INSTRUMENTS

Beacon 3200 Gas Monitor
Operator's Manual

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www.rkiinstruments.com

Product Warranty

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

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

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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. Warranty covers parts and labor performed at RKI Instruments, Inc. only, and does not cover field labor or shipment of parts back to RKI.

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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 and Table 3 list 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 3 lists the ranges and default alarm setpoints for all preset gases.

Table 2: Instrument Specifications

Input Power	VAC • 100V, 60Hz, 2.5A • 115V, 60Hz, 2.2A • 220V, 60Hz, 1.1A **or** VDC • 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)

Environmental Conditions	• For indoor or outdoor locations (Type 4X) • 2000m max. altitude • -40°C to 40°C max (-4°F to 104°F) 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 ***NOTE:*** *The Beacon 3200 cannot be mounted in direct sunlight.*
Safety/Regulatory	QPS
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)

Table 3: Beacon 3200 Default Alarm Setpoints

Target Gas	Range	Alarm 1	Alarm 2	Alarm 3
Acetone	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Ammonia	0 - 75.0 ppm	12.0 ppm	25.0 ppm	50.0 ppm
Arsine	0 - 0.20 ppm	0.05 ppm	0.10 ppm	0.15 ppm
Arsine	0 - 1.50 ppm	0.20 ppm	0.50 ppm	1.00 ppm
Carbon Dioxide	0 - 100% vol.	100% vol.	100% vol.	100% vol.

Target Gas	Range	Alarm 1	Alarm 2	Alarm 3
Carbon Dioxide	0 - 5.00% vol.	0.50% vol.	3.00% vol.	5.00% vol.
Carbon Dioxide	0 - 50.0% vol.	50.0% vol.	50.0% vol.	50.0% vol.
Carbon Dioxide	0 - 5000 ppm	2500 ppm	5000 ppm	5000 ppm
Carbon Monoxide	0 - 300 ppm	25 ppm	50 ppm	100 ppm
Chlorine	0 - 10.0 ppm	1.0 ppm	3.0 ppm	5.0 ppm
Chlorine	0 - 3.00 ppm	0.50 ppm	1.00 ppm	2.00 ppm
Chlorine Dioxide	0 - 1.00 ppm	0.10 ppm	0.30 ppm	0.30 ppm
Ethanol	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Hexane	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Hydrocarbons	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Hydrogen	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Hydrogen Cyanide	0 - 15.0 ppm	5.0 ppm	10.0 ppm	15.0 ppm
Hydrogen Sulfide	0 - 100 ppm	10 ppm	50 ppm	75 ppm
Isobutane	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Isopropanol	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Methane	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Methanol	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Nitric Oxide	0 - 100 ppm	25 ppm	50 ppm	100 ppm
Nitrogen Dioxide	0 - 15.0 ppm	5.0 ppm	10.0 ppm	10.0 ppm
Oxygen	0 - 25.0% vol.	19.5% vol.	17.0% vol.	23.5% vol.
Pentane	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Phosphine	0 - 1.00 ppm	0.10 ppm	0.30 ppm	0.60 ppm
Propane	0 - 100% LEL	10% LEL	20% LEL	50% LEL
Silane	0 - 15.0 ppm	1.5 ppm	3.0 ppm	7.0 ppm
Styrene	0 - 100% LEL	10% LEL	20% LEL	50% LEL

Target Gas	Range	Alarm 1	Alarm 2	Alarm 3
Sulfur Dioxide	0 - 10.0 ppm	1.00 ppm	2.00 ppm	5.00 ppm
Sulfur Dioxide	0 - 6.00 ppm	1.00 ppm	2.00 ppm	6.00 ppm

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.

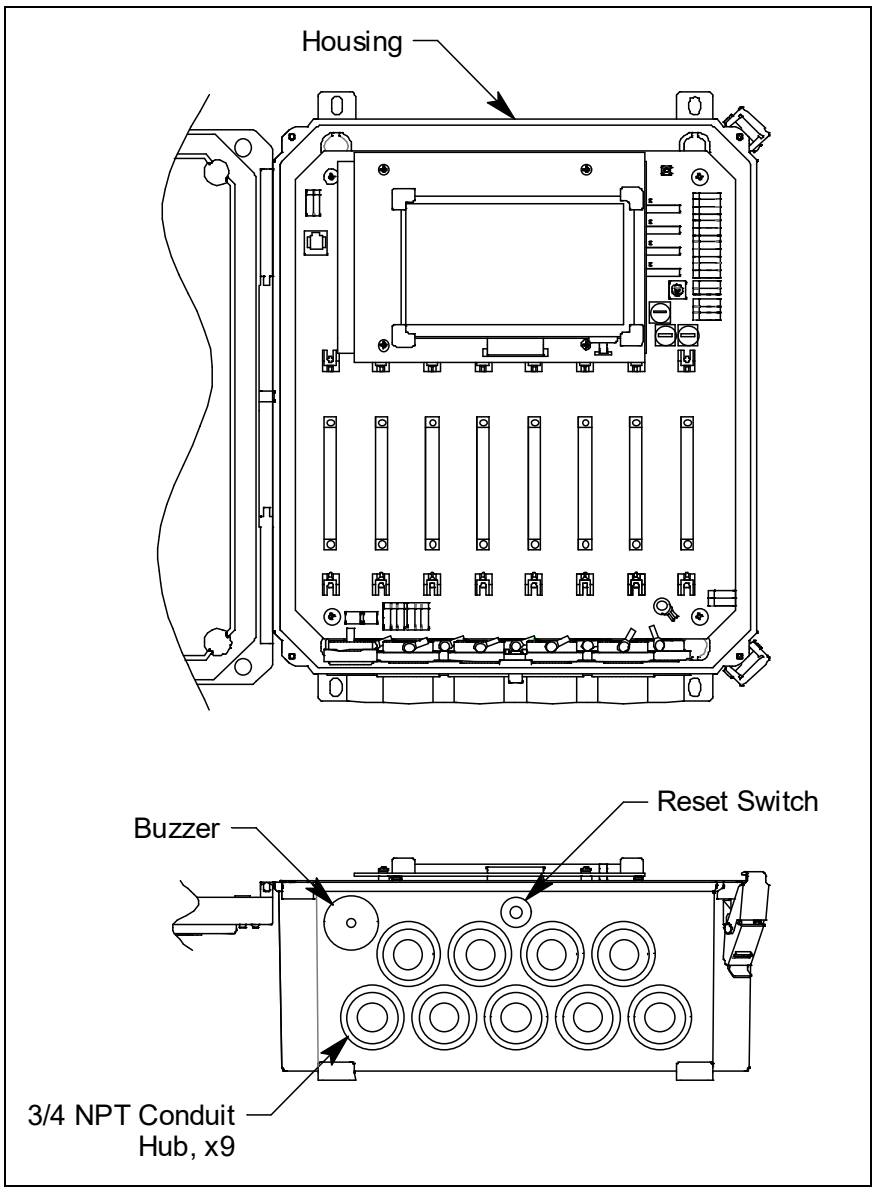


Figure 1: External Component Location

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. Refer to the parts list on page 156 when ordering conduit hub plugs.

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

NOTE: You can set each channel for latched or self-resetting alarms in Setup Mode's Channel Settings (see page 72).

- 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 62) 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 75)
- Silences the buzzer during a fail condition if the buzzer silence parameter in Setup Mode's System Settings (see page 62) 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.

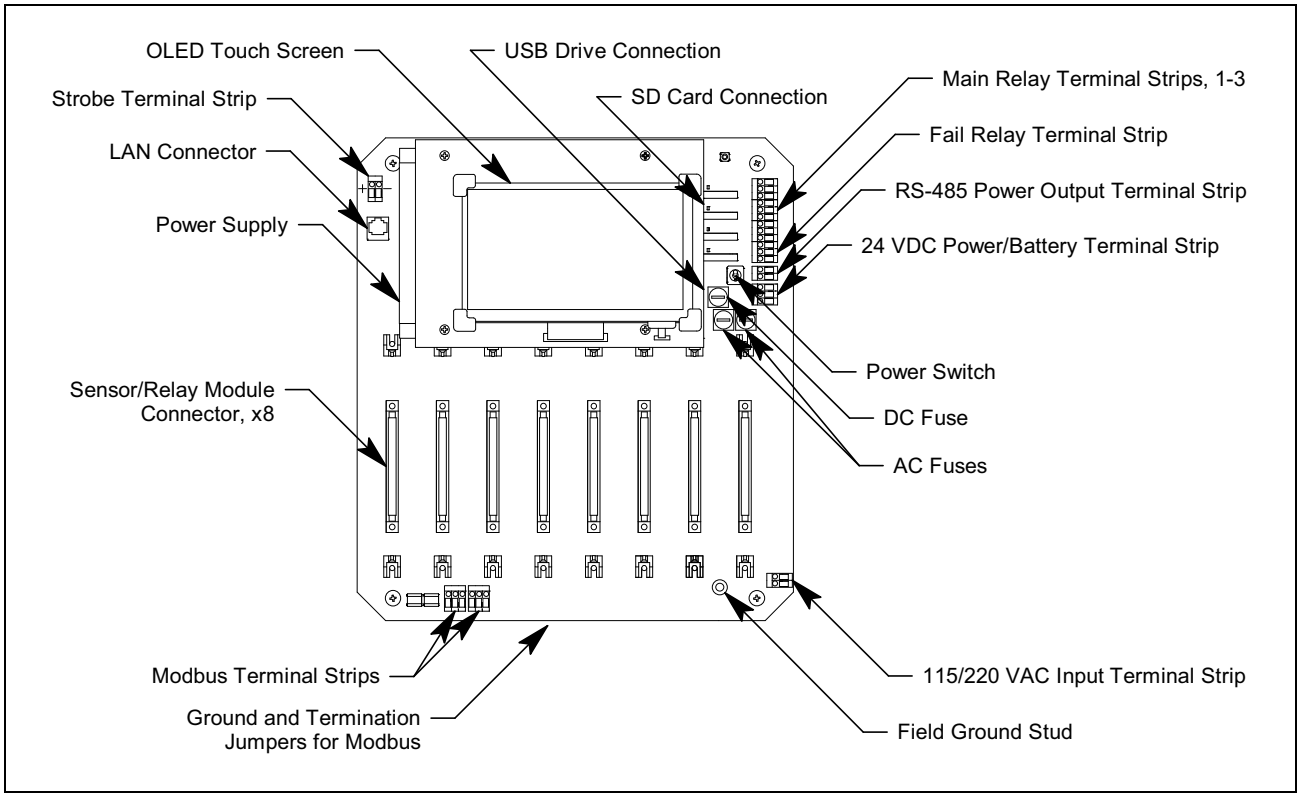


Figure 2: Internal Component Location

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 4: 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
Min/Max	Shows each channel's min/max spans from the most recent calibration (if available)
Page Up	Scrolls up a page if active channels take up more than one screen

Table 4: Beacon 3200 Control Button Functions

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 157 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 62).

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 17 for more information.

Table 5: 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 6: 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 27 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.*

LAN Connector

The LAN connector 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.

NOTE: Each relay on the relay module has an associated red LED that will light up when the relay is energized.

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 32 and page 36 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 72).

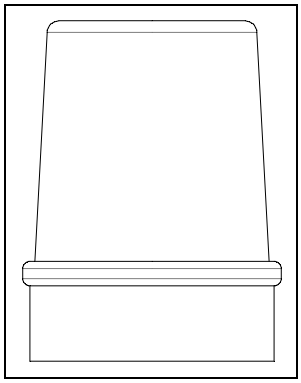


Figure 3: 51-0001-XX Type Alarm Strobe

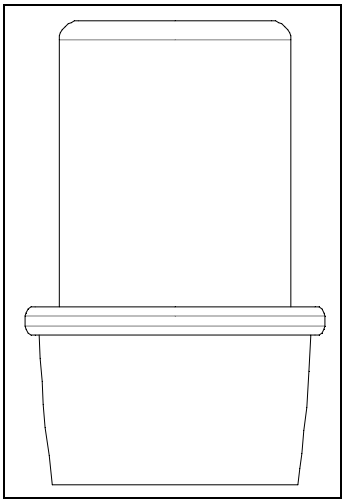


Figure 4: 51-017X Type Alarm Strobe

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 72).

NOTE: See Chapter 3: Installation and Start Up for complete Beacon 3200 installation instructions.

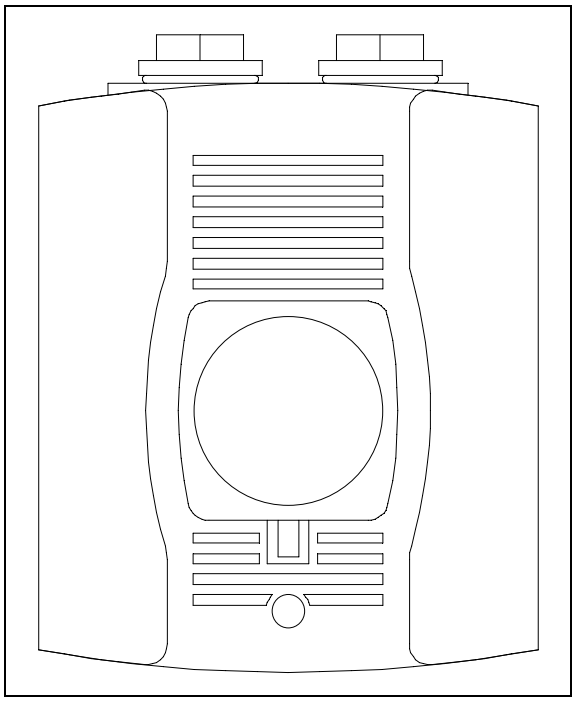


Figure 5: 51-0096RK Horn/Strobe

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.***

NOTE: The Beacon 3200 cannot be mounted in direct sunlight.

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.

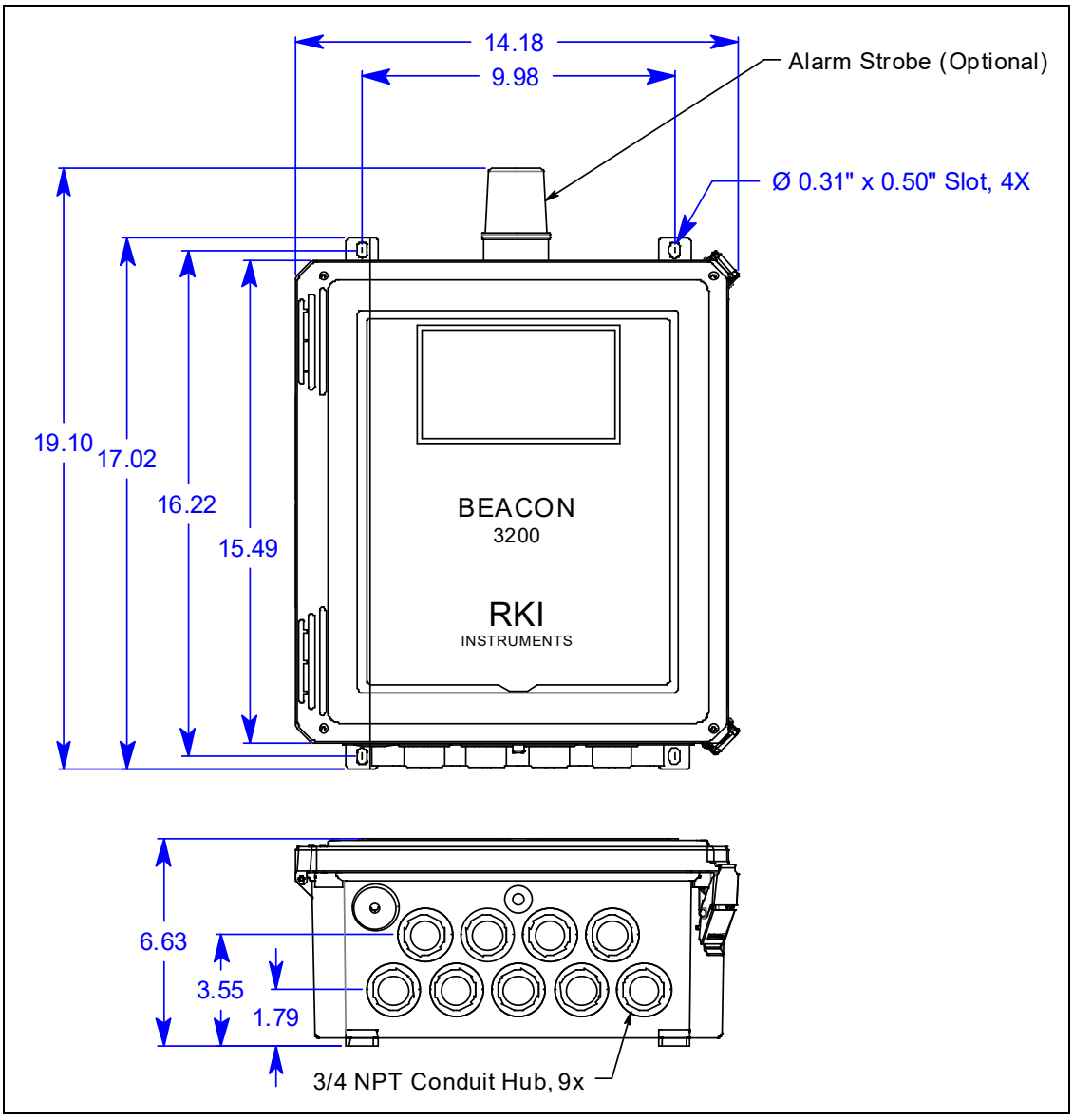


Figure 6: Outline and Mounting Dimensions with 51-0001 Series Alarm Strobe Installed

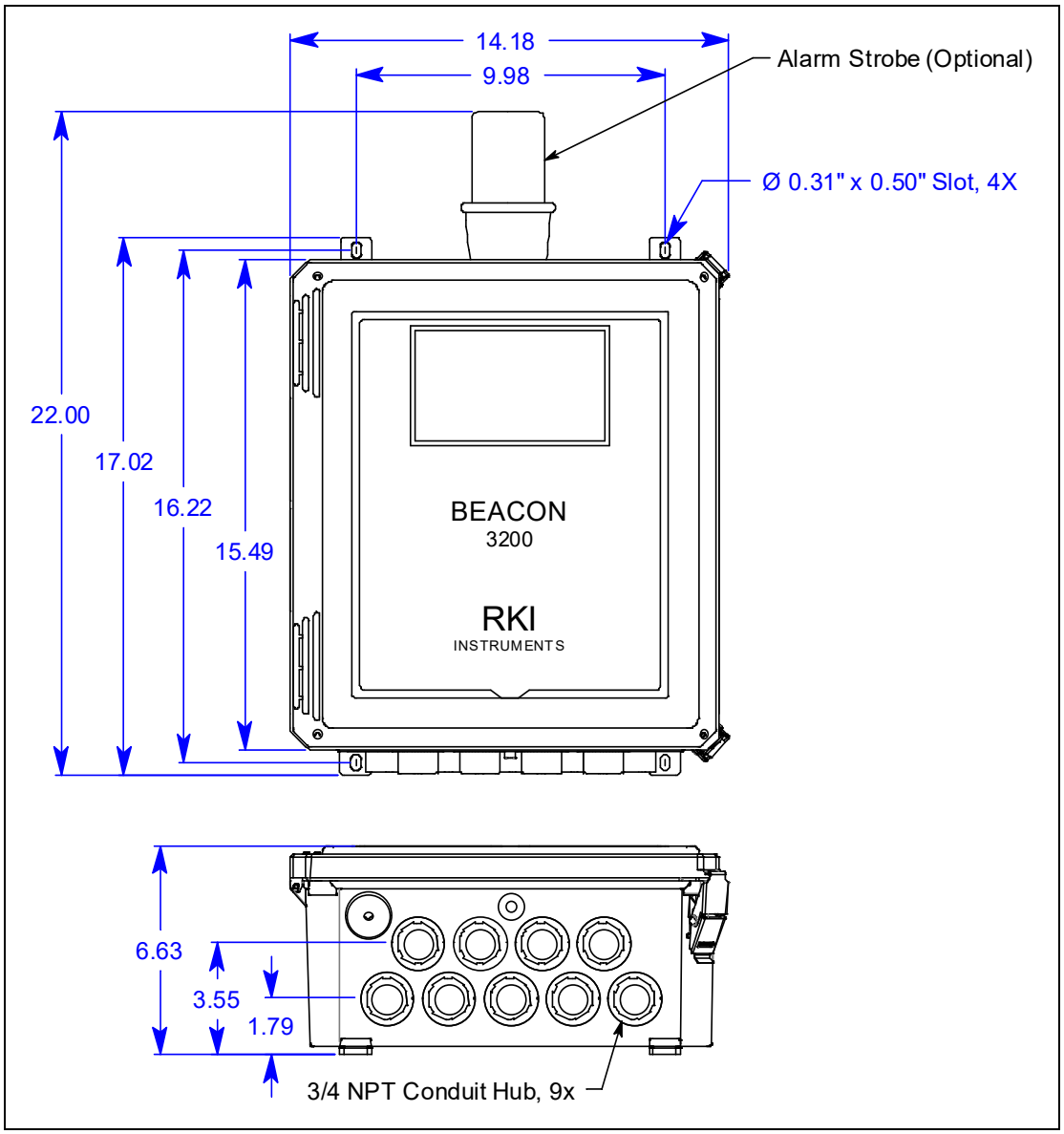


Figure 7: Outline and Mounting Dimensions with 51-0170 Series Alarm Strobe Installed

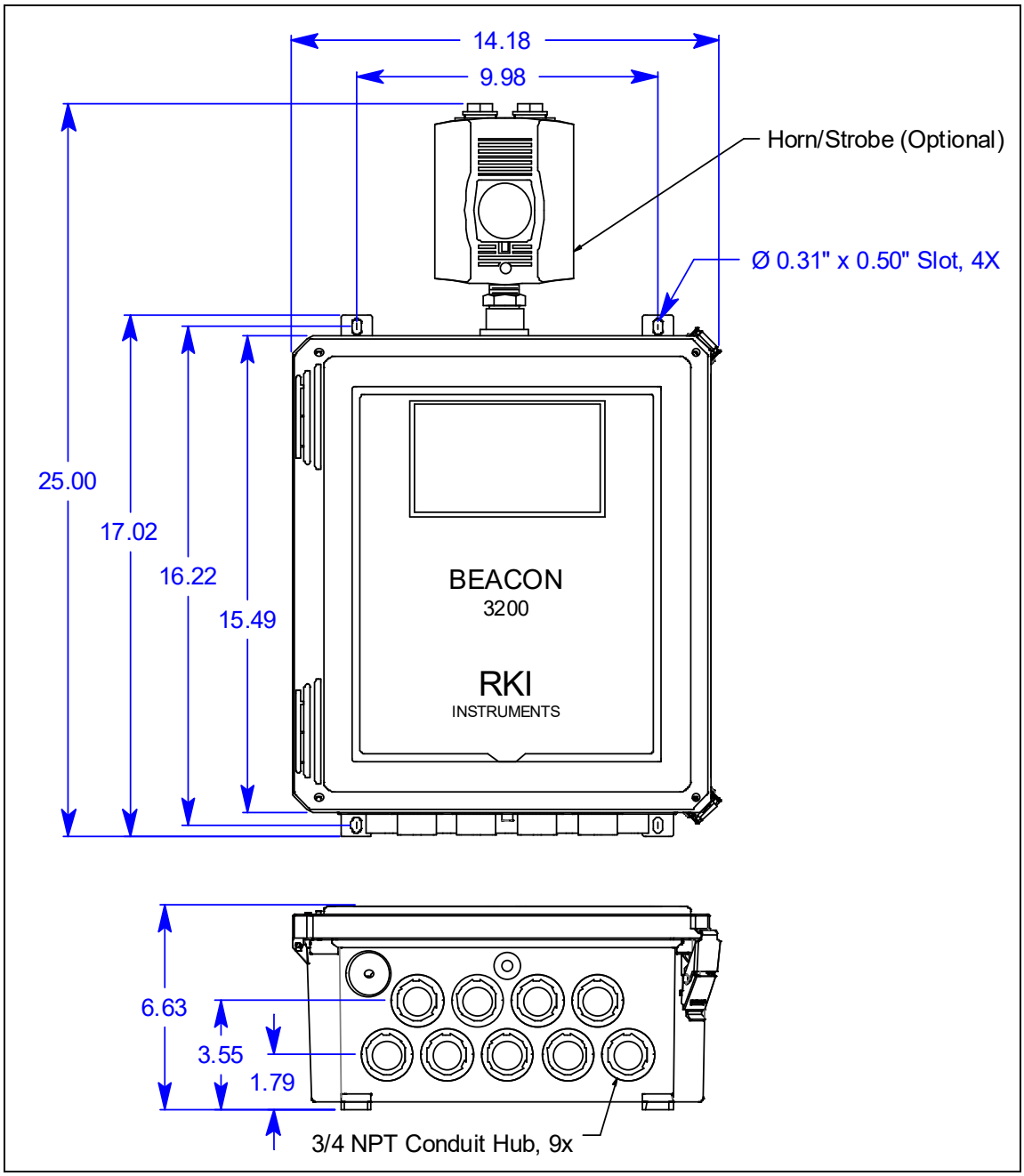


Figure 8: Outline and Mounting Dimensions with Horn/Strobe Installed

Field Installation of 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.*

If an instrument does not have a factory installed strobe or horn/strobe, a horn/strobe may be field installed separately from an instrument and wired to the instrument.

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 most 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 most conduit hub.

5. Connect the wires to the strobe terminal strip in the upper left corner of the main PCB as shown in the figure below.

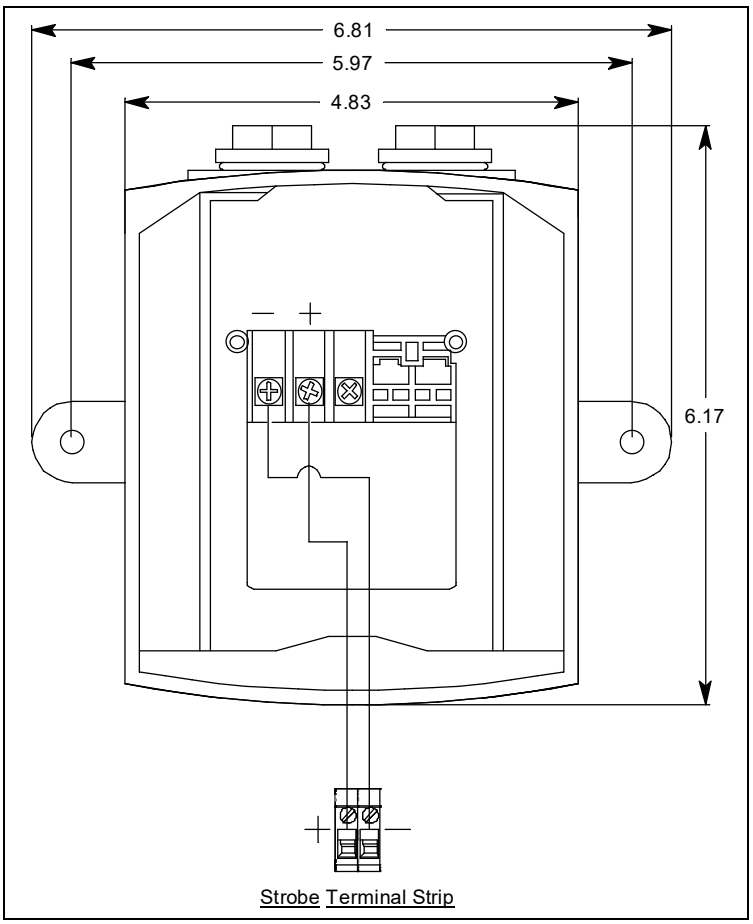


Figure 9: Horn/Strobe Wiring and Dimensions

Factory Wiring

The Beacon 3200's buzzer, reset switch, and optional strobe or horn/strobe are factory wired as shown below in Figure 10.

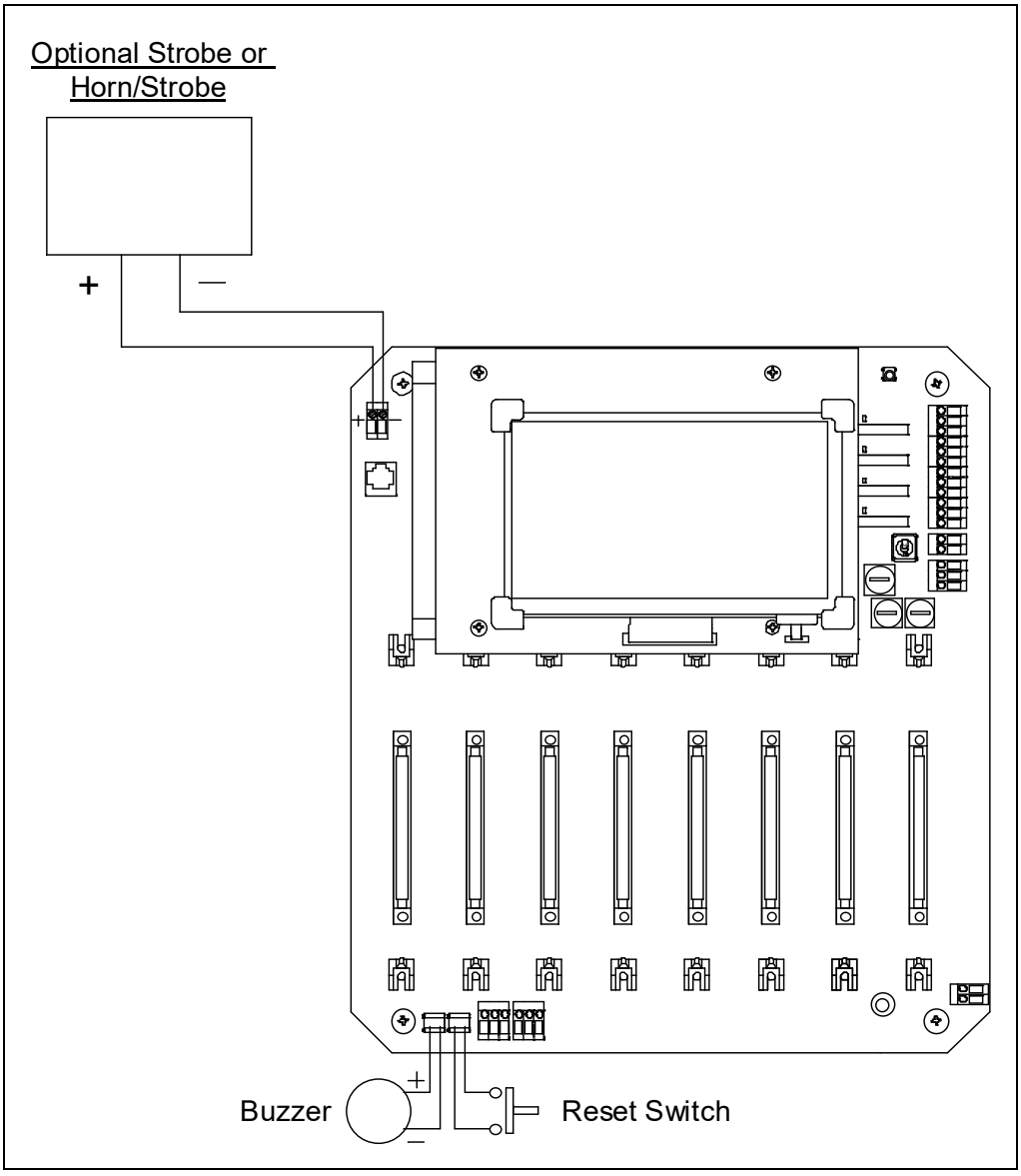


Figure 10: Factory Wiring Diagram

Wiring to a Power Source

This section describes routing wire to the Beacon 3200, connecting it to an AC power source, a 24 VDC power supply, and a backup battery. This section also covers procedures for wiring into a Modbus system (with the Beacon 3200 as a master or slave device) and wiring to main/fail relays.

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.

Routing Wiring Into the Beacon 3200 Housing

Wiring must 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.

Do not drill into the Beacon 3200 housing for any reason. Drilling the Beacon 3200 housing and routing wiring through holes not factory drilled will void the warranty 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”.

NOTE: Power for signaling devices should come from a source that is separate from the Beacon 3200’s power source.

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 10-20 A. For 220 VAC connection, the switch or circuit breaker must be rated to 220 VAC, 50/60 Hz, and 10-20 A.

Perform the following procedure to connect the AC power source to the Beacon 3200.

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

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 13). 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.*

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.

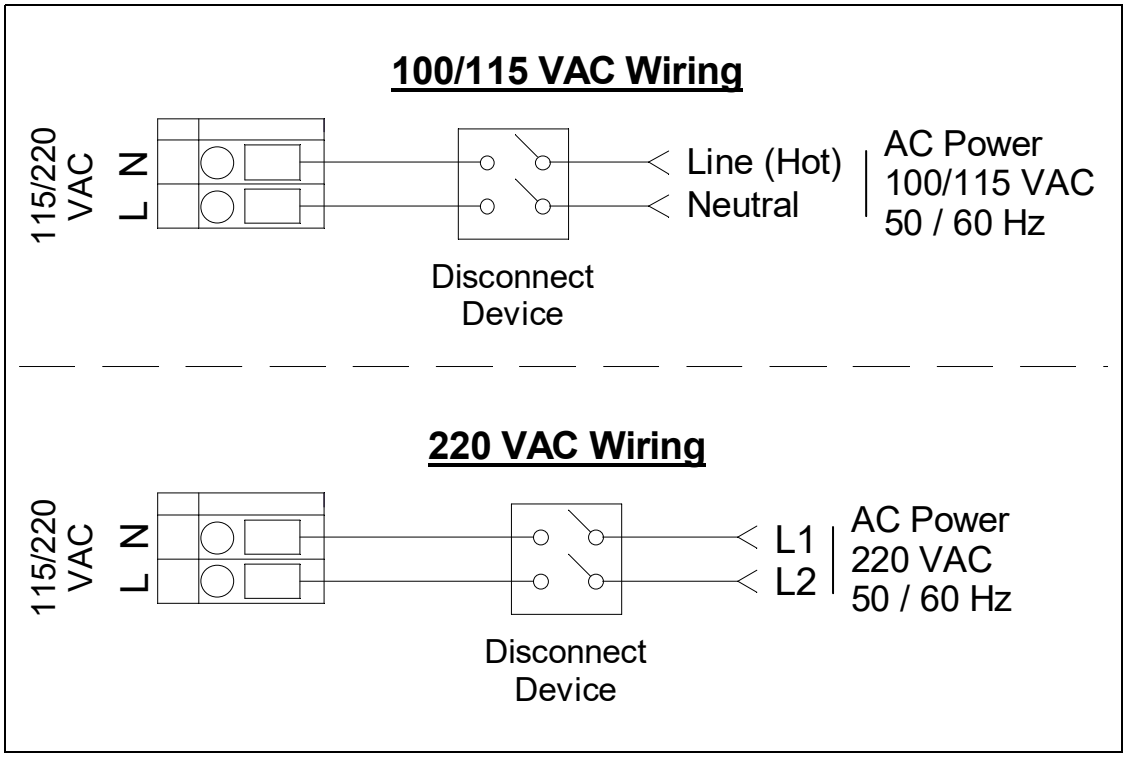


Figure 11: AC Power Wiring

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 13. 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.***

NOTE: Power for signaling devices should come from a source that is separate from the Beacon 3200's power source.

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 13). 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.

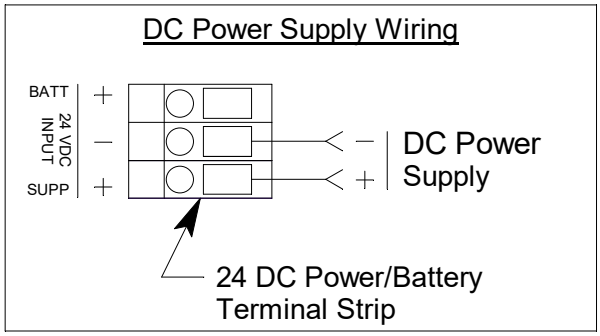


Figure 12: DC Power Supply Wiring

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.***

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 13). 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.

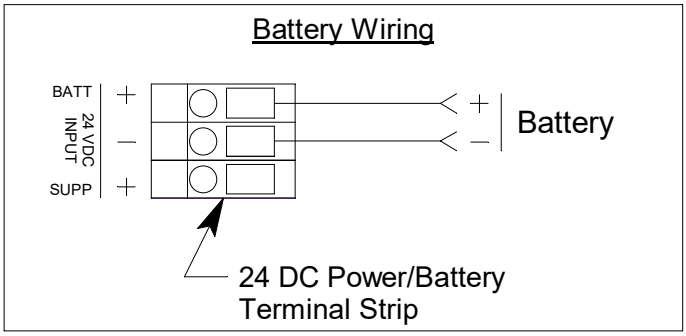


Figure 13: Backup Battery Wiring

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 59 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.

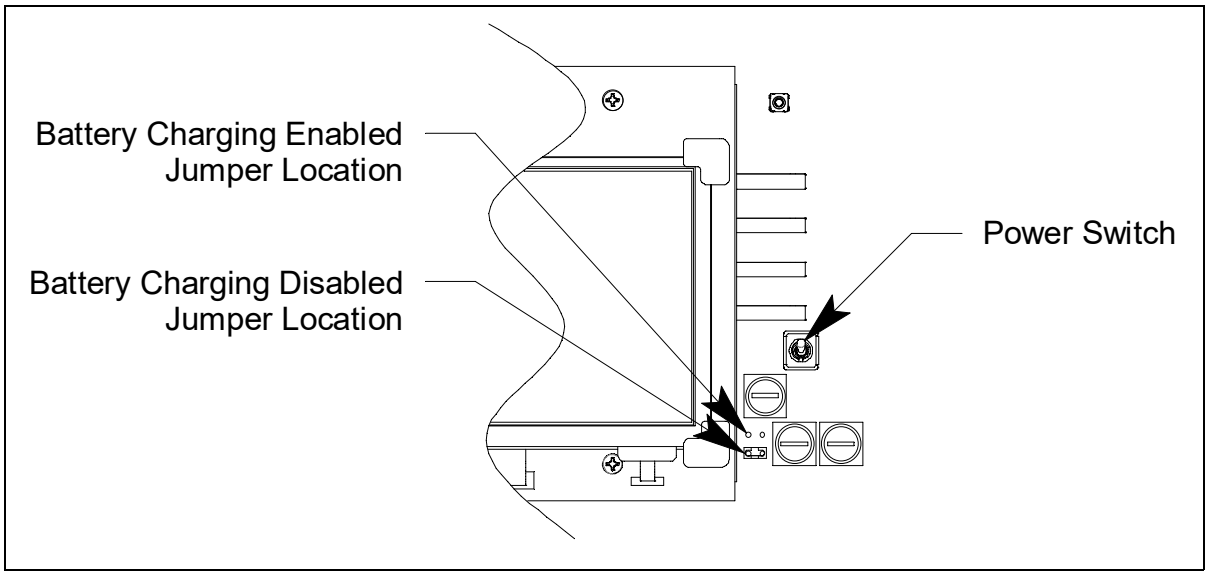


Figure 14: Battery Charging Jumper Locations

RS-485 Modbus Wiring: Connecting Slave Devices to the Beacon 3200

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

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 Modbus detectors (M2As, VOC Pros, T3As, or some combination of these) connected together without the need for a repeater. Figure 16 and Figure 17 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 7: Modbus Terminal Signals

Modbus Terminal Label (M2A)	Modbus Terminal Label (VOC Pro, T3A)	Modbus Signal Name
A	B	TX/RX +
B	A	TX/RX -
C	GND	Common

1. Connect the slave device(s) to the Beacon 3200 RS-485 Master terminals in the lower left corner of the main PCB and to power as shown in Figure 16 (for M2A) and Figure 17 (T3A/ VOC Pro).

