**WARNING**

Read and understand this instruction manual before operating instrument. Improper use of the gas monitor could result in bodily harm or death.

Maintenance of the gas monitor is essential for proper operation and correct readings.

Bump test the instrument before each day’s use with a known concentration of each target gas. A bump test can be done in User Mode’s BUMP item or by applying gas in Measuring Mode. The instrument does not need to be calibrated unless it does not pass the User Mode bump test or does not respond appropriately, as defined by the user, in Measuring Mode. For more information about bump test and calibration requirements, see IEC 60079-29-2.
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WARNING: Understand manual before operating. Substitution of components may impair intrinsic safety. To prevent ignition of a hazardous atmosphere, batteries must only be changed or charged in an area known to be nonhazardous. Not tested in oxygen enriched atmospheres (above 21%).
Chapter 1: Introduction

Overview

This chapter briefly describes the GX-3R gas monitor. This chapter also describes the GX-3R Operator’s Manual (this document). Table 1 at the end of this chapter lists the specifications for the GX-3R.

About the GX-3R

Using an advanced detection system consisting of up to three gas sensors, the GX-3R personal four-gas monitor detects the presence of combustible gas, oxygen ($O_2$), carbon monoxide (CO), and hydrogen sulfide ($H_2S$) simultaneously. The GX-3R’s compact size and easy-to-use design make it ideally suited for a wide range of applications, including sewage treatment plants, utility manholes, tunnels, hazardous waste sites, power stations, petrochemical refineries, mines, paper mills, drilling rigs, and fire fighting stations. The GX-3R offers a full range of features, including:

- Simultaneous monitoring of one to four gases
- Liquid crystal display (LCD) for complete and understandable information at a glance
- Ultrabright alarm LEDs
- Distinctive audible/vibrating alarms for dangerous gas conditions and audible alarms for unit malfunction
- Microprocessor control for reliability, ease of use, and advanced capabilities
- Data logging functions
- Alarm trend data
- STEL, TWA, and over range alarms
- Peak readings
- Built-in time function
- Lunch break feature
- CSA “C/US” classification for Class I, Division I, Groups A, B, C, and D hazardous atmosphere (pending)

**WARNING:** The Model GX-3R detects oxygen deficiency, elevated levels of oxygen, combustible gases, carbon monoxide, and hydrogen sulfide, all of which can be dangerous or life threatening. When using the GX-3R, you must follow the instructions and warnings in this manual to assure proper and safe operation of the unit and to minimize the risk of personal injury. Be sure to maintain and periodically calibrate the GX-3R as described in this manual.
## Specifications

<table>
<thead>
<tr>
<th>Detection Range</th>
<th>Combustible Gas, Methane (CH₄) Calibration Standard</th>
<th>Oxygen (O₂)</th>
<th>Hydrogen Sulfide (H₂S)</th>
<th>Carbon Monoxide (CO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Range</td>
<td>n/a</td>
<td>0 - 25% volume</td>
<td>0 - 100.0 ppm</td>
<td>0 - 500 ppm</td>
</tr>
<tr>
<td>Reading Increment</td>
<td>1% LEL</td>
<td>0.1% volume</td>
<td>0.1 ppm</td>
<td>1 ppm</td>
</tr>
<tr>
<td>Factory Setting</td>
<td>10% LEL</td>
<td>19.5% volume, decreasing</td>
<td>5.0 ppm</td>
<td>25 ppm</td>
</tr>
<tr>
<td>Alarm Setting</td>
<td>25% LEL</td>
<td>18.0% volume, decreasing</td>
<td>30.0 ppm</td>
<td>50 ppm</td>
</tr>
<tr>
<td>Alarm H Setting</td>
<td>50% LEL</td>
<td>23.5% volume, increasing</td>
<td>100.0 ppm</td>
<td>1200 ppm</td>
</tr>
<tr>
<td>STEL Alarm</td>
<td>n/a</td>
<td>n/a</td>
<td>5.0 ppm</td>
<td>200 ppm</td>
</tr>
<tr>
<td>TWA Alarm</td>
<td>n/a</td>
<td>n/a</td>
<td>1.0 ppm</td>
<td>25 ppm</td>
</tr>
</tbody>
</table>

* The GX-3R is also available set up for general hydrocarbons and calibrated to a combustible gas other than methane, such as isobutane. Consult RKI Instruments, Inc. for further information.

## Table 2: GX-3R Specifications

<table>
<thead>
<tr>
<th>Sampling Method</th>
<th>Diffusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Time</td>
<td>T90 within 30 seconds</td>
</tr>
<tr>
<td>Display</td>
<td>Graphics LCD Display</td>
</tr>
</tbody>
</table>

**Operating Environment:**
- Continuous environment: -20°C to 50°C/Below 90% RH
- Temporary environment (up to 15 minutes): -40°C to 60°C/Below 95% RH

**Indication Accuracy for Detection Range**
- Combustible Gas, Catalytic Type Sensor
  - ± 5% of reading or ± 2% LEL (whichever is greater)
- Oxygen
  - ± 0.5% O₂
- Hydrogen Sulfide
  - ± 5% of reading or ± 2 ppm H₂S (whichever is greater)
- Carbon Monoxide
  - ± 5% of reading or ± 5 ppm CO (whichever is greater)

**Indication Accuracy for Service Range**
- Oxygen
  - ± 3.0% O₂
- Hydrogen Sulfide and Carbon Monoxide
  - ± 20% of reading
### About this Manual

The *GX-3R Operator’s Manual* uses the following conventions for notes, cautions, and warnings.

**NOTE:** Describes additional or critical information.

**CAUTION:** Describes potential damage to equipment.

**WARNING:** Describes potential danger that can result in injury or death.

---

**Safety/Regulatory**
- ATEX: II 1 G Ex da ia IIC T4 Ga
  - Certificate Number: DEKRA 17ATEX0103 X
- IECEx: Ex da ia IIC T4 Ga
  - Certificate Number: IECEx DEK 17.0050X

---

**Power Supply**
- Lithium ion battery pack

---

**Continuous Operating Hours @ 25 °C**
- 25 hours in Measuring Mode (Non Alarm Operation, Fully Charged)

---

**Case**
- High-impact Plastic, RF Shielded, Dust and Weather Proof (IP66/68)

---

**Included Accessories**
- Alligator clip
- Rubber boot
- Wrist strap
- Calibration cup
- Single-unit charger

---

**Other Accessories**
- 12 VDC adapter
- Multi-unit charger
- Belt clip
- SDM-3R
- RP-3R
- IrDA/USB Cable for connecting to a computer when using the Data Logger Management Program (not needed if computer has an infrared port)

---

**Dimensions and Weight**
- Approximately 65(H) x 58(W) x 26(D) mm (2.6”H x 2.3”W x 1.0”D)
- Approximately 100 g (3.5 oz.)
Chapter 2: Description

Overview

This chapter describes the GX-3R instrument and its accessories.

Instrument Description

Case

The GX-3R’s sturdy, high-impact plastic case is radio frequency (RF) resistant and is suitable for use in many environmental conditions, indoors and out. The case is dust proof and water resistant. A clear plastic window on the front of the case allows for LCD viewing. The black bottom cover, located on the bottom of the case, allows access to the filters and sensors. A sensor retainer and filter gasket help orient and retain the sensor and filters. Three threaded inserts on the back of the case allow for installation of an alligator clip or belt clip.

LCD

The digital LCD (liquid crystal display) simultaneously shows the gas reading for all installed sensors. The LCD also shows information for each of the GX-3R’s operating modes.
Control Buttons
Two control buttons, AIR and POWER MODE, are located below the LCD.

<table>
<thead>
<tr>
<th>Button</th>
<th>Function(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIR</td>
<td>• turns on LCD backlight</td>
</tr>
<tr>
<td></td>
<td>• resets alarm condition if LATCHING is set to ON in Maintenance Mode</td>
</tr>
<tr>
<td></td>
<td>• enters User Mode, Maintenance Mode, and Gas Select Mode when used</td>
</tr>
<tr>
<td></td>
<td>with POWER MODE button</td>
</tr>
<tr>
<td></td>
<td>• activates the demand zero function (adjusts the GX-3R’s fresh air reading)</td>
</tr>
<tr>
<td></td>
<td>• changes the value of a parameter available for adjustment</td>
</tr>
<tr>
<td></td>
<td>• scrolls through parameter options</td>
</tr>
<tr>
<td>POWER MODE</td>
<td>• turns the GX-3R on and off</td>
</tr>
<tr>
<td></td>
<td>• turns on LCD backlight</td>
</tr>
<tr>
<td></td>
<td>• enters and scrolls through Display Mode</td>
</tr>
<tr>
<td></td>
<td>• enters instructions into the GX-3R’s microprocessor</td>
</tr>
<tr>
<td></td>
<td>• resets alarm condition if LATCHING is set to ON in Maintenance Mode</td>
</tr>
<tr>
<td></td>
<td>• enters User Mode, Maintenance Mode, and Gas Select Mode when used</td>
</tr>
<tr>
<td></td>
<td>with AIR button</td>
</tr>
</tbody>
</table>

Table 3: GX-3R Control Button Functions

Alarm LEDs
The six alarm LEDs around the edge of the case alert you to gas, low battery, and failure alarms.

Buzzer
One solid-state electronic buzzer is located inside the case. Sound exits the case through a hole in the middle front of the case. The buzzer sounds for gas alarms, malfunctions, low battery voltage, and as an indicator during use of the GX-3R’s many display and adjustment options.

Vibrator
A vibrating motor inside the GX-3R case vibrates for gas alarms, unit malfunctions, and as an indicator during normal use of the various modes of the GX-3R.

NOTE: If STEALTH is set to ON, the vibrator only functions when VIB in the STEALTH Gas Select Mode item is set to ON. See “Stealth and Vibrator Settings (STEALTH)” on page 101.

Sensors
The GX-3R uses three sensors to monitor combustible gas, oxygen (O₂), carbon monoxide (CO), and hydrogen sulfide (H₂S) simultaneously. The sensors are located inside the GX-3R and are held in their sockets by the sensor retainer and bottom cover. The sensors use different detection principles, as described below.

Combustible Gas Sensor
The combustible gas sensor detects combustible gas in the % LEL range using a catalytic element. The element’s resistance changes based on the reaction of gas with oxygen. The change in resistance affects the current flowing through the element. The GX-3R’s circuitry amplifies the current, converts the current to a gas concentration, and displays the concentration on the LCD.
The standard calibration for the combustible gas sensor is to methane but the sensor will still detect and respond to a variety of combustible gases.

**O₂/CO/H₂S Sensors**

The O₂, CO, and H₂S sensors are electrochemical cells that consist of two precious metal electrodes in a dilute acid electrolyte. A gas permeable membrane covers the sensor face and allows gas to diffuse into the electrolyte. The gas reacts in the sensor and produces a current proportional to the concentration of the target gas. The GX-3R’s circuitry amplifies the current, converts the current to a gas concentration, and displays the concentration on the LCD.

There are 4 different types of CO and H₂S sensors available:

- **CO only (ESR-A13P):** A single electrochemical cell that detects CO. Instruments with this sensor cannot detect H₂S.
- **H₂ compensated CO (ESR-A1CP):** A single electrochemical cell that detects CO. This sensor does not respond to or responds minimally to hydrogen (displays H₂ RICH once H₂ concentration reaches 2000 ppm). Instruments with this sensor cannot detect H₂S.
- **H₂S only (ESR-A13i):** A single electrochemical cell that detects H₂S. Instruments with this sensor cannot detect CO.
- **CO/H₂S (ESR-A1DR):** A combination electrochemical cell that detects both CO and H₂S.

**Dummy Sensors**

A dummy sensor is installed in any units that have less than 3 sensors. Dummy sensors are factory installed. The flat side of the dummy sensor faces away from the GX-3R and the hollow side faces toward the GX-3R.

**Filters**

**Combustible Gas Sensor H₂S Removal Filter Disk (Dark Red)**

An H₂S removal filter disk is placed into a recess in the filter gasket over the combustible gas sensor. The filter disk prolongs the life of the combustible gas sensor by preventing H₂S in the ambient air from reaching the sensor. The H₂S filter disk is dark red in color and although it may darken over time, its color is not indicative of remaining filter life.

The H₂S filter disk needs replacing once it’s been exposed to 33 ppm hours of H₂S. This means the filter needs replacing after 80 minutes of exposure to 25 ppm H₂S which equates to 40 2-minute calibrations with a cylinder containing 25 ppm H₂S. If H₂S exists in the monitoring environment, the H₂S filter disk will have to be replaced more frequently.

**CO/H₂S Sensor Dual Filter (Black and White)**

A dual filter is placed into a recess in the filter gasket over the dual CO/H₂S sensor. The black half is a charcoal filter for the CO sensor. The white half is a humidity filter for the H₂S sensor.

Replace the filter if you notice:

- Unexplained CO readings.
- For users with a 1 ppm H₂S alarm setpoint: A drift on the H₂S zero reading, unexplained H₂S readings, the filter appears dirty, or every 6 months (whichever is sooner).
**CO Sensor Charcoal Filter (Black)**

A black charcoal filter is placed into a recess in the filter gasket over the CO sensor. The charcoal filter disk scrubs H₂S and certain hydrocarbons out of the sample to avoid false CO readings. If false or elevated CO readings are noticed, especially in the presence of H₂S, change the charcoal filter.

**H₂S Sensor Humidity Filter (White)**

A white humidity filter covers the H₂S sensor. The filter absorbs humidity in the sampling environment to prevent unstable readings around 0 ppm H₂S. For users with a 1 ppm H₂S alarm setpoint, the filter should be replaced every 6 months, if you notice a drift on the zero reading, or if the filter appears dirty (whichever is sooner). For users with a 2 ppm or higher H₂S setpoint, the filter does not necessarily need to be replaced.

**Hydrophobic Dust Filter**

The oval-shaped hydrophobic dust filter sits on the filter gasket, covering the sensor ports and the filters.

**Infrared Communications Port**

An infrared (IR) communications port is located on the top of the case, near the top LEDs. Logged data transmits through the port in standard IrDA protocol. A computer’s infrared port or an IrDA/USB cable connected to a USB port can be used to download data to the GX-3R Data Logger Management Program. See the GX-3R Data Logger Management Program operator’s manual for data logging and downloading instructions.

**Charging Socket and Battery Pack**

A charging socket on the back of the instrument allows for charging cable connection. A lithium ion (Li-ion) battery pack powers the GX-3R. At 25°C the battery lasts at least 25 hours. The battery icon in the upper right of the LCD shows remaining battery life. A low battery warning activates when the GX-3R detects a low battery voltage. The GX-3R sounds a dead battery alarm when battery voltage is too low for Measuring Mode. The battery pack can be recharged by using the GX-3R charging cable. The battery pack is not user-replaceable.

**NOTE:** Use of batteries or battery chargers not specified by RKI Instruments, Inc. will compromise the CSA classification and may void the warranty. See “Recharging the Batteries” on page 75.

**WARNING:** To prevent ignition of a hazardous atmosphere, batteries must only be changed or charged in an area known to be nonhazardous.

**AVERTISSEMENT:** Pour éviter l’inflammation d’une atmosphère dangereuse, les batteries doivent uniquement être modifiés ou facturés dans une zone connue comme non dangereuse.
Included Accessories

**Alligator Clip**
An alligator clip is installed on the back of the GX-3R. The alligator clip can be used to attach the GX-3R to clothing or a belt. Teeth in the alligator clip’s jaws prevent the unit from slipping off.

![Alligator Clip](Figure 2: Alligator Clip)

**Rubber Boot**
A black rubber boot is installed on the GX-3R.

**Wrist Strap**
A wrist strap is included with the GX-3R and can be attached to the wrist strap installation feature on the left side of the GX-3R’s case.

**Single-Unit AC Charger**
The charging cable is a 4 foot cable with an AC adapter on one end and a charging plug that connects to the GX-3R on the other end.

![Charging Cable](Figure 3: Charging Cable)
**Calibration Cup**

Use the calibration cup to apply gas during a bump test, calibration, or gas test. The calibration cup has an installation orientation to observe. “Front” and “rear” imprinting on the bottom of the cup correspond to the front and rear of the GX-3R when the calibration cup is installed. In addition, a “front” label on the front of the calibration cup should be visible when viewing the LCD with the calibration cup installed.

![Figure 4: Calibration Cup](image)

**Other Accessories**

**12 VDC Charger**

The 12 VDC charger is a 4 foot cable with a vehicle plug on one end and plug that connects to the GX-3R’s power jack on the other end.

**Multi-Unit AC Charger**

The multi-unit charger is a 4 foot wall plug style adapter that plugs into a bar. The bar has five 2-foot cables coming out one side. The end of each of the five cables has a plug that connects to the GX-3R’s power jack. The AC adapter is rated 100 - 240 VAC input, 5.99 VDC output.

**Belt Clip**

A belt clip makes it easy to hook the GX-3R to a utility belt.

![Figure 5: Belt Clip](image)

**SDM-3R**

The SDM-3R is a calibration station for the GX-3R and GX-3R Pro. The station’s buttons can be used for operations (Standalone Mode) or a computer can be used to control the docking station (PC Controlled Mode). See the appropriate SDM-3R manual for more information.
RP-3R
The RP-3R is a pump that draws sample to the GX-3R.

IrDA Cable
Unless your computer has a built-in IrDA port, an IrDA cable is needed to establish communication between the GX-3R and the Datalogging Program or the User Setup Program.
Chapter 3: Measuring Mode

Overview

This chapter explains how to use the GX-3R to perform confined space entry monitoring or general area monitoring in Measuring Mode.

Start Up

This section explains how to start up the GX-3R, get it ready for operation, and turn it off.

NOTE: The screens illustrated in this section are for a standard 4-gas unit. The screens displayed by your GX-3R may be slightly different.

Turning On the GX-3R

To illustrate certain functions, the following description of the GX-3R start up sequence assumes that the following menu items in User Mode are turned on: LUNCH, CAL RMDR, and BUMP.RMDR in User Mode, and ID DISP and AUTOZERO in Maintenance Mode. If any of these items are turned off, then the corresponding screens will not appear.

1. Press and briefly hold down POWER MODE. Confirm that the LCD turns on, the LEDs flash, the buzzer sounds, and the motor vibrates before continuing with operation. Release the POWER MODE button when you hear a beep.

2. If LUNCH is set to ON (factory setting if OFF, see “Updating the Lunch Break Setting (LUNCH)” on page 67), the Lunch Break Screen appears. The unit counts down from 5 seconds.

   a. Continue Accumulating: To continue accumulating peak and time-weighted average (TWA) readings from the last time the GX-3R was used, press and release POWER MODE or allow the countdown to reach 0. The short-term exposure limit (STEL) reading is reset each time the GX-3R is turned on.

   b. Reset Accumulation: To reset the accumulation of peak and time-weighted average (TWA) readings, press and release AIR before the countdown reaches 0.
3. If **CAL RMDR** is set to **ON** (factory setting) and a calibration is due, the screen that appears next depends on how **CAL EXPD** is set in User Mode (see “CAL EXPD” on page 59). The three possible screens are described below. If a calibration is not due, the instrument shows how many days are left until a calibration is due.

