Eclipse Detector Head Operator's Manual

Part Number: 71-0036RK

Revision; 0

Released: 3/12/03

Warranty

RKI Instruments, Inc., warranties gas alarm equipment manufactured by RKI and sold by RKI to be free from defects in materials and workmanship 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 items that are subject to deterioration or consumption in normal service, and which must be cleaned, repaired, or replaced routinely. Those items include, but are not limited to:

absorbent cartridges	sensors
pump diaphragms and valves	filter elements
lamp bulbs and fuses	batteries

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

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTIES AND REPRESENTATIONS, EXPRESSED OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF RKI INSTRUMENTS, INC., INCLUDING BUT NOT LIMITED TO THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL RKI INSTRUMENTS, INC., BE LIABLE FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL LOSS OR DAMAGE OF ANY KIND CONNECTED WITH THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCTS TO FUNCTION OR OPERATE PROPERLY.

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

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

About the Eclipse Detector Head

The Eclipse Detector Head is a fixed mounted, continuous-monitoring detector head. All user adjustable parameters may be adjusted non-intrusively by use of an optical switch which is accessible through a window at the front face of the detector head.

The Eclipse displays the current gas reading on an LCD display which is visible through the window in the cover (front face). It also provides a 4 - 20 mA signal which indicates the target gas reading for use by a recording device, gas monitor controller, or programmable controller.

Specifications

Table 1 lists specifications for the Eclipse.

Table 1: Specifications

Target Gas / Detection Range	Combustible Gas: 0 - 100% LEL, 1% LEL increments Oxygen: 0 - 25% volume, 0.1% increments Carbon Monoxide: 0 - 300 ppm, 1 ppm increments Hydrogen Sulfide: 0 - 100 ppm, 0.5 ppm increments
Construction (housing)	Explosion-proof Junction Box
Area Classification	Explosion-proof for Class I, Groups B, C, and D
Sampling Method	Diffusion
Input Power	24 VDC
Controls	Optical Switch (operated at front face)
Weight	4.5 lbs.
Signal Output	4 to 20 mA

Description

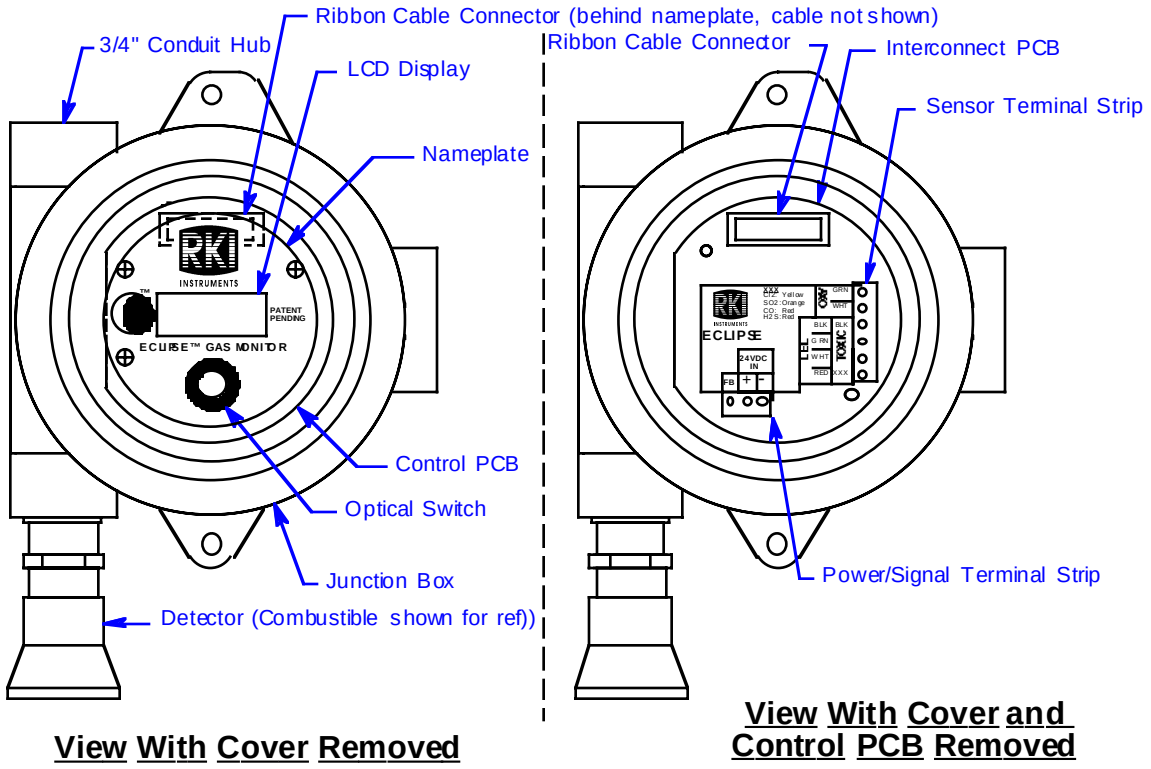

Figure 1: Eclipse Component Location

The Eclipse consists of the gas detector, amplifier set, and junction box.

