AMC-1BZ Series

Gas Monitor

USER MANUAL

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This product is warranted against defects in material and workmanship for a period of two years from date of delivery. Maintenance items are not warranted. During the warranty period, *The Armstrong Monitoring Corporation* will repair or replace components that prove to be defective in the opinion of AMC. Any equipment deemed to be defective by the user should be returned to *The Armstrong Monitoring Corporation* for evaluation (see product return below). Site visits by Armstrong personnel, to evaluate/repair equipment, are not covered by this warranty unless covered under the site contract. AMC is not liable for auxiliary interfaced equipment, nor for consequential damage. This warranty shall not apply to any product which has been modified in any way, which has been repaired by any other party other than a qualified technician or authorized AMC representative, or when failure is due to misuse or conditions of use.

Note: Extended Warranty and mail in calibration programs are available (please call 1-800-465-5777) or see our contacts page at www.armstrongmonitoring.com

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All AMC products must be installed and maintained according to instructions. Only qualified personnel should install and maintain the equipment. This product must not be placed in areas with combustible gases reaching 100% LEL (environments prone to explosions).

AMC shall have no liability arising from auxiliary interfaced equipment, for consequential damage, or the installation and operation of this equipment. AMC shall have no liability for labor or freight costs, or any other costs or charges in excess of the amount of the invoice for the products.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE THEREOF.

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All products returned for warranty or service should be shipped by prepaid freight and will be accepted only with RMA or repair number issued by AMC.

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For information, please call 1-800-465-5777, visit www.armstrongmonitoring.com or email directly support@armstrongmonitoring.com.

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Due to an ongoing development program, AMC reserves the right to substitute components and change specifications at any time without incurring any obligations.

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Act Delay	The delay in seconds between the gas concentration reaching an alarm setpoint, and the corresponding alarm level activating.
Alarm	Alarm is an audible, visual, or physical presentation designed to warn the instrument user that a specific level of a dangerous gas/vapor concentration has been reached or exceeded.
Calibration	Calibration is the procedure used to adjust the instrument for proper response.
Calibration Gas	Calibration Gas is a gas of known concentration used in adjusting and testing gas detection equipment to ensure proper function and accurate readings.
Gas Concentration	Gas Concentration can be measured in: • ppm • %LEL • % Volume
Hysteresis	A user-set difference from an alarm's setpoint prevents frequent alarm activation. Hysteresis solely impacts alarm deactivation, not its activation tied to the setpoint.
LEL	Lower Explosive Limit is the lowest concentration (percentage) of a gas or a vapor in air capable of combusting in the presence of an ignition source (arc, flame, heat).
Min Run	The minimum time in seconds that an alarm state will remain active, even if the gas concentration has returned above/below the setpoint +/– hysteresis (based on a decreasing or increasing alarm type).
ppm	Parts Per Million (1% volume = 10,000ppm)
Percent by Volume	Concentration of gas in a mixture expressed as a percentage of total volume.
Span	The difference between the highest concentration and lowest concentration.
T90	Response Time in seconds to achieve 90% gas concentration reading.
T99	Response Time in seconds to achieve 99% gas concentration reading.
Zero Buffering	Zero buffering is a function of the monitor which forces the gas concentration reading to zero when sensor is exposed to low concentration of a gas. The zero buffer is indicated in the sensor specification.
Zero Gas	Zero gas is gas in which the target gas is not present. The presence of oxygen is required. Clean air is an excellent source for zero calibration. A known gas concentration can be entered during zero calibration.

System	
System Warranty Period	2 Years
Power Supply Requirement	120 VAC, 60 Hz, 53 VA or 24 VDC, 2A
Relays – AMC-1BZ1	2x DPDT, 250 VAC, 10 A
AMC-1BZ2	4x DPDT, 250 VAC, 10 A
Operating Temperature	-4 to 104F (-20 to 40C)
Operating Pressure	0.9 to 1.1 atm
Humidity Range	15 to 90% RH, non-condensing
Terminal Block Torque	7 inch-pounds (0.8 N-m)
Analog Out	
Topology	Sourcing
Voltage Range	0-10 V
Current Range	0-20 mA
Corner Frequency	300 KHz
Analog In	
Voltage Range	0-3 V (Configured for Multidrop)
Real Time Clock (RTC)	
Battery Size	CR1025, Field Replaceable.
Expected Battery Life	> 2 Years

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The AMC-1BZ Gas Monitors are designed to work with any combination of AMC-122X Series sensor modules, with up to 10 modules per zone.

The Monitor provides a digital representation of the gas concentration; this information is displayed locally via OLED. Plug-and-play modular architecture accommodates; hot-pluggable Power/Comms via the BusPower Module and field replaceable Sensor Modules (eligible for the EZ Cal exchange program).

In addition, each Monitor features alarm / system status indicators, audible feedback, 2 relays, 2 analog outputs and colour-coded connection terminal blocks, as listed and described herein.

NOTE: The AMC-1B is a variant of our UTx platform. As such many of the menu items directly reference the parent product.

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Figure 2-1: External View

1	Enclosure	Enclosure and Lid Assembly, UV Stabilized Polycarbonate, 11.750" L x 9.980" W x 5.460" H (300 x 250 x 140mm)
2	Digital Display	Display Gas Concentration & Status Information
3	Network Status LED	Not applicable to 1BZ Series
4	Alarm Status LED	The Sensor Status LED will show the same error code that is being communicated by the Sensor Module(s) or display the highest priority error (if multiple errors codes are being communicated to it by the Sensor Module(s)
5	Sensor Module Opening	Not applicable to 1BZ series
6	Sensor Module LED	Not applicable to 1BZ series
7	Menu Buttons	Momentary Pushbuttons for user interface.

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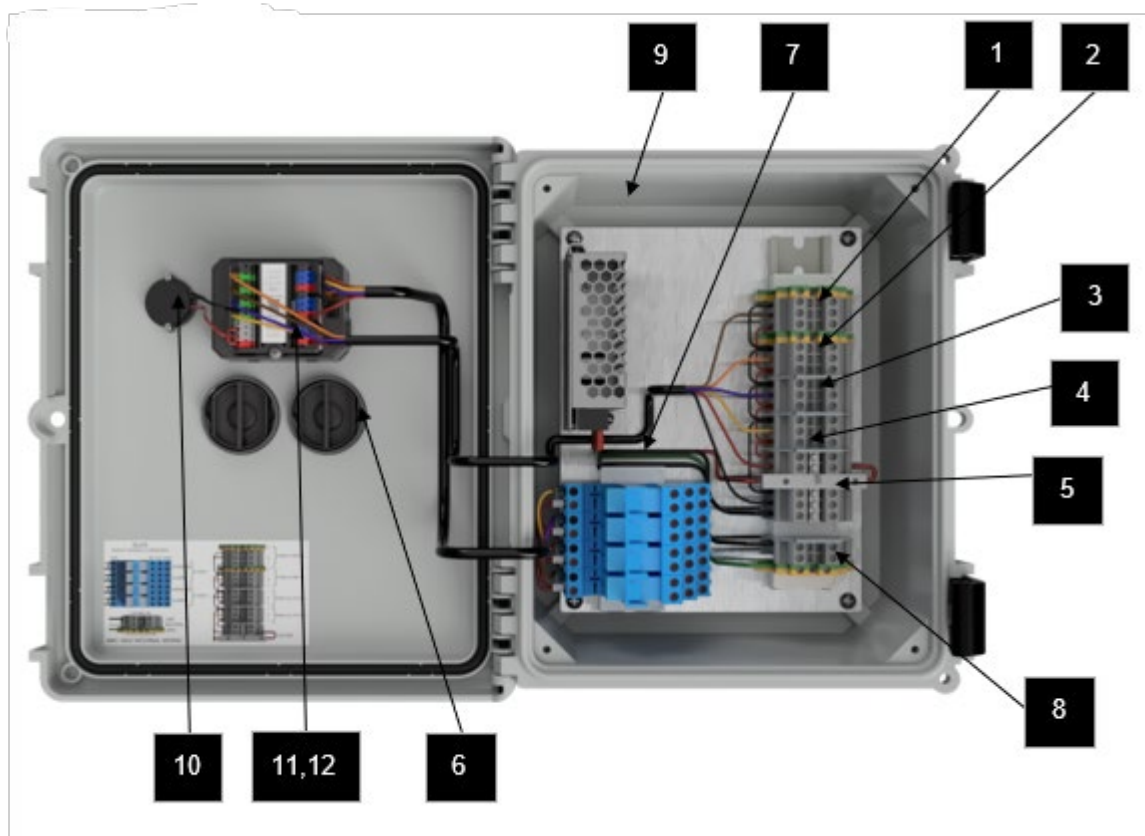
Figure 2-2: Internal View

1	Analog Input 1	Terminal Block for Zone 1 Input
2	Analog Input 2	Terminal Block for Zone 2 Input (AMC-1BZ2 Only)
3	Analog Output 1	Terminal Block for Signal Output 1
4	Analog Output 2	Terminal Block for Signal Output 2
5	2A Fuse	Device Level Input Protection
6	Sensor Module	Not applicable to 1BZ series
7	External Relays	Connection for Alarm/Warning System
8	Voltage IN	Terminal Block for Main Power In
9	Power Supply	Regulates power for the device. Present for 110 VAC input only.
10	Buzzer	Provides audible indication upon alarm state.
11	UTx Main Module	Information processing and communications hub.
12	Bus Power Module	Provides power and communications interface to the UTx.

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The installation of the AMC-1B Gas Monitor is very important as the operational quality is a direct result of the quality of the installation. The following sections provide guidelines for installation; location and mounting, wiring, and cable selection.

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Care should be taken to securely fasten the monitor unit on a solid, non-vibrating surface or structure so that the sensors are located at approximately 4.5 ft (1.4m) above floor level or per local regulations. Install the unit in an area where the local concentration of gas is unaffected by the presence of ventilation systems and away from sources of interference gases. Mount the monitor where the unit can be observed periodically. See the below **Enclosure Mounting** figure for mounting hole locations.

CAUTION: All cable entry MUST BE through the BOTTOM of the monitor enclosure only. Other entry locations will allow foreign materials to enter the enclosure, causing possible damage to the internal components.

Warning:

Conduit entry from the top or back of the housing is Not Recommended. Any water damage related to conduit entry from the top or back will not be covered under warranty.