<table>
<thead>
<tr>
<th>CAL EXPD set to CONFIRM (factory setting)</th>
<th>CAL EXPD set to CANT USE</th>
<th>CAL EXPD set to NONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>![CAL--LMT] 7:49 CAL</td>
<td>![CAL--LMT] 7:49 FAIL</td>
<td>![NEXCal] 7:49 0d</td>
</tr>
<tr>
<td>Sound</td>
<td>Buzzer sounds double pulsing tone</td>
<td>Buzzer sounds double pulsing tone</td>
</tr>
<tr>
<td>Action</td>
<td>• <strong>Option A, Perform calibration</strong>: Press and release POWER MODE to perform a calibration. The instrument takes you straight to the AUTO CAL CYL A screen in User Mode’s GAS CAL\AUTO CAL item. See “Performing a Calibration (GAS CAL)” on page 48 for calibration instructions. If the calibration is successful, the screen above will not appear again until the unit is due for calibration. If the calibration is not successful, the screen above will again appear in the startup sequence. • <strong>Option B, Bypass message</strong>: To continue without performing a calibration, press and release AIR.</td>
<td>• The GX-3R cannot be used until a successful calibration is performed. Press and release POWER MODE to perform a calibration. The instrument takes you straight to the AUTO CAL CYL A screen in User Mode’s GAS CAL\AUTO CAL item. If you don’t press POWER MODE, the instrument automatically goes to the AUTO CAL CYL A screen after 6 seconds. See “Performing a Calibration (GAS CAL)” on page 48 for calibration instructions. If the calibration is successful, the screen above will not appear again until the unit is due for calibration. If the calibration is not successful, the screen above will again appear in the startup sequence.</td>
</tr>
</tbody>
</table>
4. If BUMP.RMDR is set to ON (factory setting is OFF) and a bump test is due, the screen that appears next depends on how BUMP.EXPD is set in User Mode (see “BUMP.EXPD” on page 63). The three possible screens are described below. If a bump test is not due, the instrument shows how many days are left until a bump test is due.

<table>
<thead>
<tr>
<th>LCD</th>
<th>BUMP.EXPD set to CONFIRM (factory setting)</th>
<th>BUMP.EXPD set to CANT USE</th>
<th>BUMP.EXPD set to NONE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7:49</td>
<td>7:49</td>
<td>7:49</td>
</tr>
<tr>
<td>CAL</td>
<td>BUMP--LMT</td>
<td>FAIL</td>
<td>NEXT BP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sound</th>
<th>Buzzer sounds double pulsing tone</th>
<th>Buzzer sounds double pulsing tone</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>• Option A, Perform bump test: Press and release POWER MODE to perform a bump test. The instrument takes you straight to the BUMP CYL A screen in User Mode’s BUMP item. See “Performing a Bump Test (BUMP)” on page 42 for bump test instructions. If the bump test is successful, the screen above will not appear again until the unit is due for bump testing. If the bump test is not successful, the screen above will again appear in the startup sequence. • Option B, Bypass message: To continue without performing a bump test, press and release AIR.</td>
<td>The GX-3R cannot be used until a successful bump test has been performed. Press and release POWER MODE to perform a bump test. The instrument takes you straight to the BUMP CYL A screen in User Mode’s BUMP item. If you don’t press POWER MODE, the instrument automatically goes to the BUMP CYL A screen after 6 seconds. See “Performing a Bump Test (BUMP)” on page 42 for bump test instructions. If the bump test is successful, the screen above will not appear again until the unit is due for bump testing. If the bump test is not successful, the screen above will again appear in the startup sequence.</td>
<td>• Option A, Perform bump test: To perform a bump test, press and release POWER MODE. The instrument takes you straight to the BUMP CYL A screen in User Mode’s BUMP item. • Option B, Bypass message: To continue without performing a bump test, wait a few seconds for the instrument to continue with its startup sequence.</td>
</tr>
</tbody>
</table>

5. The Date/Time Screen appears for a few seconds.
6. The Battery Voltage Screen appears for a few seconds.
   An “AL-L” at the bottom of the screen indicates that the alarms are set to latching. An
   “AL-A” at the bottom of the screen indicates that the alarms are set to auto reset. See
   pg.90 for a description of how to change this parameter.

   ![Battery Voltage Screen]

   7:49
   bAtt
   3.8
   AL - L V

7. The following screens display for 3 seconds each: the Gas Name Screen, the Full Scale
   Screen, the Warning Setpoint Screen, the Alarm Setpoint Screen, the Alarm H Setpoint
   Screen, the STEL Alarm Screen, and TWA Alarm Screen.

   **NOTE:** If the combustible gas is set to something other than CH4 or H2 in Gas Select
   Mode, the combustible channel is displayed as “HC” and the gas formula for the
   combustible gas sensor’s target gas appears during startup.
8. If **ID DISP** is set to **ON** (factory setting is **OFF**, see pg.91), the User ID Screen appears for a few seconds, followed by the Station ID Screen.

![Image of User ID Screen]

![Image of Station ID Screen]

9. If the GX-3R experiences a sensor failure during start up, the display shows which sensor failed and the buzzer sounds a double pulsing tone once per second. In the example below, the combustible gas sensor failed.

![Image of Sensor Failure Display]

Press and release POWER MODE to acknowledge the failure and continue. “- - - -” replaces the failed sensor’s gas reading. Replace the failed sensor as soon as possible.

10. If **AUTOZERO** is set to **ON** (factory setting is **OFF**, see pg.91), the instrument prompts you to do an auto zero. An auto zero operation sets the combustible gas, H₂S, and CO channels to zero and the OXY channel to 20.9%.

**WARNING:** Make sure that the instrument is in a known fresh air environment (an environment free of combustible or toxic gases and of normal oxygen content, 20.9%) before performing an auto zero operation. If you perform an auto zero operation in an area with gases present, the adjustment will not be accurate.

You must press and release the POWER MODE button to perform an auto zero function. If you do not press any key, after 15 seconds, the instrument enters Measuring Mode without performing an auto zero.

![Image of Auto Zero Function]
11. If the combustible gas sensor is nearing the end of its useful life, the reading conversions that can be made in the LIST item in Display Mode become limited. The following screen displays, the LEDs flash, and the instrument beeps.

Press and release POWER MODE to confirm the limited gas list and continue to Measuring Mode. Replace the combustible sensor as soon as possible.

12. The GX-3R is now monitoring for gas in Measuring Mode. The Measuring Mode Screen displays the current gas reading for each target gas.

Performing a Demand Zero

Perform a demand zero before using the GX-3R. This sets the combustible gas, H₂S, and CO channels to zero and the OXY channel to 20.9%.

1. Find a fresh-air environment. This is an environment free of toxic or combustible gases and of normal oxygen content (20.9%).
2. Turn on the unit as described above in “Turning On the GX-3R”.
3. Press and hold AIR. The LCD prompts you to continue holding AIR and the buzzer pulses while you hold the button (if KEY TONE is set to ON in User Mode).
4. Continue to hold AIR until the LCD prompts you to release it. The GX-3R sets the fresh air reading for all channels. Start up is complete and the unit is now ready for monitoring.

Turning Off the GX-3R

1. Press and hold POWER MODE.
2. TURN OFF appears on the display and the buzzer pulses for about five seconds (if KEY TONE is set to ON in User Mode).
3. Release the button when TURN OFF disappears from the display.
Measuring Mode Operation

When the GX-3R completes its startup sequence, it is in Measuring Mode. In Measuring Mode the GX-3R continuously monitors the sampled atmosphere and displays the target gas concentrations. The GX-3R is considered to be in Normal Operation if there are no alarm indications.

Heart Symbol: The heart symbol in the upper left corner of the LCD indicates the operation status and blinks when normal. A microprocessor error causes the heart symbol to stop flashing or to disappear.

Check Mark: If BUMP.RMDR is set to ON and if a bump test is not due, a check mark appears in the upper left corner of the LCD.

“S”: If the instrument is operating in Stealth Mode, an “S” appears at the top of the LCD.

Backlight: In a low-light environment, press and release either button to turn on the display backlight. See pg.69 to program backlight duration.

Confirmation/Non-Compliance Indicator: If the BEEP menu item in User Mode is set to anything other than OFF, the GX-3R gives periodic indications to confirm that it’s operating or to indicate a non-compliance (pg.67).

Monitoring an Area

1. Start up the GX-3R as described above in “Start Up” on page 16. It is now in Measuring Mode.

2. Take the GX-3R to the monitoring area.

3. Wait at least 15 seconds and observe the display for gas readings. If a reading is observed, allow the reading to stabilize to determine the gas concentrations present.

4. If a gas alarm occurs, take appropriate action. See pg.26.
Combustible Gas Detection

There are three issues to keep in mind when monitoring for combustible gas.

- The combustible gas sensor responds to any combustible gas. The standard calibration gas for the combustible gas channel is methane (CH₄). If the instrument is set up for and calibrated to a different combustible gas, such as hexane or propane, the gas name right above the readings displays as “HC”.

The table below lists the conversion factors for several hydrocarbon gases if the GX-3R is calibrated to methane. To use this table, multiply the display reading on the combustible gas channel by the factor in the appropriate row to obtain the actual gas concentration. For example, if you are detecting ethylene and the display reads 10% LEL for the combustible gas channel, you actually have 10% LEL x 1.20 = 12.0% LEL ethylene present.

### Table 4: LEL Hydrocarbon Conversions

<table>
<thead>
<tr>
<th>Gas</th>
<th>LEL Conversion Factor (from CH₄ Cal.)</th>
<th>Gas</th>
<th>LEL Conversion Factor (from CH₄ Cal.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>0.45</td>
<td>IPA</td>
<td>0.61</td>
</tr>
<tr>
<td>Acetylene</td>
<td>0.70</td>
<td>Isobutane</td>
<td>0.91</td>
</tr>
<tr>
<td>Benzene</td>
<td>0.40</td>
<td>MEK</td>
<td>0.38</td>
</tr>
<tr>
<td>Butadiene</td>
<td>0.66</td>
<td>Methane</td>
<td>1.00</td>
</tr>
<tr>
<td>Cyclopentane</td>
<td>0.69</td>
<td>Methanol</td>
<td>0.55</td>
</tr>
<tr>
<td>DME</td>
<td>0.86</td>
<td>MIBK</td>
<td>0.25</td>
</tr>
<tr>
<td>Ethane</td>
<td>1.06</td>
<td>MMA</td>
<td>0.30</td>
</tr>
<tr>
<td>Ethanol</td>
<td>0.51</td>
<td>Nonane</td>
<td>0.11</td>
</tr>
<tr>
<td>Ethyl Acetate</td>
<td>0.35</td>
<td>Propane</td>
<td>0.89</td>
</tr>
<tr>
<td>Ethylene</td>
<td>1.20</td>
<td>Propylene</td>
<td>1.03</td>
</tr>
<tr>
<td>Heptane</td>
<td>0.32</td>
<td>THF</td>
<td>0.43</td>
</tr>
<tr>
<td>Hexane</td>
<td>0.53</td>
<td>Toluene</td>
<td>0.22</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>1.05</td>
<td>Xylene</td>
<td>0.13</td>
</tr>
</tbody>
</table>

- The GX-3R protects the combustible gas sensor by temporarily turning off the sensor power if levels exceeding 100% LEL are detected. Nevertheless, combustible gas concentrations above 100% LEL can still affect the zero level or calibration of the combustible gas sensor.

**CAUTION:** Do not expose the combustible gas sensor to high concentrations of combustible gas such as that from a butane lighter. Exposure to high concentrations of combustible gas may adversely affect the performance of the sensor.

**CAUTION:** Any rapid increase in the combustible gas reading on the combustible gas channel followed by a declining or erratic reading may indicate a gas concentration above the LEL which may be hazardous.
Some gases such as silicone vapors, chlorinated hydrocarbons, and sulphur compounds can contaminate the sensor’s detection elements. This causes sensor damage and/or a reduced response to combustible gas. Make every effort to avoid these gases. The H₂S scrubber disks protect the combustible sensor from H₂S, but you should avoid other sulphur compounds.

**H₂-Compensated CO Detection**

- GX-3R displays CO readings.
- H₂ reading is not displayed but “H2 RICH” appears once H₂ concentration rises above 2000 ppm.

### Alarms

This section covers alarm indications in Measuring Mode. It also describes responding to and resetting an alarm condition.

**NOTE:** False alarms may be caused by radio frequency (RF) or electromagnetic (EMI) interference. Keep the GX-3R away from RF and EMI sources such as radio transmitters or large motors.

**Alarm Indications**

The GX-3R buzzer sounds an alarm, the LEDs flash, and the vibrator pulses when any sort of alarm condition or failure occurs. If the GX-3R is operating in Stealth Mode, the buzzer does not sound and the vibrator’s operation depend on the VIB setting in Gas Select Mode’s STEALTH menu item. See pg.101 for more information.

**NOTE:** If an alarm condition occurs while you are in Display Mode, the GX-3R automatically returns to the Measuring Mode screen.

The table below summarizes the types of alarms produced by the GX-3R and their indications.

**Table 5: Alarm Types and Indications**

<table>
<thead>
<tr>
<th>Alarm Type</th>
<th>Visual Indications</th>
<th>Other Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Warning</strong></td>
<td>• Affected channel’s gas reading, gas name, and units flash</td>
<td>• High-low tone sounding once per second</td>
</tr>
<tr>
<td>Concentration of gas rises above the Warning setting or falls below the Warning setting for O₂.</td>
<td>• WARNING appears at the bottom of the LCD</td>
<td>• Vibrator pulses once per second</td>
</tr>
<tr>
<td></td>
<td>• Alarm LEDs flash in circle sequence once per second</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Backlight turns on</td>
<td></td>
</tr>
<tr>
<td><strong>Alarm</strong></td>
<td>• Affected channel’s gas reading, gas name, and units flash</td>
<td>• High-low tone sounding twice per second</td>
</tr>
<tr>
<td>Concentration of gas rises above the Alarm setting.</td>
<td>• ALARM appears at the bottom of the LCD</td>
<td>• Vibrator pulses twice per second</td>
</tr>
<tr>
<td></td>
<td>• Alarm LEDs flash in circle sequence twice per second</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Backlight turns on</td>
<td></td>
</tr>
</tbody>
</table>
Table 5: Alarm Types and Indications

<table>
<thead>
<tr>
<th>Alarm Type</th>
<th>Visual Indications</th>
<th>Other Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alarm H</strong></td>
<td>• Affected channel’s gas reading, gas name, and units flash</td>
<td>• High-low tone sounding twice per second</td>
</tr>
<tr>
<td></td>
<td>• <strong>ALARM H</strong> appears at the bottom of the LCD</td>
<td>• Vibrator pulses twice per second</td>
</tr>
<tr>
<td></td>
<td>• Alarm LEDs flash in circle sequence twice per second</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Backlight turns on</td>
<td></td>
</tr>
<tr>
<td><strong>TWA or STEL</strong></td>
<td>• Affected channel’s gas reading, gas name, and units flash</td>
<td>• High-low tone sounding once per second</td>
</tr>
<tr>
<td></td>
<td>• <strong>TWA</strong> or <strong>STEL</strong> appears at the bottom of the LCD</td>
<td>• Vibrator pulses once per second</td>
</tr>
<tr>
<td></td>
<td>• Alarm LEDs flash in circle sequence once per second</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Backlight turns on</td>
<td></td>
</tr>
<tr>
<td><strong>Over Range</strong></td>
<td>• Affected channel’s gas reading is replaced with a flashing □□□</td>
<td>• High-low tone sounding twice per second</td>
</tr>
<tr>
<td></td>
<td>• Gas name and units flash</td>
<td>• Vibrator pulses twice per second</td>
</tr>
<tr>
<td></td>
<td>• <strong>OVER</strong> appears at the bottom of the LCD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alarm LEDs flash in circle sequence twice per second</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Backlight turns on</td>
<td></td>
</tr>
<tr>
<td><strong>Minus Over Range</strong></td>
<td>• Affected channel’s gas reading is replaced with a flashing □□□</td>
<td>• High-low tone sounding twice per second</td>
</tr>
<tr>
<td></td>
<td>• Gas name and units flash</td>
<td>• Vibrator pulses twice per second</td>
</tr>
<tr>
<td></td>
<td>• <strong>M OVER</strong> appears at the bottom of the LCD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alarm LEDs flash in circle sequence twice per second</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Backlight turns on</td>
<td></td>
</tr>
<tr>
<td><strong>Low Battery Warning</strong></td>
<td>• The last bar in the battery icon disappears and the battery icon starts</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>flashing</td>
<td></td>
</tr>
<tr>
<td><strong>Dead Battery Alarm</strong></td>
<td>• Gas readings disappear. <strong>FAIL</strong> appears in the middle of the screen and <strong>BATTERY</strong> appears at the bottom of the screen.</td>
<td>Double pulsing tone once per second</td>
</tr>
<tr>
<td></td>
<td>• Alarm LEDs flash once per second</td>
<td></td>
</tr>
<tr>
<td><strong>Sensor Failure</strong></td>
<td>• <strong>SENSOR</strong> appears at the bottom of the screen and the failed sensor(s) are</td>
<td>Double pulsing tone once per second</td>
</tr>
<tr>
<td></td>
<td>indicated with <strong>FAIL</strong> under the gas name.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alarm LEDs flash once per second</td>
<td></td>
</tr>
</tbody>
</table>
Responding to Alarms
This section describes response to gas, over range, battery, sensor failure, clock failure, and system failure alarms.

**Responding to Gas Alarms**
1. Determine which gas alarm has been activated.
2. Follow your established procedure for an increasing gas condition or a decreasing oxygen condition.
3. Reset the alarm as necessary or allowed.
   a. If **LATCHING** is set to **ON** (factory setting) in Maintenance Mode, the gas reading must fall below (or rise above for an oxygen low alarm) an alarm setting before you can reset the alarm condition using POWER MODE or AIR.
   b. If **LATCHING** is set to **OFF** in Maintenance Mode, the alarm condition will automatically reset when gas reading falls below (or rises above for an oxygen low alarm) an alarm setpoint.

**Responding to Over Range Alarms**

**WARNING:** An over range condition may indicate an extreme combustible gas, toxic gas, or oxygen concentration. Confirm the gas concentration with a different GX-3R or with another gas detecting device.

