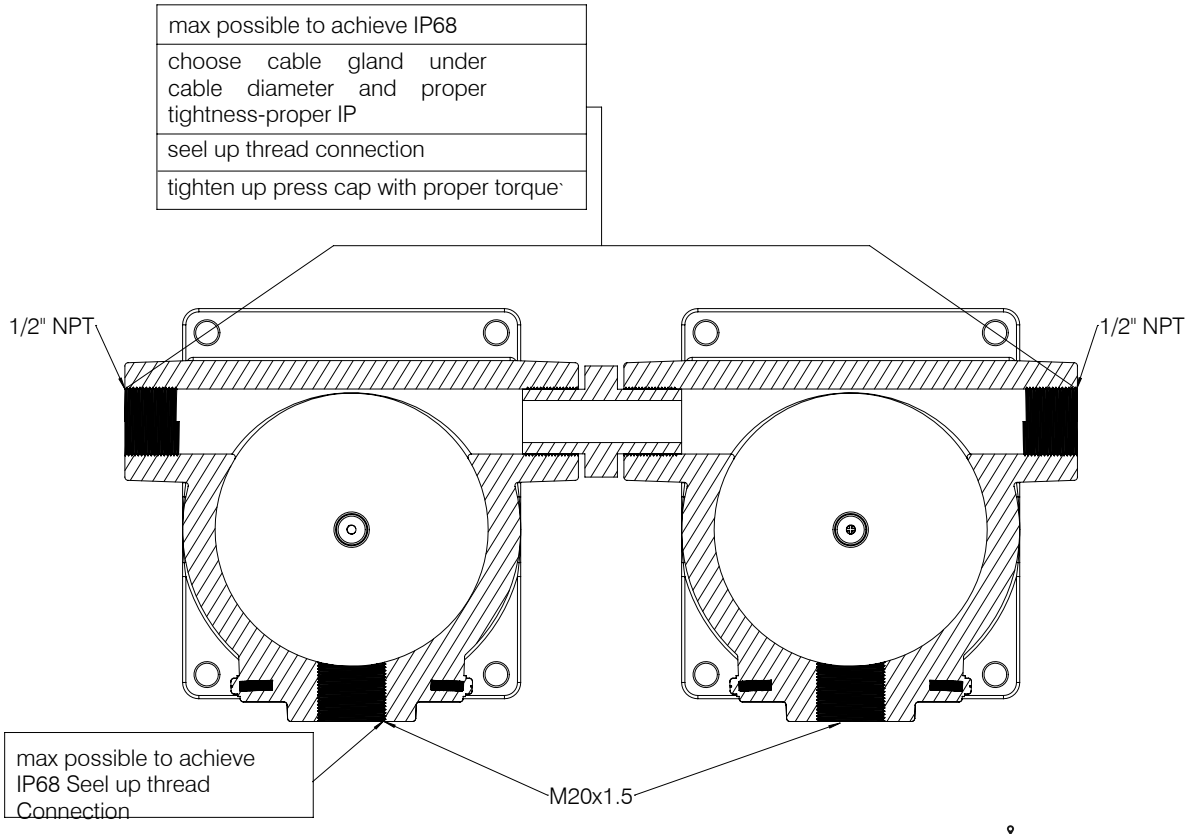
Lock the over by screw with hex socket using hex spanner with across flat 1.5 mm

