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HANSEN TECHNOLOGIES

Specifications, Applications, Service Instructions & Parts

GAS DETECTORS, CONTROLLER & ALERT SYSTEMS

For Refrigerants and other Common Gases

Gas Detector

INTRODUCTION

Hansen Technologies offers a complete line of industrial quality Gas Detector, Controller and Alert Systems for refrigerants and other common gases. These state-of-the-art gas detection products utilize a range of sensing technologies to suit a given application. Available in several configurations to meet various application requirements with optimum accuracy and reliability.

APPLICATIONS

Hansen Gas Detectors are suitable for use in industrial refrigeration engine rooms, cold storage rooms, processing rooms, truck docks, and for relief valve vent lines. They are also suitable for use in supermarkets, and large institutional and commercial buildings.

Typical gas detection applications include Ammonia, Carbon Dioxide (CO_2), Hydrocarbons, HFCs, HCFCs and CFCs.

ADVANTAGES

Hansen uses a variety of sensor element technologies including electrochemical, semiconductor and infrared sensors to selectively detect most gases. These sensor elements continuously determine the level of gas present in the surrounding environment. The analog outputs (4-20mA or 0-10V DC) can interface with nearly any existing monitor, computer or PLC controller.

The sensor elements are mounted internally on the enclosure. This helps to provide quick response to potential leaks, particularly in still air. Electronics are sealed in a IP66 enclosure which protects them from moisture, dust and the surrounding gases, which in the case of ammonia can shorten the life of electronics. The sensing elements are easily replaced.

Gas Detectors have built-in visual and audible alarms. High level, low level and fault IA, SPDT relay outputs are standard. Testing and recalibration procedures are simple.

KEY FEATURES–REMOTE GAS DETECTORS

- Accurate, fast responding
- Linear 4-20mA or 0-10V DC output
- Audible alarm
- Power indicator
- SPDT alarm relays (Fail Safe Operation)
- 24V AC/DC low voltage power
- Shipped factory calibrated and tested
- CE approved
- CSA (Electrical Features Only)

KEY FEATURES–GAS DETECTION CONTROLLER

- Visual alarm
- Audible alarm
- Power indicator
- Low level alarm relay
- High level alarm relay
- Fault relay
- Economical
- CE approved

KEY FEATURES–GAS ALERT SYSTEM

- Provides local display and alarm based on measured target gas level via gas sensor
- Visual alarm, Amber LED light
- Audible alarm (mutable)
- Power indicator, Green
- Numeric PPM reading
- Bright LED Display
- Shipped factory calibrated and tested

	 Remote Gas Detector	 2 or 8 Channel Gas Detector Controller	 Handheld Gas Detector
AMBIENT TEMPERATURE RANGE	-40°F (-40°C) to 120°F (50°C)	-4°F (-20°C) to 122°F (50°C)	-13°F (-25°C) to 131°F (55°C)
VOLTAGE REQUIREMENTS	24 VDC ± 18%, 24 VAC ± 20%	100-240 VAC, 50/60 Hz, 80W max	'D' Cell Battery
HUMIDITY RANGE (NON-CONDENSING)	5-90% RH, 15-90% RH (electrochemical)	5-90% RH	0-95% non-condensing
OUTPUTS	4-20mA, 0-5V, 1-5V, 0-10V, 2-10 VDC	RS485 Modbus RTU Slave	RS-232, 0-1 VDC analog
4-20mA SIGNAL OUTPUT	Isolated 2-wire	N/A	N/A
ALARMS	(3) SPDT RELAY, 1A @ 30V resistive load	(3) SPDT RELAY, 1A @ 30V resistive load	High, low, off
ALTITUDE	0-2,000m	N/A	N/A
ENCLOSURE	IP67	NEMA 1	N/A
ACCURACY	SC - <-10%/+15%, IF/EC - < ± 5%	N/A	Approx ± 5%
Start-up / Warm-up Time	SC - 15min*, EC - 5min*, IF - 2 min*	N/A	Up to 24hrs if not biased
Approvals	CE/EN 50270:2015/UL/CSA/IEC/EN 61010-1	UL/CSA/IEC/EN 61010-1 CE	N/A

TABLE 1

* Up to 400% longer at temperature limits

DO NOT SUBSTITUTE OR MODIFY

Because of the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the equipment.

CLEANING/DECONTAMINATION EXTERNAL SURFACE

The external surface, excluding the sensor element, can be cleaned using light detergent and water. Do not allow any of the solution to come in contact with the sensing element sintered surface.

GAS DETECTOR LOCATION

Detectors should be located in an accessible area for maintenance and testing, but away from moving equipment that could accidentally come in contact with the sensor. Avoid thermal extremes (close to heaters) and do not place unprotected in direct, strong drafts/ airflows, near exit doors, or areas where falling water or condensing moisture are present. If high humidity is always present, power up the unit as soon as possible, as long term exposure can shorten the life of the gas sensor element. In blast freezers, mount the gas detector below the coil to avoid high moisture and steam during defrost.

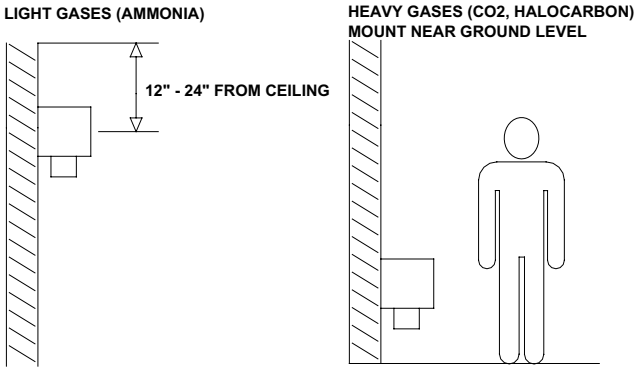
The two generally accepted methods of locating detectors are “Point” and “Perimeter” detection. “Point” detection is where detectors are located near the most likely sources of leakage. “Perimeter” detection is where detectors completely surround the area in question. The size and nature of the area will help to decide which method is the most appropriate. Air flow should be considered in a ventilated room. Place detectors downstream of potential leak points.

Any detector which is to be used for detecting a gas with a vapor density greater than one (i.e. heavier than air) should generally be located nearer ground level. Conversely, for any lighter than air gases such as ammonia, the detector needs to be located higher up. Typically ammonia detectors are mounted 12˝–24˝ (.3 to .5m) from the ceiling. Detectors should not be located too close to the ceiling as hot air trapped under the ceiling may act to buffer the target gases from reaching the detector.

The number of detectors in each area is a function of local codes and regulations and the customers’ guidelines for gas detection.

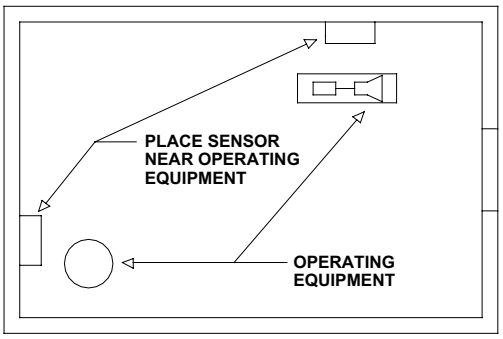
MOUNTING HEIGHT OF DETECTORS

FIG. 1



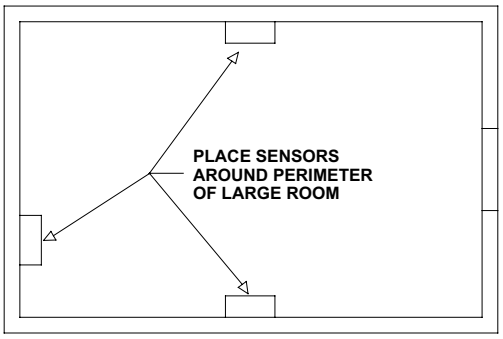
POINT DETECTION

FIG. 2



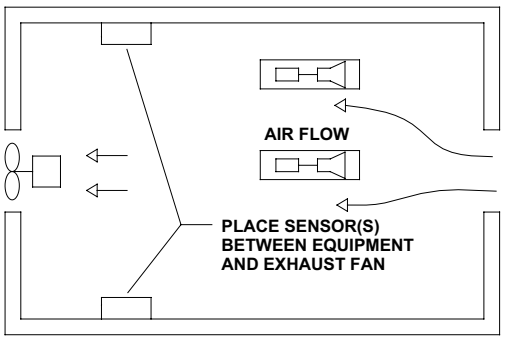
PERIMETER DETECTION

FIG. 3



VENTILATED ROOM

FIG. 4



GAS DETECTION SYSTEM CONFIGURATIONS

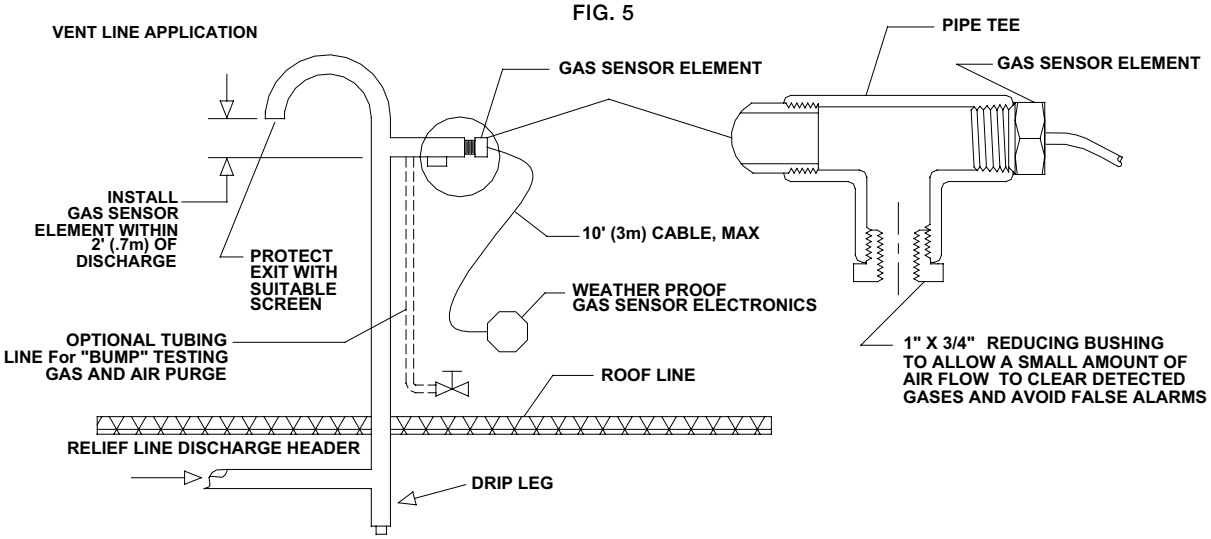
There are a number of typical installation configurations to meet national and local codes. These diagrams are just examples.

