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DESIGNING YOUR SYSTEM

Whether you are designing a new system or retrofitting an old system, installing a CTI gas detection system can be done all at once, or easily expanded in stages to meet your budget requirements. Our application engineers have many years of experience in the food industry, and will be happy to help you custom tailor a system to meet your needs.

The example schematic below complies with IIA R, ASHRAE and other regulatory codes.
SINGLE, DUAL AND MULTI-CHANNEL CONTROL PANELS

From single-channel readouts to thirty-channel stand-alone safety systems, the CTI controller line has you covered. 2 year warranty on all controllers.

**GG-6**
6-Channel Gas Monitor (expandable to 30 channels). Includes graphic LCD display, six 10A relay outputs, time-weighted averaging, event logging, three adjustable setpoints per channel, and 6.5A power supply (does not include sensors). System configuration through user friendly menu-driven LCD operator interface. Weatherproof NEMA 4X fiberglass enclosure safe for outdoors & washdown areas. Can accommodate up to three expansion modules for a total of 30 sensors. Power requirements: 110 VAC, 2 A. ETL listed to UL and CSA standards.

**GG-6 Startup**
Startup includes factory trained technician on-site for one day providing controller configuration, sensor calibration, alarm output verification, training, and report to satisfy OSHA PSM documentation requirements for the gas detection system. Includes all travel expenses within continental United States. System to be installed by others prior to arrival.

**GG-6-AOB**
Six-channel 4/20 mA Analog Output Board. Provides six individual analog outputs, powered by the GG-6 controller.

**GG-6-APS**
Auxiliary 6.5A, 24VDC power supply for the GG-6 controller. Includes mounting bracket and wire leads. Designed to handle the power requirements of multiple horn/strobe installations.

**GG-6-GE-M**
GG-6 Ethernet, Modbus gateway module, with mounting bracket.

**GG-6-GE-E**
GG-6 Ethernet, EtherNet/IP gateway module, with mounting bracket.

**GG-6-GE-B**
GG-6 Ethernet, BACnet gateway module, with mounting bracket.

**GG-6-GR-B**
GG-6 RS-485, BACnet gateway module, with mounting bracket.

**GG-6-GR-M**
GG-6 RS-485, Modbus gateway module, with mounting bracket.

**GG-XM**
GG-6 Expansion Module. Adds eight channels to the GG-6. Includes expansion module with harness interconnect, eight 10A relay outputs, 6.5A power supply, and weatherproof enclosure (does not include sensors). Simple setup and configuration through menu on GG-6 control panel. Power requirements: 110 VAC, 2 A. ETL listed to UL and CSA standards.

**GG-XM-AOB**
Eight-channel 4/20 mA Analog Output Board. Provides eight individual analog outputs, powered by the GG-XM.

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</table>
SINGLE, DUAL AND MULTI-CHANNEL CONTROL PANELS

From single-channel readouts to thirty-channel stand-alone safety systems, the CTI controller line has you covered. 2 year warranty on all controllers.

**GG-RD1**
GG-6 Remote Display. Adds remote display capability to GG-6 via MODBUS RTU protocol on RS-485. Sileanceable onboard buzzer provides audible alarm indication. Can be installed up to 1000ft from GG-6. Mirrors display of GG-6 and powered by 24VDC from GG-6. $1,295

**GG-RD2**
For applications that require more than one remote display. $1,295

**GG-2**
2-Channel Gas Monitor (does not include sensors). Includes graphic LCD display, six 10A relay outputs, event logging, dual adjustable setpoints per channel, two analog outputs, and 2.2A power supply. System configuration through user friendly menu-driven LCD operator interface. NEMA 4X fiberglass enclosure safe for outdoors and washdown. Power requirements: 110 VAC, 2 A. ETL listed to UL and CSA standards. $1,595

**GG-EM**
Entrance Monitor. Single-Channel (does not include sensor). Includes 10-segment LED bargraph display and 10A relay output with adjustable setpoint. Can be used as feed-through device for remote display/relay, or as a stand-alone application. NEMA 4X polycarbonate enclosure safe for outdoors and washdown areas. 24 VDC, 120 mA. ETL listed to UL and CSA standards. $420

**GG-EM-PS**
Add-on power supply bolts inside the GG-EM enclosure. 110 VAC input. 24 VDC, 0.625 A output. Provides DC power for GG-EM, GG sensor, and up to two Horn/Strobes. $145

920 N Trade Winds Pkwy, Columbia, MO 65201  866-394-5861  www.CTIengineering.com  sales@CTIengineering.com
Over twenty years of ammonia detection experience is designed into the GG-NH3 sensor line. Built for harsh environments. 2 year warranty on all sensors.

**GG-NH3**

- GG-NH3-100 | 0-100 ppm (standard)
- GG-NH3-250 | 0-250 ppm
- GG-NH3-500 | 0-500 ppm
- GG-NH3-1000 | 0-1000 ppm

**GG-NH3 with Stainless Steel Enclosure**
18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

- GG-NH3-100-ST
- GG-NH3-250-ST

**GG-NH3 with Duct Mount**
Duct mount hardware and polycarbonate enclosure for ammonia detection in ventilation ducts.

**GG-NH3-DM**

**GG-NH3-2%**
Catalytic Bead ammonia sensor, 0/2% range. Ammonia selective catalytic bead sensor technology. Designed for installation in ammonia compressor rooms where E-stop or electrical shunt trip is desired. Use with GG-NH3 for complete compressor room protection. Industry standard linear 4/20 mA output. Power: 24 VDC, 250 mA. ETL listed to UL and CSA standards.

**GG-NH3-2%-EXP**
Catalytic Bead ammonia sensor, 0/2% range, with explosion-proof enclosure. Ammonia selective catalytic-bead sensor technology. Circuit board is completely sealed in potting compound. Designed for installation in ammonia compressor rooms where E-stop or electrical shunt trip is desired. Industry standard linear 4/20 mA output. Power: 24 VDC, 80 mA.

**GG-NH3-EXP**

- GG-NH3-250-EXP | 0-250 ppm (standard)
- GG-NH3-500-EXP | 0-500 ppm

**GG-VL2-NH3**
Catalytic-bead ammonia vent line sensor, range 0-1%. Includes mounting kit. Continuous monitoring of refrigeration system relief valves. Circuit board is completely sealed in potting compound, protecting sensitive electronic components and copper tracing from corrosion. 18 gauge, 316 stainless steel enclosure. Industry standard linear 4/20 mA output. Power requirements: 24 VDC, 80 mA. ETL listed to UL and CSA standards.

**AMMONIA SENSORS**

- **GG-NH3**
  - GG-NH3-100 | 0-100 ppm (standard)
  - GG-NH3-250 | 0-250 ppm
  - GG-NH3-500 | 0-500 ppm
  - GG-NH3-1000 | 0-1000 ppm

- **GG-NH3 with Stainless Steel Enclosure**
  - 18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.
  - GG-NH3-100-ST
  - GG-NH3-250-ST

- **GG-NH3 with Duct Mount**
  - Duct mount hardware and polycarbonate enclosure for ammonia detection in ventilation ducts.

- **GG-NH3-DM**

- **GG-NH3-2%**
  - Catalytic Bead ammonia sensor, 0/2% range. Ammonia selective catalytic bead sensor technology. Designed for installation in ammonia compressor rooms where E-stop or electrical shunt trip is desired. Use with GG-NH3 for complete compressor room protection. Industry standard linear 4/20 mA output. Power: 24 VDC, 250 mA. ETL listed to UL and CSA standards.

- **GG-NH3-2%-EXP**
  - Catalytic Bead ammonia sensor, 0/2% range, with explosion-proof enclosure. Ammonia selective catalytic-bead sensor technology. Circuit board is completely sealed in potting compound. Designed for installation in ammonia compressor rooms where E-stop or electrical shunt trip is desired. Industry standard linear 4/20 mA output. Power: 24 VDC, 80 mA.

- **GG-NH3-EXP**

- **GG-VL2-NH3**
  - Catalytic-bead ammonia vent line sensor, range 0-1%. Includes mounting kit. Continuous monitoring of refrigeration system relief valves. Circuit board is completely sealed in potting compound, protecting sensitive electronic components and copper tracing from corrosion. 18 gauge, 316 stainless steel enclosure. Industry standard linear 4/20 mA output. Power requirements: 24 VDC, 80 mA. ETL listed to UL and CSA standards.
Entrance Display

The GG-EM Entrance Monitor is a great solution for providing a visual display at all entrances into Compressor Rooms and other potentially hazardous areas.

The monitor simply connects in series between the sensor and the control panel, re-transmitting the analog signal from the sensor back to the control panel. Up to ten Entrance Monitors can be used on a single channel. An adjustable alarm setpoint and 10A relay are included for use with horn/strobes or ventilation activation.

High Performance Sensor Design

Our product designs are a culmination of decades of experience dealing with harsh, wet, and cold environments in the food industry. A few key features that come standard on the GG sensor product line are intelligent temperature and moisture control, and potting-encapsulated circuit boards. Stainless steel and explosion proof enclosures are also available if your application requires them.

Sensor Redundancy in Compressor Rooms

With the Compressor Room posing the biggest risk of an ammonia leak, multiple sensors are required to maintain sufficient leak detection. In a typical compressor room two low-range sensors (e.g., 0-250 ppm) provide early detection and can compensate for air flow conditions which may draw the gas away from one sensor.

Adding a high-range 0-2% (0-20,000 ppm) sensor doubles as a last line of defense against catastrophic failure, providing automatic E-stop or electrical shunt trip to prevent an explosion. This high-range sensor should duplicate the low-range sensors’ alarm functions for added safety and redundancy.
CARBON DIOXIDE SENSORS

Diffusion-style sensors for many applications. 2 year warranty on all sensors.

**GG-CO2**

Carbon Dioxide specific infrared sensor technology. Sensor board is completely sealed in potting compound, protecting electronic components and copper tracing from corrosion. Weather, corrosion, and chemical resistant polycarbonate sensor enclosure suitable for all locations from -60° to +120°F, including freezer, washdown, and outdoors. Industry standard linear 4/20 mA output. Power requirements: 24 VDC, 350 mA. ETL listed to UL and CSA standards.

- **GG-CO2-1%** | 0-10,000 ppm
- **GG-CO2-3%** | 0-30,000 ppm (standard)
- **GG-CO2-5%** | 0-50,000 ppm

**GG-CO2 with Stainless Steel Enclosure**

18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

- **GG-CO2-1%-ST**
- **GG-CO2-3%-ST**
- **GG-CO2-5%-ST**

**GG-CO2 with Duct Mount**

Includes Duct Mount hardware and polycarbonate enclosure for carbon dioxide detection in ventilation ducts.

- **GG-CO2-1%-DM**
- **GG-CO2-3%-DM**
- **GG-CO2-5%-DM**

$1,195

$1,395

$1,405
CARBON MONOXIDE SENSORS

Diffusion-style sensors for many applications. 2 year warranty on all sensors.

**GG-CO**


**GG-CO-200 | 0-200 ppm (standard)**

$935

**GG-CO with Stainless Steel Enclosure**

18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

**GG-CO-200-ST**

$1,135

**GG-CO with Duct Mount**

Includes Duct Mount hardware and polycarbonate enclosure for carbon monoxide detection in ventilation ducts.

**GG-CO-200-DM**

$1,145

**GG-CO-EXP**

Explosion proof enclosure for hazardous areas (Class 1, Div 1, Groups B, C, & D). Carbon Monoxide specific electrochemical sensor, 0-200 ppm. Electronics potted to eliminate internal corrosion. Industry standard linear 4/20 mA output. Power Requirements +24vdc, 50 mA.

**GG-CO-200-EXP | 0-200 ppm (standard)**

$1,230
CHLORINE SENSORS

Diffusion-style sensors for many applications. 2 year warranty on all sensors.

**GG-CL2-B**


**GG-CL2-B | 0-5 ppm (standard)**

$935

**GG-CL2-B with Stainless Steel Enclosure**

18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

**GG-CL2-B-ST**

$1,135

**GG-CL2-B with Duct Mount**

Includes Duct Mount hardware and polycarbonate enclosure for chlorine detection in ventilation ducts.

**GG-CL2-B-5-DM**

$1,145

**GG-CL2-EXP**

Explosion proof enclosure for hazardous areas (Class 1, Div 1, Groups B, C, & D). Chlorine specific electrochemical sensor, 0-5 ppm. Electronics potted to eliminate internal corrosion. Industry standard linear 4/20 mA output. Power Requirements +24vdc, 50 mA.

**GG-CL2-EXP | 0-5 ppm (standard)**

$1,230
COMBUSTIBLE SENSORS

Diffusion-style sensors for many applications. 2 year warranty on all sensors.

GG-LEL2 ........................................................................................................................................... $795

High-range Catalytic Bead sensor technology, explosion-proof housing for hazardous areas (Class 1, Div 1, Groups B, C, & D). 0/100% LEL calibrated to target gas. Industry standard linear 4/20 mA output. Power requirements: 24 VDC, 100 mA. Other gases also available.

GG-LEL2-C2H6 (Ethane)
GG-LEL2-C2H4 (Ethylene)
GG-LEL2-H2 (Hydrogen)
GG-LEL2-CH4 (Methane)
GG-LEL2-C4H10 (N-butane)
GG-LEL2-C6H14 (N-hexane)
GG-LEL2-C5H12 (N-pentane)
GG-LEL2-C3H8 (Propane)
HFC, CFC, HCFC SENSORS

Diffusion-style sensors for many applications. 2 year warranty on all sensors.

**GG-R**

Infrared refrigerant sensor for CFC’s, HFC’s, and HCFC’s. Standard factory range 0-500 ppm, rugged temperature controlled polycarbonate enclosure suitable for all locations from -50° to +120°F, including freezer, washdown, and outdoors. Industry standard linear 4/20 mA output. 0-1,000 ppm and 0-3,000 ppm ranges available. Other gases also available. Power requirements: 24 VDC, 1A. ETL listed to UL and CSA standards.

<table>
<thead>
<tr>
<th>Range</th>
<th>GG-R22-500</th>
<th>GG-R22-1000</th>
<th>GG-R22-3000</th>
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<tr>
<td>0-500 ppm (standard)</td>
<td>GG-R22-500</td>
<td>GG-R22-1000</td>
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<td>0-1,000 ppm</td>
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<td>GG-R34a-1000</td>
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<td>0-3,000 ppm</td>
<td>GG-R404a-500</td>
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<td>0-500 ppm (standard)</td>
<td>GG-R507a-500</td>
<td>GG-R507a-1000</td>
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<td>0-1,000 ppm</td>
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<td>GG-R507a-1000</td>
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**GG-R with Stainless Steel Enclosure**

18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

<table>
<thead>
<tr>
<th>Range</th>
<th>GG-R22-500-ST</th>
<th>GG-R22-1000-ST</th>
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<td>0-1,000 ppm</td>
<td>GG-R34a-500-ST</td>
<td>GG-R34a-1000-ST</td>
<td>GG-R34a-3000-ST</td>
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<tr>
<td>0-3,000 ppm</td>
<td>GG-R404a-500-ST</td>
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<td>0-500 ppm (standard)</td>
<td>GG-R507a-500-ST</td>
<td>GG-R507a-1000-ST</td>
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<td>GG-R507a-500-ST</td>
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**GG-R with Duct Mount**

Includes Duct Mount hardware and polycarbonate enclosure for HFC, CFC, and HCFC detection in ventilation ducts.

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<tr>
<th>Range</th>
<th>GG-R22-500-DM</th>
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**GG-VL-R**


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$1,195

$1,395

$1,405

$995
HYDROGEN SENSORS

Diffusion-style sensors for many applications. 2 year warranty on all sensors.

**GG-H2-EC**

Electrochemical hydrogen sensor for ranges (0-10,000 ppm (0-25% LEL) and 0-2000 ppm H2). Designed for battery rooms and charging stations for ventilation activation. Hydrogen selective electrochemical sensor technology. Weather, corrosion, and chemical resistant polycarbonate sensor enclosure. Industry standard linear 4/20 mA output. Power requirements: 24 VDC, 250 mA. ETL listed to UL and CSA standards.

- **GG-H2-EC-10,000** | 0-10,000 ppm (standard)
- **GG-H2-EC-2,000** | 0-2,000 ppm

**GG-H2-EC with Stainless Steel Enclosure**

18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

- **GG-H2-EC-10,000-ST**
- **GG-H2-EC-2,000-ST**

**GG-H2-EC with Duct Mount**

Includes Duct Mount hardware and polycarbonate enclosure for hydrogen detection in ventilation ducts.

- **GG-H2-EC-10,000-DM**
- **GG-H2-EC-2,000-DM**

**GG-H2-EC-EXP**

Explosion proof enclosure for hazardous areas (Class 1, Div 1, Groups B, C, & D). Hydrogen specific electrochemical sensor. Electronics potted to eliminate internal corrosion. Industry standard linear 4/20 mA output. Power Requirements +24vdc, 50 mA.

- **GG-H2-EC-10,000-EXP** | 0-10,000 ppm (standard)
- **GG-H2-EC-2,000-EXP** | 0-2,000 ppm

---

New

<table>
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<tr>
<th>Sensor</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG-H2-EC-10,000</td>
<td>Electrochemical hydrogen sensor for 0-10,000 ppm</td>
<td>$935</td>
</tr>
<tr>
<td>GG-H2-EC-2,000</td>
<td>Electrochemical hydrogen sensor for 0-2,000 ppm</td>
<td></td>
</tr>
<tr>
<td>GG-H2-EC-10,000-ST</td>
<td>Stainless Steel Enclosure</td>
<td>$1,135</td>
</tr>
<tr>
<td>GG-H2-EC-2,000-ST</td>
<td>Stainless Steel Enclosure</td>
<td></td>
</tr>
<tr>
<td>GG-H2-EC-10,000-DM</td>
<td>Duct Mount</td>
<td>$1,145</td>
</tr>
<tr>
<td>GG-H2-EC-2,000-DM</td>
<td>Duct Mount</td>
<td></td>
</tr>
<tr>
<td>GG-H2-EC-10,000-EXP</td>
<td>Explosion proof enclosure</td>
<td>$1,230</td>
</tr>
<tr>
<td>GG-H2-EC-2,000-EXP</td>
<td>Explosion proof enclosure</td>
<td></td>
</tr>
</tbody>
</table>

---

920 N Trade Winds Pkwy, Columbia, MO 65201  866-394-5861  www.CTiengineering.com  sales@CTIengineering.com
HYDROGEN SULFIDE SENSORS

Diffusion-style sensors for many applications. 2 year warranty on all sensors.

GG-H2S

GG-H2S-50 | 0-50 ppm (standard) $935

GG-H2S with Stainless Steel Enclosure
18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

GG-H2S-50-ST $1,135

GG-H2S with Duct Mount
Includes Duct Mount hardware and polycarbonate enclosure for hydrogen sulfide detection in ventilation ducts.

GG-H2S-50-DM $1,145

GG-H2S-EXP
Explosion proof enclosure for hazardous areas (Class 1, Div 1, Groups B, C, & D). Hydrogen Sulfide specific electrochemical sensor, 0-50 ppm. Electronics potted to eliminate internal corrosion. Industry standard linear 4/20 mA output. Power Requirements +24vdc, 50 mA.

GG-H2S-50-EXP | 0-50 ppm (standard) $1,230

New
Nitrogen Dioxide Sensors

Diffusion-style sensors for many applications. 2 year warranty on all sensors.

**GG-NO2-B**

**GG-NO2-B-10 | 0-10 ppm (standard)**

$935

**GG-NO2-B with Stainless Steel Enclosure**
18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

**GG-NO2-B-10 ST**

$1,135

**GG-NO2-B with Duct Mount**
Includes Duct Mount hardware and polycarbonate enclosure for nitrogen dioxide detection in ventilation ducts.

**GG-NO2-B-10-DM**

$1,145

**GG-NO2-EXP**
Explosion proof enclosure for hazardous areas (Class 1, Div 1, Groups B, C, & D). Nitrogen Dioxide specific electrochemical sensor, 0-10 ppm. Electronics potted to eliminate internal corrosion. Industry standard linear 4/20 mA output. Power Requirements +24vdc, 50 mA.

**GG-NO2-10-EXP | 0-10 ppm (standard)**

$1,230
Diffusion-style sensors for many applications. 2 year warranty on all sensors.

**GG-O2-C**
Electrochemical oxygen sensor, 0-25% and 15/25% ranges available. Gas specific electrochemical sensor technology. Circuit board is completely sealed in potting compound, protecting sensitive electronic components and copper tracing from corrosion. Weather, corrosion, and chemical resistant polycarbonate sensor enclosure. Industry standard linear 4/20 mA output. Power requirements: 24 VDC, 250 mA. ETL listed to UL and CSA standards.

- **GG-O2-C0** | 0-25% (standard)
- **GG-O2-C15** | 15-25%

**GG-O2-C with Stainless Steel Enclosure**
18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

- **GG-O2-C0-ST**
- **GG-O2-C15-ST**

**GG-O2-C with Duct Mount**
Includes Duct Mount hardware and polycarbonate enclosure for oxygen detection in ventilation ducts.

- **GG-O2-C0-DM**
- **GG-O2-C15-DM**
SULFUR DIOXIDE SENSORS

Diffusion-style sensors for many applications. 2 year warranty on all sensors.

GG-SO2
Electrochemical sulfur dioxide sensor, 0-20 ppm, environmentally adaptive heated polycarbonate enclosure. Gas specific electrochemical sensor technology. Circuit board is completely sealed in potting compound, protecting sensitive electronic components and copper tracing from corrosion. Weather, corrosion, and chemical resistant polycarbonate sensor enclosure. Industry standard linear 4/20 mA output. Power requirements: 24 VDC, 350 mA.

GG-SO2 20 | 0-20 ppm (standard)

GG-SO2 with Stainless Steel Enclosure
18 gauge, NEMA 3RX washdown duty 316 stainless enclosure, #3 finish, hinged lid, with captive screw.

GG-SO2 20-ST

GG-SO2 with Duct Mount
Includes Duct Mount hardware and polycarbonate enclosure for sulfur dioxide detection in ventilation ducts.

GG-SO2 20-DM

GG-SO2-EXP
Explosion proof enclosure for hazardous areas (Class 1, Div 1, Groups B, C, & D). Sulfur Dioxide specific electrochemical sensor, 0-20 ppm. Electronics potted to eliminate internal corrosion. Industry standard linear 4/20 mA output. Power Requirements +24vdc, 50 mA.

GG-SO2-EXP 20 | 0-20 ppm (standard)

New

GG-SO2-20-DM

GG-SO2-20-ST

GG-SO2-EXP

$935

$1,135

$1,145

$1,230
## Replacement Cells and Sensor Elements

CTI replacement cells and sensor elements. 2-year warranty on all elements.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG-NH3-RC</td>
<td>Replacement extended life electrochemical cell for ammonia sensor model GG-NH3; also compatible with ECF2 / ECF9 / ECFX transmitters</td>
<td>$300</td>
</tr>
<tr>
<td>GG-NH3-HR-RC</td>
<td>Replacement extended life high-range (0-1,000 ppm) electrochemical cell for ammonia sensor model GG-NH3; also compatible with ECF2 / ECF9 / ECFX transmitters</td>
<td>$300</td>
</tr>
<tr>
<td>GG-O2-RC-SP1</td>
<td>Replacement electrochemical cell for oxygen sensor model GG-O2-SP1</td>
<td>$270</td>
</tr>
<tr>
<td>GG-O2-C-RC</td>
<td>Replacement electrochemical cell for oxygen sensor model GG-O2-C (ranges 0-25% and 15-25%)</td>
<td>$270</td>
</tr>
<tr>
<td>GG-CO-RC</td>
<td>Replacement electrochemical cell for carbon monoxide sensor model GG-CO</td>
<td>$304</td>
</tr>
<tr>
<td>GG-Cl2-B-RC</td>
<td>Replacement electrochemical cell for chlorine sensor models GG-CL2-B, and GG-CL2</td>
<td>$304</td>
</tr>
<tr>
<td>GG-H2S-RC</td>
<td>Replacement electrochemical cell for hydrogen sulfide sensor model GG-H2S</td>
<td>$304</td>
</tr>
<tr>
<td>GG-NO2-B-RC</td>
<td>Replacement electrochemical cell for nitrogen dioxide sensor model GG-NO2-B, GG-NO2, and EC-F2-NO2</td>
<td>$304</td>
</tr>
<tr>
<td>GG-H2-EC-RC</td>
<td>Replacement electrochemical cell for hydrogen sensor model GG-H2-EC (ranges 0-2,000 and 0-10,000 ppm)</td>
<td>$304</td>
</tr>
<tr>
<td>GG-SO2-RC</td>
<td>Replacement electrochemical cell for sulfur dioxide sensor model GG-SO2</td>
<td>$304</td>
</tr>
<tr>
<td>GG-NH3-2%-RS</td>
<td>Replacement catalytic bead sensor for ammonia sensor model GG-NH3-2% and GG-NH3-1%</td>
<td>$304</td>
</tr>
<tr>
<td>GG-H2-1%-RS</td>
<td>Replacement catalytic bead sensor for hydrogen sensor model GG-H2-1%</td>
<td>$304</td>
</tr>
<tr>
<td>EC-F2-NH3-RC</td>
<td>Replacement electrochemical cell for ammonia</td>
<td>$304</td>
</tr>
<tr>
<td>SS-NH3-RS</td>
<td>Replacement solid-state sensor for ammonia</td>
<td>$195</td>
</tr>
<tr>
<td>GG-VL-NH3-RS</td>
<td>Replacement vent line sensor for ammonia sensor model GG-VL-NH3</td>
<td>$195</td>
</tr>
<tr>
<td>GG-VL-R-RS</td>
<td>Replacement vent line sensor for refrigerant sensor models GG-VL-Rxxx</td>
<td>$195</td>
</tr>
</tbody>
</table>
## Replacement Cells and Sensor Elements

CTI replacement cells and sensor elements. 2-year warranty on all elements

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG-VL2-NH3-RS</td>
<td>Replacement vent line sensor for ammonia sensor model GG-VL2-NH3</td>
<td>$370</td>
</tr>
<tr>
<td>GG-NH3-2%-EXP-RS</td>
<td>Replacement explosion-proof catalytic bead sensor for ammonia sensor model GG-NH3-2%-EXP</td>
<td>$410</td>
</tr>
<tr>
<td>GG-LEL2-NH3-RS</td>
<td>Replacement explosion-proof catalytic bead sensor for combustible LEL sensor model GG-LEL2-NH3 (ammonia only)</td>
<td>$410</td>
</tr>
<tr>
<td>GG-LEL2-RS</td>
<td>Replacement explosion-proof catalytic bead sensor for combustible LEL sensor model GG-LEL2 (all gases excluding ammonia)</td>
<td>$410</td>
</tr>
<tr>
<td>GG-NH3-RC-EXP</td>
<td>Replacement explosion-proof electrochemical cell for ammonia sensor model GG-NH3-EXP</td>
<td>$369</td>
</tr>
<tr>
<td>GG-CO-RC-EXP</td>
<td>Replacement explosion-proof electrochemical cell for carbon monoxide sensor model GG-CO-EXP</td>
<td>$410</td>
</tr>
<tr>
<td>GG-CL2-RC-EXP</td>
<td>Replacement explosion-proof electrochemical cell for chlorine sensor model GG-CL2-EXP</td>
<td>$410</td>
</tr>
<tr>
<td>GG-H2-EC-RC-EXP</td>
<td>Replacement explosion-proof electrochemical cell for hydrogen sensor model GG-H2-EC-EXP (ranges 0-2,000 and 0-10,000 ppm)</td>
<td>$410</td>
</tr>
<tr>
<td>GG-H2S-RC-EXP</td>
<td>Replacement explosion-proof electrochemical cell for hydrogen sensor model GG-H2S-EXP</td>
<td>$410</td>
</tr>
<tr>
<td>GG-NO2-RC-EXP</td>
<td>Replacement explosion-proof electrochemical cell for nitrogen dioxide sensor model GG-NO2-EXP</td>
<td>$410</td>
</tr>
<tr>
<td>GG-SO2-RC-EXP</td>
<td>Replacement explosion-proof electrochemical cell for nitrogen dioxide sensor model GG-SO2-EXP</td>
<td>$410</td>
</tr>
<tr>
<td>CGT-F2-H2-RS</td>
<td>Replacement catalytic bead sensor element for hydrogen combustible sensor White, yellow and pink wires (pre-2004 transmitter)</td>
<td>$304</td>
</tr>
<tr>
<td>GG-LEL-NH3-RS</td>
<td>Replacement catalytic bead sensor for ammonia sensor model GG-LEL-NH3</td>
<td>$304</td>
</tr>
<tr>
<td>GG-LEL-CH4-RS</td>
<td>Replacement catalytic bead sensor for methane sensor model GG-LEL-CH4</td>
<td>$304</td>
</tr>
<tr>
<td>GG-LEL-H2-RS</td>
<td>Replacement catalytic bead sensor for hydrogen sensor model GG-LEL-H2</td>
<td>$304</td>
</tr>
</tbody>
</table>
Certified Calibration Gas

Calibration kits and gas work with most manufacturers’ gas sensors. N.I.S.T traceable. Custom mixes available.

**Cal Kit 17L**

Calibration Kit includes regulator for 17 liter bottles, tubing, calibration cups to fit all CTI sensors, and rugged carrying case that holds two bottles (gas not included).