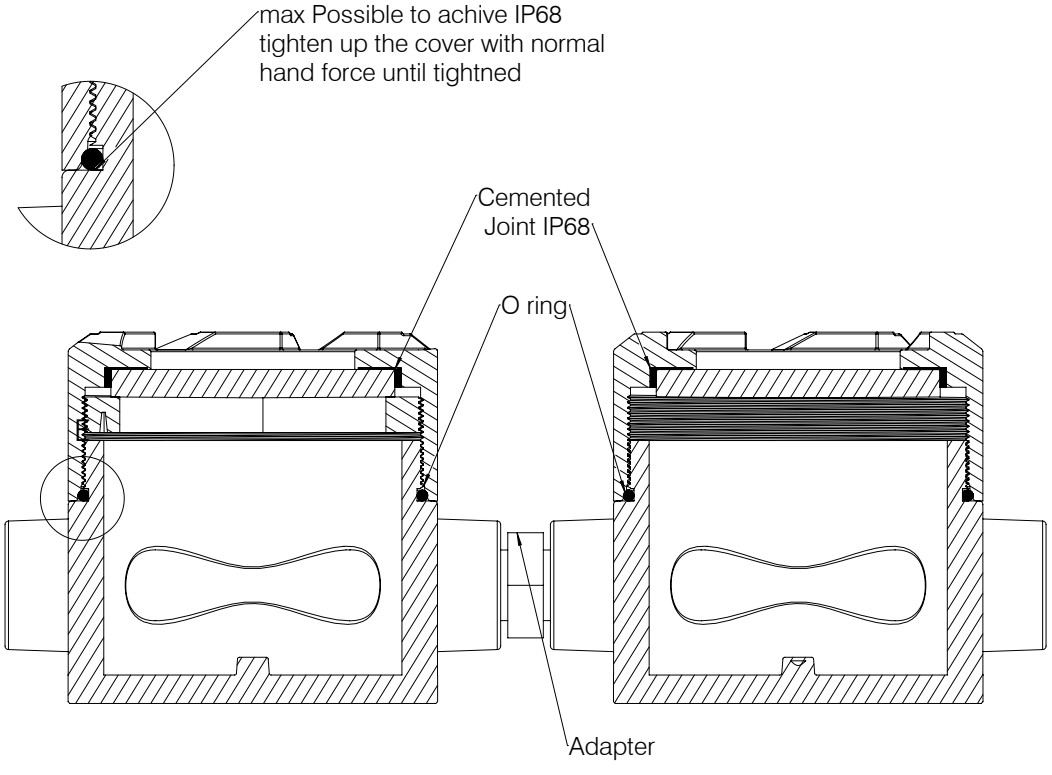


Threaded connection sealing	Possible IP
Without sealing - standard accuracy class thread	54
Use of a sealant, e.g. Loctite 577	68
Thread tightened with O-ring	68

If IP for each connection		IP of assembled device
1	2	
68	54	IP 54
	66	IP 66
	67	IP 67
	68	IP 68

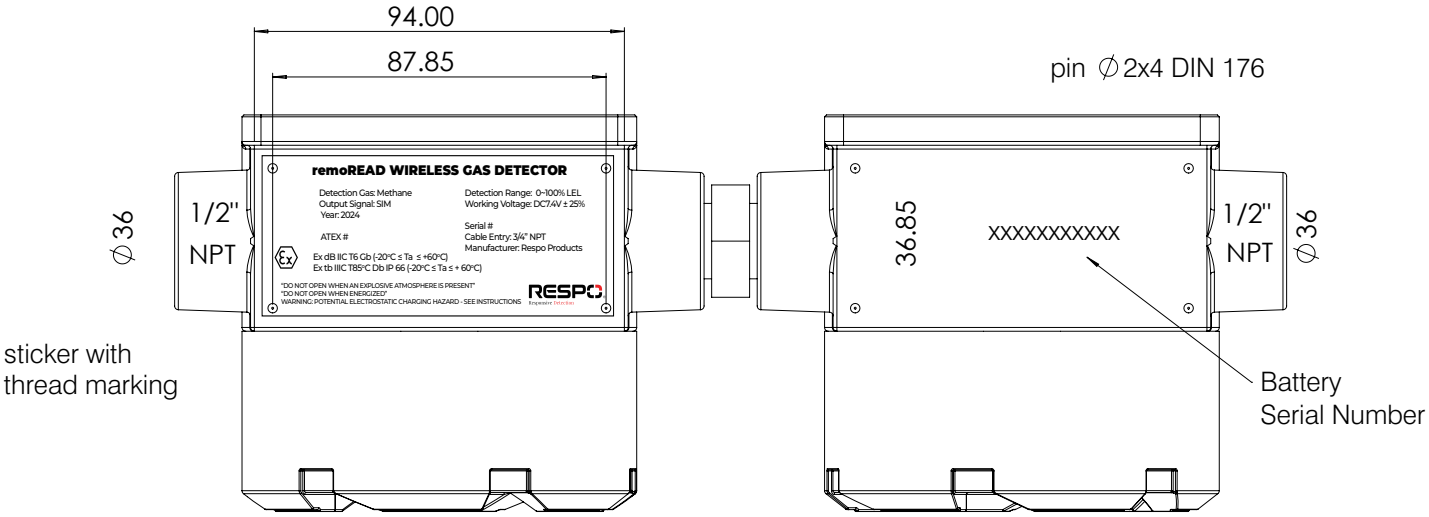
1.3.6 PROTECTION DEGREE





1.3.7 MARKING

Marking label is placed on the housing with Certification details.