RELIEF VALVE VENT LINE

Often the vent line is extended high above the ground or roof. The sensor element can be installed near the outlet of the vent line and the gas detector electronics mounted at a convenient height for servicing. A small length of tubing can be run for injecting test gas near the sensor element. Install a plug with a small opening to allow a small air flow to clear fugitive gases and detected gas after a release. Hansen recommends the alarm setting at 5000 PPM.

For water diffuser systems where the relief valve vent piping is diverted into a water diffusion tank, install the vent line detector on the diffusion tank exhaust vent, not on the piping to the diffusion tank.

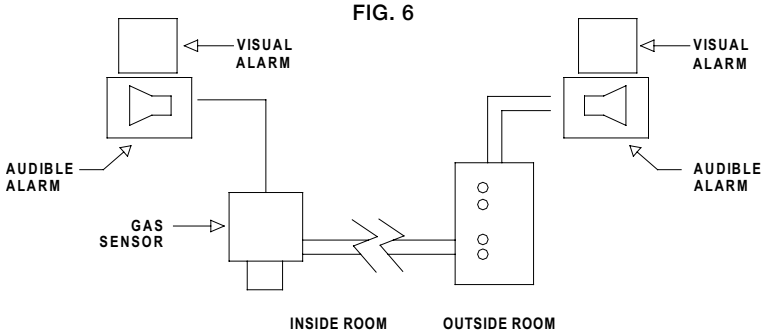
FIG. 5



LOCAL AND REMOTE VISUAL/AUDIBLE ALARM

Sometimes it may be advantageous to have both local and remote displays and alarms. A display/alarm control inside or just outside of a room can be monitored and the same display/alarm or a Hansen monitor in the control room can also alert the operator to an abnormal condition in the plant.

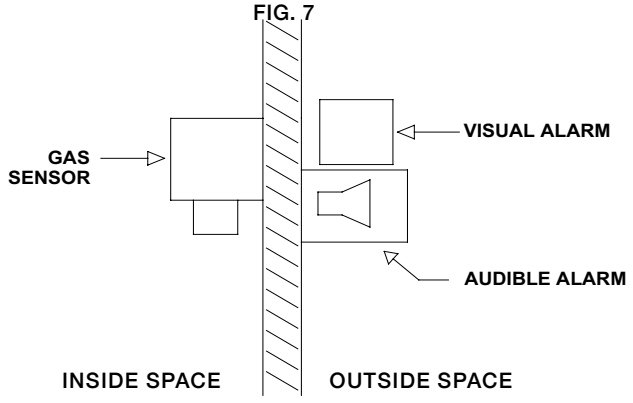
FIG. 6



STAND ALONE CONTROL

The Hansen Gas Detector can operate as a stand alone device. All that is needed is a 24V AC/DC power supply for the gas detector and auxiliary devices for light, horn or digital readout, such as the Hansen GAS Alert

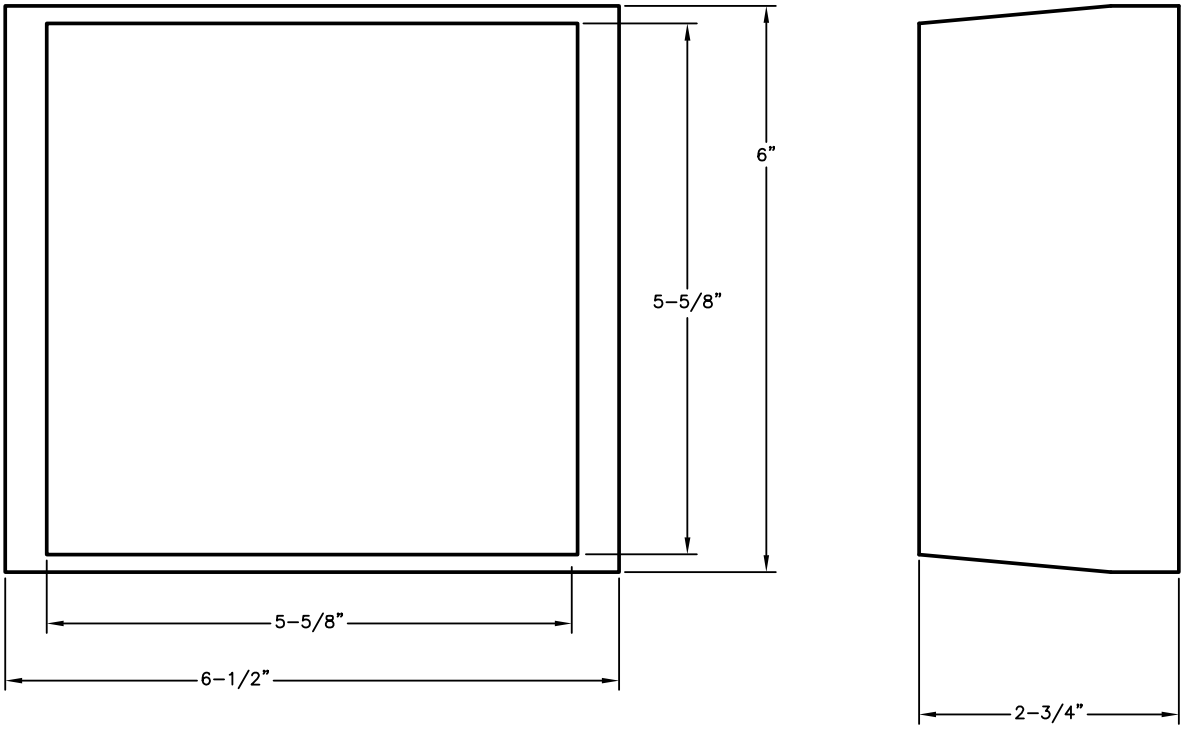
FIG. 7



INSTALLATION DIMENSIONS

INCHES (MM)

FIG. 8



GAS DETECTOR COMPONENTS

FIG. 9

#	Component Desscription
1	M16 Cable Glands (x6)
2	Rubber Gasket (IP66 Version Only)
3	Internal Alarm Buzze
4	Power Connections (x2)
5	Digital Connection (MODBUS)
6	Analog Connection
7	Tactile Switch #1
8	Ribbon Cable to Sensor
9	Tactile Switch #2
10	Relay 3 Connection (FAULT)
11	Relay 2 Connection (HIGH)
12	Relay 1 Connection (LOW)
13	Magnetic Switch #1
14	Magnetic Switch #2
15	M20 Cable Glands (x2)

SENSOR ELEMENT

Typical sensor element life is based on normal operating conditions. Exposure to the target gas will shorten these times. The typical sensor element life of the electrochemical gas sensor element is 2 to 3 years; typical sensor life for semiconductor element is 4 to 6 years; and typical sensor life for infrared element is 5 to 7 years. Recalibration should be performed at least every 6 months. Calibration can be performed locally at detector installation site. If desired results cannot be achieved or if signal reads <1.2mA >2.1mA, steady 3mA, replacement of the sensor element may be required.

ELECTROCHEMICAL SENSOR ELEMENT

Electrochemical sensor element measure the partial pressure of gases under atmospheric conditions. The monitored ambient air diffuses through a membrane into the liquid electrolyte in the sensor. The electrolyte contains a measuring electrode, a counter-electrode and a reference electrode. An electronic “potentiostat” circuit ensures a constant electrical voltage between measuring electrode and reference electrode. Voltage, electrolyte, and electrode material are selected to suit the gas being monitored so that it is transformed electrochemically on the measuring electrode and a current flows through the sensor element. This current is proportional to the gas concentration. At the same time, oxygen from the ambient air reacts at the counter electrode electrochemically. The current flowing through the sensor is amplified electronically, digitized and corrected for several parameters (e.g., the ambient temperature).

SEMICONDUCTOR SENSOR ELEMENT

Semiconductor or metallic oxide sensor element (MOSs) are among the most versatile of all broad-range sensor element. They can be used to detect a variety of gases and vapors in low ppm or even combustible ranges. The sensor element is made up of a mixture of metallic oxides. They are heated to a temperature between 150° and 300° C depending on the gas(es) to be detected. The temperature of operation as well as the “recipe” of mixed oxides determines the sensor element selectivity to various toxic gases, vapors, and refrigerants. Electrical conductivity greatly increases as soon as a diffusion process allows the gas or vapor molecules to come in contact with the sensor element surface. Water vapor, high ambient humidity, temperature fluctuations, and low oxygen levels can result in higher readings.

INFRARED SENSOR ELEMENT

The infrared (IR) gas sensor element is designed to measure the concentration of combustible gases and vapors in the ambient air. The principle is based on the concentration-dependent absorption of infrared radiation in measured gases.

The monitored ambient air diffuses through a sintered metal material into the enclosure of an optical “bench”. The broadband light emitted by an IR source passes through the gas in the optical bench and is reflected by the walls from where it is directed towards a dual-element detector. One channel of the detector measures the gas-dependent light transmission, while the other channel is used as a reference. The ratio between measurement and reference signal is used to determine the gas concentration. Internal electronics and software calculate the concentration and produce an output signal

IMPORTANT: Certain substances in the atmosphere to be monitored may impair the sensitivity of the sensors. Such substances include, but are not limited to:

- Polymerizing substances such as acrylonitrile, butadiene and styrene.
- Corrosive compounds such as halogenated hydrocarbons (releasing halogens such as bromine, chlorine or fluorine when oxidized) and halogen hydride acids as well as acidic gaseous compounds such as sulfur dioxide and nitrogen oxides.
- Catalyst poisons such as sulfurous and phosphorous compounds, silicon compounds (especially silicones), and metal-organic vapors.

LED LOGIC

The Hansen gas detectors provide external indication of their current operational state via audible visual feedbackand also provide relays outputs. Visual indication of the instrument status is provided by a single tri-color LED (Green I Red I Orange) as indicated below:

State	LED	Buzzer	Relay 1 (LOW)	Relay 2 (HIGH)	Relay 3 (Fault)
Warm-up			OFF	OFF	OFF
Normal			OFF	OFF	OFF
Low Alarm			ON	OFF	OFF
High Alarm			ON	ON	OFF
Offline			OFF	OFF	OFF
Fault			OFF	OFF	ON
Negative Gas Fault			OFF	OFF	ON
Zero Cal. Fault			OFF	OFF	OFF
Span Cal. Fault			OFF	OFF	OFF

TABLE 3

WIRING GAS DETECTORS

Install the Hansen Gas Detector in an area where operating personnel can easily monitor it. Refer to ***Gas Detector Location*** on page 3 for suggestions on proper placement of Remote Detectors.

Use two-core shielded pair, 16 to 20 AWG wire to connect power to the gas detector. Connect the power input wires to terminal 4. Connect the analog signal wire to terminal 6 and/or digital sign (MODBUS) to terminal 5. The analog 4-20mA output signal is best for long distances to the monitor and where electrical noise is a problem. The voltage output is for short distances within 10 feet (3 m) of the monitor. The maximum 4-20mA cable length is 1000 ft (300 m).

