RKI
INSTRUMENTS

Beacon 3200 Gas Monitor
Operator's Manual

Product Warranty

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

- Absorbent cartridges
- Pump diaphragms and valves
- Fuses
- Batteries
- Filter elements

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

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

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

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

Table of Contents

Chapter 1: Introduction

Overview

This chapter briefly describes the Beacon 3200 Gas Monitor. This chapter also describes the *Beacon 3200 Gas Monitor Operator's Manual* (this document). Table 2 lists the specifications for the Beacon 3200.

About the Beacon 3200 Gas Monitor

The Beacon 3200 is a fixed-mounted, continuous-monitoring controller. This multiple channel gas monitor is capable of detecting gas at up to 32 locations. The display screen shows the gas readings of 16 active channels at a time. Direct connect (internal amplifier), 4-20 mA (remote amplifier), and Modbus heads may be used with the Beacon 3200.

The main board has 8 slots that can each accept either a sensor Module or a relay module. Each sensor module can have up to 4 channels. Each relay module has 8 relays. This means you could potentially have 32 channels connected to the Beacon 3200 if you didn't need any relay connections other than the Main Relays and Fail Relay on the main board.

Table 1: Potential Gas/Relay Module Combinations

Sensor Modules	Channels	Relay Modules	Card Relays
8	32	0	0
7	28	1	8
6	24	2	16
5	20	3	24
4	16	4	32
3	12	5	40
2	8	6	48
1	4	7	56
0	0	8	64

The Beacon 3200 includes audible and visual alarms for hazardous gas condition warnings. The alarm circuits include up to three levels of gas alarms. The fail circuit indicates failures occurring in the detector heads or Beacon 3200.

The Beacon 3200's Setup Mode allows configuration of various Beacon 3200 channel and instrument parameters. It also has a Calibration Mode for calibration of the Beacon 3200's active channels.

About this Manual

The *Beacon 3200 Gas Monitor 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.**

⚠ Caution: Refer to accompanying documentation.

~ Vac (AC voltage)

--- Vdc (DC voltage)

Specifications

Table 2 lists specifications for the Beacon 3200.

Table 2: Beacon 3200 Specifications

Input Power	100/115/220V ~ ±10%, 50/60Hz, 2.0/2.0/2.0A or 24 V --- ± 10%, 8.0A
Construction (housing)	Fiberglass/polyester with lexan window (NEMA 4X)
Dimensions	16 in. H x 13.75 in. W x 6.5 in. D (40.6 cm H x 34.9 cm W x 16.5 cm D)
Weight	10.4 lbs. (without AC line cord)

Table 2: Beacon 3200 Specifications

Environmental Conditions	• For indoor or outdoor locations (Type 4X) • 2000m max. altitude • -40°C to 50°C (-4°F to 122°F) max. ambient • Maximum humidity of 80% relative • Mains supply voltage fluctuations not exceeding ± 10% of nominal • DC supply voltage fluctuations not exceeding +10% -8% of nominal • Overvoltage Category II, Pollution Degree 2
Safety/Regulatory	QPS Certification Pending
User Controls	• Reset switch • Touch screen
Relays	Relay contacts rated for 6A @ 115/220V~ resistive or 6A @ 30V ‗‗‗ resistive SPDT, Form C (common, normally open, and normally closed contacts)
Max Channels and Relays	The Beacon 3200 can support a combination of sensors and card relays. The maximum number of sensors is 32. See Table 1 on page 6 when determining desired configurations.
Max Output at RS-485 Power Output Terminal Strip	7A
Max Modbus Cable Length	4,000 ft (recommended impedance of 120 ohms)
Data Logging Interval	Once per second
Data Logging Capacity	7.5 years
Standard Accessories	USB drive (for transferring logged data)

Chapter 2: Description

Overview

This chapter describes the Beacon 3200's external and internal components.

External Description

This section describes the housing and all external components of the Beacon 3200. For the purposes of this description, the housing door is considered the front of the monitor.
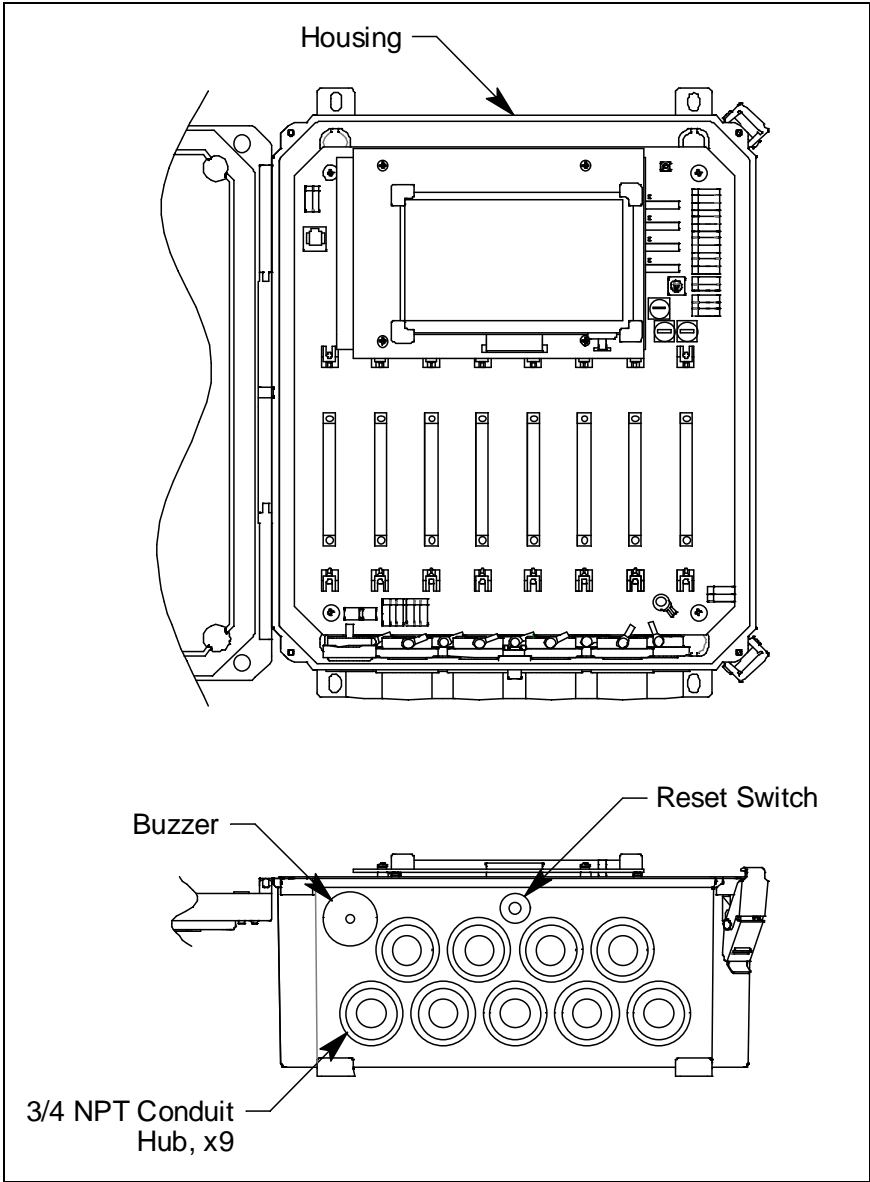

Figure 1: External Component Location

Housing

The Beacon 3200's fiberglass housing is weather- and corrosion-resistant. It is suitable for installation where general purpose equipment is in use. The housing door is hinged on the left side and is secured by two latches on the right side. The touch screen is visible through window in the housing door.

Four mounting feet are attached to the back of the housing (one at each corner). The mounting feet allow you to install the housing to a vertical surface.

There are nine conduit hubs installed on the bottom of the housing for external wiring connections. Five are along the back of the housing and four are along the front.

NOTE: One or more of the conduit hubs may be replaced by a hole plug, depending on the configuration ordered.

CAUTION: *Only use the factory-installed conduit hubs on the bottom of the housing for wire entry into the housing. Do not drill the housing for any reason.*

CAUTION: *To avoid electrical interference, do not route detector head and power wiring through the same conduit hub.*

Reset Switch

The reset switch is on the bottom of the housing. There is also a **Reset** button on the touch screen display.

The reset switch serves four functions:

 • Resets the alarm circuits for "latched" alarms after an alarm 1, alarm 2, or alarm 3 condition passes

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NOTE: You can set each channel for latched or self-resetting alarms in Setup Mode's Channel Settings (see page 61).

 • Silences the buzzer during an alarm 1, alarm 2, or alarm 3 condition if the buzzer silence parameter in Setup Mode's System Settings (see page 54) is set to **Can Silence**
 • Resets the strobe during an alarm 1, alarm 2, or alarm 3 condition if the strobe alarm setting parameter is set to **Resettable** in Setup Mode's Channel Settings (see page 64)
 • Silences the buzzer during a fail condition if the buzzer silence parameter in Setup Mode's System Settings (see page 54) is set to **Can Silence**

NOTE: Fail alarms cannot be reset with the reset switch. When a fail condition passes, the Beacon 3200 automatically resets the fail alarm circuit.

Buzzer

The buzzer is on the bottom left side of the housing. The buzzer sounds an audible alarm to warn of gas alarms and instrument failures.

Internal Description

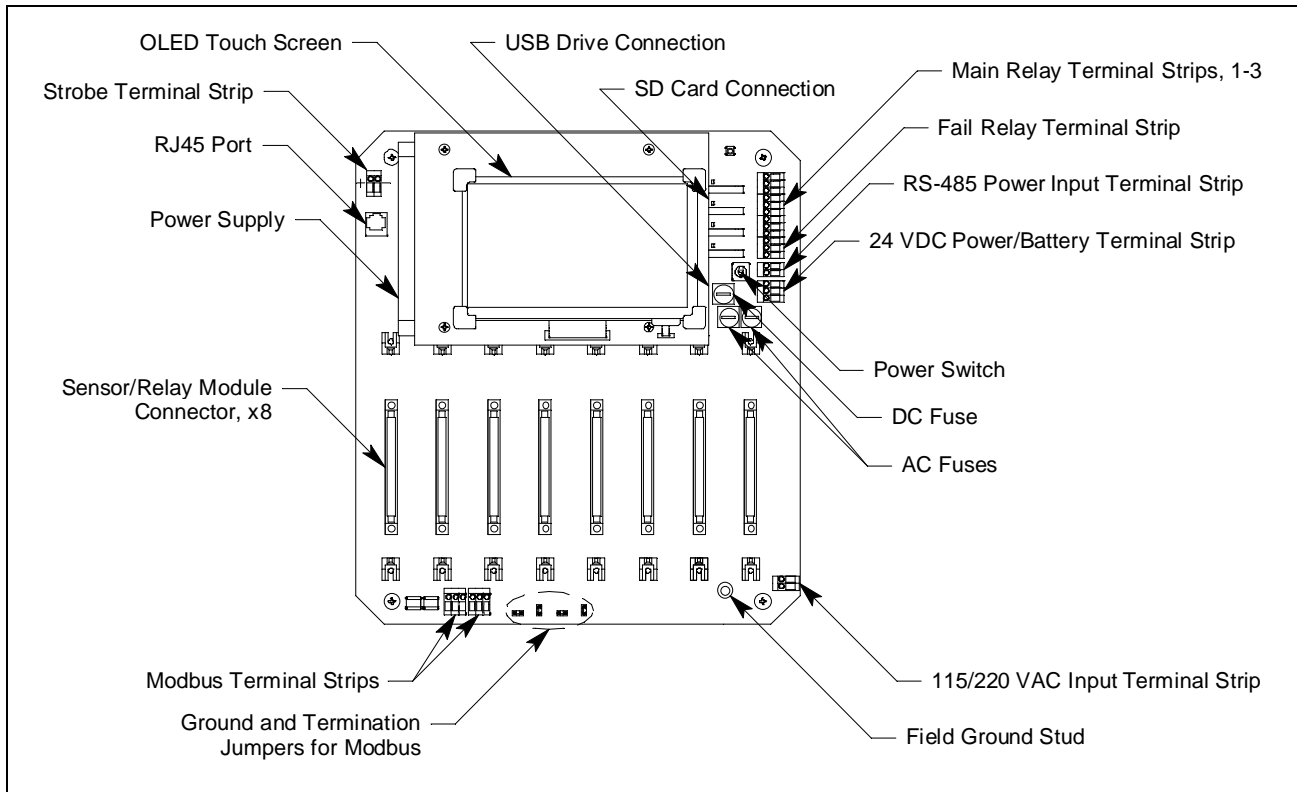This section describes the internal components of the Beacon 3200.

Figure 2: Internal Component Location

OLED Touch Screen

The OLED touch screen is located near the top of the assembly. During normal operation, the touch screen simultaneously indicates each active channel's target gas, current gas reading, measuring unit, status, and location.

The display also shows messages, settings, and other data during operation of the various selection menus and operating modes.

Table 3: Beacon 3200 Control Button Functions

History Graph	Shows the logged data in graph format
List/Bar Graph	Shows the current gas reading(s) and status in list format or bar graph format
Page Up	Scrolls up a page if active channels take up more than one screen

Page Down	Scrolls down a page if active channels take up more than one screen
Setup	Access the Setup Menu
Calibrate	Calibrate active channels
Reset/Clear	Reset any alarm conditions

SD Card Connection

A 32 GB SD card is included with the Beacon 3200 but is for Beacon 3200 use only and is **not** for customer use.

USB Drive Connection

A USB drive can be installed to transfer logged data to a computer. See page 134 for instructions on saving logged data to the USB drive and transferring it to a computer.

Main Relay Terminal Strips

The 3 main relay terminal strips (Relay 1, Relay 2, and Relay 3) are located on the top right side of the main PCB and facilitate the wiring of external alarm devices (horn, strobe, etc.). All the relays have single-pole double-throw (SPDT) contacts, also known as form C contacts, and are rated for 6 amps at 115 VAC (resistive). The main relays are field configurable as individual channel alarm relays or as common alarm relays. The contacts are labeled NO (normally open), NC (normally closed), and C (common). See "Chapter 6: System Settings" and "Chapter 9: Assigning Main Relays" for instructions on configuring main relay operation.

Fail Relay Terminal Strip

The fail relay terminal strip (Relay 4) is located on the right side of the main PCB and facilitates the wiring of an external alarm device (horn, strobe, etc.). The relay has single-pole double-throw (SPDT) contacts, also known as form C contacts, and are rated for 6 amps at 115 VAC (resistive). The fail relay activates for a fail condition and cannot be assigned to another alarm condition. Its operation can be adjusted in Setup Mode's System Settings (see page 54).

RS-485 Power Output Terminal Strip

The 2-point RS-485 Power Output Terminal Strip is located on the right side of the main PCB and supplies 24 VDC to power RS-485 detector heads. The Beacon 3200 is capable of providing up to 7.0 amps from the RS-485 Power Output Terminal Strip if no sensor modules are installed.

24 VDC Power/Battery Terminal Strip

The 3-point 24 VDC Power/Battery Terminal Strip is located on the right side of the main PCB and facilitates the wiring of a 24 VDC power supply or a 24 VDC rechargeable battery. You cannot connect both a power supply and a rechargeable battery.

When using a rechargeable battery, ensure that the charging jumper is in the correct position. See "Battery Charging Jumpers" on page 15 for more information.

Table 4: 24 VDC Power/Battery Terminal Strip Terminals

Terminal	Connects to:
+ BATT	+ 24 VDC from rechargeable battery
-	- from battery or power supply
+ SUPP	+ 24 VDC from power supply

115/220 VAC Input Terminal Strip

The 2-point 115/220 VAC Input Terminal Strip is located on the bottom right corner of the main PCB (see Figure 2) and facilitates wiring connections to the AC power source.

Table 5: AC Terminal Strip Terminals

Terminal	Connects to:
LINE	Hot wire from AC power source.
NEUT	Neutral wire from AC power source.

NOTE: The AC power source's ground wire must be connected to the field ground stud. See page 23 for instructions.

RS-485 Modbus Terminal Strips

The RS-485 Modbus Terminal Strips (Master and Slave) are located in the lower left corner of the main PCB. Modbus slave detectors must be wired to the "Master" terminals. If the Beacon 3200 is used as a slave, the master device must be wired to the "Slave" terminals.

Strobe Terminal Strip

The Strobe Terminal Strip is a 2-point terminal strip located in the upper left corner of the main PCB. When an optional strobe is ordered with a Beacon 3200, the Strobe Terminal Strip is used to factory-wire the strobe.

CAUTION: The strobe terminals are intended for use with an RKI-supplied optional strobe. Consult RKI Instruments, Inc. before attempting to use these terminals for some other alarm device.

RJ45 Port

The RJ45 port on the upper left corner of the main PCB allows for connection of an Ethernet cable. The Beacon 3200 supports Modbus TCP/IP on port 502.

Sensor/Relay Module Connector

8 sensor/relay module connectors located below the touch screen connect the modules to the main PCB and hold them in place. Each connector can accept either a sensor module or a relay module. There are no restrictions on how sensor and relay modules are arranged.

Sensor Module

Each sensor module can accept any combination of up to four direct connect or 4-20 mA detector heads. Each channel has a plug-in terminal strip for wiring connections. The channels are labeled "A-D" from bottom to top. The channel number depends on what slot the module is installed in (1-8 from left to right). Each channel also has 4-20 mA Out terminals to connect a recording device.

Relay Module

Each relay module has 8 relays installed. There is a plug-in terminal strip for each set of relay contacts. They are labeled "1-8" from bottom to top. All the relays have single-pole double-throw (SPDT) contacts, also known as form C contacts, and are rated for 6 amps at 115 VAC (resistive), 220 VAC, or 30 VDC. The contacts are labeled NO (normally open), NC (normally closed), and C (common). See Chapter 6: System Settings and Chapter 10: Assigning Card Relays for instructions on configuring card relay operation.

Power Switch

The power switch is on the right side of the main board, between the touch screen and the RS-485 Power Output Terminal Strip (see Figure 2). The power switch turns the incoming AC or DC power source on and off at the Beacon 3200. When the switch is up, the power is on.

Power Supply

The power supply is mounted to the power supply mounting plate which is located behind the display PCB. The power supply mounting plate is mounted to the main PCB with four standoffs. The power supply receives AC power from the external power source and converts it to a DC voltage that is usable by the Beacon 3200 circuitry. A polycarbonate cover prevents accidental contact with the AC terminals on the power supply.

AC and DC Fuses

Two AC fuses and one DC fuse are used in the Beacon 3200. The fuses are located on the right side of the main PCB (see Figure 2). The AC fuses are labeled F1 and F2. The DC fuse is labeled F3 on the PCB silkscreen. The fuses cut off the incoming AC or DC power in the event of a short circuit or other electrical fault which causes a high current draw in the Beacon 3200. They are housed in vertical fuse holders, each held in place by a quarter turn cover. The AC fuses are rated at 6 A, 250 V, 1/4 x 1 1/4 inch, fast acting. The DC fuse is rated at 12A, 250V, 1/4 x 1 1/4 inch, fast acting.

Field Ground Stud

Two ground studs are located on the bottom right corner of the main PCB. The left one is unlabeled and is for factory grounding connections. The stud on the right is labeled with a ground symbol and is for the field ground connection. A kep nut on the field grounding stud has one lug available to make wiring connections to earth ground. The kep nut may be removed to install more lugs if necessary. This stud is typically used to connect the shield drain wire of shielded cable to earth ground at the Beacon 3200.

Battery Charging Jumpers

The Beacon 3200 has two jumper locations related to battery charging. They are located between the LCD and the AC fuses. The upper jumper position enables battery charging, and the bottom jumper position disables battery charging.

Ground and Termination Jumpers for Modbus

2 sets of ground and termination jumpers are installed on the main PCB. 1 set is for when the Beacon 3200 is used as a Modbus master. The other set is for when the Beacon 3200 is used as a Modbus slave. Leave all ground and termination jumpers installed unless directed to remove it for a Modbus installation. See page 28 and page 30 for Modbus wiring instructions.

Optional Accessories

This section describes the optional accessories available for the Beacon 3200. All optional accessories are wired to the Strobe Terminal Strip on the upper left corner of the main PCB.

Alarm Strobe

The Beacon 3200 can be ordered with an alarm strobe light installed on the top of the housing. The Beacon 3200 retains its NEMA 4X rating with the strobe installed. Strobe operation can be programmed in Setup Mode's Channel Settings (see page 61).
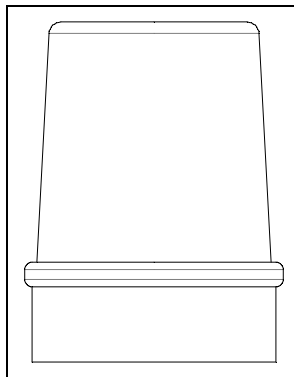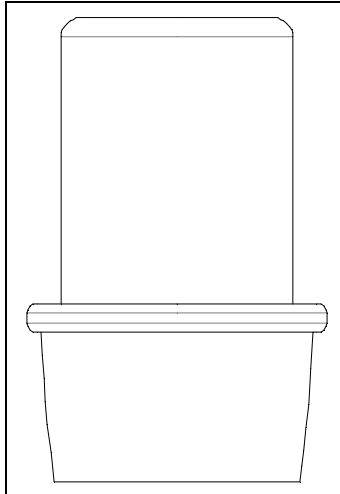

Figure 3: 51-0001-XX Type Alarm Strobe

Figure 4: 51-0170-XX Type Alarm Strobe

Horn/Strobe

The Beacon 3200 can be ordered with a horn/strobe. This option allows the user to have both a strobe and horn connected to the Strobe Terminal Strip. If the horn/strobe is not factory-installed, it also allows the user to mount the horn/strobe away from the Beacon 3200 so that it can be somewhere more visible/audible. Strobe operation can be programmed in Setup Mode's Channel Settings (see page 61).

NOTE: See Chapter 3: Installation and Start Up for complete Beacon 3200 installation instructions.
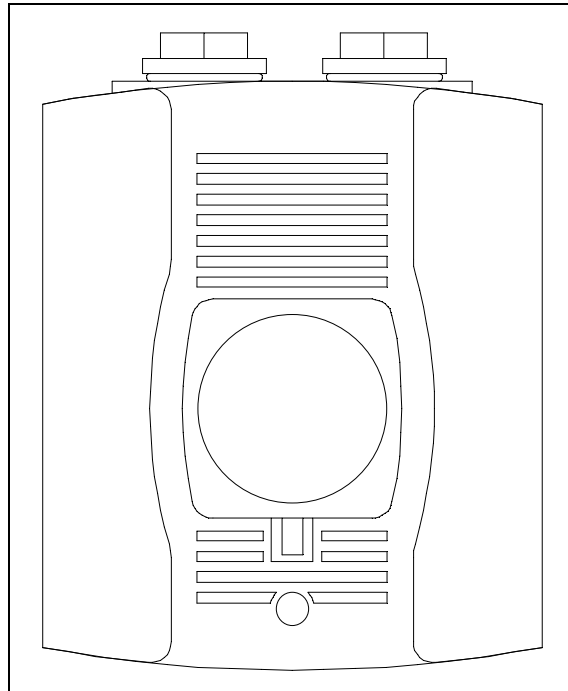
Figure 5: 51-0096 Horn/Strobe

Chapter 3: Installation and Start Up

Overview

This chapter describes procedures to mount the Beacon 3200 Gas Monitor, make wiring connections to the monitor, and start up the monitor.

WARNING: **Perform all installation and start-up procedures in a known fresh air environment, an environment free of combustible and toxic gases and of normal oxygen content. The Beacon 3200 is not in operation as a gas monitoring controller until the start up procedure is complete.**

Mounting

WARNING: **Only authorized and properly trained personnel should perform any mounting procedures.**

Perform the following procedure to install the Beacon 3200 at the mounting site.

1. Select the mounting site. When selecting the mounting site, consider the following factors:
    *   Is an AC or DC power source available?
    *   Is a vertical surface available to mount the Beacon 3200?
    *   Is there enough room to open the housing door and make wiring connections through the conduit hubs at the bottom of the housing?
    *   Is the touch screen visible?

2. Close and latch the housing door.

3. Prepare the selected mounting site as required to mount the Beacon 3200. It should be mounted at eye level (4 1/2 to 5 feet from the floor). Refer to Figure 7 for the outline and mounting dimensions.

4. Position the monitor on the vertical mounting surface.

5. Insert 1/4 in. screws through the slots in the mounting feet at each corner of the housing to secure the housing to the mounting surface.

6. Each of the door clamps has a feature for locking device installation. A locking device that requires a tool to unlock must be installed in each door clamp.
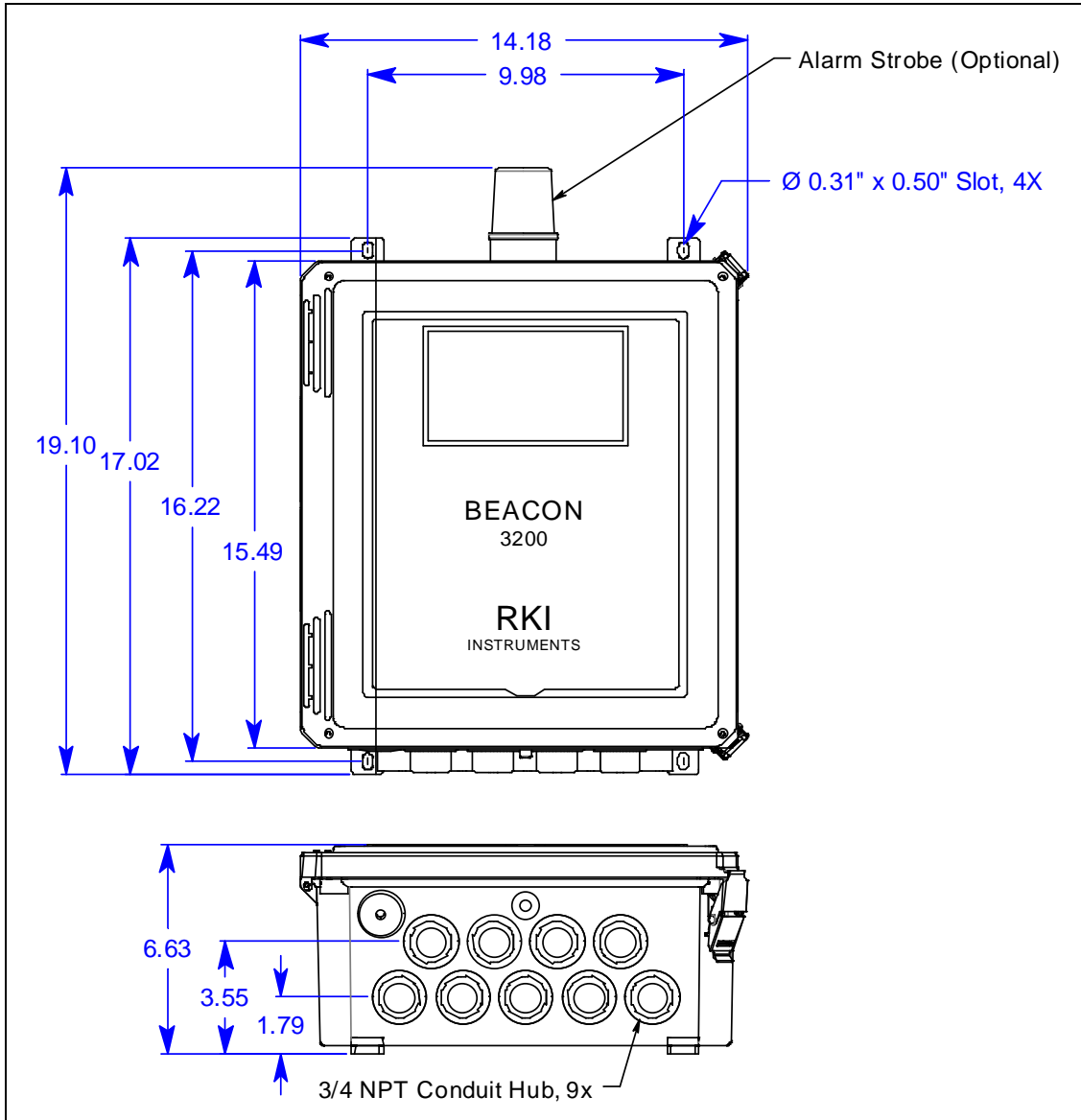
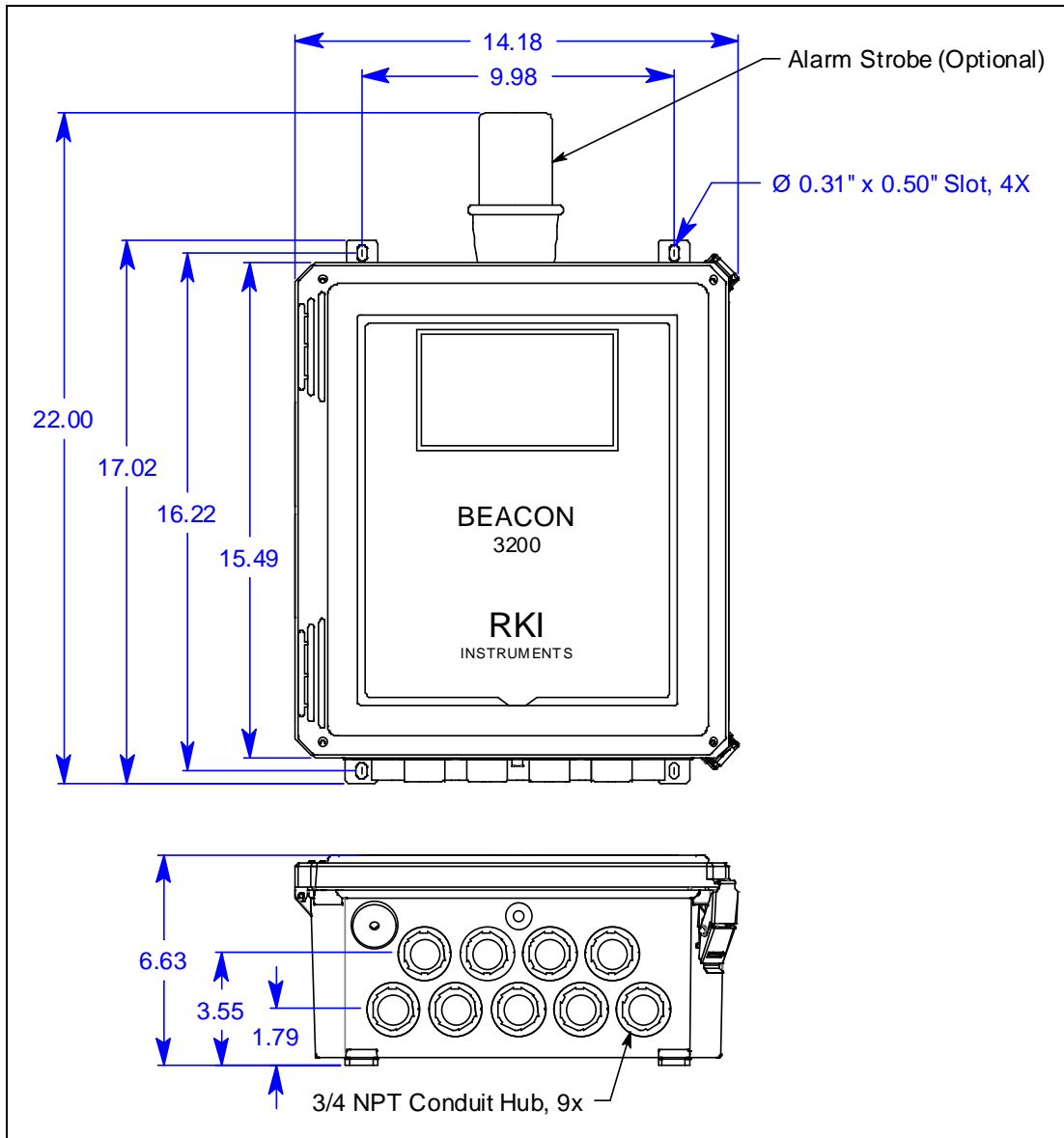**Figure 6: Outline and Mounting Dimensions with 51-0001 Series Alarm Strobe Installed**

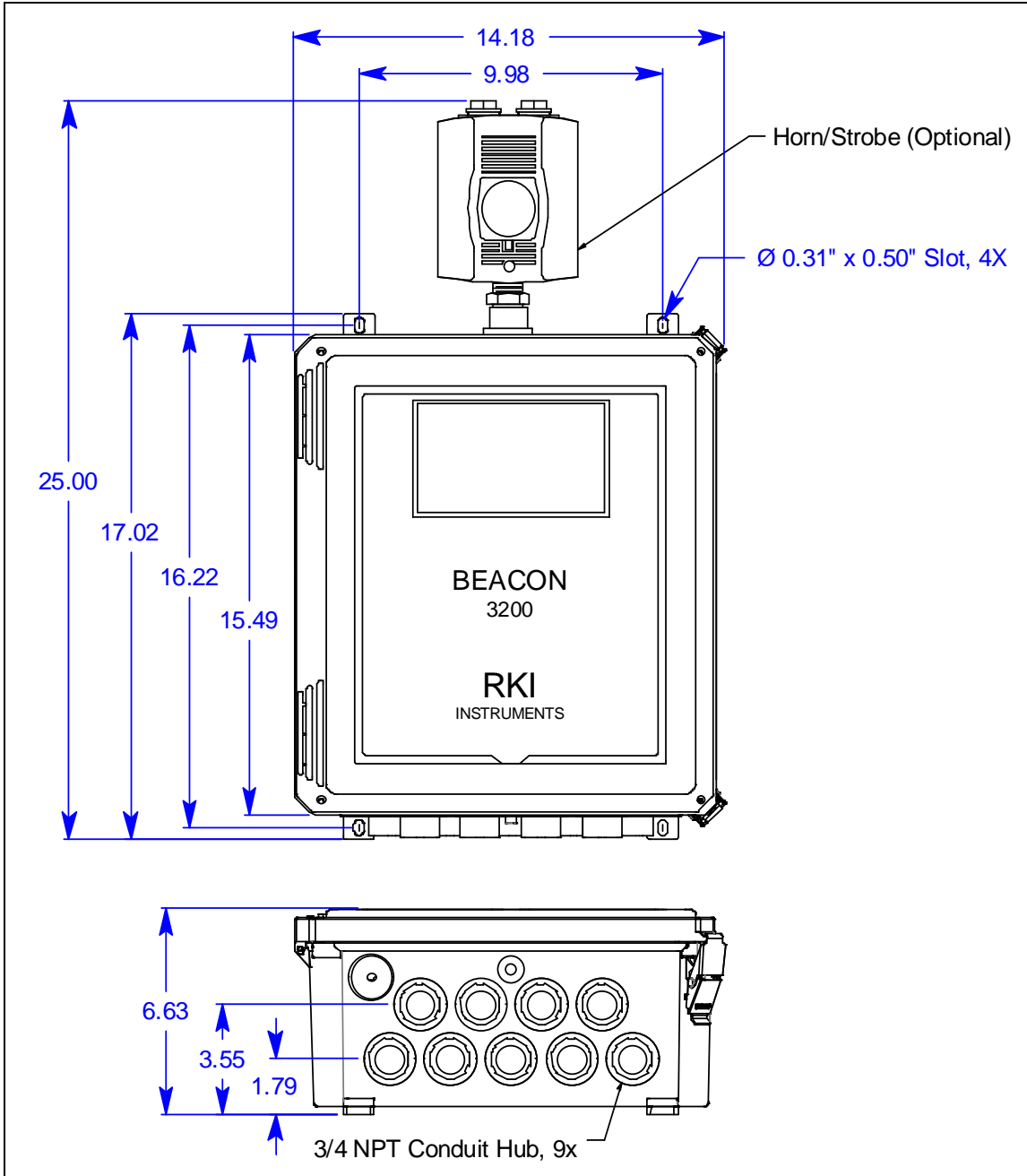**Figure 7: Outline and Mounting Dimensions with 51-0170 Series Alarm Strobe Installed**

Figure 8: Outline and Mounting Dimensions with Horn/Strobe Installed

Installing the Horn/Strobe

CAUTION: *Do not adjust the strobe brightness or the horn volume at the strobe/horn, as this may overload the Beacon 3200 strobe control circuit.*

The optional horn/strobe is generally not factory-installed and needs to be installed by the user. The following instructions describe the installation of the horn/strobe. If the horn/strobe is factory-installed, the following instructions do **not** apply.

1. Mount the horn/strobe in the desired location.

2. Install an appropriately rated cable bushing or conduit to the left conduit hub on the bottom of the Beacon 3200 housing.

3. Install an appropriately rated cable bushing or conduit at the horn/strobe.

4. Run a cable or wires in conduit from the horn/strobe to the Beacon 3200 through the left conduit hub.

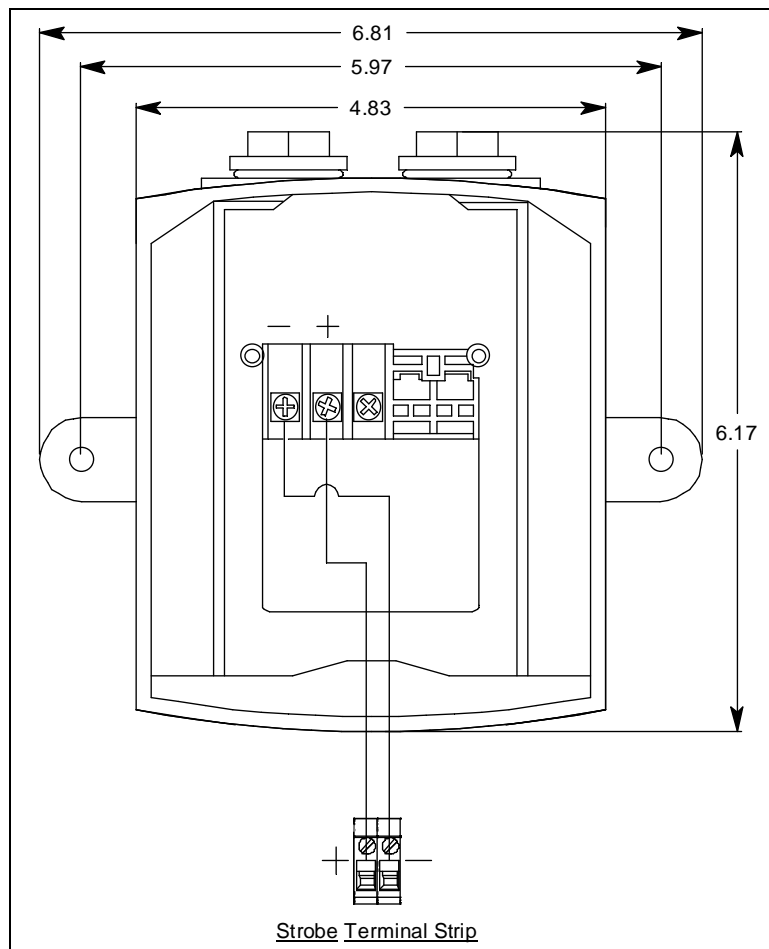5. Connect the wires to the Strobe Terminal Strip as shown in the figure below.

Figure 9: Horn/Strobe Wiring and Dimensions

Wiring

This section describes wiring procedures.