**CAUTION:** High off-scale readings may indicate an explosive concentration.

**PRUDENCE:** Des lectures élevées hors échelle peuvent indiquer une concentration explosive.

1. Determine which channel is in alarm.
2. Follow your established procedure for an extreme gas condition.
3. If **LATCHING** is set to **ON** (factory setting) in Maintenance Mode, reset the alarm using POWER MODE or AIR once the alarm condition clears.
4. Calibrate the GX-3R as described on pg.38.
5. If the over range condition continues or if you are not able to successfully calibrate the unit, you may need to replace the sensor that has triggered the over range alarm.

---

Table 5: Alarm Types and Indications

<table>
<thead>
<tr>
<th>Alarm Type</th>
<th>Visual Indications</th>
<th>Other Indications</th>
</tr>
</thead>
</table>
| Clock Failure  | • FAIL appears in the middle of the screen and CLOCK appears at the bottom of the screen.  
|                | • Alarm LEDs flash once per second                                                 | Double pulsing tone once per second      |
| System Failure | • FAIL SYSTEM appears at the bottom of the screen and an error code displays in the middle  
|                | • Alarm LEDs flash once per second                                                 | Double pulsing tone once per second      |
6. If the over range condition continues after you have replaced the sensor, contact RKI Instruments, Inc. for further instructions.

**Responding to Battery Alarms**

*WARNING:* The GX-3R is not operational as a gas monitoring device during a dead battery alarm. Take the Model GX-3R to a non-hazardous area and replace or recharge the batteries as described in “Recharging the Batteries” on page 75.

The GX-3R is fully functional during a low battery warning. However, only 1-2 hours of operating time remain. The amount of operating time left depends on LCD backlight use and the alarm frequency. Recharge the battery as soon as possible as described in “Recharging the Batteries” on page 75.

*NOTE:* Alarms and the LCD back light consume battery power and reduce the amount of operating time remaining.

**Responding to Sensor Failure Alarms**

1. Determine which sensor triggered the sensor failure alarm.
2. Calibrate the failed sensor, as described on pg.38.
3. If the sensor failure continues or if the sensor could not be calibrated, replace the sensor as described on pg.79.
4. If the sensor failure condition continues after you have replaced the sensor, contact RKI Instruments, Inc. for further instructions.

**Responding to Clock Failure Alarms**

A clock failure alarm occurs if the unit’s internal clock malfunctions.

1. Press and release POWER MODE to continue into Measuring Mode.

*CAUTION:* There will be no datalogging function if you operate the instrument after a clock failure.

2. Attempt to set the date using the DATE menu item in User Mode. See pg.71.
3. If the date cannot be set correctly, contact RKI Instruments, Inc. as soon as possible.
Responding to System Failure Alarms

1. If a system failure occurs, the system failure screen displays an error code as shown below:

   ![Failure Screen]

   - **FAIL**
   - **031**
   - **SYSTEM**

2. The error code meanings are shown in the table below:

   **Table 6: Error Code Explanation**

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>ROM failure</td>
</tr>
<tr>
<td>010</td>
<td>RAM failure</td>
</tr>
<tr>
<td>021</td>
<td>FRAM failure</td>
</tr>
<tr>
<td>031</td>
<td>FLASH memory failure</td>
</tr>
<tr>
<td>080</td>
<td>Acceleration sensor failure</td>
</tr>
<tr>
<td>081</td>
<td>PCB failure</td>
</tr>
<tr>
<td>082</td>
<td>Temperature sensor failure</td>
</tr>
</tbody>
</table>

3. If the error code is anything but 031 as shown above, the instrument cannot be used. Contact RKI Instruments, Inc. as soon as possible.
   
   If the error code is 031, you may press and release POWER MODE to continue into Measuring Mode if the instrument must be used temporarily.

   **CAUTION:** There will be no datalogging function if you operate the instrument after a 031 system failure. Contact RKI Instruments, Inc. as soon as possible.
Data Logging

The GX-3R logs Measuring Mode gas readings, alarm data, and calibration data to its internal memory. Logged data can be downloaded to a computer via the infrared communications port on the front of the unit.

To utilize the GX-3R Pro’s downloading capability, you will need the GX-3R Data Logger Management Program and a computer with an infrared port or a USB port that runs one of the following operating systems: Windows 7, Windows 8, or Windows 10. If your computer has an infrared port, then no additional accessories are needed to download data from the GX-3R Pro. If your computer does not have an infrared port but does have a USB port, a USB/IrDA adapter cable can be used to download data from the GX-3R Pro. The GX-3R Data Logger Management Program is available at www.rkiinstruments.com/gx3rpro. The USB/IrDA adapter cable is available from RKI Instruments, Inc.

The data logging capacity depends on how often the GX-3R stores data, how many channels are active, and how often the GX-3R is turned on and off. The table below illustrates how much data logging time is available for the various interval times. It assumes that the unit has three sensors, is only turned on once, and there are no alarm occurrences. The data logging interval time must be set using the GX-3R Data Logger Management Program.

<table>
<thead>
<tr>
<th>Interval Time</th>
<th>Data Logging Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 seconds</td>
<td>10 hours</td>
</tr>
<tr>
<td>20 seconds</td>
<td>20 hours</td>
</tr>
<tr>
<td>30 seconds</td>
<td>30 hours</td>
</tr>
<tr>
<td>1 minute</td>
<td>60 hours</td>
</tr>
<tr>
<td>3 minutes</td>
<td>180 hours</td>
</tr>
<tr>
<td>5 minutes</td>
<td>300 hours</td>
</tr>
<tr>
<td>10 minutes</td>
<td>600 hours</td>
</tr>
</tbody>
</table>

For a complete description of the Data Logger Management Program and procedures for downloading data to a computer, see the GX-3R Data Logger Management Program Operator’s Manual.
## Chapter 4: Display Mode

This section describes Display Mode which is accessible from Measuring Mode. See Table 8 below for a list of Display Mode’s menu items, a short description of each item, and the page number for further description.

### Table 8: Display Mode Menu Items

<table>
<thead>
<tr>
<th>Display Mode Menu Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEAK (pg.31)</td>
<td>Displays each sensor’s Peak reading.</td>
</tr>
<tr>
<td>STEL (pg.32)</td>
<td>Displays the STEL readings (CO and H2S only).</td>
</tr>
<tr>
<td>TWA (pg.32)</td>
<td>Displays the TWA readings (CO and H2S only).</td>
</tr>
<tr>
<td>LIST (pg.32)</td>
<td>Change the target gas for the catalytic sensor.</td>
</tr>
<tr>
<td></td>
<td>• CH4 (methane)</td>
</tr>
<tr>
<td></td>
<td>• i-C4H10 (isobutane)</td>
</tr>
<tr>
<td></td>
<td>• H2 (hydrogen)</td>
</tr>
<tr>
<td></td>
<td>• CH3OH (methanol)</td>
</tr>
<tr>
<td></td>
<td>• C2H2 (acetylene)</td>
</tr>
<tr>
<td></td>
<td>• C2H4 (ethylene)</td>
</tr>
<tr>
<td></td>
<td>• C2H6 (ethane)</td>
</tr>
<tr>
<td></td>
<td>• C2H5OH (ethanol)</td>
</tr>
<tr>
<td></td>
<td>• C3H6 (propylene)</td>
</tr>
<tr>
<td></td>
<td>• C3H6O (acetone)</td>
</tr>
<tr>
<td></td>
<td>• C3H8 (propane)</td>
</tr>
<tr>
<td></td>
<td>• C4H6 (butyne)</td>
</tr>
<tr>
<td></td>
<td>• C5H10 (cyclopentane)</td>
</tr>
<tr>
<td></td>
<td>• C6H6 (benzene)</td>
</tr>
<tr>
<td></td>
<td>• n-C6H14 (hexane)</td>
</tr>
<tr>
<td></td>
<td>• C7H8 (toluene)</td>
</tr>
<tr>
<td></td>
<td>• n-C7H16 (heptane)</td>
</tr>
<tr>
<td></td>
<td>• C8H10 (xylene)</td>
</tr>
<tr>
<td></td>
<td>• n-C9H20 (nonane)</td>
</tr>
<tr>
<td></td>
<td>• EtAc (ethyl acetate)</td>
</tr>
<tr>
<td></td>
<td>• IPA (isopropyl alcohol)</td>
</tr>
<tr>
<td></td>
<td>• MEK (methyl ethyl ketone)</td>
</tr>
<tr>
<td></td>
<td>• MMA (methyl methacrylate)</td>
</tr>
<tr>
<td></td>
<td>• DME (dimethyl ether)</td>
</tr>
<tr>
<td></td>
<td>• MIBK (methyl isobutyl ketone)</td>
</tr>
<tr>
<td></td>
<td>• THF (tetrahydrofuran)</td>
</tr>
<tr>
<td>USER ID (pg.33)</td>
<td>View and/or change the User ID.</td>
</tr>
<tr>
<td>STN ID (pg.34)</td>
<td>View and/or change the Station ID.</td>
</tr>
<tr>
<td>CAL DATA (pg.35)</td>
<td>Displays each sensor’s last calibration date.</td>
</tr>
<tr>
<td>BUMP DATA (pg.36)</td>
<td>Displays each sensor’s last bump test date.</td>
</tr>
<tr>
<td>TEMP (pg.36)</td>
<td>Displays the current date, time, and temperature.</td>
</tr>
<tr>
<td>ALARM--PT (pg.37)</td>
<td>View alarm points</td>
</tr>
</tbody>
</table>

A Only appears if `DISP SET` is set to `ON` in User Mode (factory setting) and if CH4 or i-C4H10 is selected for the combustible gas in Gas Select Mode.

B Only appears if `DISP SET` is set to `ON` in User Mode (factory setting) and if `ID DISP` is set to `ON` in Maintenance Mode (factory setting is `OFF`).

C Only appears if `CAL RMDR` is set to `ON` in User Mode (factory setting).

D Only appears if `BUMP RMDR` is set to `ON` in User Mode (factory setting is `OFF`).
Tips for Using Display Mode

- To enter Display Mode and scroll from one menu item to the next or skip an item when a question is asked, press and release POWER MODE.
- To enter an item, press and release AIR.
- To change a flashing parameter, press and release AIR. To reverse the direction of movement in a list (ie. from down to up or vice versa):
  a. Press and hold AIR.
  b. Immediately press POWER MODE and then release both buttons.
- To exit from an entered-information screen and go back to the main menu, press and release POWER MODE.

NOTE: Each screen displays for 20 seconds. If you do not press a button within 20 seconds, the GX-3R automatically returns to Measuring Mode.

Peak Screen (PEAK)

The peak screen displays the highest (lowest for oxygen) concentrations detected since the GX-3R was turned on. Peak readings are stored in the GX-3R’s memory until a higher level is detected (lower for oxygen), the peak reading is cleared, or the GX-3R is turned off.

The lunch break feature enables the GX-3R to save peak readings when it is turned off so it can continue with the same peaks when it is turned on again. See pg.67 for instructions to turn the lunch break feature on (default is off).

To clear the peak readings, do the following:

1. After entering Display Mode, press and release POWER MODE until PEAK appears.

2. Press and hold AIR until the screen prompts you to release it.

3. The peak readings are reset and the unit returns to the Peak Screen.
   If you do not want to clear the peak readings, release AIR before the above screen sequence occurs. The unit returns to the Peak Screen.
STEL Screen (STEL)

The STEL Screen displays the short term exposure limit (STEL) readings for $H_2S$ and $CO$ only. The STEL reading is the average reading over the last 15 minutes.

![STEL Screen](image)

TWA Screen (TWA)

The TWA Screen displays the time weighted average (TWA) readings for $H_2S$ and $CO$ only.

![TWA Screen](image)

The TWA reading is the average reading over the last 8 hours. If 8 hours have not elapsed since the last time the TWA reading was cleared, the average is still calculated over 8 hours. The missing readings are assigned a 0 value. If LUNCH is set to OFF (factory setting), the TWA is cleared when the GX-3R is turned off.

If LUNCH is set to ON, the GX-3R remembers TWA readings when it is turned off so it can continue them when it is turned on again. See pg.67 for instructions to turn the lunch break feature on (default is off).

Changing the Combustible Gas Sensor’s Gas (LIST)

The LIST screen allows you to select the target gas for the combustible gas sensor. This screen only appears if DISP SET in User Mode is set to ON (factory setting) and if CH4 or iC4H10 is selected for the combustible channel in Gas Select Mode.

If you select a new target gas, the change is saved if you turn the instrument off and on.

1. After entering Display Mode, press and release POWER MODE until LIST appears.

![LIST Screen](image)
2. Press and release AIR to enter the screen. The current gas flashes at the bottom of the screen.

3. Use AIR to scroll through the list of gases.

- CH4 (methane)
- i-C4H10 (isobutane)
- H2 (hydrogen)
- CH3OH (methanol)
- C2H2 (acetylene)
- C2H4 (ethylene)
- C2H6 (ethane)
- C2H5OH (ethanol)
- C3H6 (propylene)
- C3H6O (acetone)
- C3H8 (propane)
- C4H6 (butyne)
- C5H10 (cyclopentane)
- C6H6 (benzene)
- n-C6H14 (hexane)
- C7H8 (toluene)
- n-C7H16 (heptane)
- C8H10 (xylene)
- n-C9H20 (nonane)
- EtAc (ethyl acetate)
- IPA (isopropyl alcohol)
- MEK (methyl ethyl ketone)
- MMA (methyl methacrylate)
- DME (dimethyl ether)
- MIBK (methyl isobutyl ketone)
- THF (tetrahydrofuran)

4. When the desired gas is displayed, press and release POWER MODE. The changes are saved and the instrument returns to the LIST screen.

5. The gas formula displays at the bottom of the Measuring Mode screen. The gas selection remains selected if you turn the instrument off and on again.

---

**Changing the User ID (USER ID)**

This screen only appears if DISP SET in User Mode is set to ON (factory setting) and if ID DISP in Maintenance Mode is set to ON (factory setting is OFF).

Use this screen to select a user ID from the 128 user IDs that are stored in the GX-3R’s memory. Before a user ID is selected on a brand new instrument, the user ID is “--------”. The factory-installed user IDs have a “U_ID_XXX” format.

The user ID provides a way to identify the GX-3R user during a data logging session. If the user ID is changed during an operating session, a new data session is initiated with the new user ID attached to it.

User IDs can only be selected in this menu item. In order to edit the 128 user IDs, you must use the GX-3R Datalogging Program.
1. After entering Display Mode, press and release POWER MODE until the USER ID screen sequence appears.

2. To change the User ID, press and release AIR. The current User ID flashes.

3. Use AIR to scroll to the desired User ID.

4. Press and release POWER MODE to save the User ID and return to the USER ID screen in Display Mode.

Changing the Station ID (STN ID)

This screen only appears if DISP.SET in User Mode is set to ON (factory setting) and if ID DISP in Maintenance Mode is set to ON (factory setting is OFF).

Use this screen to select a station ID from the 128 station IDs that are stored in the GX-3R’s memory. Before a station ID is selected on a brand new instrument, the station ID is “----------”. The factory-installed station IDs have a “S_ID_XXX” format.

The station ID provides a way to identify the GX-3R location during a data logging session. If the station ID is changed during an operating session, a new data session is initiated with the new station ID attached to it.

User IDs can only be selected in this menu item. In order to edit the 128 user IDs, you must use the GX-3R Datalogging Program.

1. After entering Display Mode, press and release POWER MODE until the STN ID screen sequence appears.
2. To change the Station ID, press and release AIR. The current Station ID flashes.

3. Use AIR to scroll to the desired Station ID.
4. Press and release POWER MODE to save the Station ID and return to the STN ID screen in Display Mode.

---

### Last Successful Calibration Date (CAL DATA)

The CAL DATA screen shows the date of each installed sensor’s last successful calibration. This screen only appears if CAL.RMDR is set to ON in User Mode.

1. After entering Display Mode, press and release POWER MODE until CAL DATA appears.

2. Press AIR to enter the CAL DATA screen and to scroll through the installed sensors.

3. When you are done viewing the last calibration date for the sensors, press and release POWER MODE to return to the CAL DATA screen in Display Mode.
Last Successful Bump Test Date (BUMP DATA)

The BUMP DATA screen shows the date of each installed sensor’s last successful bump test. This screen only appears if BUMP.RMDR is set to ON.

1. After entering Display Mode, press and release POWER MODE until BUMP DATA appears.

2. Press AIR to enter the BUMP DATA screen and to scroll through the installed sensors.

3. When you are done viewing the last bump test date for the sensors, press and release POWER MODE to return to the BUMP DATA screen in Display Mode.

Date, Time, Temperature Screen (TEMP)

The TEMP screen shows the instrument’s date and time and the surrounding area’s temperature.
The Alarm Points Screen shows the gas alarm settings for all active channels.

1. After entering Display Mode, press and release POWER MODE until **ALARM--PT** appears.

2. Press and release AIR. The Full Scale Settings screen appears and shows full scale settings for each channel.

3. Use AIR to scroll through the Warning, Alarm, Alarm H, STEL, and TWA settings.

4. Press and release POWER MODE to return to the Alarm Points Screen.
Chapter 5: User Mode and Calibration

Overview

This section describes the GX-3R in User Mode. See Table 9 below for a list of the items found in User Mode, the page that the menu item’s instructions can be found on, and a short description of the menu item.

