MGM-xyy

Multi-Gas Monitor

Manual Version 2.03

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CPM System Overview

General Description

Conspec Controls' new state of the art Multi-Gas Monitor is an economical choice for toxic, combustible and oxygen gas monitoring utilizing our user friendly Plug and Play (PnP) Sensor technology. Installation time and costs are significantly reduced with our new PnP Sensor technology which allows the users to hot-swap factory calibrated and configured sensors.

The Multi-Gas Monitor has been designed for use in hazardous or classified locations. It supports various industry standard interface protocols such as 4-20mA, Modbus RTU, etc.

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Warranty and Disclaimer

DISCLAIMER

Due to Conspec Controls Inc.'s continuous effort to produce the highest quality monitoring equipment possible, products described in this manual are subject to change at any time without notice. While every effort has been made in preparing this manual to include all information pertinent to the installation, maintenance, and calibration of the product, Conspec Controls Inc. assumes no responsibility for errors, omissions, or any loss due to said errors or omissions.

A gas monitoring system alone cannot prevent hazardous conditions from occurring. The reliability of a gas monitoring system, and the resultant safety level is dependent on, and the responsibility of the user. The user's responsibilities include, but are not limited to:

* Insuring that the correct equipment is specified for conditions at the particular site
* Following recommended installation and wiring guidelines
* Meeting all applicable safety and electrical codes
* Scheduling regular calibrations and servicing
* Replacing inoperative or questionable parts or units

WARRANTY

Conspec Controls Inc. provides warranty service for one (1) year from the shipping date on all electronic and mechanical components. Sensor elements are considered a consumable part subject to varying conditions which can affect their expected life. Sensor elements are covered under warranty for a period of six (6) months. Damage to sensor elements due to overexposure of the target gas, poisoning, or other factors beyond Conspec's control are not covered under warranty. Warranty service is limited to defects in materials and workmanship on units which fail under normal use. Conspec will repair or replace any unit found to have failed due to defects in materials or workmanship. This warranty is voided if the unit has been misused, damaged due to incorrect wiring, or altered before return to the factory. Warranty claims that are denied will be billed at the standard rate. Expedited shipping is not covered under warranty.

No other warranty is authorized other than the above.

Before returning a product for service, call Conspec Controls Inc. for a Return Authorization Number (RA#) at (800) 487-8450. Returned units should be packaged securely as damages incurred during shipping are not covered under warranty.

Specifications

INPUT POWER OPTIONS

- 6 – 18 VDC
- D-Cell Battery Operation (1 year)
- 100 - 240VAC 50/60Hz

POWER CONSUMPTION

- 2mA @ 24VDC
- Sleep modes with battery operation

TEMPERATURE & HUMIDITY RANGE

- -20 to +60°C, 0-95% RH non-condensing

SENSORS

- 3 Plug-and-Play Electrochemical sensors
- Factory preconfigured and calibrated
- CO, O_2, NO_2, NO, H_2S, and more
- 3 NDIR sensors
- CH_4, CO_2, and more
- 6 Analog sensor inputs (4-20mA/0-2.0V)

IO CAPABILITIES

- 6 Digital input/output
- 6 Relay Ports
- 2 channels 4-20mA outputs

COMMUNICATION INTERFACES

- RS485, CONSPEC Trunk, Wireless
- Modbus RTU, Mesh Network

USER INTERFACE

- IR remote control
- 4 simple buttons

CONFIGURATION

- Local Menu Display
- Modbus Register Map or Wireless

MENU & DISPLAY

- Intuitive menu navigation
- Password protected
- Quick info screen shows device settings
- Slide-show of real-time gas readings
- Graphical LCD display
- Dimmable RGB backlight
- Backlight color indicates monitor status

ALARMS

- 4 Custom Alarm Levels with hysteresis and hold times
- Sensor Fail-High and Fail-Low
- Ability to map any Digital or Relay output to alarm levels from different sensors using logical voting (AND/OR)

WIRELESS FEATURES

- 1 year battery life (single D-cell)
- 2 miles (3.2 km) using external antenna
- 0.5 miles (0.8 km) using low cost internal antenna (break proof)
- Dual Band Support: 433MHz or 915MHz
- Modbus RTU over Wireless
- Sensitivity: -127dBm (13Kbps)
- Transmit Power: +13dBm
- Self-healing, Self-forming, Mesh or Star topology wireless network
- Up to 250 Modbus Gateway nodes
- Each Gateway can support up to 32 wireless multi-gas monitors

System Configuration

The Multi-Gas Monitor can be used in several different configurations:
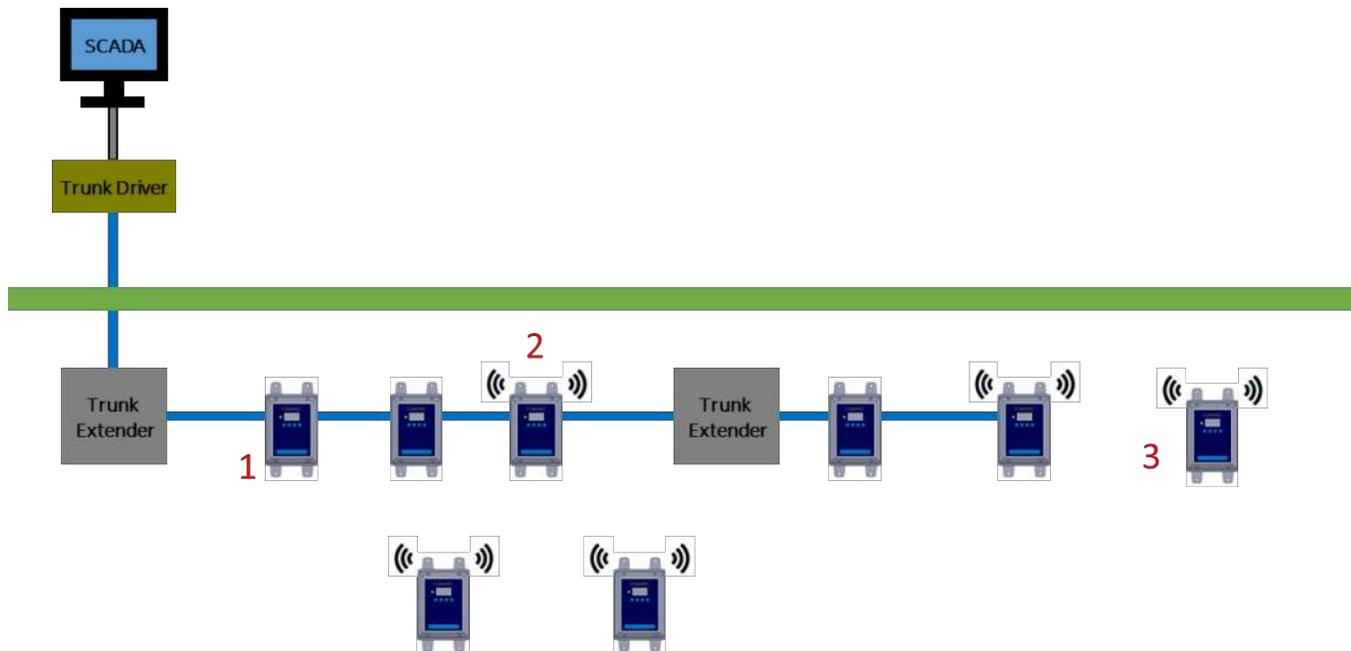
| #	Product Name	Description
1	LINE POWERED WIRED SINGLE/MULTI GAS MONITOR	Single/multi gas monitor on wired communication cable using Conspec Trunk or RS485. Can support up to 6 sensors. Will be line powered.
2	LINED POWERED WIRED SINGLE/MULTI-GAS MONITOR WITH WIRELESS GATEWAY	Single/multi gas monitor on wired communication cable using Conspec Trunk or RS485. Can support up to 6 sensors. Will be line powered. Will also be a wireless gateway to wireless monitors.
3	BATTERY POWERED WIRELESS SINGLE/MULTIGAS MONITOR	Single/multi gas monitor using wireless infrastructure. Can support up to 6 sensors. Will be battery powered.