Qualified personnel should perform the installation according to applicable electrical codes, regulations and safety standards. Ensure correct cabling practices are implemented.
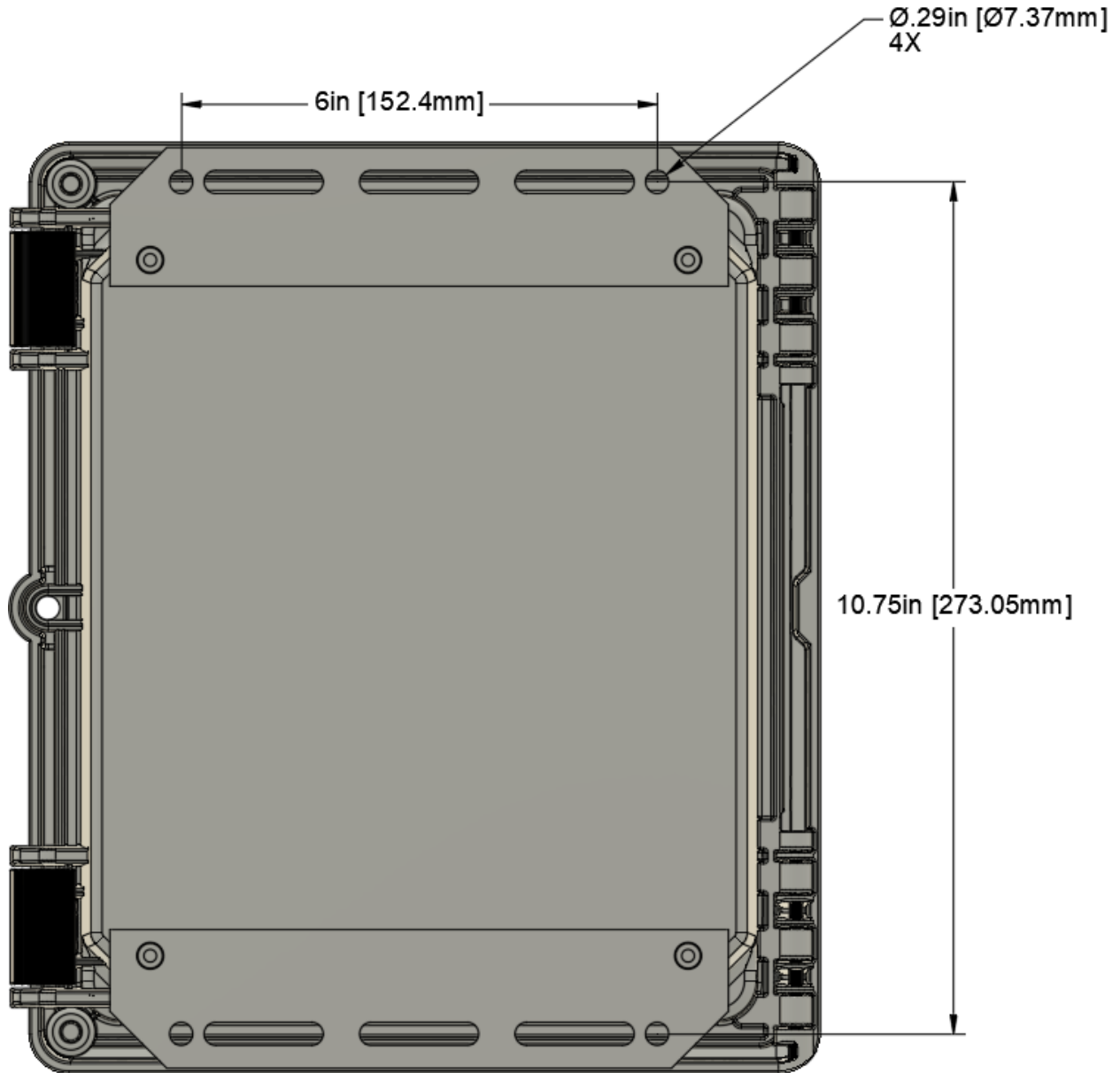
Figure 3-1: Enclosure Mounting

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The monitor operates on 120 VAC, 60 Hz or 24 VDC, 2A. The power supply connections are made at the power terminal block located inside the monitor.

All power and grounding connections to equipment must be made in accordance with applicable electrical and building codes.

For AC powered monitors, a separate, dedicated, noise free, 15 Amp power circuit, with an appropriately labeled circuit breaker is required.

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The Monitor houses 2 relays. The relay contacts are rated for 10Amps @ 28VDC/120VAC resistive. For relay contact arrangement, see below. Note that default configuration is for the relays to be energized.
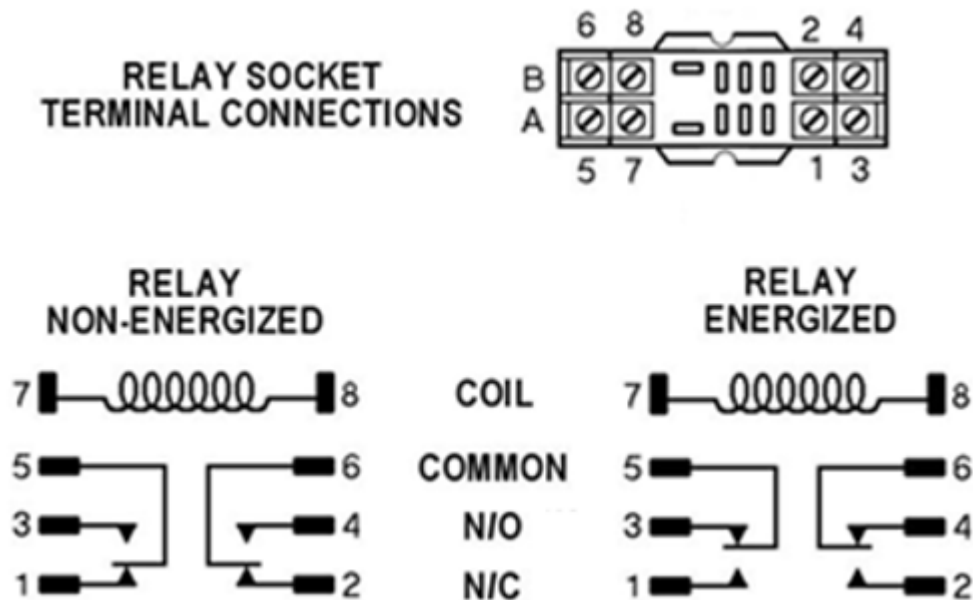
Figure 3-2: Relay Connections

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The analog input terminal blocks (See the above **Internal View** figure) are used for connecting 122X Sensor Modules in Voltage Mode. The wiring for channel 1 and 2 is conveyed in the following table.

Gas Monitor	122x Sensor Module
Chassis Ground	Connect to the cable shield
Negative -	Negative -
Signal S	Signal S
Positive +	Positive +

For further detailed wiring instructions for multiple sensor modules on one channel (up to 10) see the corresponding sensor module manual.

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Typically, analog output is used to communicate with a Building Automation System or control a Variable Frequency Drive within a ventilation system.

Each analog output accommodates either 4-20mA, 0-10V, 2-10V or AMC-Multidrop (proprietary).

Please contact Armstrong Monitoring directly for configurations to match your needs.

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The AMC-RAM-3 provides a remote alarm indication when employed with monitors such as the AMC Gas Monitor 1BZ. Each RAM-3 has a red strobe light to provide a visual indicator of an alarm condition and remains active until the alarm is cleared. The Audio alert is provided by a buzzer which emits a 2900hz tone at in excess of 90 dB(A) at a distance of 24 inches. The audio alert is activated upon entry into an alarm condition and is silenced by either pushing the Acknowledge Switch or clearing the alarm.

To support connecting RAM-3 modules to the 1BZ Monitor the recommended method is ordering the AMC-RAM-1B-WH-2 (1BZ1) or AMC-RAM-1B-WH-4 (1BZ2) (Wiring Interface for RAM-3 and 1BZ Monitor). This item provides terminal block interfaces for wiring the RAM-3 to the 1BZ Monitor and to the High Alarm Relay output that drives activation of the RAM-3. The other option is to wire the RAM-3 directly to the relay contacts but that is not recommended. Further details are available in the AMC-RAM-3 User Manual available on the AMC Website.

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This section describes how the functionalities of the AMC-1BZ Gas Monitor are operated and performed. Please consult the operation and initial configuration chapters below before attempting to use or calibrate the Gas Monitor.

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Refer to the **External View** section for LED location and descriptions.

During operation the LEDs will display the following configurations:

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Table 4-1: Status LEDs (Start Up)

LED States	Network LED	Alarm Status LED	Display Screen Message
Initialization and discovery of Sensor Modules (after UTx is powered up).	OFF	Solid WHITE	AMC Splash Screen
Sensor Warm-up	Flashing GREEN (1 sec Cycle)	Solid WHITE	Main Info Screen (or blank) No Sensor Gas Readings Shown

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Table 4-2: Status LEDs (Network Status)

LED States	Network LED	Alarm Status LED	Display Screen Message
Network status does not apply to 1B standalone monitors.	Flashing GREEN (1 sec Cycle)		

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Table 4-3: Status LEDs (Faults)

LED States	Network LED	Alarm Status LED	Display Screen Message
Fault 1:			
Stuck in Bootloader	Solid BLUE	Solid BLUE	Not Indicated on Display Screen

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Table 4-4: Status LEDs (Alarms)

LED States	Network LED	Alarm Status LED	Display Screen Message
Threshold 1 Reached	Flashing GREEN (1 sec Cycle)	Solid YELLOW	Gas Bar Indicates "WARN" For Affected Sensors
Threshold 2 Reached	Flashing GREEN (1 sec Cycle)	Solid RED	Gas Bar Indicates "ALARM" For Affected Sensors
Threshold 3 Reached	Flashing GREEN (1 sec Cycle)	Solid RED	Gas Bar Indicates "ALARM" For Affected Sensors

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Table 4-5: Status LEDs (Calibration)

LED States	Network LED	Alarm Status LED	Display Screen Message
Cal Needed	Flashing GREEN (1 sec cycle)	Solid GREEN	Not Indicated on Display Screen
In Calibration Mode / Calibration Activity Waiting to Start	Flashing GREEN (1 sec cycle)	Solid GREEN	Calibration Routine Prompts
Calibration Looking for Stable	Flashing GREEN (1 sec cycle)	Solid GREEN	Calibration Routine Prompts
Calibration Pass	Flashing GREEN (1 sec cycle)	Solid GREEN	Calibration Routine Prompts
Calibration Fail	Flashing GREEN (1 sec cycle)	Solid GREEN	Calibration Routine Prompts

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Table 4-6: Status LEDs (Miscellaneous)

LED States	Network LED	Alarm Status LED	Display Screen Message
Low RTC Battery	Flashing GREEN (1 sec cycle)		Not Indicated on Display Screen
Real-Time Clock (RTC) Disabled or Uninitialized	Flashing GREEN (1 sec cycle)	Solid MAGENTA	Not Indicated on Display Screen

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Note that a **Menu Flow Chart** is available further in this manual. The menu images and menu flow diagrams in this manual represent gas types with labels such as "GAS1", "GAS2", etc. These are mapped to specific gases based on the customer order.

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Upon startup, a brief splash screen is shown on the display which includes the Armstrong Monitoring Corp's logo and the current version of the UTx firmware. After a couple of seconds, the display will update to show the main info screen (see below). NOTE: The bar graphs indicating gas concentration are not visible initially while the sensor modules are warming up. The warm-up period will be shown in the details section for the selected sensor until the warm-up period expires. NOTE: Factory configurations define a warm-up default value that prevents false alarms while sensors are warming up. This value may be viewed during warm-up through the detailed sensor screen section.