<table>
<thead>
<tr>
<th>User Mode Menu Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUMP (pg.42)</td>
<td>Perform a bump test.</td>
</tr>
<tr>
<td>BUMP CYL X</td>
<td>Perform a bump test on the gases selected for Cylinder X (A-E cylinders available)</td>
</tr>
<tr>
<td>START</td>
<td>Begin the warmup sequence and enter Measuring Mode.</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>Return to the BUMP menu item.</td>
</tr>
<tr>
<td>GAS CAL (pg.48)</td>
<td>Perform a fresh air adjustment, perform a span adjustment, change the calibration gas concentration, disc the cylinder group.</td>
</tr>
<tr>
<td>AIR CAL (pg.48)</td>
<td>Perform a fresh air adjustment.</td>
</tr>
<tr>
<td>AUTO CAL CYL X (pg.49)</td>
<td>Perform an automatic span adjustment on the gases selected for Cylinder X (A-E cylinders available).</td>
</tr>
<tr>
<td>START</td>
<td>Begin the warmup sequence and enter Measuring Mode.</td>
</tr>
<tr>
<td>CAL-P</td>
<td>Set the calibration gas concentration for each gas.</td>
</tr>
<tr>
<td>CYL SEL</td>
<td>Assign a cylinder (A-E) to each gas (all 4 gases set to Cylinder A is the default). For single cal operation, you would assign each gas its own cylinder.</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>Return to the AUTO CAL menu item.</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>Return to the GAS CAL menu item.</td>
</tr>
<tr>
<td>CAL SET (pg.58)</td>
<td>Change calibration parameters.</td>
</tr>
<tr>
<td>CAL RMDR (pg.58)</td>
<td><strong>ON</strong> (factory setting): The instrument notifies the user upon startup when a calibration is due. Notification type depends on <strong>CAL EXPD</strong> setting below. <strong>OFF</strong>: No notification upon startup when a calibration is due.</td>
</tr>
<tr>
<td>CAL INT (pg.59)</td>
<td>How often the instrument needs to be calibrated. Options: 1 - <strong>1000</strong> days (factory setting is <strong>90</strong> days)</td>
</tr>
</tbody>
</table>
### Table 9: User Mode Menu Items

<table>
<thead>
<tr>
<th>User Mode Menu Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAL SET (cont’d)</td>
<td>CAL EXPD (pg.59)</td>
</tr>
<tr>
<td></td>
<td>Defines what action must be taken if a calibration is due upon startup. <strong>CONFIRM</strong> (factory setting): Press and release AIR to acknowledge that calibration is due and continue to Measuring Mode. <strong>CANT USE</strong>: Cannot enter Measuring Mode until a successful calibration is performed. <strong>NONE</strong>: A screen indicates that calibration is due but warmup sequence continues.</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>Return to the CAL SET menu item in User Mode.</td>
</tr>
<tr>
<td>BUMP SET (pg.60)</td>
<td>Change bump test parameters.</td>
</tr>
<tr>
<td>SETTINGS (pg.60)</td>
<td>GAS TIME How long gas is applied during a bump test. Choices: 30 (factory setting), 45, 60, 90 seconds</td>
</tr>
<tr>
<td></td>
<td>CHECK Percentage of calibration gas concentration that the bump test reading must be within in order to pass bump. Options: 10%, 20%, 30%, 40%, 50% (factory setting)</td>
</tr>
<tr>
<td></td>
<td>CAL TIME How long gas is applied during a calibration. GAS TIME is deducted from this time. Options: 90 (factory setting) or 120 seconds</td>
</tr>
<tr>
<td></td>
<td>AUTO CAL <strong>ON</strong> (factory setting): If a bump test fails, a calibration automatically starts. <strong>OFF</strong>: If a bump test fails, a calibration does not automatically start.</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>Return to the SETTINGS menu item in BUMP SET.</td>
</tr>
<tr>
<td>BUMP.RMDR (pg.62)</td>
<td><strong>ON</strong>: The instrument notifies the user upon startup when a bump test is due. Notification type depends on BUMP.EXPD setting below. <strong>OFF</strong> (factory setting): No notification upon startup when a bump test is due.</td>
</tr>
<tr>
<td>BUMP INT (pg.63)</td>
<td>How often the instrument needs to be bump tested. Options: 0 - 30 days (factory setting is 30 days)</td>
</tr>
<tr>
<td>BUMP.EXPD (pg.63)</td>
<td>Defines what action must be taken if a bump test is due upon startup. <strong>CONFIRM</strong> (factory setting): Press and release AIR to acknowledge that bump test is due and continue to Measuring Mode. <strong>CANT USE</strong>: Cannot enter Measuring Mode until a successful bump test is performed. <strong>NONE</strong>: A screen indicates that bump test is due but warmup sequence continues.</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>Return to the BUMP SET menu item in User Mode.</td>
</tr>
<tr>
<td>ALARM-PT (pg.64)</td>
<td>Set alarm points for all channels (WARNING, ALARM, ALARM H, STEL, TWA) or reset all alarms to their default settings.</td>
</tr>
<tr>
<td>LUNCH (pg.67)</td>
<td><strong>ON</strong>: Lunch break feature is on. Instrument asks if you want to resume TWA and PEAK readings at startup. <strong>OFF</strong> (factory setting): Lunch break feature is off. Instrument resets TWA and PEAK readings every time it’s turned on.</td>
</tr>
<tr>
<td>User Mode Menu Item</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>BEEP (pg.67)</td>
<td>Set confirmation beep parameters.</td>
</tr>
</tbody>
</table>
| BEEP SEL (pg.68)    | **LED**: LEDs flash and instrument vibrates based on interval defined in BEEP INT to confirm instrument is still operating.  
**BUZZER**: Buzzer sounds and instrument vibrates based on interval defined in BEEP INT to confirm instrument is still operating.  
**LED+BUZZ**: LEDs flash, buzzer sounds, and instrument vibrates based on interval defined in BEEP INT to confirm instrument is still operating.  
**BUMP/CAL**: LEDs flash based on interval defined in BEEP INT if bump test or calibration is due.  
**ALM ALERT**: LEDs flash based on interval defined in BEEP INT if instrument goes into a gas alarm.  
**B/C/ALM**: LEDs flash based on interval defined in BEEP INT if a) bump test is due, b) calibration is due, or c) instrument goes into a gas alarm.  
**OFF**: No alerts to confirm instrument is still operating or that a bump test or calibration is due. |
| BEEP INT (pg.69)    | Confirmation alert interval. Confirmation type defined in BEEP SEL. Options: 0.5 minute and 1 to 99 minutes in 1 minute increments. The factory setting is 5 minutes. |
| ESCAPE              | Return to the BEEP menu item in User Mode. |
| BL TIME (pg.69)     | How long the back light stays on after the last button press. Options: 0 - 255 seconds or OFF. The factory setting is 30 seconds. |
| KEY TONE (pg.70)    | **ON** (factory setting): Buzzer sounds when button is pressed.  
**OFF**: Buzzer does not sound when button is pressed. |
| DISP SET (pg.70)    | **OFF**: LIST, USER ID, and STN ID screens do not appear in Display Mode.  
**ON** (factory setting): LIST item appears in Display Mode. USER ID and STN ID screens appear if ID DISP in Maintenance Mode is also set to ON. |
| ZERO SUP (pg.71)*   | **ON** (factory setting): Not intended for field adjustment. The suppression values are:  
Combustible Gas: 2% LEL  
O2: 0.5% volume  
H2S: 0.3 ppm  
CO: 2 ppm |
| ZERO.FLWR (pg.71)** | **ON** (factory setting): Not intended for field adjustment. Oxygen channel does not support zero follower functionality. |
| DATE (pg.71)        | Set the instrument’s date and time. |
| PASSWORD (pg.72)    | **ON**: User Mode is password-protected. Factory-set password is 0405.  
**OFF** (factory setting): User Mode is not password-protected. |
| ROM/SUM (pg.72)     | View the firmware information for the GX-3R’s sensor board and main board. |
| START (pg.73)       | Press and release POWER MODE to begin the warmup sequence and enter Measuring Mode. |

* Only appears if ZSUP.DISP is set to ON in Maintenance Mode.  
** Only appears if ZFLW.DISP is set to ON in Maintenance Mode.
Entering User Mode

**WARNING:** The GX-3R is not in operation as a gas detector while in User Mode.

1. Take the GX-3R to a non-hazardous location and turn it off if it is on.
2. Press and hold AIR, then press and hold POWER MODE. When you hear a beep, release the buttons.
3. The screen that appears will depend on the setting of User Mode’s PASSWORD item.
   If PASSWORD is set to OFF (factory setting), continue with Step 6.
   If PASSWORD is set to ON, continue with Step 4.

4. If PASSWORD has been set to ON in User Mode, a password screen appears. The first digit is flashing.
5. Use AIR to select each password number then press POWER MODE to save it and move on to the next number. To go back a number, press and hold AIR and POWER MODE for a few seconds. To reverse the direction of change (i.e. from increasing to decreasing or vice versa):
   a. Press and hold AIR.
   b. Immediately press POWER MODE and then release both buttons.
6. The BUMP menu item appears.
7. Use AIR to move through the User Mode menu items.
Tips for Using User Mode

- To scroll from one menu item to the next, press and release AIR. To reverse the scrolling direction:
  a. Press and hold AIR.
  b. Immediately press POWER/MODE and then release both buttons.
  c. The scrolling direction returns to the original direction when you exit and reenter a menu.
- To skip an item when a question is asked, press and release AIR.
- To enter an item and to save any changes, press and release POWER MODE.
- To change a flashing parameter, press and release AIR. To reverse the direction of change (ie. from increasing to decreasing or vice versa):
  a. Press and hold AIR.
  b. Immediately press POWER MODE and then release both buttons.
- To exit an entered menu item without saving a change, press and hold AIR and POWER MODE for a few seconds.

Performing a Bump Test (BUMP)

Bump test the instrument before each day’s use with a known concentration of each target gas. The instrument does not need to be calibrated unless it does not pass the bump test.

To bump test the GX-3R, you will need:

- Known calibrating samples of the gases being detected. The combustible and toxic gas samples should have concentrations between 10 and 50% of the full scale value. For example, if you are bump testing the combustible gas channel, your calibration cylinder should have a combustible gas concentration between 10% LEL and 50% LEL. An oxygen-free source, such as 100% nitrogen is recommended for setting the oxygen zero but a concentration of up to 19.5% is acceptable.

CAUTION: Although the GX-3R can be bump tested with an oxygen concentration of up to 19.5%, RKI Instruments, Inc. recommends that a multi-gas cylinder have an oxygen concentration in the range of 10% - 16% oxygen.

- 0.25 LPM fixed flow regulator
- Non-absorbent tubing
- Calibration cup

1. Confirm that the GX-3R’s calibration gas values match the concentrations listed on the calibration gas cylinder(s) as described on pg.54.
2. Confirm that your cylinder selections are appropriate as described on pg.56.
3. Confirm that the regulator knob is turned all the way clockwise. Screw the 0.25 LPM fixed flow regulator onto the calibration cylinder.
4. Install the calibration cup onto the GX-3R. Use the label and imprinting to make sure that the calibration cup gets installed in the correct orientation relative to the GX-3R. Be sure the calibration cup is pushed on all the way.

5. Use the tubing to connect the regulator to the inlet of the calibration cup.

6. While in User Mode, press AIR to scroll to BUMP.

7. Press and release POWER MODE. The display shows the gases assigned to Cylinder A and their assigned calibration values (see pg. 54 if the calibration values do not match the calibration gas cylinder’s concentrations). The bottom of the screen alternates between “CYL A” and “BUMP”.

8. If necessary, use AIR to scroll to the Bump screen for the gas(es) you want to bump test. As shipped from the factory, combustible gas, O₂, H₂S, and CO are assigned to Cylinder A. If a H₂-compensated CO sensor is installed, H₂ is assigned to Cylinder D but there is no reason to bump test the H₂ response.

9. Make sure the GX-3R has been turned on for at least 45 seconds before continuing.
10. Turn the regulator knob counterclockwise to open the regulator.

11. Press and release POWER MODE.

12. The gas readings flash, the bottom of the screen alternates between “APPLY” and “BUMP”, and the top of the screen counts down from the time set in **BUMP SET\SETTINGS\GAS TIME**.

![Gas readings and time countdown](image)

**NOTE:** To back out of the gas application screen without performing the bump test, press and release AIR and POWER MODE together.

13. At the end of the countdown, the instrument analyzes the results. Follow the flow chart to determine the bump test outcome.

![Bump Test Flow Chart](image)

**NOTE:** Auto start after successful bump/cal parameters set using Datalogging or SDM-3R PC Programs.

*Figure 7: Bump Test Flow Chart*
<table>
<thead>
<tr>
<th>Option A from Flow Chart</th>
<th>Option B from Flow Chart</th>
<th>Option C from Flow Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bump test passed</td>
<td>• Bump test passed</td>
<td>• Bump test passed</td>
</tr>
<tr>
<td>• Multiple cylinders assigned</td>
<td>• One cylinder assigned</td>
<td>• One cylinder assigned</td>
</tr>
<tr>
<td></td>
<td>• Auto Start After Successful Bump set to ON (factory setting)</td>
<td>• Auto Start After Successful Bump set to OFF (factory setting is ON)</td>
</tr>
</tbody>
</table>

1. The instrument indicates that all channels passed the bump test. Use AIR to scroll between the bump test results and the bump test gas readings.

![BUMP/CAL M 7:49 47 11.9 22.0](image1)

2. Close the regulator.
3. Press and release POWER MODE to move to the BUMP CYL X screen for the next cylinder.
4. Unscrew the regulator from the first cylinder and screw it into the next cylinder.
5. Press and release POWER MODE to start the next cylinder’s bump test.
7. After the last cylinder is bump tested, press and release POWER MODE to go to the START item in the BUMP menu.
8. Remove the calibration cup.
9. Press and release POWER MODE to enter Measuring Mode.

1. The instrument indicates that all channels passed the bump test. Use AIR to scroll between the bump test results and the bump test gas readings.

![BUMP/CAL M 7:49 47 11.9 22.0](image2)

2. Close the regulator.
3. Unscrew the regulator.
4. Remove the calibration cup.
5. Press and release POWER MODE to enter Measuring Mode.

1. The instrument indicates that all channels passed the bump test. Use AIR to scroll between the bump test results and the bump test gas readings.

![BUMP/CAL M 7:49 47 11.9 22.0](image3)

2. Close the regulator.
3. Unscrew the regulator.
4. Remove the calibration cup.
5. Press and release POWER MODE to return to the START item in the BUMP menu.
6. Press and release POWER MODE to enter Measuring Mode.
<table>
<thead>
<tr>
<th>Option D from Flow Chart</th>
<th>Option E from Flow Chart</th>
<th>Option F from Flow Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bump test failed</td>
<td>• Bump test failed</td>
<td>• Bump test failed</td>
</tr>
<tr>
<td>• A-CAL set to OFF (factory setting is ON)</td>
<td>• A-CAL set to ON (factory setting)</td>
<td>• A-CAL set to ON (factory setting)</td>
</tr>
<tr>
<td>• Calibration failed</td>
<td>• Calibration failed</td>
<td>• Multiple cylinders assigned</td>
</tr>
</tbody>
</table>

1. The instrument shows which channels passed or failed the bump test. The LEDs flash and the buzzer sounds. Use AIR to scroll between the results and the readings.

2. Close the regulator.
3. Unscrew the regulator.
4. Remove the calibration cup.
5. Press and release POWER MODE to return to the BUMP CYL A item in the BUMP menu.
6. Use AIR to scroll to START and press and release POWER MODE to enter Measuring Mode.
7. Calibrate the GX-3R as soon as possible.

1. A calibration immediately and automatically starts. Continue to apply the calibration gas.

2. The calibration time is the difference between the GAS TIME and the CAL TIME values defined in the BUMP SET/SETTINGS item in User Mode.

3. The instrument shows which channels passed or failed the bump test/calibration. The LEDs flash and the buzzer sounds. Use AIR to scroll between the results and the readings.

4. Close the regulator.
5. Unscrew the regulator.
6. Remove the calibration cup.
7. Press and release POWER MODE to return to the BUMP CYL A item in the BUMP menu.
8. Use AIR to scroll to START and press and release POWER MODE to enter Measuring Mode.

4. Close the regulator.
5. Press and release POWER MODE to move to the BUMP CYL X screen for the next cylinder.
6. Unscrew the regulator from the first cylinder and screw it into the next cylinder.
7. Press and release POWER MODE to start the next cylinder’s bump test.
9. After the last cylinder is bump tested, press and release POWER MODE to go to the START item in the BUMP menu.
10. Remove the calibration cup.
11. Press and release POWER MODE to enter Measuring Mode.
### Option G from Flow Chart
- Bump test failed
- A-CAL set to ON (factory setting)
- Calibration passed
- One cylinder assigned
- Auto Start After Successful Cal set to ON (factory setting)

1. A calibration immediately and automatically starts. Continue to apply the calibration gas.
2. The calibration time is the difference between the GAS TIME and the CAL TIME values defined in the BUMP SET SETTINGS item in User Mode.
3. The instrument shows which channels passed or failed the bump test/calibration. Use AIR to scroll between the results and the readings.
4. Close the regulator.
5. Unscrew the regulator.
6. Remove the calibration cup.
7. Press and release POWER MODE to enter Measuring Mode.

### Option H from Flow Chart
- Bump test failed
- A-CAL set to ON (factory setting)
- Calibration passed
- One cylinder assigned
- Auto Start After Successful Cal set to OFF (factory setting)

1. A calibration immediately and automatically starts. Continue to apply the calibration gas.
2. The calibration time is the difference between the GAS TIME and the CAL TIME values defined in the BUMP SET SETTINGS item in User Mode.
3. The instrument shows which channels passed or failed the bump test/calibration. Use AIR to scroll between the results and the readings.
4. Close the regulator.
5. Unscrew the regulator.
6. Remove the calibration cup.
7. Press and release POWER MODE to return to the START item in the BUMP menu.
8. Press and release POWER MODE to enter Measuring Mode.
Performing a Calibration (GAS CAL)

Calibration Notes

- To fully calibrate the sensors, you must do a fresh air adjustment (AIR CAL) and a span adjustment (AUTO CAL).
- Bump test the instrument before each day’s use with a known concentration of each target gas. A bump test can be done in User Mode’s BUMP item or by applying gas in Measuring Mode. The instrument does not need to be calibrated unless it does not pass the User Mode bump test or does not respond appropriately, as defined by the user, in Measuring Mode.
- The hydrogen response for the H₂-compensated CO sensor only needs to be set when the sensor is replaced.

AIR CAL

1. Find a fresh air environment, an environment of normal oxygen content (20.9%) that is free of toxic and combustible gases.
2. While in User Mode, press AIR to scroll to GAS CAL.
3. Press and release POWER MODE. The AIR CAL menu item appears.
4. Press and release POWER MODE to enter the AIR CAL menu.
5. Make sure the GX-3R has been turned on for at least 45 seconds before continuing.
6. Press and hold AIR until the screen prompts you to release it.
7. If the fresh air adjustment passes, the instrument returns to the GAS CAL menu.
8. If the fresh air adjustment fails, “FAIL AIR” displays. Press and release POWER MODE to acknowledge the failure. See “Troubleshooting” on page 74.

**Performing a Span Adjustment in AUTO CAL**

**Preparing for a Span Adjustment**

To adjust the span on the GX-3R, you will need:

- Known concentrations of the gases being detected. The combustible and toxic gas samples should have concentrations between 10 and 50% of the full scale value. For example, if you are calibrating the combustible gas channel, your calibration cylinder should have a combustible gas concentration between 10% LEL and 50% LEL.

If you are setting the H₂ response for the H₂-compensated CO sensor (which only needs to be done when the sensor is replaced), 200 ppm H₂ is recommended.

An oxygen-free source, such as 100% nitrogen is recommended for setting the oxygen zero but a concentration of up to 19.5% is acceptable.

**CAUTION:** Although the GX-3R can be calibrated with an oxygen concentration of up to 19.5%, RKI Instruments, Inc. recommends that a multi-gas cylinder have an oxygen concentration in the range of 10% - 16% oxygen.

