

61-1000RK-05 Combustible Gas Detector Operator's Manual

Part Number: 71-0087RK

Revision A

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Product Warranty

RKI Instruments, Inc., warrants gas alarm equipment sold by us to be free from defects in materials, workmanship, and performance for a period of one year from date of shipment from RKI Instruments, Inc. Any parts found defective within that period will be repaired or replaced, at our option, free of charge. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired, or replaced on a routine basis. Examples of such items are:

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

Warranty is voided by abuse including mechanical damage, alteration, rough handling, or repair procedures not in accordance with the operator's manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement costs, local repair costs, transportation costs, or contingent expenses incurred without our prior approval.

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This warranty covers instruments and parts sold to users by authorized distributors, dealers, and representatives as appointed by RKI Instruments, Inc.

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.

Table of Contents

Overview	4
Specifications	4
Description	5
Combustible Gas Detector	5
Junction Box	5
Installation	6
Mounting the Combustible Gas Detector	6
Wiring the Combustible Gas Detector	7
Startup	
Introducing Incoming Power	9
Setting the Zero Signal	9
Maintenance	10
Preventive Maintenance	10
Troubleshooting	11
Replacing the Combustible Detector	11
Calibration	12
Assembling the Calibration Kit	12
Setting the Zero Reading	12
Setting the Response Reading	12
Parts List	13

Overview

This manual describes the 61-1000RK-05 combustible gas detector (internal amplifier type). This manual also describes how to install, start up, maintain, and calibrate the detector when it is used with a gas monitoring controller. A parts list at the end of this manual lists replacement parts and accessories for the combustible gas detector.


Specifications

WARNING: Do not use this product in a manner not specified in this instruction manual.

Table 1 lists specifications for the combustible gas detector.

Table 1: 61-1000RK-05 Specifications

Target Gas	Combustible gas (Methane Calibration Standard)
Area Classification	Explosionproof for Class I, Groups B, C, and D
Sampling Method	Diffusion
Detection Range	0 to 100% LEL
Response Time	90% in 45 seconds

NOTE: The following symbol on the detector label is a caution to the user to refer to this documentation for installation and operation instructions: 

Description

This section describes the components of the combustible gas detector. The detector includes the sensing elements, flame arrestor, flame arrestor guard, detector housing, and detector leads.

Sensing elements

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

Flame arrestor

The porous flame arrestor allows the target gas to diffuse into the detector assembly and contact the sensing elements. The flame arrestor also contains sparks within the detector.

Flame arrestor guard

The flame arrestor guard is permanently bonded to the detector housing and protects the flame arrestor from impact damage.

Detector housing

The sensing elements and flame arrestor are installed within the detector housing. Mounting threads (1/2 in. NPT) at the top of the detector allow you to mount the combustible gas detector into the bottom conduit hub of the junction box. A rainshield screws onto the bottom of the detector. The rainshield helps protect the detector from debris in the monitoring environment.

Detector leads

Four color-coded leads extend from the top of the detector. The leads allow you to connect the combustible gas detector to the amplifier.

Junction Box

The junction box allows you to install the detector at a mounting site that is remote from a controller, and it protects the detector wiring connections. Two conduit hubs allow you to mount the detector to the junction box and connect the wiring from the detector to a controller. Three spacers installed on the back of the junction box control the distance of the junction box from a mounting surface and insure that there is enough room to install a calibration cup on the detector during calibration.

The bottom conduit hub includes a 3/4 in. x 1/2 in. reducer that allows you to screw the detector into the hub. The terminal block within the junction box facilitates the wiring process. A cover on the front of the junction box allows access to the interior of the junction box.

Installation

This section describes procedures to mount the combustible gas detector in the monitoring environment and wire the detector to a controller.

Mounting the Combustible Gas Detector

1. Select a mounting site that is representative of the monitoring environment. Consider the following when you select the mounting site.
 - Select a site where the detector is not likely to be bumped or disturbed. Make sure there is sufficient room to perform start-up, maintenance, and calibration procedures.
 - Select a site where the target gas is likely to be found first. For lighter gases, mount the detector near the ceiling; for heavier gases, mount the detector near the floor.