NOTICE

These guidelines are **ONLY** intended as a general directive for the placement of the RespoREAD-LEL. This information should NOT serve as a complete list when considering all potential parameters for the proper location of the unit. It is STRONGLY advised that a third party Certified Industrial Hygienist, or other Certified Safety Professional, conduct a site survey and annotate the location and quantity of detection devices that should be installed for **EVERY** installation of **EVERY** site.

2. INSTALLATION & START UP

2.1 PRODUCT PLACEMENT

The installation instructions, and any other information supplied by RESPO, provide only basic guidelines relating to the properties of combustible gas and the effects of environmental conditions on the RemoREAD-LEL device. Sensor placement should be determined in consultation with the site safety personnel, as well as those knowledgeable of: (1) the site/facility where the equipment is being installed and (2) the potentially present gas types and their dispersion. RESPO strongly recommends that the end-user consults with the appropriate third party Health, Safety and Environmental (HSE) and Industrial Hygiene (IH) professionals to determine the final quantity and placement of your gas detection devices.

The primary purpose of the RemoREAD-LEL is to provide an early warning of the accumulation of flammable gas, in order to minimise hazards to people and property. Proper placement of the device is paramount to achieving this goal.

The following general guidelines should be considered when determining the placement of the RemoREAD-LEL:

- The unit should be placed greater than 6.5 Feet/2 Meters away from a monitor in order to ensure reliable communications
- The unit shall be placed such that the position of the rain guard is pointing downward to the ground.
- Avoid installing the unit in a location where airborne particles could cover or coat the sensor head.
- The unit should be placed in an area that will produce the highest gas concentration. Enclosed corners and stopping points of moving devices are two areas susceptible to a buildup of combustible gas.
- In order to provide an accurate representative sample of a room, care should be taken to avoid locating the unitnear a room entrance, fresh air intake vent, or vehicle/generator exhaust point.
- The unit should be placed as close as physically possible to the source of the potential combustible gas leak.
- In consideration of possible ignition points, the unit should be placed between the potential leak source and ignition point.
- Consider placing the unit in a seldom used area, such as a warehouse, storage area, or other unfrequented location.
- Consider accessibility for regular calibration and other required maintenance.
- When monitoring “light” hydrocarbons, such as methane, the unit should be placed near the ceiling or ceiling corner.
- When monitoring “heavy” hydrocarbons, such as gasoline, the unit should be placed approximately 2 to 3 inches from the floor.
- When monitoring a ventilated gas cylinder storage area, the unit should be placed near the air return vent.
- When monitoring an outdoor or open-air area, the unit should be placed near the air intake of the HVAC system of the building.
- When monitoring for the potential presence of multiple combustible gas types, the unit should be calibrated for the least cross-sensitive combustible gas.

2.2 PRODUCT MOUNTING

It is recommended to mount the unit to a solid structure (such as a concrete wall, steel column, or angle iron) where a minimum of vibration will be transmitted to the unit. Alternately, a pole may be used along with a strap or a U-bolt,as long as it is rigid and of sufficient strength. Wooden structures are not recommended for mounting, as they trap moisture (which could affect sensor performance) and their mounting rigidity degrades over time (screws/bolts weaken and fall out or corrode).

Any style of bolt or screw may be used as long as it is steel and meets or exceeds the following:

- Maximum ¼"-20 bolt or Ø¼" screw (length varies with user need)
- Flat washers for bolts/nuts/screws
- Minimum Grade 5 (or better)
- Corrosion protection for all hardware (paint, galvanize, zinc plating, etc.)

2.3 WIRING CONFIGURATIONS

The remoRAED-LEL is powered by 7.4V/23.2Ah Lithium Ion rechargeable batteries. It is recommended to keep a spare recharged batteries in stock to replace the depleted battery as required. Keep a check on the battery level once continuous alarm is generated from the device.

CAUTION

- The internal components can be static sensitive. Use caution when opening the enclosure and handling internal components.
- **DO NOT** use any metal objects or tools to remove the terminal board from the internal system.
- **DO NOT** mix old and new batteries.