- 0.25 LPM fixed flow regulator
- Non-absorbent tubing
- Calibration cup

1. Confirm that the GX-3R’s calibration gas values match the concentrations listed on the calibration gas cylinder(s) as described on pg.54.

2. Confirm that your cylinder selections are appropriate as described on pg.56.

3. Confirm that the regulator knob is turned all the way clockwise. Screw the 0.25 LPM fixed flow regulator onto the calibration cylinder.

4. Install the calibration cup onto the GX-3R. Use the label and imprinting to make sure that the calibration cup gets installed in the correct orientation relative to the GX-3R. Be sure the calibration cup is pushed on all the way.

![Figure 8: Calibration Cup Installation](image-url)
5. Use the tubing to connect the regulator to the inlet of the calibration cup.

**Performing a Span Adjustment**

1. While in User Mode, press AIR to scroll to GAS CAL.

2. Press and release POWER MODE. The AIR CAL menu item appears.

3. Use AIR to scroll to the AUTO CAL menu item.

4. Press and release POWER MODE. The display shows the gases assigned to Cylinder A and their assigned calibration values (see pg. 54 if the calibration values do not match the calibration gas cylinder’s concentrations). The bottom of the screen alternates between “CYL A” and “AUTO CAL”.

5. If necessary, use AIR to scroll to the Auto Cal screen for the gas(es) you want to calibrate. As shipped from the factory, combustible gas, O2, H2S, and CO are assigned to Cylinder A. If a H2-compensated CO sensor is installed, H2 is assigned to Cylinder D.

6. **Make sure the GX-3R has been turned on for at least 45 seconds before continuing.**

7. Press and release POWER MODE.

8. The gas readings flash and the bottom of the screen alternates between “APPLY” and “AUTO CAL”.

**NOTE:** To back out of the gas application screen without performing the bump test, press and release AIR and POWER MODE together.

9. Turn the regulator knob counterclockwise to open the regulator.
10. Allow the gas to flow for 2 minutes.
11. Press and release POWER MODE.
12. Follow the flow chart to determine the calibration outcome.

*NOTE: Auto start after successful cal parameter set using Datalogging or SDM-3R PC Programs.

Figure 9: Calibration Flow Chart
### Option A from Flow Chart

1. The instrument indicates that all channels passed the calibration.
2. The instrument shows the current gas readings.
3. If MAX SPAN is set to ON (default is OFF, see pg.100), the response reading’s maximum adjustment is displayed. A maximum span of 100% LEL on the combustible channel indicates that the reading could have been adjusted up to 100% LEL. If the maximum span value is close to the calibration gas value, the sensor should be replaced soon.

   The maximum adjustment is either twice the calibration value or full scale, whichever is lower. The maximum adjustment indicated for the oxygen channel is 25.0% volume.

4. If the combustible gas sensor is nearing the end of its useful life, the reading conversions that can be made in Display Mode’s LIST item become limited. Press and release POWER MODE. Replace the combustible sensor as soon as possible.

5. Close the regulator.
6. The instrument continues to the AUTO CAL CYL X screen.
7. Unscrew the regulator from the first cylinder and screw it into the next cylinder.
8. Press and release POWER MODE to start the next cylinder’s calibration.
9. Repeat Step 9 through Step 12.
10. After the last cylinder is calibrated, the instrument continues to the START item in the AUTO CAL menu.
11. Remove the calibration cup.
12. Press and release POWER MODE to enter Measuring Mode.

### Option B from Flow Chart

1. The instrument indicates that all channels passed the calibration.
2. The instrument shows the current gas readings.
3. If MAX SPAN is set to ON (default is OFF, see pg.100), the response reading’s maximum adjustment is displayed. A maximum span of 100% LEL on the combustible channel indicates that the reading could have been adjusted up to 100% LEL. If the maximum span value is close to the calibration gas value, the sensor should be replaced soon.

   The maximum adjustment is either twice the calibration value or full scale, whichever is lower. The maximum adjustment indicated for the oxygen channel is 25.0% volume.

4. If the combustible gas sensor is nearing the end of its useful life, the reading conversions that can be made in Display Mode’s LIST item become limited. Press and release POWER MODE. Replace the combustible sensor as soon as possible.

5. Close the regulator.
6. Unscrew the regulator.
7. Remove the calibration cup.
8. The instrument automatically begins its warmup sequence and enters Measuring Mode.
### Option C from Flow Chart

- Calibration passed
- One cylinder assigned
- Auto Start After Successful Cal set to OFF (factory setting is ON)

1. The instrument indicates that all channels passed the calibration.

   ![PASS](image1)

   PASS

   ![AUTO CAL](image2)

2. The instrument shows the current gas readings.

   ![CH4 \%LEL O2 \%](image3)

   51 11.9
   25.2
   ![AUTO CAL](image4)

3. If **MAX SPAN** is set to **ON** (default is **OFF**, see pg.100), the response reading’s maximum adjustment is displayed. A maximum span of 100% LEL on the combustible channel indicates that the reading could have been adjusted up to 100% LEL. If the maximum span value is close to the calibration gas value, the sensor should be replaced soon.

   The maximum adjustment is either twice the calibration value or full scale, whichever is lower. The maximum adjustment indicated for the oxygen channel is 25.0% volume.

   ![CH4 \%LEL O2 \%](image5)

   100 25.0
   70 48.5
   ![MAX SPAN](image6)

4. If the combustible gas sensor is nearing the end of its useful life, the reading conversions that can be made in Display Mode’s **LIST** item become limited. Press and release **POWER MODE**. Replace the combustible sensor as soon as possible.

   ![HC GAS LIST LIMITED](image7)

5. Close the regulator.
6. Unscrew the regulator.
7. Remove the calibration cup.
8. The instrument continues to the **START** item in the **AUTO CAL** menu.
9. Press and release **POWER MODE** to enter Measuring Mode.

### Option D from Flow Chart

- Calibration failed

1. The instrument indicates which channels failed the calibration.

   ![CH4 \%LEL O2 \%](image8)

   FAIL 11.9
   25.2
   ![AUTO CAL](image9)

2. Close the regulator.
3. Unscrew the regulator.
4. Remove the calibration cup.
5. Press and release **POWER MODE** to return to the **AUTO CAL CYL X** screen in the **AUTO CAL** menu.
Setting the Calibration Values in CAL--P

1. While in User Mode, press AIR to scroll to GAS CAL.

2. Press and release POWER MODE. The AIR CAL menu item appears.

3. Use AIR to scroll to the AUTO CAL menu item.

4. Press and release POWER MODE. The Auto Cal screen for gases assigned to Cylinder A appears.

5. Use AIR to scroll to CAL--P.

6. Press and release POWER MODE. The combustible gas channel appears.
7. Use AIR to scroll to the channel whose calibration gas value you want to change.

8. Press and release POWER MODE. The calibration value begins to flash. In the example below, the combustible gas channel is selected.

9. Use AIR to adjust the calibration gas value. The calibration gas value in the instrument must match the value listed on the calibration gas cylinder you are using for that channel.

**NOTE:** If you are using an RKI 4-gas cylinder, be sure to set the O₂ channel to 12%, not 0%.

10. Press and release POWER MODE to save the change. The calibration gas value stops flashing and the unit returns to the channel selection screen.

11. Repeat Step 7 through Step 10 for any other channels that need to be changed.

12. Use AIR to scroll to **ESCAPE**.

13. Press and release POWER MODE. The instrument returns to the **CAL--P** menu item in the Auto Cal Menu.
14. Press AIR to scroll to **ESCAPE**.
15. Press and release POWER MODE. The instrument returns to the **AUTO CAL** menu item in the **GAS CAL** Menu.
16. See “Exiting the GAS CAL Menu” on page 58 to return to User Mode.

**Making Cylinder Selections in CYL SEL**

The **CYL SEL** menu item allows you to group channels together for calibration. As shipped from the factory, the standard 4 channels (combustible gas, O₂, H₂S, and CO) are assigned to Cylinder A. As shipped from the factory, the H₂ response for the H₂-compensated CO sensor is assigned to Cylinder D. There are 5 cylinder assignments available: A, B, C, D, and E. If you wanted to calibrate each channel separately, you need to assign each channel to a different cylinder (ie. Cylinder A: combustible gas, Cylinder B: O₂, Cylinder C: H₂S, Cylinder D: CO).

1. While in User Mode, press AIR to scroll to **GAS CAL**.

```
<✓> GAS CAL
```

2. Press and release POWER MODE. The **AIR CAL** menu item appears.
3. Use AIR to scroll to the **AUTO CAL** menu item.

```
<✓> AUTO CAL
```

4. Press and release POWER MODE. The Auto Cal screen for gases assigned to Cylinder A displays.
5. Use AIR to scroll to **CYL SEL**.

```
<✓> CYL SEL
```

6. Press and release POWER MODE. The combustible gas channel displays.
7. Use AIR to scroll to the channel whose cylinder assignment you want to change.

8. Press and release POWER MODE. The current setting flashes. In the example below, the combustible gas channel is selected.

9. Use AIR to change the cylinder assignment. The choices are A, B, C, D, and E.

10. Press and release POWER MODE to save the change. The cylinder assignment stops flashing and the unit returns to the channel selection screen.

11. Repeat Step 7 through Step 10 for any other channels that need to be changed.

12. Use AIR to scroll to ESCAPE.

13. Press and release POWER MODE. The instrument returns to the CYL SEL menu item in the Auto Cal Menu.

14. Press AIR to scroll to ESCAPE.

15. Press and release POWER MODE. The instrument returns to the AUTO CAL menu item in the GAS CAL menu.

16. See “Exiting the GAS CAL Menu” on page 58 to return to User Mode.
Exiting the GAS CAL Menu
1. While in the GAS CAL menu, press AIR to scroll to ESCAPE.
2. Press and release POWER MODE. The instrument returns to the GAS CAL menu item in User Mode.
3. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.

Setting Calibration Parameters (CAL SET)

The CAL SET menu item has 4 items: CAL RMDR, CAL INT, CAL EXPD, and ESCAPE.
1. While in User Mode, press AIR to scroll to CAL SET.

   ![CAL SET](image)

   1. Press and release POWER MODE. The CAL RMDR menu item appears.

   ![CAL RMDR](image)

   **CAL RMDR**

   **ON** (factory setting): The GX-3R gives an indication at start up if it is due for calibration. The type of indication depends on the CAL EXPD setting (see pg. 59).
   **OFF**: The GX-3R does not give an indication at start up if it is due for calibration.

   1. After entering the CAL SET menu, press AIR to scroll to CAL RMDR.

   ![CAL RMDR](image)

   2. Press and release POWER MODE. The current setting flashes.
   3. Use AIR to display the desired setting.
   4. Press and release POWER MODE to save the setting and return to the CAL RMDR menu item.
   5. See “Exiting the CAL SET Menu” on page 59 to return to User Mode.
CAL INT

This setting defines the amount of time between calibrations. The time can be set in 1 day increments. The minimum setting is 1 day and the maximum setting is 1000 days. The factory setting is 90 days.

1. After entering the **CAL SET** menu, press AIR to scroll to **CAL INT**.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the **CAL INT** menu item.
5. See “Exiting the CAL SET Menu” on page 59 to return to User Mode.

CAL EXPD

This item defines what indication is given during start up when calibration is due and **CAL RMDR** is set to **ON**.

**CONFIRM** (factory setting): The GX-3R gives an indication at start up if calibration is past due. Press and release AIR to continue without calibrating or press and release POWER MODE to perform a calibration.

**CANT USE**: The GX-3R gives an indication at start up if calibration is past due. Press and release POWER MODE to enter User Mode and perform a calibration. Pressing AIR has no effect. A successful calibration must be performed in order to use the instrument.

**NONE**: The GX-3R gives an indication at startup if calibration is past due. If desired, press POWER MODE to perform a calibration but it is not necessary to acknowledge the calibration due indication. The warm-up sequence will continue on its own.

1. After entering the **CAL SET** menu, press AIR to scroll to **CAL EXPD**.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the **CAL EXPD** menu item.
5. See “Exiting the CAL SET Menu” on page 59 to return to User Mode.

Exiting the CAL SET Menu

1. While in the **CAL SET** menu, press AIR to scroll to **ESCAPE**.
2. Press and release POWER MODE. The instrument returns to the **CAL SET** menu item in User Mode.
3. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.
Setting Bump Test Parameters (BUMP SET)

The BUMP SET menu item has 5 items: SETTINGS, BUMP.RMDR, BUMP INT, BUMP.EXPD, and ESCAPE.

1. While in User Mode, press AIR to scroll to BUMP SET.

2. Press and release POWER MODE. The SETTINGS menu item appears.

SETTINGS

The SETTINGS menu item has 5 items: GAS TIME, CHECK, CAL TIME, AUTO CAL, and ESCAPE.

1. After entering the BUMP SET menu, press AIR to scroll to SETTINGS.

2. Press and release POWER MODE. The GAS TIME menu item appears.

GAS TIME

The GAS TIME is the amount of time that the instrument is exposed to gas during a bump test. The available choices are 30 seconds (factory setting), 45 seconds, 60 seconds, and 90 seconds.

1. After entering the BUMP SET SETTINGS menu, press AIR to scroll to GAS TIME.

2. Press and release POWER MODE. The current setting flashes.

3. Use AIR to display the desired setting.

4. Press and release POWER MODE to save the setting and return to the GAS TIME menu item.

5. See “Exiting the SETTINGS Menu” on page 62 to return to the BUMP SET menu.

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6. See “Exiting the BUMP SET Menu” on page 63 to return to User Mode.

**CHECK**

*CHECK* is the bump test tolerance value and is represented as a percentage of the calibration gas concentration. It is the percentage that the bump test reading can differ from the actual gas concentration and still be considered a passed bump test. If the bump test reading differs more, the bump test will fail. The available values are 10%, 20%, 30%, 40%, and 50% (factory setting).

1. After entering the **BUMP SET\SETTINGS** menu, press AIR to scroll to **CHECK**.

2. Press and release POWER MODE. The current setting flashes.

3. Use AIR to display the desired setting.

4. Press and release POWER MODE to save the setting and return to the **CHECK** menu item.

5. See “Exiting the SETTINGS Menu” on page 62 to return to the **BUMP SET** menu.

6. See “Exiting the BUMP SET Menu” on page 63 to return to User Mode.

**CAL TIME**

The **CAL TIME** is the total time the instrument is exposed to calibration gas when a bump test fails if **AUTO CAL** is set to **ON**. The bump test time is deducted from the calibration time. For example, if the **CAL TIME** is set to 90 seconds and the **GAS TIME** is set to 30 seconds, if the bump test fails, the GX-3R will only be exposed to gas for an additional 60 seconds. The available values are 90 seconds (factory setting), and 120 seconds.

1. After entering the **BUMP SET\SETTINGS** menu, press AIR to scroll to **CAL TIME**.

2. Press and release POWER MODE. The current setting flashes.

3. Use AIR to display the desired setting.

4. Press and release POWER MODE to save the setting and return to the **CAL TIME** menu item.

5. See “Exiting the SETTINGS Menu” on page 62 to return to the **BUMP SET** menu.

6. See “Exiting the BUMP SET Menu” on page 63 to return to User Mode.
**AUTO CAL**

**ON** (factory setting): If a bump test fails, the unit automatically begins a calibration.

**OFF**: If a bump test fails, the unit does not automatically begin a calibration.

1. After entering the **BUMP SET\SETTINGS** menu, press AIR to scroll to **AUTO CAL**.

\[\text{AUTO CAL} \quad 7:49\]

2. Press and release POWER MODE. The current setting flashes.

3. Use AIR to display the desired setting.

4. Press and release POWER MODE to save the setting and return to the **AUTO CAL** menu item.

5. See “Exiting the SETTINGs Menu” on page 62 to return to the **BUMP SET** menu.

6. See “Exiting the BUMP SET Menu” on page 63 to return to User Mode.

**Exiting the SETTINGS Menu**

1. While in the **BUMP SET\SETTINGS** menu, press AIR to scroll to **ESCAPE**.

2. Press and release POWER MODE. The instrument returns to the **SETTINGS** menu item of the **BUMP SET** menu.

**BUMP.RMDR**

**ON**: The GX-3R gives an indication at start up if it is due for bump testing. The type of indication depends on the **BUMP.EXPD** setting (see pg.63).

**OFF** (factory setting): The GX-3R does not give an indication at start up if it is due for bump testing.

1. After entering the **BUMP SET** menu, press AIR to scroll to **BUMP.RMDR**.

\[\text{BUMP.RMDR} \quad 7:49\]

2. Press and release POWER MODE. The current setting flashes.

3. Use AIR to display the desired setting.

4. Press and release POWER MODE to save the setting and return to the **BUMP.RMDR** menu item.

5. See “Exiting the BUMP SET Menu” on page 63 to return to User Mode.
BUMP INT
This setting defines the amount of time between bump tests. The time can be set in 1 day increments. The minimum setting is 0 days and the maximum setting is 30 days (factory setting).

1. After entering the BUMP SET menu, press AIR to scroll to BUMP INT.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the BUMP INT menu item.
5. See “Exiting the BUMP SET Menu” on page 63 to return to User Mode.

BUMP.EXPDP
This item defines what indication is given during start up when a bump test is due and BUMP.RMDR is set to ON.

CONFIRM (factory setting): The GX-3R gives an indication at start up if a bump test is past due. Press and release AIR to continue without bump testing or press and release POWER MODE to perform a bump test.

CANT USE: The GX-3R gives an indication at start up if a bump test is past due. Press and release POWER MODE to enter User Mode and perform a bump test. Pressing AIR has no effect. A successful bump test must be performed in order to use the instrument.

NONE: The GX-3R gives an indication at startup if a bump test is past due. If desired, press POWER MODE to perform a bump test but it is not necessary to acknowledge the bump test due indication. The warm-up sequence will continue on its own.

1. After entering the BUMP SET menu, press AIR to scroll to BUMP.EXPDP.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the BUMP.EXPDP menu item.
5. See “Exiting the BUMP SET Menu” on page 63 to return to User Mode.

Exiting the BUMP SET Menu
1. While in the BUMP SET menu, press AIR to scroll to ESCAPE.
2. Press and release POWER MODE. The instrument returns to the BUMP SET menu item in User Mode.
3. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.
Alarm Settings (ALARM--PT)

The ALARM--PT menu item has 3 items: ALARM--PT, DEF--ALMP, and ESCAPE.
1. While in User Mode, press AIR to scroll to ALARM--PT.

2. Press and release POWER MODE. The first channel displays.
Setting the Alarm Points

1. After entering the Alarm Points menu item, press AIR to scroll through to the instrument channel whose alarm points you want to change.

2. Press and release POWER MODE.
3. The Warning setpoint for the channel flashes. In the example below, the CO channel is selected.