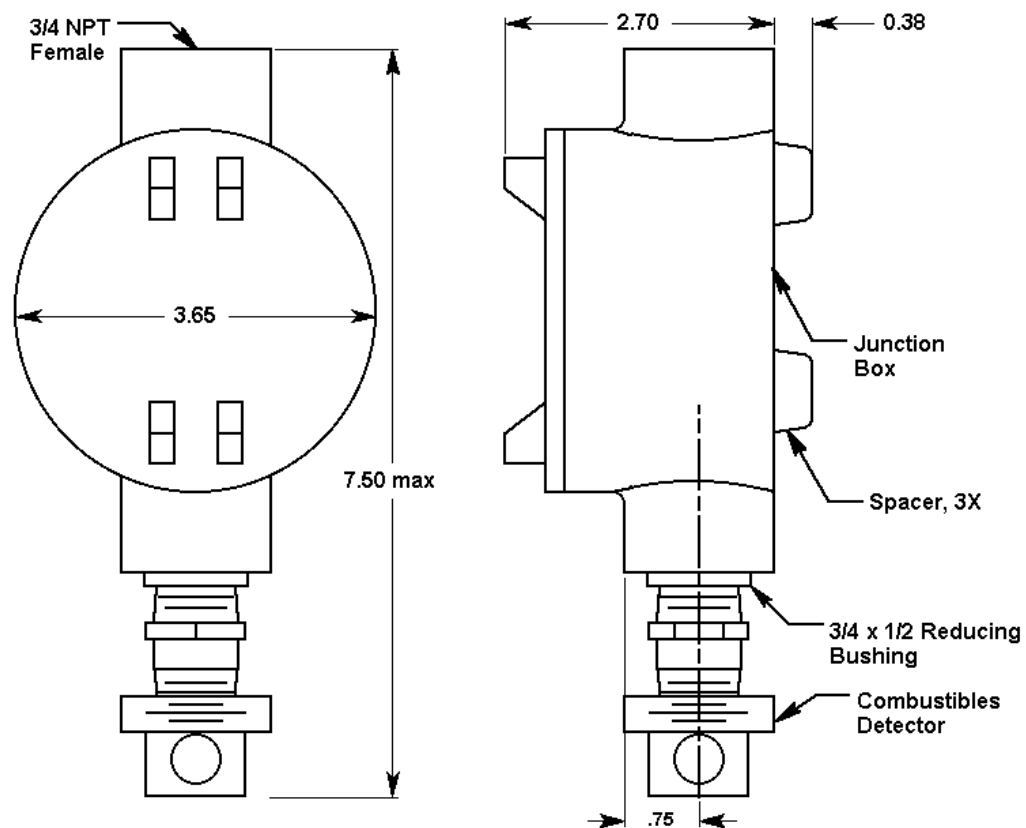


Figure 1: Mounting the Combustible Gas Detector

2. At the mounting site you select, hang or mount the junction box with the detector facing down (see Figure 1).

Wiring the Combustible Gas Detector to a Controller

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

1. Turn off the controller.
2. Turn off or unplug incoming power at the power source end.
3. Remove the cover from the junction box. If the detector is already installed in the junction box, go to step 6.
4. Guide the detector leads through the bottom conduit hub of the junction box, then screw the mounting threads of the detector into the conduit hub.
5. Connect the detector leads to the terminal block in the junction box.
6. Guide a four-conductor, shielded cable or four wires in conduit through the top conduit hub of the junction box.

WARNING: *To maintain the explosion proof classification of the LEL detector/junction box combination, a conduit seal must be used at the junction box conduit hub used for wiring to the controller.*

7. Connect the wires to the terminals opposite the detector leads.

CAUTION: *Leave the shield drain wire insulated and disconnected at the detector. You will connect the opposite end of the cable's drain wire at the controller.*

8. Secure the junction box cover to the junction box.
9. Route the cable or wires in conduit leading from the detector through one of the conduit hubs at the controller.

