USER MANUAL

RAEGuard

Energy Storage Gas Detector

Honeywell

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About this manual

This manual describes how to install and operate the RAEGuard ESGD (RAEGuard Energy Storage Gas Detector), and please read this manual before any installation, operation or maintenance of those products.

Please read and understand this manual fully before installing and operating the product.

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Revision history

Version	Date
1	Feb. 2024
2	Jul. 2024
3	Jan. 2025

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Chapter 1
Introduction

1.1 Features

RAEGUARD ESGD is a single-sensor fixed gas detector designed to monitor the leakage of the toxic (mainly Carbon Monoxide) or combustible gases (mainly Hydrogen) generated by the battery in the energy storage system due to thermal runaway, and is not used for emergency notification, evacuation of people from buildings, or calling emergency services or communication to fire departments.

Support the following interfaces depending on the model:

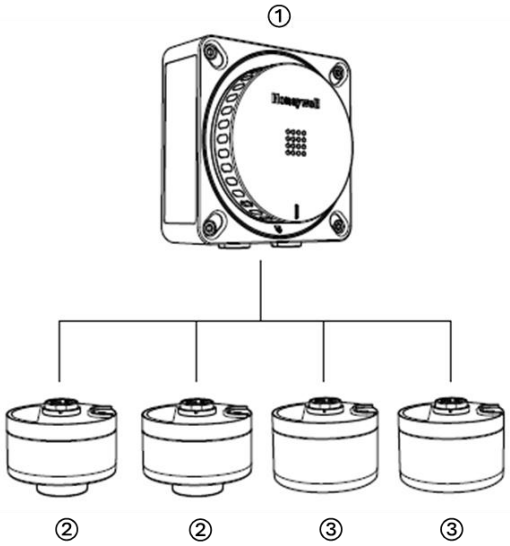
Digital output: RAEGUARD ESGD supports RS-485/MODBUS RTU digital communication.

Relay output: RAEGUARD ESGD provides two relays to issue a signal to the external control system or control the external alarm devices, such as audible and visual alarm indicators.

Mobile application: An APP application is provided to configure and maintain RAEGUARD ESGD.

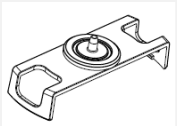
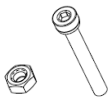
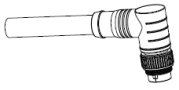
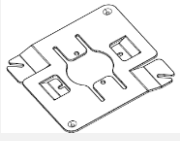
RAEGUARD ESGD can be used indoors or outdoors. If used outdoors, please choose a sheltered position to prevent direct sunlight and rain attacks.

1.2 Appearance



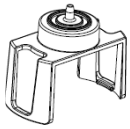
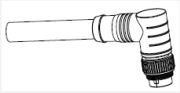
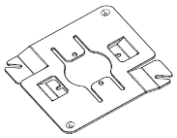
① Master Detector Hydrogen (H2)	② Slave Detector Carbon monoxide (CO)	③ Slave Detector Hydrogen (H2)

1.3 Accessories

Master Detector Accessories	
Calibration cap (master detector) × 1	
Screws (Master detector) × 4	
Adaptor for quick plug and fire pipe (M thread to F-NPT 3-4 thread) × 2	
8-core male plug (straight) harness × 1	
4-core male plug (straight) harness × 1	
8-core male plug (elbow) harness (optional) × 1	
Mounting backplate (optional) × 1	

Junction box (optional) × 1	
QSG Quick Start Guide × 1	

Slave Detector Accessories

Calibration cap (H^2 slave detector) × 1	
Calibration cap (CO slave detector) × 1	
Screws (Slave detector) × 2	
Wall-mounted bracket × 1	
Adaptor for quick plug and fire pipe (M thread to F-NPT 3-4 thread) (optional) × 1	
4-core male plug (straight) harness × 1	
4-core male plug (elbow) harness (optional) × 1	
Mounting backplate (optional) × 1	
Junction box (optional) × 1	

1.4 Detectable gases

RAEGUARD ESGD can be used to detect the following gases:

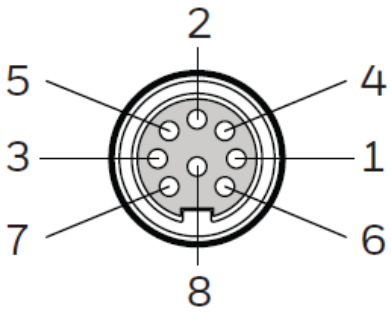
Hydrogen (H2)

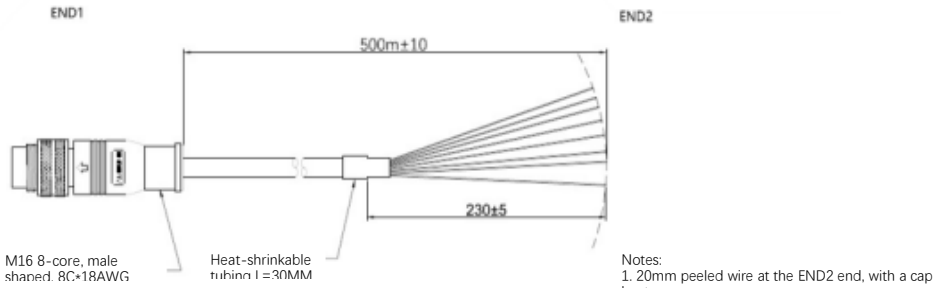
Carbon monoxide (CO)

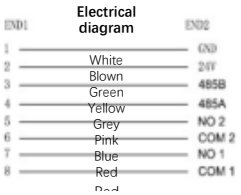
Configuration of terminal block of detector

Definition of 8-pin terminal block (external interface of master detector)

Pin	Description	Wire tube label
1	GND	GND
2	24V	24V
3	RS-485B	485B
4	RS-485A	485A
5	NO Relay2	NO2
6	COM Relay2	COM2
7	NO Relay1	NO1
8	COM Relay1	COM1



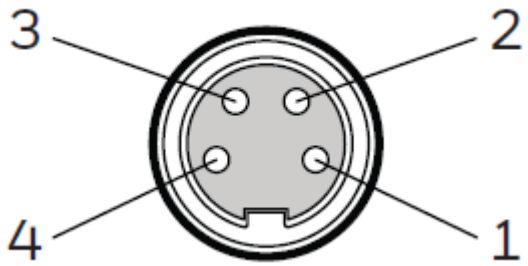


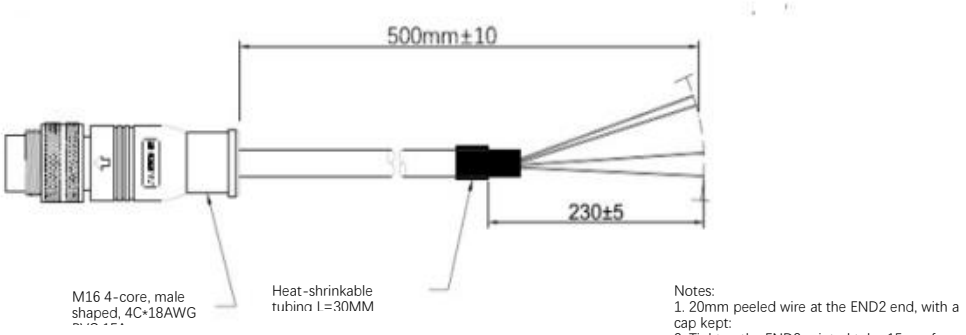


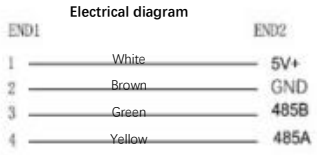
Definition of 4-pin terminal block (interface for master detector and slave

detector)