**17 Liter Bottle, 240 psi**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB17L-NH3/25</td>
<td>25 ppm ammonia (air balance)</td>
<td>$99</td>
</tr>
<tr>
<td>RB17L-NH3/50</td>
<td>50 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-NH3/100</td>
<td>100 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-NH3/150</td>
<td>150 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-NH3/250</td>
<td>250 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-NH3/300</td>
<td>300 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-NH3/500</td>
<td>500 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-NH3/1000</td>
<td>1000 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-NH3/1%</td>
<td>1.0% ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-NH3/2%</td>
<td>2.0% ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CO2/500</td>
<td>500 ppm carbon dioxide (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CO2/1%</td>
<td>1.0% carbon dioxide (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CO2/3%</td>
<td>3.0% carbon dioxide (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CO2/5%</td>
<td>5.0% carbon dioxide (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CO2/15%</td>
<td>15% oxygen (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CO2/20.9%</td>
<td>20.9% oxygen (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-N2</td>
<td>100% nitrogen</td>
<td></td>
</tr>
<tr>
<td>RB17L-ZA</td>
<td>Zero air (20.9% O2, N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CO/50</td>
<td>50 ppm carbon monoxide (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CO/200</td>
<td>200 ppm carbon monoxide (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CH4/1.0%</td>
<td>1.0% methane (20%LEL) (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-CH4/2.5%</td>
<td>2.5% methane (50%LEL) (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-H2/2000</td>
<td>2000 ppm hydrogen (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-H2/1%</td>
<td>1.0% hydrogen (25%LEL) (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R22/500</td>
<td>500 ppm R22 (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R22/1000</td>
<td>1000 ppm R22 (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R22/3000</td>
<td>3000 ppm R22 (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R134a/500</td>
<td>500 ppm R134a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R134a/1000</td>
<td>1000 ppm R134a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R134a/3000</td>
<td>3000 ppm R134a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R404a/500</td>
<td>500 ppm R404a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R404a/1000</td>
<td>1000 ppm R404a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R404a/3000</td>
<td>3000 ppm R404a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R507a/500</td>
<td>500 ppm R507a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R507a/1000</td>
<td>1000 ppm R507a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-R507a/3000</td>
<td>3000 ppm R507a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB17L-ISOB/100</td>
<td>100 ppm Isobutylene (air balance)</td>
<td></td>
</tr>
</tbody>
</table>

**CK-REG-17L**

0.8 LPM valve/regulator with pressure gauge for 17L bottles. 3 ft Norprene tubing and calibration cups included for use with all CTI sensors.

920 N Trade Winds Pkwy, Columbia, MO 65201  866-394-5861  www.CTIengineering.com  sales@CTIengineering.com
CERTIFIED CALIBRATION GAS

Calibration kits and gas work with most manufacturers’ gas sensors. N.I.S.T traceable. Custom mixes available.

**Cal Kit 29L**
Calibration Kit includes regulator for 29 liter bottles, tubing, calibration cups to fit all CTI sensors, and rugged carrying case that holds two bottles (gas not included).

**29 Liter Bottle, 500 psi**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB29-L-NH3/25</td>
<td>25 ppm ammonia (air balance)</td>
<td>$199</td>
</tr>
<tr>
<td>RB29-L-NH3/50</td>
<td>50 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-NH3/100</td>
<td>100 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-NH3/150</td>
<td>150 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-NH3/250</td>
<td>250 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-NH3/300</td>
<td>300 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-NH3/500</td>
<td>500 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-NH3/1000</td>
<td>1000 ppm ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-NH3/1%</td>
<td>1.0% ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-NH3/2%</td>
<td>2.0% ammonia (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-CO2/500</td>
<td>500 ppm carbon dioxide (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-CO2/1%</td>
<td>1.0% carbon dioxide (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-CO2/3%</td>
<td>3.0% carbon dioxide (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-CO2/5%</td>
<td>5.0% carbon dioxide (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-O2/15%</td>
<td>15% oxygen (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-O2/20.9%</td>
<td>20.9% oxygen (N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-N2</td>
<td>100% Nitrogen</td>
<td></td>
</tr>
<tr>
<td>RB29-L-ZA</td>
<td>Zero air (20.9% O2, N2 balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-CO/50</td>
<td>50 ppm carbon monoxide (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-CO/200</td>
<td>200 ppm carbon monoxide (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-CH4/1%</td>
<td>1.0% methane (20%LEL)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-CH4/2.5%</td>
<td>2.5% methane (50%LEL)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-H2/1%</td>
<td>1.0% hydrogen (25%LEL)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R22/500</td>
<td>500 ppm R22 (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R22/1000</td>
<td>1000 ppm R22 (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R22/3000</td>
<td>3000 ppm R22 (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R134a/500</td>
<td>500 ppm R134a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R134a/1000</td>
<td>1000 ppm R134a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R134a/3000</td>
<td>3000 ppm R134a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R404a/500</td>
<td>500 ppm R404a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R404a/1000</td>
<td>1000 ppm R404a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R404a/3000</td>
<td>3000 ppm R404a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R507a/500</td>
<td>500 ppm R507a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R507a/1000</td>
<td>1000 ppm R507a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R507a/3000</td>
<td>3000 ppm R507a (air balance)</td>
<td></td>
</tr>
<tr>
<td>RB29-L-R4gas-B</td>
<td>25 ppm H2S, 100 ppm CO, 50% LEL CH4, 18% O2</td>
<td></td>
</tr>
</tbody>
</table>

**CK-REG-29L**
0.8 LPM valve/regulator with pressure gauge for 29L & 58L bottles. 3 ft Norprene tubing and calibration cups included for use with all CTI sensors.

**CK-CUP & HOSE**
3 ft Norprene tubing and two sensor adaptors to fit all CTI sensors.
Getting Started
The first step in sensor calibration is obtaining a calibration kit. The calibration kit includes the regulator for attaching to the bottle, the tubing needed to transfer the gas, and the calibration cups. The calibration cups connect to the sensors and are necessary to provide an exact known concentration to the sensor, without dilution from outside air. There are two kit sizes to choose from (17L & 29L), and each kit has connections for their respective size.

Choosing a Bottle Size

The 17L bottle holds 17 liters of gas at around 240 PSI. For sensor calibration, **one 17L bottle will calibrate 7-10 sensors.** The primary use for 17L bottles is for systems using only a few sensors at specific ranges, where the excess gas that a 29L bottle provides is unnecessary.

The 29L bottle holds 34 liters of gas at around 500 PSI. For sensor calibration, **one 29L bottle will calibrate 15-20 sensors.** The primary use for 29L bottles is for systems that have a large amount of sensors with the same range. For example, a detection system using 12 NH3 detectors with a range of 0-100 ppm can be calibrated with one 29L bottle, rather than two 17L bottles.

Selecting the proper calibration gas and concentration
CTI offers a variety of detectors for different target gases. In order to choose the correct calibration gas it is necessary to know the target gas, and the range of the detector being calibrated. For example, the GG-NH3 with a range of 0-100 ppm (GG-NH3-100) will have a taget gas of NH3, and a range of 0-100 ppm. For calibration purposes, choose the gas that matches the upper range of the detector. In this instance it would be 100 ppm NH3 (RB17L-NH3/100 or RB29L-NH3/100) with a span calibration target of 200 mVdc.

Calibration gas can also be used to calibrate at less than the full-scale of the detector, but it is usually not recommended to calibrate at less than half-scale. For example, if there is only 100 ppm NH3 on hand, but a 0-200 ppm NH3 sensor needs calibration, the sensor can be calibrated to half-scale with a span calibration target of 120 mVdc. However, 100 ppm NH3 should not be used to calibrate a sensor with a range of 0-500 ppm.

Zero Calibration
CTI gas detectors have various target gases and resting signals in clean air. Some gases are found in clean air, such as Carbon Dioxide, in which case you will need to calibrate the zero signal. Other gases such as Hydrogen, do not have a scent, so zero gas is necessary to ensure there is not already gas present. Gases such as NH3 are not found in clean air but do have an odor even a very low levels, so zero gas is unnecessary. If a background target gas is detected, then zero air gas may be needed to calibrate the zero signal.

Span Calibration
For span calibration of CTI detectors, please reference the manuals included with the sensors at purchase, or available online at the specific product pages, or downloads page. A quick reference guide has been provided on the following page. For any remaining questions, please contact CTI.
**CALIBRATION GAS SELECTION**

Use the table below to select the proper calibration gas for CTI detectors.

<table>
<thead>
<tr>
<th>Sensor Model</th>
<th>Sensor Part #</th>
<th>Sensor Range</th>
<th>Zero Gas used (part #)</th>
<th>Zero target (mVdc)</th>
<th>Span gas used (part #)</th>
<th>Span target (mVdc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG-NH3</td>
<td>GG-NH3-100</td>
<td>0-100 ppm</td>
<td>*Clean air</td>
<td>40</td>
<td>RB17L-NH3/100</td>
<td>200</td>
</tr>
<tr>
<td>GG-NH3</td>
<td>GG-NH3-200</td>
<td>0-200 ppm</td>
<td>*Clean air</td>
<td>40</td>
<td>RB17L-NH3/200</td>
<td>200</td>
</tr>
<tr>
<td>GG-NH3</td>
<td>GG-NH3-250</td>
<td>0-250 ppm</td>
<td>*Clean air</td>
<td>40</td>
<td>RB17L-NH3/250</td>
<td>200</td>
</tr>
<tr>
<td>GG-NH3</td>
<td>GG-NH3-300</td>
<td>0-300 ppm</td>
<td>*Clean air</td>
<td>40</td>
<td>RB17L-NH3/300</td>
<td>200</td>
</tr>
<tr>
<td>GG-NH3</td>
<td>GG-NH3-500</td>
<td>0-500 ppm</td>
<td>*Clean air</td>
<td>40</td>
<td>RB17L-NH3/500</td>
<td>200</td>
</tr>
<tr>
<td>GG-NH3</td>
<td>GG-NH3-1000</td>
<td>0-1000 ppm</td>
<td>*Clean air</td>
<td>40</td>
<td>RB17L-NH3/1000</td>
<td>200</td>
</tr>
<tr>
<td>GG-NH3-1%</td>
<td>GG-NH3-1%</td>
<td>0-1%</td>
<td>*Clean air</td>
<td>40</td>
<td>RB17L-NH3/1%</td>
<td>200</td>
</tr>
<tr>
<td>GG-NH3-2%</td>
<td>GG-NH3-2%</td>
<td>0-2%</td>
<td>*Clean air</td>
<td>40</td>
<td>RB17L-NH3/2%</td>
<td>200</td>
</tr>
<tr>
<td>GG-VL-NH3</td>
<td>GG-VL-NH3</td>
<td>0-1%</td>
<td>*Clean air</td>
<td>40</td>
<td>Response check</td>
<td>N/A</td>
</tr>
<tr>
<td>GG-VL2-NH3</td>
<td>GG-VL2-NH3</td>
<td>0-1%</td>
<td>*Clean air</td>
<td>40</td>
<td>RB17L-NH3/1%</td>
<td>200</td>
</tr>
<tr>
<td>GG-CO2</td>
<td>GG-CO2-1%</td>
<td>0-1%</td>
<td>RB17L-CO2/500</td>
<td>48</td>
<td>RB17L-CO2/1%</td>
<td>200</td>
</tr>
<tr>
<td>GG-CO2</td>
<td>GG-CO2-3%</td>
<td>0-3%</td>
<td>RB17L-CO2/500</td>
<td>42.7</td>
<td>RB17L-CO2/3%</td>
<td>200</td>
</tr>
<tr>
<td>GG-CO2</td>
<td>GG-CO2-5%</td>
<td>0-5%</td>
<td>RB17L-CO2/500</td>
<td>41.6</td>
<td>RB17L-CO2/5%</td>
<td>200</td>
</tr>
<tr>
<td>GG-CO</td>
<td>GG-CO-200</td>
<td>0-200 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-CO/200</td>
<td>200</td>
</tr>
<tr>
<td>GG-O2-C</td>
<td>GG-O2-C0</td>
<td>0-25%</td>
<td>RB17L/N2</td>
<td>40</td>
<td>RB17L-O2/20.9%</td>
<td>173.7</td>
</tr>
<tr>
<td>GG-O2-C</td>
<td>GG-O2-C15</td>
<td>15-25%</td>
<td>RB17L-O2/15%</td>
<td>40</td>
<td>RB17L-O2/20.9%</td>
<td>134.4</td>
</tr>
<tr>
<td>GG-O2-SP1</td>
<td>GG-O2-SP1</td>
<td>0-25%</td>
<td>RB17L/N2</td>
<td>40</td>
<td>RB17L-O2/20.9%</td>
<td>173.7</td>
</tr>
<tr>
<td>GG-H2-EC</td>
<td>GG-H2-EC-10000</td>
<td>0-10,000 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-H2/1%</td>
<td>200</td>
</tr>
<tr>
<td>GG-H2-1%</td>
<td>GG-H2-1%</td>
<td>0-10,000 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-H2/1%</td>
<td>200</td>
</tr>
<tr>
<td>GG-H2S</td>
<td>GG-H2S-50</td>
<td>0-50 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>*RB34L-H2S/50</td>
<td>200</td>
</tr>
<tr>
<td>GG-NO2-B</td>
<td>GG-NO2-B-10</td>
<td>0-10 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>*RB34L-NO2/10</td>
<td>200</td>
</tr>
<tr>
<td>GG-CL2-B</td>
<td>GG-CL2-B-5</td>
<td>0-5 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>Chlorine Generator</td>
<td>200</td>
</tr>
<tr>
<td>GG-SO2</td>
<td>GG-SO2-20</td>
<td>0-20 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB29L-SO2/20</td>
<td>200</td>
</tr>
<tr>
<td>GG-R</td>
<td>GG-R22-500</td>
<td>0-500 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-R22/500</td>
<td>200</td>
</tr>
<tr>
<td>GG-R</td>
<td>GG-R22-3000</td>
<td>0-3000 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-R22/3000</td>
<td>200</td>
</tr>
<tr>
<td>GG-R</td>
<td>GG-R134a-500</td>
<td>0-500 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-R134a/500</td>
<td>200</td>
</tr>
<tr>
<td>GG-R</td>
<td>GG-R134a-3000</td>
<td>0-3000 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-R134a/3000</td>
<td>200</td>
</tr>
<tr>
<td>GG-R</td>
<td>GG-R507a-500</td>
<td>0-500 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-R507a/500</td>
<td>200</td>
</tr>
<tr>
<td>GG-R</td>
<td>GG-R507a-3000</td>
<td>0-3000 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-R507a/3000</td>
<td>200</td>
</tr>
<tr>
<td>GG-R</td>
<td>GG-R404a-500</td>
<td>0-500 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-R404a/500</td>
<td>200</td>
</tr>
<tr>
<td>GG-R</td>
<td>GG-R404a-3000</td>
<td>0-3000 ppm</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-R404a/3000</td>
<td>200</td>
</tr>
<tr>
<td>GG-VL-R</td>
<td>GG-VL-R22</td>
<td>0-1%</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>Response Check</td>
<td>N/A</td>
</tr>
<tr>
<td>GG-VL-R</td>
<td>GG-VL-R134a</td>
<td>0-1%</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>Response Check</td>
<td>N/A</td>
</tr>
<tr>
<td>GG-VL-R</td>
<td>GG-VL-R507a</td>
<td>0-1%</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>Response Check</td>
<td>N/A</td>
</tr>
<tr>
<td>GG-VL-R</td>
<td>GG-VL-R404a</td>
<td>0-1%</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>Response Check</td>
<td>N/A</td>
</tr>
<tr>
<td>GG-LEL</td>
<td>GG-LEL-CH4</td>
<td>0-100% LEL</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-CH4/1%</td>
<td>72</td>
</tr>
<tr>
<td>GG-LEL</td>
<td>GG-LEL-H2</td>
<td>0-100% LEL</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-CH4/1%</td>
<td>82</td>
</tr>
<tr>
<td>GG-LEL2</td>
<td>GG-LEL2-C2H6</td>
<td>0-100% LEL</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-CH4/2.5%</td>
<td>139</td>
</tr>
<tr>
<td>GG-LEL2</td>
<td>GG-LEL2-C2H4</td>
<td>0-100% LEL</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-CH4/2.5%</td>
<td>168</td>
</tr>
<tr>
<td>GG-LEL2</td>
<td>GG-LEL2-H2</td>
<td>0-100% LEL</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-CH4/2.5%</td>
<td>111</td>
</tr>
<tr>
<td>GG-LEL2</td>
<td>GG-LEL2-CH4</td>
<td>0-100% LEL</td>
<td>RB17L/ZA</td>
<td>40</td>
<td>RB17L-CH4/2.5%</td>
<td>120</td>
</tr>
</tbody>
</table>

*Clean air for ammonia sensors refers to the absence of ammonia odor in the area of the sensor.

*34L bottles are used because of the corrosiveness of the gas. 34L bottles use the same regulator as 29L bottles.
ACCESSORIES | LIGHTING

Lighting for use with gas detection systems.

**SHA-24**
Horn/Strobe, 24 VDC. Weatherproof enclosure for washdown and outdoor locations. Separate horn and strobe circuits allow for multiple wiring configurations. High intensity flash with field selectable buzzer tones. All units labeled “Ammonia” unless otherwise specified. Our best selling wet-weather horn/strobe.

- SHA-24-Blue
- SHA-24-Amber
- SHA-24-Red
- SHA-24-Clear

$185

**SHA-120**
Horn/Strobe, 120 VAC. Weatherproof housing and backplate for outdoor locations. Horn and strobe trigger simultaneously. High intensity flash with field selectable buzzer tones. All units labeled “Ammonia” unless otherwise specified.

- SHA-120-Blue
- SHA-120-Amber
- SHA-120-Red
- SHA-120-Green
- SHA-120-Clear

$185

**SHA-PAX-110dB**
Horn/Strobe, 110dB, 120VAC or 24VDC. Weatherproof housing for washdown and outdoor locations. Horn and strobe trigger simultaneously or independently. 110dB horn and 80 field selectable tones. All units labeled “Ammonia” unless otherwise specified.

24VDC
- SHA-PAX-110-24-Blue
- SHA-PAX-110-24-Amber
- SHA-PAX-110-24-Red

120VAC
- SHA-PAX-110-120-Blue
- SHA-PAX-110-120-Amber
- SHA-PAX-110-120-Red

$525

**StackLight 24VDC**
24 VDC stacklight assembly with 100 dB buzzer. LED technology for zero maintenance. 1/2” conduit mount adaptor. All light modules flash (except green light) for high visibility. Weatherproof for indoor/outdoor mounting. Custom configurations available.

- SLF-24-R-B
- SLF-24-AR-B
- SLF-24-GAR-B
- SLF-24-BWAR-B

$485
$645
$805
$965

**StackLight 120VAC**
120 VAC stacklight assembly with 100 dB buzzer. LED technology for zero maintenance. 1/2” conduit mount adaptor. All light modules flash (except green light) for high visibility. Weatherproof for indoor/outdoor mounting. Custom configurations available.

- SLF-120-R-B
- SLF-120-AR-B
- SLF-120-GAR-B
- SLF-120-BWAR-B

$600
$835
$1,070
$1,305
The purpose of audible and visual alarm devices for leak detection is to notify plant personnel of an elevated target gas, or a depletion of, in the facility. Actions by plant personnel will be based on the facility’s safety protocol. Other uses for horn/strobes could be weather, fire, or operation/equipment-based notifications.

**Required**

In machinery rooms, audible and visual alarm devices (horn/strobes) shall be provided inside the room to warn that, when the alarm has activated, access to the room is restricted to authorized personnel and emergency responders. Additional horn/strobes shall be located outside of each entrance to the machinery room. The audible alarms shall provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level and 5 dBA above the maximum sound level of the area in which it is installed. Ammonia leak detection alarms shall be identified by signage adjacent to the horn/strobes.

**Recommended**

In refrigerated spaces and areas other than machinery rooms, horn/strobes should be mounted in a location in which luminosity is visible and horn(s) are audible to all personnel occupying any given space in a room. These same units could have an increased effectiveness if they are visible to personnel at entryways to the affected area. Plant personnel should determine what locations and lens colors are most effective for their facility. As a general guideline, a single horn/strobe with a candela intensity of 60cd should effectively provide enough notification (unobstructed) to a 1600ft² area – room or corridor. In non-square room configurations, subdivide any offsets and treat them as a separate area in need of audible and visual alarms. Locate horn/strobes no greater than 150 horizontal feet apart on a single wall in a single room. Considerations for physical mounting locations: 80 to 96 inches above the floor where ceiling heights allow or close to the ceiling as to provide a reflective surface to further increase the effective visual noticeability. If ceiling heights are greater than 30ft, then mounting of horn/strobes can be around 30ft from the finished floor if deemed effective. Signage should be used to identify the horn/strobe.

**Sources:**
- ANSI / IIAR-2 2014
- Chapter 17 Ammonia Detection and Alarms
- NFPA 72-2016
- 18.5.5 Appliance Location

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**Lighting codes and recommendations.**

The purpose of audible and visual alarm devices for leak detection is to notify plant personnel of an elevated target gas, or a depletion of, in the facility. Actions by plant personnel will be based on the facility's safety protocol. Other uses for horn/strobes could be weather, fire, or operation/equipment-based notifications.
ACCESSORIES

Accessorize your gas detection system with these popular items.

**SB-EVI**
Emergency Ventilation Tamper-proof push-button switch, 1.5A 24VDC/120VAC NC and NO contacts, mounting plate. IP66/NEMA 4 polycarbonate enclosure safe for outdoors and washdown areas.

**SB-ES1**
Emergency Stop Tamper-proof push-button switch, 1.5A 24VDC / 120VAC NC and NO contacts, mounting plate. IP66/NEMA 4 polycarbonate enclosure safe for outdoors and washdown areas.

**SB-EPCS1**
Emergency Pressure Control Tamper-proof push-button switch, 1.5A 24VDC/120VAC NC and NO contacts, mounting plate. IP66/NEMA 4 polycarbonate enclosure safe for outdoors and washdown areas.

**SB-VS1**
Emergency Ventilation ON/AUTO Tamper-Proof selector switch, 10A dry contacts 24VDC/120VAC, mounting plate. IP66/NEMA 4 polycarbonate enclosure safe for outdoors and washdown areas.

**SB-R1**
Reset switch, 1.5A NO contacts, LED ring, mounting plate, 24VDC. IP66/NEMA 4 polycarbonate enclosure safe for outdoors and washdown areas. For use with GG-6 controller remote reset function.

**SB-SR1**
Silence & Reset switches, 1.5A NO contacts, LED rings, mounting plate, 24VDC. IP66/NEMA 4 polycarbonate enclosure safe for outdoors and washdown areas. For use with GG-6 remote silence/reset function.

**ESC-1**
Equipment Safety Cage. Designed to be mounted over sensor with attached relay module and conduit. Protects equipment from damage by fork lifts and other machinery while also providing access for maintenance.

**RM420-LR**
Relay Module, 4/20 mA feed-through design maintains signal output function while providing relay output with dry contacts. Connects to GG sensor enclosures. LR rigid conduit body allows for outdoor or wash-down installation.
ACCESSORIES

Accessorize your gas detection system with these popular items.

**Instrumentation Cable**
3-conductor, shielded, stranded cable, 300Vrms, PVC jacket, with copper drain wire. Minimum order 100 ft. Maximum spool size 1000 ft.

- **Cable-GC-20/3**
  - 20 AWG, General Cable C2525A (Belden equivalent).
  - $0.45/ft

- **Cable-GC-18/3**
  - 18 AWG, General Cable C2535A (Belden equivalent).
  - $0.50/ft

- **Cable-BE-20/3**
  - 20 AWG, Belden 8772.
  - $1.10/ft

- **Cable-BE-18/3**
  - 18 AWG, Belden 8770.
  - $1.25/ft

**GG-6-APS**
Auxiliary 6.5A, 24VDC power supply for the GG-6 controller. Includes mounting bracket and wire leads. Designed to handle the power requirements of multiple horn/strobe installations.

- $245

**GG-EM-PS**
Add-on power supply for the GG-EM. Bolts inside the GG-EM enclosure. 110 VAC input. 24 VDC, 0.625 A output. Provides DC power for GG-EM, gas sensor, and up to two Horn/Strobes.

- $145

**PS-24-3200**
Power Supply, 24 VDC, 3.2 Amp, NEMA 4X polycarbonate enclosure. 7” x 5” x 2.2” deep. 110 VAC-220 VAC input.

- $235

**PS-24-6500**
Power Supply, 24 VDC, 6.5 Amp, NEMA 12 powder-coated steel enclosure. 12” x 6” x 4” deep. 110 VAC input.

- $354

**UPS-1000VA-LCD**
1000 VA uninterruptible power supply with status and diagnostics LCD. Maintains power to gas detection system during power fluctuations and brief outages.

- $199

**AD-400**
Auto phone Dialer with 4 contact closure inputs, 1 relay output, temperature sensor, AC power monitor. Dials up to 4 phone numbers.

- $695

**Temp Sensor TS2**
Temperature sensor for ranges -60°F to +160°F (-51°C to +71°C). 2-wire transmitter with RTD probe easily adapts to CTI controllers. Watertight enclosure designed for washdown areas and outdoors. Industry standard linear 4/20 mA output. Power requirements: 24 VDC, 25 mA.

- $295
PORTABLE GAS DETECTION

Single and multi-gas portable gas detectors. 1 year warranty on all models.

**NH3 Responder**
Portable ammonia monitor (0 to 150,000 ppm NH3). Specially configured BW Micro5PID portable ammonia detector with two sensor technologies to cover NH3 response ranges. VOC photo-ionization 0-1000 ppm NH3, LEL 3-100%LEL NH3. Includes integral motorized sampling pump, sampling wand, tubing, AA battery pack, spare AA battery set, manual, and rugged carrying case.

**M5-RBC**
Rechargeable lithium polymer battery and charging cradle

**CO2 Responder**
Portable carbon dioxide monitor (0 to 50,000 ppm CO2). Infrared sensor technology. Range 0-5% Carbon Dioxide. BW Micro5IR platform. Includes integral motorized pump, AA battery pack, spare AA battery set, hose, wand, manual, and rugged carrying case.

**M5-RBC**
Rechargeable lithium polymer battery and charging cradle

**4-Gas Responder**
Portable 4-Gas monitor for detection of CO, H2S, O2, and LEL. Detection ranges of 0-30% O2, 0-500 ppm CO, 0-500 ppm H2S, and 0-100% LEL. BW Micro5 platform. Includes integral motorized pump, AA battery pack, spare AA battery set, hose, wand, manual and rugged carrying case.

**M5-RBC**
Rechargeable lithium polymer battery and charging cradle

**BW-GAXT-A2-DL**
GasAlert Extreme portable ammonia detector, range 0-400 ppm, with datalogger capability (IR datalink USB adaptor required). Compact design and alligator clip make this unit easy to wear.

**BW-MCXL**
GasAlert MicroClip XL portable confined space monitor. Detects Oxygen (O2), Carbon Monoxide (CO), Hydrogen Sulfide (H2S), & Combustibles (LEL).

**BW-MCXL-CSEK**
GasAlert MicroClip XL portable confined space monitor with confined space entry kit. Kit includes calibration gas, carrying case, 0.8 lpm regulator, and 3ft tubing.
## Portable Gas Detection

Replacement sensor elements for portable gas detectors. 1 year warranty.

### NH3 Responder Replacement Cells
- **BW-M5-PID-RS**
  - Replacement PID sensor 0-1,000 ppm. BW p/n SR-Q07
  - $850
- **BW-M5-ES**
  - Replacement PID sensor Electrode Stack, kit of 2. BW p/n M5PID-ES-1
  - $35
- **BW-GA-LEL-RS**
  - Replacement LEL sensor 0-100% LEL. BW p/n SR-W04
  - $170

### CO2 Responder Replacement Cell
- **BW-M5-CO2-RS**
  - Replacement CO2 IR sensor 0-5%. BW p/n SR-B04
  - $1,000

### 4-Gas Responder Replacement Cells
- **BW-M5-TwinTox-RC**
  - Replacement Duo-Tox cell, CO and H2S. BW p/n D4-RHM04
  - $350
- **BW-GA-LEL-RS**
  - Replacement LEL sensor 0-100% LEL. BW p/n SR-W04
  - $170
- **BW-O2-RC**
  - Replacement Oxygen cell. BW p/n SR-X2V
  - $165

### GasAlert Extreme Replacement Cell
- **BW-GAXT-A2-RC**
  - Replacement ammonia cell 0-400 ppm. BW p/n SR-A204
  - $350

### GasAlert MicroClip XL Replacement Cells
- **BW-MCXL-LEL-RC**
  - Replacement combustible (%LEL) sensor. BW p/n SR-W-MP75C
  - $120
- **BW-O2-RC**
  - Replacement Oxygen cell. BW p/n SR-X2V
  - $165
- **BW-MCXL-H2S-RC**
  - Replacement Hydrogen Sulfide cell. BW p/n SR-H-MC
  - $120
- **BW-MCXL-CO-RC**
  - Replacement Carbon Monoxide cell. BW p/n SR-M-MC
  - $120
GG-6

**Key Features**
- Simultaneously monitor 6 sensors - up to 30 with expansion modules
- Six onboard relays standard – eight more relays per expansion module
- 3 alarm setpoints per channel, in addition to TWA & STEL alarms
- Alarm Log records and stores every event
- Industry standard linear 4-20 mA input
- Simple menu-driven programming through the LCD operator interface
- 6.5A power supply can be used to power many external horn/strobes
- Watertight enclosure designed for washdown areas and outdoors
- Horn relay silenceable from front-panel Silence key
- TWA and STEL time-weighted averaging with alarm setpoints

**Applications**
- Engine Rooms
- Tank Rooms
- Mechanical Rooms
- Sea Vessels
- Refrigeration Systems
- Perimeter Monitoring
- Heat Treatment
- Refineries
- Chemical Plants

**Benefits**
- Full-featured
- Expandable
- Easy configuration

The GG-6 can interface to, but operate independently of plant control systems for a reliable stand-alone safety system. The GG-6 comes standard with six onboard relays, as well as an onboard buzzer. One relay is a dedicated programmable horn relay, the other five relays are user programmable to trigger upon any event for any sensor or group of sensors.