WARNING

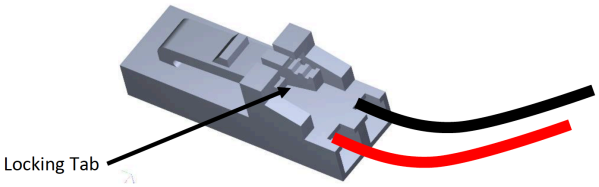
- The atmosphere **MUST** be free of combustible gases, or the sensor assembly removed from the field, beforethe lid is removed from the enclosure. Failure to follow this instruction could result in the ignition of a hazardous atmosphere.
- When securing the lid onto the device, tighten the glass enclosure lid by hand **ONLY**. Overtightening of the lid by use of hand-tools could result in damage to the O-ring, potentially compromising the moisture seal, resulting in an unsafe environment.
- Use **ONLY** Respo supplied batteries in this device.
- The enclosure **MUST** be grounded using a minimum 14 gauge wire connected from the enclosure external protective Earth ground screw to an Earth ground connection.

2.4 OPENING THE ENCLOSURE

The battery sits in a separate enclosure. Open the battery enclosure only by unscrewing it. DO NOT OPEN THE MAIN ELECTRONICS ENCLOSURE.

2.5 REPLACING THE BATTERY

Replace the depleted battery with the recharged battery by taking the battery out though the push in connectors. IT IS MANDATORY TO REPLACE THE BATTERY IN THE SAFE LOCATION ONLY.



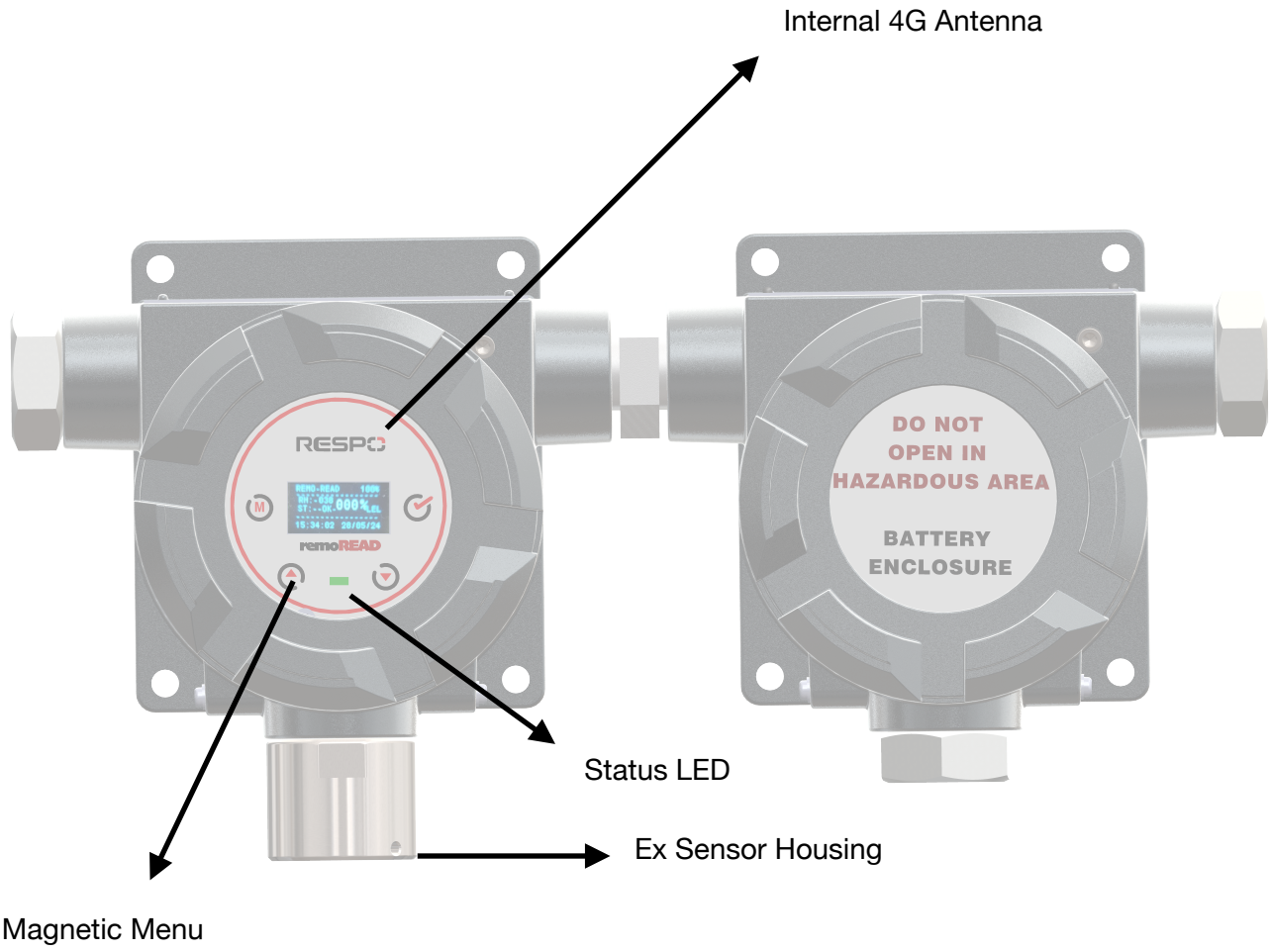
The remoREAD-LEL will last more then 6 months with normal usage, the presence of gas will increase the radio transmission rate and decrease this battery lifetime.