For all settings:
1) AIR to adjust
2) POWER MODE to save and continue

4. Use AIR to adjust the Warning setpoint. The only alarm setpoint limitation is: \( \text{WARNING} \leq \text{ALARM} \leq \text{ALARM H} \).

5. Press and release POWER MODE to save the setting.

6. Repeat Step 4 and Step 5 for the Alarm, Alarm H, STEL (CO and H₂S only) and TWA (CO and H₂S only) settings.

7. The instrument returns to the channel selection screen.

8. Repeat Step 1 - Step 7 to change the alarm points for other channels.

9. See “ESCAPE” on page 67 to return to User Mode.

**Defaulting the Alarm Points**

Defaulting the alarm points defaults them back to factory settings as outlined in Table 1 on page 7 or to the settings saved in the SAVE-AP menu item in Gas Select Mode if you have performed a SAVE-AP operation.

1. After entering the Alarm Points menu item, press AIR to scroll to DEF-ALMP.

2. Press POWER MODE to enter the DEF-ALMP menu item.
3. Press POWER MODE to perform an alarm default. Press AIR to return to the DEF-ALMP menu item.

4. The instrument asks if you’re sure you want to default the alarm points. Press POWER MODE to default the alarm points. Press AIR to return to the DEF-ALMP menu item.

5. See “ESCAPE” on page 67 to return to User Mode.

**ESCAPE**

1. While in the ALARM-P menu, press AIR to scroll to ESCAPE.
2. Press and release POWER MODE. The instrument returns to the ALARM–PT menu item.
3. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.

**Updating the Lunch Break Setting (LUNCH)**

**OFF** (factory setting): The GX-3R automatically starts new TWA and PEAK reading collection and resets the time in operation at startup.

**ON**: The Lunch Break Screen displays during startup. From this screen, you can choose to continue accumulating TWA and PEAK readings and the time in operation from the last time the GX-3R was used or start collecting new readings and reset the time in operation.

1. While in User Mode, press AIR to scroll to LUNCH.
2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the LUNCH menu item.
5. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.

**Setting the Confirmation Beep and Non-Compliance Indicator (BEEP)**

The BEEP menu item has 3 items: BEEP SEL, BEEP INT, and ESCAPE.

1. While in User Mode, press AIR to scroll to BEEP.
2. Press and release POWER MODE. The **BEEP SEL** menu item appears.

![BEEP SEL menu](image)

**BEEP SEL**

**BEEP SEL** defines what kind of confirmation or non-compliance indication you want to occur in Measuring Mode. The available choices are:

- **OFF** (factory setting): The GX-3R does not provide a confirmation alert or non-compliance indicator.
- **LED**: The GX-3R’s LEDs double flash as often as defined by the **BEEP INT** parameter to verify that the instrument is operating.
- **BUZZER**: The GX-3R’s buzzer double beeps as often as defined by the **BEEP INT** parameter to verify that the instrument is operating.
- **LED+BUZZ**: The GX-3R’s LEDs double flash and the buzzer double beeps as often as defined by the **BEEP INT** parameter to verify that the instrument is operating.
- **BUMP/CAL**: If a bump test or a calibration is due and if **BUMP.EXPD** or **CAL EXPD** is set to **CONFIRM** or **NONE**, the GX-3R’s LEDs double flash as often as defined by the **BEEP INT** parameter to indicate a non-compliance. Once a bump test or calibration (depending on which is due) is done, the LEDs stop flashing.
- **ALM ALRT**: If the instrument goes into any gas alarm, the LEDs double flash as often as defined by the **BEEP INT** parameter to indicate a non-compliance. Once a successful bump test or calibration is done, the LEDs stop flashing.

**NOTE:** Depending on the **Need to get Bump Log** setting (only accessed via SDM-3R program), a data download may also be needed to clear the non-compliance.

---

**B/C/ALM**: The LEDs double flash to indicate a non-compliance if any of the following happens.

a. **BUMP.EXPD** is set to **CONFIRM** or **NONE** and a bump test is due (cleared by successful bump test).

b. **CAL EXPD** is set to **CONFIRM** or **NONE** and a calibration is due (cleared by successful calibration).

c. The instrument goes into any gas alarm (cleared by successful bump test or calibration).

**NOTE:** Depending on the **Need to get Bump Log** setting (only accessed via SDM-3R program), a data download may also be needed to clear the gas alarm non-compliance.

---

1. While in the **BEEP** menu, press AIR to scroll to **BEEP SEL**.

![BEEP SEL menu](image)
2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the BEEP SEL menu item.
5. See “ESCAPE” on page 69 to return to User Mode.

**BEEP INT**

The **BEEP INT** parameter defines how often the confirmation alert or non-compliance indicator selected in **BEEP SEL** occurs. This setting only applies if the **BEEP SEL** parameter is set to something other than **OFF**. The available choices are **0.5** minutes and **1-99** minutes in 1 minute increments. The factory setting is **5** minutes.

1. While in the **BEEP** menu, press AIR to scroll to **BEEP INT**.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the **BEEP INT** menu item.
5. See “ESCAPE” on page 69 to return to User Mode.

**ESCAPE**

1. While in the **BEEP** menu, press AIR to scroll to **ESCAPE**.
2. Press and release POWER MODE. The instrument return to the **BEEP** menu item.
3. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.

---

**Updating the Backlight Time (BL TIME)**

This setting defines how long the LCD backlight stays on when you press any button. The minimum setting is **OFF**; the maximum setting is **255** seconds. The factory setting is **30** seconds.

1. While in User Mode, press AIR to scroll to **BL TIME**.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the **BL TIME** menu item.
5. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.
Turning the Key Tone On/Off (KEY TONE)

**ON** (factory setting): The instrument beeps when a button is pressed.
**OFF**: The instrument does not beep when a button is pressed.

1. While in User Mode, press AIR to scroll to **KEY TONE**.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the **KEY TONE** menu item.
5. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.

Display Mode Items (DISP SET)

**OFF**: LIST, USER ID, and STN ID items do not appear in Display Mode.
**ON** (factory setting): LIST item appears in Display Mode. USER ID and STATION ID screens appear in Display Mode if ID DISP in Maintenance Mode is also set to **ON** (factory setting is **OFF**).

1. While in User Mode, press AIR to scroll to **DISP SET**.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the **DISP SET** menu item.
5. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.
Zero Suppression (ZERO SUP)

This menu item only appears if ZSUP_DISP is set to ON in Maintenance Mode (factory setting is OFF).
The ZERO SUP setting is not intended for field adjustment. The default setting for each sensor is ON.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Zero Suppression Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustible Gas</td>
<td>2% LEL</td>
</tr>
<tr>
<td>O₂</td>
<td>0.5% volume</td>
</tr>
<tr>
<td>H₂S</td>
<td>0.3 ppm</td>
</tr>
<tr>
<td>CO</td>
<td>2 ppm</td>
</tr>
</tbody>
</table>

Zero Follower (ZERO.FLWR)

This menu item only appears if ZFLW_DISP is set to ON in Maintenance Mode (factory setting is OFF).
The ZERO.FLWR setting is not intended for field adjustment. The default setting is ON. The oxygen channel does not support zero follower functionality.

Setting the Date/Time (DATE)

1. From the main menu, place the cursor next to DATE.
2. Press and release POWER MODE. The date and time display with the year flashing.
3. Use AIR to display the desired year.
4. Press and release POWER MODE to save the setting. The month setting flashes.
5. Repeat Step 3 and Step 4 to enter the month, day, hours, and minutes settings. The date and time are saved and the instrument returns to the DATE menu item.
6. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.
Turning the Password On/Off (PASSWORD)

**ON**: The GX-3R prompts you for a password when you enter User Mode. The factory-set password is **0405** but it can be changed as desired.

**OFF** (factory setting): No password is required to enter User Mode.

1. While in User Mode, press AIR to scroll to **PASSWORD**.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. If you selected **OFF**, press and release POWER MODE to save the setting and return to the **PASSWORD** item in User Mode.

   If you selected **ON**, continue with Step 5.
5. Press and release POWER MODE. The Set Password Screen appears. The current password appears and the first digit flashes.

6. Use AIR to display a number from 0 to 9.
7. Press and release POWER MODE to enter the selection and advance to the next number. To go back a number, press and hold AIR and POWER MODE for a few seconds.
8. Repeat Step 6 and Step 7 to select the remaining numbers. When you press and release POWER MODE to enter the last number, the password is saved and you return to the **PASSWORD** item in User Mode.
9. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.

Viewing the ROM/SUM (ROM/SUM)

The **ROM/SUM** screen shows the instrument’s firmware version and firmware checksum.

1. While in User Mode, press AIR to scroll to **ROM/SUM**.
2. Press and release POWER MODE. The screen cycles through the main board’s ROM/SUM and the sensor board’s ROM/SUM. The ROM is the top value and the SUM is the bottom value.

![Screen showing ROM/SUM values](image)

3. Press and release POWER MODE to return to the ROM/SUM menu item in User Mode.

4. See “Entering Measuring Mode (START)” on page 73 to enter Measuring Mode.

### Entering Measuring Mode (START)

1. While in User Mode, press AIR to scroll to START.

![Screen showing START](image)

2. Press and release POWER MODE. The instrument begins its warmup sequence.
Chapter 6: Maintenance

Overview

This chapter describes troubleshooting procedures for the GX-3R. It also includes procedures for recharging the batteries and replacing various consumable parts.

WARNING: RKI Instruments, Inc. recommends that service, calibration, and repair of RKI Instruments be performed by personnel properly trained for this work. Replacing sensors and other parts with original equipment does not affect the intrinsic safety of the instrument.

Troubleshooting

The troubleshooting table describes error messages, symptoms, probable causes, and recommended action for problems you may encounter with the GX-3R.

Table 10: Troubleshooting the GX-3R

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Probable Causes</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The LCD is blank.</td>
<td>• The unit may have been turned off.</td>
<td>1. To turn on the unit, press and briefly hold POWER MODE.</td>
</tr>
<tr>
<td></td>
<td>• The batteries may need to be recharged.</td>
<td>2. If the unit does not turn on, recharge the batteries.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.</td>
</tr>
<tr>
<td>• The LCD shows abnormally high or low readings but other gas detection instruments do not.</td>
<td>• The filters may need to be replaced.</td>
<td>1. Replace the filters.</td>
</tr>
<tr>
<td></td>
<td>• The GX-3R may need to be recalibrated.</td>
<td>2. Recalibrate the unit.</td>
</tr>
<tr>
<td></td>
<td>• The sensor for the affected channel(s) may need replacement.</td>
<td>3. If the difficulties continue, replace the sensor for the affected channel(s) and calibrate the affected channel(s).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.</td>
</tr>
</tbody>
</table>
**Recharging the Batteries**

**WARNING:** To prevent ignition of a hazardous atmosphere, batteries must only be charged in an area known to be nonhazardous.

**AVERTISSEMENT:** Pour éviter l’inflammation d’une atmosphère dangereuse, les batteries doivent uniquement être modifiées ou facturées dans une zone connue comme non dangereuse.

Recharge the batteries when the battery icon indicates that the unit is in low battery warning. When in low battery warning, the lowest battery level indication bar disappears and the battery icon flashes.

1. Make sure the GX-3R is off.
2. Plug the AC adapter into an electrical outlet.

---

**Table 10: Troubleshooting the GX-3R**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Probable Causes</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Calibration fails.</td>
<td>• The calibration values may not match the cylinder gas concentrations.</td>
<td>1. Make sure the GX-3R has been properly set up for calibration.</td>
</tr>
<tr>
<td></td>
<td>• The charcoal filter or charcoal half of the dual filter is saturated causing an elevated CO reading.</td>
<td>2. Change the charcoal filter or the dual filter.</td>
</tr>
<tr>
<td></td>
<td>• The sample gas is not reaching the sensors because of a bad connection.</td>
<td>3. Check all calibration tubing for leaks or for any bad connections.</td>
</tr>
<tr>
<td></td>
<td>• The calibration cylinder may be out of gas or is outdated.</td>
<td>4. Verify that the calibration cylinder contains an adequate supply of fresh test sample.</td>
</tr>
<tr>
<td></td>
<td>• The sensor for the affected channel(s) may need replacement.</td>
<td>5. If the fail condition continues, replace the sensor(s).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. If the difficulties continue, contact RKI Instruments, Inc. for further instruction.</td>
</tr>
<tr>
<td>• Heart symbol at the top of the screen becomes steadily on or disappears</td>
<td>• A microprocessor error has occurred.</td>
<td>• Contact RKI Instruments, Inc. for further instruction.</td>
</tr>
<tr>
<td>• Charge LED alternates between green and orange</td>
<td>• Charging environment is outside the allowed 0 - 40°C charging temperature range.</td>
<td>• Move the charger to a location that is within the allowed 0 - 40°C charging temperature range.</td>
</tr>
</tbody>
</table>
3. Connect the charging jack on the charging cable to the charging socket on the GX-3R. When properly connected, a green LED turns on at the top of the GX-3R.

![Figure 10: Connecting the Charging Cable](image)

4. The LED at the top of the GX-3R turns orange while charging. When a full charge has been reached, approximately 3 hours, the LED turns green. Remove the charging cable from the GX-3R.

---

### Replacing the Buzzer Cover

The buzzer cover may need to be replaced if it becomes saturated or clogged with particles.

1. Remove the rubber boot from the GX-3R.
2. Peel off the old buzzer cover located between the AIR and POWER MODE buttons.
3. If necessary, clean any remaining residue from the case.
4. Peel the backing off of the new buzzer cover.
5. Install the new buzzer cover between the AIR and POWER MODE buttons as shown below.

![Figure 11: Buzzer Cover Replacement](image)

6. Reinstall the rubber boot.
Replacing the Sensor Filters

**Combustible Gas Sensor Filter:** The H₂S filter disk is dark red in color and although it may darken over time, its color is not indicative of remaining filter life. The H₂S filter disk can absorb H₂S for 33 ppm hours and should be replaced after that much exposure. With this many ppm hours of absorption, the H₂S filter disk should be replaced after 80 minutes of exposure to 25 ppm H₂S. This equates to replacing the H₂S filter disk after 40 2-minute calibrations with a cylinder containing 25 ppm H₂S. If H₂S exists in the monitoring environment, the H₂S filter disk will have to be replaced more frequently.

**Dual CO/H₂S Sensor Filter:** The dual CO/H₂S sensor has a half black/half white filter installed over it. The filter should be replaced if you notice either 1) unexplained CO readings or 2) For users with a 1 ppm H₂S alarm setpoint: a drift on the H₂S channel’s zero reading, unexplained H₂S readings, the filter appears dirty, or every 6 months (whichever is sooner).

**CO-Only Sensor Filter:** A black charcoal filter is installed over CO-only sensors. The filter should be replaced if you notice unexplained CO readings.

**H₂S-Only Sensor Filter:** A white humidity filter is installed over H₂S-only sensors. The filter absorbs humidity in the sampling environment to prevent unstable readings around 0 ppm H₂S. For users with a 1 ppm H₂S alarm setpoint, the filter should be replaced if you notice: a drift on the H₂S channel’s zero reading, unexplained H₂S readings, the filter appears dirty, or every 6 months (whichever is sooner). For users with a 2 ppm or higher H₂S alarm setpoint, the filter does not necessarily ever need to be replaced.

1. Verify that the GX-3R is off.
2. Turn the GX-3R upside down.
3. Use a small Phillips screwdriver to unscrew the two screws holding the bottom cover to the rest of the GX-3R’s case. Only unscrew them until the heads are flush with the edge of the bottom cover.
4. Using a small flat blade screwdriver, gently pry each side of the bottom cover away from the rest of the GX-3R’s case.
5. Remove the bottom cover from the rest of the GX-3R’s case.
6. Remove the filter gasket/sensor retainer assembly.
7. Remove the filter gasket and the hydrophobic dust filter.
8. Gently pry out the filter you want to replace.
9. Install the new filters.
   a. Dark red H₂S scrubber disk for combustible gas sensor: The brown side of the filter case should face toward the GX-3R.
   b. Black and white combo filter for CO/H₂S dual sensor: The red side of the filter case should face toward the GX-3R. The black filter material should face the edge of the GX-3R while the white filter material should face the H₂S scrubber disk.
   c. Black filter for CO-only sensor: The red side of the filter case should face toward the GX-3R.
   d. White filter for H₂S-only sensor: The white side of the filter case should face toward the GX-3R.
10. Reinstall the filter gasket and hydrophobic dust filter onto the sensor retainer. The tabs on the gasket should face toward the GX-3R. The black side of the hydrophobic dust filter should be facing up.

11. Reattach the bottom cover to the GX-3R. Push it onto the GX-3R until it snaps into place.

12. Reinstall the two screws that were loosened in Step 3.

### Replacing the Hydrophobic Filter

1. Verify that the GX-3R is off.
2. Turn the GX-3R upside down.
3. Use a small Phillips screwdriver to unscrew the two screws holding the bottom cover to the rest of the GX-3R’s case. Only unscrew them until the heads are flush with the edge of the bottom cover.
4. Using a small flat blade screwdriver, gently pry each side of the bottom cover away from the rest of the GX-3R’s case.
5. Remove the bottom cover from the rest of the GX-3R’s case. The filter gasket/sensor retainer assembly may come out.
6. Remove the white hydrophobic filter from the filter gasket. The hydrophobic dust filter may be stuck on the bottom cover.
7. Install the new hydrophobic dust filter. Place the filter on top of the filter gasket with the black side facing up.

8. Reattach the bottom cover to the GX-3R. Push it onto the GX-3R until it snaps into place.

9. Reinstall the two screws that were loosened in Step 3.

Replacing a Sensor

1. Verify that the GX-3R is off.
2. Turn the GX-3R upside down.
3. Use a small Phillips screwdriver to unscrew the two screws holding the bottom cover to the rest of the GX-3R’s case. Only unscrew them until the heads are flush with the edge of the bottom cover.
4. Using a small flat blade screwdriver, gently pry each side of the bottom cover away from the rest of the GX-3R’s case.
5. Remove the filter gasket/sensor retainer assembly from the GX-3R. The sensors will be exposed.
6. Locate the sensor you want to replace and remove it from its socket.
7. Carefully insert the replacement sensor in the correct socket. Be sure that the new sensor is installed in the same position as the old sensor and that it is aligned correctly. The toxic and oxygen sensors have slots to orient the sensor. The combustible gas sensor has tabs to orient the sensor. Do not force a sensor into its slot.
8. If your instrument has a factory installed dummy sensor, ensure that it is still installed correctly. Make sure that the flat side is facing away from the GX-3R.

9. Reinstall the filter gasket/sensor retainer assembly. The black and white filter goes over the CO/H₂S sensor with the black half of the filter facing the edge of the GX-3R. Be sure the filter gasket/sensor retainer is oriented correctly.

