

MOPEC USER MANUAL

VOLATILE ORGANIC COMPOUND (VOC) SENSOR - OPTION
MB1019



VOLATILE ORGANIC COMPOUND (VOC) SENSOR

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INTRODUCTION

The purpose of the VOC sensor, is to detect OSHA limits of Formaldehyde, track time and exposure and provide output so warnings can be given to the operator of the Grossing Station.

BACKGROUND ON OSHA AND FORMALDEHYDE/FORMALIN

1. https://www.osha.gov/OshDoc/data_General_Facts/formaldehyde-factsheet.pdf
2. Formaldehyde is a colorless, strong-smelling gas often found in aqueous (water based) solutions. Commonly used as a preservative in medical laboratories and mortuaries, formaldehyde is also found in many products such as chemicals, particle board, household products, glues, permanent press fabrics, paper product coatings, fiberboard, and plywood. It is also widely used as an industrial fungicide, germicide and disinfectant. Although the term “formaldehyde” describes various mixtures of formaldehyde, water, and alcohol, the term “formalin” is used to describe a saturated solution of formaldehyde dissolved in water, typically with another agent, most commonly methanol, added to stabilize the solution. Formalin is typically 37% formaldehyde by weight (40% by volume) and 6- 13% methanol by volume in water. The formaldehyde component provides the disinfectant effects of formalin.

SENSOR TYPE

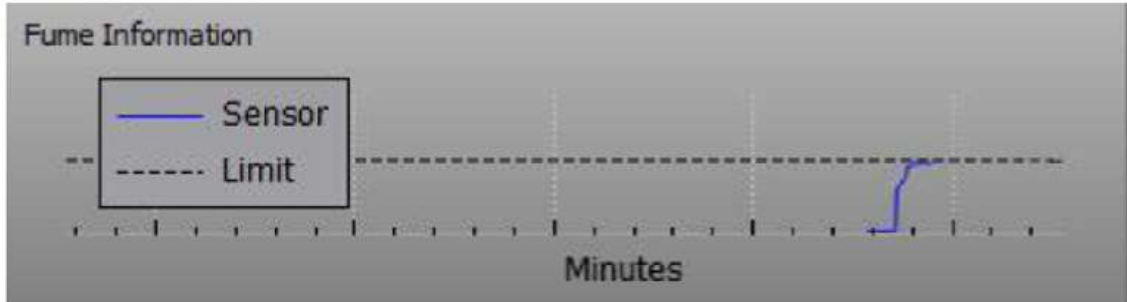
1. The system utilizes two sensing elements that are comprised of a metal oxide semiconductor layer formed on the alumina substrate of a sensing chip together with an integrated heater. In the presence of detectable gas, sensor conductivity increases depending on gas concentration in the air.

PERFORMANCE

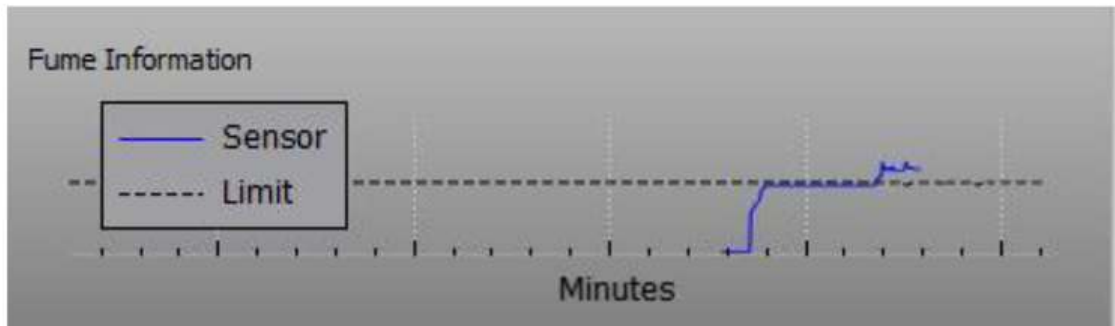
1. The sensor will detect levels of Formaldehyde equivalent to
 - a. Range: 0.2 – 5.0 ppm +/- 15% in a (-)10°C to 50°C environment.
 - b. Two-point factory calibration at 0.0 and 2.0 ppm formaldehyde
2. The sensor has a warm up time to equalize the sensing environment
 - a. Warm up: 30 minutes
3. The sensor life is variable depending on exposure levels
 - a. Life: 1 year when exposure limits do not exceed 3.0 ppm
 - b. Life detection: 100-hour warning