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Hardware Configuration

Below are the basic components of the Multi-Gas Monitor:
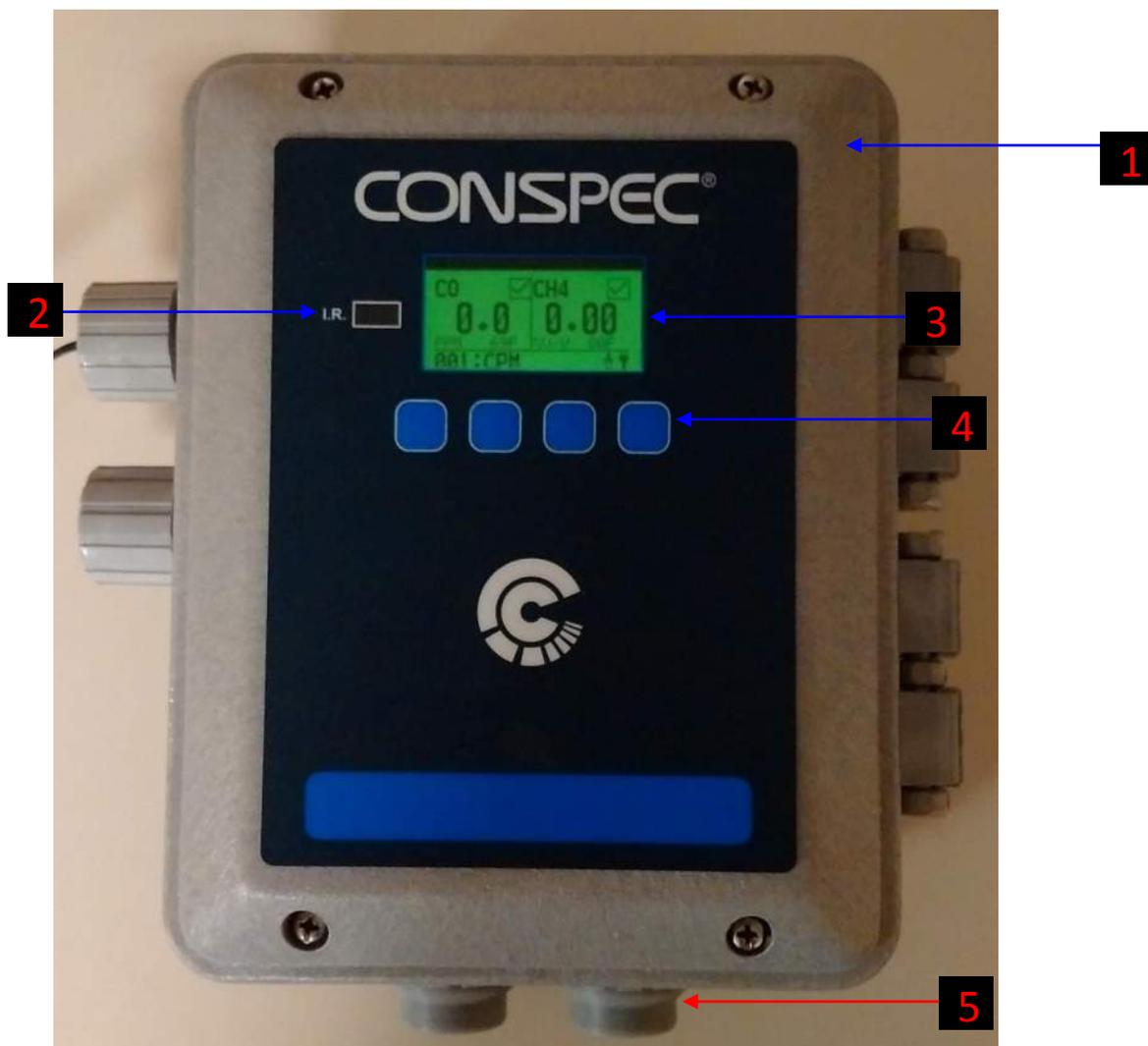
#	Name	Description
1	Enclosure	Carlon enclosure
2	IR receiver	Infrared receiver for remote control
3	LCD display	Graphical LCD display that shows current gas readings and other info
4	Push buttons	Push buttons for menu navigation
5	Sensor Housings	Sensor housings for various sensor types.

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The sensor housings are replaceable as needed:

