

35-3000RK-LEL Combustible Gas Sample-Draw Detector Operator's Manual

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- a) Absorbent cartridges
- b) Pump diaphragms and valves
- c) Fuses
- d) Batteries
- e) Filter elements

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We do not assume indemnification for any accident or damage caused by the operation of this gas monitor, and our warranty is limited to the replacement of parts or our complete goods.

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Overview

This operator's manual describes the combustible gas sample-draw detector. This manual also describes how to install, start up, maintain, and calibrate the sample-draw detector when using it with a gas monitoring controller. A parts list at the end of this manual lists replacement parts and accessories for the sample-draw detector.

Specifications

Table 1 lists specifications for the combustible gas sample-draw detector. See the controller Operator's Manual for information specific to the controller.

Table 1: Specifications

Target Gas	Combustible gas, methane calibration standard
Input Power	24 VDC Nominal (23 VDC - 28 VDC)
Construction (housing)	Fiberglass/polyester (NEMA 4X)
Dimensions	8.5 in. H x 6.5 in. W x 4.25 in. D
Weight	4.5 lbs.
Sampling Method	Sample-draw
Sample Flow	1.5 SCFH (nominal)
Detection Range	0 to 100% LEL ¹
Response Time	90% in 30 seconds
Linearity	±5% of detection range
Repeatability	±2% of detection range

Description

This section describes the components of the combustible gas sample-draw detector. The sample-draw detector consists of the housing, flow system, and detection system.

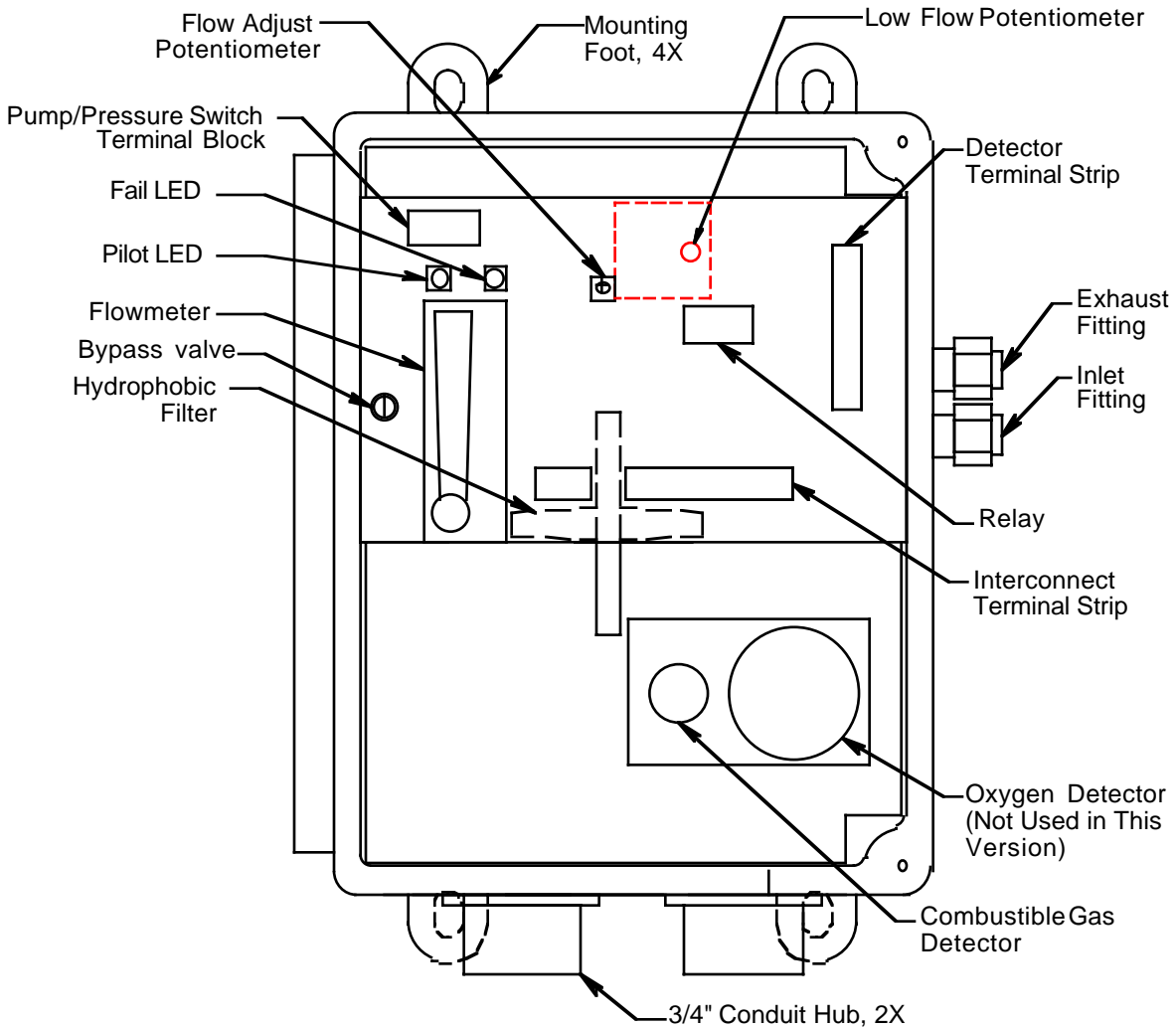


Figure 1: Combustible Gas Detector Sample-draw Component Location

Housing

The sample-draw detector's fiberglass housing is weather- and corrosion-resistant. It is suitable for installation where general purpose equipment is in use.

