

# Gas Detection

Parking Garages  
Maintenance Facilities  
Warehouses



## Key Features

- **Safety**

Workplace and tenant safety drive the need for gas detection in many facilities. Local regulatory authorities adopt acceptable concentration levels for both facility and worker safety.

- **Regulation**

Local building codes, labor acts and safety authority classifications may all share jurisdiction in your facility and require some form of gas detection equipment. For example, many labour guidelines adopt ppm concentrations from the ACGIH which recommends the TLV/TWA EV levels for CO to be 25 ppm.

- **Aesthetics**

Building occupant and worker comfort levels are enhanced when a facility is monitored by the appropriate gas detection instruments.

- **Energy**

Ventilation costs can be considerable. The heat and cooling loss in a facility, fan motor wear and maintenance, and the electricity costs can be substantially reduced by controlling ventilation equipment with gas detection equipment.

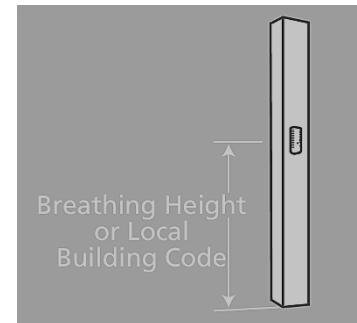
## Application

At work and home, we are surrounded by many potential sources of toxic gases. Vehicle garages and warehouses are no exception. In parking garages, Carbon Monoxide (CO) is typically the target gas for ventilation. CO is a result of incomplete combustion from gasoline engines. In some localities, gas leaks from propane vehicles are also monitored. In warehouses/ food processing industry, refrigerant, CO emissions and leaks apply to propane powered fork lifts. In maintenance garages, the addition of Nitrogen Dioxide (NO<sub>2</sub>) may be of concern. NO<sub>2</sub> is the target gas for diesel engine exhaust. While most facilities have good ventilation design, the premise of their air exchange calculation is based on continuous 24 hour/day exhaust fan operation. In lieu of continuous operation, many local codes promote the installation of gas detectors to activate the ventilation system on an as needed basis. Where codes do not specifically indicate a monitoring option they may indicate that facilities require adequate ventilation to ensure the toxic gas levels are within acceptable guidelines. A gas detector will monitor and control the ventilation so that these requirements are being met.

In parking garages, warehouses and maintenance bays, carbon monoxide (CO) from gasoline/propane vehicles and nitrogen dioxide (NO<sub>2</sub>) from diesel exhaust is present under normal conditions. The intention is not to ventilate upon the immediate presence of these gases, but to ventilate when necessary to keep the concentrations within acceptable levels. Propane leaks from vehicle storage tanks may also be considered in some applications and can be coupled with the toxic gas monitors.

## Sensor Height

The exhaust is initially warm and will be directed toward the ceiling. As it cools and is dispersed by air movements, both CO and NO<sub>2</sub> will migrate toward the floor and pass the breathing zone. The intent of the ventilation system is to maintain safe concentrations in the areas where people may be present. As such, these sensors are recommended to be mounted in the breathing zone.



Propane is more dense than air and will disperse toward the floor. Propane sensors are placed lower to the floor.

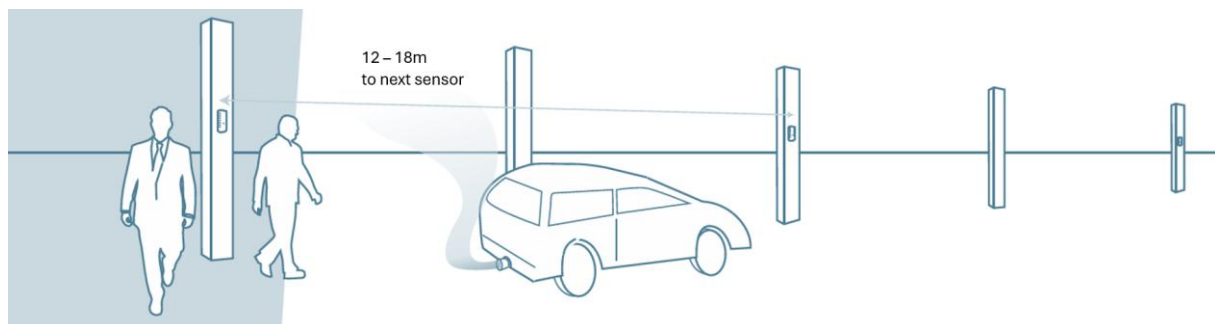
Local building codes and labour regulations may indicate specific sensor placement heights and should be verified before installation.