The GG-XM expansion module accommodates an additional eight sensors for each module, and up to three modules for a total of 30 sensors. Each GG-XM comes equipped with eight 4-20 mA inputs, eight programmable relays, and its own power supply. Analog output boards can be added on to the controller and expansion modules, and can be connected to your plant PLC or other 4-20 mA control panel.

The watertight fiberglass reinforced enclosure will stand up to corrosive washdown, temperature swings, and any other harsh environment encountered in the food industry. The GG-XM’s connect to the GG-6 and/or each other via a 24” wire harness. Since the alarm log holds 10,000 events, yesterday’s events will not go unnoticed.
The GG-6 controller utilizes a user-friendly LCD operator interface for all readout information and alarm function control. Out of the box, the controller and expansion modules are configured with default setpoints loaded in the software. Easily enter the zone location names and adjust alarm setpoints as necessary.

The backlit LCD displays real-time status of gas sensor concentrations and allows for custom programming via a user-friendly menu system. The GG-6 and expansion modules are compatible with all gas sensors with industry standard 4-20 mA inputs. The power supplies are powerful enough to power all connected sensors and external 24Vdc horn/strobes.

All wiring is safely enclosed inside and easily accessed from the hinged lids. Each expansion module connects to the GG-6 in a daisy-chain configuration. Wiring is simply plugging in a wiring harness. All human interfacing is performed via the waterproof membrane keys on the outside of the GG-6, for non-intrusive operation.

**Ordering Information**

The GG-6 is delivered ready to install. Use either the default setpoints or choose your own. Use the model numbers below to order.

**Order #:**

- **GG-6** (does not include sensors). Six channel controller includes LCD operator interface, power supply, and 6 relay outputs.
- **GG-XM** (does not include sensors). Eight channel expansion module includes power supply and 8 relay outputs.

**Options:**

- **GG-6AOB** (Six channel analog output board)
- **GG-XM0AB** (Eight channel analog output board)
- **GG-6APS** (Auxiliary 24VDC power supply, 6.5A)
- **GG-6 Startup** (Contact us for details)
- **GG-6-GEM** (Ethernet, Modbus gateway module)
- **GG-6-GE** (Ethernet, EtherNet/IP gateway module)
- **GG-6-GE-B** (Ethernet, BACnet, gateway module)
- **GG-6-GR8** (RS-485, BACnet gateway module)
- **GG-6-GRM** (RS-485, Modbus gateway module)

6 channels, 14 channels, 22 channels or 30 channels. Get what you need now...expand later.

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**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change.

**Input Power Requirements:**

- 120/240 VAC, 3 A, 50/60 Hz (GG-6)
- 120/240 VAC, 3 A, 50/60 Hz (each add-on GG-XM)

**Output DC Power:**

- 24 VDC, 4 A (GG-6/GG-XM)

**Dimensions:**

- 15.8” high x 14” wide x 7” deep (GG-6/GG-XM)

**Weight:**

- 14 lbs (GG-6/GG-XM)

**Enclosure:**

- Fiberglass Reinforced Polyester NEMA 4X, IP 65, with neoprene gasket. Continuous stainless steel hinge. Captive screws in lid. For non-classified areas

**Temperature Range:**

- 0°F to +122°F (-18°C to +50°C)

**Humidity Range:**

- 0-95% Rh condensing (100% intermittent), with proper conduit seals

**Relay Outputs:**

- (6) Programmable Relays
  - Programmable to trigger upon any event for any sensor or group of sensors

**GG-XM (Eight Relays)**

- (8) Programmable Relays
  - Programmable to trigger upon any event for any sensor or group of sensors

**Analog Outputs:** (Optional)

- (6) Individual 4-20 mA outputs (GG-6)
- (8) Individual 4-20 mA outputs (GG-XM)

**Horn:**

- PCB mount Piezo buzzer (GG-6 only)

**Terminal Block Plugs:** (Field Wiring)

- 12-26 AWG, torque 4 lbs-in

**Controller Functions:**

- LCD, backlit, graphics display (GG-6 only)
- 8 lines x 22 characters, Waterproof membrane switches, alpha-numeric keys, Non-volatile memory

- Real-Time Status Display: Displays gas concentrations and any current alarm conditions, TWA / STEL trending selectable

- Adjustable Warning, Alarm 1, Alarm 2, TWA and STEL Setpoints

- Alarm Log: Records and stores 10,000 events for easy recall

- Calibration Mode: Locks relay outputs for sensor calibration or maintenance

- Relay Test Function: Allows for easy testing of relay output functions

- Downscale Alarm Setting for Oxygen Monitoring

- Horn Silence Button Clears Horn Relay

**Certification:**

- ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12

**Warranty:**

- 2 years

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REV 20171213
Key Features

- Remote readout displays data sent from GG-6 controller
- Silenceable onboard buzzer provides audible alarm indication
- Continuous real-time sensor readings and alarm indicators
- Mirrors the display on the GG-6 controller
- MODBUS RTU protocol on RS-485
- Daisy-chain several together for multiple locations
- Powered by 24VDC from GG-6 controller
- Watertight enclosure designed for washdown areas and outdoors
- Can be installed up to 1,000’ from GG-6 controller

THE REMOTE DISPLAY SOLUTION FOR YOUR GG-6 GAS DETECTION SYSTEM.

The GG-RD is a remote display slave module designed to accept data from the GG-6 master controller. The GG-RD provides continuous real-time monitoring of each sensor via Modbus RTU protocol on RS-485 mirroring the GG-6 controller display.

The backlit LCD display provides an at-a-glance status of gas concentrations and alarms. An 80 dB buzzer on the front panel provides audible indication of any programmed event. Once the Modbus address is set, there are no user configurable settings on the GG-RD, as all other settings are configured on the GG-6 master controller.

The GG-RD is assembled into a wall mounted enclosure designed for non-classified locations, and can be installed outdoors and in washdown areas. The NEMA 4X fiberglass enclosure will stand up to corrosive washdown, temperature swings, and other harsh environments encountered in the food industry.

Applications

- Guard Shacks
- Maintenance and Refrigeration Offices
- Mechanical Room Entrances
- Anywhere a Remote Display is Needed

Benefits

- Economical
When only one GG-RD is installed, the model required is the GG-RD1. When two or more are being daisy-chained, one GG-RD1 is still required, but all other remote displays will need to be model GG-RD2. Think of the GG-RD1 as the end-of-line termination unit, with up to sixty GG-RD2 remote displays in between it and the GG-6 master controller.

The GG-RD series readouts utilize a user-friendly LCD operator interface for all readout and alarm information. The backlit LCD displays real-time status of gas sensor concentrations.

All wiring is safely enclosed inside and easily accessed from the hinged lid. All human interfacing is performed via the waterproof membrane keys on the outside, for non-intrusive operation.

The GG-RD is compatible with GG-6 controllers version 4.00 and higher. Older version GG-6 controllers can be field-upgraded. Contact Calibration Technologies for details.

**Ordering Information**

The GG-RD is delivered ready to install. Use the model numbers below to order.

Order #:
- GG-RD1 (for single remote display)
- GG-RD2 (for applications using more than 1 remote display)

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**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change

- **Input Power Requirements:**
  24 VDC, 0.25A (21 Vdc to 27 Vdc)

- **Dimensions:**
  11.3” high x 9.3” wide x 7” deep

- **Weight:**
  5 lbs

- **Enclosure:**
  Fiberglass Reinforced Polyester NEMA 4X, IP 66, with neoprene gasket. Continuous stainless steel hinge. Captive screws in lid. For non-classified areas

- **Temperature Range:**
  0°F to +122°F (-18°C to +50°C)

- **Humidity Range:**
  0-95% RH condensing (100% intermittent), with proper conduit seals

- **Buzzer:**
  80 dB, with volume attenuator shutter. Silenceable from keypad on front panel

- **Terminal Block Plugs: (Field Wiring)**
  12-26 AWG, torque 4 lbs-in

- **User Interface:**
  LCD, backlit, graphics display
  8 lines x 22 characters
  Sealed membrane switches, alpha-numeric keys
  Non-volatile memory

- **Real-Time Status Display:** Displays gas concentrations and any current alarm conditions

- **Power Wiring: (from GG-6)**
  Use 18/2 stranded cable for distances up to 1,000'

- **Communication Wiring: (from GG-6)**
  Use Cat5 shielded twisted pair (STP) or foiled twisted pair (FTP) low capacitance cable for distances up to 1,000'
  Distances up to 4,000' can be achieved using RS-485 compliant cable

- **Warranty:**
  2 years
The GG-2 can interface to, but operate independently of plant control systems for a reliable stand-alone safety system. Multiple digital and analog outputs provided on the GG-2.

The GG-2 has a total of 6 relay outputs, including one warning and one alarm relay per channel, one common fault relay, and one common horn relay. An onboard buzzer works in tandem with the common horn relay. Analog outputs are standard, which can be sent to a plant PLC or other 4/20 mA control panel.

The watertight fiberglass enclosure will stand up to corrosive washdown, temperature swings, and any other harsh environment encountered in the food industry. The alarm log holds 10,000 events, so yesterday’s events will not go unnoticed.

**Applications**
- Engine Rooms
- Tank Rooms
- Mechanical Rooms
- Sea Vessels
- Refrigeration Systems
- Perimeter Monitoring
- Heat Treatment
- Refineries
- Chemical Plants

**Benefits**
- Low cost solution for small systems
- Simple setup
- Alarm log
The GG-2 controller utilizes a user-friendly LCD operator interface for all readout information and alarm function control. The controller is configured and ready to go out of the box with default setpoints loaded in the software. Simply enter the zone location names and adjust the alarm setpoints if necessary.

The backlit LCD displays real-time status of gas sensor concentrations and allows for custom programming via the user-friendly menu system. The GG-2 is compatible with all gas sensors with its industry standard 4/20 mA inputs. The power supply is also powerful enough to power external 24Vdc horn/strobes.

All wiring is safely enclosed inside and easily accessed from the hinged lid. All human interfacing is performed via the waterproof membrane keys on the outside, for non-intrusive operation.

**Ordering Information**

The GG-2 is delivered ready to install. Use either the default setpoints or choose your own. Use the model number below to order.

**Order #:  GG-2**

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**SPECIFICATIONS**

**Due to ongoing research and product improvement, specifications are subject to change**

**Input Power Requirements:**
100-240 VAC, 1.3 A, 50/60 Hz

**Output DC Power:**
24 VDC, 1.2 A

**Dimensions:**
11.3” high x 9.3” wide x 7” deep

**Weight:**
6 lbs

**Enclosure:**
Fiberglass Reinforced Polyester NEMA 4X, IP 65, with neoprene gasket. Continuous stainless steel hinge. Captive screws in lid. For non-classified areas

**Temperature Range:**
0°F to +122°F (-18°C to +50°C)

**Humidity Range:**
0-95% RH condensing (100% intermittent), with proper conduit seals

**Relay Outputs:** (6)
- SPDT, Form C dry contacts
- 8A @ 24 VDC or 10 A @ 120/240 VAC
- Selectable to Latch/Non-Latch
- Status LEDs show relay state

(1) **Common Horn Relay**
Selectable to trigger upon warn or alarm, or both

(1) **Common Fault Relay**
Normally energized
De-activated upon power loss or 1 mA signal

(2) **Individual Warn Relays**
Programmable setpoints

(2) **Individual Alarm Relays**
Programmable setpoints

**Analog Outputs:**
(2) Individual 4-20 mA outputs

**Controller Functions:**
- LCD, backlit, graphics display (GG-6 only)
- 8 lines x 22 characters
- Waterproof membrane switches, alpha-numeric keys
- Non-volatile memory

Real-Time Status Display: Displays gas concentrations and any current alarm conditions

Alarm Log: Records and stores 10,000 events for easy recall

Calibration Mode: Locks relay outputs for sensor calibration or maintenance

Relay Test Function: Allows for easy testing of relay output functions

Adjustable Warning and Alarm Setpoints

Adjustable Relay Latch/Non-Latch

Downscale Alarm Setting for Oxygen Monitoring

Horn Silence Button Clears Horn Relay

**Certification:**
ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12

**Warranty:**
2 years
GG-EM

Key Features
• At-a-glance visual indication of gas concentrations before room entry
• For stand-alone or feed-through applications
• Onboard 10A relay with adjustable alarm setpoint
• 10-segment LED bargraph display of gas concentration
• Electronics completely potted to protect against water damage and corrosion
• Status LEDs display gas concentration, sensor power, alarm, and fault conditions
• Industry standard linear 4/20 mA input
• Calibration mode allows alarm inhibiting during maintenance or calibration
• Watertight NEMA 4X enclosure designed for washdown areas and outdoors
• Use with CTI sensor line or any other 4/20 mA gas sensor

WHAT’S LURKING BEHIND YOUR DOORS?

PROTECT YOUR PERSONNEL FROM ENTERING POTENTIALLY DANGEROUS AREAS.

The GG-EM provides plant personnel an at-a-glance visual indication before entering potentially dangerous areas. Features include a ten-segment LED bargraph display; power, alarm and fault indication; and one relay output with a simple alarm setpoint adjustment. Great for engine rooms, air handlers, and stand-alone applications.

The GG-EM can be used as a stand-alone monitor, or in series with the sensor signal to provide remote display / remote relay operation. As a feed-through device, the sensor signal is re-transmitted back to any industry standard 4/20 mA device such as a PLC or gas detection control panel.

The watertight polycarbonate enclosure will stand up to corrosive washdown, temperature swings, and any other harsh environment encountered in the food industry. The electronics are completely potted to protect against corrosion, allowing for installation in washdown areas and outdoors.

Applications
• Compressor Room Entrances
• Rooftop Air Handling Units
• Stand Alone Gas Detection
• Oxygen Deficiency Monitoring
• Remote Relay Activation and Readout

Benefits
• Low cost solution
• Remote gas concentration display
• Remote relay output

GG-EM ENTRANCE MONITOR
The **GG-EM** is a low cost solution that provides multiple configurations to meet many needs for remote display and alarm applications. Use the **GG-EM** as a stand-alone device, or a feed-through device to provide remote display and alarm output capability located at or near the sensor.

Since sensors often end up in wet and harsh environments, an onboard relay is not always ideal. The **GG-EM** provides alarm activation remote of the sensor, in a safe enclosure out of harm’s way. The onboard relay is rated at 8A @ 24VDC or 10A @ 120VAC.

The **GG-EM** provides an at-a-glance indication of dangerous gas concentrations with a 10-segment LED. An alarm indication is displayed by a flashing status LED. A 10-position rotary switch allows for easy setpoint selection in 10% increments. Calibration mode is selected via an onboard switch, and prevents relay activation during maintenance or calibration. The analog output signal is also held at 4 mA to prevent alarm conditions at the control panel or PLC.

### Ordering Information

The **GG-EM** is delivered ready to install. Use the model numbers below to order. The **GG-EM-PS** option allows the unit to be hardwired for 120VAC power.

**Order #:**

- **GG-EM** (does not include sensor or power supply)
- **GG-EM-PS** (24VDC, 0.625A power supply mounts inside of GG-EM (for stand-alone or OEM installations))

### SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change.

**Power Requirements:**
24 VDC, 125mA (does not include other connected devices)

**Signal Input:**
4/20 mA, 100 Ohm input impedance

**Dimensions:**
5.1” high x 4.2” wide x 4” deep

**Weight:**
1 lb

**Enclosure:**
Polycarbonate NEMA 4X, with neoprene gasket. Hinged lid with dual clasps. For non-classified areas

**Temperature Range:**
-40°F to +122°F (-40°C to +50°C)

**Humidity Range:**
0-100% RH, condensing

**Sensor Inputs:**
(1) 4/20 mA, 100 Ohm input impedance

**Alarm Level Setting:**
10% increments by 10-position rotary switch. Downscale alarm mode provides a precise 19.5% alarm setpoint for 0-25% and 15-25% O2 sensor ranges

**Relay Output:**
(1) SPDT relay, Form C contacts, 8A @ 24 VDC or 10A @120/240 VAC
10 Second On/Off delays
Non-Latching
Status LED shows relay state
Normally energized
An alarm condition, fault condition, or loss of power will de-energize the relay

**Terminal Block Plugs: (Field Wiring)**
12-26 AWG, torque 4 lbs-in

**Wiring Connections:**
3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft (for sensor and analog output wiring)

**Analog Output:**
4/20 mA (max input impedance: 700 Ohms)

**Monitor Functions:**
Calibration Mode: Locks relay outputs for sensor calibration or maintenance
Relay Test Function: Allows for easy testing of relay output functions
Adjustable Alarm Setpoint
Downscale Alarm Setting: for Oxygen Monitoring
Real-Time Status Display: Displays gas concentrations and any current alarm conditions

**Certification:**
ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12

**Warranty:**
2 years
GG-NH3 AMMONIA SENSOR

Key Features
- 2-year warranty, including replacement sensor element
- Electronics are potted to completely eliminate corrosion in wet environments
- Ammonia specific electrochemical sensor technology. No false alarms
- No more special-order guesswork or added costs for heated enclosures
- Industry standard linear 4/20 mA output
- Corrosion, weather, and chemical resistant polycarbonate sensor enclosure
- Intelligent-design temperature controlled enclosure for improved cell life
- Sensor designed to adapt to any harsh environment from -50°F to +140°F
- Accurately monitor OSHA’s PEL, STEL, and IDLH setpoints
- Real-time continuous monitoring for early leak detection
- Any sensor can be field calibrated to any range listed

FINALLY, ONE SENSOR DESIGNED TO PERFORM IN ALL ENVIRONMENTS.
THE INTELLIGENTLY ADAPTIVE GG-NH3 GOES ANYWHERE.

The GG-NH3 utilizes proven electrochemical sensor technology for fast and accurate leak detection. The standard detection range of the GG-NH3 provides real-time continuous monitoring of ammonia concentrations accurately down to 5 ppm, with no false alarms.

Every GG-NH3 sensor comes equipped with an intelligent internal temperature control designed to perform in the harshest areas. The controlled environment provides optimum moisture control for extended cell life. The high-quality injection-molded polycarbonate enclosure offers excellent chemical corrosion protection and high impact resistance.

The GG-NH3 provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The output signal is not affected by drastic temperature variations such as washdowns, defrost cycles, etc.

Applications
- Food Processing areas
- Cold Storage
- Compressor Rooms
- Tank Rooms
- Ventilation Ducts
- Sea Vessels
- Refrigeration Systems
- Perimeter Monitoring
- Pulp and Paper
- Heat Treatment
- Breweries
- Chemical Plants

Benefits
- Versatile for any application
- Easy to order
- Low cost
- Simple operation
- Rugged and reliable

Finally, one sensor designed to perform in all environments. The intelligently adaptive GG-NH3 goes anywhere.
One sensor for any environment (low cost & easy ordering)

The standard GG-NH3 sensor is designed to work anywhere, and at a lower base-model price than most competing models. With only one electrochemical sensor for any application; designing, ordering, and maintaining your ammonia detection system is easy. We typically recommend a 0/100 ppm range for all personnel and product protection areas. Higher ranges (0/250, 0/500, 0/1000) are an option to suit higher alarm setpoint areas such as engine rooms.

Designed “Food Industry” tough

From -50°F blast cells to +140°F engine rooms, to chemical washdowns of processing areas, the GG-NH3 is prepared to survive in just about any harsh industrial condition. Every circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and even direct hose-hits from clean-up crews. Stainless steel enclosures are available for applications which require them.

Ordering Information

The GG-NH3 is delivered calibrated and ready to install. Use the model numbers below to specify your factory calibrated range. Keep in mind, each sensor can be field calibrated to any range listed below.

Order #:

- GG-NH3-100 (standard)
- GG-NH3-250
- GG-NH3-500
- GG-NH3-1000
- GG-NH3-xxx-ST (stainless enclosure)
- GG-NH3-xxx-DM (duct mount)
- GG-NH3-RC (replacement cell)

SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change.

| Input Power: | +24 VDC, 350 mA |
| Detection Principle: | Electrochemical |
| Detection Method: | Diffusion |
| Gases: | Ammonia (NH3) |
| Ranges: | 0/100 ppm (standard) |
| | 0/250 ppm |
| | 0/500 ppm |
| | 0/1000 ppm |
| Custom ranges available. Call for more information |
| Output Signal: | Linear 4/20 mA (max input impedance: 700 Ohms) |
| Linearity: | +/- 1% of full-scale |
| Response Time: | T50 = less than 20 seconds |
| | T90 = less than 60 seconds |
| Accuracy: | +/- 5% of value, but dependent on calibration gas accuracy and time since last calibration |
| Zero Drift: | Less than 0.1% of full-scale per month, non-cumulative |
| Span Drift: | Application dependent, but generally less than 3% per month |
| Temperature Range: | -50°F to +140°F (-46°C to +60°C) |
| Humidity Range: | 5% to 100% condensing |
| Wiring Connections: | 3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft |
| Terminal Block Plugs: | (Field Wiring) |
| | 12-26 AWG, torque 4 lbs-in |
| Enclosure: | NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas |
| Dimensions: | 7.5" high x 6.5" wide x 3.75" deep |
| Weight: | 3 lbs |
| Certification: | ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12 |
| Warranty: | 2 years (including sensor element) |
GG-NH3-2%

Key Features
• Ammonia selective catalytic bead sensor technology
• Use for activation of electrical shunt-trip or E-stop up to 20,000 ppm
• Low cost compared to infrared type ammonia sensors
• Industry standard linear 4/20 mA output
• Absolutely no zero drift compared to other catalytic bead type sensors
• Sensing element designed for long life in harsh industrial environments
• Designed to perform in temperatures of -40°F to +150°F
• Accurately monitor explosive NH3 levels for emergency response situations
• Real-time continuous monitoring
• 2-year warranty, including replacement sensor element

AMMONIA COMPRESSOR ROOM EXPLOSION PREVENTION.
HIGH-RANGE SENSOR AT A LOW-RANGE PRICE.

The GG-NH3-2% is designed to detect and monitor potentially explosive levels of ammonia vapors in the event of a catastrophic failure. Codes specify an electrical shunt-trip of the mechanical room at a level not higher than 25% LEL to remove potential ignition sources in the event of a serious ammonia leak. The GG-NH3-2% allows for an earlier trip level of 12.5% LEL.

The GG-NH3-2% utilizes an ammonia selective catalytic bead sensor technology with a matched pair of detector elements. When ammonia vapors enter the sensor, the passive bead remains unchanged while the active detector bead catalyzes the oxidation of gas, generating heat and changing its resistance. The resulting change in resistance is accurately measured across the bridge circuit.

Applications
• Compressor Rooms
• Electrical Shutdown
• Heat Treatment
• Tank Rooms
• Sea Vessels
• Refrigeration System
• Cold Storage
• Pulp and Paper
• Breweries
• Refineries
• Chemical Plants

Benefits
• Low cost explosion protection
• Long sensor life (5+ years typical)
• Simple operation & calibration

The GG-NH3-2% provides an industry standard linear 4/20 mA output signal proportional to 0-2% (0-20,000 ppm) ammonia. The potted transmitter is compatible with most gas detection systems and PLCs. Long sensor life with minimal span adjustment can be expected in most mechanical room applications. The sensor element is designed for simple calibration and is field replaceable.
Since low-range sensors can't detect high enough and high-range sensors can't detect accurately at low levels, the use of the GG-NH3-2% sensor in conjunction with low-range GG-NH3 sensors ensures a second-stage line of defense in the event of a serious ammonia leak. Intended for electrical shutdown, the GG-NH3-2% provides protection against potentially explosive situations.

From hot mechanical rooms, to acid washdowns of processing areas, the GG-NH3-2% is prepared to survive in just about any harsh industrial condition. Every circuit board is sealed forever in potting compound, protecting sensitive electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and direct hose-hits from clean-up crews.

Typical sensor life is 5-7 years, with minimal to no cross-sensitivity to most other gases. Field replaceable sensor element keeps long term maintenance simple and low cost.

**Ordering Information**

The GG-NH3-2% is delivered calibrated and ready to install. The assembly includes sensor and potted transmitter mounted inside the hinged polycarbonate enclosure. Use the model numbers below to order.

Order #:  
GG-NH3-2%  
GG-NH3-2%-ST (stainless enclosure)  
GG-NH3-2%-RS (replacement sensor)

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**SPECIFICATIONS**

**Input Power:**  
+24 VDC, 250 mA

**Detection Principle:**  
Catalytic Bead

**Detection Method:**  
Diffusion

**Gases:**  
Ammonia (NH3)

**Ranges:**  
0-2% (20,000 ppm)

**Output Signal:**  
Linear 4/20 mA (max input impedance: 700 Ohms)

**Linearity:**  
+/- 0.5% of full-scale

**Repeatability:**  
+/- 1% of full-scale

**Response Time:**  
T50 = less than 30 seconds  
T90 = less than 90 seconds

**Accuracy:**  
+/- 5% of value, but dependent on calibration gas accuracy

**Zero Drift:**  
Less than 0.01% of full-scale per month, non-cumulative

**Span Drift:**  
Application dependent, but generally less than 2% per month

**Temperature Range:**  
-40°F to +150°F (-40°C to +66°C)

**Humidity Range:**  
5% to 100% condensing

**Wiring Connections:**  
3 conductor, shielded, stranded, 20 AWG cable  
(General Cable C2525A or equivalent) up to 1500 ft

**Terminal Block Plugs:**  
(Field Wiring)  
12-26 AWG, torque 4 lbs-in

**Enclosure:**  
NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas

**Dimensions:**  
7.5” high x 6.5” wide x 3.75” deep

**Weight:**  
3 lbs

**Certification:**  
ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12

**Warranty:**  
2 years (including sensor element)
GG-NH3-EXP

Key Features
• Explosion-proof enclosure for classified areas
• Ammonia specific electrochemical sensor technology
• 0-100 ppm up to 0-1,000 ppm ranges available
• Electronics potted to eliminate internal corrosion
• Industry standard 24VDC, linear 4/20 mA output
• Operating temperature from 0°F to +140°F
• Accurately monitor NH3 levels for important action levels
• No false alarms from interference gases
• Real-time continuous monitoring for early leak detection

LOW-RANGE AMMONIA DETECTION.
EXPLOSION-PROOF DESIGN.

The GG-NH3-EXP is designed for early leak detection of ammonia vapors in hazardous areas. Most codes specify audio visual alarms at 25 ppm and emergency ventilation at 150 ppm in the event of an ammonia leak. The GG-NH3-250-EXP provides great accuracy at both of these levels.

The GG-NH3-EXP utilizes a proven ammonia specific electrochemical sensor, designed and manufactured in Columbia, MO. Tight quality control and years of testing ensure no false alarms due to cross-sensitivities from other gases, or false alarms from temperature and humidity fluctuations.

The GG-NH3-EXP provides an industry standard linear 4/20 mA output signal proportional to ppm concentration of ammonia. Long sensor life with minimal span adjustment can be expected in most mechanical room applications. The sensor is designed for simple calibration and the sensor head is easily field replaceable.

Applications
• Compressor Rooms
• Refrigeration System
• Heat Treatment
• Tank Rooms
• Sea Vessels
• Chemical Plants
• Cold Storage
• Pulp and Paper
• Breweries

Benefits
• Low cost explosion protection
• No false alarms from interference gases
• Simple operation & calibration

GG-NH3-EXP
LOW-RANGE AMMONIA SENSOR
EXPLOSION-PROOF
920 N Trade Winds Pkwy, Columbia, MO 65201      866-394-5861      www.CTIengineering.com      sales@CTIengineering.com
Since low-range sensors cannot detect high enough and high-range sensors can't detect accurately at low levels, the use of GG-NH3-EXP sensors in conjunction with the high-range GG-NH3-2%-EXP sensor ensures a second line of defense in the event of a serious ammonia leak.

The GG-NH3-EXP is intended for horn/strobe and emergency ventilation activation, and is also useful for alarm outputs such as phone dialers, solenoid valves and other alarm functions.

Typical sensor element life is 3 years, with no cross-sensitivity to other gases. Field replaceable sensor elements keeps long term maintenance simple and low cost. Every circuit board is potted to completely eliminate corrosion to the electronic components and copper tracing on the circuit board. An explosion-proof aluminum enclosure houses the transmitter.

Ordering Information
The GG-NH3-EXP is delivered calibrated and ready to install. The assembly includes sensor and potted transmitter mounted inside an explosion-proof enclosure. Use the model numbers below to order.