Top
View

Side
View

Bottom
View
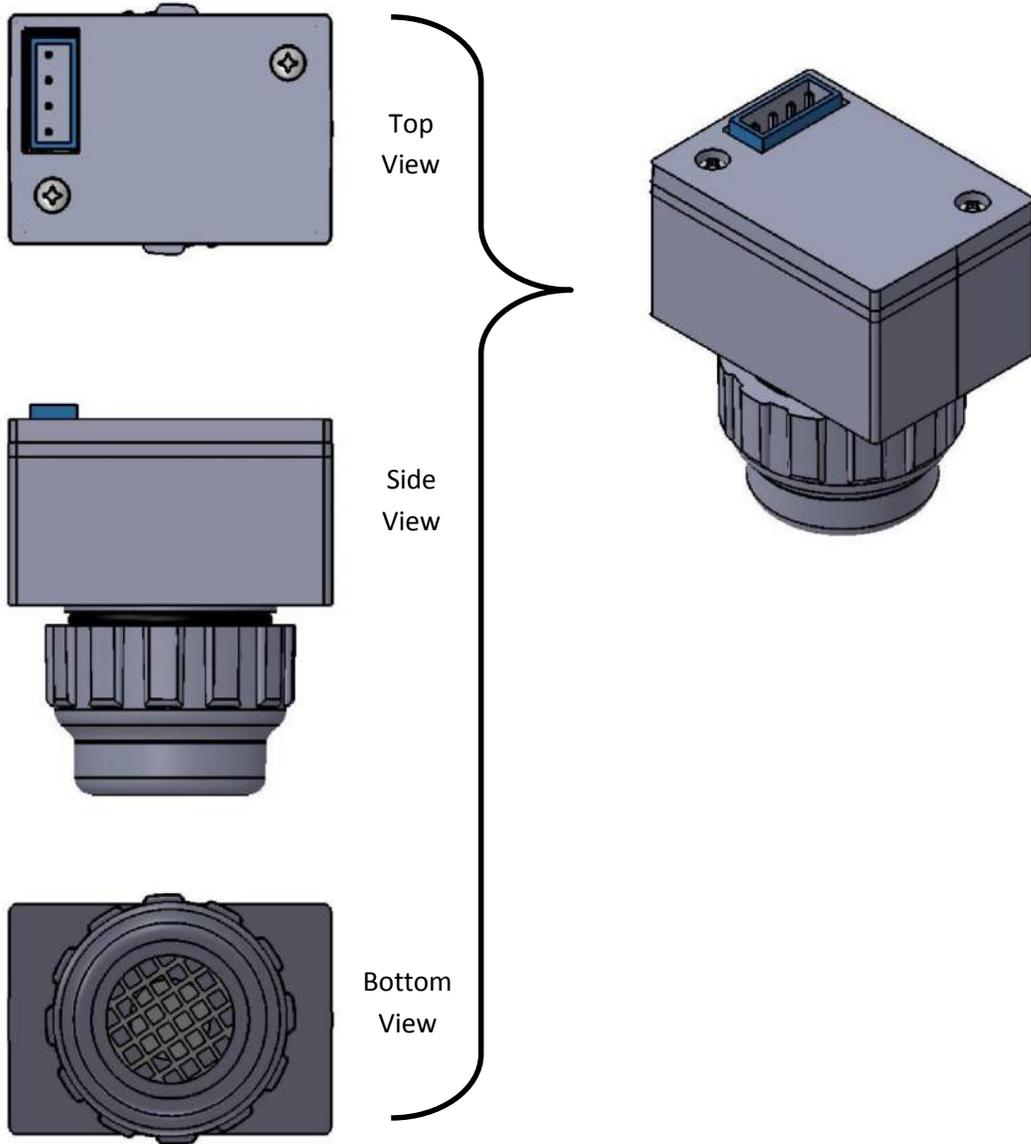
Wiring/Installation

The Multi-Gas Monitor is available in a Carlon enclosure for use in Classified Areas.

Locate a suitable location free of drips and drafts that allows the user to safely access the unit. The Multi-Gas Monitor shall be mounted so the detection head is pointing downward. Securely mount the unit using industry approved methods and materials taking into account sound mechanical and electrical practices.

The Multi-Gas Monitor is powered via a **5-conductor 18-22AWG shielded cable**.

Power to the Multi-Gas Monitor should be isolated from process power. The use of an isolated power supply (Clean Power) is strongly recommended when the Industrial Gas Monitor is part of a personnel safety system. In most cases, building and electrical codes require the use of conduit to protect electrical wiring and prevent tampering. Conspec recommends electrical wiring to the Industrial Gas Monitor is placed in conduit.

It is the user's responsibility to follow all applicable Federal, State, Local Building and Electrical Codes including NEC Guide Lines.

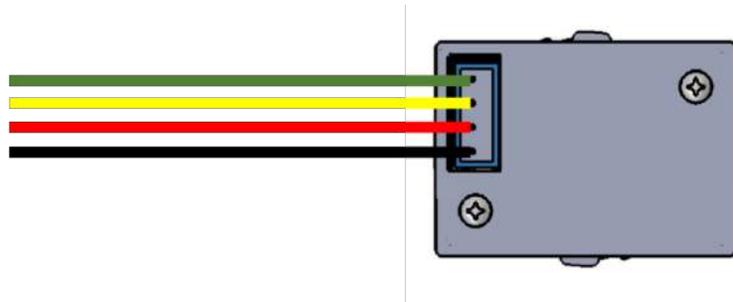**Below is a simple wiring and connector description of the Multi-Gas Monitor:**
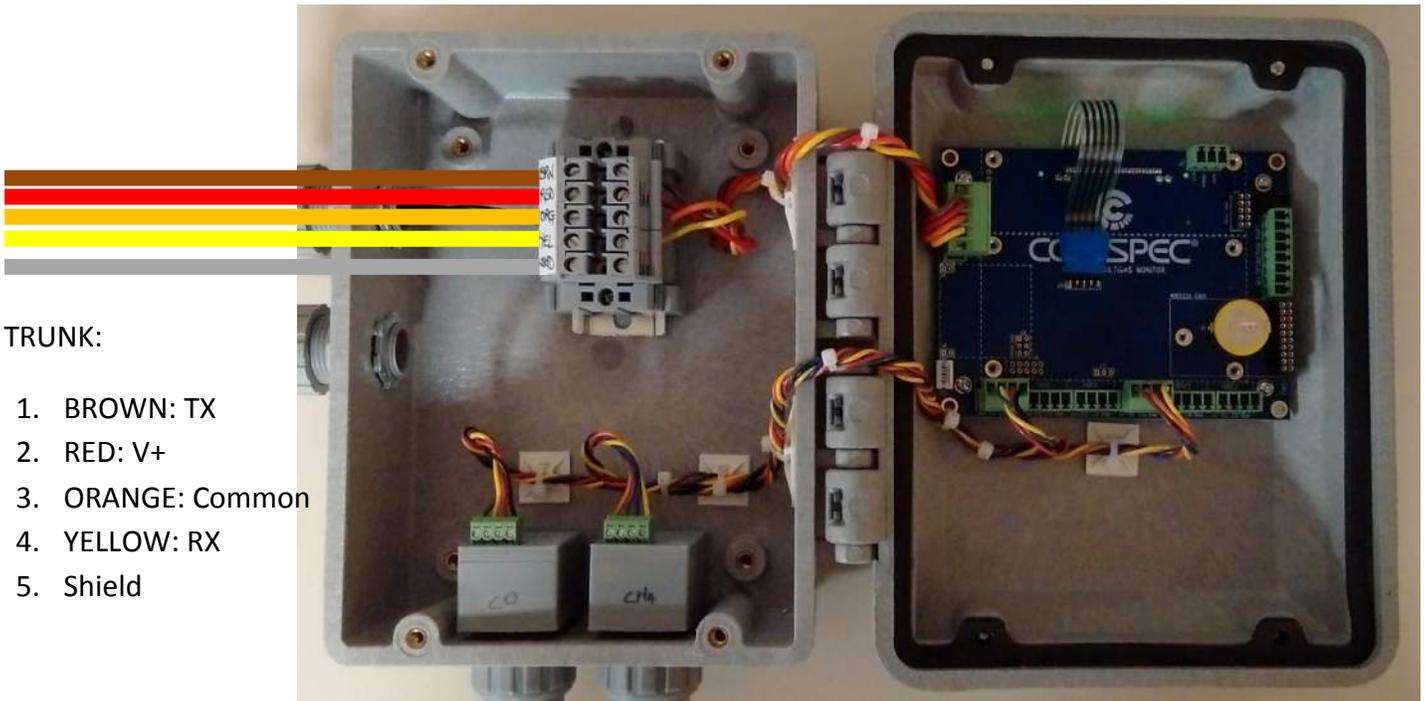
TRUNK:

1. BROWN: TX
2. RED: V+
3. ORANGE: Common
4. YELLOW: RX
5. Shield

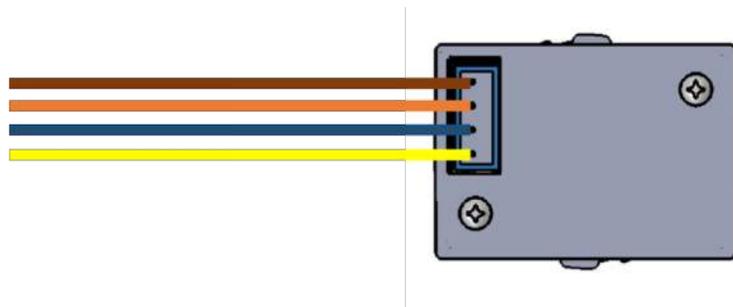**The wiring for PNP sensor modules are as follows:**

PNP:

1. Green: SDA
2. Yellow: SCL
3. Red: 3.3V
4. Black: PGND

The wiring for NDIR sensor modules are as follows:

NDIR:

1. Brown: TX
2. Orange: RX
3. Blue: 3.3
4. Yellow: NGND

Installation Recommendations

1. **Isolate process power from safety equipment power:**
   Conspec recommends part number "MeanWell DRC-100B" power supply with 2 SLA type batteries or a quality comparable technology.

2. **Install ALL equipment to meet appropriate standards:**
   Installing all cabling in conduit will provide a level of protection against EMI.

3. **Ground all cable shields:**
   Properly grounding the shields will reduce the amount of radiated EMF induced into the cabling. Grounding of shield should only be at one end (do not ground at both ends as this will act an inductive antenna).

4. **Isolate DC common from earth ground:**
   Isolating earth ground will provide a path to shunt electrical interference to ground without affecting the DC power provided to system components.

5. **Bond earth grounds to prevent ground loops:**
   Our Field Inspections of several installed systems has revealed that current can flow through the earth ground wiring and that resistances of +/- 400 ohms could be measured between various earth ground terminals.

Monitor Operation

Start-up Screen

When the monitor is first powered on, there is a short power on delay. The delay generally lasts for five seconds, however this can be set by the user. The "Start-up" screen also indicates to the user what version of the firmware is currently running on the monitor:
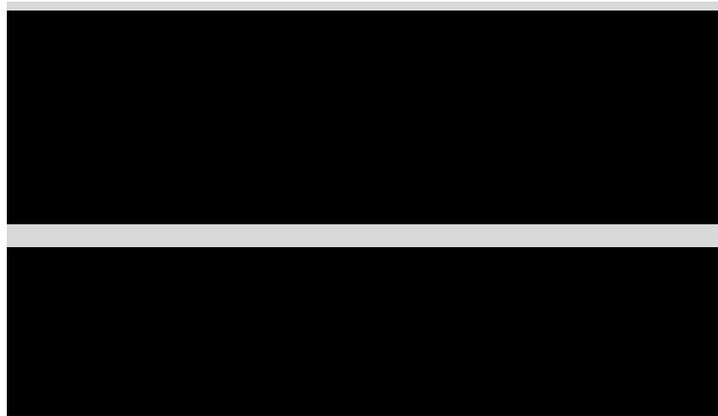
Warm Up Timer

Once the monitor clears the power on delay countdown timer, it goes into the main view screen. Shortly after power on, there will be a warm up period for the sensor elements. All the configured gas sensors will be displayed on the same screen. If the monitor is a single gas monitor, it will display one gas. However, if the monitor is a Multi-Gas monitor, the screen will split and it will display all the gases.
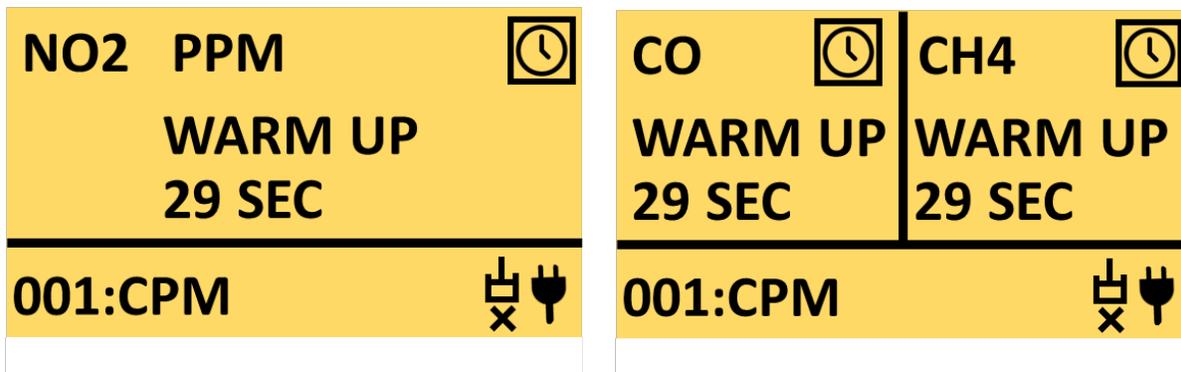
Main Run-Time Screen

Once the timer times out, the display will show the "Run-Time Screen":
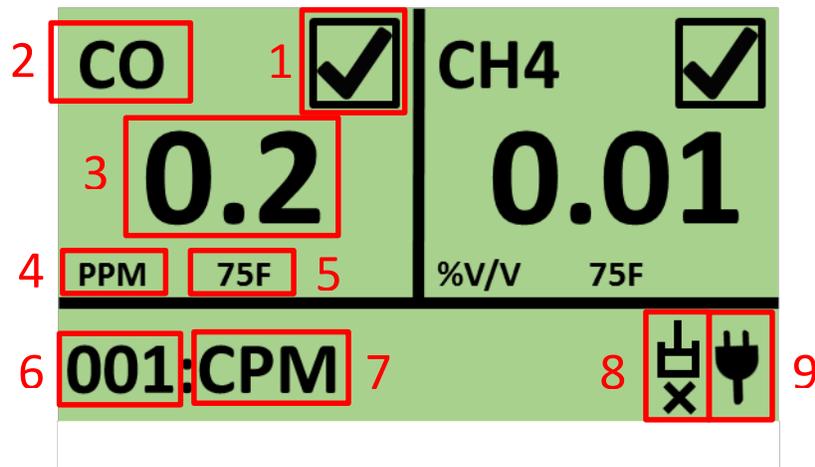
1. **Status:** This icon shows the status of the gas reading. Each sensor reading will have its own status icon.
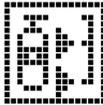
	Indicates that the gas reading is normal and no alarms breached.
	Indicates that there is a sensor fail high. (Above MAX range)
	Indicates that there is s sensor fail low. (Below MIN range)
	Indicates that the sensor reading is in alarm 1.
	Indicates that the sensor reading is in alarm 2.
	Indicates that the sensor reading is in alarm 3.
	Indicates that the sensor reading is in alarm 4.
	Indicates that calibration is due, such that the user defined calibration period has elapsed.
	Indicates that the sensor is in warmup delay.
	Indicates a dislodged sensor. If this icon shows, it means that the sensor element is mechanically dislodged from the board, or is missing.