   The Beacon 3200's RS-485 Modbus Power Output is shown powering the slaves in Figures 16 and 17, but a user supplied power supply may be used instead. See the M2A, T3A, or VOC Pro manuals for the detector head power requirements.

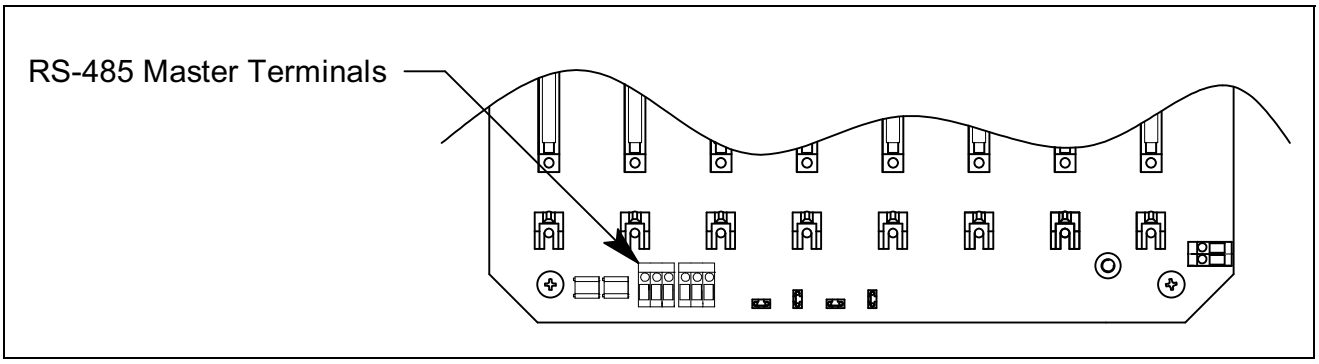
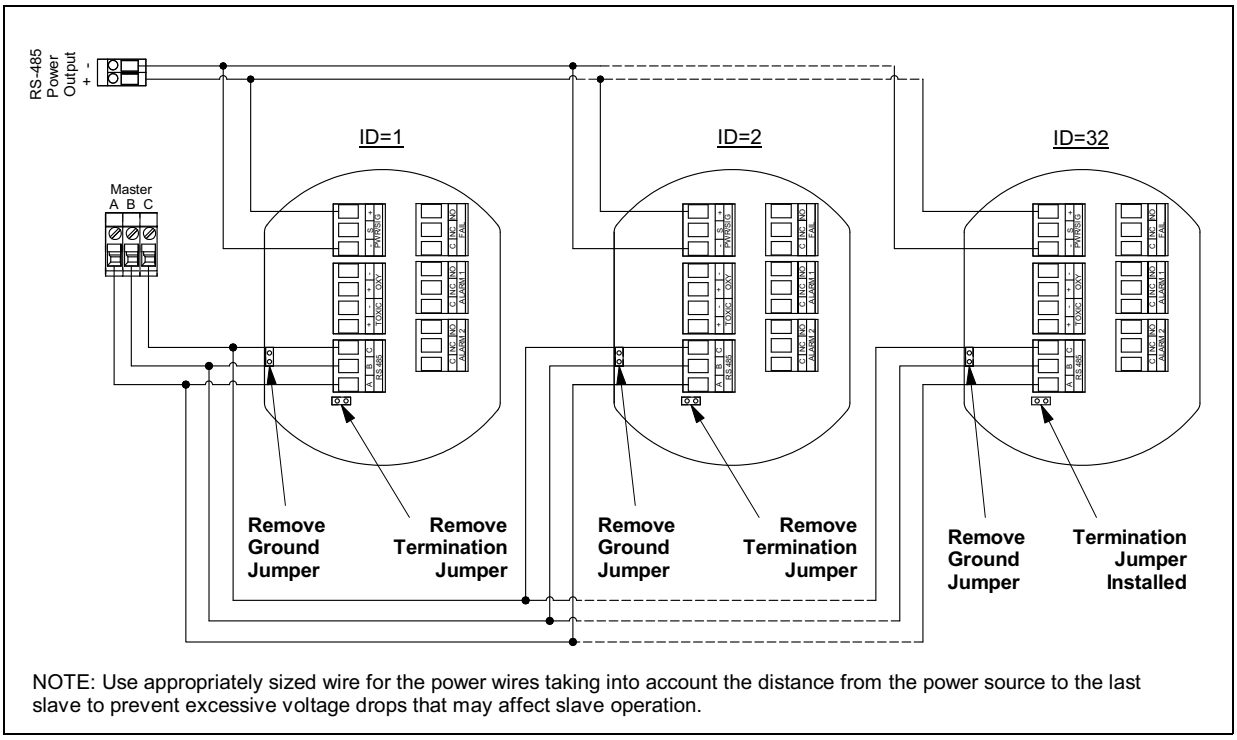
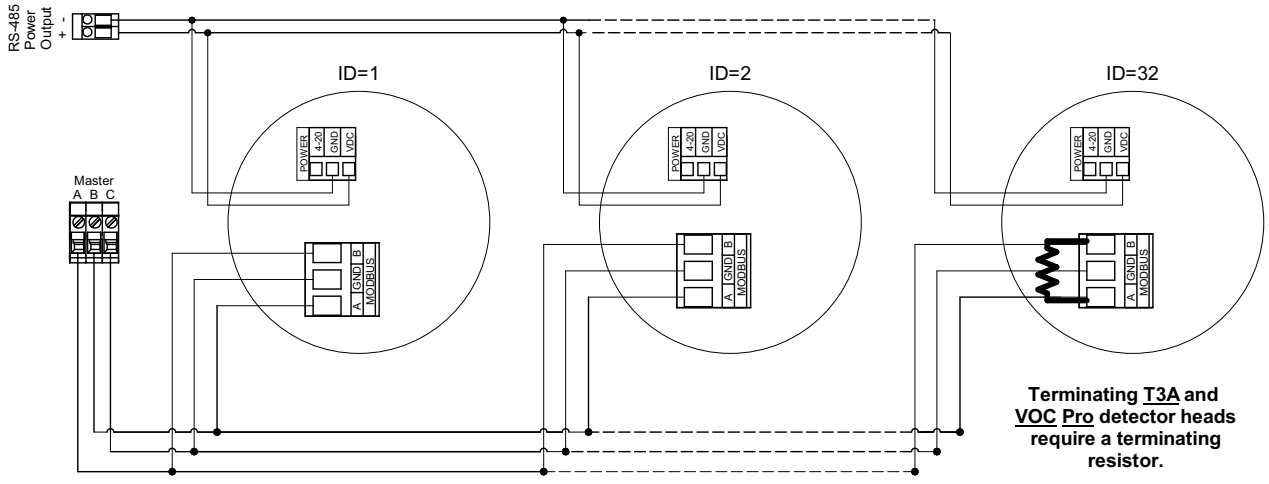


Figure 15: Modbus Master Terminal Locations



NOTE: Use appropriately sized wire for the power wires taking into account the distance from the power source to the last slave to prevent excessive voltage drops that may affect slave operation.

Figure 16: Modbus Master Wiring for M2A Detector Heads



NOTE: Use appropriately sized wire for the power wires taking into account the distance from the power source to the last slave to prevent excessive voltage drops that may affect slave operation.

Figure 17: Modbus Master Wiring for T3A and VOC Pro Detector Heads

CAUTION: *If wiring a Modbus system that includes both M2A and T3A or VOC Pro slaves, make sure to take into account the different Modbus terminal label letter assignment for the corresponding Modbus Signal Name between the M2A and the T3A or VOC Pro as shown in Table 7.*

2. Configure the Beacon 3200's ground and termination jumpers (locations shown in Figure 18) as shown in Figure 19. Leave the Beacon 3200 master ground jumper in place or install it if it has been removed. The termination jumper must be installed at each end of the Modbus system.

CAUTION: *Do not remove the slave jumpers. If the Beacon 3200 is intended to function as a slave device, see the next section "RS-485 Modbus Wiring: Connecting the Beacon 3200 to a Master Device".*

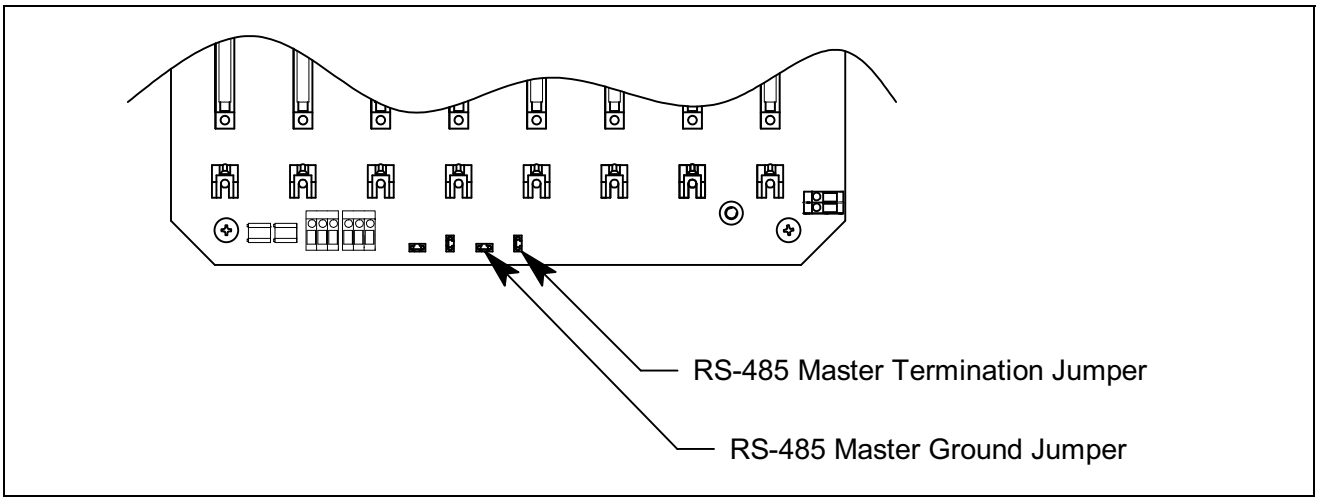


Figure 18: Modbus Master Jumper Locations

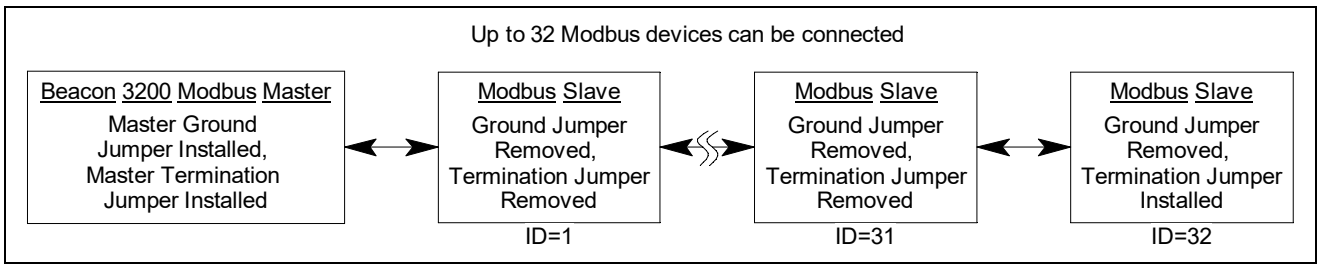


Figure 19: Jumper Configuration (Beacon 3200 as Modbus Master)

3. Configure the slave detector head ground and termination jumpers.
   - For M2A slave devices, configure the ground and termination jumpers as shown in Figure 16 and Figure 19.
   - For VOC Pro or T3A slave devices, there is no ground jumper. If a T3A or VOC Pro is the final slave device in the line, install a 120 Ohm, 3/4W termination resistor across the Modbus terminals A and B shown in Figure 20.

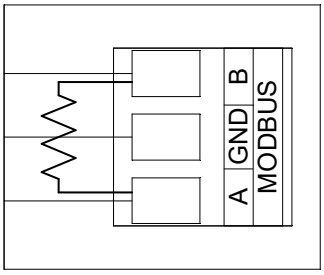


Figure 20: Installing the Terminating Resistor

RS-485 Modbus Wiring: Connecting the Beacon 3200 to a Master Device

NOTE: RKI Instruments does not provide a PC application to be used with the Beacon 3200's RS-485 Modbus output. Users must provide their own software.

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

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 22 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 8: 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 Beacon 3200 RS-485 slave terminals in the lower left corner of the main PCB.

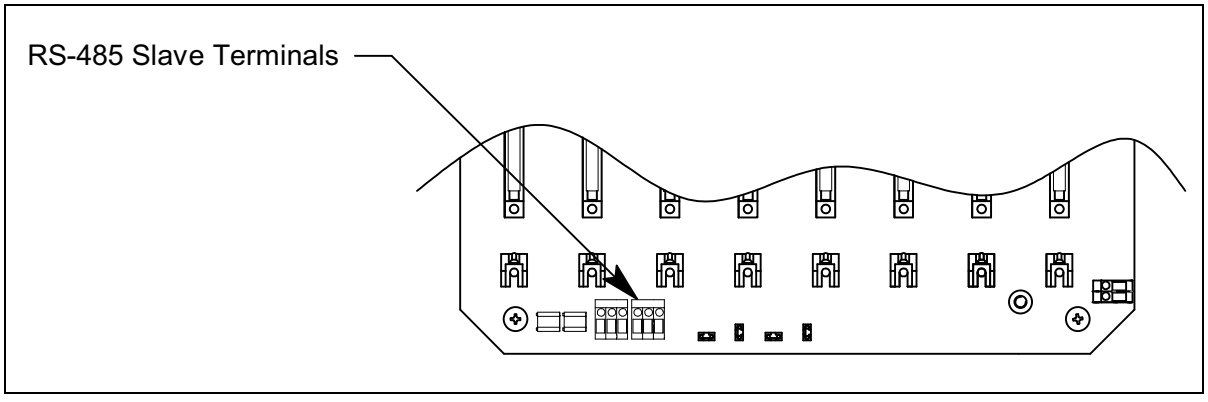


Figure 21: Modbus Slave Terminal Locations

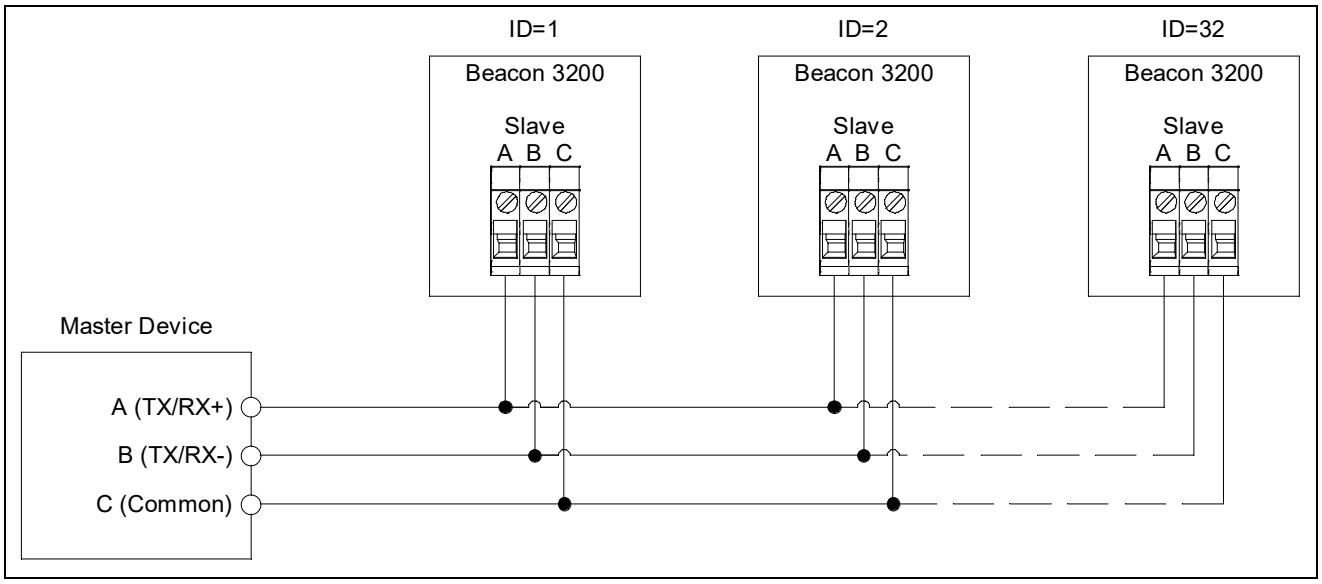


Figure 22: Modbus Slave Wiring

2. Configure the ground and termination jumpers (locations in Figure 23) as shown in Figure 24.

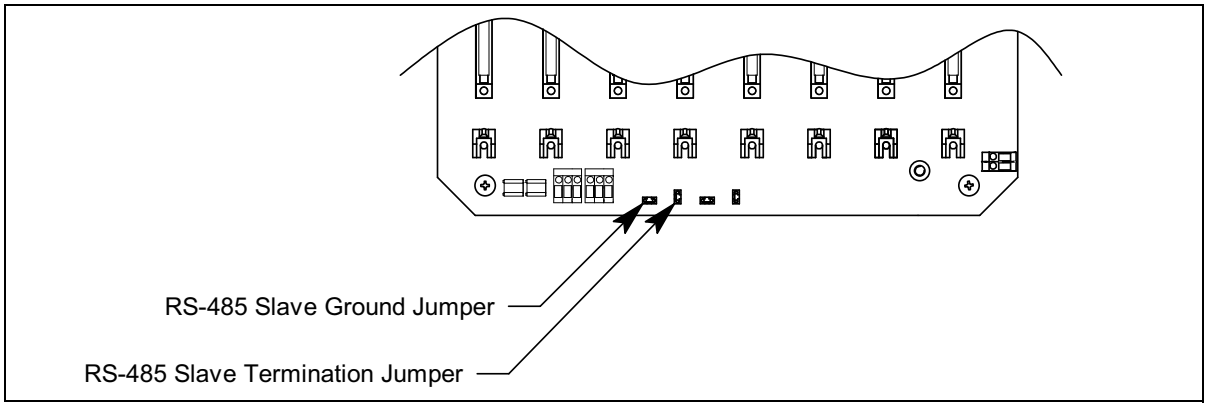


Figure 23: Modbus Slave Jumper Locations

3. Install the ground jumper at the master device. Remove the Beacon 3200 slave ground jumper from the Beacon 3200 slaves and the ground jumper from any other wired slaves. The termination jumper must be installed at each end of the Modbus system.

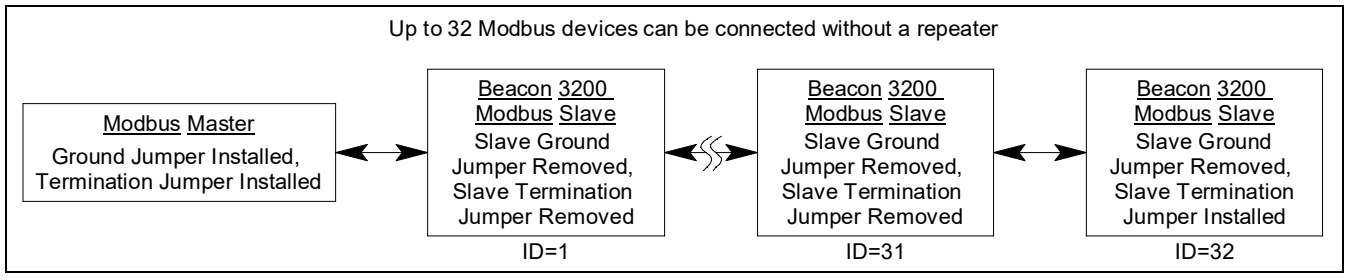


Figure 24: Jumper Configuration (Beacon 3200 as Modbus Slave)

Modbus Over Ethernet Connection

NOTE: RKI Instruments does not provide a PC application to be used with the Beacon 3200's RS-485 Modbus output or its Modbus over Ethernet output. Users must provide their own software.

The Beacon 3200 supports Modbus TCP/IP on port 502.

1. Plug an Ethernet cable into the LAN connector in the upper left corner of the main PCB.
2. Plug the other end of the Ethernet cable into a nearby LAN port that is connected to the desired LAN network.

Wiring Relays

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 104 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 62 and "Chapter 7: Adjusting Channel Settings" on page 72 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. 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.*

4. 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.*

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5. 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 25.

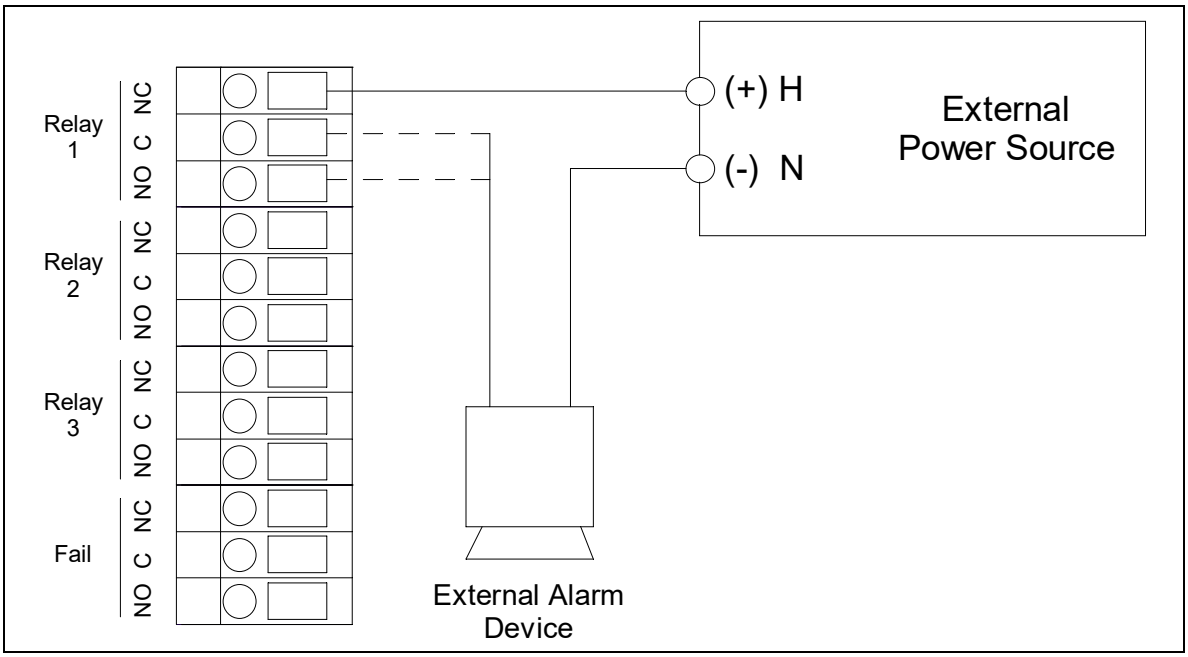


Figure 25: Wiring to the Main and Fail Relays

6. Repeat Step 4 and Step 5 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 107 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 62 and “Chapter 7: Adjusting Channel Settings” on page 72 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.

NOTE: Each relay on the relay module has an associated red LED that will light up when the relay is energized.

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

1. Turn off or disconnect main power to the Beacon 3200.
2. Open the housing door, then place the power switch in the OFF position.
3. Locate the applicable 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. Refer to Figure 26 for identifying each relay set.

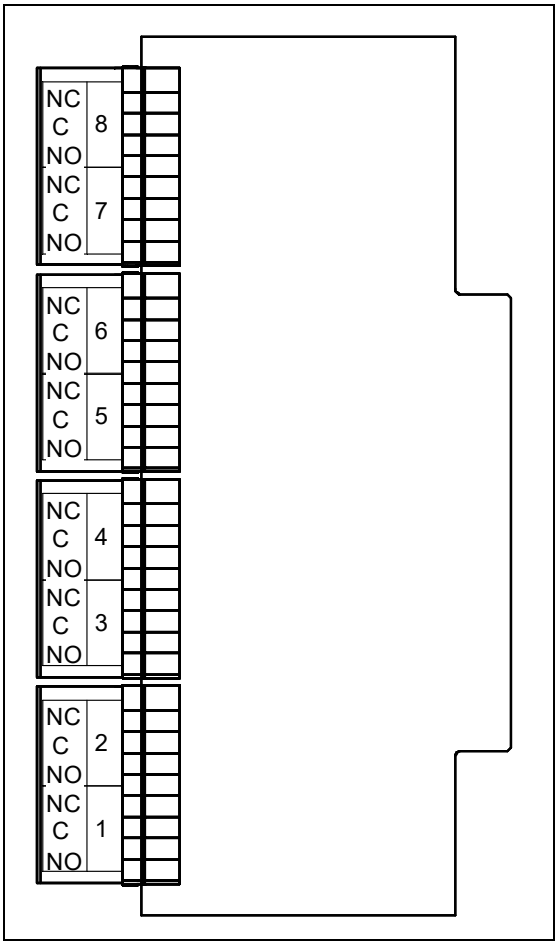


Figure 26: Relay Module Labels

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 card relay terminals as shown in Figure 27.

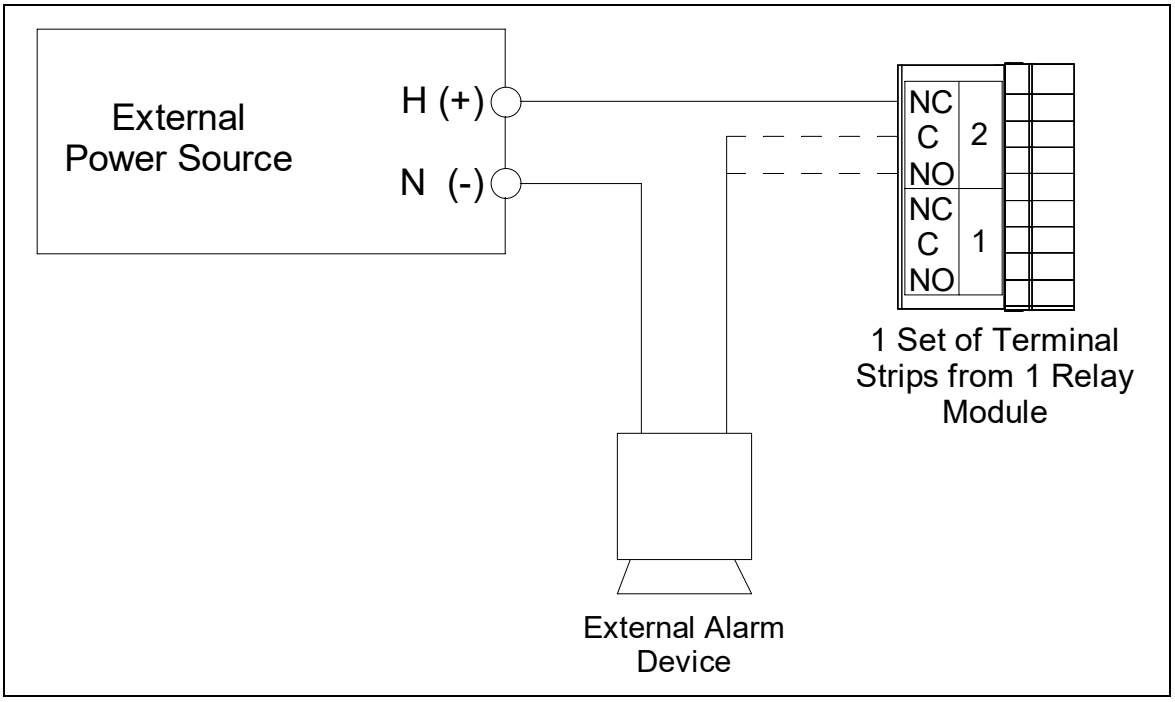


Figure 27: Wiring to the Card Relays

7. Repeat Step 4 and Step 5 for additional external alarm devices.

Wiring to the Sensor Module

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 72 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 9 below for wire size and distance guidelines.

Table 9: 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.

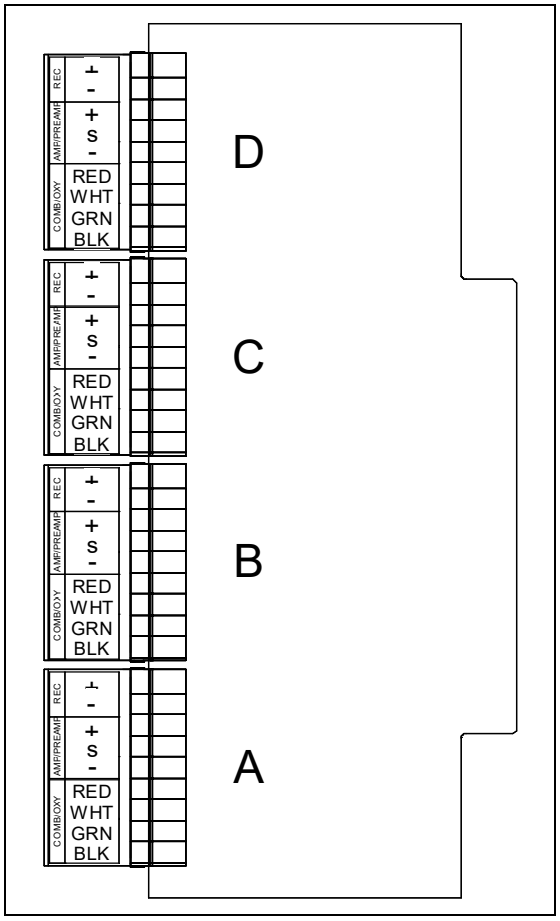


Figure 28: Sensor Module Channel Assignment

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 72 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.

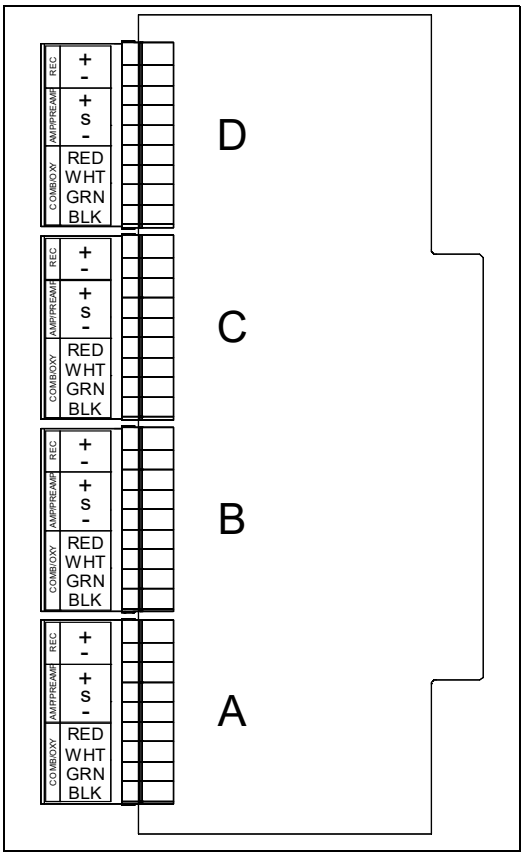


Figure 29: Sensor Module Channel Assignment

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.*

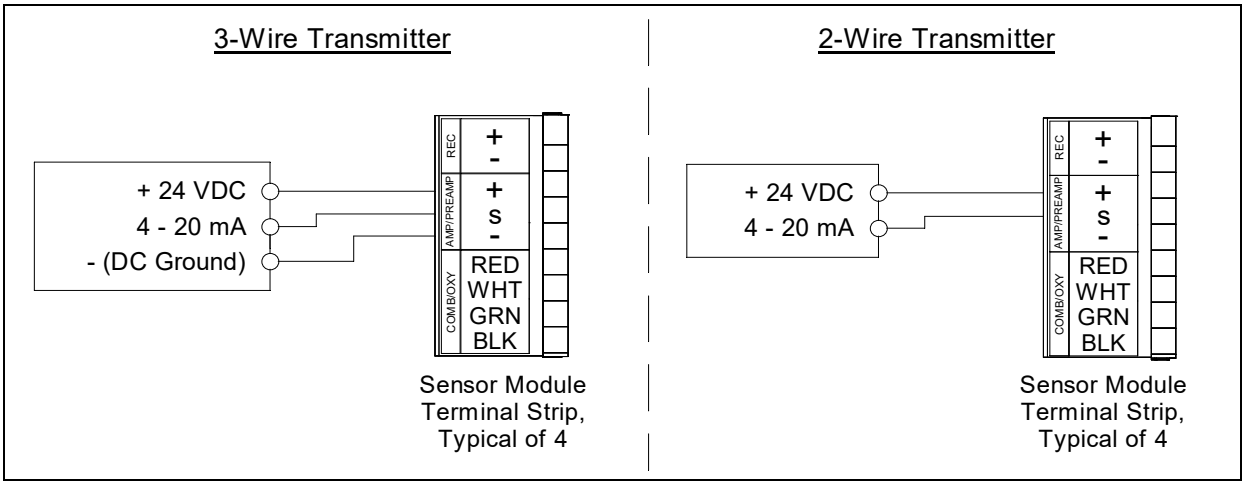


Figure 30: 4 to 20 mA Transmitter Wiring

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.

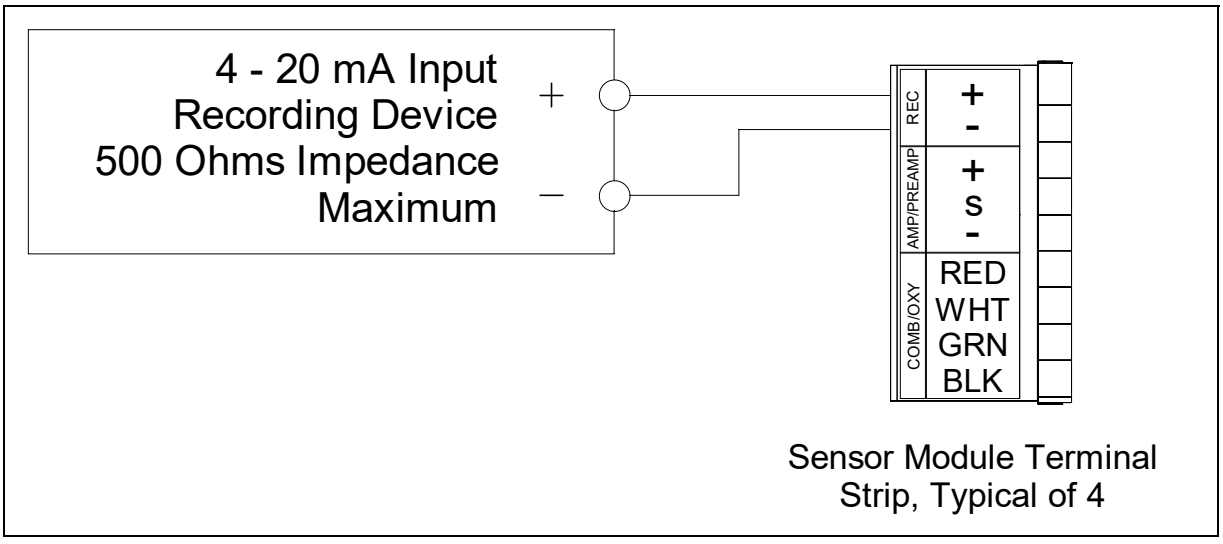


Figure 31: Recorder Output Wiring

Start Up

NOTE: RKI Instruments does not provide a PC application to be used with the Beacon 3200's RS-485 Modbus output or its Modbus over Ethernet output. Users must provide their own software.

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's Power Output Terminal Strip.
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.

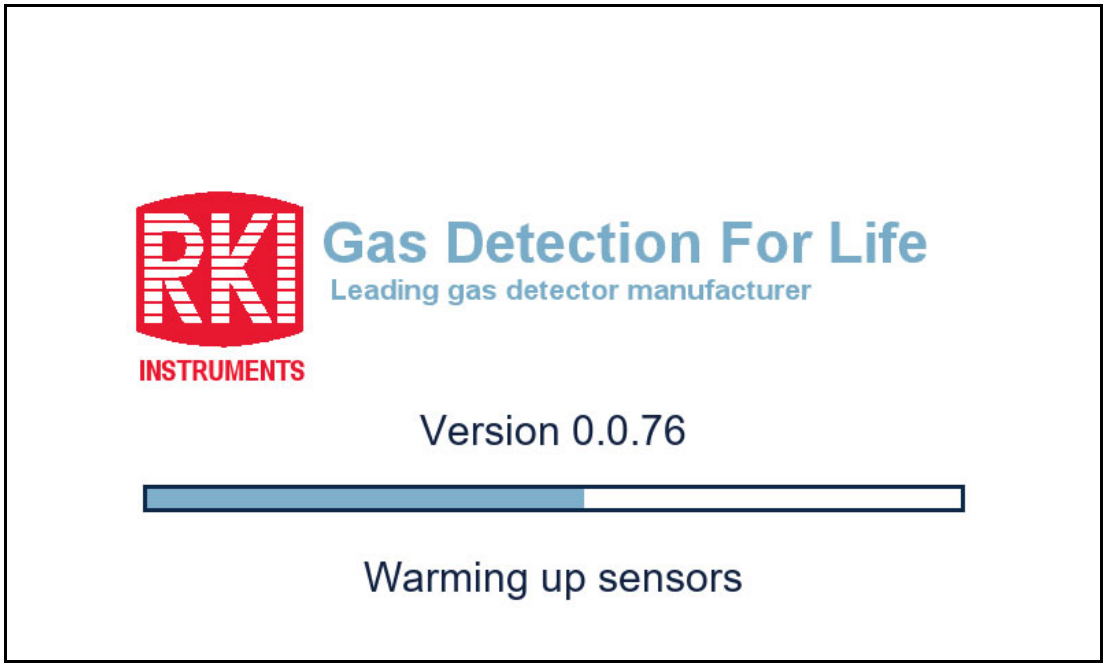


Figure 32: Warmup Screen

NOTE: To prevent unwanted alarms during warmup, 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.