10. If the hydrophobic dust filter came out, place the filter on top of the filter gasket with the black side facing up.

11. Reattach the bottom cover to the GX-3R. Push it onto the GX-3R until it snaps into place.

12. Reinstall the two screws that were loosened in Step 3.

13. Calibrate the new sensors as described in “Performing a Calibration (GAS CAL)” on page 48. If a new H₂-compensated CO sensor was installed, you need to calibrate with CO and set the H₂ response.
Table 11 lists part numbers for the GX-3R’s replacement parts and accessories.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>06-1248RK-03</td>
<td>Calibration kit tubing, 3 foot length</td>
</tr>
<tr>
<td>13-0112RK</td>
<td>Wrist strap</td>
</tr>
<tr>
<td>13-0124</td>
<td>Alligator clip</td>
</tr>
<tr>
<td>13-0125</td>
<td>Belt clip</td>
</tr>
<tr>
<td>20-0332</td>
<td>Rubber boot, black</td>
</tr>
<tr>
<td>20-0333</td>
<td>Leather case</td>
</tr>
<tr>
<td>20-0334</td>
<td>Heat-resistant case</td>
</tr>
<tr>
<td>21-1950</td>
<td>Screen protector</td>
</tr>
<tr>
<td>33-0181</td>
<td>Hydrophobic dust filter</td>
</tr>
<tr>
<td>33-0553</td>
<td>Buzzer cover</td>
</tr>
<tr>
<td>33-7130</td>
<td>Charcoal filter/humidity filter disk (black and white), for dual CO/H₂S sensor, 5 pack</td>
</tr>
<tr>
<td>33-7131</td>
<td>H₂S scrubber disk (dark red), for combustible gas sensor, 5 pack</td>
</tr>
<tr>
<td>33-7132</td>
<td>Charcoal filter disk (black), for CO and H₂-compensated CO sensors, 5 pack</td>
</tr>
<tr>
<td>33-7133</td>
<td>Humidity filter (white), for H₂S sensor, 5 pack</td>
</tr>
<tr>
<td>47-5084RK</td>
<td>USB/IrDA adapter module, no USB cable (for all premier portables)</td>
</tr>
<tr>
<td>47-5084RK-01</td>
<td>USB/IrDA adapter module, with USB cable (for all premier portables)</td>
</tr>
<tr>
<td>47-5085RK</td>
<td>USB A to USB mini cable, 6 feet, for 47-5084RK</td>
</tr>
<tr>
<td>49-0133</td>
<td>Single-unit AC adapter, with 4 foot cable</td>
</tr>
<tr>
<td>49-0134</td>
<td>Multi-unit AC adapter, with 2 foot cables</td>
</tr>
<tr>
<td>49-2021</td>
<td>Single-unit DC adapter, with 4 foot cable</td>
</tr>
<tr>
<td>65-7004</td>
<td>Dummy sensor</td>
</tr>
<tr>
<td>71-0477</td>
<td>Operator’s Manual, GX-3R (this document)</td>
</tr>
<tr>
<td>71-0491</td>
<td>Operator’s Manual, GX-3R Datalogging Program</td>
</tr>
<tr>
<td>81-0000RK-51</td>
<td>Calibration cylinder, 200 ppm H₂ in air, 34 liter steel</td>
</tr>
<tr>
<td>81-0090RK-01</td>
<td>Calibration cylinder, 3-gas (CH₄/O₂/CO), 34 liter steel</td>
</tr>
<tr>
<td>81-0090RK-03</td>
<td>Calibration cylinder, 3-gas (CH₄/O₂/CO), 103 liter</td>
</tr>
<tr>
<td>81-0154RK-02</td>
<td>Calibration cylinder, 4-gas (CH₄/O₂/ H₂S/CO), 58 liter</td>
</tr>
<tr>
<td>81-0154RK-04</td>
<td>Calibration cylinder, 4-gas (CH₄/O₂/ H₂S/CO), 34 liter aluminum</td>
</tr>
<tr>
<td>Part Number</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>81-1050RK-25</td>
<td>Regulator, fixed flow, 0.25 LPM, with gauge and knob, for 17 liter and 34 liter steel cylinders (cylinders with external threads)</td>
</tr>
<tr>
<td>81-1051RK-25</td>
<td>Regulator, fixed flow, 0.25 LPM, with gauge and knob, for 34 liter aluminum, 58 liter, and 103 liter cylinders (cylinders with internal threads)</td>
</tr>
<tr>
<td>81-1193</td>
<td>Calibration cup</td>
</tr>
<tr>
<td>81-GX3RCO</td>
<td>Calibration kit: 103 liter 3-gas (CH&lt;sub&gt;4&lt;/sub&gt;/O&lt;sub&gt;2&lt;/sub&gt;/CO) cylinder, 0.25 LPM regulator, calibration tubing, and case</td>
</tr>
<tr>
<td>81-GX3RCO-LV</td>
<td>Calibration kit: 34 liter 3-gas (CH&lt;sub&gt;4&lt;/sub&gt;/O&lt;sub&gt;2&lt;/sub&gt;/CO) cylinder, 0.25 LPM regulator, calibration tubing, and case</td>
</tr>
<tr>
<td>81-GX3RHSCO</td>
<td>Calibration kit: 58 liter 4-gas (CH&lt;sub&gt;4&lt;/sub&gt;/O&lt;sub&gt;2&lt;/sub&gt;/H&lt;sub&gt;2&lt;/sub&gt;S/CO) cylinder, 0.25 LPM regulator, calibration tubing, and case</td>
</tr>
<tr>
<td>81-GX3RHSCO-LV</td>
<td>Calibration kit: 34 liter aluminum 4-gas (CH&lt;sub&gt;4&lt;/sub&gt;/O&lt;sub&gt;2&lt;/sub&gt;/H&lt;sub&gt;2&lt;/sub&gt;S/CO) cylinder, 0.25 LPM regulator, calibration tubing, and case</td>
</tr>
<tr>
<td>81-GX3RHSCO-116</td>
<td>Calibration kit: 116 liter aluminum 4-gas (CH&lt;sub&gt;4&lt;/sub&gt;/O&lt;sub&gt;2&lt;/sub&gt;/H&lt;sub&gt;2&lt;/sub&gt;S/CO), 0.25 LPM regulator, calibration tubing, and case</td>
</tr>
<tr>
<td>ESR-A13i</td>
<td>Hydrogen sulfide (H&lt;sub&gt;2&lt;/sub&gt;S) sensor</td>
</tr>
<tr>
<td>ESR-A13P</td>
<td>Carbon monoxide (CO) sensor</td>
</tr>
<tr>
<td>ESR-A1CP</td>
<td>Hydrogen-compensated carbon monoxide (CO) sensor</td>
</tr>
<tr>
<td>ESR-A1DP</td>
<td>Dual carbon monoxide (CO) and hydrogen sulfide (H&lt;sub&gt;2&lt;/sub&gt;S) sensor</td>
</tr>
<tr>
<td>ESR-X13P</td>
<td>Oxygen sensor</td>
</tr>
<tr>
<td>NCR-6309</td>
<td>Combustible gas sensor, catalytic</td>
</tr>
</tbody>
</table>
Appendix A: Maintenance Mode

Overview

This appendix describes the GX-3R in Maintenance Mode. The GX-3R is factory-set to suit most applications. Update settings in Maintenance Mode only if required for your specific application. Maintenance Mode items and their factory settings are listed in Table 12 below.

<table>
<thead>
<tr>
<th>Maintenance Mode Menu Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAS CAL (pg.86)</td>
<td>Perform an air adjust, perform a span adjustment, change the calibration values, set the cylinder group.</td>
</tr>
<tr>
<td>AIR CAL</td>
<td>Perform a fresh air adjustment.</td>
</tr>
<tr>
<td>AUTO CAL</td>
<td>Perform a span adjustment, set the calibration gas concentration, and set the cylinder for each gas.</td>
</tr>
<tr>
<td>AUTO CAL CYL X</td>
<td>Perform an automatic span adjustment on the gases selected for Cylinder X (A-E cylinders available).</td>
</tr>
<tr>
<td>START</td>
<td>Begin the warmup sequence and enter Measuring Mode.</td>
</tr>
<tr>
<td>CAL-P</td>
<td>Set the calibration concentration for each gas.</td>
</tr>
<tr>
<td>CYL SEL</td>
<td>Assign a cylinder (A-E) to each gas (all 4 gases set to Cylinder A is the default). For single cal operation, you would assign each gas its own cylinder.</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>Return to the AUTO CAL menu item.</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>Return to the GAS CAL menu item.</td>
</tr>
<tr>
<td>GAS TEST (pg.86)</td>
<td>Apply gas to test sensor response and observe alarm indications without an alarm event being recorded.</td>
</tr>
<tr>
<td>SEN DATE (pg.88)</td>
<td>View the replacement date for each sensor and the battery and/or set the replacement date for each sensor or the battery to the current date.</td>
</tr>
<tr>
<td>BUMP (pg.89)</td>
<td>Perform a bump test.</td>
</tr>
<tr>
<td>BUMP CYL X</td>
<td>Perform a bump test on the gases selected for Cylinder X (A-E cylinders available)</td>
</tr>
<tr>
<td>START</td>
<td>Begin the warmup sequence and enter Measuring Mode.</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>Return to the BUMP menu item.</td>
</tr>
<tr>
<td>LATCHING (pg.90)</td>
<td><strong>ON</strong> (factory setting): The GX-3R remains in alarm until the alarm condition passes and POWER MODE is pressed. <strong>OFF</strong>: The GX-3R automatically resets an alarm when the alarm condition passes.</td>
</tr>
<tr>
<td>Maintenance Mode Menu Item</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| DEM ZERO (pg.90)          | **ON** (factory setting): You can manually perform a fresh air adjust in Measuring Mode by pressing AIR.  
**OFF**: You cannot manually perform a fresh air adjust in Measuring Mode by pressing AIR. |
| AUTOZERO (pg.91)          | **ON**: The GX-3R asks if you want to perform a fresh air adjustment at the end of the startup sequence.  
**OFF** (factory setting): The GX-3R does not ask if you want to perform a fresh air adjustment at the end of the startup sequence. |
| ID DISP (pg.91)           | **ON**: User ID and Station ID screens appear in startup sequence. IDs can be changed in Display Mode if DISP.SET in User Mode is also set to **ON**.  
**OFF** (factory setting): User ID and Station ID screens do not appear in startup sequence. IDs cannot be changed in Display Mode. |
| ZERO SUP (pg.92)          | **ON** (factory setting): Not intended for field adjustment. The suppression values are:  
Combustible Gas: 2% LEL  
O₂: 0.5% volume  
H₂S: 0.3 ppm  
CO: 2 ppm  
**OFF** (factory setting): Not intended for field adjustment. Oxygen channel does not support zero follower functionality. |
| ZERO.FLWR (pg.92)         | **ON** (factory setting): Not intended for field adjustment. Oxygen channel does not support zero follower functionality. |
| DATE (pg.92)              | Set the current date and time. |
| PASSWORD (pg.93)          | **ON** (factory setting): Maintenance Mode is password-protected. Factory-set password is **8102**.  
**OFF**: Maintenance Mode is not password-protected. |
| ROM/SUM (pg.94)           | View the firmware information for the GX-3R’s sensor board and main board. |
| M.DEFAULT (pg.94)         | Set all parameters back to their RKI factory settings. |
| START (pg.95)             | Press and release POWER MODE to begin the warmup sequence and enter Measuring Mode. |
Entering Maintenance Mode

**WARNING:** The GX-3R is not in operation as a gas detector while in Maintenance Mode.

1. Take the GX-3R to a non-hazardous location and turn it off if it is on.
2. Press and hold AIR, then press and hold POWER MODE. You will hear a beep after one second. Continue to hold the buttons down.
3. When you hear a second beep, release the buttons.
4. The screen that appears depends on the setting of Maintenance Mode’s **PASSWORD** item.
   - If **PASSWORD** is set to **OFF**, continue with Step 8.
   - If **PASSWORD** is set to **ON** (factory setting), continue with Step 5.

5. If **PASSWORD** is set to **ON** in Maintenance Mode, a password screen appears. The first digit flashes. The factory-set password is **8102** but it can be changed as desired.
6. Use AIR to select each password number then press POWER MODE to save it and move on to the next number. To go back a number, press and hold AIR and POWER MODE for a few seconds. To reverse the direction of change (ie. from increasing to decreasing or vice versa):
   a. Press and hold AIR.
   b. Immediately press POWER MODE and then release both buttons.
7. Continue to Step 6.
8. The **GAS CAL** menu item displays.

9. Use AIR to move through the Maintenance Mode menu items.
Tips for Using Maintenance Mode

- To scroll from one menu item to the next, press and release AIR. To reverse the scrolling direction:
  a. Press and hold AIR.
  b. Immediately press POWER/MODE and then release both buttons.
  c. The scrolling direction returns to the original direction when you exit and reenter a menu.
- To skip an item when a question is asked, press and release AIR.
- To enter an item and to save any changes, press and release POWER MODE.
- To change a flashing parameter, press and release AIR. To reverse the direction of change (ie. from increasing to decreasing or vice versa):
  a. Press and hold AIR.
  b. Immediately press POWER MODE and then release both buttons.
- To exit an entered menu item without saving a change, press and hold AIR and POWER MODE for a few seconds.

Performing a Calibration (GAS CAL)

See “Performing a Calibration (GAS CAL)” on page 48 for a description of the GAS CAL menu item.

Performing a Gas Test (GAS TEST)

The GAS TEST menu item allows you to apply gas to the instrument and see all alarm indications except for the buzzer indication. There is no buzzer indication in the GAS TEST menu even though the buzzer will sound in the event of a real gas alarm condition while in Measuring Mode.

Preparing for a Gas Test

To perform a gas test on the GX-3R, you will need:
- A calibration cylinder. The concentrations should be above the alarm condition you want to check. Standard alarm points are listed on pg.7.
- 0.25 LPM fixed flow regulator
- Non-absorbent tubing
- Calibration cup
1. Confirm that the regulator knob is turned all the way clockwise. Screw the 0.25 LPM fixed flow regulator onto the calibration cylinder.
2. Install the calibration cup onto the GX-3R. Use the label and imprinting to make sure that the calibration cup gets installed in the correct orientation relative to the GX-3R. Be sure the calibration cup is pushed on all the way.

3. Use the tubing to connect the regulator to the inlet of the calibration cup.

Performing a Gas Test

1. While in Maintenance Mode, press AIR to scroll to GAS TEST.

2. Press and release POWER MODE. The current gas readings display. The bottom of the LCD alternates between “GAS TEST” and “BUZZ OFF”.

3. Turn the regulator knob counterclockwise to open the regulator.

4. The instrument initiates alarm indications except for the buzzer. There is no buzzer indication in the GAS TEST menu even though the buzzer will sound in the event of a real gas alarm condition.

5. Turn the regulator knob clockwise to close the regulator.
6. Unscrew the regulator from the calibration cylinder.
7. Remove the calibration cup from the GX-3R.
8. Store the calibration kit in a safe and convenient place.
9. Press and release POWER MODE to return to the GAS TEST menu item in Maintenance Mode.
10. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.

Sensor/Battery Replacement Date (SEN DATE)

The SEN DATE menu item allows you to keep track of when the sensors and the battery were replaced.

1. While in Maintenance Mode, press AIR to scroll to SEN DATE.

2. Press and release POWER MODE. The combustible gas sensor’s replacement date displays.
3. Use AIR to scroll to the item whose replacement date you want to view or change.

4. To change the replacement date:
   a. With the desired item displayed, press and release POWER MODE.
   b. Press and release POWER MODE again to set the replacement date to the current date.

5. Use the AIR button to scroll to the ESCAPE menu item.

6. Press and release POWER MODE to return to the SEN DATE menu item in Maintenance Mode.

7. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.

Performing a Bump Test (BUMP)

See “Performing a Bump Test (BUMP)” on page 42 for a description of the BUMP menu item.
Setting Alarms to Latching or Self-Resetting (LATCHING)

**ON** (factory setting): The GX-3R remains in alarm until the alarm condition passes and POWER MODE is pressed.

**OFF**: The GX-3R automatically resets an alarm when the alarm condition passes.

1. While in Maintenance Mode, press AIR to scroll to LATCHING.

   ![LATCHING]

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the LATCHING menu item.
5. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.

Turning the Demand Zero Function On/Off (DEM ZERO)

**ON** (factory setting): You can manually perform a fresh air adjust in Measuring Mode by pressing AIR.

**OFF**: You cannot manually perform a fresh air adjust in Measuring Mode.

1. While in Maintenance Mode, press AIR to scroll to DEM ZERO.

   ![DEM ZERO]

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the DEM ZERO menu item.
5. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.
### Turning the Auto Zero Function On/Off (AUTOZERO)

**ON**: The GX-3R asks if you want to perform a fresh air adjustment at the end of the startup sequence.

**OFF (factory setting)**: The GX-3R does not ask if you want to perform a fresh air adjustment at the end of the startup sequence.

1. While in Maintenance Mode, press AIR to scroll to AUTOZERO.
2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the AUTOZERO menu item.
5. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.

### Turning the ID Display Function On/Off (ID DISP)

**ON**: The User ID and Station ID screens appear in startup sequence. If DISP.SET in User Mode is also set to ON, then the IDs can be changed in Display Mode.

**OFF (factory setting)**: The User ID and Station ID screens do not appear in startup sequence and the IDs cannot be changed in Display Mode.

1. While in Maintenance Mode, press AIR to scroll to ID DISP.
2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the ID DISP menu item.
5. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.
Turning the Zero Suppression On/Off (ZERO SUP)

The ZERO SUP setting is not intended for field adjustment. The default setting for each sensor is ON.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Zero Suppression Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustible Gas</td>
<td>2% LEL</td>
</tr>
<tr>
<td>O₂</td>
<td>0.5% volume</td>
</tr>
<tr>
<td>H₂S</td>
<td>0.3 ppm</td>
</tr>
<tr>
<td>CO</td>
<td>2 ppm</td>
</tr>
</tbody>
</table>

Turning the Zero Follower On/Off (ZERO.FLWR)

The ZERO.FLWR setting is not intended for field adjustment. The default setting is ON. The oxygen channel does not support zero follower functionality.

User Mode Zero Suppression (ZSUP_DISP)

ON: Zero suppression menu item appears in User Mode.
OFF (factory setting): Zero suppression menu item does not appear in User Mode. The zero suppression menu item is always available in Maintenance Mode.

It is not normally necessary to have the zero suppression menu item appear in User Mode. Contact RKI Instruments before turning this setting on.