2. **Sensor Type:** The MGM system supports a variety of different gas types and sensors. This field indicates which gas or sensor type is being used.

3.   **Reading:** This shows the gas/sensor reading. The decimal points is user defined.
4.   **Units:** The measurement unit of the gas/sensor reading.
5.   **Temperature:** Because some of the sensors can be mounted remotely, each gas/sensor reading will have its own temperature reading. The user can switch between C/F under MENU > DEVICE SETTINGS.
6.   **Address:** This is the user defined MODBUS address of the monitor. This is user defined under MENU > SERIAL. (Defaults to 1)
7.   **Name:** The user can name the monitor. (Default "CPM")
8.   **Communications Status:** This icon shows what the various communications statuses are, such as connected/disconnected serial, and connected/disconnected wireless.
9.   **Power:** This icon shows what the power source is, i.e. line power or battery power.
     The table below describes each of the functions on the main "Run-Time Screen":

When the user presses any keys, the menu pops up onscreen:
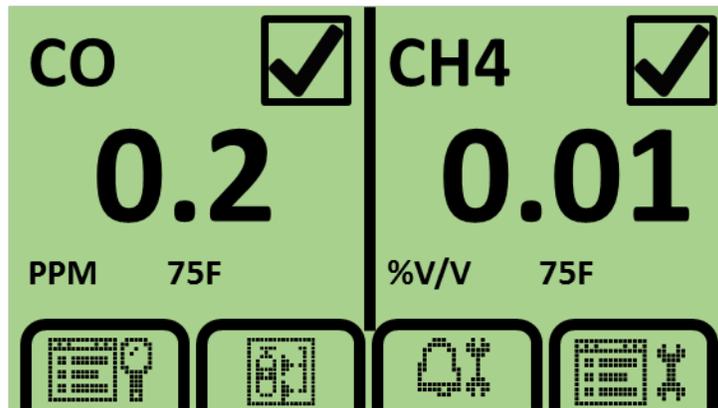
Icon	Description
	Review Monitor Settings: This option allows the user to review all the monitor settings.
	Calibration: This allows the user to view the various calibration options and to calibrate the unit.
	Alarm Settings: This option allows the user to view and configure the alarm settings for the monitor.
	Configure Monitor Settings: This option allows the user to make changes to all the other configurations and settings for the monitor.

Review Monitor Settings

When the "" is selected, the monitor will take you to the various review screens. The screens provide information on the sensors that are attached, calibration information, communication statistics, etc.

The following review pages are available:

1. **Firmware Info:** provides the firmware version number, serial number, as well as the date and time.
2. **PNP Info:** displays all of the PNP (Plug and Play) cards that are currently attached to the monitor. The user can go one level deeper in this page to find more specific settings on individual PNP modules:
   a. UID: Unique ID
   b. SFL: Sensor Fail Low
   c. AL1: Alarm 1
   d. AL2: Alarm 2
   e. AL3: Alarm 3
   f. AL4: Alarm 4
   g. SFH: Sensor Fail High
   h. Span: Span value for calibration
   i. Max: Max concentration value
3. **PNP Cal Info:** This screen displays when each PNP sensor was last calibrated, and when the next calibration is due. It also displays the remaining life of the cell. The user can go one level deeper into each PNP module and find additional information:
   a. UID: Unique ID
   b. ZER: The zero ADC that was saved for the last calibration
   c. SPN: The span ADC that was saved for the last calibration
   d. S: The calculated slope of the line
   e. REZ: The resolution of the reading (i.e. ADC per unit of measure)
   f. SFH: Sensor fail high ADC
   g. TIA: Gain setting
   h. REF: Reference setting
   i. ADS: ADS setting

4. **NDIR Info:** Same as PNP Info, but for NDIR.
5. **NDIR Cal Info:** Same as PNP Cal Info, but for NDIR.
6. **Serial Info:** The information displayed on this screen is for the serial communications settings. It shows the baud rate, parity, stop bit and TYPE of serial communications (TRUNK/RS485).

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7. **Modbus Info:** This screen shows all the communications information pertaining to Modbus comm. The screen displays:

   a. DEVTYPE: This is the register map of the device type that is being used (e.g. P2065, CPM, etc.)
   b. ADDRESS: The Modbus address of the device
   c. COMM QUALITY: This is a calculated communications quality value in percent (e.g. 100% = Best Quality)
   d. POLLS: The number of times the device has been polled
   e. ERRORS: The number of bad messages the device has received

   The user can go one level deeper into the menu and see the Modbus statistics, which displays the total messages received, the total number of messages that are for that specific address, the number of bad messages received and any error codes that may be generated.

8. **Wireless Info:** If the monitor is being used wirelessly, all the wireless data will be presented on this screen.
9. **HW Monitor:** This screen shoes data specific to the monitor such as power source, voltage, and temperature.
10. **Relay Info:** This screen shows the status of all the relays that are currently connected to the monitor.
11. **MFP Info:** This screen shows the status of all the digital inputs on the Multi-Function Port.
12. **Logged Events:** The CPM monitor has a built in data logger. All important events are logged and the user can view all logged events using this menu screen.
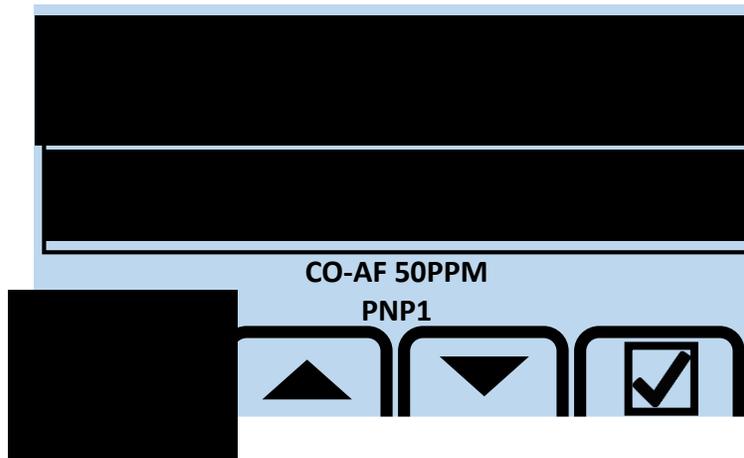
Calibration

When the "⬚" is selected, the monitor will allow you to calibrate the various sensors that are attached to it.

The first screen will ask for a password entry:

ENTER PASSWORD

The default user password is "123". Once the password has been entered successfully, the user is taken to a screen to select which sensor will be calibrated. If the monitor is a single gas monitor, this step is skipped.