WARNING: *Make all connections to the Beacon 3200 before plugging in or turning on the AC or DC power source. Before making any wiring adjustments, always verify that all power sources are not live.*
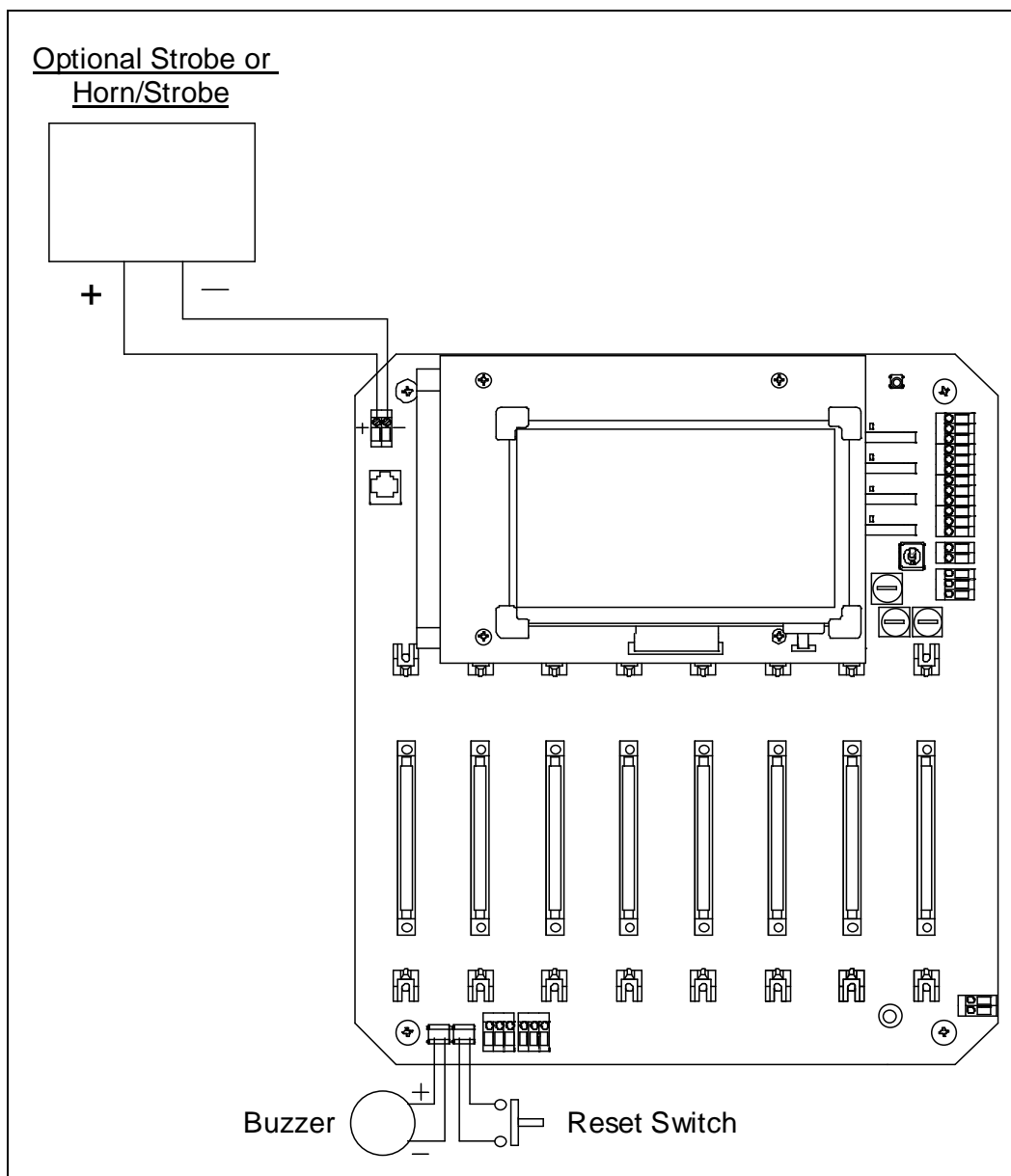

Factory Wiring

Figure 10: Factory Wiring Diagram

Routing Wiring Into the Beacon 3200 Housing

Wiring <u>must</u> be brought into the housing through one or more of the nine factory-installed conduit hubs on the bottom of the housing.

NOTE: Depending on how it was ordered, one or more of the holes on the bottom of the housing may be plugged with a hole plug instead of having a conduit hub installed.

<u>Do not</u> drill into the Beacon 3200 housing for any reason. Drilling the Beacon 3200 housing and routing wiring through holes not factory drilled <u>will void the warranty</u> and could result in:

- Damage to internal components from the drilling process.
- Moisture damage to internal components from poorly sealed holes.
- Unpredictable Beacon 3200 behavior due to EMI/RFI interference caused by wires routed across the PCBs.
- Possible shorting of Beacon 3200 components due to wires routed across the PCBs.

Connecting the AC Power Source

NOTE: If you are using DC power as the primary power source, go to the next section, "Connecting a 24 VDC Power Supply".

The AC in terminal strip accepts 24 - 14 AWG wire. For 115 VAC connection, select wire that is sized appropriately for the power requirements of the connected device and that is rated to a minimum of 80°C and 150 V. For 220 VAC connection, select wire that is sized appropriately for the power requirements of the connected device and that is rated to a minimum of 80°C and 250 V. When selecting wire, be sure to meet the local electrical code.

A certified switch of circuit breaker must also be installed in the AC line. For 115 VAC connection, the switch or circuit breaker must be rated to 115 VAC, 50/60 Hz, and 0.5 A. For 220 VAC connection, the switch or circuit breaker must be rated to 220 VAC, 50/60 Hz, and 0.3 A.

WARNING: **Verify that the power source is unplugged or turned off before you continue with this procedure.**

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1. Turn off or disconnect mains power to the Beacon 3200.

2. Open the housing door, then place the power switch in the OFF position.

3. Locate the 115/220 VAC Input Terminal Strip (see Figure 2 on page 11). The terminals are labeled **L** and **N** for line and neutral respectively.

4. Install an appropriately rated cable bushing or conduit in the right-most conduit hub on the bottom of the Beacon 3200 housing.

CAUTION: *Only use the factory-drilled holes on the bottom of the housing for wire entry into the housing. Do not drill the housing for any reason.*

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5. Guide the AC power cord or wires in conduit through the right-most conduit hub on the bottom of the Beacon 3200 housing.

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

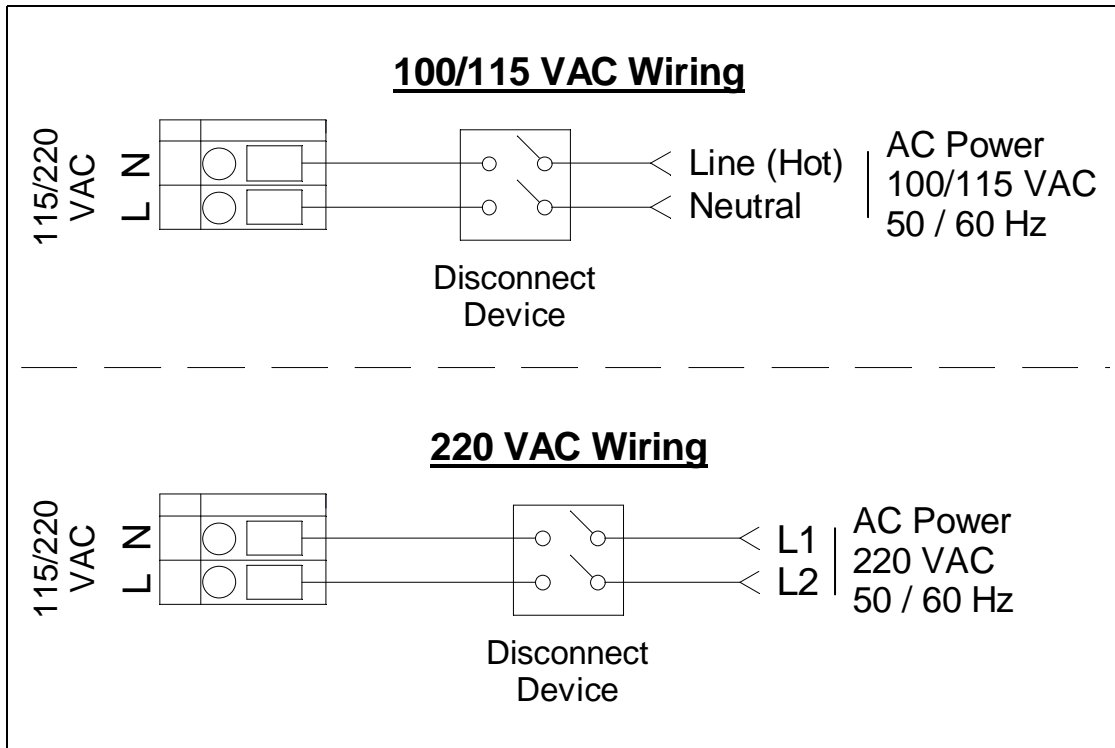6. Connect the AC wires to the 115/220 VAC Input Terminal Strip as shown in Figure 11 below.

Figure 11: AC Power Wiring

7. Connect the ground wire to the crimp terminal that is factory-installed on the field ground stud. The field ground stud is located in the lower right corner of the main PCB and is marked with a ground symbol. See Figure 2 on page 11. A factory ground stud is located just to the left of the field ground stud and is not for field use.

a. Remove the lug from the field ground stud. There is only 1 lug on the stud available for customer wiring.

b. Crimp the ground wire to the lug.

c. Reinstall the lug.

WARNING: ***Follow this grounding procedure to maintain the CSA classification of the Beacon 3200.***

Connecting a 24 VDC Power Supply

WARNING: ***Verify that the power source is unplugged or turned off before you continue with this procedure.***

A 24 VDC power supply may be used as a primary power source. If DC power (connected to the 24 VDC Power/Battery Terminal Strip) is the **primary** power source, **DO NOT** connect AC power to the 115/220 VAC Input Terminal Strip.

The 24 VDC Power/Battery Terminal Strip accepts 24 - 14 AWG wire. Select wire that is sized appropriately for the power requirements of the connected device and that is rated to a minimum of 80°C and 150 V. When selecting wire, be sure to meet the local electrical code.

WARNING: ***The 24 VDC Power/Battery Terminal Strip is only intended for connecting a battery or a power supply to the Beacon 3200. Do not connect any horns or strobes to the 24 VDC Power/Battery Terminal Strip.***

1. Turn off or disconnect mains power to the Beacon 3200.

2. Open the housing door, then place the power switch in the OFF position.

3. Locate the 24 VDC Power/Battery Terminal Strip, near the power switch (see Figure 2 on page 11). It is labeled **+BATT**, **-24 VDC INPUT**, **+SUPP**.

4. Install an appropriately rated cable bushing or conduit in an unused conduit hub on the bottom of the Beacon 3200 housing.

   CAUTION: *Only use the factory-drilled holes on the bottom of the housing for wire entry into the housing. Do not drill the housing for any reason.*

5. Guide a DC power cord or two wires in conduit through the selected conduit hub on the bottom of the Beacon 3200 housing.

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

6. Connect the power wires to the appropriate terminals on the 24 VDC Power/Battery Terminal Strip.
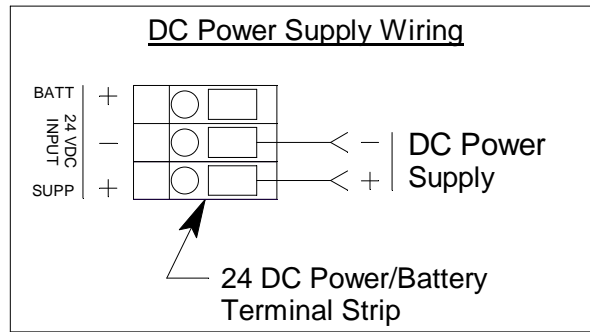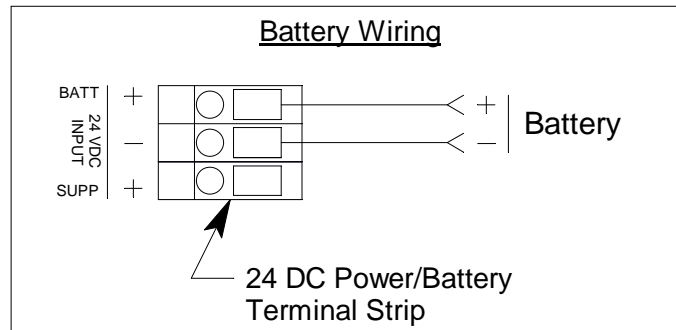

Figure 12: DC Power Supply Wiring

NOTE: The Beacon 3200 will operate from the DC input down to 18.5 V.

Connecting a Backup Battery

WARNING: *Verify that the power source is unplugged or turned off before you continue with this procedure.*

A 24 volt battery may be used as a backup power source.

The 24 VDC Power/Battery Terminal Strip accepts 24 - 14 AWG wire. Select wire that is sized appropriately for the power requirements of the connected device and that is rated to a minimum of 80°C and 150 V. When selecting wire, be sure to meet the local electrical code.

WARNING: *The 24 VDC Power/Battery Terminal Strip is only intended for connecting a battery or a power supply to the Beacon 3200. Do not connect any horns or strobes to the 24 VDC Power/Battery Terminal Strip.*

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1. Turn off or disconnect mains power to the Beacon 3200.

2. Open the housing door, then place the power switch in the OFF position.

3. Locate the 24 VDC Power/Battery Terminal Strip, near the power switch (see Figure 2 on page 11). It is labeled **+BATT**, **-24 VDC INPUT**, **+SUPP**.

4. Install an appropriately rated cable bushing or conduit in an unused conduit hub on the bottom of the Beacon 3200 housing.

CAUTION: *Only use the factory-drilled holes on the bottom of the housing for wire entry into the housing. Do not drill the housing for any reason.*

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5. Guide a DC power cord or two wires in conduit through the selected conduit hub on the bottom of the Beacon 3200 housing.

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

6. Connect the power wires to the appropriate terminals on the 24 VDC Power/Battery Terminal Strip.


Figure 13: Backup Battery Wiring

NOTE: The Beacon 3200 will operate from the DC input down to 18.5 V. If a self contained backup battery is used, see its operator's manual for a description of its recharging characteristics.

7. Set the battery charging jumper as desired. See page 51 for a description of the battery charging feature. If a rechargeable battery is connected, ensure the jumper is in the enabled position. For non-rechargeable batteries, the jumper must be in the disabled position.
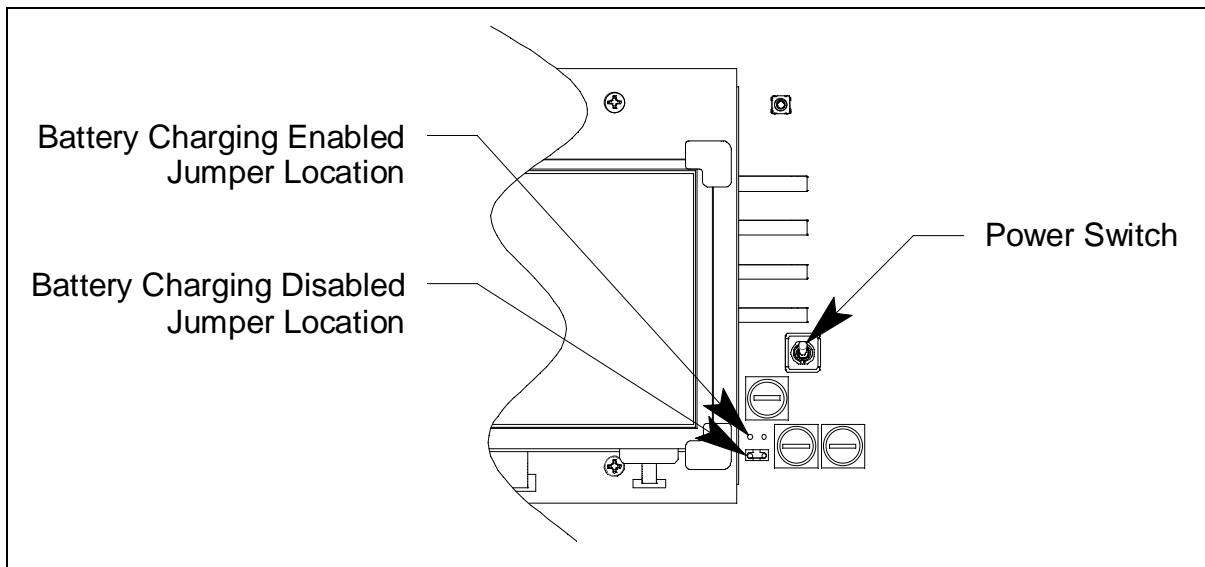
RS-485 Modbus Wiring (Connecting Slaves)

The Beacon 3200 is a 2-wire Modbus RTU device. When wiring the Beacon 3200 into a Modbus system, adhere to standard Modbus wiring practices per the Modbus Over Serial Line Specification and Implementation Guide V1.0 or later. This document can be found online at www.modbus.org/specs.php.

The Beacon 3200 supports up to 32 M2As connected together without the need for a repeater. Figure 15 and Figure 16 illustrate typical Beacon 3200 wiring configurations.

The Modbus protocol supports a maximum of 247 unique slave addresses (1-247).

The following signals are available at the Modbus terminals:

Table 6: Modbus Terminal Signals

Modbus Terminal Label (RS-485 Name)	Modbus Signal Name
A	TX/RX +
B	TX/RX -
C	Common

1. Connect the slave(s) to the RS-485 <u>Master</u> terminals on the lower left corner of the main PCB.
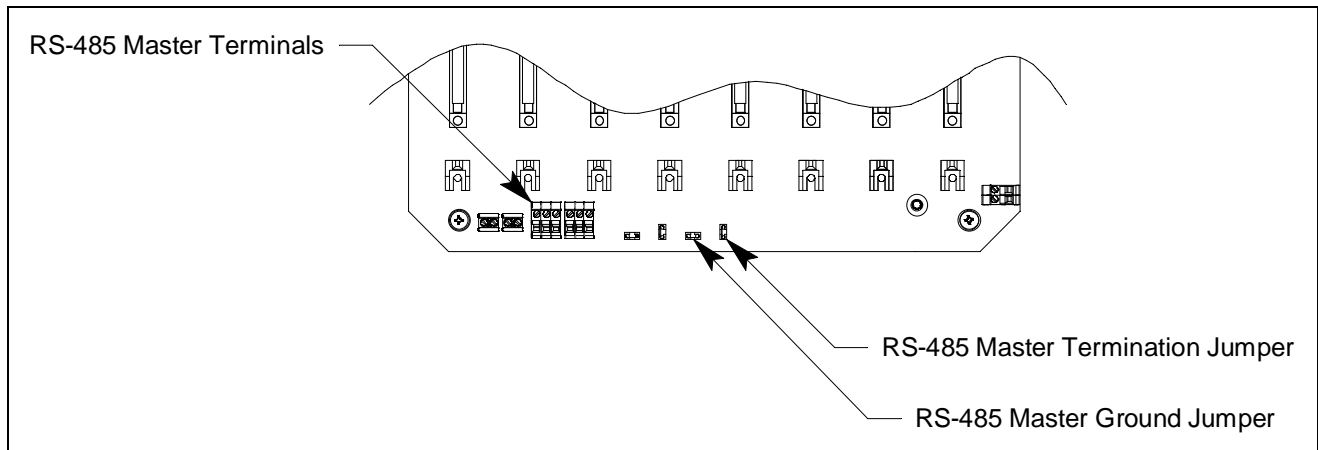
Figure 14: Modbus Master Terminal and Jumper Locations
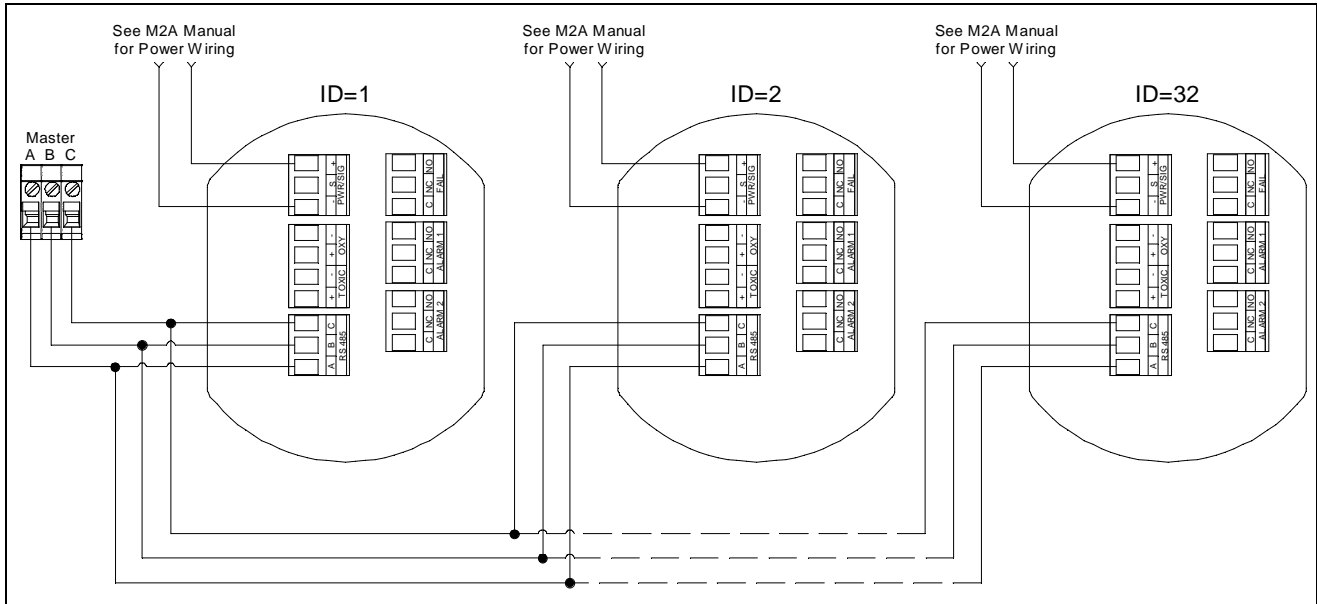
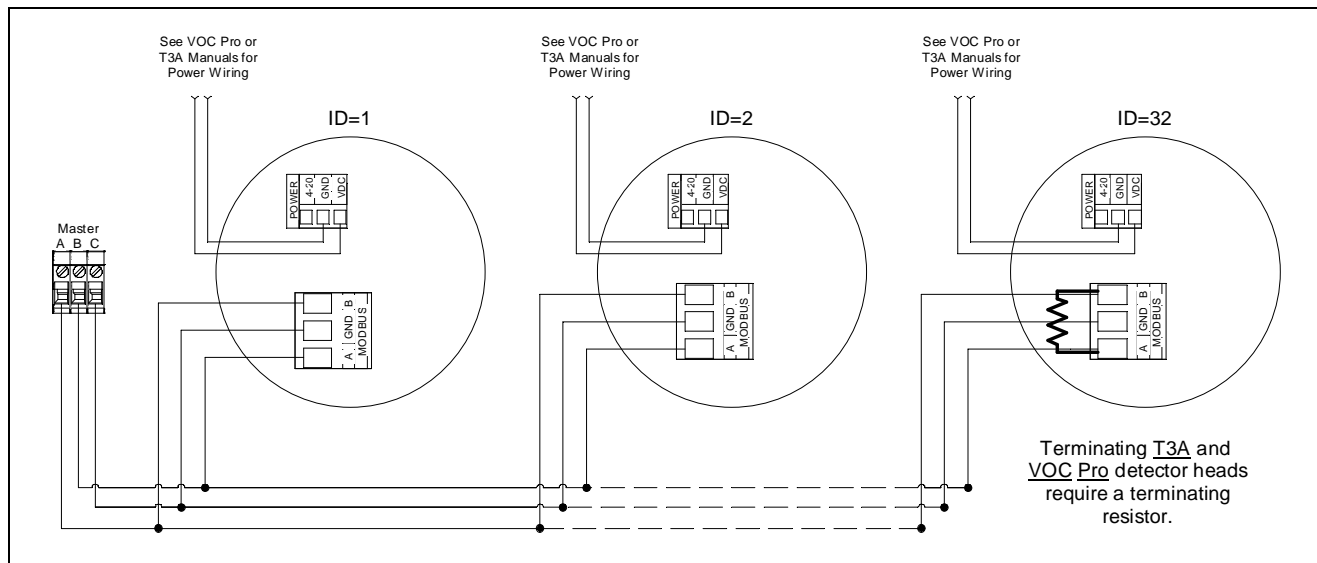**Figure 15: Modbus Master Wiring for M2A Detector Heads**

Figure 16: Modbus Master Wiring for T3A and VOC Pro Detector Heads

2. Configure the ground and termination jumpers (locations shown in Figure 14) as shown in Figure 17.

3. Install the ground jumper at the Beacon 3200. If the slave devices have ground jumpers, remove them. The termination jumper <u>must</u> be installed at <u>each</u> end of the Modbus system.
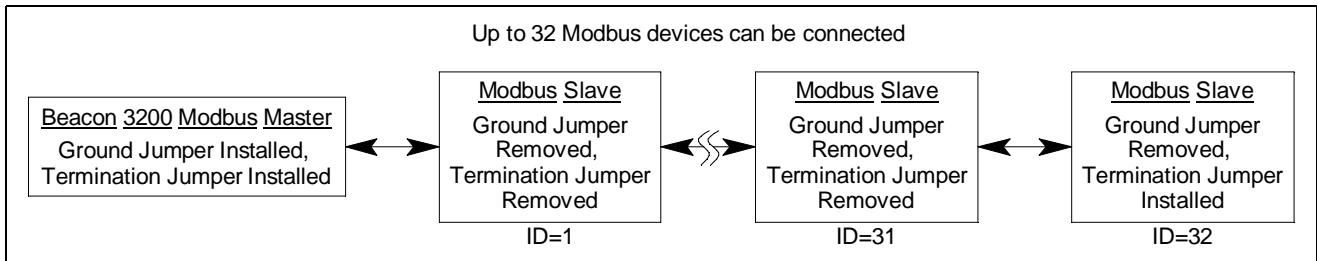
Up to 32 Modbus devices can be connected

<u>Beacon</u> <u>3200</u> <u>Modbus</u> <u>Master</u> Ground Jumper Installed, Termination Jumper Installed	<u>Modbus</u> <u>Slave</u> Ground Jumper Removed, Termination Jumper Removed	<u>Modbus</u> <u>Slave</u> Ground Jumper Removed, Termination Jumper Removed	<u>Modbus</u> <u>Slave</u> Ground Jumper Removed, Termination Jumper Installed
	ID=1	ID=31	ID=32

Figure 17: Jumper Configuration

4. If a VOC Pro or T3A detector is the final terminating detector head, then a separate, 120 Ohm, 3/4W terminating resistor <u>must</u> be installed at the detector head's Modbus terminal strip between terminals A and B as shown in Figure 18.
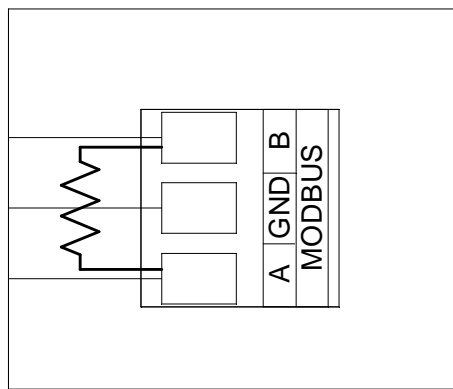
Figure 18: Installing the Terminating Resistor

RS-485 Modbus Wiring (Connecting to a Master)

The Beacon 3200 is a 2-wire Modbus RTU device. When wiring the Beacon 3200 into a Modbus system, adhere to standard Modbus wiring practices per the Modbus Over Serial Line Specification and Implementation Guide V1.0 or later. This document can be found online at www.modbus.org/specs.php.

The Beacon 3200's line driver provides for up to 32 Beacon 3200s (or some combination of Beacon 3200s and other Modbus slave devices, such as the M2A) to be connected together without the need for a repeater. Figure 20 illustrates typical Beacon 3200 wiring configurations. If more than 32 Beacon 3200s (or Beacon 3200s and other slave devices) need to be connected together, an RS-485 repeater(s) should be used such that no more than 32 Beacon 3200s reside on any given network segment.

The Modbus protocol supports a maximum of 247 unique slave addresses (1-247).

The following signals are available at the Modbus terminals:

Table 7: Modbus Terminal Signals

Modbus Terminal Label (RS-485 Name)	Modbus Signal Name
A	TX/RX +
B	TX/RX -
C	Common

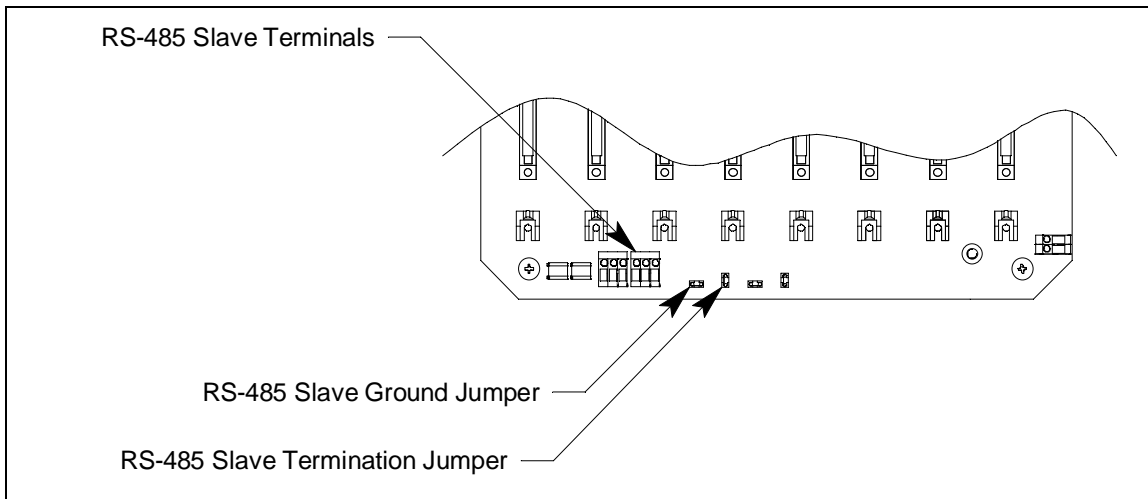1. Connect the master to the RS-485 <u>Slave</u> terminals in the lower left corner of the main PCB.

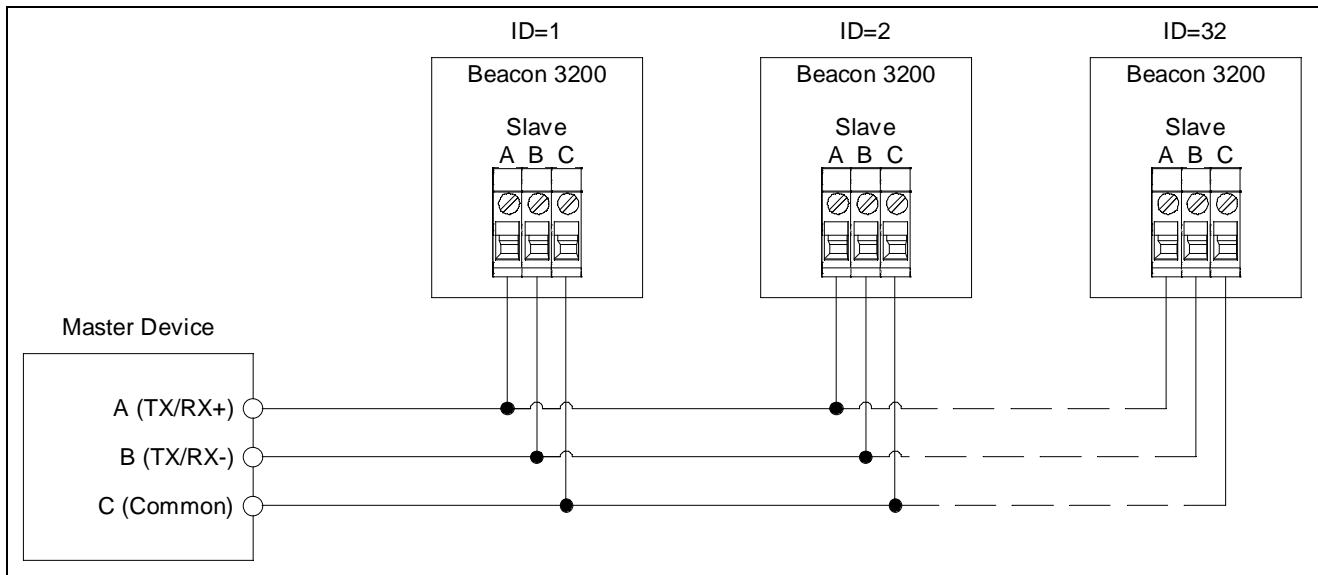**Figure 19: Modbus Slave Terminal and Jumper Locations**

Figure 20: Modbus Slave Wiring

2. Configure the ground and termination jumpers (location shown in Figure 15) as shown in Figure 21.

3. Install the ground jumper at the master device. Remove the ground jumpers from the slave devices. The termination jumper <u>must</u> be installed at <u>each</u> end of the Modbus system.
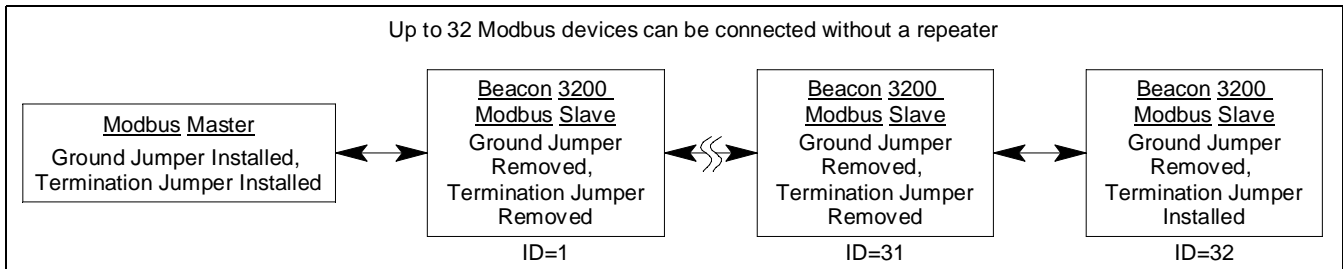
Figure 21: Jumper Configuration

Modbus Over Ethernet Connection

The Beacon 3200 supports TCP/IP on port 502.

1. Plug an Ethernet cable into the RJ45 port in the upper left corner of the main PCB.

2. Connect the other end of the Ethernet cable to the monitoring device.

Connecting Devices to the Main and Fail Relays

Before connecting any external alarm devices to the main or fail relay contacts, make sure you know how you want the devices to operate. For example, confirm under what alarm condition you want a device to turn on or turn off and what channel is going to control the device. See "Chapter 9: Assigning Main Relays" on page 86 for information.

Ensure that the relays' parameter settings in Setup Mode's System Settings and Channel Settings are set for the desired alarm device's operation. See "Chapter 6: System Settings" on page 54 and "Chapter 7: Adjusting Channel Settings" on page 61 for information on relay parameters.

The relays are rated for 6A at 115/220 VAC or 30 VDC.

The main and fail relay terminals accept 24 - 14 AWG wire. Select wire that is sized appropriately for the power requirements of the connected device and that is rated to a minimum of 80°C and up to 250 V depending on the device being powered.

WARNING: Do not connect external alarms to the 24 VDC input terminals.

1. Turn off or disconnect mains power to the Beacon 3200.

2. Open the housing door, then place the power switch in the OFF position.

3. Each relay module has 8 relays installed. There is a plug-in terminal strip for each set of relay contacts. They are labeled "1-8" from bottom to top. Refer to Figure 22 for identifying each relay set.
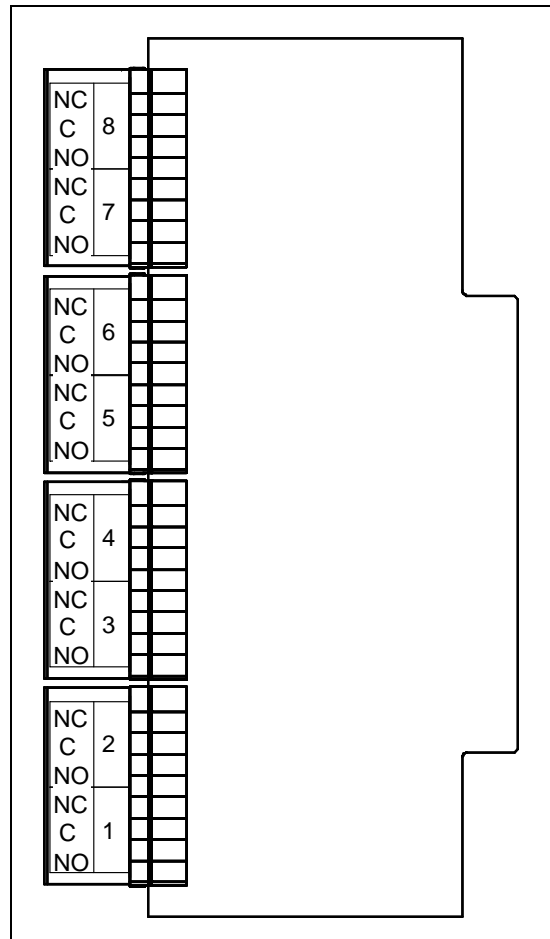

Figure 22: Relay Module Assignment

4. Install an appropriately rated cable bushing or conduit in an unused conduit hub on the bottom of the Beacon 3200.

CAUTION: *Only use the factory-drilled holes on the bottom of the housing for wire entry into the housing. Do not drill the housing for any reason.*

---

5. Guide the wiring of the external alarm device through the selected conduit hub on the bottom of the Beacon 3200 housing.

CAUTION: *Do not route the external alarm wiring and detector head wiring through the same conduit hub. The external alarm wiring may disrupt the transmission of the detector head signal to the Beacon 3200.*

---

6. Connect the leads from the external alarm device and an external power source to the selected main or fail relay terminals as shown in Figure 23.
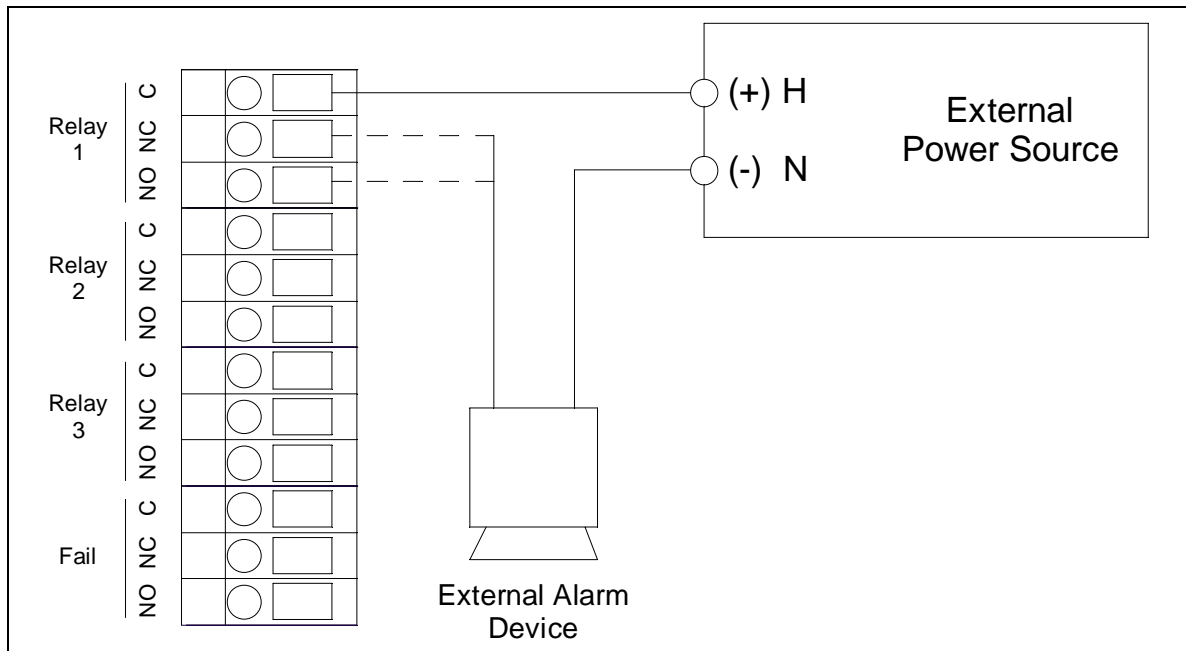
Figure 23: Wiring to the Main and Fail Relays

7. Repeat Step 5 and Step 6 for additional external alarm devices.

Connecting Devices to the Card Relays

Before connecting any external alarm devices to the card relay contacts, make sure you know how you want the devices to operate. For example, confirm under what alarm condition you want a device to turn on or turn off and what channel is going to control the device. See "Chapter 10: Assigning Card Relays" on page 90 for information.

Ensure that the relays' parameter settings in Setup Mode's System Settings and Channel Settings are set for the desired alarm device's operation. See "Chapter 6: System Settings" on page 54 and "Chapter 7: Adjusting Channel Settings" on page 61 for information about the relay parameters.

The relays are rated for 6A at 115/220 VAC or 30 VDC.

The alarm terminals accept 22 - 12 AWG wire. Select wire that is sized appropriately for the power requirements of the connected device and that is rated to a minimum of 80°C and up to 250 V depending on the device being powered.

WARNING: Do not connect external alarms to the 24 VDC input terminals.

1. Turn off or disconnect mains power to the Beacon 3200.

2. Open the housing door, then place the power switch in the OFF position.

3. Locate the applicable alarm terminal strip (see Figure 22 on page 33).

4. Install an appropriately rated cable bushing or conduit in an unused conduit hub on the bottom of the Beacon 3200.

CAUTION: *Only use the factory-drilled holes on the bottom of the housing for wire entry into the housing. Do not drill the housing for any reason.*

---

5. Guide the wiring of the external alarm device through the selected conduit hub on the bottom of the Beacon 3200 housing.