The housing door is hinged on the left side and is secured by two latches on the right side. The flowmeter and status lights are visible through a window in the housing door.

Four mounting feet are attached to the back of the housing (one at each corner). Use the mounting feet to install the housing to a vertical surface. Use the two conduit hubs on the bottom of the housing to make wiring connections to a gas monitoring controller.

An aluminum subpanel is mounted to the interior of the housing. The sample-draw detector's internal components are mounted to the subpanel.

Flow System

The sample-draw detector's flow system consists of the INLET fitting, hydrophobic filter, pump, flowmeter, bypass valve, status lights, pressure switch, and EXHAUST fitting (see Figure 1). Figure 2 illustrates how the gas sample moves through the flow system.

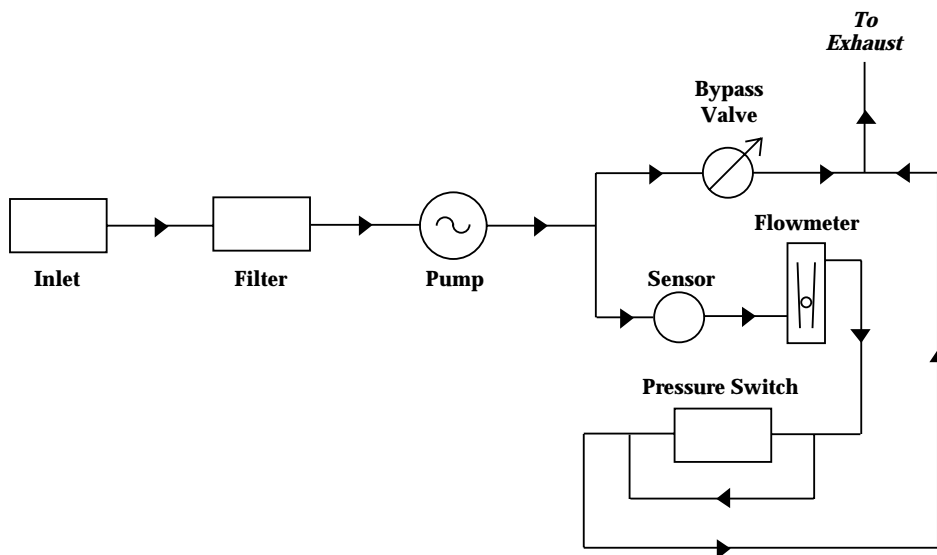


Figure 2: Combustible Gas Sample-draw Detector Flow Diagram

INLET fitting

The INLET fitting on the right side of the housing allows the gas sample to enter the sample-draw detector. The INLET fitting accepts 1/4 in. rigid tubing. See the Installation section on page 9 to connect tubing to the INLET fitting.

Hydrophobic Filter

The hydrophobic filter is below the main circuit board. The filter prevents particulates and water in the incoming gas sample from damaging the flow and detection systems. Replace the filter when it appears dirty, discolored, or clogged.

Pump

The pump is behind the main circuit board near the top of the sample-draw detector. The pump pulls the gas sample into the sample-draw detector. The pump operates on 24 VAC, which is generated from the 24 VDC supplied by the controller.

Flowmeter

The flowmeter is attached to the main circuit board near the top left corner (see Figure 1.) You can see it through the window in the door. A ball in the flowmeter column indicates the flow rate of the sample-draw detector. The flowmeter measures the flow in the range 0.2 to 2.0 SCFH (Standard Cubic Feet per Hour). The optimum flow rate is 1.5 SCFH.

Bypass valve

The bypass valve is to the left of the flowmeter. The bypass valve adjusts the flow rate to the detector. Use a flat-blade screwdriver to adjust the bypass valve.

NOTE: The bypass valve allows fine adjustments of the flow rate. For a wider range of adjustment, use the flow adjust potentiometer (see Figure 1.)

Status lights

Two status lights are above the flowmeter. They are also visible through the window in the housing door.

Pilot light

The green Pilot light is on when the sample-draw detector is receiving power from the controller.

Fail light

The red Fail light is on when the sample flow rate is below the low flow level.

NOTE: The factory set low flow level is 0.6 SCFH (± 0.2). See “Adjusting the Low Flow Setting” on page 17 to adjust this setting.

Pressure switch

The pressure switch is mounted to the opposite side of the main circuit board. The pressure switch monitors the flow rate of the incoming gas sample.

