KECO

HOUND SERIES GAS ANALYZER USER MANUAL

CarbonHound (CO_2) • SulfurHound (H_2S) • MethaneHound (CH_4) • OxyHound (O_2)

Release Date: 09/07/2022
Document Number: 15

Revision Record:

12	01/02/2023	Calibration
15	05/16/2024	OxyHound added
16	03/11/2025	MethaneHound added
17	05/23/2025	Spares Updates

9515 Windfern Rd., Houston, Texas, 77064, USA
Phone 281-516-3950 | Fax 281-351-8925
sales@kecosystems.com, support@kecosystems.com
www.LiquidGasAnalyzers.com

Copyright Notice:

Disclaimer:

Analytical Systems KECO, LLC makes no representations or warranties with respect to the contents hereof. Further, Analytical Systems KECO, LLC reserves the right to revise this publication and to make changes in the content hereof, without obligation to notify any person or organization of such revision or changes.

Patent Notice:

Manufactured under United States, Worldwide Patents, and Patents Pending.

Trademark Information:

Analytical Systems KECO, LLC and its logo(s) are trademark(s) of Analytical Systems KECO, LLC.

Document Label Definitions Used To Indicate Potential Hazards:

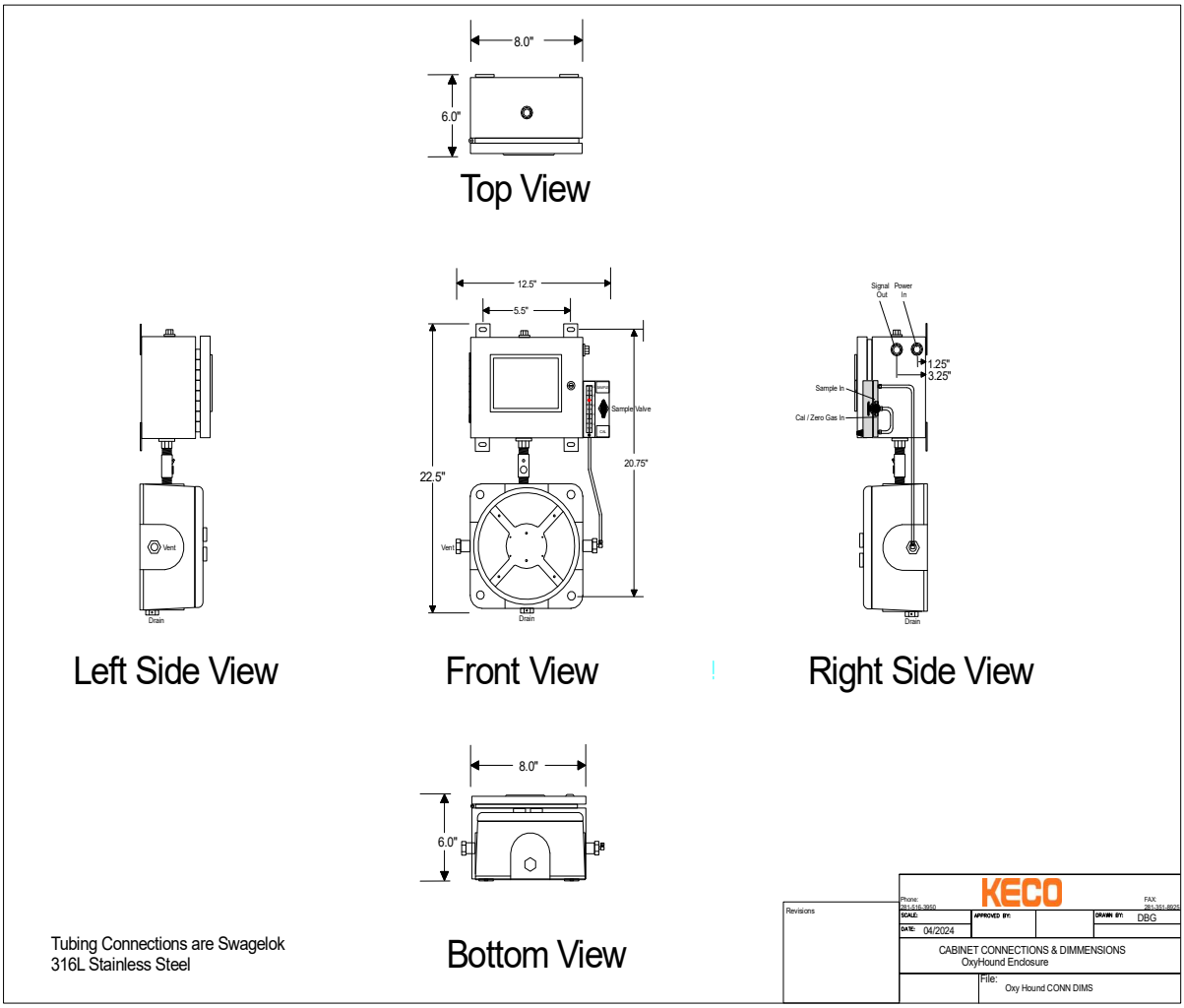
⚠ Warning	Consists of conditions, practices or procedures that must be observed to prevent personal injury and/or equipment damage.
⚠ Caution	Risk of electric shock or high temperature parts may result in injury if proper precautions are not taken.

Locating Information:

In the interest of completeness, manuals and drawings included with the analyzer may provide information pertaining to options not included with your analyzer. Information in application notes supersedes general information in these documents. Information can be located in this manual using the Table of Contents or the Index.

Table of Contents

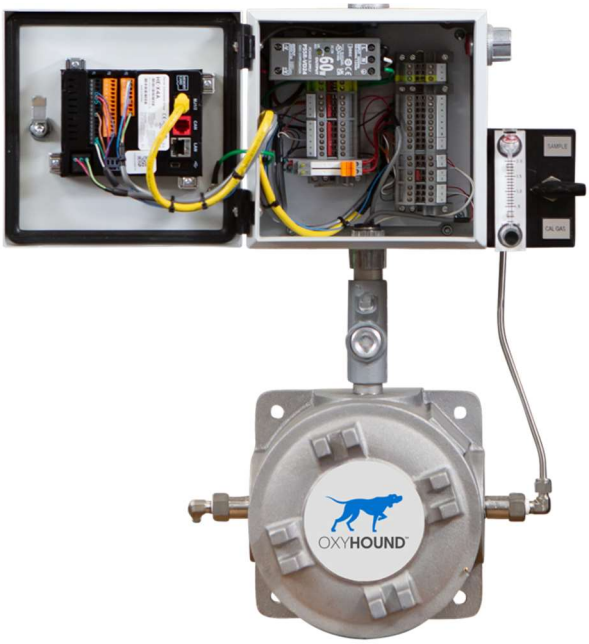
DRAWINGS & DIAGRAMS



Section 1

OVERVIEW

The Hound Series Gas Analyzer can quantify up to two unique sensor measurements: H2S, CO2,CH4, and O2. The sample gas can be air, natural gas, biogas, landfill gas and more. The Hound Series Gas Analyzers use an Advanced Electrochemical Cell for hydrogen sulfide measurement (SulfurHound) and a NDIR sensor for carbon dioxide and methane measurement (CarbonHound/MethaneHound) and Quenched Luminescence technology for oxygen (OxyHound).



FEATURES

- HMI 4” full color TFT touch screen display
- Up to four unique sensors: H2S (SulfurHound), CO2 (CarbonHound), CH4 (MethaneHound), O2 (OxyHound) displayed and recorded
- Sensors replaced quickly and easily without tools
- Process, real-time analyzer with typical 99% uptime
- Proven online reliability
- Low total cost of ownership
- Continuous, real-time analysis (no cycle lags)
- 4-20mA loop output
- MODBUS RTU and ASCII
- MODBUS over RS-485 half duplex
- MODBUS TCP/IP over Ethernet
- Data Logger with high capacity MicroSD card
- Concentration alarm and Fault/Diagnostic alarm relays (optional items)
- NEMA 4X enclosure for outdoor environments (UL listed, CSA rated), IP66
- Built to Class 1 Division 2 (groups B, C, D) and Zone 2 hazardous location standards

OPTIONS

- Dry relay alarms (concentration and/or fault)
- Isolation for 4-20mA and Ethernet
- Solar System (panels, mounting pole, batteries, controller)
- H2S Scrubber for vent
- Fugitive Emission Control Unit (FECU) for analyzer vent (eliminates fugitive emissions before venting to atmosphere)
- Sampling System for gasses entrained with light liquids: “Sampling System Auto-Liquid-Blk”, max 1500 psi input pressure
- Sampling system for dry gasses: “Sampling System Gas (Simple)”, max 1500 psi input pressure
- Sample System for LPG, LNG (heated), max 2500psi input pressure
- Sample probe for gasses entrained with liquids: “Probe Gas Liquid Rejection” with optional Pressure Regulator on prob: “Regulator for Liq-Reject Prob”
- Sample Probe to be installed at tap point
- Self-standing Rack (includes sun/rain shield, drip pan, forklift holes, foundation mount holes)

CROSS-SENSITIVITY

- SulfurHound: May respond to other gasses in addition to H2S. For example, given 100 PPMv of the following gasses present, response will be approximately:
    - Methyl mercaptan 40 PPMv
    - Carbon monoxide 4 PPMv
    - Hydrogen 1 PPMv
    - Sulfur dioxide 18 PPMv
- OxyHound: No degradation or cross-interference from H2S, CO2, NH3, gaseous SO2, sulfate, chloride or other ionic species. Compatible with hydrocarbons such as natural gas (even with CO2 and H2S present), propylene, ethylene, polypropylene, methanol and ethanol mixtures. Not compatible with organic solvents including toluene, acetone, chloroform, benzene, methylene chloride or any strong oxidizers such as gaseous chlorine.
- For a complete list contact KECO.

BASIC OPERATIONAL SETTINGS

PRESSURE:

Sample Pressure: Set to 10 psig (0.69 barg) constant and stable pressure, maximum Input Pressure 30 psig (2.07 barg). This pressure is established using a pressure regulator as part of an optional sample conditioning system from KECO or as provided by the customer.

CAL Gas Pressure: Set to the same pressure as the Sample. This pressure is established using a pressure regulator on the CAL Gas bottle provided by the customer.

Zero Gas/Air Pressure: Set to the same pressure as the Sample. This pressure is established using a pressure regulator provided by the customer.

Cal Gas Specification: **OxyHound:** Concentration between 100 and 200 ppmv gaseous oxygen or critical point (10 ppmv for example), balance N2 6.0 grade. For % ranges, use 50% of scale.
SulfurHound: Concentration at critical point, balance air
CarbonHound/MethaneHound: Concentration at 50% of scale, balance air

Zero Gas Specification: **OxyHound:** Oxygen-free Nitrogen 6.0 grade
SulfurHound: Instrument air
CarbonHond: Any of the above

FLOW:

Gas Flow: Set to 1.5 SCFH using the flowmeter

Gas Fast Loop Flow (optional item): Set to as much flow as possible, while maintaining recommend pressure and flow through the analyzer

ALARM SET POINTS

Concentration Alarm (optional item) User-Defined

Fault/Diagnostic Alarm (optional item) Factory set

General Safety and Operating Information:

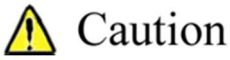
This section contains general safety and operating information applicable to electrical equipment installed within hazardous locations. This information must be understood by all persons installing, using, or maintaining the electrical equipment. This information is designed to aid personnel in safe installation, operation, and maintenance of the Hound Series Gas Analyzer. It is not designed to replace or limit appropriate safety measures applicable to work performed by personnel. Any additional safety and operating measures that are required must be determined by and followed by personnel performing work on the electrical equipment.

⚠ Warning — Deviation from the specified instructions or procedure steps can result in injury to personnel, equipment malfunction or equipment damage.

⚠ Warning — Return unit to factory for any repairs or replacement of parts, customer not permitted. This will void all warranties and hazardous area certification(s).

General Precautions:

Protective eyewear (glasses with side shields or goggles, as appropriate) must be worn when servicing any part of electrical equipment. Hot components should be allowed to cool before servicing if possible. Other appropriate equipment or clothing must be used as required by the type of work performed. All applicable regulations and procedures must be followed for the work performed. Before beginning any work on the equipment, carefully consider all the potential hazards and ensure that appropriate measures are taken to prevent injury to personnel or equipment damage.



Electrical equipment components may be hot even when power is not applied. Take appropriate precautions to prevent injury from contact with hot items.

Applicable permits must be obtained and appropriate precautions must be taken to prevent possible injury to personnel or equipment damage when installing or maintaining this equipment.

Electrical Power:

The Hound Series Gas Analyzer uses 110/220 VAC or 24 VDC power (optional) (see label inside analyzer enclosure for details). The 24 VDC is an optional item that much be ordered at time of purchase. Applying incorrect voltage can damage the analyzer and internal components. Appropriate precautions must be taken to prevent sparks that may ignite combustible materials that may be present in the purge controller's environment. Precautions must also be taken to prevent electrical shock if the electrical equipment's enclosure being monitored by purge controller is opened. Applying incorrect voltage can damage the analyzer and internal components.

The power to the Hound Series Gas Analyzer must be free from noise, surges, sags, and spikes for proper operation. Customer must provide appropriate surge protection. AC power circuit breakers and wiring must be sized properly for the required current. All wiring installations must meet applicable electrical codes. Customer must provide an external power switch.

