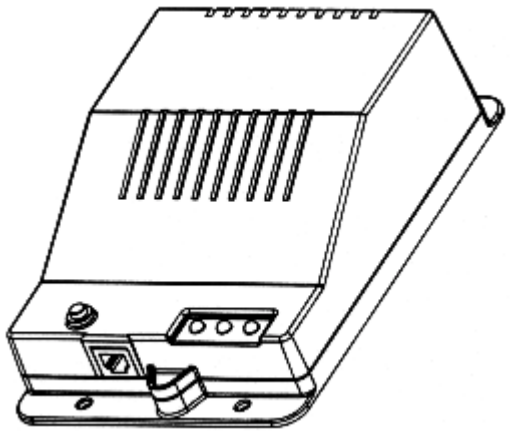
HDGI - Hydrogen Gas Detector

For Lead-Acid Battery Charging Rooms And Other Areas Where Hydrogen Is Present



Protects Life, Property and Profits

Hydrogen gas detectors are hydrogen gas monitors that act as hydrogen gas alarms and exhaust fan controllers.

Lead-acid batteries on charge emit hydrogen gas after reaching the 80% recharge point.

Typical hydrogen emissions per battery are:

Battery Size	Hydrogen Gas
12 Volt / 500 Ampere-Hour	3.5 Cubic Feet Per Hour
24 " / 720 " "	10.1 " " " "
36 " / 935 " "	19.8 " " " "
48 " / 850 " "	23.9 " " " "

Concentrations of 4.1% to 75% mixed with air can be explosive. Sparks or hot surfaces can ignite them. A hydrogen gas detector in your battery room will provide a warning and facilitate dissipation of hydrogen concentrations before they reach the lower explosive limit (LEL) of 4.1%.

Operation:

Should the concentration of hydrogen gas in the air surrounding the sensor reach 1% by volume, the "1% Caution" yellow LED will light and the 1% internal relay will close. Should the hydrogen gas concentration reach 2% by volume, the "2% Warning" red LED will flash and an 80 db alarm will sound; the 1% relay will remain closed and, if a Dual-Relay model, the 2% internal relay will close. Either relay can activate a remote exhaust fan and/or alarm.

Location:

Hydrogen is colorless and odorless, the lightest of all gases and thus rises. The detector, therefore, should be installed at the highest, draft-free location in the battery compartment or room where hydrogen gas would accumulate.

The size of the area one detector will protect depends upon the battery compartment or room. The detector measures hydrogen gas concentration in the air immediately surrounding the sensor. If hydrogen gas might accumulate in several, unconnected areas in the compartment or room, individual detectors should be placed at each location.

Added Benefits:

In addition to protecting your employees and your property, the detector also may reduce the following costs:

A. Electricity - Heating - Air Conditioning. Instead of continuously running an exhaust fan to prevent hydrogen gas accumulation, use the detector to activate the fan only if the concentration reaches 1%.

B. Insurance. Installation of a detector in areas where batteries are charged may result in a premium reduction.

Features:

Automatic Operation, Continuous Monitoring, High Sensitivity & Stability, Solid State Reliability, Intrinsically Safe - - 12 Volt dc Operating Voltage, Easy Installation, Low Cost, Two Year Warranty.

Specifications:

Dimensions:

Height 7 " (17.8 cm.)
Width 4-3/4 " (12.0 cm.)
Depth 2-1/2 " (5.5 cm.)

Mounting:

Four 3/16 " (4.5 mm.) screws

Power Requirements:

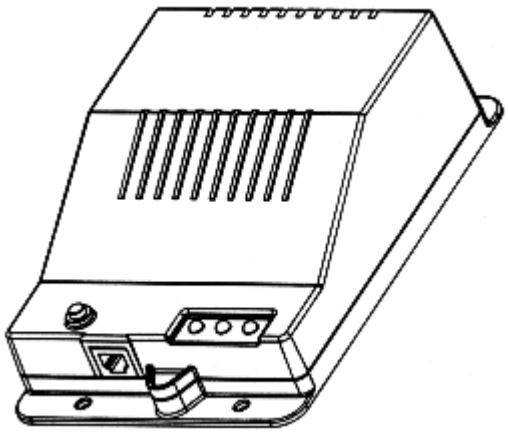
120 volts ac 50/60 hertz standard.
220 volts ac, or 12 to 48 volts dc upon request.