If the flow rate falls below the preset low flow level, the pressure switch causes the fail relay to interrupt the signal from the detector. The interrupted detector signal causes a fail condition at the controller. The low flow level is factory-set at 0.6 SCFH (± 0.2 SCFH).

EXHAUST fitting

The EXHAUST fitting on the right side of the housing allows the gas sample to exit the sample-draw detector. The EXHAUST fitting accepts 1/4 in. rigid tubing. See the Installation section on page 9 to connect tubing to the EXHAUST fitting.

Detection System

The detection system consists of the combustible gas sensor and the main circuit board.

Combustible Gas sensor

The combustible gas sensor is installed in a cavity block. The cavity block is mounted to the aluminum subpanel near the bottom of the sample-draw detector. The combustible gas sensor includes the sensing elements, flame arrestor, connector, and sensor leads.

NOTE: The cavity block includes a cavity for an oxygen sensor. This version of the sample-draw detector does not include the oxygen sensor.

Sensing elements

Two sensing elements are protected within the sensor assembly. Through a series of thermal and electronic reactions, these elements produce an electrical output that is proportional to the detection range of the sample-draw detector.

Flame arrestor

The porous flame arrestor allows the gas sample to enter the sensor assembly and contact the sensing elements. The flame arrestor also contains any sparks that may occur within the sensor.

Connector

The top of the sensor includes five pins that plug into the socket connector. This connector allows you to replace the sensor without disconnecting the wiring. The sensor leads are soldered to the connector.

Sensor leads

Four color-coded leads extend from the connector. The leads allow you to connect the combustible gas sensor to the main circuit board.

Main Circuit Board

The main circuit board includes the interconnect terminal strip, detector terminal strip, pump terminal strip, and relay (see Figure 1).

NOTE: The flowmeter and status lights are mounted to the main circuit board but are considered part of the flow system.

Interconnect terminal strip

The interconnect terminal strip is the nine-point terminal strip near the bottom edge of the main circuit board. Use the interconnect terminal strip to connect the sample-draw detector to a controller

Detector terminal strip

The detector terminal strip is the nine-point terminal strip near the right edge of the circuit board. Use the detector terminal strip to connect the combustible gas sensor to the main circuit board.

NOTE: The combustible gas sensor is factory-wired to the circuit board. See the “Installation” section on page 9 for all wiring procedures related to the sample-draw detector.

Pump terminal strip

The pump terminal strip is the four-point terminal strip near the top edge of the circuit board. Use the pump terminal strip to connect the pump and pressure switch to the main circuit board.

NOTE: The pump and pressure switch are factory-wired to the circuit board. See the “Installation” on page 9 for all wiring procedures related to the sample-draw detector.

Relay

The relay is to the left of the detector terminal strip. The relay is single-pole, double-throw (SPDT) and is rated for 2 amps at 25 VDC (resistive). If the pressure switch senses a low flow condition, the relay interrupts the signal from the sensor. The interrupted sensor signal causes a fail condition at the controller

Installation

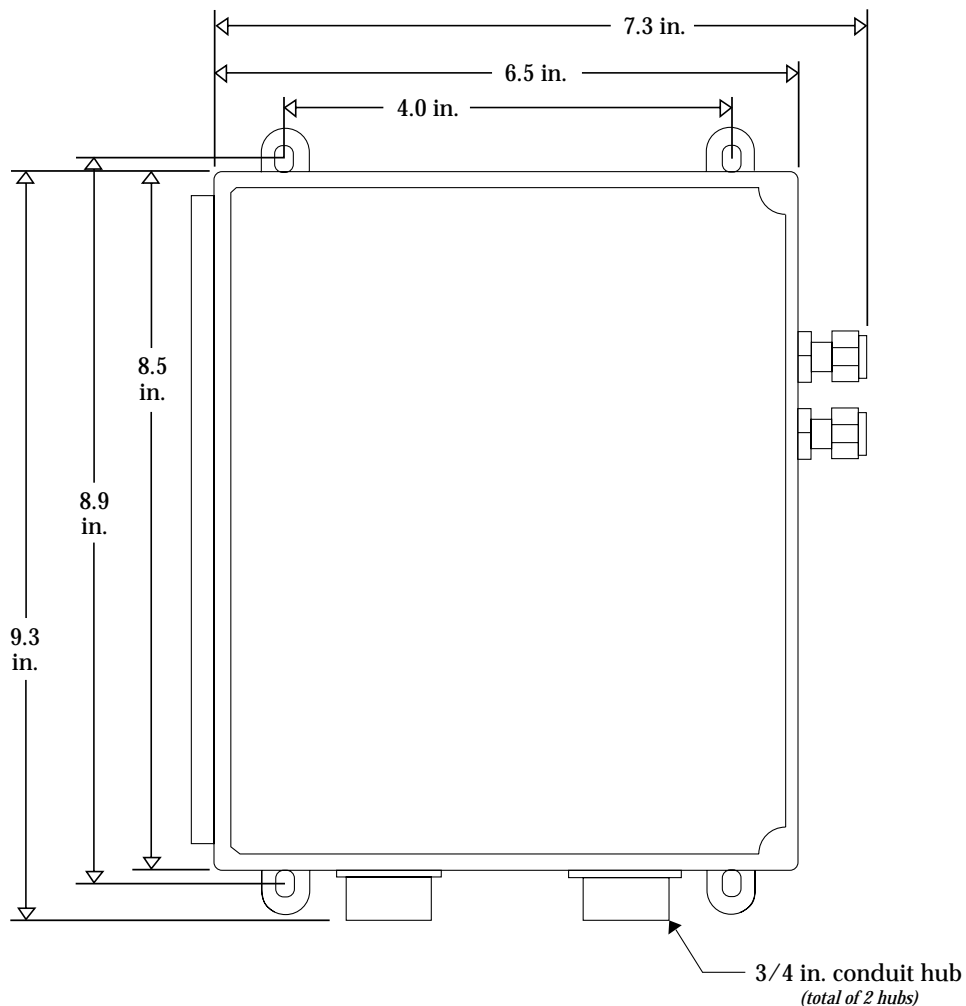
This section describes procedures to mount the sample-draw detector in the monitoring environment and wire the sample-draw detector to a controller.