Order #:  
- GG-NH3-100-EXP  
- GG-NH3-250-EXP (standard)  
- GG-NH3-300-EXP  
- GG-NH3-500-EXP  
- GG-NH3-1000-EXP  
- GG-NH3-RC-EXP (replacement sensor)

Input Power: +24 VDC, 50 mA
Detection Principle: Electrochemical
Detection Method: Diffusion
Gases: Ammonia (NH3)
Ranges:  
- 0-100 ppm  
- 0-250 ppm (standard)  
- 0-300 ppm  
- 0-500 ppm  
- 0-1,000 ppm
Output Signal: Linear 4/20 mA (max input impedance: 700 Ohms)
Linearity: +/- 0.5% of full-scale
Repeatability: +/- 1% of full-scale

Response Time:
- T50 = less than 10 seconds  
- T90 = less than 30 seconds
Accuracy: +/- 0.5% of full-scale
Zero Drift: Less than 0.1% of full-scale per month, non-cumulative
Span Drift: Less than 2% per month
Temperature Range: 0°F to +140°F (-18°C to +60°C)
Humidity Range: 5% to 95% non-condensing
Wiring Connections: 3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft
Terminal Block Plugs: (Field Wiring) 26-12 AWG, torque 4 lbs-in

Weight: 3.75 lbs
Dimensions: 6.75" high x 5.25" wide x 4.5" deep
Enclosure: Copper-free aluminum body, epoxy powder coat finish, neoprene gasket, for hazardous areas. NEC/CEC:  
- Class I, Division 2, Groups B, C, D  
- Class II, Division 1, Groups E, F, G  
- Class II, Division 2, Groups F, G  
- Class III  
NEMA/EEMAC: 3, 4, 4X, 7BCD, 9EFG  
UL Standard: 1203  
CSA Standard: C22.2 No. 30  
FM Classification No.: 3615  
ATEX Certificate KEMA 02 ATEX 2265U  
IEC Standards EN:60079-0, EN:60079-1, EN:60529

Warranty: 2 years (including sensor element)
The GG-NH3-2%-EXP is designed to detect and monitor potentially explosive levels of ammonia vapors in the event of a catastrophic failure. Most codes specify an electrical shunt-trip at a level not higher than 25% LEL to remove potential ignition sources in the event of a serious ammonia leak. The GG-NH3-2%-EXP allows for an earlier trip level of 12.5% LEL.

The GG-NH3-2%-EXP utilizes an ammonia selective catalytic bead sensor technology with a matched pair of detector elements. When ammonia vapors enter the sensor, the passive bead remains un-changed while the active detector bead catalyzes the oxidation of gas, generating heat and changing its resistance. The resulting change in resistance is accurately measured across the bridge circuit.

The GG-NH3-2%-EXP provides an industry standard linear 4/20 mA output signal proportional to 0-2% (20,000 ppm) of ammonia. Long sensor life with minimal span adjustment can be expected in most mechanical room applications. The sensor is designed for simple calibration and the sensor head is easily field replaceable.
Since low-range sensors can’t detect high enough and high-range sensors can’t detect accurately at low levels, the use of the GG-NH3-2%-EXP sensor in conjunction with low-range GG-NH3 sensors ensures a second-stage line of defense in the event of a serious ammonia leak. Intended for emergency stop of all compressors, pumps and normally closed valves, the GG-NH3-2%-EXP provides protection against potentially explosive situations.

Typical sensor element life is 5-7 years, with minimal to no cross-sensitivity to most other gases. Field replaceable sensor elements keeps long term maintenance simple and low cost. Every circuit board is potted to completely eliminate corrosion to the electronic components and copper tracing on the circuit board. An explosion-proof aluminum enclosure houses the transmitter.

### ORDERING INFORMATION

The GG-NH3-2%-EXP is delivered calibrated and ready to install. The assembly includes sensor and potted transmitter mounted inside an explosion-proof enclosure. Use the model numbers below to order.

**Order #:**

- GG-NH3-2%-EXP (replacement sensor)
- GG-NH3-2%-RS-EXP (replacement sensor)

### SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change.

**Input Power:**

+24 VDC, 80 mA

**Detection Principle:**

Catalytic Bead

**Detection Method:**

Diffusion

**Gases:**

Ammonia (NH3)

**Ranges:**

0-2% (20,000 ppm) (1,000 ppm deadband)

**Output Signal:**

Linear 4/20 mA (max input impedance: 700 Ohms)

**Linearity:**

+/- 0.5% of full-scale

**Repeatability:**

+/- 1% of full-scale

**Response Time:**

T50 = less than 30 seconds

T90 = less than 60 seconds

**Accuracy:**

+/- 5% of value

**Zero Drift:**

Less than 0.1% of full-scale per month, non-cumulative

**Span Drift:**

Less than 2% per month

**Temperature Range:**

-10°F to +140°F (-23°C to +60°C)

**Humidity Range:**

5% to 95% non-condensing

**Wiring Connections:**

3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft

**Terminal Block Plugs:**

(General Wiring)

26-12 AWG, torque 4 lbs-in

**Dimensions:**

6.75” high x 5.25” wide x 4.5” deep

**Weight:**

3.75 lbs

**Enclosure:**

Copper-free aluminum body, epoxy powder coat finish, neoprene gasket, for hazardous areas.

- NEC/CEC:
  - Class I, Division 2, Groups B, C, D
  - Class II, Division 1, Groups E, F, G
  - Class II, Division 2, Groups F, G
  - Class III

- NEMA/EEMAC: 3, 4, 4X, 7BCD, 9EFG

- UL Standard: 1203

- CSA Standard: C22.2 No. 30

- FM Classification No.: 3615

- ATEX Certificate KEMA 02 ATEX 2265U

- IEC Standards EN:60079-0, EN:60079-1, EN:60529

**Sensor Head:**

Stainless steel flameproof enclosure constructed with an integral stainless steel sinter filter for the safe entry of the atmosphere being detected.

- ATEX Certificate CESI 01 ATEX 066 U

**Warranty:**

2 years (including sensor element)
**Key Features**

- New ammonia-selective cat-bead sensor technology prevents false alarms
- Continuous monitoring of refrigeration system relief valves
- Rugged, long life, and low power catalytic-bead sensor
- Designed for harsh environments (-40°F to +140°F)
- Sensor and preamp in one assembly
- 0-1% NH₃ (0-10,000ppm) detection range
- Ability to detect “weeping valves” to prevent refrigerant loss over time
- Sensor housing allows for easy sensor replacement and calibration
- 316 stainless steel 18 gauge enclosure
- Industry standard 24VDC, linear 4/20 mA output

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**Applications**

- Ammonia Refrigeration System Vent Lines

**Benefits**

- Low cost
- Rugged and reliable
- Simple sensor replacement
- Typical sensor life 5 to 7 years

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**FROM UNLIKELY HIGH-PRESSURE RELEASES TO THE INEVITABLE “weepers”, THE CTI VENT LINE SENSOR WILL NOTIFY YOU … BEFORE YOUR NEIGHBORS DO.**

The GG Vent Line 2 utilizes a rugged ammonia-selective catalytic bead sensor technology for fast leak detection and long life. The standard 0-1% NH₃ detection range of the GG-VL2-NH₃ provides real-time continuous monitoring of ammonia concentrations in your high-pressure relief vent header.

High concentrations of ammonia gases in your vent line are usually indications of a leaking valve or system overpressure. This could mean costly repairs or plant downtime, not to mention loss of refrigerant and regulatory fines. Early detection can save money while also protecting equipment, product, and personnel.

The GG-VL2-NH₃ provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. Expect long sensor life and no zero-signal drift over time.

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**AMMONIA SENSOR VENT LINE**

The new design allows for easy and safe calibration, plus component replacement from inside the enclosure. Gone are the days of breaking apart the piping!

- Sensor element assembly
- Calibration port and cap
- Easy to replace transmitter

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**920 N Trade Winds Pkwy, Columbia, MO 65201  866-394-5861  www.CTIengineering.com  sales@CTIengineering.com**
The **GG-VL2-NH3** is designed for outdoor mounting. We recommend that the sensor be mounted 3’ to 5’ above the roofline on the relief discharge to atmosphere. The 1/2” pipe nipple of the supplied mounting kit should be welded or threaded into the relief discharge. The new enclosure design allows for an easier and safer way to calibrate the sensor and replace the sensor element or transmitter in the future.

**Reliable & robust**

The stainless steel enclosure provides ultimate protection against weather and will stay corrosion free. Every transmitter circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion.

Since the catalytic-bead sensor is designed to endure the coldest of winters and hottest of summers, the output signal is not affected by extreme temperature variations. The life of the sensor is also not affected by the occasional exposure to high concentrations of ammonia gas.

### Ordering Information

The **GG-VL2-NH3** sensor kit is delivered calibrated and ready to install. The kit includes the transmitter/sensor/enclosure assembly and mounting kit. Use the model numbers below to order.

**Order #:**

- **GG-VL2-NH3** (replacement sensor)
- **GG-VL2-NH3-RS** (replacement sensor element)

### SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change.

**Input Power:**

- +24 VDC, 80 mA

**Detection Principle:**

Catalytic Bead (NH3 selective)

**Detection Method:**

Diffusion

**Gases:**

Ammonia (NH3)

**Ranges:**

0/1% (0 - 10,000 ppm) with 0.25% NH3 deadband

**Output Signal:**

Linear 4/20 mA (max input impedance: 700 Ohms)

**Linearity:**

+/- 2% of full-scale

**Repeatability:**

+/- 1% of full-scale

**Response Time:**

T90 = less than 30 seconds

**Accuracy:**

+/- 2% of full-scale, but dependent on calibration gas accuracy and time since last calibration

**Zero Drift:**

Less than 0.1% of full-scale per month, non-cumulative

**Span Drift:**

Less than 1% of full-scale per month, non-cumulative

**Temperature Range:**

-40°F to +140°F (-40°C to +60°C)

**Humidity Range:**

5% to 100% condensing

**Wiring Connections:**

3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft

**Terminal Block Plugs:**

(General Wiring) 12-26 AWG, torque 4 lbs-in

**Enclosure:**

NEMA 4X 316 stainless steel (316) gasketed housing. Captive screw in hinged lid. For non-classified areas

**Dimensions:**

4.8” high x 4.72” wide x 3.35” deep

**Weight:**

5 lbs (includes mounting kit)

**Certification:**

ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12

**Warranty:**

2 years (including sensor element)
GG-CO2

Key Features

• CO2 specific infrared sensor technology
• Industry standard linear 4/20 mA output
• Corrosion, weather, and chemical resistant sensor enclosures
• Sensor designed to adapt to any harsh environment from -60°F to +120°F
• Accurately monitor OSHA’s PEL and STEL setpoints for personnel protection
• Real-time continuous monitoring
• 0-3% range (0/30,000 ppm) allows setpoints at both critical levels (0.5% & 3.0%)
• 2-year warranty

INDUSTRIAL STRENGTH CO2 MONITORING…FOR ANY HARSH ENVIRONMENT

The GG-CO2 utilizes proven infrared sensor technology for fast and accurate leak detection. With no moving parts and no cells to replace, the GG-CO2 provides real-time continuous monitoring and inexpensive long term operating costs.

The GG-CO2 is carbon dioxide specific, so false alarms from floor cleaners and food off-gassing is non-existent. The output signal is also not affected by moisture or drastic temperature variations such as washdowns, defrost cycles, etc.

The GG-CO2 provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The high-quality polycarbonate or optional stainless steel enclosures offer excellent chemical corrosion protection and high impact resistance.

Applications

• Wineries
• Food Processing areas
• Indoor Air Quality
• Bottling Plants
• Breweries
• Refrigeration Systems
• Perimeter Monitoring
• Chemical Plants

Benefits

• Versatile for any application
• Low cost
• Simple operation
• Rugged and reliable
The standard **GG-CO2** sensor comes equipped with a corrosion proof enclosure and adaptive temperature control designed to work anywhere. With only one sensor for any application; designing, ordering, and maintaining your CO2 monitoring system is easy. The 0/3% range (0/30,000 ppm) is broad enough to handle OSHA’s recommended alarm levels (0.5% and 3.0%), providing plenty of upper range detection for high output systems.

**Designed “Food Industry” tough**

The **GG-CO2** is prepared to survive in just about any harsh industrial condition. Every circuit board is sealed forever in potting compound, which protects electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and direct hose-hits from clean-up crews. An 18 ga stainless steel sensor enclosure is also available for applications that require it.

**Ordering Information**

The **GG-CO2** is delivered calibrated and ready to install. Use the model numbers below to order.

**Order #:**

- **GG-CO2-1%**
- **GG-CO2-3%** (standard)
- **GG-CO2-5%**
- **GG-CO2-xxx-ST** (stainless enclosure)
- **GG-CO2-xxx-DM** (duct mount)

**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change

- **Input Power:** +24 VDC, 350 mA
- **Detection Principle:** (NDIR) Non-Dispersive Infrared
- **Detection Method:** Diffusion
- **Gas:** Carbon Dioxide (CO2)
- **Range:**
  - 0/1%
  - 0/3% (standard)
  - 0/5%
- **Output Signal:**
  - Linear 4/20 mA (max input impedance: 700 Ohms)
- **Linearity:** +/- 3% of full-scale
- **Repeatability:** +/- 3% of full-scale
- **Response Time:**
  - T50 = less than 30 seconds
  - T90 = less than 60 seconds
- **Accuracy:** +/- 5% of value, but dependent on calibration gas accuracy
- **Zero Drift:** Less than 1% of full-scale per month, non-cumulative
- **Span Drift:** Less than 1% of full-scale per month, non-cumulative
- **Temperature Range:**
  - -60°F to +120°F (-51°C to +49°C)
- **Humidity Range:**
  - 5% to 100% condensing
- **Wiring Connections:**
  - 3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft
- **Terminal Block Plugs:** (Field Wiring)
  - 12-26 AWG, torque 4 lbs-in
- **Enclosure:**
  - NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas
- **Dimensions:**
  - 7.5" high x 6.5" wide x 3.75" deep
- **Weight:** 3 lbs
- **Certification:**
  - ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12
- **Warranty:** 2 years
Key Features

- CO specific electrochemical sensor technology. No false alarms
- 5-year cell life average in most applications
- Industry standard linear 4/20 mA output
- Corrosion, weather, and chemical resistant polycarbonate sensor enclosure
- Intelligent-design enclosure temperature control for improved cell life
- Sensor designed to adapt to any harsh environment from -20°F to +120°F
- Accurately monitor OSHA’s PEL, STEL, and IDLH setpoints
- Real-time continuous monitoring for early warning.
- Detection range of 0-200 ppm Carbon Monoxide

Applications

- Food Processing areas
- Warehouses
- Air Quality Monitoring
- Tank Rooms
- Ventilation Ducts
- Breweries
- Parking Garages
- Modified Atmosphere Packaging
- Bottling Plants
- Chemical Manufacturing

Benefits

- Low cost
- Simple operation
- Rugged and reliable

The GG-CO utilizes proven electrochemical sensor technology for fast and accurate leak detection. The standard detection range of the GG-CO provides real-time continuous monitoring of carbon monoxide concentrations accurately down to 10 ppm, with no false alarms.

Each GG-CO sensor comes equipped with an intelligent internal temperature control designed to perform in the harshest of areas. The controlled environment provides optimum moisture control for extended cell life. The high-quality injection-molded polycarbonate enclosure offers excellent chemical corrosion protection and high impact resistance.

The GG-CO provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The output signal is not affected by drastic temperature variations such as washdowns, defrost cycles, etc. Expect an average of 5-years of cell life for most applications.
Easy ordering

The standard GG-CO sensor is designed to work anywhere, and at a lower base-model price than most competing models. With only one sensor for any application; designing, ordering, and maintaining your carbon monoxide monitoring system is simple.

Designed “Food Industry” tough

Developed for chemical washdowns of processing areas, the GG-CO is prepared to survive in just about any harsh industrial condition. Each circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and even direct hose-hits from clean-up crews.

Ordering Information

The GG-CO is delivered calibrated and ready to install. Use the model numbers below to order.

**Order #:**  
- **GG-CO 200** (standard)  
- **GG-CO 200-ST** (stainless enclosure)  
- **GG-CO RC** (replacement cell)  
- **GG-CO 200-DM** (duct mount)

### SPECIFICATIONS

**Input Power:**  
+24 VDC, 350 mA

**Detection Principle:**  
Electrochemical

**Detection Method:**  
Diffusion

**Gases:**  
Carbon Monoxide (CO)

**Ranges:**  
0/200ppm (standard)  
Custom ranges available. Call for more information

**Output Signal:**  
Linear 4/20 mA (max input impedance: 700 Ohms)

**Linearity:**  
+/- .5% of full-scale

**Repeatability:**  
+/- 1% of full-scale

**Response Time:**  
T50 = less than 10 seconds  
T90 = less than 20 seconds

**Accuracy:**  
 +/- 5% of value, but dependent on calibration gas accuracy and time since last calibration

**Zero Drift:**  
Less than 0.1% of full-scale per month, non-cumulative

**Span Drift:**  
Application dependent, but generally less than 2% per month

**Temperature Range:**  
-20°F to +120°F (-28°C to +49°C)

**Humidity Range:**  
5% to 100% condensing

**Wiring Connections:**  
3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft

**Terminal Block Plugs:** (Field Wiring)  
12-26 AWG, torque 4 lbs-in

**Enclosure:**  
NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas

**Dimensions:**  
7.5" high x 6.5" wide x 3.75" deep

**Weight:**  
3 lbs

**Certification:**  
ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12

**Warranty:**  
2 years (including sensor element)
**Key Features**
- Explosion-proof enclosure for classified areas
- Carbon Monoxide specific electrochemical sensor technology
- 0-200 ppm factory range
- Electronics potted to eliminate internal corrosion
- Industry standard 24VDC, linear 4-20 mA output
- Operating temperature from -4°F to +122°F
- Accurately monitor CO levels for important action levels
- No false alarms from interference gases
- Real-time continuous monitoring for early CO detection

**Applications**
- Food Processing areas
- Warehouses
- Air Quality Monitoring
- Tank Rooms
- Ventilation Ducts
- Breweries
- Parking Garages
- Modified Atmosphere Packaging
- Bottling Plants
- Chemical Manufacturing

**Benefits**
- Low cost explosion protection
- No false alarms from interference gases
- Simple operation & calibration

The GG-CO-EXP is designed for detection of carbon monoxide vapors in hazardous areas. The standard detection range of 0-200 ppm provides real-time continuous monitoring of concentrations accurately down to 20 ppm with no false alarms.

The GG-CO-EXP utilizes a proven hydrogen sulfide specific electrochemical sensor for detecting poisonous CO gas concentrations. No false alarms due to cross-sensitivities from other gases, and no false alarms from temperature or humidity fluctuations.

The GG-CO-EXP provides an industry standard linear 4/20 mA output signal proportional to ppm concentration of carbon monoxide. Long sensor life with minimal span adjustment can be expected in most applications. The sensor is designed for simple calibration and the sensor head is easily field replaceable.
Carbon monoxide gas is approximately the same weight as air and will mix evenly with the air in all spaces. For personnel protection, mount the sensor at a height in the breathing zone of the employees. It would typically be 4 to 5 feet off the ground, which also allows easy access. As a general rule of thumb, try to mount sensors within 30 feet of potential CO sources.

The GG-CO-EXP is intended for horn/strobe and ventilation activation, and is also useful for alarm outputs such as phone dialers and other alarm functions.

Typical sensor element life is 5+ years, with only a 20:1 cross-sensitivity to hydrogen. Field replaceable sensor element keeps long term maintenance simple and low cost. Every circuit board is potted to completely eliminate corrosion to the electronic components and copper tracing on the circuit board. An explosion-proof aluminum enclosure houses the transmitter.

**Ordering Information**

The GG-CO-EXP is delivered calibrated and ready to install. The assembly includes sensor and potted transmitter mounted inside an explosion-proof enclosure. Use the model numbers below to order.

**Order #:**

- GG-CO-200-EXP
- GG-CO-RC-EXP (replacement sensor)

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**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Power:</strong></td>
<td>+24 VDC, 50 mA</td>
</tr>
<tr>
<td><strong>Detection Principle:</strong></td>
<td>Electrochemical</td>
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<tr>
<td><strong>Detection Method:</strong></td>
<td>Diffusion</td>
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<td><strong>Gases:</strong></td>
<td>Carbon Monoxide (CO)</td>
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<td><strong>Ranges:</strong></td>
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<tr>
<td><strong>Output Signal:</strong></td>
<td>Linear 4/20 mA (max input impedance: 700 Ohms)</td>
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<tr>
<td><strong>Linearity:</strong></td>
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<tr>
<td><strong>Repeatability:</strong></td>
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<tr>
<td><strong>Response Time:</strong></td>
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<td><strong>Accuracy:</strong></td>
<td>+/- 5% of full-scale</td>
</tr>
<tr>
<td><strong>Zero Drift:</strong></td>
<td>Less than 0.1% of full-scale per month, non-cumulative</td>
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<tr>
<td><strong>Span Drift:</strong></td>
<td>Less than 2% per month</td>
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<tr>
<td><strong>Temperature Range:</strong></td>
<td>-4°F to +122°F (-20°C to +50°C)</td>
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<tr>
<td><strong>Humidity Range:</strong></td>
<td>5% to 95% non-condensing</td>
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<tr>
<td><strong>Wiring Connections:</strong></td>
<td>3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft</td>
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<td><strong>Terminal Block Plugs:</strong></td>
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<tr>
<td></td>
<td>26-12 AWG, torque 4 lbs-in</td>
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<td><strong>Weight:</strong></td>
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<td><strong>Dimensions:</strong></td>
<td>6.75” high x 5.25” wide x 4.5” deep</td>
</tr>
</tbody>
</table>
| **Enclosure:**                 | Copper-free aluminum body, epoxy powder coat finish, neoprene gasket, for hazardous areas. NEC/CEC:
|                                | Class I, Division 1 & 2, Groups B, C, D |
|                                | Class II, Division 1, Groups E, F, G |
|                                | Class III, Division 2, Groups F, G |
|                                | NEMA/EEMAC: 3, 4, 4X, 7BCD, 9EFG |
|                                | UL Standard: 1203              |
|                                | CSA Standard: C22.2 No. 30      |
|                                | FM Classification No.: 3615     |
|                                | ATEX Certificate KEMA 02 ATEX 2265U |
|                                | IEC Standards EN:60079-0, EN:60079-1, EN:60529 |
| **Warranty:**                  | 2 years (including sensor element) |
GG-CL2-B  CHLORINE SENSOR

Key Features
• Chlorine specific electrochemical sensor technology
• Electronics completely potted to prevent corrosion in harsh environments
• Industry standard linear 4/20 mA output
• Corrosion, weather, and chemical resistant polycarbonate sensor enclosure
• Intelligent-design enclosure temperature control for improved cell life
• Sensor designed to adapt to any harsh environment from -20°F to +120°F
• Real-time continuous monitoring for early detection of toxic concentrations
• Accurately monitor OSHA’s PEL, STEL, and IDLH setpoints
• Detection range of 0-5 ppm Cl₂

TOXIC CHLORINE GAS DETECTION DESIGNED ‘FOOD INDUSTRY’ TOUGH

The GG-CL2-B utilizes proven electrochemical sensor technology for fast and accurate detection. The standard detection range of the GG-CL2-B provides real-time continuous monitoring of chlorine concentrations accurately down to 0.5 ppm, with no false alarms. The intelligent internal temperature control of the GG-CL2-B provides optimum temperature control for extended cell life. The high-quality injection-molded polycarbonate enclosure offers excellent chemical corrosion protection and high impact resistance. The GG-CL2-B provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The output signal is not affected by drastic temperature variations or other atmospheric conditions.

Applications
• Process Areas
• Tank Storage
• Injection Systems
• Indoor Pools
• Sanitizing Systems
• Air Monitoring

Benefits
• Low cost
• Simple operation
• Rugged and reliable
The standard GG-CL2-B sensor is designed to work anywhere, and at a lower base-model price than most competing models. With only one electrochemical sensor for any application; designing, ordering, and maintaining your chlorine detection system is simple.

**Designed “Food Industry” tough**

The GG-CL2-B is prepared to survive in just about any harsh industrial condition, including acid washdown of processing areas. Every circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and direct hose-hits from clean-up crews.

**Ordering Information**

The GG-CL2-B is delivered calibrated and ready to install. Use the model numbers below to order.

Order #:  
- **GG-CL2-B-5** (standard)  
- **GG-CL2-B-5-ST** (stainless enclosure)  
- **GG-CL2-B-RC** (replacement cell)  
- **GG-CL2-B-5-DM** (duct mount)

---

**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change.

- **Input Power:** +24 VDC, 350 mA  
- **Detection Principle:** Electrochemical  
- **Detection Method:** Diffusion  
- **Gases:** Chlorine (CL2)  
- **Ranges:** 0-5 ppm  
- **Output Signal:** Linear 4/20 mA (max input impedance: 700 Ohms)  
- **Linearity:** +/- 0.5% of full-scale  
- **Repeatability:** +/- 1% of full-scale  
- **Response Time:**  
  - T50 = less than 60 seconds  
  - T90 = less than 120 seconds  
- **Accuracy:** +/- 5% of value, but dependent on calibration gas accuracy and time since last calibration  
- **Zero Drift:** Less than 0.1% of full-scale per month, non-cumulative  
- **Span Drift:** Application dependent, but generally less than 3% per month  
- **Temperature Range:** 
  - -20°F to +120°F (-29°C to +49°C)  
- **Humidity Range:** 5% to 100% condensing  
- **Wiring Connections:**  
  - 3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft  
  - Terminal Block Plugs (Field Wiring)  
  - 12-26 AWG, torque 4 lbs-in  
- **Enclosure:** 
  - NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas  
- **Dimensions:** 7.5" high x 6.5" wide x 3.75" deep  
- **Weight:** 3 lbs  
- **Certification:** ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12  
- **Warranty:** 2 years (including replacement cell)
The GG-CL2-EXP is designed for detection of chlorine gas in hazardous areas. The standard detection range of 0-5 ppm provides real-time continuous monitoring of concentrations accurately down to 0.5 ppm with no false alarms.

The GG-CL2-EXP utilizes a proven chlorine specific electrochemical sensor for detecting toxic chlorine gas concentrations. These toxic fumes can be from storage tanks, sanitizing or other sources. No false alarms due to cross-sensitivities from other gases, and no false alarms from temperature or humidity fluctuations.

The GG-CL2-EXP provides an industry standard linear 4/20 mA output signal proportional to ppm concentration of chlorine. Long sensor life with minimal span adjustment can be expected in most applications. The sensor is designed for simple calibration and the sensor head is easily field replaceable.

**Applications**
- Compressor Rooms
- Refrigeration System
- Heat Treatment
- Tank Rooms
- Sea Vessels
- Chemical Plants
- Cold Storage
- Pulp and Paper
- Breweries

**Benefits**
- Low cost explosion protection
- No false alarms from interference gases
- Simple operation & calibration
Chlorine gas is more than twice as heavy as air and will tend to accumulate in low-lying areas in poorly ventilated rooms. For optimum personnel protection (representative concentration reading that an employee would be exposed to), mount the sensor at a height in the breathing zone of the employees. It would typically be no higher than 4 to 5 feet off the ground, which also allows easy access. As a general rule of thumb, try to mount sensors within 30 feet of potential CL2 leak sources.

The GG-CL2-EXP is intended for horn/strobe and ventilation activation, and is also useful for alarm outputs such as phone dialers and other alarm functions.

Typical sensor element life is 3 years, with minimal cross-sensitivity to other gases. Field replaceable sensor element keeps long term maintenance simple and low cost. Every circuit board is potted to completely eliminate corrosion to the electronic components and copper tracing on the circuit board. An explosion-proof aluminum enclosure houses the transmitter.

**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Power:</strong></td>
<td>+24 VDC, 50 mA</td>
</tr>
<tr>
<td><strong>Detection Principle:</strong></td>
<td>Electrochemical</td>
</tr>
<tr>
<td><strong>Detection Method:</strong></td>
<td>Diffusion</td>
</tr>
<tr>
<td><strong>Gases:</strong></td>
<td>Chlorine (CL2)</td>
</tr>
<tr>
<td><strong>Ranges:</strong></td>
<td>0-5 ppm (standard)</td>
</tr>
<tr>
<td><strong>Output Signal:</strong></td>
<td>Linear 4/20 mA (max input impedance: 700 Ohms)</td>
</tr>
<tr>
<td><strong>Linearity:</strong></td>
<td>+/- 0.5% of full-scale</td>
</tr>
<tr>
<td><strong>Repeatability:</strong></td>
<td>+/- 1% of full-scale</td>
</tr>
<tr>
<td><strong>Response Time:</strong></td>
<td>T50 = less than 30 seconds, T90 = less than 60 seconds</td>
</tr>
<tr>
<td><strong>Accuracy:</strong></td>
<td>+/- 5% of full-scale</td>
</tr>
<tr>
<td><strong>Zero Drift:</strong></td>
<td>Less than 0.1% of full-scale, non-cumulative</td>
</tr>
<tr>
<td><strong>Span Drift:</strong></td>
<td>Less than 3% per month</td>
</tr>
<tr>
<td><strong>Temperature Range:</strong></td>
<td>-4°F to +122°F (-20°C to +50°C)</td>
</tr>
<tr>
<td><strong>Humidity Range:</strong></td>
<td>5% to 95% non-condensing</td>
</tr>
<tr>
<td><strong>Wiring Connections:</strong></td>
<td>3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft</td>
</tr>
<tr>
<td><strong>Terminal Block Plugs:</strong></td>
<td>(Field Wiring) 26-12 AWG, torque 4 lbs-in</td>
</tr>
<tr>
<td><strong>Weight:</strong></td>
<td>3.75 lbs</td>
</tr>
<tr>
<td><strong>Dimensions:</strong></td>
<td>6.75” high x 5.25” wide x 4.5” deep</td>
</tr>
<tr>
<td><strong>Enclosure:</strong></td>
<td>Copper-free aluminum body, epoxy powder coat finish, neoprene gasket, for hazardous areas. NEC/CEC: Class I, Division 1 &amp; 2, Groups B, C, D Class II, Division 1, Groups E, F, G Class II, Division 2, Groups F, G Class III NEMA/EEMAC: 3, 4, 4X, 7BCD, 9EFG UL Standard: 1203 CSA Standard: C22.2 No. 30 FM Classification No.: 3615 ATEX Certificate KEMA 02 ATEX 2265U IEC Standards EN:60079-0, EN:60079-1, EN:60529 Warranty: 2 years (including sensor element)</td>
</tr>
</tbody>
</table>
GG-LEL2

Key Features

- Useful for activation of electrical shunt-trip, ventilation, or fuel supply shutoff
- Industry standard linear 4/20 mA output
- Calibrated for desired combustible gas 0-100% LEL (specify target gas)
- Sensing element designed for long life in harsh industrial environments
- Class I, Div 1, Groups B, C, and D explosion-proof housing
- Designed to perform in temperatures of -40°F to +140°F
- Real-time continuous monitoring

EXPLOSION PREVENTION.