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

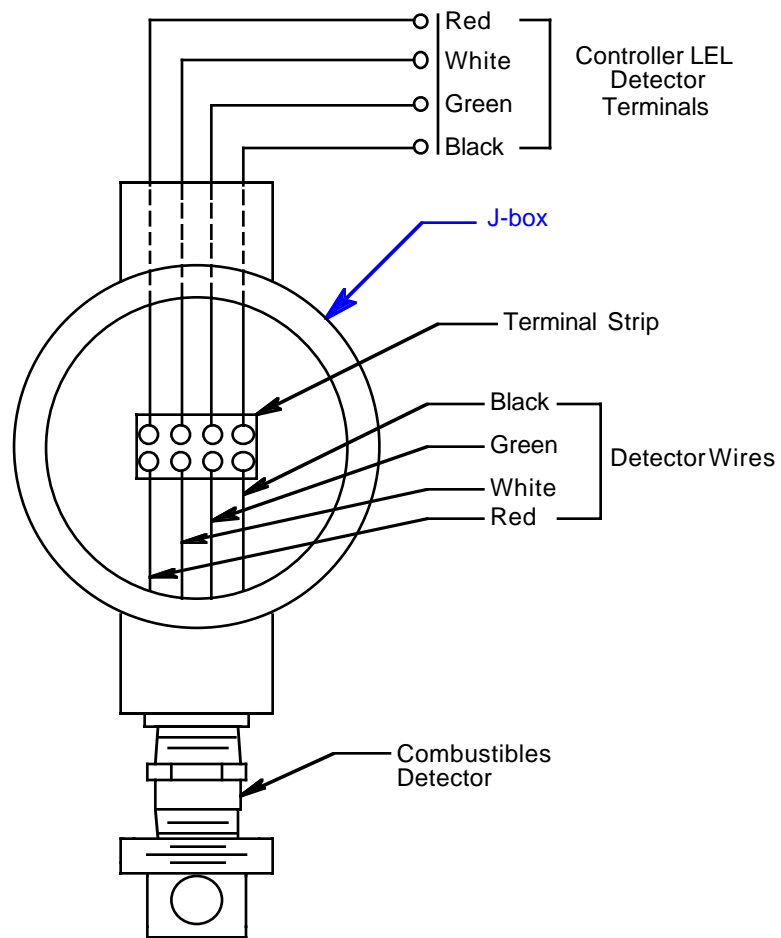


Figure 2: Wiring the Combustible Gas Detector to a Controller

Start Up

This section describes procedures to start up the combustible gas detector and place the detector into normal operation.

Introducing Incoming Power

1. Complete the installation procedures described earlier in this manual.
2. Verify that the power wiring to the controller is correct and secure. Refer to the controller instruction manual.
3. Turn on or plug in the incoming power at the power source end, then turn on the controller.
4. Verify that the controller is on and operating properly. Refer to the controller instruction manual.

CAUTION: *Allow the detector to warm up for 5 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 zero air calibration cylinder to introduce "fresh air" to the detector and verify an accurate zero reading.*

1. Verify that the detector is in a fresh air environment (environment known to be free of combustible gas).
2. Verify a reading of 0% LEL at the controller.
If the display reading is 0% LEL, start up is complete. The combustible detector is in normal operation. If the display reading is not 0% LEL, continue with step 3.
3. Perform a zeroing operation at the controller. See the controller instruction manual for directions.

Maintenance

This section describes maintenance procedures. It includes preventive maintenance, troubleshooting, and component replacement procedures.

Preventive Maintenance

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

Daily

Verify a display reading of 0% LEL at the controller. Investigate significant changes in the reading.

Monthly

This procedure describes a test to verify that the combustible gas detector responds properly to the target gas.

WARNING: *The controller is not an active gas monitoring device during the response test procedure.*

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

1. Place the controller into its calibration program or disable external alarms.
2. Verify that the controller display reading is 0% LEL.
If the controller reading is not 0% LEL, set the zero reading then continue this procedure. See the controller instruction manual for directions to set the zero reading.
3. Screw the calibration cup over the bottom of the detector.
4. Use the sample tubing to connect the regulator to the calibration cup.
5. Screw the regulator into the calibration cylinder. The sample will begin to flow.
6. When the reading at the controller stabilizes, verify that the reading is within $\pm 10\%$ of the gas concentration.

NOTE: If the readings are not within $\pm 10\%$ of the gas concentration, calibrate the detector as described in the Calibration section of this manual.

7. Unscrew the regulator from the calibration cylinder, then disassemble the calibration kit as described in the calibration section of this manual.
8. When the display reading falls below the alarm setpoints, return the controller to normal operation.

Quarterly

Calibrate the detector as described in the Calibration section of this manual.