Under no circumstances should the gas detector low voltage signal wires be in a common conduit, tray or wiring panel with power wiring over 48 volts. Do not run wires near variable frequency drive (VFD) equipment.

Hansen recommends backup of gas detection system with an uninterruptable power supply to provide battery backup in the event of a power failure.

POWER & SIGNAL WIRING TABLE

Connection	Description	Label	Wiring Termination
Power	24 VDC/VAC in	24V IN: -	24 VDC/VAC neutral/ground
		24V IN: +	24 VDC positive / VAC live
	24 VDC/VAC out	24V OUT: -	24 VDC/VAC neutral/ground
		24V OUT: +	24 VDC positive / VAC live
Digital Output	Modbus Network Communications	MODBUS: B	RS-485 "B" (inverted)
		MODBUS: A	RS-485 "A" (non-inverted)
		MODBUS: GND	RS-485 GND
		MODBUS: SH	RS-485 Shield
Analog Output	Voltage or Current output	ANALOG: -	Analog output ground
		ANALOG: +	Analog output signal (+)

TABLE 4

NOTES: 1. Polarity must not be reversed. 2. for 24 VAC in a daisy chain configuration, the neutral polarity must be maintained for all instruments. 3. If analog output is configured for 4-20mA output, ensure the current loop is connected to a sinking current loop monitor before powering on the instrument.

MODBUS RTU RS-485 INTERFACE

For the MODBUS RS-485 network use a 16 to 24 AWG 3-core, 2 twisted pair+ ground, shielded cable with 120 ohm characteristic impedance (recommended Belden 3106A or equivalent).

The MODBUS address, baud rate, stop bit, parity and child termination is configured through the setup menu. No jumpers or hardware switch settings are required.

Ensure the communication parameters within the network, including any user supplier PLC, are configured identically.

To ensure optimal performance of the MODBUS network, ensure the following guidelines are implemented:

- Detectors are configured in a single bus topology, connecting multiple buses in parallel or branching multiple units from the main bus may introduce impedance mismatches, reflections, and/or signal distortions.
- Avoid long stubs when connecting detectors to the bus (should be less than 3').
- Detectors at end of bus have 120 ohm terminating resistor enabled. Terminating resistors may be enabled via Hansen Gas Detector App.
- A/B signal polarity is maintained throughout RS-485 network .
- Connect cable shield to drain to physical earth or ground at the controller only.
- Connect cable shield to (SH) terminal at sensor
- Cable shield integrity is maintained throughout RS-485 network.
- Do not use shield connection for signal ground. Use cable that provides dedicated ground conductor for signal ground. Connect signal ground to (GND) terminal of sensor.

After all wiring has been completed, power the sensor and perform a bump test to verify instrument functionality.

START-UP SEQUENCE

After applying power, the instrument will go through a start-up sequence (initialization, audible/visual test and self-test sequence). After start-up sequence completes, the instrument will enter a warm-up period to allow the sensor element to stabilize before reporting a valid output.

1. Switch power on.
2. Observe the start-up sequence and warm-up phase:
   - Green LED will blink at 0.5 HZ for about 5 minutes.
   - MODBUS flag for warm-up is set.
   - Buzzer is off.
   - Relay state is "no alarm."
   - Gas reading is invalid.
3. Observe normal operation:
   - Green LED is steady on.
   - MODBUS flag for warm-up is cleared.
   - Buzzer is off.
   - Relay state is "no alarm."
   - Gas reading is valid.

The detector may also enter several special states, these are indicated below by the specific analog output levels indicated:

MODE OF OPERATION	4-20mA	1-5V	0-5V	2-10V	0-10V
Instrument Fault	≤ 1.2 mA	≤ 0.3 V	N/A	≤ 0.6 V	N/A
Offline Mode / Maintenance	3 mA	0.75 V	N/A	1.5 V	N/A
Drift below Zero	3.8 mA	0.95V	N/A	1.9 V	N/A
Measuring Range Exceeded	20.5 mA	5.12 V	5.12 V	10.25 V	10.25 V
Fault on Analog Interface	>21 mA	> 5.25 V	> 5.25 V	> 10.5 V	> 10.5 V

TABLE 5

GAS DETECTOR TESTING

Field testing of the gas detector is normally done for three reasons. The first is to determine if the gas detector is responding to the specific gas. This test is sometimes called a "bump" test. The frequency of the test is usually stated in the facilities Process Safety Management (PSM) document, but not less than every six months.

The second reason for gas detector testing is to be sure the gas detector is properly calibrated. Depending on the sensor element type, the sensor element sensitivity will change with time. In particular, electrochemical sensor elements use a material that is depleted with time. The length of time varies depending on the amount of exposure to the target gas, the ambient temperature and humidity, and changes to temperature and humidity range. Atmospheres that are very dry or very humid will shorten the life of a sensor element.

The third reason is to be sure the gas detector output triggers the alarms on the monitor, PLC, Gas Alert System, horn or lights. All gas detectors are recommended to be recalibrated at least every 6 months. All detectors should be recalibrated immediately after exposure to a large concentration of the target gas.

Note: Insurance companies, local and state agencies may require more frequent testing and calibration; refer to insurance carrier mandates as well as local and state codes

DETECTOR BUMP TEST

A bump test is a live test of the detector to verify the detector responds to the target gas and all connected alarm devices are operating accordingly. Prior to test, it is recommended all involved persons are informed about the test as certain alarms might have to be inhibited.

1. Connect adapter and proper PPM gas cylinder to the sensor element.
2. If desired, disable or silence audible alarms.
3. Apply a sufficiently high concentration of the target gas to trigger alarm condition, but NOT pure refrigerant or hydrocarbons.

4. Once alarm thresholds have been exceeded, relays should activate and digital signal outputs should transmit the gas concentration.
5. Turn off gas flow from cylinder and remove calibration adapter from detector.
6. Allow detector to recover/stabilize before returning to normal operation (green LED lit).

VERIFYING ANALOG SIGNAL

The Hansen Gas Detector features a single configurable analog output. During normal operation the analog output signal of the detector is proportional to the detected gas concentration.

GAS CONCENTRATION	4-20mA	1-5V	0-5V	2-10V	0-10V
0%	4 mA	1 V	0 V	2 V	0 V
50%	12 mA	3 V	2.5 V	6 V	5 V
100%	20 mA	5 V	5 V	10 V	10 V

TABLE 6

SWITCH FUNCTIONS

FIG. 10

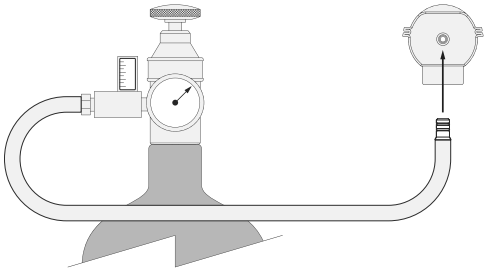
User interaction with the gas detector is accomplished through the use of two magnetic switches located on the bottom of each unit. To actuate a magnetic switch (referred to as MAG#1 or MAG#2), apply the supplied magnetic wand) to the relevant switch location as indicated below:

State	Switch 1 (Tap)	Switch 1 (Hold)	Switch 2 (Tap)	Switch 2 (Hold)
Warm-up	Enable Bluetooth® Connectivity	-	Enable Bluetooth® Connectivity	-
Normal		Start Zero Calibration		Start Scan Calibration
Low Alarm		Mute Buzzer		Ack. Latched Alarm
High Alarm		Mute Buzzer		Ack. Latched Alarm
Offline		-		-
Fault		Mute Buzzer		Ack. Latched Alarm
Negative Gas Fault		Mute Buzzer		Start San Calibration
Zero Cal. Fault		Acknowledge Fault		-
Span Cal. Fault		-		Acknowledge Fault

TABLE 7

GENERAL CALIBRATION PROCEDURE

FIG. 11



Ambient air can be used to zero the detector instead of synthetic air only if the area is known to be free of the target gas to which any detector may be cross-sensitive. In this case, no cylinder or calibration adapter is needed for zero adjustment. Otherwise follow the steps below

NOTE: The gas detector MAY NOT be in an alarm or fault condition during calibration. Acknowledge any alarms or faults BEFORE attempting to begin the calibration process. Except for CO2, calibration gas must be in a balance of air, NOT nitrogen (Ni).

1. Fit calibration adapter to the sensing element on the gas detector lid.
2. If using a variable flow regulator, adjust the gas flow to approximately 0.3 L/min.
3. Hold magnet at MAG#I for >5 seconds
4. Apply zero gas
5. Tap magnet at MAG#I within 30 seconds or gas detector will time-out
6. The LED will blink green-red, green-red-red, etc. until calibration is complete.
7. Turn off gas flow from zero gas

Zero calibration can be aborted during step 6 by holding the magnet at MAG#I for >5 seconds. If calibration is unsuccessful orange LED blinks, in this case tap MAG#I with magnet to discard calibration attempt and start over.

After calibrating the zero adjustment, the span adjustment should be calibrated. With calibration adapter still connected and flow regulator still adjusted to approximately 0.3 L/min:

1. Hold magnet at MAG#2 for >5 seconds. The LED will blink green-green-orange when ready
2. Apply target gas at appropriate concentration level
3. Tap magnet at MAG#2 within 30 seconds or sensor will time-out
4. The LED will blink green-orange, green-orange-orange, etc. until calibration is complete.
5. Turn off gas flow from calibration gas

Span calibration can be aborted during step 4 by holding the magnet at MAG#1 for >5 seconds. If calibration is unsuccessful LED blinks orange, in this case tap magnet at MAG#2 to discard calibration attempt.

After the calibration process is complete, allow the sensor to recover and stabilize before the sensor returns to normal operation. The green LED should be lit for normal operation.

REPLACING THE SENSOR ELEMENT

The Hansen Gas Detectors come with a pre-calibrated sensor elements which maintain the sensor's gas type and calibration information. Replacement sensor elements come pre-calibrated as well for the refrigerant type and calibration level. To replace the gas detector's sensor element:

1. Power-down the gas detector.
2. Using a 5/32" (4mm) hex key/ allen wrench (not included), remove the lid and disconnect the ribbon cable from the sensor element.
3. Remove installed sensor element from lid by holding onto the housing and turning counter clockwise 90°. Take care not to apply excessive force to the sensor element's circuit board. When the square tab of the sensor housing is aligned with the lock icon, firmly pull the module to remove it from the housing.
4. Install the new sensor element by aligning the square tab with the lock icon before firmly pressing it into the enclosure. Taking care not to apply excessive force to the sensor element's circuit board, rotate the sensor element clockwise 90° (or until the triangle icon aligns with the lock icon on the lid).
5. Connect the ribbon cable (to the sensor element and transmitter) and close the lid.
6. Ensure gasket is aligned correctly and tighten the lid using the supplied hardware in an "X" pattern. Tightening torque should be limited to hand tight and should be uniform.
7. Power-up the gas detector.
8. After start-up sequence has finished, check sensor response (bump test).