CAUTION: *Do not route the external alarm wiring and detector head wiring through the same conduit hub. The external alarm wiring may disrupt the transmission of the detector head signal to the Beacon 3200.*

---

6. Connect the leads from the external alarm device and an external power source to the selected channel alarm or common/channel alarm relay contact terminals as shown in Figure 24.
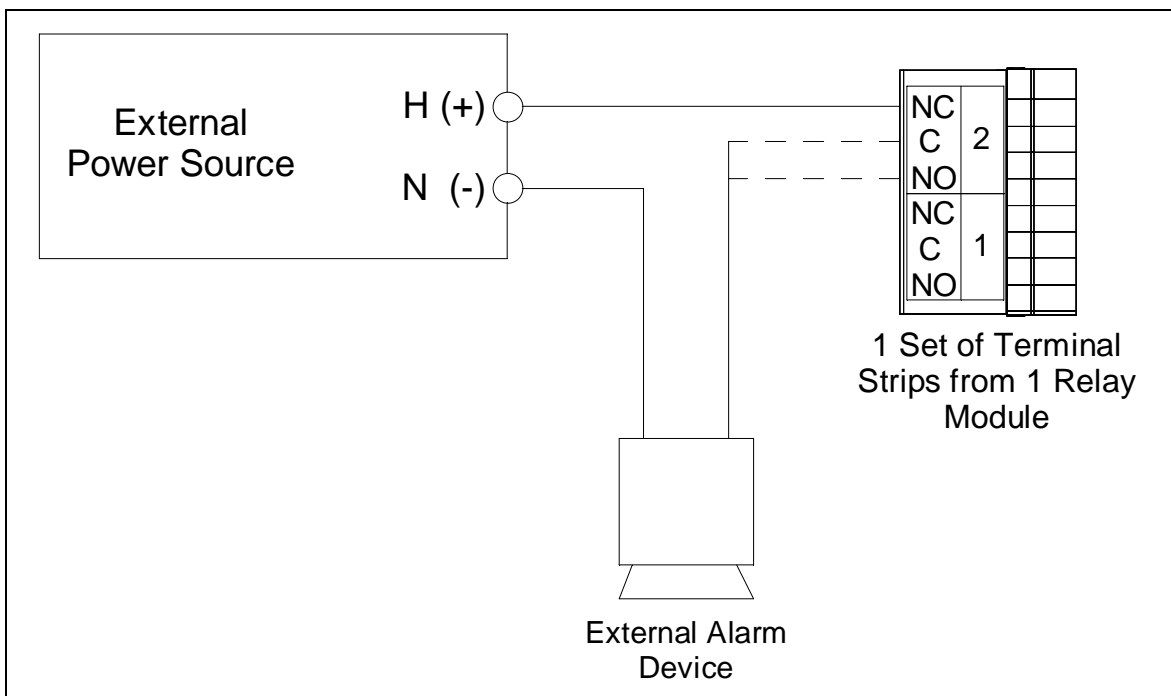
Figure 24: Wiring to the Card Relays

7. Repeat Step 5 and Step 6 for additional external alarm devices.

Connecting RKI Detector Heads

When a Beacon 3200 is ordered from the factory, any detector heads that were ordered with it are already setup on particular channels of the Beacon 3200. If you are adding an RKI detector head to your existing system, see "Chapter 7: Adjusting Channel Settings" on page 61 for instructions to setup a new channel.

The detector/transmitter terminals accept 28 - 16 AWG wire. Select wire that is sized appropriately for the power requirements of the connected device and that is rated to a minimum of 80°C and 150 V.

1. Turn off or disconnect mains power to the Beacon 3200.

2. Open the Beacon 3200 door and place the power switch in the off position.

3. See the detector head operator's manual for instructions on how to connect the detector head to a controller.

4. Install an appropriately rated cable bushing or conduit in an unused conduit hub on the bottom of the Beacon 3200 housing.

> *CAUTION:*   *Only use the factory-drilled holes on the bottom of the housing for wire entry into the housing. Do not drill the housing for any reason.*

Route the wires in conduit or shielded cable from the detector head through the selected conduit hub into the Beacon 3200. See Table 8 below for wire size and distance guidelines.

Table 8: Wire Size Guidelines for RKI Detector Heads

Detector Head Type	Number of Wires to Controller	Max Distance to Controller w/18 Gauge Wire	Max Distance to Controller w/16 Gauge Wire	Max Distance to Controller w/14 Gauge Wire
Direct Connect LEL	4	500 ft.	1,000 ft.	2,000 ft.
Direct Connect Oxygen	2			
Direct Connect H2S				
Direct Connect CO				
Direct Connect ESM-01 or CT-7 type				
2-Wire 4 - 20 mA	2	2,500 ft.	5,000 ft.	8,000 ft.
3-Wire 4 - 20 mA	3			

5. Unshielded twisted pair cable in conduit or shielded twisted pair cable is recommended for all the direct connect detector heads. For the LEL detector, pair and twist the **R** & **B** wires and the **W** & **G** wires. Shielded cable or wires in conduit are recommended for the 2-wire and 3-wire 4 - 20 mA transmitters.

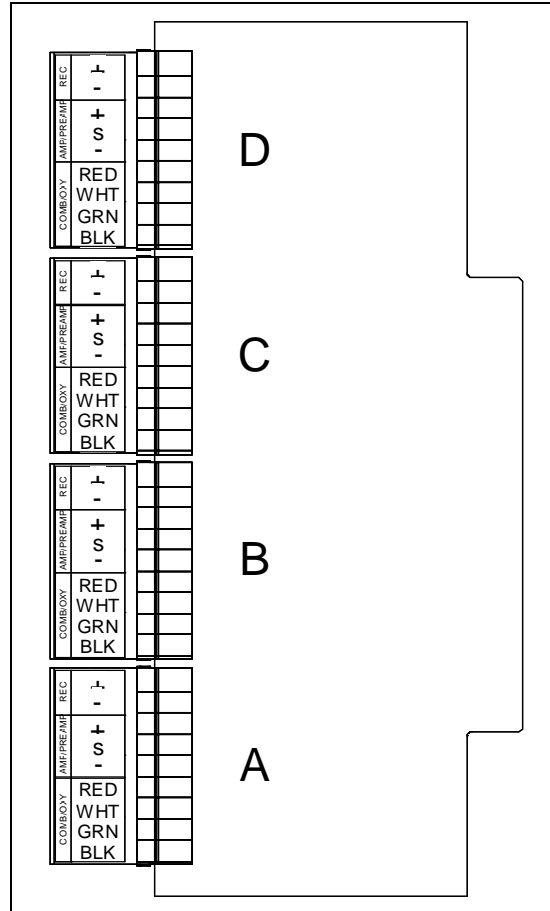6. The sensor module's channels are assigned A-D from bottom to top.

Figure 25: Sensor Module Channel Assignment

7. Connect the wires from the detector head to the appropriate detector/transmitter terminals on the appropriate channel. See the detector head operator's manual and the Beacon 3200 Detector Head Specification Sheet for detector head connections to the Beacon 3200.

CAUTION: *Do not route power and detector head wiring through the same conduit hub. The power wiring may disrupt the transmission of the detector head's signal to the Beacon 3200.*

8. If shielded cable is used, leave the cable shield's drain wire disconnected and insulated at the detector head and connect the cable shield's drain wire to the Beacon 3200's ground stud.

Connecting User-Supplied 4 - 20 mA Transmitters

The Beacon 3200 may be used with a user-supplied 2-wire or 3-wire 4 - 20 mA transmitter which runs on 24 VDC.

If a user supplied 4 - 20 mA transmitter is added in the field, see "Chapter 7: Adjusting Channel Settings" on page 61 for instructions to setup a new channel.

The detector/transmitter terminals accept 28 - 16 AWG wire. Select wire that is sized appropriately for the power requirements of the connected device and that is rated to a minimum of 80°C and 150 V.

1. Turn off or disconnect mains power to the Beacon 3200.

2. Open the Beacon 3200 door and turn off the power switch.

3. See the transmitter's operator's manual for instructions on how to connect wires to the transmitter.

4. Install an appropriately rated cable bushing or conduit in an unused conduit hub on the bottom of the Beacon 3200 housing.

CAUTION: *Only use the factory-drilled holes on the bottom of the housing for wire entry into the housing. Do not drill the housing for any reason.*

---

5. Route the wires from the transmitter through the selected conduit hub into the Beacon 3200.

6. The sensor module's channels are assigned A-D from bottom to top.
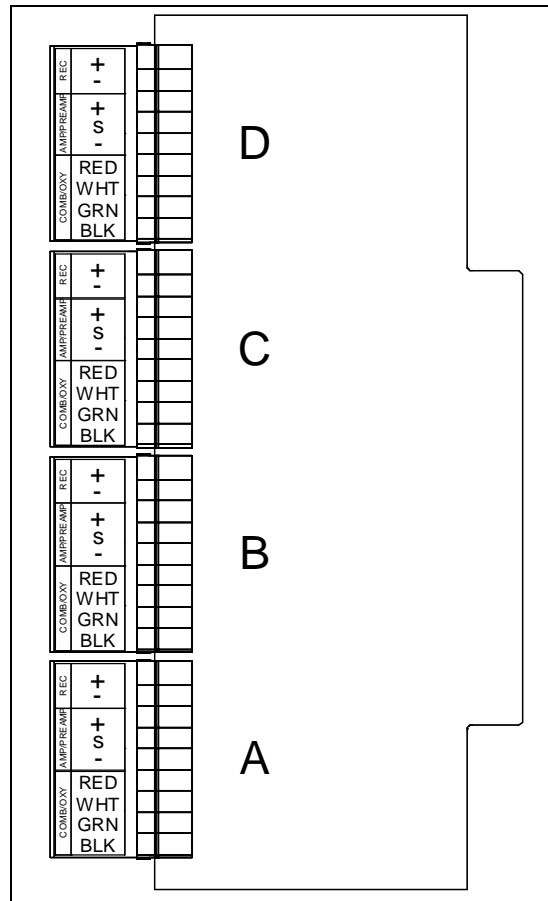
Figure 26: Sensor Module Channel Assignment

7. Connect the wires from the transmitter to the appropriate channel's terminal strip. See the transmitter operator's manual for controller terminal connections and wiring recommendations.

> *CAUTION:* *Do not route power and transmitter wiring through the same conduit hub. The power wiring may disrupt the transmission of the transmitter's signal to the Beacon 3200.*
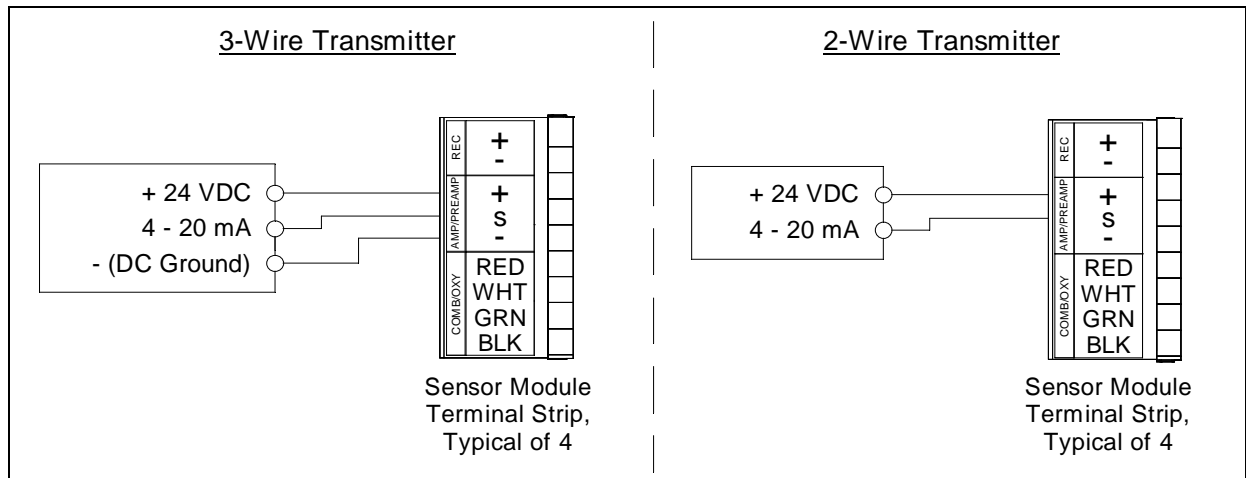
Figure 27: 4 to 20 mA Transmitter Wiring

Connecting Recorders

The output at the recorder output terminals for each channel is a 4 - 20 mA signal that corresponds to the detection range of the detector head connected to that channel. Be sure to read the recording device's operator's manual before installation and follow all wiring procedures and recommendations made by the recording device's manufacturer.

The connected device must not have an impedance greater than 500 ohms.

The recorder output terminals accept 28 - 16 AWG wire. Select wire that is sized appropriately for the power requirements of the connected device and that is rated to a minimum of 80°C and 150 V.

1. Turn off or disconnect mains power to the Beacon 3200.

2. Open the housing door, then place the power switch in the OFF position.

3. Locate the recorder output terminals on the right end of each of the sensor module's terminal strips. They are labeled **REC +** and **REC -.**

4. Install an appropriately rated cable bushing or conduit in an unused conduit hub on the bottom of the Beacon 3200 housing.

> *CAUTION:* *Only use the factory-drilled holes on the bottom of the housing for wire entry into the housing. Do not drill the housing for any reason.*

5. Guide the wiring from the recording device through the selected conduit hub on the bottom of the Beacon 3200 housing.

6. Connect the leads from the recording device to the recorder output terminals of the selected active channel(s) as shown below.
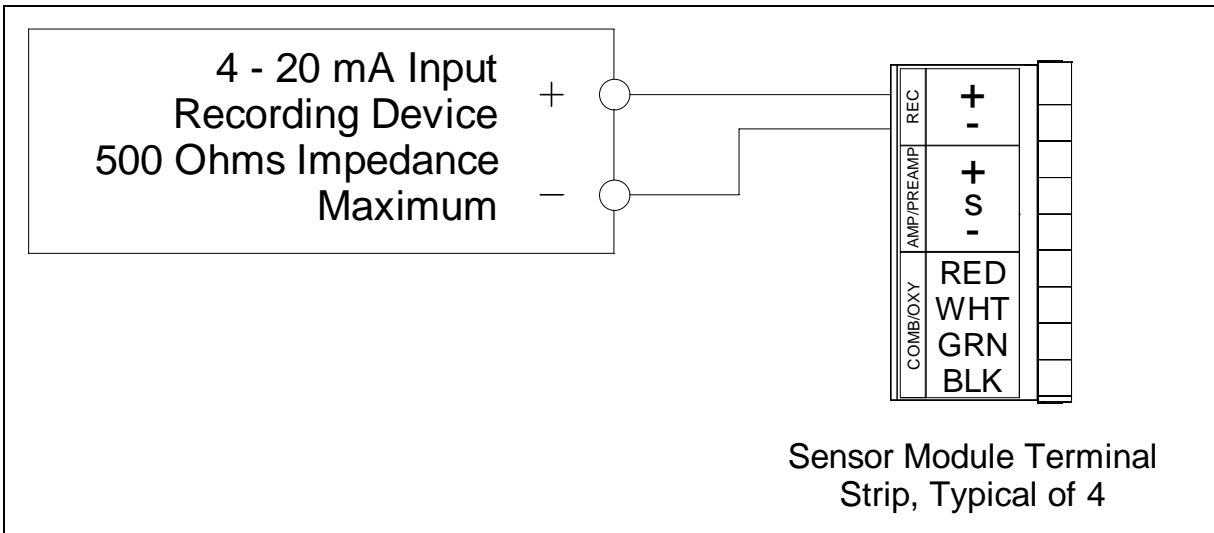

Figure 28: Recorder Output Wiring

Start Up

Perform the following procedure to place the Beacon 3200 into normal operation.

1. Complete the mounting and wiring procedures described earlier in this chapter.

2. Complete all installation procedures described in the detector head operator's manual.

3. Verify that all wiring connections are correct and secure and that the Beacon 3200's power switch is in the OFF position.

4. Turn on power to any connected Modbus detector heads (if power is not being supplied by the Beacon 3200).

5. Plug in or turn on the incoming power source (AC or DC).

6. Turn on the power switch.

7. The warmup screen will display for 60 seconds. The warmup screen shows the instrument's firmware version.
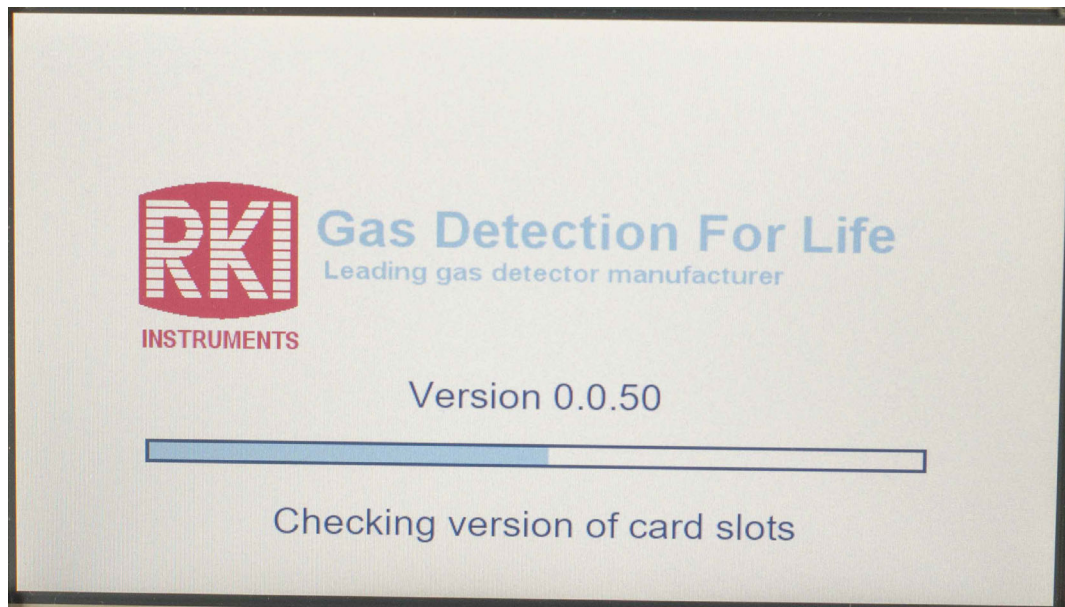
NOTE: To prevent unwanted alarms during warm up, the alarm circuits are not active while the Beacon 3200 is warming up.

8. If any Modbus detector heads are found, the Beacon 3200 asks if you want to import them.
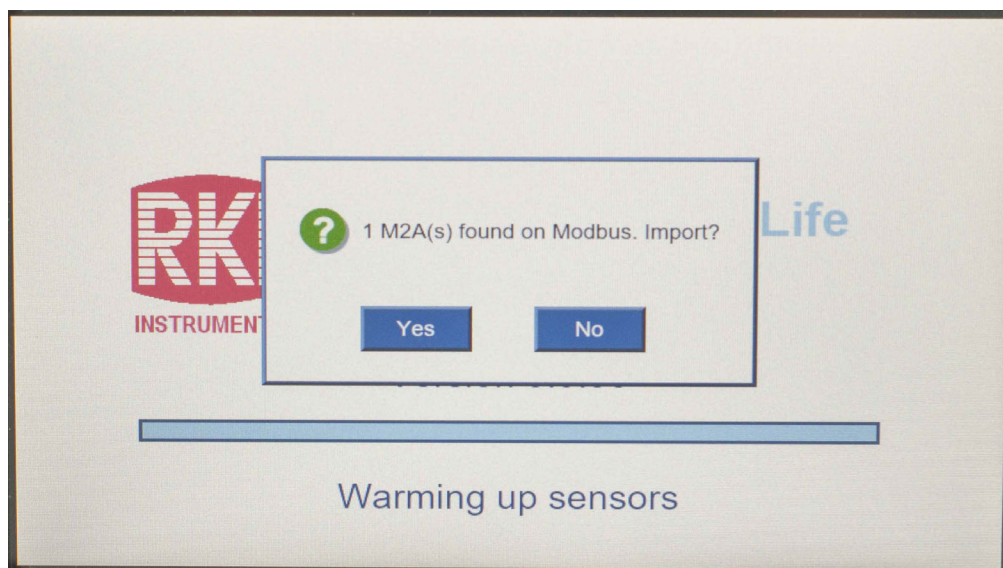
9. When the warm-up period is complete, normal operation will begin. During normal operation, the display will indicate the target gas, current gas reading, channel status, and channel location for each active channel.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

AC Pwr	History Graph	Bar Graph	Min Max	Page Up	Page Down	Setup	Calibrate	Reset / Clear

10. Verify that the display is indicating the current gas reading and target gas for all active channels.

11. Perform the start-up procedure for each detector head or user supplied 4 - 20 mA transmitter as described in the detector head operator's manual.

Chapter 4: Normal Operation

Overview

This chapter describes the Beacon 3200 Gas Monitor in normal operation. This chapter also describes the Beacon 3200 in alarm 1, alarm 2, alarm 3, and fail conditions, and suggests responses to these conditions.

Normal Operation Displays

Normal operation is defined as follows:

- the start-up procedure is complete.
- the Beacon 3200 is not indicating an alarm 1, alarm 2, alarm 3, or fail condition.
- the Beacon 3200 is not running in Setup Mode or Calibration Mode.

The normal operation screen can be displayed as a list or as a bar graph. Press **List** or **Bar Graph** at the bottom of the screen to switch between the two.

A **Reset/Clear** button appears in both screens and can be used to reset alarm indications for latching alarms. The **Reset/Clear** button's function is the same as the reset switch on the bottom of the housing.

List

In List view, the Beacon 3200 displays the channel number target gas, current gas reading, unit of measure, status, and location for 16 active channels at a time. Use the **Page Up** and **Page Down** button at the bottom of the screen to scroll between the pages.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

AC Pwr	History Graph	Bar Graph	Min Max	Page Up	Page Down	Setup	Calibrate	Reset / Clear

Bar Graph

In Bar Graph view, the Beacon 3200 displays the channel number, the reading value, and a bar graph depiction of the current gas reading. The color of the bar graph indicates alarm status as described on page 45.

4 - 20 mA Signal Output Operation

Each channel on the sensor module has **REC +/-** terminals that output a 4 - 20 mA signal.

During normal operation, the 4-20 mA signal corresponds to the gas concentration on the display.

There are several circumstances where the signal output does not correspond to the display reading:

Condition	4-20 mA Output
Warmup	4 ma (17.4 mA for O_2)
New channel that needs calibration	3.5 mA
Channel set up as Not Used	0.7 mA
Channel set up as Offline	3.5 mA
Setup Mode and Calibration Mode	3.5 mA
Post-calibration	4 mA (17.4 mA for O_2)
Low power	0.7 mA

Condition	4-20 mA Output
Fail condition or communication failure between a module and the main board	0.7 mA

Alarm Indications

This section describes the Beacon 3200 in alarm 1, alarm 2, alarm 3, and fail conditions, and suggests responses to these conditions. Table 9 below lists the alarm indications for each condition.

NOTE: If an alarm is triggered while away from the Home screen, the Beacon 3200 will immediately return to the Home screen.

NOTE: The Beacon 3200 allows configuration of various alarm and alarm relay parameters. The description of alarm indications in Table 9 assumes that all parameters are at their factory set value. It also assumes that the alarm setpoints are set such that alarm 1 < alarm 2 < alarm 3 and all alarms are increasing except for an oxygen channel where alarm 3 > alarm 1 > alarm 2 because alarm 1 and alarm 2 are decreasing alarms and alarm 3 is an increasing alarm.

See "Chapter 6: System Settings" on page 54 and "Chapter 7: Adjusting Channel Settings" on page 61 for detailed information on displaying or changing various channel parameters including alarm and alarm relay parameters.

Table 9: Visual and Audible Alarm Indications

Condition	Cause	Visual Indication(s)	Audible Indication
Alarm 1	Increasing (decreasing for O_2) gas reading at or above the alarm 1 set-point	• In List view, the Status column displays **Alarm 1** and background flashes yellow • In Bar Graph view, the graph increments turn yellow • If installed and set to activate for alarm 1, strobe flashes	Pulsing tone

Table 9: Visual and Audible Alarm Indications

Condition	Cause	Visual Indication(s)	Audible Indication
Alarm 2	Increasing (decreasing for O_2) gas reading at or above the alarm 2 set-point	• In List view, the Status column displays **Alarm 1/ Alarm 2** and background flashes orange • In Bar Graph view, the graph increments turn orange • If installed, strobe continues to flash if set to activate for alarm 1. If set to activate for alarm 2 only or if channel in alarm is an oxygen channel, it begins to flash when an alarm 2 condition begins.	Pulsing tone
Alarm 3	Increasing gas reading at or above the alarm 3 setpoint	• In List view, the Status columns displays **Alarm 1/ Alarm 2/ Alarm 3** and background flashes red • In Bar Graph view, the graph increments turn red • If installed, strobe continues to flash if set to activate for alarm 1 and/or alarm 2 for non oxygen type channels or alarm 1 for oxygen channels. If set to activate for alarm 3 only, it begins to flash when an alarm 3 condition begins.	Pulsing tone
Fail	• Disconnected or misconnected detector head wiring • Display reading below -10% of full scale or lower • Malfunctioning components	• In List view, the Status column displays **Fail** and background flashes red • In Bar Graph view, the graph increments turn red • If installed and set to activate for fail, strobe flashes	Steady tone
Low Battery	No AC power and DC power source (primary or backup) less than 18.5 volts.	• Display shows **Low Power Standby** message and the input DC voltage	None

NOTE: Card relays and Relay 1 - Relay 3 of the main relays can be set to be either all normally energized or all normally de-energized in Setup Mode's System Settings. You can also assign alarm conditions to each relay in Setup Mode. The following sections describe the factory settings of normally de-energized relays. See "Chapter 6: System Settings" on page 54., "Chapter 9: Assigning Main Relays" on page 86 and "Chapter 10: Assigning Card Relays" on page 90 for relay setup instructions.

The fail relay is factory-set as normally energized and is not user adjustable.

Alarm 1 Condition

This section describes the indications for an alarm 1 condition and suggests responses to an alarm 1 condition.

Alarm 1 Condition Indications

When the gas reading of an active channel reaches the alarm 1 setpoint, the Beacon 3200 senses an alarm 1 condition. The Beacon 3200 alerts you to an alarm 1 condition as follows:

- the Status column displays **Alarm 1** and its background flashes yellow
- the buzzer sounds a pulsing tone
- any relays assigned to the alarm 1 condition energize
- if installed and set to activate in an alarm 1 condition, the strobe flashes

Responding to an Alarm 1 Condition

1. Follow your established procedure for a low-level combustible or toxic gas condition or a decreasing oxygen condition.

2. To acknowledge the alarm condition and silence the buzzer while in an alarm 1 condition, press and release the reset switch or the **Reset/Clear** button on the touch screen. You cannot de-energize the relays (by pressing the reset switch or the **Reset/Clear** button on the touch screen) until the gas reading falls below (rises above for oxygen) the alarm 1 setpoint.

3. Alarms are factory set as latching. After the gas reading falls below the alarm 1 setpoint, press the reset switch or the **Reset/Clear** button on the touch screen to reset the alarm 1 circuit. Resetting the alarm 1 circuit silences the buzzer (if the alarm has not been acknowledged), resets the display for the channel(s) in alarm, turns off the strobe if it is installed and set to activate for alarm 1, and de-energizes applicable relays.

Alarm 2 Condition

This section describes the indications for an alarm 2 condition and suggests responses to an alarm 2 condition.

Alarm 2 Condition Indications

When the gas reading of an active channel reaches the alarm 2 setpoint, the Beacon 3200 senses an alarm 2 condition. The Beacon 3200 alerts you to an alarm 2 condition as follows:

- the Status column displays **Alarm 1/ Alarm 2** and its background flashes orange

- the buzzer sounds a pulsing tone
- any relays assigned to the alarm 2 condition energize
- if installed and set to activate for alarm 1, the strobe continues to flash

Responding to an Alarm 2 Condition

1. Follow your established procedure for a high-level combustible or toxic gas condition, or a decreasing oxygen condition.

2. To acknowledge the alarm condition and silence the buzzer while in an alarm 2 condition, press and release the reset switch. You cannot de-energize the relays (by pressing the reset switch or the **Reset/Clear** button on the touch screen) until the gas reading falls below (rises above for oxygen) the alarm 2 setpoint.

3. Alarms are factory set as latching. After the gas reading falls below (rises above for oxygen) the alarm 2 setpoint, press the reset switch or the **Reset/Clear** button on the touch screen to reset the alarm circuit. Resetting the alarm circuit silences the buzzer (if the alarm has not been acknowledged), resets the display for the channel(s) in alarm, turns off the strobe if it is installed and set to activate for alarm 2 only, and de-energizes the applicable relays.

Alarm 3 Condition

This section describes the indications for an alarm 3 condition and suggests responses to an alarm 3 condition.

Alarm 3 Condition Indications

When the gas reading of an active channel reaches the alarm 3 setpoint, the Beacon 3200 senses an alarm 3 condition. The Beacon 3200 alerts you to an alarm 3 condition as follows:

- the Status column displays **Alarm 1/ Alarm 2/ Alarm 3** (**Alarm 3** for oxygen) and its background flashes red
- the buzzer sounds a pulsing tone
- any relays assigned to the alarm 3 condition energize
- if installed and set to activate for alarm 1 and/or alarm 2 for non-oxygen channels, the strobe continues to flash
- if set to activate for alarm 3 only, the strobe begins to flash when an alarm 3 condition begins

Responding to an Alarm 3 Condition

1. Follow your established procedure for a high-level combustible or toxic gas condition, or an increasing oxygen condition.

2. To acknowledge the alarm condition and silence the buzzer while in an alarm 3 condition, press and release the reset switch. You cannot de-energize the relay (by pressing the reset switch or the **Reset/Clear** button on the touch screen) until the gas reading falls below the alarm 3 setpoint.

3. Alarms are factory set as latching. After the gas reading falls below the alarm 3 setpoint, press and release the reset switch or the **Reset/Clear** button on the touch screen to reset the alarm circuit. Resetting the alarm circuit silences the buzzer (if the alarm has not been acknowledged) and de-energizes applicable relays.

Fail Condition

This section describes the indications for a fail condition and suggests responses to a fail condition.

The Beacon 3200 senses a fail condition for any of the following:

- the detector head wiring is disconnected or incorrectly connected;
- the display reading is -10% of full scale or lower;
- the Beacon 3200 or one of its detector heads is malfunctioning.

Fail Condition Indications

When the Beacon 3200 senses a fail condition, it alerts you as follows:

- the gas reading for the failing channel is replaced by the **FAIL** message;
- the buzzer sounds a steady tone;
- the common fail relay de-energizes.

NOTE: The appropriate relay de-energizes in a fail condition. See "Chapter 9: Assigning Main Relays" and "Chapter 10: Assigning Card Relays" for instructions to assign relays.

Responding to a Fail Condition

1. To acknowledge the fail condition and silence the buzzer while in a fail condition, press and release the reset switch or the **Reset/Clear** button on the touch screen. The fail circuit is self resetting and cannot be manually reset.

2. Verify that the detector head wiring is correctly and securely connected.

3. See "Troubleshooting" on page 114.

Low DC Power Condition

This section describes the audible and visual indications for a low DC power condition and suggests responses to a low DC power condition. This condition only occurs when DC power is used as the primary or a backup power source

Low DC Power Condition Indications

The Beacon 3200 senses a DC low power condition when the DC power source is 18.5 V or less.

WARNING: While in a low power condition, the Beacon 3200 is not an active gas monitor.

When the Beacon 3200 senses a low DC power condition, it alerts you as follows:

- The fail relay de-energizes.

- A **Low Power Standby** message appears along with the input voltage.

NOTE: The low DC power alarm cannot be cleared using the reset switch or **Reset/Clear** button.

When the DC input voltage increases to 19.0 V, the low DC power alarm is cleared and the Beacon 3200 begins its warm-up sequence.

Responding to a Low DC Power Condition

If DC power is the **primary** power source:

1. For a *temporary* DC power source, disconnect primary DC power at the Beacon 3200, then connect a 24 VDC battery to the +BATT and - terminals on the 24 VDC Power/Battery Terminal Strip.

   NOTE: Make sure the battery charging jumper to the left of the power switch is in the bottom (disabled) position if the battery is non-rechargeable.

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2. Determine and correct the cause of primary DC power loss. When the DC power source rises above 19.0 V, the Beacon 3200 begins the warm up process.

3. Verify that the Beacon 3200 enters normal operation after its warm-up sequence.

If DC power is the **backup** power source:

1. If a non-rechargeable battery is used for backup, replace the battery.

2. Determine and correct the cause of primary AC power loss. When backup DC or primary AC power is restored, the Beacon 3200 begins the warm up process.

   When AC power is restored, the Beacon 3200 charges the backup battery with a charge current that starts at 250 mA for a fully depleted battery and decreases to 10 mA as the battery gets more charged. The Beacon 3200 maintains a fully charged battery with a 10 mA charge current.

3. Verify that the Beacon 3200 enters normal operation after its warm-up sequence.

Viewing and Resetting Min/Max Readings

1. While the Beacon 3200 is in normal operation, press **Min Max** at the bottom of the touch screen.

2. The Location column changes to Min and Max columns.

3. To reset the min/max readings, hold the reset switch or **Reset/Clear** button on the touch screen for 5 seconds.

4. To go back to viewing each channel's location, press **Location** at the bottom of the touch screen.

Battery Charging

The Beacon 3200 has a backup battery charging feature. It is disabled, unless the Beacon 3200 is shipped with an RKI backup battery, but can be enabled by moving the battery charging jumper.

<u>Enabled</u>: Connected battery <u>must</u> be rechargeable lead acid type. If AC power is used as primary power and a backup battery is connected to the Beacon 3200's + BATT and - 24VDC INPUT terminals as shown in Figure 12 on page 26, the Beacon 3200 charges the battery with a charge current that starts at around 250 mA for a fully depleted battery and decreases to around 10 mA as the battery gets more charged and keeps it charged with a charge current of approximately 10 mA.

CAUTION: *When using a battery as backup power, do not use a non-rechargeable battery or a backup battery with its own charging feature. Use RKI backup battery 49-8104RK or an appropriately rated 24 VDC rechargeable lead acid type battery as the backup battery.*

<u>Disabled</u>: Connected battery can be non-rechargeable or be charged by another source.
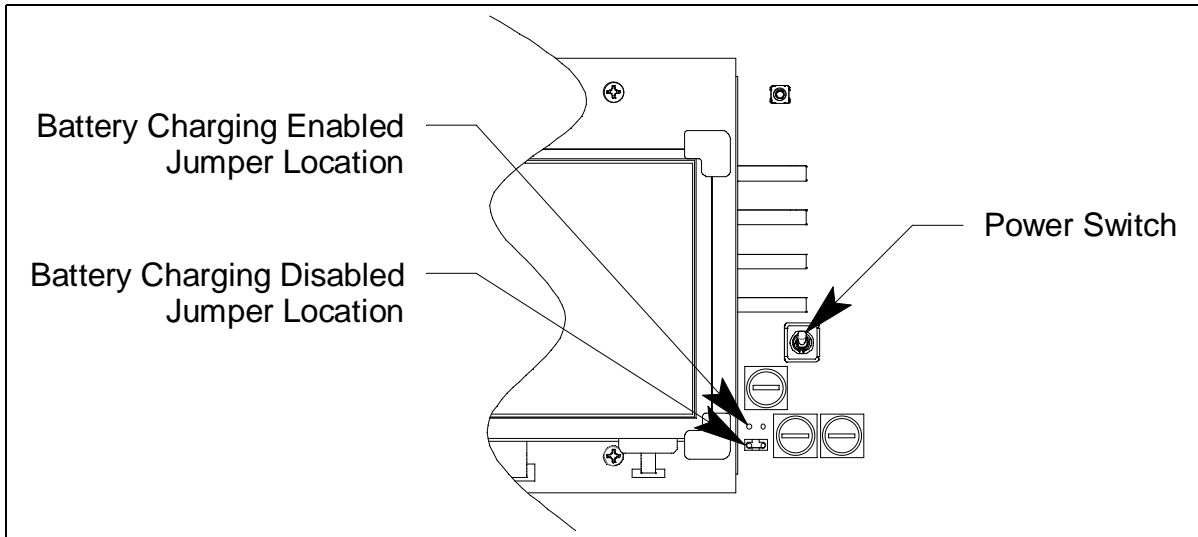
Figure 29: Battery Charging Jumper Locations

Chapter 5: History Graph Screen

The Beacon 3200 records data for each channel once per second and can store 7.5 years' worth of data. The History Graph screen shows the gas reading history for each channel, one channel at a time.

NOTE: If an alarm is triggered while the History Graph is displayed, the Beacon 3200 will immediately return to the Home screen.
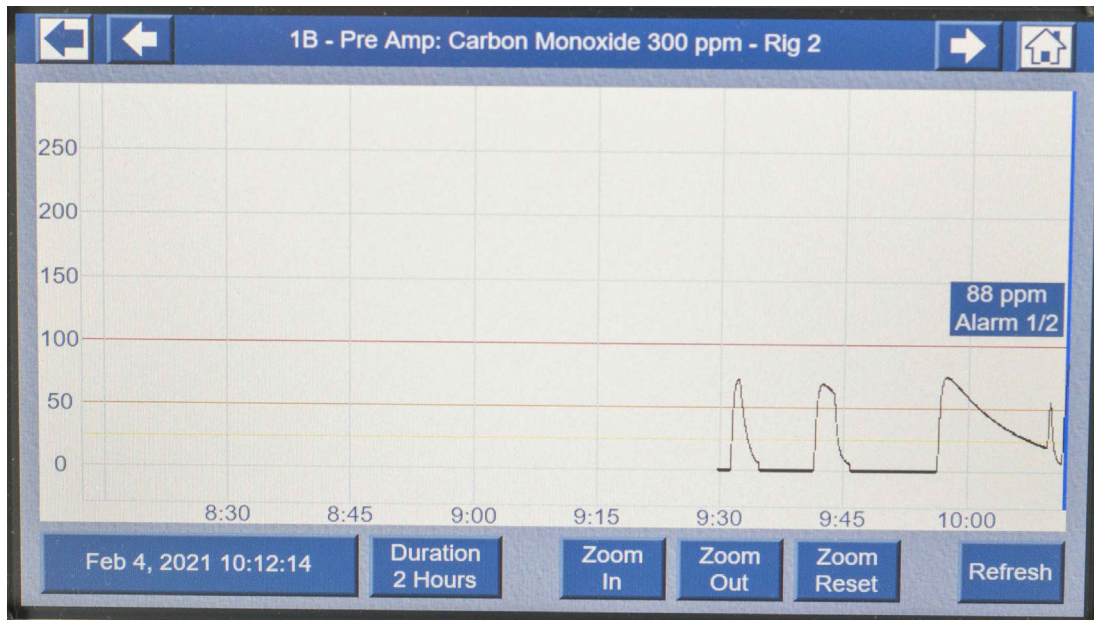
History Graph Screen Items	Description
Top line between arrows	Shows the channel number, type, full scale, and location (if defined). Use the arrows to the right and left of this information to scroll through all Online channels.
Graph Area	Horizontal axis: Time Vertical axis: 0 to full scale of displayed channel Black line: Gas readings Yellow horizontal line: Alarm 1 threshold Orange horizontal line: Alarm 2 threshold Red horizontal line: Alarm 3 threshold Blue vertical line: Gas reading cursor
Gas Reading in Blue Box	Gas reading where blue vertical line crosses black gas reading line

History Graph Screen Items	Description
Date/Time Button	Shows the date and time where the blue vertical line intersects the graph. If you press a location on the graph to move the blue line, the date/time changes accordingly. You may also type in a date and time to move the blue line.
Graph Duration Button	Indicates the amount of time being displayed on the graph at once. Pressing **Zoom In**, **Zoom Out**, or **Zoom Reset** will change the duration. You may also press **Graph Duration** and select a graph duration. Up to a year of data can be displayed at once.
Zoom In Button	Decreases the amount of time being displayed on the graph. It does not affect the vertical axis.
Zoom Out Button	Increases the amount of time being displayed on the graph. It does not affect the vertical axis.
Zoom Reset Button	Takes the graph back to displaying 2 hours of data.
Refresh Button	Moves the vertical blue line all the way to the right and loads data that accumulated since you entered the History Graph screen.

Chapter 6: System Settings

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Setup Mode, the Beacon 3200 will immediately return to the Home screen.

Table 10: System Settings Parameters

	Parameter	Available Settings & Description
Accessories	Strobe	• Uninstalled (factory setting): The strobe setting will <u>not</u> appear in the Channel Settings Input field. • Installed: The strobe setting will appear in the Channel Settings Input field.
	Buzzer	• Can't Silence (factory setting): The buzzer cannot be silenced by the reset switch while the Beacon 3200 is in a gas alarm condition. • Can Silence: The buzzer can by silenced by pressing and releasing the reset switch when the Beacon 3200 is in a gas alarm condition.
	Relays (Relay 1 - Relay 3 main relays and any installed card relays)	• Normally De-Energized (factory setting): The gas alarm relays are de-energized in normal operation and energize when the appropriate alarm circuit is activated. The NO (normally open) relay contacts are open during non-alarm operation and close when the appropriate alarm condition occurs. The NC (normally closed) relay contacts are closed during non-alarm operation and open when the appropriate alarm condition occurs. • Normally Energized: The gas alarm relays are energized in normal operation and de-energize when the appropriate alarm circuit is activated. The NO (normally open) relay contacts are closed during non-alarm operation and open when the appropriate alarm condition occurs. The NC (normally closed) relay contacts are open during non-alarm operation and close when the appropriate alarm condition occurs. *NOTE: The fail relay is factory set as normally energized and is not field adjustable.*
	Data Log	• Don't Overwrite: Once the datalogger is full, the Beacon 3200 will stop recording data until the datalogger is cleared. • Overwrite (factory setting): Once the datalogger is full, the Beacon 3200 will begin overwriting the oldest data.