Pin	Description	Wire tube label
1	5V	5V
2	GND	GND
3	RS-485B	485B
4	RS-485A	485A

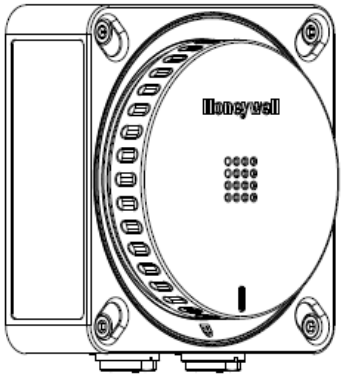






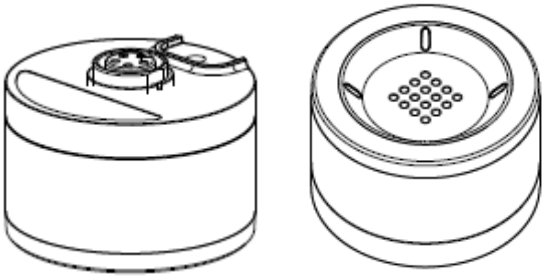
1.5 Specification

Size and weight of master detector



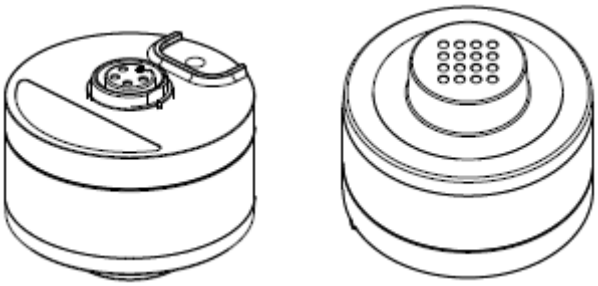
Length	**110 mm (excluding plug)**
Width	110 mm
Height	50 mm
Weight	350g

Size and weight of slave detector (Hydrogen)



Dia.	**60 mm**
Height	45 mm (excluding plug)
Weight	60g

Size and weight of slave detector (CO)



Dia.	**60 mm**
Height	50 mm (excluding plug)
Weight	60g

Power supply

It is required that RAEGUARD ESGD is equipped with an isolated power supply that passes the national or international standard certification, such as UL standards

Rated DC input voltage	**24VDC (12~27)**
Operating current (mA)	<300 mA

Communication output	**RS-485/MODBUS RTU**
Max. current output of relay 1	5A (DC)
Max. current output of relay 2	1A (DC)

These two relays can be used for fault signals or alarm signals. The assignment and operation of the relay can be configured through the mobile App.

To get details of the Modbus registers, please refer to Appendix G.

Adjustable Modbus settings:

Slave ID: 1 to 247

Baud rate: 9600, 19200, 38400 bps (default: 19200)

Parity: None

Stop: 1

Default settings of relay

Relay 1	Any fault and initial states are all inactive
Relay 2	Gas alarm 1 and initial states are all inactive

Power consumption

Detector	**Max Power consumption**	**Min Power consumption** (with LED lightings off)
Detector master	2.3W	1.51W
Hydrogen Detector slave	1.5W	0.92W
CO Detector slave	0.6W	0.1 W

Operating environment

Operating temp.	-30 to 60℃ ($H2$); -20 to 50℃ (CO)
Storage temp.	0 to 30℃
Humidity	15% to 90% (non-condensing) *
Atmospheric pressure	70 to 110kPa

* Hydrogen detectors should work at 10% to 90% relative humidity. Operating the detector out of this range may result in an increase of drift and reduction of detection accuracy.

Note

Please install RAEGUARD ESGD in a sheltered position, far away from direct ultraviolet light and rain.

Type of wall-mounted screw

Type (master detector)	**GB /T 70.1 2000**
Size	M4 x 40 mm

Type (slave detector)	**GB/T9074.1**
Size	M3 x 10 mm

Chapter 2
Installation

2.1 Safety information

⚠ Warning

Please observe the precautions described in this section, otherwise this may cause injury to persons or damage to property.

Please observe the following precautions:

- To minimize the risk of static electricity, adequate earthing measures should be provided, and the equipment should be installed in such a way to prevent accidental discharge occurred.
- When the service life expires, please dispose the RAEGUARD ESGD in accordance with local regulations.
- Do not use cleaning solvents or abrasives to clean the gas detector.
- Do not attempt to modify the product in any way that violates the manufacturer's design or specifications. Otherwise, the warranty will be void and the gas detector may fail.
- Use only original spare parts and accessories provided by RAEGUARD ESGD. The use of non-standard parts may cause failure.

RAEGUARD ESGD is only used in general applications and must not be installed in hazardous site. The installation must comply with the standards recognized by the relevant authorities of the country in which it is located. For installation in Europe, refer to EN60079-14, EN60079-29-2, and EN61241-14. For installations in North America, please strictly follow the National Electrical Code (NFPA 70). Please comply with all applicable local and national regulations.