GAS1 �◄ — Highlighted background indicates which sensor is currently selected

GAS2 ▯bar

12.25 PPM
GAS1 Long Name ◄ — Details pertaining to the selected sensor (its current value and long name)
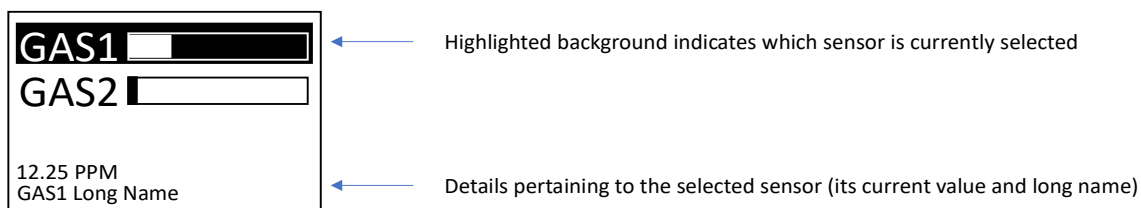
As shown above, two sensors are currently attached to the transmitter. Only one sensor can be selected at a time for the purpose of inspecting its details. Use the **UP** and **DOWN** buttons to navigate between each sensor. The following diagram illustrates the main info screen after pressing the **DOWN** button from the previous display. Notice how the details are updated to reflect the newly selected sensor.

```
┌─────────────────────────┐
│ GAS1 ▣▬───              │
│ GAS2 ▮▬▬▬▬             │
│                         │
│                         │
│ 12.25 PPM               │
│ GAS2 Long Name          │
└─────────────────────────┘
```
← Highlighted background indicates which sensor is currently selected

← Details pertaining to the selected sensor (its current value and long name)
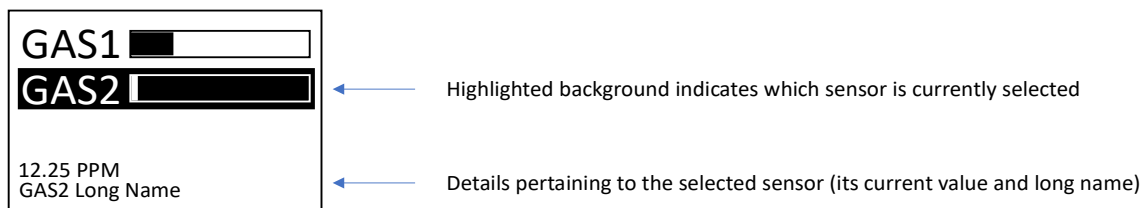
After a programmed timeout period without any button presses, the display will go blank (screen saver mode). To re-enable the display, simply press the **ENTER** button.

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In the event of a failed sensor, the bar graph is replaced with a large FAIL indication and the detailed description is updated accordingly. If the sensor fails while the display is OFF, the display will immediately turn ON and the failed sensor will be selected by default. In addition, the FAIL indication will toggle between normal and inverse 'white space' mode at a rate of once per second as shown below.

```
┌─────────────────────────┐
│ GAS1  FAIL              │
│ GAS2  FAIL              │
│                         │
│ Sensor Not Connected    │
│ GAS1 Long Name          │
└─────────────────────────┘
```
← Highlighted background indicates sensor module is currently missing. FAIL in normal video mode.

← Details pertaining to the failed sensor selection

```
┌─────────────────────────┐
│ GAS1  FAIL              │
│ GAS2  FAIL              │
│                         │
│ Sensor Not Connected    │
│ GAS1 Long Name          │
└─────────────────────────┘
```
← Highlighted background indicates sensor module is currently missing. FAIL in inverse video mode.

← Details pertaining to the failed sensor selection
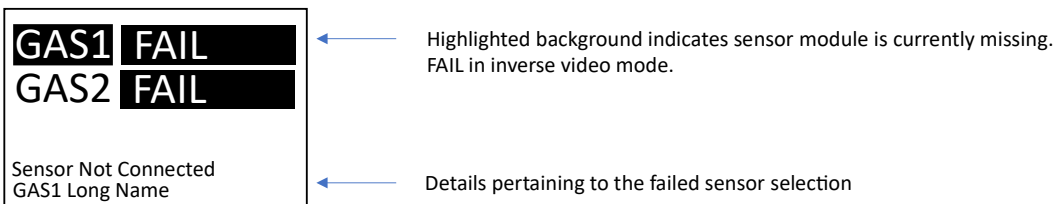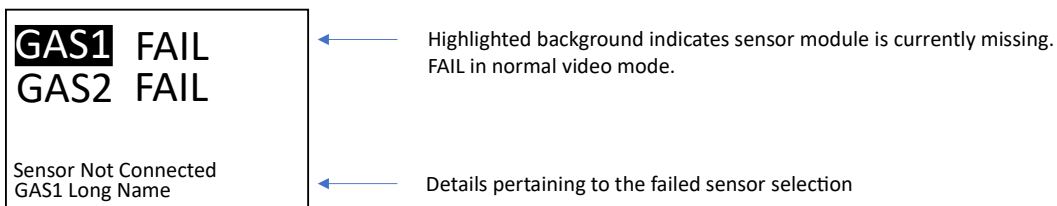
If the failure condition is resolved, the main display for the failed sensor will resume normal operation by indicating the sensor reading via bar graph.

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When a warning or an alarm occurs, the bar graph is replaced with a large WARN indication for warnings or a large ALARM for alarms. If the sensor enters a warning or alarm state while the display is OFF, the display will immediately turn ON and the sensor responsible for the warning/alarm will be selected by default. Like the FAIL indication, the WARN/ALARM indication will toggle between normal and inverse 'white space' mode at a rate of once per second as shown below.

The user has the option to silence the buzzer while the warning/alarm condition is still active. To silence the alarm, the channel responsible for the warning/alarm needs to be selected and the user needs to press the **ENTER** button. Once silenced, the contextual help (small text) will provide an indication of how long the audio buzzer will remain silenced. Once this period expires, the previous 'Press ENTER to ACK" message will return, and the buzzer will resume operation.

GAS1 WARN
GAS2 ▮▬▬▬▬

Warning – XX.X PPM
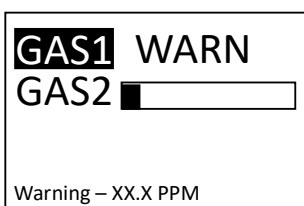
Highlighted background indicates which sensor is currently in a warning state. WARN in normal video mode.

Details pertaining to the sensor

GAS1 WARN
GAS2 ▮▬▬▬▬

Warning – XX.X PPM
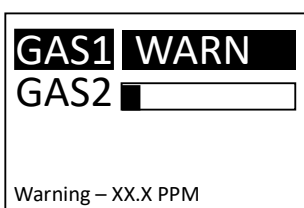
Highlighted background indicates which sensor is currently in a warning state. WARN in inverse video mode.

Details pertaining to the sensor

GAS1 ALARM
GAS2 ▮▬▬▬▬

Alarm – XX.X PPM
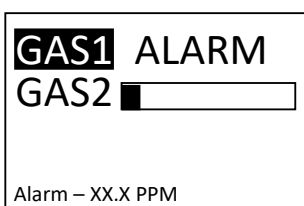
Highlighted background indicates which sensor is currently in alarm. ALARM in normal video mode.

Details pertaining to the selected sensor which is currently in alarm. The current sensor reading is shown.

GAS1 ALARM
GAS2 ▮▬▬▬▬

Alarm – XX.X PPM
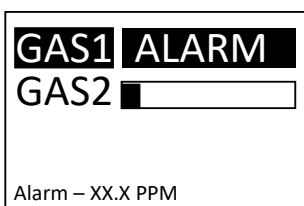
Highlighted background indicates which sensor is currently in alarm. ALARM in inverse video mode.

Details pertaining to the selected sensor which is currently in alarm. The current sensor reading is shown.

For units configured at factory to use latched alarms, when the alarm condition is cleared the display will indicate that the relays are latched until cleared by the user by pressing the **ENTER** button to release the latching condition.

GAS1 LATCH
GAS2 ▮▬▬▬▬

Press ENTER to RELEASE
Latched – X.X PPM

Highlighted background indicates which sensor is currently selected with latched relays. LATCH in normal video mode.

Details pertaining to the selected sensor which currently has its relays in Latched mode. The current sensor reading is shown with an instruction to press the ENTER button to release the relays from their active state.

GAS1 LATCH
GAS2 ▮▭

Press ENTER to RELEASE
Latched – X.X PPM
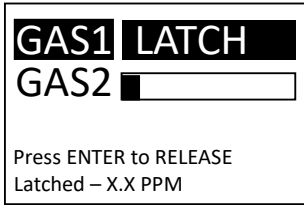
Highlighted background indicates which sensor is currently selected with latched relays. LATCH in inverse video mode.

Details pertaining to the selected sensor which currently has its relays in Latched mode. The current sensor reading is shown with an instruction to press the ENTER button to release the relays from their active state.

The following two menu images show a fault condition in normal and inverse video modes.

GAS1 FAULT
GAS2 ▮▭

Sensor At Fault
GAS1 Long Name
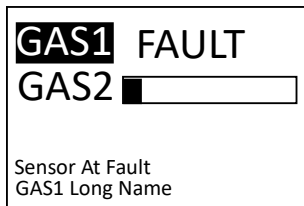
Highlighted background indicates which sensor is currently at fault. FAULT in normal video mode.

Details pertaining to the sensor at fault

GAS1 FAULT
GAS2 ▮▭

Sensor At Fault
GAS1 Long Name
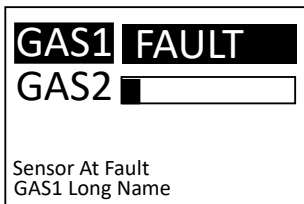
Highlighted background indicates which sensor is currently at fault. FAULT in inverse video mode.

Details pertaining to the sensor at fault

To access the detailed information for each sensor, press and hold the **UP** button until the following screen appears.

S1 : GAS1
Current   : 2.35
15 min avg   : 1.75
8 hour avg   : 2.82
Daily Peak   : 3.71
Custom   : 0.00
Sensor 1 of 2
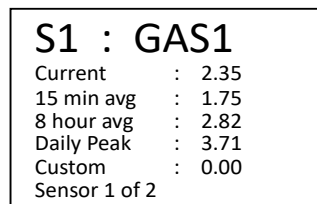
Label indicates which sensor is currently selected
Current instantaneous value for the selected sensor
15 min average value for the selected sensor
8 hour average value for the selected sensor
Daily peak value for the selected sensor
Custom filter value for the selected sensor (if specified, 0 otherwise)
Paging info updated as different sensors are selected using UP/DOWN buttons

The detailed sensor screen provides several values for each sensor. Use the **UP** and **DOWN** buttons to page through all the attached sensors. This detailed screen will timeout after 30 seconds if no button is pressed thereby returning the user back to the main info screen. Alternatively, the user can exit the detailed sensor screen on demand by pressing the **ENTER** button to return back to the main info screen.

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To access the detailed status for each sensor, press and hold the DOWN button until the following screen appears.

```
S1 : GAS1
Status     :  Normal
Last Cal   :  76 days
Next Cal   :  104 days
Lifetime   :  2126 days
S/N        :  1234
Sensor 1 of 2
```

←───── Label indicates which sensor is currently selected
←───── Current operational status for the selected sensor
←───── Number of days since last calibration for the selected sensor
←───── Number of days until next calibration for the selected sensor
←───── Remaining sensor life for the selected sensor
←───── Serial number for the selected sensor
←───── Paging info updated as different sensors are selected using UP/DOWN buttons

The detailed status screen provides the complete status for each sensor. Use the UP and DOWN buttons to page through all the attached sensors. This detailed screen will timeout after 30 seconds if no button is pressed thereby returning the user back to the main info screen. Alternatively, the user can exit the detailed status screen on demand by pressing the ENTER button to return to the main info screen.