Table 10: System Settings Parameters

	Parameter	Available Settings & Description
Accessories cont.	Main Relays	• Channel: The 4 relays on the main PCB can be assigned to individual channel alarms. • Common (factory setting): The 4 relays on the main PCB are common relays for all channels.
	Relays Deact.	• Never (factory setting): Relays remain active during any non-Normal Mode. • Calibration Mode: Relays will deactivate upon entering Calibration Mode. • Setup Mode: Relays will deactivate upon entering Setup Mode. • Setup and Calibrate: Relays will deactivate upon entering Setup and Calibration Modes.
Date/Time	Format	• AM/PM • 24 Hour (factory setting)
	Zone	• GMT-12 to GMT+12
	Clock	Set the instrument's date and time (Hour, Minute, Second)
Ethernet	DHCP	Off: The network will not assign an IP address, and the user must set one themselves. On (factory setting): The network will assign an IP address to the Beacon 3200.
	Static IP Address	Assign a static IP address (only if **DHCP** is set to **Off**).
	Static Subnet Mask	Assign a static subnet mask (only if **DHCP** is set to **Off**).
	Static Gateway	Assign a static gateway (only if **DHCP** is set to **Off**).
Modbus Master	Baud Rate	• 9600 • 14400 • 19200 (factory setting) • 38400
	Parity	• Even (factory setting) • Odd • None

Table 10: System Settings Parameters
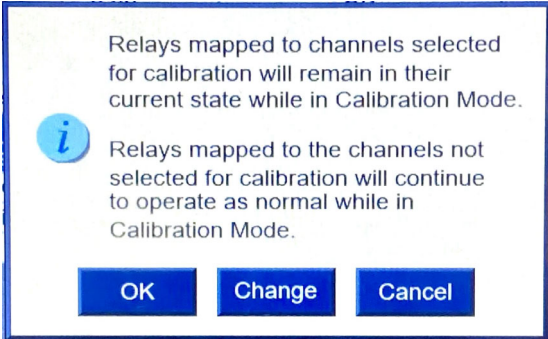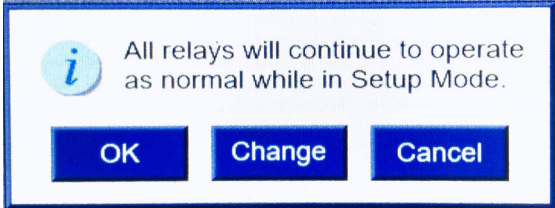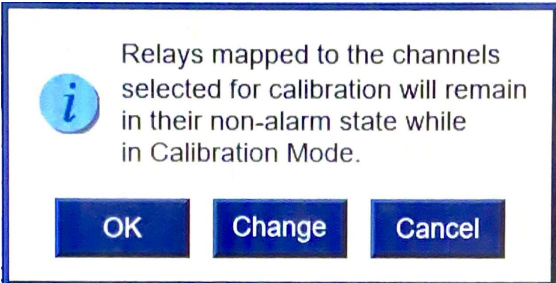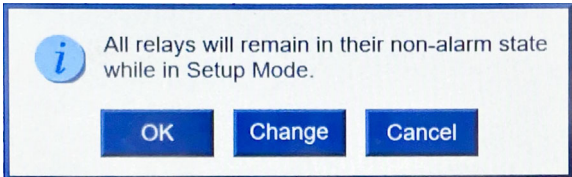
	Parameter	Available Settings & Description
Modbus Slave	Slave ID	**1** to **247** (factory setting is **11**). The Beacon 3200 will only receive messages from the Master which are addressed to this Slave ID (except for broadcast messages which are received by all slaves)
	Baud Rate	• 9600 • 14400 • 19200 (factory setting) • 38400
	Parity	• Even (factory setting) • Odd • None
NOTE: All Beacon 3200s on a Modbus network must be configured with the same baud rate and parity, and each Beacon 3200 must have a unique slave ID.	
Timeouts	Setup	**1** to **10** (factory setting is **5**) The amount of time, in minutes, that has to pass before the Beacon 3200 will time out of Setup Mode.
	Calibrate	**1** to **240** (factory setting is **5**) The amount of time, in minutes, that has to pass before the Beacon 3200 will time out of Calibration Mode.
Password	Setup	On: A password is required to enter Setup Mode. Off (factory setting): No password is required to enter Setup Mode.
	Cal	On: A password is required to enter Calibration Mode. Off (factory setting): No password is required to enter Calibration Mode.
Advanced Settings (see page 135)	4-20 mA Inputs Calibration	Calibrate the 4-20 mA input for each Beacon 3200 channel being used with a 4-20 mA detector head.
	4-20 mA Outputs Calibration	Calibrate the 4-20 mA output at the **REC +/-** terminals for each active Beacon 3200 channel.
	LEL Sensor Current Calibration	Set the LEL sensor current for each Beacon 3200 channel being used with a direct connect LEL detector.

Relay Deactivation

Before entering either Setup or Calibration Mode, a pop-up will indicate the alarm state that the relays will enter while the Beacon 3200 is in a given mode. Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

NOTE: Entering Calibration Mode will only affect the relays of the channels that are selected for calibration.
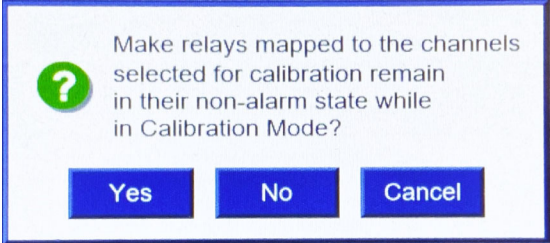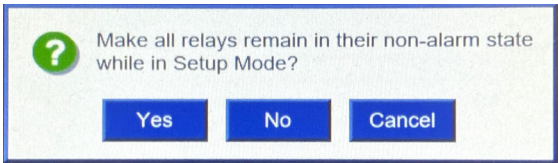
Table 11: Relay Deactivation Dialogue Boxes

Entering Calibration Mode	Entering Setup Mode
Current Relay Deact. Setting (found in System Settings): • "Never" • "Setup Mode" Relays mapped to channels selected for calibration will remain in their current state while in Calibration Mode. Relays mapped to the channels not selected for calibration will continue to operate as normal while in Calibration Mode. OK Change Cancel	Current Relay Deact. Setting (found in System Settings): • "Never" • "Calibration Mode" All relays will continue to operate as normal while in Setup Mode. OK Change Cancel
Current Relay Deact. Setting (found in System Settings): • "Calibration Mode" • "Setup and Calibration" Relays mapped to the channels selected for calibration will remain in their non-alarm state while in Calibration Mode. OK Change Cancel	Current Relay Deact. Setting (found in System Settings): • "Setup Mode" • "Setup and Calibration" All relays will remain in their non-alarm state while in Setup Mode. OK Change Cancel

Changing Relay Deactivation Settings

To change the relay deactivation setting of selected channels while in Calibration Mode or all channels while in Setup Mode, press "Change" while viewing the dialogue box(es) in Table 11.

Table 12: Changing Relay Deactivation Settings

For Calibration Mode	For Setup Mode
Make relays mapped to the channels selected for calibration remain in their non-alarm state while in Calibration Mode? Yes No Cancel	Make all relays remain in their non-alarm state while in Setup Mode? Yes No Cancel

Adjusting System Settings

1. While in normal operation, press Setup.

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **System Settings**.
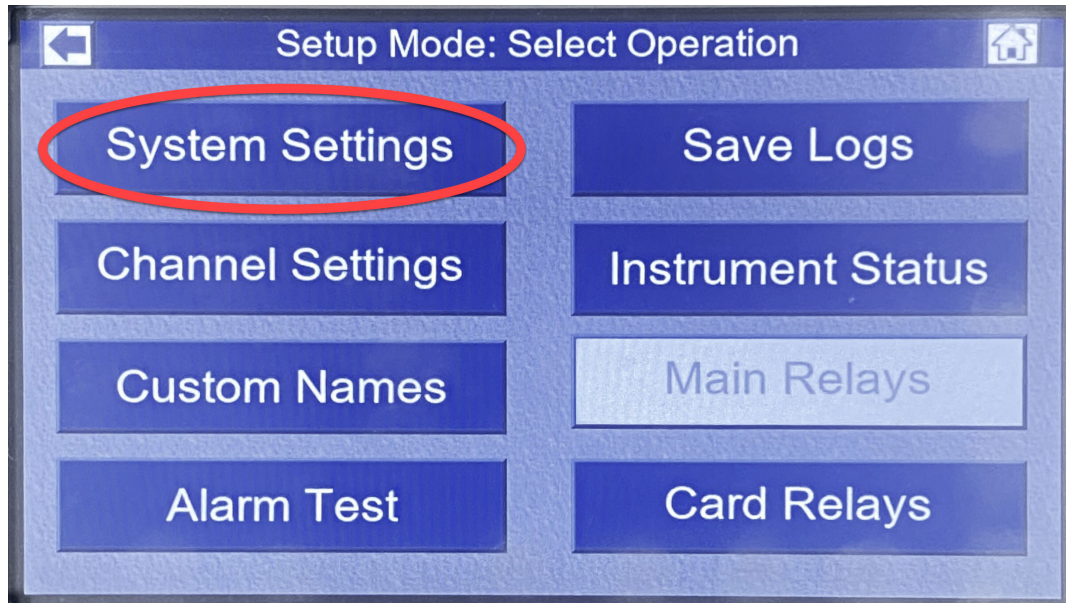
5. Press the current parameter setting for the parameter you want to change. A summary of the System Settings parameters and their available settings is shown in Table 10.
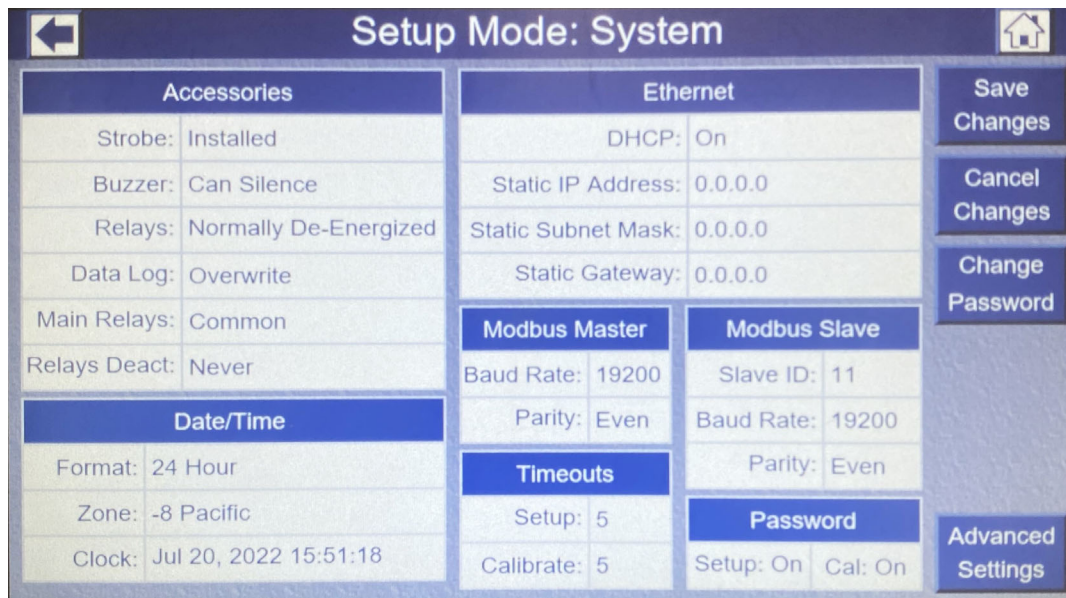
6. A menu appears that lists the available settings for that parameter.

7. Press the desired setting and press **Enter**.

8. Repeat Step 5 through Step 7 for any other parameters whose setting you want to change.

9. Press **Save Changes**.

10. To change the password required to enter Setup Mode and Calibration Mode, perform the following:

    a. Press **Change Password**.

    b. Type in the new password and press **Enter**. The password can be 0-32 characters long and can include numbers and a period symbol.

    c. Type in the new password again and press **Enter**.

    d. Press **OK** in the confirmation window.

11. For **Advanced Settings**, see "Appendix B: Advanced 4 - 20 mA and LEL Current Settings" on page 135.

12. Press the arrow in the upper left corner to return to Setup Mode.

13. Press the home icon in the upper right corner to return to normal operation.

Chapter 7: Adjusting Channel Settings

Overview

This chapter describes how to view and change Beacon 3200 channel settings. Parameters can be accessed individually from the main Channel Settings menu or you can go through the Channel Wizard and have it guide you through the selections.

The Channel Settings Menu has a user-defined timeout feature. If you do not press a button for the user-defined amount of time, the Beacon 3200 automatically returns to the Home screen.

Table 13 below shows the parameters that may be edited in the Channel Settings menu.

<p align="center">Table 13: Gas/Range Parameters</p>

Parameter	Available Settings & Descriptions
State	• Setup: The Channel Wizard will open upon selection. See page 67 for more information. • Offline: Channel is defined but is not currently being used. • Not Used: Channel is not used in any way. • Online: Channel is defined and is being monitored.
Type	• 4-20 mA Transmitter: Wired to the Beacon 3200 with 2 or 3 wires, depending on the detector head model, using the AMP +, S, and - terminals on the detector/transmitter terminal strips. All calibration adjustments are made at the detector head. • Pre Amp Direct: Wired to the Beacon 3200's AMP + and S terminals on the detector/transmitter terminal strips. All calibration adjustments are made at the Beacon 3200. • Oxygen Direct: Wired to the Beacon 3200's OXY W (white) and G (green) terminals on the detector/transmitter terminal strips. All calibration adjustments are made at the Beacon 3200. • RWGB Direct: Wired to the Beacon 3200's LEL R (red), W (white), G (green) and B (black) terminals on the detector/transmitter terminal strips. All calibration adjustments are made at the Beacon 3200. This is typically a combustible gas LEL detector head, but may be a CO_2 detector.

Parameter	Available Settings & Descriptions	
Gas/Range	<u>4-20 mA Transmitter</u> • Ammonia 75.0 ppm • Arsine 0.20 ppm • Arsine 1.50 ppm • Carbon Dioxide 100% VOL • Carbon Dioxide 5.00% VOL • Carbon Dioxide 50.0% VOL • Carbon Dioxide 5000 ppm • Carbon Monoxide 300 ppm • Chlorine 10.0 ppm • Chlorine 3.00 ppm • Hexane 100% LEL • Hydrocarbons 100% LEL • Hydrogen 100% LEL • Hydrogen Sulfide 100 ppm • Isobutane 100% LEL • Methane 100% LEL • Nitric Oxide 100 ppm • Nitrogen Dioxide 15.0 ppm • Oxygen 25.0% VOL • Phosphine 1.00 ppm • Propane 100% LEL • Silane 15.0 ppm • Sulfur Dioxide 10.0 ppm • Sulfur Dioxide 6.00 ppm	<u>RWGB Direct</u> • Acetone 100% LEL • Carbon Dioxide 100% VOL • Carbon Dioxide 5.00% VOL • Carbon Dioxide 50.0% VOL • Carbon Dioxide 5000 ppm • Ethanol 100% LEL • Hexane 100% LEL • Hydrocarbons 100% LEL • Hydrogen 100% LEL • Isobutane 100% LEL • Isopropanol 100% LEL • Methane 100% LEL • Methanol 100% LEL • Pentane 100% LEL • Propane 100% LEL • Styrene 100% LEL
	<u>Oxygen Direct</u> • Oxygen 25.0% VOL	<u>Pre Amp Direct</u> • Ammonia 75.0 ppm • Arsine 1.50 ppm • Carbon Monoxide 300 ppm • Chlorine 10.0 ppm • Chlorine 3.00 ppm • Chlorine Dioxide 1.00 ppm • Hydrogen Cyanide 15.0 ppm • Hydrogen Sulfide 100 ppm • Phosphine 1.00 ppm • Sulfur Dioxide 10.0 ppm • Sulfur Dioxide 6.00 ppm

Parameter	Available Settings & Descriptions
Dead Band	The dead band setting defines the first gas concentration that will be displayed when the gas reading increases or decreases from the normal fresh air concentration (20.9 for oxygen and 0 for all other channel types). This feature helps prevent "jumpy" readings near the normal fresh air reading. For example, if the dead band setting is **2% LEL** for a combustible channel whose range is 0 - 100% LEL, the Beacon 3200 will display a reading of 0% LEL for gas readings from -2% LEL to 2% LEL. Factory Settings • 0.5% vol for O_2 • 2% for LEL ***NOTE:** The MPS^{TM} sensor has a built-in deadband of 3% LEL for CH_4 and 5% LEL for all other gases. Even if the Beacon 3200's deadband is set to 2% LEL for an MPS channel, a reading will not be displayed until it has exceeded the MPS sensor's internal deadband.*
Noise Filter	The noise filter feature helps "smooth out" jumpy signals from the detector head. The filter setting indicates the number of seconds over which the displayed reading is being averaged. You can set the noise filter from **1** second to **10** seconds (factory setting is <u>**5** seconds</u>). • A setting of **10** seconds produces the greatest amount of smoothing, but causes the displayed gas reading to respond more slowly to changes in gas concentrations. • A setting of **1** second gives the fastest gas reading response to a change in gas concentration, but gives the least amount of smoothing.
Zero Correction	• Off: The zero correction function is turned off. • On (factory setting): At the end of each hour, if a difference between the maximum and minimum detected readings is not greater than 2% of the span value <u>and</u> if the reading is not 0, then the Beacon 3200 alters its calibration values to correct the reading to show 0. The Beacon 3200 will not correct for more than +6% of the span value from the last calibration. ***NOTE:** The Zero Correction function does not affect any 4-20 mA or O_2 direct connect channels.*
Zero Follower	• Off (factory setting for carbon dioxide channels): The zero correction function is turned off. • On (factory setting for non-carbon dioxide channels): The Beacon 3200's firmware will monitor the zero (fresh air) reading and make automatic zero adjustments under precisely specified conditions if it determines that a reading change is due to normal sensor drift. ***NOTE:** The Zero Follower function does not affect any 4-20 mA or O_2 direct connect channels.*

Parameter	Available Settings & Descriptions
Strobe	• No Strobe: None of the strobe alarm settings appear in the alarm settings menu and the strobe circuit does not function. • Alarms Only (factory setting): The strobe will activate when the appropriate gas alarm condition occurs as defined in the alarm settings menu (see next section). It will not operate when a fail alarm occurs. • Fail Only: The strobe will activate when a fail alarm occurs. • Alarms and Fail: The strobe will activate when the appropriate gas alarm condition occurs as defined in the alarm settings menu (see next section) and when a fail alarm occurs. *NOTE: This parameter appears only if the Strobe parameter in the System Settings Menu is set to Installed.*

Table 14: Alarm Parameters

Parameter	Available Settings and Descriptions				
Setpoints	The gas reading at which an alarm 1, alarm 2, or alarm 3 condition occurs and the Beacon 3200 activates the alarm 1, alarm 2, or alarm 3 circuit for this channel.				
	Gas	Range	Alarm 1	Alarm 2	Alarm 3
	Acetone	100% LEL	10% LEL	20% LEL	50% LEL
	Ammonia	75.0 ppm	12.0 ppm	25.0 ppm	50.0 ppm
	Arsine	0.20 ppm	0.05 ppm	0.10 ppm	0.15 ppm
	Arsine	1.50 ppm	0.20 ppm	0.50 ppm	1.00 ppm
	Carbon Dioxide	100% VOL	100% VOL	100% VOL	100% VOL
	Carbon Dioxide	5.00% VOL	0.50% VOL	3.00% VOL	5.00% VOL
	Carbon Dioxide	50.0% VOL	50.0% VOL	50.0% VOL	50.0% VOL
	Carbon Dioxide	5000 ppm	2500 ppm	5000 ppm	5000 ppm
	Carbon Monoxide	300 ppm	25 ppm	50 ppm	100 ppm
	Chlorine	10.0 ppm	1.0 ppm	3.0 ppm	5.0 ppm
	Chlorine	3.00 ppm	0.50 ppm	1.00 ppm	2.00 ppm
	Chlorine Dioxide	1.00 ppm	0.10 ppm	0.30 ppm	0.30 ppm
	Ethanol	100% LEL	10% LEL	20% LEL	50% LEL
	Hexane	100% LEL	10% LEL	20% LEL	50% LEL

Table 14: Alarm Parameters

Parameter	Available Settings and Descriptions				
Setpoints cont.	Gas	Range	Alarm 1	Alarm 2	Alarm 3
	Hydrocarbons	100% LEL	10% LEL	20% LEL	50% LEL
	Hydrogen	100% LEL	10% LEL	20% LEL	50% LEL
	Hydrogen Cyanide	15.0 ppm	5.0 ppm	10.0 ppm	15.0 ppm
	Hydrogen Sulfide	100 ppm	10 ppm	50 ppm	75 ppm
	Isobutane	100% LEL	10% LEL	20% LEL	50% LEL
	Isopropanol	100% LEL	10% LEL	20% LEL	50% LEL
	Methane	100% LEL	10% LEL	20% LEL	50% LEL
	Methanol	100% LEL	10% LEL	20% LEL	50% LEL
	Nitric Oxide	100 ppm	25 ppm	50 ppm	100 ppm
	Nitrogen Dioxide	15.0 ppm	5.0 ppm	10.0 ppm	10.0 ppm
	Oxygen	25.0% VOL	19.5% VOL	17.0% VOL	23.5% VOL
	Pentane	100% LEL	10% LEL	20% LEL	50% LEL
	Phosphine	1.00 ppm	0.10 ppm	0.30 ppm	0.60 ppm
	Propane	100% LEL	10% LEL	20% LEL	50% LEL
	Silane	15.0 ppm	1.5 ppm	3.0 ppm	7.0 ppm
	Styrene	100% LEL	10% LEL	20% LEL	50% LEL
	Sulfur Dioxide	10.0 ppm	1.00 ppm	2.00 ppm	5.00 ppm
	Sulfur Dioxide	6.00 ppm	1.00 ppm	2.00 ppm	6.00 ppm
Trigger	• Increasing (factory setting for all alarms except oxygen Alarms 1 and oxygen Alarm 2): Alarm 1, Alarm 2, or Alarm 3 circuit activated by gas reading increasing to Alarm 1, Alarm 2, or Alarm 3 level. • Decreasing (factory setting for oxygen Alarm 1 and oxygen Alarm 2): Alarm 1, Alarm 2, or Alarm 3 circuit activated by gas reading decreasing to Alarm 1, Alarm 2, or Alarm 3 level.				
Type	• Latching (factory setting): You must press the RESET button to reset the alarm 1, alarm 2, or alarm 3 circuit after the alarm 1, alarm 2, or alarm 3 condition passes. • Self Resetting: The Beacon 3200 automatically resets the alarm 1, alarm 2, or alarm 3 circuit after the alarm 1, alarm 2, or alarm 3 condition passes.				

Table 14: Alarm Parameters

Parameter	Available Settings and Descriptions
On Delay	The amount of time the Beacon 3200 delays activation of the alarm 1, alarm 2, or alarm 3 circuit after the gas reading reaches the alarm 1, alarm 2, or alarm 3 setpoint. • 0 - 60 seconds in 1 second increments • 1 - 15 minutes in 1 minute increments Factory setting is **1 second**.
Off Delay	The amount of time the Beacon 3200 delays resetting the alarm 1, alarm 2, or alarm 3 circuit after the alarm 1, alarm 2, or alarm 3 condition passes. • 0 - 60 seconds in 1 second increments • 1 - 15 minutes in 1 minute increments • 15 - 60 minutes in 15 minute increments Factory setting is **0 seconds**. *NOTE: This parameter appears only if the **Type** parameter is set to **Self Resetting**.*
Strobe	• Resettable: The strobe can be turned off with the Reset Switch while an alarm 1, alarm 2, or alarm 3 condition still exists. • Non-Resettable (factory setting): The strobe cannot be turned off with the Reset Switch while an alarm 1, alarm 2, or alarm 3 condition still exists. • No Strobe: The strobe will not activate due to an alarm 1, alarm 2, or alarm 3 condition. *NOTE: This parameter appears only if the **Strobe** parameter in System Settings is set to **Installed** <u>and</u> if the **Strobe** parameter in the Channel Settings Input Menu is set to **Alarms Only** or **Alarms and Fail**.*
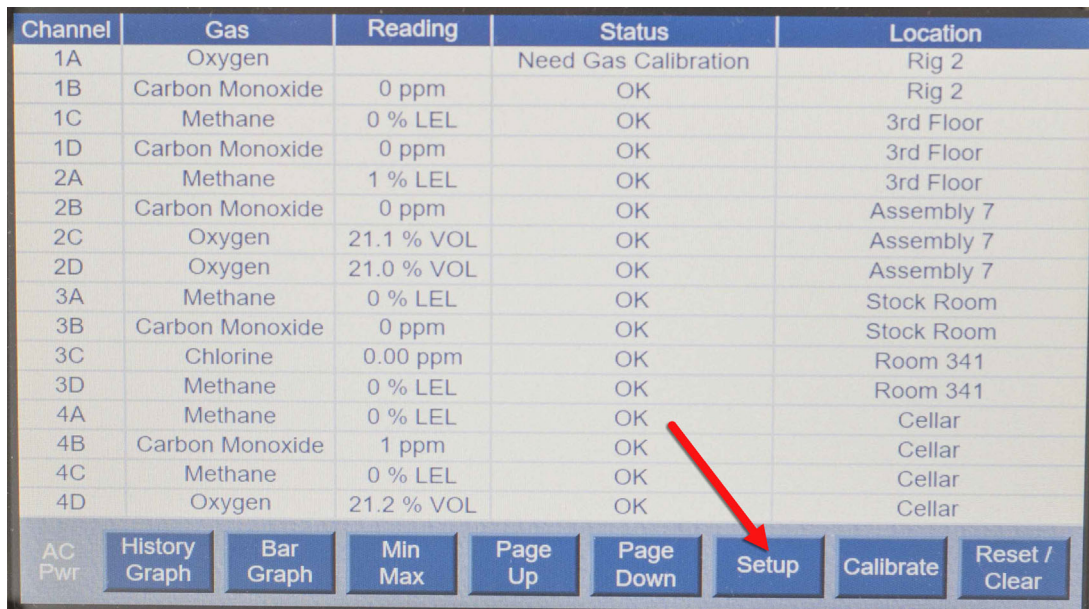
Changing Channel Settings Using the Channel Wizard

The Channel Wizard is useful for setting up a channel for the first time. If you only want to change a few parameters, see "Changing the Gas/Range Input Settings" on page 72 or "Changing the Alarm Settings" on page 76.

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Setup Mode, the Beacon 3200 will immediately return to the Home screen.

1. While in normal operation, press **Setup**.

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **Channel Settings**.

5. Press the channel number for the channel you would like to set up using the Channel Wizard.

6. Press **Change State**.
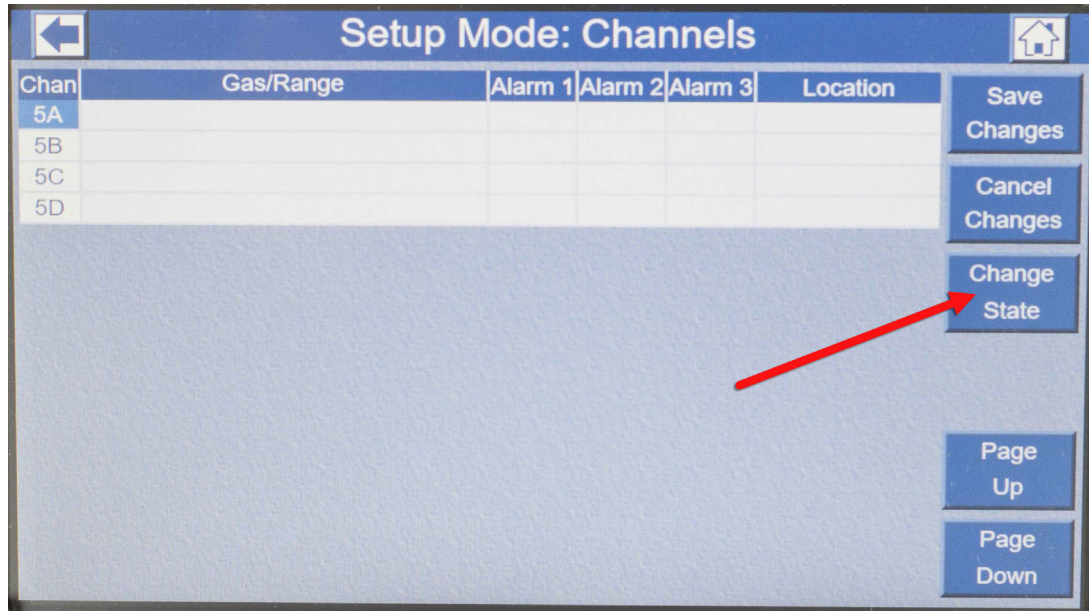
7. Press **Setup** and press **Enter**.
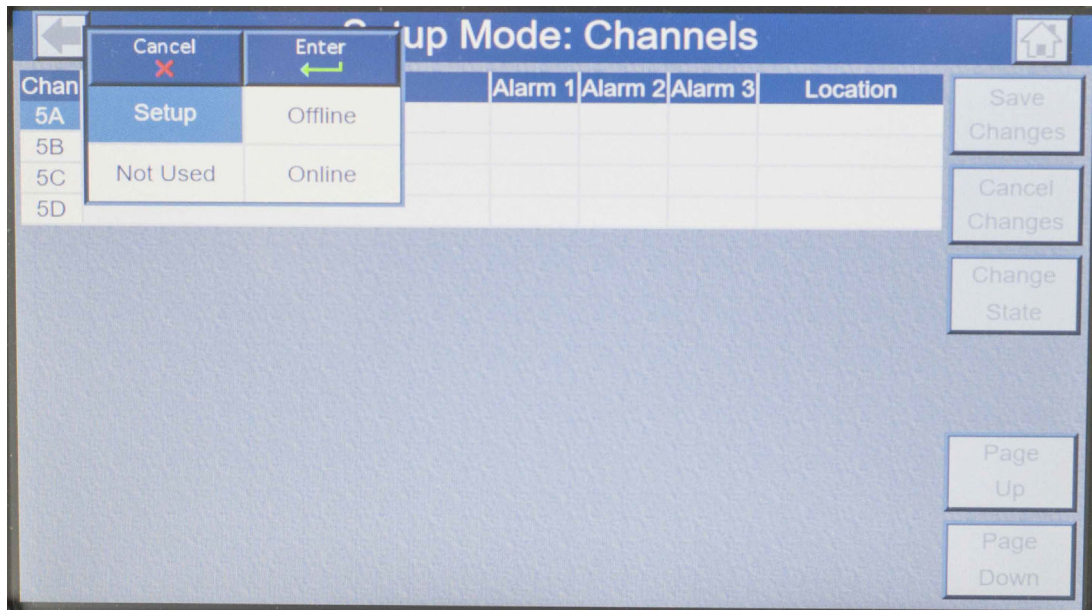
8. Select an input. The 4 options are described in Table 13 on page 61.

Channel Wizard: Select Input

4-20 mA Transmitter	Oxygen Direct
Pre Amp Direct	**RWGB Direct**

Cancel ✕ | Custom ✛ | Back ⟵ | Next ⟶ | Finish ⟵

9. Select a gas/range combination and press **Next**. The available options depends on the Input that was selected in the previous step. See Table 13 on page 61.

Channel Wizard: Select RWGB Direct

Acetone 100 % LEL	Hexane 100 % LEL	Methanol 100 % LEL
Carbon Dioxide 100 % VOL	Hydrocarbons 100 % LEL	Pentane 100 % LEL
Carbon Dioxide 5.00 % VOL	Hydrogen 100 % LEL	Propane 100 % LEL
Carbon Dioxide 50.0 % VOL	Isobutane 100 % LEL	Styrene 100 % LEL
Carbon Dioxide 5000 ppm	Isopropanol 100 % LEL	
Ethanol 100 % LEL	**Methane 100 % LEL**	

Cancel ✕ | Custom ✛ | Back ⟵ | Next ⟶ | Finish ⟵
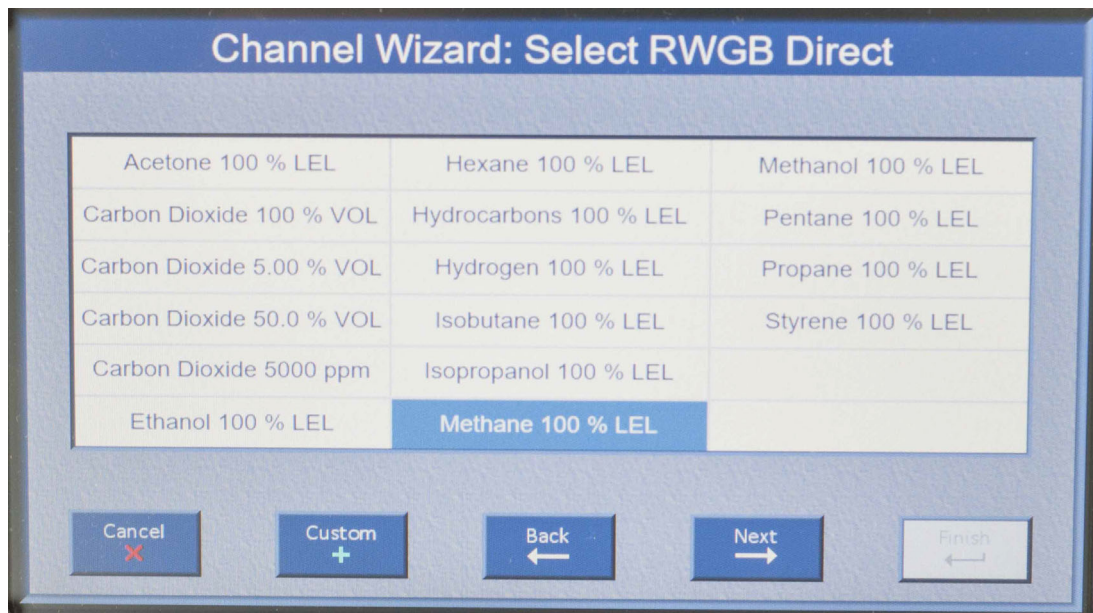
10. If you do not see your gas/range combination listed, perform the following steps:
    a. Click **Custom**.
    b. Select the gas and press **Next**. If the desired gas name is not listed, press **Custom**, type in a gas name, and press **Enter**. The gas name has a 20 character limit.
    c. Select the units and press **Next**. If the desired units are not listed, press **Custom**, type in the units, and press **Enter**. The units have a 6 character limit.
    d. Type in the range and press **Next**.

11. A message will pop up to inform you that you can press **Finish** at any time to complete the installation using factory settings. If you want to view or change any of the factory settings, continue to press **Next** to scroll through the settings. The available settings and their factory settings are described in Table 13 on page 61 and Table 14 on page 64.
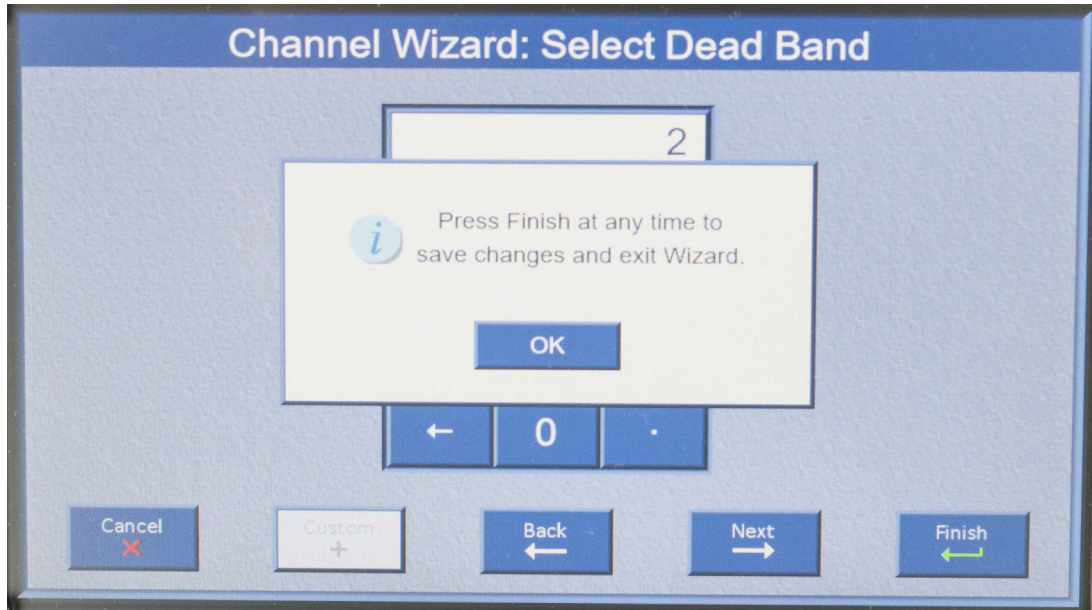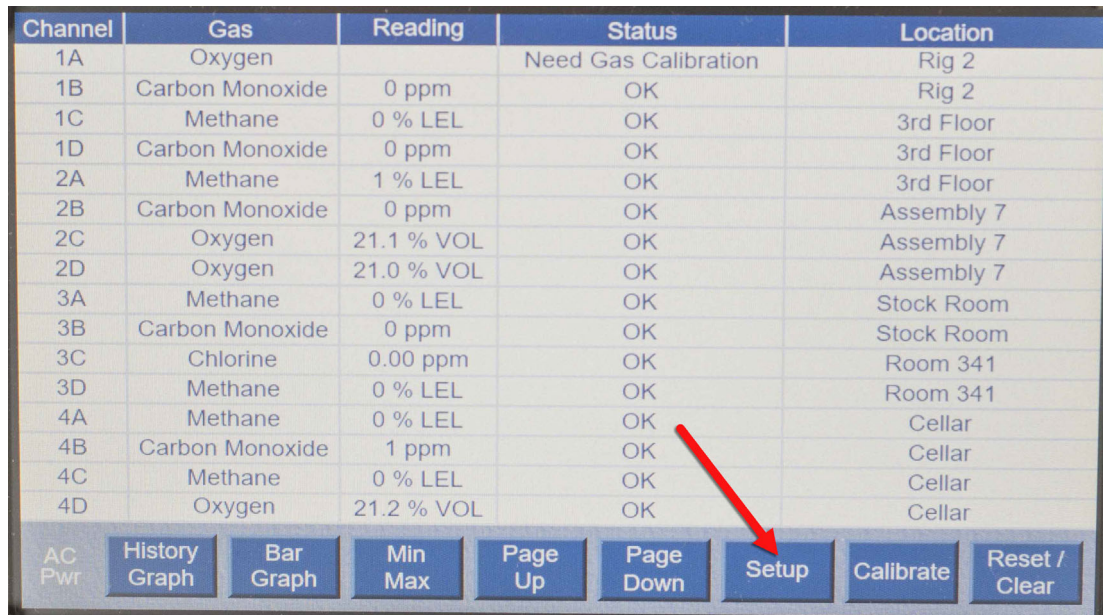
12. Press **Finish**.

Changing the Gas/Range Input Settings

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Setup Mode, the Beacon 3200 will immediately return to the Home screen.