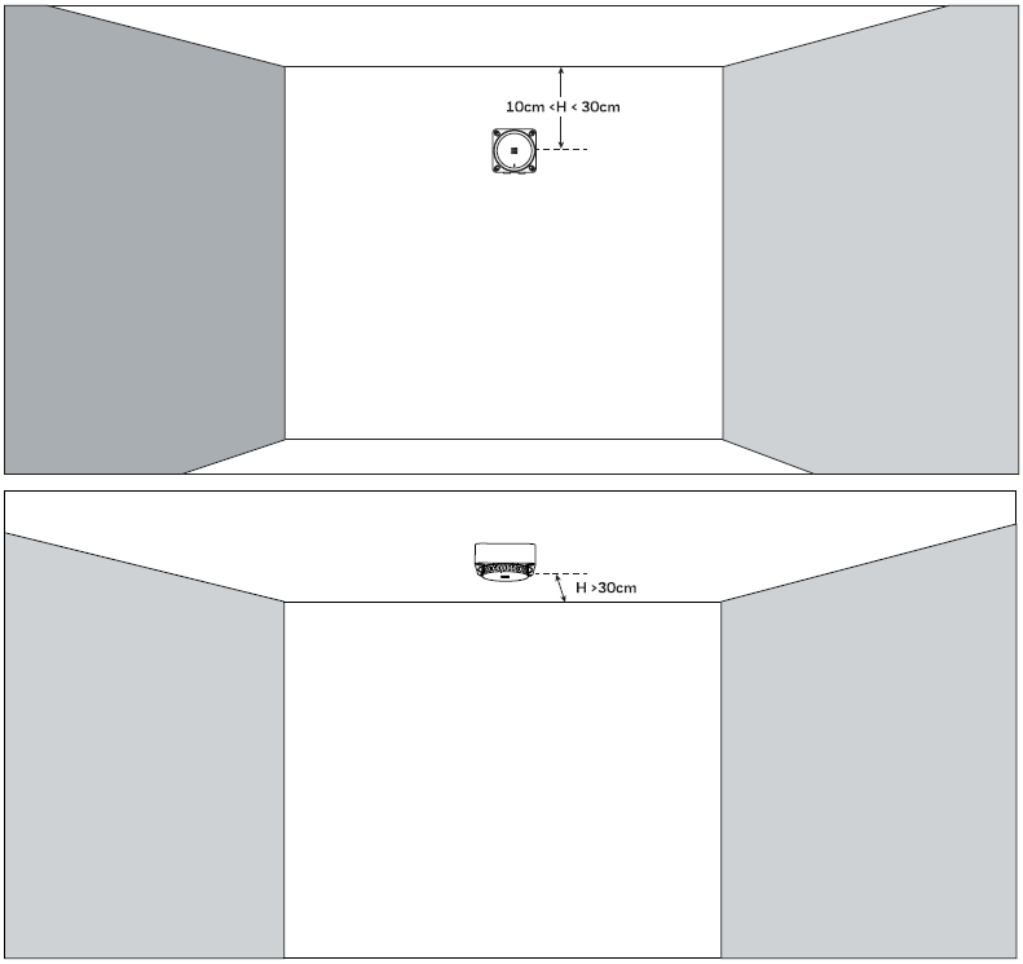
2.2 Installation layout

Recommended installation location

- It should be installed in a place near the ceiling and at a height greater than the height of any doors or windows
- For ceiling-mounted installation, the horizontal distance from the air inlet of detector to the surrounding wall shall be at least 30 cm.
- For wall-mounted installation, the vertical distance from the air inlet of detector to the ceiling shall be ranged 10 cm to 30 cm.
- The detector should be installed in an area relatively close to the source of the potential leak.

Note

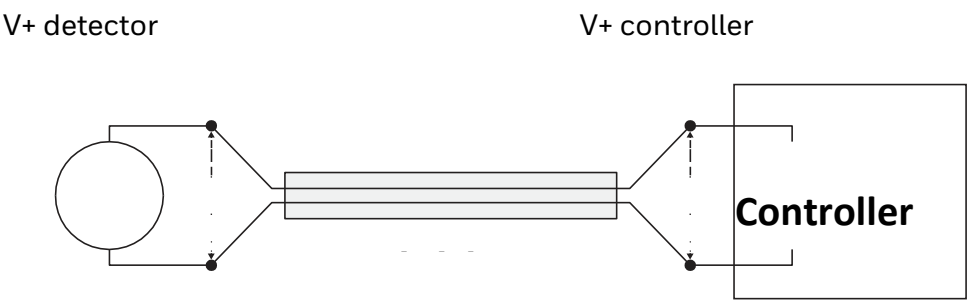
Hydrogen is lighter than air, so gas leaks can occur at high levels. The detector should be located above the location of the possible source of the leak or near the ceiling.



The final location of the gas detector should be determined based on the characteristics of the gas being detected and other environmental factors. Contact the expert for advice if necessary.

2.3 Power cable specifications

RAEGUARD ESGD shall be powered by the power supply of the controller with a specified supply voltage range. Please ensure that the lowest supply voltage at the RAEGUARD ESGD can be measured by considering the voltage drop caused by the cable resistance.



The maximum circuit resistance ($R_{loop\ max}$) in the field cable is calculated as follows:

$R_{loop\ max}=(V_{controller}-V_{detector\ min}) \div I_{detector\ max}$

$I_{detector\ max}= W_{detector\ max} \div V_{detector\ min}$

Example:

The rated voltage provided by the controller is 24VDC ($V_{controller}$) and the minimum permissible voltage of the RAEGUARD ESGD is 15VDC ($V_{detector}$ min). Therefore, the maximum permissible voltage drop of the cable between the controller and the detector is $V_{controller}$-$V_{detector}$ min = 9 VDC. The max. power consumption of the detector is 4.4 W ($W_{detector\ max}$). The maximum current required to drive the RAEGUARD ESGD at the minimum voltage is 2.3W÷11V DC=293.3mA($I_{detector\ max}$). Therefore, the maximum field cable circuit resistance ($R_{loop\ max}$) is 9 V DC÷0.2933= 30.7Ω. For any given cable type, the maximum cable length can be obtained by dividing the maximum permissible resistance per core of the cable by the cable resistance provided by the cable manufacturer.

The table below shows the typical maximum cable distance in an example.

Cable size (sectional area)	Typical cable resistance	Max. cable length （L）

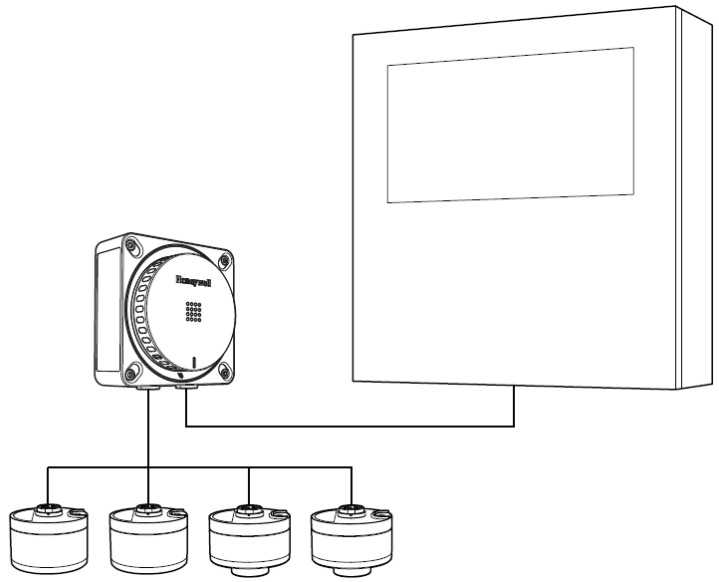
0.26 mm2 (23 AWG')	48.5Ω/km	316 m
0.32 mm2 (22 AWG')	54.3Ω/km	283 m
0.41 mm2 (21 AWG')	42.7Ω/km	359 m
0.52 mm2 (20 AWG')	33.9Ω/km	453 m
0.57 mm2 (19 AWG')	26.9Ω/km	571 m
0.81 mm2 (18 AWG')	21.4Ω/km	717 m

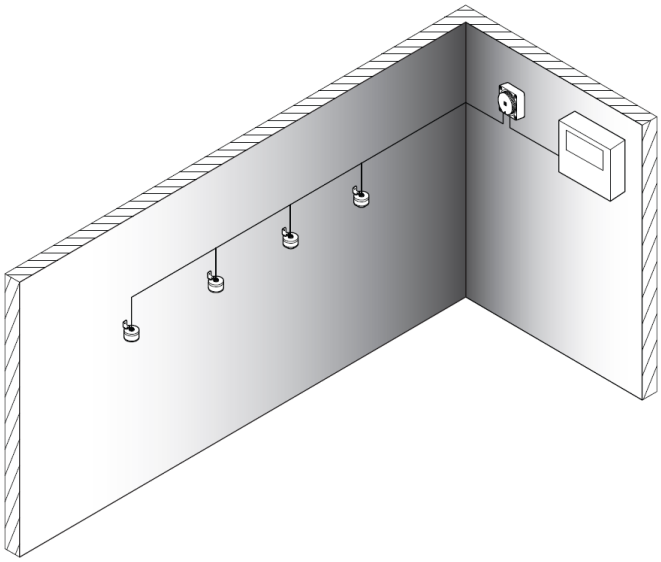
Approximate equivalence relation

2.4 Cabling of Modbus output

Modbus connection

For Modbus, up to 4 detector slaves can be connected to the detector master, as shown in the figure below.