Gas Detector

The gas detector senses the target gas and is mounted in a 3/4" conduit hub on the left bottom side of the Eclipse. The detector type will depend on the target gas and may be one of the following: combustible gas, oxygen, carbon monoxide (CO), or hydrogen sulfide (H2S).

The CO and H2S detectors have replaceable sensors. The CO detector includes a charcoal filter disk which is held onto the sensor with a rubber retaining boot. The charcoal filter disk scrubs out interfering gases to which the CO sensor responds such as H2S and certain hydrocarbons.

NOTE: The combustible gas detector has a 1/2" NPT thread and requires a 3/4" x 1/2" conduit reducer to mount in the detector hub.

Amplifier Set

The amplifier set converts the electrical output from the detector to a signal which can be displayed by the LCD display and also to a 4 - 20 mA signal (that is proportional to the detection range). The 4 - 20 mA signal may be used by a recording device, gas monitor controller, or programmable controller. The amplifier set consists of two potted printed circuit board (PCB) assemblies: the interconnect and control PCB's. The control PCB includes the LCD display and optical control switch. The interconnect PCB includes the

detector terminal strip and power / signal terminal strip. A ribbon cable with a connector on each end connects the two PCB's.

Interconnect PCB

The interconnect PCB is mounted into the rear of the junction box with two standoffs. A banana jack is screwed into each of the standoffs and used for mounting the control PCB. On the right side of the interconnect PCB is the detector terminal strip, a six position terminal strip. It is used to connect the detector to the Eclipse. At the bottom of the interconnect PCB is the power / signal terminal strip, a three position terminal strip. It is used to connect the Eclipse to incoming power and an external device.

NOTE: The detector is factory-wired to the Eclipse. See the Installation section of this manual for all wiring procedures related to the Eclipse.

Control PCB

The control PCB is installed on top of the interconnect PCB by lining up its two mounting holes with the banana jacks which are installed in the interconnect PCB mounting standoffs and pushing it onto the banana jacks. The jacks retain the control PCB.

- LCD Display

  The LCD display is mounted on the control PCB. It indicates the current gas reading.

- Optical Switch

  The optical switch is also installed on the control PCB. This switch is below the display and is visible through the window in the junction box cover. It is used to enter the calibration program and adjust calibration settings by covering it and uncovering it with a finger in certain patterns. The switch senses the change in light intensity which occurs when it is covered and uncovered and interprets this as a press and release. **IT IS NOT NECESSARY TO REMOVE THE JUNCTION BOX COVER TO USE THIS SWITCH**.

  Hereafter in this manual the action of covering and uncovering the optical switch will be referred to as a press and release. A press and release is indicated in the upper right corner of the display by a number which increments up by 1 with each press and release up to 3. The next press and release will clear this number and then the next press and release will display 1 again. The action of covering the optical switch and keeping a finger over the switch will be referred to as a press and hold. This is indicated in the upper right corner of the display by an "H".

NOTE: When pressing, the finger should touch the glass cover directly over the switch to insure that the switch will sense the change in light intensity.

Since the optical switch works by sensing changes in light intensity, the Eclipse requires a steady background light level when the switch is being used. If the background light level changes significantly, the Eclipse requires approximately one minute to adjust to this change before the switch can be used. For example, if the Eclipse is in a room with the lights on and the lights are turned off (likewise if they are off and then turned on), allow one minute for it to adjust to the change in background light before attempting to use the optical switch. The same may be true if it is installed in an area with bright sunlight and you step in front of it so that your shadow is cast on the optical sensor. If the Eclipse has adjusted to the new background light level, it will indicate each press and release of the optical switch by incrementing the number

in the upper right of the display.

If the Eclipse is installed in an area with no significant background light, use a portable lantern or flashlight to provide a steady background light level.

Junction Box

Use the junction box to install the Eclipse detector head at a mounting site. The junction box also protects the Eclipse and all connections made to it. Use the two 3/4 in. conduit hubs to mount the detector to the junction box (bottom hub) and connect wiring from an external device.

NOTE: The gas detector and amplifier set are factory-mounted in the junction box.

Use the junction box's two mounting holes to mount the Eclipse to a vertical surface at the monitoring site. The window in the cover on the front of the junction box allows you to cover the optical switch in patterns to perform calibration. Removing the cover allows you to access the interior of the junction box.

Installation

This section describes procedures to mount the Eclipse Detector Head in the monitoring environment and wire it to input power and devices.

Mounting the Eclipse Detector Head

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 Eclipse 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.
2. At the monitoring site, use #10 screws through the junction box's two mounting holes to secure the junction box to a vertical surface. Figures 2-5 show the outline and mounting dimensions for each of the Eclipse detector heads.