NOTE: When connected, M2As can be set up by the Beacon 3200 automatically or manually. The T3A and VOC Pro detectors must be set up manually. See "Modbus Channel Setup" on page 82 for manual setup of Modbus inputs.

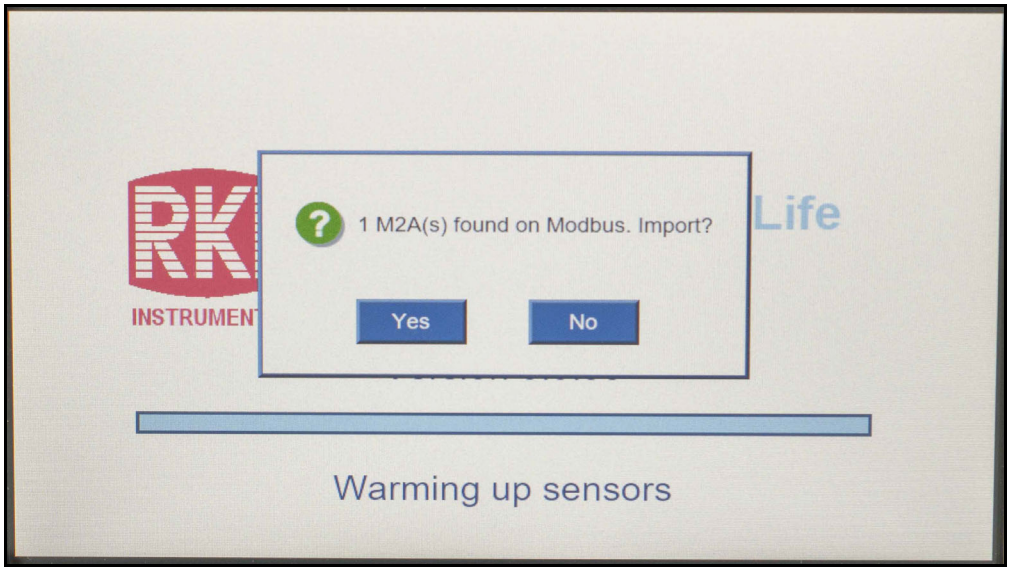


Figure 33: Modbus Detector Discovery

NOTE: If the Beacon 3200 has Modbus Slave devices connected or is connected to a Modbus Master device, confirm that all the appropriate Modbus Slave/ Master parameters have been adjusted in Setup Mode prior to operation (see page 82).

9. When the warm-up period is complete, normal operation will begin. During normal operation, the List 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	20.9 % VOL	OK	Rig 2
1B	Methane	0 % LEL	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Nitric Oxide		Offline	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Chlorine	0.0 ppm	OK	Assembly 7
2D	Oxygen	20.9 % VOL	OK	Assembly 7
3A	Isobutane	0 % LEL	OK	Stock Room
3B	Methane	0 % LEL	OK	Stock Room
3C	Propane	0 % LEL	OK	Room 431
3D	Phosphine	0.00 ppm	OK	Room 431
4A	Carbon Dioxide	0.0 % VOL	OK	Cellar
4B	Carbon Monoxide	0 ppm	OK	Cellar
4C	Methane		Offline	Cellar
4D	Hydrogen Sulfide	0 ppm	OK	Cellar

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

Figure 34: List View (Normal Operation)

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 displaying the Home screen, the top-level screen of the Beacon 3200

The **Home** screen can be displayed as a list or as a bar graph of all configured channels. Press **List** or **Bar Graph** at the bottom of the screen to switch between the two types of views. For information about the **History Graph** view, see “Chapter 5: History Graph Screen” on page 60.

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 View

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.

The **Page Up** and **Page Down** buttons at the bottom of the display can be used to scroll between the two pages. These buttons only appear in List view when there are more than 16 channels configured.

Channel	Gas	Reading	Status	Location
1A	Oxygen	20.9 % VOL	OK	Rig 2
1B	Methane	0 % LEL	OK	Rig 2
1C	Methane	0 % LEL	OK	3rd Floor
1D	Carbon Monoxide	0 ppm	OK	3rd Floor
2A	Nitric Oxide		Offline	3rd Floor
2B	Carbon Monoxide	0 ppm	OK	Assembly 7
2C	Chlorine	0.0 ppm	OK	Assembly 7
2D	Oxygen	20.9 % VOL	OK	Assembly 7
3A	Isobutane	0 % LEL	OK	Stock Room
3B	Methane	0 % LEL	OK	Stock Room
3C	Propane	0 % LEL	OK	Room 431
3D	Phosphine	0.00 ppm	OK	Room 431
4A	Carbon Dioxide	0.0 % VOL	OK	Cellar
4B	Carbon Monoxide	0 ppm	OK	Cellar
4C	Methane		Offline	Cellar
4D	Hydrogen Sulfide	0 ppm	OK	Cellar

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

Figure 35: List View Display

Bar Graph View

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 53.

The **One Row**/**Two Row**s button changes how many bar graphs are displayed at one time. This option is only available when there are more than 16 configured channels.

The **Page Up** and **Page Down** buttons scroll between the two pages. These buttons only appear in Bar Graph view when there are more than 16 configured channels and the **One Row** display is selected.

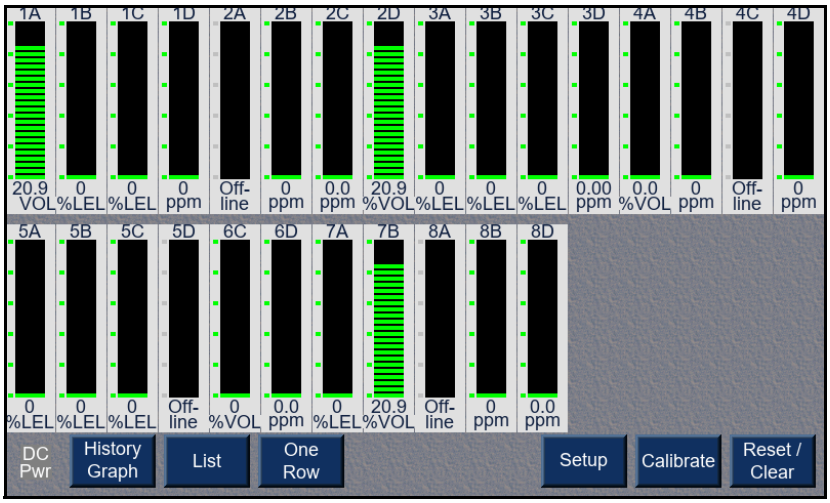


Figure 36: Two Row Display (Bar Graph)

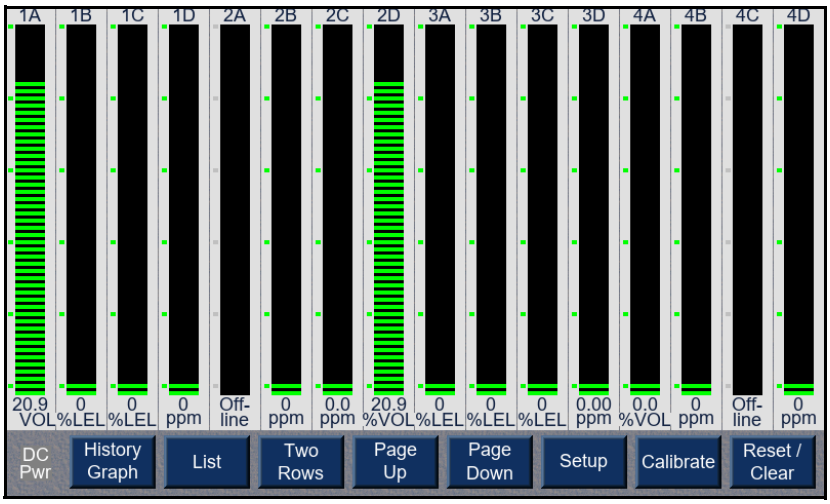


Figure 37: One Row Display (Bar Graph)

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:

Table 10: 4-20 mA Output Conditions

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
Post-calibration	4 mA (17.4 mA for O_2)
Low power	0.7 mA
Fail condition or communication failure between a module and the main board	0.7 mA
Entering Setup Mode:	
Relay Deact. setting: “Setup” or “Setup and Calibrate”	3.5 mA for all channels
Relay Deact. setting: “Never” or “Calibrate Mode”	All outputs reflect current channel readings.
Entering Alarm Test (in Setup Mode):	
All Relay Deact. settings	All outputs reflect current channel readings.
Entering Calibrate Mode:	
All Relay Deact. settings	Selected Channels: 3.5 mA Unselected Channels: Current sensor output

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 11 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.

The Beacon 3200 allows configuration of various alarm and alarm relay parameters. The description of alarm indications in Table 11 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 62 and “Chapter 7: Adjusting Channel Settings” on page 72 for detailed information on displaying or changing various channel parameters including alarm and alarm relay parameters.

Table 11: 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
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

Table 11: Visual and Audible Alarm Indications

Condition	Cause	Visual Indication(s)	Audible Indication
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 62, "Chapter 9: Assigning Main Relays" on page 104, and "Chapter 10: Assigning Card Relays" on page 107 for relay setup instructions.

NOTE: The fail relay is factory-set as normally energized and is not user-adjustable. Card relays assigned to be fail relays will automatically be set to normally-energized and cannot be adjusted.

NOTE: Each relay on the relay module has an associated red LED that will light up when the relay is energized.

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 channel's Status cell 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 channel's Status cell 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 channel's Status cell 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 failing channel's Status cell displays the **FAIL** message;
- the buzzer sounds a steady tone;
- the common fail relay de-energizes.
- any card relays assigned to a fail condition de-energize

NOTE: 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 128.

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.

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.

Enabled: Connected battery must 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 30, 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.*

Disabled: Connected battery can be non-rechargeable or be charged by another source.

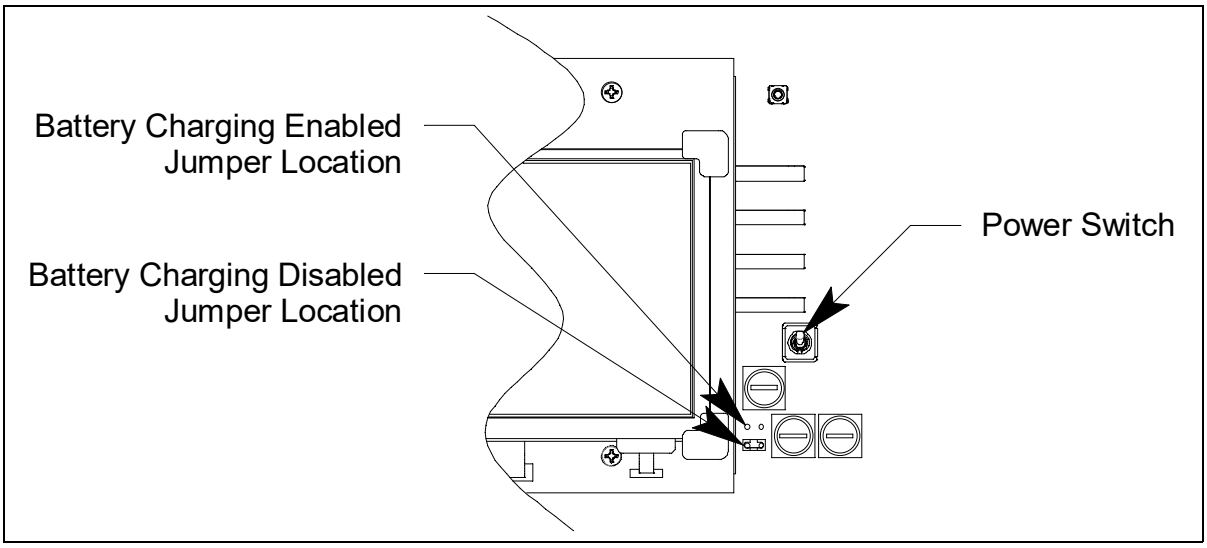


Figure 38: Battery Charging Jumper Locations

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 Home screen is displayed, the History Graph can only be accessed after the alarm is cleared. If an alarm is triggered while the History Graph is displayed, the Beacon 3200 will immediately return to the Home screen.

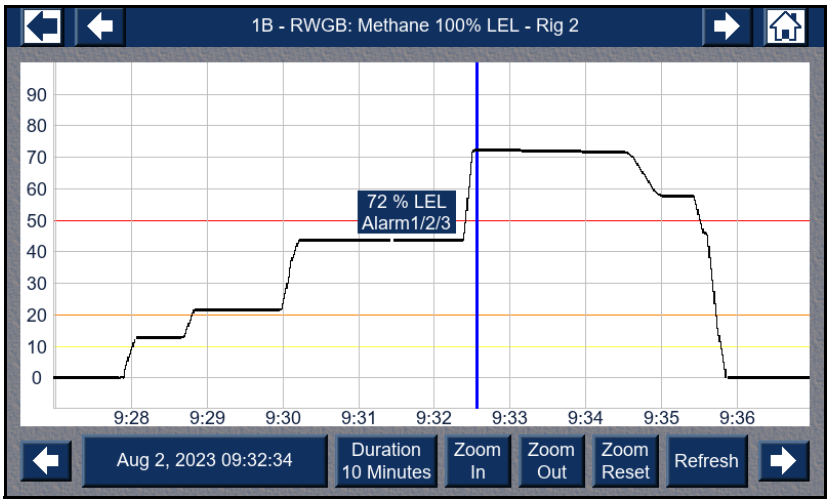


Figure 39: History Graph Screen

Table 12: History Graph Functions

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

Table 12: History Graph Functions

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 (see Table 13).

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

Table 13: System Settings Parameters

Accessories	Strobe • Uninstalled (factory setting): The strobe setting will not 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. Card relays assigned to be fail relays will automatically be set to normally-energized and cannot be adjusted.*
	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 13: System Settings Parameters

Accessories cont.	Main Relays • Channel: The PCB's main relays can be assigned to individual channel alarms. • Common (factory setting): Relays 1, 2, and 3 on the main PCB are assigned to Alarm 1, Alarm 2, and Alarm 3 respectively for all channels.
	Relays Deact. (see page 65) • Never (factory setting): Relays remain active during any non-Normal Mode. • Calibrate 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 DHCP server will not assign an IP address, and the user must set one themselves. • On (factory setting): The DHCP server will assign an IP address to the Beacon 3200. Any values in the Static IP Address, Static Subnet Mask, and Static Gateway fields will be ignored by the instrument.
	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 13: System Settings Parameters

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 158)	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.

Adjusting System Settings

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

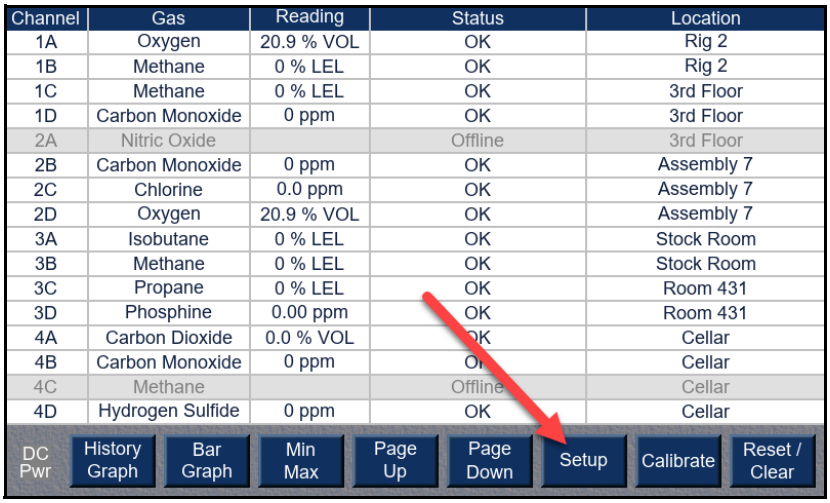


Figure 40: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **System Settings**.

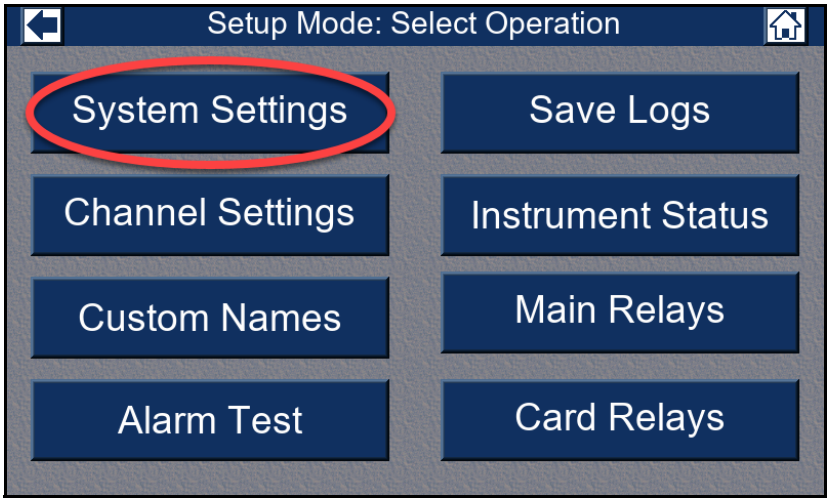


Figure 41: System Settings Button

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 13.

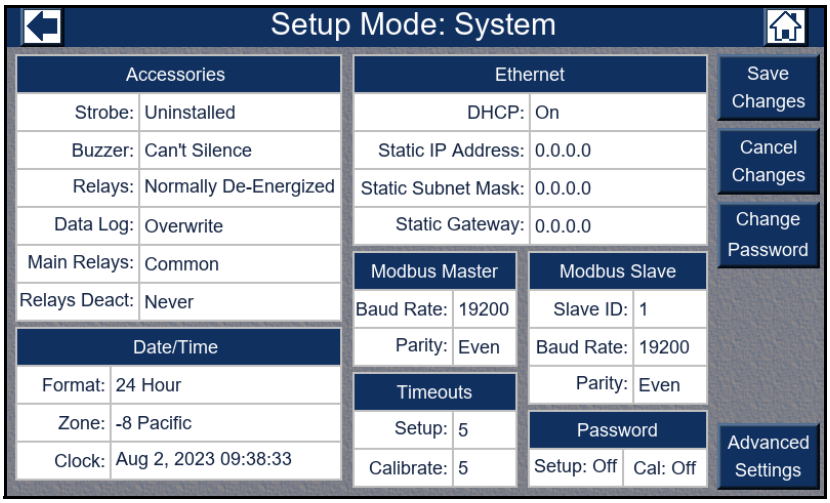


Figure 42: System Settings Button

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 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 158.
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.

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 (see Table 13).

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**.

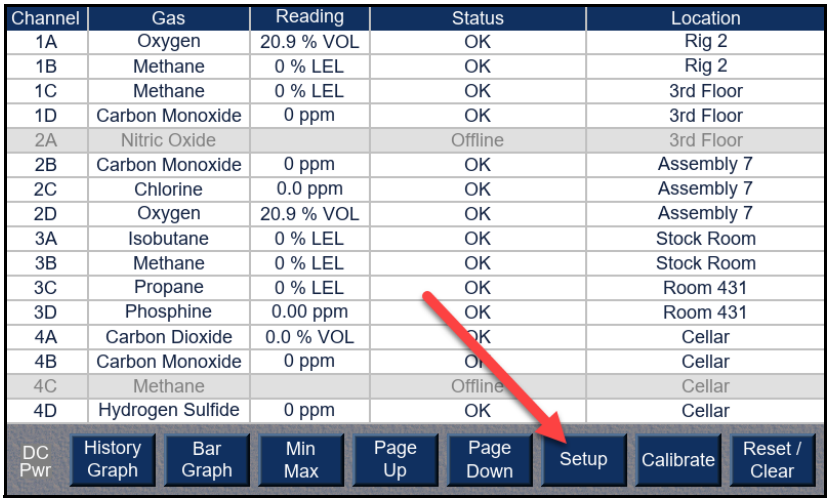


Figure 43: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Instrument Status**.

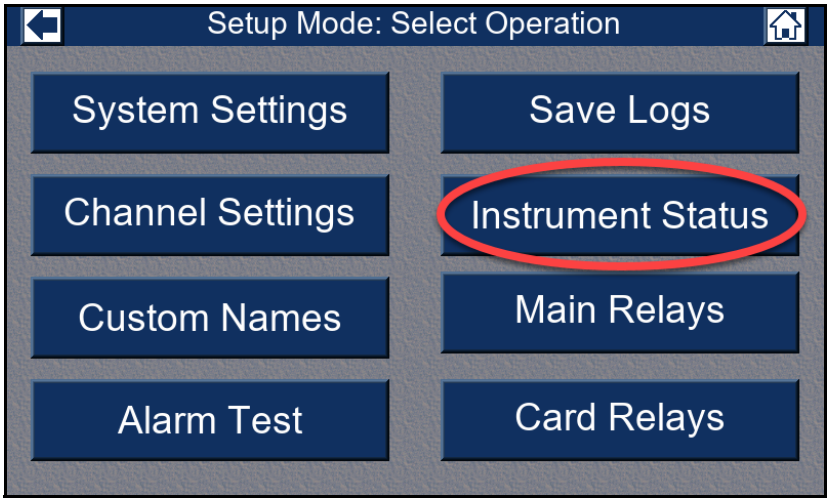


Figure 44: Instrument Status Button

5. The Instrument Status screen displays the following information:
   a. Version: This is the firmware version installed in the instrument.
   b. Serial Number: This is the instrument serial number. It is entered at the factory and cannot be changed in the field.
   c. MAC Address: This is the instrument's MAC (Media Access Control) address and is a unique number specific to the instrument.
   d. IPv4 Address: This is the IP address being used for the Ethernet connection.
   e. Subnet Mask: This is the subnet mask being used for the Ethernet connection.
   f. Gateway: This is the gateway being used for the Ethernet connection.

g. DC voltage: This is the DC voltage running the instrument. If the unit is running from AC, it is nominally the output of the AC/DC power supply.

NOTE: If the DHCP parameter (in System Settings, under Ethernet) is set to **On**, then the IPv4 Address, Subnet Mask, and Gateway fields are assigned by the DHCP server and will be displayed on the Instrument Status screen. Any user-assigned values in the Static IP Address, Static Subnet Mask, and Static Gateway Ethernet fields of the System Settings screen are ignored.

If DHCP is set to **Off**, the fields in the Instrument Status screen will display the Static IP Address, Static Subnet Mask, and Static Gateway Ethernet fields assigned by the user in System Settings.

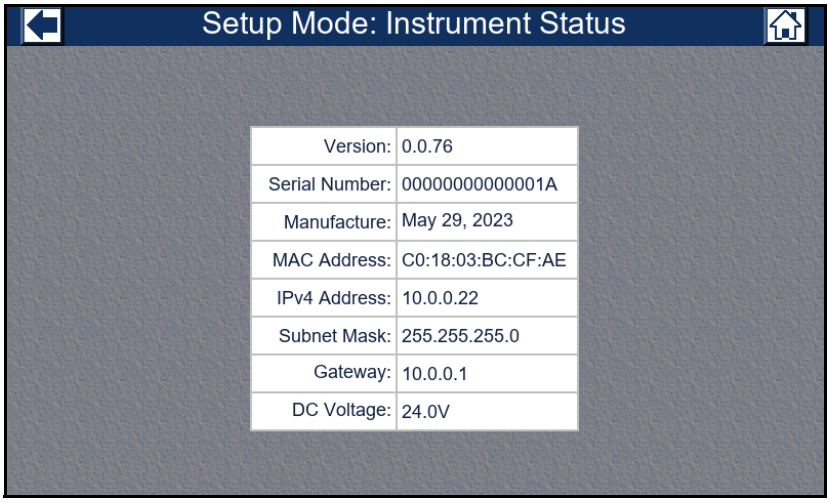


Figure 45: Instrument Status Screen

Relay Deactivation Options

This parameter controls whether relays continue normal operation, deactivate, or remain fixed in their current state while entering Setup Mode and/or Calibration Mode.

This section describes the setting's available options:

- Never
- Setup Mode
- Calibrate Mode
- Setup and Calibrate

NOTE: See Table 10 on page 52 for information about how the relay deactivation options affect the 4-20 mA output operation.

Relay Deactivation: "Never"

Entering Setup Mode

When in Setup Mode, all relays operate as normal. If any channel goes into alarm while in Setup Mode, the Beacon 3200 immediately returns to Normal Mode.

Entering Calibration Mode

When entering Calibration Mode, relays of selected channels remain fixed in their current state. Any selected channels currently in alarm do not cause the Beacon 3200 to return to Normal Mode.

Relays of unselected channels continue to operate as normal. If any unselected channel goes into alarm while in Calibration Mode, the Beacon 3200 immediately returns to Normal Mode.

Relay Deactivation: "Setup Mode"

Entering Setup Mode

When entering Setup Mode, all relays are deactivated. The instrument is **not** actively monitoring while in Setup Mode.

Entering Calibration Mode

When entering Calibration Mode, relays of selected channels remain fixed in their current state. Any selected channels currently in alarm do not cause the Beacon 3200 to return to Normal Mode.

Relays of unselected channels continue to operate as normal. If any unselected channel goes into alarm while in Calibration Mode, the Beacon 3200 immediately returns to Normal Mode.

Relay Deactivation: "Calibrate Mode"

Entering Setup Mode

When entering Setup Mode, all relays operate as normal. If any channel goes into alarm while in Setup Mode, the Beacon 3200 immediately returns to Normal Mode.

Entering Calibration Mode

When entering Calibration Mode, relays of selected channels are deactivated. Any relays of selected channels currently in alarm will revert to their non-alarm state. These channels are **not** actively monitoring while in Calibration Mode.

Relays of unselected channels continue to operate as normal. If any unselected channel goes into alarm while in Calibration Mode, the Beacon 3200 immediately returns to Normal Mode.

Relay Deactivation: "Setup and Calibrate"

Entering Setup Mode

When entering Setup Mode, all relays are deactivated. The instrument is **not** actively monitoring while in Setup Mode.

Entering Calibration Mode

When entering Calibration Mode, relays of selected channels are deactivated. Any relays of selected channels currently in alarm will revert to their non-alarm state. These channels are **not** actively monitoring while in Calibration Mode.

Relays of unselected channels will continue to operate as normal. If any unselected channel goes into alarm while in Calibration Mode, the Beacon 3200 immediately returns to Normal Mode.

Relay Status Alert

Before entering Setup or Calibration Mode, a dialogue box will indicate the relay properties while operating in each mode. The exact dialogue will vary depending on the current relay deactivation setting.

Figure 46 is one version of the alert. It appears when entering Setup Mode while Relay Deactivation is set to "Never" or "Calibrate Mode".

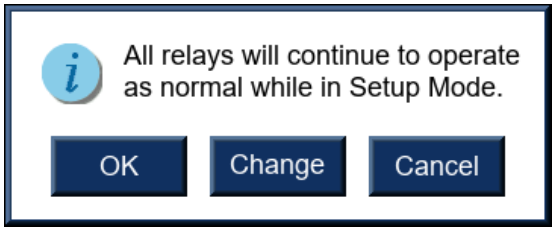


Figure 46: Relay Deactivation Dialogue Box (Sample)

- To acknowledge the current **Relay Deactivation** setting, press "OK".
- To change the **Relay Deactivation** setting of selected channels while in Calibration Mode or all channels while in Setup Mode, press "Change".
- To remain in Normal Mode, press "Cancel".

Chapter 7: Adjusting Channel Settings

Overview

This chapter describes how to view and change Beacon 3200 channel settings. These settings can be adjusted individually from the Channel Settings menu or when setting up a channel through the Channel Setup Wizard. The Setup Wizard is accessed through the Channel Settings menu by changing the selected channel state(s) to "Setup". See page 76 for more information.

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

Table 14: Parameters in Channel Setup Menu

Parameter	Available Settings & Descriptions
State	• Setup: The Channel Wizard will open upon selection. See page 76 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	4-20 mA Transmitter • 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	RWGB Direct • 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
	Oxygen Direct • Oxygen 25.0% vol.	Pre Amp Direct • 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. Default Settings • 0.5% vol for O_2 • 2% for LEL ***NOTE:*** *The MPS™ 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 **5** seconds). • 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 and 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:*** *Zero Correction is not available for the O_2 and CO_2 direct connect channels and any 4-20mA 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:*** *Zero Follower is not available for the O_2 and CO_2 direct connect channels and any 4-20mA 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.*
Alarm 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. Refer to Table 3 on page 8 for the Beacon 3200's default alarm setpoints.
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.
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****.*

Parameter	Available Settings & Descriptions
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 only appears if the* **Strobe** *parameter in System Settings is set to* ***Installed*** *and if the* **Strobe** *parameter in the Channel Settings Input Menu is set to* ***Alarms Only*** *or* ***Alarms and Fail****.*

Changing Channel Settings with Channel Wizard (Non-Modbus)

The Channel Wizard is useful for setting up channels for the first time. If you only want to change a few parameters, see "Changing the Gas/Range Settings" on page 91 or "Changing the Alarm Settings" on page 95.

For manual setup of Modbus head connections (required for T3A and VOC Pro detectors), see "Modbus Channel Setup" on page 82.

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 Table 13).

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**.

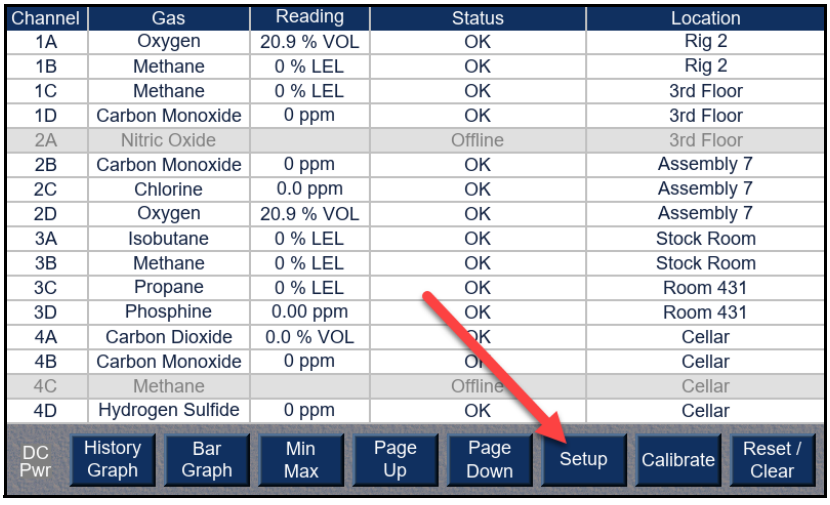


Figure 47: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Channel Settings**.

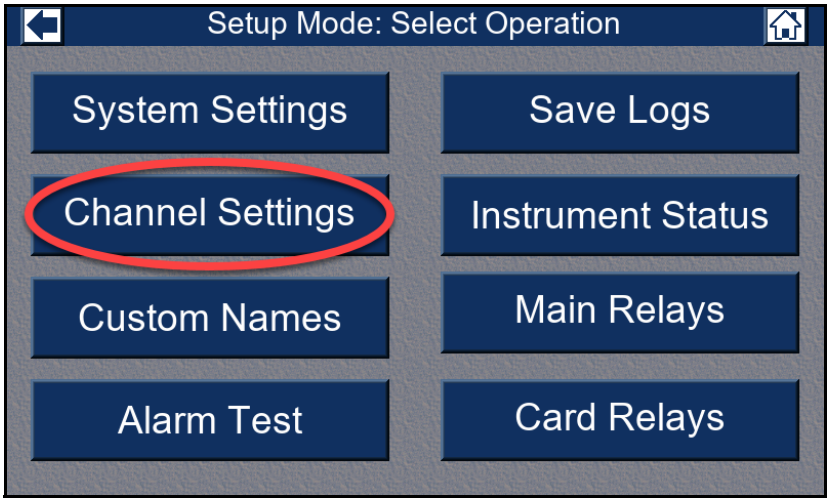


Figure 48: Channel Settings Button

5. Press the channel number(s) of the channel(s) you would like to set up using the Channel Wizard.

NOTE: Channels with an "**s**" next to the channel number are associated with installed sensor modules. Channels with an "**m**" next to the channel number are associated with a module slot position that does not have a sensor module installed and may be setup as a Modbus channel.

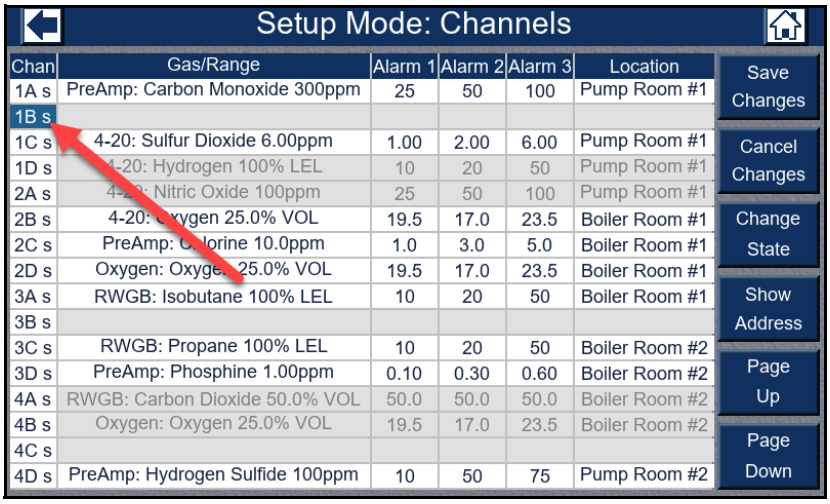


Figure 49: Channel Selection for Setup

6. Press **Change State**.

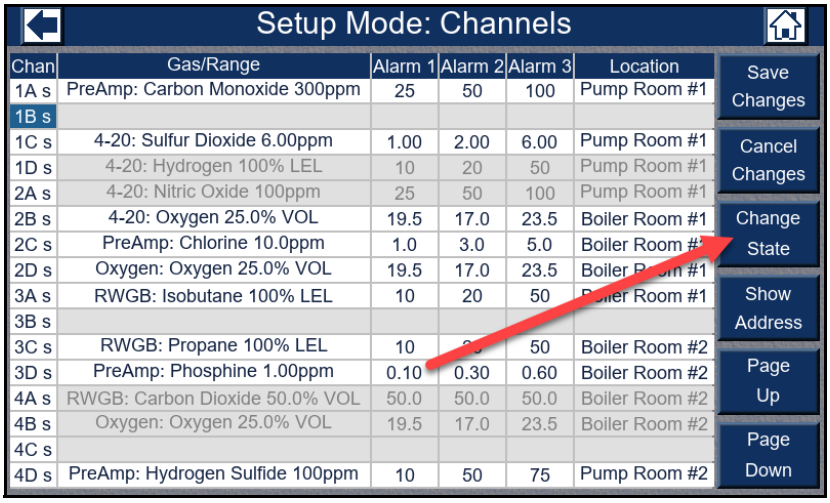


Figure 50: Change State Button

7. Select **Setup** and press **Enter**

NOTE: Setup for Modbus connections will have different options than non-Modbus connected detectors. For Modbus channel setup, see page 82.

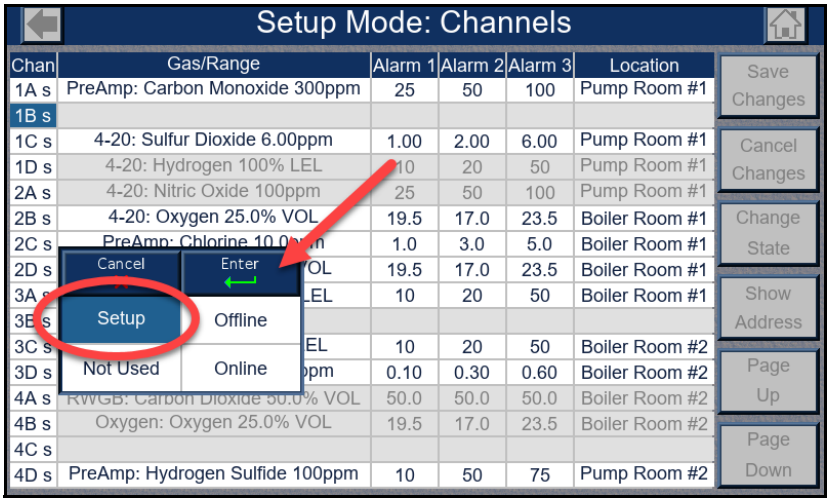


Figure 51: Selecting the Setup Channel State

8. Select an input and press **Next**. The 4 options are described in Table 14 on page 72.

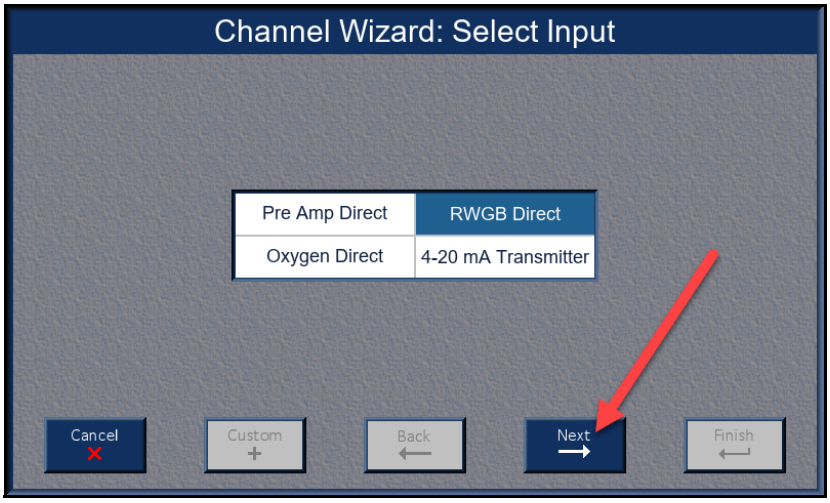


Figure 52: Confirm Input Type Selection

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 14 on page 72.