PLEASE BE CAREFUL WHEN PULLING THE BATTERY FROM THE TAB.
CAREFULLY REMOVE THE CONNECTOR FOR REPLACING THE BATTERY.

2.6 CLOSING THE ENCLOSURE

Once the battery is replaced close the enclosure and place/mount the detector to its desired location.

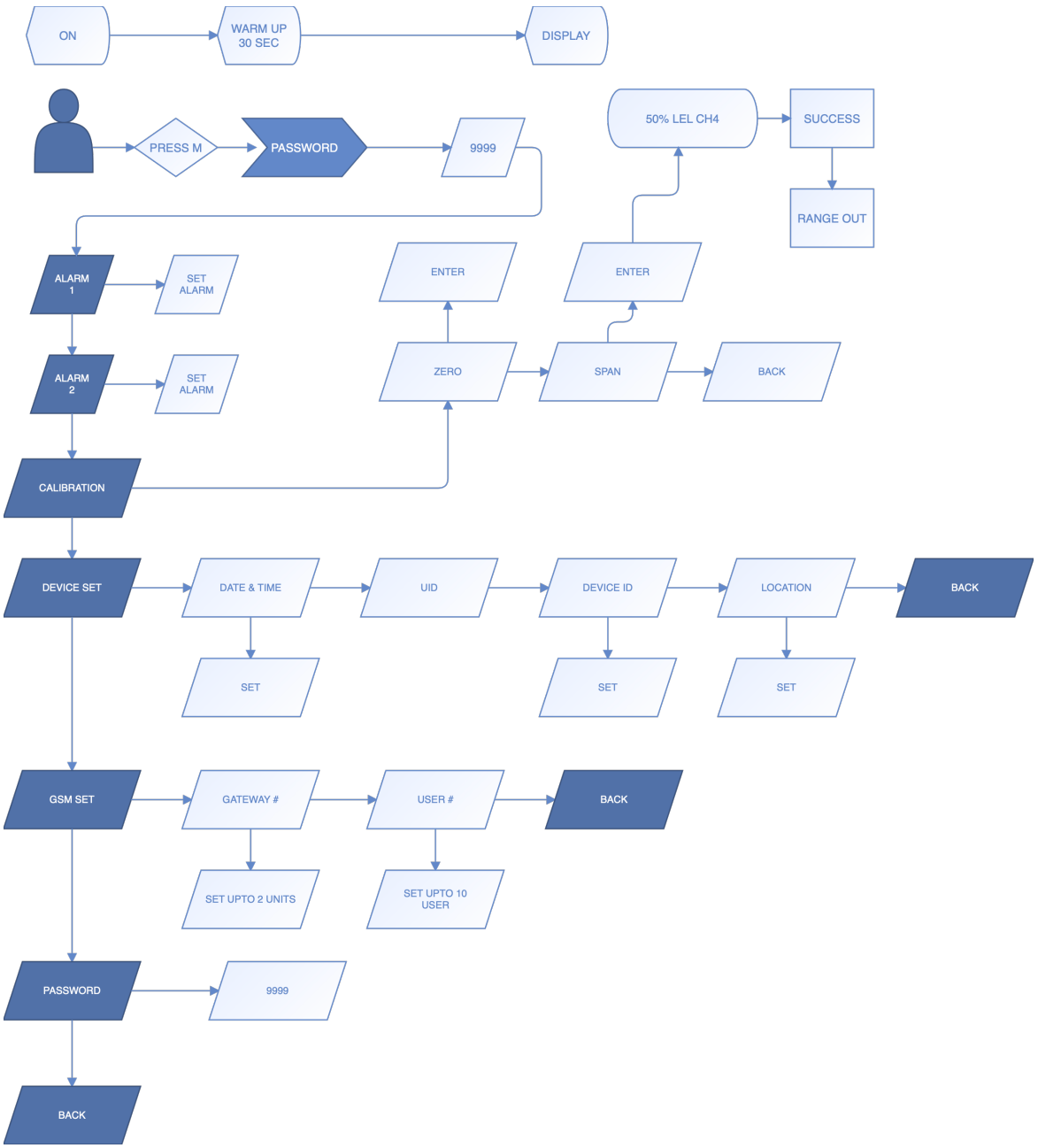
3. DESCRIPTION



Note: The display shall be turnoff after sometime to save the battery. This can be turned on manually at any time by the user. To activate the display the user has to show the magnetic wand to the glass window.

4. OPERATING MENU

The Menu can be accessed through the magnetic reed switches placing the Magnetic Wand (provided) on the Glass.



5. BATTERY SPECIFICATIONS

Battery Mode: LIR 18650 2600mAh
Connection Type: 2 Series 8 Parallel

1. Scope

This specification describes the technological parameters and testing standard for the lithium ion rechargeable cell manufactured and supplied by EEMB Co. Ltd.

2. Products specified

2.1.Name Cylindrical Lithium Ion Rechargeable Cell

2.2.Type LIR18650-2600mAh

3. References

In this specification reference is made to: GB/T182847-2000, UL1642 and IEC61960-1:2000.

4. Caution:

4.1. Please read these specifications carefully before testing or using the cell as improper handling of a Li-ion cell may result in lose of efficiency, heating, ignition, electrolyte leakage or even explosion.

2. While testing the cell by charging and discharging, please use test-equipment especially designed for Li-ion cell. Do not use ordinary constant current and constant voltage (CC/CV) power supplies. These do not protect the cell from being overcharged and over-discharged, resulting in possible loss of functionality or danger.