NOTE: All information dependent on the real-time clock (RTC) such as 'Last Cal' or 'Next Cal' may be incorrect if the RTC is currently disabled or uninitialized (as indicated by a solid magenta on the Alarm Status LED).

Continuing to press **DOWN** after the sensor pages show the firmware version of up to all four modules that are available on the UTx platform. This list also displays the date and time for convenience.

```
FIRMWARE
  TM  : v5.14
  DM  : v5.14
 SM1 : v5.14
 SM2 : v5.13

YYYY-MM-DD HH:MM:SS
```

←───── 'Firmware' serves as a label only
←───── Transmitter (UTx) firmware version
←───── Display module firmware version
←───── First sensor module version, if applicable
←───── Second sensor module version, if applicable

←───── Date and time information

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To access the service menu system, the user needs to press and hold the **ENTER** button until the following password entry screen is displayed.

```
Password
 ☐ ☐ ☐ ☐ ☐

Enter service password
Exit in 8 seconds
```

←───── The status of the password entry timeout is shown here

Enter the password using a combination of the **UP**, **DOWN** and **ENTER** buttons. The password is factory set to **UP** - **DOWN** - **UP** - **DOWN** - **ENTER** – **ENTER**. As the password is being entered, the display updates with each button press. The diagram below illustrates the state of the password entry after 3 button presses. The password entry screen will timeout after 10 seconds if no button is pressed thereby returning the user back to the main info screen.

```
┌─────────────────────────────┐
│      Password               │
│                             │
│   ☒  ☒  ☒  ☐  ☐  ☐          │
│                             │
│                             │
│  Enter service password     │
│  Exit in 5 seconds          │  ◄─────  The status of the password entry timeout is shown here
└─────────────────────────────┘
```

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The service menus remain unlocked for a programmed timeout period (set to 5 minutes). Within that period, the service menus can be re-enabled by long pressing the **ENTER** button. If the timeout period is allowed to expire, the password entry screen will appear prior to accessing the service menus. Also, if the service menu is active when a timeout occurs, the service mode is disabled, and the display will go blank (i.e. power saving mode). Lastly, the service menu timeout is reset with each button press while the service menus are active.

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Once the correct password is entered, the main service menu is displayed as shown in the following diagram.

```
┌─────────────────────────────┐
│ S1 : GAS1                   │  ◄─────  Highlighted background indicates which service menu is selected
│ S2 : GAS2                   │
│ UTx                         │
│                             │         The name of the selected service menu. In the case of a sensor service
│ GAS1 Long Name              │  ◄─────  menu, the sensor's gas serves as its name
└─────────────────────────────┘
```

Once again, the **UP** and **DOWN** buttons can be used to navigate the list of service menus. The main service menu provides the menu items listed in the table below:

Table 4-7: Service Menu Options

Menu Item	Description
<Sensor #>: <Gas Label>	Each sensor is included in the service menu indicated by its number and gas label (Ex: S2: CO).
UTx	Access the settings for the transmitter module through the 'UTx' menu item.
Exit	Select this menu item to exit the service menu.

To exit the Service Menu, press **DOWN** repeatedly until the end is reached and Exit is highlighted as shown below.

S2 : GAS2
UTx
Exit

Exit Service Menu

Highlighted background indicates that Exit is selected

Context sensitive help

With 'Exit' highlighted (as above), press **ENTER** to exit the service mode and return back to the main info screen as shown below.

GAS1
GAS2

11.875 PPM
GAS1 Long Name

Upon exiting the service menus, the first sensor is selected by default

Details for the current sensor are updated in real-time as well as the progress bar which represents the current value relative to its max value

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NOTE: The Outputs menu (available from the main service menu) is used to provide supplemental configuration options that are applicable to external sensors, beyond those in the External Sensor Service menu.

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If the **ENTER** button is pressed while the service menus are active and an external sensor is currently selected, then the following menu is shown for external sensors. This menu is common to all external sensors, therefore, selecting any external sensor will produce the same menu.
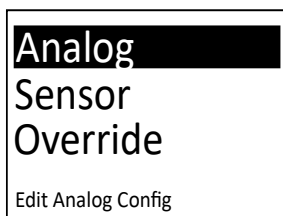
```
Analog
Sensor
Override

Edit Analog Config
```
← Context sensitive help (for the currently highlighted menu item)

The **UP** and **DOWN** buttons can be used to navigate the list of service menus for the selected sensor. The sensor's service menu provides the following menu items:

Table 4-8: External Sensor Menu Options

Menu Item	Description
Analog	Analog configuration sub-menu for the selected sensor.
Sensor	Sensor configuration sub-menu for the selected sensor.
Override	Override sub-menu for the selected sensor.
Exit	Select this menu to return to the main service menu.

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If 'Analog' configuration sub-menu is activated from the sensor's service menu when an external sensor is selected, then the display will be updated to show the following sub-menu.
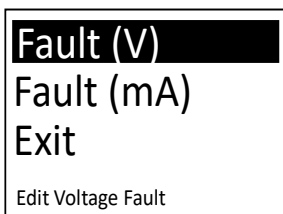
```
Fault (V)
Fault (mA)
Exit

Edit Voltage Fault
```
← Activate this menu item to edit the fault threshold for voltage mode input
← Activate this menu item to edit the fault threshold for current mode input
← Highlighted background indicates that Exit is selected
← Context sensitive help (for the currently highlighted menu item)

The **UP** and **DOWN** buttons can be used to navigate the list of analog configuration options for the selected external sensor. The analog configuration sub-menu is defined in the below table:

Table 4-9: Analog Sub-Menu Options

Menu Item	Description
Fault (V)	Activate this menu item to edit the fault threshold (in V) for voltage mode input.
Fault (mA)	Activate this menu item to edit the fault threshold (in mA) for current mode input.
Exit	Select this menu item to return to the sensor's service menu. The 'Analog' sub-menu will be selected when the sensor's service menu appears.

If 'Fault (V)' is activated from the 'Analog' configuration sub-menu, then the display will be updated to show the following editing screen.

```
Fault (V)
█01.0


Enter To Adv Cursor
```

← 'Fault (V)' serves as a label only.

← Edit the voltage fault threshold value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

← Context sensitive help (for the currently highlighted menu item)

When the **ENTER** button is pressed with the last digit selected, the screen will update to display the confirmation dialog (described previously). If 'Yes' is selected, the edit value is persisted as the new value for the voltage fault threshold for the selected external sensor. Otherwise, the edit value is rejected. In either case, the menu returns to the 'Analog' configuration sub-menu menu with the 'Fault (V)' menu item selected.

NOTE: This value only applies when the input mode is voltage mode and has a non-zero minimum input. For example, with an external sensor configured for operation between 2 - 10 V, setting a fault value of 1 V would lead to the sensor being found in a 'FAIL' state with an input voltage of less than 1 V.

CAUTION: Entering a fault value of 0 V disables the fault check.

If 'Fault (mA)' is activated from the 'Analog' configuration sub-menu, then the display will be updated to show the following editing screen.

```
Fault (mA)
█02.5


Enter To Adv Cursor
```

← 'Fault (mA)' serves as a label only.

← Edit the current fault threshold value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

← Context sensitive help (for the currently highlighted menu item)

When the **ENTER** button is pressed with the last digit selected, the screen will update to display the confirmation dialog (described previously). If Yes is selected, the edit value is persisted as the new value for the current fault threshold for the selected external sensor. Otherwise, the edit value is rejected. In either case, the menu returns to the 'Analog' configuration sub-menu menu with the 'Fault (mA)' menu item selected.

NOTE: This value only applies when the input mode is current mode and has a non-zero minimum input. For example, with an external sensor configured for operation between 4 - 20 mA, setting a fault value of 2 mA would lead to the sensor being found in a 'FAIL' state with an input current of less than 2 mA.

CAUTION: Entering a fault value of 0 mA disables the fault check.

If 'Exit' is activated from the 'Analog' configuration sub-menu, then the user is returned to the sensor's service menu for an external sensor.

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If the 'Sensor' sub-menu is activated from the sensor's service menu when an external sensor is selected, then the display will be updated to show the following sub-menu.

Gas Label	← Activate this menu item to edit the gas label for the selected sensor
Eng Units	← Activate this menu item to edit the engineering units for the selected sensor
Window	← Activate this menu item to edit the custom filter window for the selected sensor
Edit Gas Label	← Context sensitive help (for the currently highlighted menu item)
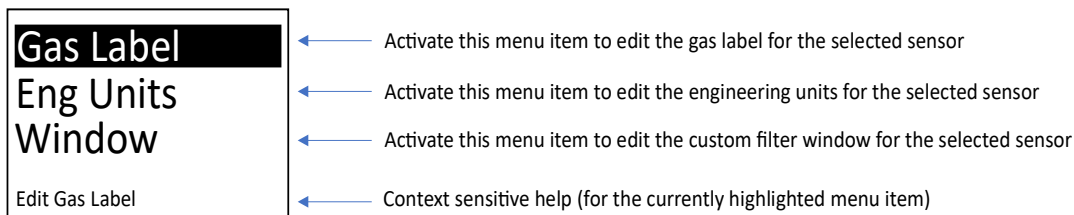
The **UP** and **DOWN** buttons can be used to navigate the list of sensor configuration options for the selected external sensor. The sensor configuration sub-menu is defined in the below table:

Table 4-10: Sensor Sub-Menu Options

Menu Item	Description
Gas Label	Activate this menu item to edit the gas label for the selected sensor.
Eng Units	Activate this menu item to edit the engineering units for the selected sensor.
Window	Activate this menu item to edit the custom filter window for the selected sensor.
Exit	Select this menu item to return to the sensor's service menu. The 'Config' sub-menu will be selected when the sensor's service menu appears.

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If 'Gas Label' is activated from the 'Sensor' sub-menu, then the display will be updated to show the following editing screen.

Gas Label	← 'Gas Label' serves as a label only, therefore, this item can not be selected.
GAS	← Edit the gas label value character at a time using the UP/DOWN buttons. Press ENTER to advance the cursor to the next character. Press ENTER when the last character (space) is highlighted to save the value.
Enter To Adv Cursor	← Context sensitive help (for the currently highlighted menu item)
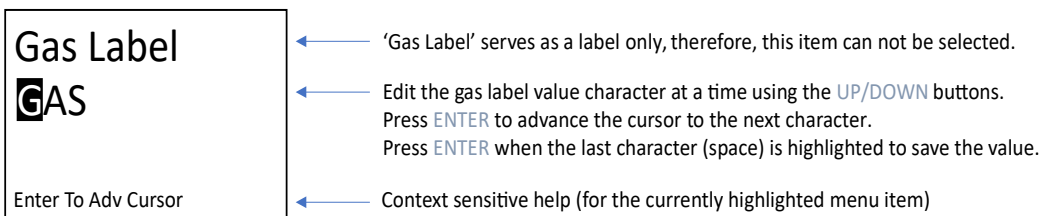
Each character can be edited to any alpha-numeric value (A-Z, 0-9) including a space. When **ENTER** button is pressed with the last non-space character highlighted, a space will be appended to the label to allow expanding the label value.

