



Gas and Flame Detection

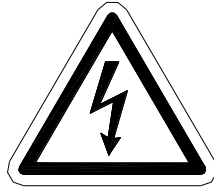
# Operation and Maintenance Manual

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GDS-58DXP Dual Channel Sample Draw Monitor

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**CAUTION: FOR SAFETY REASONS THIS EQUIPMENT MUST BE OPERATED AND SERVICED BY QUALIFIED PERSONNEL ONLY. READ AND UNDERSTAND INSTRUCTION MANUAL COMPLETELY BEFORE OPERATING OR SERVICING.**

**ATTENTION: POUR DES RAISONS DE SÉCURITÉ, CET ÉQUIPEMENT DOIT ÊTRE UTILISÉ, ENTRETENU ET RÉPARÉ UNIQUEMENT PAR UN PERSONNEL QUALIFIÉ. ÉTUDIER LE MANUE D'INSTRUCTIONS EN ENTIER AVANT D'UTILISER, D'ENTREtenir OU DE RÉPARER L'ÉQUIPEMENT.**

REVISION HISTORY

Revision 1.0    3/15/2022    Initial release

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## 1 SAFETY INFORMATION

### Important – Read Before Installation

Users should have a detailed understanding of GDS-58DXP operating and maintenance instructions. Use the GDS-58DXP only as specified in this manual or detection of gases and the resulting protection provided may be impaired. Read the following WARNINGS prior to use.

#### WARNINGS

- The GDS-58DXP sample draw system must be installed, operated, and maintained in accordance with information contained herein. Installation in any hazardous area must comply with all applicable restrictions, requirements, and guidelines for said hazardous areas. It is the end user customer's final decision to ensure that the GDS-58DXP is suitable for the intended use.
- The GDS-58DXP is designed and constructed to measure the level of certain gases in ambient air. Accuracy in atmospheres containing steam or inert gases cannot be guaranteed.
- Do not paint transmitter or sensor assembly.
- Do not operate the GDS-58DXP if its enclosure is damaged or cracked or has missing components. Make sure the cover, internal PCB's and field wiring are securely in place before applying power.
- Do not expose the GDS-58DXP to electrical shock or continuous severe mechanical shock. Protect the GDS-58DXP from dripping liquids and high-power sprays.
- Calibrate with known target gas at start-up and check on a regular schedule, at least every 90 days. More frequent inspections are encouraged to spot problems such as dirt, oil, paint, grease or other foreign materials in the sample tubing or in the sensor head.
- Periodically test for correct operation of the system's alarm events by exposing the sample extraction point to a calibration gas concentration above the High Alarm set point.
- If a purge unit is installed, read and follow all instructions regarding proper operation of the purge system before applying power to the GDS-58DXP.

#### WARRANTY

GDS Corp. UPS products carry a 2-year limited repair or replacement warranty on electronics and workmanship and one year warranty on sensors. GDS Corp. reserves the right to void warranty claims based on evidence of misuse, abuse, or misapplication. Warranty period starts on date of shipment.

#### IF YOU HAVE QUESTIONS

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## 2 PRODUCT OVERVIEW

The GDS-58DXP is designed to provide reliable gas detection in locations where the environment is not suitable for the installation of traditional ambient sensors. The GDS-58DXP combines a highly reliable brushless DC sample pump, low flow detection switch, visual flow meter and GASMAX DSX gas detector into a single unit that provides 4-20mA analog output, programmable relays including system FAULT and a MODBUS slave interface. The integrated Run/Cal switch and GASMAX DSX user-prompted calibration procedure make normal maintenance quick and easy.

The GDS-58DXP consists of a gas detector coupled with an integrated pump / flow switch and wiring junction box. The Run / Cal valve selects between the sample input and local calibration gas input. The Visual Flow Indicator shows GREEN if flow is OK, and RED if flow is blocked or the pump fails. The Wiring Junction Box provides an easy and convenient way for the user to attach power and signal wiring.

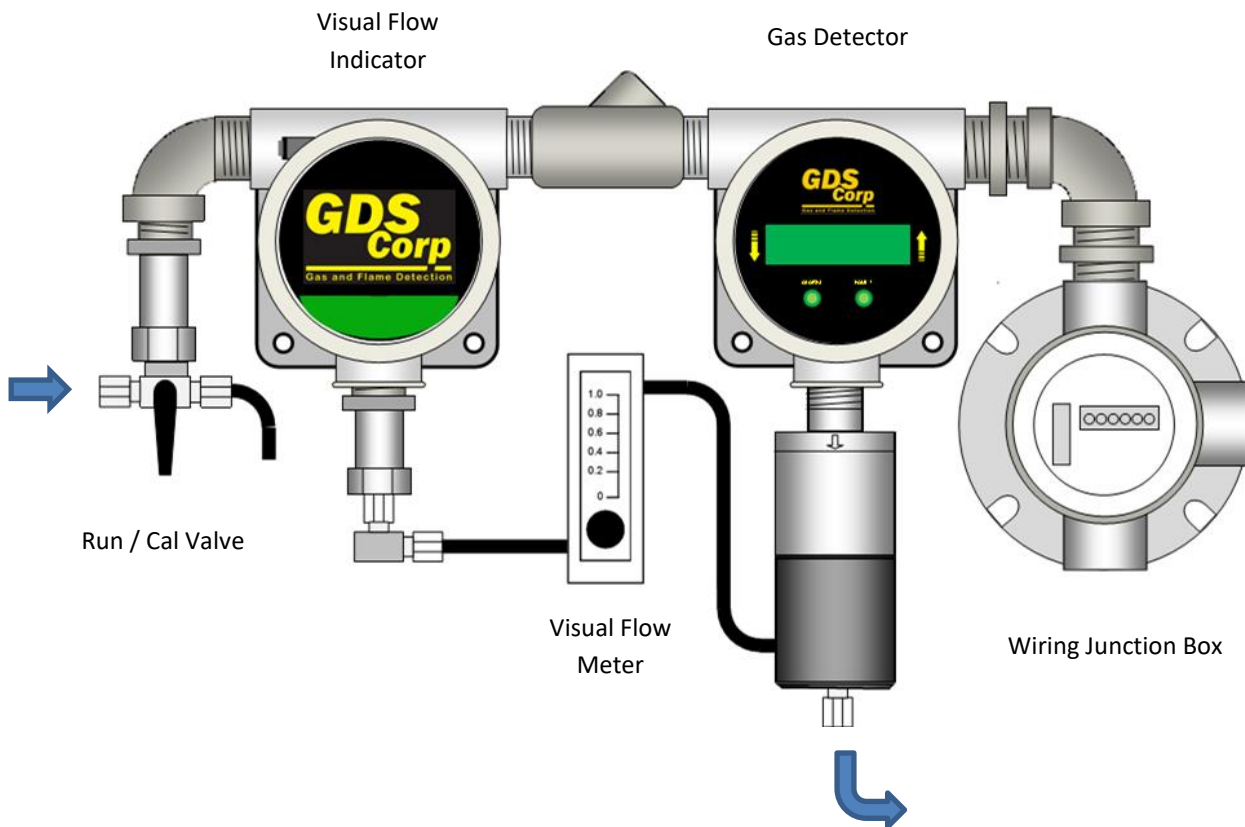


Figure 2-1: GDS-58DXP Sample Draw Monitor

Sample gas enters the unit through the Run/Cal valve where it is drawn into the explosion proof enclosure

by the pump after passing through the first of two flame arrestors. Output from the pump is directed through the low flow switch and exits the explosion proof enclosure through the second flame arrestor where it travels to the flow meter and sensor flow cell and then exits the flow cell at ambient atmospheric pressure. In the event of a pump failure or if flow is blocked for some reason, the 4-20mA output of the GDS-58DXP will drop to zero.

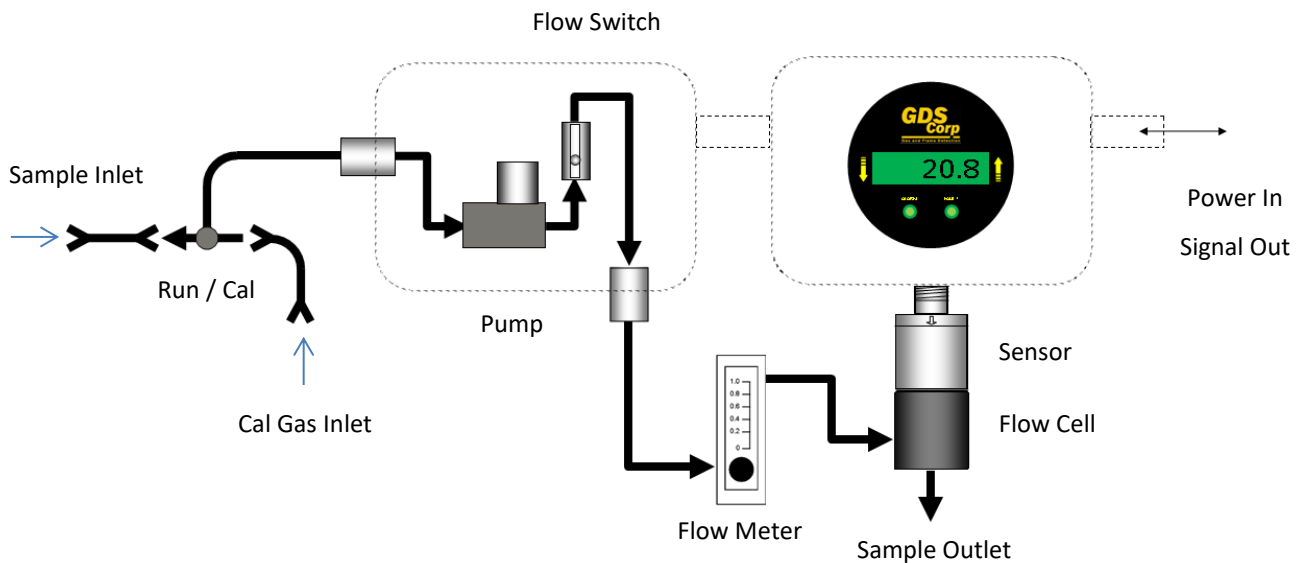


Figure 2-2: GDS-58DXP Flow Diagram

### GDS-58DXP SENSOR TECHNOLOGY

For toxic gases the GDS-58DXP supports a range of electrochemical (“echem”) sensors for toxic gases and oxygen levels. These sensors use chemical reactions to sense the presence of gases such as hydrogen sulfide, sulfur dioxide and many others. Each sensor contains an amount of chemical electrolyte that reacts with the target gas to create free electrons that are amplified and measured. Once the electrolyte is depleted, sensor output will diminish, and the sensor must be replaced.

**IMPORTANT: TOXIC SENSORS ARE SUBJECT TO ACCELERATED DETERIORATION IF POWER IS NOT APPLIED WITHIN 3 MONTHS OF SHIPMENT FROM GDS CORP.**

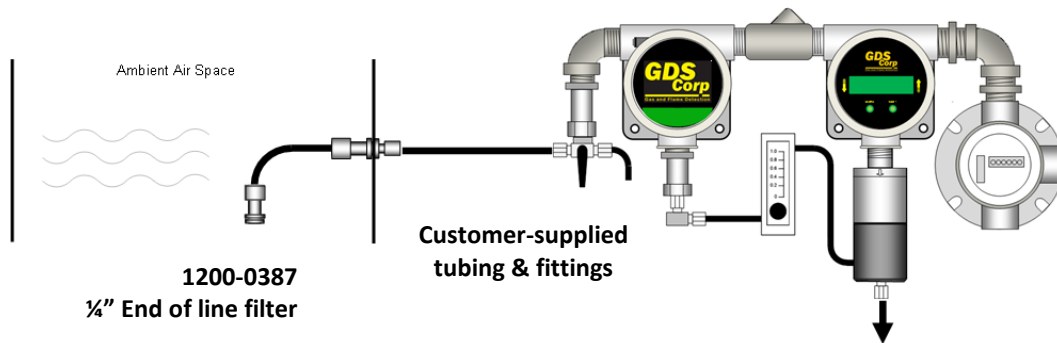
For combustible gases the GDS-58DXP uses a GDS-IR infrared sensor. These sensors can be calibrated for many different combustible gases.