Relay(s):

Form A, Normally-Open standard.
Form B, Normally-Closed upon request.
Form C, Single Relay upon request.

Sensor:

The sensor consists of a semiconductor whose electrical conductivity increases when hydrogen is adsorbed on its surface. Conductivity, proportional to the gas concentration, is continuously measured by an electronic circuit.



Installation:

Hydrogen gas is only 7% the density of air, and thus rises. Your hydrogen gas detector, therefore, should be installed at the highest, draft-free location in the battery room or compartment where hydrogen gas would accumulate.
Remove the cover from the detector box using care not to break the hinge connection at the top of the box.
Attach the detector to the wall, ceiling, or optional junction box using the mounting holes at the top and bottom of the detector box.
For hard wiring using conduit, the detector box will fit the following junction boxes: Appleton 25075, Bowers 702 SPL, Raco 951, or Steel City 2G-1/2&3/4. If you have difficulty finding one of these junction boxes, you can order one from your dealer.
The detector has a terminal block for connection to a single-phase ac power source and to one or two internal relays. The relays can be used to switch a remote exhaust fan and/or alarm on and off.
For 120 volts ac power, use an 128 gage SJT 3-condustor PVC jacketed cable (Belden 19348, equivalent or better). For relay wires, use 14 gage twisted-pair wire (Belden 8473, equivalent or better).
The detector's relay dry contacts are rated at 10A / 250VAC, sufficient for most 1/3 HP exhaust fans. For higher current requirements, add external relays.
Ensure that your installation complies completely with all relevant local, state, federal, and OSHA safety and health regulations.
An optional 2 inch (5 cm.) square remote box with duplicate LEDs, test button, and buzzer if wanted, can be placed anywhere. This remote box connects to the detector box via a standard style 6-connector, 6-contact telephone-type modular cable.

Operation:

Keep the detector on at all times. If the green LED is lit, power is on.
When power is first turned on, approximately 10 minutes will elapse before the detector will start to function. This delay is to prevent false activation of the internal relay and alarm.
If the unit has been stored un-energized for more than 1 week, the sensor will require 7 days or more to stabilize. During this period the sensor will be overly sensitive to hydrogen gas. This may activate the internal relay at a slightly lower concentration level, but normally should not reach the point of activating the internal alarm.
If the concentration of hydrogen gas in the air surrounding the sensor reaches 1% by volume, the yellow LED will light and the 1% internal relay will close to activate a remote fan and/or alarm. A 4 second delay prevents false activation.
Should the concentration reach 2%, the red LED will flash, the internal 80 db warning alarm will sound, and the 2% internal relay (dual-relay model only) will close. The 1% relay will remain closed & the yellow LED on.
When the concentration decreases below 2%, the red LED will turn off, the internal alarm will stop, and the 2% relay (dual-relay model only) will open.
When the concentration falls below 1%, the 1% relay will open and the Yellow LED will turn off.
The sensor is calibrated at room temperature and humidity at sea level. It is slightly more sensitive at higher temperature, humidity or altitude. In these situations, the detector may activate at a slightly lower gas concentration. This, however, should not noticeably affect its operation nor require any adjustment.
Note: The sensor detects several other gases in addition to hydrogen. Its sensitivity to other gases, however, is much lower than its sensitivity to hydrogen. Although additive, the presence of other gases is unlikely to falsely activate the detector.