THE GG-LEL2 IS THE LAST LINE OF DEFENSE AGAINST CATASTROPHIC FAILURE.

The GG-LEL2 utilizes catalytic-bead sensor technology with a matched pair of detector elements. When combustible vapors enter the sensor, the passive bead remains unchanged while the active detector bead catalyzes the oxidation of gas, generating heat and changing its resistance. The resulting change in resistance is accurately measured across the bridge circuit.

The GG-LEL2 sensor provides an industry standard linear 4/20 mA output signal proportional to 0-100% LEL of the target gas. The transmitter is compatible with most gas detection systems and PLCs.

Long sensor life with minimal span adjustment can be expected in most applications. The sensor is designed for simple calibration and is field replaceable.

Applications

- Mechanical Rooms
- Boiler Rooms
- Heat Treatment
- Tank Rooms
- Refrigeration Systems
- Cold Storage
- Pulp and Paper
- Chemical Plants
- Breweries
- Refineries
- Maintenance Garages
- Process Areas

Benefits

- Low cost explosion protection
- Long sensor life (5-7 yrs typical)
- Simple operation & calibration
The GG-LEL2 is designed to detect and monitor potentially explosive levels of combustible gas vapors in air within the range of 0-100% LEL.

A ¾” NPT threaded conduit entrance is provided on the top of the transmitter housing. Mounting tabs are provided for support of the GG-LEL2. Long sensor life can be expected in most mechanical room applications with a typical sensor life of 5-8 years. Field replaceable sensor element keeps long term maintenance simple and low cost.

### Measurable gases
- Ethane (C2H6)
- Ethylene (C2H4)
- Hydrogen (H2)
- Methane (CH4)
- N-butane (C4H10)
- N-hexane (C6H14)
- N-pentane (C5H12)
- Propane (C3H8)

*other gases not listed*

### Ordering Information

The GG-LEL2 is delivered calibrated 0-100% LEL for your target gas and ready to install. The assembly includes sensor and transmitter mounted inside the explosion proof housing. Use the model numbers below to order.

**Order #:**
- GG-LEL2.xxx (specify target gas)
- GG-LEL2-NH3-RS (replacement sensor for ammonia)
- GG-LEL2-RS (replacement sensor for all other gases)

**Input Power:**
+24 VDC, 80 mA

**Detection Principle:**
Catalytic-Bead

**Detection Method:**
Diffusion

**Gases:**
Combustible gases listed above

**Range:**
0/100% LEL

**Output Signal:**
Linear 4/20 mA (max input impedance: 700 Ohms)

**Linearity:**
+/- 0.5% of full-scale

**Response Time:**
T50 = less than 20 seconds
T90 = less than 45 seconds

**Accuracy:**
+/- 5% of value, but dependent on calibration gas accuracy and time since last calibration

**Zero Drift:**
Less than 0.3% of full-scale per month, non-cumulative

**Span Drift:**
Application dependent, but generally less than 1% per month

**Temperature Range:**
-40°F to +140°F (-40°C to +60°C)

**Humidity Range:**
5% to 100% condensing

**Wiring Connections:**
3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft

**Terminal Block Plugs:**
12-26 AWG, torque 4 lbs-in

**Weight:**
3.5 lbs

**Warranty:**
2 years (including replacement sensor head)

**Enclosure:**
Copper-free aluminum body, epoxy powder coat finish, neoprene gasket, for hazardous areas.

**NEC/CEC:**
Class I, Division 1, Groups B, C, D
Class II, Division 1, Groups E, F, G
Class II, Division 2, Groups F, G
Class III

**NEMA/EEMAC:**
3, 4, 4X, 7BCD, 9EFG

**UL Standard:**
1203

**CSA Standard:**
C22.2 No. 30

**FM Classification No.:**
3615

**ATEX Certificate KEMA 02 ATEX 2265U**

**IEC Standards EN:60079-0, EN:60079-1, EN:60529**

**Sensor Head:**
Stainless steel flameproof enclosure constructed with an integral stainless steel sinter filter for the safe entry of the atmosphere being detected.

**ATEX Certificate CESI 01 ATEX 066 U**

**Warranty:**
2 years (including sensor element)
GG-R REFRIGERANT SENSOR

Key Features
- R22, R134a, R404a, R507a, R422d and other refrigerant gases detected
- Gas-specific infrared sensor technology
- Industry standard linear 4-20 mA output
- Corrosion, weather, and chemical resistant sensor enclosure
- Sensor designed to adapt to any harsh environment from -50°F to +120°F
- Real-time continuous monitoring
- 0-500 ppm, 0-1,000 ppm, and 0-3,000 ppm ranges available
- Self-diagnostics of sensor elements for fail-safe operation
- Meets California Air Resources Board specifications with 0-500 ppm range

INDUSTRIAL STRENGTH REFRIGERANT LEAK DETECTOR

The GG-R utilizes proven infrared sensor technology for fast and accurate leak detection. With no moving parts and no cells to replace, the GG-R provides real-time continuous monitoring and inexpensive long-term operating costs.

The GG-R is refrigerant gas specific, so false alarms from floor cleaners and food off-gassing is non-existent. The output signal is not affected by EMI/RFI, or moisture.

The GG-R provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The high-quality polycarbonate enclosure offer excellent chemical corrosion protection and high impact resistance.

Applications
- Refrigeration Systems
- Food Processing areas
- Perimeter Monitoring
- Bottling Plants
- Breweries
- Ice Rinks
- Supermarkets
- Rack Houses
- Compressor Rooms
- Pharmaceuticals
- Sea Vessels

Benefits
- Extremely long life
- Low cost of ownership
- Simple operation
- Rugged and reliable
- Versatile for any application
The standard **GG-R** sensor comes equipped with a corrosion proof enclosure. With only one sensor for any application; designing, ordering, and maintaining your refrigerant monitoring system is simple. The 0-500 ppm model provides the highest accuracy and lowest leak detection ability starting at 10 ppm, to meet the California Air Resources Board specifications.

The **GG-R** is available for two different target gas classes. The R8 model operates at approximately 8 microns wavelength and detects R123, R125, R134a, R404a, R410a, R422d, R434a, R507a, and other HFC gases. The R9 model operates at approximately 9 microns wavelength and detects R22, R11, and other CFC/HCFC gases.

The adaptive temperature control system allows the **GG-R** to automatically adjust to temperature fluctuations. Each circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and direct hose-hits from clean-up crews.

### SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change.

**Input Power:**
+24 VDC, 1A

**Detection Principle:**
NDIR (Non-Dispersive Infrared)

**Detection Method:**
Diffusion

**Gases:**
- **R8 model:** R123, R125, R134a, R404a, R410a, R422d, R434a, R507a
- **R9 model:** R11, R22, R401a, R402a

Contact us for more HFC / CFC / HCFC gases

**Ranges:**
- 0-500 ppm (standard)
- 0-1,000 ppm
- 0-3,000 ppm

Contact us for custom ranges

**Output Signal:**
Linear 4/20 mA (max input impedance: 700 Ohms)

**Linearity:**
+/- 3% of full-scale

**Repeatability:**
+/- 1% of full-scale

**Response Time:**
- T50 = less than 30 seconds
- T90 = less than 60 seconds

**Accuracy:**
+/- 2% of full-scale

**Zero Drift:**
Less than 1% of full-scale per month, non-cumulative

**Span Drift:**
Less than 1% of full-scale per month, non-cumulative

**Temperature Range:**
-50°F to +120°F (-45°C to +49°C)

**Humidity Range:**
5% to 100% condensing

**Enclosure:**
NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas

**Wiring Connections:**
- 3 conductor, shielded, stranded, with drain wire. Temperatures down to -10°F (max cable run): 1000 ft: 18AWG cable (General Cable C2535A)
  1700 ft: 16AWG cable (General Cable C2536A)
- Temperatures down to -40°F (max cable run): 500 ft: 18 AWG cable (General Cable C2535A)
  800 ft: 16 AWG cable (General Cable C2536A)
  1300 ft: 14 AWG cable (General Cable C2538A)

Contact us for cable recommendations for other temperatures.

**Terminal Block Plugs:** (Field Wiring)
26-12 AWG, torque 4.5 lbs-in

**Dimensions:**
7.5” high x 6.5” wide x 3.75” deep

**Weight:**
3 lbs

**Certification:**
ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12

**Warranty:**
2 years

---

### Ordering Information

The **GG-R** is delivered calibrated and ready to install. Use the model numbers below to order.

<table>
<thead>
<tr>
<th>Order #</th>
<th>0-500 ppm</th>
<th>0-1000 ppm</th>
<th>0-3000 ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG-R134a-500</td>
<td>GG-R134a-1000</td>
<td>GG-R134a-3000</td>
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<tr>
<td>GG-R404a-500</td>
<td>GG-R404a-1000</td>
<td>GG-R404a-3000</td>
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</tr>
<tr>
<td>GG-R410a-500</td>
<td>GG-R410a-1000</td>
<td>GG-R410a-3000</td>
<td></td>
</tr>
<tr>
<td>GG-R507a-500</td>
<td>GG-R507a-1000</td>
<td>GG-R507a-3000</td>
<td></td>
</tr>
<tr>
<td>GG-R22-500</td>
<td>GG-R22-1000</td>
<td>GG-R22-3000</td>
<td></td>
</tr>
</tbody>
</table>

*Meets California Air Resources Board specifications.

Other gases available. Contact us if your target gas is not listed.
The GG-VL-R utilizes a rugged solid-state sensor technology for fast leak detection and long life. The standard detection range of the GG-VL-R provides real-time continuous monitoring of refrigerant concentrations in your high-pressure relief vent header. High concentrations of refrigerant gases in your vent line are usually indications of a leaking valve or system overpressure. This could mean costly repairs or plant downtime, not to mention loss of refrigerant. Early detection can save money and protect equipment and personnel.

The GG-VL-R sensor provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. Expect long sensor life and virtually zero signal drift over time. Minimum maintenance requirements include only a response check twice per year.

Applications
- Refrigeration System Vent Lines (outdoor installations only)

Benefits
- Low cost
- Rugged and reliable
- Simple sensor replacement
- Typical sensor life 5 to 7 years
The GG-VL-R sensor is designed for outdoor mounting. The sensor is recommended to be mounted 3’ to 5’ above the roofline on the relief discharge to atmosphere. The 1/2” pipe nipple of the supplied mounting kit should be welded or threaded to the relief discharge. The innovative mounting kit with union allows for easy and low cost sensor replacement.

### Reliable & robust

The stainless steel enclosure provides the ultimate protection against any type of weather and will stay corrosion free. Every transmitter circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. Since the solid-state sensor is designed to endure the coldest of winters and hottest of summers, the output signal is not affected by extreme temperature variations. The life of the sensor is not affected by exposure to refrigerant gases.

### Ordering Information

The GG-VL-R sensor kit is delivered calibrated and ready to install. The kit includes the transmitter/sensor assembly and mounting kit. Use the model numbers below to order.

Order #:  
GG-VLR22  
GG-VLR134a  
GG-VLR404a  
GG-VLR507a  
GG-VLRxxx-RS (replacement sensor)

### SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Power:</strong></td>
<td>+24 VDC, 250 mA</td>
</tr>
<tr>
<td><strong>Detection Principle:</strong></td>
<td>Solid-state</td>
</tr>
<tr>
<td><strong>Detection Method:</strong></td>
<td>Diffusion</td>
</tr>
</tbody>
</table>
| **Gases:** | R22, R134a, R404a, and R507a  
Other gases available. Call for more information |
| **Ranges:** | 0/1% (10,000 ppm) |
| **Output Signal:** | Linear 4/20 mA (max input impedance: 700 Ohms) |
| **Linearity:** | +/- 5% of full-scale |
| **Repeatability:** | +/- 5% of full-scale |
| **Response Time:** | T90 = less than 30 seconds |
| **Accuracy:** | +/- 5% of full-scale, but dependent on calibration gas accuracy and time since last calibration |
| **Zero Drift:** | Less than 1% of full-scale per month, non-cumulative |
| **Span Drift:** | Less than 1% of full-scale per month, non-cumulative |
| **Temperature Range:** | -46°F to +140°F (-43°C to +60°C) |
| **Humidity Range:** | 5% to 100% condensing |
| **Wiring Connections:** | 3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft |
| **Terminal Block Plugs:** | (Field Wiring)  
12-26 AWG, torque 4 lbs-in |
| **Enclosure:** | NEMA 4X 316 stainless steel gasketed housing. Captive screw in hinged lid. For non-classified areas |
| **Dimensions:** | 4.8” high x 4.72” wide x 3.35” deep |
| **Weight:** | 5 lbs (includes mounting kit) |
| **Certification:** | ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12 |
| **Warranty:** | 2 years (including sensor element) |
GG-H2-EC

Hydrogen Sensor

Key Features

- Hydrogen specific electrochemical sensor technology. Absolutely no false alarms
- Industry standard linear 4/20 mA output
- Corrosion, weather, and chemical resistant polycarbonate sensor enclosure
- Intelligent-design enclosure temperature control for improved cell life
- Sensor designed to adapt to any harsh environment from -40°F to +120°F
- Real-time continuous monitoring for early detection of explosive concentrations
- Detection ranges of 0-10,000 ppm (25% LEL) and 0-2,000 ppm (5% LEL) H2
- 2 year warranty

Applications

- Battery Charging Rooms
- Steel Industry
- Refineries
- Perimeter Monitoring
- Heat Treatment
- Sea Vessels

Benefits

- Simple operation
- Energy savings
- Rugged and reliable

Energy savings plus prevention of explosive hydrogen gas build-up.

The perfect solution for battery room ventilation.

The GG-H2-EC utilizes proven electrochemical sensor technology for fast and accurate detection. The standard detection range provides real-time continuous monitoring of hydrogen concentrations accurately down to 200 ppm (0-2,000 ppm range), with no false alarms.

The intelligent internal temperature control of the GG-H2-EC provides optimum temperature control for extended cell life. The high-quality injection-molded polycarbonate enclosure offers excellent chemical corrosion protection and high impact resistance.

The GG-H2-EC provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The output signal is not affected by drastic temperature variations or other atmospheric conditions.
The International Fire Code section 608.6.1 states “the ventilation system shall be designed to limit the maximum concentration of hydrogen to 1% (25% LEL) of the total volume of the room” or “continuous ventilation shall be provided at a rate of not less than 1 cfm per square foot of floor area in the room”.

When using the GG-H2-EC in combination with the CTI controller line (or any other 4/20 mA input device), exhaust fan activation will prevent dangerous accumulation of explosive hydrogen gas concentrations. Since continuous ventilation can add up to huge costs, activating exhaust fans only when necessary can amount to thousands of dollars a year in energy savings for your company.

Every circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and direct hose-hits from clean-up crews.

**Ordering Information**

The GG-H2-EC is delivered calibrated and ready to install. Use the model numbers below to order.

**Order #:**

- GG-H2-EC-1000 (standard)
- GG-H2-EC-2000
- GG-H2-EC-xxxx-ST (stainless enclosure)
- GG-H2-EC-xxxx-DM (duct mount)
- GG-H2-EC-RC (replacement cell)

**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change.

<table>
<thead>
<tr>
<th>Input Power:</th>
<th>+24 VDC, 350 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection Principle:</td>
<td>Electrochemical</td>
</tr>
<tr>
<td>Detection Method:</td>
<td>Diffusion</td>
</tr>
<tr>
<td>Gases:</td>
<td>Hydrogen (H2)</td>
</tr>
<tr>
<td>Ranges:</td>
<td>0/2,000 ppm (0.2% Vol (5% LEL)) 0/10,000 ppm (1.0% Vol (25% LEL))</td>
</tr>
<tr>
<td>Output Signal:</td>
<td>Linear 4/20 mA (max input impedance: 700 Ohms)</td>
</tr>
<tr>
<td>Linearity:</td>
<td>+/- 0.5% of full-scale</td>
</tr>
<tr>
<td>Repeatability:</td>
<td>+/- 1% of full-scale</td>
</tr>
<tr>
<td>Response Time:</td>
<td>T50 = less than 10 seconds T90 = less than 30 seconds</td>
</tr>
<tr>
<td>Accuracy:</td>
<td>+/- 5% of value, but dependent on calibration gas accuracy and time since last calibration</td>
</tr>
<tr>
<td>Zero Drift:</td>
<td>Less than 0.1% of full-scale per month, non-cumulative</td>
</tr>
<tr>
<td>Span Drift:</td>
<td>Application dependent, but generally less than 3% per month</td>
</tr>
<tr>
<td>Temperature Range:</td>
<td>-40°F to +120°F (-40°C to +49°C)</td>
</tr>
<tr>
<td>Humidity Range:</td>
<td>5% to 100% condensing</td>
</tr>
<tr>
<td>Wiring Connections:</td>
<td>3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft</td>
</tr>
<tr>
<td>Terminal Block Plugs:</td>
<td>(Field Wiring) 12-26 AWG, torque 4 lbs-in</td>
</tr>
<tr>
<td>Enclosure:</td>
<td>NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>7.5” high x 6.5” wide x 3.75” deep</td>
</tr>
<tr>
<td>Weight:</td>
<td>3 lbs</td>
</tr>
<tr>
<td>Certification:</td>
<td>ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12</td>
</tr>
<tr>
<td>Warranty:</td>
<td>2 years (including sensor element)</td>
</tr>
</tbody>
</table>
GG-H2-EC-EXP

Key Features

- Explosion-proof enclosure for classified areas
- Hydrogen specific electrochemical sensor technology
- Electrochemical Sensor un-harmed from sulfur off-gasing
- 0-2,000 ppm and 0-10,000 ppm ranges
- Electronics potted to eliminate internal corrosion
- Industry standard 24VDC, linear 4-20 mA output
- Operating temperature from -4°F to +122°F
- Accurately monitor H2 levels for personnel protection
- No false alarms from interference gases
- Real-time continuous monitoring for early leak detection

AVOID POTENTIALLY EXPLOSIVE HYDROGEN GAS BUILDUP.
POISON-PROOF, EXPLOSION-PROOF DESIGN.

The GG-H2-EC-EXP is designed for detection of potentially explosive hydrogen gas in hazardous areas. The standard detection range of 0-10,000 ppm provides accurate concentrations and the ability to react before the levels reach the LEL. An alternate range of 0-2,000 ppm is also available for other applications.

The GG-H2-EC-EXP utilizes a proven hydrogen specific electrochemical sensor for detecting hydrogen gas concentrations. No false alarms due to cross-sensitivities from other gases, and no false alarms from temperature or humidity fluctuations.

The GG-H2-ECEXP provides an industry standard linear 4/20 mA output signal proportional to ppm concentration of hydrogen. Long sensor life with minimal span adjustment can be expected in most battery room applications. The sensor is designed for simple calibration and the sensor head is easily field replaceable.

Applications

- Battery Charging Rooms
- Steel Industry
- Refineries
- Perimeter Monitoring
- Heat Treatment
- Sea Vessels

Benefits

- Low cost explosion protection
- No false alarms from interference gases
- Simple operation & calibration
The International Fire Code section 608.6.1 states “the ventilation system shall be designed to limit the maximum concentration of hydrogen to 1% (25% LEL) of the total volume of the room” or “continuous ventilation shall be provided at a rate of not less than 1 cfm per square foot of floor area in the room”.

Hydrogen gas is much lighter than air and will tend to accumulate in areas by the ceiling. For optimum detection, mount the sensor at a height not lower than a few feet from the highest point in the room, keeping accessibility in mind. As a general rule of thumb, try to mount sensors within 30 feet of potential H2 sources.

The GG-H2-EC-EXP is useful for ventilation activation, and also for alarm outputs such as horn/strobes, phone dialers and other alarm functions.

Typical sensor element life is 3 years, with minimal cross-sensitivity to other gases. Field replaceable sensor element keeps long term maintenance simple and low cost. Every circuit board is potted to completely eliminate corrosion to the electronic components and copper tracing.

**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change

| Input Power: | +24 VDC, 50 mA |
| Detection Principle: | Electrochemical |
| Detection Method: | Diffusion |
| Gases: | Hydrogen (H2) |
| Ranges: | 0-2,000 ppm 0-10,000 ppm (standard) (1% Vol (25% LEL)) |
| Output Signal: | Linear 4/20 mA (max input impedance: 700 Ohms) |
| Linearity: | +/- 0.5% of full-scale |
| Repeatability: | +/- 1% of full-scale |
| Response Time: | T50 = less than 10 seconds T90 = less than 20 seconds |
| Accuracy: | +/- 5% of full-scale |
| Zero Drift: | Less than 0.1% of full-scale per month, non-cumulative |
| Span Drift: | Application dependent, but generally less than 3% per month |
| Temperature Range: | -4°F to +122°F (-20°C to +50°C) |
| Humidity Range: | 5% to 95% non-condensing |
| Wiring Connections: | 3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft |
| Terminal Block Plugs: (Field Wiring) | 26-12 AWG, torque 4 lbs-in |
| Weight: | 3.75 lbs |
| Dimensions: | 6.75” high x 5.25” wide x 4.5” deep |
| Enclosure: | Copper-free aluminum body, epoxy powder coat finish, neoprene gasket, for hazardous areas. |
| NEC/CEC: | Class I, Division 1 & 2, Groups B, C, D Class II, Division 1, Groups E, F, G Class II, Division 2, Groups F, G Class III NEMA/EEMAC: 3, 4, 4X, 7BCD, 9EFG |
| UL Standard: | 1203 |
| CSA Standard: | C22.2 No. 30 |
| FM Classification No.: | 3615 |
| ATEX Certificate KEMA 02 ATEX 2265U |
| IEC Standards EN:60079-0, EN:60079-1, EN:60529 |
| Warranty: | 2 years (including sensor element) |

Ordering Information

The GG-H2-EC-EXP is delivered calibrated and ready to install. The assembly includes sensor and potted transmitter mounted inside an explosion-proof enclosure. Use the model numbers below to order.

Order #:   
GG-H2-EC-2000-EXP  
GG-H2-EC-10000-EXP  
GG-H2-RC-EXP (replacement sensor)
GG-H2S

HYDROGEN SULFIDE SENSOR

Key Features
• H2S specific electrochemical sensor technology. Absolutely no false alarms
• Industry standard linear 4/20 mA output
• Corrosion, weather, and chemical resistant polycarbonate sensor enclosure
• Intelligent-design enclosure temperature control for improved cell life
• Temperature compensated
• Sensor designed to adapt to any harsh environment from -40°F to +120°F
• Accurately monitor OSHA’s PEL and STEL setpoints for personnel protection
• Real-time continuous monitoring for early warning
• Detection range of 0-50ppm H2S

Applications
• Sewer Gas Monitoring
• Paper Mills
• Petroleum Refineries
• Tanneries

Benefits
• Low cost
• Simple operation
• Rugged and reliable

The GG-H2S utilizes proven electrochemical sensor technology for fast and accurate leak detection. The standard detection range of the GG-H2S provides real-time continuous monitoring of carbon monoxide concentrations accurately down to 10 ppm, with no false alarms.

Every GG-H2S sensor comes equipped with an intelligent internal temperature control designed to perform in the harshest of areas. The controlled environment provides optimum moisture control for extended cell life. The high-quality injection-molded polycarbonate enclosure offers excellent chemical corrosion protection and high impact resistance.

The GG-H2S provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The output signal is not affected by drastic temperature and humidity variations during washdown. Expect an average of 4-years of cell life for most applications.
Easy ordering

The standard GG-H2S sensor is designed to work anywhere, and at a lower price than most competing models. With only one sensor for any application; designing, ordering, and maintaining your hydrogen sulfide monitoring system is simple.

Developed for corrosive environments, the GG-H2S is prepared to survive in almost any harsh industrial condition. Every circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and direct hose-hits from clean-up crews.

Ordering Information

The GG-H2S is delivered calibrated and ready to install. Use the model numbers below to order.

Order #:  
- GG-H2S-50 (standard)  
- GG-H2S-50-ST (stainless enclosure)  
- GG-H2S-50-DM (duct mount)  
- GG-H2S-RC (replacement cell)

Input Power: +24 VDC, 350 mA

Detection Principle: Electrochemical

Detection Method: Diffusion

Gases: Hydrogen Sulfide (H2S)

Ranges: 0/50ppm

Output Signal: Linear 4/20 mA (max input impedance: 700 Ohms)

Linearity: +/- 0.5% of full-scale

Repeatability: +/- 1% of full-scale

Response Time: T50 = less than 10 seconds  
T90 = less than 30 seconds

Accuracy: +/- 5% of value, but dependant on calibration gas accuracy and time since last calibration

Zero Drift: Less than 0.1% of full-scale per month, non-cumulative

Span Drift: Application dependant, but generally less than 2% per month

Temperature Range: -40°F to +120°F (-40°C to +49°C)

Humidity Range: 5% to 100% condensing

Wiring Connections: 3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft

Terminal Block Plugs: (Field Wiring)  
12-26 AWG, torque 4 lbs-in

Enclosure: NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas

Dimensions: 7.5" high x 6.5" wide x 3.75" deep

Weight: 3 lbs

Certification: ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12

Warranty: 2 years (including sensor element)
GG-H2S-EXP

Key Features
- Explosion-proof enclosure for classified areas
- Hydrogen sulfide specific electrochemical sensor technology
- 0-50 ppm factory range
- Electronics potted to eliminate internal corrosion
- Industry standard 24VDC, linear 4-20 mA output
- Operating temperature from -4°F to +122°F
- Accurately monitor OSHA/NIOSH levels for personnel protection
- No false alarms from interference gases
- Real-time continuous monitoring for early leak detection

Applications
- Sewer Gas Monitoring
- Petroleum Refineries
- Paper Mills
- Tanneries

Benefits
- Low cost explosion protection
- No false alarms from interference gases
- Simple operation & calibration

The GG-H2S-EXP is designed for detection of hydrogen sulfide vapors in hazardous areas. The standard detection range of 0-50 ppm provides real-time continuous monitoring of concentrations accurately down to 5 ppm with no false alarms.

The GG-H2S-EXP utilizes a proven hydrogen sulfide specific electrochemical sensor for detecting poisonous H2S gas concentrations. No false alarms due to cross-sensitivities from other gases, and no false alarms from temperature or humidity fluctuations.

The GG-H2S-EXP provides an industry standard linear 4/20 mA output signal proportional to ppm concentration of hydrogen sulfide. Long sensor life with minimal span adjustment can be expected in most applications. The sensor is designed for simple calibration and the sensor head is easily field replaceable.
Hydrogen sulfide gas is slightly heavier than air and will tend to accumulate in low-lying areas in poorly ventilated spaces. For optimum personnel protection (representative concentration reading that an employee would be exposed to), mount the sensor at a height in the breathing zone of the employees. It would typically be no higher than 4 to 5 feet off the ground, which also allows easy access. As a general rule of thumb, try to mount sensors within 30 feet of potential H2S sources.

The **GG-H2S-EXP** is intended for horn/strobe and ventilation activation, and is also useful for alarm outputs such as phone dialers and other alarm functions.

Typical sensor element life is 3 years, with minimal cross-sensitivity to other gases. Field replaceable sensor element keeps long term maintenance simple and low cost. Every circuit board is potted to completely eliminate corrosion to the electronic components and copper tracing on the circuit board. An explosion-proof aluminum enclosure houses the transmitter.

**Ordering Information**

The **GG-H2S-EXP** is delivered calibrated and ready to install. The assembly includes sensor and potted transmitter mounted inside an explosion-proof enclosure. Use the model numbers below to order.

**Order #:**

- GG-H2S-50-EXP
- GG-H2S-RC-EXP (replacement sensor)

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**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change.