Mounting the Sample-Draw Combustible Gas Detector

1. Select the mounting site. Consider the following when you select the mounting site.
 - Is there enough room to open the housing door and make wiring connections at the bottom of the housing and tubing connections at the right of the housing?

Make sure there is sufficient room to perform start-up, maintenance, and calibration procedures.

- Are the flowmeter and status lights visible?



Note: The housing is 4.25 in. deep.

Figure 3: Mounting the Combustible Gas Sample-Draw Detector

4. Close and latch the housing door.

NOTE: The sample-draw detector is shipped with the mounting feet “tucked under” the housing to protect the mounting feet during shipment.

5. Slightly loosen the screw that secures the mounting foot to the housing, then rotate the mounting foot 180 degrees (see Figure 3).
6. Tighten the screw that secures the mounting foot to the housing.
7. Repeat steps 3 and 4 for the remaining three mounting feet.
8. Position the sample-draw housing on a vertical surface at eye level (4 1/2 to 5 feet from the floor).
9. Insert 1/4 inch or 5/16 inch screws through the slots in the mounting feet to secure the housing to the mounting surface.

Connecting the Sample Lines to the Sample-Draw Detector

1. Attach 1/4 in. metal or rigid plastic sample tubing to the INLET fitting. Brass tubing is recommended for most applications. If tubing corrosion caused by the air being sampled is a concern, stainless steel tubing or rigid polypropylene tubing may be used.

CAUTION: *If you use **flexible** sample tubing (polyurethane for example), use an appropriate metal insert to seal the connection between the tubing and the INLET fitting. See the Parts List at the end of this manual, for an example of an appropriate metal insert.*

2. Place the opposite end of the tubing at the sampling area.

CAUTION: *Avoid loops or slumps in the incoming sample line. To reduce response time, keep the incoming sample line as short as possible.*

3. Attach rigid sample tubing to the EXHAUST fitting.
4. Route the opposite end of the tubing to an open area where the sample can safely disperse.

Wiring the Sample-Draw Combustible Gas Detector to a Controller

WARNING: *Always verify that the controller is off and that power to the controller is off before you make wiring connections.*