When the **ENTER** button is pressed with the last character selected and that character is a space, the screen will update to display the confirmation dialog (described previously). If 'Yes' is selected, the edit value is persisted as the new value for the Gas Label for the selected external sensor.

Otherwise, the edit value is rejected. In either case, the menu returns to the 'Sensor' configuration sub-menu menu with the 'Gas Label' menu item selected.

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If 'ENG UNITS' is activated from the 'Sensor' sub-menu, then the display will be updated to show the following editing screen.
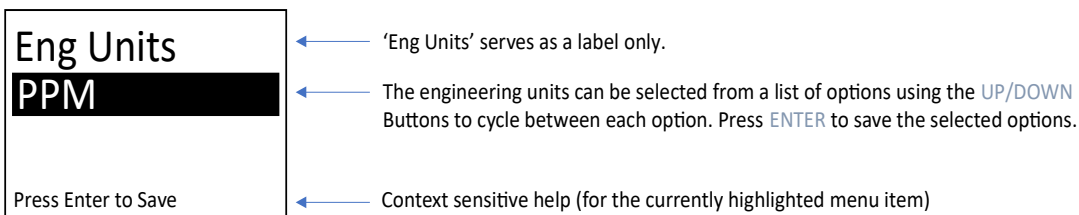
The available options for 'ENG UNITS' are listed in the following table.

Table 4-11: Engineering Unit Options

Menu Item	Description
PPB	Parts per Billion
PPM	Parts per Million
% LEL	Percent of Lower Explosive Limit
% VOL	Percent by Volume
Volt	Voltage
% FS	Percent of Full Scale
% LFL	Percent of Lower Flammable Limit

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously).

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously).

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Window is a custom average filter for gas readings, where the averaging "window" can be selected from a multiplier of 2-60. This refers to the "Custom" average that can be seen through the detailed sensor screen for each sensor. The averaging time ranges between 30–900, minutes in increments of 15 minutes. For example, a multiplier of 3 would correspond to an averaging window of 45 minutes.

If 'Window' is activated from the external 'Sensor' sub-menu, then the display will be updated to show the following editing screen.

```
┌─────────────────────────────┐
│ Window                      │ ◄─────  'Window' serves as a label only.
│ ■30                         │ ◄─────  Edit the window filter value one digit at a time using the UP/DOWN buttons.
│                             │         Press ENTER to advance the cursor to the next digit.
│                             │         Press ENTER when the last digit is highlighted to save the value.
│ Enter To Adv Cursor         │ ◄─────  Context sensitive help
└─────────────────────────────┘
```

When the **ENTER** button is pressed with the last digit selected, the screen will update to display the confirmation dialog (described previously). If 'Yes' is selected, the edit value is persisted as the new value for the filter window for the selected external sensor. Otherwise, the edit value is rejected. In either case, the menu returns to the 'Sensor' sub-menu with the 'Window' menu item selected.

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The External Sensor Menu allows the current gas reading of an external sensor to be overridden by a simulated gas level. This may be useful during the system commissioning to verify operation of the Monitor or alarm relays.

Table 4-12: External Override Sub-Menu Options

Menu Item	Description
Sim Enable	Menu item for turning the external gas override value on/off.
Sim Gas	Allows an external override value to be selected (only applied if Sim Enable set to "Enabled").
Exit	Select this menu item to return to the external sensor service menu.

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If 'Override' sub-menu is activated from the external sensor's service menu, then the display will be updated to show the following sub-menu.

```
┌─────────────────────────────┐
│ Sim Enable                  │ ◄─────  Activate this menu item to edit the simulated gas enable flag for the selected sensor
│ Sim Gas                     │ ◄─────  Activate this menu item to edit the simulated gas concentration for the selected sensor
│ Exit                        │ ◄─────  Activate this menu item to exit the "Override" sub-menu
│ Edit Sim Enable             │ ◄─────  Context sensitive help (for the currently highlighted menu item)
└─────────────────────────────┘
```

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If 'Sim Enable' is activated from the 'Override' sub-menu, then the display will be updated to show the following editing screen.

Sim Enable
Disabled

Press Enter to Save

Defaults to the current value of the Sim Enable flag. Use UP/DOWN arrow buttons to toggle between Disabled and Enabled. Press ENTER button to confirm selection.

Context sensitive help (for the currently highlighted menu item)

When the **ENTER** button is pressed, the confirmation screen (described previously) is displayed. If 'Yes' is selected, the edit value is persisted as the new value for the Sim Enable flag. Otherwise, the edit value is rejected. In either case, the menu returns to the Override sub-menu menu with the 'Sim Enable' menu item selected.

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If 'Sim Gas' is activated from the 'Override' sub-menu, then the display will be updated to show the following editing screen.

Sim Gas
+100.0

Enter to Adv Cursor

'Sim Gas' serves as a label only.

Edit the simulated gas value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

Context sensitive help

When the **ENTER** button is pressed with the last digit highlighted, the confirmation screen (described previously) is displayed. If 'Yes' is selected, the edit value is persisted as the new value for the Sim Gas concentration value. Otherwise, the edit value is rejected. In either case, the menu returns to the Override sub-menu menu with the 'Sim Gas' menu item selected.

Selected 'Exit' from the 'Override' sub-menu returns the user to the sensor's service menu with the 'Override' menu item selected.

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If the 'UTx menu item is activated from the main service menu via the **ENTER** button, then UTx service menu will appear on the display as shown in the following diagram.

The **UP** and **DOWN** buttons can be used to navigate the list of service menus for the UTx. The following table outlines all the menu items from the UTx menu:

Table 4-13: Transmitter Service Menu

Menu Item	Description
Sensors	Select this menu item to activate the Sensors sub-menu.
Alarms	Select this menu item to activate the Alarms sub-menu.
Relays	Select this menu item to activate the Relays sub-menu.
Test	Select this menu item to toggle the test enable flag.
Buzzer	Select this menu item to toggle the low alarm buzzer enable flag.
Ack Timer	Select this menu item to adjust the buzzer acknowledgement timeout (30 – 120 seconds).
Reset	Select this menu item to trigger a software reset of the UTx.
Exit	Select this menu item to return to the main service menu. The menu item for the UTx will be selected when the main service menu appears.

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From the UTx service menu, selecting 'Sensors' will update the display to show the following sub-menu.
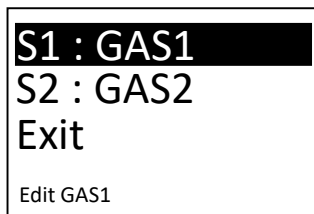
S1 : GAS1
S2 : GAS2
Exit

Edit GAS1   ⟵   Context sensitive help (for the currently highlighted menu item)

The **UP** and **DOWN** buttons can be used to navigate the list of configured sensors for the sensors sub-menu. The table below outlines all the menu items from the sensors sub-menu:

Table 4-14: Sensor Module Configuration Menu

Menu Item	Description
S1: GAS1	Select this menu item to activate the configuration sub-menu for sensor 1.
S2: GAS2	Select this menu item to activate the configuration sub-menu for sensor 2.
Exit	Select this menu item to return to the UTx service menu.

Selecting a sensor from the 'Sensors' sub-menu (ex: S1: GAS1) will update the display to show the following sub-menu.

Alarm SP 1
Alarm SP 2
Alarm SP 3

Edit Alarm 1 ←—————— Context sensitive help (for the currently highlighted menu item)
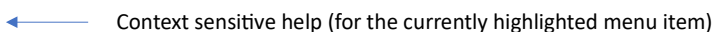
The **UP** and **DOWN** buttons can be used to navigate the list of menus for the 'Sensors' sub-menu. The below table outlines all the menu items from the sensor sub-menu:

Table 4-15: Sensor Alarm Configuration

| Menu Item	Description
Alarm SP 1-3	Select this menu item to edit the alarm setpoints for the selected alarm (1-3).
Alarm Hyst	Select this menu item to edit the alarm hysteresis. This hysteresis value is applied to all alarm setpoints.
Zero Buff	Select this menu item to edit the zero-buffer level for the display of small gas concentrations.
Cal Freq	Select this menu item to edit the time period between re-calibrations.
Exit	Select this menu item to return to the Sensors sub-menu.

4.3.10.2.1 Setpoint

If 'Alarm SP 1' is activated from the sensor alarm configuration sub-menu, then the display will be updated to show the following editing screen.

Alarm SP 1 ←——— 'Alarm SP 1' serves as a label only.
+025.0 ←——— Edit the alarm 1 setpoint value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

Enter To Adv Cursor ←——— Context sensitive help
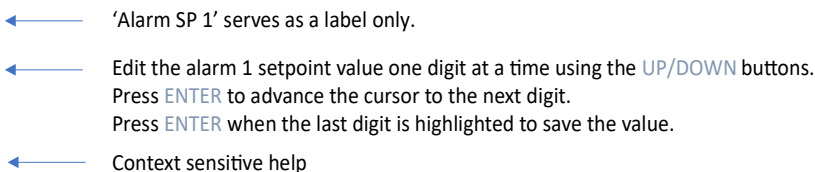
When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously).

The same process is repeated for Alarm SP 2 and Alarm SP 3. In all cases, once the confirmation dialog is reached, regardless of which option it selected, the user is returned back to the Sensors sub-menu.

4.3.10.2.2 Alarm Hysteresis

If 'Alarm Hyst' is activated from the sensor sub-menu, then the display will be updated to show the following editing screen.

```
Alarm Hyst
█02.0



Enter To Adv Cursor
```

'Alarm Hyst' serves as a label only.

Edit the alarm hysteresis setpoint value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

Context sensitive help

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously). If 'Yes' is selected, the edit value is persisted as the new value for the Alarm Hysteresis for the selected sensor. Otherwise, the edit value is rejected. In either case, the menu returns to the Sensor sub-menu menu with the 'Alarm Hyst' menu item selected.

4.3.10.2.3 Zero Buffer

If 'Zero Buff' is activated from the sensor sub-menu, then the display will be updated to show the following editing screen.

```
Zero Buff
█000



Enter To Adv Cursor
```

'Zero Buff' serves as a label only.

Edit the alarm hysteresis setpoint value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

Context sensitive help

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously). If 'Yes' is selected, the edit value is persisted as the new value for the Zero Buffer for the selected sensor. Otherwise, the edit value is rejected. In either case, the menu returns to the Sensor sub-menu menu with the 'Zero Buff' menu item selected.

4.3.10.2.4 Calibration Frequency

If 'Cal Freq' is activated from the sensor sub-menu, then the display will be updated to show the following editing screen.

```
Cal Freq
6 Months



Press Enter To Save
```

'Cal Freq' serves as a label only.

The calibration frequency can be selected from a list of options using the UP/DOWN buttons to cycle between each option. Press ENTER to save the selected options.

Context sensitive help

The available options for 'Cal Freq' are listed in the table below.

Table 4-16: Calibration Frequency Configuration

Menu Item	Description
OFF	Next calibration due date is not calculated.
3 Months	Next calibration due date is calculated as 3 months from last calibration timestamp.
4 Months	Next calibration due date is calculated as 4 months from last calibration timestamp.
6 Months	Next calibration due date is calculated as 6 months from last calibration timestamp.
12 Months	Next calibration due date is calculated as 12 months from last calibration timestamp.

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously).