System Location:

The Hound Series Gas Analyzer must be installed in a suitable location. The Hound Series Gas Analyzer must not be installed in an area classification for which it is not rated and must be protected from temperature extremes. The Hound Series Gas Analyzer should not be mounted in an area with potentially high vibration. The Hound Series Analyzer must be mounted in a location to permit adequate viewing of the HMI display and to permit proper sample exhaust venting.

The internal Exd enclosure located inside Hound Series Gas Analyzer enclosure must not be opened or unscrewed unless power is removed from the analyzer or the area is known not to contain explosive materials.

INSTALLATION

WARNING: Before attempting to install the Hound Series Gas Analyzer review all the material and all safety information in this manual and all other applicable document.

Applicable permits must be obtained and appropriate precautions must be taken to prevent possible injury to personnel or equipment damage when installing the Hound Series Gas Analyzer.

INSTALLATION REQUIREMENTS

Surrounding Air Temperature	If below freezing, external tubing may require heat tracing
Storage Temperature	**SulfurHound & CarbonHound**: Between -10°C and 50°C **OxyHound**: Optimal 20°C to + 40°C, Max -20°C to + 50°C
Operation Temperature	**SulfurHound** & **CarbonHound**: Between 0°C and 50°C **OxyHound**: Optimal 0°C to + 40°C, Max -20°C to + 50°C
Weight	25 lbs
Sample Gas Humidity	**SulfurHound**: 15-90% RH non-condensing **CarbonHound**: 0-95% RH non-condensing **OxyHound**: N/A
Zero Gas/Air	**OxyHound**: Nitrogen 6.0 grade, oxygen-free **SulfurHound** & **CarbonHound**: Laboratory grade Nitrogen recommended or breathing-quality air
Calibration Gas	**OxyHound**: Laboratory grade blended Calibration Gas, recommended concentration between 100 and 200 ppmv or critical point (10 ppmv for example), balance N2 6.0 grade **CarbonHound** & **SulfurHound**: Laboratory grade blended Calibration Gas, recommended concentration of 10% or greater of full span blended: H2S balance N2 for SulfurHound, CO2 balance N2 for CarbonHound, CH4 balance N2 for MethaneHound, or combination gasses if multiple sensors.
SD Card Capacity	Up to 32GB
Electrical Power Requirements	120/240VAC or 24VDC (optional item) External power switch (provided by customer) Power consumption: 120 VAC 0.6 amps, 240 VAC 0.3 amps, 24 VDC 1.1 amps
4-20 mA Loop Output	Standard self-powered two wire loop (not loop powered) Optically Isolated (isolation is an optional item)
TCP/IP over Ethernet	10/100 Mbps Cat-5 or better Optically Isolated (isolation is an optional item)
Concentration, Fault/Diagnostic alarm relays	Contact rated at 6 amps at 250VAC normally closed (optional items)

Sample Conditioning Sample Conditioning Guidelines	If the sample pressure is above 30 psi, or if the sample pressure is not constant, a sample pressure regulator must be provided by the Customer (or can be purchased from KECO), with the output pressure of this regulator set to 10 psi, which will provide the analyzer with a steady sample flow rate. If the sample is not clean, a particulate and/or coalescing filter must be provided by the Customer (or can be purchased from KECO). If the sample is entrained with light liquids a liquid block filter must be provided by the customer (or can be purchased from KECO), Note that all wetted parts should be 316 stainless steel, including tubing, valves, fittings and pressure regulators – any material in contact with the sample or CAL gases. In addition, a fast loop bypass may be provided by the Customer (or can be purchased from KECO). KECO offers four Sampling System options: 1. "Sampling System, Gas (Simple)" - for dry gas samples includes on/off valve at sample input connection, pressure regulator (2500 psig max input, 30 psi output) and gauge installed after coalescing filter (element included) with fast loop bypass. 2. "Sampling System Auto-Liquid-Blk" for gasses entrained with light liquids: includes pressure regulator (2500 psig max input, 30 psig output) and gauge, Auto Drain Liquid Block with automatic shutoff/open drain feature and fast loop bypass. 3. For LPG, LNG KECO offers a Heated Pressure Regulator, 2500 max input pressure, 30 psig output pressure 4. "Probe Gas Liquid Rejection" with optional Pressure Regulator on probe: "Regulator for Liq-Reject Prob" for in-situ sample conditioning of gasses entrained with liquids or for occasional liquid upset conditions.

Tubing Connections	The following guidelines should be used to determine the required design of the sample conditioning system. 5. If the Analyzer is mounted a short distance from the tap point (within 10-15' or less), and the sample is dry and clean: a. If the sample pressure at the tap point is stable and between 10 psig and 30 psig at a flow rate of 1.5 SCFH, use of a pressure regulator and/or a fast loop or other sample conditioning is not required. 1/8" tubing is recommended. b. If the sample pressure is not stable and is at least 30 psig, or is greater than 30 psig, then the use of a pressure regulator is required. Fast loop will not be required, 1/8" tubing is recommended. c. If the sample pressure at the tap point is less than 10 psig, a booster pump and pressure regulator will be required, a fast loop may also be required. 6. If the Analyzer is mounted a distance of more than 10-15' from the tap point, and the sample is dry and clean, a pressure regulator and a fast loop will be required. A booster pump may be required. Flow rate through the analyzer must be 1.5 SCFH, and there will be a need for a fast loop flow (to decrease sample transport lag time). The fast loop flow rate required will be determined by the length and diameter of the tubing and the available sample pressure. Typical tubing sizes are ¼ inch and 3/8 inch. For this example, KECO recommends the optional KECO "Sampling System, Gas (Simple)". 7. If the sample gasses are entrained with light liquids, a pressure regulator, a liquid block filter, and a fast loop will be required (see above). For this example, KECO recommends the optional "Sampling System Auto-Liquid-Blk" or "Sampling System, Gas-External". 8. If the sample is LPG or LNG, a heated regulator will be required, and depending on the distance from the tap point to the analyzer, a fast loop may be required. A liquid block filter is also typically required. For this

	example, KECO recommends a Heated Pressure Regulator. The Sample Input, Zero Gas/Air Input, Calibration Gas Input, and Sample Vent are all ¼" Swagelok tubing connections. The use of stainless steel tubing is highly recommended.

SHIPMENT ARRIVAL PROCEDURES:

This shipment has been thoroughly inspected at the factory prior to its delivery to the freight carrier. After the shipment is picked up by the carrier, it becomes their responsibility. When the shipment arrives, make certain that it is undamaged and complete. If not, contact the freight forwarder.

MOUNT ANALYZER:

> ⚠ Caution The analyzer equipment is heavy! Maneuver it with extreme caution to avoid injury to personnel and equipment. Never attempt to move or install this product without help or lifting gear.

1. Refer to appropriate drawings to verify procedures.
2. Make sure the area surrounding the installation is known to be non-hazardous.
3. Make sure power is removed from the analyzer.
4. For best results mount the Hound Series Gas Analyzer in a building, especially for low PPM range analyzers. If the Analyzer is mounted outside, it is important to have a roof over it to keep it out of direct sunlight and rainfall. KECO can provide an optional free-standing mounting skid that includes a rain/sun shield roof. For cold weather environments, heat tracing of sample lines and drain lines may be required.
5. Use the Cabinet Mounting drawing to accurately locate the mounting holes.
6. Mounting height. Consider the view of the HMI display when determining mounting height. Recommend height of HMI display is 60-65” above ground.

ELECTRICAL CONNECTIONS:

> ⚠ Warning Electrical equipment is dangerous, even at low voltages. Be sure power is off before making any connections.

7. With the Hound Series Gas Analyzer turned off: connect power, 4-20 mA signals, RS-485 signals, Ethernet signals, and alarm relay contact signals, as required. Refer to the Customer Connections Wiring Diagram in the Appendix. Refer to the Installation Requirements page for information on power specifications.
8. Ensure SD card is installed in the HMI
9. During installation, ensure the analyzer is properly grounded.

⚠ Warning	Cable glands, cable and hole plugs must be rated for the appropriate hazardous area classification.
⚠ Caution	Electrical power wiring must be checked for correct size and routing.
⚠ Caution	Electrical power must be free of spikes, sags, surges, or electrical noise.

TUBING CONNECTIONS:

⚠ Caution Purge all exterior tubing lines before connection to analyzer to clean out any liquids & contamination.

⚠ Warning Verify that components match expected pressures upstream and downstream of all fluid components. Failure to do so could result in rupture causing injury and/or release of toxic substances.

Refer to the Connections drawing for details on the tubing connections

⚠ Warning When purging all external tubing, DO NOT apply air pressure to the Sample In or Sample Drain connectors on the analyzer – doing so might damage the analyzer.

⚠ Caution Sample line pressure to analyzer shall not exceed 30 psig.

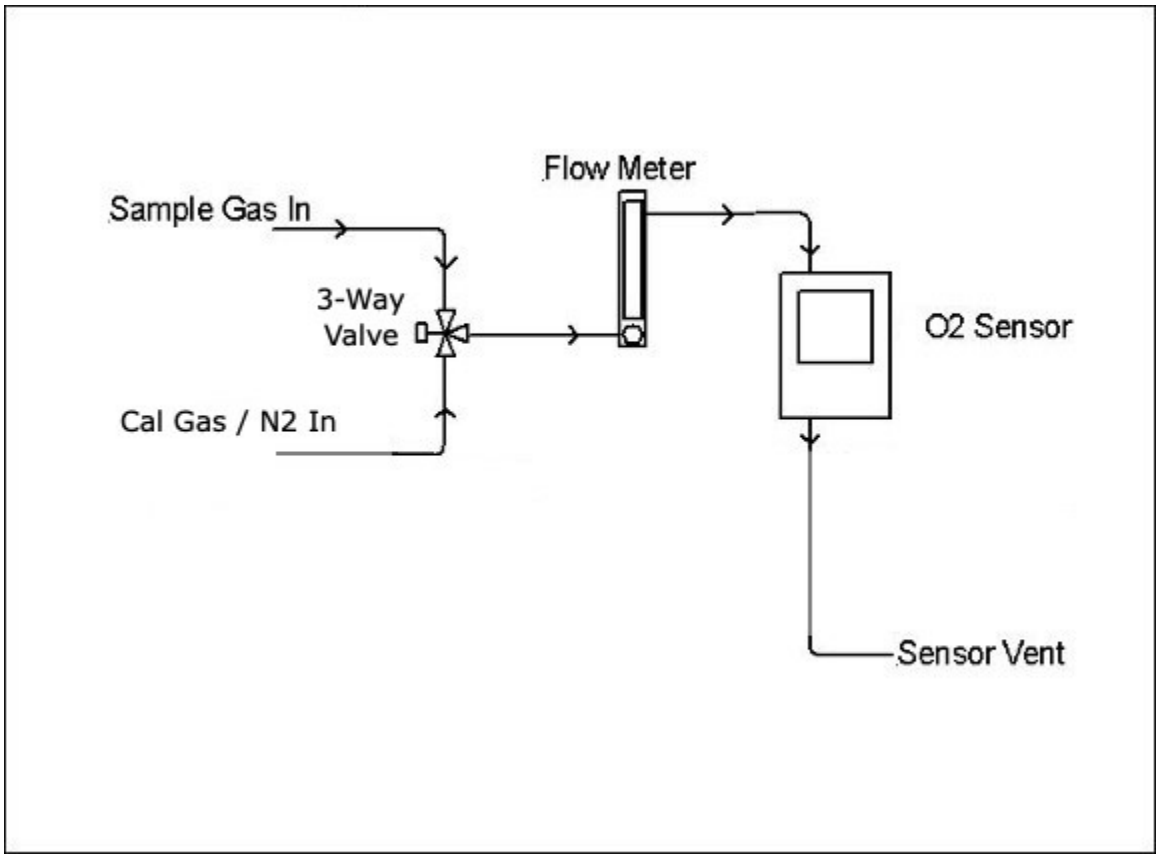
10. Connect Sample Gas, Zero Gas/Air and Calibration Gas lines to the appropriate ¼" tubing connections. These three connections are labeled on the side of the enclosure. Refer to drawings in the Appendix for more information.

11. Connect the Vent line to the ¼" tubing Vent connection. Refer to drawings in the Appendix for recommendations on routing the vent tubing. Maximum backpressure must not be over 3 psig (0.21 barg) constant. Install an H2S Scrubber or a Fugitive Emission Control Unit for the vent when applicable. The vent will flow approximately 1.5 SCFH flow of Sample Gas or Zero Gas/Air (pure nitrogen/air for CO2 sensors or breathing quality air for H2S sensors) or Calibration Gas.

Note that all wetted parts should be 316 stainless steel, including tubing, valves, fittings and pressure regulators – any material in contact with the sample or CAL gases.

12.

ANALYZER DESIGN



NOTE: An additional sensor will be present in series if two sensors are purchased with analyzer.