Calibration:

This detector has been calibrated at the factory for hydrogen gas and should not be adjusted in the field. **DO NOT ATTEMPT TO FIELD CALIBRATE THIS UNIT.**

Testing (after the ac power is on for 10 minutes):

A "push-to-test" button is located on the unit's front. Push and hold this button for approximately 10 seconds to test the unit's electronic circuitry. The caution and warning LEDs will light in sequence; the relays will activate whatever is connected to them and the internal warning alarm will sound.

Note: The "push-to-test" button does NOT test the sensor itself.

Unless the detector becomes overly sensitive, recalibration or replacement of the sensor board should not be necessary for several years. For safety sake, however, replace the sensor board every five years.

Warning:

This detector is added protection, not a substitute, for prudent safety measures where hydrogen gas is present. For large or highly sensitive areas, use two or more detectors.

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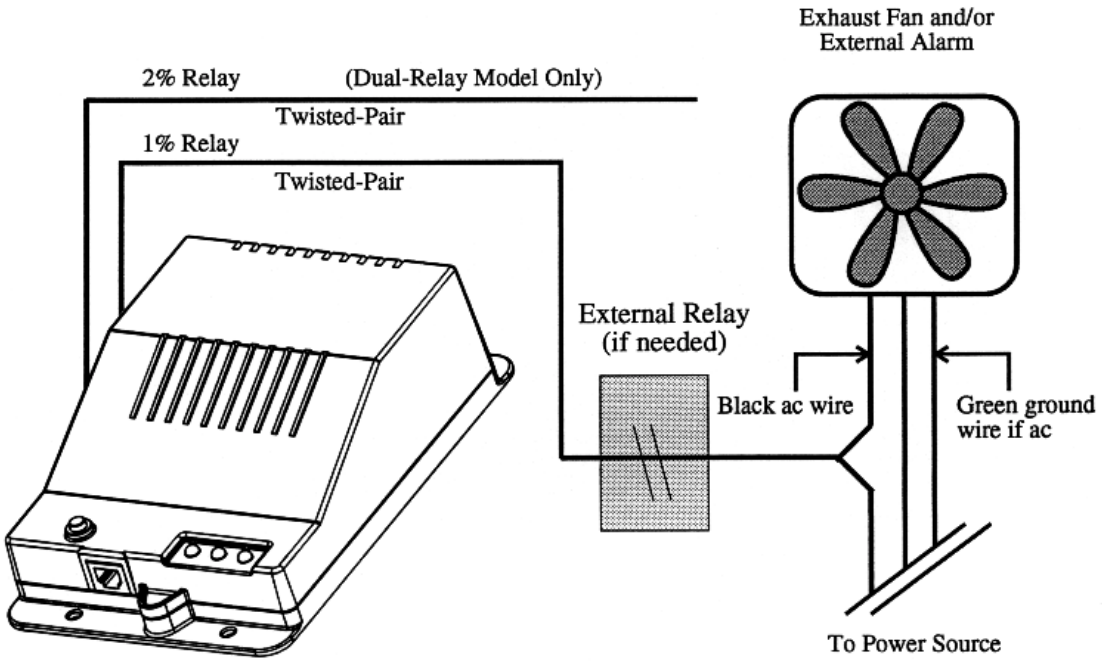
Installation Diagram

Single and Dual Relay Models



1. The detector has an internal, normally-open Form A relay that closes if the sensor detects a 1% concentration of hydrogen gas in the air surrounding it. The Dual-Relay model has a second relay that closes at a 2% concentration.
2. Connect the twisted-pair wires from the relays in "series" with the live wire (black) of the ac input line to the exhaust fan and/or alarm.
3. The detector's internal relays are rated: 10 amps at 250 volts ac; 10 amps at 30 volts dc; 1/3 horsepower at 125 volts ac; 1/2 horsepower at 250 volts ac.
4. For currents higher than these relay ratings, add an external relay (shaded item in the sketch above).