RESET SYSTEM TO FACTORY DEFAULT SETTINGS

To reset system to factory defaults, remove lid and hold TACT#1 and TACT#2 simultaneously for 30 seconds. Instrument will restart to confirm factory reset.

Alarm Delay

A time delay for the operation of the relay and alarm horn can be adjusted.

Alarm Buzzer

Alarm Buzzer can be reconfigured to up to 15 minute delay. Alarm Buzzer is ≥72dB at 4 default factory setting is enabbled, with option to disable

HANSEN GAS DETECTOR APP COMPONENTS

FIG. 12

APP COMPONENT DESCRIPTION	
1	Main Menu (APP settings)
2	Status (Gas Concentration)
3	Calibrate (Calibration/Bump test)
4	Details (Instrument information)
5	Disconnect Bluetooth®
6	Restart Connected Device
7	Test Mode (LED/Buzzer/Relays/Analog Output)
8	Device Configuration
9	Logs

BLUETOOTH INSTRUCTIONS

The Hansen Gas Detector has a Bluetooth® feature to allow a smartphone to communicate with the individual detector. This feature allows the user to confirm the target gas, the target gas level, log the sensor readings, and initiate calibration/bump tests. To start this option, user would need to download the Hansen Gas Detector App from either Google Play Store or Apple Store.

SENSOR SETUP

In order to utilize the Bluetooth® option, sensors will need to be setup individually thru the APP. To do this:

1. Enable Bluetooth® discovery by tapping MAG#1 for 1-second. After 10-seconds, device will indicate that it is discoverable with audible heartbeat until it has been paired, discovery has timed-out or has been cancelled
2. Launch the Hansen Gas Detector APP and click the Bluetooth® icon at the bottom of the screen to initiate a scan

3. Select the instrument (default is “18TMAH”) from the list of available gas detectors

4. When prompted, enter the passkey (default is “123456”)

5. Go to configure tab to setup device. When prompted, enter unlock code to access device configuration. (default is “1234”)

APP CALIBRATION PROCEDURE

To calibrate the sensor using the APP:

1. Fit calibration adapter to the gas detector lid.

2. If using a variable flow regulator, adjust the gas flow to approximately 0.3 L/min

Begin ZERO adjustment:

3. On APP, Home Tab > Calibrate > manually enter values for zero gas.

4. Apply zero gas (or ambient except for CO2 or O2 if ambient air free of target or cross-sensitive gases).

Confirm the start of calibration:

5. Press the Start Zero button.

Complete ZERO adjustment:

6. APP will countdown to completion. If calibration is successful, proceed to Step 12.

7. Turn off gas flow from zero gas.

8. Replace zero gas with calibration gas in preparation for span adjustment.

Begin SPAN adjustment:

9. Manually enter values for calibration gas.

10. Apply calibration gas at the concentration listed on the cal gas concentration label *(located on top of the instrument)*.

Confirm the start of calibration:

11. Press the Start Span button.

Complete SPAN adjustment:

12. APP will countdown to completion. If calibration is successful, proceed to Step 18.

13. Turn off gas flow from calibration gas and remove the calibration adapter.

14. Allow detector to recover / stabilize before the instrument returns to normal operation *(green LED)*.

APP BUMP TEST PROCEDURE

Bump tests are required following installation of detector or after replacement of sensing element. Bump tests are also performed to verify the instrument functionality. The steps to perform a bump test with the Hansen Gas Detector APP:

1. Connect adapter and gas cylinder according to the instructions in the General Calibration Procedure.

2. If desired, disable / silence external annunciators *(e.g., shutdown valves, notification of authorities, etc.)*: *Home Tab > Calibrate > Bump > toggle Take Offline* to disable communications to external devices.

3. Apply a sufficiently high concentration of the target gas to trigger alarms, but NOT pure refrigerant or hydrocarbons *(e.g., do not use a butane lighter)*.

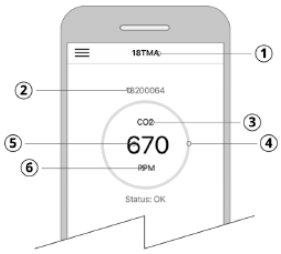
4. Once thresholds have been exceeded, relays should activate, digital outputs should transmit the gas concentration and on APP, gas concentration should be displayed, the instrument status should be “Low Alarm” or “High Alarm” and alarms states should be “On.”

5. Turn off gas flow and remove the calibration adapter.

6. Allow detector to recover / stabilize before the instrument returns to normal operation *(green LED)*.

APP COMPONENTS

FIG. 13



	DESCRIPTION
1	Alias - user configured sensor name
2	Serial Number - sensor 8 digit serial number
3	Target Gas - gas type currently detected by sensor
4	Status Ring - visual indication of various sensor states (see below)
5	Live Measurement - current measurement
6	Measurement Unit - unit of measure (PPM/PPB/%LEL/%VOL)

STATE	STATUS RING	DESCRIPTION
Warm-up	Green	Gas Detector stabilizing after power on or restart
Normal	Green	Normal operation
Low Alarm	Yellow	Measurement below low alarm set point
High Alarm	Red	Measurement above high alarm set point
Offline	Orange	Sensor not actively monitoring gas or in maintenance mode
Fault	Orange	Fault detected
Negative Gas Fault	Orange	Sensor calibration drfited below zero, recalibrate
Zero Cal. Fault	Orange	Error during zero calibration, zero recalibration required
Span Cal. Fault	Orange	Error during span calibration, span recalibration required

KEY FEATURES / SPECIFICATIONS

- 100 – 230 VAC, 50/60 Hz, 80W (max)
- Operating Temperature range -4°F (-20°C) to 122°F (50°C)
- Audible/Visual Alarm indication
- (2) SPDT alarm and (1) SPDT fault relay
- SD Card Logging (8-channel)
- CE Approved
- R5485 MODBUS RTU

OVERVIEW

The Hansen Gas Detection Controller, HGD-C-2 and HGD-C-8, is intended to be used to provide audio-visual alerts and information on the status of a network of gas detectors in a centralized location. This allows clear at-a-glance visualization of any alarm or fault status on a connected gas detector in a location outside of the monitored space, as required by many regulatory codes and standards.

This Controller displays comprehensive information about the status of all connected gas detectors. A maximum of (8) Hansen gas detectors can be connected to the HGD-C-8 Controller via MODBUS RTU and a maximum of (2) Hansen gas detectors to the HGD-C-2

The Controller can be used to provide power to each connected, compatible gas detector, negating the need for separate power supply at the location of the gas detector.

The HGD-C-8 Controller displays status via an LCD screen and LEDs, (The HGD-C-2 only displays status via LEDs on cover) for each connected gas detector, status is clearly indicated via dedicated LEDs to indicate:

- Power & connectivity
- High alarm
- Low alarm
- Fault

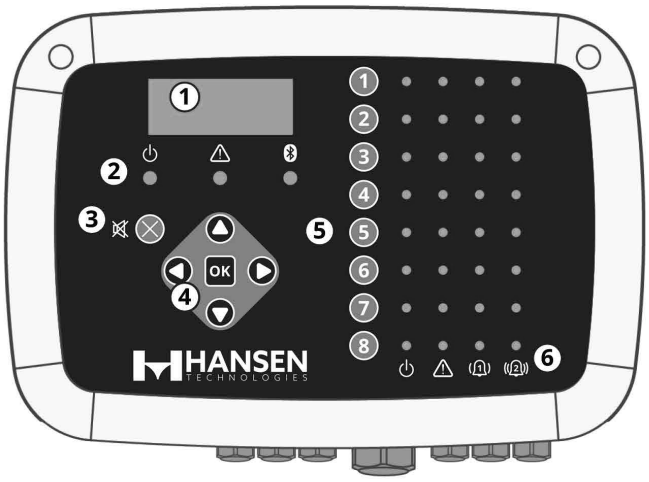
The Controller provides an interface by which you can monitor, acknowledge alarms, and observe conditions inside the mechanical room. The HGD-C-8 LCD screen will display the current gas reading and gas type for the selected channel, or will indicate fault and/or alarm status. The LCD screen is also used for configuration of the Controller via the integrated keypad. In addition to the visual alarm status displayed, the Controller includes an integrated audible alarm. An optional audio-visual alarm beacon can be installed, mounted in the top of the enclosure, to enhance local alarm indication.

The Controller provides SPDT relays (indicating any high alarm, low alarm or fault status) and can act as a MODBUS slave device. This allows connection to a third-party device such as a Building Management System (BMS) or Programmable Logic Controller (PLC).

Data logging is available on the HGD-C-8 via the integrated SD card, which can be removed to allow download of the logged data to a computer.

8-CHANNEL CONTROLLER EXTERNAL COMPONENTS

FIG. 14



External Component Description	
1	LCD Display
2	Power, Warning, and Bluetooth* indicators ***NOTE** - The bluetooth indicator will light when a bluetooth communication path is established between mobile App and downstream sensor.
3	Alarm Mute Button
4	Main Keypad
5	Channel Keys
6	Power Fault, Alarm 1, Alarm 2 indicators for each channel

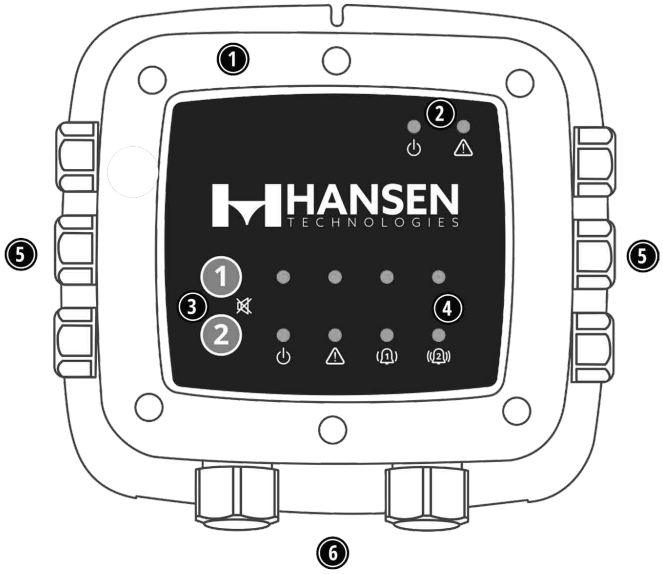
8-CHANNEL CONTROLLER INTERNAL COMPONENTS

FIG. 15

#	Component Description
1	AC Power Terminal Block
2	Power Supply
3	Cooling Fan
4	SD Card Slot
5	Coin Cell Battery
6	Reset Switch
7	High Alarm Relay
8	Low Alarm Relay
9	Fault Relay
10	Sensor Power Connector
11	Sensor Data Connector
12	BMS Data Connector
13	AV Beacon Connector (beacon not shown)