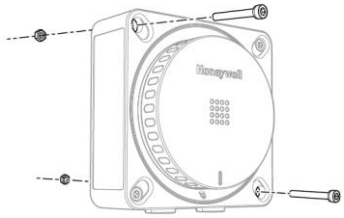




2.5 Fix main detector to the wall or ceiling

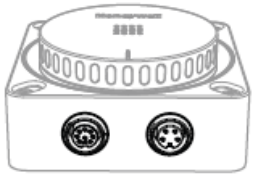
⚠Warning

Before installation, please ensure that the system controller or external power supply is turned off.

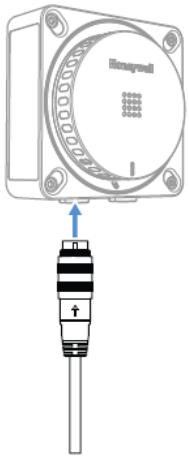


There are four screw positions on the housing of the detector master. As the manufacturing default settings, the two diagonal torx screws on the upper right and lower left are used to assemble the base plate with the housing together, and the additional two diagonal screw positions on the upper left and lower right are used for installation. Securely fix the detector master in its installation position with an appropriate fastener that is suitable for the mounting surface, and the mounting screws supplied with this product are hexagon socket screws GB/T 70.1 2000, M4 x 40 mm.

2.6 Cable connection (master detector)

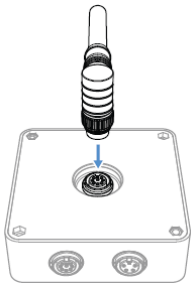


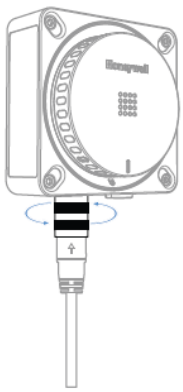
1. There are three female connectors in the master detector: an 8-pin connector on the base plate, a 4-pin connector and an 8-pin connector on one side of the housing.



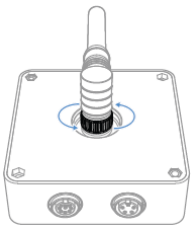
2. The male plug connected to the power supply and fire controller has 8 pins, and the male plug connected to the slave detector has 4 pins. The pin configuration refers to Section 1.5. According to the actual situation of the site, an 8-core plug is only required to connect the master detector to the power supply and fire controller, and the 8-pin plug at the bottom or the 8-pin plug on the side can be used.

   Insert the male plug into the female connector of the master detector and note the limit slots on the plug.

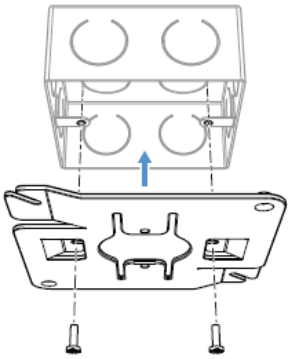




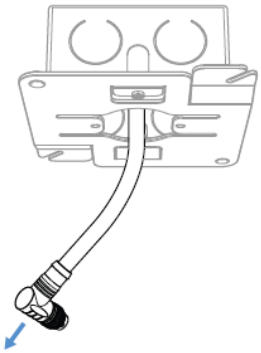
3. Rotate the nut on the male plug clockwise to lock the male and female connectors.



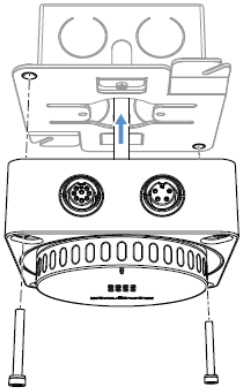
When choosing the ceiling installation of the master detector, the mounting floor and junction box can be selected to install the master detector.



1. Fix the mounting base plate and the junction box with screws



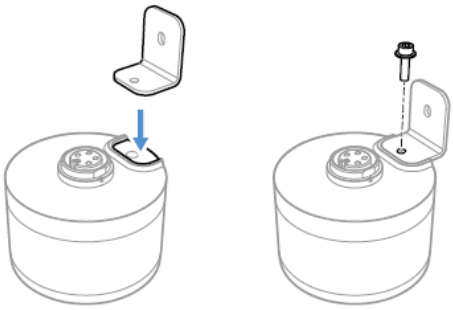
2. Pass the male plug cable harness through the junction box and the mounting floor (it is recommended to use a cable harness with a right-angle elbow male plug for ceiling installation).



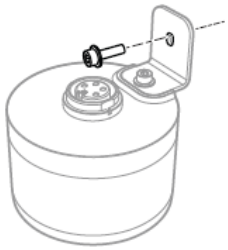
3. Insert the plug into the master detector and secure the detector to the mounting base plate with screws.

2.7 Fix the slave detector to the wall or ceiling

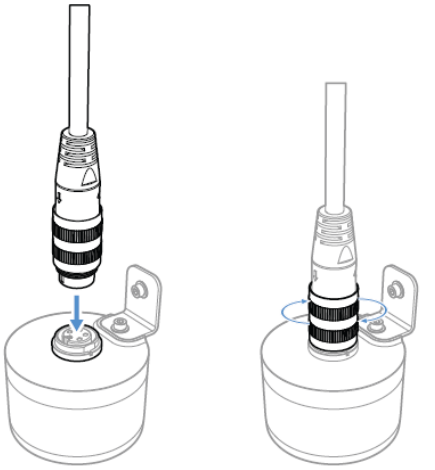
The slave detector can be mounted on the wall with an L-shaped bracket, as shown in the figure below.



1. Fix the L-shaped bracket to the slave detector with a screw

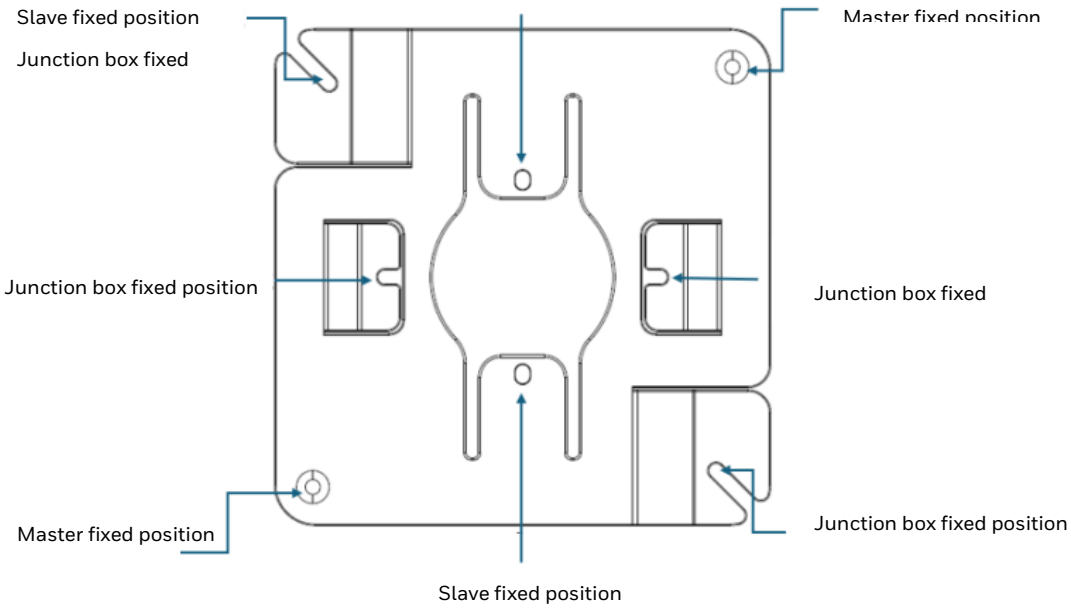


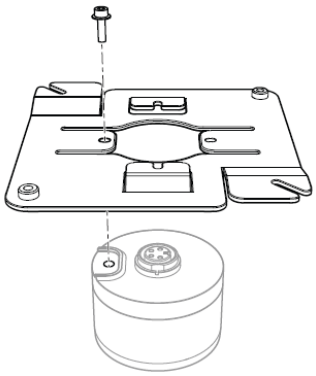
2. Fix the L-shaped bracket equipping with the slave detector to the wall with a screw.