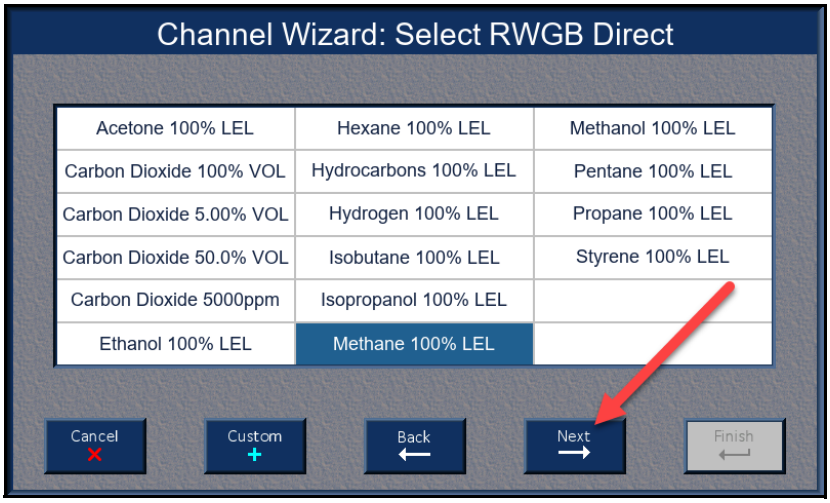
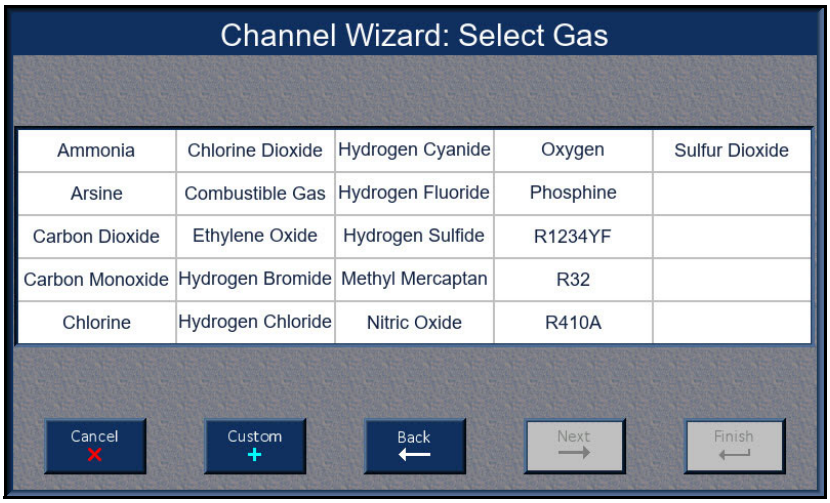


Figure 53: Confirm Gas/Range Selection

10. If you do not see your gas/range combination listed, perform the following steps:
    a. Click **Custom** + at the bottom of the screen.
    b. If the desired gas name is not listed, press **Custom**, type in a gas name, and press **Enter**. This parameter has a 20-character limit. Press **Next** when finished.



    c. Select the units and press **Next**. If the desired units are not listed, press **Custom**, type in the units, and press **Enter**. This parameter has a 6-character limit.

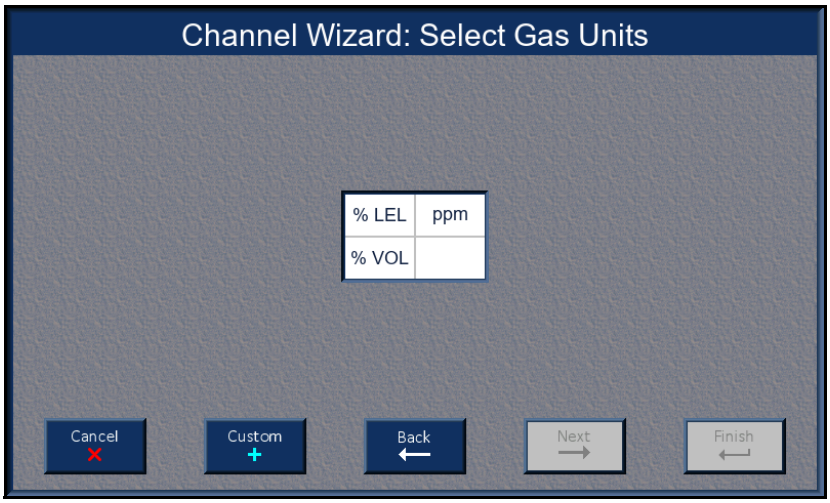


Figure 54: Custom Unit Select Screen

    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 rest of the installation using factory settings. Press **OK** to clear the message.

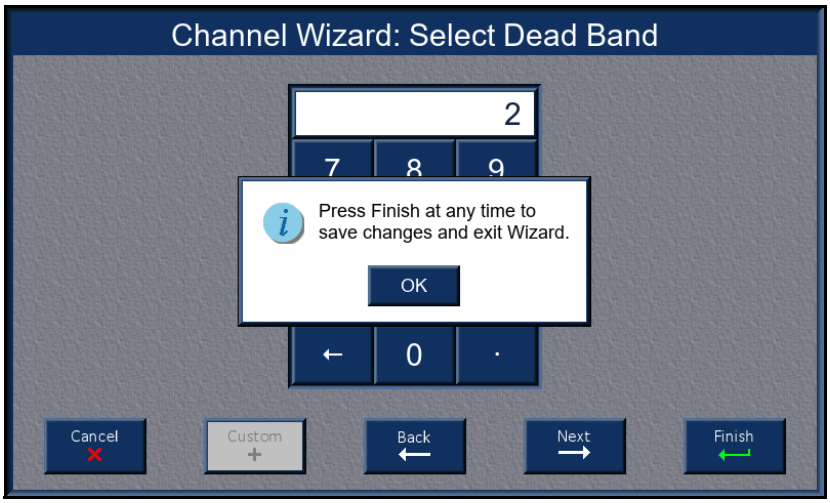


Figure 55: Confirm Channel Setup

12. 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 3 on page 8 and Table 14 on page 72.

13. Press **Finish** to save the new channel settings.

Modbus Channel Setup

The following describes manual setup of Modbus channels, which is required for connecting VOC and T3A detectors to the Beacon 3200.

Table 15 below shows the parameters that are available for Modbus channels in the Channel Settings menu.

Table 15: Parameters in Channel Setup Menu (Modbus)

Parameter	Available Settings & Descriptions
Input Type	• Modbus M2A • Modbus VOC • Modbus T3A
Gas/Range	Modbus M2A • Ammonia 75.0 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 100 ppm • Carbon Monoxide 200 ppm • Carbon Monoxide 300 ppm • Chlorine 10.0 ppm • Chlorine 3.00 ppm • Chlorine Dioxide 1.00 ppm • Hexane 100% LEL • Hydrocarbons 100% LEL • Hydrogen 100% LEL • Hydrogen Cyanide 15.0 ppm • Hydrogen Sulfide 100 ppm • Isobutane 100% LEL • Methane 100% LEL • Methane 100% vol. • Methane 5.00% vol. • Methane 8980 ppm • Nitric Oxide 100 ppm • Oxygen 25.0% vol. • Phosphine 1.00 ppm • Propane 100% LEL • Sulfur Dioxide 6.00 ppm
	Modbus VOC Combustible Gas with the following ranges: • 0 - 10.0 ppm • 0 - 20.0 ppm • 0 - 50.0 ppm • 0 - 100 ppm • 0 - 200 ppm • 0 - 500 ppm • 0 - 1000 ppm • 0 - 2000 ppm

Table 15: Parameters in Channel Setup Menu (Modbus)

Parameter	Available Settings & Descriptions
Gas/Range cont.	Modbus T3A • Ammonia 100 ppm • Ammonia 200 ppm • Ammonia 400 ppm • Arsine 1.00 ppm • Carbon Dioxide 5.00% vol. • Carbon Monoxide 300 ppm • Chlorine 10.00 ppm • Chlorine 20.00 ppm • Chlorine 3.00 ppm • Chlorine Dioxide 1.00 ppm • Chlorine Dioxide 5.00 ppm • Combustible Gas 100% LEL • Ethylene Oxide 10.00 ppm • Hydrogen Bromide 30 ppm • Hydrogen Chloride 30.0 ppm • Hydrogen Cyanide 30.0 ppm • Hydrogen Fluoride 10.0 ppm • Hydrogen Sulfide 100 ppm • Methyl Mercaptan 10.0 ppm • Nitric Oxide 100 ppm • Oxygen 25.0% vol. • Phosphine 5.00 ppm • R1234YF 2000 ppm • R32 2000 ppm • R410A 2000 ppm • Sulfur Dioxide 20.00 ppm
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.*
Alarm 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. Refer to Table 3 on page 8 for the Beacon 3200's default alarm setpoints. ***NOTE:*** *For M2A detectors that* ***automatically*** *connect via Modbus Discovery during startup, the Beacon 3200 uses the Alarm 1 and Alarm 2 setpoints that are currently saved to the M2A. For M2As that are* ***manually*** *connected, the Beacon 3200 uses its own Alarm 1 and Alarm 2 setpoints (see Table 3).* ***NOTE:*** *The Beacon 3200 will not register any alarm setpoint changes made directly to an M2A* ***after*** *it has connected to the Beacon 3200.*

Table 15: Parameters in Channel Setup Menu (Modbus)

Parameter	Available Settings & Descriptions
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.
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 only appears if the* **Strobe** *parameter in System Settings is set to* ***Installed*** *and if the* **Strobe** *parameter in the Channel Settings Input Menu is set to* ***Alarms Only*** *or* ***Alarms and Fail****.*

Setting Up Modbus Channels

The following describes how to setup Modbus channels manually. This method is required for connecting VOC and T3A detectors to the Beacon 3200.

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

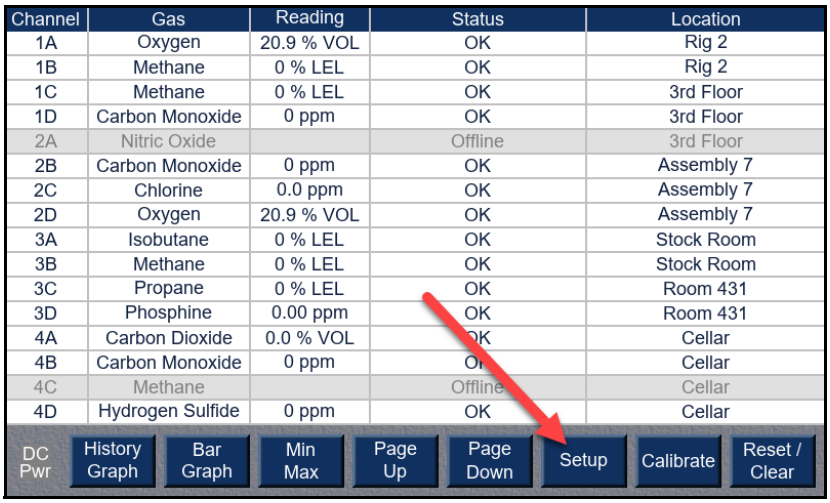


Figure 56: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Channel Settings**.

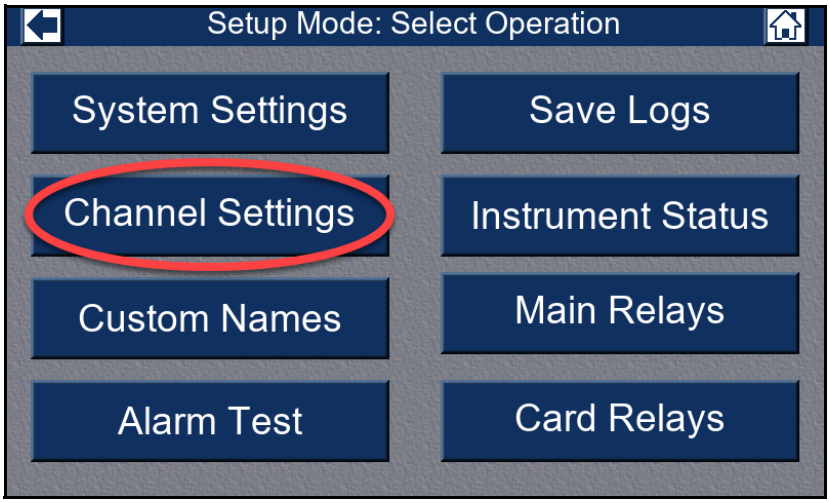


Figure 57: Channel Settings Button

5. Press the channel number(s) of the channel(s) you would like to set up using the Channel Wizard.

NOTE: Only channels associated with slot positions that do not have a sensor module installed will be available to set up as Modbus channels.

NOTE: Channels with an "**s**" next to the channel number are associated with installed sensor modules. Channels with an "**m**" next to the channel number are associated with a module slot position that does not have a sensor module installed and may be setup as a Modbus channel.

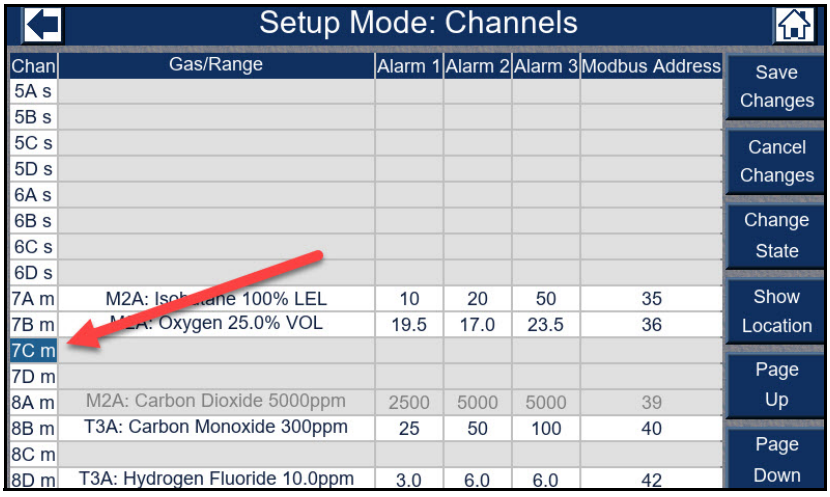


Figure 58: Modbus Channel Selection for Setup

6. Press **Change State**.

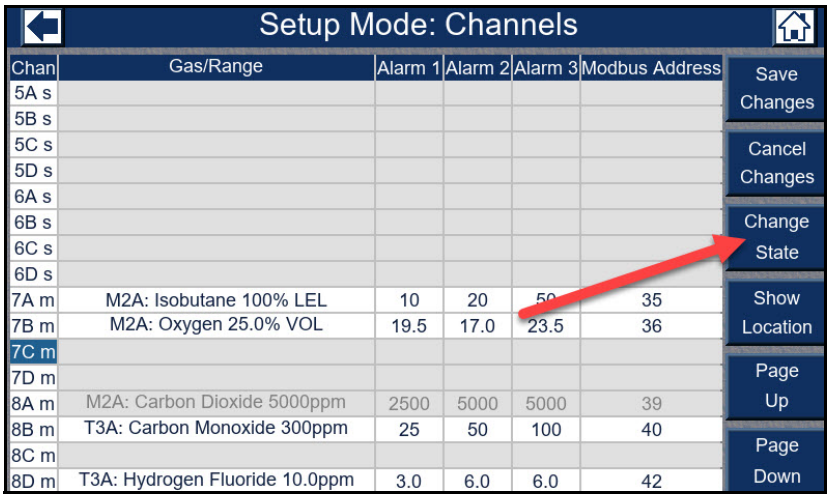


Figure 59: Change State Button

7. Select **Setup** and press **Enter**.

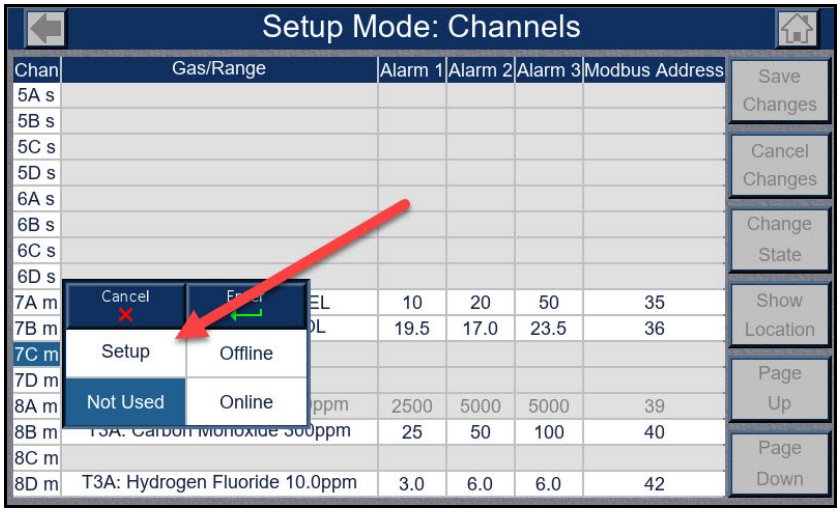


Figure 60: Selecting the Setup Channel State

8. Select an input and press **Next**. The 3 options are described in Table 15 on page 82.

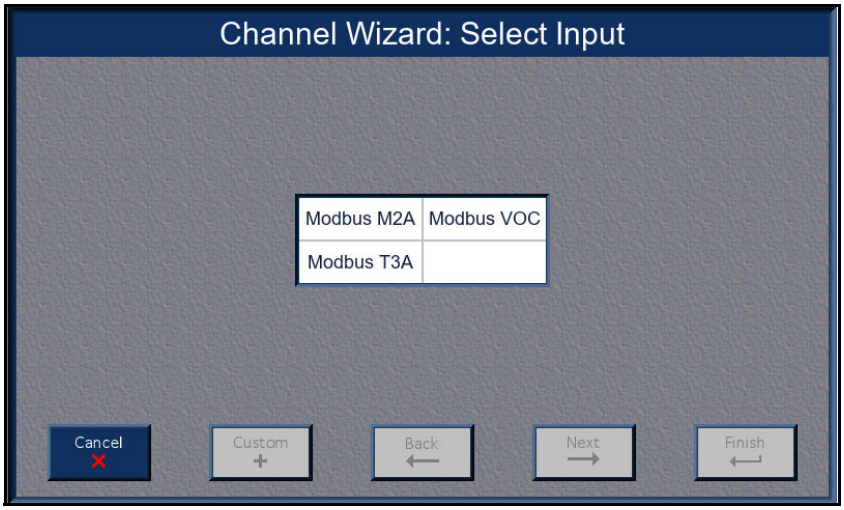


Figure 61: Confirm Modbus Input Type Selection

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 15 on page 82.

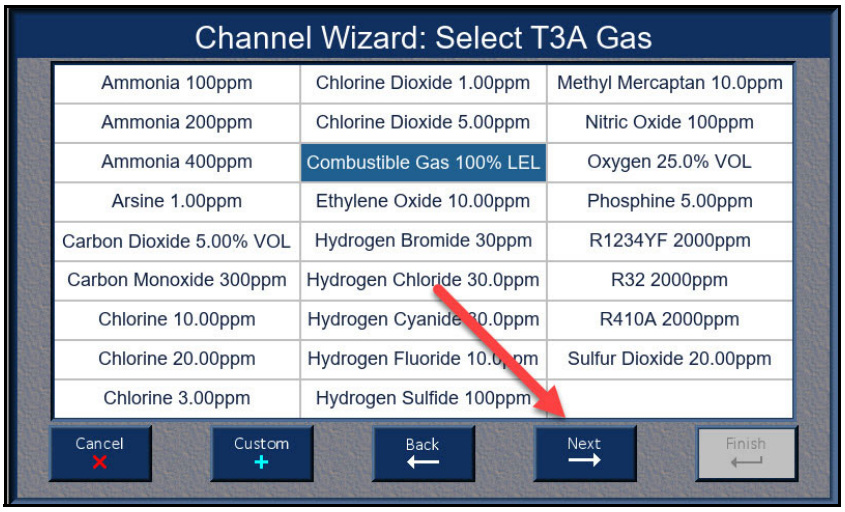


Figure 62: Confirm Gas/Range Selection

10. If you do not see your gas/range combination listed, perform the following steps:
    a. Click **Custom** + at the bottom of the screen.
    b. If the desired gas name is not listed, press **Custom**, type in a gas name, and press **Enter**. This parameter has a 20-character limit. Press **Next** when finished.

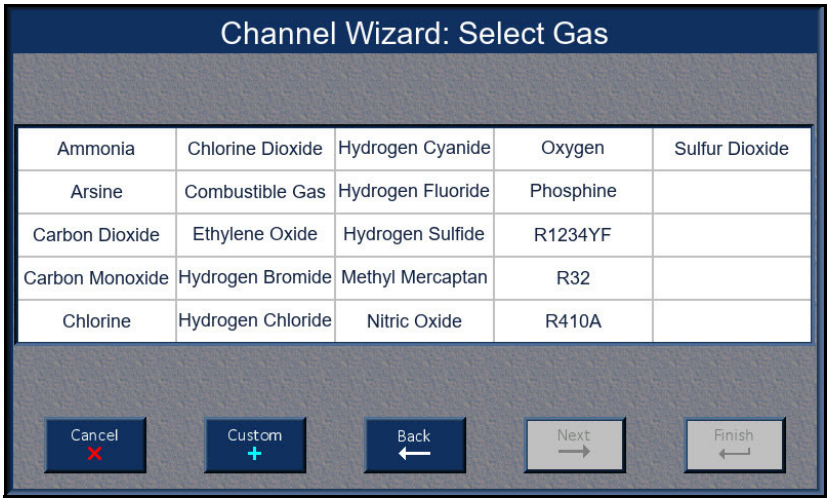


Figure 63: Custom Gas Options

c. Select the units and press **Next**. If the desired units are not listed, press **Custom**, type in the units, and press **Enter**. This parameter has a 6-character limit.

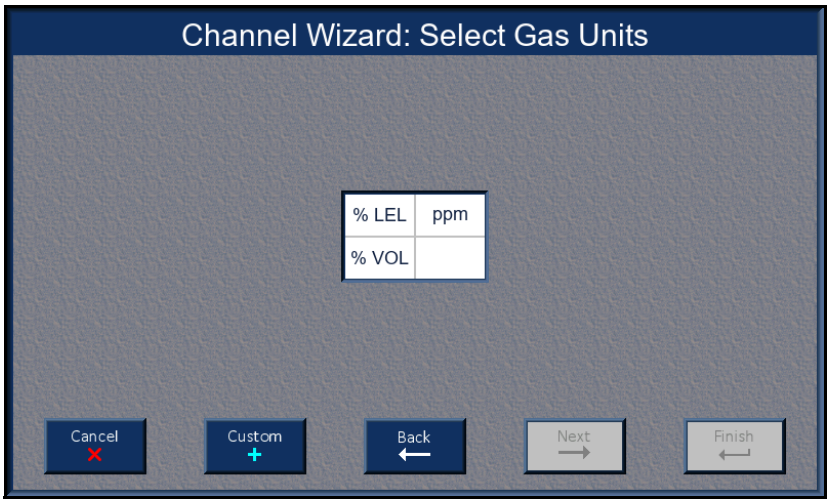


Figure 64: Custom Unit Select Screen

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 rest of the installation using factory settings. Press **OK** to clear the message.

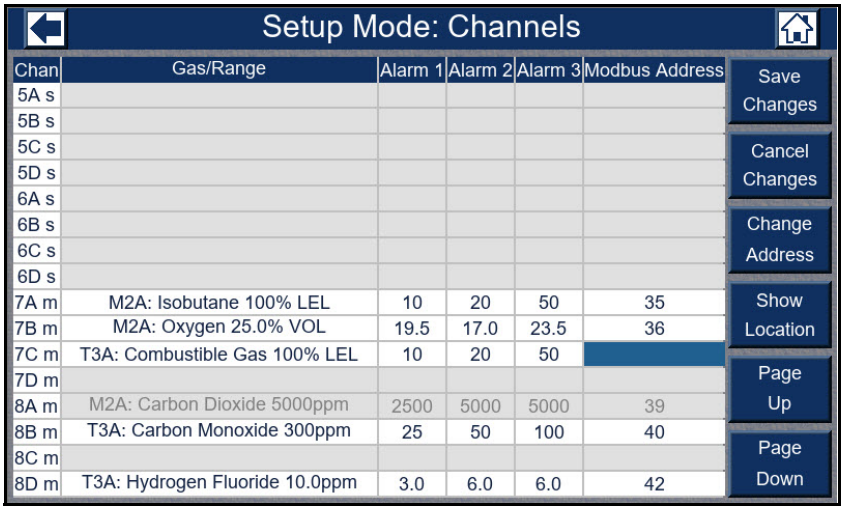


Figure 65: Confirm Modbus Channel Setup

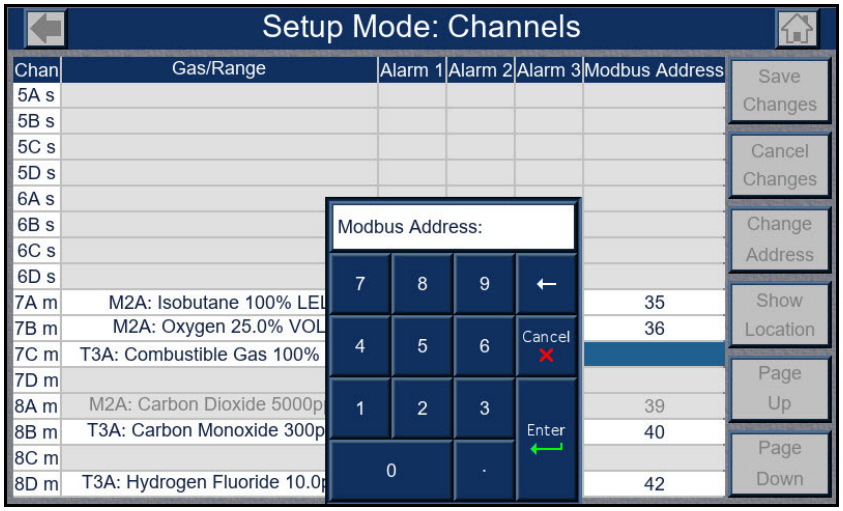
12. If you want to view or change any of the available parameters, press **Next** to scroll through each one. The available parameters (and their factory settings) are described in "Parameters in Channel Setup Menu (Modbus)" on page 82.

13. Press **Finish** to save the new channel settings.

14. While in the Channel Settings menu, press the newly setup channel's **Modbus Address**.



15. A number pad appears. Type in an unused Modbus address. This Modbus address must match the Modbus address of the channel's detector. Press **Enter** to save the parameter.



Changing the Gas/Range 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 (see Table 13).

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**.

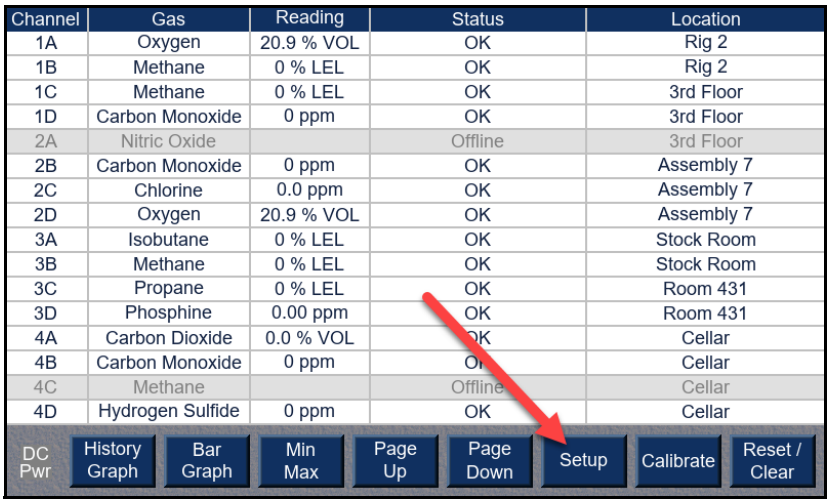


Figure 66: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Channel Settings**.

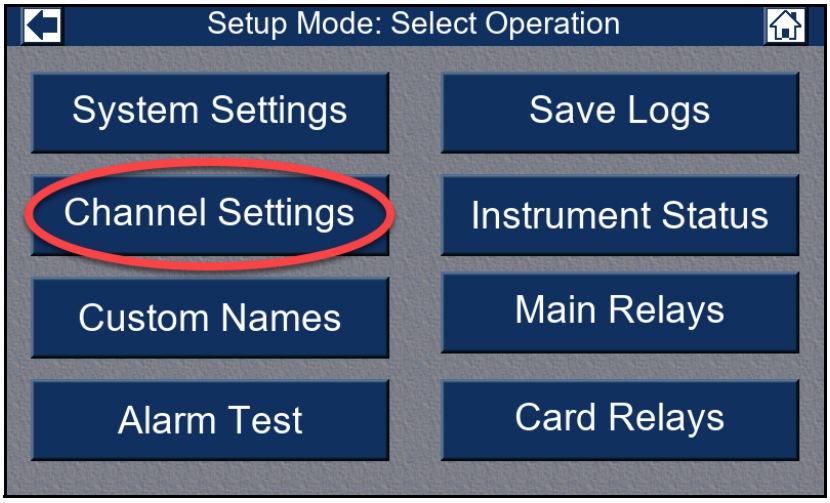


Figure 67: Channel Settings Button

5. Press the gas/range for the existing channel(s) you would like to change.

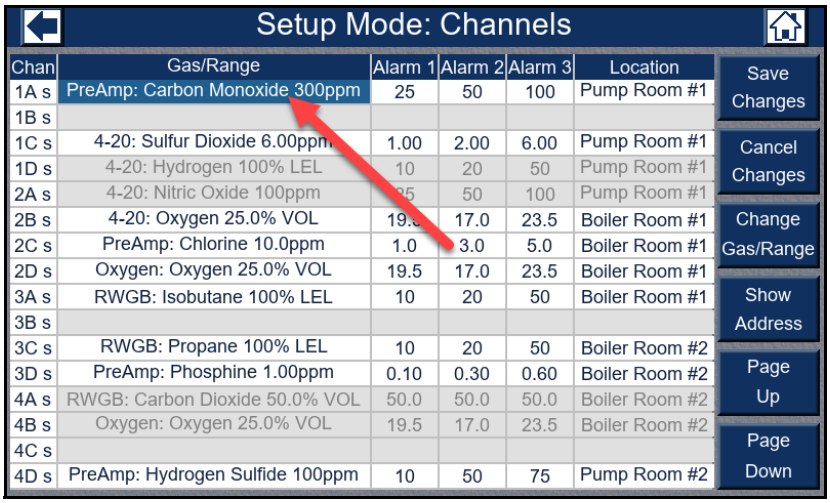


Figure 68: Gas/Range Selection

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

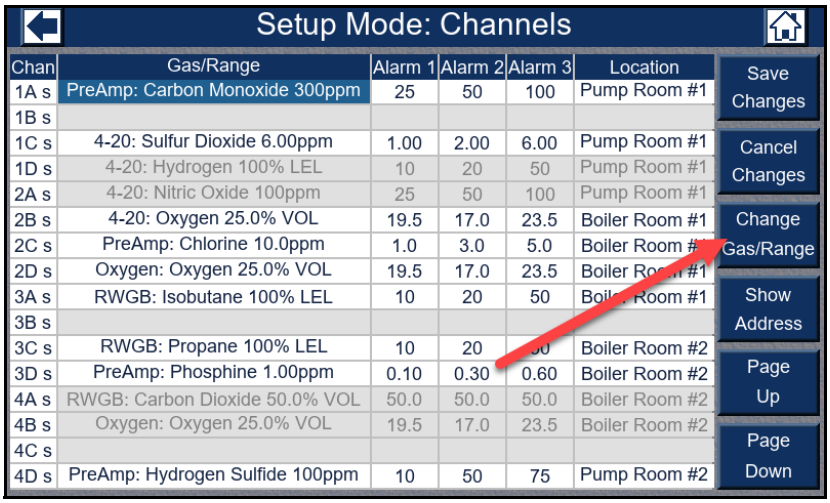


Figure 69: Change Gas/Range Button

7. The Input Menu appears. Press the parameter you want to change.

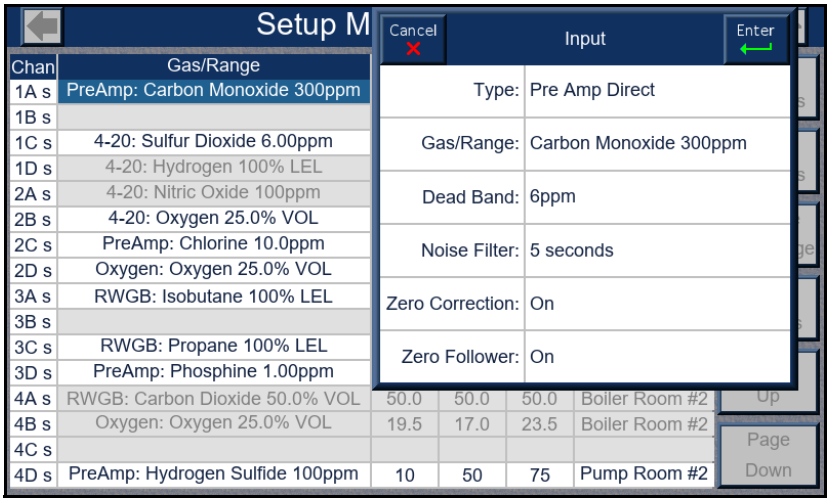


Figure 70: Gas/Range Settings Menu

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 14 on page 72.

10. When changing the **Gas/Range** parameter, if you don't see the gas and/or range you are looking for, perform the following steps:
    a. Press **Custom** + at the top of the Input Menu.

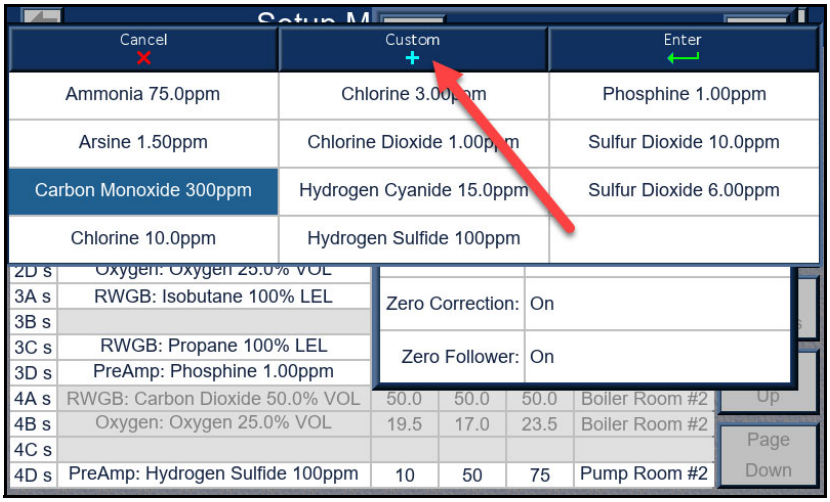


Figure 71: Custom Gas/Range Button

    b. The **Custom Gas/Range** menu appears.

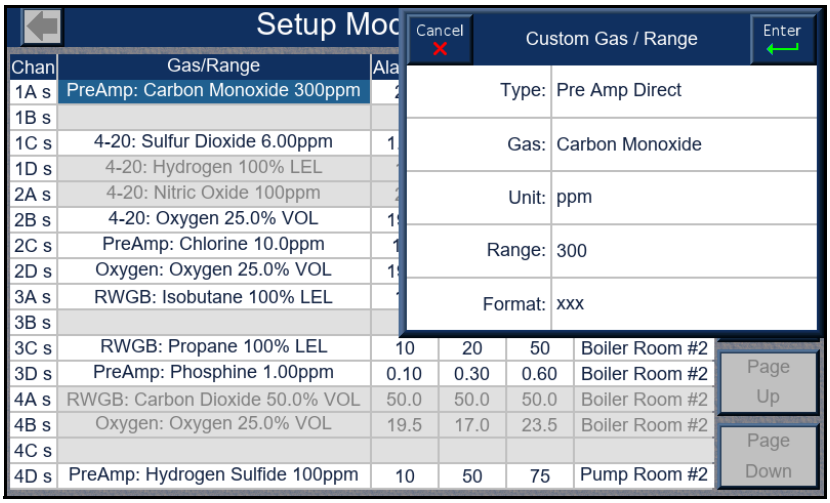


Figure 72: Custom Gas/Range Menu

    c. Press **Type** and select the transmitter type, then press **Enter**.
    d. Press **Gas** and select the gas, then 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**. This parameter has 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 shown in Step 69.
    j. The dead band level, noise filter, zero follower and zero correction can also be adjusted. Refer to Table 13 for descriptions of these parameters.

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**.

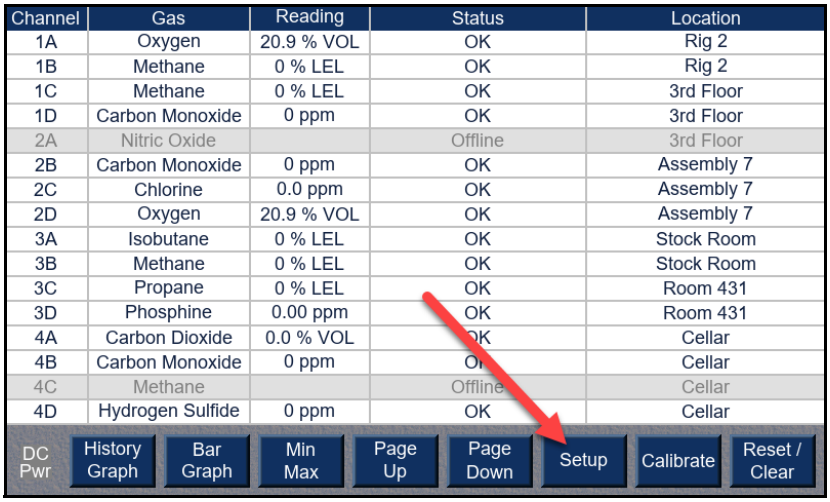


Figure 73: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Channel Settings**.