Troubleshooting

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

NOTE: This troubleshooting guide describes detector problems only. See the controller operator's manual for problems you may encounter with the controller.

Table 2: Troubleshooting the Combustible Gas Detector

Condition	Symptom(s)	Probable Causes	Recommended Action
Fail Condition	<ul style="list-style-type: none">Controller indicates a fail condition.	<ul style="list-style-type: none">The detector wiring is disconnected or misconnected.The detector zero signal is low enough to cause a fail condition.The detector is malfunctioning.	<ol style="list-style-type: none">Verify that the detector wiring is correct and secure.Calibrate the detector.If the fail condition continues, replace the detector.If the fail condition continues, contact RKI for further instruction.
Slow or No Response/ Difficult or Unable to Calibrate	<ul style="list-style-type: none">Detector responds slowly or does not respond to response test.Unable to accurately set the zero or response reading during calibration.Detector requires frequent calibration. <p>Note: Under "normal" circumstances, the detector requires calibration once every three months. Some applications may require a more frequent calibration schedule.</p>	<ul style="list-style-type: none">The calibration cylinder is low, out-dated, or defective.The detector is malfunctioning.	<ol style="list-style-type: none">Verify that the calibration cylinder contains an adequate supply of a fresh test sample.If the calibration/response difficulties continue, replace the detector.If the calibration/response difficulties continue, contact RKI for further instruction.

Replacing the Combustible Detector

- Turn off the controller.
- Turn off power to the controller.
- Remove the junction box cover.
- Disconnect the detector leads from the terminal block inside the junction box. Note the position of the color-coded leads as you remove them.
- Unscrew the detector from the junction box.
- Guide the detector leads of the replacement detector through the bottom conduit hub of the junction box, then screw the mounting threads of the detector into the conduit hub.
- Connect the detector leads of the terminal block in the same position as the leads you removed in step 4.

8. Turn on power to the controller.
9. Turn on the controller.
10. Secure the junction box cover to the junction box.
11. Calibrate the replacement detector as described in the Calibration section of this manual.

Calibration

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

WARNING: *The controller is not an active gas monitoring device during the calibration procedure.*

Assembling the Calibration Kit

1. Screw the calibration cup onto the bottom of the detector.
2. Use the sample tubing to connect the regulator to the calibration cup.

NOTE: Do not screw the regulator into the calibration cylinder at this time.

3. Place the controller into its calibration program or disable external alarms.

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

Setting the Zero Reading

CAUTION: *If you suspect the monitoring environment is not free of combustible vapors, use the calibration kit and a zero air calibration cylinder to introduce "fresh air" to the detector and verify an accurate zero setting*

1. Verify that the detector is in a fresh air environment.
2. Follow the directions in the controller's instruction manual for setting the zero reading.

Setting the Response Reading

1. Follow the directions in the controller's instruction manual for setting the response reading (span).
2. When the directions call for exposing the detector to gas, screw the regulator into the cylinder and allow the gas to flow to the detector until the reading at the controller stabilizes, approximately 2 minutes, before continuing with the directions.
3. After setting the response reading, unscrew the regulator from the cylinder and remove the calibration cup from the detector.

NOTE: For convenience, leave the components of the calibration kit connected by the sample tubing.

4. Allow about 15 seconds for the gas reading to decrease below the alarm points and then return the controller to normal operation.

NOTE: If you do not allow the gas reading decrease below the alarm points, then unwanted alarms may occur.

5. Verify that the controller display reading decreases and stabilizes at 0%LEL.
6. Store the components of the calibration kit in a safe and convenient place.

Parts List

Table 3 lists replacement parts and accessories for the 61-1000RK-05 combustible gas detector.

Table 3: Parts List

Part Number	Description
18-0400RK-01	Junction box with spacers
61-0140RK-05	Replacement combustible gas detector
71-0087RK	<i>61-1000RK-05 Combustible Gas Detector Operator's Manual</i> (this document)
81-0007RK-01	Calibration cylinder (50% LEL Hexane in air, 34 liter)
81-0012RK-01	Calibration cylinder (50% LEL Methane in air, 34 liter)
81-0076RK-01	Zero air calibration cylinder (34 liter)
81-1003RK	Regulator, 0.5 liter/minute; continuous flow (for 17 and 34 liter calibration cylinders)
81-1117RK	Calibration cup