3. When charging and discharging cells or packing them into equipment, reversing the positive and negative terminals will result in overcharging and over-discharging of the cell(s). This could lead to serious loss of efficiency and even explosions.
4. Do not solder directly on the cell. Do not resolve the cell.
5. Do not put cell(s) in pockets or bags together with metal products such as necklaces, hairpins, coins, screws, etc. Neither stores them together without proper isolation. Do not connect the positive and negative electrode directly with each other through conductive materials. This can result in a short circuit of the cell.
6. Do not beat, throw or trample the cell, do not put the cell into washing machines orhigh-pressure containers.
7. Keep the cell away from heat sources such as fires, heaters, etc. Do not use or store cell(s) at locations where the temperature can exceed 60℃， such as in direct sunlight. This may lead to the generation of excessive heat, ignition and lose of efficiency.
8. Do not get cells wet or throw them into water. When not in use, place the cells in a dry environment at low temperatures.
9. While during use, testing or storing cells, cells become hot, distribute a smell, change color, deform or show any other abnormalities, please stop using or testing immediately. Attempt toisolate the cell and keep it away from other cells.
10. Should electrolyte get into the eyes, do not rub the eyes, rinse the eyes with clean water and seek medical attention if problems remain. If electrolyte gets onto the skin or clothing, wash with clean water immediately.

All the menu Options during Configuration shall be shown in Display respectively.

Relays shall function corresponding to the Alarm set individually for LOW and HIGH.