<table>
<thead>
<tr>
<th><strong>Input Power:</strong></th>
<th>+24 VDC, 50 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Detection Principle:</strong></td>
<td>Electrochemical</td>
</tr>
<tr>
<td><strong>Detection Method:</strong></td>
<td>Diffusion</td>
</tr>
<tr>
<td><strong>Gases:</strong></td>
<td>Hydrogen Sulfide (H2S)</td>
</tr>
<tr>
<td><strong>Ranges:</strong></td>
<td>0-50 ppm</td>
</tr>
<tr>
<td><strong>Output Signal:</strong></td>
<td>Linear 4/20 mA (max input impedance: 700 Ohms)</td>
</tr>
<tr>
<td><strong>Linearity:</strong></td>
<td>+/- 0.5% of full-scale</td>
</tr>
</tbody>
</table>
| **Response Time:** | T50 = less than 30 seconds  
T90 = less than 120 seconds |
| **Accuracy:** | +/- 5% of full-scale |
| **Zero Drift:** | Less than 0.1% of full-scale per month, non-cumulative |
| **Span Drift:** | Less than 3% per month |
| **Temperature Range:** | -4°F to +122°F (-20°C to +50°C) |
| **Humidity Range:** | 5% to 95% non-condensing |
| **Wiring Connections:** | 3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft |
| **Terminal Block Plugs:** | (Field Wiring)  
26-12 AWG, torque 4 lbs-in |
| **Weight:** | 3.75 lbs |
| **Dimensions:** | 6.75” high x 5.25” wide x 4.5” deep |
| **Enclosure:** | Copper-free aluminum body, epoxy powder coat finish, neoprene gasket, for hazardous areas.  
NEC/CEC:  
Class I, Division 1 & 2, Groups B, C, D  
Class II, Division 1, Groups E, F, G  
Class II, Division 2, Groups F, G  
Class III  
NEMA/EEMAC: 3, 4, 4X, 7BCD, 9EG  
UL Standard: 1203  
CSA Standard: C22.2 No. 30  
FM Classification No.: 3615  
ATEX Certificate KEMA 02 ATEX 2265U  
IEC Standards EN:60079-0, EN:60079-1, EN:60529 |
| **Warranty:** | 2 years (including sensor element) |
**Key Features**

- Nitrogen Dioxide specific electrochemical sensor technology
- Electronics completely potted to prevent corrosion in harsh environments
- Industry standard linear 4/20 mA output
- Corrosion, weather, and chemical resistant polycarbonate sensor enclosure
- Intelligent-design enclosure temperature control for improved cell life
- Sensor designed to adapt to any harsh environment from -20°F to +120°F
- Real-time continuous monitoring for early detection of toxic concentrations
- Accurately monitor OSHA’s PEL, STEL, and IDLH setpoints
- Detection range of 0-10 ppm NO₂

**Applications**

- Truck docks
- Loading bays
- Tunnels
- Maintenance garages
- Diesel Engine Test Benches
- Air Monitoring

**Benefits**

- Low cost
- Simple operation
- Rugged and reliable

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**LONG-LIFE TOXIC NITROGEN DIOXIDE MONITORING USEFUL FOR VENTILATION CONTROL**

The GG-NO2-B utilizes proven electrochemical sensor technology for fast and accurate detection. The standard detection range of the GG-NO2-B provides real-time continuous monitoring of concentrations accurately down to 1 ppm, with no false alarms.

The intelligent internal temperature control of the GG-NO2-B provides optimum temperature control for extended cell life. The high-quality injection-molded polycarbonate enclosure offers excellent chemical corrosion protection and high impact resistance.

The GG-NO2-B provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The output signal is not affected by drastic temperature variations or other atmospheric conditions.
The standard **GG-NO2-B** sensor is designed to work anywhere, and at a lower base-model price than most competing models. With only one electrochemical sensor for any application; designing, ordering, and maintaining your nitrogen dioxide detection system is simple.

**Designed “Food Industry” tough**

The **GG-NO2-B** is prepared to survive in just about any harsh industrial condition, including acid washdown of processing areas. Every circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and direct hose-hits from clean-up crews.

Rule of thumb for personnel protection: mount sensor no higher than breathing zone (5ft off of floor) since NO2 is heavier than air and tends to sink to low-lying areas. One sensor covers approximately 4000 square feet.

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### Ordering Information

The **GG-NO2-B** is delivered calibrated and ready to install. Use the model numbers below to order.

**Order #:**
- **GG-NO2-B** (standard)
- **GG-NO2-B-ST** (stainless enclosure)
- **GG-NO2-B-DM** (duct mount)
- **GG-NO2-B-RC** (replacement cell)

---

### SPECIFICATIONS

**Due to ongoing research and product improvement, specifications are subject to change**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power:</td>
<td>+24 VDC, 350 mA</td>
</tr>
<tr>
<td>Detection Principle:</td>
<td>Electrochemical</td>
</tr>
<tr>
<td>Detection Method:</td>
<td>Diffusion</td>
</tr>
<tr>
<td>Gases:</td>
<td>Nitrogen Dioxide (NO2)</td>
</tr>
<tr>
<td>Ranges:</td>
<td>0-10ppm</td>
</tr>
<tr>
<td>Output Signal:</td>
<td>Linear 4/20 mA (max input impedance: 700 Ohms)</td>
</tr>
<tr>
<td>Linearity:</td>
<td>+/- 0.5% of full-scale</td>
</tr>
<tr>
<td>Response Time:</td>
<td>T50 + less than 60 seconds</td>
</tr>
<tr>
<td></td>
<td>T90 + less than 120 seconds</td>
</tr>
<tr>
<td>Accuracy:</td>
<td>+/- 5% of value, but dependent on calibration gas accuracy and time since last calibration</td>
</tr>
<tr>
<td>Zero Drift:</td>
<td>Less than 0.1% of full-scale per month, non-cumulative</td>
</tr>
<tr>
<td>Span Drift:</td>
<td>Application dependent, but generally less than 3% per month</td>
</tr>
<tr>
<td>Temperature Range:</td>
<td>-20°F to +120°F (-29°C to +49°C)</td>
</tr>
<tr>
<td>Humidity Range:</td>
<td>5% to 100% condensing</td>
</tr>
<tr>
<td>Wiring Connections:</td>
<td>3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft</td>
</tr>
<tr>
<td>Terminal Block Plugs:</td>
<td>(Field Wiring) 12-26 AWG, torque 4 lbs-in</td>
</tr>
<tr>
<td>Enclosure:</td>
<td>NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas.</td>
</tr>
<tr>
<td>Dimensions:</td>
<td>7.5&quot; high x 6.5&quot; wide x 3.75&quot; deep</td>
</tr>
<tr>
<td>Weight:</td>
<td>3 lbs</td>
</tr>
<tr>
<td>Certification:</td>
<td>ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12</td>
</tr>
<tr>
<td>Warranty:</td>
<td>2 years (including sensor element)</td>
</tr>
</tbody>
</table>
**GG-NO2-EXP**

**Key Features**
- Explosion-proof enclosure for classified areas
- Nitrogen dioxide selective electrochemical sensor technology
- 0-10 ppm factory range
- Electronics potted to eliminate internal corrosion
- Industry standard 24VDC, linear 4-20 mA output
- Operating temperature from -4°F to +122°F
- Accurately monitor NO2 levels for important action levels
- No false alarms from interference gases
- Real-time continuous monitoring for early leak detection

**Applications**
- Truck docks
- Loading bays
- Tunnels
- Maintenance garages
- Diesel Engine Test Benches
- Air Monitoring

**Benefits**
- Low cost explosion protection
- No false alarms from interference gases
- Simple operation & calibration

The GG-NO2-EXP is designed for detection of nitrogen dioxide vapors in hazardous areas. The standard detection range of 0-10 ppm provides real-time continuous monitoring of concentrations accurately down to 1 ppm with no false alarms.

The GG-NO2-EXP utilizes a proven nitrogen dioxide specific electrochemical sensor for monitoring toxic levels produced by diesel-powered heavy engines and other sources. No false alarms due to cross-sensitivities from other gases, and no false alarms from temperature or humidity fluctuations.

The GG-N02-EXP provides an industry standard linear 4/20 mA output signal proportional to ppm concentration of nitrogen dioxide. Long sensor life with minimal span adjustment can be expected in most applications. The sensor is designed for simple calibration and the sensor head is easily field replaceable.
Nitrogen Dioxide Sensors

Ordering Information

The GG-NO2-EXP is delivered calibrated and ready to install. The assembly includes sensor and potted transmitter mounted inside an explosion-proof enclosure. Use the model numbers below to order.

Order #: 

GG-NO2.10-EXP
GG-NO2.RC-EXP (replacement sensor)

Replacement sensor element

The GG-NO2-EXP is intended for horn/strobe and ventilation activation, and is also useful for alarm outputs such as phone dialers, bay doors and other alarm functions.

Typical sensor element life is 3 years, with minimal cross-sensitivity to other gases. Field replaceable sensor element keeps long term maintenance simple and low cost. Every circuit board is potted to completely eliminate corrosion to the electronic components and copper tracing on the circuit board. An explosion-proof aluminum enclosure houses the transmitter.

SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power:</td>
<td>+24 VDC, 50 mA</td>
</tr>
<tr>
<td>Detection Principle:</td>
<td>Electrochemical</td>
</tr>
<tr>
<td>Detection Method:</td>
<td>Diffusion</td>
</tr>
<tr>
<td>Gases:</td>
<td>Nitrogen Dioxide (NO2)</td>
</tr>
<tr>
<td>Ranges:</td>
<td>0-10 ppm (standard)</td>
</tr>
<tr>
<td>Output Signal:</td>
<td>Linear 4/20 mA (max input impedance: 700 Ohms)</td>
</tr>
<tr>
<td>Linearity:</td>
<td>+/- 0.5% of full-scale</td>
</tr>
<tr>
<td>Repeatability:</td>
<td>+/- 1% of full-scale</td>
</tr>
</tbody>
</table>
| Response Time: | T50 = less than 45 seconds  
T90 = less than 90 seconds |
| Accuracy: | +/- 5% of full-scale |
| Zero Drift: | Less than 0.1% of full-scale per month, non-cumulative |
| Span Drift: | Less than 3% per month |
| Temperature Range: | -4°F to +122°F (-20°C to +50°C) |
| Humidity Range: | 5% to 95% non-condensing |
| Wiring Connections: | 3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft |
| Terminal Block Plugs: (Field Wiring) | 26-12 AWG, torque 4 lbs-in |
| Weight: | 3.75 lbs |
| Dimensions: | 6.75” high x 5.25” wide x 4.5” deep |
| Enclosure: | Copper-free aluminum body, epoxy powder coat finish, neoprene gasket, for hazardous areas.  
NEC/CEC:  
Class I, Division 1 & 2, Groups B, C, D  
Class II, Division 1, Groups E, F, G  
Class II, Division 2, Groups F, G  
Class III  
NEMA/EEMAC: 3, 4, 4X, 7BCD, 9EFG  
UL Standard: 1203  
CSA Standard: C22.2 No. 30  
FM Classification No.: 3615  
ATEX Certificate KEMA 02 ATEX 2265U  
IEC Standards EN:60079-0, EN:60079-1, EN:60529 |
| Warranty: | 2 years (including sensor element) |
**Key Features**

- Oxygen specific electrochemical sensor technology
- 3-year cell life typical
- Industry standard linear 4/20 mA output
- Corrosion, weather, and chemical resistant polycarbonate sensor enclosure
- Temperature and moisture control for improved cell life
- Temperature compensated
- Sensor designed to adapt to any harsh environment from -30°F to +125°F
- Accurately monitor oxygen deficiency or enrichment levels
- Real-time continuous monitoring for early leak detection
- Detection ranges of 0-25% or 15-25% O2 (volume)

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**INDUSTRIAL OXYGEN LEVEL MONITORING.**

**DESIGNED “FOOD INDUSTRY TOUGH” WITH A 3-YEAR SENSOR.**

The GG-O2-C utilizes a proven oxygen sensor with a typical life-span of 3 years. With a large capacity electrolyte reservoir for exceptional cell life, the GG-O2-C electrochemical cell is designed with excellent chemical durability and is not affected by pressure changes or interference gases such as carbon dioxide.

Every GG-O2-C sensor comes equipped with an internal temperature control designed to perform in the harshest of areas. The controlled environment provides temperature and moisture control for extended cell life. The high-quality injection-molded polycarbonate enclosure offers excellent chemical corrosion protection and high impact resistance.

The GG-O2-C provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The output signal is not affected by drastic temperature variations such as washdown and defrost cycles, and is minimally affected by barometric pressure changes.

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**Applications**

- Air Quality Monitoring
- Refrigeration Systems
- Confined Space
- Tank Rooms
- Food Processing
- Breweries

**Benefits**

- Low cost of ownership
- Simple operation
- Rugged and reliable
Durability and long life

The standard GG-O2-C sensor is designed to work anywhere, and at a lower base-model price than most competing models. With the rugged extended life cell, the GG-O2-C sensor will give you years of trouble-free operation resulting in an extremely low cost of ownership. Typical alarm set points include a 19.5% alarm setpoint for oxygen deficiency monitoring for personnel protection, and 23.5% for oxygen enrichment situations.

Designed “Food Industry” tough

From hot mechanical rooms, to acid washdowns of processing areas, the GG-O2-C is prepared to survive in just about any harsh industrial condition. Every circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and direct hose-hits from clean-up crews. A stainless steel enclosure is also available for applications that require it.

Ordering Information

The GG-O2-C is delivered calibrated and ready to install. Use the model numbers below to order.

Order #:  
- GG-O2-C0 (0/25%) (standard)  
- GG-O2-C15 (15/25%)  
- GG-O2-Cxx-ST (stainless steel enclosure)  
- GG-O2-Cxx-DM (duct mount)  
- GG-O2-C-RC (replacement cell)

SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change.

Input Power:  
+24 VDC, 350 mA

Detection Principle:  
Electrochemical

Detection Method:  
Diffusion

Gases:  
Oxygen (O2)

Ranges:  
0/25% (volume)  
15/25% (volume)

Output Signal:  
Linear 4/20 mA (max input impedance: 700 Ohms)

Pressure Limits:  
0.5 to 1.5 Atmosphere

Linearity:  
+/- 1% of full-scale

Repeatability:  
+/- 1% of full-scale

Response Time:  
T50 = less than 30 seconds  
T90 = less than 60 seconds

Accuracy:  
+/- 2% of value, but dependent on calibration gas accuracy and time since last calibration

Zero Drift:  
Less than 0.1% of full-scale per month, non-cumulative

Span Drift:  
Application dependent, but generally less than 3% per month

Temperature Range:  
-30°F to +125°F (-34°C to +52°C)

Humidity Range:  
5% to 100% condensing

Wiring Connections:  
3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft

Terminal Block Plugs: (Field Wiring)  
12-26 AWG, torque 4 lbs-in

Enclosure:  
NEMA 3RX injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas

Dimensions:  
7.5" high x 6.5" wide x 3.75" deep

Weight:  
3 lbs

Certification:  
ETL listed to UL standard 61010-1, and CSA standard C22.2 No. 61010-1-12

Warranty:  
2 years (including sensor element)
GG-SO2

SULFUR DIOXIDE SENSOR

Key Features
• Sulfur Dioxide specific electrochemical sensor technology
• Electronics completely potted to prevent corrosion in harsh environments
• Industry standard linear 4/20 mA output
• Corrosion, weather, and chemical resistant polycarbonate sensor enclosure
• Intelligent-design enclosure temperature control for improved cell life
• Sensor designed to adapt to any harsh environment from -40°F to +122°F
• Real-time continuous monitoring for early detection of toxic concentrations
• Accurately provide TWA, STEL and IDLH alarms for personnel protection
• Detection range of 0-20 ppm SO2

TOXIC SULFUR DIOXIDE DETECTION FOR INDUSTRIAL APPLICATIONS

The GG-SO2 utilizes proven electrochemical sensor technology for fast and accurate detection. The standard detection range of the GG-SO2 provides real-time continuous monitoring of concentrations accurately down to 1 ppm, with no false alarms.

The intelligent internal temperature control of the GG-SO2 provides optimum temperature control for extended cell life. The high-quality injection-molded polycarbonate enclosure offers excellent chemical corrosion protection and high impact resistance.

The GG-SO2 provides an industry standard linear 4/20 mA output signal compatible with most gas detection systems and PLCs. The output signal is not affected by drastic temperature variations or other atmospheric conditions.

Applications
• Wineries
• Wastewater
• Refrigeration systems
• Perimeter Monitoring
• Heat Treatment
• Air quality
• Refineries
• Process manufacturing
• Textiles

Benefits
• Low cost
• Simple operation
• Rugged and reliable
The standard GG-SO2 sensor is designed to work anywhere, and at a lower base-model price than most competing models. With only one electrochemical sensor for any application; designing, ordering, and maintaining your sulfur dioxide detection system is simple.

The GG-SO2 is prepared to survive in just about any harsh industrial condition, including acid washdown of processing areas. Every circuit board is sealed forever in potting compound, protecting electronic components and copper tracing from corrosion. A specially vented chemical-resistant polycarbonate enclosure protects the sensor from accidental damage, weather, and direct hose-hits from clean-up crews.

Rule of thumb for personnel protection: mount sensor no higher than breathing zone (5ft off of floor) since SO2 is heavier than air and tends to sink to low-lying areas in poorly ventilated areas. One sensor covers approximately 4000 square feet.

Ordering Information
The GG-SO2 is delivered calibrated and ready to install. Use the model numbers below to order.

Order #:  
GG-SO2-20  (stainless enclosure)  
GG-SO2-20-ST (duct mount)  
GG-SO2-RC (replacement cell)

SPECIFICATIONS  
Due to ongoing research and product improvement, specifications are subject to change

Input Power:  
+24 VDC, 350 mA

Detection Principle:  
Electrochemical

Detection Method:  
Diffusion

Gases:  
Sulfur Dioxide (SO2)

Ranges:  
0-20 ppm

Output Signal:  
Linear 4/20 mA (max input impedance: 700 Ohms)

Linearity:  
+/- 0.5% of full-scale

Repeatability:  
+/- 1% of full-scale

Response Time:  
T50 = less than 60 seconds  
T90 = less than 120 seconds

Accuracy:  
+/- 5% of value, but dependent on calibration gas accuracy and time since last calibration

Zero Drift:  
Less than 0.1% of full-scale per month, non-cumulative

Span Drift:  
Application dependent, but generally less than 3% per month

Temperature Range:  
-40°F to +122°F (-40°C to +50°C)

Humidity Range:  
5% to 100% condensing

Wiring Connections:  
3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft

Terminal Block Plugs: (Field Wiring)  
12-26 AWG, torque 4 lbs-in

Enclosure:  
NEMA 3RX Injection-molded, washdown-duty polycarbonate sensor housing with hinged lid and captive screw. For non-classified areas. Optional 316L 18 GA, NEMA 3RX washdown-duty stainless steel housing with hinged lid and captive screw. For non-classified areas.

Dimensions:  
7.5" high x 6.5" wide x 3.75" deep

Weight:  
3 lbs

Warranty:  
2 years (including sensor element)
The GG-SO2-EXP is designed for detection of sulfur dioxide gas in hazardous areas. The standard detection range of 0-20 ppm provides real-time continuous monitoring of concentrations accurately down to 1 ppm with no false alarms.

The GG-SO2-EXP utilizes a proven sulfur dioxide specific electrochemical sensor for detecting toxic SO2 gas concentrations. No false alarms due to cross-sensitivities from other gases, and no false alarms from temperature or humidity fluctuations.

The GG-SO2-EXP provides an industry standard linear 4/20 mA output signal proportional to ppm concentration of sulfur dioxide. Long sensor life with minimal span adjustment can be expected in most applications. The sensor is designed for simple calibration and the sensor head is easily field replaceable.

**Applications**
- Wineries
- Wastewater
- Refrigeration systems
- Perimeter Monitoring
- Heat Treatment
- Air quality
- Refineries
- Process manufacturing
- Textiles

**Benefits**
- Low cost explosion protection
- No false alarms from interference gases
- Simple operation & calibration
Sulfur dioxide gas is twice as heavy as air and will tend to accumulate in low-lying areas in poorly ventilated rooms. For optimum personnel protection (representative concentration reading that an employee would be exposed to), mount the sensor at a height in the breathing zone of the employees. It would typically be no higher than 4 to 5 feet off the ground, which also allows easy access. As a general rule of thumb, try to mount sensors within 30 feet of potential SO2 sources.

The GG-SO2-EXP is useful for horn/strobe and ventilation activation, and is also useful for alarm outputs such as phone dialers and other alarm functions.

Typical sensor element life is 3 years, with minimal cross-sensitivity to other gases. Field replaceable sensor element keeps long term maintenance simple and low cost. Every circuit board is potted to completely eliminate corrosion to the electronic components and copper tracing on the circuit board. An explosion-proof aluminum enclosure houses the transmitter.

**Ordering Information**

The GG-SO2-EXP is delivered calibrated and ready to install. The assembly includes sensor and potted transmitter mounted inside an explosion-proof enclosure. Use the model numbers below to order.

**Order #:**
- GG-SO2-20-EXP
- GG-SO2-RC-EXP (replacement sensor)

**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change.

**Input Power:**
+24 VDC, 50 mA

**Detection Principle:**
Electrochemical

**Detection Method:**
Diffusion

**Gases:**
Sulfur dioxide (SO2)

**Ranges:**
0-20 ppm

**Output Signal:**
Linear 4/20 mA (max input impedance: 700 Ohms)

**Linearity:**
+/- 0.5% of full-scale

**Repeatability:**
+/- 1% of full-scale

**Response Time:**
- T50 = less than 20 seconds
- T90 = less than 45 seconds

**Accuracy:**
+/- 5% of full-scale

**Zero Drift:**
Less than 0.1% of full-scale per month, non-cumulative

**Span Drift:**
Application dependent, but generally less than 3% per month

**Temperature Range:**
-4°F to +122°F (-20°C to +50°C)

**Humidity Range:**
5% to 95% non-condensing

**Wiring Connections:**
3 conductor, shielded, stranded, 20 AWG cable (General Cable C2525A or equivalent) up to 1500 ft

**Terminal Block Plugs: (Field Wiring)**
26-12 AWG, torque 4 lbs-in

**Weight:**
3.75 lbs

**Dimensions:**
6.75” high x 5.25” wide x 4.5” deep

**Enclosure:**
Copper-free aluminum body, epoxy powder coat finish, neoprene gasket, for hazardous areas.

**NEC/CEC:**
- Class I, Division 1 & 2, Groups B, C, D
- Class II, Division 1, Groups E, F, G
- Class II, Division 2, Groups F, G
- Class III

**NEMA/EEMAC:**
- 3, 4, 4X, 7BCD, 9EFG

**UL Standard:**
1203

**CSA Standard:**
C22.2 No. 30

**FM Classification No.:**
3615

**ATEX Certificate KEMA:**
EN:60079-0, EN:60079-1, EN:60529

**Warranty:**
2 years (including sensor element)
Calibration Technologies gas sensor calibration kits and replacement cylinders allow for field calibration of most fixed and portable gas detectors. The disposable certified gas cylinders are N.I.S.T. traceable. After initial purchase, replacement cylinders can be ordered at any time.

Key Features
- One year shelf life for most certified gases
- Large stock of most popular concentrations
- Custom mixes available
- Replacement regulators and cylinders available
- Pressure gauge on all regulators
- Sensor calibration manuals included
- Custom flow rate regulators available

Applications
- Periodic sensor calibration requirements
- OSHA PSM compliance
- Regulatory and insurance requirements
- Safety system verification

Accessories Included
- Hard carrying case (holds two cylinders)
- 0.8 LPM regulator with pressure gauge
- Case holds (2) calibration gas bottles
- Norprene tubing and calibration cups
- Calibration manual for CTI sensors

Calibration Gas
920 N Trade Winds Pkwy, Columbia, MO 65201
866-394-5861
www.CTIengineering.com
sales@CTIengineering.com
### Ordering Information

**17L Calibration Kit**
- **Part number**: Cal Kit 17L
- **Description**: Calibration Kit with regulator for 17 liter bottles, calibration cups for all GG sensors, and rugged carrying case that holds two bottles (gas not included)

**17L Calibration Gas Bottles**
- **Part number**: RB17L
- **Description**: 25 ppm ammonia, 50 ppm ammonia, 100 ppm ammonia, 500 ppm ammonia, 1000 ppm ammonia, 1.0% ppm ammonia, 2.0% ppm ammonia, Zero air (20.9% O2), 500 ppm carbon dioxide, 1.0% carbon dioxide, 3.0% carbon dioxide, 5.0% carbon dioxide, 15% oxygen, 100% nitrogen, 200 ppm carbon monoxide, 1.0% methane, 2.5% methane, 2000 ppm hydrogen, 1.0% hydrogen (25% LEL), 500 ppm R22, 1000 ppm R22, 3000 ppm R22, 500 ppm R134a, 1000 ppm R134a, 3000 ppm R134a, 500 ppm R404a, 1000 ppm R404a, 3000 ppm R404a, 500 ppm R507a, 1000 ppm R507a, 3000 ppm R507a, 100 ppm Isobutylene

**29L Calibration Kit**
- **Part number**: Cal Kit 29L
- **Description**: Calibration Kit with regulator for 29 liter bottles, calibration cups for all GG sensors, and rugged carrying case that holds two bottles (gas not included)

**29L Calibration Gas Bottles**
- **Part number**: RB29L
- **Description**: 25 ppm ammonia, 50 ppm ammonia, 100 ppm ammonia, 500 ppm ammonia, 1000 ppm ammonia, 1.0% ppm ammonia, 2.0% ppm ammonia, Zero air (20.9% O2), 500 ppm carbon dioxide, 1.0% carbon dioxide, 3.0% carbon dioxide, 5.0% carbon dioxide, 15% oxygen, 100% nitrogen, 200 ppm carbon monoxide, 1.0% methane, 2.5% methane, 2000 ppm hydrogen, 1.0% hydrogen (25% LEL), 500 ppm R22, 1000 ppm R22, 3000 ppm R22, 500 ppm R134a, 1000 ppm R134a, 3000 ppm R134a, 500 ppm R404a, 1000 ppm R404a, 3000 ppm R404a, 500 ppm R507a, 1000 ppm R507a, 3000 ppm R507a, O2, CH4, CO, H2S (18%, 50% LEL, 100 ppm, 25 ppm)
SHA-24 HORN / STROBE

Key Features
- Weatherproof design for outdoor or washdown installations
- 24 VDC operation (16-33V range)
- Separate horn and strobe circuits allow for multiple wiring configurations
- High intensity intermittent strobe flash
- Blue, amber, red, or clear strobe lenses available
- Field selectable horn tone – continuous, temporal, or chime pattern
- Corrosion, weather, and chemical resistant enclosure for washdown areas
- Labeled for ammonia, but sticker can be removed for use with other gases

HIGH VISIBILITY IN A WEATHER-PROOF PACKAGE.
THE PERFECT ADDITION TO YOUR GAS DETECTION SYSTEM.

The SHA series horn/strobe is designed to provide audible/visual signal for life safety and property protection. The SHA-24 meets or exceeds NFPA/ANSI standards and UL464/UL1638.

The horn provides either a continuous tone or a temporal pattern tone. The horn and strobe can be connected independently or in unison. The horn can be silenced while the strobe remains flashing.

The SHA series horn/strobe is housed in a durable poly enclosure, able to withstand weather and washdown environments. A weatherproof mounting backbox is included.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>STROBE INTENSITY</td>
<td>65 Candela</td>
</tr>
<tr>
<td>SOUND OUTPUT</td>
<td>99 dB @ 10 ft</td>
</tr>
<tr>
<td>FLASH RATE</td>
<td>1 flash per second</td>
</tr>
<tr>
<td>SUPPLY VOLTAGE</td>
<td>+24 VDC (16-33V) @ 150 mA</td>
</tr>
<tr>
<td>OPERATING TEMPERATURE</td>
<td>-40°F to +150°F</td>
</tr>
<tr>
<td>DIMENSIONS</td>
<td>6” X 7” X 5” (H x W x D)</td>
</tr>
<tr>
<td>ENCLOSURE RATING</td>
<td>IP65 / NEMA 4X</td>
</tr>
<tr>
<td>APPROVALS</td>
<td>UL1638</td>
</tr>
</tbody>
</table>

Designed to meet or exceed ANSI/NFPA

Due to ongoing research and product improvement, specifications are subject to change.

Order #: SHA-24-Blue
         SHA-24-Amber
         SHA-24-Red
         SHA-24-Clear

All units labeled “Ammonia” unless otherwise specified.
**Wiring Diagram**

The SHA-24 can be wired to operate the horn and strobe together or as two individual circuits.

**Figure 1**
Strobe and Horn to operate together (with dipswitches 1 and 2 ON)

**Figure 2**
Strobe and Horn to operate independently (with dipswitches 1 and 2 OFF)

**Dipswitch Settings**

The SHA-24 is shipped with default settings for 4-wire operation and optimal horn settings. The following describes the dipswitch settings.

**Horn/strobe operation:**
1 and 2 ON = Horn/strobe on 2 wires
1 and 2 OFF = Horn and Strobe on 4 wires

**Volume:**
6 ON = High
6 OFF = Low

**Tone Settings**

<table>
<thead>
<tr>
<th>Tone</th>
<th>Switch Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Temporal 3</td>
<td>ON ON ON</td>
</tr>
<tr>
<td>Mechanical Continuous</td>
<td>OFF ON ON</td>
</tr>
<tr>
<td>2400 Hz - Temporal 3</td>
<td>ON OFF ON</td>
</tr>
<tr>
<td>2400 Hz 0 Continuous</td>
<td>ON ON OFF</td>
</tr>
<tr>
<td>Chime - Terminal 3</td>
<td>OFF ON OFF</td>
</tr>
<tr>
<td>Chime - Continuous</td>
<td>OFF ON OFF</td>
</tr>
<tr>
<td>Whoop</td>
<td>ON OFF OFF</td>
</tr>
<tr>
<td>Whoop</td>
<td>OFF OFF OFF</td>
</tr>
</tbody>
</table>

*100 dB based on anechoic rating using default switch settings as shown. Anechoic dBA is measured on axis in a non-reflective (free field) test room using fast meter peak response. Reverberant dBA is a minimum UL rating based on sound power measurements in a reverberant test room.*
**SHA-120 HORN / STROBE**

**Key Features**
- 120 VAC, two-wire connection
- Horn and strobe activate together
- Blue, amber, red, green, or clear strobe lens covers available
- Field selectable horn tone – continuous or temporal pattern
- Field selectable candela settings – low to high intensity flash
- Corrosion, weather, and chemical resistant enclosure for washdown areas
- Weatherproof backbox included for outdoor installation
- -40°F to 150°F, NEMA 4X
- Labeled for ammonia, but sticker can be removed for use with other gases

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**HIGH VISIBILITY IN A WEATHER-PROOF PACKAGE.**

**THE PERFECT ADDITION TO YOUR TOXIC GAS ALERT SYSTEM.**

The SHA-120 series horn/strobe is designed to provide audible/visual signal for life safety and property protection. The SHA-120 meets or exceeds NFPA/ANSI standards and UL464/UL1638.