2-CHANNEL CONTROLLER EXTERNAL COMPONENTS

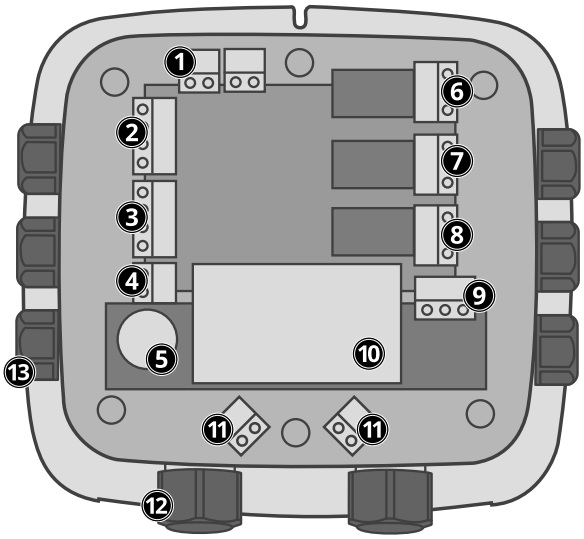
FIG. 16



#	Component Description
1	Integrated Visual Alarm
2	Controller Power and Fault LEDs
3	Channel 1 and 2 alarm mute buttons
4	Power, Fault, Low, High Alarm LEDs
5	M16 Cable Glands (x6)
6	M20 Cable Glands (x2)

2-CHANNEL CONTROLLER INTERNAL COMPONENTS

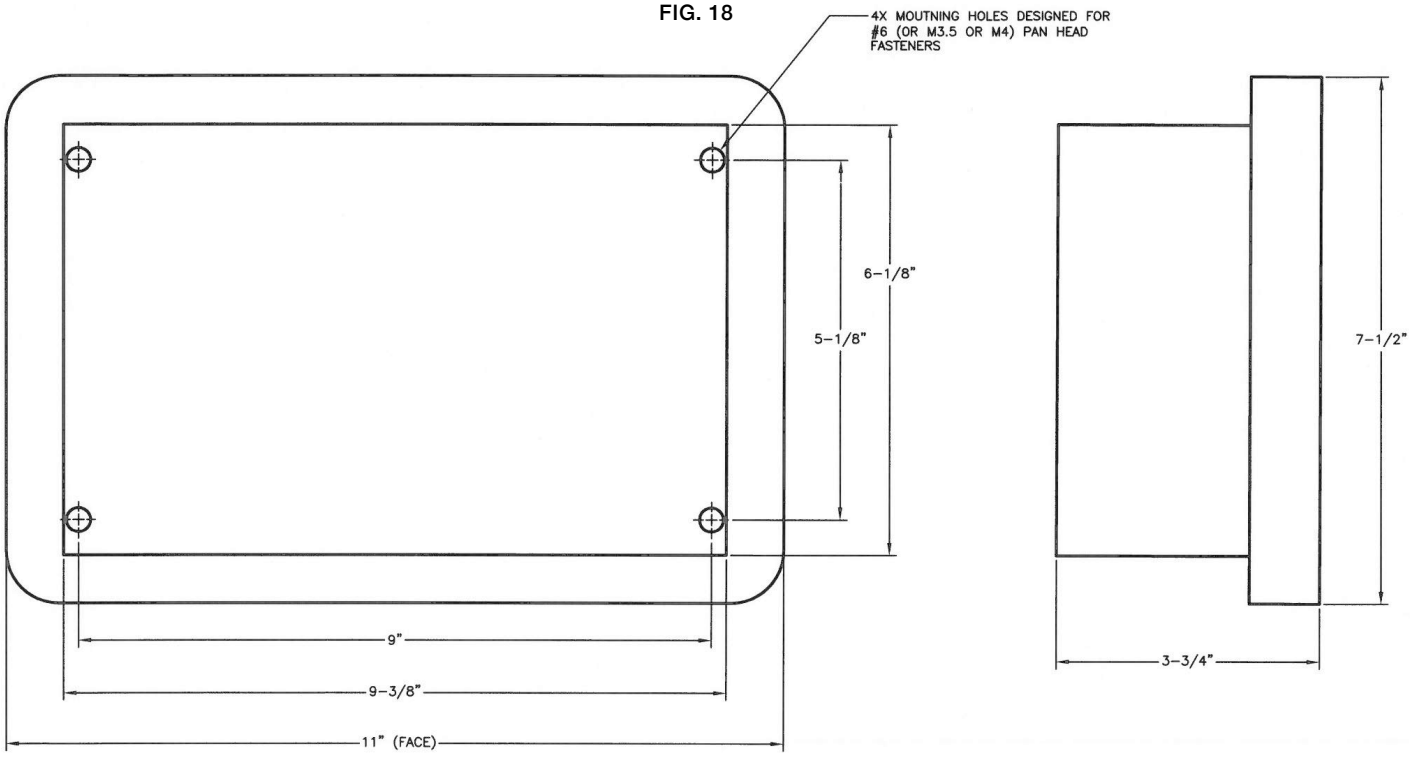
FIG. 17



#	Component Description
1	Analog Output (x2)
2	MODBUS to Gas Detector(s)
3	MODBUS to BMS
4	Remote Silence
5	Audible Alarm
6	Fault Relay
7	High Alarm Relay
8	Low Alarm Relay
9	AC Power Line Input
10	Power Supply
11	Sensor Power Connections (x2)
12	M20 Cable Glands (x2)
13	M16 Cable Glands (x6)