1. While in normal operation, press **Setup**.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

| AC Pwr | History Graph | Bar Graph | Min Max | Page Up | Page Down | Setup | Calibrate | Reset / Clear |

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.
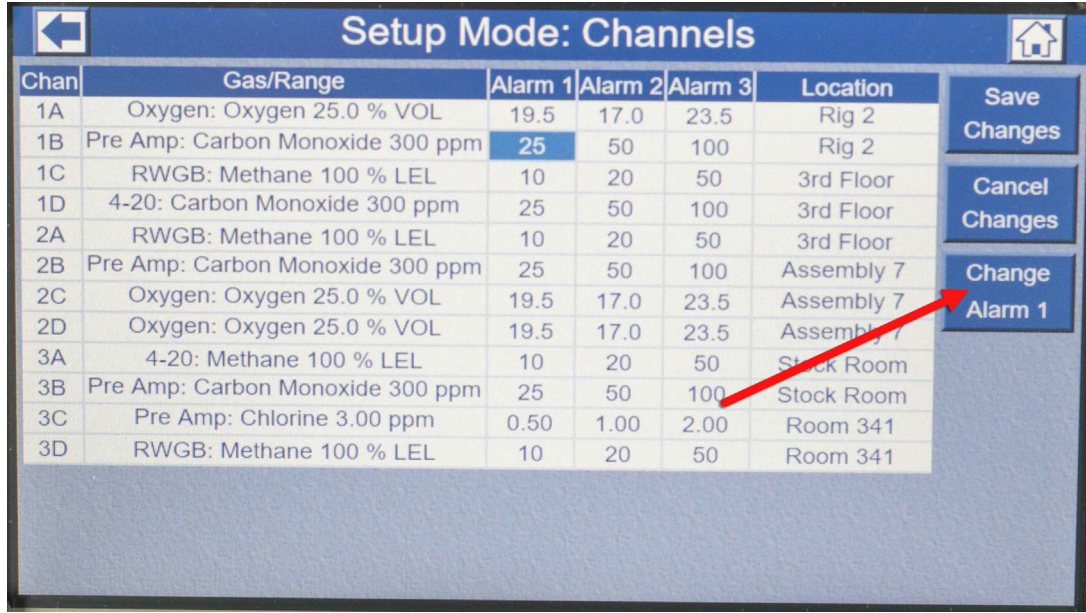
4. Press **Channel Settings**.

5. Press the current gas/range for the channel you would like to change.

6. Press **Change Gas/Range**.
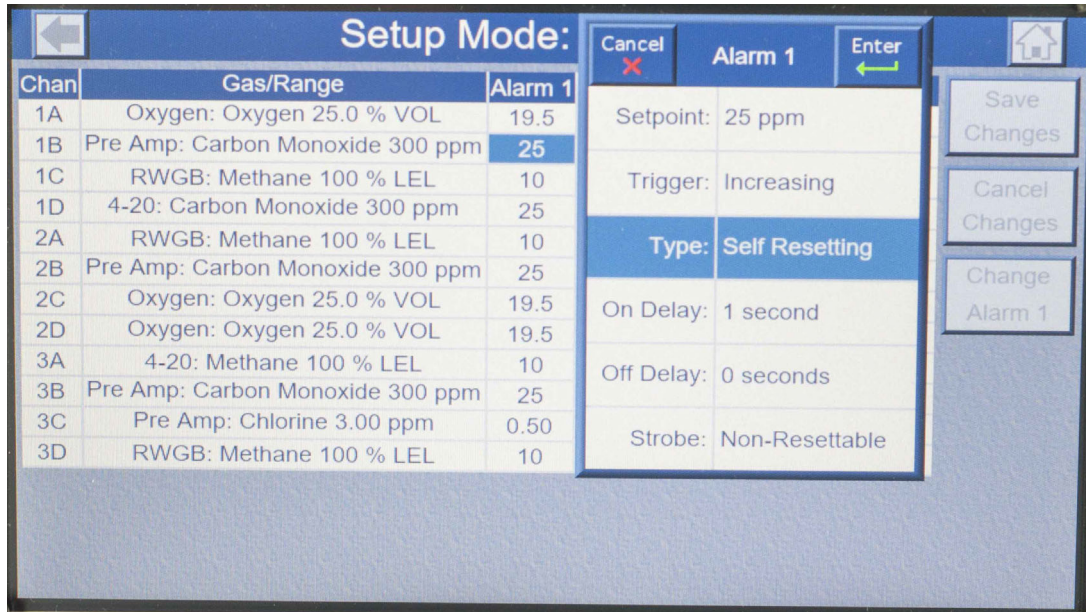

7. The Input Menu appears.

8. Press the current value for the parameter you want to change.

9. Select or type in the desired setting and press **Enter**. A summary of the Input Menu parameters and their available settings is shown in Table 13 on page 61.

10. When selecting a gas/range, if you don't see the gas and/or range you are looking for, perform the following steps:

    a. Press **Custom**.

    b. The Custom Gas/Range menu appears.
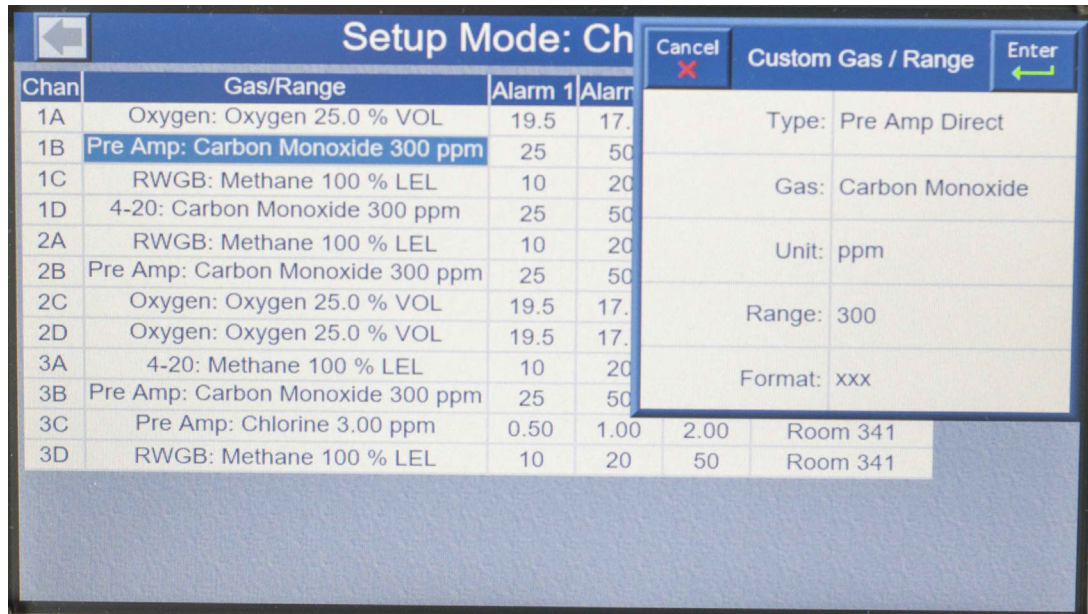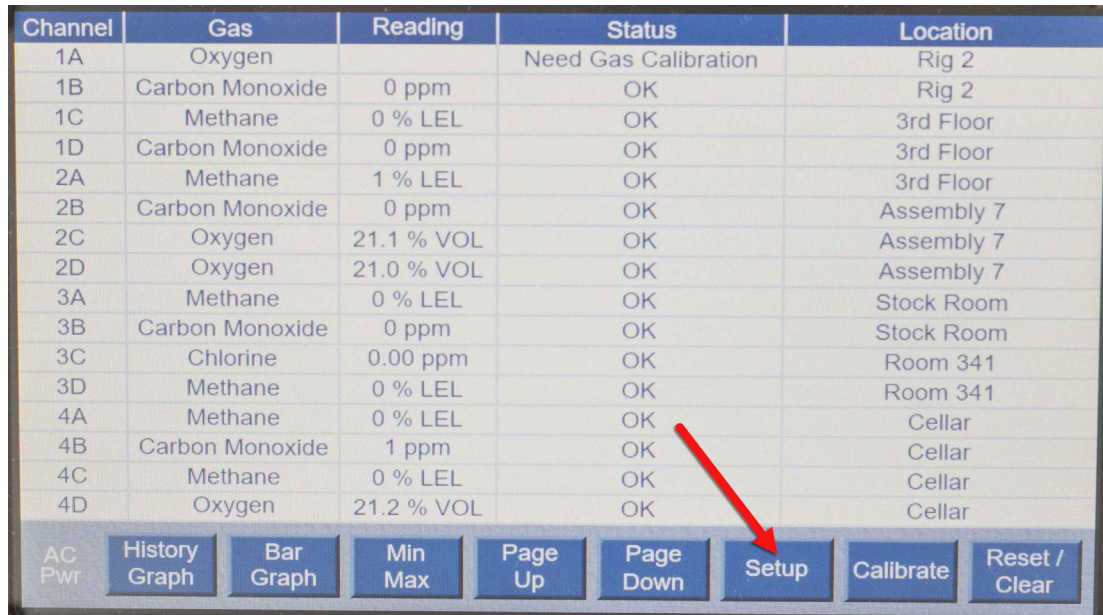
    c. Select the transmitter type and press **Enter**.

    d. Select the gas and press **Enter**. If the desired gas name is not listed, press **Custom**, type in a gas name, and press **Enter**. The gas name has a 20 character limit.

    e. Select the units and press **Enter**. If the desired units are not listed, press **Custom**, type in the units, and press **Enter**. The units have a 6 character limit.

    f. Type in the range and press **Enter**.

    g. Select a decimal point format and press **Enter**.

    h. Press **Enter** to return to the gas/range selection screen. The new custom gas/range will be highlighted.

    i. Press **Enter** to return to the Input Menu.

11. When you are finished updating parameters for the selected channel(s) press the Input Menu's **Enter** button.

12. Press **Save Changes**.

13. Repeat Step 5 through Step 12 for any other channel's input settings you want to change.

14. Press the arrow in the upper left corner to return to Setup Mode.

15. Press the home icon in the upper right corner to return to normal operation.

Changing the Alarm Settings

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Setup Mode, the Beacon 3200 will immediately return to the Home screen.

1. While in normal operation, press **Setup**.

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **Channel Settings**.

5. Press the current Alarm 1, Alarm 2, or Alarm 3 setting for the channel you would like to change.

6. Press **Change Alarm X**.

7. The Alarm Settings Menu appears.

8. Press the current setting for the parameter you want to change.

9. Select or type a new setting and press **Enter**. A summary of the Alarm parameters and their available settings is shown in Table 14 on page 64.

10. Repeat Step 8 and Step 9 for the selected alarm point's other settings.

11. Press the Alarm Setting Menu's **Enter** button.

12. Repeat Step 5 through Step 11 for the other alarm points, if desired.

13. Press **Save Changes**.
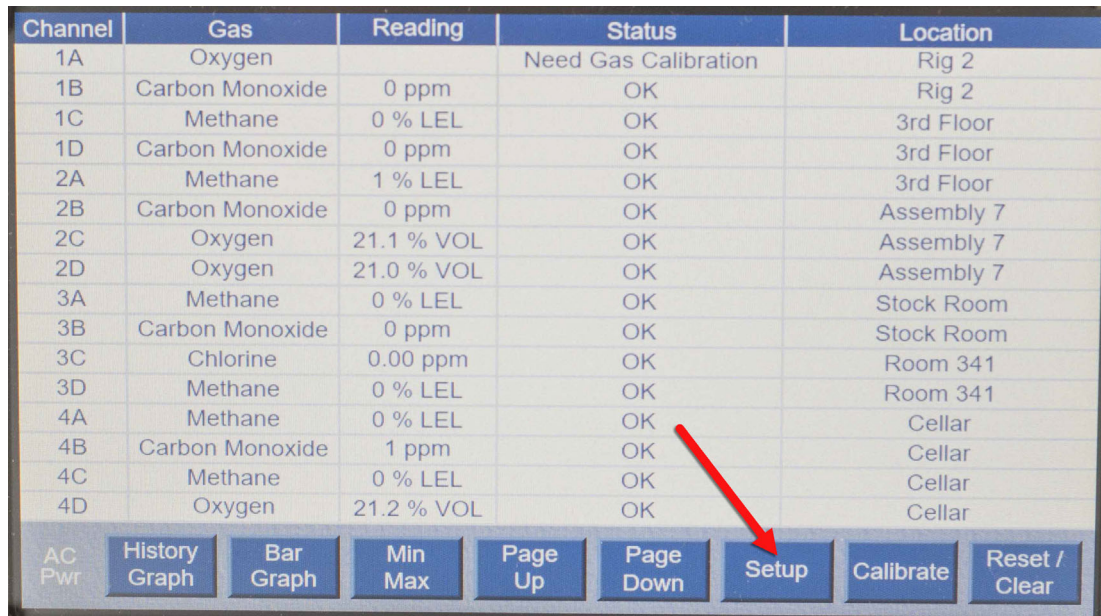
14. Press the arrow in the upper left corner to return to Setup Mode.

15. Press the home icon in the upper right corner to return to normal operation.

Changing the Location

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

1. While in normal operation, press **Setup**.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

| AC Pwr | History Graph | Bar Graph | Min Max | Page Up | Page Down | Setup | Calibrate | Reset / Clear |

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **Channel Settings**.

5. Press the current location for the channel you would like to change.

Beacon 3200 Gas Monitor
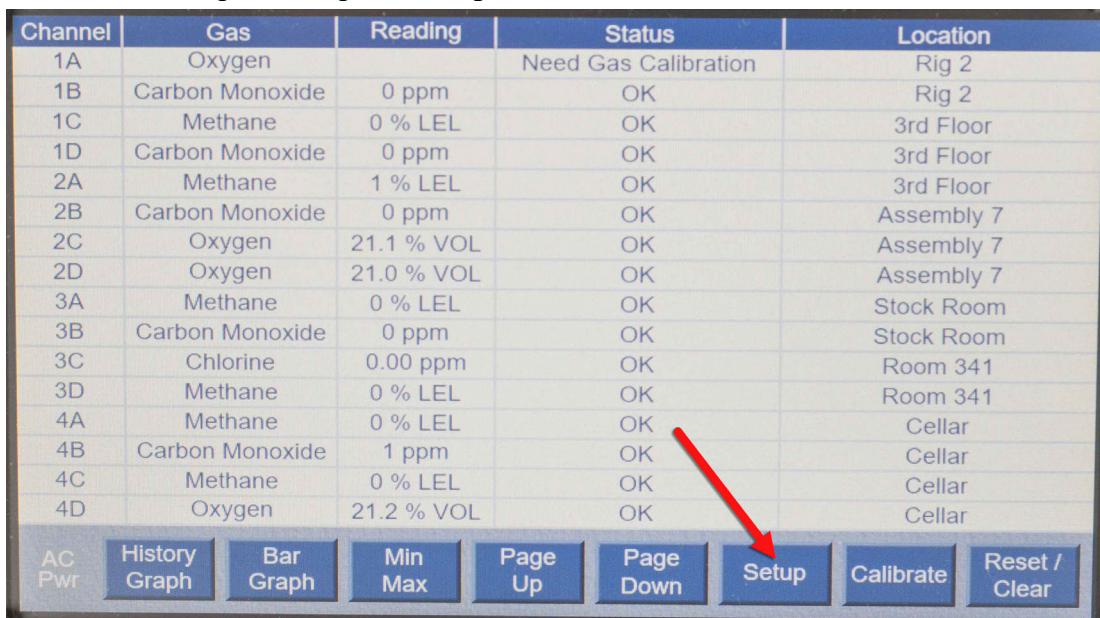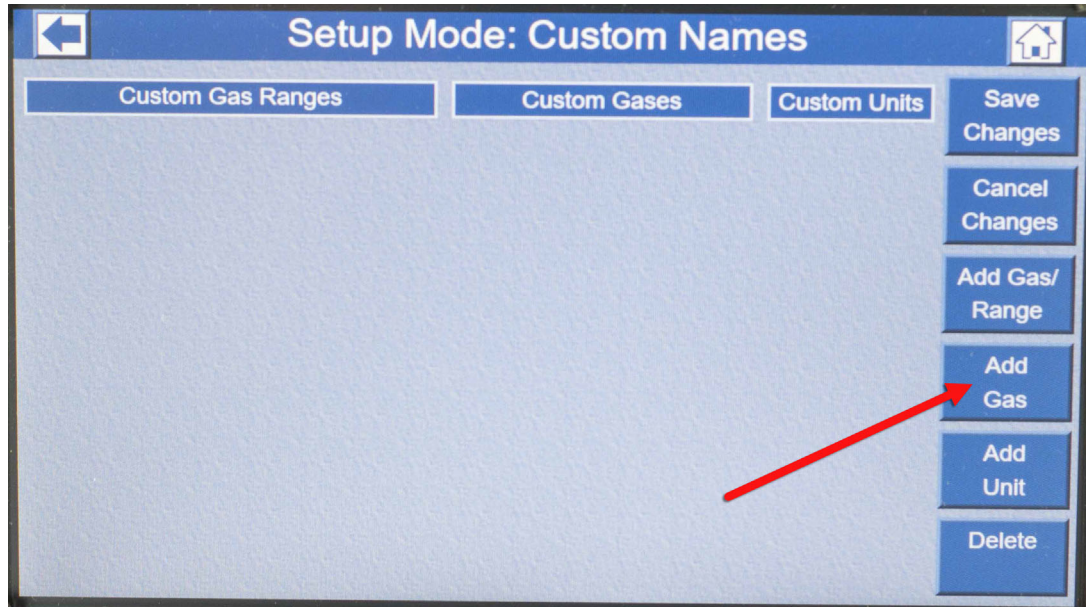
6. Press **Change Location**.

7. Type in the desired location (uppercase letters, lowercase letters, numbers, and/or symbols). The location has a 20 character limit.

8. Press **Enter**.

9. Repeat Step 5 through Step 8 for any other channels, if desired.

10. Press **Save Changes**.

11. Press the arrow in the upper left corner to return to Setup Mode.

12. Press the home icon in the upper right corner to return to normal operation.

Chapter 8: Creating Custom Ranges, Gases, and Units

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Setup Mode, the Beacon 3200 will immediately return to the Home screen.

---

1. While in normal operation, press **Setup**.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

AC Pwr	History Graph	Bar Graph	Min Max	Page Up	Page Down	Setup	Calibrate	Reset / Clear

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **Custom Names**.
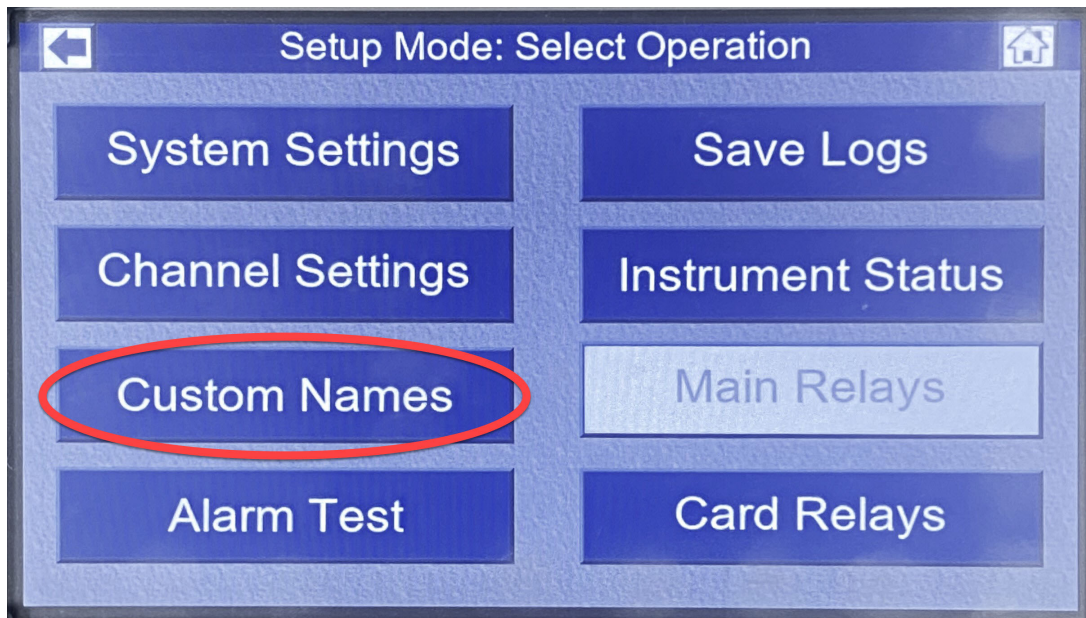
5. To add a custom gas/range:
   a. Press **Add Gas/Range**.
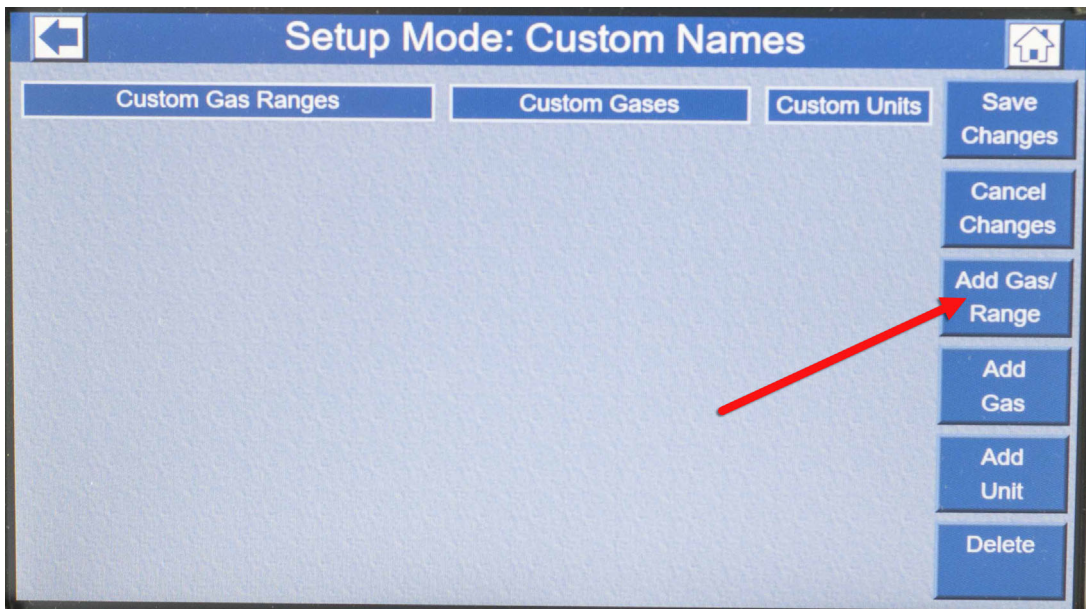
   b. Select the desired detector type. See "Gas/Range Parameters" on page 61 for a description of the choices.
   c. Select the desired gas. If you don't see what you want in the list, press **Custom**, type the gas name, and press **Enter**. The gas name has a 20 character limit.
   d. Select the desired unit and press **Enter**. If you don't see what you want in the list, press **Custom**, type the units, and press **Enter**. The units have a 6 character limit.
   e. Type in the desired full scale value for the gas/range and press **Enter**.

f.   Select a decimal point format and press **Enter**.
   • Use the format **xxx0** for ranges with increments of 10 or greater.
   • Use the format **0.xxx** for ranges with increments less than 1.0.

g.   Press **Enter** in the Custom Gas/Range Menu.

h.   The custom gas name appears under the **Custom Gases** section on the screen.

6.   To add a custom gas:
   a.   Press **Add Gas**.

   b.   Type in the desired custom gas name (uppercase letters, lowercase letters, numbers, and/or symbols). The gas name has a 20 character limit.

   c.   Press **Enter**.

   d.   The custom gas name appears under the **Custom Gases** section on the screen.

7. To add a custom unit:
   a. Press **Add Unit**.
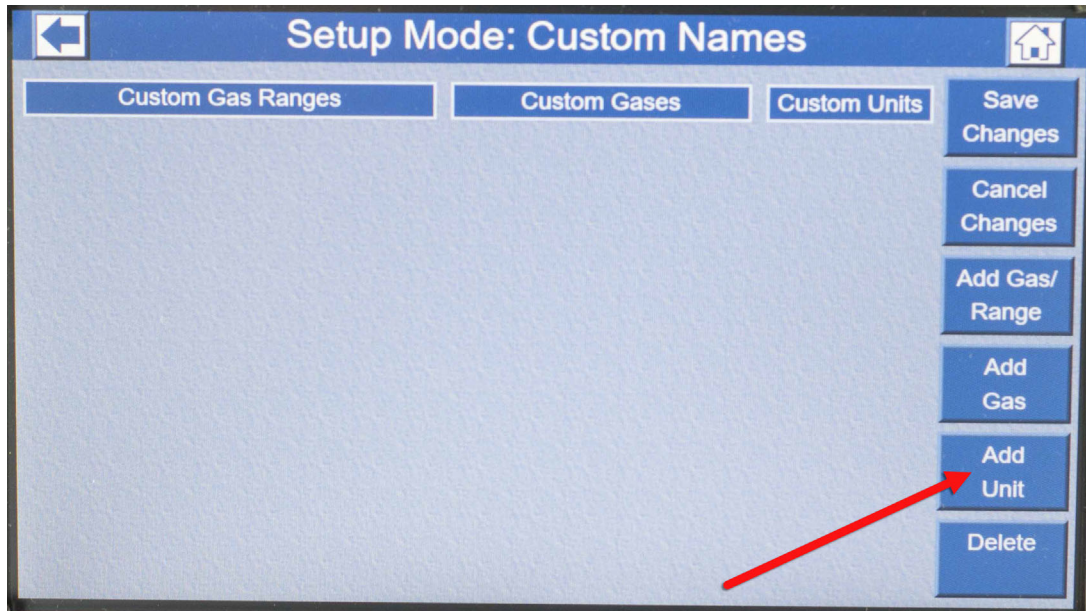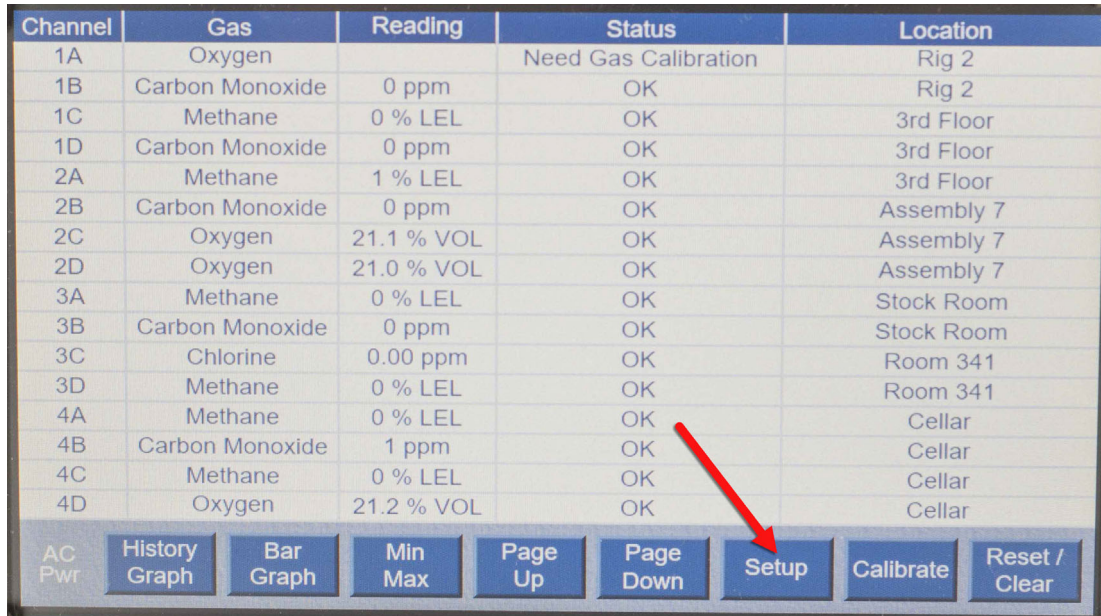
   b. Type in the desired custom unit name (uppercase letters, lowercase letters, numbers, and/or symbols). The units have a 6 character limit.
   c. Press **Enter**.
   d. The custom unit name appears under the **Custom Units** section on the screen.

8. To delete a customer gas/range, a custom gas, or a custom unit:
   a. Select the gas range, gas, or unit you want to delete.
   b. Press **Delete Gas/Range**, **Delete Gas**, or **Delete Unit**.

9. Press **Save Changes**.

10. Press the arrow in the upper left corner to return to Setup Mode.

11. Press the home icon in the upper right corner to return to normal operation.

Chapter 9: Assigning Main Relays

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Setup Mode, the Beacon 3200 will immediately return to the Home screen.

1. While in normal operation, press **Setup**.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

AC Pwr	History Graph	Bar Graph	Min Max	Page Up	Page Down	Setup	Calibrate	Reset / Clear

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **Main Relays**.

NOTE: The **Main Relays** button will not be active unless the **Main Relays** parameter in Setup Mode's System Settings is set to **Channel**.

---

5. Press the relay assignment(s) you would like to change.

6. Press **Select Relays**.

7. The relay selection screen appears.

If the alarms you selected already had relay assignments, the discrepancies between those assignments will be highlighted in red. You must either select or deselect those relays before pressing **Enter**.

8. Once you have selected the relay(s) that you want assigned to the selected alarm or fail conditions, press **Enter**.
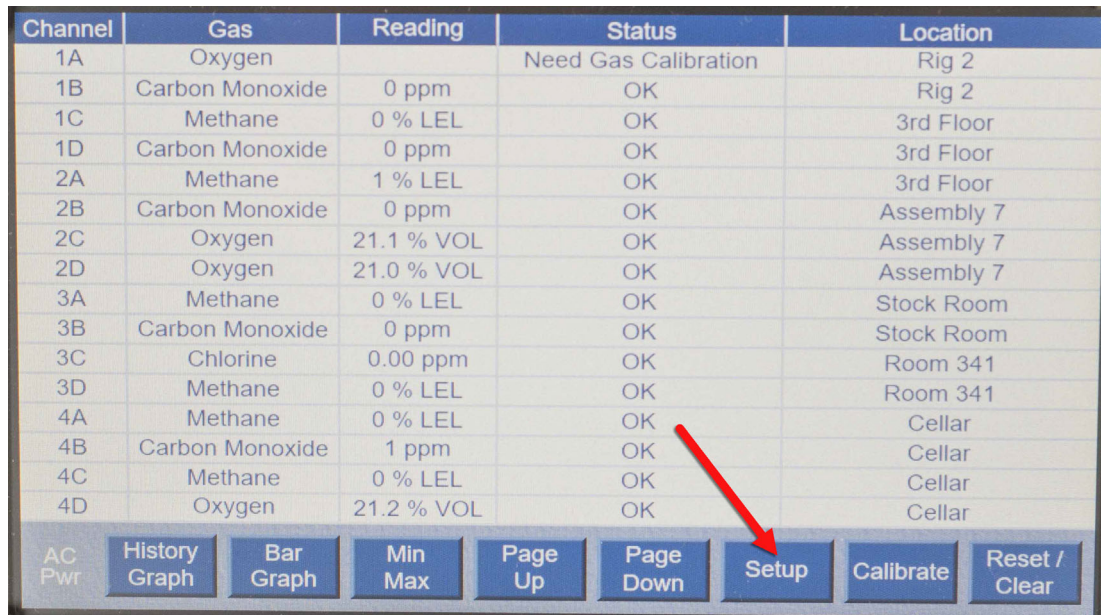
9. Change the relay allocations for any other alarm or fail conditions, if desired.

10. Press **Save Changes**.

11. Press the arrow in the upper left corner to return to Setup Mode.

12. Press the home icon in the upper right corner to return to normal operation.

Chapter 10: Assigning Card Relays

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Setup Mode, the Beacon 3200 will immediately return to the Home screen.

1. While in normal operation, press **Setup**.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

AC Pwr | History Graph | Bar Graph | Min Max | Page Up | Page Down | Setup | Calibrate | Reset / Clear

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.
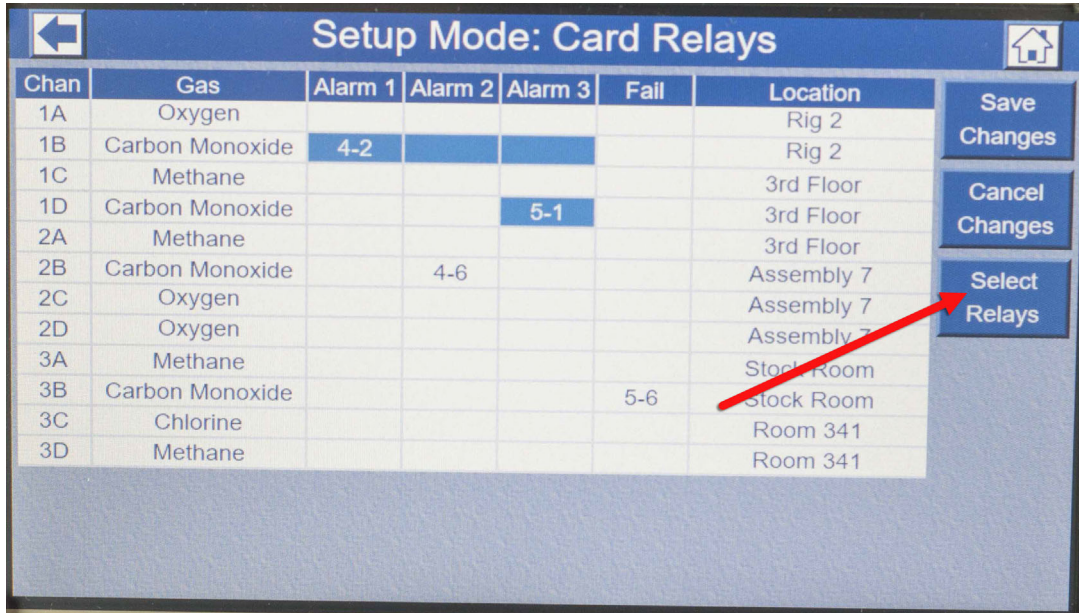
4. Press **Card Relays**.

5. Press the relay assignment(s) you would like to change.

6. Press **Select Relays**.

7. The relay selection screen appears.

Squares with a gray background are not installed relays and cannot be assigned. Squares with a white or blue background are installed relays that can be assigned.

If the alarms you selected already had relay assignments, those relay assignments will be highlighted in red. You must either select (blue) or deselect (white) those relays before pressing **Enter**.

8. Once you have selected the relay(s) that you want assigned to the selected alarm or fail conditions, press **Enter**.

9. Repeat Step 5 through Step 8 to change the relay allocations for any other alarm or fail conditions, if desired.

10. Press **Save Changes**.

11. Press the arrow in the upper left corner to return to Setup Mode.

12. Press the home in the upper right corner to return to normal operation.

Chapter 11: Calibration Mode

Overview

WARNING: **Upon entering calibration mode, the 4-20mA output signal for each selected channel "freezes" at 3.5mA. Selected channel relays will either remain in their current state or will switch to their non-alarm state, depending on the Relays Deact. setting in System Settings (see Table 10).**

The 4-20mA output signal for each unselected channel continues to track the gas readings. Unselected channel relays continue to function as necessary.

NOTE: If an alarm is triggered while in Calibration Mode, the Beacon 3200 will immediately return to the Home screen.

Table 15 below briefly describes the operations that can be performed in Calibration Mode. A more detailed description of each operation is given later in this chapter. In order to do a complete calibration, you must perform a fresh air adjust <u>and</u> a gas adjust.

Table 15: Calibration Mode Functions

Fresh Air Adjust	This operation allows you to set the fresh air reading of the selected channel(s) to zero (20.9% for an oxygen channel).
Gas Adjust	This operation allows you to set the response reading of the selected channels with calibration gas.
Min/Max Spans	This operation gives a measure of how much gas response adjustment remains on a direct connect type channel by allowing you to view the minimum and maximum possible adjustment on gas during the most recent calibration for each channel.
Set Timeout	This operation controls the amount of time (5 to 240 minutes) that has to pass before the Beacon 3200 will time out of Calibration Mode.
Install Dates	Allows you to change the install and calibration dates for each channel. The install date is a useful way to keep track of when a sensor was replaced.

Calibration Frequency

Although there is no particular calibration frequency that is correct for all applications, a calibration frequency of every 3 to 6 months is adequate for most Beacon 3200 applications. Unless experience in a particular application dictates otherwise, RKI Instruments, Inc. recommends a calibration frequency of every 3 months.

If an application is not very demanding, for example detection in a clean, temperature controlled environment where a combustible or toxic gas is not normally present, and calibration adjustments are minimal at calibration, then a calibration frequency of every 6 months may be adequate.

If an application is very demanding, for example if a combustible or toxic gas is present often and in significant concentrations or the environment is not well controlled, then more frequent calibration than every 3 months may be necessary. For combustible gas detection using catalytic combustion type detectors, if potential catalyst poisons are known or likely to be present, more frequent calibration than every 3 months will be necessary.

Detector Head Types

The Beacon 3200 can support direct connect (internal amp), 4-20 mA (remote amp), and Modbus detector heads.

- Direct connect detector heads (Pre Amp Direct, Oxygen Direct, or RWGB Direct inputs)

  All calibration adjustments are made <u>at the Beacon 3200</u> after calibration gas is applied to the detectors.

- 4-20 mA transmitter detector heads (4-20 mA Transmitter input)

  All calibration adjustments are made <u>at the detector head</u> when calibration gas is applied to the detectors.

- Modbus detector heads

  All calibration adjustments are made <u>at the detector head</u> when calibration gas is applied to the detectors.

Calibration Gas Response Memory Feature

When a direct connect detector head is installed, the Beacon 3200 has the capability to "remember" the detector's response to the calibration gas after the gas is removed from the detector during the fresh air or gas (zero for an oxygen detector) adjustment procedure. This feature enables one person to perform calibration if the detector heads are mounted remotely from the Beacon 3200.

When zero air is applied to a detector head during a fresh air adjustment in Calibration Mode, the Beacon 3200 will freeze the display reading at the lowest (highest for an oxygen detector head) response and the Beacon 3200 will continue to display this reading and retain it in its memory until the fresh air adjustment procedure is completed.

When calibration gas is applied to a detector head during a span (zero for an oxygen detector) adjustment in Calibration Mode, the Beacon 3200 will freeze the display reading at the highest (lowest for an oxygen detector) response to the calibration gas.

The calibration gas can then be removed and the Beacon 3200 will continue to display this reading and retain it in its memory until the span (zero for an oxygen detector) adjustment procedure is completed.

Performing a Fresh Air Adjustment

Performing a fresh air adjustment sets the gas reading in fresh air for the selected channels to zero (20.9% for oxygen).
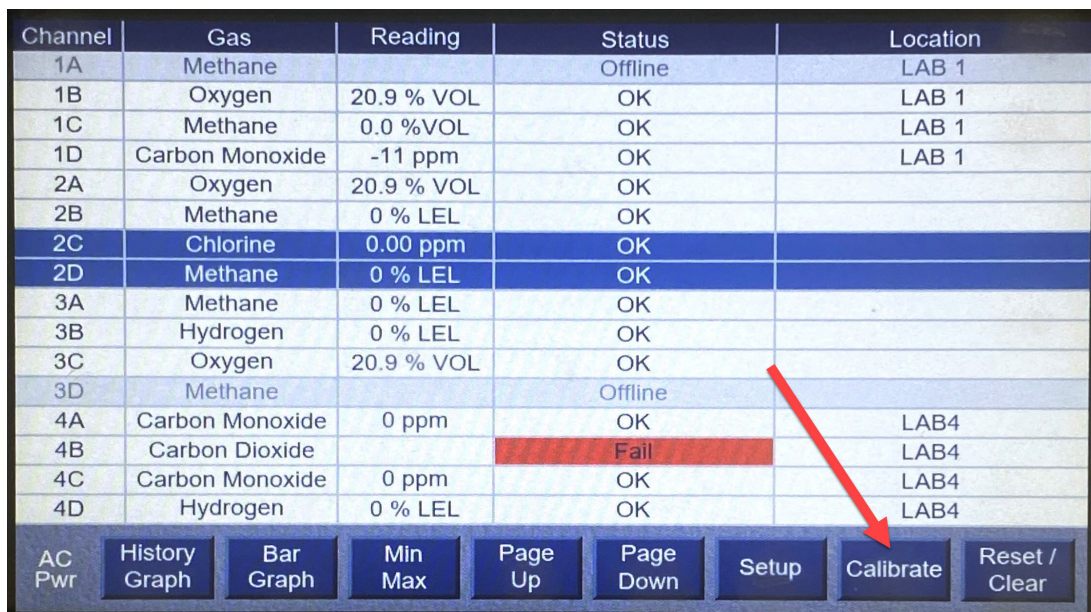
If you suspect that the environment at a detector head location is not a fresh air environment (an environment with normal oxygen content and free of combustible or toxic gases), you will need to apply zero air to the detector when making the fresh air adjustment. See the detector head operator's manual for instructions specific to that detector head.

NOTE: The Beacon 3200 will time out of Calibration Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Calibration Mode, the Beacon 3200 will immediately return to the Home screen.

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1. While in normal operation, select the desired channel(s) for fresh air adjustment by pressing anywhere on a channel's line.

2. Press **Calibrate**.

3. If the password is enabled for Calibration Mode, use the keypad to enter the password. The default password is **1234**.

4. A pop-up message will indicate whether the selected channel relays remain active or deactivate upon entering Calibration Mode. Press **OK** to proceed to Calibration Mode.

    Refer to Table 11 for all relay state messages and their corresponding settings.