## Sensor Coverage

Historically, manufacturer guidelines for CO sensor placement indicated one sensor per 460m<sup>2</sup> in open areas or about 25 meters sensor to sensor in tighter areas. Trends toward smaller vehicles with improved exhaust systems have reduced the rate of the concentration rise in facilities where vehicles are operating. This, coupled with improved ventilation systems, has generally allowed the number of sensors to decrease. In areas of high public or worker use, one sensor per 460m<sup>2</sup> is recommended. In lower use areas and unobstructed facilities, this coverage can be extended to one sensor per 700m<sup>2</sup>. In facilities with a continuous mechanical air movement to help disperse the gas quickly, a placement of one sensor per 900m<sup>2</sup> can be considered. There are no specific codes to dictate sensor coverage. Mechanical Engineers familiar with your ventilation system can assist.

## Sensor Location

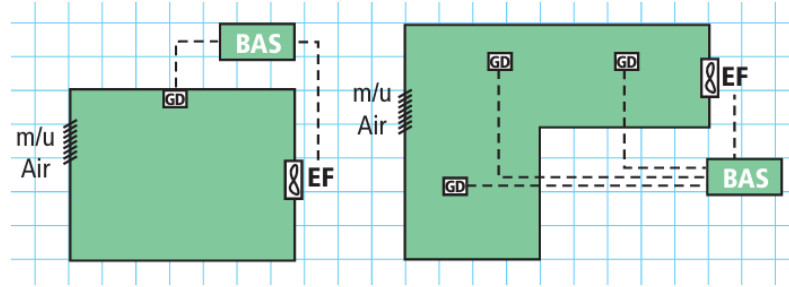
The following views are examples only. Sensor layout is dependent on individual requirements, access to pillars for mounting, etc. The strategy is to start off the wall based on the chosen radius of the sensor and place sensors 2 x the radius apart throughout the garage. To maximize coverage, place the sensors on pillars and away from external walls where possible.



## Facilities that have a Building Automation System (BAS)

- Each sensor provides a discrete 4-20 mA signal to the BAS
- Multiple Fan locations are controlled by BAS
- Facility may have contactor or VFD Fans

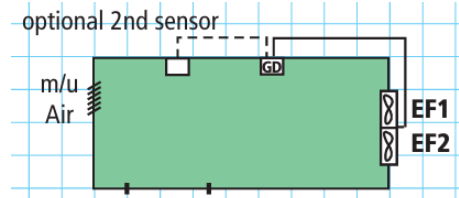
Recommended unit: EC-GOLD.



## Facilities < 750m²

- One Exhaust Fan location
- Fan may have contractor or VFD Fan

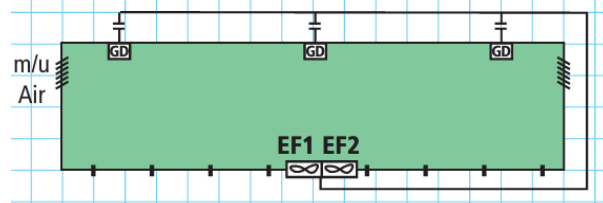
Recommended unit: EC-GOLD Dual.



## Facilities > 460m²

- One or more fan exhaust location
- Facilities where individual audio alarms and ppm displays are desirable

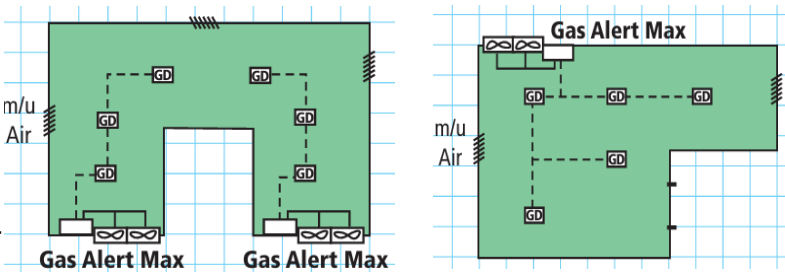
Recommended: multiple EC-GOLD Dual with relays wired in parallel to fan control.



## Facilities > 460m²

- Areas or floors can be zoned into one or more groups of sensors to control local fans
- Sensor ppm values not required
- Lowest cost wiring and control package

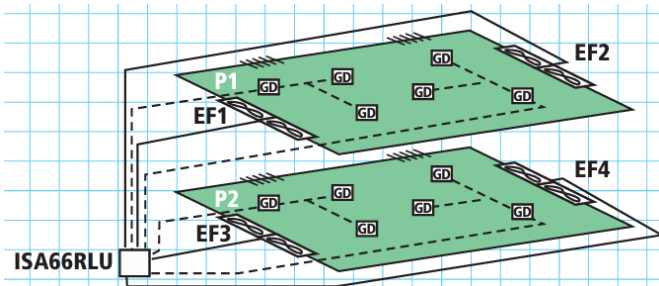
Recommended: Gas Alert Max with EC-GOLD Sensors. Use one Gas Alert Max per zone or floor.