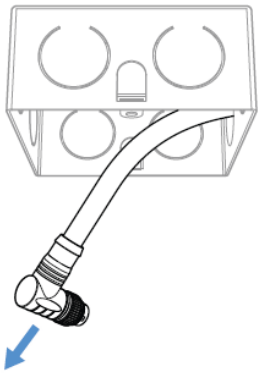
3. Insert the plug into the slave detector and rotate the nut on the male plug clockwise to lock the male plug with female socket.

The slave detector can also be installed on the ceiling through the base plate and the junction box, the following is the instruction for the holes on the mounting base plate.

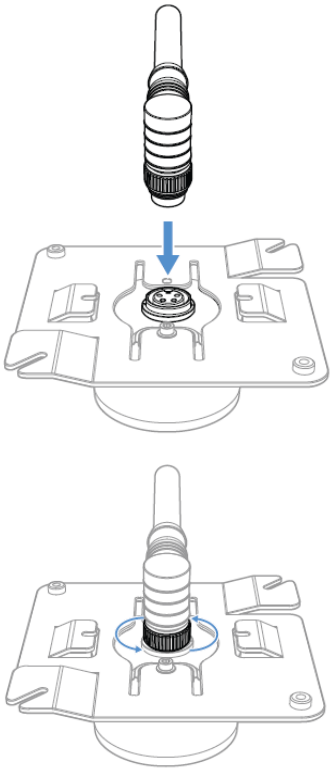


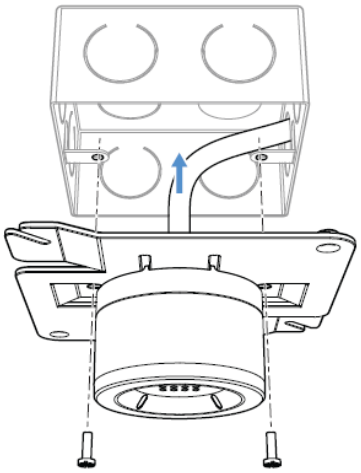


1. Fix the slave detector to the mounting base plate with screw



2. Pass the 4-pin male wiring harness (elbow) through the junction box, insert the 4-pin female socket at the bottom of the slave, and then tighten the nut of male plug to ensure that the male plug and female socket are locked.





3. Fix the mounting base plate with the junction box with screws

Chapter 3
Maintenance

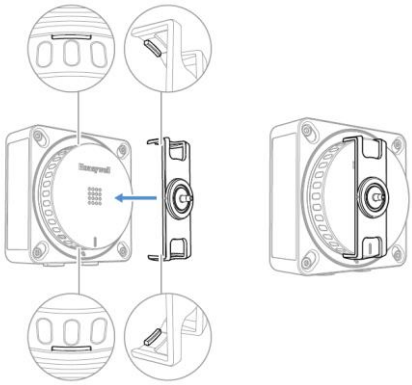
3.1 Calibration

Before calibration, please confirm that the CF value is set as 1. After calibration, if the measured gas and the calibration gas are different, please modify the CF value first.

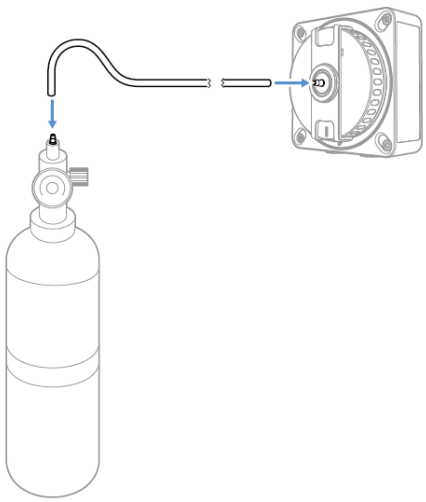
3.1.1 Calibration for the master detector

The recommended flow rate is 500cc/min.

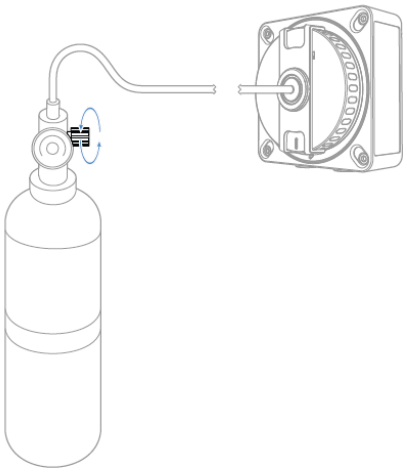
For calibration, a special calibration cap accessory shall be used. To install the calibration cap, follow the steps below.



1. Install the calibration cap onto the detector master, and ensure that the inverted buckle of the calibration cap and the buckle of the upper cover of the master detector are inserted in place.



2. Connect one end of one air pipe to the cylinder of the calibration gas, and connect the other end of the air pipe to the air inlet on the calibration cap.

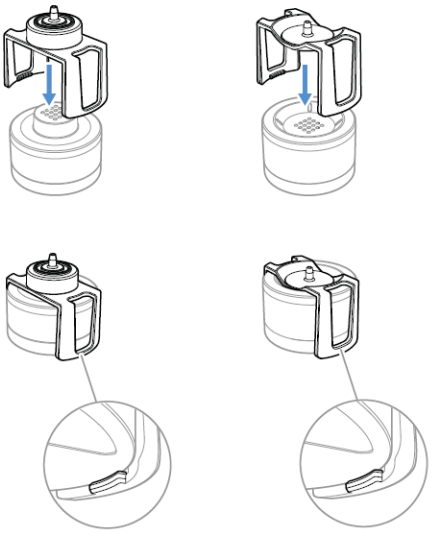


3. How to operate the cylinder gas flow control valve and how to start and stop the gas flow of the cylinder, please refer to the cylinder manufacturer's instructions.

⚠ Warning

Make sure that a gas cylinder that is within the expiration date is used.