User Mode Zero Follower (ZFLW_DISP)

ON: Zero follower menu item appears in User Mode.
OFF (factory setting): Zero follower menu item does not appear in User Mode. The zero follower menu item is always available in Maintenance Mode.

It is not normally necessary to have the zero follower menu item appear in User Mode. Contact RKI Instruments before turning this setting on.

Setting the Date/Time (DATE)

1. From the main menu, place the cursor next to DATE.

   💕 M 7:49

   DATE
2. Press and release POWER MODE. The date and time display with the year flashing.

3. Use AIR to display the desired year.
4. Press and release POWER MODE to save the setting. The month setting flashes.
5. Repeat Step 3 and Step 4 to enter the month, day, hours, and minutes settings. The date and time are saved and the instrument returns to the DATE menu item.
6. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.

Turning the Password On/Off (PASSWORD)

**ON** (factory setting): The GX-3R prompts you for a password when you enter Maintenance Mode. The factory-set password is **8102** but it can be changed as desired.

**OFF**: No password is required to enter Maintenance Mode.

1. While in Maintenance Mode, press AIR to scroll to PASSWORD.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. If you selected OFF, press and release POWER MODE to save the setting and return to the PASSWORD item in Maintenance Mode.
   
   If you selected ON, continue with Step 5.
5. Press and release POWER MODE. The Set Password Screen appears. The current password appears and the first digit flashes.

6. Use AIR to display a number from 0 to 9.
7. Press and release POWER MODE to enter the selection and advance to the next number. To go back a number, press and hold AIR and POWER MODE for a few seconds.
8. Repeat Step 6 and Step 7 to select the remaining numbers. When you press and release POWER MODE to enter the last number, the password is saved and the instrument returns to the PASSWORD item in Maintenance Mode.
9. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.
Viewing the ROM/SUM (ROM/SUM)

The **ROM/SUM** screen shows the instrument’s firmware version and the firmware checksum.

1. While in Maintenance Mode, press AIR to scroll to **ROM/SUM**.

2. Press and release POWER MODE. The screen cycles through the main board’s ROM/SUM and the sensor board’s ROM/SUM. The ROM is the top value and the SUM is the bottom value.

3. Press and release POWER MODE to return to the **ROM/SUM** menu item in Maintenance Mode.

4. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.

Performing a Default (M.DEFAULT)

Performing a default operation in Maintenance Mode returns all parameters to their RKI factory settings.

1. While in Maintenance Mode, press AIR to scroll to **M.DEFAULT**.

2. Press and release POWER MODE to continue. Press and release AIR to return to the **M.DEFAULT** menu item in Maintenance Mode.
3. Press and release POWER MODE to perform a default operation. The instrument asks if you are sure you want to perform a default operation.

4. Press and release POWER MODE to perform a default operation. Press and release AIR to return to M.DEFAULT menu item in Maintenance Mode.

5. The instrument beeps twice and returns to the M.DEFAULT menu item in Maintenance Mode.

6. See “Entering Measuring Mode (START)” on page 95 to enter Measuring Mode.

**Entering Measuring Mode (START)**

1. While in Maintenance Mode, press AIR to scroll to START.

2. Press and release POWER MODE. The instrument begins its warmup sequence.
Appendix B: Gas Select Mode

Overview

This appendix describes the GX-3R in Gas Select Mode. The GX-3R is factory-set to suit most applications. Update settings in Gas Select Mode only if required for your specific application. A description of the Gas Select Mode items is shown in Table 13 below.

<table>
<thead>
<tr>
<th>Menu Item (Page # of Description)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAS COMB (pg.98)</td>
<td>Turn channels on or off and change target gas for each channel.</td>
</tr>
<tr>
<td>SAVE-AP (pg.100)</td>
<td>Set the current alarm points as the default alarm points.</td>
</tr>
<tr>
<td>MAX SPAN (pg.100)</td>
<td><strong>ON</strong>: Maximum span screen appears after a successful calibration. <strong>OFF</strong> (factory setting): No maximum span screen appears.</td>
</tr>
</tbody>
</table>
| STEALTH (pg.101)                  | **STEALTH ON**: No backlight, LED, or buzzer operation. **STEALTH OFF** (factory setting): Backlight, LED, and buzzer operate normally. *This setting has no effect unless STEALTH is set to ON.*  
**VIB ON**: Vibrator activates for alarm conditions. 
**VIB OFF** (factory setting): Vibrator does not activate in any situation. |
| CHG LEL (pg.102)                  | **STANDARD** (factory setting): Apply standard settings for lower explosive limit’s ppm level.  
**IEC**: Apply IEC standards for the lower explosive limit’s ppm level.  
**ISO**: Apply ISO standards for the lower explosive limit’s ppm level. |
| START (pg.103)                    | Enter Measuring Mode |
Entering Gas Select Mode

**WARNING:** *The GX-3R is not in operation as a gas detector while in Gas Select Mode.*

1. Take the GX-3R to a non-hazardous location and turn it off if it is on.
2. Press and hold AIR, then press and hold POWER MODE. You will hear a beep after one second. Continue to hold the buttons down.
3. You will hear a second beep. Continue to hold the buttons down.
4. When you hear a third beep, release the buttons.
5. A password screen appears. The first digit flashes. The password is **2014**.

6. Use AIR to select each password number then press POWER MODE to save it and move on to the next number. To go back a number, press and hold AIR and POWER MODE for a few seconds. To reverse the direction of change (i.e. from increasing to decreasing or vice versa):
   a. Press and hold AIR.
   b. Immediately press POWER MODE and then release both buttons.
7. The **GAS COMB** menu item displays.

8. Use AIR to move through the Gas Select Mode menu items.

**Tips for Using Gas Select Mode**

- To scroll from one menu item to the next, press and release AIR. To reverse the scrolling direction:
  a. Press and hold AIR.
  b. Immediately press POWER/MODE and then release both buttons.
  c. The scrolling direction returns to the original direction when you exit and reenter a menu.
- To skip an item when a question is asked, press and release AIR.
- To enter an item and to save any changes, press and release POWER MODE.
- To change a flashing parameter, press and release AIR. To reverse the direction of change (i.e. from increasing to decreasing or vice versa):
  a. Press and hold AIR.
  b. Immediately press POWER MODE and then release both buttons.
To exit an entered menu item without saving a change, press and hold AIR and POWER MODE for a few seconds.

### Changing the Gas Combination (GAS COMB)

The GAS COMB menu item allows you to turn channels on and off and change each channel’s target gas.

1. While in Gas Select Mode, press AIR to scroll to GAS COMB.

2. Press and release POWER MODE. The first channel displays.

3. Press AIR to scroll through to the instrument channel whose target gas you want to change.
4. Press and release POWER MODE.
5. The target gas for the selected channel flashes. In the example below, the combustible gas channel is selected.

![Image of GX-3R instrument with green CH4 symbol]

6. Use AIR to change the target gas or turn the channel off.

### Table 14: Target Gas Options for Each Channel

<table>
<thead>
<tr>
<th>Channel</th>
<th>Target Gas Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combustible Gas</strong></td>
<td>• CH4 (methane)</td>
</tr>
<tr>
<td></td>
<td>• i-C4H10 (isobutane)</td>
</tr>
<tr>
<td></td>
<td>• H2 (hydrogen)</td>
</tr>
<tr>
<td></td>
<td>• CH3OH (methanol)</td>
</tr>
<tr>
<td></td>
<td>• C2H2 (acetylene)</td>
</tr>
<tr>
<td></td>
<td>• C2H4 (ethylene)</td>
</tr>
<tr>
<td></td>
<td>• C2H6 (ethane)</td>
</tr>
<tr>
<td></td>
<td>• C2H5OH (ethanol)</td>
</tr>
<tr>
<td></td>
<td>• C3H6 (propylene)</td>
</tr>
<tr>
<td></td>
<td>• C3H6O (acetone)</td>
</tr>
<tr>
<td></td>
<td>• C3H8 (propane)</td>
</tr>
<tr>
<td></td>
<td>• C4H6 (butyne)</td>
</tr>
<tr>
<td></td>
<td>• C5H10 (cyclopentane)</td>
</tr>
<tr>
<td></td>
<td>• C6H6 (benzene)</td>
</tr>
<tr>
<td></td>
<td>• n-C6H14 (hexane)</td>
</tr>
<tr>
<td></td>
<td>• C7H8 (toluene)</td>
</tr>
<tr>
<td></td>
<td>• n-C7H16 (heptane)</td>
</tr>
<tr>
<td></td>
<td>• C8H10 (xylene)</td>
</tr>
<tr>
<td></td>
<td>• n-C9H20 (nonane)</td>
</tr>
<tr>
<td></td>
<td>• EtAc (ethyl acetate)</td>
</tr>
<tr>
<td></td>
<td>• IPA (isopropyl alcohol)</td>
</tr>
<tr>
<td></td>
<td>• MEK (methyl ethyl ketone)</td>
</tr>
<tr>
<td></td>
<td>• MMA (methyl methacrylate)</td>
</tr>
<tr>
<td></td>
<td>• DME (dimethyl ether)</td>
</tr>
<tr>
<td></td>
<td>• MIBK (methyl isobutyl ketone)</td>
</tr>
<tr>
<td></td>
<td>• THF (tetrahydrofuran)</td>
</tr>
<tr>
<td></td>
<td>• CH4_VOL (methane %volume)*</td>
</tr>
<tr>
<td></td>
<td>• ---------- (off)</td>
</tr>
<tr>
<td><strong>O2</strong></td>
<td>• O2 (oxygen)</td>
</tr>
<tr>
<td></td>
<td>• ---------- (off)</td>
</tr>
<tr>
<td><strong>H2S</strong></td>
<td>• H2S (hydrogen sulfide for dual CO/H2S sensor)</td>
</tr>
<tr>
<td></td>
<td>• H2S_SING (hydrogen sulfide for single-gas H2S sensor)</td>
</tr>
<tr>
<td></td>
<td>• H2_CO-H2 (hydrogen compensated CO)</td>
</tr>
<tr>
<td></td>
<td>• ---------- (off)</td>
</tr>
<tr>
<td><strong>CO</strong></td>
<td>• CO (carbon dioxide for dual CO/H2S sensor or single-gas CO sensor)</td>
</tr>
<tr>
<td></td>
<td>• CO_CO-H2 (hydrogen compensated CO)</td>
</tr>
<tr>
<td></td>
<td>• ---------- (off)</td>
</tr>
</tbody>
</table>

*If CH4_VOL is selected, the CHG LEL item in Gas Select Mode has no effect on operation.*

7. Press and release POWER MODE to save the setting.
8. The instrument returns to the channel selection screen.
9. Repeat Step 3 - Step 8 to change the target gas for other channels.
10. Use AIR to scroll to ESCAPE and press and release POWER MODE.
11. The instrument returns to the GAS COMB menu item.
Saving the Alarm Points (SAVE-AP)

Performing a SAVE-AP operation saves the current alarm setpoints.
Performing a DEF ALMP operation in the ALARM-PT User Mode menu item sets the instrument’s alarm points to those saved during the SAVE-AP operation (if performed).
Performing a SAVE-AP operation has no effect on an M.DEFAULT in Maintenance Mode.
An M.DEFAULT operation returns all instrument settings to the RKI default regardless of if a SAVE-AP operation was performed.

1. While in Gas Select Mode, press AIR to scroll to SAVE-AP.

![SAVE-AP Menu]

2. Press and release POWER MODE. The display cycles through the following screens.

![SAVE-AP Flowchart]

3. Press and release POWER MODE to save the current alarm point settings as the default.
4. The instrument returns to the SAVE-AP menu item.
5. See “Exiting Gas Select Mode (START)” on page 103 to enter Measuring Mode.

Turning Calibration Max Span On/Off (MAX SPAN)

**ON:** After a passed calibration, the GX-3R displays the maximum possible adjustment it could have made to the response reading. So if the combustible gas channel was calibrated with 50% LEL gas and the maximum indicated span is 95% LEL, this means that there was enough adjustment left on that channel to set the reading to 95% LEL when the detector was exposed to 50% LEL gas. If the maximum span value is close to the calibration gas value, for example if it is 53% LEL when exposed to 50% LEL gas, the sensor should be replaced soon. The upper limit on the maximum adjustment indicated for all channels except for oxygen is either twice the calibration value or full scale, whichever is lower. The upper limit on the maximum adjustment indicated for the oxygen channel is 25.0% volume.

**OFF** (factory setting): There is no maximum span indication at the end of a calibration.
1. While in Gas Select Mode, press AIR to scroll to **MAX SPAN**.

2. Press and release POWER MODE. The current setting flashes.

3. Use AIR to display the desired setting.

4. Press and release POWER MODE to save the setting and return to the **MAX SPAN** menu item.

5. See “Exiting Gas Select Mode (START)” on page 103 to enter Measuring Mode.

---

### Stealth and Vibrator Settings (STEALTH)

**STEALTH**

**ON:**
- The instrument’s backlight does not come on, regardless of the **BL TIME** setting.
- The instrument’s LEDs do not come on for any reason, even alarm conditions.
- The instrument’s buzzer does not sound for any reason, even alarm conditions.
- An “S” appears at the top of the LCD.

**OFF** (factory setting): The instrument’s backlight and LEDs operate normally.

**VIB**

The **VIB** setting only affects instrument operation if **STEALTH** is set to **ON**.

**ON:** The vibrator activates for alarm conditions. It can be useful to have this feature turned on if you have also turned **STEALTH** on.

**OFF** (factory setting): The vibrator does not activate for any reason.

1. While in Gas Select Mode, press AIR to scroll to **STEALTH**.

2. Press and release POWER MODE. The current **STEALTH** setting flashes.

3. Use AIR to display the desired setting.

4. Press and release POWER MODE. The current **VIB** setting flashes.

5. Use AIR to display the desired setting.

6. Press and release POWER MODE to save the setting and return to the **STEALTH** menu item.

7. See “Exiting Gas Select Mode (START)” on page 103 to enter Measuring Mode.
The **CHG LEL** menu item defines what standard the instrument follows in determining the LEL (lower explosive limit) for the combustible channel’s target gas.

**STANDARD**: Apply the standard settings for the lower explosive limit’s ppm level.

**IEC**: Apply the IEC settings for the lower explosive limit’s ppm level.

**ISO**: Apply the ISO settings for the lower explosive limit’s ppm level.

### Table 15: Lower Explosive Limit ppm Levels

<table>
<thead>
<tr>
<th>Gas</th>
<th>Standard (ppm)</th>
<th>IEC (ppm)</th>
<th>ISO (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane (CH4)</td>
<td>50,000</td>
<td>44,000</td>
<td>44,000</td>
</tr>
<tr>
<td>Isobutane (i-C4H10)</td>
<td>18,000</td>
<td>13,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Hydrogen (H2)</td>
<td>40,000</td>
<td>40,000</td>
<td>40,000</td>
</tr>
<tr>
<td>Methanol (CH3OH)</td>
<td>55,000</td>
<td>60,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Acetylene (C2H2)</td>
<td>15,000</td>
<td>23,000</td>
<td>23,000</td>
</tr>
<tr>
<td>Ethylene (C2H4)</td>
<td>27,000</td>
<td>23,000</td>
<td>24,000</td>
</tr>
<tr>
<td>Ethane (C2H6)</td>
<td>30,000</td>
<td>24,000</td>
<td>24,000</td>
</tr>
<tr>
<td>Ethanol (C2H5OH)</td>
<td>33,000</td>
<td>31,000</td>
<td>31,000</td>
</tr>
<tr>
<td>Propylene (C3H6)</td>
<td>20,000</td>
<td>20,000</td>
<td>18,000</td>
</tr>
<tr>
<td>Acetone (C3H6O)</td>
<td>21,500</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Propane (C3H8)</td>
<td>20,000</td>
<td>17,000</td>
<td>17,000</td>
</tr>
<tr>
<td>Butadiene (C4H6)</td>
<td>11,000</td>
<td>14,000</td>
<td>14,000</td>
</tr>
<tr>
<td>Cyclopentane (C5H10)</td>
<td>14,000</td>
<td>14,000</td>
<td>14,000</td>
</tr>
<tr>
<td>Benzene (C6H6)</td>
<td>12,000</td>
<td>12,000</td>
<td>12,000</td>
</tr>
<tr>
<td>N-hexane (n-C6H14)</td>
<td>12,000</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Toluene (C7H8)</td>
<td>12,000</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>N-heptane (n-C7H16)</td>
<td>11,000</td>
<td>8,500</td>
<td>8,000</td>
</tr>
<tr>
<td>Xylene (C8H10)</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>N-nonane (n-C9H20)</td>
<td>7,000</td>
<td>7,000</td>
<td>7,000</td>
</tr>
<tr>
<td>Ethyl acetate (EtAc)</td>
<td>21,000</td>
<td>20,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Isopropyl alcohol (IPA)</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Methyl ethyl ketone (MEK)</td>
<td>18,000</td>
<td>15,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Methyl methacrylate (MMA)</td>
<td>17,000</td>
<td>17,000</td>
<td>17,000</td>
</tr>
</tbody>
</table>
Table 15: Lower Explosive Limit ppm Levels

<table>
<thead>
<tr>
<th>Gas</th>
<th>Standard (ppm)</th>
<th>IEC (ppm)</th>
<th>ISO (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl ether (DME)</td>
<td>30,000</td>
<td>27,000</td>
<td>27,000</td>
</tr>
<tr>
<td>Methyl isobutyl ketone (MIBK)</td>
<td>12,000</td>
<td>12,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Tetrahydrofuran (THK)</td>
<td>20,000</td>
<td>15,000</td>
<td>15,000</td>
</tr>
</tbody>
</table>

1. While in Gas Select Mode, press AIR to scroll to CHG LEL.

2. Press and release POWER MODE. The current setting flashes.
3. Use AIR to display the desired setting.
4. Press and release POWER MODE to save the setting and return to the CHG LEL menu item will be displayed.
5. See “Exiting Gas Select Mode (START)” on page 103 to enter Measuring Mode.

Exiting Gas Select Mode (START)

1. While in Gas Select Mode, press AIR to scroll to START.

2. Press and release POWER MODE. The instrument begins its warm-up sequence.
Warranty

RKI Instruments, Inc. warrants the GX-3R sold by us to be free from defects in materials, workmanship, and performance for a period of three years from the date of shipment from RKI Instruments, Inc. This includes the instrument and the original sensors. Replacement parts are warranted for 1 year from the date of their shipment from RKI Instruments, Inc. except for replacement sensors which are warranted for 3 years. Any parts found defective within their warranty 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:

- Absorbent cartridges
- Filter elements, disks, or sheets
- Pump diaphragms and valves

Warranty is voided by abuse including mechanical damage, alteration, rough handling, or repair procedures not in accordance with the instruction 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.

This warranty covers instruments and parts sold to users only 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 replacement of parts or our complete goods.