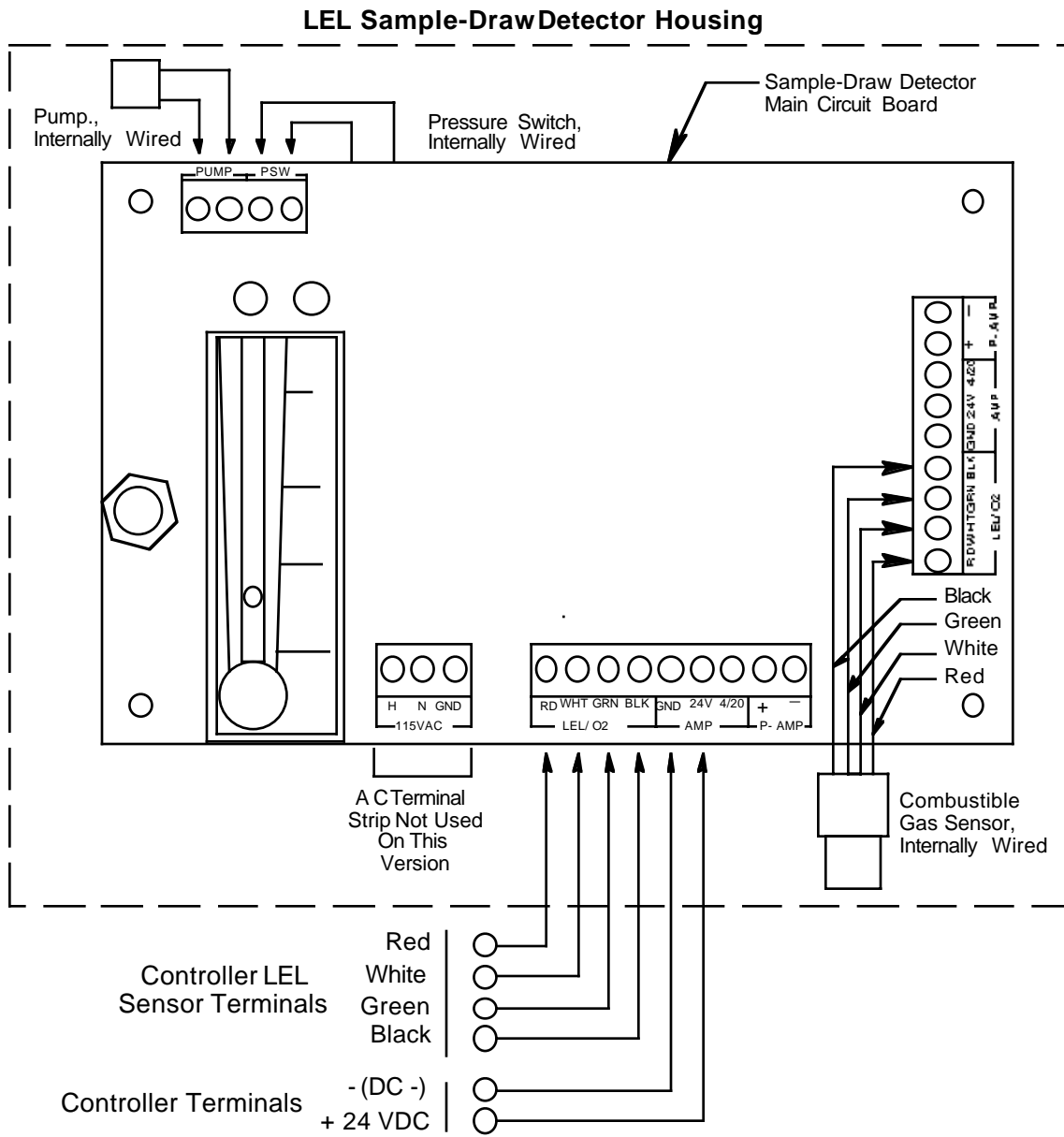
1. Turn off the controller
2. Turn off power to the controller.
3. Unlatch and open the housing door of the sample-draw detector.
4. Guide a six-conductor, shielded cable or six wires in conduit through one of the conduit hubs at the bottom of the sample-draw housing.
5. Connect the cable to the sample-draw detector’s interconnect terminal strip as shown in Figure 4.
6. Close and latch the housing door of the sample-draw detector.

CAUTION: If using shielded cable, leave the cable shield's drain wire insulated and disconnected at the sample-draw detector. You will connect the opposite end of the drain wire at the controller.

7. Route the cable or wires in conduit leading from the sample-draw detector through one of the conduit hubs at the controller.

CAUTION: Do not route controller power wiring and detector wiring through the same hub. The power cable may disrupt the transmission of the sensor signal to the controller.

8. Connect the wires to the applicable detector terminal strip and power terminals at the controller as shown in Figure 4.



5. Connect the cable shield to an available chassis ground at the controller. The grounding screw on one of the controller's grounded conduit hubs is an example of a chassis ground.

Start Up

This section describes procedures to start up the sample-draw detector and place the sample-draw detector into normal operation.

Introducing Incoming Power

1. Complete the installation procedures described earlier in this manual.
2. Verify that the wiring is correct and secure. Refer to the controller operator's manual for connections at the controller.
3. Turn on or plug in the power to the controller, then turn on the controller.
4. Verify that the sample-draw detector's PILOT light is on.
5. Verify that the controller is on and operating properly. Refer to the controller operator's manual.
6. Verify that the flowmeter indicates a flow rate of approximately 1.5 SCFH. If necessary, use the bypass valve or flow adjust potentiometer to adjust the flow rate.

NOTE: The following step tests for leaks in the sample line. This test will cause a low flow condition at the sample-draw detector and a fail condition at the controller. Be sure to put the controller into its calibration program or disable external alarms before performing this test.

7. Verify that the incoming sample line is not leaking. To test the sample line, plug the open end of the sample line with your thumb. If the flowmeter ball drops to the bottom of the flowmeter, the incoming sample line is not leaking.
8. Remove your thumb from the sample line, verify that the flowmeter returns to a normal flow rate.
9. Enable alarms or place the controller in normal operation.

CAUTION: *Allow the sample-draw detector to warm up for 15 minutes before you continue with the next section, "Setting the Zero Reading."*

Setting the Zero Reading

CAUTION: *If you suspect the presence of combustible gas in the monitoring environment, use the calibration kit and the zero air calibration cylinder to introduce "fresh air" to the sensor and verify an accurate zero setting. See "Calibration" on page 18 for instructions on using a zero air calibration cylinder for setting the zero reading.*

1. Verify that the sample-draw detector is sampling a fresh air environment (environment known to be free of combustible gas).
2. Verify a reading of 0 %LEL on the controller display screen for the applicable channel. If the display reading is 0 % LEL, start up is complete. The sample-draw detector is in normal operation. If the display reading is not 0 % LEL, continue with step 3.