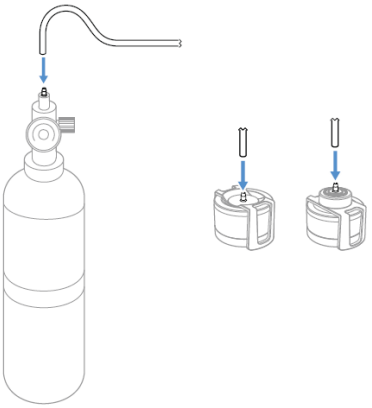
3.1.2 Calibration for the slave detector



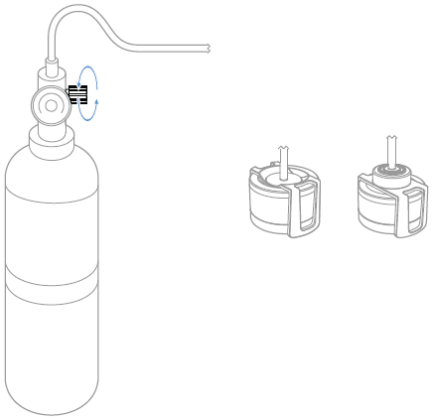
1. Insert the calibration cap onto the slave detector, making sure that the inverted buckle of the calibration cap is inserted in the edge of the bottom of the slave detector properly.

   (Left: Carbon monoxide slave detector.

   Right: H2 slave detector).



2. Connect one end of one air pipe to the cylinder of the calibration gas, and connect the other end of the air pipe to the air inlet on the calibration cap.

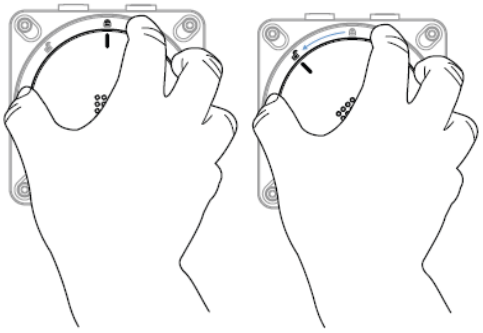


3. How to operate the cylinder gas flow control valve and how to start and stop the gas flow of the cylinder, please refer to the cylinder manufacturer's instructions.

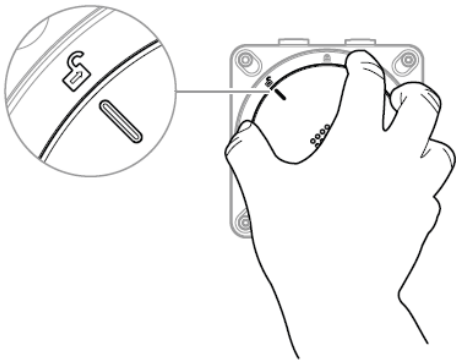
3.1.3 Offline calibration

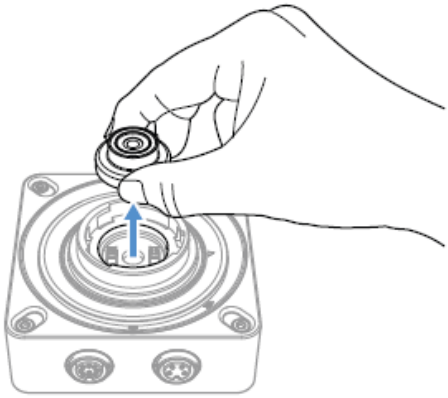
The offline calibration of the sensor module of the master detector is supported, and for details, please contact the service staff.

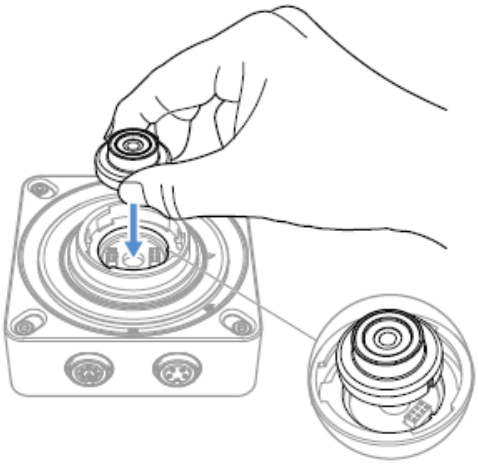
3.2 Replace the sensor module of the master detector



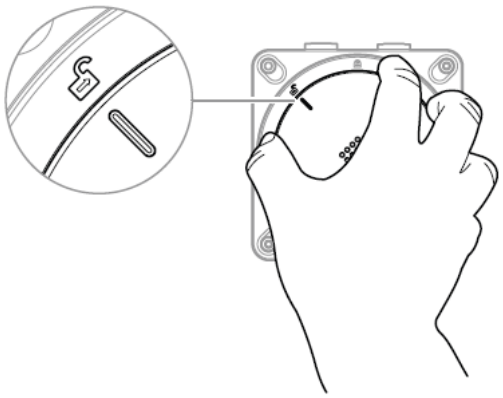
1. Turn the sensor cover counterclockwise from the locked position to the unlocked position and remove the sensor cover from the housing.

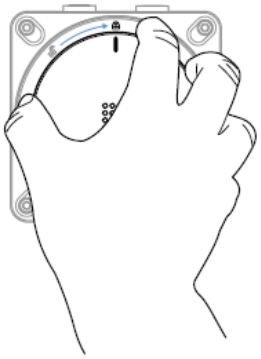






2. Take out the old sensor module from the detector, insert the new sensor module into the detector, and there is a foolproof notch on the sensor module and the detector body to ensure it is installed in place.





3. Turn the pointer of the sensor cover to the unlocked position and rotate the sensor cover clockwise to the locked position.

Note

Please only use genuine sensors designed specifically for RAEGUARD ESGD for replacement. The use of non-genuine sensors may result in product failure.

⚠ Warning

Before replacing the sensor, be sure to perform one of the following:

a) Cut off the power supply of the RAEGUARD ESGD, or b) Make the detector in sensor maintenance mode.

Connect your smartphone to the RAEGUARD ESGD through Bluetooth. Click the Maintenance button and select Replace Sensor. Follow the instructions shown on screen and the App user manual.

⚠ Warning

Do not forcedly insert the sensor into the socket, otherwise this may cause damage to the sensor.

3.3 Alarm and fault reset

When there is a continuous alarm or failure, reset it through the mobile app. This will reset continuous alarms and faults and activate self-diagnostics to ensure that there are no warnings or faults in the detector.

3.4 LED light status indication

- Normal: When the target gas concentration is within the normal range, the indicator lights are on and the green light flickers.
- Warning: When the gas detector is in warning state, the green and yellow indicator lights will flicker alternately
- Fault: When the gas detector is in a faulty state, the yellow indicator light will flicker.
- Inhibited: When the user makes the detector in the inhibited state for maintenance or repair, the yellow indicator light will always on.
- Alarm: When the gas concentration exceeds the alarm level threshold, the red indicator light will flicker.
- Out-of-range alarm: When the gas concentration exceeds the full-scale deviation of the detector, the red indicator light will flicker quickly.
- Bluetooth pairing: When the gas detector is Bluetooth paired with an

Android device, the blue indicator light will flicker.

- Bluetooth connected: When a Bluetooth connection is established and the detector is in a normal state, the blue indicator light will be always on.

The LEDs should be prioritized from highest to lowest: Alarm > Fault -> Warning -> BLE Connection > Normal

Only the master has Bluetooth function, and the slave machine does not have Bluetooth function.