5. Press **Fresh Air Adjust**.
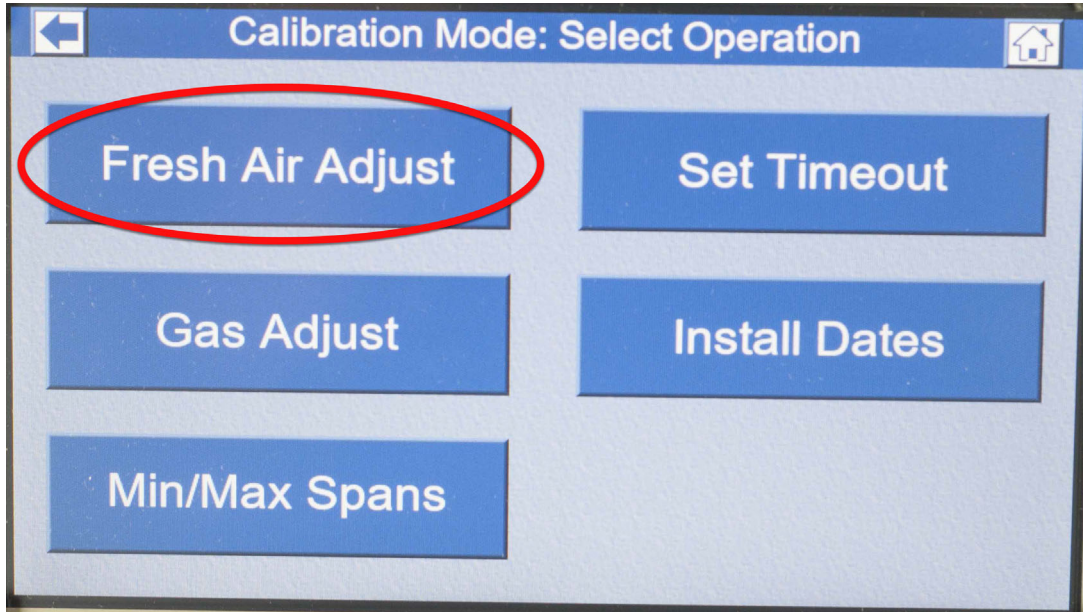
6. Select the desired channel(s) you for fresh air adjustment by pressing anywhere on a channel's line. You can select all channels by pressing **Select All**.

7. Direct connect channels will say "**Apply zero air if needed**" and 4-20 type detectors will say "**Calibrate at head**".

8. For 4 - 20 mA type detector heads, adjust the detector head's fresh air reading (sometimes referred to as the zero reading) at the detector head. See the detector head operator's manual for fresh air adjustment instructions. If you are also adjusting direct connect channels, continue to Step 9. If you are only adjusting 4 - 20 mA detector detectors, continue to Step 12.

9. For direct connect type detector heads in a fresh air environment, continue to Step 11.

10. For direct connect type detector heads <u>not</u> in a fresh air environment:

   a. Apply zero air to each selected detector for <u>two minutes</u>. See each detector head's operator's manual for instructions to apply zero air to each detector. The Beacon 3200 will freeze the display reading at the lowest level reached while applying zero air (highest level for an oxygen detector head).

   b. Remove the zero air source from the detector.

   c. Continue to Step 11.

11. Press **Fresh Air Adjust**. The Beacon 3200 will perform a fresh air adjustment and the display indicates **Passed** for each direct connect type detector head if the air adjust is successful. If the air adjust is not successful for any channel, the display indicates **FAIL** for that channel and shows why.
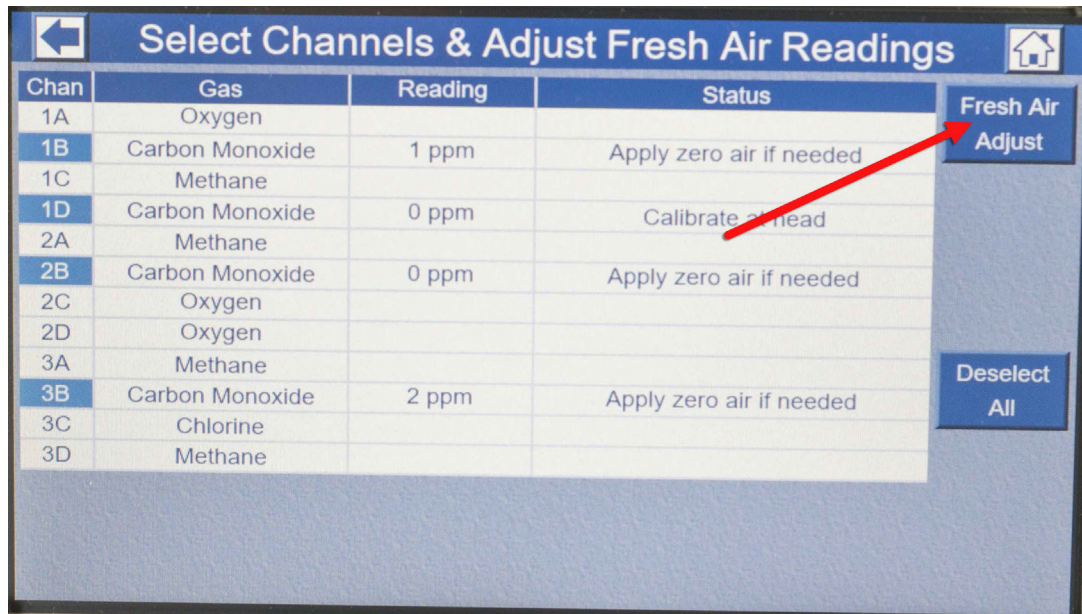
12. Press the arrow in the upper left corner of the screen to return to the Calibration Mode Menu.

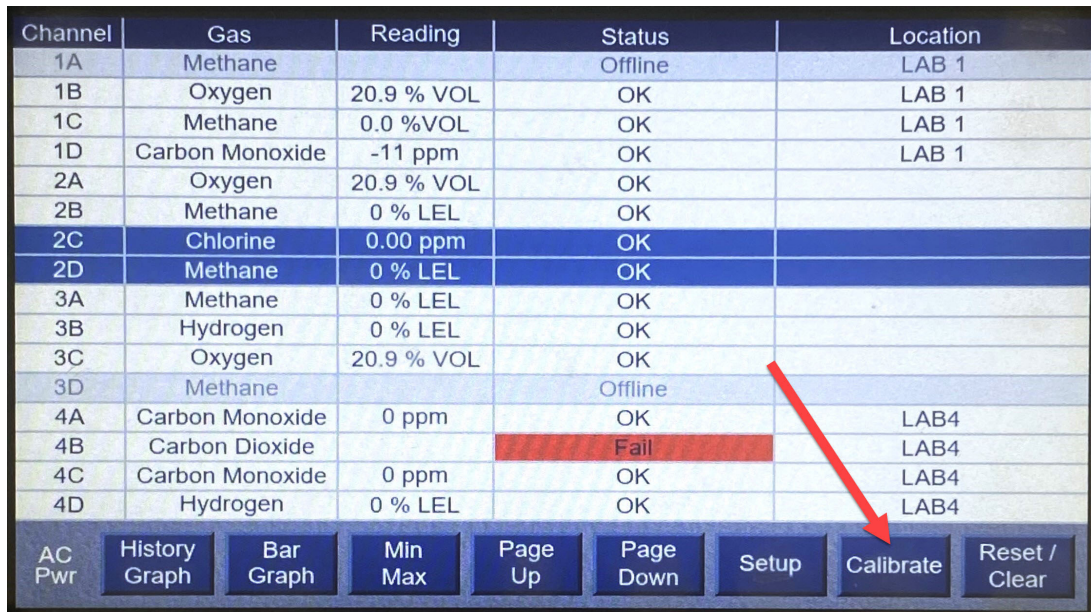   Press the home icon in the upper right corner to return to normal operation.

Performing a Gas Adjustment

Performing a gas adjustment sets the response level to calibration gas for the selected channels. This is also known as a span adjustment. See the operator's manual for each detector head that you are gas adjusting for instructions specific to that detector head.

NOTE: The Beacon 3200 will time out of Calibration Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Calibration Mode, the Beacon 3200 will immediately return to the Home screen.

---

1. While in normal operation, select the desired channel(s) for fresh air adjustment by pressing anywhere on a channel's line.

2. Press **Calibrate**.

3. If the password is enabled for Calibration Mode, use the keypad to enter the password. The default password is **1234**.

4. A pop-up message will indicate whether the selected channel relays remain active or deactivate upon entering Calibration Mode. Press **OK** to proceed to Calibration Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

5. Press **Gas Adjust**.

6. Select the channel(s) you want to calibrate by pressing anywhere on that channel's line. You can select all channels by pressing **Select All**.

7. Direct connect channels will display the gas reading and will say "**Apply Gas**". 4 - 20 mA type detectors will display the gas reading and auto cal value and will say "**Calibrate at head**".

8. To adjust the auto cal value:
    a. Press the value you want to change and then press **Change Autocal**.
    b. Type in the autocal value using they keypad and press **Enter**. Be sure the auto cal value matches the concentration listed on the calibration cylinder.
    c. If you change the auto cal value from its default value, the text turns red. This does not mean that the auto cal value is incorrect. It just means that it differs from the default setting.

9. For a 4 - 20 mA type detector head, see the detector head operator's manual for instructions on how to adjust the gas response reading. This is sometimes referred to as adjusting the span (or zero for an oxygen channel). If you are only adjusting 4 - 20 mA detector detectors, continue to Step 13.

10. For direct connect type detector heads, apply calibration gas to each selected detector for <u>two minutes</u>. See each detector head's operator's manual for instructions on how to apply gas to each detector.

    When calibration gas is applied to a detector, the Beacon 3200 will freeze the display gas reading at the highest level reached while the gas was applied (lowest for an oxygen detector head).

11. Remove the gas from the detector. The Beacon 3200 continues to display the maximum gas response (lowest for an oxygen detector head) on the display and retains the response level in its memory.

12. Press **Gas Adjust**. The Beacon 3200 performs a gas adjustment and the display indicates **Passed** for each direct connect type detector head if the gas adjustment is successful. If the gas adjustment is not successful for any channel, the display indicates **FAIL** for that channel and shows why.

Select Channels & Adjust Gas Readings

Chan	Gas	Reading	Autocal	Status	
1A	Oxygen				Gas Adjust
1B	Carbon Monoxide	2 ppm	50	Apply Gas	
1C	Methane				Change Autocal
1D	Carbon Monoxide	0 ppm	N/A	Calibrate at head	
2A	Methane				
2B	Carbon Monoxide	1 ppm	50	Apply Gas	
2C	Oxygen				
2D	Oxygen				
3A	Methane				Deselect All
3B	Carbon Monoxide	2 ppm	50	Apply Gas	
3C	Chlorine				
3D	Methane				

NOTE: Allow time for the calibration gas to clear from the detector(s).

13. Press the arrow in the upper left corner of the screen to return to the Calibration Mode Menu.

14. Press the home icon in the upper right corner to return to normal operation. The Status field for the calibrated channel(s) indicates **Remove Cal Gas** for 1 minute. During this 1 minute period, the relays remain in their non-alarm state to avoid unwanted alarms while the calibration gas clears from the detector. At the end of the 1 minute period, the Status field indicates any alarm conditions for the channel.

Viewing Minimum/Maximum Spans

This operation allows you to see how much gas response adjustment remains on direct connect type channels after a calibration is performed. This is a useful gauge for whether or not a sensor is nearing the end of its life.

The minimum and maximum span values are only generated for direct connect type channels. For 4 - 20 mA transmitter type channels, the **Minimum Span** and **Maximum Span** columns will be blank.

When you enter the **View Min/Max Spans** screen, the Beacon 3200 displays the minimum and maximum possible adjustment that the Beacon 3200 could have made to the response reading with the calibration gas that was used for each direct connect type channel during the most recent successful calibration. So if a 0 - 100% LEL channel is calibrated using 50% LEL gas and the minimum indicated span and maximum indicated span is 35% LEL and 95% LEL, this means that there was enough adjustment left on that channel to set the reading as low as 35% LEL or as high as 95% LEL when the detector was exposed to 50% LEL gas. If either the minimum or maximum span value is close to the calibration gas value, for example if it is 47% LEL or 53% LEL for a 0 - 100% LEL channel when 50% LEL calibration gas is used, the sensor should be replaced soon.

The displayed minimum and maximum span values are from the most recent successful calibration for each channel. So they are most useful soon after a calibration is performed. If an extended period of time, for example 2 or 3 months, has passed since the last successful calibration on a particular channel, the minimum and maximum span value for that channel may no longer be accurate.

NOTE: The Beacon 3200 will time out of Calibration Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.
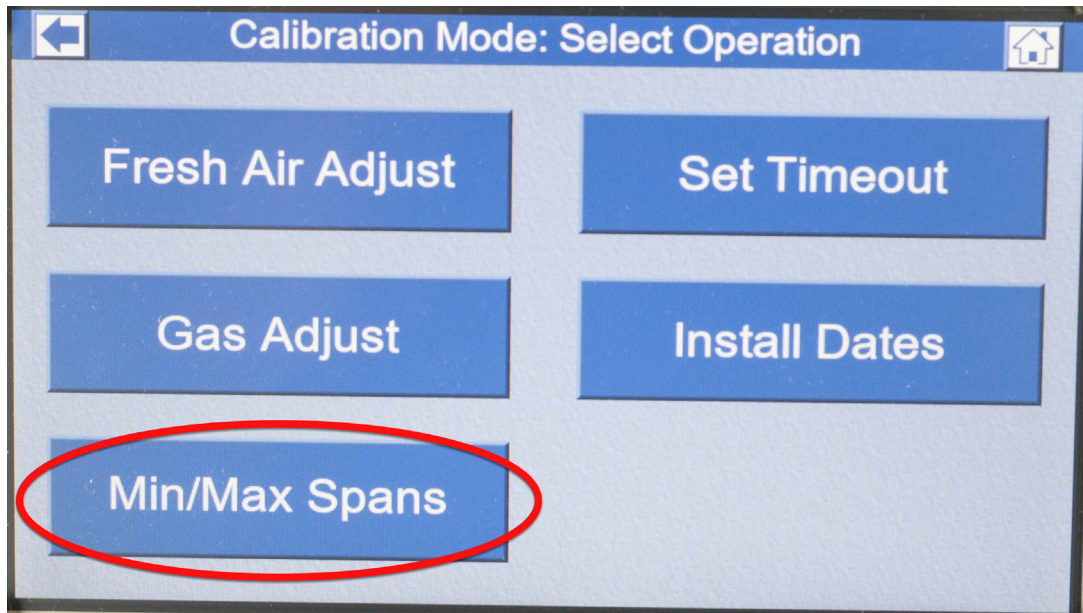

NOTE: If an alarm is triggered while in Calibration Mode, the Beacon 3200 will immediately return to the Home screen.

---

1. While in normal operation, press **Calibrate**.

| Channel	Gas	Reading	Status	Location
1A	Methane		Offline	LAB 1
1B	Oxygen	20.9 % VOL	OK	LAB 1
1C	Methane	0.0 %VOL	OK	LAB 1
1D	Carbon Monoxide	-11 ppm	OK	LAB 1
2A	Oxygen	20.9 % VOL	OK	
2B	Methane	0 % LEL	OK	
2C	Chlorine	0.00 ppm	OK	
2D	Methane	0 % LEL	OK	
3A	Methane	0 % LEL	OK	
3B	Hydrogen	0 % LEL	OK	
3C	Oxygen	20.9 % VOL	OK	
3D	Methane		Offline	
4A	Carbon Monoxide	0 ppm	OK	LAB4
4B	Carbon Dioxide		Fail	LAB4
4C	Carbon Monoxide	0 ppm	OK	LAB4
4D	Hydrogen	0 % LEL	OK	LAB4

| AC Pwr | History Graph | Bar Graph | Min Max | Page Up | Page Down | Setup | Calibrate | Reset / Clear |

2. Enter the password using the keypad. The default password is **1234**.

3. A pop-up message will indicate whether the selected channel relays remain active or deactivate upon entering Calibration Mode. Press **OK** to proceed to Calibration Mode.

    Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **View Min/Max Spans**.

Calibration Mode: Select Operation

Fresh Air Adjust   Set Timeout

Gas Adjust   Install Dates

Min/Max Spans

5. The minimum and maximum span for each channel will be displayed, if available and appropriate. 4 - 20 mA detector heads will not have a minimum or maximum span displayed.

Chan	Gas	Minimum Span	Maximum Span
1A	Oxygen		
1B	Carbon Monoxide	100	900
1C	Methane	33	173
1D	Carbon Monoxide		
2A	Methane	33	179
2B	Carbon Monoxide	100	900
2C	Oxygen	8.3	29.8
2D	Oxygen	8.3	31.2
3A	Methane		
3B	Carbon Monoxide	100	900
3C	Chlorine	1.00	9.00
3D	Methane	33	167
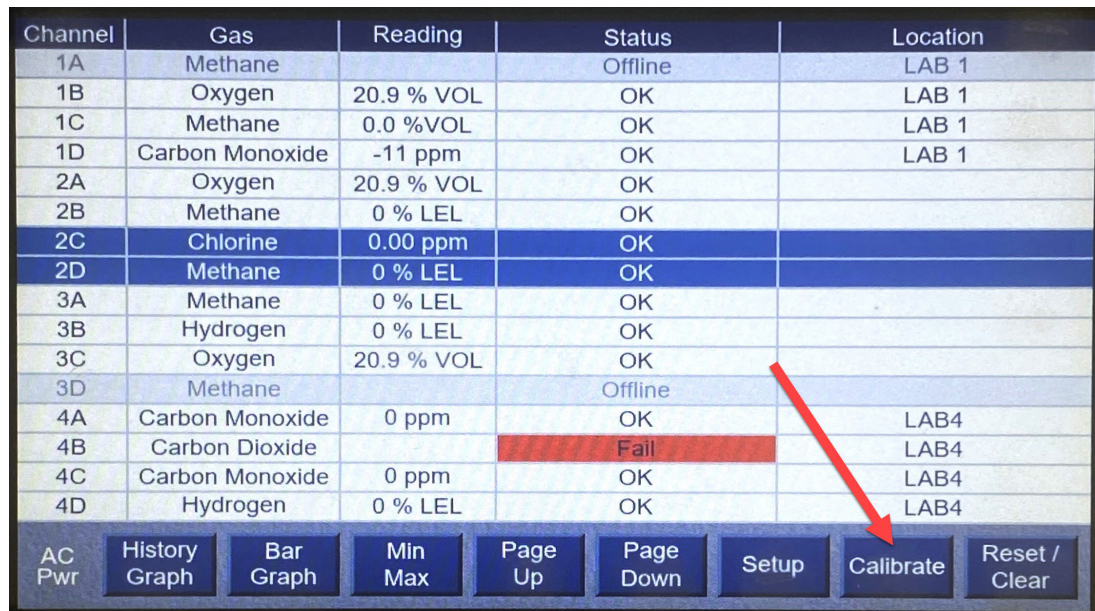
6. Press the arrow in the upper left corner of the screen to return to the Calibration Mode Menu. Or press the home icon in the upper right corner to return to normal operation.

Setting the Timeout

NOTE: The Beacon 3200 will time out of Calibration Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Calibration Mode, the Beacon 3200 will immediately return to the Home screen.
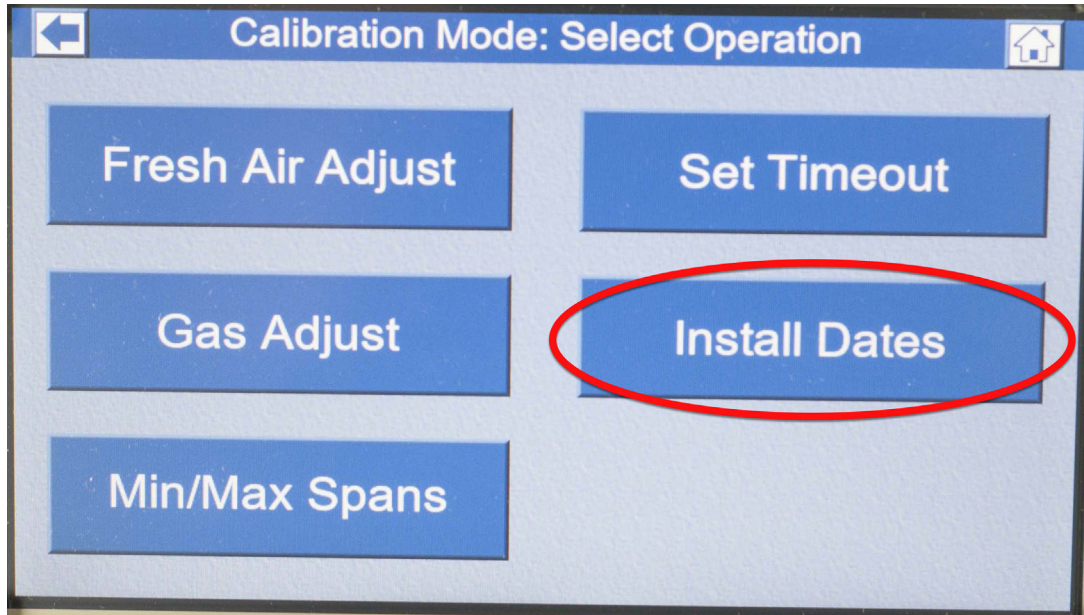
1. While in normal operation, press **Calibrate**.

2. If the password is enabled for Calibration Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the selected channel relays remain active or deactivate upon entering Calibration Mode. Press **OK** to proceed to Calibration Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **Set Timeout**.
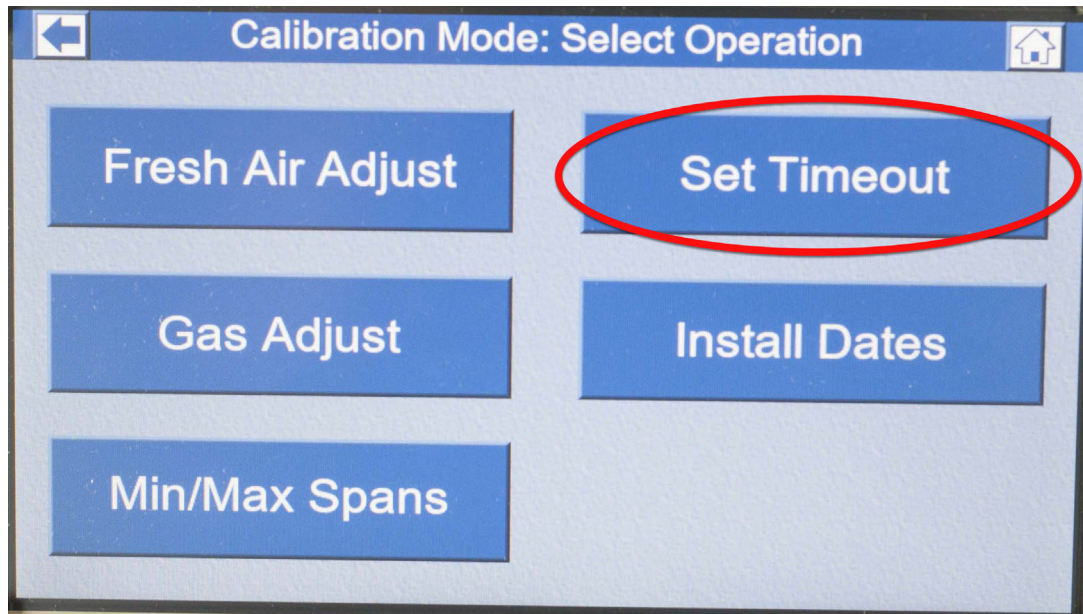
5. The Beacon 3200 takes you to the System Settings screen.
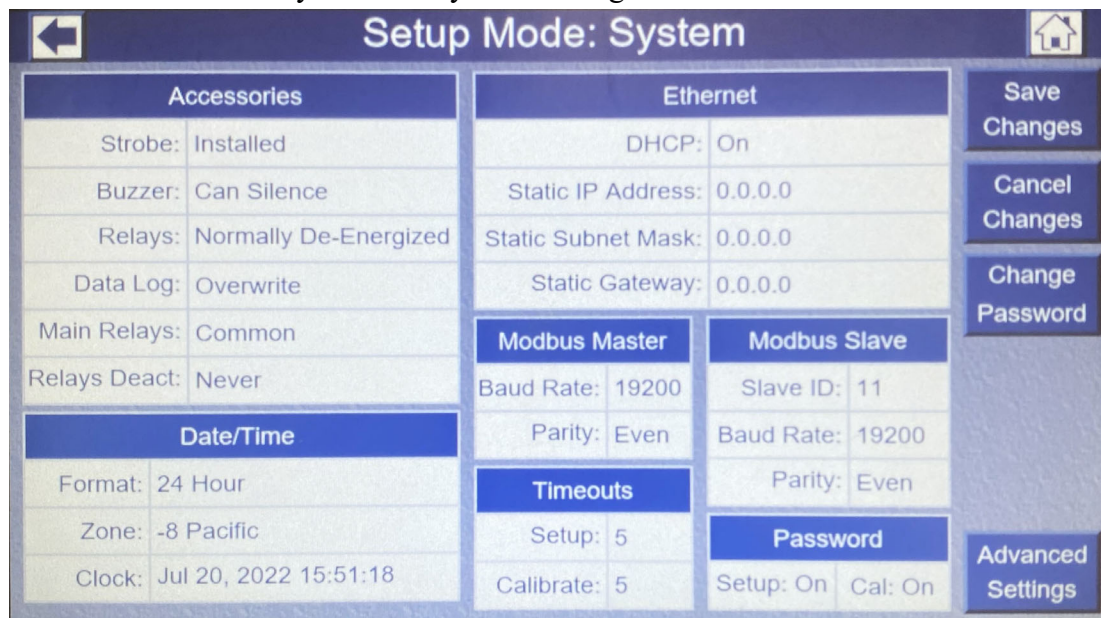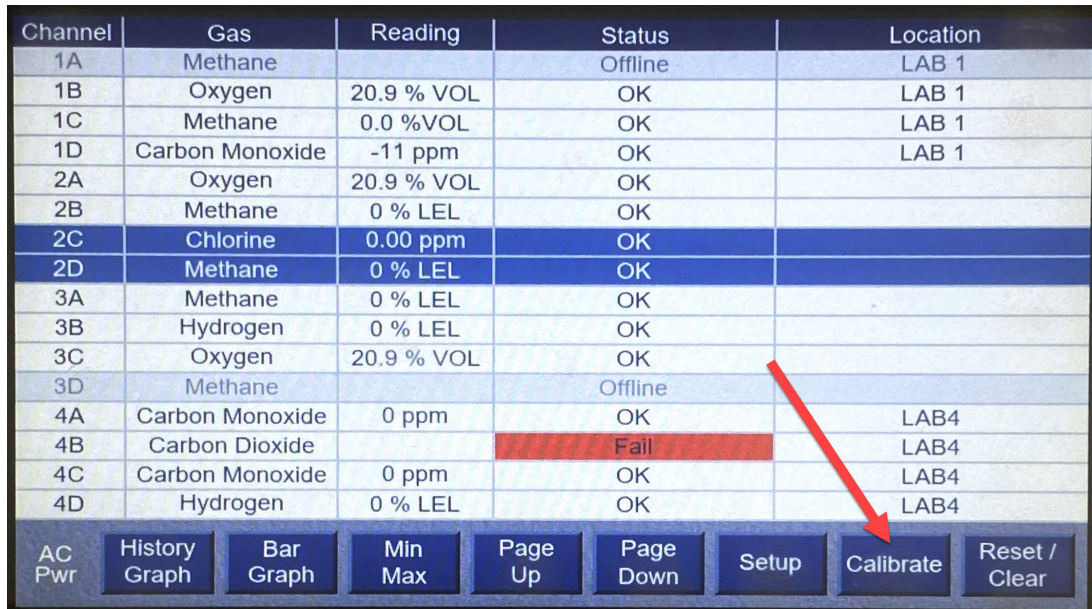
6. Press the **Calibrate** parameter in the Timeouts box.

7. Type in a new value, from **1** to **240** minutes, and press **Enter**.

8. Press **Save Changes**.

9. Press the arrow in the upper left corner to return to Setup Mode.

10. Press the home icon in the upper right corner to return to normal operation.

Changing the Install and Calibration Dates

NOTE: The Beacon 3200 will time out of Calibration Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If an alarm is triggered while in Calibration Mode, the Beacon 3200 will immediately return to the Home screen.

1. While in normal operation, press **Calibrate**.

Channel	Gas	Reading	Status	Location
1A	Methane		Offline	LAB 1
1B	Oxygen	20.9 % VOL	OK	LAB 1
1C	Methane	0.0 %VOL	OK	LAB 1
1D	Carbon Monoxide	-11 ppm	OK	LAB 1
2A	Oxygen	20.9 % VOL	OK	
2B	Methane	0 % LEL	OK	
2C	Chlorine	0.00 ppm	OK	
2D	Methane	0 % LEL	OK	
3A	Methane	0 % LEL	OK	
3B	Hydrogen	0 % LEL	OK	
3C	Oxygen	20.9 % VOL	OK	
3D	Methane		Offline	
4A	Carbon Monoxide	0 ppm	OK	LAB4
4B	Carbon Dioxide		Fail	LAB4
4C	Carbon Monoxide	0 ppm	OK	LAB4
4D	Hydrogen	0 % LEL	OK	LAB4

AC Pwr	History Graph	Bar Graph	Min Max	Page Up	Page Down	Setup	Calibrate	Reset / Clear

2. If the password is enabled for Calibration Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the selected channel relays remain active or deactivate upon entering Calibration Mode. Press **OK** to proceed to Calibration Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **Install Dates**.

5. The install date and calibration date will be displayed for each channel.

6. To change the install date or calibration date for one or more channels, select the dates you want to change. You can change multiple install dates at once and multiple calibration dates at once but you cannot change an install date and a calibration date at the same time.

7. Press **Change Date**.

8. Select the year, month, date, hour, minute, and second.

9. Press **Enter**.

10. Change more dates, if necessary.

11. Press **Save Changes**.

12. Press the arrow in the upper left corner of the screen to return to the Calibration Mode Menu. Or press the home icon in the upper right corner to return to normal operation.

Chapter 12: Maintenance

WARNING: *Only authorized and properly trained personnel should perform any maintenance procedures.*

Overview

This chapter describes preventive maintenance procedures for the Beacon 3200, how to view the instrument's status, troubleshooting procedures, and how to replace the AC fuses.

Preventive Maintenance

Preventive maintenance of the Beacon 3200 and its detector heads consists of daily, monthly, and quarterly procedures to ensure that the installed detector heads remain on zero (20.9 for oxygen) in fresh air and are responsive to the target gas. See the detector head operator's manuals for preventive maintenance procedures for each connected detector head.
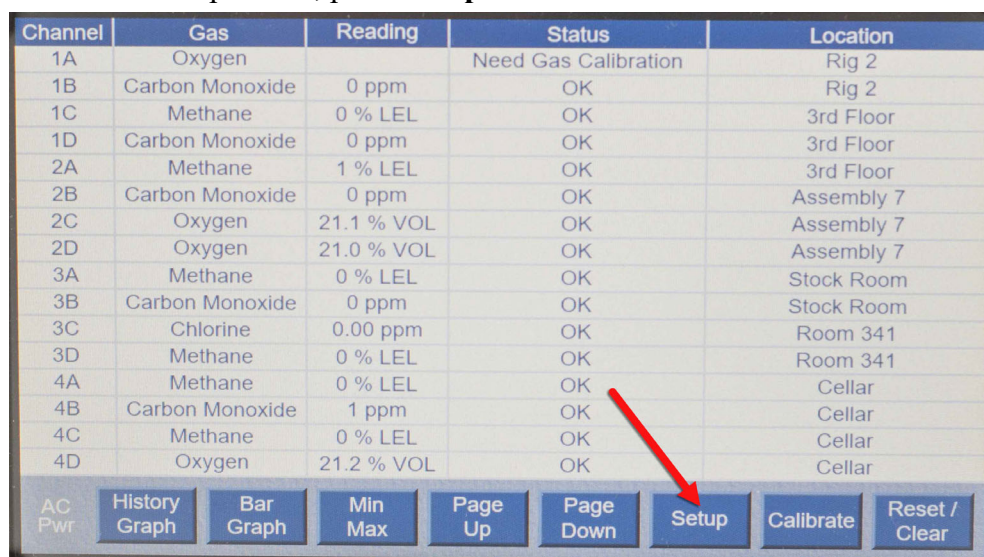
Viewing Instrument Status

The Instrument Status screen displays parameters related to the Beacon 3200's manufacturing and operation.

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings.

NOTE: If there is an active alarm while in Setup Mode, the Beacon 3200 will immediately return to the Home screen.

1.   While in normal operation, press **Setup**.

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

    Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **Instrument Status**.
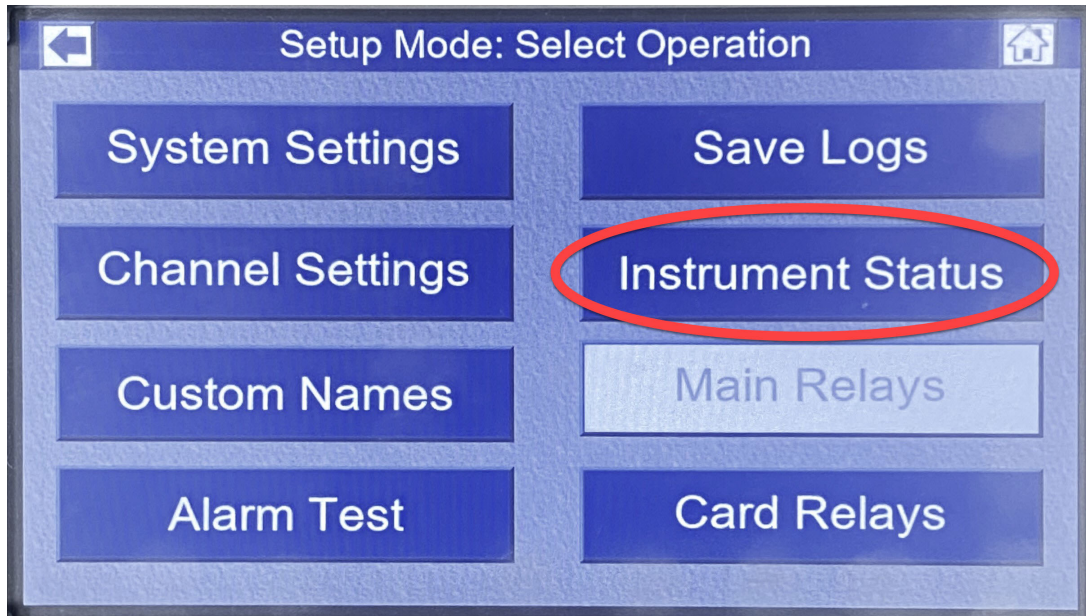
5. The touch screen displays information related to the instrument.
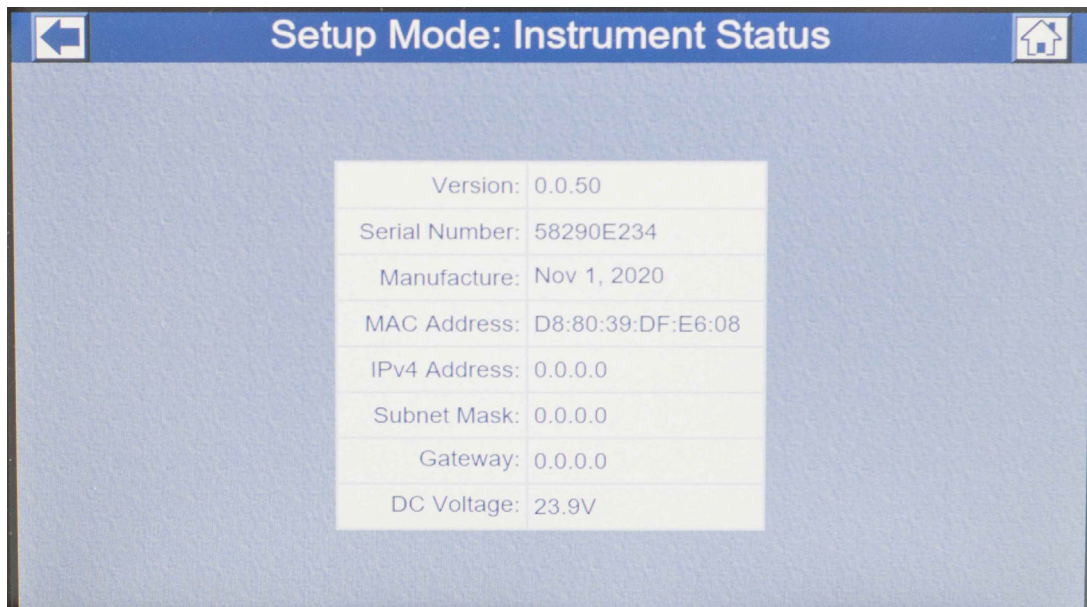
Alarm Test

The **Alarm Test** feature allows the user to simulate an alarm condition in order to confirm that the alarms function as configured.

1. While in normal operation, press **Setup**.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

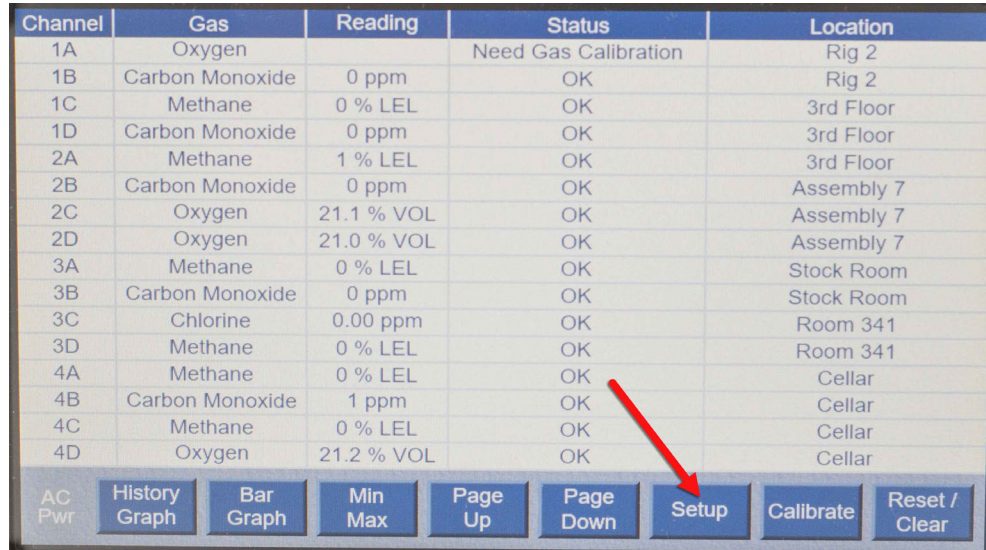| AC Pwr | History Graph | Bar Graph | Min Max | Page Up | Page Down | Setup | Calibrate | Reset / Clear |

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   Refer to Table 11 and Table 12 for all relay state messages and their corresponding settings.

4. Press **Alarm Test**.

Setup Mode: Select Operation

System Settings   Save Logs

Channel Settings   Instrument Status

Custom Names   Main Relays

Alarm Test   Card Relays
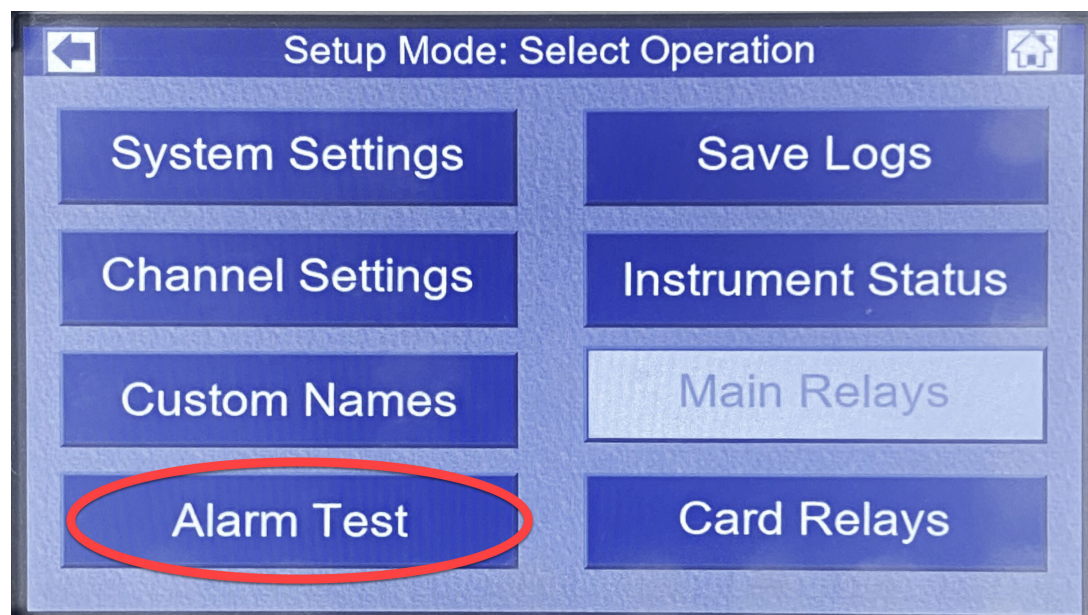
5. The Alarm Test screen appears, displaying the current, active channels. The following buttons are displayed at the bottom of the screen.