CAUTION: *Mount the Eclipse with the detector facing down.*

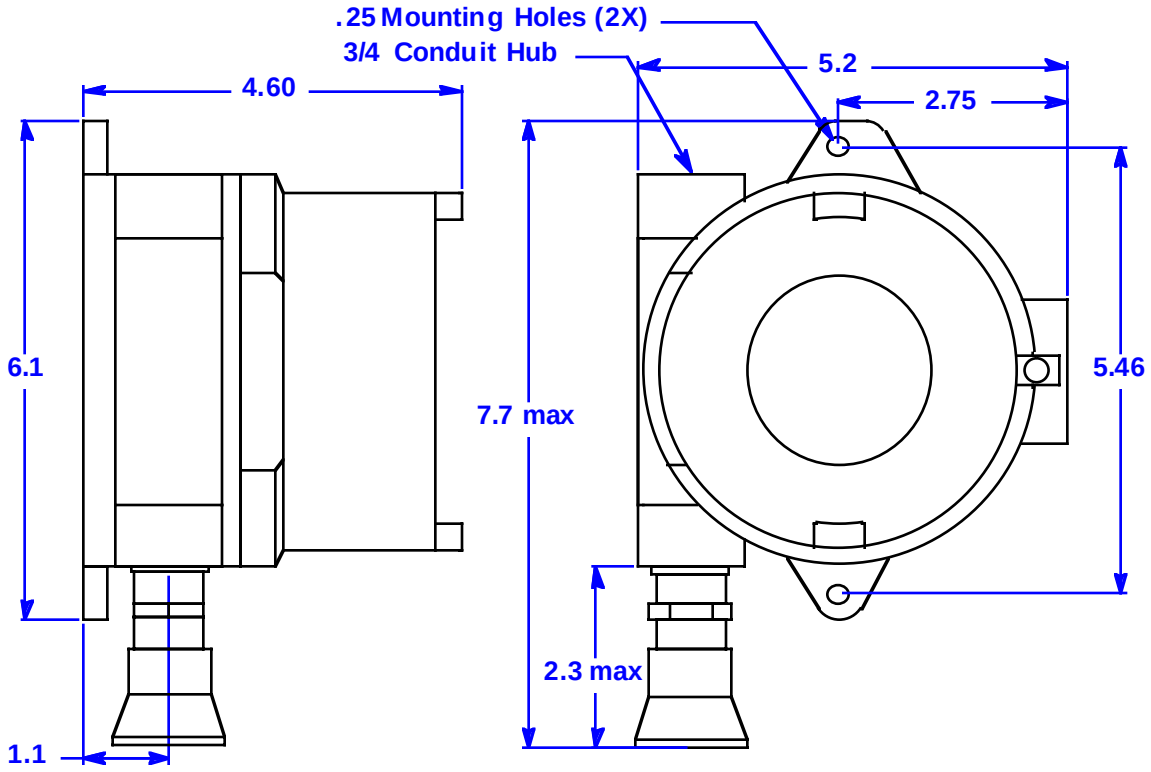

Figure 2: Outline & Mounting Dimensions, LEL

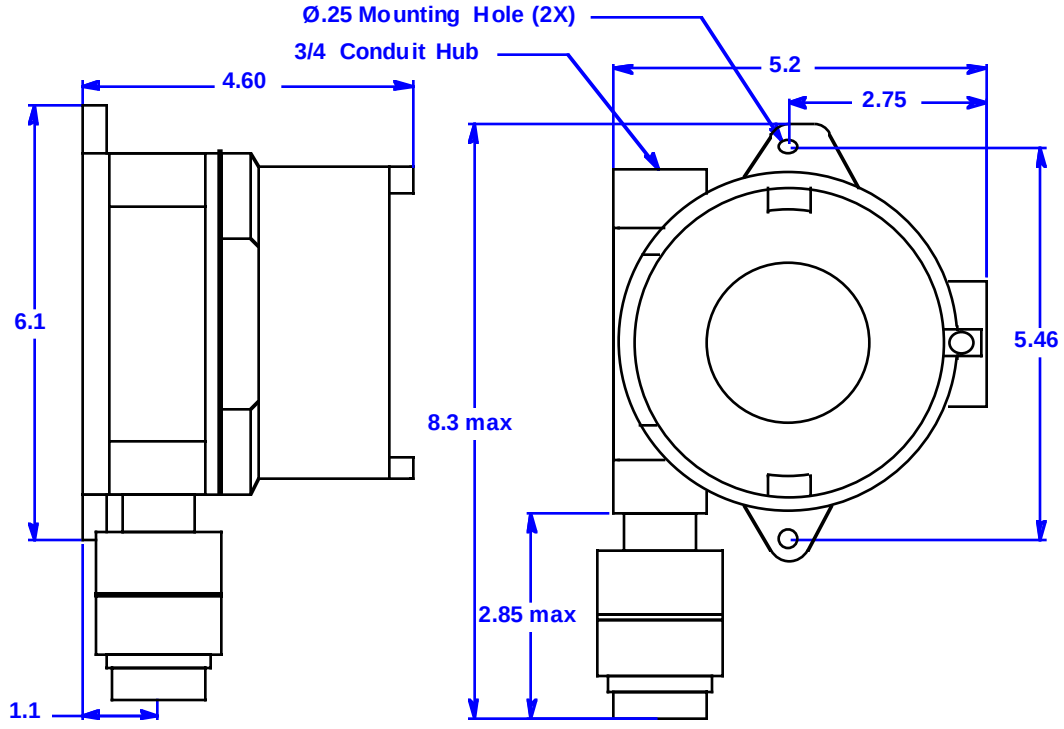

Figure 3: Outline & Mounting Dimensions, HS/CO

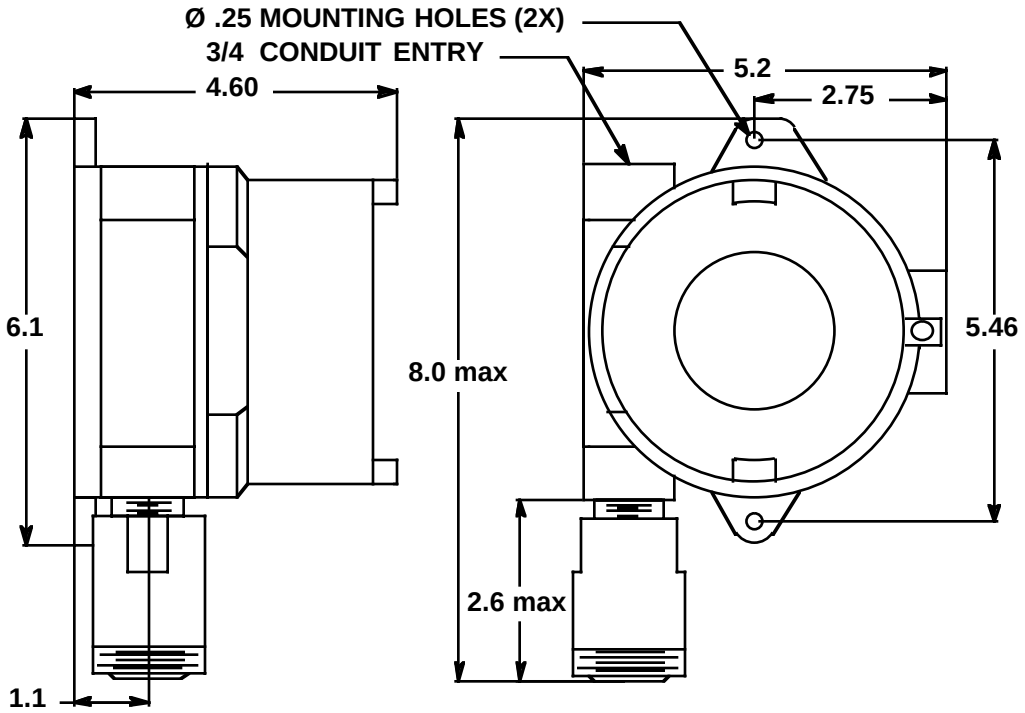

Figure 4: Outline & Mounting Dimensions, Oxygen

Wiring the Eclipse

WARNING: Always verify that the power source is off or disconnected before performing any wiring.

1. Remove the junction box cover.
2. Grasp the round Eclipse nameplate though which the LCD display is visible.
3. Gently pull until the control PCB is pulled away from the junction box. The detector and power / signal terminal