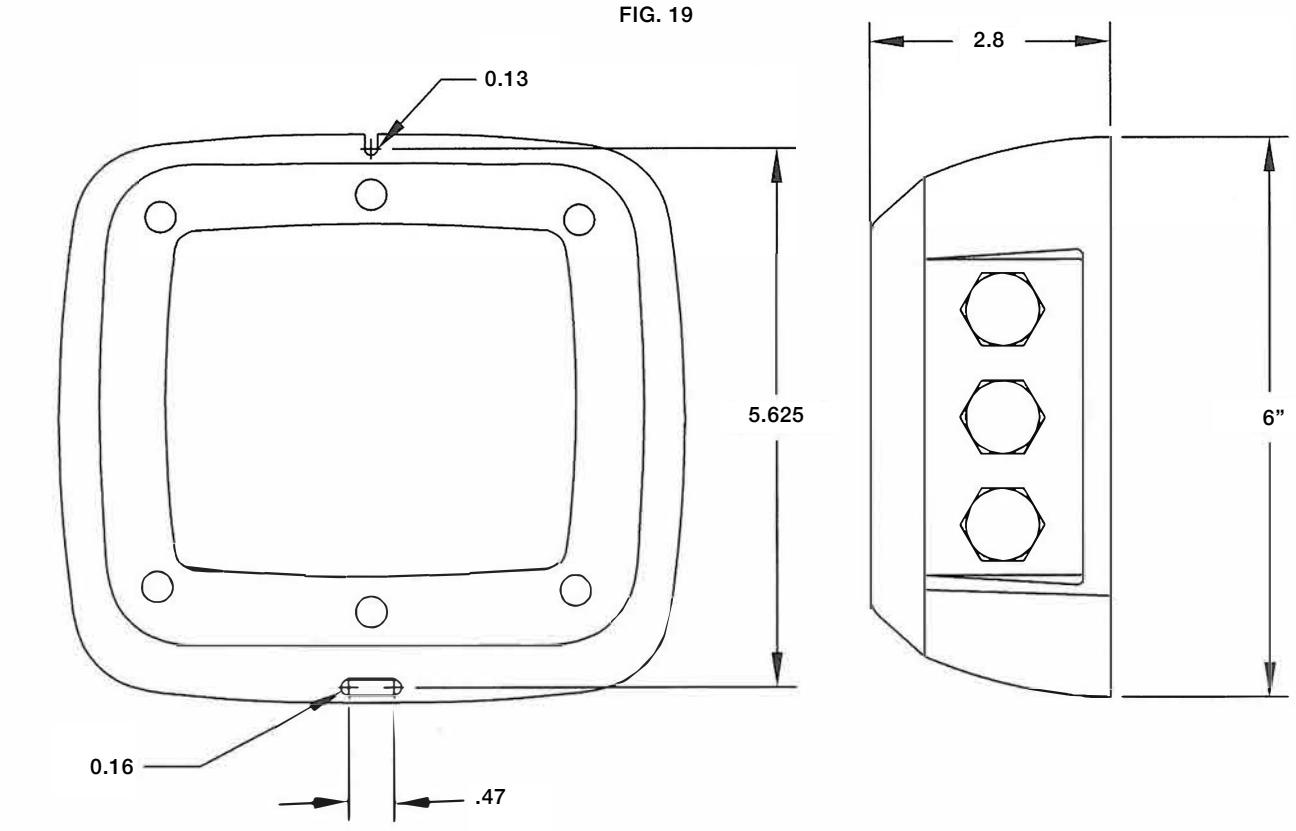
INSTALL DIMENSIONS 8-CHANNEL CONTROLLER

FIG. 18



INSTALL DIMENSIONS 2-CHANNEL CONTROLLER

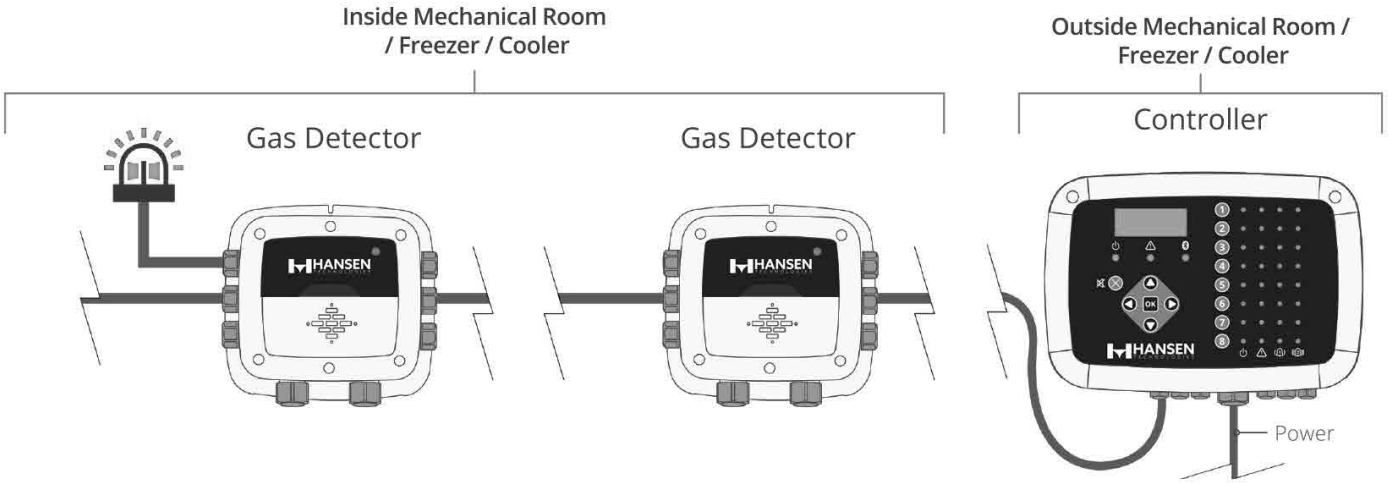
FIG. 19

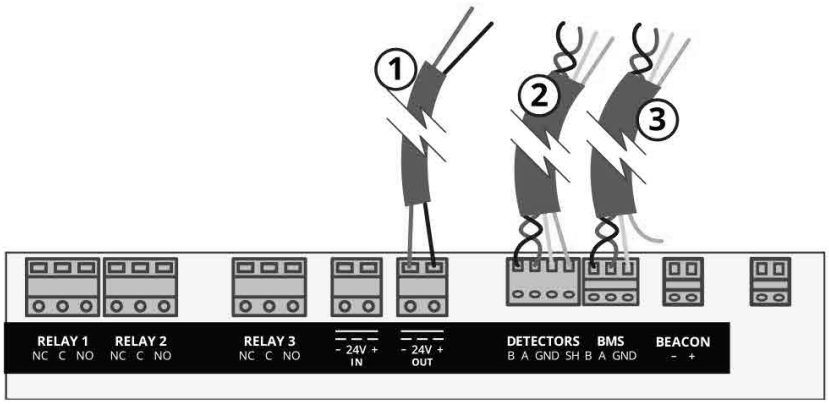


REFERANCE
NOT TO SCALE

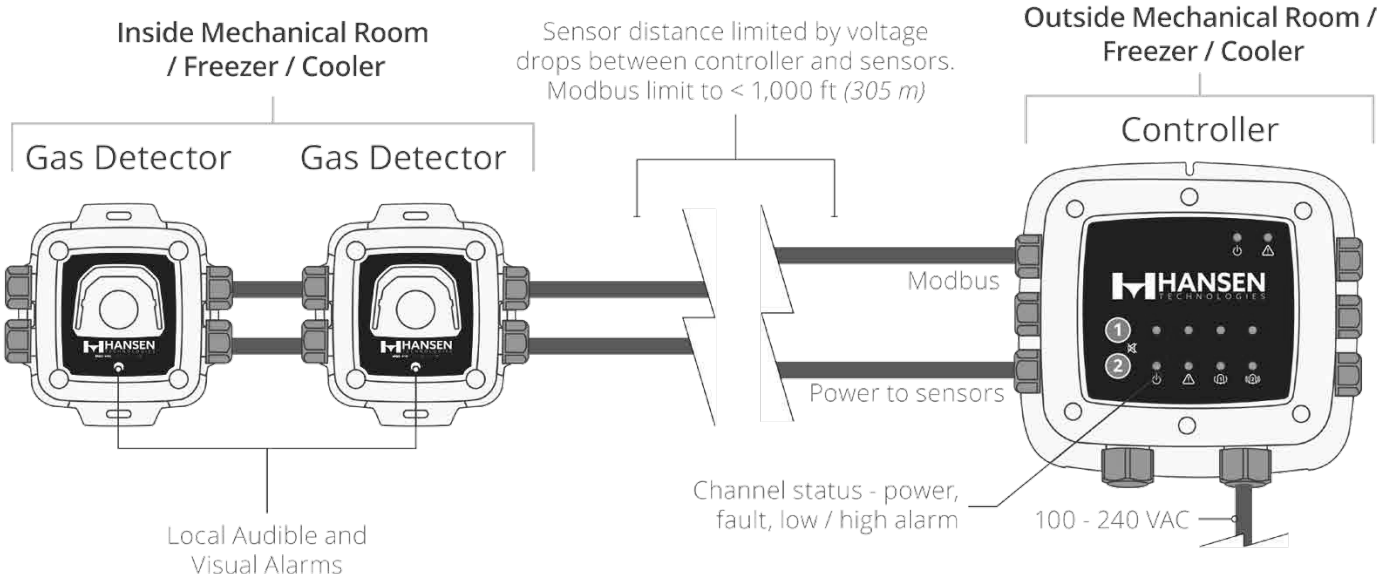
CONTROLLER WIRING CONNECTIONS

FIG. 20





#	Description
1	24 V DC Out Connector to 24V DC Power Supply
2	RS-485 Modbus Connector to Gas Monitor
3	RS-485 Modbus Connector to Building Management System *(BMS)*



INSTALLATION

The Controller has been thoroughly inspected and tested prior to shipment from the factory. Nevertheless, it is recommended that the instrument be re-checked prior to installation. Upon receipt, inspect the outside of the enclosure to make sure there are no obvious signs of shipping damage. Loosen the screws on the enclosure lid and open the front panel. Visually inspect the interior of the enclosure for loose wires or components that may have become dislodged during shipment.

The Controller should be centrally located in the facility (preferably outside of the mechanical room) and should be easily accessible for visual monitoring and servicing. This is the “split architecture design” for safety of the operator. Dirt, grease, and oils can adversely affect the operation of the Controller. This Controller should be installed out of direct sunlight in a clean, dry area that is not subject to temperature or humidity extremes. Installation in a mechanical room is acceptable provided reasonable environmental conditions exist. If there is a question, consider installing the unit outside of the mechanical room in a cleaner area of the facility.

The Controller should be installed plumb and level and securely fastened to a rigid mounting surface. The enclosure utilizes four mounting holes designed for #6 (or M3.5 or M4) pan head fasteners (included). Mounting holes are located in the four corners of the enclosure, accessed by opening the front panel. Install and adjust the screws as necessary to hold the unit securely against the mounting surface.

The Controller enclosure features M20 two cable glands that are intended for power entry. If conduit is preferred simply remove one of the M20 glands and install a suitable ½” conduit adapter. Locate the AC power and Ground on the power input terminal block. Secure the incoming AC power neutral (white/blue) and live (black/brown) and ground wires to the appropriate terminals using a screwdriver on the press to release tabs as shown below.

The Controller is connected to Hansen gas detectors using a shielded twisted pair instrument cable (Belden 3106A or equivalent). The maximum distance between the furthest gas detector and the Controller is 1000 feet (1372 m) when only using MODBUS communications. The available distance is less when using the Controller as the power supply for gas detectors. The total power available for gas detectors is 51W. Careful attention to voltage drop over distance with a suitable wire gauge employed is also required. Use any of the remaining cable glands to gain access to the interior of the unit. The RS-485 communication wiring between the gas detector and the Controller must be connected in the following manner:

1. Locate the RS-485 connector in the gas detector.

2. Connect one lead of a twisted shielded pair to the “B” connection point; note the wire color.

3. Connect the second wire to the “A” connection point; note the wire color.

4. Connect the ground to the “GND” connection point

5. Connect the shield or drain wire to the “SH” connection point.

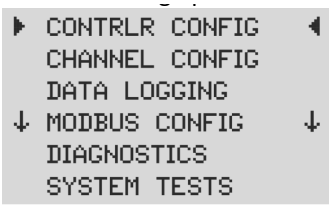
Locate the RS-485 connectors in the Controller. The left RS-485 connector is for downstream “child” devices (includes a dedicated shield position) and the right RS-485 connector is used to connect to “parent” devices upline, such as building management controls.

A second RS485 connector allows a Building Management System (BMS) to communicate with the Controller via MODBUS protocol. The connection is established using a shielded twisted pair cable such as Belden 3106A. Use any of the remaining service cable glands to gain access to the interior of the Controller. Locate the RS485 upline connector, secure the wire leads to the connector in the orientation as displayed on the board. Check to make sure the polarity matches the wiring to the BMS. The shield connection should only be grounded at the BMS device and should not be connected at the controller.

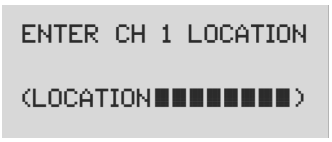
8-CHANNEL SETUP PARAMETERS

Pressing a Channel number key will bring up a scrollable channel detail screen with detector specific information. Pressing the channel number key a second time will access the channel setup menu.

The system level menu is accessed by pressing the OK key while the main screen is being displayed. The currently selected menu item is indicated with triangle pointers to the left and right of the description. If the menu list is longer than can be displayed, up and down arrow keys on the right side of the screen will indicate additional items are available by either scrolling up or down.

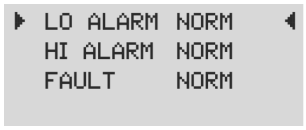


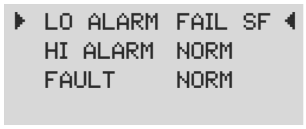
Some of the screens you will access will require data entry, such as the date/time setup or location description. These screens will appear with a character selected, as displayed below. Use the up/down Arrow keys to scroll through the characters provided for that character’s place. Use the left/right Arrow keys to move the cursor to the next character. When all character selections for the screen are completed, press ENTER to accept the entries.



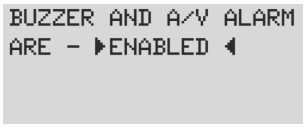
Before using the Controller various parameters must be set by the user based on how the controller has been wired. These parameters are accessed from the main menu by selecting ”CONTRLR CONFIG”.

From the RELAY menu, each of the three relays can be configured for either normal or failsafe operation. The default is normal, meaning normally open contacts will close with the event corresponding the relay designation. If fail safe is selected the relay will be normally energized and will be de-energized with the relays designated event or a power failure.



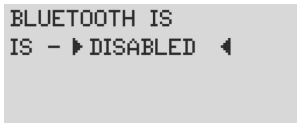


The optional beacon, if installed, and the internal buzzer may be enabled to indicate an alarm condition. When enabled, the beacon will be energized, and the buzzer will beep, if either a low or high alarm condition exists.



Fault latching defaults to DISABLED, allowing the fault indication to clear with the condition without user intervention. When ENABLED the fault indication will persist after the condition has cleared, until a user clears the current faults by selecting “CLEAR FAULT” from the diagnostic menu.

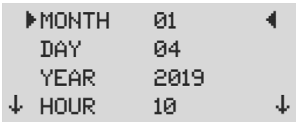
To use the Hansen smart phone APP, before connecting you must ENABLE Bluetooth from this menu screen.



From the LCD contrast setting screen, use the arrow keys to adjust the contrast from 1-63, with 30 being the default.

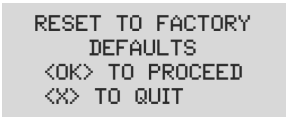
The brightness of front panel LEDs can be adjusted from 0-10. A full bright setting of 10 will be visible from a long distance but may be too bright when the user is operating the keypad. For this reason, when the keypad is in use the LED brightness will auto-dim to a comfortable level, and resume the programmed brightness setting after a period of keypad inactivity

The real time clock should be checked and set after installation or when the coin cell battery is changed. Enter or edit the month, day, year, hour and minute by scrolling the menu.