The horn provides either a continuous tone or a temporal pattern tone, with a 3-position volume switch. A slide switch allows for several candela settings from low to high intensity.

The SHA-120 series horn/strobe is housed in a durable poly enclosure, able to withstand weather and washdown environments. A 120VAC adapter plate and weather-proof mounting backbox is included.

---

**SPECIFICATIONS**

**STROBE INTENSITY:** 15 to 185 Candela  
**SOUND OUTPUT:** 99 dB @ 10 ft  
**FLASH RATE:** 1 flash per second  
**SUPPLY VOLTAGE:** 120 VAC, 150 mA max  
**OPERATING TEMPERATURE:** -40°F to +150°F  
**DIMENSIONS:** 6” X 7” X 5” (H x W x D)  
**APPROVALS:** UL listed

Designed to meet or exceed ANSI/NFPA standards and ADA accessibility guideline

**Configurations**

All units labeled “Ammonia” unless otherwise specified.

- **Order #:** SHA-120-Blue  
- SHA-120-Amber  
- SHA-120-Red  
- SHA-120-Green  
- SHA-120-Clear

---
**Wiring Diagram**

**Multiple Devices**
- Black/hot from 120V horn/strobe relay terminal
- White/neutral

**Single Device**
- Black/hot from 120V horn/strobe relay terminal
- White/neutral

**Components / Assembly**

**Dimensions**
- 4.7” x 5.6”
- 4.5”

**Horn Tones**
*indicates default settings

<table>
<thead>
<tr>
<th>Switch</th>
<th>Sound Pattern</th>
<th>dB Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>*1</td>
<td>Temporal</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>Temporal</td>
<td>Medium</td>
</tr>
<tr>
<td>3</td>
<td>Temporal</td>
<td>Low</td>
</tr>
<tr>
<td>4</td>
<td>Non-Temporal</td>
<td>High</td>
</tr>
<tr>
<td>5</td>
<td>Non-Temporal</td>
<td>Medium</td>
</tr>
<tr>
<td>6</td>
<td>Non-Temporal</td>
<td>Low</td>
</tr>
<tr>
<td>7</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

**Candela Rating**
*indicates default settings

<table>
<thead>
<tr>
<th>Strobe Output (cd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*15</td>
</tr>
<tr>
<td>15/75</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>75</td>
</tr>
<tr>
<td>95</td>
</tr>
<tr>
<td>110</td>
</tr>
<tr>
<td>115</td>
</tr>
<tr>
<td>135</td>
</tr>
<tr>
<td>150</td>
</tr>
<tr>
<td>177</td>
</tr>
<tr>
<td>185</td>
</tr>
</tbody>
</table>
**STACKLIGHT**

**Key Features**
- 24VDC with low power consumption (120VAC also available)
- LEDs provide 50,000 hours working life for zero maintenance
- Flashing colored light modules display at-a-glance alarm status
- User selectable horn tone – continuous or temporal pattern
- Fluted light modules allow for easy viewing even in sunlight
- Separate horn and light circuits allow for multiple wiring configurations
- Corrosion, weather, and washdown area safe
- Custom configurations available

---

**AT-A-GLANCE INFORMATION FOR THE ULTIMATE IN PERSONNEL PROTECTION.**

**A MUST-HAVE FOR ANY TOXIC GAS ALERT SYSTEM.**

The Omni-directional LED lights and horn provide vital life-safety information to protect your personnel. The differentiated colors also provide crucial indications as to the severity of the leak situation. Housed in durable polycarbonate modules, the bright LEDs provide over 50,000 work hours of maintenance free life. The 100dB horn comes standard and has selectable settings for continuous tone or a temporal pattern tone. The Stack Light casing has a sealant rating of IP55 (total ingress protection from dust and water spray from any direction). The two mounting adaptors allow easy panel mount or ½” EMT conduit mount installation.

---

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>OPERATING TEMPERATURE:</th>
<th>-10°F to +125°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOUND OUTPUT:</td>
<td>100 dB @ 10 ft</td>
</tr>
<tr>
<td>SOUND FREQUENCY:</td>
<td>2500 to 2900 Hz (temporal or steady)</td>
</tr>
<tr>
<td>FLASH TYPE:</td>
<td>Flashing (84 fpm) (Green LED module is non-flashing)</td>
</tr>
<tr>
<td>POWER: +24 VDC:</td>
<td>(40 mA max each LED module; 180 mA buzzer)</td>
</tr>
<tr>
<td>POWER: +120 VAC:</td>
<td>(10 mA max each LED module; 50 mA buzzer)</td>
</tr>
<tr>
<td>MATERIAL:</td>
<td>polycarbonate</td>
</tr>
<tr>
<td>PROTECTION DEGREE:</td>
<td>IP 64</td>
</tr>
<tr>
<td>UL LISTED</td>
<td></td>
</tr>
</tbody>
</table>

**Configurations**

Custom configurations available.

**Order #:**
- **SL-24-F-R-B** (red module)
- **SL-24-F-AR-B** (amber and red modules)
- **SL-24-F-GAR-B** (green, amber, and red modules)
- **SL-24-F-BWAR-B** (blue, white, amber, and red modules)
- **SL-24-F-BGAR-B** (blue, green, amber, and red modules)
- **SL-24-F-GWAR-B** (green, white, amber, and red modules)
- **SL-120-F-R-B** (red module)
- **SL-120-F-AR-B** (amber and red modules)
- **SL-120-F-GAR-B** (green, amber, and red modules)
- **SL-120-F-BWAR-B** (blue, white, amber, and red modules)
- **SL-120-F-BGAR-B** (blue, green, amber, and red modules)
- **SL-120-F-GWAR-B** (green, white, amber, and red modules)
The audible LED stack lights are designed for visual and audible signaling in order to display the real-time status of the gas detection system. Up to 7 modules can be combined into one stacklight assembly.

Below is an example configuration:

**Green Light On** (optional)
Steady on. No leaks detected. Gas concentration is below the low alarm level. Workplace assumed safe for personnel. Turns off upon alarm.

**Amber Light Flashing**
Low alarm level reached. Gas concentration may require limited time allowable for personnel. Emergency ventilation if possible.

**Red Light Flashing**
High alarm level reached. Gas concentration dangerous. Evacuation and equipment shutdown may be required.

**Audible Alarm**
High alarm level reached. Gas concentration dangerous. Evacuation and equipment shutdown may be required.

**Audible Alarm**
High alarm audio signaling buzzer temporal or steady

**LED Module**
High-alarm visual indicator, red Flashing

**LED Module**
Low-alarm visual indicator, amber Flashing

**LED Module**
System normal visual indicator, green Steady

**Wiring Module**
Contains screw terminals and wiring

**Wiring Module**
"C" terminal is Common to all connected modules.
Numbers 1 through 7 refer to the modules, from the base to the top.

C = Common (power supply ground)
1 = +24VDC for first module
2 = +24VDC for second module
3 = +24VDC for third module
4 = +24VDC for fourth module
5 = +24VDC for fifth module
6 = +24VDC for sixth module
7 = +24VDC for seventh module

**Mounting Adaptors Included**
7/8" threaded male adaptor for panel mount and ½" EMT conduit compression fitting included.

**Available Colors**
- White
- Red
- Yellow
- Amber
- Green
- Blue
High Output Horn/Strobe

**Key Features**
- IP66 Weatherproof design for outdoor or washdown installations
- Available for 120VAC or 24VDC
- 110 dB horn
- Separate horn and strobe circuits allow for multiple wiring configurations
- High intensity intermittent Xenon strobe flash
- Blue, amber, and red strobe lenses available
- 80 Field selectable tones - with 4 inputs to control 4 different tones
- 360° visible field for strobe
- Labeled for ammonia, custom labels available upon request
- 2-year warranty

**SPECIFICATIONS**

- **OPERATING TEMPERATURE:** -40°F to +130°F
- **SOUND OUTPUT:** 110 dB
- **FLASH RATE:** 1 flash per second (1 Hz)
- **FLASH ENERGY:** 10 Joules
- **POWER:** 24 VDC or 120 VAC (specify)
- **MATERIAL:** UV resistant Polycarbonate/ABS
- **PROTECTION DEGREE:** IP 66
- **CURRENT DRAW:** 1040 mA @ 24VDC / 450 mA @ 120 VAC
- **DIMENSIONS:** 10.6” x 8.4” x 6.1”
- **LISTING:** UL, cUL, CE

**Configurations**

All units labeled “Ammonia” unless otherwise specified.

<table>
<thead>
<tr>
<th>Order #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHA-PAX-110-120-Blue</td>
<td>110dB</td>
</tr>
<tr>
<td>SHA-PAX-110-120-Red</td>
<td>110dB</td>
</tr>
<tr>
<td>SHA-PAX-110-120-Amber</td>
<td>110dB</td>
</tr>
<tr>
<td>SHA-PAX-110-24-Blue</td>
<td>110dB</td>
</tr>
<tr>
<td>SHA-PAX-110-24-Red</td>
<td>110dB</td>
</tr>
<tr>
<td>SHA-PAX-110-24-Amber</td>
<td>110dB</td>
</tr>
</tbody>
</table>

SHA-PAX horn/strobe is designed to provide audible/visual signal for life safety and property protection. The SHA-PAX is available in both 120VAC and 24VDC versions, and is listed with UL, cUL, and CE.

The SHA-PAX features a 110dB horn, and can be wired with the horn and strobe operating simultaneously, or independently of each other. There are 80 field selectable tones for the horn, and the strobe is visible from 360°.

The SHA-PAX is housed in a UV resistant Polycarbonate/ABS enclosure, able to withstand weather and washdown environments from -40°F to 130°F.
Terminal for operating voltage - Sounder-beacon combination:

**Figure 1**
Strobe and horn operate together (default setting)

**Figure 2**
Strobe and horn operate independently

Hole pattern inside of housing
EMERGENCY PUSHBUTTON SWITCHES

Key Features
- 40 mm push/pull latching mushroom pushbutton switch
- Tamper-proof clear switch cover
- IP66/NEMA 4 weatherproof design for outdoors or washdown environments
- 120 VAC or 24 VDC
- Form C dry contacts, 1.5 Amp
- Circuit board with terminal block for wire landings
- Mounting flanges for wall mounting
- Solution for compressor room E-stop / E-vent / EPCS applications
- 2-year warranty

INDOOR / OUTDOOR COMPRESSOR ROOM PUSHBUTTON SWITCHES

Emergency pushbutton switches are an important part of any control system. They are ideal for protecting personnel and property, allowing the user to press the buttons for emergency stop/ventilation control, in addition to triggering the relays through the gas detection system.

The Emergency-Stop, Emergency-Ventilation and Emergency Pressure Control switches can be used with 24 VDC or 120 VAC, and have two sets of 1.5A contacts (one set of NO, and one set of NC). The Tamper-proof flip-cover meets most new codes, including IIAR-2 2014.

The switches are housed in a durable NEMA 4 polycarbonate enclosure, able to withstand weather and washdown environments for indoor or outdoor mounting applications. A terminal block for wire landings, and mounting flanges are also included for easy installation.

SPECIFICATIONS

CONTACTS RATING: 1.5A, 120VAC or 24VDC
ENCLOSURE: Polycarbonate, IP66/NEMA 4
OPERATING TEMPERATURE: -40°F to +150°F
MOUNTING PLATE: Anodized aluminum
CONTACTS: Form C dry contacts
ACTUATOR: Pull to release, mushroom 40 mm
MECHANICAL DURABILITY: 500,000 cycles
ILLUMINATION: Non-illuminated
DIMENSIONS: 5.1” high x 4.2” wide x 4” deep
LISTING: UL, CE

Order #: SB-ES1 Emergency Stop pushbutton switchbox, tamper-proof flip-cover, NEMA 4 enclosure
SB-EV1 Emergency Ventilation pushbutton switchbox, tamper-proof flip-cover, NEMA 4 enclosure
SB-EPCS1 Emergency Pressure Control Switch pushbutton switch box, tamper-proof flip-cover, NEMA 4 enclosure

All pushbutton switches are pre-installed and wired in their enclosures.
ANSI / IIAR 2-2014:

6.12 Emergency Control Switches

6.12.1 Emergency Stop Switch. A clearly identified emergency shut-off switch with a tamper-resistant cover shall be located outside and adjacent to the designated principal machinery room door. The switch shall provide off-only control of refrigerant compressors, refrigerant pumps, and normally closed automatic refrigerant valves located in the machinery room. The function of the switch shall be clearly marked by signage near the controls.

6.12.2 Emergency Ventilation Control Switch. A clearly identified control switch for emergency ventilation with a tamper-resistant cover shall be located outside the machinery room and adjacent to the designated principal machinery room door. The switch shall provide “ON/AUTO” override capability for emergency ventilation. The function of the switch shall be clearly marked by signage near the controls.

Appendix I.4.5.2 Where required by the fire department, the EPCS should be provided with a remote switch for manual activation.

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Wiring Diagram

![Wiring Diagram Image]

Circuit board wiring terminal

Form C Dry Contact (SPDT)
EMERGENCY VENTILATION SWITCH

Key Features
- On/Auto 2 position ventilation selector switch
- Tamper-proof clear switch cover
- IP66/NEMA 4 weatherproof design for outdoors or washdown environments
- 120 VAC or 24 VDC
- 10 Amp dry contacts
- Circuit board with terminal block for wire landings
- Mounting flanges for wall mounting
- 2-year warranty

INDOOR/OUTDOOR EMERGENCY VENTILATION SWITCH

The use of an Emergency Ventilation switch provides On or Auto circuit selection for proper engine room operation. They are ideal for protecting personnel and property, allowing operators full override control as necessary.

The emergency ventilation switch can be used with 24 VDC or 120 VAC, and has one set of 10 Amp dry contacts that is open in the "Auto" position, and closed in the "On" position. The Tamper-proof flip-cover meets most new codes, including IIAR-2 2014.

The switches are housed in a durable NEMA 4 polycarbonate enclosure, able to withstand weather and washdown environments for indoor or outdoor mounting applications. Mounting flanges are also included for easy installation.

SPECIFICATIONS

| CONTACTS RATING: | 10A, 120VAC or 24VDC |
| ENCLOSURE: | Polycarbonate, IP66/NEMA 4 |
| OPERATING TEMPERATURE: | -40°F to +150°F |
| MOUNTING PLATE: | Anodized aluminum |
| CONTACTS: | 1 set dry contacts |
| MECHANICAL DURABILITY: | 500,000 cycles |
| ILLUMINATION: | Non-illuminated |
| DIMENSIONS: | 5.1” high x 4.2” wide x 4” deep |
| LISTING: | UL, CSA, CE |

Configurations

Order #: SB-VS1

Emergency Ventilation selector switchbox, tamper-proof flip-cover, NEMA 4 enclosure

Due to ongoing research and product improvement, specifications are subject to change.
ANSI / IIAR 2-2014:
6.12 Emergency Control Switches
6.12.2 Emergency Ventilation Control Switch. A clearly identified control switch for emergency ventilation with a tamper-resistant cover shall be located outside the machinery room and adjacent to the designated principal machinery room door. The switch shall provide “ON/AUTO” override capability for emergency ventilation. The function of the switch shall be clearly marked by signage near the controls.

Example Wiring Diagram
KEY FEATURES

- Stainless steel 22 mm momentary pushbutton switch
- LED ring backlit for higher visibility
- IP66/NEMA 4 weatherproof design for outdoors or washdown environments
- 24 VDC rated (provided by GG-6 control panel)
- 1.5 Amp normally open contacts
- Circuit board with terminal block for wire landings
- Mounting flanges for wall mounting
- Solution for compressor room ventilation remote reset application
- Silence switch allows operators to silence horns if desired
- 2-year warranty

REMOTE RESET AND SILENCE SWITCHES FOR GAS DETECTION SYSTEMS

The R1 and SR1 switches allow the GG-6 control panel to be located outside of the compressor room with the Reset and Silence switches located inside the compressor room for easy access.

The switches are connected to the GG-6 controller via three wires for the reset switch and four wires for the silence/reset and has wire terminals on the circuit board for optional switch lighting.

The switches are housed in a durable polycarbonate enclosure, able to withstand weather and washdown environments for indoor or outdoor mounting applications. A terminal block for wire landings, and mounting flanges are also included for easy installation.

SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change.

ENCLOSURE: Polycarbonate, IP66/NEMA 4
OPERATING TEMPERATURE: -40°F to +150°F
MOUNTING PLATE: Anodized aluminum
CONTACTS: (2) NO
ACTUATOR: Momentary
MECHANICAL DURABILITY: 300,000 cycles
ILLUMINATION: Non-illuminated
CURRENT RATING: 1.5A (24VDC)
DIMENSIONS: 5.1” high x 4.2” wide x 4” deep

CONFIGURATIONS

All pushbutton switches are pre-installed and wired in their enclosures.

Order #:  

SB-R1  GG-6 Reset pushbutton switchbox, LED, momentary, NEMA 4 enclosure
SB-SR1  G-6 Silence and Reset pushbutton switchbox, LED, momentary, NEMA 4 enclosure
ANSI / IIAR 2-2014:
6.13 Ammonia Detection and Alarm
6.13.2.3 Detection of ammonia concentrations equal to or exceeding 150 ppm (1/2 IDLH) shall activate visual indicators and an audible alarm and shall activate emergency ventilation, where required, in accordance with Section 6.14.7. Once activated, emergency ventilation shall continue to operate until manually reset by a switch located in the machinery room.

Wiring Diagram (for SR1)
For the SB-R1 model, only 3 conductors are needed for remote silence function.

Use 20 AWG 4-conductor cable (ground required for LED ring backlight.)

Circuit board wiring terminal

GG-6 power supply  Backside of GG-6 operator interface
The Relay Module is an economical solution to adding a fail-safe relay output to any 4-20 mA device. It can be directly mounted and wired to any GG sensor to provide equipment shutdown such as rooftop AHU’s, solenoid valves, etc. The relay module can also be used with a horn strobe to provide audio visual notification at the sensor location.

The 4-20 mA analog signal feeds through the relay module to maintain the existing function of the gas sensor or output device. The alarm setpoint is adjusted via rotary switches in 1% increments for varying alarm setpoints between 1-99% of full scale. The relay will trip once the signal reaches the setpoint on the relay module.

The circuit board of the Relay Module is potted inside the conduit body to completely prevent corrosion due to water or moisture, and is able to withstand harsh weather and washdown environments. This allows the relay module to be used in any environment you place your CTI detector. A 10” 3-wire pigtail is built in for easy wiring to the gas detector.

**Key Features**

- 4-20 mA feed-through design maintains signal output function
- Relay output with Form C dry contacts, 8A, 24VDC, or 120VAC
- 24VDC power requirements with 4-20 mA signal input
- 2-second alarm / 10-second clear, non-latching relay
- Circuit board with terminal block for easy wire landings
- Adjustable alarm setpoints (1-99% of scale), with rotary switches
- Threaded insert allows for 1/2” or 1” conduit and fittings
- LR rigid conduit body allows for outdoor or wash-down installation
- Economical alternative to long control-wiring pulls
- 2 year warranty

**EASILY ADD A FAIL-SAFE RELAY OUTPUT TO ANY 24VDC 4-20 MA DEVICE**

**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change

**POWER REQUIREMENTS:** 24VDC, 20mA (plus 1A max current draw of attached device)

**ANALOG INPUT IMPEDENCE:** 10 Ohms

**RELAY:** (1) SPDT relay, Form C contacts, 8A @ 24VDC, 8A @ 120VAC, normally energized, non-latching, Status LED shows relay state

**RELAY TIME DELAY:** 2 second on, 10 seconds off

**FAIL SAFE FUNCTION:** Sensor fault (0.5 mA) or loss of power will de-energize the relay

**FAULT SETPOINT:** 1 mA

**ALARM DIRECTION:** Upscale only

**ENCLOSURE:** Powder coated aluminum, LR conduit body

**OPERATING TEMPERATURE:** -40°F to +122°F

**WARRANTY:** 2 years

**Order #: RM420-LR**

Relay Module 4-20mA, LR Configuration

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**RM420-LR**

**RELAY MODULE**

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**CTI CALIBRATION TECHNOLOGIES INC.**

**GAS DETECTION SPECIALISTS**

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920 N Trade Winds Pkwy, Columbia, MO  65201   866-394-5861    www.CTIengineering.com    sales@CTIengineering.com
The Relay Module can be used as a stand-alone device or feed-through, either terminating the 4-20mA signal, or passing it through to a controller input.

Precise alarm setpoints in 1% of full-scale increments are achieved using the two rotary switches. For example, setting the switches to positions 2 and 5 (from left to right), equates to 25% of full-scale (or 8 mA). The relay will trip once the signal reaches the setpoint. The fail-safe design also de-energizes the relay upon loss of power or sensor fault.

To test the relay, turn both rotary switches to 0. This will instantaneously de-energize the relay and allow verification of the relay output. To clear the relay, adjust the switches back to their intended alarm positions.

Wiring Diagram

**Figure 1**
Feed-through configuration

**Figure 2**
Stand-alone configuration
TEMPERATURE SENSOR

Key Features

• -60°F to +160°F range (-51°C to +71°C)
• 2-wire transmitter with RTD probe
• 24VDC, industry standard linear 4-20 mA output
• Easily adapted to GG line gas detection controllers
• Great for engine room ventilation control and refrigerated areas
• Watertight enclosure designed for washdown areas and outdoors
• Long term accuracy/stability of 0.1% of span/year

USE IN CONJUNCTION WITH CTI GAS SENSORS FOR A COMPLETE ENGINE ROOM VENTILATION SYSTEM PACKAGE

The Temp Sensor TS2 was designed for indoor/outdoor temperature monitoring. The IP65 aluminum enclosure can withstand washdown areas and other harsh environments. A fast-acting RTD reacts quickly to temperature changes and features a very long expected life with no change in accuracy.

This sensor is used for measuring indoor air temperature. Typical applications are mechanical rooms, refrigerated rooms, etc. Installation should be about 6 ft off the floor, and not located near a cooling or heat source, or directly in front of air blowing channels.

The Temp Sensor TS2 connects to any 24Vdc, 4-20mA controller via 2-conductor cable. The weatherproof powder-coated enclosure will easily stand up to harsh environments.

Applications

• Engine Rooms
• Refrigerated areas
• Mechanical Rooms
• Sea Vessels
• Chemical Plants
• Heat Treatment

Benefits

• Easy integration
• Long-term reliability
The Temp Sensor TS2 is an easy solution for ventilation or temperature control and integrates nicely with the GG line controllers.

This simple 2-wire device mounts almost anywhere and can be installed side-by-side with gas sensors to provide temperature and gas detection monitoring points at each location.

The Temp Sensor TS2 is shipped with a factory calibration that should not require calibration for 5-10 years. Checking against a calibrated standard is recommended on an annual basis.

**Installation Information**

- Use 2 or 3-conductor, insulated, stranded, shielded copper cable.
- Do not pull sensor wiring with AC power cables. This can cause electrical interference.
- Ground the shield at the main control panel. Connect the shield wire to the sensor chassis.
- Should be easily accessible for calibration and maintenance.
- Take air movement and ventilation patterns into account.

**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change

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**Ordering Information**

The Temp Sensor TS2 is delivered ready to install. Use the model number below to order.

Order #: Temp Sensor TS2

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**Input Power:**

24 VDC, 25 mA

**Output Signal:**

Linear 4/20 mA (max input impedance: 700 Ohms)

**Linearity:**

+/- 0.1% of full-scale

**Repeatability:**

+/- 1% of full-scale

**Accuracy:**

+/- 1% of full-scale

**Zero Drift:**

Less than 0.1% of full-scale per month, non-cumulative

**Span Drift:**

Less than 0.1% of full-scale per year

**Temperature Range:**

-60°F to +160°F (-51°C to +71°C)

**Humidity Range:**

0-95% RH condensing (100% intermittent), with proper conduit seals

**Wiring Connections:**

2-conductor, shielded, stranded, ≥ 20 AWG cable up to 1500 ft

**Terminal Block:** (Field Wiring)

16-26 AWG, torque 4 lbs-in

**Enclosure:**

Powder-coated aluminum NEMA 4X, Captive screws in lid. For non-classified areas

**Dimensions:**

4.6" high x 3.4" wide x 1.75" deep

**Weight:**

1 lb

**Warranty:**

2 years
**Key Features**

- Smaller and 50% lighter than competing instruments
- Water-resistant design in an integral concussion-proof enclosure
- Large LCD allows for easy-to-read monitoring
- Integral motorized pump for remote sampling and fast response
- AA battery powered for easy replacement (rechargeables available)
- 95 dB alarm tone, bright LED alarm bars, & internal vibrating alarm
- Auto backlight activates in low light & when in alarm
- Four alarm levels: instantaneous Low Alarm, High Alarm, TWA, and STEL
- Records TWA, STEL, and max gas exposures (displays readings on command)
- Datalogger with programmable sampling intervals
- Full self-test of sensor, battery, circuit integrity, and audible/visual alarms

**With full-range detection from 0 ppm to 100% LEL,**
**it’s the only portable ammonia detector you’ll ever need.**

The NH3 Responder utilizes two sensor technologies to cover the ranges of interest in an ammonia response operation. The low-level sensor PID sensor detects ammonia concentration readings within the range of 0-1,000 ppm for the 35 ppm PEL and 300 ppm IDLH decision making points. At concentrations over 4,000 ppm, the PID sensor will display “OL” and the LEL sensor takes over, giving you 3-100% LEL readings for the explosive-levels decision making range. Most response trainers recommend leaving the area at 10% LEL.

Additionally, the PID sensor has an extremely fast response time and is useful for finding small ammonia leaks. Think of it as an “electronic sulfur stick”. Refrigeration technicians will find this a useful tool for locating difficult-to-find leaks by “sniffing” around valve packing, sight glasses, shaft seals, etc.

**Applications**

- Compressor Rooms
- Tank Rooms
- Vent Lines
- Air Monitoring
- Sea Vessels
- Food Processing
- Chemical Plants
- Refrigeration Systems
- Emergency Response

**Accessories Included**

- Integral Motorized Pump
- Sampling Wand
- Sampling Tube
- AA Alkaline Battery Pack
- Hand Carrying Case
- User Manual
Equipped with one of the largest LCD’s on the market, the NH3 Responder is still smaller and lighter than competitors’ models. The special low-temp LCD is designed to stay readable at temperatures down to -10 °F, so looking for leaks in freezers no longer requires many short-term sessions or “insulating” the instrument.

The NH3 Responder comes equipped with an integral motorized pump. Audible, visual, and vibrator alarms activate in the event of a low, high, TWA, or STEL alarm condition. Other standard features include automatic calibration, datalogger, full function self-test, user selectable confidence beep, stealth mode, backlight options, selectable ppm resolution, STEL / TWA measurement choice, combustible correction factor options, user-settable calibration gas concentrations, and multi-language support.

AA alkaline or hot-swappable battery pack options allow for battery installation in the field.

Ordering Information
The NH3 Responder is delivered ready for use with PID and LEL sensors, integral motorized pump, AA alkaline battery set, spare AA battery set, sampling wand and hose (3 ft), stainless steel alligator belt clip, instructions, and a rugged hard-shell carrying case.

Order #: NH3 Responder
- M5-RBC (rechargeable battery and charging cradle)
- BW-M5-PID-RS (replacement PID sensor)
- BW-M5-ES (replacement Electrode Stack)
- BW-GA-LEL-RS (replacement LEL sensor)

SPECIFICATIONS
Due to ongoing research and product improvement, specifications are subject to change

Battery: 8 hours runtime on three AA alkaline cells
8 hours on rechargeable lithium polymer battery (run-time dependent on backlight usage)

Pump: Integral motorized rotary pump. Tubing length up to 100 ft / 30 m (50 ft / 15 m standard) with user options

Sensors: Plug-in, PID (VOC) 10.6 eV lamp; catalytic (LEL)

Ranges: PID (0-10,000 ppm); LEL (3-100% LEL or 4,000-150,000 ppm)

Calibration Due Date: Days remaining until next calibration displayed on start-up

LCD: Continuous, alphanumeric gas readout and status display advises

Tests: Full function self-test, sensor integrity, circuitry, battery, and audible/visual alarms on activation

Alarm Indicators: Clearly advises alarm conditions with audible, visual, and internal vibrator alarms
Visual alarms: Two flashing alarm bars visible from all angles. LCD indicates gas present and alarm levels encountered
Audible alarm: Typically 95 dB at 1 ft / 30 cm variable pulsed audible alarm
Vibrator alarm: Pulses warning in gas alarm conditions, or for any status alarms
Status alarms: Low battery, over range, multiple gas, pump, and failed or missing sensor

Alarm Levels: Instantaneous Low Alarm; Instantaneous High Alarm; TWA (time-weighted average), and STEL (short-term exposure limit)

Alarm setpoints: Displayed on activation and on demand

Calibration Schedule: 6-month intervals

Enclosure: Rugged, composite material; two-shot molded polymer case with integral anti-shock boot. Highly water resistant and dust proof

Humidity: 0 - 95% RH (non-condensing)

Dimensions: 5.7 x 2.9 x 1.5 in

Weight: 13.1 oz

Gas concentration: Simultaneously and continuously displays gas concentration(s) for all sensors (in ppm or % LEL). Peak (max)/STEL/TWA ppm or %. Records exposures and displays on demand

User field options: Confidence beep, set STEL period, force calibration on start-up, enable / disable sensor, pass code protection, latching alarms, span level, passed calibration user-lockout option, “SAFE” display function, stealth mode, fast pump, alarm only backlight mode, LCD language option, STEL calculation choice, TWA calculation choice, PID / combustible correction factor options, and user-settable calibration gas level

Warranty: 1 year (including sensors)
**Key Features**

- Smaller and 50% lighter than competing instruments
- Water-resistant design in an integral concussion-proof enclosure
- Large LCD allows for easy-to-read monitoring
- Integral motorized pump for remote sampling and fast response
- AA battery powered for easy replacement (rechargeables available)
- 95 dB alarm tone, bright LED alarm bars, & internal vibrating alarm
- Auto backlight activates in low light & when in alarm
- Four alarm levels: instantaneous Low Alarm, High Alarm, TWA, and STEL
- Records TWA, STEL, and max gas exposures (displays readings on command)
- Datalogger with programmable sampling intervals
- Full self-test of sensor, battery, circuit integrity, and audible/visual alarms

**CO2 Responder**

**CO2 RESPONDER**

**Carbon Dioxide Leak Detector**

The CO2 Responder utilizes infrared sensor technology for accurate and reliable performance. The highly selective infrared sensor guarantees only CO2 gas is detected with no chance of false readings from interference gases.