Infrared sensors use the fact that hydrogen-carbon bonds found in all hydrocarbon gases absorb infrared light at certain frequencies. When the target gas passes between a source of infrared light and a suitable detector, a reduction in detector output indicates the presence of gas. Infrared sensors cannot be poisoned or damaged by chemicals in the target gas and typically have a very long and stable operational life. GDS-IR sensors carry a 5-year warranty on the electronics and a 12-year warranty on the IR source.

**IMPORTANT: INFRARED COMBUSTIBLE GAS SENSORS CANNOT DETECT COMBUSTIBLE HYDROGEN GAS**

### SAMPLING APPLICATIONS

When sampling from a static area, mount the GDS-58DXP as close as possible to the extraction point. Try to keep the unit above the sampling point so that any moisture that condenses inside the tubing flows back to the source.



**Figure 2-3: GDS-58DXP Ambient Air Sampling**

For stainless steel tubing runs (typically 1/4" OD) GDS Corp recommends the installation of #1200-0387 end-of-line dust filter at the pickup point if the area contains significant amounts of dust or particulates (See Fig. 2-3).

For tubing runs that can use flexible tubing, GDS Corp recommends the #20-0198 filter kit that includes a non-metallic end-of-line filter / silencer with replaceable filter element and 50 feet of Tygon tubing.

If water may be present at the sample inlet point, GDS Corp recommends the #20-0186 Float Probe Kit with 50' of Tygon tubing or the #20-0187 Float Probe Kit with 100' of Tygon Tubing. The float probe ensures that the pickup point remains above the liquid level under most circumstances. The sample pump used on the GDS-58DXP is capable of lifting liquid water to a height of 15 ft / 5m, and if the end of the sample line is placed in liquid water, the pump will draw water through the inlet filter, flame arrestors, sample pump, flow switch and flow meter and sensor flow cell, resulting in damage to the components.



In addition to end-of-line filters & probes, the GDS-58DXP offers three choices for inlet filters that are directly integrated into the unit. These filters are mounted on the left side, in-between the flame arrestor and Run/Cal valve.

Filter option #1 ("FIL" = 1) includes a coalescing / dust filter with integrated drain valve. This filter is best for use in areas that do not have corrosive or acidic gases. The filter element is designed to remove particles that are larger than 5 microns.

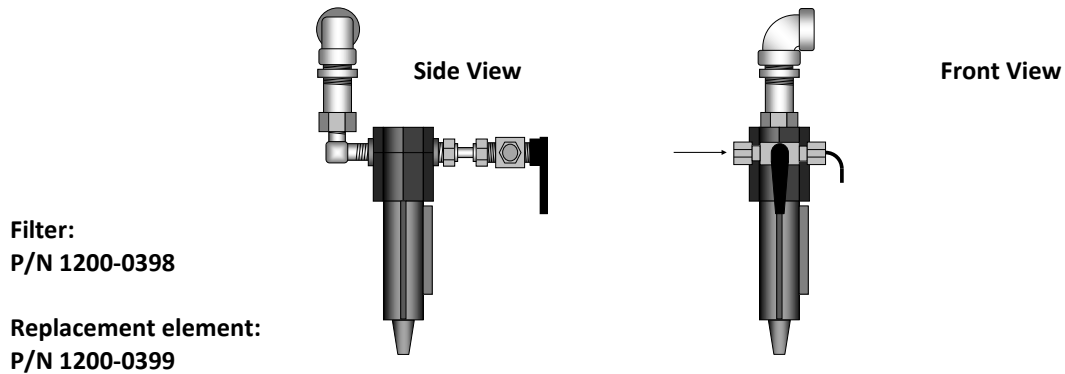


Figure 2-4: Filter Option #1

Filter option #2 ("FIL" = 2) includes a stainless steel coalescing filter with stainless steel drain valve. This filter is recommended if there are any corrosive or acidic gases present that are not compatible with materials such as plastics or mild steel. The filter element used in this filter is designed to remove particles that are larger than 0.1 microns.

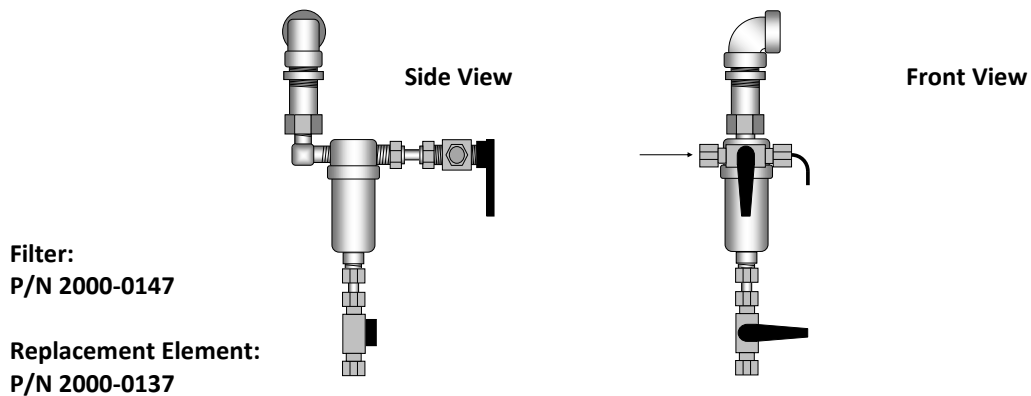


Figure 2-5: Filter Option #2

Filter option #3 ("FIL" = 3) includes a Pyrex clear coalescing filter with stainless steel drain valve. This filter is recommended if there are any corrosive or acidic gases present and if the sample air or gas may contain high levels of moisture.

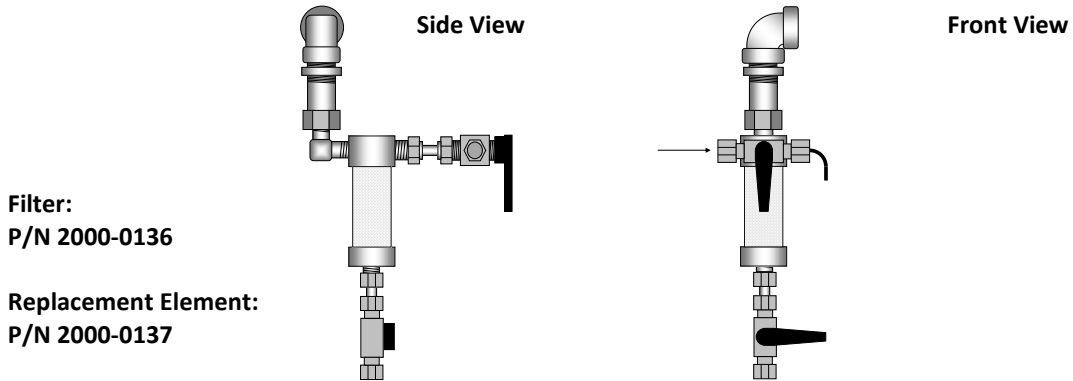


Figure 2-6: Filter Option #3

**IMPORTANT: WHEN DRAINING AN INLET FILTER, BLOCK THE SAMPLE FLOW BY REMOVING POWER FROM THE UNIT OR SETTING THE RUN/CAL VALVE TO A POSITION BETWEEN RUN AND CAL.**

Sampling inside air conditioning ducts presents several problems for ambient sensors. Rapid air flow can damage the sensor, access for calibration or maintenance is difficult, and non-linear gas distribution can result in errors. Using a GDS-58DXP with a #20-0141 Duct Sample Kit simplifies installation, maintenance and calibration and samples a larger cross-section of the duct stream.

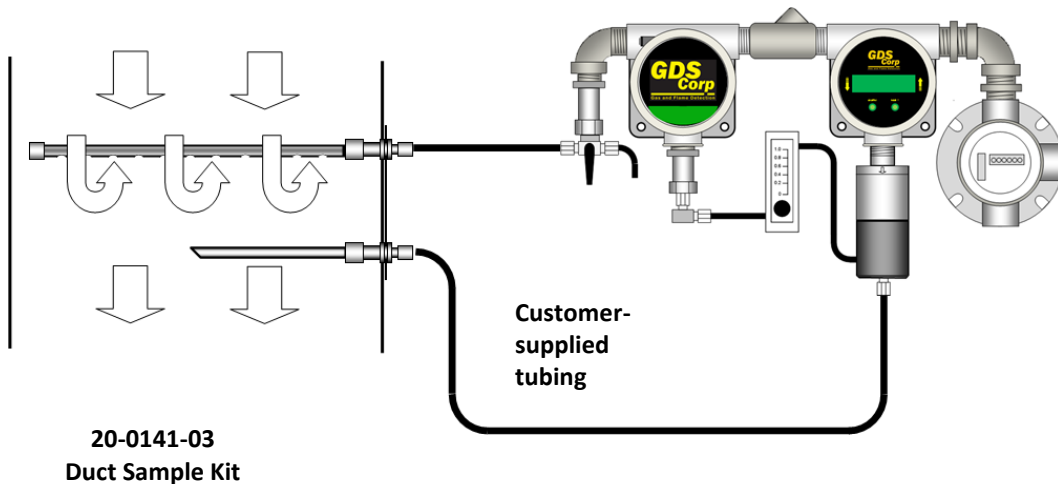


Figure 2-7: GDS-58DXP Air Duct Sampling

### 3 HARDWARE

The GDS-58DXP consists of two NEMA 7 explosion-proof enclosures that contain the sample pump and flow switch (left side) and GASMAX DSX gas monitor, sensor, and flow cell (right side). Gas enters the left side enclosure via explosion proof flame arrestors, passes through the flow meter and into the sensor.