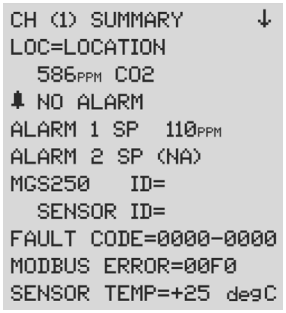


The Controller can be password protected to prevent the unauthorized editing of setup parameters. When password protection is enabled, an operator may still navigate between screens to observe settings or monitor network status. The unit is shipped with password protection OFF. Entering a 3 digit (non-zero) password enables password protection. After protection is enabled, the user will be prompted to enter the password when an attempt is made to edit a setup parameter. After entering the password, a 30 minute time period will be allowed for entries, after which the user will again be prompted to re-enter the password. To disable password protection, simply change the password to all zero’s (000).

Selecting FACTORY RESET will revert all user settings to their factory out of box defaults. A confirmation screen will ask the user to confirm their intent since user settings will be lost and you will need to re-configure each channel. For this reason record settings in each channel edit screen before performing a reset.

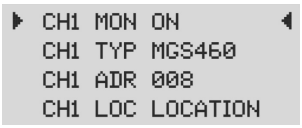


Pressing a CHx key from the main screen will bring up a channel summary screen with detailed information collected from the gas detector assigned to that channel.



Prior to setting channel parameters, the installer should verify and record the instrument type, node address and baud rate for each connected detector. All detectors must be set for the same baud rate, either 9600 (default) or 19200, and must have a unique node address. The BAUD setting in the MODBUS CONFIG menu must match the settings of the detectors. The channel setup screen may be accessed either by selecting CHANNEL CONFIG from the main menu or by pressing the channel number key twice at the main screen. For each detector channel

there are 4 parameters the user set MON, TYP, ADR, LOC.



CHx MON (Monitor)

This parameter set to ON or OFF, enables or disables the monitoring of the gas detector assigned to that channel. When set to ON the controller will attempt to collect data, every 5 seconds, from the gas detector type and at the node address specified in the corresponding channel parameters. Successful communication will be indicated with a solid green LED next to the channel number key. Each time data is collected the LED will flicker to indicate communication access. Failed communication will be indicated by a blinking green LED and yellow system fault LED. Failed communication can be caused by a mismatch of either node address, instrument type or baud rate settings between the controller and the detector, or an unpowered detector. Setting the MON parameter to OFF will exclude the gas detector assigned to that channel from being scanned. If all channels have monitor parameters set to OFF a system level fault will be triggered to indicate no detectors are being monitored.

CHx TYP (Instrument Type)

The instrument type parameter indicates what instrument model is connected to CHx, this should be MGS450.

CHx ADR (Node Address)

Each connected detector must have a unique node address (see detector instruction for how to set the detector node address). Select the node address corresponding to the detector assigned to CHx, valid addresses are 1-247.

CHx LOC (Location)

For each channel a 16 character string may be defined to describe the name or location of the detector assigned to that channel. This string will appear in the CHx detail summary screen as an aid to identify the location of the associated gas detector.

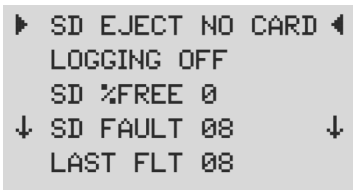
Data Logging Overview

With an SD card installed, the controller will log concentration, units of measure, gas name, low alarm state, high alarm state, detector fault code and controller fault code, every 10 seconds. Log data is buffered for 10 minutes before writing to the SD card, so it is important to use the 'SD EJECT' menu item before removing the SD card, this will write the contents of the buffer and turn off data logging, so the card is ready to be removed. Log data is divided into weekly files using the naming convention MGS408_LOG_WEEK_XXX_OF_YYYY.csv, where XXX is the week number (1-52) and YYYY is the year. The file format is comma delimited text which can be opened directly in Microsoft Excel. Row 1 will contain a descriptive header for each column. The supplied 32Gb SD card can hold up to 10 years of log data.

The Controller comes with a 32Gb SD card installed, which can hold up to 10 years worth of log data. A compatible SD card will have 32GB or less capacity and be formatted in the FAT32 format.

Data Logging Menu

From the data logging menu the user can safely eject the SD card, turn logging ON or OFF, view the percentage of free space remaining on the SD card, and view any current or historical fault codes.



Select 'SD EJECT' just prior to removing the SD card. This will write any buffered log data to the card and turn off logging. Logging will automatically resume when the SD card is re-installed.

Enable or disable data logging by setting 'LOGGING' to ON / OFF.

'% FREE' shows the percentage of free space remaining on the installed SD card

Any faults associated with the SD card will display as a two digit code next to this menu item, and selecting it will bring up a scrollable list of faults in English. Selecting a fault item will bring up a suggested remedy. SD card specific faults include:

- SD CARD MISSING (01)
- SD POWER FAIL (02)
- SD CARD FULL (04)
- SD MOUNT FAIL (08)
- SD FILE FAIL (10)
- SD WRITE FAIL (20)
- SD CAP READ (40)
- SD WRITE PROTECT (80)

'SD FLT (XX)' displays a two digit fault history code, and selecting it will bring up a scrollable list of faults in English. Selecting a fault item will bring up a suggested remedy. The code may be cleared from the diagnostic menu by selecting "CLR LAST SDFAULT".

Function

Every 5 seconds the Controller collects gas concentration and status information from each connected gas detector. Gas concentration appears on the LCD display and connection status, fault and alarm conditions are indicated by the LED matrix for each channel. When an SD card is installed, concentration and status information is logged every 10 seconds for all connected gas detectors. Detector data and controller status information can also be communicated via MODBUS, to a parent or BMS device.

After power up, the firmware revision level will be indicated on the LCD followed by an LED/LCD and beacon self test. The controller will then begin scanning connected detectors and display their reported gas concentration on the LCD and status information on the LED matrix.

EXTERNAL ALARMS

One switched 24V DC contact marked “BEACON” is available for the connection of an external alarm device. The terminals can sink up to 300 mA at 24V DC. Form C relay contacts are provided for FAULT, LOW ALARM and HI ALARM conditions.

Use the remaining cable glands to gain access to the interior of the Controller. Locate the relay connectors, secure the wire leads to the connectors

2-CHANNEL SETUP PARAMETERS

During power up the perimeter visual alarm and the audible alarm will both run through a test cycle. The POWER green LED for the controller (see Figure 16) will illuminate. When the Hansen gas detector establishes communications with the 2-channel Controller the FAULT amber LED for the controller (see Figure 16) will go from illuminated to not illuminated. It can take up to 5 minutes for the Hansen Gas Detectors to warm up.

As default all settings on Switch 1 and Switch 2 are in OFF position. If using the Hansen 2-Channel Controller to interface with a BMS as a child the MODBUS protocol needs to be configured (Refer to Figure 21). Using switch 1 (SW1) on the underside of the lid of the Controller, use setting 4 to acknowledge whether the Hansen gas detector will need to have the terminating resistor engaged. Please see MODBUS protocol for best practice. All of the settings of the Hansen gas detector must match the BMS system to work correctly.

The (3) form C relays that are included in the Hansen gas detector (fault, low alarm, high alarm) can be configured to be fail safe. The fail safe mode will be set to its fault or alarm state during loss of power until power is restored. The fail safe mode can be configured for each of the individual relays and is done using SW1 settings 1, 2 and 3. If fail safe mode is desirable for the relays change settings to ON.

Switch 2 setting 3 is enabled if a second Hansen gas detector will be connected to this 2-Channel Hansen Controller. As a default, the Controller is set to one gas detector input.

The (2) analog outputs can be configured to 4-20mA, 1-5V or 2-10V depending on user preference. When configured both analog outputs will be configured the same (i.e., both 4-20mA, both 1-5V, or both 2-10V). Using SW2 settings 4 and 5 set the desired configuration. Output cannot be on analog signal and MODBUS.

2-CHANNEL CONTROLER LID LABEL

FIG. 21

Switch 1					
MODBUS Setting					Action
4	5	6	7	8	
OFF					Disabled
ON					Enabled
	OFF				Parity disabled
	ON				Parity enabled
		OFF			Even Parity
		ON			Odd Parity
			OFF		1 Stop Bit
			ON		2 Stop Bit
				OFF	9600 Bits per Second
				ON	19200 Bits per Second

TABLE 8

Switch 2			
MODBUS Address	Setting		
	6	7	8
10	OFF	OFF	ON
20	OFF	ON	OFF
30	OFF	ON	ON
40	ON	OFF	OFF
50	ON	OFF	ON
60	ON	ON	OFF
70	ON	ON	ON
80	OFF	OFF	OFF

TABLE 9

GAS Alert System

KEY FEATURES–GAS ALERT SYSTEM

Provides local display and alarm based on measured target gas level
Visual alarm, Amber LED light
Audible alarm (mutable)
Power indicator, Green

KEY FEATURES–GAS ALERT SYSTEM

- Provides local display and alarm based on measured target gas level
- Visual alarm, Amber LED light
- Audible alarm (mutable)
- Power indicator, Green
- Numeric PPM reading
- Bright LED display
- Shipped factory calibrated and tested

TECHNICAL SPECIFICATIONS

Operating Temperature Range: -10°F (-23°C) to 125°F (50°C)

Humidity Range (Non-condensing): 0-95%

Voltage Requirements: 24V AC/DC, 50/60 Hz

Display: LED, Red

Loop Resistance: 100 ohms

Power Requirements at 24V AC, 50/60Hz with sensor: 11.4VA

Power Requirements at 24V DC with sensor: 247mA

Audible Alarm Sound Pressure: 97dB at 2 feet

Tone Type: Continuous, 2900 Hz

Muted Sound Pressure: 60dB at 2 feet

Visual Alarm, LED Lamp: Amber, 38 lumens

Enclosure: Watertight, NEMA4X (IP65)

Pollution Degree: 4

True Altitude: 2000M

Installation Category: 1

Duty Cycle: 100%

Equipment Class: 3

INSTALLATION OF GAS ALERT SYSTEM

The GAS Alert System is shipped factory calibrated and tested; ready to use. Mount in a location safe and easily accessible. Avoid thermal extremes and areas where falling water or condensation moisture is present.

The GAS Alert System can be mounted to any solid flat surface. Two options are available for mounting; screw the base to a solid flat surface or clip-on to a DIN-rail. The lower cover must be removed to access the two mounting holes for screw mounting. Attach to the wall with the appropriate mounting screws. Replace the cover when complete.