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From the UTx service menu, selecting 'Alarms' will update the display to show the following sub-menu.
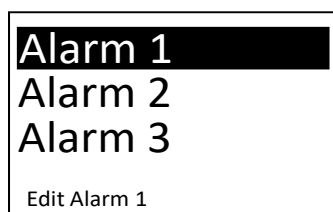
```
Alarm 1
Alarm 2
Alarm 3

Edit Alarm 1
```
← Context sensitive help (for the currently highlighted menu item)

The **UP** and **DOWN** buttons can be used to navigate the list of menus for the Alarms sub-menu. The table below outlines all the menu items from the Alarms sub-menu:

Table 4-17: Transmitter Alarm Settings

Menu Item	Description
Alarm 1-18	Select this menu item to activate the configuration sub-menu for the selected alarm.
Exit	Select this menu item to return to the UTx service menu. The alarms menu item will be selected when the UTx service menu appears.

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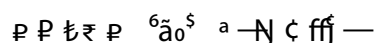
Selecting an alarm from the alarms sub-menu will update the display to show the following:
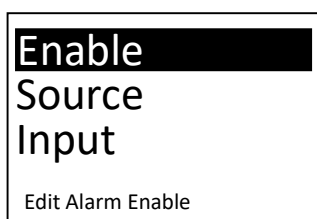
```
┌─────────────────────────┐
│ Enable                  │
│ Source                  │
│ Input                   │
│                         │
│ Edit Alarm Enable       │
└─────────────────────────┘
```
←──── Context sensitive help (for the currently highlighted menu item)

The below table outlines all the menu items from the alarm sub-menu:

Table 4-18*: Transmitter Alarm Sub-Menu Settings*

Menu Item	Description
Enable	Select this menu item to edit the alarm's enable state.
Source	Select this menu item to edit the alarm's source (i.e. from the available sensors).
Input	Select this menu item to edit the alarm's input value.
Level	Select this menu item to edit the alarm's setpoint.
Type	Select this menu item to edit the alarm's type (increasing or decreasing).
Output	Select this menu item to edit the alarm's trigger output (i.e. activate which relays).
Act Delay	Select this menu item to edit the alarm's act delay in terms of seconds.
Min Run	Select this menu item to edit the alarm's minimum run time in terms of seconds.
Exit	Select this menu item to return to the Alarms sub-menu.

4.3.10.4.1 Enable

If 'Enable' is activated from the alarm sub-menu, then the display will be updated to show the following editing screen.
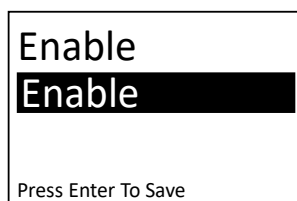
```
┌─────────────────────────┐
│ Enable                  │
│ Enable                  │
│                         │
│ Press Enter To Save     │
└─────────────────────────┘
```
←──── 'Enable' serves as a label only.

←──── Defaults to the current value of the Enable flag. Use UP/DOWN arrow buttons to toggle between Disabled and Enabled. Press ENTER button to confirm selection.

←──── Context sensitive help

When the **ENTER** button is pressed, the confirmation screen (described previously) is displayed.

4.3.10.4.2 Source

If 'Source' is activated from the alarm sub-menu, then the display will be updated to show the following editing screen.

```
Source
S1 : GAS1


Press Enter To Save
```

'Source' serves as a label only.

The source can be selected from a list of sensors. Cycle through all the values using the UP/DOWN buttons.

Context sensitive help
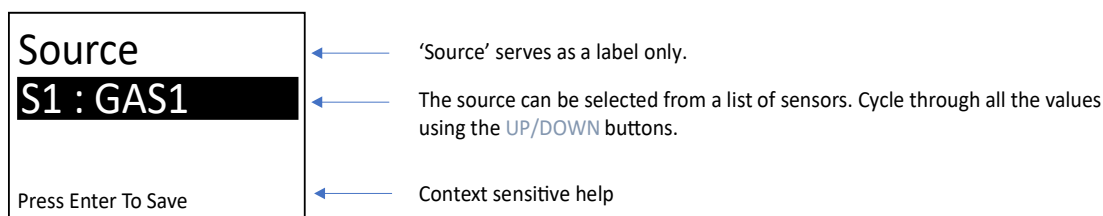
The available options for 'Source' are equal to the list of sensors currently configured for the UTx. The label for each sensor is dynamically assigned to S<n>: GAS<n> where n represents the sensor's 1 base index and GAS represents the sensor's gas name in short form.

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously).

4.3.10.4.3 Input

If 'Input' is activated from the alarm sub-menu, then the display will be updated to show the following editing screen.

```
Input
15m Avg


Press Enter To Save
```

'Input' serves as a label only.

The input can be selected from a list of options using the UP/DOWN buttons to cycle between each option. Press ENTER to save the selected options.

Context sensitive help

The available options for 'Input' are listed in the table below:

Table 4-19: Alarm Input Options

Menu Item	Description
Inst. Value	Instantaneous gas value, updated once per second.
15m Avg	Gas concentration averaged over the past 15 minutes.
8h Avg	Gas concentration averaged over the past 8 hours.
Custom	Gas concentration averaged over a custom filter window (15-minute multipliers of 2-60, refer to the **External Sensor Custom Window Average** section for details.
Daily Peak	Daily peak value.

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously).

4.3.10.4.4 Level

If 'Level' is activated from the alarm sub-menu, then the display will be updated to show the following editing screen.

Level
High Alarm
Press Enter To Save

'Level' serves as a label only.

The level can be selected from a list of options using the UP/DOWN buttons to cycle between each option. Press ENTER to save the selected options.

Context sensitive help
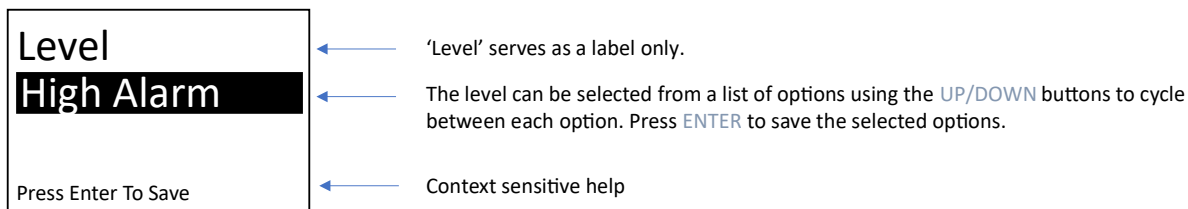
The available options for 'Level' are listed the below table.

Table 4-20: Alarm Setpoint Options

Menu Item	Description
Warning	Alarm setpoint 1 from the selected source.
Alarm	Alarm setpoint 2 from the selected source.
High Alarm	Alarm setpoint 3 from the selected source.

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously).

4.3.10.4.5 Type

If 'Type' is activated from the alarm sub-menu, then the display will be updated to show the following editing screen.

Type
Increasing
Press Enter To Save

'Type' serves as a label only.

The type can be selected from a list of options using the UP/DOWN buttons to cycle between each option. Press ENTER to save the selected options.

Context sensitive help
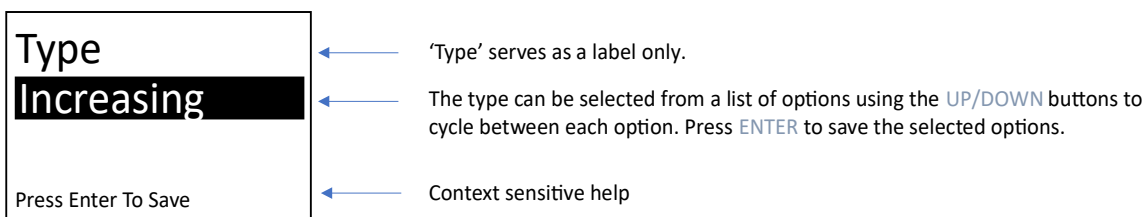
The available options for 'Type' are listed in the table below:

Menu Item	Description
Increasing	Alarm is triggered when alarm exceeds its threshold in an increasing direction.
Decreasing	Alarm is triggered when alarm exceeds its threshold in a decreasing direction.

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously).

4.3.10.4.6 Output

If 'Output' is activated from the alarm sub-menu, then the display will be updated to show the following editing screen.

```
⊠Relay 1
☐ Relay 2
☐ Relay 3
Press Enter To Toggle
```
→ Use the UP/DOWN buttons to cycle between each relay.
Press ENTER to toggle between checked or unchecked.

→ Context sensitive help
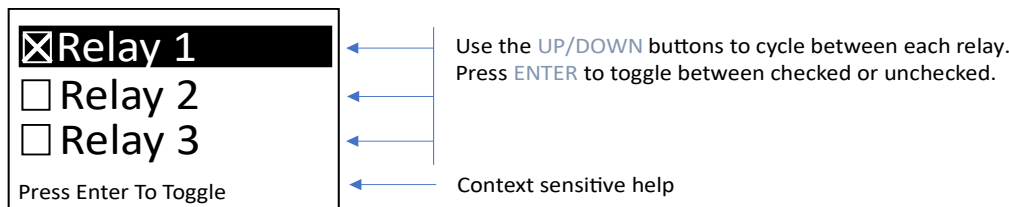
The available options for 'Output are 'Local' and 'Relay 1' through 'Relay 5'. If the checkbox next to the relay is checked, then that relay will activate when the associated alarm is active. Otherwise, the relay will not activate.

NOTE: Relays 3 through 5 are unavailable in the AMC-1B Series. Any attempt to toggle the state of a checkbox associated with an unavailable relay will be ignored.

When the **ENTER** button is pressed with 'Done' selected, the screen will update to Transmitter Alarm Sub-Menu.

4.3.10.4.7 Act Delay

If 'Act Delay' is activated from the Alarm sub-menu, then the display will be updated to show the following editing screen.
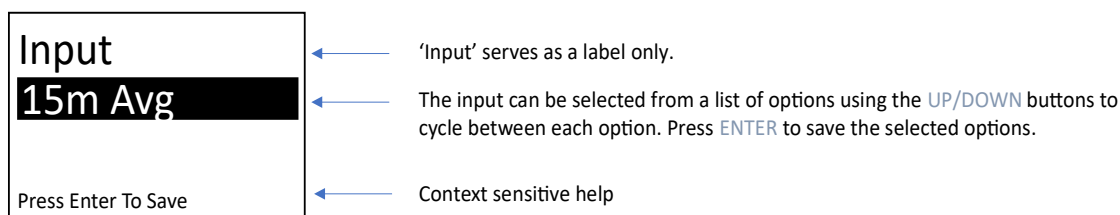
```
Act Delay
+300


Enter To Adv Cursor
```
→ 'Act Delay' serves as a label only.

→ Edit the act delay value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

→ Context sensitive help
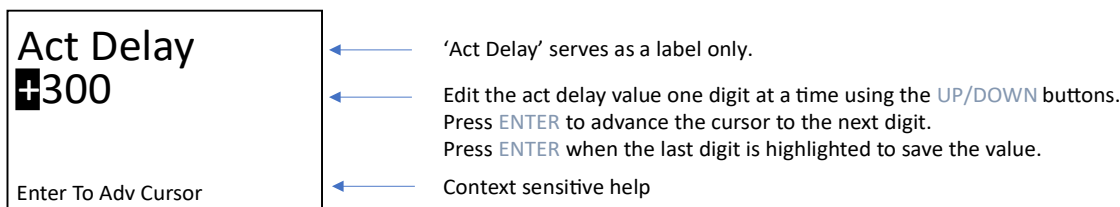
When the **ENTER** button is pressed while the last digit is highlighted, the screen will update to display the confirmation dialog (described previously).