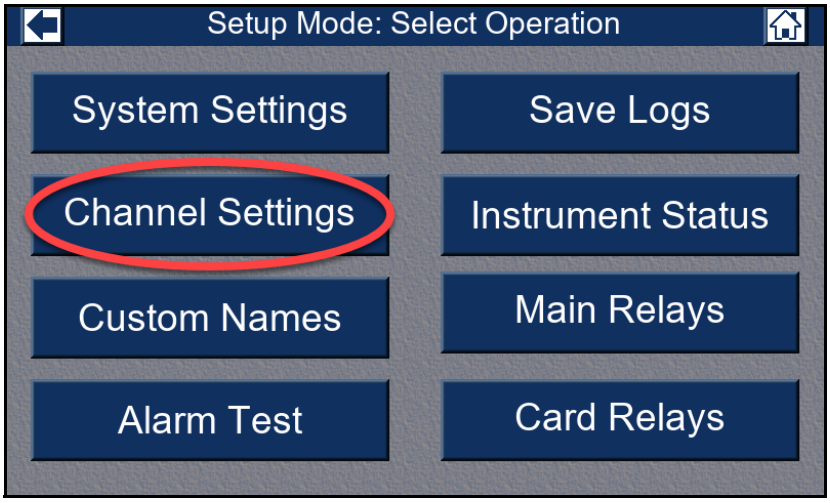


Figure 74: Channel Settings Button

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

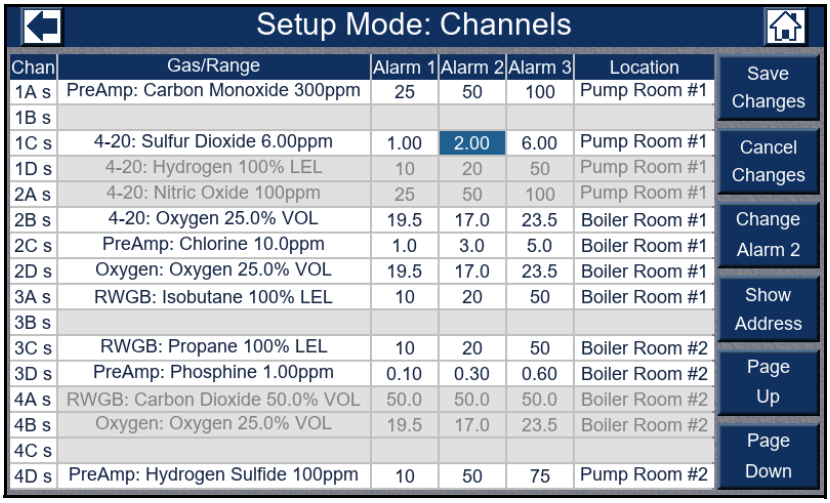


Figure 75: Selecting a Channel Alarm Condition

6. Press **Change Alarm X**.

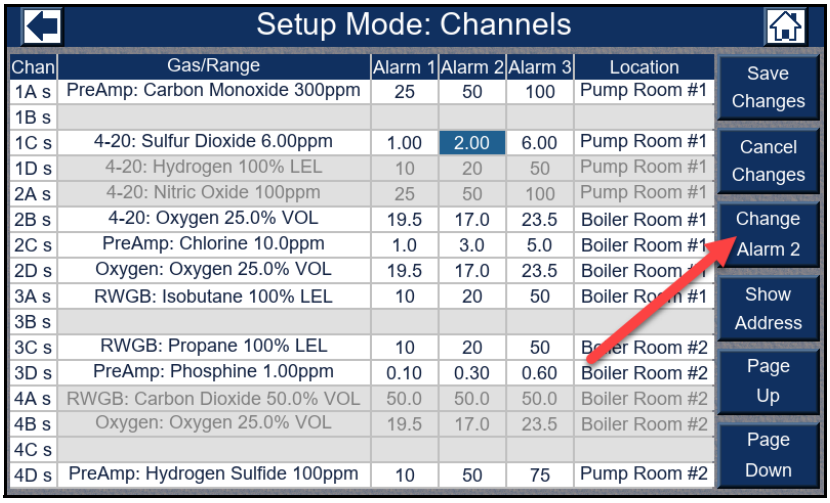


Figure 76: Change Alarm Button

7. The alarm's settings menu appears.

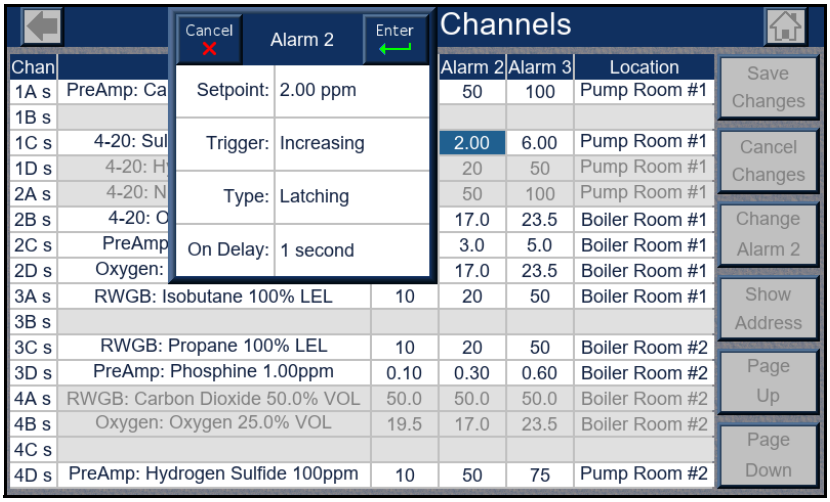


Figure 77: Alarm Settings Menu

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 3 on page 8.
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 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 (see Table 13).

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

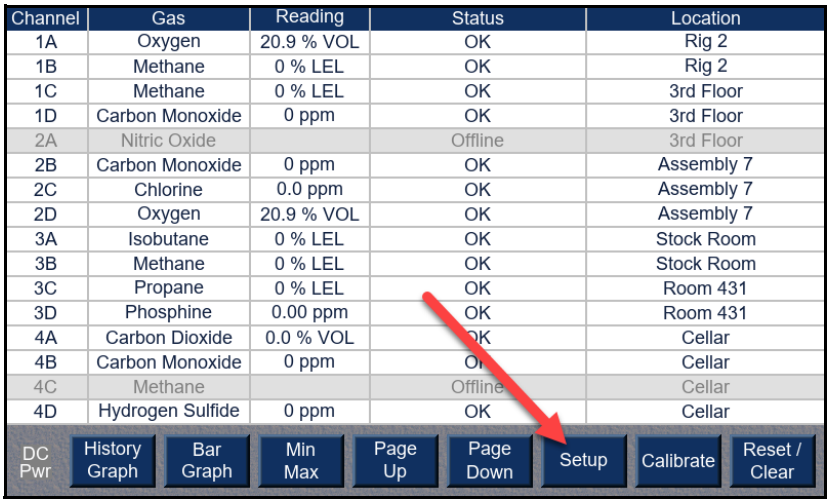


Figure 78: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Channel Settings**.

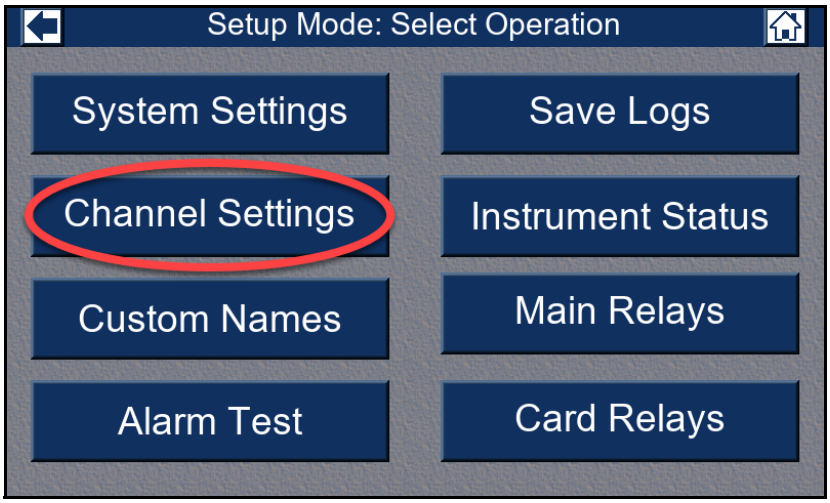


Figure 79: Channel Settings Button

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

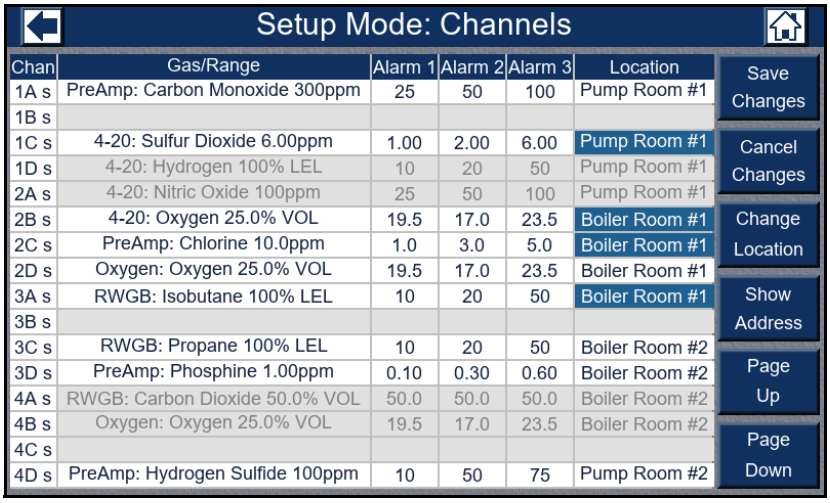


Figure 80: Selecting Channel Locations

6. Press **Change Location**.

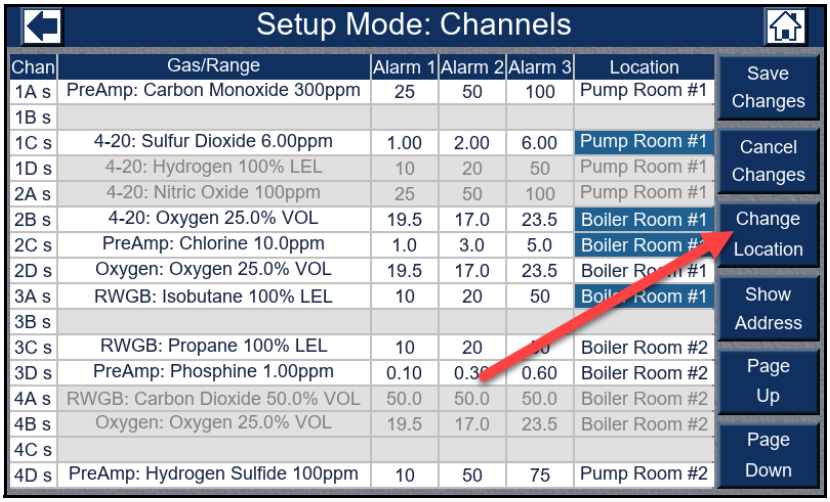


Figure 81: Change Location Button

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 (see Table 13).

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**.

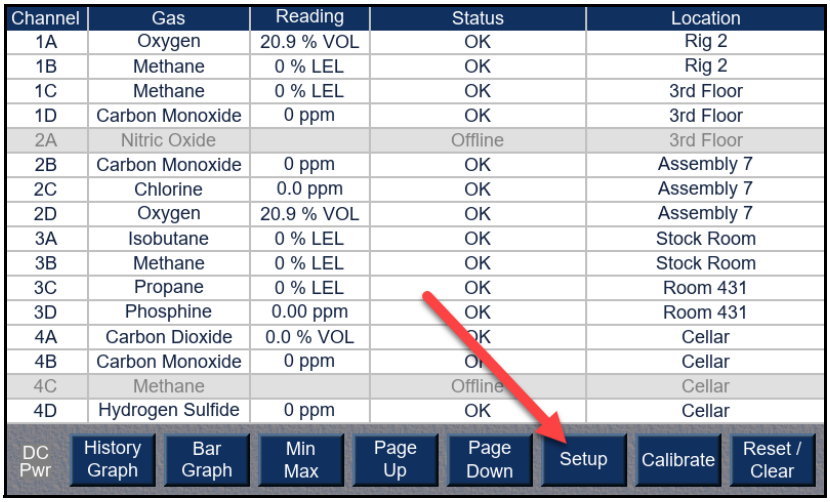


Figure 82: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Custom Names**.

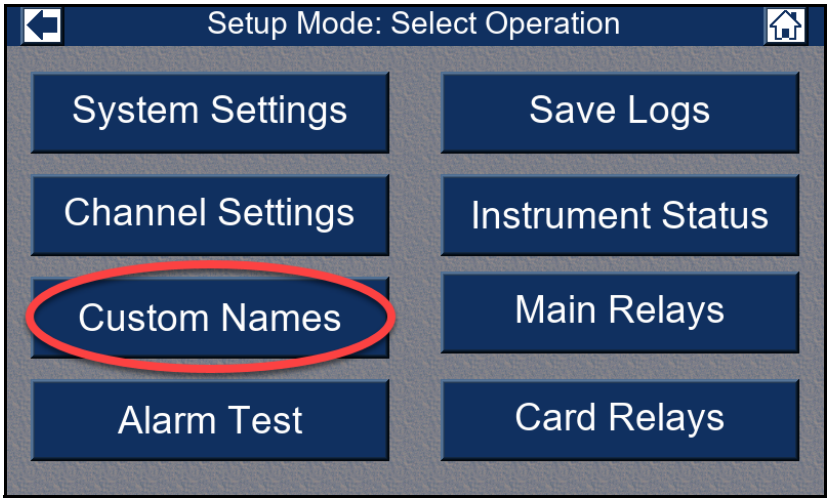


Figure 83: Custom Names Button

5. To add a custom gas/range:
   a. Press **Add Gas/Range** in the Custom Names menu.

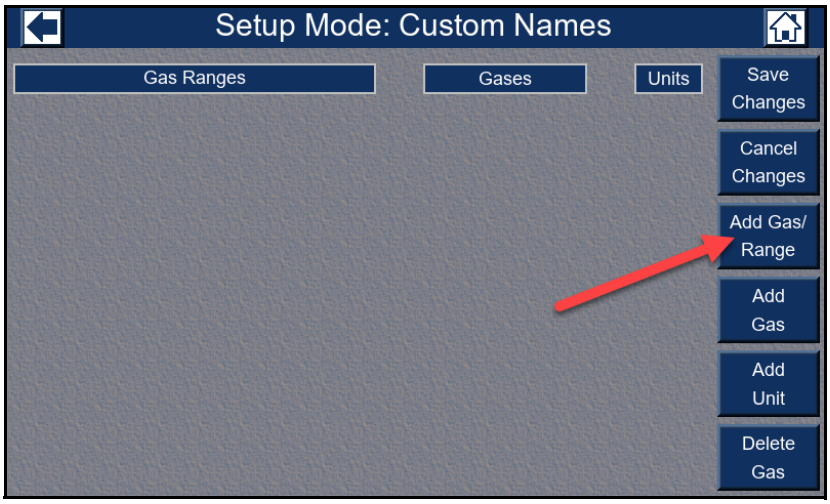


Figure 84: Add Gas/Range Button

   b. Select the desired detector type. See "Parameters in Channel Setup Menu" on page 72 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 **Gas Ranges** section on the screen.

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

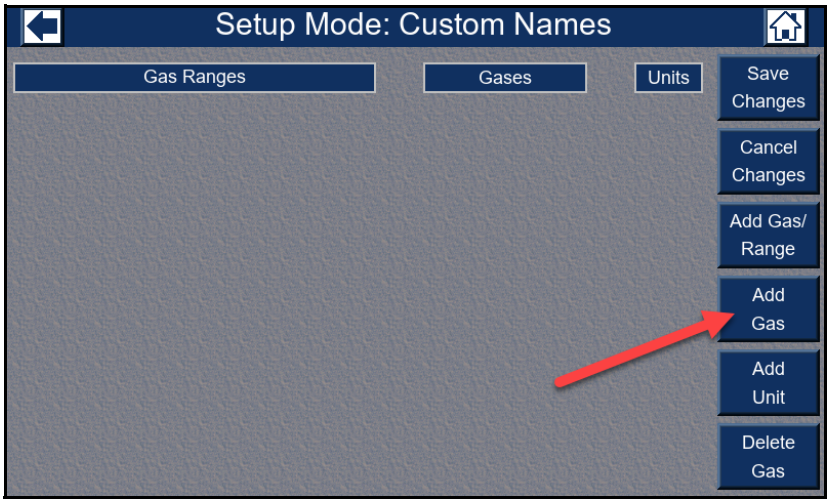


Figure 85: Add Gas Button

   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**.

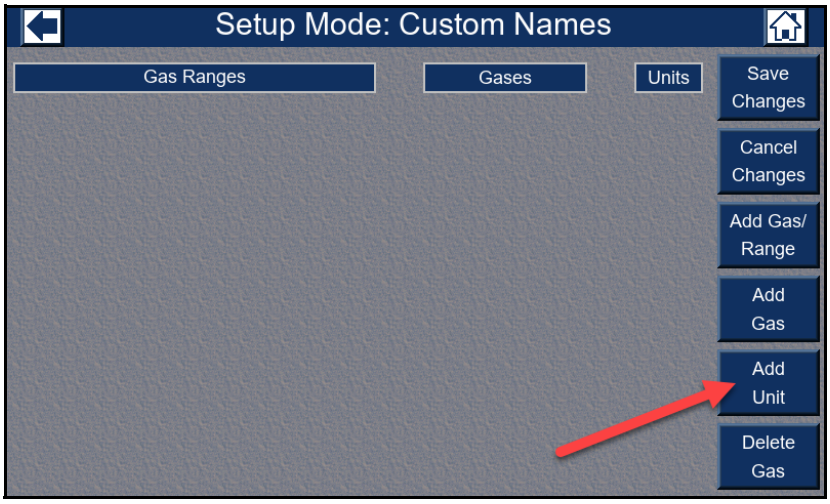


Figure 86: Add Unit Button

   b. Type in the desired custom unit name (uppercase letters, lowercase letters, numbers, and/or symbols). This parameter has 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 (see Table 13).

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

The main relays can only be user assigned as described if the **Main Relays** item under Accessories in System Settings is set to **Channel**. If **Main Relays** is set to **Common**, the Main Relays button will be grayed out and cannot be selected.

When **Main Relays** is set to **Common**, the main relays are automatically assigned based on relay/alarm number (Relay 1 assigned to Alarm 1, Relay 2 assigned to Alarm 2, Relay 3 assigned to Alarm 3).

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

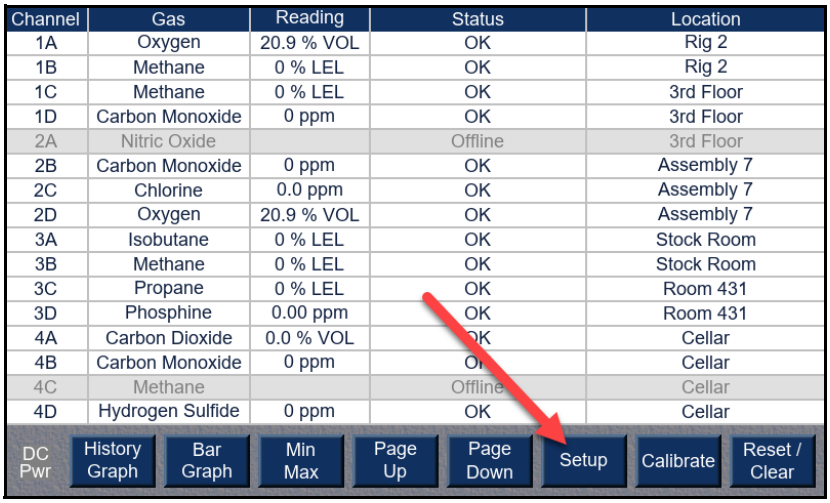


Figure 87: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Main Relays**.

NOTE: The main relays can only be user assigned if the **Main Relays** item under Accessories in System Settings is set to **Channel**. If **Main Relays** is set to **Common**, the Main Relays button will be grayed out and cannot be selected.

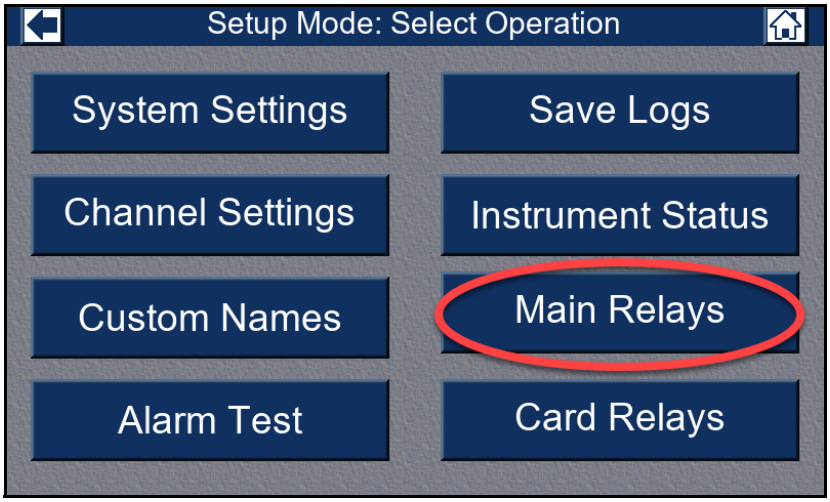


Figure 88: Main Relays Button

5. Select the alarm condition(s) of the relay assignment(s) you would like to change.

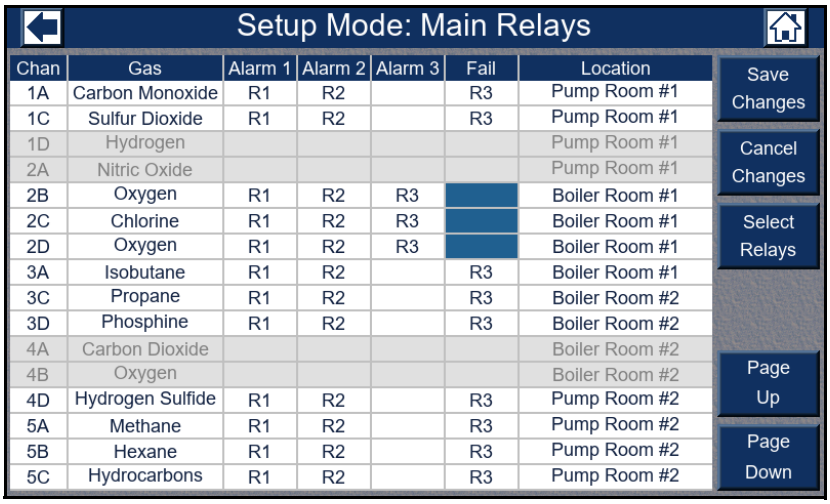


Figure 89: Selecting Main Relay Assignments

6. Press **Select Relays**.

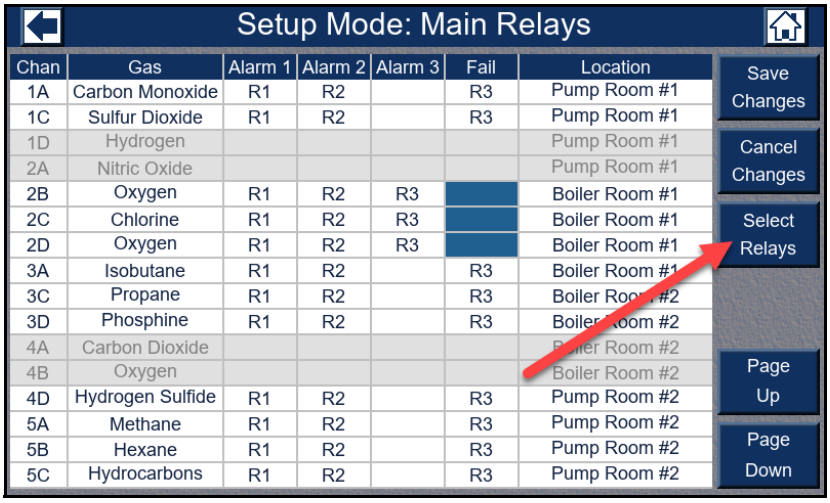


Figure 90: Select Relays Button

7. The relay selection menu appears.

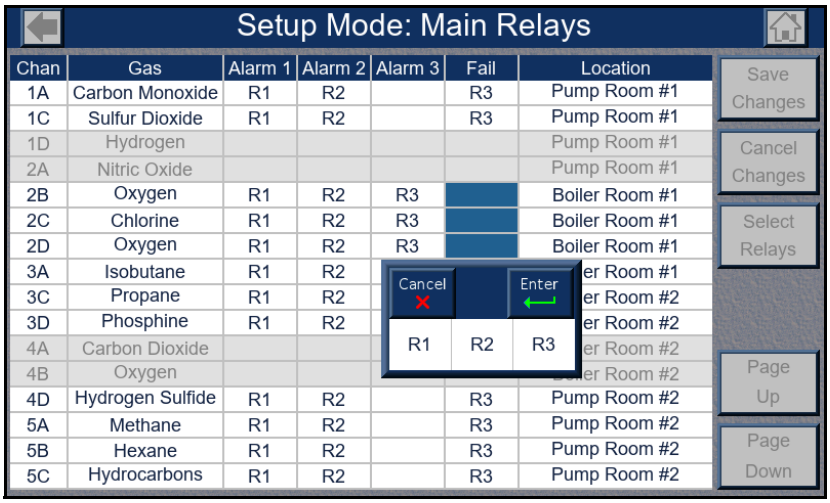


Figure 91: Select Relays Menu

If the alarms you selected already had relay assignments, any conflicting 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 (see Table 13).

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**.

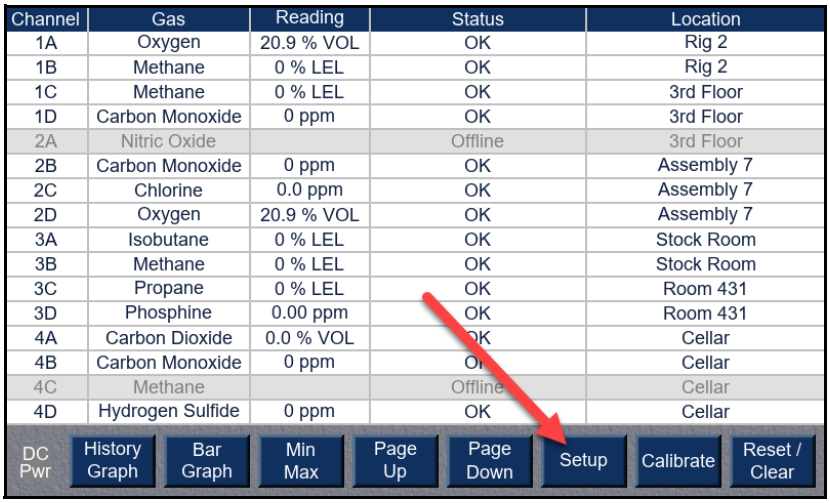


Figure 92: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Card Relays**.

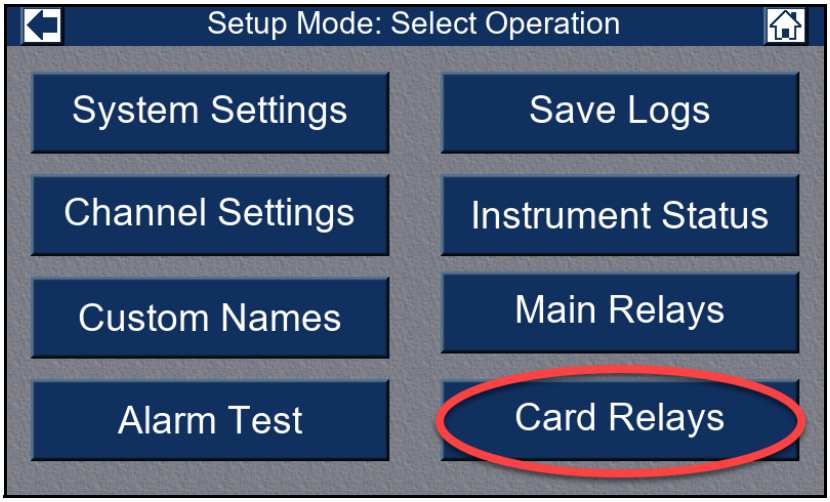


Figure 93: Card Relays Button

5. Select the alarm condition(s) of the relay assignment(s) you would like to change.

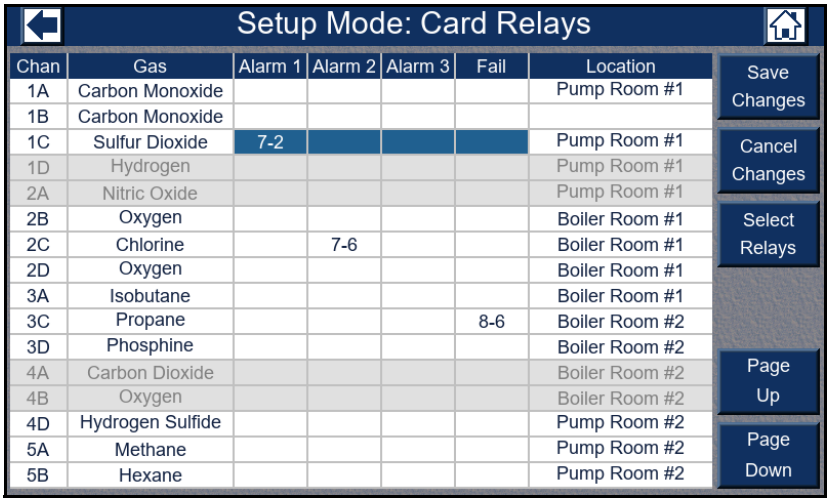


Figure 94: Selecting Card Relay Assignments

6. Press **Select Relays**.

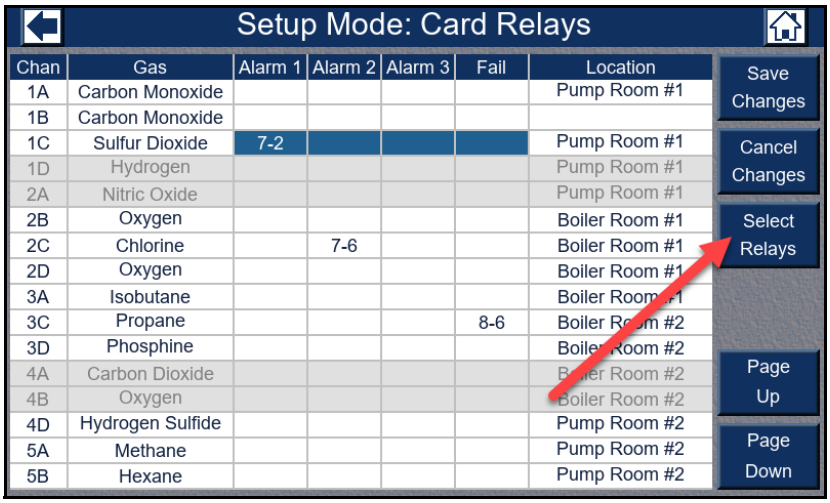


Figure 95: Select Relays Button

7. The relay selection screen appears.

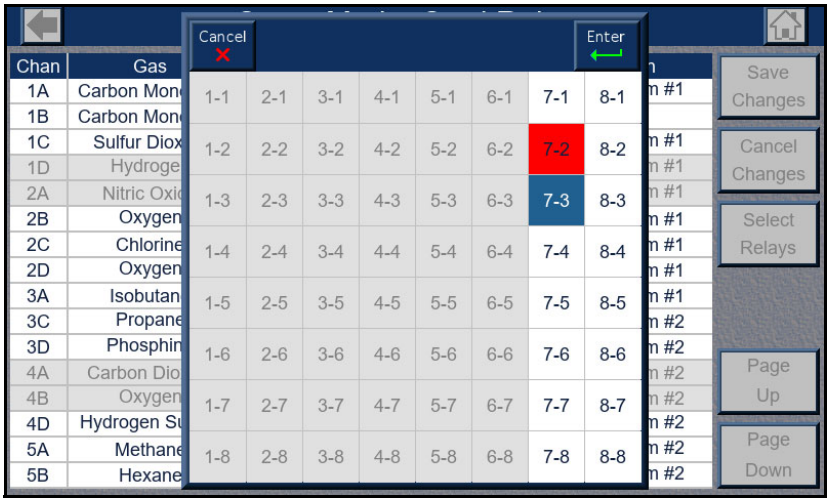


Figure 96: Select Relay Assignment Menu

Squares with a gray background are not installed relays and cannot be assigned. Blue or white squares 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**.

NOTE: Card relays assigned to be fail relays will automatically be set to normally-energized and cannot be adjusted.

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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 4-20 mA output signal for each selected channel "freezes" at 3.5 mA. 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 13).***

The 4-20 mA 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 16 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 and a gas adjust.

Table 16: 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	This parameter displays the install and calibration dates. Both of these fields can be updated manually. • The **Install Date** field is populated when a channel is added and updated if the channel's head type or gas/range is changed. • The **Calibration Date** field is populated when exiting Calibration Mode after performing a complete calibration (fresh air adjust and gas adjust).

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 a particular application demands 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 at the Beacon 3200 after calibration gas is applied to the detectors.
- 4-20 mA transmitter detector heads (4-20 mA Transmitter input)

  All calibration adjustments are made at the detector head when calibration gas is applied to the detectors.
- Modbus detector heads

  All calibration adjustments are made at the detector head 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 (see Table 13).

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**.

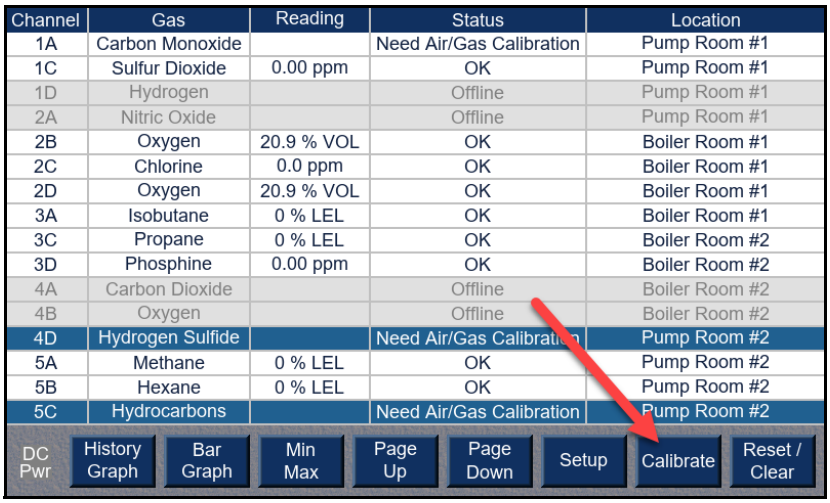


Figure 97: Calibration Mode Button

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.

   For more information about the relay deactivation setting, see page 70.

5. Press **Fresh Air Adjust**.

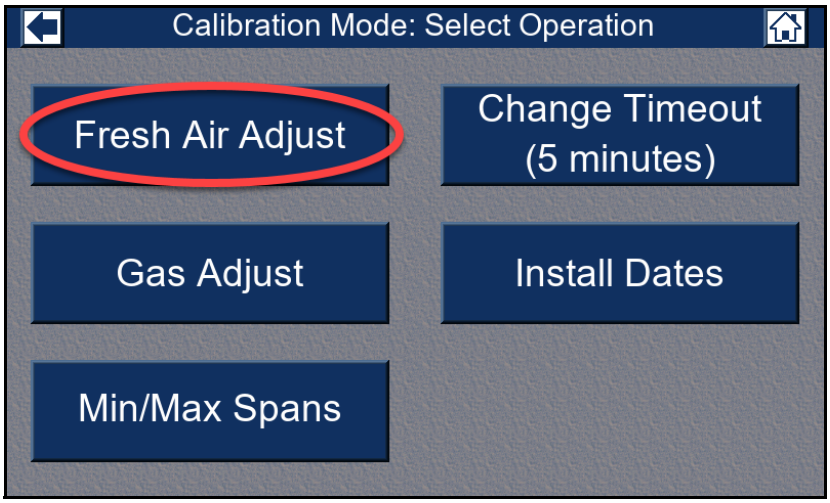


Figure 98: Fresh Air Adjust Button

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**.

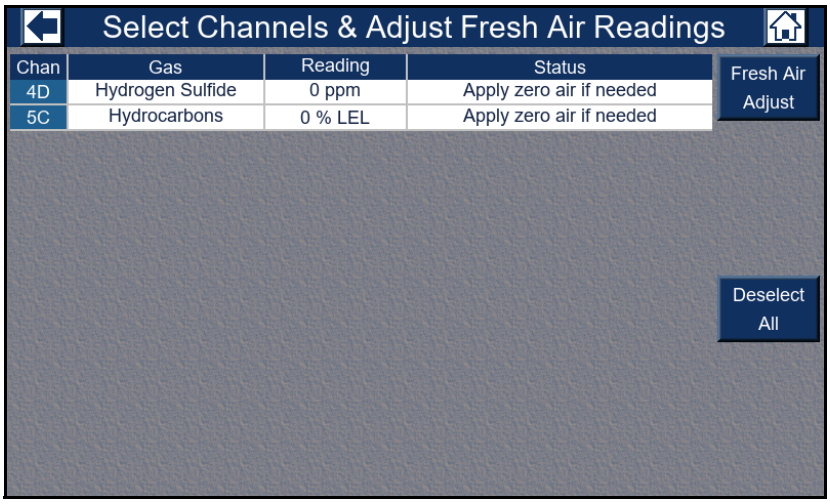


Figure 99: Fresh Air Adjust Menu

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 not in a fresh air environment:
    a. Apply zero air to each selected detector for two minutes. 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.

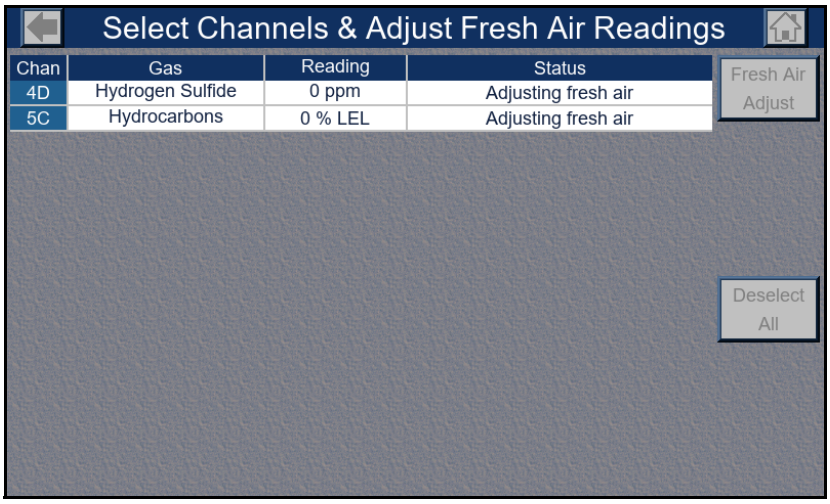


Figure 100: Fresh Air Adjust Results

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 (see Table 13).

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**.