PRIMARY ANALYZER COMPONENTS:

Item No.	Name	Purpose
K-020016	HMI display and logic controller	Electronic assembly to digitize readings from sensors for display and interaction
K-014050	Flow meter and needle valve	Set to 1.5 SCFH
K-SS-41GXS2	Three-Way Valve	Used to manually switch between sample, zero gas, and calibration gas
K-021037	Sensor Exchange Cap	**OxyHound only:** Quantifies oxygen in the gas sample

K-021036	Flow Cell	**OxyHound only:** O2 Sensor is contained in the flow cell and connects to fiber optic cable
K-021034	O2 Main Board	**OxyHound only:** Sends/receives optical signal to/from O2 Sensor and to the HMI
K-021038	Fiber Optic Cable	**OxyHound only:** Transmits and receives signal from Flow Cell to the O2 Main Board
K-021022	CO2 Sensor 0-5,000 PPM vol	Spare sensor for **CarbonHound** NDIR CO2 Analyzer. Must provide analyzer serial number before an order can be processed.
K-021023	CO2 Sensor 0-5% vol	Spare sensor for **CarbonHound** NDIR CO2 Analyzer. Must provide analyzer serial number before an order can be processed.
K-021024	CO2 Sensor 0-10% vol	Spare sensor for **CarbonHound** NDIR CO2 Analyzer. Must provide analyzer serial number before an order can be processed.
K-021025	CO2 Sensor 0-100% vol	Spare sensor for **CarbonHound** NDIR CO2 Analyzer. Must provide analyzer serial number before an order can be processed.
K-021027	H2S Sensor 0-50 PPMv	Spare sensor for **SulfurHound** electrochemical cell H2S Analyzer. Must provide analyzer serial number before an order can be processed.
K-021028	H2S Sensor 0-200 PPMv	Spare sensor for **SulfurHound** electrochemical cell H2S Analyzer. Must provide analyzer serial number before an order can be processed.
K-021029	H2S Sensor 0-2000 PPMv	Spare sensor for **SulfurHound** electrochemical cell H2S Analyzer. Must provide analyzer serial number before an order can be processed.
K-021041	CH4 Sensor 0-100% vol	Spare sensor for **MethaneHound** NDIR CH4 Analyzer. Must provide analyzer serial number before an order can be processed.
K-021042	CH4 Sensor 0-5% vol	Spare sensor for **MethaneHound** NDIR CH4 Analyzer. Must provide analyzer serial number before an order can be processed.

SAMPLE RESPONSE TIME:

Initial detection for SulfurHound, CarbonHound, and MethaneHound is typically 60 seconds or less after initial contamination reaches the analyzer, reaching T90 in 90 – 120 seconds.

T90 detection of O2 from zero is typically <10-30 seconds after initial O2 reaches the analyzer's sensor.
NOTE: Response time is sensor and application dependent, and may vary.

CALIBRATION:

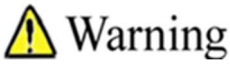
For procedures to perform Calibration of the sensors refer to the HMI section of this manual.

VALIDATION:

For procedures to perform Validation of the sensors refer to the HMI section of this manual.

START UP

The following procedure should be performed when initially starting up the analyzer.



Failure to heed the following information may lead to injury of personnel or equipment damage.

Do not open the electrical equipment enclosure in a hazardous area even when de-energized unless area has been properly tested and is known to not contain explosive gases.

This unit may require a disconnect device (provided by user) rated at 24VDC and 5A max. It must protected by a circuit breaker rates at 24VDC and 5A max, and is to be installed in accordance with local electrical codes.

This unit may require a disconnect device (provided by user) rated at 240VDC and 5A max. It must protected by a circuit breaker rates at 240VDC and 5A max, and is to be installed in accordance with local electrical codes.

Open circuit before removing cover. Cover must be properly secured and closed to maintain hazardous area rating.

Before initially starting the equipment, electrical power wiring must be checked for correct size and routing.

Step 1 Check Surrounding Area and Vent, Close Gas Flowmeter Needle Valve.

Make sure that the area surrounding the Hound Series Analyzer enclosure is known to be non-hazardous. Ensure the external power switch (provided by customer) is in the OFF position. Verify that the Vent tubing has not become restricted or blocked. Do not apply any gas pressure (Sample Gas, Zero Gas/Air and Calibration Gas) at this time.

Step 2 Apply Power

Turn on power to the analyzer.

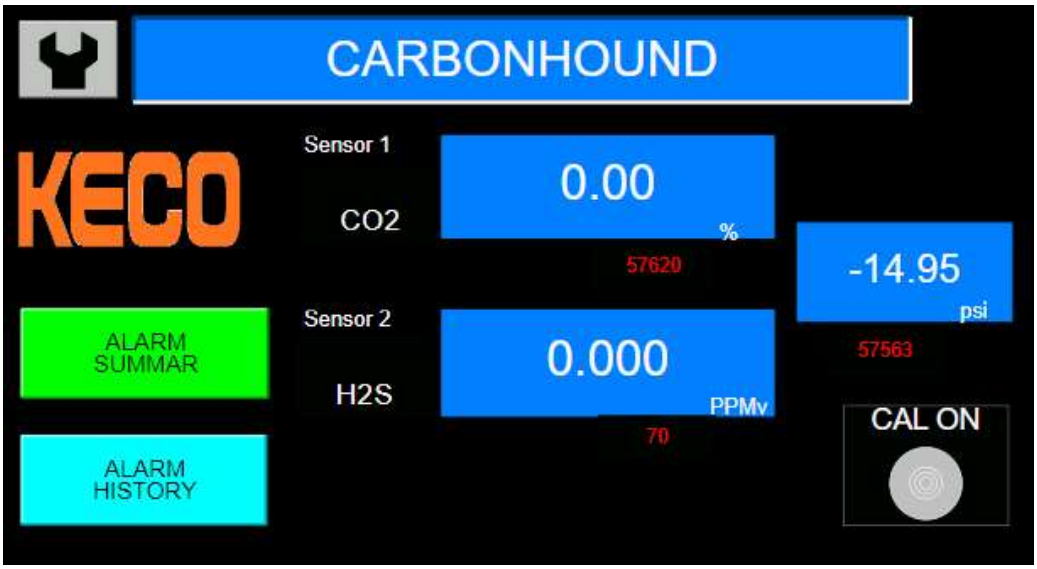
⚠ Warning

DO NOT TURN ON POWER TO THE ANALYZER, UNLESS AREA HAS BEEN PROPERLY TESTED AND IS KNOWN NOT TO CONTAIN EXPLOSIVE MATERIALS.

.

With power applied to the analyzer, the Main Screen will appear on the HMI. This screen displays the sensor concentration reading(s), and the Gas Pressure (optional). Refer to the HMI section below for more information on operating the HMI.

NOTE: Throughout this user manual, the images of the HMI screens shown are the CarbonHound, SulfurHound or OxyHound model, and as a result readings and settings for either H2S, O2 or the CO2 sensors are displayed. Your analyzer may have more than one unique sensor so will the images of the HMI may differ.



Step 3 Adjust Gas Pressures

With the Gas Flowmeter Needle Valve closed, adjust the Sample Gas pressure to 10 psig. The pressure setting is the initial settings – further adjustment may be necessary once the Gas Flowmeter Needle Valve is opened, and also once the optional Fast Loop Needle Valve (optional item) is opened.

You will also need to adjust the pressure regulators on the user provided Zero Gas and Calibration Gas bottles. These three gas pressures are adjusted using external pressure regulators (provided by customer or purchased separately from KECO) on the Sample Gas, Zero Gas and the Calibration Gas. These three pressure regulators should have output pressure gauges for this purpose.

If the Hound Series analyzer has been installed with no Sample Gas pressure regulator, then it is possible that the Sample Gas pressure could be between 10 and 30 psig.

Step 4 Establish Fast Loop (optional):

The optional Fast Loop Needle Valve will be part of one of the optional Sample Conditioning Systems. The Fast Loop is designed to ensure that a representative sample is always present at the input to the analyzer. The initial adjustment of the Fast Loop Needle Valve is accomplished by:

a) First close the Gas Flowmeter Needle Valve!
b) Next supply Sample Gas to the Sample Conditioning System.
c) Open the Fast Loop Needle Valve allowing as much gas to flow through the Fast Loop as possible.
d) Slowly begin closing the Fast Loop Needle valve until the analyzer shows 10 psig with as much Sample Gas flowing out the Fast Loop as possible. Note that this adjustment may require back and forth adjustments to the Sample Pressure Regulator and the Fast Loop Needle Valve.

Step 5 Establish Sample Flow

a) On the HMI Main Screen, verify that the analyzer is not in calibration mode (CAL indicator at bottom right). If the CAL indicator is green, go to the Calibration Screen and turn off CAL – see instructions in the HMI section of this manual. Also verify the analyzer is not in Validation mode – again see instructions in the HMI section of this manual.
b) Slowly open the Sample Flow Needle Valve to achieve the recommended 1.5 SCFH flow rate. It may be necessary to close the optional Fast Loop Needle Valve just enough to slightly "pinch off" some of the fast loop flow, resulting in a more residual pressure, ideally at least 10 psig (0.69 barg) to the analyzer. It may also be necessary to adjust the optional Sample Gas pressure regulator. Using this method of pinching off just enough sample gas flowing out the fast loop, to where the analyzer is left with at least 10 psig (0.69 barg) of sample pressure will maximize the fast loop flow rate, which is the goal.

To avoid damage to the analyzer, do not accidentally adjust the sample pressure to more than 100 psig into the analyzer, and do not accidentally adjust the sample flow rate to more than 2.0 SCFH.

Note: If there is not enough sample pressure to provide at least 5-10 psig constant pressure at the analyzer with adequate analyzer and optional Fast Loop flow rates, it may be necessary to add a booster pump to the sample flow.

Note: For normal operation of the Hound Series Analyzer, the sample flow rate is not critical. The Hound Series analyzer will measure H2S or CO2 in the sample gas correctly with a flow rate from approximately 1.0 SCFH to 2.0 SCFH.

STABILIZATION

With power applied and the sample flowing, the analyzer will begin its warm up process.

An initial warm up period of 5-10 minutes is recommended before stabilization of the sensor is complete.

NOTE: The analyzer is shipped with specific program settings that will not need to be adjusted in most cases. However, if a program setting must be changed, see the HMI section of this manual for more information.

ANALYZER OPERATION

Once the sensor stabilizes, the analyzer runs continuously.

Occasional checking the sample pressure and flow rate is all that is necessary for normal operation.

Check flow rate often for the first few days, making sure sample gas flow is steady. There are no required daily or weekly operational procedures other than visual checks of pressure and flow of sample. In addition, depending on the quality of the sample gas, the analyzer must be maintained by cleaning the sample flow path periodically.

MAINTENANCE

> ⚠ Warning Electrical equipment is dangerous, even at low voltages. Be sure power is off before making any connections.

⚠ Warning Failure to heed the following information may lead to equipment damage or injury to personnel.

- There are no moving parts, other than the float in the flow meter. Sensor life is typically 1-2 years when this user manual is precisely followed. The electronics, barring electrical damage from current spikes, rarely fail.
- Check filter (optional item) regularly, or whenever the sample pressure at the analyzer cannot be maintained at equal to or greater than 10 psig (0.69 barg). Filter cleaning or element change is dependent on degree of contamination. Maximum filter element size is 50 microns.
- If sample flow cannot be maintained at 1.5 SCFH, the tubing may be obstructed. Check the tubing for blockage.
    - See Helpful Procedures and Information Section for procedures for cleaning blockage from the analyzer tubing.

SHUTDOWN AND START UP – MAINTENANCE OR SERVICE PROCEDURE:

The following procedure should be performed when shutting down and re-starting the analyzer to perform maintenance or service.

Warning Failure to heed the following information may lead to injury of personnel or equipment damage.

Caution Do not open the analyzer in a hazardous area even when de-energized unless area has been properly tested and is known to not contain explosive materials.

Caution *Electrical equipment components may be hot even when power is* not applied. Take appropriate precautions to prevent injury from contact with hot items.

Step 1 Turn off Power

Properly disconnect power from the analyzer which requires maintenance or servicing by switching off the external power switch.

Step 2 Shut off Sample Gas, Zero Gas/Air, and CAL Gas

After power has been disconnected from the analyzer, shut off the all the gas supplies.

Step 3 Begin Service or Maintenance

With power disconnected and gas supplies properly shut off, maintenance or service can begin.

If maintenance or service must be performed with power applied to the electrical equipment within the analyzer enclosure, first make sure that area surrounding the enclosure is known to be non-hazardous.

Caution Electrical equipment components may be hot even when power is not applied. Take appropriate precautions to prevent injury from contact with hot items.

Step 4 START UP

With the maintenance or service complete, follow the START UP procedure described in this user manual.

DO NOT TURN ON POWER TO THE ANALYZER, UNLESS AREA HAS BEEN PROPERLY TESTED AND IS KNOWN NOT TO CONTAIN EXPLOSIVE MATERIALS.

.

CLEANING SAMPLE GAS FLOW PATH

BACKGROUND:

The analyzer may have performance issues due to buildup of oils, liquids, particulates or other contaminates inside the analyzer tubing, parts, etc. over time. This could include the analyzer reading lower. The best method to prevent this from occurring in the future is to have a Sample Conditioning System that includes an appropriate filter or liquid block. These can be provided by KECO. Please contact KECO for a quote.

WARNING: Take all safety precautions when handling the chemicals mentioned in this document.

NOTE: Please read the entire document before starting your cleaning. Please contact ASK technical support if you have any questions.

WHAT TO CLEAN?

The Sample Gas flow path includes the fittings and tubing inside the analyzer, the Gas Flowmeter and Needle Valve, the Solenoids and finally the Sensor Housings. The basic idea is to first remove Sensor Housing(s), rinse out the tubing, fittings, flow meter and needle valve using an appropriate chemical, followed by drying out the chemical by running dry Zero Gas/Air until all liquids are removed. You might be able to clean the Sensor housing by hand (just a clean cloth, no chemicals), or simply replace the Sensor Housing (Sensor Housing always includes a sensor, and cannot be sold separately).

Typical chemicals used to clean the tubing, fittings, etc. include 97% Isopropyl Alcohol to remove oily contamination and particulates, and distilled vinegar to remove built up scale.

TYPICAL CLEANING PROCESS:

Note: This cleaning process is TYPICAL ONLY and may need to be modified depending on the application and/or severity of contamination. Contact KECO for more information.