3. Perform a zero operation at the controller. See the controller operator's manual for instructions to perform a zero operation.

Maintenance

This section describes maintenance procedures. It includes preventive maintenance procedures. This section also includes procedures to troubleshoot the sample-draw detector, replace components of the sample-draw detector, and adjust the low flow setting.

Preventive Maintenance

This section describes a preventive maintenance schedule to ensure the optimum performance of the sample-draw detector. It includes daily, monthly, and quarterly procedures.

Monthly Visual Checks

1. Verify that the pilot light is on.
2. Verify that the flowmeter indicates a flow rate of approximately 1.5 SCFH. If necessary use the bypass valve or flow adjust potentiometer to adjust the flow rate to 1.5 SCFH.
3. Verify a display reading of 0 %LEL at the controller. Investigate significant changes in the display reading.

Monthly Response Test

This procedure describes a test to verify that the sample-draw detector responds properly to the target gas.

NOTE: To reduce the response time of this test, use a short incoming sample line. If the sample-draw detector's sample line is long, connect a shorter line for this test. Make sure you reconnect the sample line after you complete this procedure.

NOTE: Performing a response test on the sample-draw detector may cause alarms. Be sure to put the controller into its calibration program or disable external alarms before performing this test

Preparing for the response test

NOTE: This procedure describes the RKI calibration kit that includes a dispensing valve and a gas collection bag. A calibration kit that uses a demand flow regulator is also available.

1. Verify that the display reading at the controller is 0 % LEL.
If the display reading is not 0 % LEL, set the zero reading as described in "Calibration" on page 18, then continue this procedure.
1. Follow the instructions in the controller's operator's manual for entering calibration mode.
2. Connect the calibration kit sample tubing to the fitting on the gas collection bag and run the tubing through the tubing clamp provided with the calibration kit.

3. Disconnect the incoming sample line from the sample-draw detector's inlet fitting, then connect the sample tubing from the gas collection bag to the inlet fitting.
Allow the sample-draw pump to draw out any residual gas in the gas collection bag.
4. Close the tubing clamp.

NOTE: This step will cause a low flow alarm.

5. Disconnect the calibration kit sample tubing from the inlet fitting.

NOTE: If you can verify a fresh air environment, it is not necessary to use a zero air calibrating sample to set the zero reading at the controller. If you can verify a fresh air environment, go to the next section, *Setting the Zero Reading*.

6. Screw the dispensing valve onto the test gas cylinder.
7. Connect the tubing from the gas collection bag to the dispensing valve, then open the clamp.
8. Open the dispensing valve. The gas collection bag begins to fill.
9. Close the dispensing valve when the gas collection bag appears full.
10. Close the tubing clamp, then disconnect the sample tubing from the dispensing valve.
11. Remove the dispensing valve from the test gas cylinder.

Performing the response test

1. Connect the calibration tubing from the gas collection bag to the INLET fitting.
The sample-draw detector's pump automatically begins pulling the test sample from the gas collection bag when you connect the tubing to the INLET fitting.
2. After approximately one minute, verify that the reading at the controller stabilizes within $\pm 10\%$ of the concentration of the test sample. If the reading is not within $\pm 10\%$ of the test sample, calibrate the sample-draw detector as described in "Calibration" on page 18.
3. Remove the calibration tubing from the INLET fitting, then reconnect the sample tubing to the INLET fitting.

Quarterly Calibration

RKI Instruments recommends calibrating the combustible gas sample-draw detector quarterly. Some applications may require a more or less frequent calibration schedule depending on environmental conditions, frequency of gas exposure, and other factors. Calibrate the sample-draw detector as described in "Calibration" on page 18.

Troubleshooting

The troubleshooting guide describes symptoms, probable causes, and recommended action for problems you may encounter with the sample-draw detector.

NOTE: This troubleshooting guide describes sample-draw detector problems only. See the controller Operator's Manual if the controller exhibits any problems.

Fail condition

Symptoms

- The sample-draw detector's Fail light is on.
- The monitoring device is operating properly but indicates a reading well below zero.

Probable causes

- The sample-draw detector's flow rate is too low because of an obstructed sample line, failed pump, etc.
- The sample-draw detector is malfunctioning.
- The sensor wiring is disconnected or misconnected.

Recommended action

1. At the sample-draw detector, set the correct flow rate with the bypass valve or flow adjust potentiometer.
2. If you cannot set the correct flow rate, check the sample lines for obstructions or kinks.
3. Verify that the sensor wiring is correct and secure. "Wiring the Sample-Draw Combustible Gas Detector to a Controller" on page 10 describes sensor wiring connections.
4. Calibrate the sample-draw detector as described in "Calibration" on page 18.
5. If the fail condition continues, replace the sensor as described later in this section.
6. If the fail condition continues, contact RKI Instruments, Inc., for further instruction.