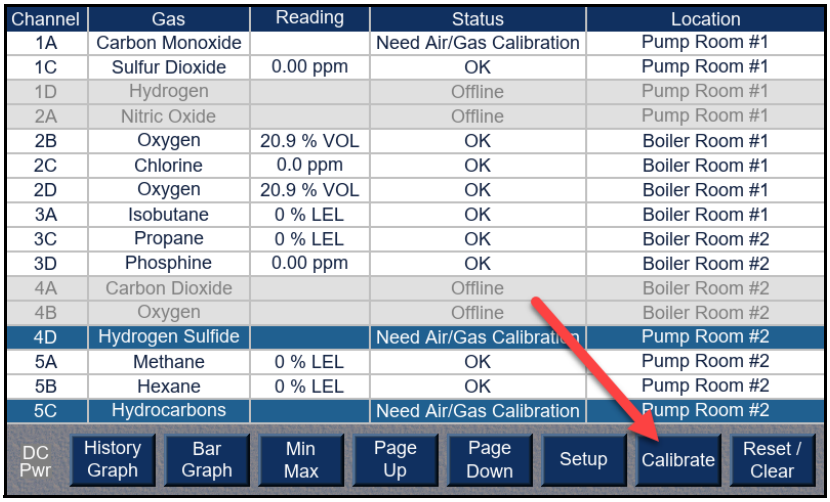


Figure 101: Calibration Mode Button

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.

   For more information about the relay deactivation setting, see page 70.

5. Press **Gas Adjust**.

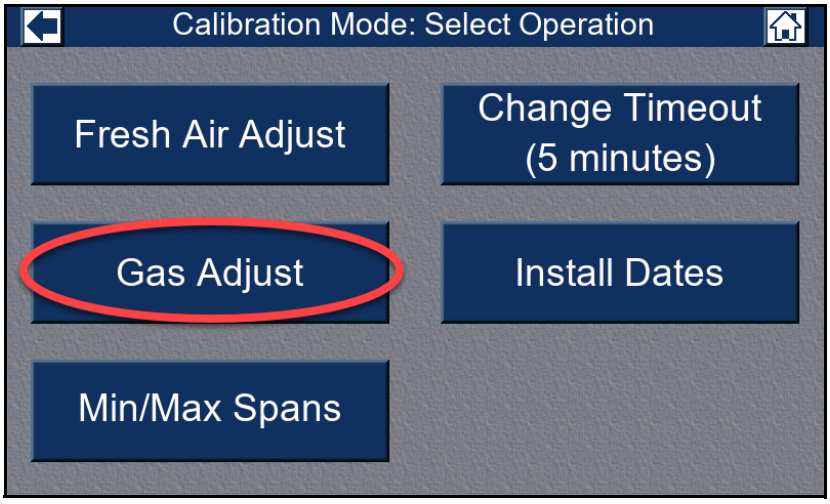


Figure 102: Gas Adjust Button

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**.

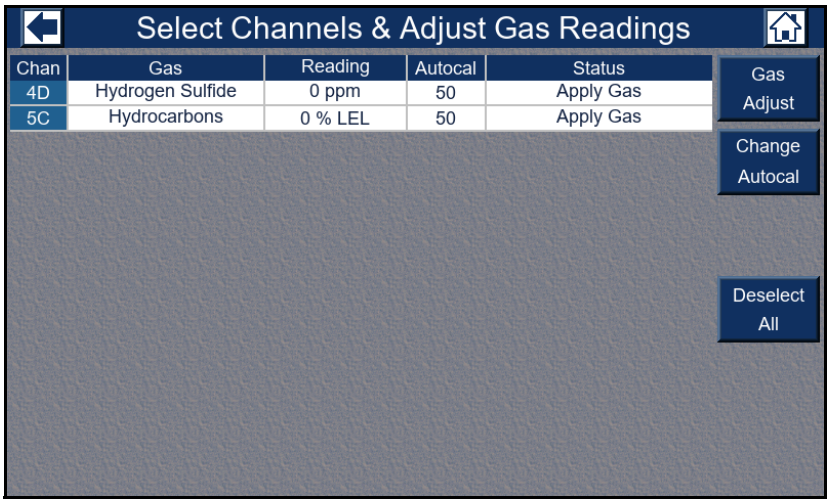


Figure 103: Gas Adjust Menu

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.

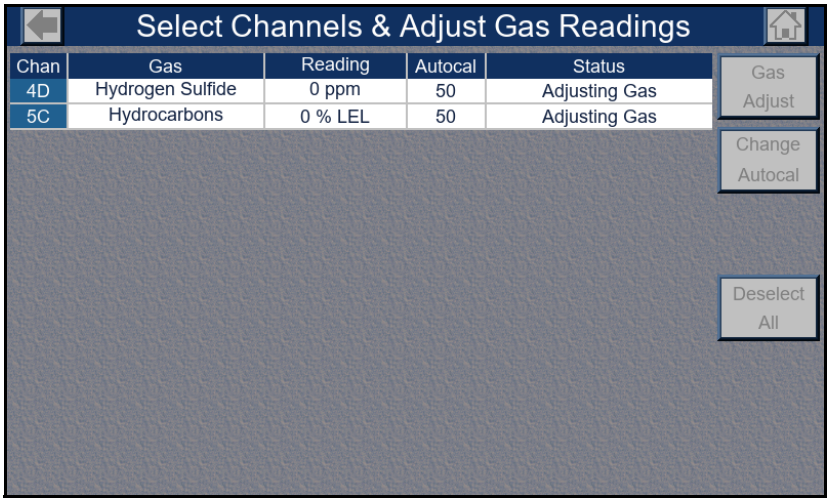


Figure 104: Gas Adjust Results

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.

NOTE: 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 (see Table 13).

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**.

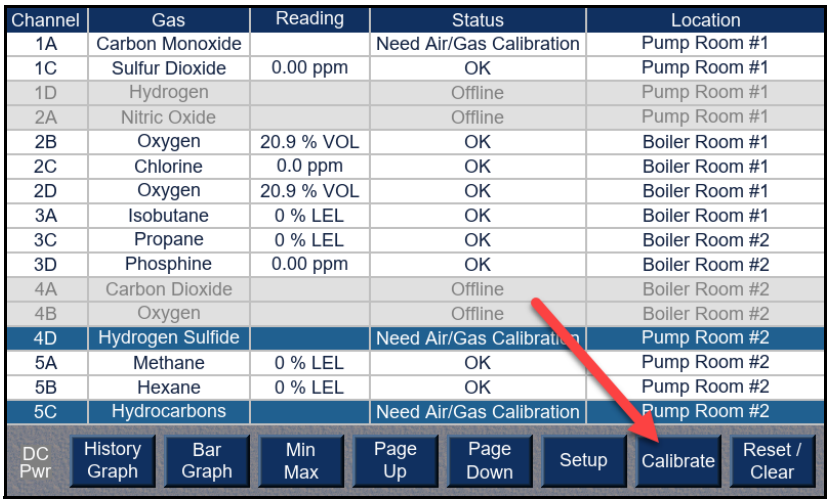


Figure 105: Calibration Mode Button

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.

   For more information about the relay deactivation setting, see page 70.
4. Press **View Min/Max Spans**.

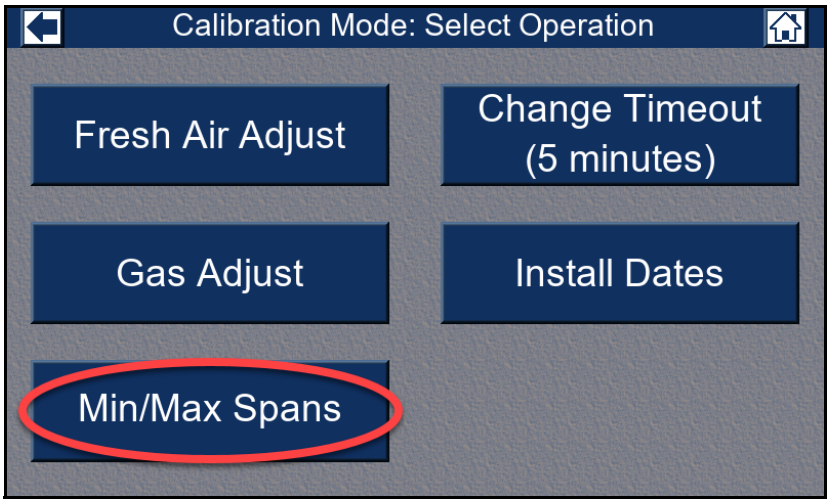
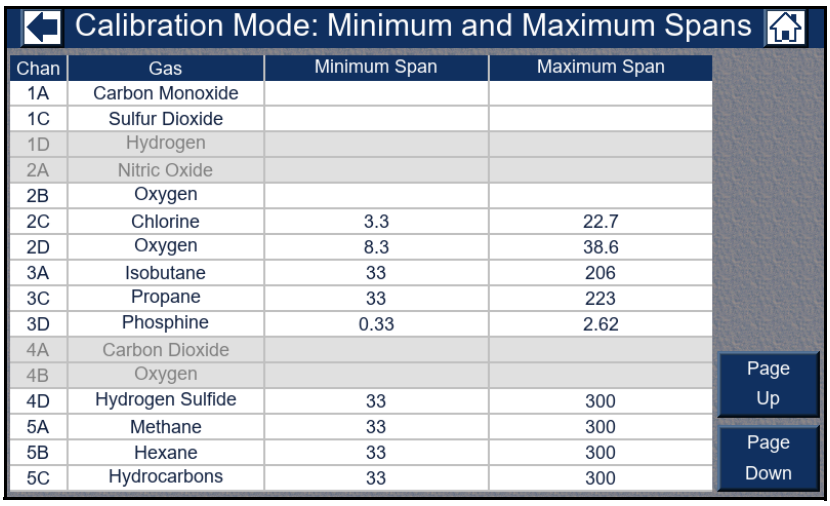


Figure 106: Min/Max Spans Button

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	Carbon Monoxide		
1C	Sulfur Dioxide		
1D	Hydrogen		
2A	Nitric Oxide		
2B	Oxygen		
2C	Chlorine	3.3	22.7
2D	Oxygen	8.3	38.6
3A	Isobutane	33	206
3C	Propane	33	223
3D	Phosphine	0.33	2.62
4A	Carbon Dioxide		
4B	Oxygen		
4D	Hydrogen Sulfide	33	300
5A	Methane	33	300
5B	Hexane	33	300
5C	Hydrocarbons	33	300

Figure 107: Viewing the Min/Max Spans Menu

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 (see Table 13).

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**.

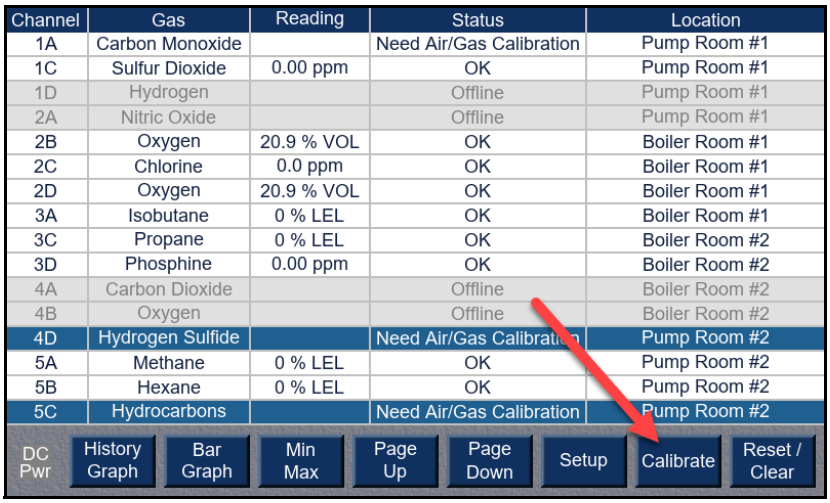


Figure 108: Calibration Mode Button

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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Set Timeout**.

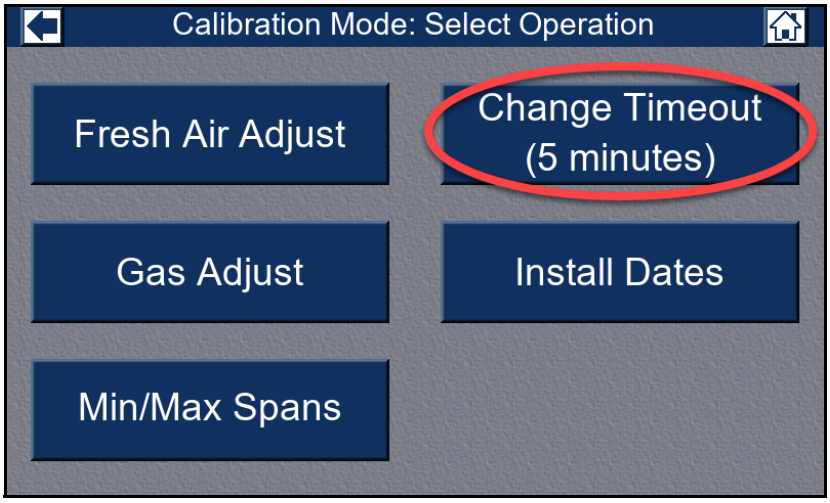


Figure 109: Change Calibration Timeout Button

5. A number pad appears. Type in a new value (**1** to **240** minutes). Press **Enter** to save the parameter.

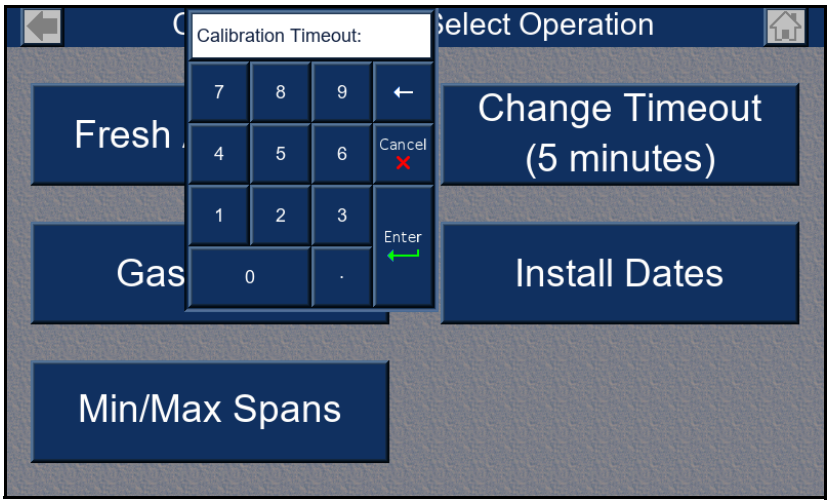


Figure 110: Calibration Timeout Numpad

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

Changing the Install and Calibration Dates

Each channel's sensor installation and calibration dates are updated automatically but can also be changed manually.

- Installation Date: The installation date is automatically saved when a channel is created and is updated when the channel's head type or gas/range are changed.
- Calibration Date: The calibration date is automatically saved when exiting Calibration Mode after performing a complete calibration (fresh air adjust and gas adjust).

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 (see Table 13).

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**.

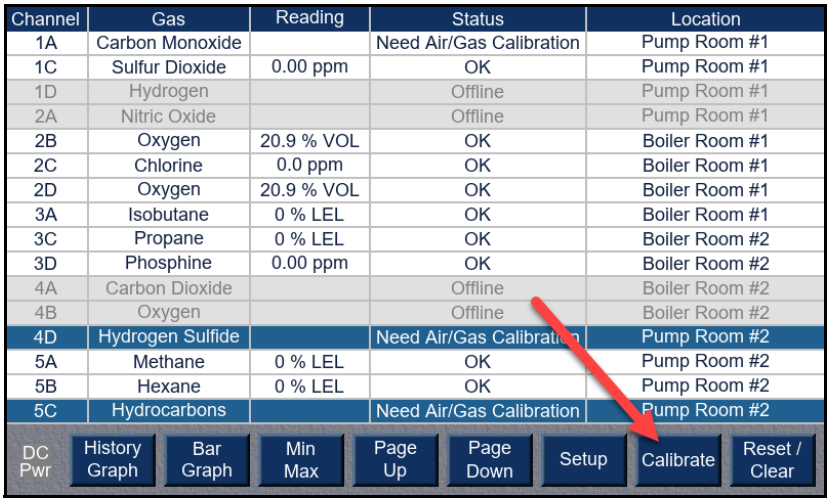


Figure 111: Calibration Mode Button

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.

   For more information about the relay deactivation setting, see page 70.

4. Press **Install Dates**.

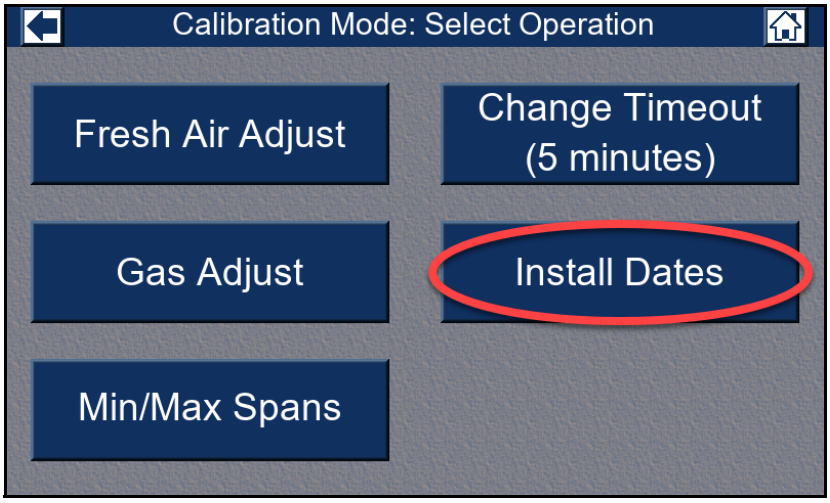
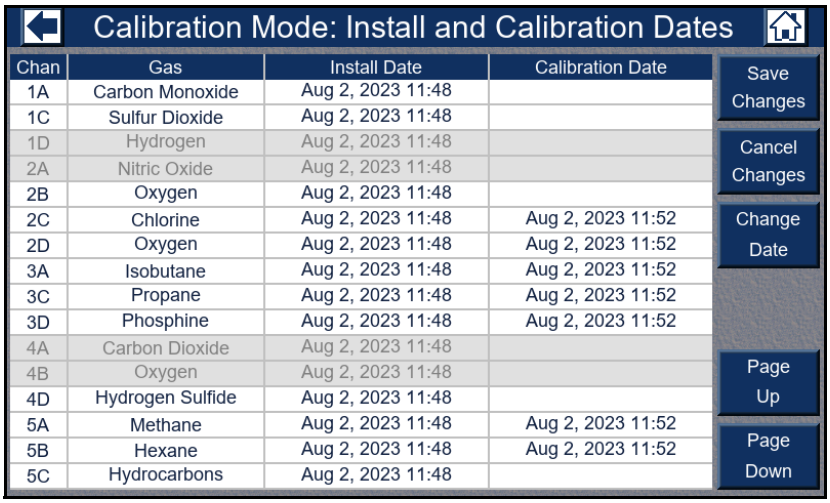


Figure 112: Install Dates Button

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



Chan	Gas	Install Date	Calibration Date
1A	Carbon Monoxide	Aug 2, 2023 11:48	
1C	Sulfur Dioxide	Aug 2, 2023 11:48	
1D	Hydrogen	Aug 2, 2023 11:48	
2A	Nitric Oxide	Aug 2, 2023 11:48	
2B	Oxygen	Aug 2, 2023 11:48	
2C	Chlorine	Aug 2, 2023 11:48	Aug 2, 2023 11:52
2D	Oxygen	Aug 2, 2023 11:48	Aug 2, 2023 11:52
3A	Isobutane	Aug 2, 2023 11:48	Aug 2, 2023 11:52
3C	Propane	Aug 2, 2023 11:48	Aug 2, 2023 11:52
3D	Phosphine	Aug 2, 2023 11:48	Aug 2, 2023 11:52
4A	Carbon Dioxide	Aug 2, 2023 11:48	
4B	Oxygen	Aug 2, 2023 11:48	
4D	Hydrogen Sulfide	Aug 2, 2023 11:48	
5A	Methane	Aug 2, 2023 11:48	Aug 2, 2023 11:52
5B	Hexane	Aug 2, 2023 11:48	Aug 2, 2023 11:52
5C	Hydrocarbons	Aug 2, 2023 11:48	

Figure 113: Install and Calibration Dates Menu

6. To change the install date or calibration date for one or more channels, select the dates you want to change. Multiple install dates or multiple calibration dates can be changed at once, but both cannot be changed at the same time.

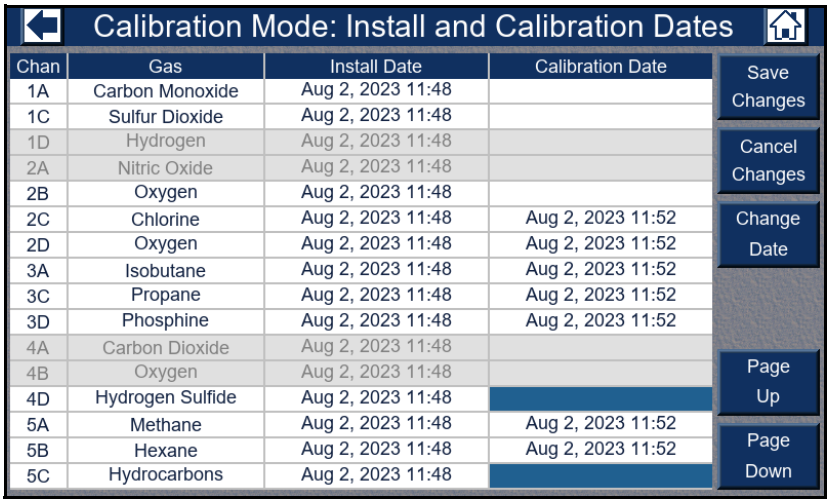


Figure 114: Multiple Calibration Date Fields Selected

7. Press **Change Date**.

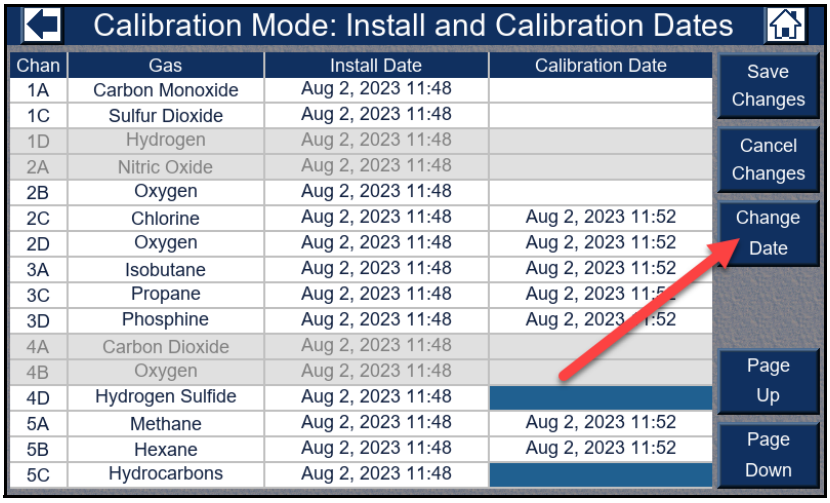


Figure 115: Change Date Button

8. A number pad appears with the current time and date automatically filled in. Select the year, month, date, hour, minute, and second.
9. Press **Enter**. Change more dates, if necessary.
10. Press **Save Changes**.
11. 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.

Alarm Test

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

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

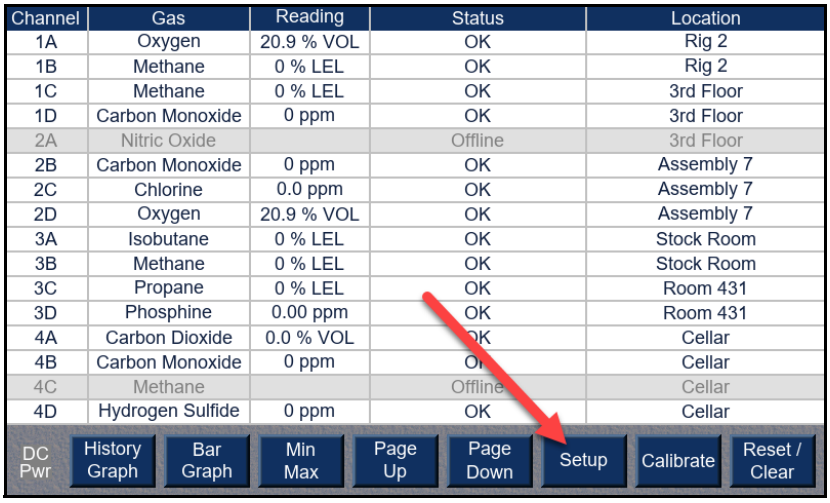


Figure 116: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

NOTE: If **Relays Deact** in System Settings is set to **Setup** or **Setup and Calibrate**, the 4-20 mA output for each active channel goes to 3.5 mA when entering Setup Mode and then reflects the current simulated display reading while in Alarm Test. If **Relays Deact** in System Settings is set to **Never** or **Calibrate Mode**, the 4-20 mA output for each channel reflects the current reading when entering Setup Mode and reflects the current simulated display reading while in Alarm Test.

For more information on 4-20 mA output behavior while using the Alarm Test feature, see Table 10, "4-20 mA Output Conditions," on page 52.

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4. Press **Alarm Test**.

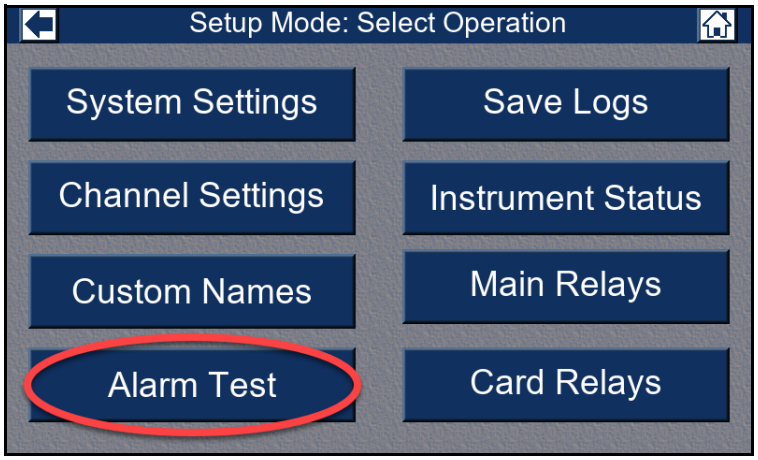


Figure 117: Alarm Test Button

5. The **Alarm Test** screen appears, displaying up to 16 configured channels and row of buttons.

   The following list describes the function of each button and their effect on the relays of selected channels.

Channel	Gas	Reading	Status	Location
1A	Carbon Monoxide		Need Air/Gas Calibration	Pump Room #1
1C	Sulfur Dioxide	0.00 ppm	OK	Pump Room #1
1D	Hydrogen		Offline	Pump Room #1
2A	Nitric Oxide		Offline	Pump Room #1
2B	Oxygen	20.9 % VOL	OK	Boiler Room #1
2C	Chlorine	0.0 ppm	OK	Boiler Room #1
2D	Oxygen	20.9 % VOL	OK	Boiler Room #1
3A	Isobutane	0 % LEL	OK	Boiler Room #1
3C	Propane	0 % LEL	OK	Boiler Room #2
3D	Phosphine	0.00 ppm	OK	Boiler Room #2
4A	Carbon Dioxide		Offline	Boiler Room #2
4B	Oxygen		Offline	Boiler Room #2
4D	Hydrogen Sulfide	0 ppm	OK	Pump Room #2
5A	Methane	0 % LEL	OK	Pump Room #2
5B	Hexane	0 % LEL	OK	Pump Room #2
5C	Hydrocarbons	0 % LEL	OK	Pump Room #2

Alarm Test Mode | Alarm 1 | Alarm 2 | Alarm 3 | Page Up | Page Down | Cancel Test | ← | Reset / Clear

Figure 118: Alarm Test Display

Alarm 1

- Pressing the Alarm 1 button will ramp the reading for any selected channel(s) and the 4-20 mA output 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) and the 4-20 mA output 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) and the 4-20 mA output 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 (if there are more than 16 configured channels)

- Pressing Page Up or Page Down buttons will scroll between the first and second screen of all configured channels.

Cancel Test

- Pressing the Cancel Test button returns the reading(s) and 4-20 mA output(s) to their fresh air values and deactivates all relays associated with the alarms triggered during the test.

Back Arrow

- Pressing the back arrow button navigates back to the Setup Mode screen.

Reset/Clear

- Pressing the Reset/Clear button clears any alarm conditions that have passed and deactivates any relays associated with those alarm conditions.

  For example, if Alarm 1 is pressed after Alarm 3, the Alarm 2 and Alarm 3 conditions will persist for the selected channel(s) even though the reading(s) have changed to the Alarm 1 setpoint(s). Pressing the Reset/Clear button will clear Alarm 2 and Alarm 3 on the selected channel(s) and deactivate any relays associated with those alarm conditions.

Troubleshooting

Table 17 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 17: 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 17: 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.

RS-485 Modbus and Modbus Over Ethernet Settings

The RS-485 Modbus and Modbus over Ethernet settings are accessed in Setup Mode's System Settings. See the Modbus Master and Modbus Slave settings on page 63 and page 64 for a description of the RS-485 Modbus settings and how to change them.

See the Ethernet settings on page 63 and the Instrument Status fields on page 68 for descriptions of the Modbus over Ethernet settings and how they can be configured.

NOTE: RKI Instruments does not provide a PC application to be used with the Beacon 3200's RS-485 Modbus output or its Modbus over Ethernet output. Users must provide their own software.

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 18: Register 40000

Register	MSB	LSB
40000	Operating Mode • 0 = Not Used • 1 = Testing with PC App • 2 = Normal Operation • 3 = Setup • 4 = Calibration • 5 = Low Power	• 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 19 - Table 21 outline what register numbers apply to each channel. Table 22 on page 135 defines each of those registers.

Table 19: 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
“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

Table 19: 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
“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 20: 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
“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

Table 20: 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
“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 21: 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
“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

Table 21: Register Assignments for Channels “7” - “8”

Register	Ch. 7A	Ch. 7B	Ch. 7C	Ch. 7D	Ch. 8A	Ch. 8B	Ch. 8C	Ch. 8D
“20”	40500	40520	40540	40560	40580	40600	40620	40640

Table 22: Definitions for Registers “1” - “18”

Register	Channel State (MSB)	Channel Status Bits (LSB)
“1”	• 0 = Not Used • 1 = Not Used • 2 = Normal Operation • 3 = Warmup • 4 = Failed • 5 = Calibration • 6 = Post Calibration • 7 = Low Power • 8 = Setup • 9 = Comm. Failed • 10 = Channel Offline	• 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]
“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]

Table 22: Definitions for Registers “1” - “18”

Register	Channel State (MSB)	Channel Status Bits (LSB)
“18”	Gas Units[4]	Gas Units[5]

Table 23: Definitions for Registers “19” - “20”

Register	Description
“19”	Numerical value of gas reading in an unsigned integer.
“20”	• Bit 8 = 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 x100) 0100 = .FFF (0 digits, 3 fraction; the count represents the reading x1000)

Function Code 06: Write Single Register

Register 40000: Write a non-zero value to clear alarm indications.

Chapter 14: Sensor Logs Program

The Beacon 3200 records data for each channel once per second. Up to 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

NOTE: When a data file is saved to a USB drive, the Beacon 3200 generates the file name using the current date. Multiple .RKI files saved to the same location on the same day will have identical file names. Data files should be renamed *before saving additional logs on the same day*.

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**.

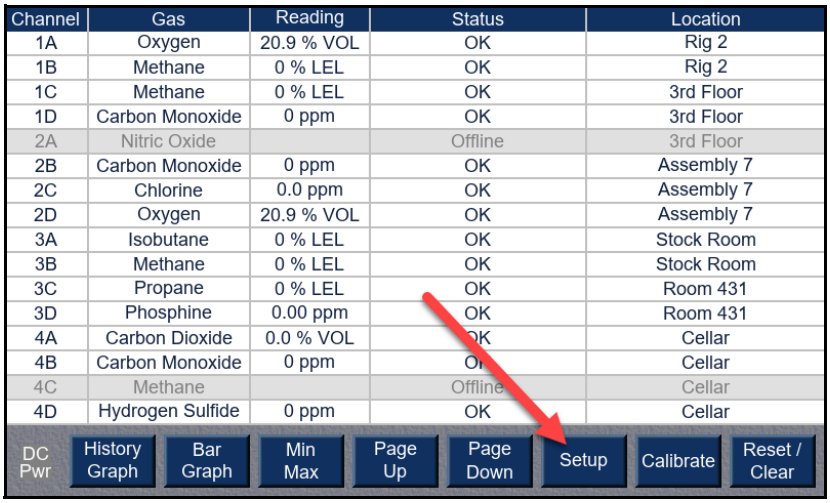


Figure 119: Setup Mode Button

3. If a 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.

   For more information about the relay deactivation setting, see page 70.

5. Press **Save Logs**.

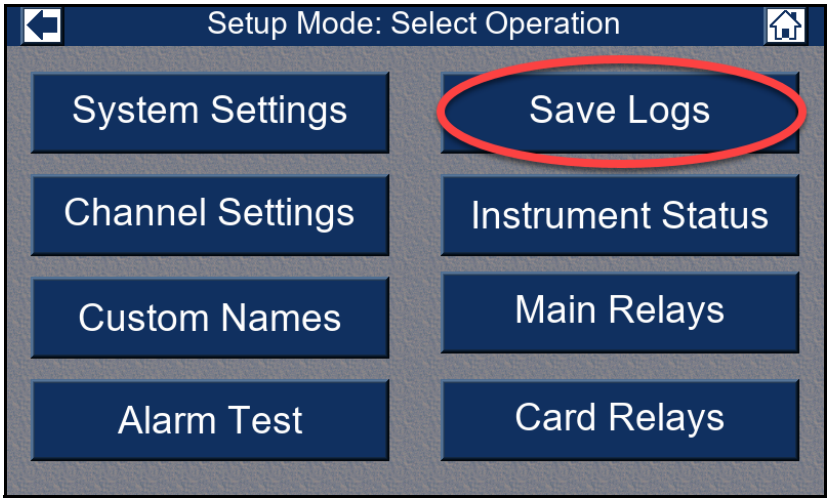


Figure 120: Save Logs Button

6. A progress bar tracks the data-writing status.
7. The **Cancel** button changes to a **Done** button when the data-writing is finished.

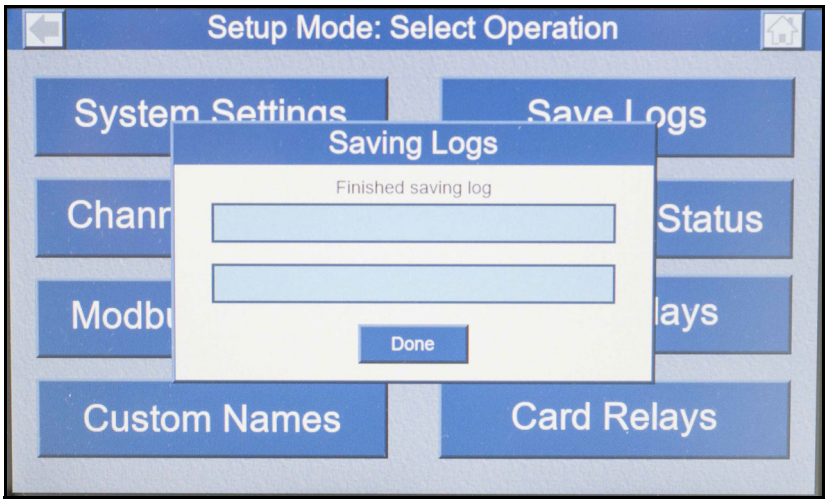


Figure 121: Loading Bar for Saving Logged Data

8. Press **Done**. A data file is created on the USB drive (.RKI format). File names are assigned using the date that the file was created.

CAUTION: *When saving multiple Beacon 3200 data files on the same day and in the same location, each file should be renamed before saving a new file to prevent data files from being overwritten.*

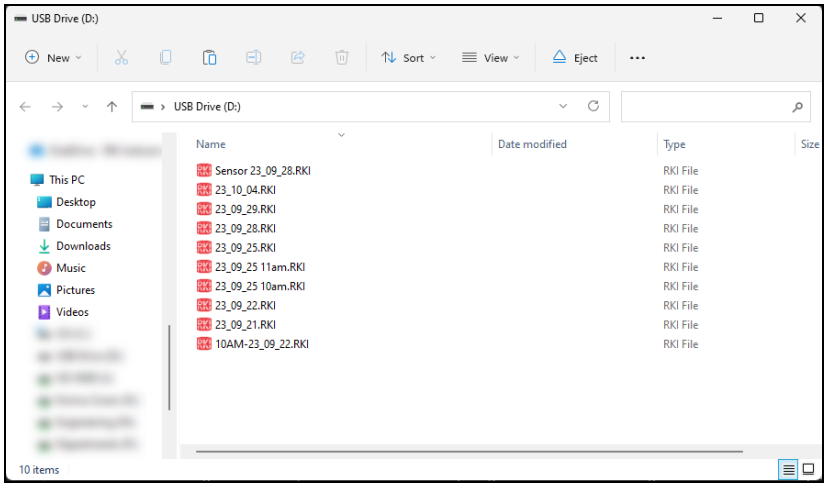


Figure 122: USB Drive File Directory

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 by the "Timeouts" setting found in Setup Mode's System Settings (see Table 13).

10. Remove the USB drive from the Beacon 3200.

CAUTION: *All Beacon 3200 data files should be saved to a computer or external storage device before opening via the Sensor Logs Program.*

Installing the Sensor Logs Program

1. Navigate to the Software page on the RKI Instruments, Inc. website.
2. Click on “Fixed Systems”.
3. Click on “Beacon 3200 Sensor Logs” to begin downloading the .zip folder.