The LOW and HIGH alarm Values set in the NODE shall be same in the GATEWAY

5. BASIC CHARACTERISTICS

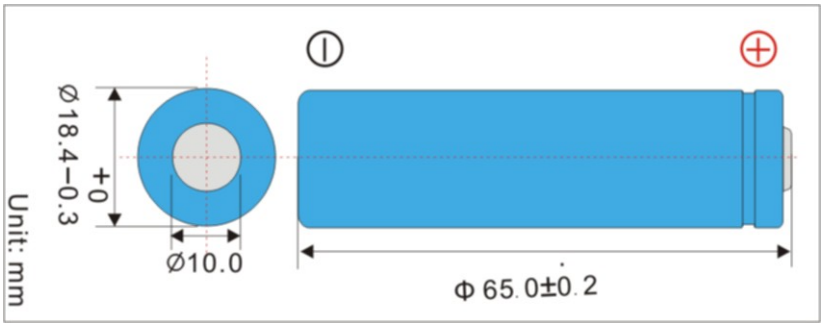
5.1 Capacity (25±5℃)	Nominal Capacity： 2600mAh (0.52A Discharge，2.75V) Typical Capacity： 2550mAh (0.52A Discharge，2.75V) Minimum Capacity：2500mAh (0.52A Discharge，2.75V)
5.2 Nominal Voltage	3.7V
5.3 Internal Impedance	≤ 70mΩ
5.4 Discharge Cut-off Voltage	3.0V
5.5 Max Charge Voltage	4.20±0.05V
5.6 Standard Charge Current	0.52A
5.7 Rapid Charge Current	1.3A
5.8 Standard Discharge Current	0.52A
5.9 Rapid Discharge Current	1.3A
5.10 Max Pulse Discharge Current	2.6A
5.11 Weight	46.5±1g
5.12 Max. Dimension	Diameter(Ø): 18.4mm Height (H): 65.2mm
5.13 Operating Temperature	Charge: 0 ~ 45℃ Discharge: -20 ~ 60℃
5.14 Storage Temperature	During 1 month: -5 ~ 35℃ During 6 months: 0 ~ 35℃

6. Standard conditions for test

All the tests need to be done within one month after the delivery date under the following conditions : Ambient Temperature:25±5℃; Relative Humidity: 65±20%

7. Appearance

All surfaces must be clean, without damages, leakage and corrosion. Each product will have a product label identifying the model.



Standard Charge	Constant Current and Constant Voltage (CC/CV) Current = 0.52A Final charge voltage = 4.2V Final charge Current = 0.052A
Standard Discharge	Constant Current (CC)Current = 0.52A End Voltage = 3.0V

6. PRODUCT MAINTENANCE

6.1 SCHEDULED MAINTENANCE

Respo recommends that our equipment be calibrated a **MINIMUM** of every 6 Months, and **STRONGLY** advise that calibration be performed every 8 Months. Without knowing the specific application, sensor assembly location, gas exposure and other factors, the company recommends monthly calibrations – assuming no damage or potential damage has occurred to the sensor and that there has not been a power outage to the sensor assembly. If damage has occurred or the power supplied to the sensor has changed, a calibration should be completed immediately. **THE SAME IS NOT APPLICABLE IN CASE OF MPS SENSOR AS THE MPS SENSOR DO NOT REQUIRE ANY CALIBRATION DURING THE LIEFESPAN OF THE SENSOR.**

Scheduled maintenance should include the null and calibration of the sensor and a relay test. Consult the Sensor Calibration and Relay Test sections of this manual for further information and instructions on how to perform these procedures.

The sensor head and rain guard should be kept free of airborne particles, dirt, mud, spider webs, bugs and insects, and/or any other debris that could potentially cover or coat the sensor. Keeping the sensor head and rain guard clear of foreign articles will allow for proper operation of the device. A brief inspection during scheduled maintenance should suffice, but dependent upon the location and the environment in which the unit is installed, more frequent inspections may be warranted.

The remoREAD-LEL may be adversely affected by the exposure to certain airborne substances. Loss of sensitivity or corrosion may be gradual, if such materials are present in sufficient concentrations. The performance of the device may be impaired during operation in the presence of substances that can cause corrosion on gold plating. Other inhibiting substances are those that can coat the internal walls of the optical chamber and reduce reflectivity. These include, but are not limited to, heavy oil deposits, dust/powder, water condensation, and salt formation. Continuous and high concentrations of corrosive gases may also have a detrimental long-term effect on the product's service life. The presence of such substances in an area does not preclude the use of this device, but the likelihood of the shortened lifetime of the sensor element, as a result, should be noted. Use of the RespoREAD-LEL in these environments may require more frequently scheduled maintenance to ensure safe and reliable system performance.