Slow or no response/difficult or unable to calibrate

Symptoms

- The sensor responds slowly or does not respond during the monthly response test.
- Unable to accurately set the zero or response reading during the calibration procedure.
- The sensor requires frequent calibration.

Probable causes

- The calibration cylinder is low, out-dated, or defective.
- If a demand flow regulator calibration kit is used, the demand flow regulator is not functioning properly.
- The sample-draw detector's flow rate is too low because of an obstructed sample line, failed pump, etc.
- The sample-draw detector is malfunctioning.

Recommended action

1. Verify that the calibration cylinder contains an adequate supply of a fresh test sample.
2. If a demand flow regulator calibration kit is used, use a different demand flow regulator to determine if the original one is functioning properly.
3. If necessary, set the correct flow rate with the bypass valve or flow adjust potentiometer.
4. If you cannot set the correct flow rate, check the sample line for obstructions or kinks.
5. If the calibration/response difficulties continue, replace the sensor as described later in this section.

6. If the calibration/response difficulties continue, contact RKI Instruments, Inc., for further instruction.

Replacing Components of the Combustible Gas Sample-draw Detector

This section includes procedures to replace the sensor, hydrophobic filter, and ferrules.

Replacing the combustible gas sensor

1. Turn off the controller
2. Turn off power to the controller.
3. Open the housing door of the sample-draw detector.
4. Unscrew and remove the two screws that secure the sensor retraining plate, then lift the plate, connector, and sensor out of the housing.
5. Unplug the connector from the sensor.
6. Verify that you are using the correct replacement sensor (NC-6240 is printed on the sensor), then plug the sensor into the connector.
7. Place the sensor in the combustible gas sensor cavity, then position the retaining plate on the two standoffs.
8. Secure the retaining plate to the standoffs with the two screws you removed in step 4.
9. Close and latch the housing door.
10. Turn on power to the controller.
11. Turn on the controller.

CAUTION: Allow the replacement sensor to warm up for 15 minutes before you continue.

12. Calibrate the replacement sensor as described in "Calibration" on page 18.

Replacing the filter

1. Open the housing door of the sample-draw detector.
2. Disconnect the filter from the rubber elbows on each end of the filter, then remove the filter from the sample-draw detector.
3. Install the new filter.
4. Verify that the flow rate is approximately 1.5 SCFH, then close the housing door.

Replacing the ferrules

The INLET and EXHAUST fittings each includes two ferrules that seal the inlet or exhaust tubing to the fitting. Replace the ferrules if the seal is bad or if you replace the sample tubing. Always replace the ferrules as a pair.

1. Unscrew the nut that holds the tubing to the fitting from the fitting.
2. Slide the nut away from the end of the tubing.
3. Cut off the end of the sample tube with the old ferrules off about one inch from the end
4. Slide the nut off the sample tubing.
5. Position the nut so the threaded end is facing you, then insert the bottom (smaller) ferrule into the nut. Insert the ferrule so the flat side is facing down.

NOTE: Make sure the bottom ferrule is laying flat in the nut.

6. Insert the cone-shaped front ferrule on top of the bottom ferrule. Insert the ferrule so the smaller end of the cone is facing up.
7. Screw the nut onto the fitting by hand just until it stops turning.
8. Insert the sample tubing into the fitting until it bottoms out.
9. Firmly tighten the nut so the ferrules crimp onto the sample tubing and make a seal.

Adjusting the Low Flow Setting

NOTE: Adjusting the low flow setting will cause a low flow alarm at the sample-draw detector and a fail alarm at the controller. Be sure to put the controller into its calibration program or disable external alarms before performing this test

The factory-set low flow setting is 0.6 SCFH (± 0.2). To adjust the low flow setting:

1. Use the flow adjust potentiometer (VR1) to set the flow to 0.6 SCFH.

If the sample-draw detector goes into low flow alarm before you can adjust the flow down to 0.6 SCFH, adjust the low flow potentiometer 1/4 turn clockwise, then attempt to set the flow again. Repeat this step until you are able to adjust the flow to 0.6 SCFH.

NOTE: The low flow potentiometer is accessible through a circular cutout in the main circuit board. The cutout is labeled PS1.

2. Slowly turn the low flow potentiometer counterclockwise just until the sample-draw detector goes into low flow alarm.
3. Increase the flow using VR1 until the unit is out of low flow alarm.
4. Decrease the flow very slowly and verify that the low flow alarm is 0.6 SCFH (± 0.2).
If the low flow alarm is set too low, turn the low flow potentiometer slightly clockwise. Repeat steps 3 and 4 if necessary.
5. Use the flow adjust potentiometer (VR1) to set the flow to 1.5 SCFH.
6. Make sure the sample-draw detector's Fail light is off.

Calibration

This section describes how to calibrate the combustible gas sample-draw detector. It includes procedures to assemble the calibration kit, set the zero reading, set the response reading, and return to normal operation.

The standard calibration gas for the sample-draw detector is methane. The sample-draw detector may be calibrated to other combustible gases such as hexane or hydrogen. Use the correct calibration gas for your installation.