strips are now visible on the interconnect PCB. Take care not to pull too hard and damage the cable which connects the top and bottom PCB's.
4. If necessary, disconnect the cable from the interconnect PCB and lay it aside with the control PCB.
5. Verify that the detector leads are wired to the detector terminal strip as shown on the wiring label which is on the bottom PCB:
   - Combustible gas detector.

     Red wire to terminal labelled LEL RED, white wire to terminal labelled LEL WHT, green wire to terminal labelled LEL GRN, black wire to terminal labelled LEL BLK.

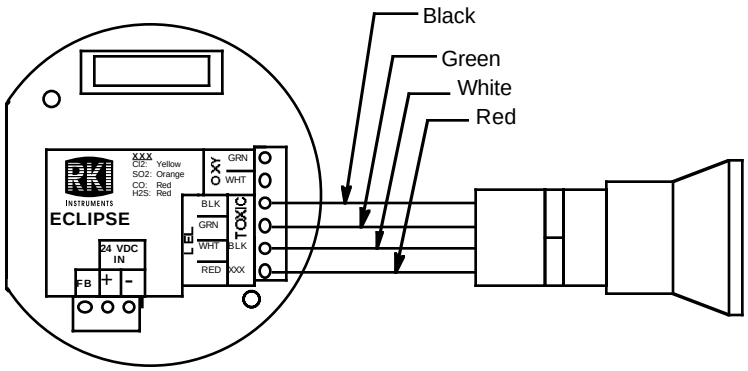

Figure 6: LEL Detector Wiring

- CO or H_2S gas detector.