Steps:

1. Remove the Sensor Housing(s).
2. Connect a syringe cleaning system (a syringe with tubing that replaces the needle, to connect to the analyzer input fittings) filled with the appropriate chemical to the Sample Input ¼" tubing bulkhead fitting. Normally it will not be necessary to clean the Zero Gas/Air Input and the Calibration Gas Input.
3. Disconnect the tubing at the flame arrestor fitting and run a length of spare tubing into a collection container.
4. Apply cleaning solution pressure from the syringe and ensure Sample Needle Valve is open and flow is established.
5. Allow cleaning solution to flow through the analyzer for several cycles.
6. Repeat steps for each cleaning solution, as necessary.
7. Disconnect the syringe cleaning system and connect the dry Zero Gas/Air to the Sample Input, allow the Zero Gas/Air to flow long enough to dry up all the liquid.
8. Reconnect the Sample Gas line and the tubing going to the flame arrestor fitting.
9. If possible, clean the Sensor Housings and Sensor Housing mounting plates by hand with a dry cloth. It may be necessary to replace the Sensor Housing(s).
10. Install the Sensor Housings and resume normal operation of the analyzer.

TYPICAL MAINTENANCE SCHEDULE:

Note: This maintenance schedule is TYPICAL ONLY and may need to be modified depending on the application.

Note: Refer to onsite experts knowledgeable of the typical contamination and maintenance strategies when developing an appropriate maintenance schedule.

Bi-Weekly

- Inspect optional filter element. Clean or replace, as necessary.
- Perform Calibration/Validation

Monthly

- Inspect flow rate. If optimal flowrate is not able to be achieved, a deeper cleaning may be necessary and increase frequency of cleaning.
    - Deeper cleaning involves isolating components to find primary restriction points.

- Inspect filter elements for contamination and replace as needed
- Inspect tubing for signs of liquid break-thru and clean/replace as needed

HELPFUL PROCEDURES & INFORMATION:

OPERATIONAL TEST:

The VALIDATION screen on the HMI can be used to manually switch flow between the Sample Gas, the Zero Gas/Air, and the Calibration Gas to verify readings.

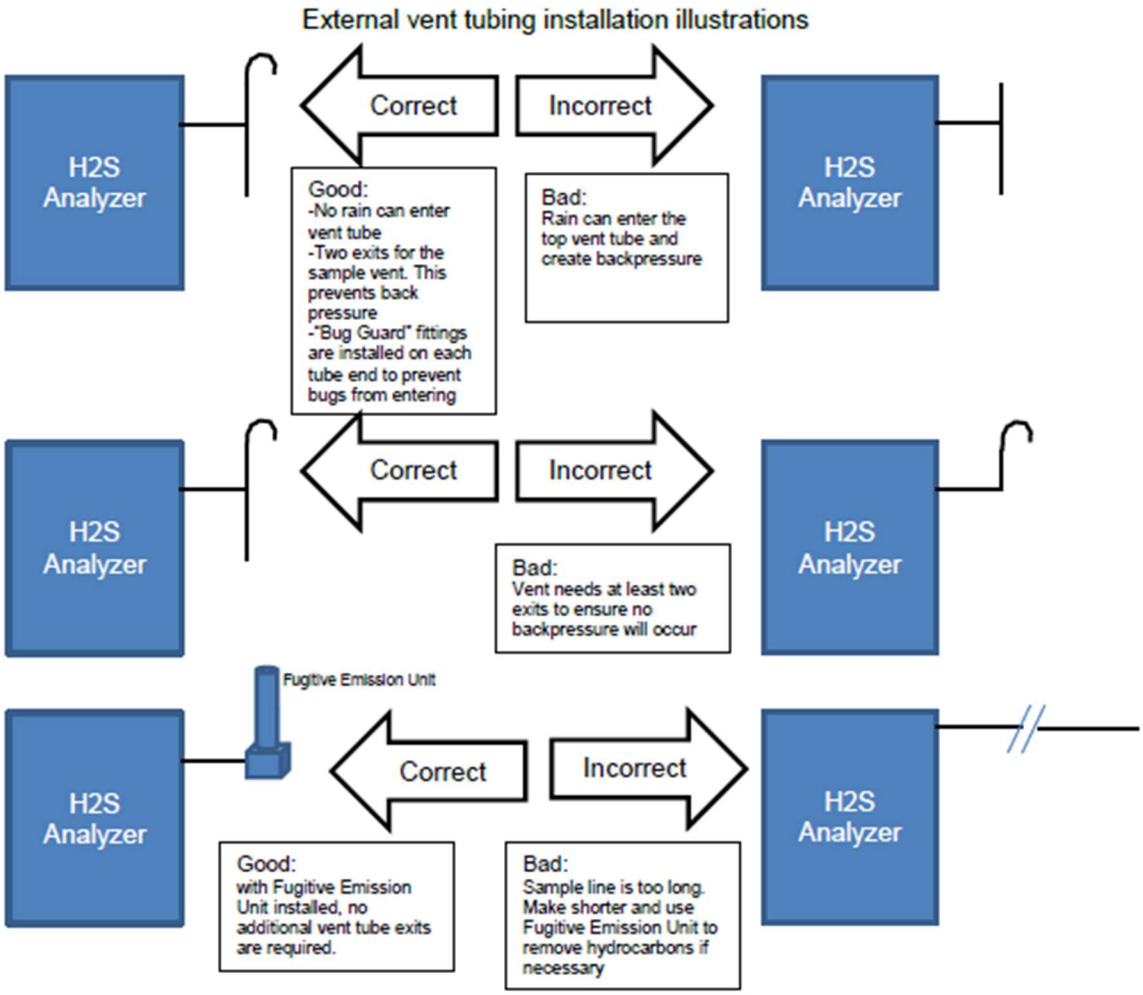
ZERO AIR/GAS QUALITY:

A laboratory grade bottle of Nitrogen is normally recommended for the Zero Gas for CO2 sensors and breathing-quality air for H2S sensors.

For O2 sensors, laboratory grade, oxygen-free bottle of Nitrogen 6.0 is required for the Zero Gas.

PRESSURE CAUTION ON GAS VENT

Prevent blockage of the and Sample Gas Vent line leading from the Analyzer cabinet. The recommended vent line includes a short tube connected to the analyzer vent bulkhead fitting, to a “T” fitting, where the vertical upward tube forms a shepherd hook, and a vertical downward tube. This provides two vent exits and prevents rain from entering the vent. “Mud daubers” fittings are highly recommended to prevent bugs from blocking the vent.



REPLACING A SENSOR:

The sensors have a low failure rate and a long life when the analyzer is used in compliance with this user manual. However, the sensors do slowly degrade and eventually must be replaced.

To replace a CO2 or H2S sensor:

1. Open the door to the enclosure.
2. Open the round internal Exd enclosure by unscrewing the lid.
3. Disconnect the wire going to the appropriate Sensor Housing by simply un-clipping it.
4. Loosen the two large thumbscrews holding the Sensor Housing until the sensor housing is loose.
5. Remove the Sensor Housing by sliding it out from under the thumbscrews.
6. Install the new Sensor Housing by following these steps in the opposite order.

To replace an O2 sensor:

1. Cut off sample flow to the analyzer
2. Cut off power to the analyzer
3. Unscrew the Exd enclosure
4. Gently pull the fiber optic cable out of the flow cell. It is connected by a coupling magnet.
5. Using a wrench, unscrew the input and output nut from the Flow Cell
6. Install the new Flow Cell by following these steps in the opposite order.
7. Perform both a Zero Calibration and Span Calibration following the steps described in this manual.

TROUBLESHOOTING MATRIX

TAKE PROPER SAFETY PRECAUTIONS WHEN SERVICING ANALYZER TO AVOID PERSONAL INJURY OR EQUIPMENT DAMAGE FROM ELECTRICAL SHOCK.			
Note: There is an assumption being made prior to using this troubleshooting guide that the analyzer has been installed and started up correctly and the analyzer has not been modified, either by changing or modifying the parts, or by modifying the settings in the HMI. If the HMI settings have been changed, it is recommended the settings be returned to the default factory setting prior to performing this troubleshooting procedure.			
Indication	**Problem**	**Check For**	**Corrective Measure**
Failsafe Alarm	Analyzer does not have established power	Power at circuit breaker. Using voltmeter, test power to the analyzer and power supplies.	Flip circuit breaker to ON. Establish power to the analyzer. Replace malfunctioning components.
	Back pressure on gas vent	Back pressure on gas vent	Remove source of back pressure on gas vent.
	Sample has higher concentration than the full span calibration of the analyzer	Have sample tested by lab.	Upgrade to higher range.
	Moisture in sample lines	Wet sample gas or condensation	Install gas dryer or liquid block filter
LCD reading zero or too low	Sample contains no or very low H2S, O2 or CO2	Test sample by using Calibration Gas	Calibrate the analyzer
	No sample flow	Check that the analyzer's settings match the proper settings as described on settings page of the manual	Establish correct flow to the analyzer.
		Test output of sample flow with a portable gas flow meter to confirm correct flow rate.	See "Low Sample Flow" Indicator below.
	Sample lines need cleaning	Determine whether dirt, moisture, or other substance is present in sample lines.	Clean analyzer flow path. Follow instructions on cleaning guide.
	Damaged sensor	Liquid in Sample Gas lines	Replace sensor.
	Sensor not connected	Check for a disconnected sensor cable	Connect sensor cable
	Backpressure on vent	Check for a clogged vent	Resolve source of backpressure on vent

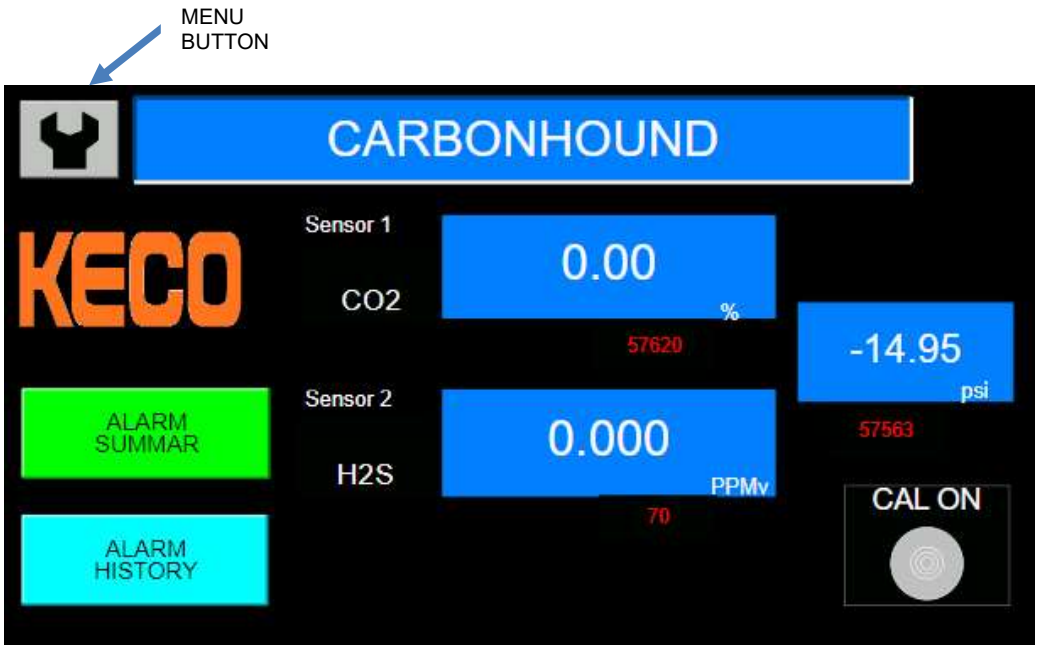
LCD Reading too high	Residual gas in sensor housing	Check for no sample flow	Purge with zero gas or resume sample flow
	Calibration Error	Multiplier too high	Recalibrate with appropriate gas
	False positive	Sample composition	Offset reading
LCD reading spikes instantaneously up or down	Loose electrical connections	Check for loose connections on the LCD transmitter for the 4-20mA and sensor wires as shown in the wiring diagram.	Tighten connectors. Ensure metal wire is making connection with contact. Ensure plastic wire jacket (insulation) is not blocking metal to metal contact.
LCD reading drastically increases and then drastically decreases over a short period of time	Slug of contamination	Check particulate filter	Replace filter
		Check for contamination build up tubing	Clean analyzer. Follow instructions on cleaning guide.
Calibration results in high Multiplier	Calibration Gas has low concentration level or expired	Verify the Calibration Gas is an appropriate concentration for the range of the analyzer and not expired	Calibration Gas should be at least 10% of full span.
	Calibration Gas bottle empty	Verify the Calibration Gas bottle is not empty	
	Analyzer may not be switching from Sample Gas to Calibration Gas.	Solenoids may be stuck open/closed	Replace solenoid(s)
Calibration results in high Zero Offset	Zero Gas/Air bottle empty	Verify the Zero Gas/Air bottle is not empty or expired	Replace Zero Gas/Air bottle
	Analyzer may not be switching from Sample Gas to Zero Gas/Air	Solenoids may be stuck open/closed	Replace solenoid(s).
Low Sample Gas/ Zero Gas/ Calibration Gas Flow Rate	Low Sample Gas/ Zero Gas/ Calibration Gas Pressure	Pressure below 10psi.	Verify Pressure Regulator settings, Install a pump to increase Sample Gas pressure to at least 10 psi

	Sample Leaking	Loose connections	Make sure all fittings are properly tightened. Warning: overtightening can cause flow issues especially with teflon tubing.
	Back pressure on Gas Vent	Back pressure on Gas Vent	Remove source of back pressure on Gas Vent
Incorrect reading on pressure transducer	Pressure transducer might be broken.	Using voltmeter, test current flow on white and black wire from the pressure transducer. Should be reading 7-8 mA at 10psi	The pressure transducer is faulty and needs to be replaced.
Calibration Fail	Sensor Disabled	Sensor CAL button set to disabled	Enable sensor calibration by pressing button in CAL screen

HMI INTRODUCTION

The HMI (Human Machine Interface) provides comprehensible, near instantaneous operational data. These values can be transmitted via Modbus and/or recorded on a SD card for detailed monitoring of the analyzer's processes in a cohesive system.