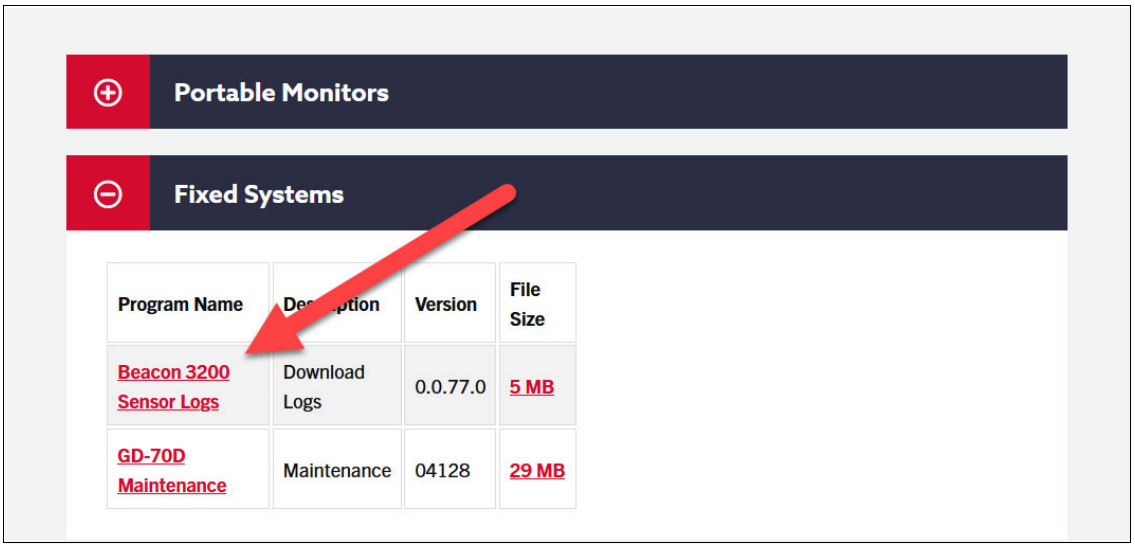


Figure 123: Software Download Link

NOTE: Use the Sensor Logs Program version number that matches your instrument's firmware version number. See “Viewing Instrument Status” on page 67 for instructions to view the firmware version.

If the Sensor Logs Program version number on the RKI website does not match your instrument firmware version, contact RKI Instruments to obtain the appropriate Sensor Logs Program version.

4. Unzip the .zip folder and save its contents in a desired location.
5. Open the saved folder and click on the setup file.

6. The program installation window appears. Follow the on-screen instructions to finish installing the Sensor Logs Program.

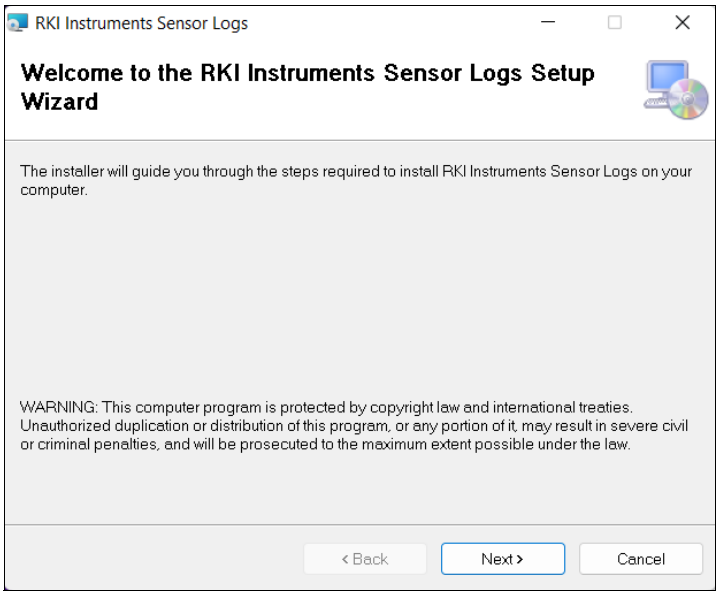


Figure 124: Sensor Logs Setup Wizard

7. Locate **RKI Sensor Logs** program and double click the file to launch it. The default window configuration appears with all windows blank.

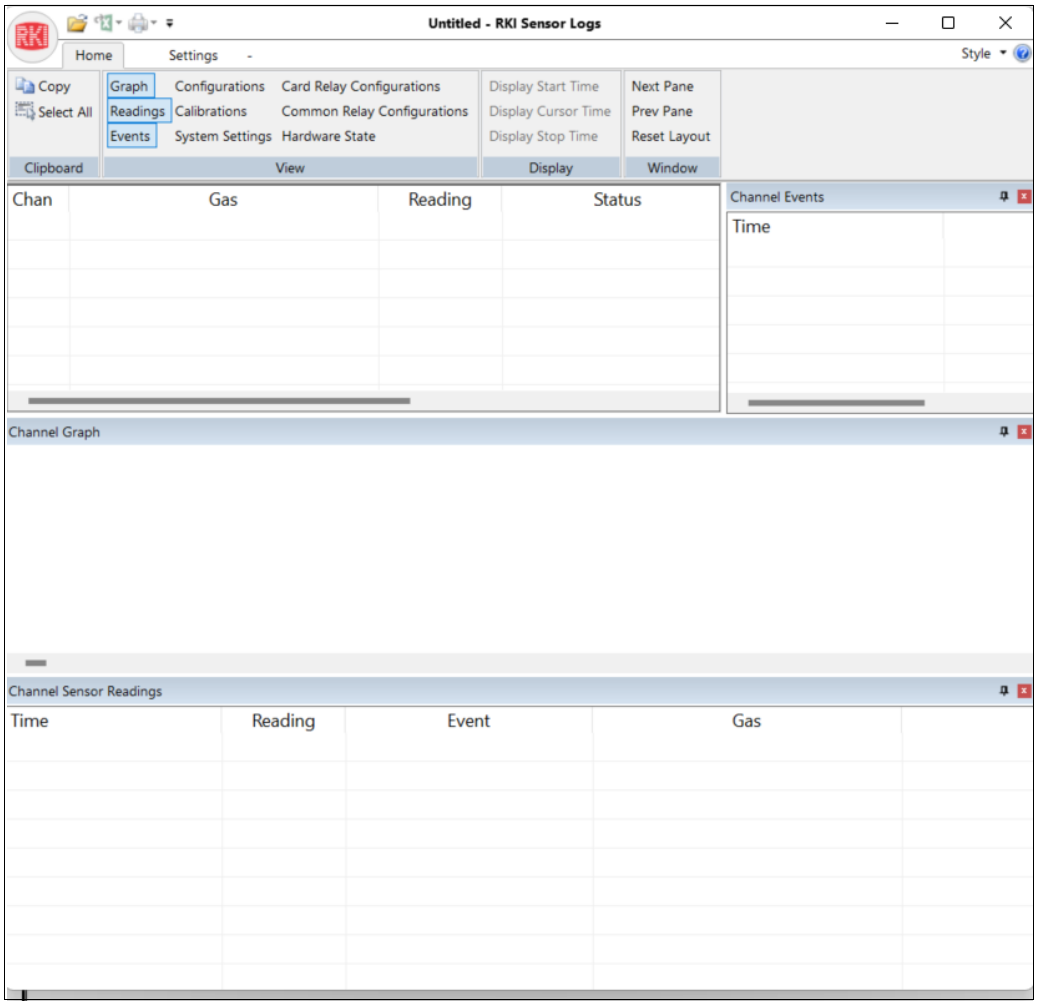


Figure 125: Sensor Logs Program Window

Viewing Data via the Sensor Logs Program

To view logged data saved by the Beacon 3200, data files generated by the Beacon 3200 must be opened using the Sensor Logs Program.

1. Open the RKI Sensors Logs program and click the **Open** folder icon in the top left corner of the Sensor Logs window.

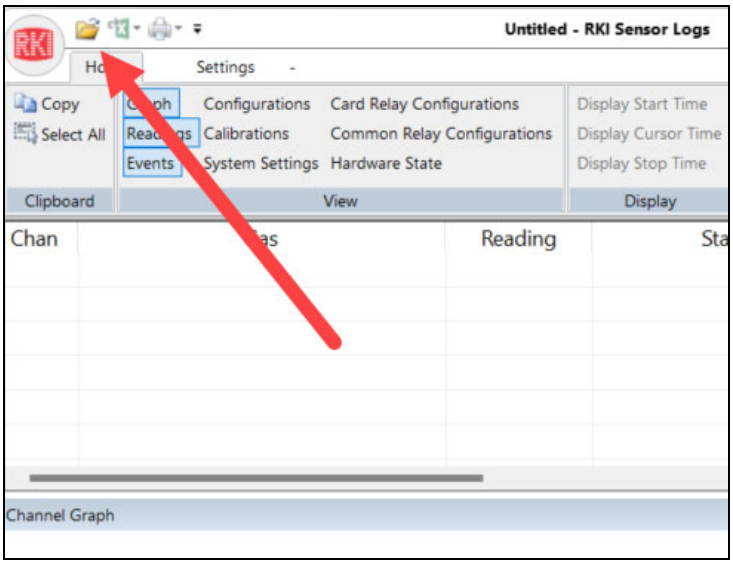


Figure 126: Open Folder Icon

2. A file directory window opens. After navigating to the Beacon 3200 data files (.RKI files), double-click on the desired file to open it.

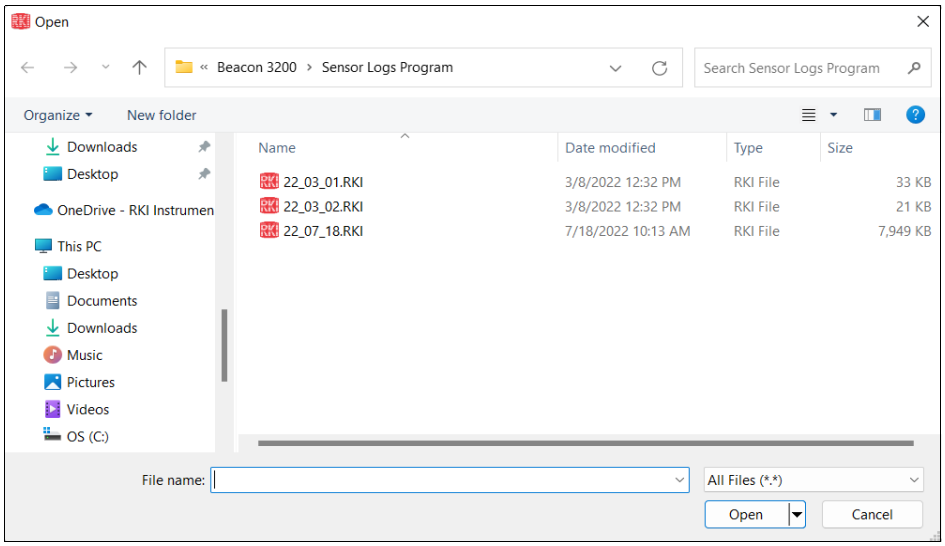


Figure 127: File Directory of Data Files

3. The Sensor Logs Program loads the .RKI file's data and displays it in the default configuration as shown below.

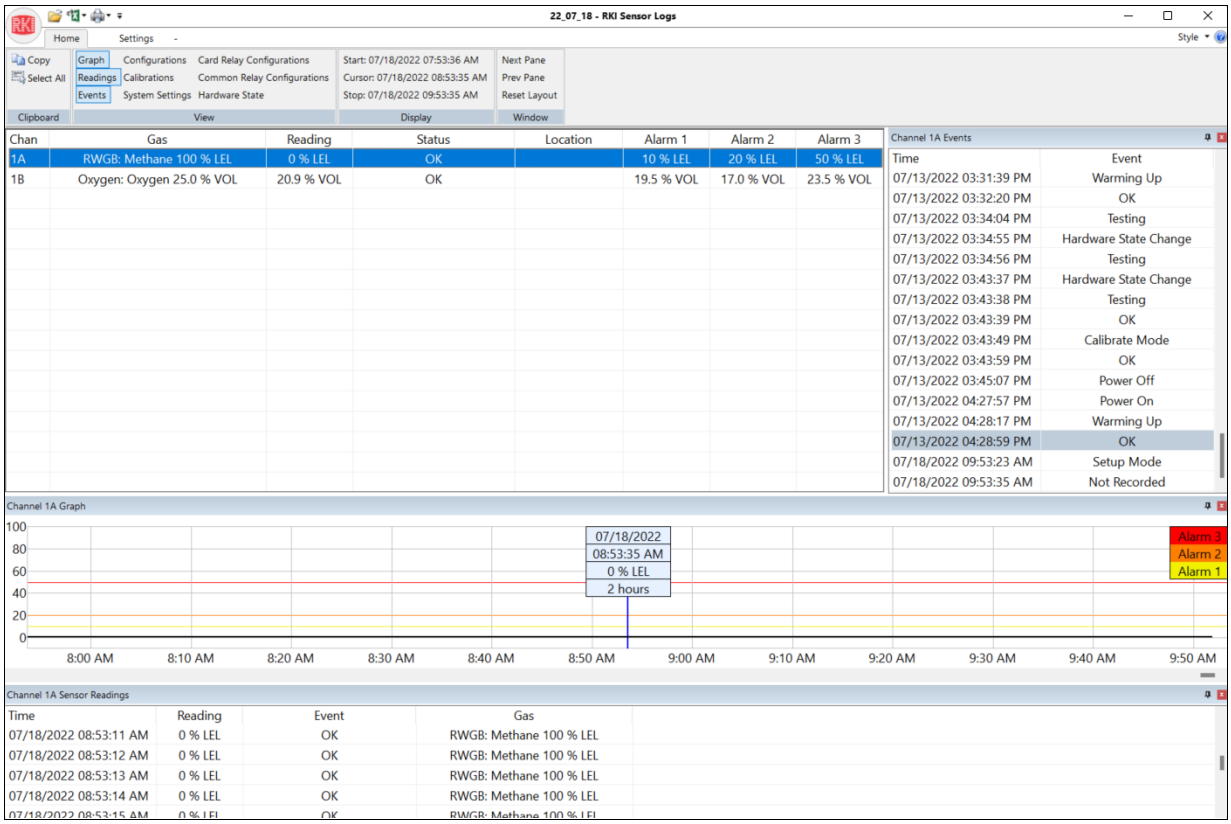


Figure 128: Default Configuration

Using the Sensor Logs Program

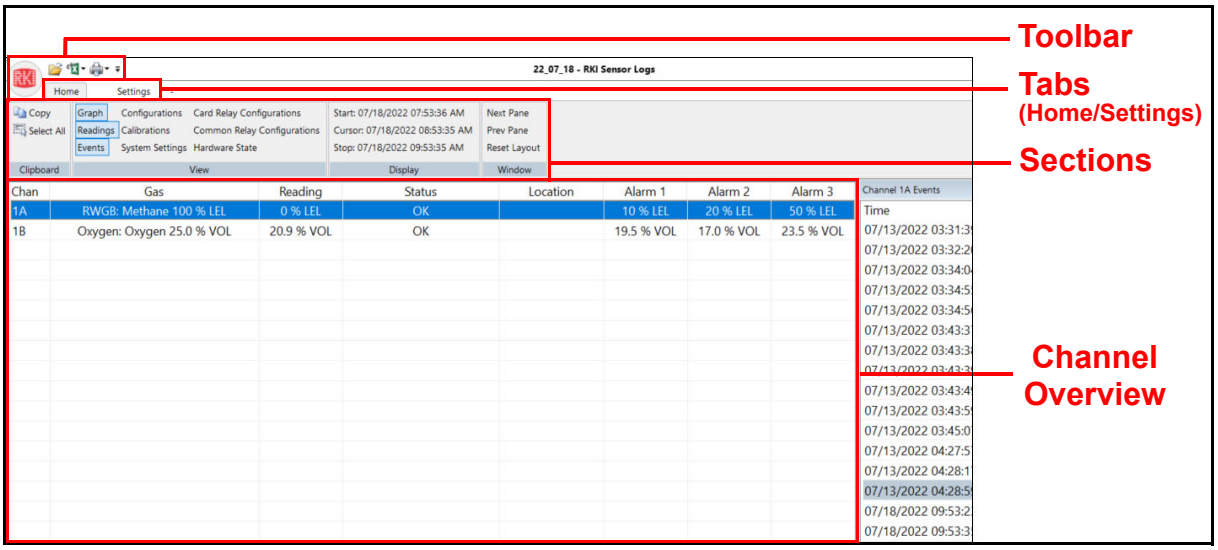


Figure 129: Sensor Logs Program Interface

After opening a data file, the Sensor Logs Program can be used to view and export sensor logs.

Channel Overview

The Channel Overview pane is used to select channels. Selections made in the Channel Overview will populate the other view panes with the selected channel's readings, main relay or card relay configurations, and calibration data.

Home Tab

Clipboard Section

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

View Section

The View section allows users to select which panes are displayed. By default, the Graph, Readings, and Events view are displayed.

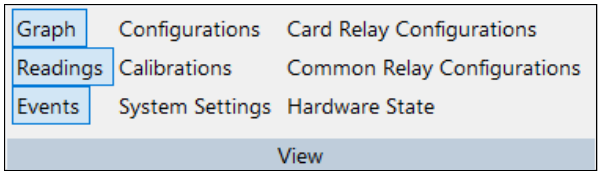


Figure 130: View Section

Views can be re-arranged by clicking and dragging on the title bar at the top of each view pane. They can also be resized by hovering over the edge of a pane and dragging across the screen. All views can be closed by pressing the cross icon on the top right of each pane.

The pin icon next to the cross icon is used to pin or unpin view panes to the program window. When a view pane is unpinned, it is minimized into a tab on the bottom or right side of the program window.

To view a minimized pane momentarily, hover the cursor over the view pane's tab. Move the cursor away to hide the pane again. To pin the pane back onto the program window, click the pane's unpinned icon.

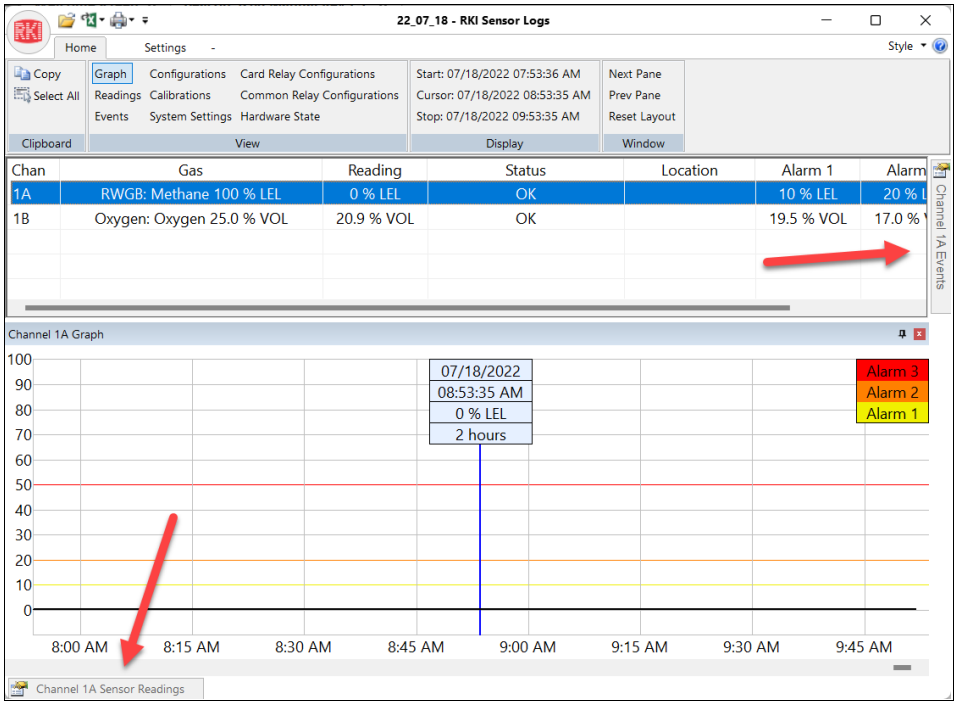


Figure 131: Minimized Pane Locations

Channel Graph View

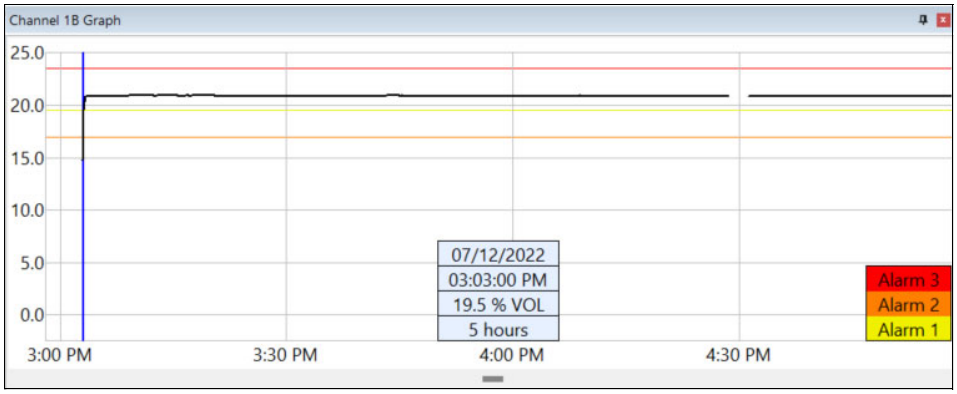


Figure 132: Example of the Graph View Pane

The Graph view displays sensor log data as a graph (X-axis as time, Y-axis as the selected channel's reading). Channel readings are represented by the black line. The yellow, orange, and red lines represent the channel's alarm setpoints (Alarms 1, 2, and 3).

The blue vertical line is the selection cursor and can be moved by clicking different areas in the Graph view, selecting a different reading from the Channel Readings view, or manually adjusting the Cursor field in the Display section (see page 151). The blue text box pinned to the Graph view displays the date, time, and channel reading based of wherever the cursor is placed and the duration of time the graph is displaying.

When the blue cursor in the Graph view is moved, the Channel Readings pane will update. If a different reading is selected in the Channel Readings view, the blue cursor will update in the Graph view.

NOTE: Other view panes will approximate and highlight logs that are closest to cursor's selected time/date.

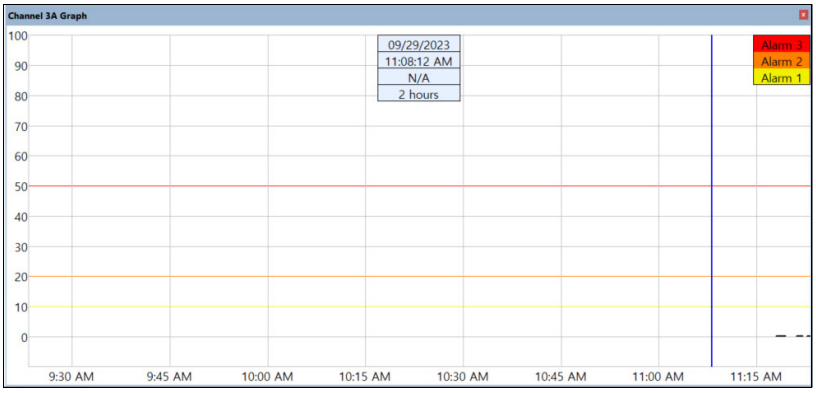
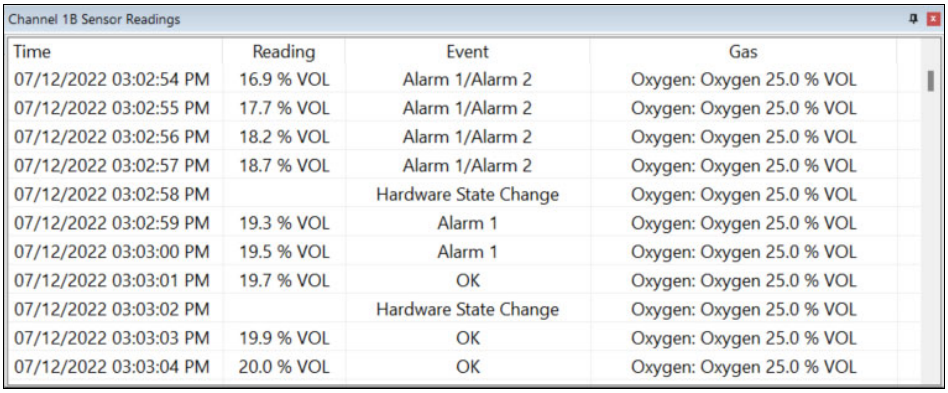


Figure 133: Default Graph View Pane

By default, the range of the Graph view displays the last 2 hours of a data file, and the cursor (blue vertical line) is placed in the middle of this 2-hour period.

For files with less than 2 hours of logs, the graph still has a 2-hour range that ends at the end of the data file, and the cursor is placed at the beginning of recorded data (shown in Figure 133 above). The graph range and cursor location can be adjusted using the time/date fields in the Display section (see "Display Section" on page 151).

Channel Readings View


Channel 1B Sensor Readings

Time	Reading	Event	Gas
07/12/2022 03:02:54 PM	16.9 % VOL	Alarm 1/Alarm 2	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:02:55 PM	17.7 % VOL	Alarm 1/Alarm 2	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:02:56 PM	18.2 % VOL	Alarm 1/Alarm 2	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:02:57 PM	18.7 % VOL	Alarm 1/Alarm 2	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:02:58 PM		Hardware State Change	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:02:59 PM	19.3 % VOL	Alarm 1	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:03:00 PM	19.5 % VOL	Alarm 1	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:03:01 PM	19.7 % VOL	OK	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:03:02 PM		Hardware State Change	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:03:03 PM	19.9 % VOL	OK	Oxygen: Oxygen 25.0 % VOL
07/12/2022 03:03:04 PM	20.0 % VOL	OK	Oxygen: Oxygen 25.0 % VOL

Figure 134: Channel Readings View Pane

The Channel Readings view displays a table with a selected channel's log dates, times, readings, the event types, and target gas(es) at the time of recording.

When a sensor reading is selected from the Channel Readings view, the blue cursor in the Graph view will move to the corresponding point in the graph. If a point is selected in the Graph view, causing the cursor to move, the selected sensor reading in the Channel Readings view will shift to the corresponding log.

Time periods with no available data will be represented in the Event column as “Not Recorded”. Channels that no longer have sensor modules installed will also display “Not Recorded” in the Event column until a module is installed and recognized by the instrument.

Channel Events View

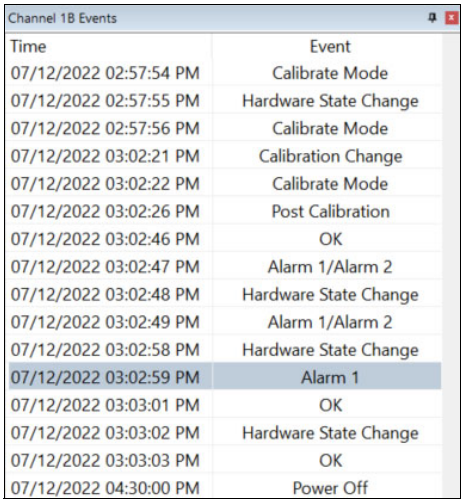


Figure 135: Events View Pane

The Events view displays a table with log dates, times, and event type at the time of recording. This can be used to quickly locate key moments that can then be reviewed in greater detail in other view panes.

When a sensor module is removed or moved to a different slot, the Events view will log the removal as a “Power Off” event in the Event column.

When a new data file is opened, the highlighted Events log is the most recent event prior to the cursor’s time/date selected in the Graph view. If there is less than 2 hours of recorded data, the cursor is placed at the start of the recorded data and the “Power On” event in the Events view is highlighted.

Channel Configurations View

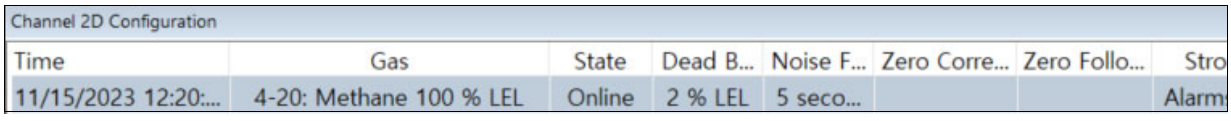


Figure 136: Configurations View Pane

The Configurations view displays a table with the selected channel’s target gas, time of log, state of the channel, and channel parameters at the time of recording. When a sensor module is removed and swapped with another module, the new module’s target gas and other configuration data are displayed as a second log.

If a module is removed, a subsequent log will display the same channel information, but “Not Used” is displayed in the State column.

Channel Calibrations View

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

Figure 137: Calibrations View Pane

The Calibrations view displays each calibration performed on a channel's sensor, the sensor's installation date, the most recent calibration, results, the min/max adjustments, and LEL sensor currents (when applicable).

System Settings View

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

Figure 138: System Settings View Pane

The System Settings view displays a table with the Beacon 3200's system settings configurations. Any changes made to these settings appear as new logs in this view.

Channel Card Relay Configurations View

Channel 1A Card Relay Configurations

Time	Alarm 1 Relays	Alarm 2 Relays	Alarm 3 Relays	Fail Relays
08/03/2023 10:02:02 AM	2-1	2-2	2-3	

Figure 139: Channel Card Relay Configurations View Pane

The Channel Card Relay Configurations view displays all initial card relay assignments and any assignment changes for the channel selected in the Channel Overview pane. New channel relay assignment(s) or changes to current relay assignments are displayed under each alarm condition.

A blank cell in the view panel indicates that there are no card relays assigned to an alarm/fail or a relay was unassigned from an alarm condition.

Channel Main Relay Configurations View

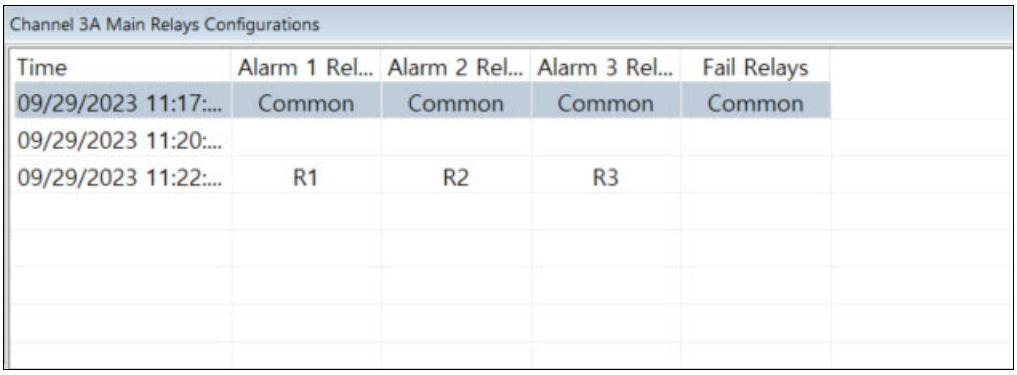


Figure 140: Channel Main Relay Configurations View Pane

The Channel Main Relay Configurations view displays all initial main relay assignments and any assignment changes for the channel selected in the Channel Overview pane. When the instrument's **Main Relays** parameter in System Settings is changed from **Common** to **Channel**, each cell either displays the new relay assignment (configured in the instrument's **Main Relays** menu in Setup Mode) or is left blank. Blank cells indicate there are no main relay assignments for a given alarm condition.

When the instrument's **Main Relays** parameter in System Settings is changed from **Channel** to **Common**, all cells will display "Common" to indicate the automatic assignment for each main relay (Relay 1 assigned to Alarm 1, Relay 2 assigned to Alarm 2, Alarm 3 for Relay 3).

Hardware States View

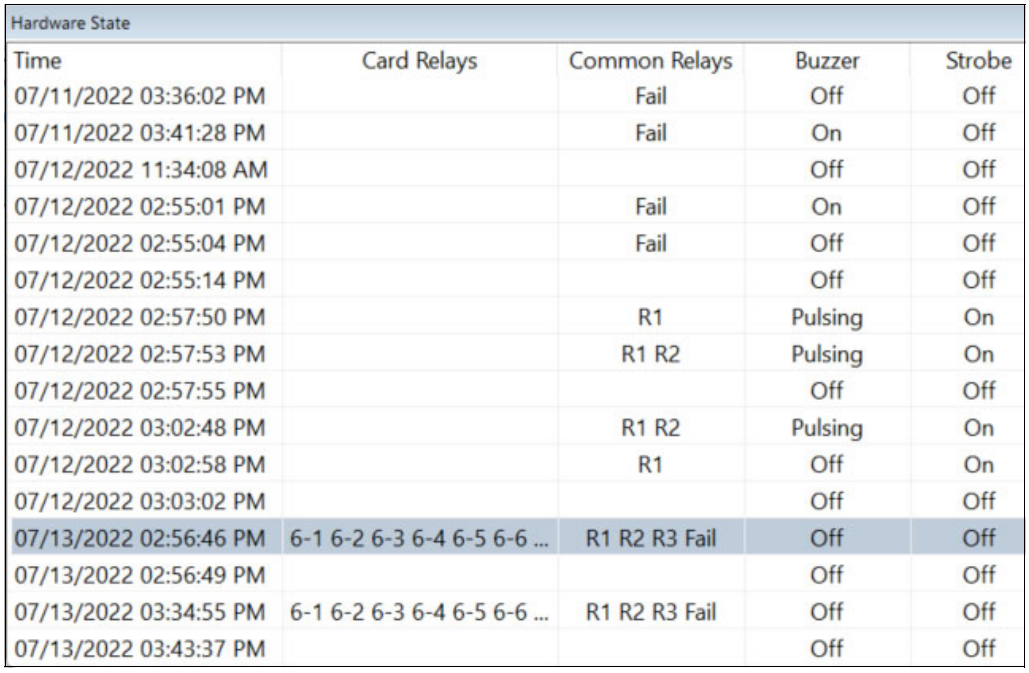


Figure 141: Hardware States View Pane

The Hardware States view displays a table listing relay activations: activated card relays, activated main relays, and the On/Off states of the buzzer and strobe during each log.

Display Section

The Display section displays the time/date fields of the Start, Stop, and Cursor points. The Start and Stop fields define the time period displayed in the Graph and Channel Readings view panes. This range can be adjusted to be wider or narrower than the data file's actual duration.

The Cursor field controls the time and date of the selected data point (the blue line in the Graph view and the selected sensor reading in the Channel Readings view), allowing precise analysis of data using the cursor. The Cursor field will update automatically when a data point in the Channel Readings or the Graph views is selected.

NOTE: Other view panes will approximate and highlight the logs that are closest to the time/date entered in the Cursor field.

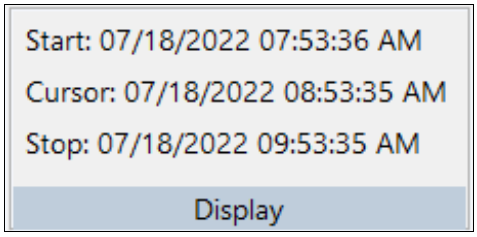


Figure 142: Display Section

To change the Start, Cursor, and Stop time/date:

1. Click on the Start, Cursor, or Stop time/date.
2. A window will appear, allowing the selected field (Start, Cursor, or Stop) to be edited. The "Set Channel Start Time" is shown in Figure 143 as an example.
   - To change the date, press the drop down menu to open a calendar menu and select a date or manually type the date in the field.
   - To change the time, press the up/down arrows or type in the field.
   - Pressing the Use Record Start or User Record End buttons automatically assigns the start or end date/time of the data file to the field selected (Start, Cursor, or Stop).

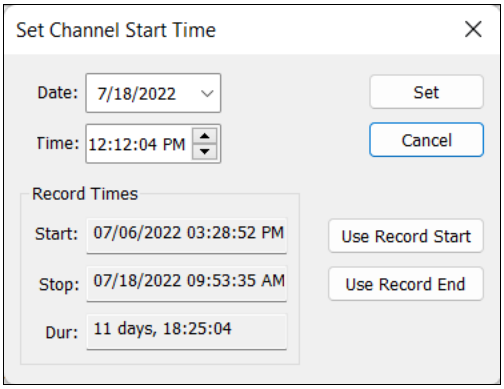


Figure 143: Set Channel Start Time Window

Window Section

The Window section is used to navigate between the different view windows that are opened through the Views section. The “Reset Layout” button returns the program’s layout to the default configuration (see Figure 128).

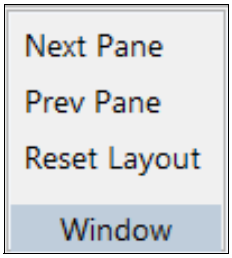


Figure 144: Window Section

Additional Features

The Style dropdown menu offers multiple display themes that can be applied to change the appearance of the Sensor Logs Program.

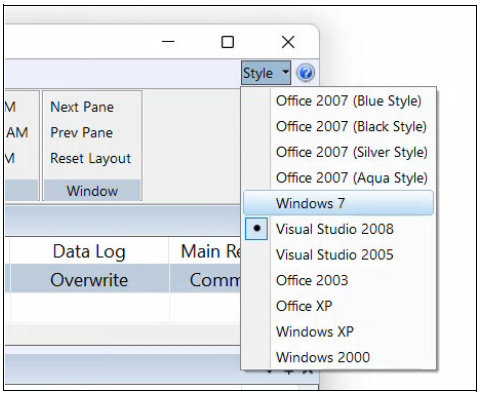


Figure 145: Styles Dropdown Menu

The question mark button displays a pop-up with the Sensor Log program’s current version number, copyright, and developer information.

Settings Tab

Font

The Font section displays the interface’s current font and font size selected. Both settings can be changed using the dropdown menus.

Options (Time Format)

The Options section displays the current time format selected. It can be changed using the dropdown menu.