  Red wire to terminal labeled TOXIC RED, black wire to terminal labelled TOXIC BLK.

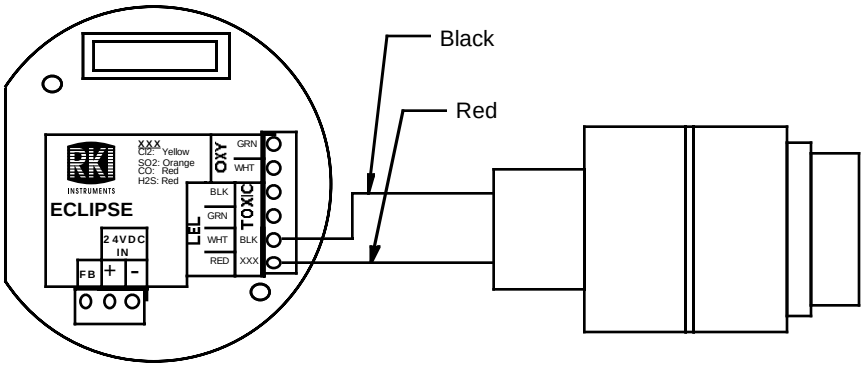

Figure 7: H2S/CO Detector Wiring

- Oxygen Detector.

  White wire to terminal labelled OXY WHT, green wire to terminal labelled OXY GRN.

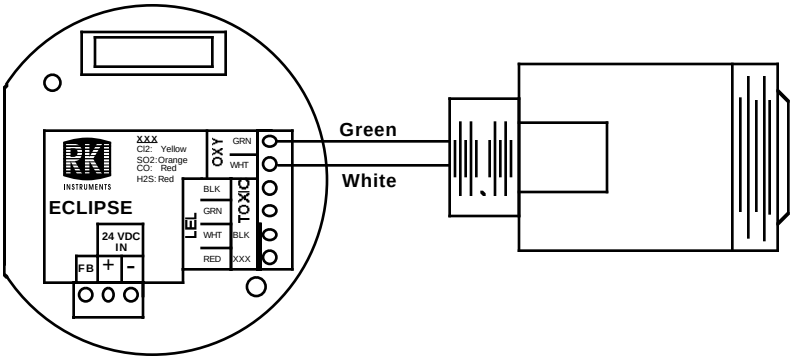

Figure 8: Oxygen Detector Wiring

6. Guide a three-conductor, shielded cable or three wires in conduit through the top conduit hub of the junction box.
7. Connect the three wires to the power / signal terminal strip as follows.
   - Connect the +24 VDC wire to the terminal labeled **24 VDC IN +**.
   - Connect the feedback wire to the terminal labeled **FB**.
   - Connect the - wire to the terminal labeled **24 VDC IN -**.

CAUTION: *Leave the ground (shield) wire insulated and disconnected at the Eclipse. You will connect the opposite end of the cable's ground wire at the device.*

8. Re-install the control PCB (and ribbon cable if necessary). Be sure the ribbon cable is routed down below the control PCB so it will not be damaged by the cover when it is screwed back on.
9. Secure the junction box cover to the junction box.
10. At the recording device, gas monitor controller, or programmable controller, connect the cable's ground (shield) wire to an available chassis ground.

Start Up

This section describes procedures to start up the Eclipse and place the detector head into normal operation.

Introducing Incoming Power

1. Complete the installation procedures described earlier in this manual.
2. Verify that the power and detector wiring is correct and secure.
3. Turn on or plug in the incoming power at the power source end.
4. Verify that the LCD display is indicating the gas reading.

CAUTION: *Allow the detector to warm up for 15 minutes before you continue with the next section, "Setting the Fresh Air Signal."*

Setting the Fresh Air Signal

Note: For combustible gas and toxic versions of the Eclipse, setting the fresh air signal requires setting the zero signal. For oxygen versions it requires adjusting the span setting.

CAUTION: *If you suspect the presence of combustible gas, toxic gas, or that the oxygen content is not normal in the monitoring environment, use the calibration kit and the zero air calibration cylinder to introduce "fresh air" to the detector and verify an accurate fresh air setting.*

Verify that the transmitter is in a fresh air environment (environment known to be free of the target gas and combustible or toxic gas vapors and of normal oxygen content, 20,9%). If a fresh air environment cannot be verified, see the calibration section for instructions on how to use a zero air cylinder. **Leave the junction box cover on during this entire procedure.**

WARNING: ***The Eclipse is not an active gas monitoring device during the zero procedure. The 4-20 mA output signal will "freeze" at the level it was at just before entering the Calibration Menu. It will not indicate current readings until the Eclipse is in normal operation again.***