4.3.10.4.8 Min Run

If 'Min Run' is activated from the Alarm sub-menu, then the display will be updated to show the following editing screen.

```
Min Run
+100


Enter To Adv Cursor
```
→ Edit the minimum run time value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

→ Context sensitive help

When the **ENTER** button is pressed while the last digit is highlighted, the screen will update to display the confirmation dialog (described previously).

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From the UTx service menu, selecting 'Relays' will update the display to show the following sub-menu.

Relay 1
Relay 2
Relay 3
Edit Relay 1

⟵ Context sensitive help

The **UP** and **DOWN** buttons can be used to navigate the list of menus for the Alarms sub-menu. The following table outlines all the menu items from the Alarms sub-menu:

Menu Item	Description
Relay 1-5	Selecting this menu item to activate the configuration sub-menu for the selected relay (ranging from 1 to 5).
Exit	Select this menu item to return to the UTx service menu. The Relays menu item will be selected when the UTx service menu appears.

Selecting a relay from the alarms sub-menu will update the display to show the following:

Polarity
Exit
Edit Polarity

⟵ Context sensitive help (for the currently highlighted menu item)

The table below outlines all the menu items from the relay sub-menu:
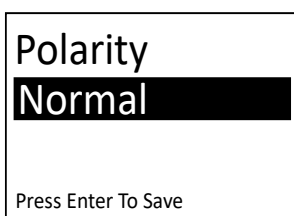
Menu Item	Description
Polarity	Select this menu item to edit the relay's polarity setting.
Exit	Select this menu item to return to the Relays sub-menu.

If 'Polarity' is activated from the relay sub-menu, then the display will be updated to show the following editing screen.

Polarity	←	'Polarity' serves as a label only.
Normal	←	The polarity can be selected from a list of options using the UP/DOWN buttons to cycle between each option. Press ENTER to save the selected options.
Press Enter To Save	←	Context sensitive help

The available options for 'Polarity' are listed in the table below:

Menu Item	Description
Normal	Relay coil is energized when associated alarm is active. Otherwise, the relay coil is de-energized.
Reverse	Relay coil is de-energized when associated alarm is active. Otherwise, the relay coil is energized.

When the **ENTER** button is pressed, the screen will update to display the confirmation dialog (described previously).

NOTE: The monitor system configuration is factory-set to use the reverse setting for the fail-safe mode. Fail safe mode provides continuity between COM to NC during WARN/ALARM/FAULT and power failure, and the associated relay LED indicator will be off.

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Analog output configuration is handled via the Outputs menu available from the main service menu. With the Outputs menu it is possible to configure the analog output to use multiplexed sensor sources to determine the output response; this section concludes with an example. Once in the Outputs menu, the **UP** and **DOWN** buttons can be used to navigate the list of available analog outputs to be configured.

```
┌─────────────────────────┐
│ Analog OP1              │  ◄──────   Context sensitive help (for the currently highlighted menu item)
│ Analog OP2              │
│ Exit                    │
│                         │
│ Edit Analog OP1         │
└─────────────────────────┘
```
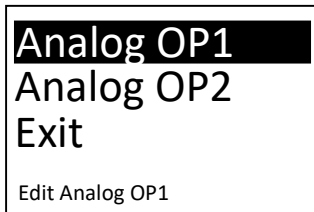
Table 4-21: Outputs Sub-Menu

Menu Item	Description
Source	Allows the analog output channel to be driven based on desired gas sources. With this menu item, it is possible to multiplex several of the available gases together to drive the output.
Mode	Used to select between voltage or current analog output modes.
Range	Can be used to adjust the output range. The units in the menu are either V or mA, depending on the selection chosen with the Mode menu item.

```
┌─────────────────────────┐
│ Source                  │  ◄──────   Context sensitive help (for the currently highlighted menu item)
│ Mode                    │
│ Range                   │
│                         │
│ Edit Output Source      │
└─────────────────────────┘
```
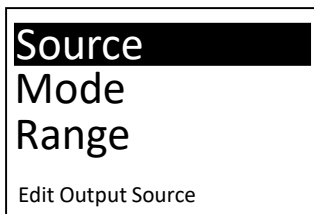
4.3.10.6.1 Source

When the **ENTER** button is pressed with Source selected, the list of available gases will be presented. A checkbox to the left of each gas label indicates if a gas is being used in the calculation of the analog output.

```
┌─────────────────────────┐
│ ⊠GAS1 (M)              │  ◄──────   Context sensitive help (for the currently highlighted menu item)
│ □GAS2                   │
│ Done                    │
│                         │
│ Press Enter to Toggle   │
└─────────────────────────┘
```
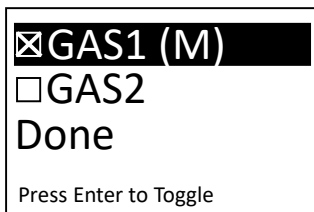
To the right of each enabled gas an "M" or "A" in brackets denotes which gas concentration is used in scaling the output response. The "M" indicates that the maximum supported gas concentration of the sensor is used in scaling the output response. An "A" indicates that the gas concentration tied to the high alarm (Alarm SP 3, see the '**Transmitter Sensor Settings'** section, is used as max scale in the calculation of the analog output response.
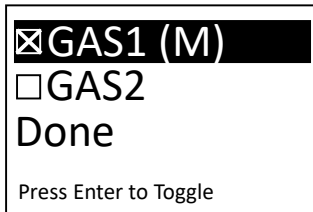
```
⊠GAS1 (M)
☐GAS2
Done

Press Enter to Toggle        ◄——— Context sensitive help (for the currently highlighted menu item)
```

When the **ENTER** button is pressed with an unchecked gas selected, a screen will be presented to allow the selection between the max gas concentration ("MAX") or Alarm SP 3 ("HI ALARM"). Use the **UP** and **DOWN** buttons to select between the two options, and press **ENTER** to confirm the selection. This will cause a return to Source sub-menu with the gas as checked. Pressing the **ENTER** button on an already checked gas will cause it to become unchecked and clear the "M" or "A" setting.
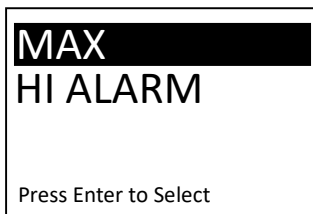
```
MAX
HI ALARM
                             ◄——— Press UP/DOWN to toggle between options.



Press Enter to Select        ◄——— Context sensitive help (for the currently highlighted menu item)
```

4.3.10.6.2 Mode

From the Outputs menu, when the **ENTER** button is pressed with Mode selected, a menu option to select between and analog output mode of voltage or current will be presented. Use the UP and **DOWN** buttons to select between the two options, and press **ENTER** to confirm the selected mode.
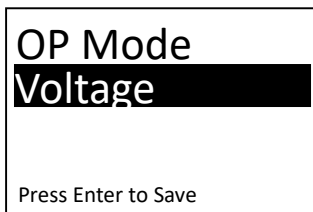
```
OP Mode
Voltage
                             ◄——— Press UP/DOWN to toggle between voltage and current output modes.



Press Enter to Save          ◄——— Context sensitive help (for the currently highlighted menu item)
```

4.3.10.6.3 Range

From the Outputs menu, when the **ENTER** button is pressed with Range selected, a sub-menu to configure the minimum and maximum analog output response will become available. The engineering unit (V or mA) displayed in the Output Min/Max menu items will reflect the analog output mode selected with the Mode menu item.

```
┌─────────────────────────────┐
│ Output Min                  │
│ Output Max                  │
│ Exit                        │
│                             │
│ Edit Output Minimum         │
└─────────────────────────────┘
```

◄─── Context sensitive help (for the currently highlighted menu item)

The permitted analog output range for voltage mode is between 0-10V.

```
┌─────────────────────────────┐
│ Min (V)                     │
│ 00                          │
│                             │
│                             │
│ Enter To Adv Cursor         │
└─────────────────────────────┘
```

◄─── 'Min (V)' serves as a label only.

◄─── Edit the window filter value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

◄─── Context sensitive help

```
┌─────────────────────────────┐
│ Max (V)                     │
│ 10                          │
│                             │
│                             │
│ Enter To Adv Cursor         │
└─────────────────────────────┘
```

◄─── 'Max (V)' serves as a label only.

◄─── Edit the window filter value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

◄─── Context sensitive help

The permitted analog output range for current mode is between 0-20mA.

```
┌─────────────────────────────┐
│ MIN (mA)                    │
│ 00                          │
│                             │
│                             │
│ Enter To Adv Cursor         │
└─────────────────────────────┘
```

◄─── 'MIN (mA)' serves as a label only.

◄─── Edit the window filter value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

◄─── Context sensitive help

```
┌─────────────────────────────┐
│ MAX (mA)                    │
│ 10                          │
│                             │
│                             │
│ Enter To Adv Cursor         │
└─────────────────────────────┘
```

◄─── 'MAX (mA)' serves as a label only.

◄─── Edit the window filter value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

◄─── Context sensitive help

Multiplexing Example

With an overview of the Outputs menu complete, it is worthwhile to show an example of how a multiplexed sensor configuration can be used to drive the analog output. In this example, the following configuration is used:

- Voltage output mode on OP1.
- 2-10V range selected for OP1.
- GAS1, with a max gas concentration of 100 PPM, and Alarm SP 3 of 100 PPM.
- GAS2, with a max gas concentration of 10 PPM, and Alarm SP 3 of 3 PPM.
- GAS1 and GAS2 are to be multiplexed; whichever gas has a higher percentage of maximum scale is to drive the output.
- GAS1 is using the max gas concentration for scaling ("M"), whereas GAS2 is using Alarm SP 3 ("A").

Suppose GAS1 has a present reading of 7 PPM, and GAS2 has a present reading of 0.5 PPM. GAS1 has a percent of max scale of 7/100=0.07. GAS2 has a percent of max scale of 0.5/3=0.16. As a result, it is GAS2 that presently determines the analog output response.

The range selected for voltage mode is (10V – 2V) = 8V. Accounting for the output offset (Output Min) of 2V, the analog output value will be found to be 2V + 0.16 * 8V = 3.33 V.

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From the UTx service menu, selecting 'Buzzer' will update the display to show the following:

Buzzer	← 'Buzzer' serves as a label only.
None	← The buzzer activation level can be selected from a list of options using the UP/DOWN buttons to cycle between each option. Press ENTER to save the selected options.
Press Enter To Save	← Context sensitive help

The available options for 'Buzzer' are listed in the table below:

Table 4-22: Buzzer Menu

Menu Item	Description
None	Disable local buzzer completely.
Alarm	Local buzzer sounds for alarm level and fault.
All Levels	Local buzzer sounds for warning, alarm, high alarm levels, and fault.

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From the UTx service menu, selecting 'Ack Timer' will update the display to show the following:

```
Ack Timer
█030


Enter to Adv Cursor
```

'Ack Timer' serves as a label only.