MAIN SCREEN

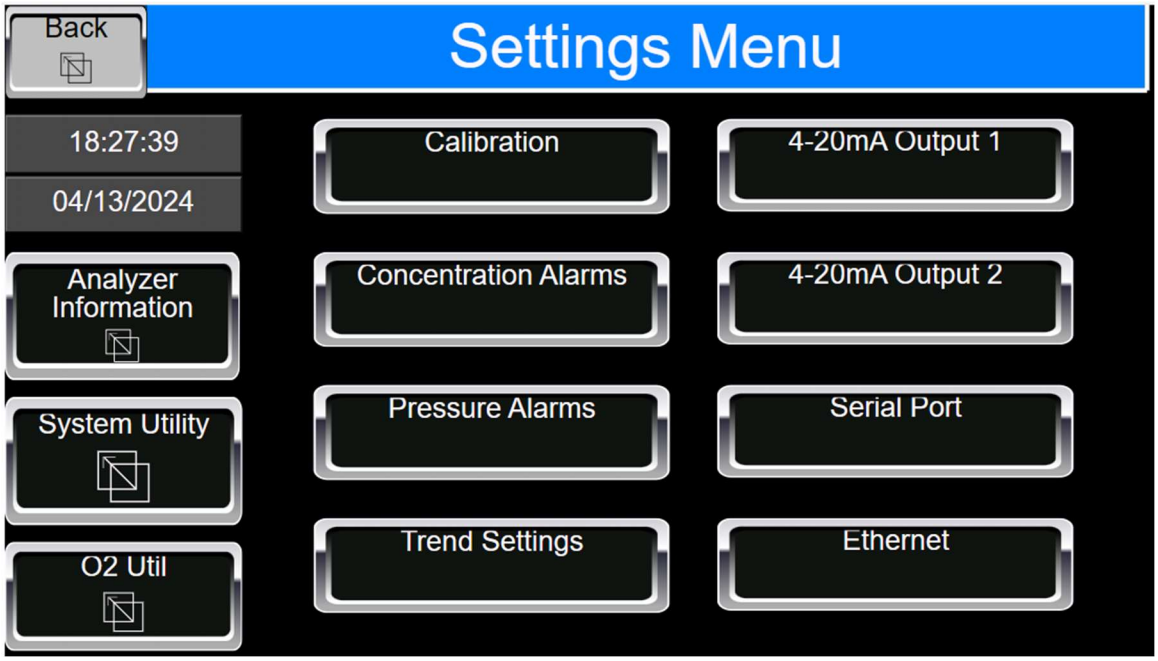


The HMI operates with a touch screen. The analyzer powers up displaying the Main Screen, which is the primary screen that will be used during operation of the analyzer. The alarm summary and alarm history are accessed by pressing the appropriate button. In addition, displayed values on this screen are also used as buttons to bring up trend line graph corresponding to that sensor.

A screen saver turns off the display after 15 minutes of no activity, touching the screen anywhere turns the display back on.

In the upper left corner of the screen is the MENU button, used to bring up a menu screen used to access the advanced settings, which are primarily used during initial installation.

MENU SCREEN



Each button on this screen takes you to another screen. The date and time are also buttons that bring up a pop-up window time box or date box used to change the date or time. The Back button brings up the Main Screen shown on the previous page of this section. Refer to the ADVANCED SETTINGS section for a description of the other screens.

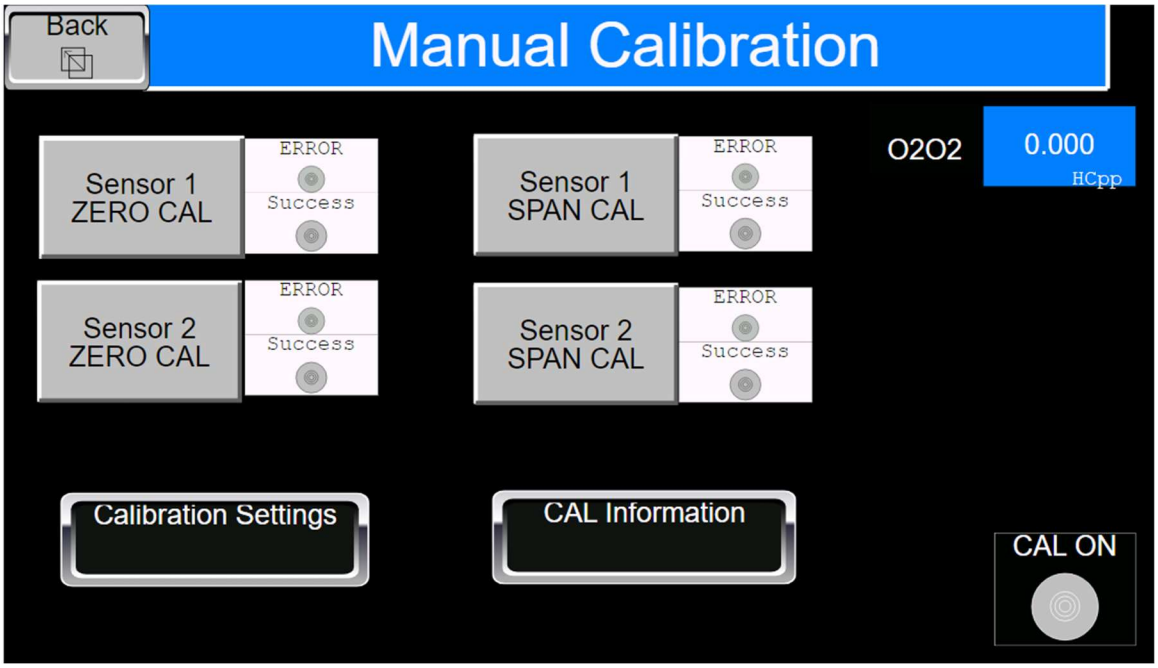
POP-UP WINDOW

Sometimes a Pop-Up Window will appear when tapping buttons where values can be changed. Some values are protected by a password. If password protected information needs to be changed, please contact KECO technical support.

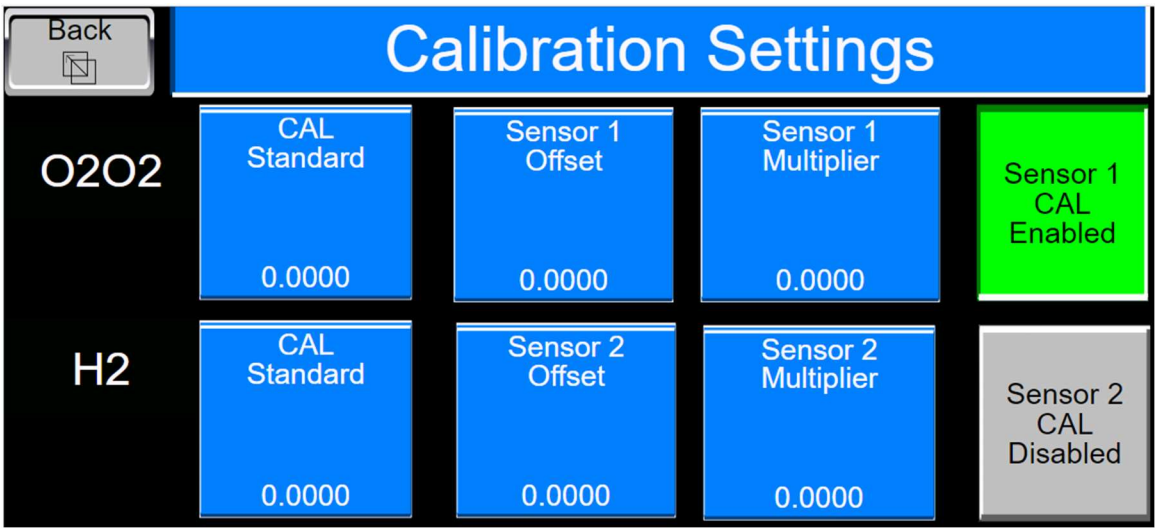
When changing values using the Pop-Up Window, simply enter the desired value and press ENTER. If no change is needed, press the ESC button to close the Pop-up Window.

The Pop-Up Window functions as a typical QWERTY keyboard. Pressing SHIFT will allow access to extra character options.

CALIBRATION



Several screens make up the Calibration section. The first screen is used to select the calibration mode of either Zero Cal or Span Cal for Sensor 1 and Sensor 2 (if equipped). In addition, two more buttons at the bottom bring up the Calibration Settings, Validation, and CAL Information screens.



The **Calibration Settings** screen has buttons for setting the values of the CAL gas being used to calibrate the analyzer. When two sensors are installed (if equipped), the CAL gas being used must be blended with an appropriate concentration of both CAL gases balanced with nitrogen.

The **Offset** and **Multiplier** values currently in use are displayed. Typically, these values are set automatically after each Calibration process is completed. In addition, these Offset and Multiplier values displayed are also buttons that can be pressed allowing any calibration process values to be manually overridden.

On the right of the screen are push buttons that are normally enabled. These buttons can be used when two sensors are installed in the analyzer, but there is a desire to only calibrate one of the sensors by disabling calibration of the other sensor.

PERFORMING A CALIBRATION

The following are steps required to perform both a zero calibration and span calibration using certified calibration bottles available for many air supply houses:

1. Attach the zero gas bottle to the Calibration port on the the analyzer. It is important the zero gas for the CO2 and O2 sensors be nitrogen 6.0 grade. The H2S requires breathing quality air. The bottle must have a pressure regulator with an output up to 10 psig.

2. Turn the 3-Way valve from Sample Gas to Calibration Gas.

3. Open the valve on the zero gas bottle and adjust pressure regulator on the bottle to set at 10 psig.

4. Adjust the Flow Meter on the analyzer to 1.5 level.

5. Go to the Calibration Settings screen and ensure the correct Sensor Cal button is enabled for the sensor you are calibrating.

6. Go to the Manual Calibration screen and press Zero Cal for the sensor you are calibrating. The “Cal On” light will turn green.

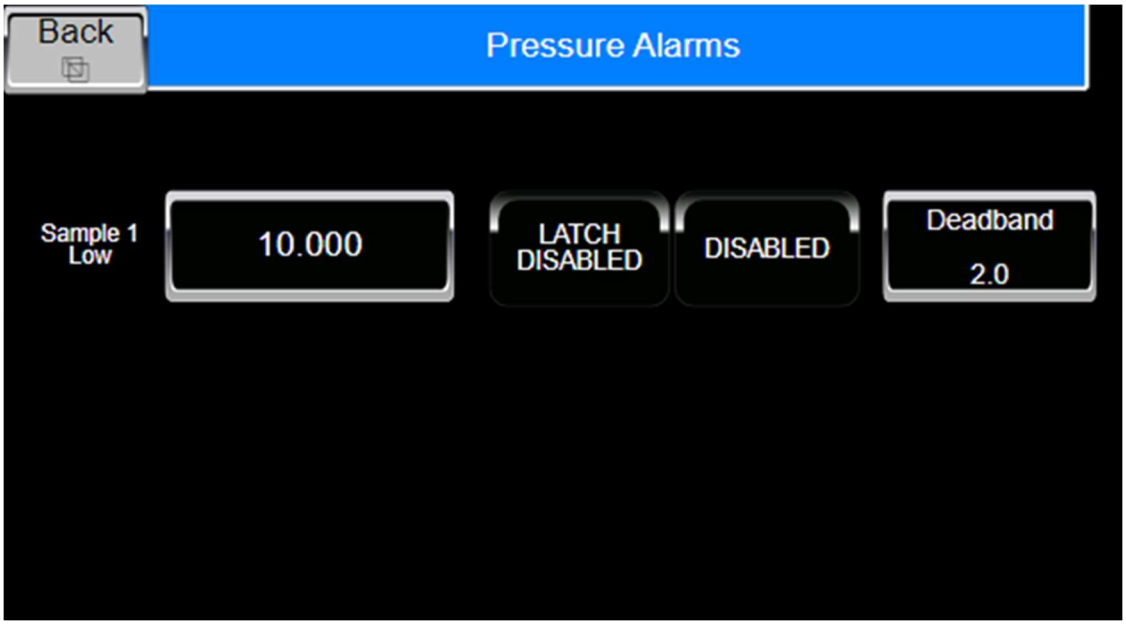
7. When the Zero Calibration is complete, the “Cal On” light will disable. The Zero Cal is complete.

8. The next step is the Span Calibration. Go to the Calibration Settings screen again and press the CAL Standard button. Enter the ppm concentration from the Span Cal bottle you are using

9. Return to the Manual Calibration screen and press the SPAN Cal button. The Span call will be initiated. When completed the CAL ON light will go from green to disabled. You have completed the calibration of the analyzer.