Combustible and Toxic versions, Setting the Zero Signal

1. Enter the Calibration Menu.
   - Press and release (cover and uncover) the optical switch with your finger 3 times and then press and hold your finger over the switch. After each press and release (cover and uncover), a number will display in the upper right of the LCD indicating how many times the sensor has been pressed. If you hold your finger over the sensor, an "H" will appear in place of the number in the upper right indicating that you are pressing and holding.
   - After 5 seconds, the following will display: CAL MODE HOLD SW. If you hold your finger over the sensor for 5 more seconds, the following will display: RELEASE to ZERO. Release your finger at this time and the current reading will display with the message ZERO in the upper left of the display and an "R" in the upper right indicating that the Eclipse is ready for a zero operation.

NOTE: If there is no switch activity for 60 seconds while the screen indicates that the unit is ready for a zero operation, the unit will return to normal operation.

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2. Press and release the optical switch once. The Eclipse will perform a zero adjust which will take approximately 3 seconds and then return to the ready screen.
3. Press and release the optical switch 3 times. A "3" will display in the upper right of the LCD and after a few seconds the unit will return to normal operation.

Oxygen version, Adjusting the Span Setting

1. Enter the Calibration Menu.
   - Press and release (cover and uncover) the optical switch with your finger 3 times and then press and hold your finger over the switch. After each press and release (cover and uncover), a number will display in the upper right of the LCD indicating how many times the sensor has been pressed. If you hold your finger over the sensor, an "H" will appear in place of the number in the upper right indicating that you are pressing and holding.
2. After 5 seconds, the following will display: CAL MODE HOLD SW. If you hold your finger over the sensor for 10 more seconds, the following will display: RELEASE to SPAN. Release your finger at this time and the current reading will display with the message SPAN in the upper left of the display and an "R" in the upper right indicating that the Eclipse is ready for a span adjustment.

NOTE: If there is no switch activity for 5 minutes while the screen indicates that the unit is ready for a span operation, the unit will return to normal operation.

3. Adjust the reading to 20.9 if necessary.
   - If the reading is below 20.9, press and hold the optical switch to increase the reading. Initially the reading increases slowly. If a large adjustment is needed, continue to hold and after a few seconds the reading will increase at a faster rate. Release when the desired reading is reached.
   - If the reading is above the 20.9, press and release once and then press and hold to decrease the reading. Initially the reading decreases slowly. If a large adjustment is needed, continue to hold and after a few seconds the reading will decrease at a faster rate. Release when the desired reading is reached.
4. Press and the release the optical sensor 3 times. After a few seconds the Eclipse will return to normal operation.

NOTE: If there is no switch activity for 60 seconds while the screen indicates that the unit is ready for a zero operation, the unit will return to normal operation.

Replacing Components of the Eclipse

Replacing the gas detector

Note: The entire detector must be changed when necessary for the combustible gas, oxygen, Cl2, and SO2 versions of the Eclipse. The detectors in the CO and H2S versions have a replaceable sensor. The entire CO and H2S detectors do not normally need replacement, just the sensors inside the stainless steel housing. See the next section, Replacing the CO and H2S Sensors, for directions to replace the CO and H2S sensors.

1. Turn off or disconnect power at the power source end.
2. Remove the junction box cover.
3. Grasp the round Eclipse nameplate though which the LCD display is visible.
4. Gently pull until the control PCB is pulled away from the junction box. The detector and power / signal terminal strips are now visible on the interconnect PCB. Take care not to pull too hard and damage the cable which connects the top and bottom PCB's.
5. If necessary, disconnect the cable from the interconnect PCB and lay it aside with the control PCB.
6. Disconnect the detector leads from the detector terminal strip. Note the position of the color-coded leads as you remove them.
7. Unscrew the detector from the junction box.
8. 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.
9. Connect the detector leads to the detector terminal strip as follows:
   - Combustible gas detector.

     Red wire to terminal labelled LEL RED, white to terminal labelled LEL WHT,

green wire to terminal labelled LEL GRN, black wire to terminal labelled LEL BLK.

- CO or H2S gas detector.

  Red wire to terminal labeled TOXIC RED, black wire to terminal labelled TOXIC XXX.

- Oxygen gas detector.

  Green wire to terminal labelled OXY GRN, white wire to terminal labelled OXY WHT.

CAUTION: *Allow the replacement detector to warm up for 15 minutes before you continue with the next step.*

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10. Re-install the control PCB (and ribbon cable if necessary). Be sure the ribbon cable is routed down below the control PCB so it will not be damaged by the cover when it is screwed back on.
11. Secure the junction box cover to the junction box.
12. Calibrate the replacement detector as described in the Calibration section of this manual.

Replacing the CO and H2S Sensors

1. Turn off or disconnect power at the power source end.
2. Unscrew the bottom section of the CO or H2S detector housing from the top section.
3. Unplug and remove the sensor.