CO-AF 50PPM
PNP1

In case of a multi-gas monitor, the up and down arrows will allow the user to scroll through the different sensors attached. Once the user has selected the sensor that needs calibration, the check mark will take the user to begin calibration

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1. **Zero Gas Calibration:**
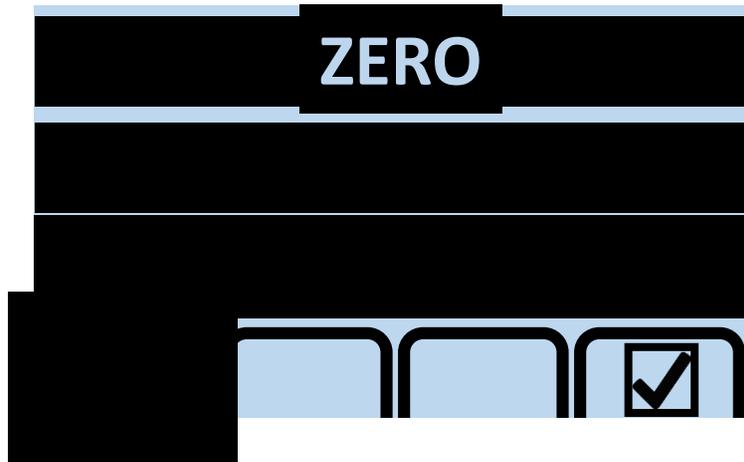
- **PREV**: The previous calibration ADC Value.
- **DIFF**: The difference between the previous and the current ADC reading.

2. **Span Gas Calibration:**
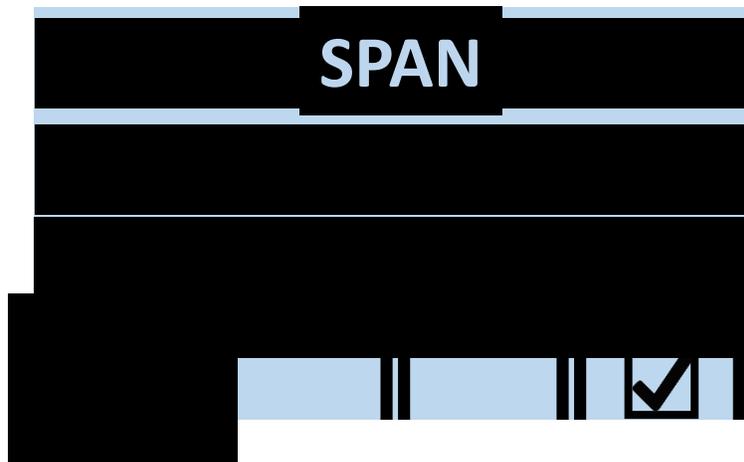
If the calibration is successful and passes all the internal checks, a window will be displayed indicating the calibration was successful. The user needs to press "" icon to save the calibration. After the calibration has been successfully saved, there is a purge period that allows the user to purge the monitor. During the purge period, no alarms will be set.

However, if the calibration had failed, the user will be notified that the calibration failed and will be offered an opportunity to redo the calibration.

The rules for a successful calibration for the NDIR sensors is as follows:

1. For CH4 sensors, Zero must be less than 0.5%VOL or 10%LEL
2. Span must be +/-50% of the Span value. Example: if the span value is 50%, the span reading must fall between 25% and 75%.
3. For NDIR ONLY, zero calibration can be completed independently from Span by exiting the span mode.

The rules for a successful calibration for the PNP sensors is as follows:

1. Minimum resolution (ADC/PPM) must be greater than 10 ADC/PPM.
2. Sensor Fail High (SFH) must be less than 65535.
3. SPAN ADC must be within +/- 50% of the previously accepted SPAN ADC.
4. ZERO ADC must not equal SPAN ADC.

For the Purge Screen:
1. The reading must be below the AL1 value.
2. The monitor remains in calibration mode until the user EXITS the purge screen.
3. If the reading is greater than AL1 when the calibration is completed, the user is automatically taken into the purge screen.

Alarm Settings

When the " " is selected, the user will be allowed to change the alarm settings for a specific sensor input.

If more than one sensor is present, the user will be asked to select a sensor:
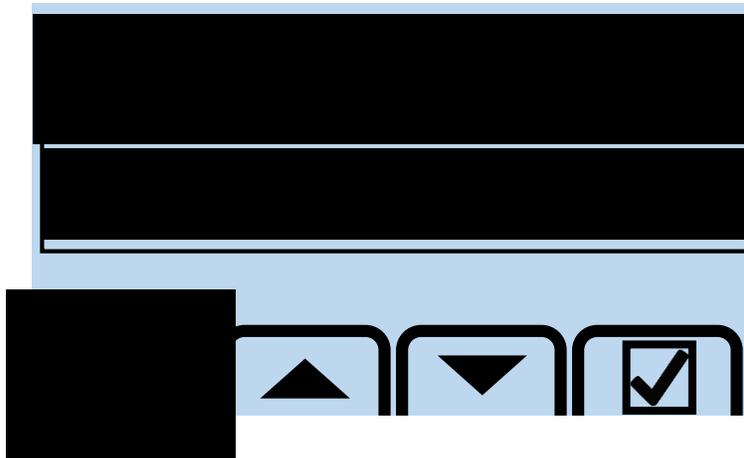
The user will then be required to select an alarm level by scrolling using the up/down keys. The alarm options in the menu are:

	Sensor Fail High			Alarm 2
	Sensor Fail Low			Alarm 3
	Alarm 1			Alarm 4

Once the user has selected which Alarm is being configured, they will be taken to another screen that allows the user to determine which specific aspect of the alarm that can be configured. The options are:

1. **Alarm Level**: An option to set the numerical value of the alarm. The window will indicate on top the current set value.

2. **Hysteresis Level**: This can also be referred to as the dead band to clear alarm. When the sensor is in alarm, the reading must fall below the alarm level and an extra hysteresis level to clear the alarm.
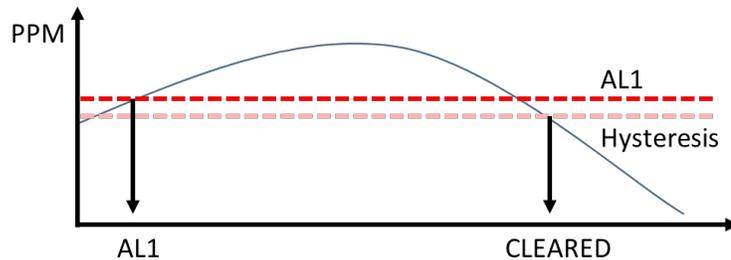
3. **Alarm Hold Delay**: The delay time that needs to elapse before a status is changed. For example, if the delay hold time is set to 3 seconds, if the value goes into an alarm state, it needs to stay in that state for a minimum of 3 seconds before the state is changed from normal to alarm. This is used to prevent nuisance alarms.

4. **Alarm On/Off**: The option to turn certain alarms on or off (or Enable/Disable). Users may only want to use two alarms rather than four, so this will allow them to turn alarms three and four off.