ADVANCED SETTINGS

ALARM SET POINTS (if equipped)



Each of the concentration alarms on this screen are set by pressing the desired alarm value button, entering the new alarm value in the pop-up window, pressing enter to return to this screen. The alarm is then enabled by pressing the DISABLED/ENABLED button. Each alarm by default is a momentary alarm, but each can be changed to a latched alarm by pressing the LATCH DISABLED/ENABLED button. Note that only one concentration alarm is standard, the additional concentration alarms are optional.

At the bottom left and bottom right are arrow buttons used to bring up the other alarm setup screens:

When any alarm goes off, the following occurs:

- The Alarm Indicator in the upper right corner of the Main Screen turns red. The normally green ALARM SUMMARY button on the Main Screen turns red.
- An entry is made in the ALARM LOG.
- The appropriate MODBUS alarm register is updated
- The appropriate normally opened alarm relay is opened

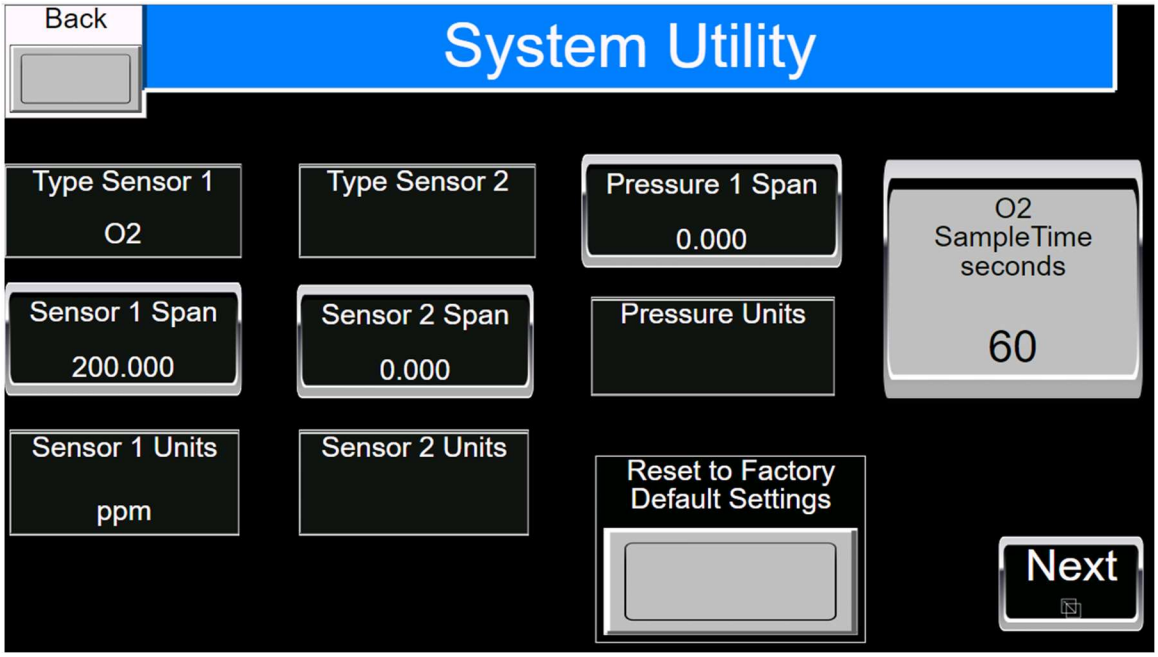
Pressing the ALARM SUMMARY button on the Main Screen will bring up a pop-up window providing more detail on the cause of the alarm. Once the alarm has been acknowledged, the ALARM SUMMARY pop-up window is cleared, the alarm is reset, the Alarm Indicator will turn off, and the ALARM SUMMARY button will return to green.

If an alarm goes off that has been set to LATCHED in the ALARM SET POINT screen, acknowledging the alarm in the ALARM SUMMARY pop-up window will clear the

ALARM SUMMARY pop-up window, but the alarm will not be reset. This ALARM SUMMARY button will turn yellow to indicate this situation. A latched alarm can be cleared by going to the ALARM SETPOINTS screen and disabling the latch by pressing the LATCH button.

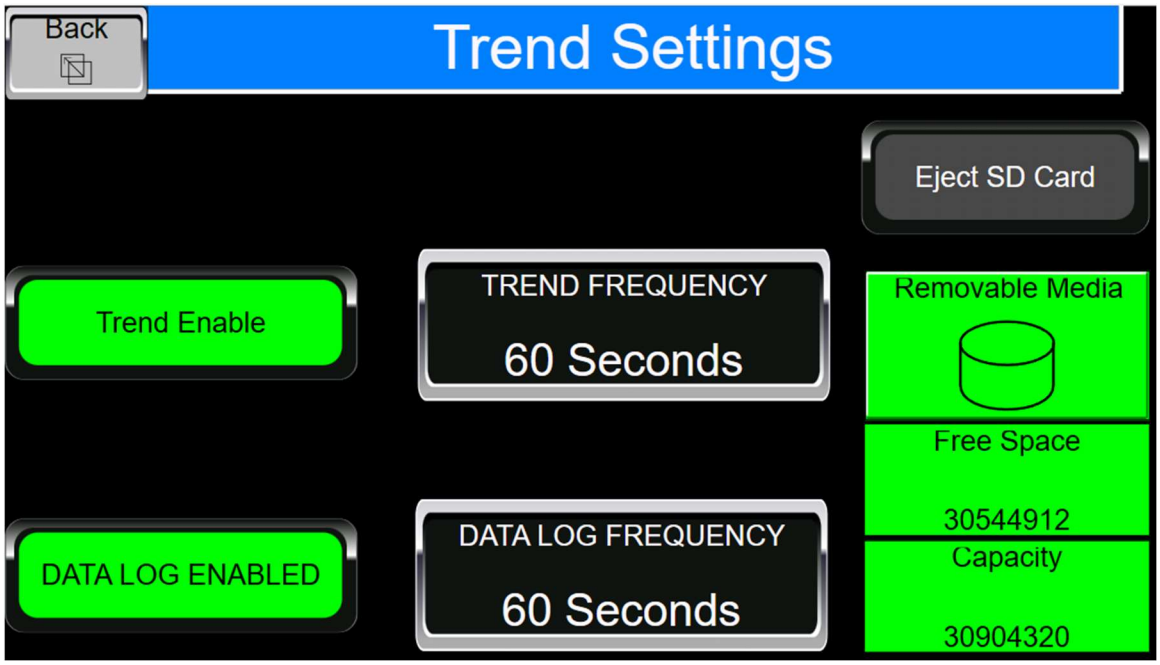
Every time an alarm goes off, a log entry is made in the ALARM HISTORY file. This file can be viewed by pressing the ALARM HISTORY button on the Main Screen. The ALARM HISTORY file is stored on the SD card if DATA LOGGING is enabled.

SYSTEM UTILITY



The SYSTEM UTILITY screen is used to control the system settings. Also on the screen are the units displayed on the Main Menu screen for each sensor.

TREND SETTINGS



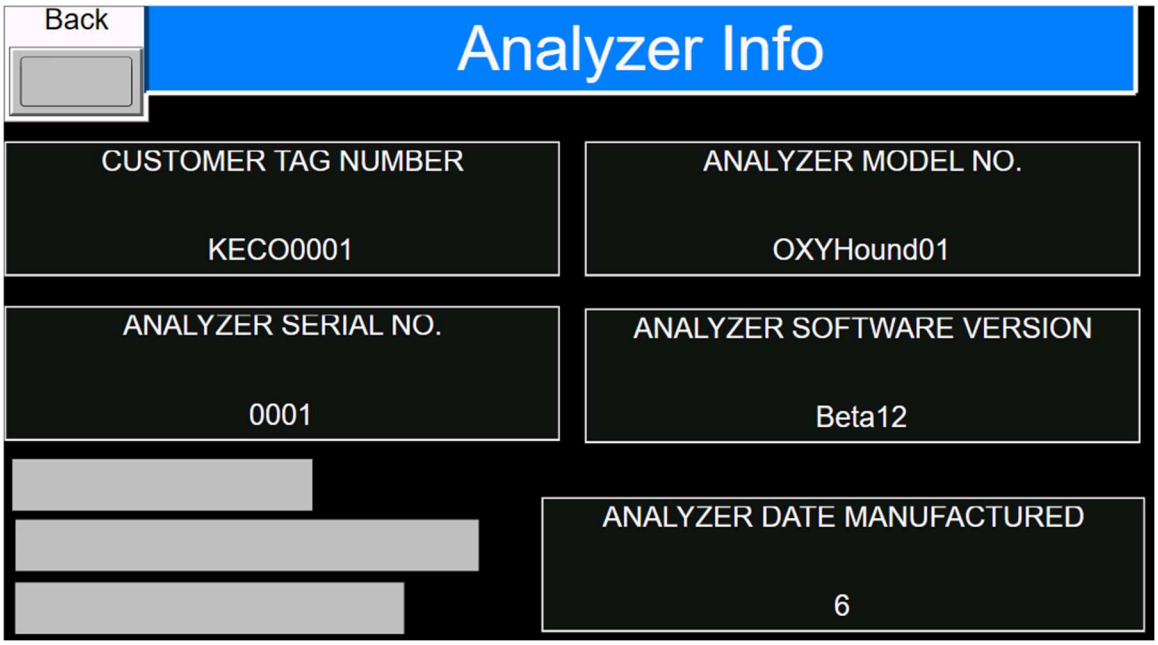
The right side of the screen information is provided on the status of the SD card.

The DATA LOG DISABLED/ENABLED button is used to turn on/off the data logging feature which logs events such as alarm events to a file on the SD card. The default setting for this button is DATA LOG ENABLED.

The TREND DISABLED/ENABLED button is used to turn on/off the recording of all the trend graph data to a file on the SD card. Associated with this button is the DATA LOG FREQUENCY which determines how often the trend data is recorded.

The Eject SD Card button is used to insure all files are saved before removing the SD card.

ANALYZER INFORMATION

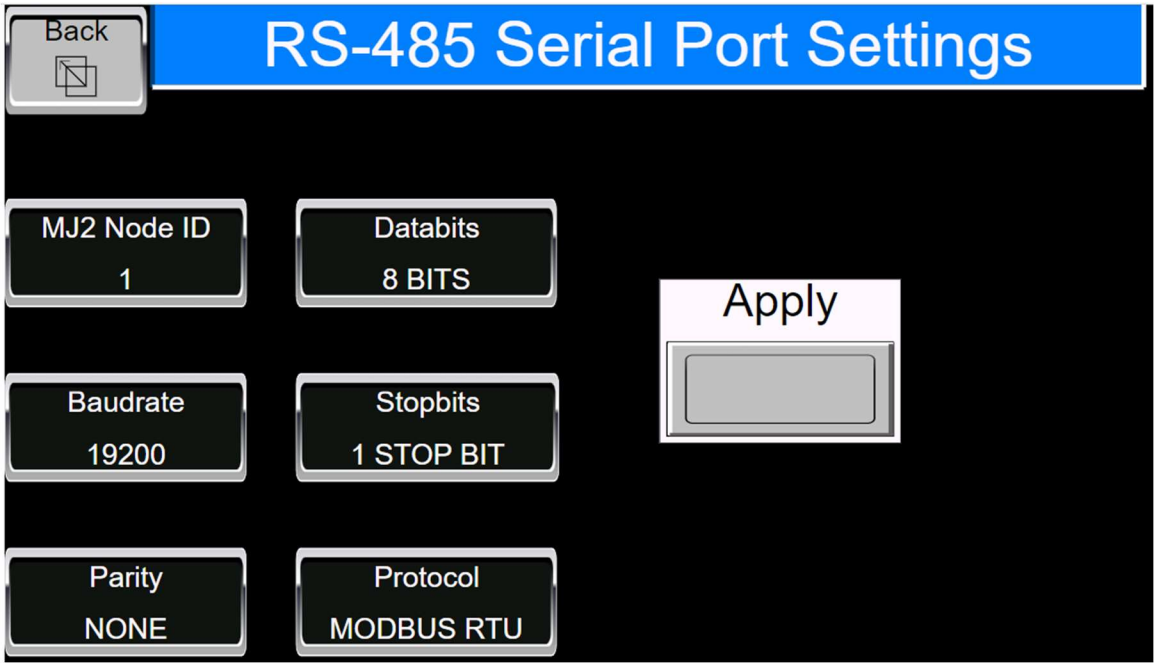


The ANALYZER INFORMATION screen displays basic model number and serial number data. These are factory settings.