WIRING GAS ALERT SYSTEM

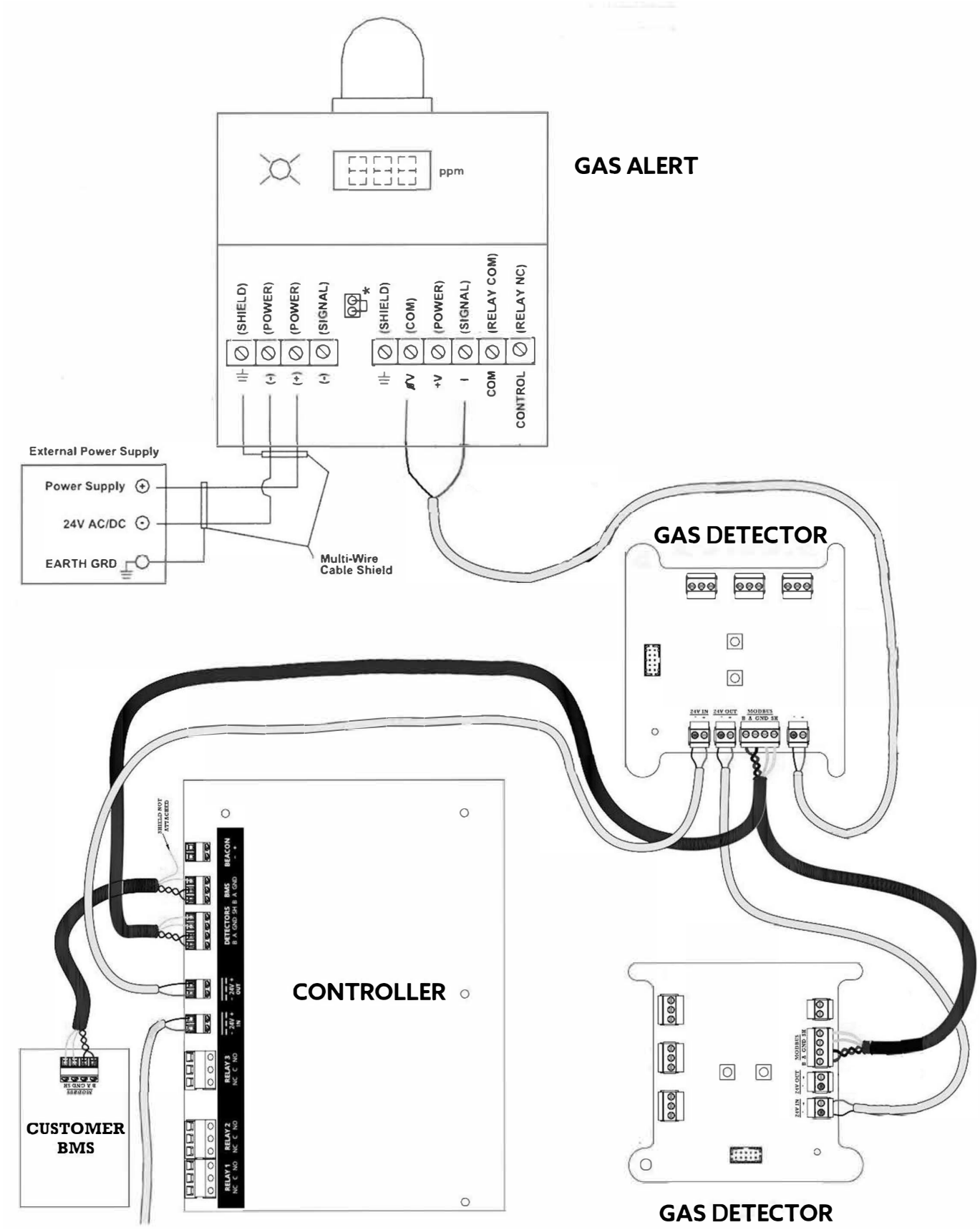
The GAS Alert System can be used as a standalone, locally monitored system or as part of a larger gas monitoring and signaling system. The lower cover to the terminal compartment must be removed to gain access for wiring. Knockouts are available for ¼˝ and ½˝ conduit or liquid tight cable clamps. To use as a standalone system one gas sensor is required. The gas sensor is powered via the GAS Alert System. The gas sensor 4-20mA signal is fed back to the GAS Alert System to allow for a numeric readout of the actual PPM value measured. The gas sensor internal relay is wired to the GAS Alert System to trigger the signaling lamp and sounder. The GAS Alert System signal lamp and sounder will clear when the gas level as detected by the gas sensor drops below the adjusted trip point. The default setting from the factory for a specified gas sensor is half the total range.

To use as part of a larger gas monitoring and signaling system, each GAS Alert System will be mated with a gas sensor. The 4-20mA signal can be used to drive the GAS Alert System device, plus a larger monitoring system or PLC monitoring signaling system.

Due to system irregulaties the Gas Alert System LED display, when connected to a gas sensor with no target gas present, the display may not read at zero. If this is not acceptable, the user can adjust the LED display in the Gas Alert System or adjust the zero setting in the gas sensor.

To adjust the Gas Alert System LED display, open the clear cover and remove the LED display panel by removing the 4 screws. On the backside of the LED display, adjust the potentiometer labeled Z until the display reads 0 PPM. Reverse procedure to assemble.

WIRING SCHEMATIC FOR CONTROLLER AND DETECTOR



NOTE: Hansen Gas Controllers HGD-C-2 and HGD-C-8 cannot be used with old style gas detector, i.e. HEC4-N100, etc.

Gas Detection Test Certificate

Product Description:_____ Serial Number:_____

Date of First Calibration:_____ Date of Last Calibration:_____

Type/Range of Test Gas:_____

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1. Carry out "Bump Test" (Set delay to zero) *Initial the following, encircle "OK" when completed.*

Power (Green LED)	_____	OK
Visual Alarm (Red LED)	_____	OK
Audible Alarm Operating	_____	OK
Relay Operating	_____	OK
Remote Systems if connected to relay	_____	OK
Check Analog Output in Use, e.g. 0-5V, 4-20 mA	_____	OK

2. On-Site Gas Calibration *Initial the following, encircle "OK" when completed.*

System Passed _____ OK

If the Gas Sensor did not respond correctly and could not be recalibrated due to age, exposure to gas etc, then either the Gas Sensor or the sensing element should be replaced (and recalibrated.)

System Failed _____

I hereby certify that the above specified test procedure has been performed.

The Hansen Gas Sensor (is)/(is not) performing as specified. *Encircle the appropriate conclusion.*

Test Performed by: _____ _____
Signature Date

ORDERING INFORMATION: GAS DETECT0RS, CONTROLLERS, SENSOR ELEMENTS

AMMONIA		
MODEL	SENSOR TYPE	RANGE (PPM)
HGD-EC-NH3-100	ELECTROCHEMICAL	0-100
HGD-EC-NH3-1000	ELECTROCHEMICAL	0-1000
HGD-EC-NH3-5000	ELECTROCHEMICAL	0-5000

CO2		
MODEL	SENSOR TYPE	RANGE (PPM)
HGD-IR-CO2-10000	Infrared	0-10,000

GAS DETECTION CONTROLLER	
HGD-C-2	2 Channel controller, 115/230 VAC
HGC-C-8	8 Channel controller, 115/230 VAC

AMMONIA - LIMITED AVAILABILITY		
MODEL	**SENSOR TYPE**	**RANGE (PPM)**
HSC4H-N10K (old style)	SEMICONDUCTOR	0-10000
HVSC4-N10K (old style)	SEMICONDUCTOR (VENT LINE)	0-10000

CALIBRATION GAS CYLINDERS (17 L)		
31-0031	Ammonia	100 PPM
31-0032	Ammonia	250 PPM
31-0033	Ammonia	1,000 PPM
31-0034	Ammonia	10,000 PPM
31-0127	CO2	10,000 PPM
31-0035	R22	1,000 PPM
31-0079	R404/R507	3,000 PPM
31-0080	R134	3,000 PPM
31-0130	R410	5,000 PPM
[redacted]		
31-1000	CALIBRATION KIT (REVISION PRIOR 2020)	
31-1037	CALIBRATION KIT (CURRENT REVISION)	

GAS ALERT SYSTEM	
GAS-100	0-100 PPM
GAS-250	0-250 PPM
GAS-1K	0-1,000 PPM
GAS-3K	0-3,000 PPM
GAS-10K	0-10,000 PPM

CAUTION

Hansen Gas Detectors, Controllers and Alert Systems have been designed for industrial and commercial refrigeration systems. These instructions must be completely read and understood before selecting, using or servicing Hansen gas detection equipment. Only knowledgeable, trained refrigeration personnel should install, operate, or service this gas detection equipment. Stated temperature and voltage limits should not be exceeded. See Safety Precautions in current List Price Bulletin and Safety Precautions Sheet supplied with product.

WARRANTY

All Hansen products, except electronics, are guaranteed against defective materials or workmanship for one year F.O.B. factory. Electronics are guaranteed against defective materials or workmanship for 90 days F.O.B. factory. No consequential damages or field labor is included.

HALOCARBON		
MODEL	SENSOR TYPE	RANGE (PPM)
HGD-SC-R22-1000	Semiconductor	0-1000
HGD-SC-R134A-1000	Semiconductor	0-1000
HGD-SC-R404A-1000	Semiconductor	0-1000
HGD-SC-R407A-1000	Semiconductor	0-1000
HGD-SC-R410A-1000	Semiconductor	0-1000
HGD-SC-R507A-1000	Semiconductor	0-1000

PORTABLE GAS DETECTION		
HEP1	Handheld unit without sensor	module
31-1012	Electrochemical	0-50/500 PPM
31-1013	Electrochemical	0-500/2000 PPM
31-1032	Filter	10 pack

SENSOR ELEMENT REPLACEMENT KITS (2020 models)		
KIT	REFRIGERANT	RANGE (PPM)
31-1033	NH3	0-100
31-1034	NH3	0-1,000
31-1035	NH3	0-5,000
31-1036	R22	0-1,000
31-1038	R134A	0-1,000
31-1039	R404A	0-1,000
31-1040	R410A	0-1,000
31-1041	R507A	0-1,000
31-1042	CO2	0-10,000

SENSOR ELEMENT REPLACEMENT KITS (prior 2020)		
KIT	REFRIGERANT	RANGE (PPM)
31-1024	NH3, Standard	0-100, 0-250
31-1003	NH3, Standard	0-1,000
31-1004	NH3, Standard	0-10,000
31-1025	NH3, Harsh/Extreme	0-100, 0-250
31-1005	NH3, Harsh/Extreme	0-1,000
31-1006	NH3, Harsh/Extreme	0-10,000
31-1018	NH3, Explosion Proof	0-100, 250, 1,000
31-1016	NH3, Explosion Proof	0-10,000
31-1007	NH3, Vent Line	0-10,000
31-1015	Halocarbon, Vent Line	0-5,000
31-1008	Halocarbon, Basic	0-3,000
31-1009	Halocarbon, Harsh/Extreme	0-3,000
31-1017	Halocarbon, Explosion Proof	0-3,000

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