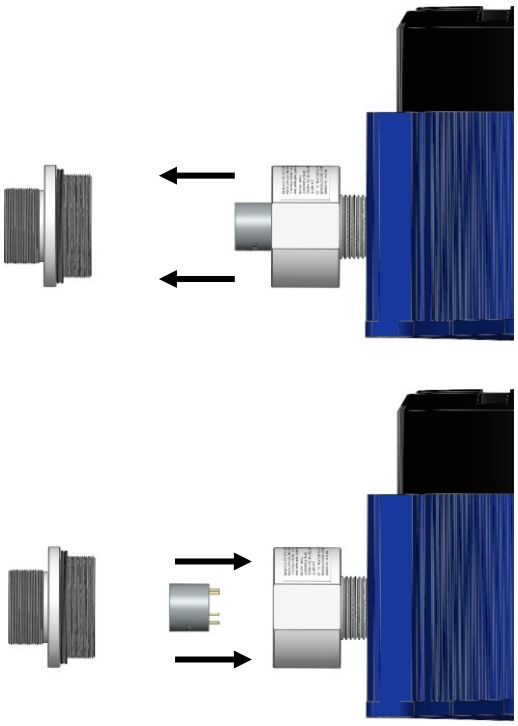
6.2 SENSOR REPLACEMENT

The infrared sensor element used in the respoREAD-LEL detects gas in % LEL, this element must be fully functional inorder for the system to operate correctly. Respo recommends replacing the sensing element whenever a slow response to gas is observed during the normal calibration process. After replacing the sensing element the device **MUST** then be nulled and calibrated for proper operation of the device.

CAUTION

- The internal components can be static sensitive. Use caution when opening the enclosure and handling internal components.
- **DO NOT** use any metal objects or tools to remove the sensing element from the sensor adapter board.

1. Turn the Unit Off.
2. Unscrew and remove the sensor housing cap from the sensor housing base. Set aside.
3. Using the thumb and forefinger, gently unplug the sensing element from the sensor adapter board.
4. Plug in the new sensing element into the sensor adapter board. Ensure that the pins on the sensingelement align with the sockets on the sensor adapter board.
5. Screw the sensor housing cap back onto the sensor housing base, ensuring that the sensor housing cap is only tightened hand tight.

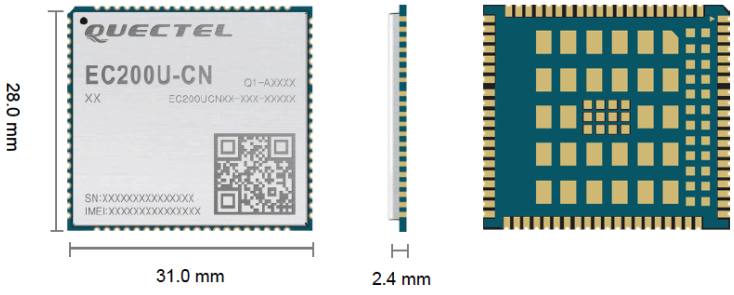


7. MODEM

Quectel EC200U-CN

IoT/M2M-optimized
LTE Cat 1 Module

Quectel EC200U-CN is the latest LTE Cat 1 module optimized specially for M2M and IoT applications. It delivers maximum data rates up to 10 Mbps downlink and 5 Mbps uplink. Designed in the compact and unified form factor, EC200U-CN is compatible with Quectel multi-mode LTE Standard EC25 series /EC21 series/EC20 R2.1/EC20-CN/EC200T series/EC200S series/EC25-G/EC21-G and UMTS/HSPA+ UC200T series, ensuring that it can easily migrate from 3G to 4G network. EC200U-CN also supports standard Mini PCIe packages to meet the needs of different industry applications.
Adopting laser engraving process, EC200U-CN features a more fashionable appearance, strong metallic texture, better heat dissipation capability and durable label information, which makes it ideally suited for automation requirement.



EC200U-CN has a rich set of Internet protocols, industry-standard interfaces and abundant functionalities (USB drivers for Windows 7/8/8.1/10, Linux, Android) extend the applicability of the module to a wide range of M2M and IoT applications such as POS/POC/ ETC, shared equipment, data card, energy control and monitoring, security and protection, and industrial PDA.

8. SAFETY RECOMMENDATION

It is advised by the user not to change any menu settings without proper training by Respo Staff. We are available 24x7 to provide you immediate assistance as the need arises. You are requested to call **1800-180-73776** for immediate assistance in the normal office hours.

Respo Products
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0562 2881590
0562 2885331

Technical Assistance: Hari Krishan Sharma 9760098715