## Facilities > 460m²

- Used where there are more than 1 zone of control
- Used where the fan starters are located in a central electrical room

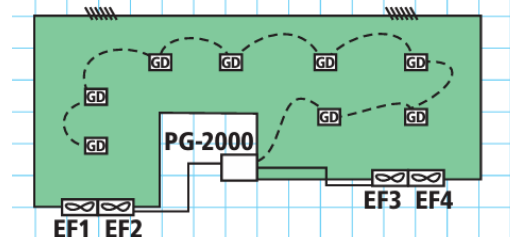
Recommended: ISA-66 RLU with EC-GOLD Sensors.



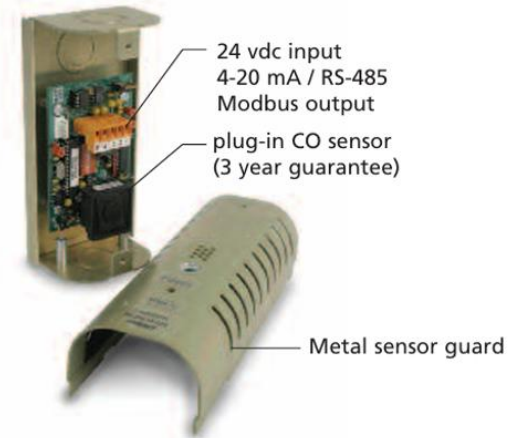
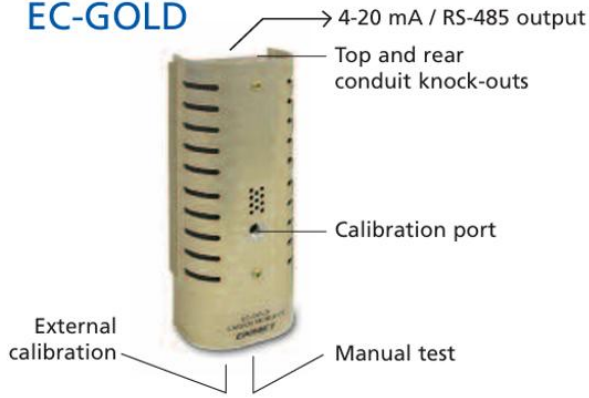
## Facilities > 460m²

- All sensors are addressable via RS-485
- Zones can be determined at central panel for fan control
- Higher cost communication wiring and installation but sensors are addressable and controls can be mapped

Recommended: PG-2000 Scanner with EC-GOLD Sensors



**EC-GOLD**



**Standard Features**

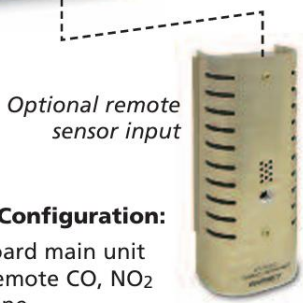
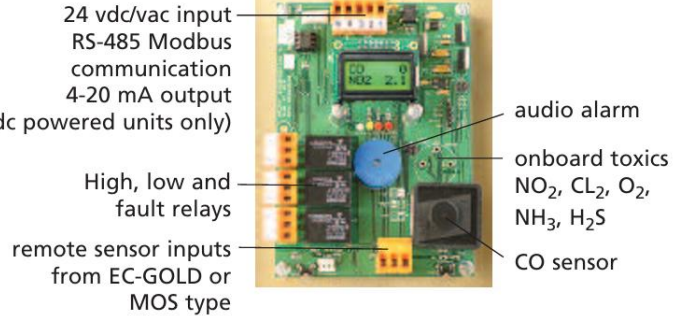
- Plug-in wiring terminal block for quick installation and maintenance
- 1/2" and 3/4" knockouts, top, bottom, and back for easy installation
- LED alarm status indication including flashing fault alarm
- External calibration port for easy application of Test Gas (used with onboard CO sensor)
- Protective aluminum housing with electronics filter screen
- External push button for calibration (the user is not required to open the unit to calibrate)
- Shielded sensor port for plug-in sensors

**Extra Features**

on the Carbon Monoxide sensor:

- fault acknowledgement on sensor failure or expiration
- manual Push-to-Test by external button to confirm interlocks
- 3 year sensor life guarantee
- single point calibration