Chapter 4
Mobile Application

With the RAEGuard app application, allow your smart device to connect to RAEGUARD ESGD. This mobile app application makes it easier to configure and maintain the RAEGUARD ESGD. The general process of using the mobile app is as follows:

1. Download the RAEGuard app from the Google Play or Apple Store. Install and start the app application.

The download link is as follows:

Apple Store

Google Play

2. After installing the detector, turn on the power supply of the detector master.
3. Turn on your smartphone's Bluetooth.
4. On the home screen of the App application, click DETECTORS to scan for available detectors.
5. Select a detector from the list of detectors to pair.
6. Look for detectors with the status light flickering blue.
7. Click "Confirm Detector" to pair with the detector. Otherwise, Click Back to List to select another detector.

When a Bluetooth connection is established, the detector's readings will be displayed on the app interface and the gas type will be displayed.

Chapter 5
Safety Guidelines

Please observe:

Ensure that only authorized and reliable personnel who are subject to appropriate training have access to the equipment.

The installation of RAEGuard ESGD must strictly comply with local applicable standards.

Instrument operation must be carried out by professionally trained personnel.

Before performing any work, you must ensure that all operations comply with local regulations and site work specifications and must meet the overall certification standards of the detector.

The sensor may contain corrosive solutions, please handle with care.

Unauthorized tampering or disassembly of the sensor is strictly prohibited.

Do not expose the sensor to an environment that exceeds the operating temperature.

Do not store the sensor in an organic substance or flammable environment.

When the sensor reaches the end of its service life, the discarded sensor must be stored in a safe environment to avoid environmental contamination.

Appendix
A. Detector Parameters

Gas Type	User Selectable Range	Default Range	User Selectable Calibration Gas Range	Default Calibration Point	Response Time t90(s)	Resolution	Accuracy (whichever is greater of the reading and the percentage of the gas used)
Hydrogen (H2)	50~100 %LEL	100 %LEL	50~70 %LEL	50 %LEL	<30	1 %LEL	Room temp. ± 5 %LEL(0~50 %LEL) ± 10%FS(50~100 %LEL) Full temp. range: ±30% or 15%FS
Carbon monoxide (CO)	50 to 1000 ppm	300 ppm	30 to 70% of selected fulls cale range	150 ppm	< 30	1 ppm	Room temp. ± 2 ppm or ± 5%FS Full temp. range: ±20% or 10%FS

Gas Type	Sensor Operating Temp.		Level 1 alarm	Direction	Level 2 alarm	Direction	Min. detection line
Hydrogen (H2)	-30°C	60°C	10 %LEL	Rising	25 %LEL	Rising	3 %LEL
Carbon monoxide (CO):	-20°C	50°C	30ppm	Rising	100 ppm	Rising	4 ppm

Note

Performance data is based on the following conditions:

The relative humidity of the test gas is 50%. The performance values given are valid in the range of 10% to 90% relative humidity.

Measurements are performed using a test unit calibrated at 50% of full scale.

Detector Parameters

Measurement is based on the supply of gas at a rate of 500 ml/min using a calibration adapter.

Response time (T90) may increase when operating at lower temperatures.

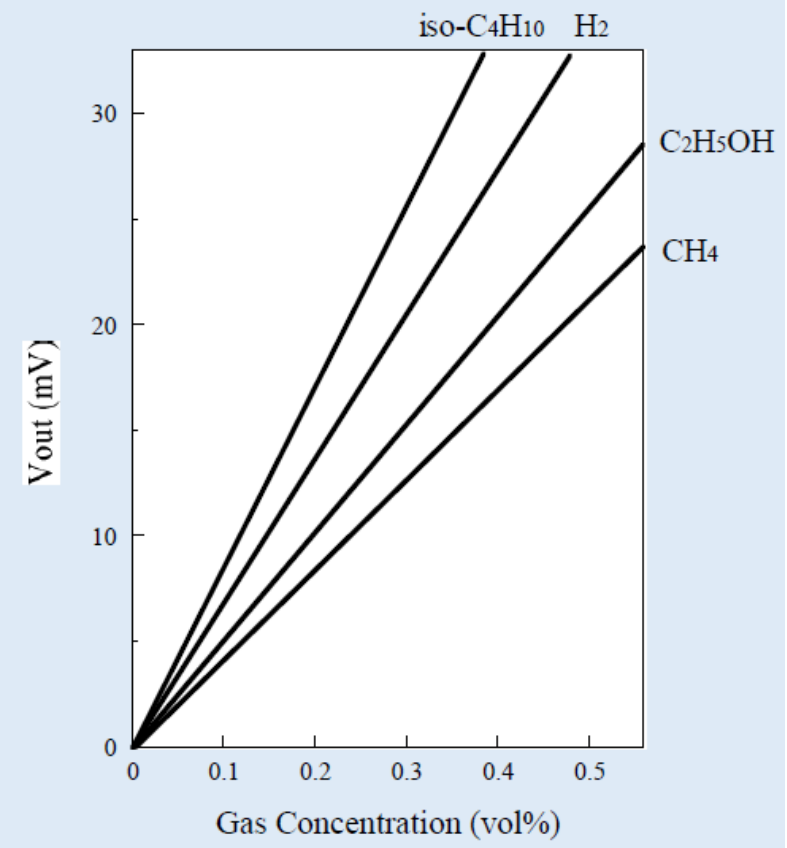
CO Cross Sensitivity Table (from sensor datasheet)：

Gas Type	Concentration （ppm）	Exposure （minutes）	Reading （ppm CO）
Carbon Monoxide	100	5	100
Acetone	1000	5	0
Acetylene	40	5	80
Ammonia	100	5	0
Chlorine	2	5	0
Ethanol	2000	30	3
Ethylene	100	5	85
Hydrogen	100	5	20
Hydrogen Sulfide	25	5	0
Iso-Propanol	200	120	0
Nitric Oxide	50	5	8
Nitrogen Dioxide	800	30	20
Sulfur Dioxide	50	600	0.5

Note: The figures in this table are typical values and should not be used as a basis for cross calibration. Cross sensitivities may not be linear and should not be scaled. For some cross interferents break through may occur if gas is applied for a longer time period.

The graph below (from sensor datasheet) shows the relative sensitivity characteristics for the flammable gases Methane, Iso-Butane, Hydrogen and Ethanol.

Note
Performance data is based on the following conditions: The relative humidity of the test gas is 50%. The performance values given are valid in the range of 10% to 90% relative humidity. Measurements are performed using a test unit calibrated at 50% of full scale. Measurement is based on the supply of gas at a rate of 500 ml/min using a calibration adapter. Response time (T90) may increase when operating at lower temperatures.



Appendix
B. Troubleshooting

B.1 Warning

	Description	Troubleshooting
Red light is flickering (0.5HZ)	Concentration exceeds the threshold	Ventilation, evacuation
Red light is flickering (0.5HZ)	Concentration out of the range	Ventilation, evacuation

B.2 Fault

Code	Description	Troubleshooting
301	Warning: BLE module is not installed	Check whether the BLE module is welded
302	Warning: BLE module initialization failed	Check whether the BLE module works properly
303	Warning: RTC errors	Check whether the RTC battery and crystal oscillator works normally
331	Warning: Calibration expired	Calibration is required
332	Warning: The service life of the sensor expires	Replace the sensor
333	Warning: Negative shift of readings	Calibration is required
431	Fault: Sensor (module) is not installed	Check whether the sensor (module) is installed
432	Fault: Sensor initialization failed	Check whether the sensor (module) works normally
433	Fault: Sensor Profile errors	Replace sensors (modules)
434	Fault: Sensor output signal errors	Replace sensors (modules)

Appendix C. Warranty

Honeywell provides warranty for defects in parts and process of RAEGUARD ESGD

This warranty does not cover consumables, batteries, fuses, normal wear and tear, or damage caused by accident, abuse, installation errors, unauthorized use, modification or repair, environmental conditions, poisons, contaminants, or abnormal operating conditions.