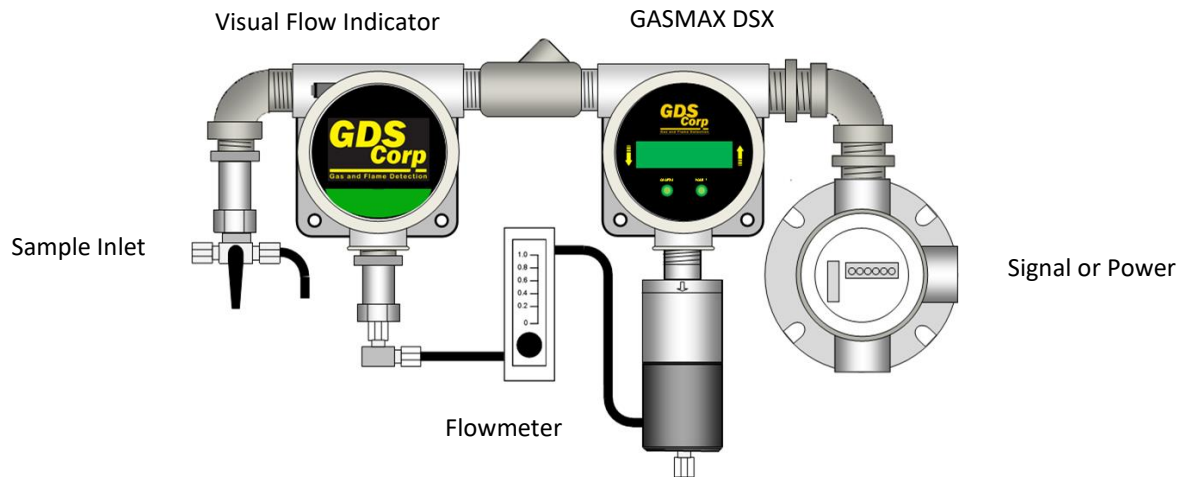


Figure 3-1: GDS-58DXP with Single Toxic Sensor

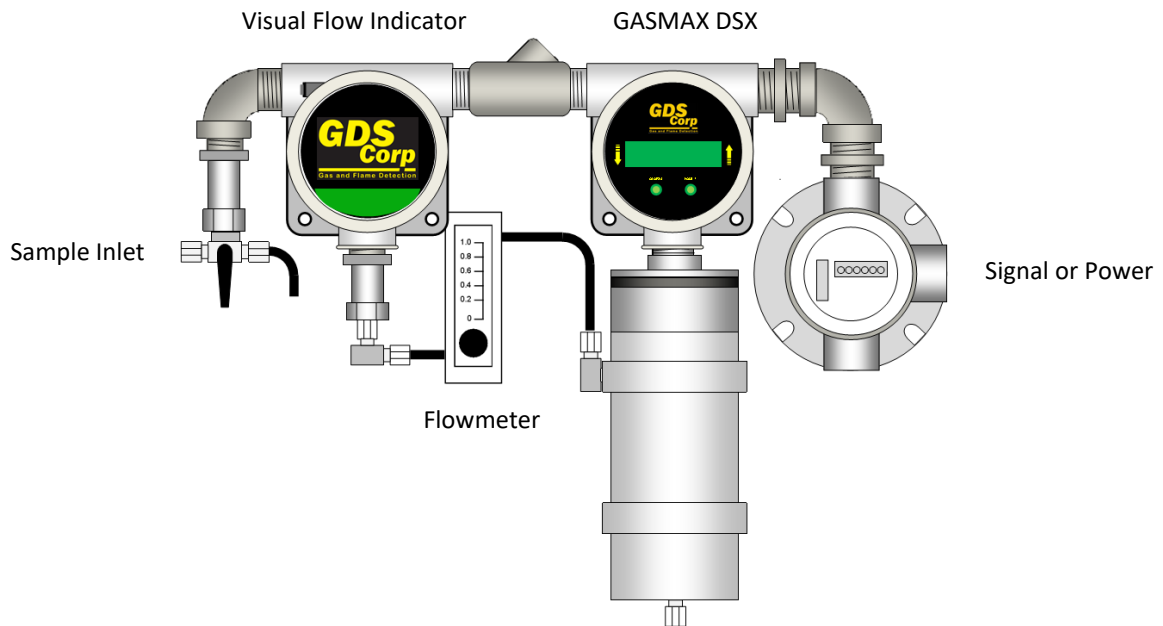


Figure 3-2: GDS-58DXP with Single GDS-IR Sensor

## 4 INSTALLATION

### SELECTING A LOCATION

As compared to a fixed-point gas detector, the GDS-58DXP sample draw system provides a good deal of flexibility when choosing a mounting location. Consider the following when considering where to install the GDS-58DXP:

- Locate the GDS-58DXP where it will be easy to service and calibrate.
- Minimize the length of sample tubing.
- Mount the GDS-58DXP at or above the sample point, if possible, to minimize condensation
- Keep the sample pickup from becoming submerged in liquid. The sample pump is capable of drawing water to a height of 15 feet. *If liquid enters the flame arrestor or sample pump, damage will occur.*
- If it is necessary to tie the sample outlet back to the sample source, make sure there are no obstructions or restrictions. Any increase in pressure inside the sensor flow cell *will result in reading errors.*

### MOUNTING THE GDS-58DXP

The GDS-58DXP standard configuration is a dual aluminum explosion-proof enclosure and is available standalone, on a 21" x 21" painted steel plate or in a 24" x 24" non-metallic or stainless-steel enclosure. The GDS-58DXP must be mounted vertically for the flow switch and flow meter to operate properly.

### INLET TUBING

Specifications for the inlet tubing depend on the target gas. Long runs of sample tubing will cause a significant delay between the appearance of gas and the resulting warning. Small diameter stainless steel (1/4" OD) is ideal for most gases. Flexible tubing or tubing manufactured from Teflon or PTFE may also be used.

#### Inlet Delay Calculation

For 1/4" OD tubing, allow 5 seconds delay for every 10 feet of sample line

Smaller diameter tubing results in faster response because of the smaller total volume of gas that must be drawn from the sample point. Tests have shown that it takes approximately 3.5 minutes for a sample to be drawn through 500 feet of 1/4" OD flexible tubing; this gives a delay rate of roughly 0.4 seconds per foot of tubing. Larger diameter tubing with higher internal volume will result in a longer delay, while smaller tubing may be subject to blockage from condensed water droplets or dirt particles.

**NOTE: THE SAMPLE PUMP IS CAPABLE OF PULLING UP TO 7.0 PSI VACUUM, ENOUGH TO LIFT WATER OVER 15 FEET. CARE SHOULD BE TAKEN NOT TO SUBMERGE THE SAMPLE EXTRACTION POINT IN LIQUID**

AS THE PUMP WILL QUICKLY FILL THE FLAME ARRESTORS, FLOW SWITCH, FLOW METER AND SAMPLE FLOW CELL WITH LIQUID.

### SAMPLE EXHAUST

Changes in ambient pressure will affect the output from most sensors and allowing the sample to exhaust directly to the atmosphere will minimize these affects. Long runs of tubing connected to the sample outlet may increase the backpressure inside the sensor flow cell and cause higher than normal readings.

Returning a sample to a process stream may be desirable and will work if the process stream is only slightly above ambient (< 5" of water column) and has a relatively constant pressure.

**IMPORTANT: DO NOT RESTRICT THE SAMPLE EXHAUST OUTLET.**

### DC POWER & SIGNAL CONNECTIONS

To access signal and power connections, remove the cover on the wiring junction box mounted on the right side of the GDS-58DXP. Power, ground (common) and signal outputs are shown in figure 5-4 below. Connect power to TB1 pin 1 and ground to TB1 pin 6. Additional +24V (TB1 pin 2) and Common (TB1 pin 5) connections are available for local strobes or horns. The "DC ON" LED is connected across the DC input wiring and can be used to confirm the existence of properly polarized DC power.

NOTE: Connector "TB1" is removable and allows power to the GDS-58DXP to be temporarily removed for troubleshooting or maintenance without physically disconnecting any field wiring.

#### Recommended Wire Gauge

< 100 ft	#18 GA
100 to 500 ft	#16 GA
500 to 1000 ft	#14 GA

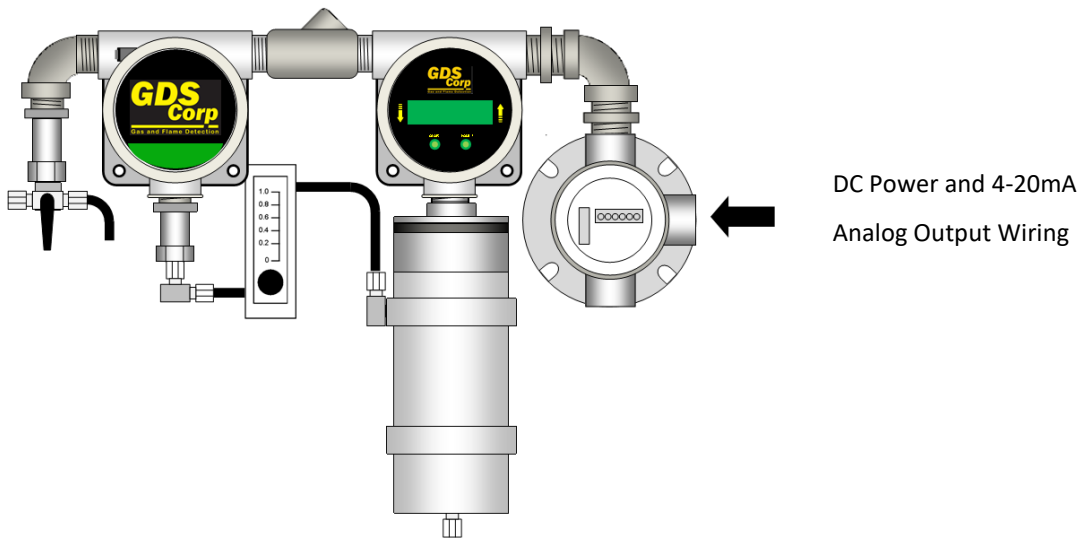


Figure 4-1: Power and Analog Signal Wiring Path

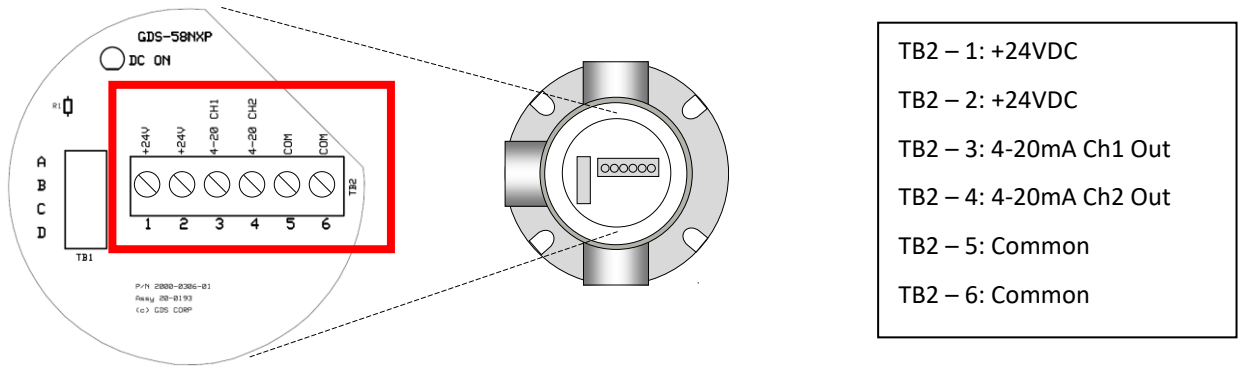


Figure 4-2: GDS-58DXP Power and Signal Wiring

**RELAY / MODBUS CONNECTIONS**

Wiring terminals for the Serial MODBUS interface and four alarm relays is located on the back of the GASMAX DSX display board. To access the wiring, remove the cover of the right-side enclosure, disconnect the display, and flip it around to access the wiring terminals. Wiring as needed can be run through the wiring junction box on the far-right side.

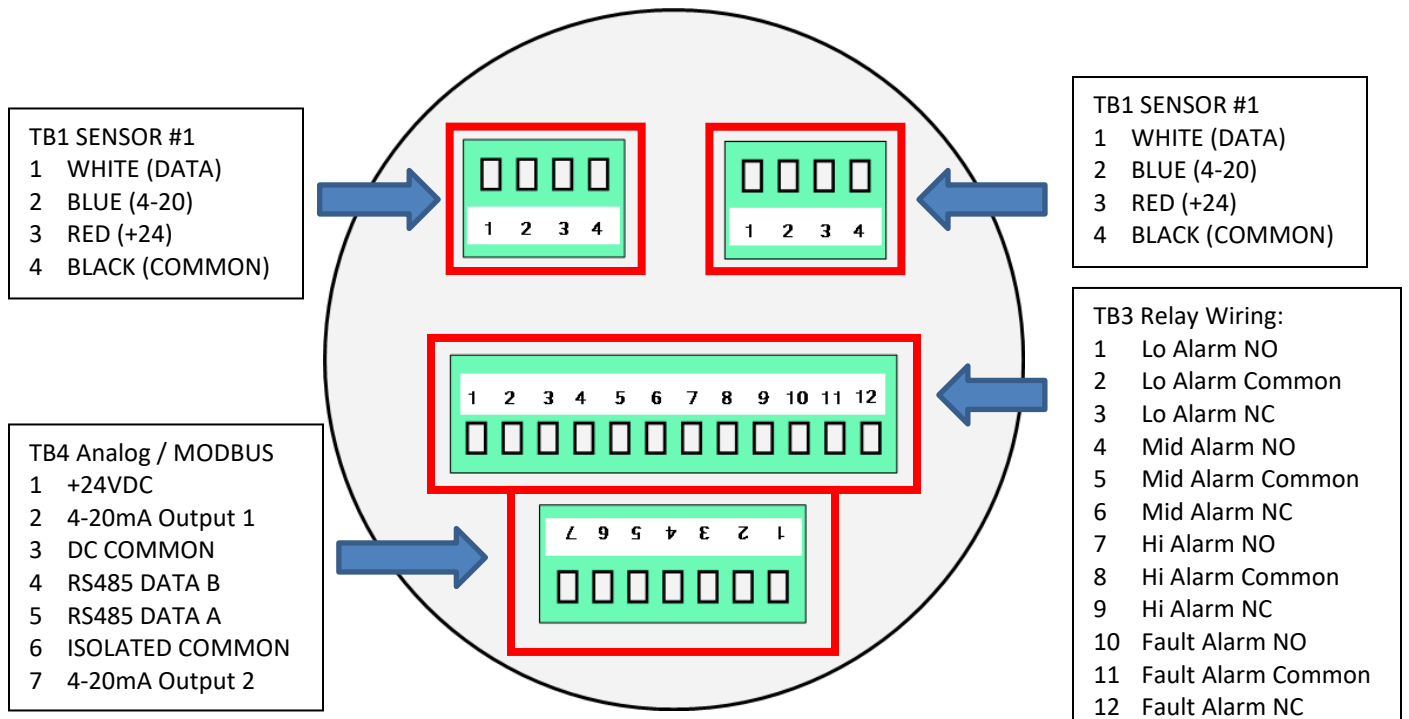


Figure 4-3: Analog / Relay MODBUS Connections

Relays 1, 2 and 3 correspond to Low Alarm, Mid Alarm and High Alarm. Relay 4 is a Fault Alarm. Alarms can be programmed to trigger above or below a certain value, work as normal or 'failsafe' and can be made to latch if desired.