5. **Alarm Local/System**: Generally, monitors can have their on board outputs and alarms triggered via two different methods; local and system. Local is when the alarms are triggered by the monitor. If the monitor goes into alarm, it triggers the outputs. It is completely independent. The System option is when a remote SYSTEM triggers the outputs, via Modbus command. This can be used in large scale systems that utilize front end SCADA software. The system option allows the front end user/system to determine the state of the alarm/outputs.

6. **Alarm Direction**: There are two basic options for this; rising and falling. Certain alarms are dangerous as the values increase, such as CO. In a situation like that you would select the rising condition. Other gases such as O2, it is more dangerous to have lower values. In that situation, you would use a falling condition.

EXAMPLE:

This is an example trend of a gas monitor. If, alarm hold delays and hysteresis are being used, the following would be the sequence of events:
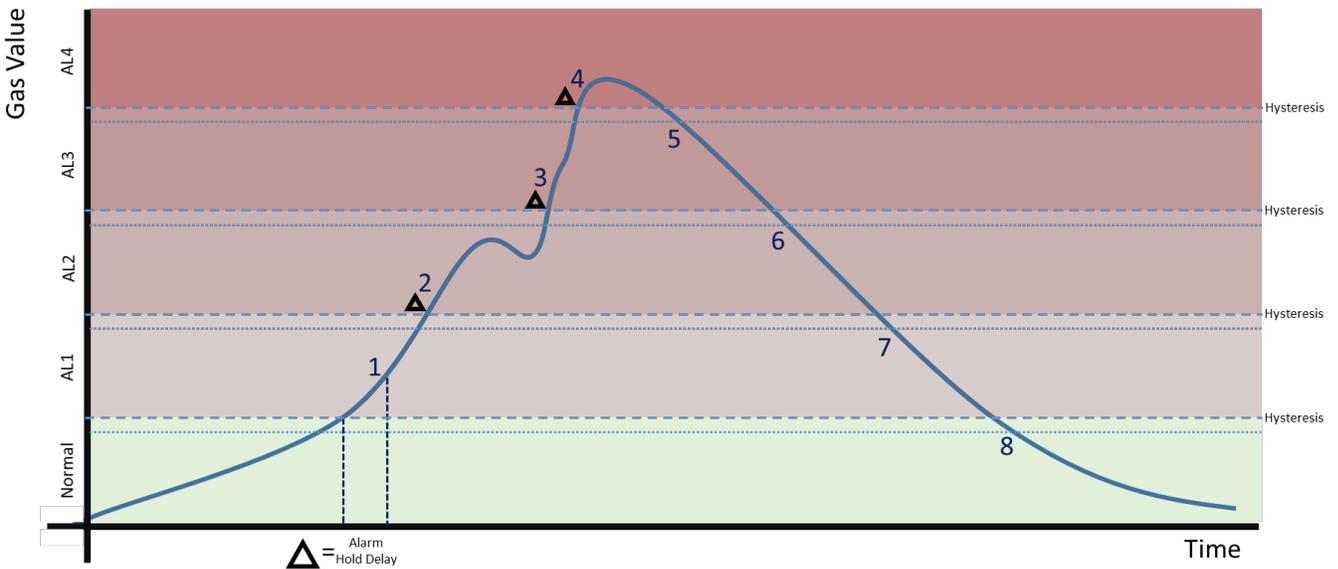
1. Once the value exceeds alarm level and hold delay, the sensor goes from NORMAL to ALARM 1. Hysteresis is only applied as the reading drops below the alarm level.
2. The status is changed from AL1 to AL2, once the hold delay is cleared.
3. The status is changed from AL2 to AL3, once the hold delay is cleared.
4. The status is changed from AL3 to AL4, once the hold delay is cleared.
5. The status is changed from AL4 to AL3
6. The status is changed from AL3 to AL2
7. The status is changed from AL2 to AL1
8. The status is changed from AL1 to NORMAL

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Configure Monitor Settings

When the " " is selected, the user can now change the settings and congfigurations of the monitor. The following are the configurable options that are available under the SUPERVISORY PASSWORD:
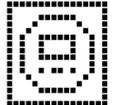
	Device Setup			Serial Setup
	Sensor Setup			Relay Setup
	Span Setup			MFP: DIO/AIN
	Gas Calibrate			4-20mA Setup
	Alarm Setup			
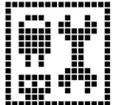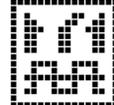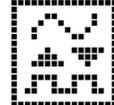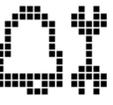
The user can select any one of these to see further options:

1. Device Setup: Allows the users to change settings specific to the monitor.
   a. **Factory Reset:** Resets all the configurations to the factory default settings.
   b. **Device Select:** Allows the user to select what kind of register map will be used.
   c. **Set Device Name:** Allows the user to assign a specific name to the monitor.
   d. **Set Power Up Time:** The user can select a power on delay time.
   e. **Set Warmup Time:** The user can select a warm up delay time. This often varies for different gas times, i.e., IR sensors will generally require a longer warm up period compared to certain electrochemical sensors.
   f. **Set Alarm SIL Time:** The alarm silence is used to determine how long the silence period will be when the users silences an alarm. If the monitor is STILL in alarm after the silence period elapses, the alarm will once again trigger.
   g. **Set Backlight Time**: This is the amount of time the backlight will remain on before timing out and turning off.
   h. **Set Screen Timeout:** This is the amount of time the screen will sit on a specific page before timing out and returning to the main screen.

i.   **Set LCD Refresh:** The user has the option of changing the LCD refresh rate. The time is in milliseconds.
j.   **Set LCD Contrast:** The user has the option of changing the contrast on the LCD.
k.   **Set Temperature Unit:** Because the main screen displays the temperatures at the sensors, the user can select whether the temperature reading should be in Celsius or Fahrenheit.
l.   **Set Backlight Brightness:** Depending on where the monitor is being installed, the user may want to change the backlight brightness of the monitor.
m.   **Set User Password:** Allows the user to change the basic user password.
n.   **Set Admin Password:** The admin password has additional configurations and options.
o.   **Set Factory Password:** The factory password allows the user to view ALL the settings and options in the monitor.
p.   **Set Date/Time:** Setting the time and date is important for the use of the data logger.
q.   **Erase Log Data:** Allows the user to clear all the data in the data logger.
r.   **PNP Power:** Allows the user to turn the power to the PNP off.
s.   **NDIR Power:** Allows the user to turn the power to the NDIR off.
t.   **Calibrate Mipex Temp:** This option allows the user to calibrate the temperature reading on the Mipex sensor element.