Edit the activation timer value one digit at a time using the UP/DOWN buttons.
Press ENTER to advance the cursor to the next digit.
Press ENTER when the last digit is highlighted to save the value.

Context sensitive help

When the **ENTER** button is pressed while the last digit is highlighted, the screen will update to display the confirmation dialog (described previously).

The allowable values for the activation timer are 30-120 seconds. During an alarm state, the local buzzer may be silenced for a period equal to activation timer, by pressing the **ENTER** button.

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The main service menu Date and Time items can be used to update the on-board real-time clock (RTC). The RTC runs on battery power when main power is unavailable. These menus provide a mechanism to update the date and time, for example, in the event of low battery during a power outage.

Use the **UP** and **DOWN** buttons to scroll though available year, month, and day options. A short press of the **ENTER** button will advance to the next digit. A long press of the **ENTER** button will return to the previous digit. Press the **ENTER** button on the last digit to proceed to the confirmation Save dialog.

```
YY-MM-DD
█3-10-29


Enter To Adv Cursor
```

'YY-MM-DD' serves as a label only.

Context sensitive help

Button presses for Time menu behave in the same manner as the Date menu. Note that it is only possible to update the RTC hour and minute currently.

```
HH:MM
█6:27


Enter To Adv Cursor
```

'HH:MM' serves as a label only.

Context sensitive help

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Maintenance is a crucial activity that should be done at the proper time intervals, which are discussed below.

The AMC-1BZ should be cleaned (brushed or wiped) as required, depending on the rate of accumulation of any dust or dirt.

To avoid damage, the unit **MOST NOT** be submerged, hosed, or splashed with any liquids. Ensure the green indicators (LEDs) are slowly blinking to indicate a healthy state.

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Verification of operation should be performed at least once every 6 months. For highly demanding applications more frequent verification is recommended.

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The Main Service Menu allows the activation of all relays and LEDs, regardless of alarm state. This may be useful during system configuration to verify operation of the LEDs and relays, as well as to verify that the polarity settings are correct.

From the Main Service Menu, selecting 'Test' will update the display to show the following:
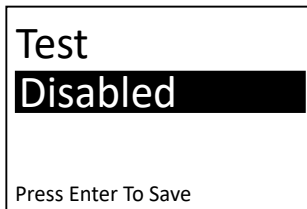
Test	
Disabled	← 'Test' serves as a label only.
	← Defaults to the current value of the test enable flag. Use UP/DOWN arrow buttons to toggle between Disabled and Enabled. Press ENTER button to confirm selection.
Press Enter To Save	← Context sensitive help

When the **ENTER** button is pressed, the confirmation screen (described previously) is displayed.

In addition to activating all relays (taking into account polarity settings), all display LEDs will appear solid white, if functional.

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Table 6-1: Troubleshooting

Symptom	Possible Cause	How to Verify	Corrective Action
Buzzer or Relays Not Activating.	Bad Connection to Buzzer or Relays.	No continuity between COM and NO Bus Module terminals.	Re-seat wiring connections for buzzer and relay coils.
	Configuration Incorrect.	No continuity between Relay Coil connection and Relay Coils.	Check UTx > Buzzer menu parameters. Check if either Alarm or All Levels are selected in item.
			Check UTx > Alarms > Alarm 1/2/3/4 > Output menu parameters; ensure Relays 1 and 2 are checked (enabled). **Note: For 1BZ2 Only**: Ensure Relays 1, 2, 3 and 4 are checked (enabled).
			The Relay 1 coil is energized during the WARN state for AI1, while the Relay 2 coil is energized during the ALARM state for AI1. **Note: For 1BZ2 Only**: The Relay 3 coil is energized during the WARN state for AI2, while the Relay 4 coil is energized during the ALARM state for AI2.
			Alarm 1 is used to control Relay 1 for AI1. Alarm 2 is used to control Relay 2 for AI1. **Note: For 1BZ2 Only**: Alarm 3 is used to control Relay 3 for AI2. Alarm 4 is used to control Relay 4 for AI2.

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Figure 7-1: Main Screen / Password Flow

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From Main
Service Menu

Sensors
Alarms
Relays
Outputs
Test
Buzzer
Ack Timer
Date
Time
Reset
Exit

Use UP/DOWN
buttons to navigate list
and press ENTER
button to select Sub-
Menu, Reset to reset
the UTx Module or Exit
to return to the Main
Service Menu

Select
Sensors

S1:GAS1
S2:GAS2
Exit

Select Sensor Module to access
Sensor Configuration Sub-Menu

Alarm SP1-3
Alarm Hyst
Zero Buff
Cal Freq
Exit

See Sensor
Configuration
Sub-Menu Flow
Diagram

Select
Alarms

Alarm 1 -18
Exit

Use UP/DOWN buttons to
navigate list and press ENTER
button to select Sub-Menu or
Exit to return to the UTx
Service Menu

Enable
Source
Input
Level
Type
Trigger
Act Delay
Min Run
Exit

See Alarms
Sub-Menu Flow
Diagram

Select
Relays

Relay 1
Relay 2
Relay 3
Relay 4
Relay 5
Exit

Polarity
Exit

Polarity
Normal

Save?
Yes

Select
Outputs

Analog OP1
Analog OP2
Exit

Source
Mode
Range
Exit

See Outputs
Configuration
Sub-Menu Flow
Diagram

(b)

Figure 7-2: UTx Service Menu (a)

(a)

Select Test → Test Disabled

Select Buzzer → Buzzer Alarm

Use UP/DOWN buttons to toggle between available options (None/Alarm/All Levels) and press ENTER button to choose desired option.

Select Ack Timer → Ack Timer +030

Select Date → YY-MM-DD 23-06-09

Select Time → HH:MM 11:59

Save? Yes

Figure 7-3: UTx Service Menu (b)

From Sensor
Service Menu

ADAPTICal
As Found
Window
Override
Firmware
Reset
Exit

Use UP/DOWN
buttons to navigate
list and press ENTER
button to select Sub -
Menu, Reset to reset
the Sensor Module or
Exit to return to the
Main Service Menu

Select
ADAPTiCal

Background
+0.00

Enter the Background Gas level one digit at a time
using the UP/DOWN buttons. Press ENTER to
advance to next digit. Press ENTER button while last
digit is highlighted will save value.

Span Level
+40.00

Enter the Span Gas level one digit at a time using the
UP/DOWN buttons. Press ENTER to advance to
next digit. Press ENTER button while last digit is
highlighted will save value.

ADAPTICal
"Current State"
Abort

Calibration process has started and the menu will
display the following states during process
- Buffering – Unit is preparing for calibration
- Find Zero – Unit is determining Zero Gas value
- Confirm Background – User to abort or apply gas if
  suggested background agrees with portable unit.
- Span Level – Calibration is underway – continue applying
  gas until results screen is displayed

ADAPTICal
"Cal Results"
OK

Once calibration is complete the results will be
displayed as "Cal Passed" or "Cal Failed" with OK
highlighted. Press ENTER button to return to the
Sensor Service Menu screen

(b)

Figure 7-4: Sensor Service Menu Diagram (a)

(a)

Select
As Found → Background
+000.0

Select
Window → Window
+30

Select
Override → Sim Enable
Sim Gas
Exit

Select
Sim Enable → Sim Enable
Disabled

Sim Gas will
have no
effect unless
Sim Enable
Is set.

Select
Sim Gas → Sim Gas
+00.0 → Save?
Yes

Select
Firmware → Firmware
TM vX.XX → Save?
Yes

Use the UP/DOWN buttons to select from
available firmware images for each module.
Press ENTER to advance to the save screen.
Press ENTER button with "Yes" selected to
begin the boot -load process. LEDs will flash
blue to indicate boot -loading. When
complete, the AMC jingle will be heard the and
logo screen will present itself .

Figure 7-5: Sensor Service Menu Diagram (b)

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From UTx Service
Menu/Alarms Menu
Selection

```
Alarm 1-18
Exit
```

Select Alarm

```
Enable
Source
Input
Level
Type
Trigger
Act Delay
Min Run
Exit
```

Use **UP/DOWN** buttons to navigate list and press **ENTER** button to select Sub-Menu or Exit to return to the UTx Service Menu

Select Enable
```
Enable
Enable
```
Using the **UP/DOWN** buttons to toggle between Enable/Disable. Press **ENTER** button to select the desired response.

Select Source
```
Source
S1:GAS1
```
Using the **UP/DOWN** buttons to cycle through a list of sensors. Press **ENTER** button to select the sensor to link to this alarm

Select Input
```
Input
Inst.Value
```
Use **UP/DOWN** buttons to cycle through a list of inputs (Inst. Value / 15m Avg / 8h Avg / Custom / Daily Peak) and press **ENTER** button to select desired source.

Select Level
```
Level
Warning
```
Use **UP/DOWN** buttons to cycle through a list of levels (Warning / Alarm / High Alarm) and press **ENTER** button to select desired source.

Select Type
```
Type
Increasing
```
Using the **UP/DOWN** buttons. Press **ENTER** button to select whether the gas type for the alarm is increasing or decreasing.

Select Trigger
```
☐ Relay 1
☐ Relay 2
☐ Relay 3
☐ Relay 4
☐ Relay 5
Done
```
Using the **UP/DOWN** buttons. Press **ENTER** button to select which relays are activated when the alarm is triggered (menu will show checked box). Press **ENTER** with Done selected.

Select Act Delay
```
Act Delay
+300
```

Select Min Run
```
Min Run
+100
```

Enter the Delay value in seconds one digit at a time using the **UP/DOWN** buttons. Press Enter to advance to next digit. Pressing **ENTER** button while last digit is highlighted will present save screen.

```
Save?
Yes
```
Use **UP/DOWN** buttons to choose Yes/No and press **ENTER** button to confirm selection.

Figure 7-6: Alarm Menu Flow Diagram

" ̶ç̄ ̶ç4

From UTx Service
Menu/Outputs/Analog OP
Menu Selection

Source
Mode
Range
Exit

Use UP/DOWN
buttons to navigate list
and press ENTER
button to select Sub-
Menu, or Exit to return
to the Outputs Sub-
Menu overview

Use UP/DOWN
buttons to toggle
between available
options (MAX/HI
ALARM) and press
ENTER Button to
choose desired option.
The selected gas will
then have a checked
box to indicate that it is
being used as a source
for the analog output.
An "(M)" or "(A)" will
be present beside the
gas to indicate if MAX
or HI ALARM was
selected.

Select
Source

☐ GAS1
☐ GAS2
Exit

MAX
HI ALARM

Use UP/DOWN buttons to move between available gas
types. If a gas has a checked box, that indicates it is being
used as a source for the analog outputs. Pressing ENTER
will de-activate the use of that gas. If a gas is unchecked,
pressing ENTER will present options for selecting the gas
concentration that corresponds to max output.

Use UP/DOWN buttons to toggle between
available options (Voltage/Current) and
press ENTER Button to choose desired
option. The Range sub-menu will reflect the
engineering units (V/mA) for the chosen
output mode.

Select
Mode

OP Mode
Voltage

Select
Output Min

MIN (V)
+00

Select
Range

Output Min
Output Max
Exit

MAX (V)
+10

Select
Output Max

Save?
Yes

Figure 7-7: Outputs Menu Flow Diagram

Table 8-1: Document Revision History

Revision	Release Date	Change Description
B	July 2025	Initial Web Release