**WARNING: CONTACTS ARE RATED FOR RESISTIVE LOADS ONLY! INDUCTIVE LOADS, SUCH AS COILS, MOTORS OR SOLENOID VALVES MAY CAUSE ARCING AND INTERFERE WITH SENSOR DATA.**

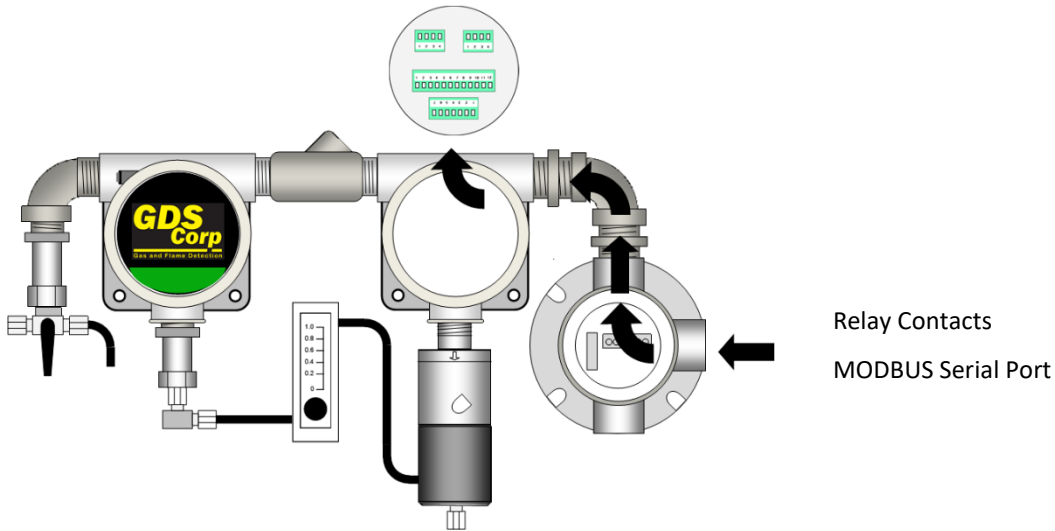


Figure 4-4: Relay & MODBUS Wiring Path

### SERIAL MODBUS CONNECTIONS

The GDS-58DXP provides a single isolated MODBUS RTU slave interface that allow remote controllers or PLCs to monitor many aspects of operation, including real-time data, range and alarm setpoints and alarm and fault status bits. The GDS-58DXP operates at 9600 baud using an isolated RS-485 differential signal. Access to the MODBUS RS-485 interface is provided on the back of the GASMAX DSX main display board. MODBUS system architecture requires that the devices in any MODBUS loop be connected in a daisy-chain layout. This minimizes signal reflections and improves signal noise margin. A MODBUS Termination Jumper installs a load resistor across the MODBUS signal lines and should only be set to "A" (ON) at the last device in the string.

Cable selection for MODBUS systems is important for both signal integrity and power distribution. MODBUS / RS-485 transmissions use low-voltage differential signaling to achieve reasonable data rates over very long distances, up to 4000 feet without a repeater. For MODBUS data signals, GDS Corp recommends 20GA to 24GA shielded cable. Daisy-chain power distribution may require larger gauge wire since it is critical that the supply voltage for the GDS-58DXP at the far end of the string not fall below 22VDC during power-up.

### OPTIONAL MODBUS WIRING JUNCTION BOX [MJB]

If the GDS-58DXP is to be used in a MODBUS daisy chain configuration, GDS Corp recommends the addition of the MODBUS Wiring Junction Box (see Fig. 4-3). This option minimizes the need to access wiring inside the GDS-58DXP, provides individual wire landing points for incoming and outgoing MODBUS and power wiring and shields, and makes it easy to temporarily disconnect the GDS-58DXP power or MODBUS connections without affecting any other MODBUS device.

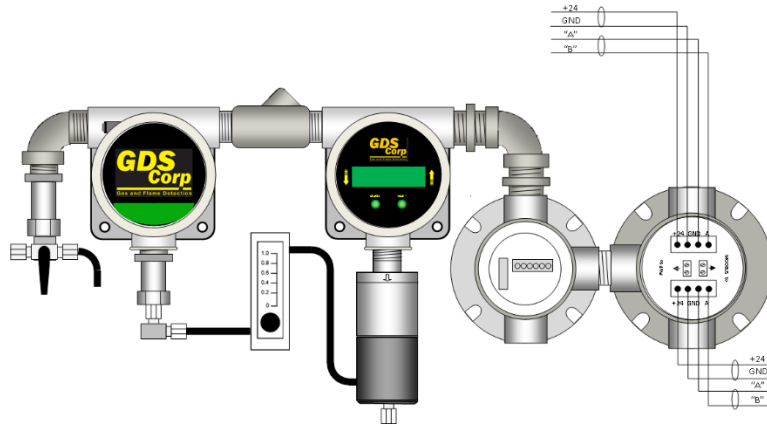


Figure 4-5: GDS-58DXP with Optional Modbus Wiring Junction Box (MJB)

### EXPLOSION PROOF INSTALLATION

The GDS-58DXP is designed for use in Class 1 Division 1 hazardous areas. Installation in these areas should follow best industry standard practices and all appropriate electrical codes. Generally, these codes require rigid metal conduit, poured seals and other installation elements necessary to ensure safety. For maximum protection against RF interference or electrical surge, the GDS-58DXP enclosure and interconnecting conduit must be properly grounded.

The GDS-58DXP can be equipped with a stainless-steel enclosure and Z-purge system for additional safety in hazardous areas. See installation drawings for more details, or contact GDS Corp.

### INTRINSICALLY SAFE INSTALLATION

The GDS-58DXP is not certified for use as an Intrinsically Safe device.



## 5 CALIBRATION

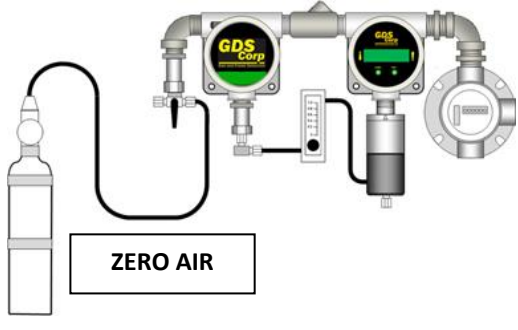
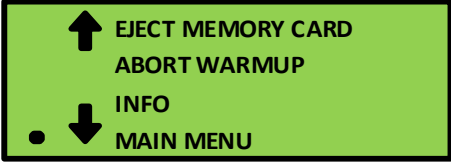
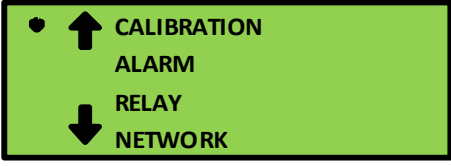
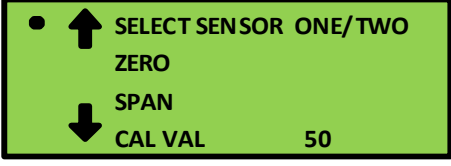
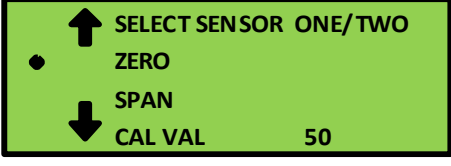
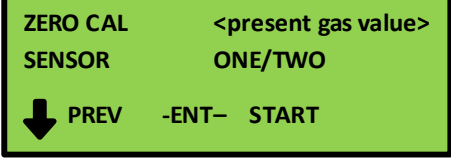
Calibration is critically important to ensure correct operation of the GDS-58DXP. The built-in CAL MODE function is designed to make calibration quick, easy and error free; a successful ZERO and SPAN calibration requires only four keystrokes.


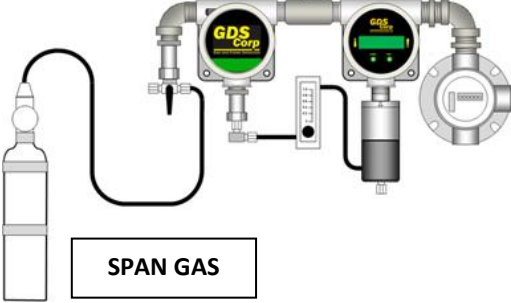
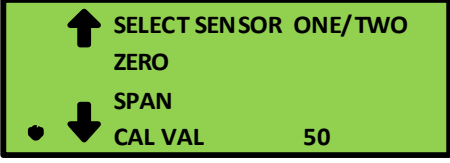
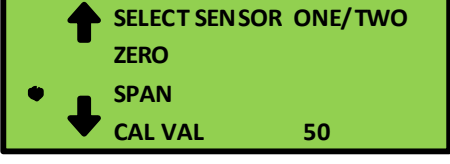
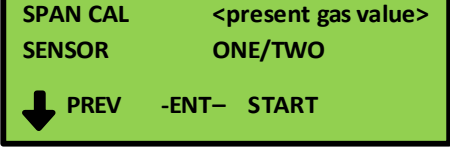

Follow these GDS-58DXP calibration guidelines:

- CALIBRATION ACCURACY IS ONLY AS GOOD AS THE CALIBRATION GAS ACCURACY. GDS CORP CALIBRATION GASES ARE TRACEABLE TO NIST (NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY) STANDARDS.
- **NEVER USE CALIBRATION GAS THAT HAS PASSED ITS EXPIRATION DATE.**
- CHECK THE SPAN GAS VALUE SETTING AND MAKE SURE IT MATCHES THE CALIBRATION GAS.
- BE SURE TO USE A CYLINDER OF ZERO AIR, A MIXTURE OF 21% OXYGEN AND 79% NITROGEN, AS A ZERO REFERENCE UNLESS YOU ARE CERTAIN THAT NO TARGET GAS EXISTS IN THE AREA. AMBIENT AIR WITH MINUTE AMOUNTS OF TARGET GAS MAY RESULT IN AN 'ELEVATED ZERO' CONDITION THAT MAY CAUSE A FAULT TO OCCUR ONCE THE AMBIENT GAS IS NO LONGER PRESENT.
- **ALWAYS CALIBRATE A NEW SENSOR BEFORE DEPENDING ON THE GDS-58DXP FOR PERSONNEL OR EQUIPMENT SAFETY**
- CALIBRATE ON A REGULAR SCHEDULE. GDS CORP RECOMMENDS A FULL CALIBRATION EVERY 3 MONTHS, WITH PERIODIC 'BUMP TESTS' ON A MORE FREQUENT BASIS TO ENSURE THAT THE SENSOR HAS NOT BEEN AFFECTED BY TEMPERATURE EXTREMES OR THE PRESENCE OF INCOMPATIBLE GASES.
- **BE SURE TO RETURN THE RUN / CAL VALVE BACK TO THE RUN POSITION ONCE CALIBRATION IS COMPLETE. IF THE VALVE IS NOT SET PROPERLY, THE GDS-58DXP WILL NOT PULL GAS FROM THE REMOTE LOCATION AND THERE WILL BE NO INDICATION TO THE USER.**

### CALIBRATION PROCEDURE

Before beginning calibration, make sure you have the following items: A cylinder of calibration gas, fixed flow regulator and a length of flexible tubing. A cylinder of 'zero air' may be necessary if the absence of target gas cannot be confirmed in the sample area.