Quick-Access Toolbar

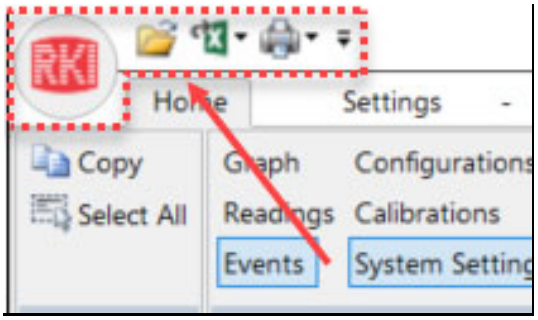


Figure 146: Quick-Access Toolbar

The default Quick-Access Toolbar allow data files to be opened, printed, or exported:

- Open Folder Icon: Opens a window for users to open new .RKI files
- Excel Icon: Allows .RKI files to be exported to Excel as .csv files (see “Exporting .csv Files” on page 155)
- Printer Icon: Allows individual view panes to be selected for printing. A print preview will be created before proceeding to print
- RKI Logo: Functions as a compact version of the quick-access toolbar (the functions listed above) but can also be used to close the program window or adjust Print Setup preferences

Toolbar Customization

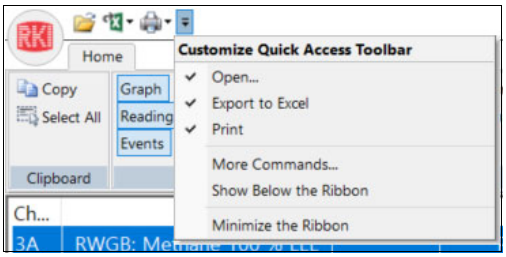


Figure 147: Toolbar Customization Options

The downwards arrow button on the toolbar has four main functions:

- moves the toolbar's location above or below the Home and Settings tabs
- hides or shows the ribbon (the sections under the Home and Settings tabs)
- allows commands to be added or removed from the toolbar (see Figure 148 below)
- allows keyboard shortcuts to be created and assigned to any toolbar command

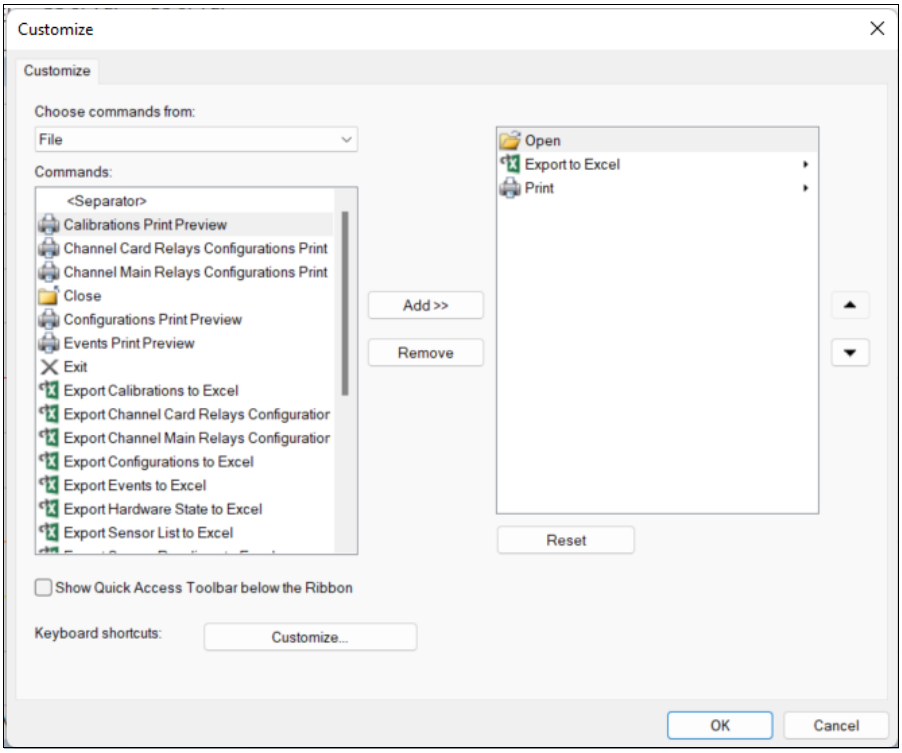


Figure 148: Add/Remove Toolbar Commands

Exporting .csv Files

The Sensor Logs Program can export Beacon 3200 sensor log data to Microsoft Excel for editing or to be used by other data management software.

1. After opening a sensor log data file, press the Excel icon on the top toolbar. A dropdown menu appears with all of the available view options.

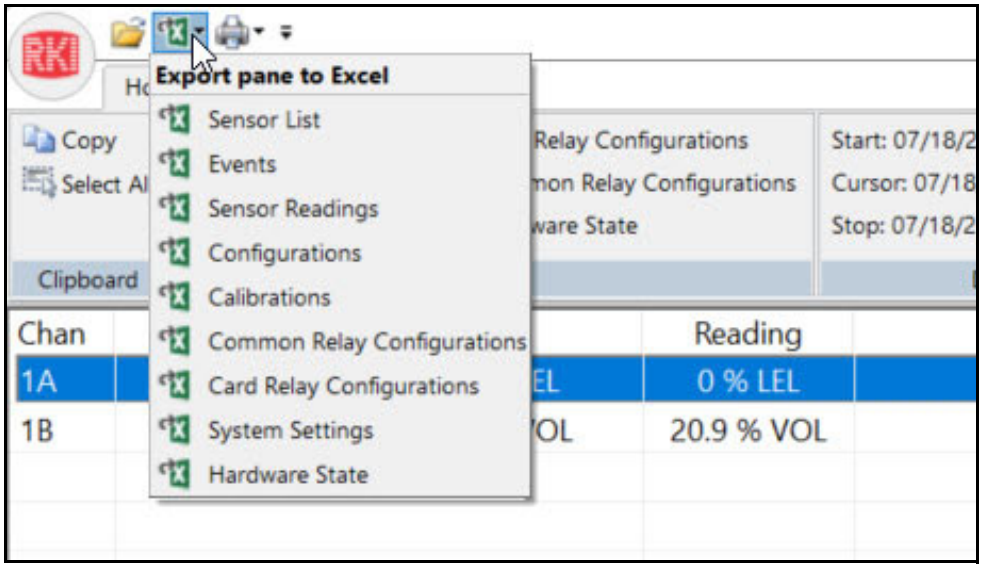


Figure 149: Excel Export Menu

2. Click on the desired view type for export. A file directory window appears, displaying where the exported data will be saved.

3. Select the desired save location and click **Save**.

4. The Sensor Logs Program displays a loading bar for the export. Click **OK** once the export is finished.

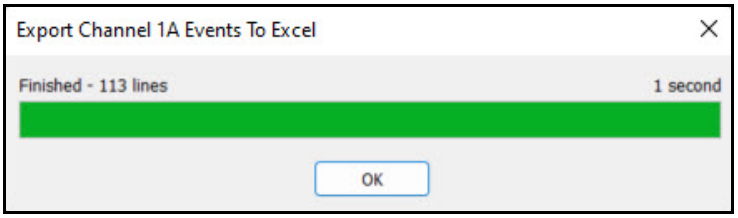


Figure 150: Export Loading Bar

5. The export is complete. The exported data file can now be opened and edited using Microsoft Excel or other .csv compatible software.

Chapter 15: Parts List

Table 24: Parts List

Part No.	Description
18-0020	Housing conduit hub plug
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 newest firmware file.

NOTE: Firmware updates do not affect sensor calibration or instrument setup.

1. Turn the Beacon 3200 off if it is on.
2. Put the .dfu firmware file provided by RKI Instruments, Inc. onto a USB drive. The file name should use the following formatting: *RKI_Beacon3200_Firmware_v.0.0.77_20230626.dfu*.
3. Plug the USB drive into the USB connector beneath 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). Follow the updating sequence on the display in case any prompts come up that require you to make a selection. 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**.

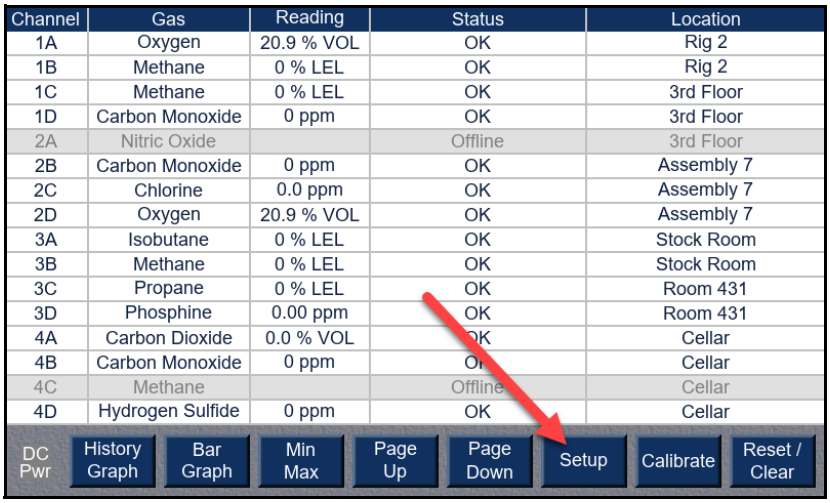


Figure 151: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **System Settings**.

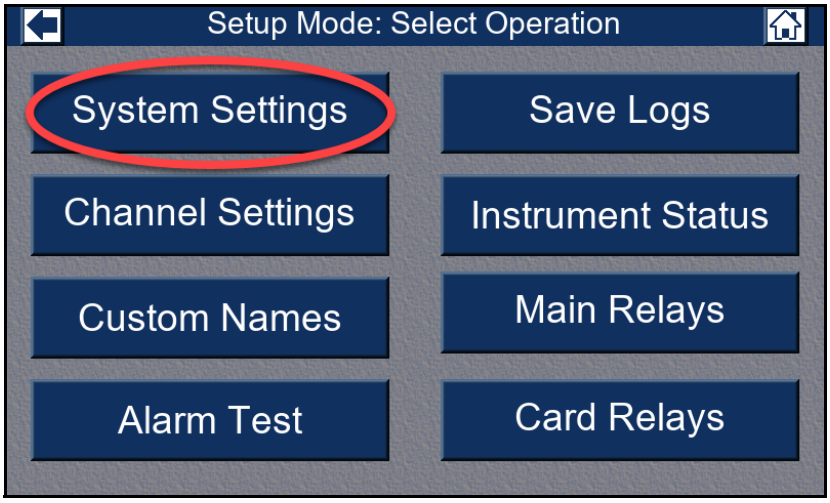


Figure 152: System Settings Button

5. Press **Advanced Settings**.

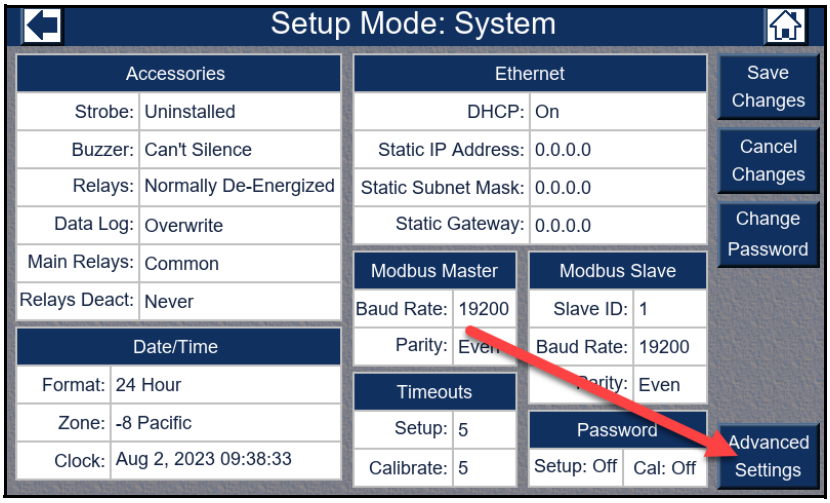


Figure 153: Advanced Settings Button

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

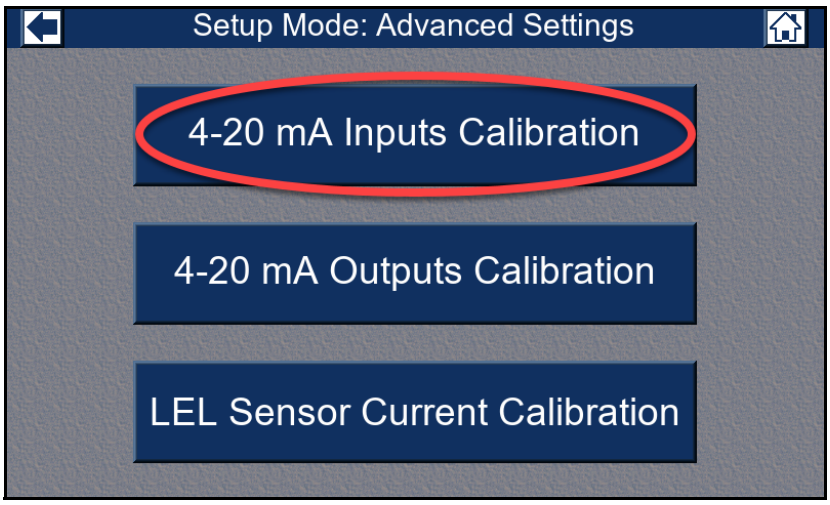


Figure 154: 4-20 mA Inputs Calibration Button

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

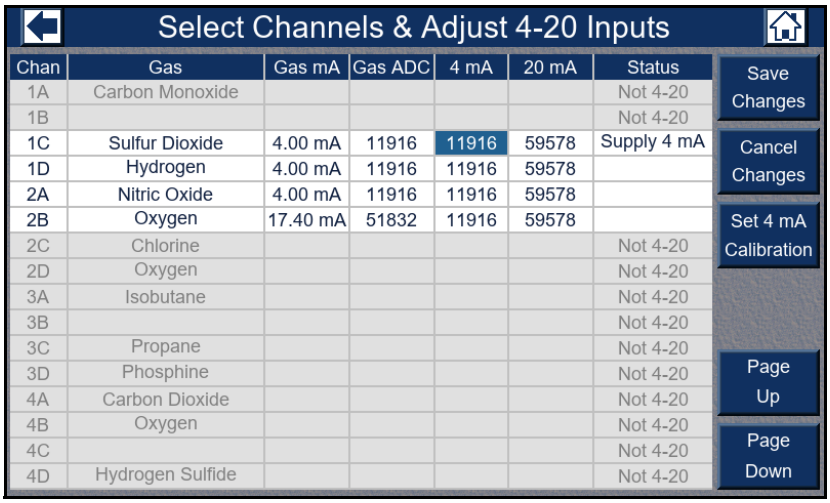


Figure 155: Selecting 4 mA Inputs

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**.

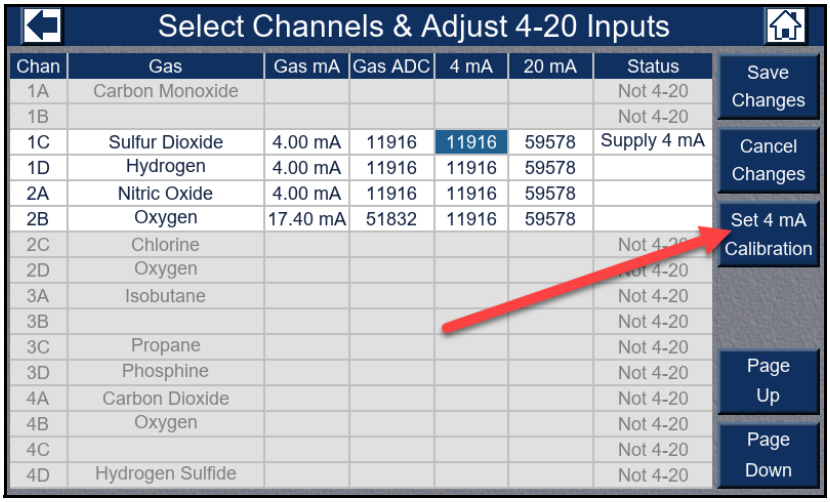


Figure 156: Set 4 mA Calibration Button

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

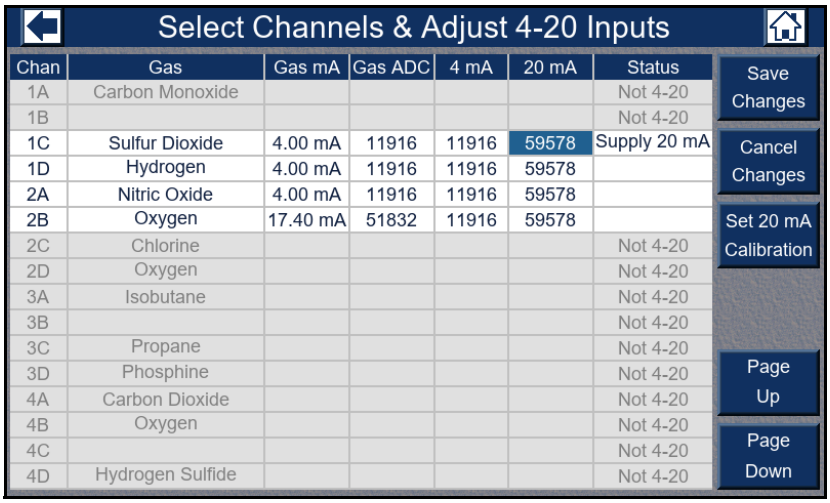


Figure 157: Selecting 20 mA Inputs

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**.

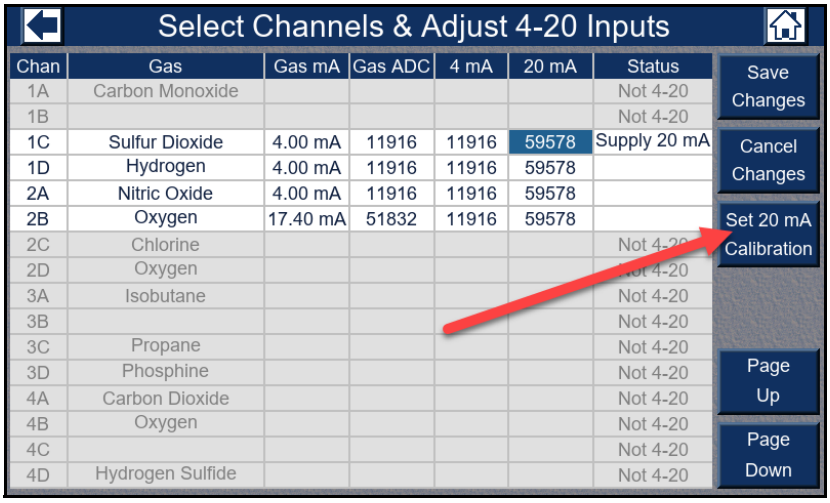


Figure 158: Set 20 mA Calibration Button

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**.

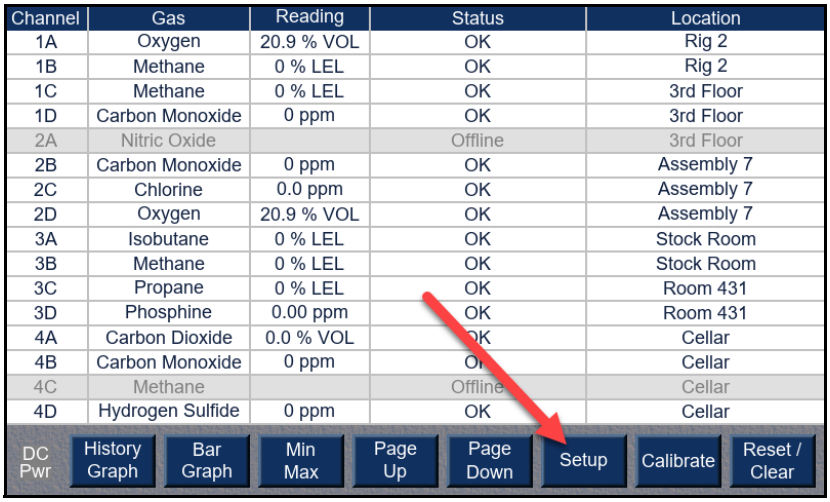


Figure 159: Setup Mode Button

2. If a 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.

   For more information about the relay deactivation setting, see page 70.

4. Press **System Settings**.

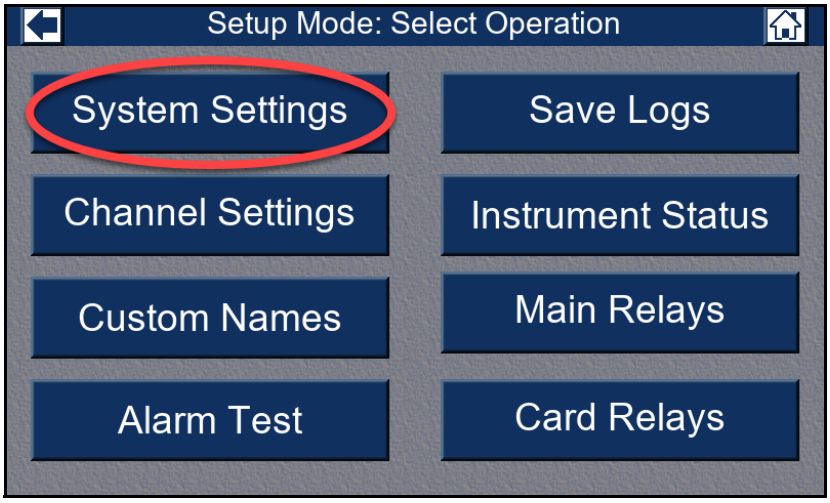


Figure 160: System Settings Button

5. Press **Advanced Settings**.

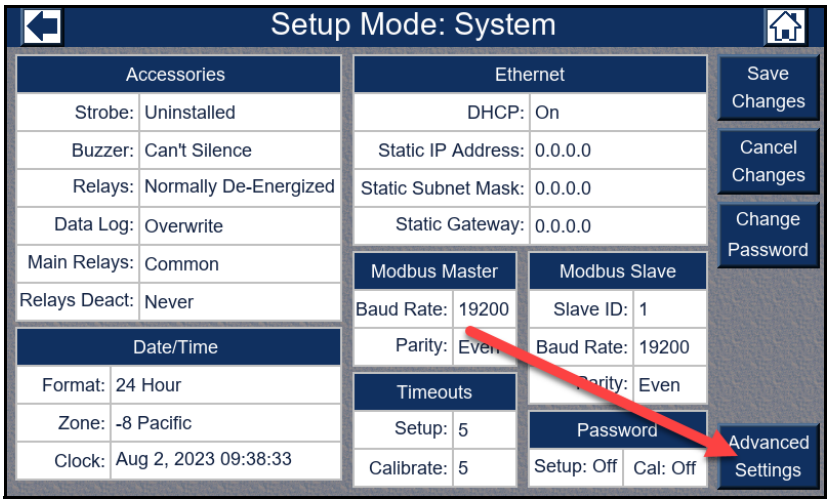


Figure 161: Advanced Settings Button

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

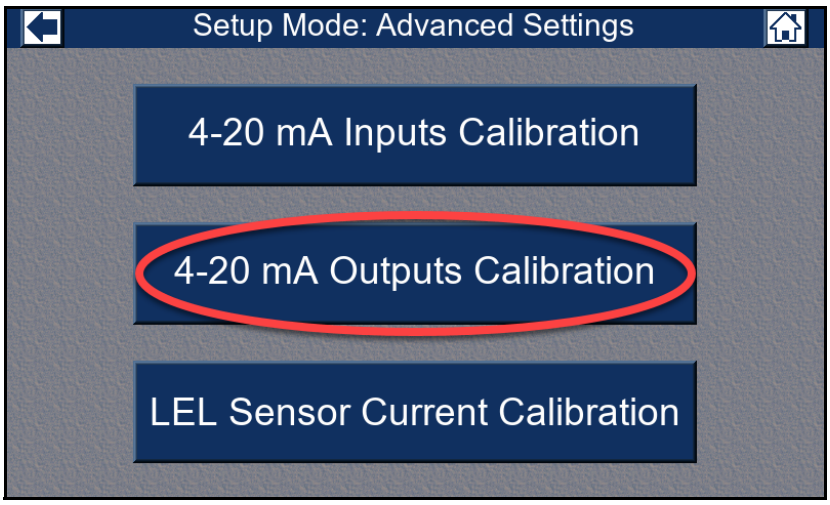
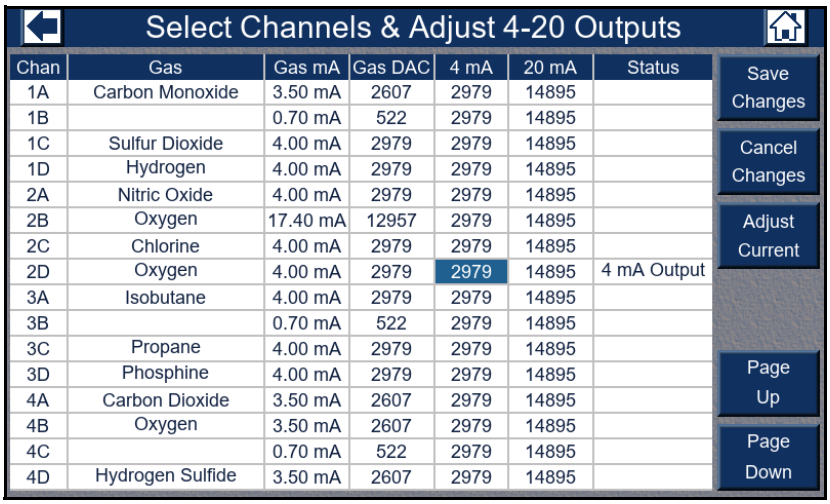


Figure 162: 4-20 mA Outputs Calibration Button

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



Chan	Gas	Gas mA	Gas DAC	4 mA	20 mA	Status
1A	Carbon Monoxide	3.50 mA	2607	2979	14895	
1B		0.70 mA	522	2979	14895	
1C	Sulfur Dioxide	4.00 mA	2979	2979	14895	
1D	Hydrogen	4.00 mA	2979	2979	14895	
2A	Nitric Oxide	4.00 mA	2979	2979	14895	
2B	Oxygen	17.40 mA	12957	2979	14895	
2C	Chlorine	4.00 mA	2979	2979	14895	
2D	Oxygen	4.00 mA	2979	2979	14895	4 mA Output
3A	Isobutane	4.00 mA	2979	2979	14895	
3B		0.70 mA	522	2979	14895	
3C	Propane	4.00 mA	2979	2979	14895	
3D	Phosphine	4.00 mA	2979	2979	14895	
4A	Carbon Dioxide	3.50 mA	2607	2979	14895	
4B	Oxygen	3.50 mA	2607	2979	14895	
4C		0.70 mA	522	2979	14895	
4D	Hydrogen Sulfide	3.50 mA	2607	2979	14895	

Figure 163: Selecting 4 mA Outputs

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**.

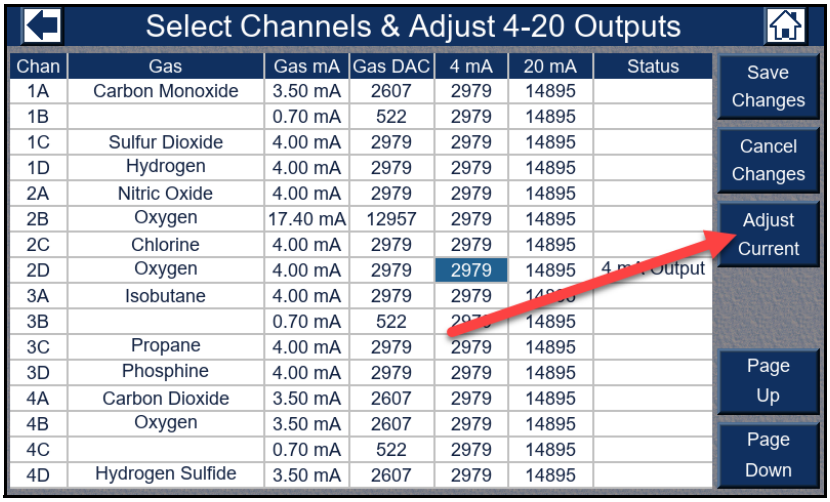


Figure 164: Adjust Current Button

10. A number pad appears. 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.

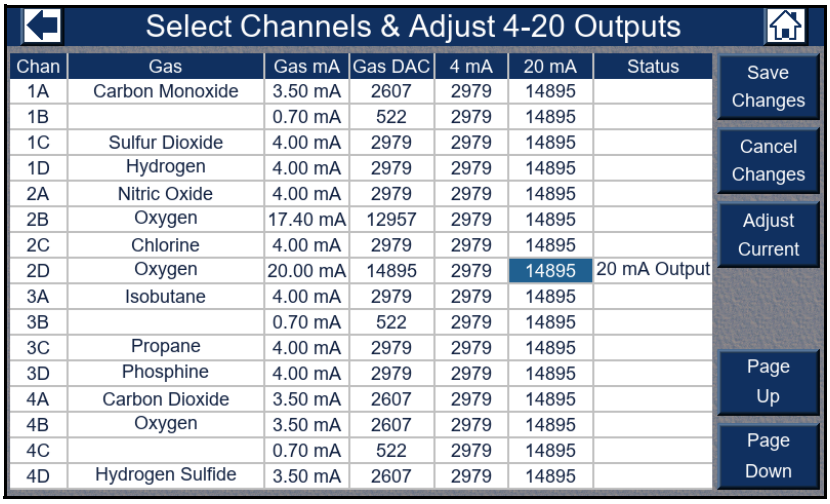


Figure 165: Selecting 20 mA Outputs

13. Press **Adjust Current**.

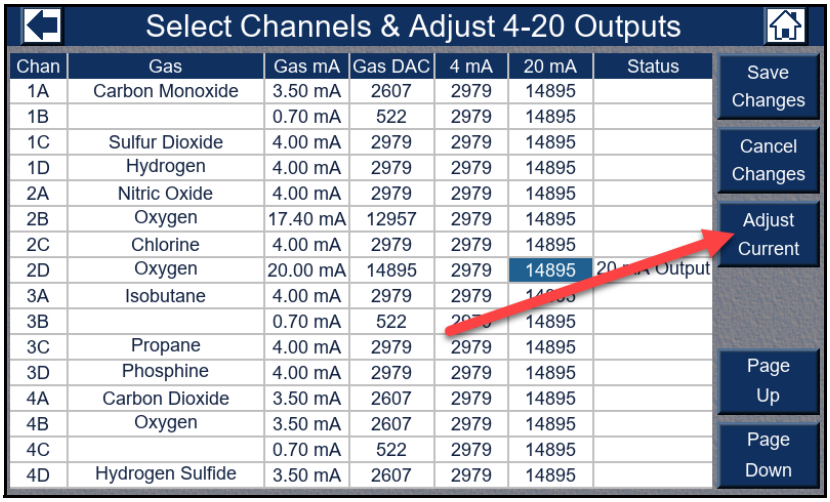


Figure 166: Adjust Current Button

14. A number pad appears. 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 specific sensor current values to operate correctly. The sensor current provided by the Beacon 3200 to direct connect LEL detectors can be adjusted to optimize performance and preserve sensor life.

Any channel set up for methane (CH_4) or any other gases in the RGWB-type gas list (shown on page 73) except hydrogen (H_2) will have a default sensor current of 148 mA. In addition, all custom RWGB-type channels have a default sensor current of 148 mA. The sensor current may be adjusted if necessary for optimal performance to detect a particular gas or if a particular detector part number requires a different sensor current for optimal performance. Sensor currents for RKI direct connect LEL detectors are shown below.

NOTE: When RWGB-type channels are configured for hydrogen (H_2), the sensor current defaults to 130 mA. For channels configured to the H_2-specific detector NC-6205, the sensor current should be readjusted to 115 mA as indicated in Table 25.

Table 25: Specified Sensor Currents for LEL Detectors

LEL Detector P/N	LEL Sensor Current
61-0140RK	• Standard current: 148 mA • H_2 calibration: 130 mA • Others defined per application
NC-6205 (H_2-specific)	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 72).
2. While in normal operation, press **Setup**.

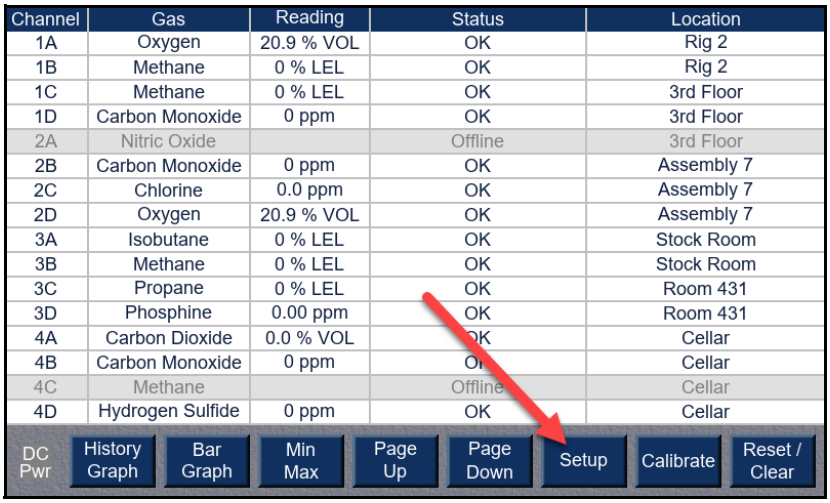


Figure 167: Setup Mode Button

3. If a 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.

   For more information about the relay deactivation setting, see page 70.
5. Press **System Settings**.

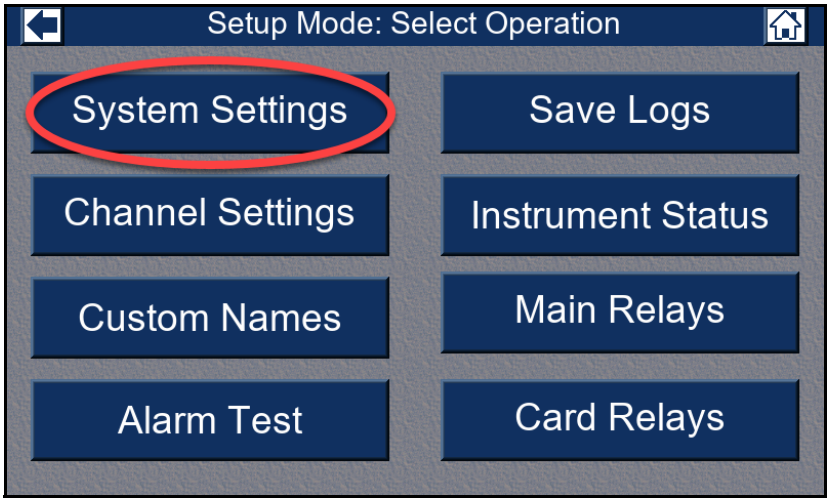


Figure 168: System Settings Button

6. Press **Advanced Settings**.

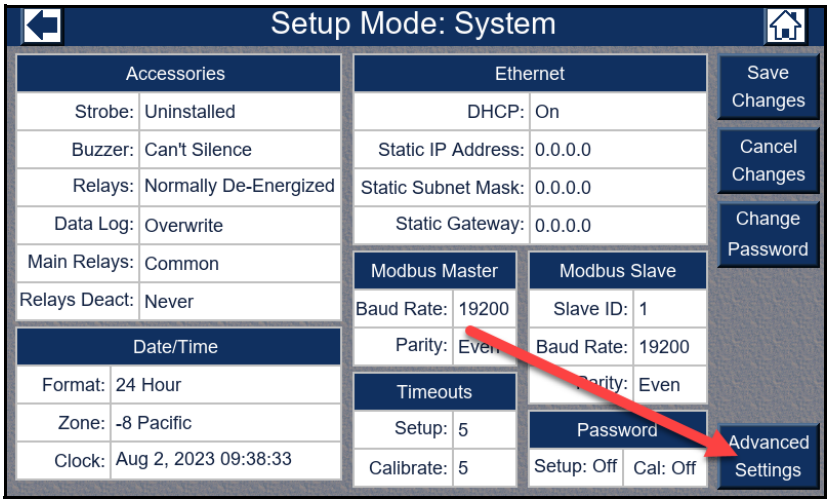


Figure 169: Advanced Settings Button

7. Press **LEL Sensor Current Calibration**.

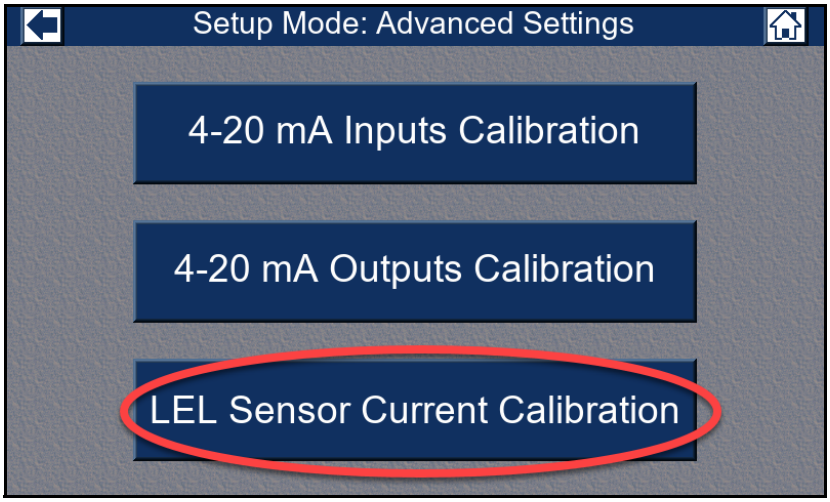


Figure 170: LEL Sensor Current Calibration Button

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

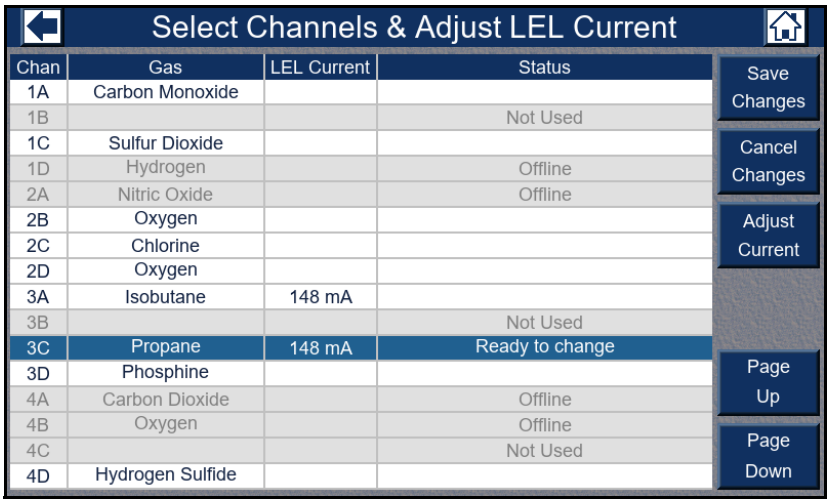


Figure 171: LEL Sensor Selection

9. Press **Adjust Current**.

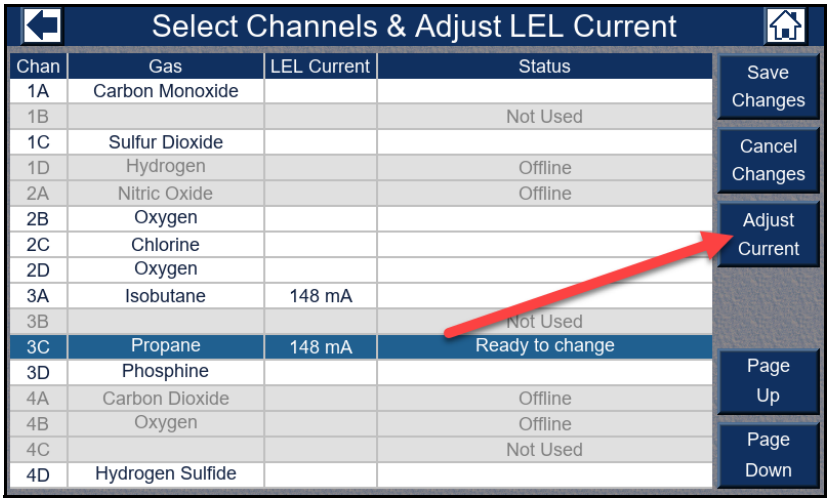


Figure 172: Adjust Current Button

10. A number pad appears. Type in the desired LEL sensor current and press **Enter**.
11. Press **Save Changes**.