SERIAL PORT SETTING

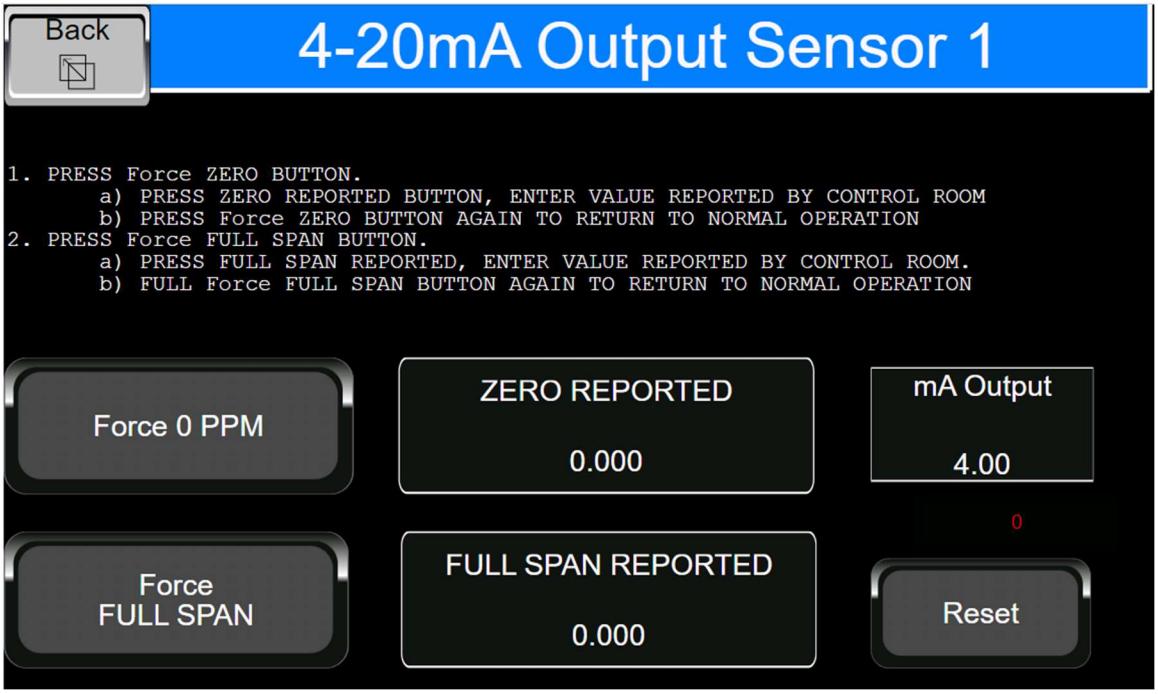
The SERIAL PORT SETTING screen is used to configure the RS-485 Serial MODBUS output connection. Pressing any of the buttons on this screen brings up a popup, where the up and down arrows are used to select a setting from the available choices. The SLAVE ID ("MJ2 Node ID") popup uses a digit keypad for entering the desired SLAVE ID. Once a choice is selected, the Enter key is pressed to confirm the setting and to return to this screen.

The PROTOCOL can be configured to MODBUS RTU or MODBUS ASCII



Once all the Serial Port Settings have been entered, press the Apply button to complete the process.

4-20mA OUTPUT CONFIG



The VOC 4-20 mA Output Signal Fine Tuning screens provide a way to slightly adjust the 4-20mA signal output to compensate for slight variations in the 4-20mA circuit impedance. This adjustment will make sure the reading on the display of the analyzer will match what is observed on the screen in the facility control room.

The adjustment procedure:

- Activate by pressing the FORCE 0 PPM button. (Activated button will turn green)
- Ask the control room to report what PPM or PPB or %vol value they are seeing on their PLC.
- Press the ZERO REPORTED button to bring up the popup and type in the value reported.
- Press enter to close popup window and apply the value entered.
- Confirm reading matches on control room PLC.
- Deactivate by pressing the Force 0 PPM button. (Deactivated button will turn gray)
- The same procedure is used to set the FULL SPAN reading.
- Press the HOME button in the top left corner to return to normal operation.

Note that this is a fine tuning procedure is intended to compensate for small differences in the readings. If a significant difference in reading is reported by the control room, such difference must be investigated before using this screen to fine tune it.

Note: Exiting this screen with either the Force 0 PPM or Force Full Span buttons active will not disable these buttons, be sure to deactivate these buttons before returning to normal operation.

RS-485 MODBUS

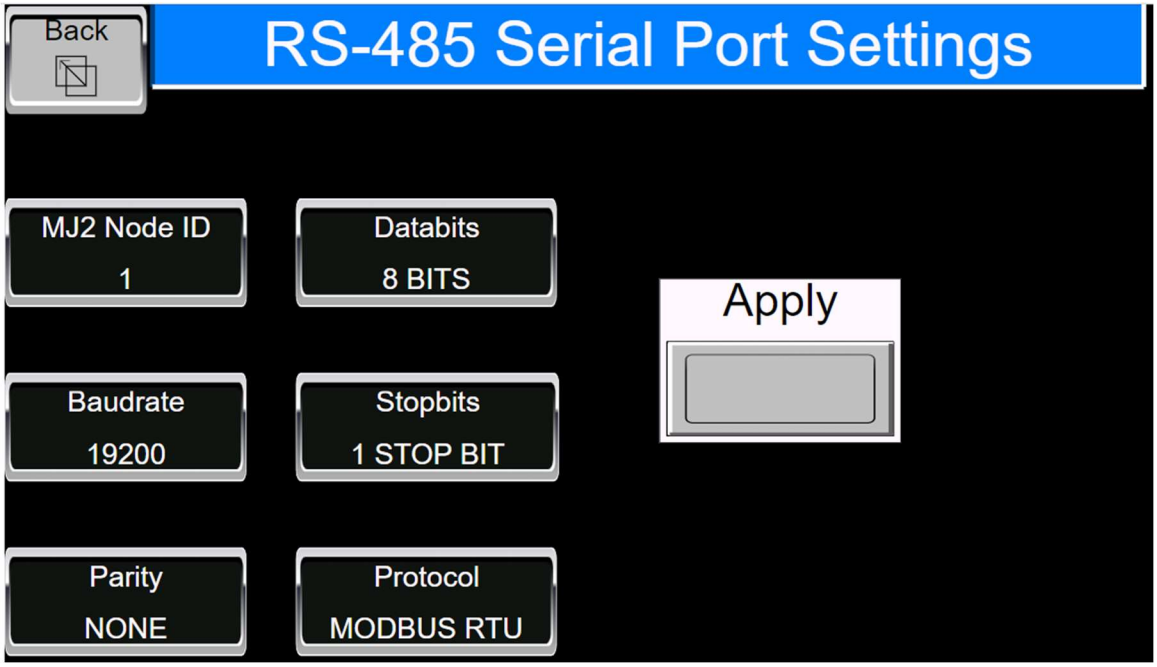
Modbus (serial) is a popular, de-facto standard protocol that allows industrial devices from multiple manufacturers to easily share data in real-time.
Modbus protocol allows for one master and multiple slaves. The master always initiates the conversation by sending a request to a particular slave. Only the addressed slave will send a response when the request is completed. Should the slave be unable to complete the request, it returns the appropriate error response. Should the slave be unable to respond, the master's timeout timer expires to provide an indication of no response. Refer to the MODBUS Registers section in the appendix for the MODBUS register map.

The RS-485 serial port acts as a Modbus slave. Modbus includes support for both ASCII and RTU modes of operation across a range of baud rates and protocol frames.

Note: The Hound Series support Half Duplex RS-485 only.

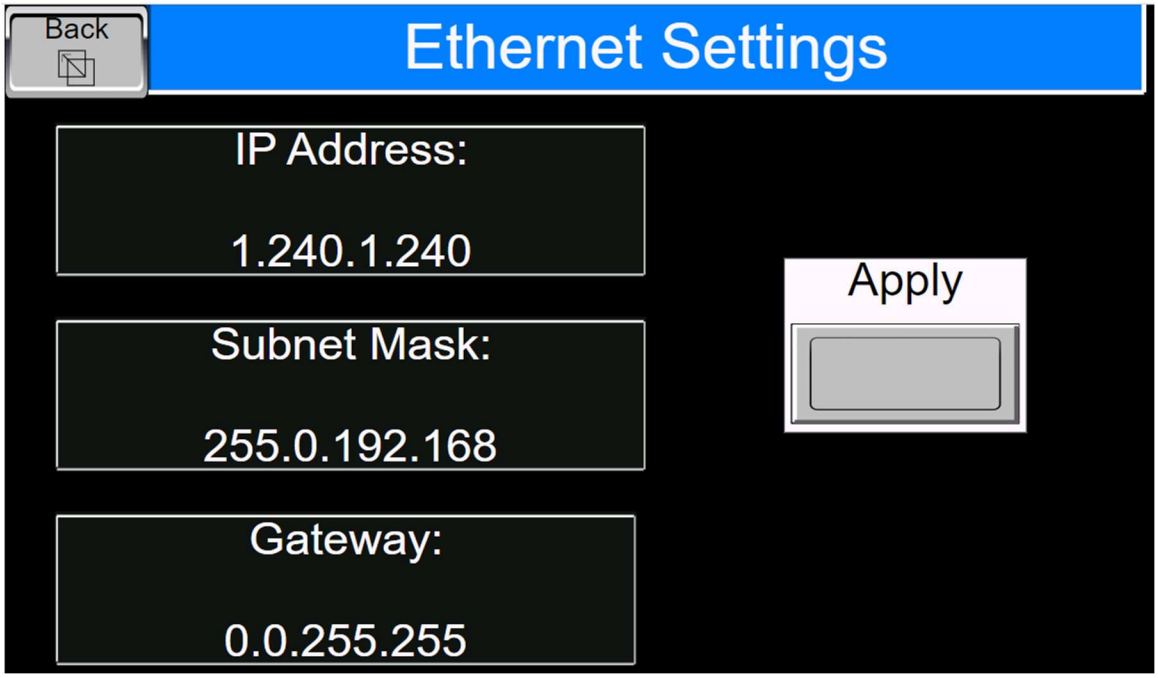
From the MENU screen, press the SERIAL PORT SETTINGS button to configure the RS-485 settings.

The SERIAL PORT SETTING screen is used to configure the RS-485 Serial MODBUS output connection. Pressing any of the buttons on this screen brings up a popup, where the up and down arrows are used to select a setting from the available choices. The SLAVE ID popup uses a digit keypad for entering the desired SLAVE ID. Once a choice is selected, the Enter key is pressed to confirm the setting and to return to this screen.



Once all the Serial Port Settings have been entered, press the Apply button to complete the process.

MODBUS OVER ETHERNET



The Ethernet connection can be used for MODBUS TCP/IP, and it can be used for the Web Screen Interface.

APPENDIX

MODBUS REGISTER AND FUNCTION CODE SUMMARY

Modbus is available using ASCII or RTU encoding over RS-485 Serial half duplex and Modbus is available over Ethernet TCP/IP.

Defined data types within the Modbus 16-bit register address specification include BYTE (half a register), ASCII (two characters per register), INT (one register), DINT (two consecutive registers) and REAL (32-bit Floating, two consecutive registers).

NOTE: 32-bit Floating byte order is little endian byte swap format (DCBA).

All Registers are read only.

Modbus conventions used in the table below list each register address as a decimal based offset value. A corresponding 5-digit PLC address would be the Function Code followed by the Register Address Offset minus 1.

MODBUS over Ethernet uses port 502.

PROCESS VALUES

Register Address Offset	Function Code	Modbus Command	Description	Range	Register type
3750	3	Read Holding Register	Sensor 1 Concentration	0-SPAN	32-bit Floating
3752	3	Read Holding Register	Sensor 2 Concentration	0-SPAN	32-bit Floating
3754	3	Read Holding Register	Sample Pressure	0-60	32-bit Floating

ALARMS

Register Address Offset	Function Code	Modbus Command	Description	Range	Register type
3758	3	Read Holding Register	0x0001=Sensor 1 High High Concentration Alarm		1-bit
3758	3	Read Holding Register	0x0002=Sensor 1 High Concentration Alarm		1-bit
3758	3	Read Holding Register	0x0004=Sensor 2 High High Concentration Alarm		1-bit
3758	3	Read Holding Register	0x0008=Sebsir 2 High Concentration Alarm		1-bit
3758	3	Read Holding Register	0x0010=Sample Pressure Alarm		1-bit

ALARM SET POINTS

Register Address Offset	Function Code	Modbus Command	Description	Range	Register type
3790	3	Read Holding Register	Sensor 1 High High Alarm SP	0-SPAN	32-bit Floating
3792	3	Read Holding Register	Sensor 1 High High Deadband	0-SPAN	32-bit Floating
3794	3	Read Holding Register	Sensor 1 High Alarm SP	0-SPAN	32-bit Floating
3796	3	Read Holding Register	Sensor 1 High Deadband	0-SPAN	32-bit Floating
3798	3	Read Holding Register	Sensor 2 High High Alarm SP	0-SPAN	32-bit Floating
3800	3	Read Holding Register	Sensor 2 High High Deadband	0-SPAN	32-bit Floating
3802	3	Read Holding Register	Sensor 2 High Alarm SP	0-SPAN	32-bit Floating
3804	3	Read Holding Register	Sensor 2 High Deadband	0-SPAN	32-bit Floating
3806	3	Read Holding Register	Sample Pressure Alarm SP	0-SPAN	32-bit Floating
3808	3	Read Holding Register	Sample Pressure Deadband	0-SPAN	32-bit Floating

INFORMATION

Register Address Offset	Function Code	Modbus Command	Description	Range	Register type
3760	3	Read Holding Register	SD Card Free Space		32-bit Integer
3762	3	Read Holding Register	SD Card Capacity		32-bit Integer
3764	3	Read Holding Register	SD Card Error [1]		16-bit Integer

[1] SD Card Errors: 0=ok, 1=unknown format, 2=no card, 3=card not supported, 4=card swapped before complete, 5=unknown error