<p>Attach a cylinder of Zero Air to the Run/Cal valve and set the Run/Cal valve to the CAL position.</p>	
<p>Press the ENTER key to access the MAIN MENU</p>	
<p>Select the CALIBRATION option and press the ENTER key</p>	
<p>Calibration Menu. Select Sensor 1 or Sensor 2 using the UP or DOWN buttons. DOWN selects Sensor #1 and UP selects Sensor #2</p>	
<p>Select ZERO and press ENTER.</p>	
<p>With the ZERO AIR flowing, <b>wait for the present gas value to stabilize</b>. Press ENTER to continue.</p>	

<p>Wait for the ZERO CAL COMPLETE screen to appear. The system will return to the Calibration Menu.</p>	
<p>Remove the cylinder or ZERO AIR and attach a cylinder of SPAN GAS to the Run/Cal valve.</p>	
<p>If the CAL (SPAN) VAL setting is correct, proceed to SPAN calibration. If not, enter the CAL VAL menu and adjust the CAL (SPAN) VAL to match the calibration gas value.</p>	
<p>Select the SPAN option and press ENTER.</p>	
<p>With the SPAN GAS flowing, <b>wait for the present gas value to stabilize</b>. Press ENTER to continue.</p>	
<p>Wait for the SPAN CAL COMPLETE screen to appear. The system will return to the Calibration Menu.</p>	
<p>Disconnect the cylinder of SPAN GAS Reset the Run / Cal valve to RUN Calibration is now complete.</p>	

## 6 SETUP AND OPERATION

### UNDERSTANDING THE USER INTERFACE

Once installed, apply power to the GDS-58DXP and verify that the LCD display is active. There are three magnetic switches on the face of the GDS-58DXP, arranged to the left, right and below the display. The left-side switch is “DOWN” and has an arrow pointing down. The right-side switch is “UP” and has an arrow pointing up. The switch below the display is “ENTER”. These three switches are used to access the MAIN MENU to perform calibration, configuration, and troubleshooting.

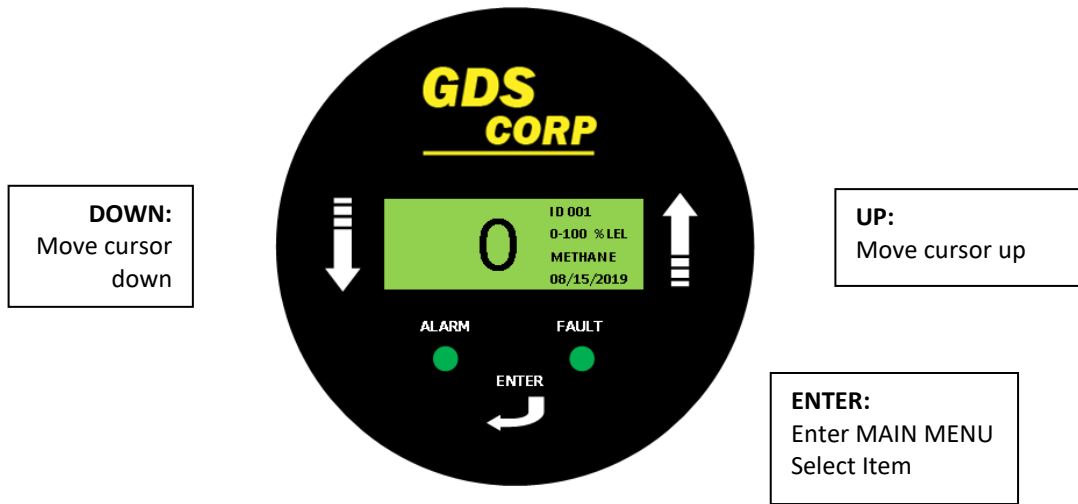


Figure 6-1: GDS-58DXP Gas Detector Display

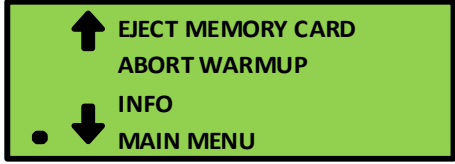
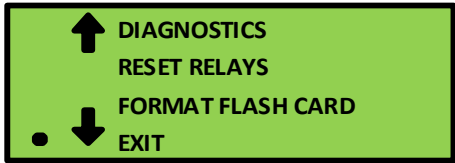
### OPERATIONAL DISPLAY

During normal operation, the gas detector display shows the current gas value, sensor ID number, sensor range and engineering units and target gas. The bottom line will scroll through the memory card status, date, time and sensor warning code if one exists (WARN XXX).

<p>Channel One showing a reading of 14% LEL methane. Date is 8/15/2019.</p>	<p>S1 14 ID 001 0-100 %LEL METHANE 08/15/2019</p>
<p>Channel Two showing a reading of 20.8% oxygen and a time value of 15 minutes and 33 seconds past 12 noon.</p>	<p>S2 20.8 ID 001 0-25 % OXYGEN 12:15:33</p>

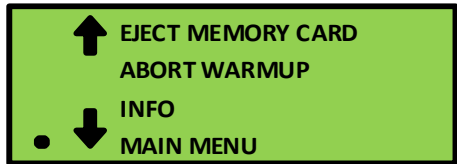
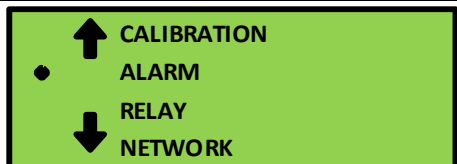
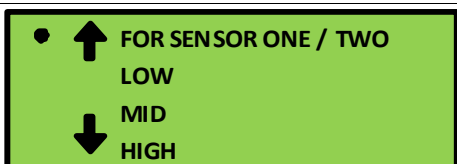
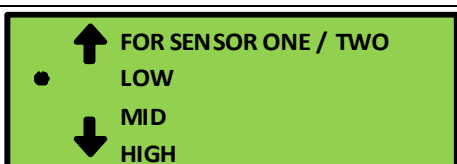
### ACCESSING THE MENU SYSTEM

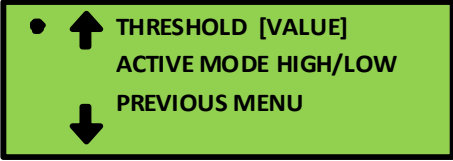
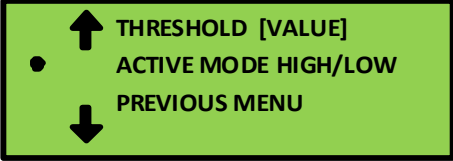
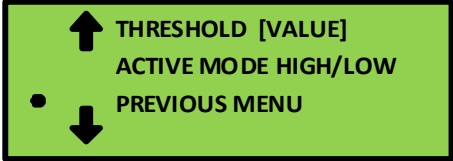

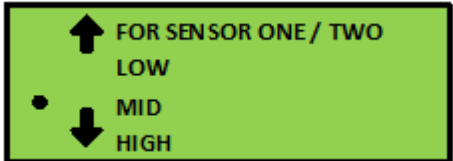
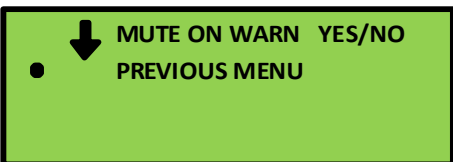
To access the MAIN MENU, activate the ENTER key by applying the magnetic wand to the face of the screen above the word "ENTER". The MAIN MENU screen should appear. For the remainder of this manual, the term "Press" will refer this technique of using the magnetic wand to activate a key.

<p>Pressing the EDIT key brings up Page One of the System Menu. This screen includes the entry for the Main Menu for Alarms and Relays.</p>	
<p>Pressing the DOWN key will show Page Two of the System Menu. This screen includes the entry for Relay Reset (if latched) and system diagnostics.</p>	

### PROGRAMMING ALARM LEVELS

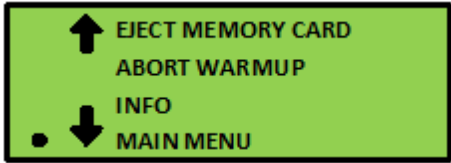
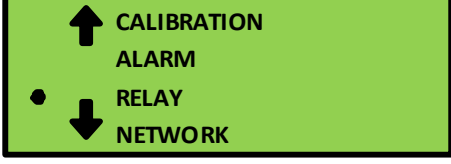
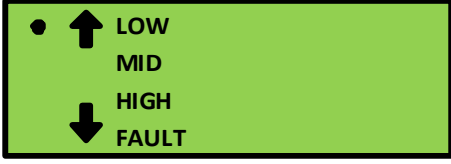

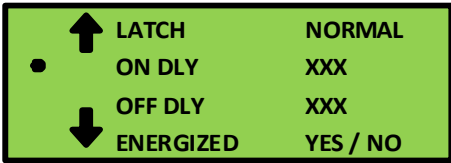
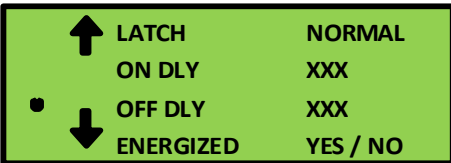
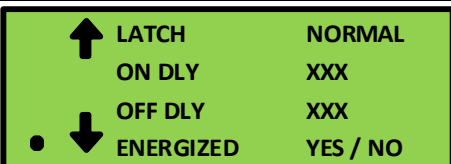
The GDS-58DXP has three alarm levels that activate each of the three alarm relays. Each alarm can be set to a different level and can be programmed to trigger when the input goes ABOVE the alarm value (HIGH) or BELOW the alarm value (LOW).


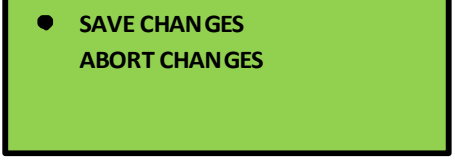
<p>Press the ENTER key to access the MAIN MENU</p>	
<p>Press the DOWN key to move the cursor to the ALARM setting and press ENTER</p>	
<p>With the cursor on "FOR SENSOR ONE/TWO, press the DOWN key to select Sensor #1 or the UP key to select Sensor #2. In single channel mode, always select Sensor #1</p>	
<p>Press the DOWN key to move the cursor to the LOW alarm setting and press ENTER.</p>	

<p>With the cursor as shown, use the UP and DOWN keys to set the alarm level. When complete, press ENTER.</p>	
<p>Press the DOWN key to select ACTIVE MODE. Use the UP or DOWN keys to select the alarm mode. HIGH means that the alarm is triggered when the level is ABOVE the alarm setpoint. A LOW setting will trigger the alarm if the value falls BELOW the setpoint.</p>	
<p>Select PREVIOUS MENU when changes are complete</p>	
<p>With the cursor pointing to "SAVE CHANGES", press enter to confirm the new settings.</p>	
<p>Select the MID alarm setting and repeat the previous procedure to program the MID level alarm. Select the HIGH alarm setting and repeat the previous procedure to program the HIGH level alarm.</p>	
<p>When finished setting the alarm levels, press the DOWN key to access the second alarm sub-menu. Select PREVIOUS MENU and press ENTER to return to the MAIN MENU.</p>	

## PROGRAMMING RELAYS

Each LOW, MID and HIGH alarm setting is logically connected to the LOW, MID and HIGH alarm relays. When operating in dual channel mode, the relay output is a LOGICAL OR from each of the two channels. That means that the LOW alarm relay will be activated if either the Channel One LOW alarm threshold is exceeded OR the Channel Two alarm threshold is exceeded.