NOTE: The CO sensor has a charcoal disk filter held onto it by a rubber retaining boot. When replacing a CO sensor, remove this filter and boot from the old sensor. RKI instruments recommends replacing the charcoal disk filter whenever a CO sensor is replaced. Re-install the charcoal disk filter and retaining boot before continuing.

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4. Carefully match the replacement sensor's male pins with the 4-socket pattern in the top section and plug it in.
5. Screw the bottom section of the detector housing into the top section.
6. Secure the junction box cover to the junction box.
7. Turn on power at the power source end.
8. Calibrate the detector as described in the Calibration section of this manual.

Replacing the CO Sensor Charcoal Filter

1. Turn off or disconnect power at the power source end.
2. Unscrew the bottom section of the CO or H2S detector housing from the top section.
3. Remove the rubber retaining boot with the charcoal filter disk from the sensor.
4. Replace the charcoal filter disk in the rubber retaining boot and install the boot onto the sensor.
5. Screw the bottom section of the detector housing into the top section.
6. Turn on power at the power source end.

Calibration, Combustible and Toxic Versions

This section describes how to calibrate the combustible gas and toxic gas versions of the Eclipse. It includes procedures to prepare for calibration, enter the Calibrate menu, set the zero reading, set the response reading, and return to normal operation. See the next section, **Calibration, Oxygen Version**, for instructions to calibrate an oxygen Eclipse.

WARNING: ***The Eclipse is not an active gas monitoring device during the calibration procedure. The 4-20 mA output signal will "freeze" at the level it was at just before entering the Calibration Menu. It will not indicate current readings until the Eclipse is in normal operation again.***

Preparing for Calibration

NOTE: The following procedure assumes the use of a calibration kit which includes a calibration gas cylinder, zero air cylinder, fixed flow regulator, calibration cup for the appropriate sensor, and a short piece of sample tubing to connect the regulator to the calibration cup.

NOTE: The following procedure assumes that hazardous gases are present. If a fresh air environment can be verified, applying zero air to the sensor is not necessary when setting the zero reading.

1. Connect the regulator to the calibration cup using the sample tubing.
2. Install the calibration cup over the detector, then screw the regulator into the zero air calibration cylinder.
3. Allow zero air to flow over the sensor for 1 minute then proceed.

Entering the Calibration Menu

1. Press and release (cover and uncover) the optical switch with your finger 3 times and then press and hold. After each press and release, a number will display in the upper right of the LCD indicating how many times the sensor has been pressed and released. If you press and hold your finger over the sensor, an "H" will appear in the upper right indicating that you are pressing and holding.
2. After 5 seconds, the following will display: CAL MODE HOLD SW. If you hold your finger over the sensor for 5 more seconds, the following will display: RELEASE to ZERO. Release your finger at this time and the current reading will display with the message ZERO in the upper left of the display and an "R" in the upper right indicating that the Eclipse is ready for a zero operation.

NOTE: If there is no switch activity for 60 seconds while the screen indicates that the unit is ready for a zero operation, the unit will return to normal operation.

Setting the Zero Reading

1. Verify that the gas reading has stabilized.
2. Press and release the optical switch once. The Eclipse will perform a zero adjust which will take approximately 3 seconds and return to the ready screen.
3. Unscrew the regulator from the zero air calibration cylinder.

   Leave the sample tubing connected to the regulator and the calibration cup.

Setting the Response Reading

1. Press and release the optical switch 3 times and then press and hold.
2. After approximately 5 seconds, the following will display: RELEASE to SPAN. Release your finger at this time and the current reading will display with the message SPAN in the upper left of the display and an “R” in the upper right indicating that the Eclipse is ready for a span operation.

NOTE: If there is no switch activity for 5 minutes while the screen indicates that the unit is ready for a span operation, the unit will return to normal operation.

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3. Screw the regulator onto the target gas cylinder.
4. Allow gas to flow over the sensor for 2 minutes.
5. Adjust the reading to match the target gas concentration if necessary.
   - If the reading is below the target gas concentration, press and hold the optical switch to increase the reading. Initially the reading increases slowly. If a large adjustment is needed, continue to hold and after a few seconds the reading will increase at a faster rate. Release when the desired reading is reached.
   - If the reading is above the target gas concentration, press and release once and then press and hold to decrease the reading. Initially the reading decreases slowly. If a large adjustment is needed, continue to hold and after a few seconds the reading will decrease at a faster rate. Release when the desired reading is reached.
6. Unscrew the regulator from the gas cylinder.
7. Remove the calibration cup from the sensor.
8. Press and the release the optical sensor 3 times. After a few seconds the Eclipse will return to normal operation.

Calibration, Oxygen Version

This section describes how to calibrate the oxygen version of the Eclipse. It includes procedures to prepare for calibration, enter the Calibrate menu, set the zero reading, set the response reading, and return to normal operation. See the previous section, **Calibration, Combustible and Toxic Versions**, for instructions to calibrate a combustible gas or toxic gas Eclipse.