The compact and lightweight CO2 Responder comes loaded with features. Auto-backlit LCD, four alarm levels and max exposure levels to name a few. The display is user configurable to display CO2 readings in either PPM or %.

With the motorized integral sampling pump, response times are extremely fast. The CO2 Responder can be a useful tool for indoor air quality monitoring and CO2 leak detection for quickly determining dangerous levels of CO2.

**Applications**

- Food Processing
- Wineries
- Breweries
- Bottling Plants
- Greenhouses
- Indoor Air Quality
- Industrial Hygiene
- Refrigeration Systems
- Produce Storage

**Accessories Included**

- Integral Motorized Pump
- Sampling Wand
- Sampling Tube
- AA Alkaline Battery Pack
- Hand Carrying Case
- User Manual

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The CO2 Responder is ideally suited for use in food processing, wineries, breweries, bottling plants, greenhouses, indoor air quality monitoring, industrial hygiene, refrigeration systems, and produce storage. Its user-configurable display allows for CO2 readings to be displayed in either PPM or %.

With its motorized integral sampling pump, the CO2 Responder offers extremely fast response times, making it a valuable tool for indoor air quality monitoring and CO2 leak detection. It can quickly determine dangerous levels of CO2, ensuring a safer working environment.
Equipped with one of the largest LCD’s on the market, the **CO2 Responder** is still smaller and lighter than competitors’ models.

The **CO2 Responder** comes equipped with an integral motorized pump. Audible, visual, and vibrator alarms activate in the event of a low, high, TWA, or STEL alarm condition. Other standard features include automatic calibration, full function self-test, user selectable confidence beep, stealth mode, backlight options, selectable ppm resolution, STEL / TWA measurement choice, user-settable calibration gas concentrations, and multi-language support.

**Ordering Information**

The **CO2 Responder** is delivered ready for use with IR (infrared) sensors, integral motorized pump, AA alkaline battery set, spare AA battery set, sampling wand and hose (3 ft), stainless steel alligator belt clip, instructions, and a rugged hard-shell carrying case.

**Order #:**

- **CO2 Responder**
- **M5-RBC** (rechargeable battery and charging cradle)
- **BW-M5-CO2-RS** (replacement IR sensor)

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**SPECIFICATIONS**

Due to ongoing research and product improvement, specifications are subject to change

**Battery:**
8 hours runtime on three AA alkaline cells (runtime dependent on backlight usage)

**Pump:**
Integral motorized rotary pump. Tubing length up to 100 ft. / 30 m (50 ft. / 15 m standard) with user options

**Sensors:**
Plug-in, IR (infrared) Carbon Dioxide

**Range:**
(0-5%) (0-50,000 ppm)

**Calibration Due Date:**
Days remaining until next calibration displayed on start-up

**LCD:**
Continuous, alphanumeric gas readout and status display advises

**Tests:**
Full function self-test, sensor integrity, circuitry, battery, and audible/visual alarms on activation

**Alarm Indicators:**
Clearly advises alarm conditions with audible, visual, and internal vibrator alarms

**Visual alarms:**
Two flashing alarm bars visible from all angles. LCD indicates gas present and alarm levels encountered

**Audible alarm:**
Typically 95 dB at 1 ft. / 30 cm variable pulsed audible alarm

**Vibrotor alarm:**
Pulse warning in gas alarm conditions, or for any status alarms

**Status alarms:**
Low battery, over range, multiple gas, pump, and failed or missing sensor

**Alarm Levels:**
Instantaneous Low Alarm; Instantaneous High Alarm; TWA (time-weighted average), and STEL (short-term exposure limit)

**Alarm setpoints:**
Displayed on activation and on demand

**Calibration Schedule:**
6-month intervals

**Enclosure:**
Rugged, composite material; two-shot molded polymer case with integral anti-shock boot. Highly water resistant and dust proof

**Humidity:**
0 - 95% RH (non-condensing)

**Dimensions:**
5.7 x 2.9 x 1.5 in

**Weight:**
13.1 oz

**Gas concentration:**
Simultaneously and continuously displays gas concentration(s) for all sensors (in ppm or % LEL). Peak (max)/STEL/TWA ppm or %: Records exposures and displays on demand

**User field options:**
Confidence beep, set STEL period, force calibration on start-up, enable / disable sensor, pass code protection, latching alarms, span level, passed calibration user-lockout option, “SAFE” display function, stealth mode, fast pump, alarm only backlight mode, LCD language option, STEL calculation choice, TWA calculation choice, PID / combustible correction factor options, and user-settable calibration gas level

**Warranty:**
1 year (including sensors)
The 4Gas-Responder utilizes four sensors for monitoring and detection of carbon monoxide (CO), hydrogen sulfide (H2S), oxygen (O2), and combustible gases (LEL). The sensors can be custom selected with a maximum of 5 gases per unit. With preset and user adjustable alarm setpoints, dangerous gas levels are instantly made aware by audible and visual alarms, as well as vibration; ensuring that personnel are aware of potential hazards.

Additionally, the 4Gas-Responder can accommodate a fifth sensor for custom monitoring: SO2, PH3, NO2, HCN, CI2, ClO2, O3, & NH3. The integral pump provides personnel the ability to draw a sample from the space prior to entry.
The **4-Gas Responder** has one of the largest LCD's on the market, and comes equipped with an integral motorized pump.

Audible, visual, and vibrator alarms activate in the event of a low, high, TWA, or STEL alarm condition. Other standard features include automatic calibration, datalogger, full function self-test, user selectable confidence beep, stealth mode, backlight options, selectable ppm resolution, STEL / TWA measurement choice, combustible correction factor options, user-settable calibration gas concentrations, and multi-language support.

### Ordering Information

The **4-Gas Responder** is delivered ready for use with CO, H2S, O2, & LEL sensors, integral motorized pump, AA alkaline battery set, spare AA battery set, sampling wand and hose (3 ft), stainless steel alligator belt clip, instructions, and a rugged hard-shell carrying case.

**Order #:**

- **4-GAS Responder**  
- M5-RBC (rechargeable battery and charging cradle)  
- BW-M5-TwinTox-RC (replacement cell CO/H2S).  
- BW-GA-LEL-RS (replacement LEL sensor)  
- BW-O2-RC (replacement O2 sensor)

### SPECIFICATIONS

**Battery:**

- 8 hours runtime on three AA alkaline cells (runtime dependent on backlight usage)

**Pump:**

- Integral motorized rotary pump. Tubing length up to 100 ft. / 30 m (50 ft. / 15 m standard) with user options

**Sensors:**

- Plug-in, electrochemical (EC) and catalytic (LEL)

**Ranges:**

- CO (0-100 ppm), H2S (0/25 ppm), O2 (0/25%), LEL 0/100%

**Calibration Due Date:**

- Days remaining until next calibration displayed on start-up

**LCD:**

- Continuous, alphanumeric gas readout and status display advises

**Tests:**

- Full function self-test, sensor integrity, circuitry, battery and audible/visual alarms on activation

**Alarm Indicators:**

- Clearly advises alarm conditions with audible, visual, and internal vibrator alarms

**Visual alarms:**

- Two flashing alarm bars visible from all angles. LCD indicates gas present and alarm levels encountered

**Audible alarm:**

- Typically 95 dB at 1 ft. / 30 cm variable pulsed audible alarm

**Vibrator alarm:**

- Pulses warning in gas alarm conditions, or for any status alarms

**Status alarms:**

- Low battery, over range, multiple gas, pump, and failed or missing sensor

**Alarm Levels:**

- Instantaneous Low Alarm; Instantaneous High Alarm; TWA (time-weighted average), and STEL (short-term exposure limit)

**Alarm setpoints:**

- Displayed on activation and on demand

**Calibration Schedule:**

- 6-month intervals

**Enclosure:**

- Rugged, composite material; two-shot molded polymer case with integral anti-shock boot. Highly water resistant and dust proof

**Humidity:**

- 0 - 95% RH (non-condensing)

**Dimensions:**

- 5.7 x 2.9 x 1.5 in

**Weight:**

- 13.1 oz

**Gas concentration:**

- Simultaneously and continuously displays gas concentration(s) for all sensors (in ppm or % LEL). Peak (max)/STEL/TWA ppm or %: Records exposures and displays on demand

**User field options:**

- Confidence beep, set STEL period, force calibration on start-up, enable / disable sensor, pass code protection, latching alarms, span level, passed calibration user-lockout option, “SAFE” display function, stealth mode, fast pump, alarm only backlight mode, LCD language option, STEL calculation choice, TWA calculation choice, PID / combustible correction factor options, and user-settable calibration gas level

**Warranty:**

- 1 year (including sensors)
GASALERT EXTREME
AMMONIA LEAK DETECTOR

Key Features
• Smaller and lighter than competing instruments
• Water-resistant design in an integral concussion-proof enclosure
• Real-time readings on large LCD
• Compact and comfortable to wear
• 1.5 year battery life
• Internal vibrating alarm for high noise areas
• Bright wide-angled visual alarm bars
• Auto backlight activates in low light & when in alarm
• Four alarm levels: instantaneous Low Alarm, High Alarm, TWA, and STEL

AMMONIA PERSONNEL PROTECTOR 0-400 PPM

The GasAlert Extreme utilizes electrochemical sensor technology to cover a range of 0-400 ppm ammonia. Ideal for personnel protection with use of alligator belt clip for working on ammonia systems.

At concentrations between 0-400 ppm ammonia, the GasAlert Extreme provides audio/visual alarms at customizeable low and high alarm set-points, as well as TWA and STEL alarms.

The electrochemical sensor offers real time readings of the ammonia concentrations in the atmosphere. Refrigeration technicians will find this a useful tool for monitoring ammonia levels while working in industrial environments involving dangerous ammonia gas.

Applications
• Compressor Rooms
• Tank Rooms
• Personnel Protection
• Air Monitoring
• Sea Vessels
• Food Processing
• Chemical Plants
• Refrigeration Systems
• Emergency Response

Accessories Included
• Long Life Battery
• User Manual
• Alligator Belt Clip
The **GasAlert Extreme** has a large LCD offering real-time concentrations of ammonia gas.

Audible, visual, and vibrator alarms activate in the event of a low, high, TWA, or STEL alarm condition. Other standard features include automatic O2 calibration, full function self-test, stealth mode, confidence beep, backlight options, STEL / TWA measurement choice, user-settable calibration gas concentrations, calibration due lockout, and multi-language support.

**GasAlert Extreme** detectors come standard with a datalogging feature and include a built-in IR COM port for automatic data transfer to a computer through the optional IR Datalink (sold separately). Up to 8 months of continuous data is automatically stored at 5 second intervals (based on a normal work week). Sampling rate can be adjusted in the user options. When full, wraparound memory feature replaces oldest data with most recent data.

### SPECIFICATIONS

Due to ongoing research and product improvement, specifications are subject to change

| **Battery:** | Replaceable 3v Lithium battery with 1.5 year battery life |
| **Sensors:** | Electrochemical NH3 |
| **Ranges:** | 0-400 ppm NH3 |
| **Calibration Due Date:** | Days remaining until next calibration displayed on start-up |
| **LCD:** | Continuous, alphanumeric gas readout and status display advises |
| **Tests:** | Sensor integrity, circuitry, audible/visual alarms on activation, and battery (continuous) |
| **Datalogger:** | All readings and events. 5-second interval sampling, adjustable from 1 second to 60 seconds. |

**Alarm Indicators:**
Clearly advises alarm conditions with audible, visual, and internal vibrator alarms

**Visual alarms:** Two flashing alarm bars visible from all angles. LCD indicates gas present and alarm levels encountered

**Audible alarm:** Typically 95 dB at 1 ft. / 30 cm variable pulsed audible alarm

**Vibrator alarm:** Pulses warning in gas alarm conditions, or for any status alarms

**Status alarms:** Low battery, calibration due

**Alarm Levels:**
Instantaneous Low Alarm; Instantaneous High Alarm; TWA (time-weighted average), and STEL (short-term exposure limit)

**Alarm setpoints:**
Customizable and displayed on activation

**Calibration Schedule:**
6-month intervals

**Enclosure:**
Rugged, composite material; Highly water resistant and dust proof, with built-in concussion-proof boot

**Humidity:**
0 - 95% RH (non-condensing)

**Dimensions:**
1.1 x 2.0 x 3.75 in

**Weight:**
2.9 oz

**Gas concentration:**
Continuously displays gas concentration

**User field options:**
Confidence beep, latching alarms, stealth mode, passcode protection, automatic O2 calibration, automatic backlight, user-settable calibration gas level, calibration past due locked, and 5 language choices

**Warranty:**
1 year (including sensors)

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**Ordering Information**

The **GasAlert Extreme** is delivered ready for use with a 0-400 ppm electrochemical sensor, long life battery, stainless steel alligator belt clip, instructions, and calibration adapter.

**Order #:**

- **BW-GAXT A2 DL** (replacement NH3 cell)
- **BW-GAXT A2 RC**
- **BW-GA USB2 IR** (IR datalink)

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920 N Trade Winds Pkwy, Columbia, MO 65201  866-394-5861  www.CTIengineering.com  sales@CTIengineering.com
Key Features

• Confined Space detection for O2, CO, H2S, and LEL
• Compact, lightweight, and easy to wear
• IntelliFlash™ verifies operation and compliance
• Continuous LCD shows real-time concentrations
• One-button operation reduces training time
• Audible, visual, and vibrating alarms
• Simple automatic calibration procedure
• 10 hr battery life - recharges in less than 4 hours
• Built-in concussion boot and alligator clip
• Optional kit includes everything necessary for bump testing and calibration

PORTABLE DETECTOR FOR O2, CO, H2S, AND LEL.
COMPACT AND EASILY WEARABLE FOR USE IN CONFINED SPACES.


The optional confined space entry kit (BW-MCXL-CSEK) includes the MicroClip XL monitor, hard carrying case, charger, calibration gas, hose, and calibration adapter. The kit provides the equipment necessary to bump test the unit before each use and calibrate in 6 month intervals. The 34L bottles provides enough gas for many bump tests and calibrations.

The MicroClip XL has a light and compact design for wearing comfortably. The case is water resistant, and is surrounded by a concussion-proof rubberized boot with a built-in alligator clip. This monitor provides continuous visual confirmation of detector operation and compliance with the IntelliFlash™ Feature.

Applications

• Confined Space
• Tank Rooms
• Vent Lines
• Air Monitoring
• Sea Vessels
• Food Processing
• Chemical Plants
• Refrigeration Systems
• Emergency Response

Accessories Included

• Rechargeable Battery & Charger
• User Manual
• Calibration Adapter
• Carrying case (optional)
• calibration gas (optional)
• Regulator and hose (optional)
Equipped with a continuous LCD offering real time readings of gas concentrations, the MicroClip XL is compact and light-weight for wearing in confined spaces. The monitor provides continuous visual confirmation of detector operation and compliance for detection of O2, CO, H2S, and Combustibles (LEL).

User options include: Confidence beep, auto zero on startup, O2 auto calibration, calibration lock option, stealth mode, latching alarms, language options and more.

Ordering Information

The MicroClip XL is delivered ready for use with O2, CO, H2S, and LEL sensors, rechargeable battery and charger, stainless steel alligator belt clip, and instruction manual.

The confined space entry kit (BW-MCXL-CSEK) includes the MicroClip XL, carrying case, calibration gas, regulator, and calibration tubing.

Order #:  

- BW-MCXL  
- BW-MCXL-CSEK (includes confined space entry kit)  
- BW-MCXL-LEL-RC (replacement LEL sensor)  
- BW-O2-RC (replacement O2 cell)  
- BW-MCXL-H2S-RC (replacement H2S cell)  
- BW-MCXL-CO-RC (replacement CO cell)

SPECIFICATIONS

Battery: Single Lithium polymer. 10-hours runtime; recharge in less than 4 hours

Sensors:
- H2S: Electrochemical; 1 ppm resolution
- CO: Electrochemical; 1 ppm resolution
- O2: Electrochemical; 0.1% resolution
- LEL: Catalytic; 1% resolution

Ranges:
- H2S: 0-100 ppm
- CO: 0-500 ppm
- O2: 0-30%
- LEL: 0-100%

Calibration Due Date: Days remaining until next calibration displayed on start-up

LCD: Continuous, alphanumeric gas readout and status display advises

Tests: Full function self-test, sensor integrity, circuitry, battery, and audible/visual alarms on activation

Alarm Indicators:
- Clearly advises alarm conditions with audible, visual, and internal vibrator alarms
- Audible alarm: Typically 95 dB at 1 ft. / 30 cm variable pulsed audible alarm

Vibrator alarm: Pulses warning in gas alarm conditions, or for any status alarms

Status alarms: Low battery, and failed or missing sensor

Alarm Levels:
- Instantaneous Low Alarm; Instantaneous High Alarm; TWA (time-weighted average), and STEL (short-term exposure limit)

Alarm setpoints: Displayed on activation and on demand

Calibration Schedule: 6-month intervals

Enclosure:
- Rugged, composite material; two-shot molded polymer case with integral anti-shock boot. Highly water resistant and dust proof

Humidity: 0 - 95% RH (non-condensing)

Dimensions: 4.4 x 2.4 x 1.1 in

Weight: 6 oz

Gas concentration:
- Simultaneously and continuously displays gas concentration(s) for all sensors (in ppm or % LEL). Peak (max)/STEL/TWA ppm or %; Records exposures and displays on demand

User field options:
- Confidence beep, set STEL interval, enable / disable sensor, latching alarms, passed calibration user-lockout option, stealth mode, LCD language option, force calibration when overdue, Intelliflash interval, low alarm acknowledge, and user-settable calibration gas level

Warranty:
- 1 year (including sensors)
SUMMARY OF CARBON DIOXIDE DETECTION CODE REQUIREMENTS

Regulatory concentrations of interest for CO2

OSHA PEL (Occupational Safety and Health Administration - Permissible Exposure Limit)
5,000 ppm (0.5%) TWA (8 Hour Time Weighted Average)

NIOSH REL (National Institute for Occupational Safety and Health - Recommended Exposure Limit)
5,000 ppm (0.5%) TWA
30,000 ppm (3.0%) STEL (Short Term Exposure Limit = 15 min time weighted average)
40,000 ppm (4.0%) IDLH (Immediately Dangerous to Life and Health)

ACGIH TLV (American Conference of Governmental Industrial Hygienists - Threshold Limit Value)
5,000 ppm (0.5%) TWA
30,000 ppm (3.0%) STEL

Mounting your CO2 sensor

When CO2 is used as a refrigerant in a cascade system
The recommended method for mounting CO2 detectors is to mount them in the breathing zone (~5 feet off of the floor). This is representative of what personnel are exposed to in an everyday environment. CO2 vapor is heavier than air, so mounting a CO2 detector lower than the breathing zone is okay. On the contrary, do not mount a CO2 detector above the breathing zone.

When CO2 is used in a process
The recommended method for mounting CO2 detectors in a process leak detection system is to mount them in the breathing zone (~5 feet off of the floor). Mount the sensor wherever people frequent, do not mount close to a leak source unless people are always there. Do not mount the CO2 detector lower than the breathing zone.
CARBON DIOXIDE DETECTION SYSTEM DESIGN SPECIFICATIONS

When CO2 is used as refrigerant in a cascade system

Choosing Alarm set points and actions
The typical CO2 Gas Detector for refrigerant leak detection should be ranged 0-3% CO2, with warning set points at 0.5% (8 Hour TWA allowable exposure) and alarm set points at 1.0% (10,000 ppm) CO2.

With the above warning and alarm set-points, the recommended actions would be to investigate a potential Carbon Dioxide leak at 0.5%, and shut down valves to the evaporator and evacuate the room at 1.0%. A 1.0% evacuation is recommended rather than the 3.0% STEL, because it is a point measurement and CO2 concentrations can be higher elsewhere in the room.

One issue to keep in mind is that unlike ammonia, CO2 is always present in air, and concentrations can build up to these levels in a facility from sources other than a leak in the CO2 refrigeration system. Common examples of CO2 presence are from dry ice usage, and normal personnel respiration in a non-ventilated room. Field experience indicates that a Carbon Dioxide alarm at 0.5% is high enough that background CO2 levels will not reach that level in most cases; therefore 0.5% CO2 can be reliably used as a leak indicating set-point.

<table>
<thead>
<tr>
<th>Level of CO2</th>
<th>Action</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5% (5,000 ppm)</td>
<td>Investigate potential leak</td>
<td>Hand-held CO2 leak detector</td>
</tr>
<tr>
<td>1.0% (10,000 ppm)</td>
<td>Shut down valves to evaporator</td>
<td>Set relays with valve shut-offs</td>
</tr>
<tr>
<td>1.0% (10,000 ppm)</td>
<td>Evacuate the room</td>
<td>Horn/strobes and proper training</td>
</tr>
</tbody>
</table>

Selecting CO2 sensor range
If a 0-1% sensor is chosen and found in a leak situation at 1.0% CO2, more information is necessary to make the proper response decision. It is very important to know if the STEL of 3.0% has been exceeded. If a level of 3.0% CO2 has been exceeded, investigation and response must be executed with great caution.

Choosing a 0-5% sensor range does not give the desired resolution at the 0.5% warning level. A 0-5% CO2 sensor can be desirable if paired with a 0-1% sensor, or if you are monitoring for catastrophic leaks only.

Choosing the 0-3% range is best for balancing concerns in industrial CO2 detection. The 0-3% range provides accuracy and resolution at the 0.5% and 1.0% levels, and gives operators the crucial information for calculating the seriousness of the situation. In terms of danger, there is a big difference between 1.0% and 3.0% CO2 and your fixed CO2 gas detector should provide this information accurately and in a timely manner.

When CO2 is used in a process

Choosing Alarm set points and actions
The typical CO2 Gas Detector for process leak detection should be ranged 0-3% CO2, with a warning set-point at 0.5% (8 Hour TWA allowable exposure) and an alarm set-point at 3.0% (15 minute STEL) CO2.

With the above warning and alarm set-points, the recommended actions would be to initiate ventilation at 0.5%, and set off alarms for evacuation at a level of 3.0% CO2 has been reached.

<table>
<thead>
<tr>
<th>Level of CO2</th>
<th>Action</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5% (5000 ppm)</td>
<td>Initiate ventilation</td>
<td>Set relays with fans</td>
</tr>
<tr>
<td>3.0% (30,000 ppm)</td>
<td>Alarms for evacuation</td>
<td>Horn/Strobes and proper training</td>
</tr>
</tbody>
</table>

Selecting CO2 sensor range
A 0-1% sensor is out of the question unless directly paired with a higher range sensor. The accuracy on the low end is beneficial, but the inability to detect past the range of 1.0% renders this sensor inadequate for process leak detection.

A 0-5% sensor is not accurate enough on the low end of the scale to trip precisely at 0.5% to initiate ventilation. This sensor will only be beneficial if paired with a low range detector.

The 0-3% range provides accuracy and resolution at the 0.5% and 1.0% levels for ventilation and warning necessary at your plant. It will also trip relays set at 3.0% CO2 for Evacuation. The ability to handle the ventilation and evacuation set-points, and everything in between, make the 0-3% CO2 sensor the best sensor for process leak detection.
## Summary of Ammonia Detection Code Requirements

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comply with IIAR2, UMC, and ASHRAE 15</td>
<td></td>
<td></td>
<td>Ammonia exception. Comply with IIAR2, IIAR3, and IIAR5</td>
<td>Comply with IMC-2012</td>
<td>Comply with IIAR2, ASHRAE 16, and IFC 2012</td>
<td></td>
</tr>
<tr>
<td><strong>Alarm signal to monitored location</strong></td>
<td>25 ppm</td>
<td>YES</td>
<td>“approved location”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Machine Room - De-energize compressors, pumps, NC valves</strong></td>
<td>40,000 PPM or upper limit of detector</td>
<td>40,000 PPM or upper limit of detector</td>
<td>40,000 PPM or upper limit of detector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Machine Room Audio Visual Alarms inside room and outside each entrance</strong></td>
<td>25 PPM</td>
<td>1,000 PPM Manual reset inside machine room</td>
<td>1,000 PPM</td>
<td>25 PPM* “Approved locations”</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Machine Room - activate emergency ventilation</strong></td>
<td>150 PPM</td>
<td>1,000 PPM</td>
<td>1,000 PPM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power and Supervision</strong></td>
<td>Dedicated branch, UPS or backup generator. Trouble signal indicating fault to monitored location</td>
<td>Dedicated branch, 24 hour UPS or backup generator. Trouble signal indicating fault in system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Machine Room Concentration Display</strong></td>
<td>Suggested</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Refrigerated Areas</strong></td>
<td>25 PPM, alarm to monitored location</td>
<td>1,000 PPM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Packaged systems</strong></td>
<td>25 PPM, audio visual and alarm to monitored location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Machinery under 100 HP not in Machine Room, and Equipment Pits</strong></td>
<td>25 PPM, alarm to monitored location, close liquid feed and hot gas solenoid valves, audio/visual devices inside the area, activate emergency exhaust and de-energize all pumps, motors, and non-emergency fans</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*25 PPM* indicates the concentration at which alarm signals are triggered.
# Ammonia Detection System Design Specifications

<table>
<thead>
<tr>
<th>Room</th>
<th>Sensor</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor Room (minimum 2 sensors)</td>
<td>GG-NH3-250</td>
<td><strong>25 ppm</strong> - Alarm to monitored location&lt;br&gt;<strong>25 ppm</strong> - Horn Strobe outside each entrance and inside engine room&lt;br&gt;<strong>150 ppm</strong> - Emergency Ventilation</td>
</tr>
<tr>
<td>Compressor Room (minimum 1 sensor)</td>
<td>GG-NH3-2%</td>
<td><strong>10,000 ppm</strong> - Redundant Emergency Ventilation&lt;br&gt;<strong>20,000 ppm</strong> - De-energize pumps, compressors, and normally closed valves</td>
</tr>
<tr>
<td>Vent Line</td>
<td>GG-VL2-NH3</td>
<td><strong>1%</strong> - Alarm to monitored location</td>
</tr>
<tr>
<td>Refrigerated Areas</td>
<td>GG-NH3-100</td>
<td><strong>25 ppm</strong> - Alarm to monitored location&lt;br&gt;<strong>35 ppm</strong> - Close liquid and hot gas solenoid valves</td>
</tr>
<tr>
<td>Packaged Systems</td>
<td>GG-NH3-100</td>
<td><strong>25 ppm</strong> - Alarm to monitored location&lt;br&gt;<strong>35 ppm</strong> - Horn Strobe inside room</td>
</tr>
<tr>
<td>Machinery under 100 HP and equipment Pits (not in machine rooms)</td>
<td>GG-NH3-100</td>
<td><strong>25 ppm</strong> - Alarm to monitored location&lt;br&gt;<strong>25 ppm</strong> - Close liquid and hot gas solenoid valves&lt;br&gt;<strong>25 ppm</strong> - Horn Strobe inside room&lt;br&gt;<strong>25 ppm</strong> - De-energize pumps, motors, and non-emergency fans&lt;br&gt;<strong>25 ppm</strong> - Emergency Ventilation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG-6</td>
<td>Six channel controller</td>
<td>Monitor gas detection system</td>
</tr>
<tr>
<td>GG-XM</td>
<td>Eight channel expansion module</td>
<td>Additional monitoring capability</td>
</tr>
<tr>
<td>GG-RD1</td>
<td>Remote display for GG-6</td>
<td>Remote monitoring of gas detection system</td>
</tr>
<tr>
<td>GG-EM</td>
<td>Entrance monitor</td>
<td>Outside compressor room doorways</td>
</tr>
<tr>
<td>UPS:1000VA-LCD</td>
<td>Uninterruptible power supply</td>
<td>Backup Power for GG-6</td>
</tr>
<tr>
<td>SHA-24-BLUE</td>
<td>Strobe/Horn assembly 24vdc</td>
<td>Audio Visual</td>
</tr>
<tr>
<td>GG-NH3-100</td>
<td>0/100 ppm electrochemical sensor</td>
<td>Refrigerated Area</td>
</tr>
<tr>
<td>GG-NH3-250</td>
<td>0/250 ppm electrochemical sensor</td>
<td>Compressor Room</td>
</tr>
<tr>
<td>GG-NH3-2%</td>
<td>0/2% catalytic bead sensor</td>
<td>Compressor Room shutdown</td>
</tr>
<tr>
<td>GG-VL2-NH3</td>
<td>0/1% vent line sensor</td>
<td>HP relief header, above rooftopline</td>
</tr>
<tr>
<td>GG-CO2-3%</td>
<td>0/3% infrared sensor</td>
<td>CO2 refrigeration systems</td>
</tr>
</tbody>
</table>
www.CTIengineering.com

Let us help you with all of your gas detection needs

866-394-5861
sales@ctiengineering.com

Due to ongoing product improvements, specifications are subject to change.
Visit our website for up-to-date brochures and manuals