<p>Press the ENTER key to access the MAIN MENU</p>	
<p>Press the DOWN key to move the cursor to the RELAY setting and press ENTER</p>	
<p>Select the desired relay using the UP and DOWN keys and press ENTER. Settings below can be applied to any of the LOW, MED or HIGH relays.</p>	
<p>Latching mode can be set to NORMAL, LATCHING or AUDIBLE.          NORMAL = Relays do not latch          LATCHING = Relays latch until user forces reset          AUDIBLE = Relays can be silenced by user</p>	
<p>The time delay in seconds from the time that the alarm condition occurs until the alarm is activated. Maximum is 255 seconds. Useful to eliminate spikes or nuisance alarms.</p>	
<p>The time delay in seconds from the time that the alarm condition ends until the relays deactivate. Maximum is 255 seconds. Useful if relays control fans or blowers to allow the purge air to continue running.</p>	
<p>If the ENERGIZED mode is set to "NO", the relay is not energized until the alarm occurs. If the mode is set to "YES" then the relay is energized at power-up and is de-energized when the alarm occurs.</p>	

<p>After setting the ENERGIZED mode, press the DOWN key to access the PREVIOUS MENU selection. Press ENTER.</p>	
<p>If desired, press ENTER to save the changes made previously. Else move the cursor to ABORT changes.</p>	

### GETTING STARTED CHECKLIST

To install and commission a GDS-58DXP, perform the following steps:

- 1) Identify a suitable sample extraction point and mounting location.
- 2) Install the GDS-58DXP in a vertical orientation, making sure there is room below for maintenance of the sensor housing and flow cell.
- 3) Install the sample inlet and exhaust tubing
- 4) Set the Run/Cal valve to the RUN position and apply power to the GDS-58DXP. Verify that the flow meter shows ~0.5 liters / minute or more. Allow the unit to warm up for the recommended time.
- 5) Check date and time for proper values.
- 6) Check MODBUS communications parameters
- 7) Set LOW, MID and HIGH alarm settings for desired levels
- 8) Set LOW, MID and HIGH relay settings (if relays installed)
- 9) Once the unit has completed the necessary warm up, perform a full zero and span calibration.
- 10) GDS Corp recommends applying calibration gas to the sample extraction point to verify end-to-end operation of the safety system and document the actual delay between gas appearing at the extraction point and gas sensor response.

### NORMAL OPERATION

During normal operation, the GDS-58DXP display shows the current gas reading and the 4-20mA output will transmit values that represent the % of scale shown on the display. If the sensor malfunctions or the internal microprocessor fails, the display will show FAULT. If sample flow is blocked or the pump fails, the visual flow indicator will show RED and the 4-20mA outputs will drop to 0.0 mA

**NOTE: THE MODBUS OUTPUT WILL NOT INDICATE A FAULT IF SAMPLE FLOW IS BLOCKED OR THE PUMP FAILS.**



## **7 MAINTENANCE**

Normal maintenance for the GDS-58DXP involves verification of proper sample flow and periodic calibration using accurate gas standards. GDS Corp recommends calibration at least every three months, or more often if temperature extremes, vibration, the presence of incompatible gases or other environmental factors may accelerate the deterioration of the sensor element. Calibration should also include inspections for clogged or wet sensor heads, cracked or damaged enclosures and water incursion inside conduit or junction boxes. The sample pump is sealed and does not have any user-serviceable parts. The flow switch is sealed and does not have any user-serviceable parts.

In the event that water or other liquid enters the GDS-58DXP, the flow meter, flow switch and flame arrestors may need to be replaced or cleaned thoroughly. The flame arrestors can be cleaned and dried using compressed air or heat. The sensor should not require replacement unless the liquid level in the flow cell was excessive due to backpressure or a clogged outlet.

### **TOXIC SENSOR REPLACEMENT**

A toxic sensor that shows FAULT, does not respond to gas, or can no longer be calibrated should be replaced. The range value should also be specified when ordering replacement sensors. Contact GDS Corp for more information on toxic sensor replacement.

## 8 TROUBLESHOOTING GUIDELINES

### TOXIC SENSOR INDICATES FAULT OR OVERRANGE

- Certain toxic sensors indicate off-scale low or high at power up and quickly drift towards zero.
- Toxic sensors showing constant FAULT: If local, remove sensor and examine for moisture or discoloration. Replace sensor if wet or discolored. If remote, check sensor cable and junction box for moisture or standing water. Remove sensor and examine for moisture or discoloration. FAULT indication generally indicates sensor useful life is exhausted.
- Toxic sensors left unpowered for more than 3 months are subject to accelerated degradation and may demonstrate a permanent loss of sensitivity.

### TOXIC SENSOR WILL NOT CALIBRATE

- Sensor reading during zero calibration exceeds upper limit of zero – sensor is defective and should be replaced.
- Sensor reading during span calibration too low – sensor may be defective.

### RECEIVING DEVICE (4-20mA) AND GDS-58DXP DISPLAYED VALUES DON'T MATCH

- Check that zero and full-scale range values match between GDS-58DXP and receiving device (controller).
- Check for high impedance shorts to ground on 4-20mA wiring.

### MODBUS DATA INCORRECT

- Verify that MODBUS master is requesting data from correct registers.
- Verify that the GDS-58DXP MODBUS address matches the address programmed into the controller's channel configuration.

### CONTROLLER SHOWING MODBUS COMM ERROR

- Check for incorrect MODBUS polarity (swap "A" and "B" if unsure; no damage will occur).
- Verify that MODBUS master is requesting data from correct MODBUS address.
- Verify that MODBUS master is requesting correct registers.
- Verify that there are no other MODBUS slave devices with identical MODBUS address.

### GDS-58DXP DISPLAY BLANK

- Verify DC power at IO/Power Supply board, TB1, terminals 1 (+24) and 4 (Gnd).

## 9 SPECIFICATIONS

Model	GDS-58DXP Sample Draw System
Power Input	24VDC $\pm$ 5% at < 10 watts (Toxic sensor) 24VDC $\pm$ 5% at < 15 watts (GDS-IR sensor)
Display	LCD with engineering units display
Sensor Types	Electrochemical sensors for toxic gases GDS-IR infrared sensor for combustibles and CO <sub>2</sub>
Draw Distance	Demonstrated up to 500 feet of ¼" OD tubing
Accuracy	+/- 5% of full scale (typical)
Standard Output	Single or dual three-wire 4-20mA current source outputs with fault and overrange indication. Maximum loop resistance is 750 ohms with standard 24VDC supply. Optional Relay / MODBUS interface with 4x 4A SPDT programmable alarm relays Single channel RS-485 serial MODBUS
Flow Monitor	Low-flow warning with screen and 4-20mA output fault indication
Temperature	0°C to +50°C Operating <b>Note: Ambient temperature below 0°C may keep sample pump from starting</b>
Memory	On-board non-volatile memory retains all user settings
Housing	Aluminum housings (2) with epoxy paint standard #316 stainless steel optional
Dimensions	Width 15" (381 mm), Height 10.5" (267 mm), Depth 5" (127 mm) (Toxic Sensor) Width 15" (381 mm), Height 20" (508 mm), Depth 5" (127 mm) (GDS-IR Sensor) Shipping weight minimum 16 pounds (7.25 kg), 20"x20"x14" 21" wide x 21" tall painted steel or 316 stainless steel plate
Approvals	GASMAX DSX monitor CSA Certified Div 1 & 2 Groups B, C, D. Enclosure CSA certified for use in Class I Div 1 areas. Flame arrestors UL certified for use in Class 1 Div 1 areas.
Warranty	Two years on electronics, one year on sensors

	<b>Sensor Type</b>	<b>Min Range</b>	<b>Max Range</b>	<b>Temp Range</b>	<b>Warm-Up</b>
10	Oxygen	0-25% v/v	0-25% v/v	0°C to + 55°C	2 to 4 hours
11	Carbon Monoxide	0-100 ppm	0-9999 ppm	0°C to + 50°C	2 to 4 hours
14	Hydrogen	0-4000 ppm	0-4% v/v	0°C to + 50°C	2 to 4 hours
15	Hydrogen Sulfide	0-10 ppm	0-5000 ppm	0°C to + 50°C	2 to 4 hours
16	Hydrogen Cyanide	0-30 ppm	0-30 ppm	0°C to + 50°C	8 to 12 hours
19	Sulfur Dioxide	0-50 ppm	0-500 ppm	0°C to + 50°C	4 to 8 hours
22	Ethylene Oxide	0-50 ppm	0-200 ppm	0°C to + 50°C	8 to 12 hours
28	Nitric Oxide	0-25 ppm	0-100 ppm	0°C to + 50°C	8 to 12 hours
29	Nitrogen Dioxide	0-50 ppm	0-200 ppm	0°C to + 50°C	8 to 12 hours

**Figure 9-1: Toxic Sensor Characteristics & Recommended Warm-up Time**

	Sensor Type	Range	Temp Range	Warm-Up
109	Acetylene	0-100% LEL	0°C to + 55°C	4 to 8 hours
110	Methane	0-100% LEL	0°C to + 55°C	4 to 8 hours
111	Propane	0-100% LEL	0°C to + 55°C	4 to 8 hours
112	Isobutane	0-100% LEL	0°C to + 55°C	4 to 8 hours
113	Pentane	0-100% LEL	0°C to + 55°C	4 to 8 hours
114	Cyclopentane	0-100% LEL	0°C to + 55°C	4 to 8 hours
115	n-Butane	0-100% LEL	0°C to + 55°C	4 to 8 hours
116	Ethanol	0-100% LEL	0°C to + 55°C	4 to 8 hours
117	Methanol	0-100% LEL	0°C to + 55°C	4 to 8 hours
118	Propylene	0-100% LEL	0°C to + 55°C	4 to 8 hours
119	Ethylene	0-100% LEL	0°C to + 55°C	4 to 8 hours
120	Hexane	0-100% LEL	0°C to + 55°C	4 to 8 hours
121	Jet-A	0-100% LEL	0°C to + 55°C	4 to 8 hours
122	Diesel	0-100% LEL	0°C to + 55°C	4 to 8 hours
123	Gasoline	0-100% LEL	0°C to + 55°C	4 to 8 hours
124	Isopropyl Alcohol	0-100% LEL	0°C to + 55°C	4 to 8 hours
125	Acetone	0-100% LEL	0°C to + 55°C	4 to 8 hours
126	p-Xylene	0-100% LEL	0°C to + 55°C	4 to 8 hours
127	Ethylene Oxide	0-50% LEL	0°C to + 55°C	4 to 8 hours
128	MEK	0-100% LEL	0°C to + 55°C	4 to 8 hours
129	Styrene	0-50% LEL	0°C to + 55°C	4 to 8 hours
130	Methane (by volume)	0-100% v/v	0°C to + 55°C	4 to 8 hours
131	Propane (by volume)	0-100% v/v	0°C to + 55°C	4 to 8 hours
132	Carbon Dioxide	0-5.0% v/v	0°C to + 55°C	4 to 8 hours
133	Carbon Dioxide	0-3.5% v/v	0°C to + 55°C	4 to 8 hours

**Figure 9-2: GDS-IR Sensor Characteristics & Recommended Warm-up Time**

## 10 MODBUS REGISTERS

The GDS-58DXP features a set of user-accessible MODBUS registers that allow a remote MODBUS master device to

SERIAL PORT SETTINGS		
Parameter	Setting	Notes
Baud Rate	9600 baud	Fixed value
Start Bit	1 start bit	
Data Bits	8 data bits	
Stop Bits	2 stop bits	Note: Common value is 1 stop bit
Error Check	CRC (0xA001)	

MODBUS REGISTERS				
Variable Name	Alias	Read	Write	Notes
Status Code	3001	X		
Alarm Code	3002	X		
Alarm Code	3003	X		
Alarm Code	3004	X		
Alarm Code	3005	X		
Command Byte	3006	X	X	Starts Zero or Span
Cal Date Year	3007	X	X	
Cal Date Month	3008	X	X	
Cal Date Day	3009	X	X	
N/A	3010			Not Used
Error Code	3011	X		
ID	3012	X		
N/A	3013			Not Used
N/A	3014			Not Used
Gas Concentration	4001	X		IEEE 754 Float 32 bit
Alarm level high	4002	X	X	IEEE 754 Float 32 bit
Alarm level mid	4003	X	X	IEEE 754 Float 32 bit
Alarm level low	4004	X	X	IEEE 754 Float 32 bit
Range	4005	X		IEEE 754 Float 32 bit
Cal value	4006	X	X	IEEE 754 Float 32 bit
Gas Name	9001	X	X	8 byte text string
Gas Units	9002	X	X	8 byte text string

## 11 SPARE PARTS

### GDS-58DXP SPARE PARTS (TOXIC SENSOR)

#### Sample Pump Assembly:

	Enclosure, white, with cover
1200-0034	Flame Arrestors (2)
1200-0234	Sample Pump
1200-0047	Flow switch
	Mounting PCB
1200-0160	Pump mounting bracket
	Indicator PCB

#### GDS-59DXP Display:

10-0387	Display
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#### Junction Box Assembly:

20-0193	Junction Box PCB
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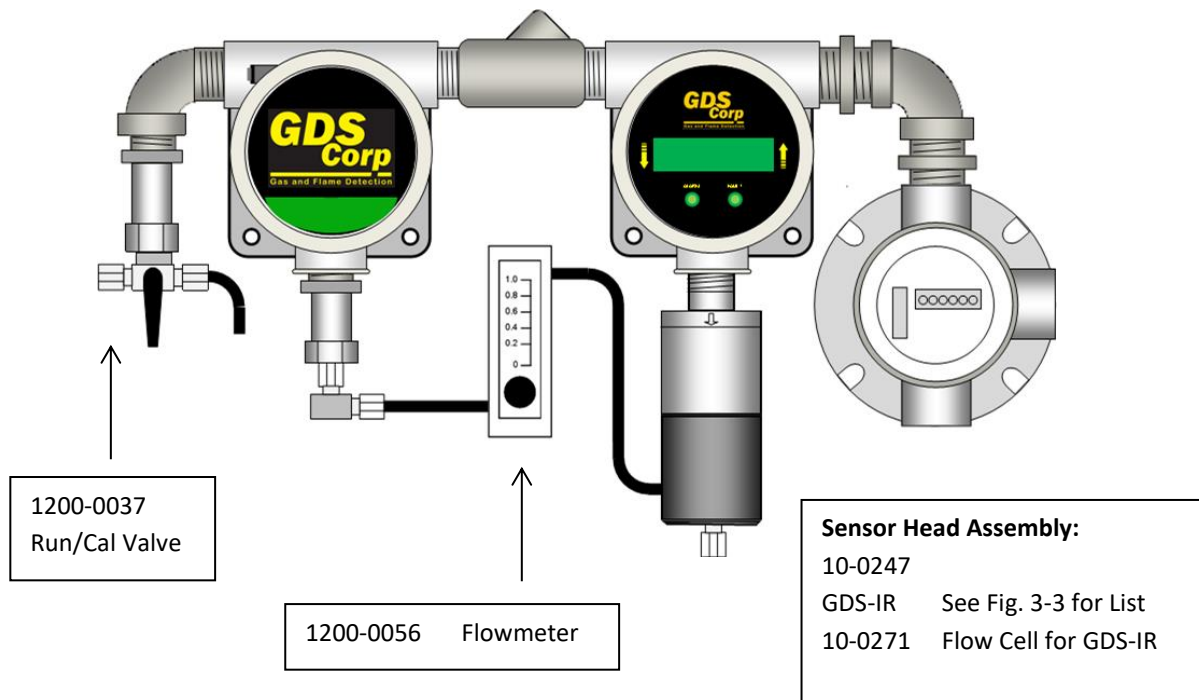
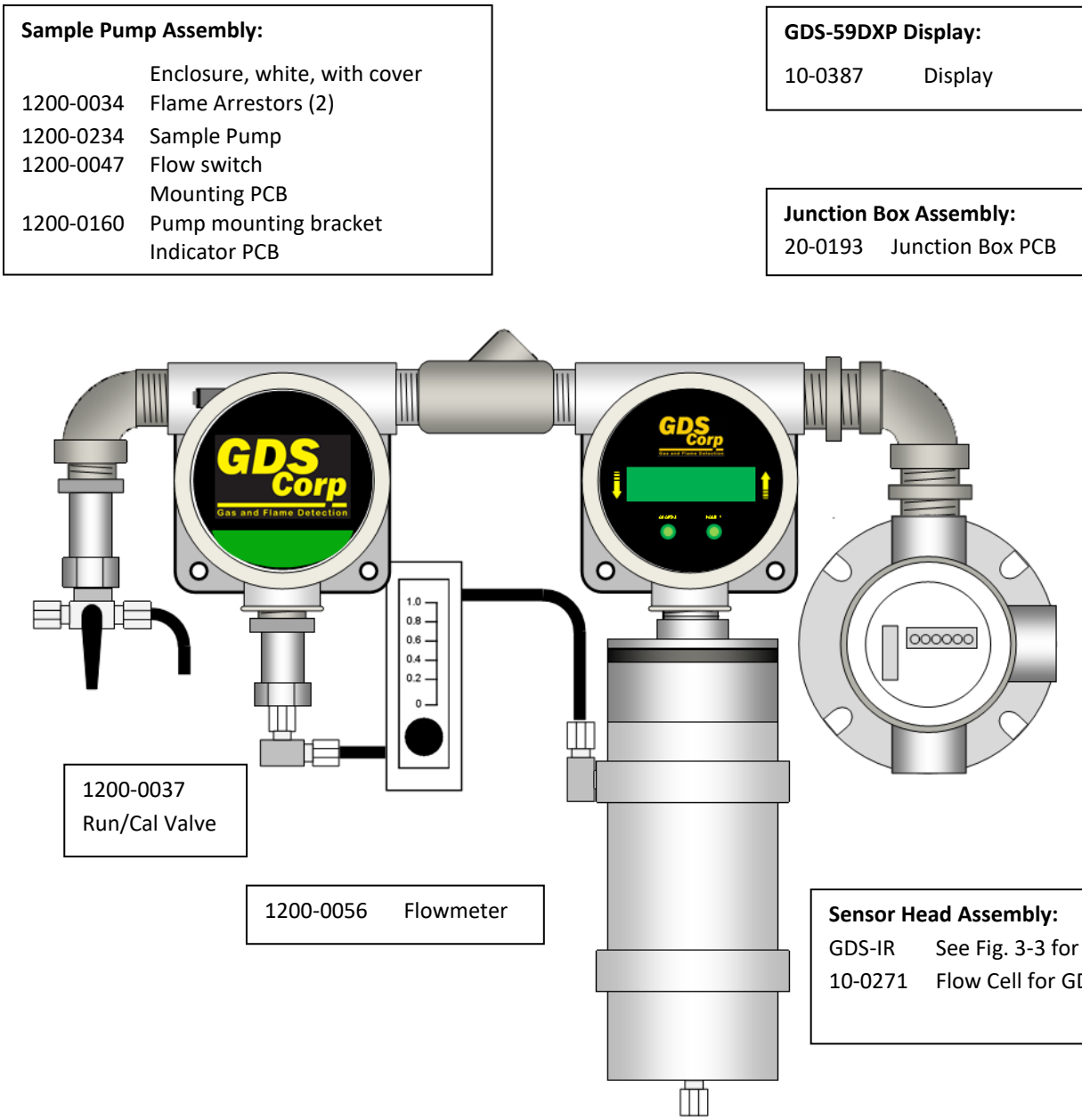


Figure 11-1: GDS-58DXP Assembly with Toxic Sensor (Spare Parts)

**GDS-58DXP SPARE PARTS (GDS-IR SENSOR)**



**Figure 11-2: GDS-58DXP Assembly with GDS-IR Sensor (Spare Parts)**



## 12 DRAWINGS AND DIMENSIONS

### GDS-58DXP DIMENSIONS (SINGLE TOXIC SENSOR)

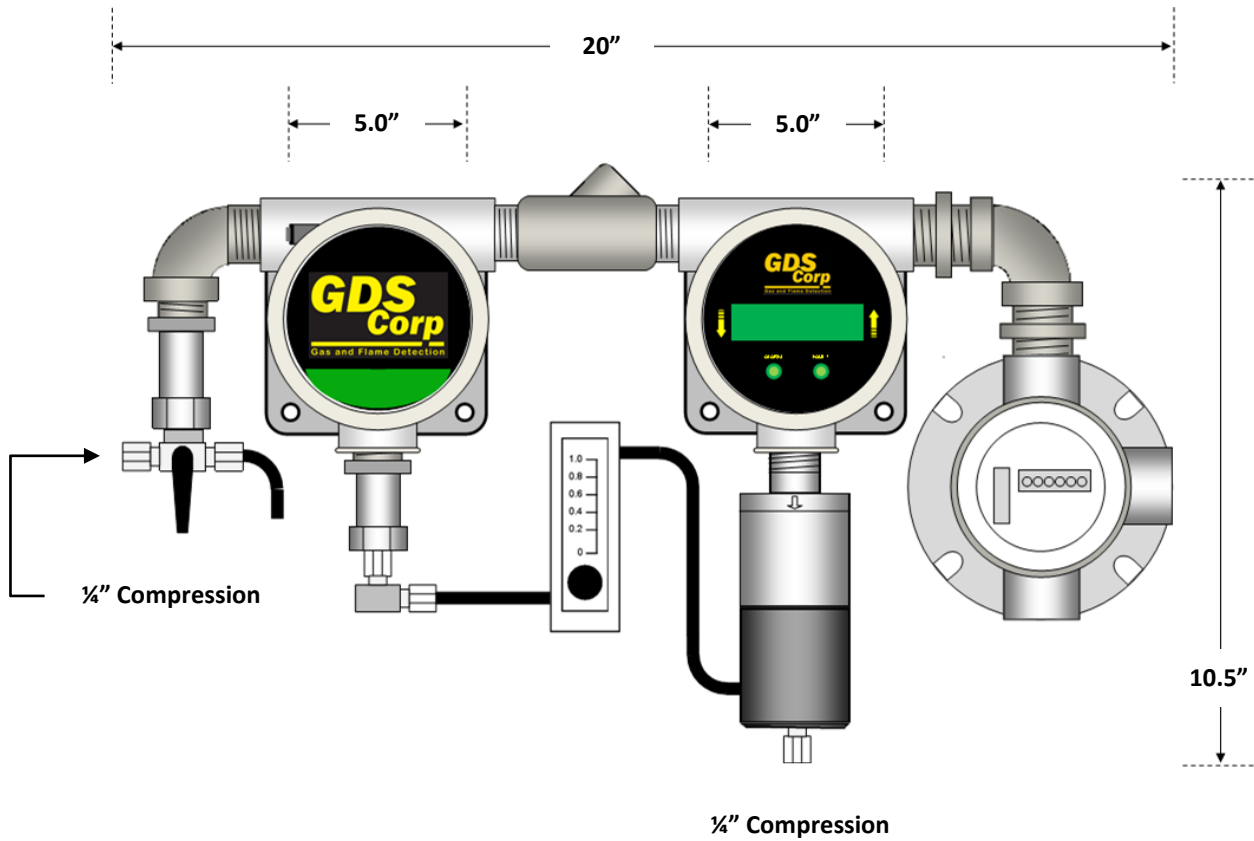
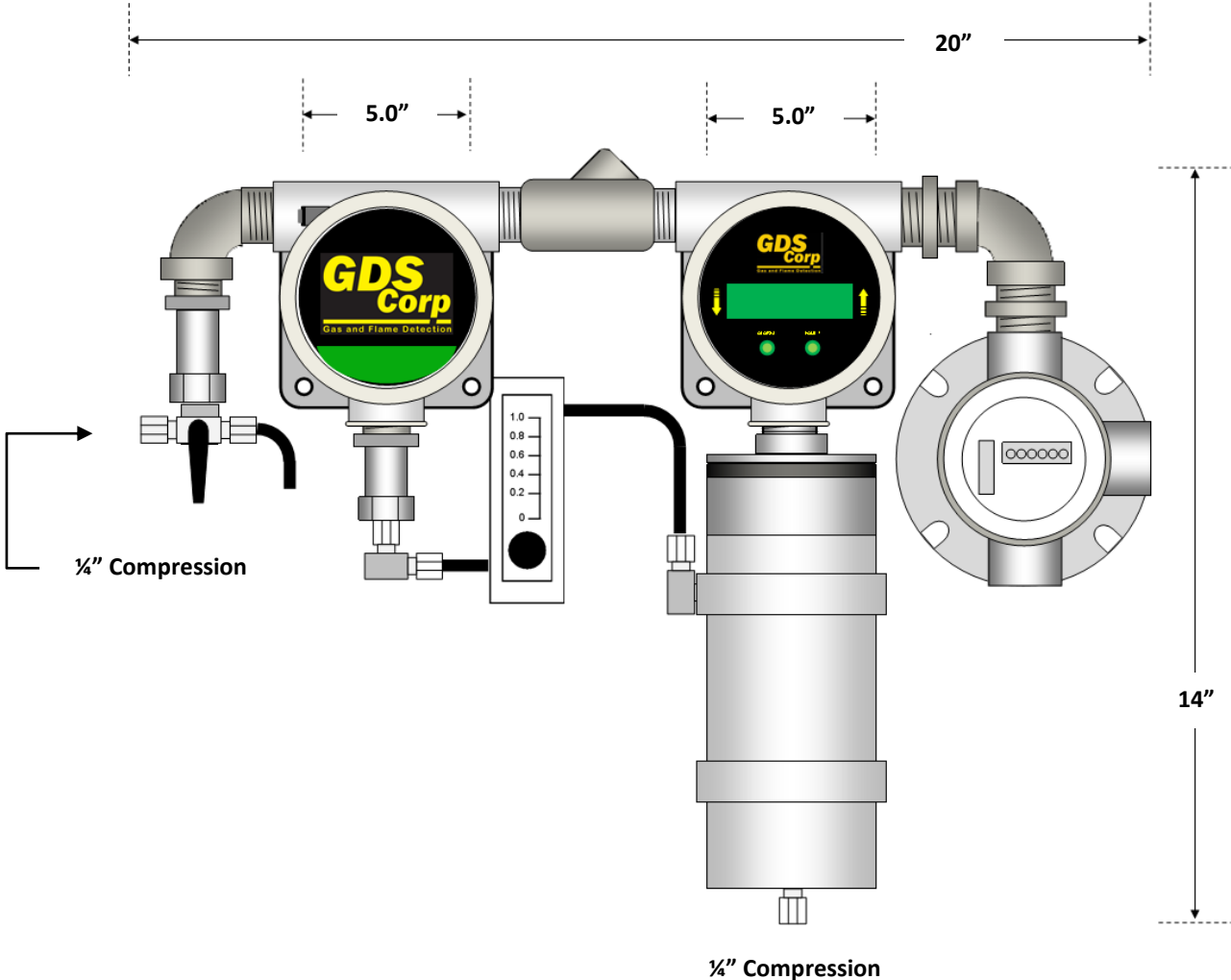