NOTE: Calibrating the sample-draw detector may cause alarms. Be sure to put the controller into its calibration program or disable external alarms before continuing.

NOTE: This procedure describes calibration using a dispensing valve and a gas collection bag. A demand-flow regulator calibration kit is also available for calibrating the sample-draw detector without using a sample bag.

Preparing for Calibration

1. Follow the instructions in the controller's operator's manual for entering calibration mode.
2. Connect the calibration kit sample tubing to the fitting on the gas collection bag and run the tubing through the tubing clamp provided with the calibration kit.
3. Disconnect the incoming sample line from the sample-draw detector's inlet fitting, then connect the sample tubing from the gas collection bag to the inlet fitting.
Allow the sample-draw pump to draw out any residual gas in the gas collection bag.
4. Close the tubing clamp.

NOTE: This step will cause a low flow alarm.

5. Disconnect the calibration kit sample tubing from the inlet fitting.

NOTE: If you can verify a fresh air environment, it is not necessary to use a zero air calibrating sample to set the zero reading at the controller. If you can verify a fresh air environment, go to the next section, Setting the Zero Reading.

6. Screw the dispensing valve onto the zero air calibration cylinder.
7. Connect the tubing from the gas collection bag to the dispensing valve, then open the clamp.
8. Open the dispensing valve. The gas collection bag begins to fill.
9. Close the dispensing valve when the gas collection bag appears full.
10. Close the tubing clamp, then disconnect the sample tubing from the dispensing valve.
11. Remove the dispensing valve from the zero air calibration cylinder.

Setting the Zero Reading

1. Open the tubing clamp, then connect the sample tubing from the gas collection bag to the sample-draw detector's inlet line. **This step is not necessary if you verified a fresh air environment earlier in this procedure.**
2. Allow the sample-draw detector to draw sample for one minute.
3. Follow the directions in the controller's operator's manual for setting the zero reading. If you used a zero air calibration cylinder to set the zero reading, proceed to step 4. If you verified a fresh air environment, proceed to the next section, Setting the Response Reading.
4. Allow the sample-draw detector to draw out any residual gas in the gas collection bag.
5. Close the tubing clamp, then disconnect the gas bag sample tubing from the inlet fitting.

NOTE: This step will cause a low flow alarm.

6. Unscrew the dispensing valve from the zero air calibration cylinder.

Setting the Span

1. Screw the dispensing valve onto the combustible gas calibration cylinder.
2. Connect the tubing from the gas collection bag to the dispensing valve, then open the clamp.
3. Open the dispensing valve. The gas collection bag begins to fill.
4. Close the dispensing valve when the gas collection bag appears full.
5. Close the tubing clamp, then disconnect the sample tubing from the dispensing valve.
6. Remove the dispensing valve from the combustible gas calibration cylinder.
7. Open the tubing clamp, then connect the sample tubing from the gas collection bag to the sample-draw detector's inlet line.
8. Allow the sample-draw detector to draw sample for one minute.
9. Follow the directions in the controller's operator's manual for setting the span.
10. Allow the sample-draw detector to draw out any residual gas in the gas collection bag.

NOTE: This step may cause a low flow alarm.

11. Disconnect the gas bag sample tubing from the inlet fitting.
12. Unscrew the dispensing valve from the combustible gas calibration cylinder.

Returning to Normal Operation

1. Wait approximately one minute to allow the combustible gas reading to decrease below the alarm level.
2. Follow the instructions in the controller's operator's manual to exit the calibration mode.

Parts List

Table 2 lists replacement parts and accessories for the sample-draw combustible gas detector.

Table 2: Parts List

Part Number	Description
06-1248RK	Sample tubing, 3/16 x 5/16, specify length, (for calibration kit)
17-2593RK	Brass insert for flexible 1/4 OD x .17 ID tubing (for INLET and EXHAUST fittings)
17-2683RK	Front ferrule (for INLET and EXHAUST fittings)
17-2688RK	Back ferrule (for INLET and EXHAUST fittings)
30-0610RK	Pump
33-0165RK	Hydrophobic filter
61-0145RK	Combustible gas sensor, plug-in type, LEL range
71-0104RK	Operator's Manual, 35-3000RK-LEL sample-draw Detector
81-0002RK-01	Calibration cylinder, 50% LEL hydrogen in air 34 liter)
81-0002RK-03	Calibration cylinder, 50% LEL hydrogen in air, 103 liter
81-0007RK-01	Calibration cylinder, 50% LEL hexane in air, 34 liter
81-0012RK-01	Calibration cylinder, 50% LEL methane in air, 34 liter
81-0012RK-03	Calibration cylinder, 50% LEL methane in air 103 liter)
81-0076RK-01	Zero air calibration cylinder (34 liter)
81-0076RK-03	Zero air calibration cylinder (103 liter)
81-1001RK	Dispensing valve (with knob)
81-1054RK	Regulator (demand flow)
81-1126RK	Gas collection bag (2 liter)