REPLACEMENT PARTS LIST

Part No.	Name	Description
K-021037	Sensor Exchange Cap (OxyHound)	Quantifies oxygen in the gas sample, 0-200ppmv
K-021040	Sensor Exchange Cap (OxyHound)	Quantifies oxygen in the gas sample, 0-50%v
K-021042	Sensor Exchange Cap (OxyHound)	Quantifies oxygen in the gas sample, 0-5%v
K-021036	Flow Cell (OxyHound)	O2 Sensor is contained in the flow cell and connects to fiber optic cable
K-021034	O2 Main Board (OxyHound)	Sends/receives optical signal to/from O2 Sensor and to the HMI
K-021038	Fiber Optic Cable (OxyHound)	Transmits and receives signal from Flow Cell to the O2 Main Board
K-021035	Terminal Adaptor (OxyHound)	Connects Main Board to HMI
Sensor, CO2 5,000v	CO2 Sensor 0-5,000 PPM vol	Spare sensor for CarbonHound NDIR CO2 Analyzer. Must provide analyzer serial number before an order can be processed.
Sensor, CO2 5%	CO2 Sensor 0-5% vol	Spare sensor for CarbonHound NDIR CO2 Analyzer. Must provide analyzer serial number before an order can be processed.
Sensor, CO2 10%	CO2 Sensor 0-10% vol	Spare sensor for CarbonHound NDIR CO2 Analyzer. Must provide analyzer serial number before an order can be processed.
Sensor, CO2 100%	CO2 Sensor 0-100% vol	Spare sensor for CarbonHound NDIR CO2 Analyzer. Must provide analyzer serial number before an order can be processed.
Sensor, CH4 100%	CH4 Sensor 0-100% vol	Spare sensor for MethaneHound NDIR CO2 Analyzer. Must provide analyzer serial number before an order can be processed.
H2S-200 PPM	H2S Sensor 0-200 PPMv	Spare sensor for SulfurHound electrochemical cell H2S Analyzer up to 200 ppm range. Must provide analyzer serial number before an order can be processed.
H2S-2000 PPM	H2S Sensor 0-2000 PPMv	Spare sensor for SulfurHound electrochemical cell H2S Analyzer up to 2000 ppm range. Must provide analyzer serial number before an order can be processed.
K-020016	HMI	Human Machine Interface (HMI) 4 Series for analyzers, includes color touchscreen, processor, core I/O, memory, and loaded program. NOTE: To replace in existing analyzer, please provide serial number of analyzer installed.
K-003007	Relay	Relay, Alarm
K-022029	Solenoid	Solenoid, 3-way 1/8" NPT< for H2S service. Stainless Steel body, 175PSI pressure rating, Explosionproof Class I, Div I, 24VDC
K-016025	Power Supply 120/220	Power supply for 120/220VAC, 1.3A powered units (if equipped)
K-016013	Power Supply 24vdc	24VDC, 60w Power Supply (for 120/220VAC powered analyzers only, not 24VDC powered analyzers)
K-014050	Flowmeter	Flowmeter with needle valve, SS. Max input pressure 100 psig.
K-003011	Relay	Relay, Alarm
K-SS-42GXS4	Three-Way Valve	Used to manually switch between sample, zero gas, and calibration gas
BD 1/2 SNT	Drain Plug	Drain plug for XP housing enclosure
T0316-700	Flame Arrestor	Flame Arrestor connected to XP housing (input/output sample)
K-006007	Enclosure	Enclosure for Hound Lite series analyzers
K-006009	Feet Mounting	Mounting feet for Hound Lite series enclosure
K-014051	Bracket Flowmeter	Bracket for Flowmeter on Hound Series analyzers

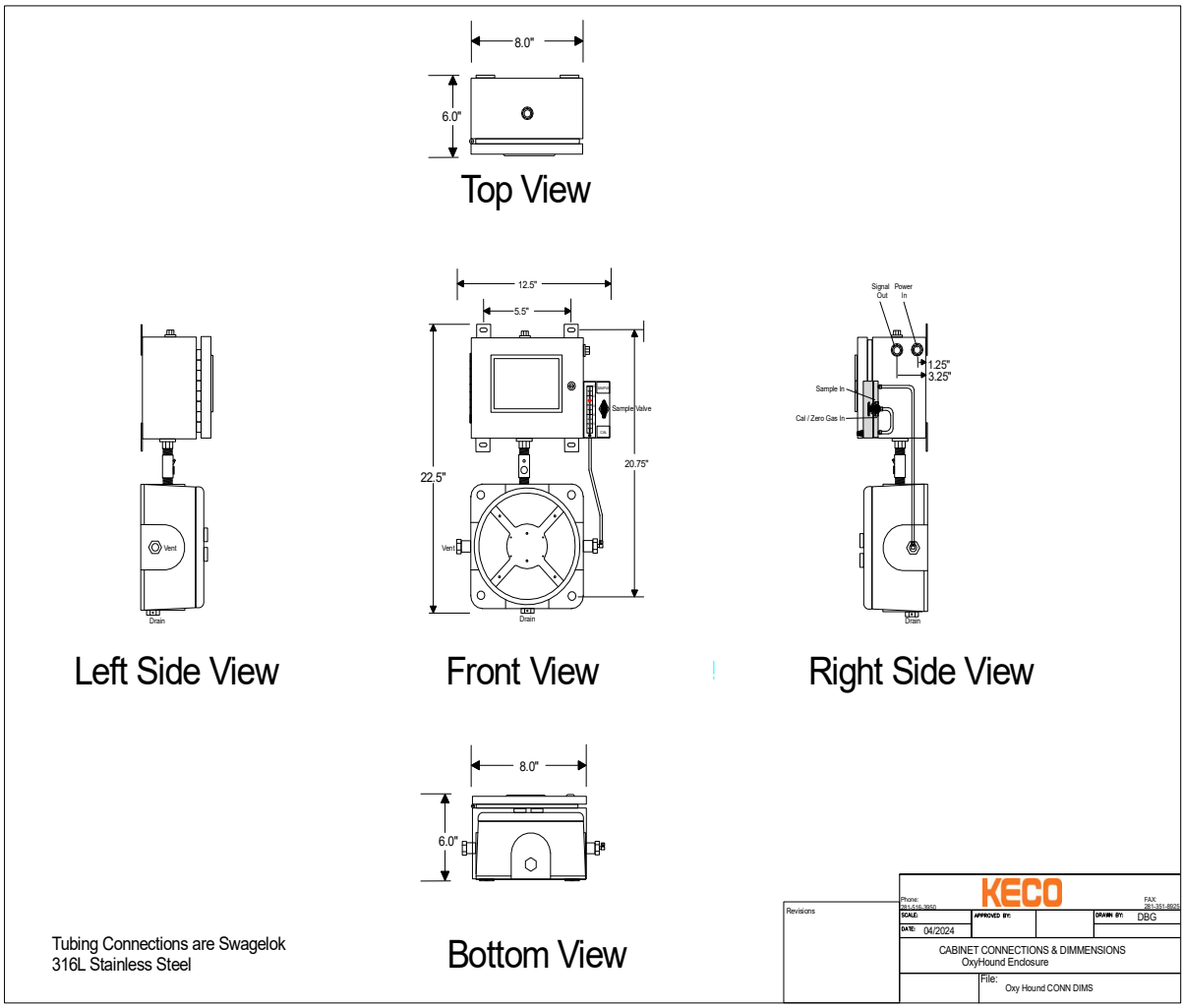
ANALYTICAL SYSTEMS KECO, LLC
Voice 281-516-3950
FX 281-351-8925
Web www.liquidgasanalyzers.com
E-mail Sales@asikeco.com
support@asikeco.com

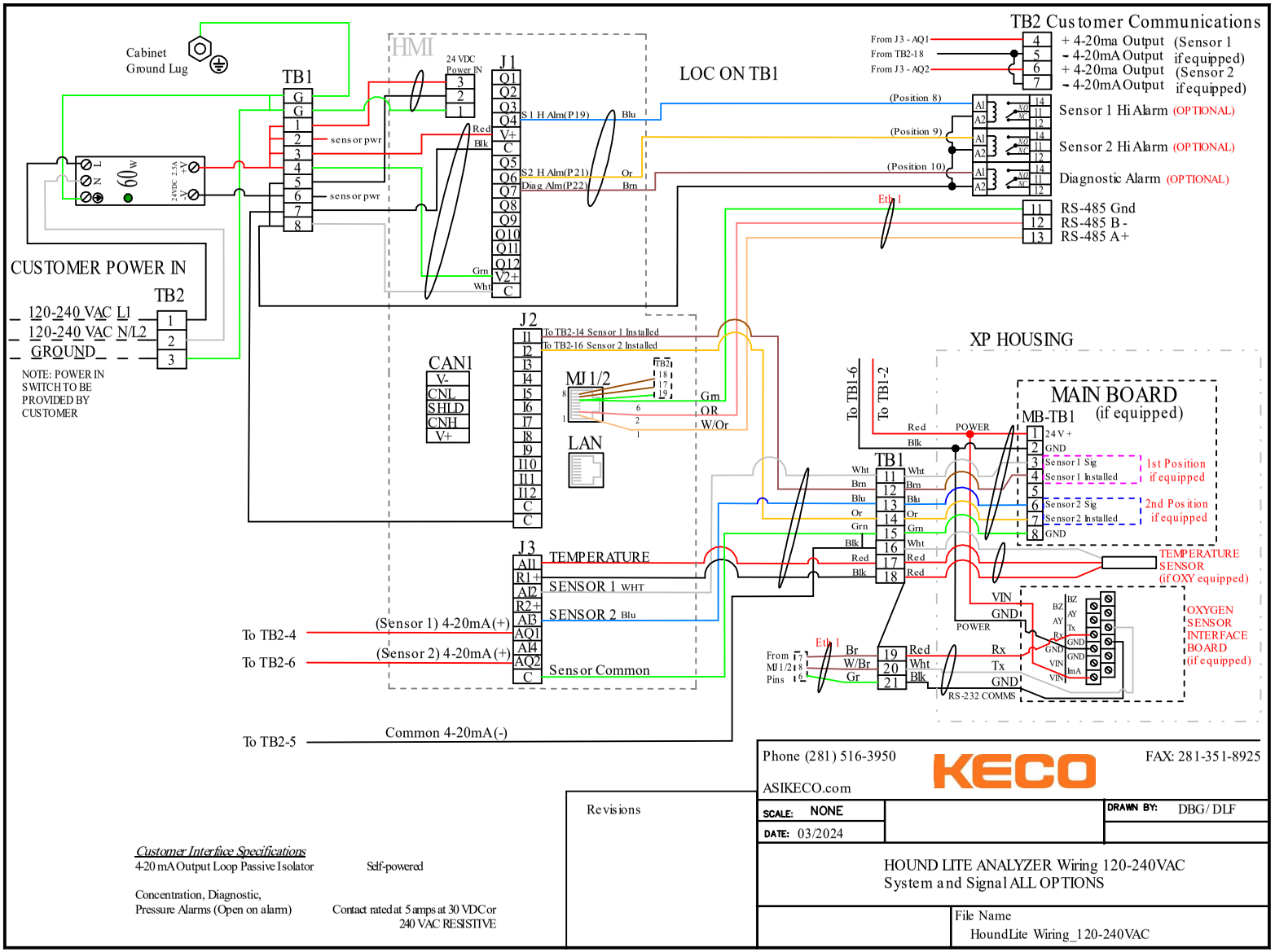
ANALYZERS AVAILABLE:

FOR LIQUID SAMPLES:	H_2S in Liquids
	Hydrocarbon (VOCs) in Water
FOR GAS & LPG SAMPLES:	H_2S Sulfur CO_2

Analytical Systems KECO, LLC

DRAWINGS & DIAGRAMS




Cabinet Ground Lug
TB1
HMI
24 VDC Power IN
J1
LOC ON TB1
TB2 Customer Communications
From J3 - AQ1
From TB2-18
From J3 - AQ2
+ 4-20ma Output (Sensor 1 if equipped)
- 4-20mA Output
+ 4-20ma Output (Sensor 2 if equipped)
- 4-20mA Output
(Position 8)
Sensor 1 Hi Alarm (OPTIONAL)
(Position 9)
Sensor 2 Hi Alarm (OPTIONAL)
(Position 10)
Diagnostic Alarm (OPTIONAL)
Eth 1
RS-485 Gnd
RS-485 B -
RS-485 A+
sensor pwr
S1 H Alm(P19)
S2 H Alm(P21)
Diag Alm(P22)
CUSTOMER POWER IN
TB2
120-240 VAC L1
120-240 VAC N/L2
GROUND
NOTE: POWER IN SWITCH TO BE PROVIDED BY CUSTOMER
J2
To TB2-14 Sensor 1 Installed
To TB2-16 Sensor 2 Installed
CAN1
V-
CNL
SHLD
CNH
V+
MJ1/2
LAN
Gm OR W/Or
XP HOUSING
To TB1-6
To TB1-2
MAIN BOARD (if equipped)
MB-TB1
24 V +
GND
Sensor 1 Sig
Sensor 1 Installed
1st Position if equipped
Sensor 2 Sig
Sensor 2 Installed
2nd Position if equipped
TB1
J3
TEMPERATURE
SENSOR 1 WHT
SENSOR 2 Blu
TEMPERATURE SENSOR (if OXY equipped)
To TB2-4
(Sensor 1) 4-20mA(+)
To TB2-6
(Sensor 2) 4-20mA(+)
Sensor Common
To TB2-5
Common 4-20mA(-)
From MJ1/2 Pins
VIN
GND
POWER
OXYGEN SENSOR INTERFACE BOARD (if equipped)
RS-232 COMMS
Phone (281) 516-3950
ASIKECO.com
FAX: 281-351-8925
KECO
Revisions
SCALE: NONE
DATE: 03/2024
DRAWN BY: DBG/ DLF
HOUND LITE ANALYZER Wiring 120-240VAC
System and Signal ALL OPTIONS
File Name
HoundLite Wiring_120-240VAC
Customer Interface Specifications
4-20 mA Output Loop Passive Isolator
Self-powered
Concentration, Diagnostic, Pressure Alarms (Open on alarm)
Contact rated at 5 amps at 30 VDC or 240 VAC RESISTIVE