**EC-GOLD Dual**



**Typical Configuration:**

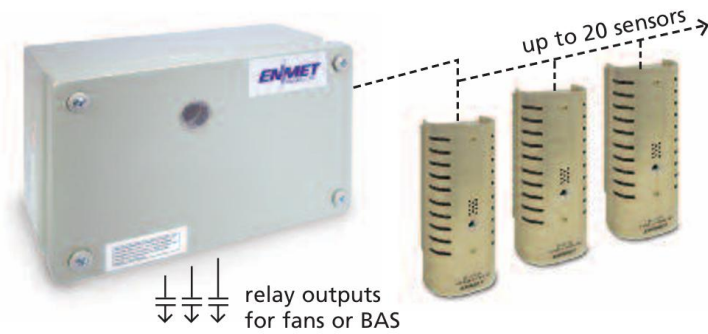
CO onboard main unit with a remote CO, NO<sub>2</sub> or propane.

**Features and Benefits**

- analog and relay outputs for control interface
- metal sensor guard
- top, bottom and rear conduit entry
- 3 year sensor guarantee (CO sensor)
- on-board diagnostics
- up to four sensors simultaneously
- remote sensor input capability
- LCD display of concentration
- LED Alarm Status indication
- Buzzer with silence
- Keypad/menu driven set-up
- Single analog output representing highest sensor concentration for easy fan speed control or logging



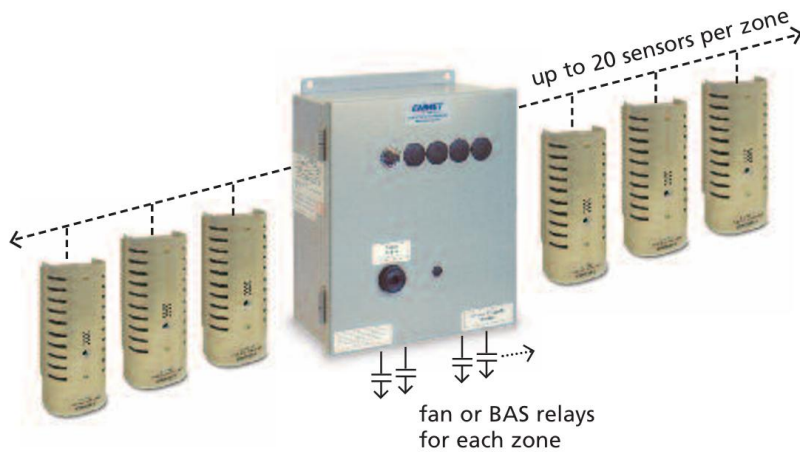
■ GasAlert Max



The **GasAlert Max** monitors up to 20 sensors for a common interlock to fans or alarms.

- central panel offers relays, BAS outputs, and LED alarm status
- up to 20 sensors on one 3-conductor run

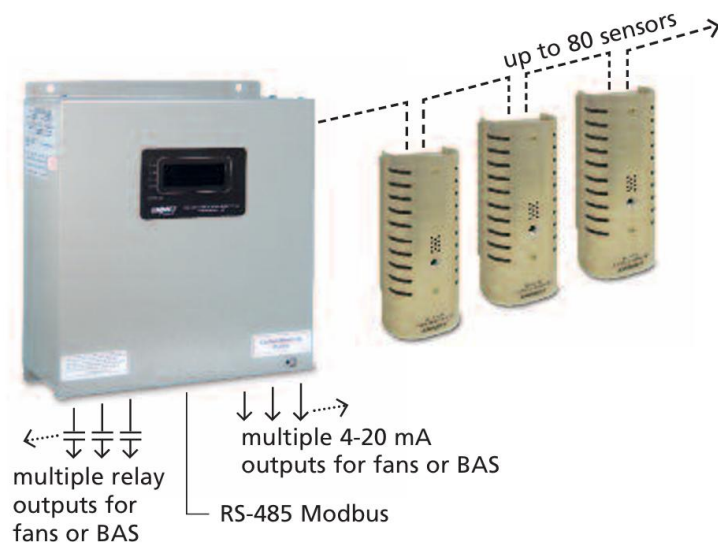
■ ISA-66 RLU



The **ISA-66 RLU** is ideal in facilities where fan starters are located in one central electrical room.

- central panel allows up to 5 zones of fan control
- central panel offers relays, BAS outputs, and LED alarm status
- up to 20 sensors on one 3-conductor run per zone

■ PG-2000



The **PG-2000** offers an intelligent solution to gas monitoring and ventilation control.

- central panel offers display and control functions
- up to 80 sensors on one RS-485 daisy chain communication run