Alarm 1

- Pressing the Alarm 1 button will ramp the reading for any selected channel(s) up (or down if Alarm 1 is a decreasing alarm for an oxygen channel) until it reaches the Alarm 1 setpoint.
- All Alarm 1 indications will be initiated and any relays mapped to the Alarm 1 condition for the selected channel(s) will activate (or deactivate if defined as NE).

Alarm 2

- Pressing the Alarm 2 button will ramp the reading for any selected channel(s) up (or down if Alarm 2 is a decreasing alarm for an oxygen channel) until it reaches the Alarm 2 setpoint.
- All Alarm 2 indications will be initiated and any relays mapped to the Alarm 2 condition for the selected channel(s) will activate (or deactivate if defined as NE).

Alarm 3

- Pressing the Alarm 3 button will ramp the reading for any selected channel(s) up (or down if Alarm 3 is a decreasing alarm for an oxygen channel) until it reaches the Alarm 3 setpoint.
- All Alarm 3 indications will be initiated and any relays mapped to the Alarm 3 condition for the selected channel(s) will activate (or deactivate if defined as NE).
- Page Up and Page Down buttons (if there are more than 16 active channels)
- Pressing Page Up or Page Down will scroll through the list screen of channels.

Troubleshooting

Table 16 describes symptoms, probable causes, and recommended actions for the most common problems you may encounter with the Beacon 3200.

NOTE: This troubleshooting guide describes Beacon 3200 problems **only**. See the detector head operator's manuals for preventive maintenance procedures that apply to the detector heads connected to your Beacon 3200.

If necessary during troubleshooting, the plug-in terminal strip on a sensor or relay module can be removed without having to remove the entire module. To remove a plug-in terminal strip, pull the terminal strip straight out from the module.

Table 16: Troubleshooting

Condition	Symptom(s)	Probable Causes	Recommended Action
No Power to Instrument and/or Display PCB	• The touch screen is blank.	• The power wiring is disconnected or misconnected. • The AC fuse is blown. • The display cable is disconnected or misconnected.	1. Verify that the wiring to the power source is correct and secure. 2. At the Beacon 3200, verify that the wiring to the AC in terminal strip is correct and secure. 3. Check the continuity of the AC fuses. 4. Verify that the display cables are connected. 5. If the power difficulties continue, contact RKI for further instruction.
Frequent or Suspect Alarms	• The Beacon 3200 alerts you to frequent or suspect alarms. • The detector heads' fresh air readings remain on zero (20.9 for oxygen) despite alarm occurrences.	• The Beacon 3200 is experiencing false readings due to RFI or EMI. • The detector head wiring has one or more intermittent connections.	1. Verify that the detector head wiring is properly shielded. 2. Verify that the detector head wiring is correct and secure. 3. Verify that power and detector head wiring is routed through separate conduit hubs on the bottom of the Beacon 3200 housing. 4. Increase the alarm on delay setting in Setup Mode's Channel Settings. 5. Increase the noise filter in Setup Mode's Channel Settings. 6. If the frequent or suspect alarm difficulties continue, contact RKI for further instruction.

Table 16: Troubleshooting (Continued)

Condition	Symptom(s)	Probable Causes	Recommended Action
Momentarily Unstable Gas Readings on Display	• The display reading for one or more channels rises or falls briefly and then returns to the normal fresh air reading.	• The Beacon 3200 is experiencing false readings due to RFI or EMI. • The detector head wiring has one or more intermittent connections. • The noise filter setting is too low. • The dead band setting is too low. • The display screen is malfunctioning.	1. Verify that the detector head wiring is properly shielded. 2. Verify that the detector head wiring is correct and secure. 3. Verify that power and detector head wiring is routed through separate conduit hubs on the bottom of the Beacon 3200 housing. 4. Increase the noise filter setting in Setup Mode's Channel Settings. 5. Increase the dead band setting in Setup Mode's Channel Settings. 6. If the difficulties continue, contact RKI for further instruction.
Buzzer not Working	• The buzzer does not sound an audible alarm during alarm conditions. • The buzzer sounds weak or broken.	• The buzzer is disconnected or misconnected. • The buzzer is malfunctioning.	1. Verify that the wiring to the **Alarm Buzzer -** and **Alarm Buzzer** + terminals in the bottom left corner of the main PCB is correct and secure. 2. If the buzzer difficulties continue, contact RKI for further instruction.
Reset Switch not Working	• Depending on the instrument setup, the buzzer or strobe does not turn off in the appropriate situation when the reset switch is pressed. • The applicable alarm circuit does not reset when you press the reset switch after an alarm condition passes.	• The reset switch is disconnected or misconnected. • The reset switch is malfunctioning. • The Beacon 3200 is not properly setup for the desired reset switch operation. •	1. Verify that the wiring to the **Reset** (2) terminals in the bottom left corner of the main PCB is correct and secure. 2. If the reset switch difficulties continue, contact RKI for further instruction. 3. Make sure that the Beacon 3200 is properly setup in Setup Mode's System Settings and Channel Settings for the desired reset switch operation.

Replacing the Fuses

The Beacon 3200 has two user serviceable AC fuses and one user serviceable DC fuse. The replacement AC fuses must be rated to 6 A, 250 V, 1/4 x 1 1/4 inch, fast acting. The replacement DC fuse must be rated to 10A, 250V, 1/4 x 1 1/4 inch, fast acting.

NOTE: To replace other components of the Beacon 3200, contact RKI Instruments, Inc. for further information.

1. Turn off or unplug all incoming power to the Beacon 3200.

2. Open the Beacon 3200 housing door, then place the power switch in the OFF position.

3. The fuses are located below the power switch. Use a flat-blade screwdriver to rotate the applicable fuse holder 1/4 turn counterclockwise. The fuse holder releases from the socket.

4. Remove the fuse holder from the socket, then remove the fuse from the fuse holder.

   CAUTION: *Verify that the replacement fuses are the same type and rating as the fuses you are replacing. The Beacon 3200's AC fuses are fast blow fuses rated for 6A, 250 V and the DC fuse is a fast blow fuse rated for 10A, 250V.*

5. Install the replacement fuse in the fuse holder, then place the fuse holder in the socket.

6. Push the fuse holder into the socket, then turn the holder 1/4 turn clockwise to secure it in the socket.

7. Plug in or turn on all incoming power to the Beacon 3200.

8. Place the Beacon 3200's power switch in the ON position.

9. Close and secure the housing door.

Chapter 13: Modbus Output

Overview

This chapter describes the Beacon 3200's RS-485 and Modbus-over-Ethernet output and how to make use of it.

The Beacon 3200 provides an RS-485 serial communications interface and an RJ45 Ethernet interface. It can be used as a Modbus Master Device and/or as a Modbus Slave Device. It supports 2-wire RS-485 Modbus RTU serial communications and Modbus TCP/IP over port 502.

NOTE: The Beacon 3200 supports a max cable length of 4,000 feet. RKI Instruments recommends an impedance of 120 ohms.

Modbus Settings

Modbus settings are accessed in Setup Mode's System Settings. See page 54 for a description of the items and how to change the settings.

NOTE: All Beacon 3200s on a Modbus network must be configured with the same baud rate and parity, and each Beacon 3200 must have a unique slave ID.

Function Code 03: Read Holding Registers

System Status

Register 40000 gives information about the system as a whole, and should be checked before reading or interpreting the channel data in the registers that follow. When the Beacon 3200 is in any operating menu other than normal operation, the channel registers simply hold their existing values. Once the Beacon 3200 returns to normal operation, the channel registers are updated each second.

Table 17: Register 40000

Register	MSB	LSB
40000	Operating Mode • 0 = Not Used • 1 = Initialization • 2 = Normal Operation • 3 = Warmup • 4 = Fail • 5 = Calibration • 6 = Post Calibration • 7 = Low Power • 8 = Setup • 9 = Comm. Failed • 10 = Offline	• Bit 7 = Relay 4 (0 = energized, 1 = de-energized) • Bit 6 = Relay 3 (0 = inactive, 1 = active) • Bit 5 = Relay 2 (0 = inactive, 1 = active) • Bit 4 = Relay 1 (0 = inactive, 1 = active) • Bit 3 = Normal Relay State (0 = normally de-energized, 1 = normally energized) • Bit 2 = Strobe (0 = off, 1 = on) • Bit 1 = Audible Alarm (0 = off, 1 = on) • Bit 0 = Power Source (0 = DC, 1 = AC)

Channel Information

Table 17 - Table 19 outline what register numbers apply to each channel. Table 20 on page 120 defines each of those registers.

Table 18: Register Assignments for Channels "1" - "3"

Register	Ch. 1A	Ch. 1B	Ch. 1C	Ch. 1D	Ch. 2A	Ch. 2B	Ch. 2C	Ch. 2D	Ch. 3A	Ch. 3B	Ch. 3C	Ch. 3D
"1"	40001	40021	40041	40061	40081	40101	40121	40141	40161	40181	40201	40221
"2"	40002	40022	40042	40062	40082	40102	40122	40142	40162	40182	40202	40222
"3"	40003	40023	40043	40063	40083	40103	40123	40143	40163	40183	40203	40223
"4"	40004	40024	40044	40064	40084	40104	40124	40144	40164	40184	40204	40224
"5"	40005	40025	40045	40065	40085	40105	40125	40145	40165	40185	40205	40225
"6"	40006	40026	40046	40066	40086	40106	40126	40146	40166	40186	40206	40226
"7"	40007	40027	40047	40067	40087	40107	40127	40147	40167	40187	40207	40227

Table 18: Register Assignments for Channels "1" - "3"

Register	Ch. 1A	Ch. 1B	Ch. 1C	Ch. 1D	Ch. 2A	Ch. 2B	Ch. 2C	Ch. 2D	Ch. 3A	Ch. 3B	Ch. 3C	Ch. 3D
"8"	40008	40028	40048	40068	40088	40108	40128	40148	40168	40188	40208	40228
"9"	40009	40029	40049	40069	40089	40109	40129	40149	40169	40189	40209	40229
"10"	40010	40030	40050	40070	40090	40110	40130	40150	40170	40190	40210	40230
"11"	40011	40031	40051	40071	40091	40111	40131	40151	40171	40191	40211	40231
"12"	40012	40032	40052	40072	40092	40112	40132	40152	40172	40192	40212	40232
"13"	40013	40033	40053	40073	40093	40113	40133	40153	40173	40193	40213	40233
"14"	40014	40034	40054	40074	40094	40114	40134	40154	40174	40194	40214	40234
"15"	40015	40035	40055	40075	40095	40115	40135	40155	40175	40195	40215	40235
"16"	40016	40036	40056	40076	40096	40116	40136	40156	40176	40196	40216	40236
"17"	40017	40037	40057	40077	40097	40117	40137	40157	40177	40197	40217	40237
"18"	40018	40038	40058	40078	40098	40118	40138	40158	40178	40198	40218	40238
"19"	40019	40039	40059	40079	40099	40119	40139	40159	40179	40199	40219	40239
"20"	40020	40040	40060	40080	40100	40120	40140	40160	40180	40200	40220	40240

Table 19: Register Assignments for Channels "4" - "6"

Register	Ch. 4A	Ch. 4B	Ch. 4C	Ch. 4D	Ch. 5A	Ch. 5B	Ch. 5C	Ch. 5D	Ch. 6A	Ch. 6B	Ch. 6C	Ch. 6D
"1"	40241	40261	40281	40301	40321	40341	40361	40381	40401	40421	40441	40461
"2"	40242	40262	40282	40302	40322	40342	40362	40382	40402	40422	40442	40462
"3"	40243	40263	40283	40303	40323	40343	40363	40383	40403	40423	40443	40463
"4"	40244	40264	40284	40304	40324	40344	40364	40384	40404	40424	40444	40464
"5"	40245	40265	40285	40305	40325	40345	40365	40385	40405	40425	40445	40465
"6"	40246	40266	40286	40306	40326	40346	40366	40386	40406	40426	40446	40466
"7"	40247	40267	40287	40307	40327	40347	40367	40387	40407	40427	40447	40467
"8"	40248	40268	40288	40308	40328	40348	40368	40388	40408	40428	40448	40468
"9"	40249	40269	40289	40309	40329	40349	40369	40389	40409	40429	40449	40469
"10"	40250	40270	40290	40310	40330	40350	40370	40390	40410	40430	40450	40470
"11"	40251	40271	40291	40311	40331	40351	40371	40391	40411	40431	40451	40471

Table 19: Register Assignments for Channels "4" - "6"

Register	Ch. 4A	Ch. 4B	Ch. 4C	Ch. 4D	Ch. 5A	Ch. 5B	Ch. 5C	Ch. 5D	Ch. 6A	Ch. 6B	Ch. 6C	Ch. 6D
"12"	40252	40272	40292	40312	40332	40352	40372	40392	40412	40432	40452	40472
"13"	40253	40273	40293	40313	40333	40353	40373	40393	40413	40433	40453	40473
"14"	40254	40274	40294	40314	40334	40354	40374	40394	40414	40434	40454	40474
"15"	40255	40275	40295	40315	40335	40355	40375	40395	40415	40435	40455	40475
"16"	40256	40276	40296	40316	40336	40356	40376	40396	40416	40436	40456	40476
"17"	40257	40277	40297	40317	40337	40357	40377	40397	40417	40437	40457	40477
"18"	40258	40278	40298	40318	40338	40358	40378	40398	40418	40438	40458	40478
"19"	40259	40279	40299	40319	40339	40359	40379	40399	40419	40439	40459	40479
"20"	40260	40280	40300	40320	40340	40360	40380	40400	40420	40440	40460	40480

Table 20: Register Assignments for Channels "7" - "8"

Register	Ch. 7A	Ch. 7B	Ch. 7C	Ch. 7D	Ch. 8A	Ch. 8B	Ch. 8C	Ch. 8D
"1"	40481	40501	40521	40541	40561	40581	40601	40621
"2"	40482	40502	40522	40542	40562	40582	40602	40622
"3"	40483	40503	40523	40543	40563	40583	40603	40623
"4"	40484	40504	40524	40544	40564	40584	40604	40624
"5"	40485	40505	40525	40545	40565	40585	40605	40625
"6"	40486	40506	40526	40546	40566	40586	40606	40626
"7"	40487	40507	40527	40547	40567	40587	40607	40627
"8"	40488	40508	40528	40548	40568	40588	40608	40628
"9"	40489	40509	40529	40549	40569	40589	40609	40629
"10"	40490	40510	40530	40550	40570	40590	40610	40630
"11"	40491	40511	40531	40551	40571	40591	40611	40631
"12"	40492	40512	40532	40552	40572	40592	40612	40632
"13"	40493	40513	40533	40553	40573	40593	40613	40633
"14"	40494	40514	40534	40554	40574	40594	40614	40634
"15"	40495	40515	40535	40555	40575	40595	40615	40635
"16"	40496	40516	40536	40556	40576	40596	40616	40636

Table 20: Register Assignments for Channels "7" - "8"

Register	Ch. 7A	Ch. 7B	Ch. 7C	Ch. 7D	Ch. 8A	Ch. 8B	Ch. 8C	Ch. 8D
"17"	40497	40517	40537	40557	40577	40597	40617	40637
"18"	40498	40518	40538	40558	40578	40598	40618	40638
"19"	40499	40519	40539	40559	40579	40599	40619	40639
"20"	40500	40520	40540	40560	40580	40600	40620	40640

Table 21: Definitions for Registers "1" - "18"

Register	Channel State (MSB)	Channel Status Bits (LSB)
"1"	• 0 = Not Installed • 2 = Not Used • 3 = Offline • 4 = Standby • 5 = Normal • 6 = Warmup • 7 = Fail • 8 = Post Calibration • 9 = Low Power • 10 = Comm. Failed • 11 = Calibration • 12 = Setup	• Bit 7 = Alarm 3 Status (1 = energized) • Bit 6 = Alarm 2 Status (1 = energized) • Bit 5 = Alarm 1 Status • Bit 4 = Overscale Status (1 = overscale) • Bits [3:0] = Not used
"2"	Gas Name[0]	Gas Name[1]
"3"	Gas Name[2]	Gas Name[3]
"4"	Gas Name[4]	Gas Name[5]
"5"	Gas Name[6]	Gas Name[7]
"6"	Gas Name[8]	Gas Name[9]
"7"	Gas Name[10]	Gas Name[11]
"8"	Gas Name[12]	Gas Name[13]
"9"	Gas Name[14]	Gas Name[15]
"10"	Gas Name[16]	Gas Name[17]
"11"	Gas Name[18]	Gas Name[19]
"12"	Gas Reading[0]	Gas Reading[1]

Table 21: Definitions for Registers "1" - "18"

Register	Channel State (MSB)	Channel Status Bits (LSB)
"13"	Gas Reading[2]	Gas Reading[3]
"14"	Gas Reading[4]	Gas Reading[5]
"15"	Gas Reading[6]	Gas Reading[7]
"16"	Gas Units[0]	Gas Units[1]
"17"	Gas Units[2]	Gas Units[3]
"18"	Gas Units[4]	Gas Units[5]

Table 22: Definitions for Registers "19" - "20"

Register	Description
"19"	Numerical value of gas reading in an unsigned integer.
"20"	• Bit 4 = Sign (0 = positive reading, 1 = negative reading) • Bits [0:3] = Digits and Fractions 0000 = DDDD (4 digits, no fraction; the count represents the reading without a divisor) 0001 = DDD (3 digits, no fraction; the count represents the reading without a divisor) 0010 = DD.F (2 digits, 1 fraction; the count represents the reading x10) 0011 = D.FF (1 digit, 2 fraction; the count represents the reading x 100) 0100 = .FFF (0 digits, 3 fraction; the count represents the reading x 1000)

Function Code 06: Write Single Register

Register 40000: Write a non-zero value to clear alarm indications.
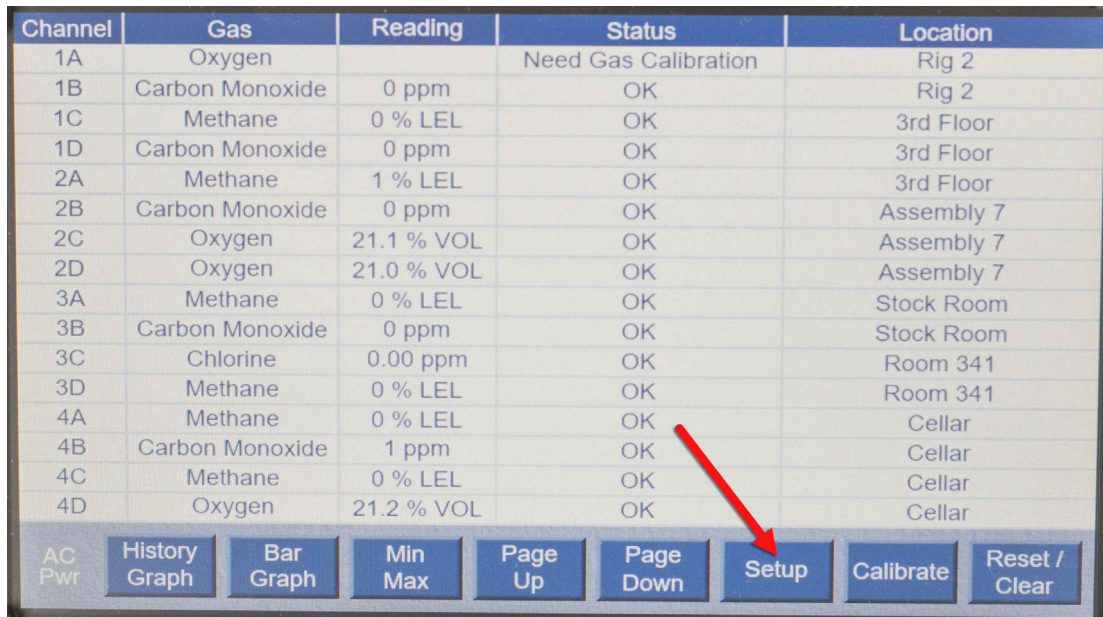
Chapter 14: Logged Data and Sensor Logs Program

The Beacon 3200 records data for each channel once per second. 7.5 years of data can be stored in the Beacon 3200, regardless of how many channels are used. Data can be viewed in the History Graph screen or can be transferred to a USB drive and be imported into the Sensor Logs program.

NOTE: If there is an active alarm while in Setup Mode, the Beacon 3200 will immediately return to the Home screen.

Saving Logged Data to a USB Drive

1. Plug a USB drive into the connector at the bottom of the display PCB's right edge.

2. While in normal operation, press **Setup**.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

AC Pwr	History Graph	Bar Graph	Min Max	Page Up	Page Down	Setup	Calibrate	Reset / Clear

3. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

4. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   To change the relay deactivation setting, press **Change**.

5. Press **Save Logs**.
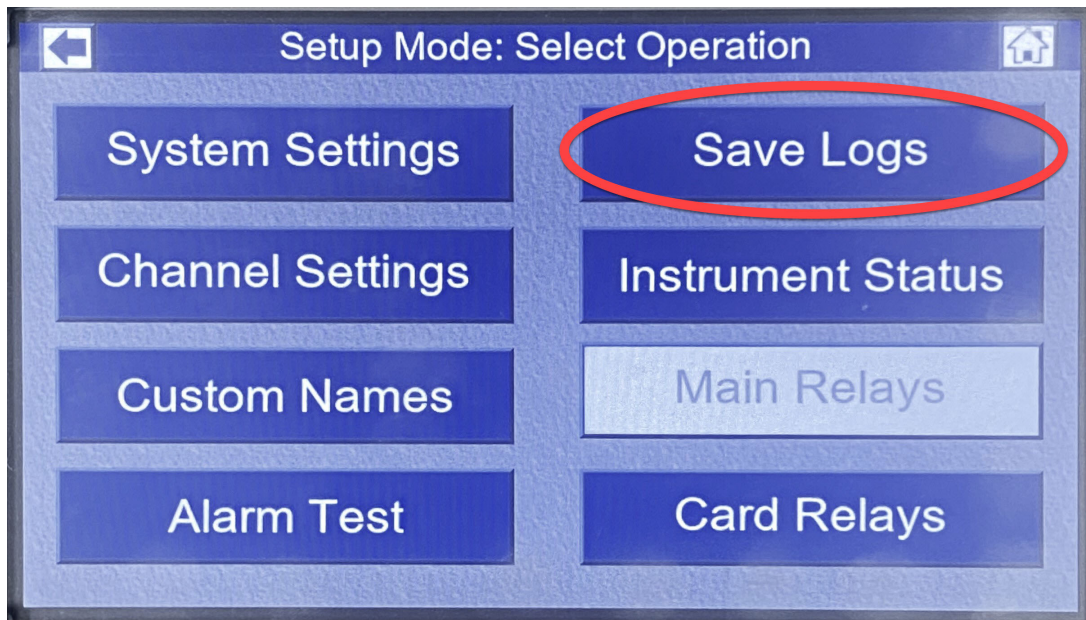
6. A progress bar tracks the data-writing status.

7. The **Cancel** button turns into a **Done** button when the data-writing is finished.
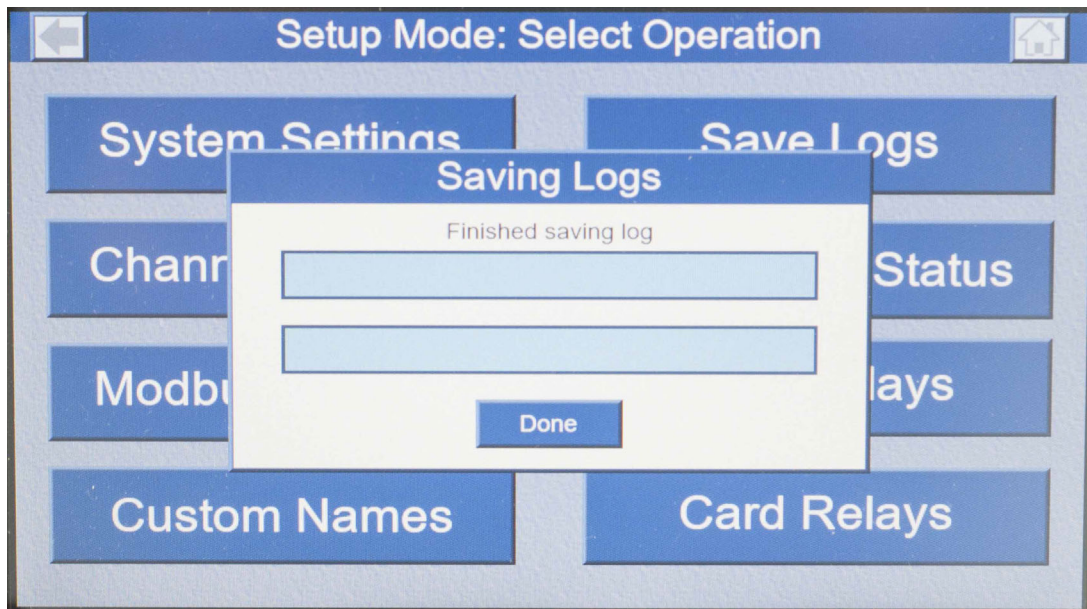
8. Press **Done**.

9. Press the arrow in the upper left corner or the home icon in the upper right corner to return to normal operation.

NOTE: The Beacon 3200 will time out of Setup Mode if a button is not pressed in the number of minutes defined in Setup Mode's System Settings (see page 54).

Installing the Sensor Logs Program

1. Open the Beacon 3200 file package.

2. Double click on the setup file.
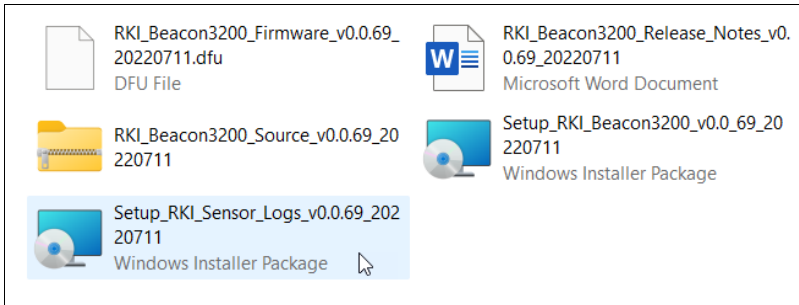
3. The program installation window appears. Follow the on-screen instructions to finish installing the Sensor Logs program.
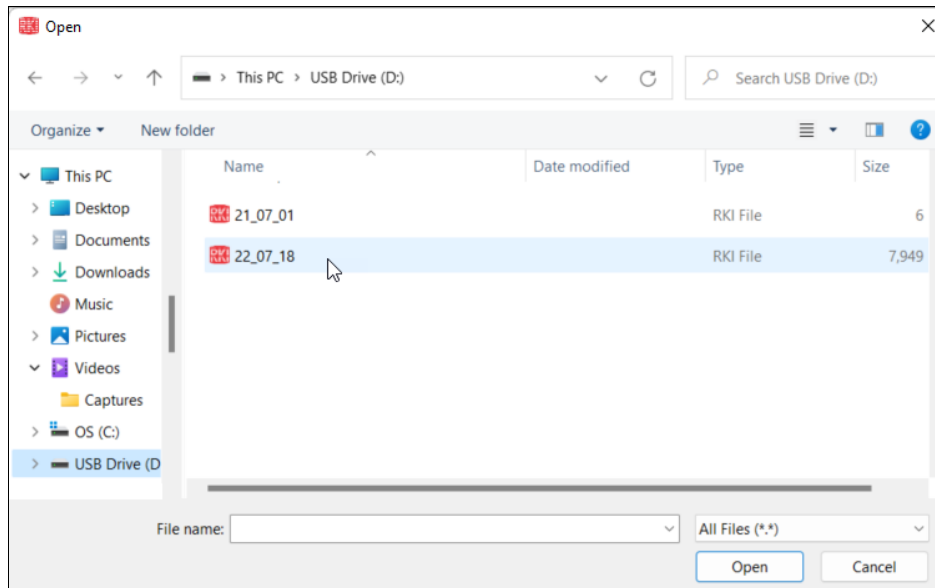
4. Locate **RKI Sensor Logs** and double click the file to launch the program. The default program window appears with all panels empty.
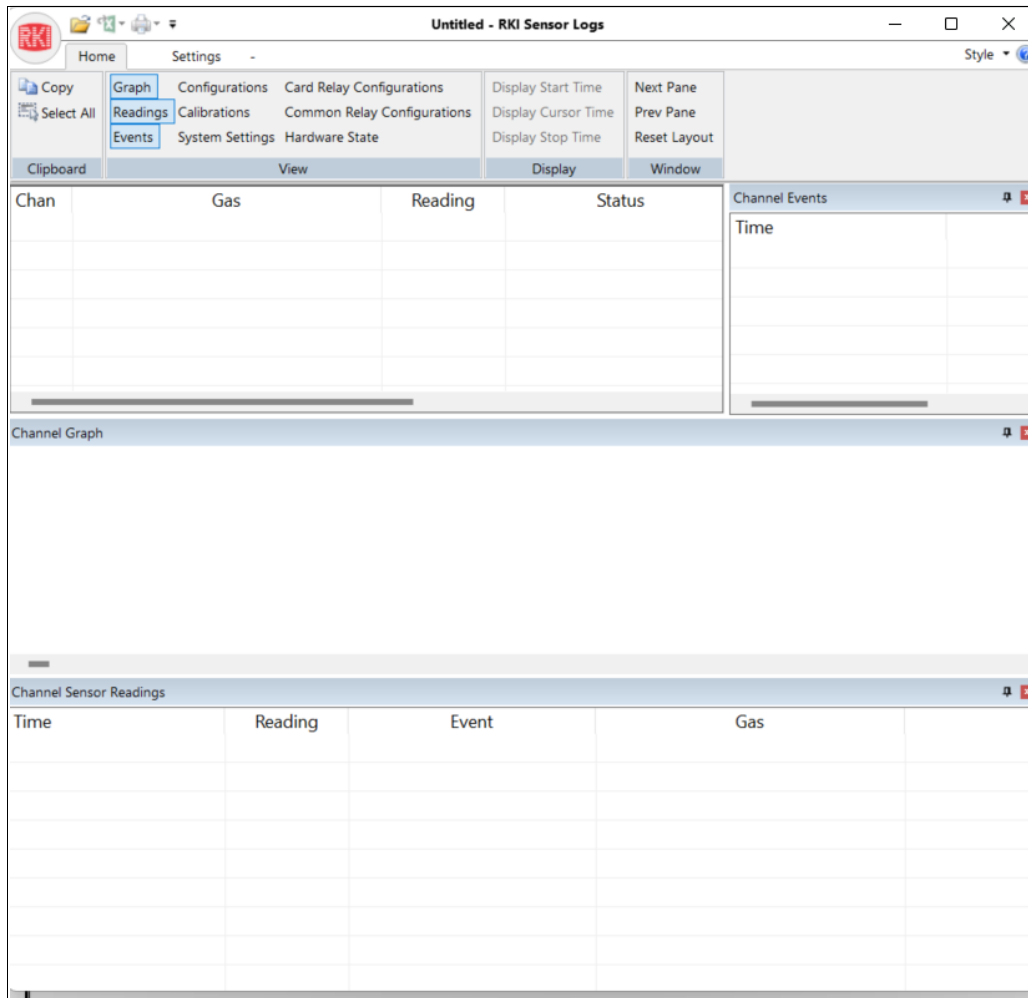
Importing Data into the Sensor Logs Program

In order to view the saved logs from the Beacon 3200, the data must be imported from via USB drive.

1. Insert the USB drive containing the Sensor Log data.

2. Open or return to the RKI Sensors Logs program and click the **Open** folder icon in the top left corner of the Sensor Logs window.
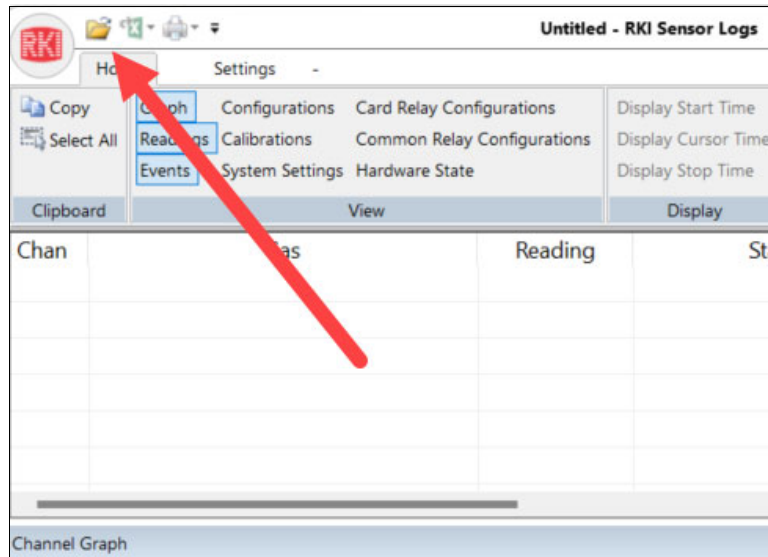
3. A file directory window opens. After navigating to the flash drive, click on the RKI log file to select it.
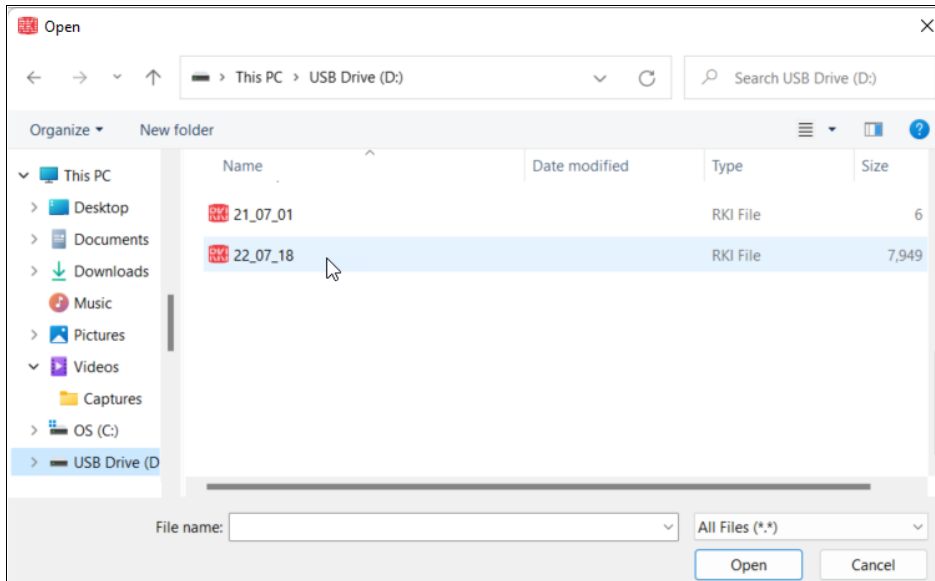
4. The Sensor Logs application loads the log file's data and displays it in the default layout as shown below.
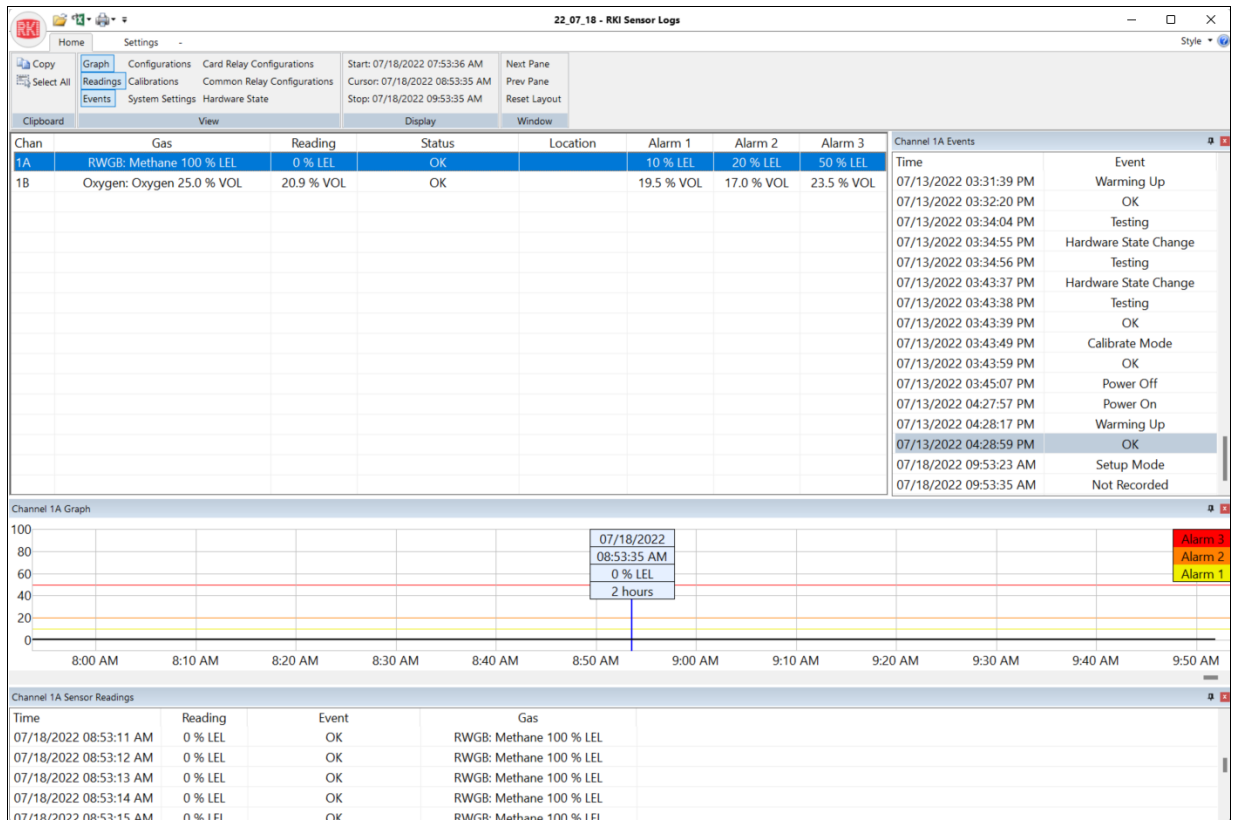
Using the Sensor Logs Program
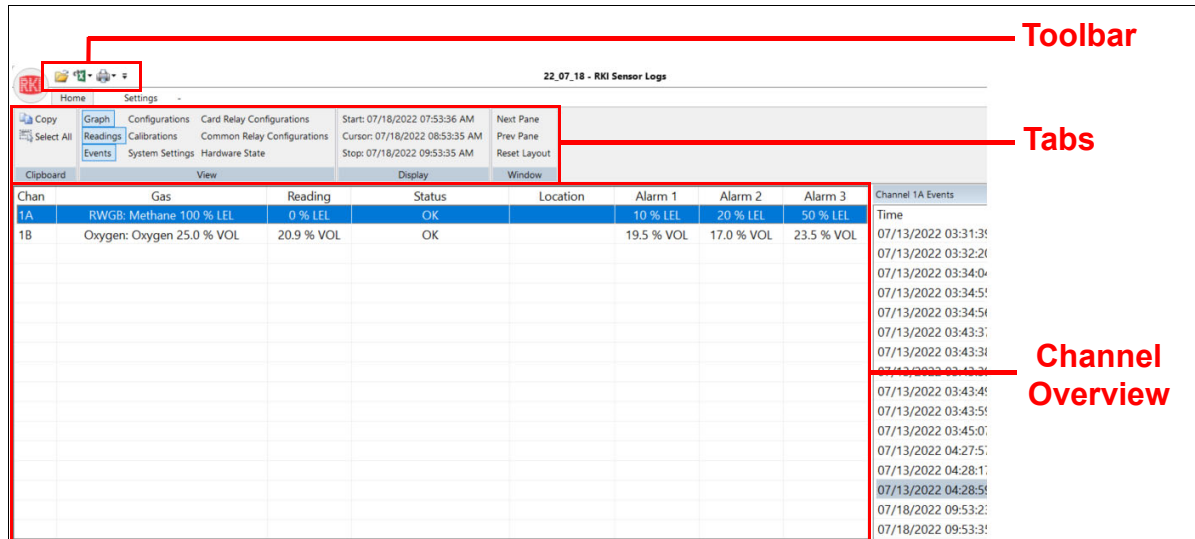
After importing the log file, the Sensor Logs program can be used to view, record, and export data. Within the Channel Overview panel, individual channels can be selected and their data will appear in the other, adjacent panels.

Clipboard Tab

The Clipboard tab is used for selecting all and copying readings to be pasted into other programs or files.

View Types

The View tab allows users to select which panels are displayed.