WARNING: ***The Eclipse is not an active gas monitoring device during the calibration procedure. The 4-20 mA output signal will "freeze" at the level it was at just before entering the Calibration Menu. It will not indicate current readings until the Eclipse is in normal operation again.***

Preparing for Calibration

NOTE: The following procedure assumes the use of a calibration kit which includes a 100% nitrogen gas cylinder, zero air cylinder, fixed flow regulator, calibration cup for the oxygen sensor, and a short piece of sample tubing to connect the regulator to the calibration cup.

1. Connect the regulator to the calibration cup using the sample tubing.
2. Install the calibration cup over the detector, then screw the regulator into the 100% nitrogen calibration cylinder.
3. Allow 100% nitrogen to flow over the sensor for 1 minute then proceed.

Entering the Calibration Menu

1. Press and release (cover and uncover) the optical switch with your finger 3 times and then press and hold. After each press and release, a number will display in the upper right of the LCD indicating how many times the sensor has been pressed and released. If you press and hold your finger over the sensor, an "H" will appear in the upper right indicating that you are pressing and holding.
2. After 5 seconds, the following will display: CAL MODE HOLD SW. If you hold your finger over the sensor for 5 more seconds, the following will display: RELEASE to ZERO. Release your finger at this time and the current reading will display with the message ZERO in the upper left of the display and an "R" in the upper right indicating that the Eclipse is ready for a zero operation.

NOTE: If there is no switch activity for 60 seconds while the screen indicates that the unit is ready for a zero operation, the unit will return to normal operation.

Setting the Zero Reading

1. Verify that the oxygen reading has stabilized.
2. Press and release the optical switch once. The Eclipse will perform a zero adjust which will take approximately 3 seconds and return to the ready screen.
3. Unscrew the regulator from the 100% nitrogen calibration cylinder.

   Leave the sample tubing connected to the regulator and the calibration cup.

Setting the Response Reading

NOTE: The following procedure assumes that the oxygen content is not normal (20.9%). If a fresh air environment can be verified, applying zero air to the sensor is not necessary when adjusting the span setting.

1. Press and release the optical switch 3 times and then press and hold.
2. After approximately 5 seconds, the following will display: RELEASE to SPAN. Release your finger at this time and the current reading will display with the message SPAN in the upper left of the display and an “R” in the upper right indicating that the Eclipse is ready for a span adjustment.

NOTE: If there is no switch activity for 5 minutes while the screen indicates that the unit is ready for a span operation, the unit will return to normal operation.

3. Screw the regulator onto the zero air calibration cylinder.
4. Allow gas to flow over the sensor for 2 minutes.
5. Adjust the reading to 20.9% if necessary.
   - If the reading is below 20.9, press and hold the optical switch to increase the reading. Initially the reading increases slowly. If a large adjustment is needed, continue to hold and after a few seconds the reading will increase at a faster rate. Release when the desired reading is reached.
   - If the reading is above 20.9, press and release once and then press and hold to decrease the reading. Initially the reading decreases slowly. If a large adjustment is needed, continue to hold and after a few seconds the reading will decrease at a faster rate. Release when the desired reading is reached.
6. Unscrew the regulator from the zero air gas cylinder.
7. Remove the calibration cup from the sensor.
8. Press and the release the optical sensor 3 times. After a few seconds the Eclipse will return to normal operation.

Parts List

Table 6 lists replacement parts and accessories for the Eclipse Detector Head.

Table 2: Parts List

Part Number	Description
06-1248RK	Sample tubing (3/16 in. x 5/16 in.; specify length when ordering)
07-0203RK	Rubber retaining boot for charcoal filter
18-0405RK-01	Junction box w/o cover
18-0404RK	Junction box cover, with lens
33-7101RK	Charcoal filter disk
61-0140RK	LEL detector
65-2510RK	Oxygen sensor
71-0036RK	*Eclipse Detector Head Operator's Manual (this document)*
81-0007RK-01	Calibration cylinder, 50% LEL Hexane; 34 liter steel
81-0012RK-01	Calibration cylinder, 50% LEL Methane; 34 liter steel
81-0064RK-01	Calibration cylinder, CO, 50 ppm in air, 34 liter steel
81-0076RK-01	Zero air calibration cylinder,34 liter steel
81-0078RK-01	Calibration cylinder, 100% nitrogen, 34 liter steel
81-0151RK-04	Calibration cylinder, H_2S, 25 ppm in nitrogen, 34 liter aluminum
81-1003RK	Regulator, 0.5 liter/minute continuous flow, for combustible gas, nitrogen, and CO cylinders.
81-1004RK	Regulator, 0.5 liter/minute continuous flow, for H2S cylinder
81-1117RK	Calibration cup
ES-1531-CO	CO sensor, plug-in
ES-1537-H2S	H2S sensor, plug-in