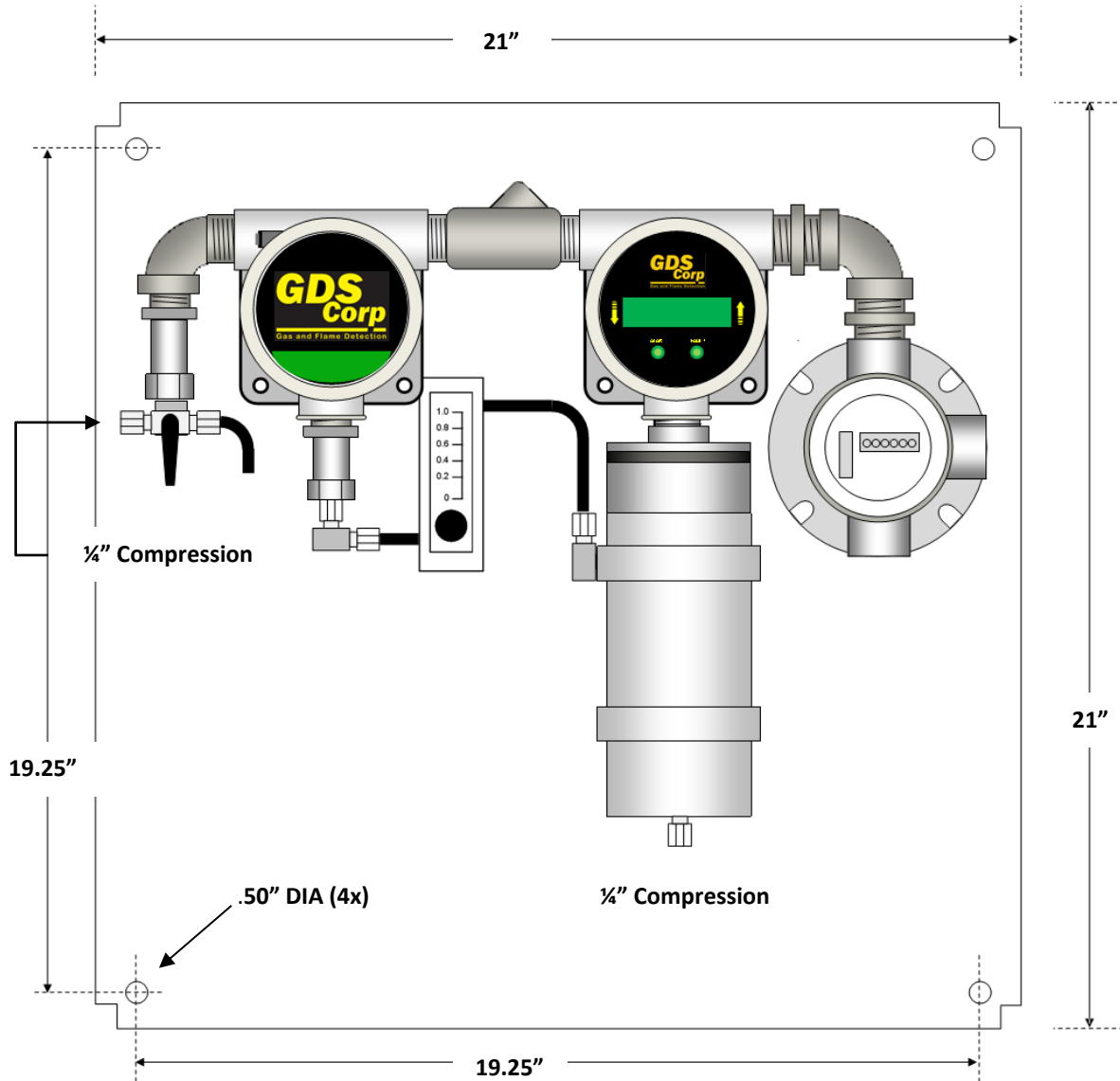
Figure 12-1: GDS-58DXP Dimensions (Single Toxic Sensor)

**GDS-58DXP DIMENSIONS (GDS-IR SENSOR)**



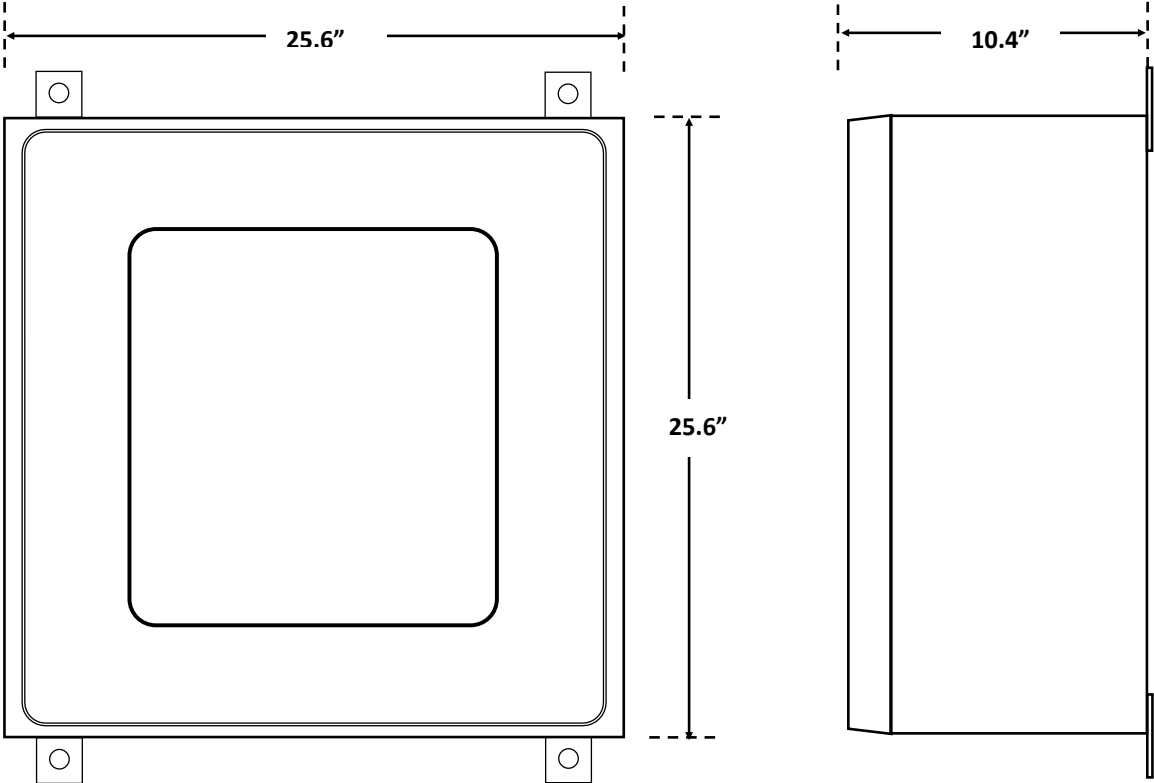
**Figure 12-2: GDS-58DXP Dimensions (GDS-IR Sensor)**

**GDS-58DXP MOUNTING PLATE DIMENSIONS (EITHER SENSOR TYPE)**



**Figure 12-3: GDS-58DXP Dimensions (Stainless Steel Plate, 1 Sensor)**

**GDS-58DXP DIMENSIONS (Non-Metallic Enclosure)**



**Figure 12-4: GDS-58DXP Enclosure Dimensions (Non-Metallic)**

## 13 SAMPLE DRAW DUCT ASSEMBLY 20-0141

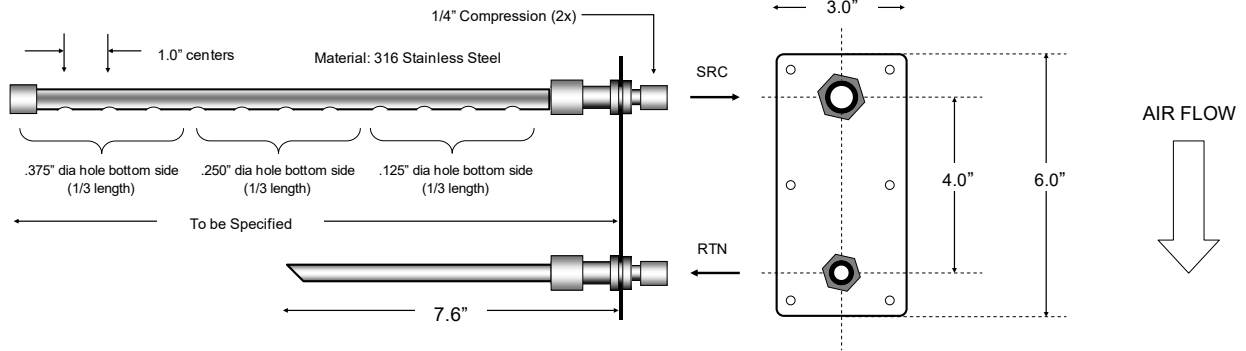


Figure 13-1: Sample Draw Duct Assembly

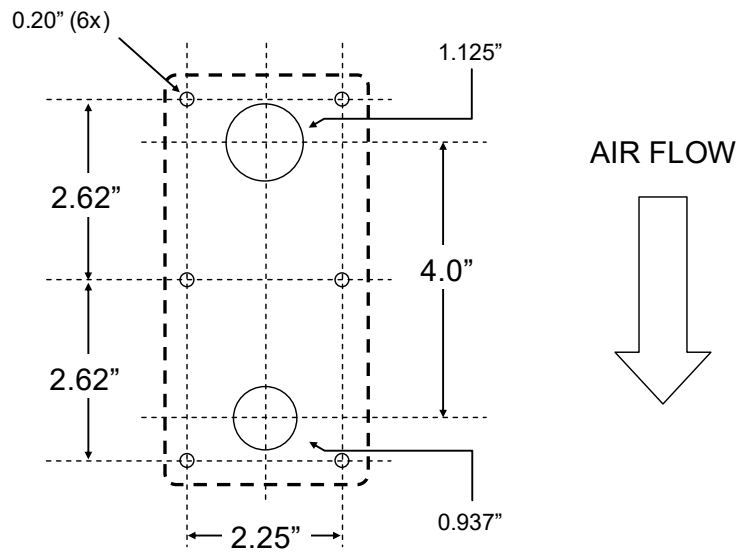


Figure 13-2: Sample Draw Duct Assembly Hole Mounting Pattern

**NOTE: APPLY GASKET SEAL ON FACE OF PLATE WHEN INSTALLING SAMPLE DRAW DUCT ASSEMBLY**

**GDS**  
**Corp**

**Gas and Flame Detection**

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