Graph
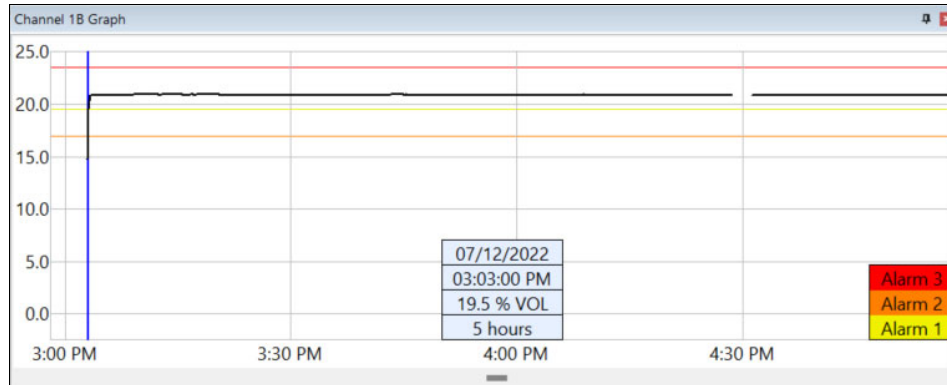
The Graph view presents the sensor log data visually and also compares the readings to the alarm setpoints that were configured during the time of the log. The logged data is mapped out along the black line.

By clicking on different points of the graph, the log box will display that point's date, measurement, and the amount of time that is represented on the graph at one time.

Readings

The Readings view presents the sensor log's date, time, reading, the event type, and target gas at the time of recording.

Events

The Events view presents each sensor log's date, time, and event type at the time of recording.

Configurations

Time	Gas	State	Dead Band	Noise Filter	Zero Correction	Zero Follower	Stro
07/06/2022 03:28:54 PM	RWGB: Methane 100 % LEL	Online	2 % LEL	5 seconds	On	On	Alarm
07/11/2022 11:54:42 AM	4-20: Methane 100 % LEL	Online	2 % LEL	5 seconds			Alarm
07/12/2022 02:54:34 PM	RWGB: Methane 100 % LEL	Online	2 % LEL	5 seconds	On	On	Alarm
07/12/2022 02:55:34 PM	Oxygen: Oxygen 25.0 % VOL	Online	0.5 % VOL	5 seconds	Off	Off	Alarm

The Configurations view presents each channel's target gas, time of log, state of the channel, as well as its current set of parameters at the time of recording.

Calibrations

Channel 1B Calibration						
Time	Install Date	Calibration Date	AutoCal	Min Adjustment	Max Adjustment	LEL Current
07/12/2022 02:56:16 PM	07/12/2022 02:55:29 PM	n/a	0.0 % VOL	0.0 % VOL	0.0 % VOL	n/a
07/12/2022 03:02:21 PM	07/12/2022 02:55:29 PM	n/a	0.0 % VOL	0.0 % VOL	0.0 % VOL	n/a

The Calibrations view presents each calibration performed, the sensor installation date, the most recent calibration, and the results of that calibration.

System Settings

System Settings					
Time	Strobe	Buzzer	Relays	Data Log	Main Relays
07/06/2022 03:28:52 PM	Installed	Can Silence	Normally De-Energized	Overwrite	Common

The System Settings view presents the Beacon 3200's system settings at the time of each recorded log.

Exporting .csv Files

The Sensor Logs program can be used to export Beacon 3200 data to Microsoft Excel for editing.

1. After importing sensor log data, press the Excel icon on the toolbar. A dropdown menu appears with all export options.
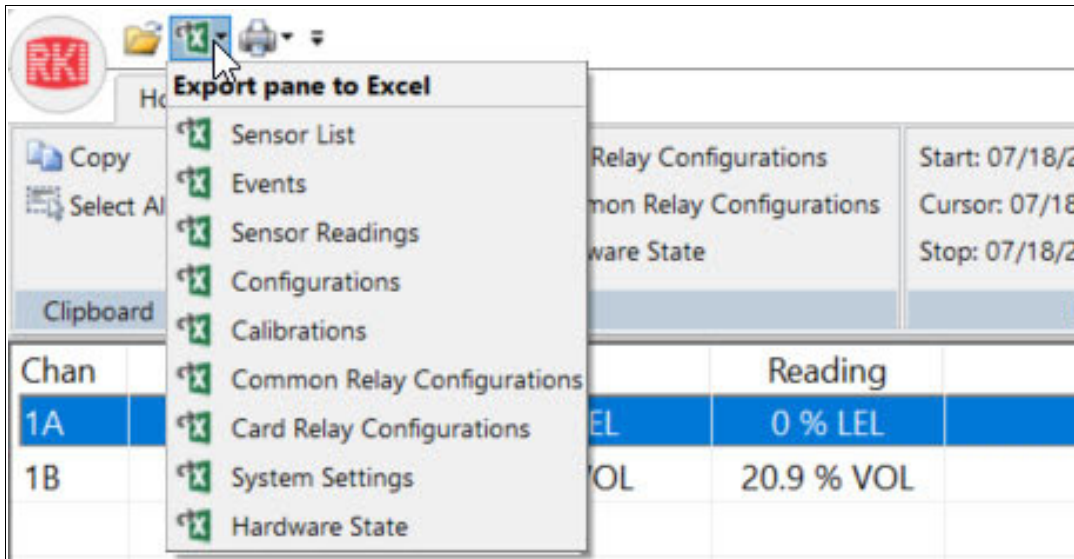
2. Click on the desired view type for export. A file directory window appears.

3. Click **Save**.

4. The Sensor Logs program displays a loading bar for the export. Click **OK** once the export is finished.
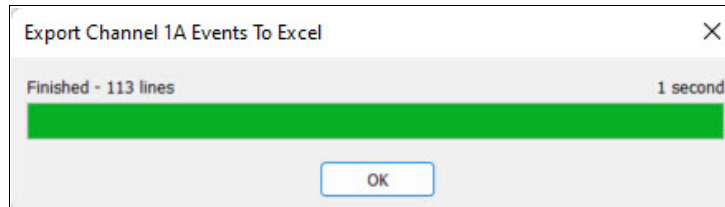
5. The export is complete. The exported data can now be viewed and edited using Microsoft Excel.

Chapter 15: Parts List

Table 23: Parts List

Part No.	Description
18-0107RK	Conduit hub (3/4 NPT)
43-0440RK	Reset switch
43-4170RK	AC fuse, 6A, 250 V, 1/4 x 1 1/4 inch, fast acting
43-4179RK	DC fuse, 10A, 250V, 1/4 x 1/4 inch, fast acting
51-0001-AMB	Strobe, amber, 24 VDC, NEMA 4X
51-0001-BLU	Strobe, blue, 24 VDC, NEMA 4X
51-0001-RED	Strobe, red, 24 VDC, NEMA 4X
51-0096RK	Strobe/horn, 10 - 33 VDC, NEMA 4X
51-0170	Strobe, amber, 12 - 48 VDC, NEMA 4X
51-0171	Strobe, blue, 12 - 48 VDC, NEMA 4X
51-0174	Strobe, red, 12 - 48 VDC, NEMA 4X
52-1016RK	Buzzer
57-0168-01	Sensor module
57-0169-01	Relay module
71-0435	Beacon 3200 Gas Monitor Operator's Manual (this document)
82-6110	SD card, 32 GB

Appendix A: Loading New Firmware

If it becomes necessary to update the firmware in a Beacon 3200, contact RKI Instruments, Inc. for the new firmware file(s).

1. Turn the Beacon 3200 off if it is on.

2. Put the firmware files from RKI Instruments, Inc. onto a USB drive.

3. Plug the USB drive into the USB connector on the bottom of the display PCB's right edge.

4. Turn on the Beacon 3200.

5. The Beacon 3200 will automatically recognize the new files on the USB drive and will automatically update the appropriate PCB(s). The Beacon 3200 will not update the PCB(s) if the USB drive's firmware files are the same or older than what is already installed.

6. When the reprogramming is finished, the Beacon 3200 enters normal operation.

Appendix B: Advanced 4 - 20 mA and LEL Current Settings

CAUTION: *Consult with RKI Instruments, Inc. before adjusting the advanced 4 - 20 mA settings to ensure appropriate.*

The following examples would warrant adjustment of the 4-20mA settings:

- If the Beacon 3200's display doesn't track with the mV output on an amp or the reading on an M2A
- If the 4-20 output doesn't track with the Beacon 3200's display
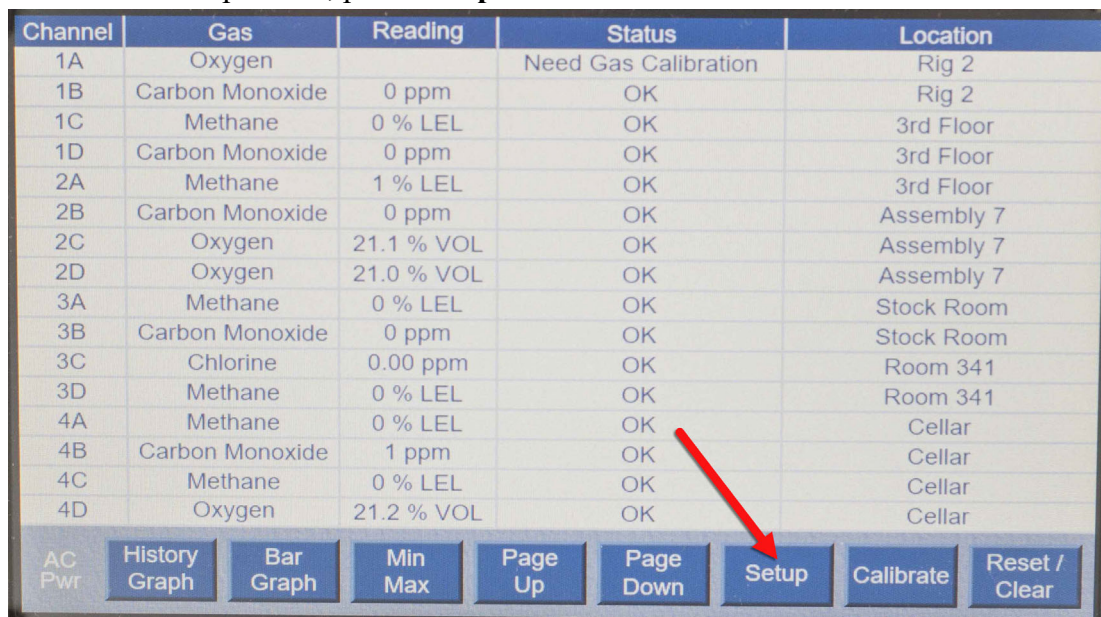
Consult with RKI Instruments, Inc. before changing the sensor current to ensure it is warranted. The following examples would warrant adjustment of the LEL current settings:

- Adding a channel with a sensor that does not use 148 mA
- Replacing an existing channel with a sensor that needs a different sensor current from the one installed
- Changing the calibration to another gas that needs a different sensor current

4-20 mA Inputs Calibration

1. While in normal operation, press **Setup**.

Channel	Gas	Reading	Status	Location
1A	Oxygen		Need Gas Calibration	Rig 2
1B	Carbon Monoxide	0 ppm	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Methane	1 % LEL	OK	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Oxygen	21.1 % VOL	OK	Assembly 7
2D	Oxygen	21.0 % VOL	OK	Assembly 7
3A	Methane	0 % LEL	OK	Stock Room
3B	Carbon Monoxide	0 ppm	OK	Stock Room
3C	Chlorine	0.00 ppm	OK	Room 341
3D	Methane	0 % LEL	OK	Room 341
4A	Methane	0 % LEL	OK	Cellar
4B	Carbon Monoxide	1 ppm	OK	Cellar
4C	Methane	0 % LEL	OK	Cellar
4D	Oxygen	21.2 % VOL	OK	Cellar

| AC Pwr | History Graph | Bar Graph | Min Max | Page Up | Page Down | Setup | Calibrate | Reset / Clear |

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.
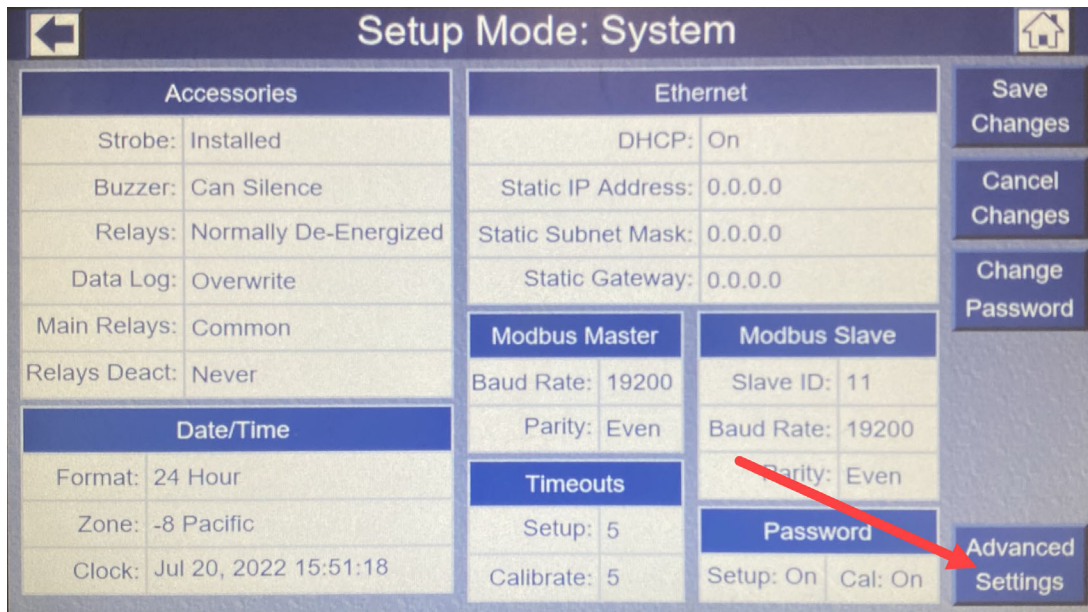
3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   To change the relay deactivation setting, press **Change**.
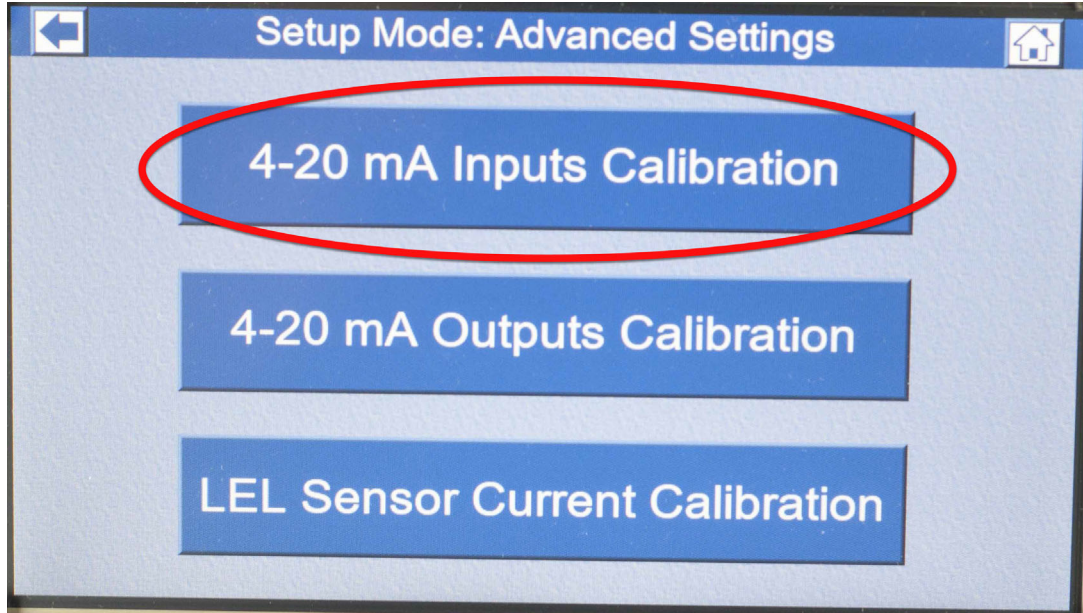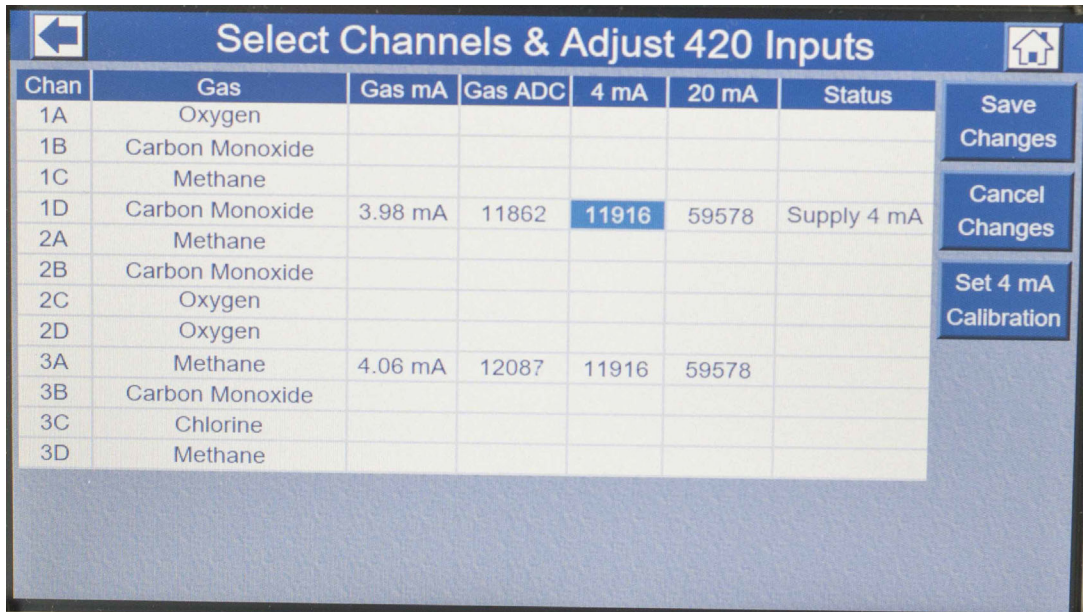
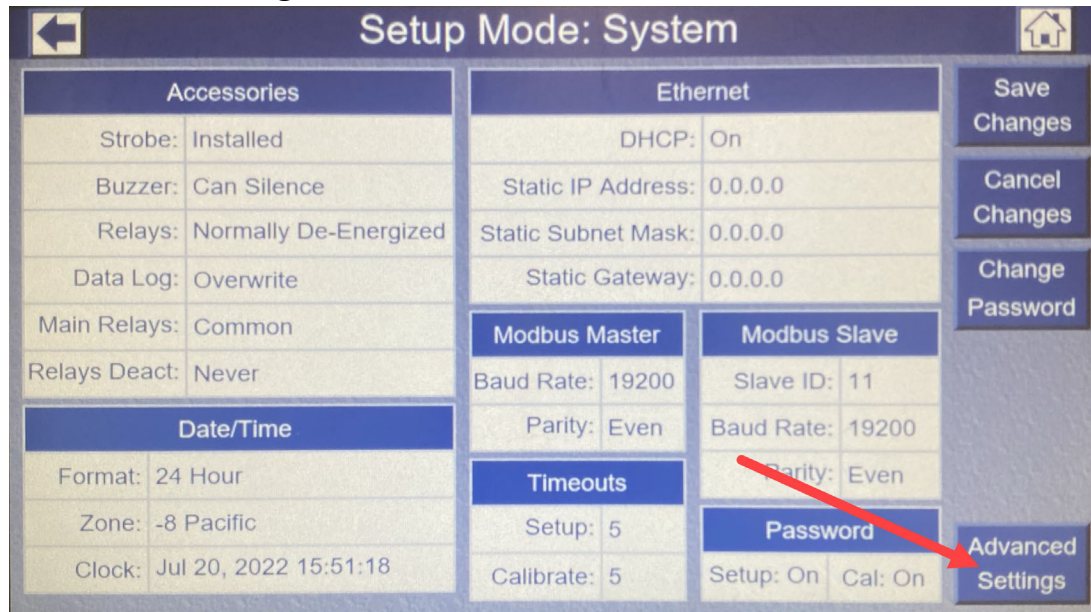4. Press **System Settings**.

5. Press **Advanced Settings**.

6. Press **4-20 mA Inputs Calibration**.

7. Press the **4 mA** box for the channel you are adjusting.

Chan	Gas	Gas mA	Gas ADC	4 mA	20 mA	Status	
1A	Oxygen						Save Changes
1B	Carbon Monoxide						
1C	Methane						
1D	Carbon Monoxide	3.98 mA	11862	11916	59578	Supply 4 mA	Cancel Changes
2A	Methane						
2B	Carbon Monoxide						
2C	Oxygen						Set 4 mA Calibration
2D	Oxygen						
3A	Methane	4.06 mA	12087	11916	59578		
3B	Carbon Monoxide						
3C	Chlorine						
3D	Methane						

8. Use an ammeter to measure the output of the 4-20 mA detector head.

9. Use adjustment pots on the 4-20 mA detector head to adjust the output to **4 mA** (±0.05 mA).

10. Press **Set 4 mA Calibration**.

11. Press the **20 ma** box for the channel you are adjusting.

12. Use adjustment pots on the 4-20 mA detector head to adjust the output to **20 mA** (±0.05 mA).

13. Press **Set 20 mA Calibration**.
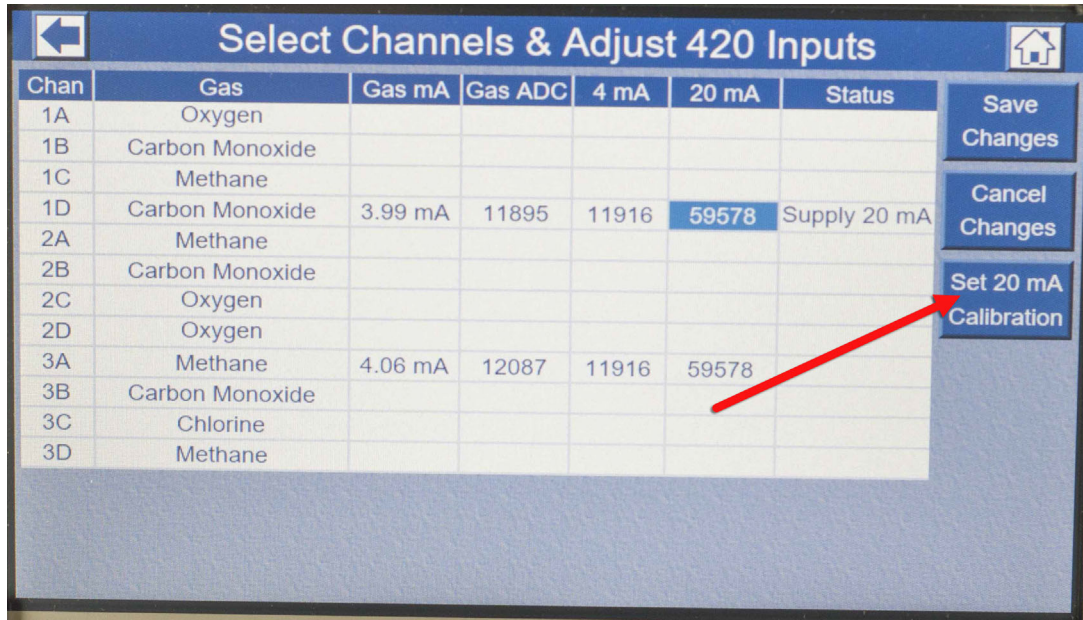
14. Set the adjustment pots back to their zero/span values.

15. Press **Save Changes**.

4-20 mA Outputs Calibration

1. While in normal operation, press **Setup**.

2. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

3. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

   To change the relay deactivation setting, press **Change**.

4. Press **System Settings**.

5. Press **Advanced Settings**.

6. Press **4-20 mA Outputs Calibration**.
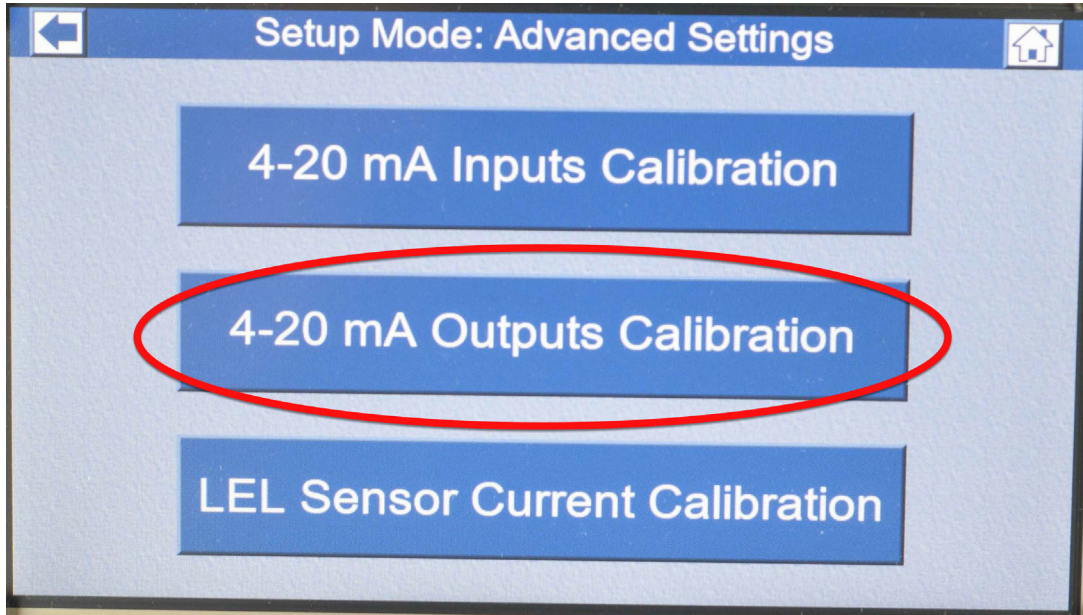
7. Press the **4 mA** box for the channel you are adjusting.

Chan	Gas	Gas mA	Gas DAC	4 mA	20 mA	Status	
1A	Oxygen	3.50 mA	2607	2979	14895		Save Changes
1B	Carbon Monoxide	3.50 mA	2607	2979	14895		
1C	Methane	3.50 mA	2607	2979	14895		Cancel Changes
1D	Carbon Monoxide	3.50 mA	2607	2979	14895		
2A	Methane	3.50 mA	2607	2979	14905		
2B	Carbon Monoxide	4.00 mA	2985	2985	14915	4 mA Output	Adjust Current
2C	Oxygen	3.50 mA	2613	2985	14915		
2D	Oxygen	3.50 mA	2613	2985	14900		
3A	Methane	3.50 mA	2613	2985	14905		
3B	Carbon Monoxide	3.50 mA	2615	2987	14913		
3C	Chlorine	3.50 mA	2613	2985	14900		
3D	Methane	3.50 mA	2615	2987	14915		

8. The detector head's mA output is displayed in the **Gas mA** column on the Beacon 3200's touch screen.

9. Press **Adjust Current**.

Chan	Gas	Gas mA	Gas DAC	4 mA	20 mA	Status
1A	Oxygen	3.50 mA	2607	2979	14895	
1B	Carbon Monoxide	3.50 mA	2607	2979	14895	
1C	Methane	3.50 mA	2607	2979	14895	
1D	Carbon Monoxide	3.50 mA	2607	2979	14895	
2A	Methane	3.50 mA	2607	2979	14905	
2B	Carbon Monoxide	4.00 mA	2985	2985	14915	4 mA Output
2C	Oxygen	3.50 mA	2613	2985	14915	
2D	Oxygen	3.50 mA	2613	2985	14900	
3A	Methane	3.50 mA	2613	2985	14905	
3B	Carbon Monoxide	3.50 mA	2615	2987	14915	
3C	Chlorine	3.50 mA	2613	2985	14900	
3D	Methane	3.50 mA	2615	2987	14915	

10. Type in a number 10 digits higher or lower than the value displayed in the **4 mA** column, depending on which direction the current displayed in the **Gas mA** column needs to go and press **Enter**.

11. Keep adjusting the number in the **4 mA** column until the **Gas mA** column says 4.00 mA (±0.05 mA).

12. Press the **20 mA** box for the channel you are adjusting.

Chan	Gas	Gas mA	Gas DAC	4 mA	20 mA	Status
1A	Oxygen	3.50 mA	2607	2979	14895	
1B	Carbon Monoxide	3.50 mA	2607	2979	14895	
1C	Methane	3.50 mA	2607	2979	14895	
1D	Carbon Monoxide	3.50 mA	2607	2979	14895	
2A	Methane	3.50 mA	2607	2979	14905	
2B	Carbon Monoxide	20.00 mA	14915	2985	14915	20 mA Output
2C	Oxygen	3.50 mA	2613	2985	14915	
2D	Oxygen	3.50 mA	2613	2985	14900	
3A	Methane	3.50 mA	2613	2985	14905	
3B	Carbon Monoxide	3.50 mA	2615	2987	14913	
3C	Chlorine	3.50 mA	2613	2985	14900	
3D	Methane	3.50 mA	2615	2987	14915	

13. Press **Adjust Current**.
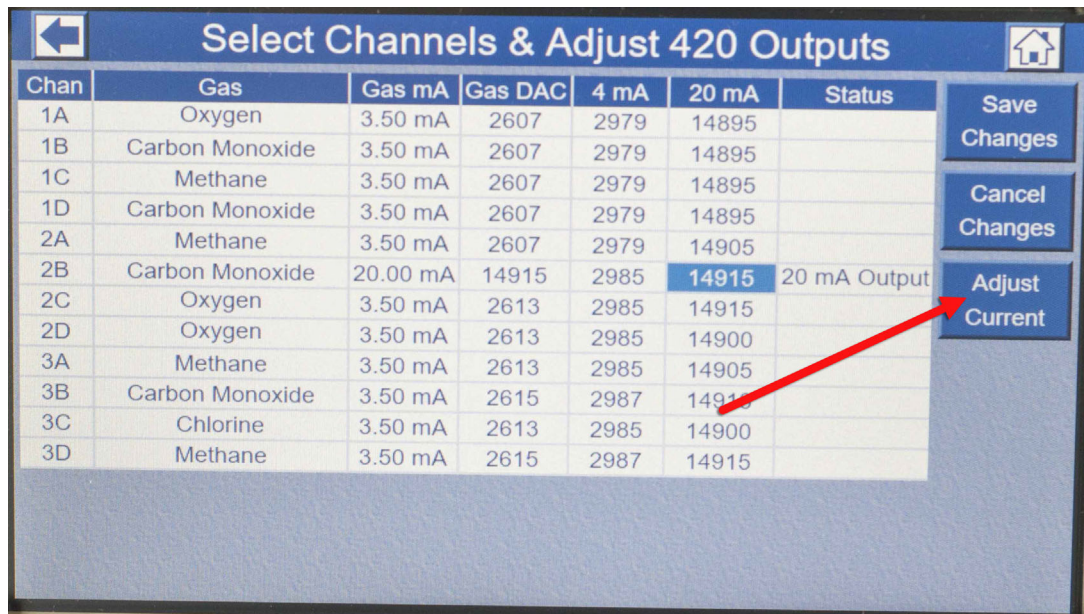
14. Type in a number 10 digits higher or lower than the value displayed in the **20 mA** column, depending on which direction the current displayed in the **Gas mA** column needs to go and press **Enter**.

15. Keep adjusting the number in the **20 mA** column until the **Gas mA** column says 20.00 mA (±0.05 mA).

16. Press **Save Changes**.

LEL Sensor Current Calibration

Different LEL detectors require different current values to operate correctly. Similarly, the detector current on the same LEL detector can be changed to detect other gases. The current provided to direct connect LEL detectors by the Beacon 3200 can be adjusted, as necessary.

A channel set up for methane defaults to a sensor current of 148 mA but some methane sensors need a higher current. A channel set up for hydrogen defaults to a sensor current of 130 mA. Sensor currents for RKI direct connect LEL detectors are shown below.

LEL Detector P/N	LEL Sensor Current
61-0140RK	• Standard sensor: 148 mA • H2 calibration: 130 mA • others defined per application
NC-6205	115 mA
HW-6211	295 mA
HW-6213	385 mA

1. Set all of the active channels up in Setup Mode's Channel Settings (see page 61).
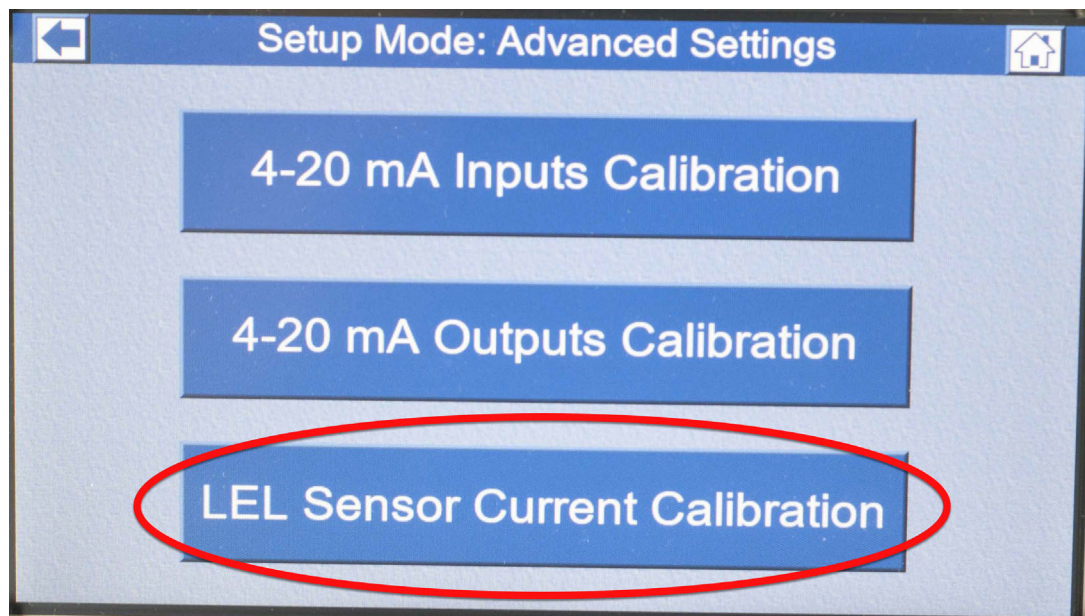
2. While in normal operation, press **Setup**.

3. If the password is enabled for Setup Mode, use the keypad to enter the password. The default password is **1234**.

4. A pop-up message will indicate whether the relays remain active or deactivate upon entering Setup Mode. Press **OK** to proceed to Setup Mode.

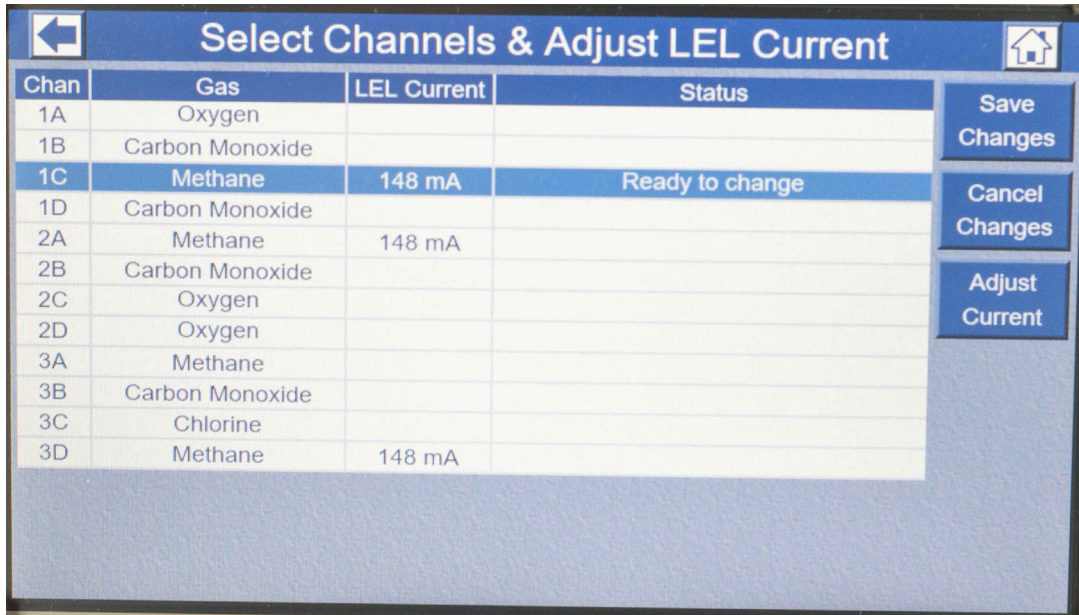   To change the relay deactivation setting, press **Change**.

5. Press **System Settings**.

6. Press **Advanced Settings**.
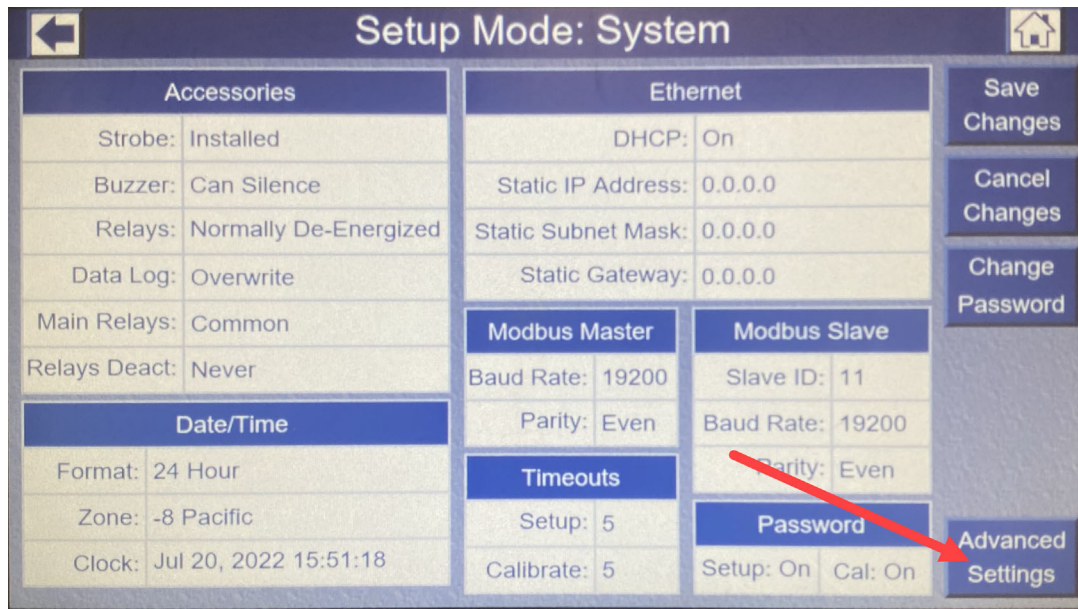
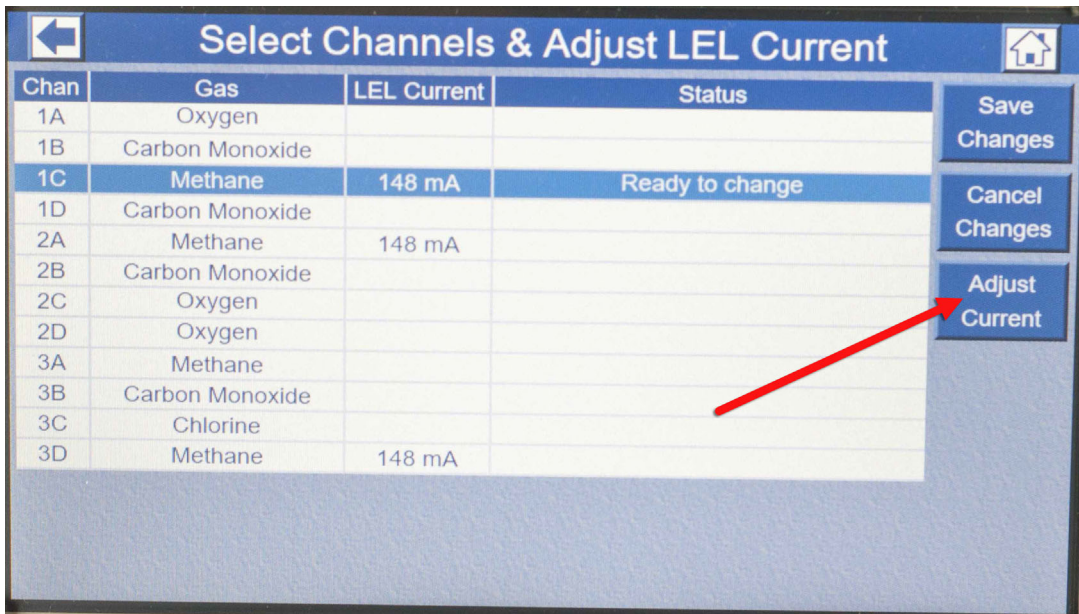
7. Press **LEL Sensor Current Calibration**.

8. Press the line of the channel whose LEL sensor current you want to adjust.

9. Press **Adjust Current**.

10. Type in the desired LEL sensor current and press **Enter**.

11. Press **Save Changes**.