2.   Sensor Setup: Allows the user to change settings specific to the sensors.
   a.   **Location Name:** Allows the user to select a specific name/identifier for the sensor.
   b.   **Span Gas Value:** The span gas is the target gas that is generally used for calibration. Our recommendation is to use 50% of the full range, however the end user may sometimes not be able to attain exactly 50% of the full range. In that situation, they would go into this menu option and change the span value to whatever gas they were able to attain.
   c.   **Auto Cal Timer:** This option allows the user the select what the auto calibration count down timer should be. When using auto calibration, the timer counts down from the timer amount, and whatever value is read when the timer reaches zero, is the value that will be registered. Some gases require more time to correctly calibrate than others.
   d.   **Cal Period:** The required time period between calibrations. This will generally be used for the calibration due date.
   e.   **Sensor Advanced:** Advanced settings are for factory password holders. Generally they will select a preset gas table option. However, if the need arises, the advanced options allow for certain values to be changed:
       ➢ Preset Gas: for factory setup only. Restores sensor to original factory setting.
       ➢ Gas Min Range: changes gas min range.
       ➢ Gas Max Range: changes gas max range.

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> ➤ Gas Decimal Place: changes the number of decimal points. Also affects Modbus values returned.
> ➤ LMP Gain: internal factory use only
> ➤ LMP Load R: internal factory use only
> ➤ LMP Bias V: internal factory use only
> ➤ Post Gain: internal factory use only
> ➤ Gas Type: the gas type used (e.g. O2, CH4, H2S, CO, CO2, etc.)
> ➤ Gas Unit: the gas unit of measurement (e.g. LEL, PPM, %, FPM, mBar, etc.)

3. Span Setup: The span gas is the target gas that is generally used for calibration. Our recommendation is to use 50% of the full range, however the end user may sometimes not be able to attain exactly 50% of the full range. In that situation, they would go into this menu option and change the span value to whatever gas they were able to attain.

4. Gas Calibrate: Allows the user to calibrate the various gases. This has been discussed in detail in previous sections.

5. Alarm Setup: Allows the user to setup alarm levels and other alarm options. This has been discussed in detail in previous sections.

6. Serial Setup: These options allow the user to change the serial communications configurations.
   a. **Address:** The address of the device
   b. **Serial Input:** These can be either TRUNK/RS232/RS485
   c. **Baud Rate:** The baud rate of the device, 1200/2400/4800/9600/19200/38400/57600/CUSTOM
   d. **Stop Bits:** The number of stop bits
   e. **Parity Bit:** The parity bit, EVEN/ODD/NONE

7. Relay Setup: This menu works by selecting items in the drop down for each option.

   a. **RELAY** :
   Select one of the following relays to configure:
   > ➤ **Relay 1, Relay2, Relay 3, Relay 4, Relay 5/Strobe, Relay 6/Horn, All relays**
   b. **CONTROL**:
   Select which alarm source will "control" the selected relay
   > ➤ **Alarm 1, Alarm 2, Alarm 3, Alarm 4**: activates when alarm level is reached
   > ➤ **SFH**: activates if Sensor Fail High is asserted (above max sensor reading)
   > ➤ **Trouble**: activates when any of the following is true: SFH, SFL, Warm up, Dislodged sensor, sensor Disconnected.

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>**Disabled**: relay is not used (saves power consumption)

>**Modbus**: relay is controlled remotely via Modbus commands

>**SFL**: activates when the sensor reading drifts below zero (calibration needed)

c. **DRIVE**:

>Norm Open: when the relay is activated the contacts are closed.

>Norm Closed: when the relay is activated the contacts are opened. This is also known as "Fail Safe."

d. **SILENCE**:

>Disabled: pushing the silence button does not change the relay output state

>Enabled: pushing the silence button will temporarily de-activate the relay

e. **LATCH**:

>Non Latch: all relays are non-latching

f. **SENSOR**:

>XXXXXX OR: this is a compressed summary view showing which selected sensors "X" and their voting logic "AND/OR" will be associated with the selected "RELAY", such that 1=PnP1, 2=PnP2, 3=PnP3, 4=NDIR1, 5=NDIR2, 6=NDIR3

>ALL (OR): when the selected alarm from "CONTROL" is asserted on ANY connected sensor, the relay will activate

>ALL (AND): when the selected alarm from "CONTROL" is asserted on ALL connected sensors, the relay will activate

8. MFP: DIO/AIN: Each of the six MFPs can be one of six options:

a. Analog 4-20mA

b. Analog 3.0V

c. Digital Input

d. Digital Output

e. Sensor 4-20mA

f. Sensor 3.0V

9. 4-20mA Setup:

a. **4-20mA Calibrate**: This option allows the user to calibrate the sensor outputs. It'll step the user through various calibration screens, one for 4mA and one for 20mA.

b. **4-20mA T-Updates**: The output delay for the output. This value is defaulted to 300mSec.

c. **4-20mA In Source**: The user needs to determine what the source of the 4-20mA output is. The user will select either of the PNP sensors or the SERIAL NDIR sensors.

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Maintenance and Repair

Maintenance

This Gas Detection system requires evaluation every thirty (30) days to ensure accuracy. The device should be checked for accuracy by applying a known concentration of the target gas that exceeds the programmed alarm levels. The displayed gas value will stabilize as the gas fills the calibration chamber within the sensor head. When the programmed alarm levels are breached, the alarm output for that level is activated subsequently to the programmed alarm delay duration. The displayed target gas value should match that of the concentration of test gas. Any warning or control devices connected to the alarm outputs should remain connected during this test to ensure proper operation of the entire gas detection system. Replace any inoperative or questionable parts immediately. This gas detection system requires calibration every ninety (90) days to ensure accuracy and to correct sensor drift. The gas detection "cell" located within the sensor housing is in most cases a consumable, with a defined life expectancy. The cell's output decreases slowly as it nears the end of its expected life. The rate at which the output decreases depends greatly on the concentration and presence of target gas. This must be corrected by calibrating the monitor often to ensure an accurate reading and dependable alarming and control of connected devices. Conspec recommends that no modifications be made to this monitor without first consulting Conspec Technical Services. Modifying this equipment without consulting the factory could result in unsafe operation and/or unsafe atmospheric conditions. Modifying this equipment will void any warranty authorized by Conspec Controls Inc.

Repair

Any monitor found to be defective or questionable should be returned to Conspec Controls for evaluation and repair. Conspec requires any returned equipment to first be issued a Return Authorization Number (R.A.#) by calling Conspec at (800) 487-8450 Mon.-Fri. 8am-5pm est. Conspec also offers on-site Repair and Start-up service for Conspec Gas Detection Equipment.

Replacement Parts

Damaged or questionable parts should be replaced immediately upon detection. Damaged or inoperative parts could contribute to hazardous and/or unsafe conditions. Any consumable parts should be replaced if the reliability is questionable or within the part's specific expected life. Consumable parts include any filters, pump motors, sensors….etc.

Questions / Technical Support………………………..(800) 487-8450 Mon-Fri 8am-5pm EST
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E-mail……………………………………………………………………sales.usa@conspec-controls.com
Web site…………………………………………………………www.conspec-controls.com

Please contact Conspec for an accurate timeframe of how often the monitors and sensors require calibration. Failure to adhere to a strict calibration schedule can result in improper readings and monitor malfunction. Spare parts can be stored under conditions that fall within the limits of the operation specifications. Please note, time frames for storing replacement sensor cells should be based on the manufacturer specifications.