This warranty does not apply to sensors or components bound by separate warranty terms, nor does it apply to any third-party cables and components.

In no event shall Honeywell be liable for damage or injury of any nature or type arising from the improper handling or use of this equipment.

In no event shall Honeywell be liable for any failure or damage to the equipment, including (but not limited to) incidental, direct, indirect, special and consequential damages, loss of business profits, business interruption, loss of business information, or other property damage caused by improper installation or use of the equipment.

Any claim involving the warranty of a Honeywell product must be made within the warranty period as soon as possible after the defect is discovered. Please contact your local Honeywell representative to register your claim.

This is only a summary. For complete warranty terms, please refer to the general statement of the Honeywell Limited about Product Warranty, and this Statement will be available upon request.

Appendix
D. Safety Information for Wireless Devices

D.1 FCC Compliance

The device complies with Part 15 of the FCC Rules. Operations are limited by the following two conditions: (1) the device must not cause harmful interference, and (2) the device must be subject to any interference received, including interference that may cause poor operation.

This transmitter must not be co-located or co-operated with any other antenna or transmitter. This device complies with FCC radiation exposure limits requirements set for uncontrolled environments. End users must follow specific operation instructions to meet RF exposure compliance requirements.

Note

This device has been tested and complies with the Part 15 of the FCC Rules on the limits for a Class A digital device. These limits are intended to provide reasonable protection against harmful interference when operating equipment in a commercial environment. As this device generates, uses, and radiates radio frequency energy, if failure to follow the product instructions during installation and operation, this may cause harmful interference to wireless communications. Operating this equipment in a residential area may result in harmful interference, at which point the user will bear any expenses caused by the correction of such interface.

Safety information for wireless devices

⚠ Warning

Changes or modifications not expressly approved by the manufacturer who is responsible for conformity could void the user's right to operate the equipment.

This device complies with FCC radiation exposure limits requirements set for uncontrolled environments and complies with FCC guidelines for wireless frequency (RF) exposure. The device has very low RF energy levels and is considered to meet the criteria for not requiring a Maximum Permissible Exposure Assessment (MPE). However, it is recommended to place and operate the antenna at least 20 cm or more from the human body.

D.2 RED Compliance

Hereby, Honeywell Process Measurement & Control China declares that this gas detector RAEGUARD ESGD complies with the basic requirements of Directive 2014/53/EU and other relevant provisions.

Appendix E. Certification

Electromagnetic Compatibility

- EN 50270:2015

Electrical Safety

- IEC/EN 61010-1
- UL/CSA 61010-1

Wireless Related

- RED
- FCC
- BT SIG

Enclosure Protection

- IP65

Gas Performance

- UL 2075 (Certificate to be issued in Q2 2025)

Appendix F. Modbus Register

The Modbus version of RAEGUARD ESGD allows interaction with gas detectors through Modbus RTUs on the RS-485 physical layer. The Modbus interface provides a way to monitor and inquire detectors, and the alarm can be also reset remotely. Optional baud rate: 9600, 19200 (default), 38400, data format (8N1), slave address range (1~247), default address 0x01.

The Modbus registers for RAEGUARD ESGD are listed in the table below.

The instrument supports 3# Command, and the data format is listed below:

Read the command:

Device Address	Function Code	Starting Address high byte	Starting Address low byte	Quantity of Registers high byte	Quantity of Registers low byte	CRC low byte	CRC high byte
Client ID	0x03	addr	addr	qty	qty	crc	crc

Reply command:

Device Address	Function Code	Byte Count	Register Values	CRC low byte	CRC high byte
Client ID	0x03	len	MSB……LSB	crc	crc

The detailed list of commands is shown below:

Note: The minimum communication interval is 500ms.

reg addr	length	Information	R/W	Description	Notes
0x0101	1	System run mode & final status	R	High byte-system run mode; 0. measure mode; 1. inhibit mode; 2. startup mode; low byte-system run final status in measure mode; 0. normal; 1. warning; 2. fault; 3. twa; 4. stel; 5. low; 6. low latch; 7. high; 8. high latch; 9. over; others-reserved;	
0x0102	1	Master main board overall status	R	Byte[0-1]: status; bit0-inhibit; bit2-warning; bit3-fault; others-reserved;	0-no occur. 1-occurred;
0x0104	2	Master sensor reading	R	Byte[2-3]: the integer part of reading (U16) Byte[0-1]: the decimal part of reading (U16)	
0x0106	1	Master sensor overall status	R	byte[0-1]: status; bit0-inhibit bit1-hint (NA.) bit2-warning bit3-fault bit4-safety_fault (NA.) bit5-twa bit6-stel bit7-low bit8-high bit9-over bit10-low_latch bit11-high_latch bit12-disable others-reserved;	0-no occur. 1-occurred;
0x0108	2	Slave1 reading	R	Byte[2-3]: the integer part of reading (U16) Byte[0-1]: the decimal part of reading (U16)	
0x010a	1	Slave1 overall status		byte[0-1]: status; bit0-inhibit bit1-hint (NA.)	0-no occur. 1-occurred;

				bit2-warning bit3-fault bit4-safety_fault (NA.) bit5-twa bit6-stel bit7-low bit8-high bit9-over bit10-low_latch bit11-high_latch bit12-disable bit13-comm error others-reserved;
0x010c	2	Slave2 reading	R	Same as slave1
0x010e	1	Slave2 overall status	R	Same as slave1
0x0110	2	Slave3 reading	R	Same as slave1
0x0112	1	Slave3 overall status	R	Same as slave1
0x0114	2	Slave4 reading	R	Same as slave1
0x0116	1	Slave4 overall status	R	Same as slave1
0x0130	1	Heartbeat	R	plus1 per second
0x0131	9	Date time	R	Format is “mm/dd/yy hh:mm:ss”
0x013b	1	Ble connect status	R	Bit0: 0-disconnected; 1-connected;
0x013c	1	Relay status	R	Byte[1]: bit0-relay2 status (0: De-energized, 1: Energized) Byte[0]: bit0-relay1 statue (0: De-energized, 1: Energized)
0x013d	1	Relay configuration	R	Byte[1]: bit1~2-relay2 act status; (0: Fault, 1: Alarm1, 2: Alarm2) Bit0-relay2 energize type; (0: De-energized, 1: Energized) Byte[0]: bit1~2-relay1 act status; (0: Fault, 1: Alarm1, 2: Alarm2) Bit0-relay1 energize type; (0: De-energized, 1: Energized)
0x0140	13(0x0d)	Location tag	R	string

Appendix
G. Contact Information

For more contact information, please visit www.honeywell.com.

Honeywell Process Measurement & Control Division
Address: Building 1, No. 555, Huanke Road, Zhangjiang Hi-Tech Park, Pudong New Area, Shanghai, China, Zip: 201203

Tel: 400-639-6841

Email: ContactIA@honeywell.com

Honeywell Sensing & Control (China) Co., Ltd.
Address: No. 1668, Tianyin Road, Jiangning District, Nanjing, Jiangsu Province, China Zip: 211100

Tel: +86 025-51832222