SENSOR DISPLAY

1. The sensor display output shows the following performance chart trendline after warm up period.



Simulated sensor voltage just under alarm point
Alarm adjust set to 0%



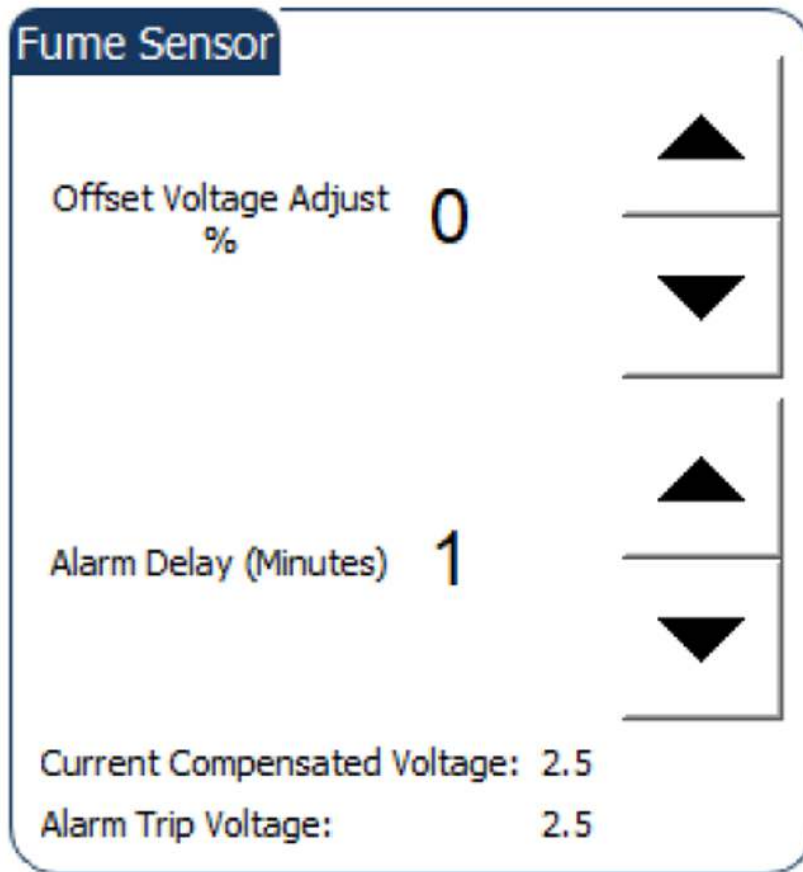
Simulated sensor voltage just under alarm point
Alarm adjust set to 20%

2. Sensor trendline will show the trailing 15 minutes of data.
3. Extremely high levels (over 5.0 ppm) will go off the chart and can take up to 10 minutes to return back to the normal operating range

SENSOR ALERT LIMIT

Sensor alert limit should be set by laboratory management here

1. Setup Screen (Lab Manager)



2. WARNINGS:

- a. **VOC Temporarily inactive** – performance data error due to warm up fault or environmental condition being out of range below 0 deg C or above 70 deg C, warm up resets allowed for 24 hours before faulting
- b. **Replace VOC sensor soon** – sensing element within 100 hours of end of life (warning: warn_sensor_eol)
- c. **Replace VOC – Life Exceeded** – sensor 100-hour warning timer has expired (Fault condition: fault_replace_voc)

SENSOR REPLACEMENT

1. Remove the (4) mounting screws using a Phillips screwdriver (shown below) on the underside of the hood.

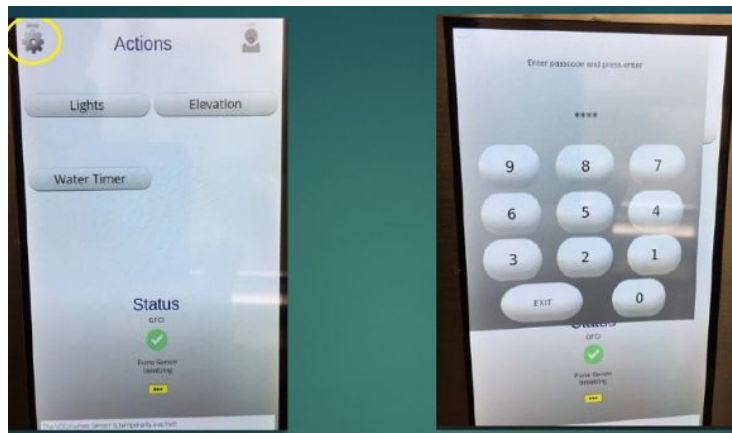


2. Disconnect the ethernet cable
3. Unpackage the new sensor and connect the ethernet cable **(P/N 7220)**
4. Attach the (4) mounting screws.
5. Power up sensor to begin the warm up cycle.
6. Check for any Warnings listed on the user interface.

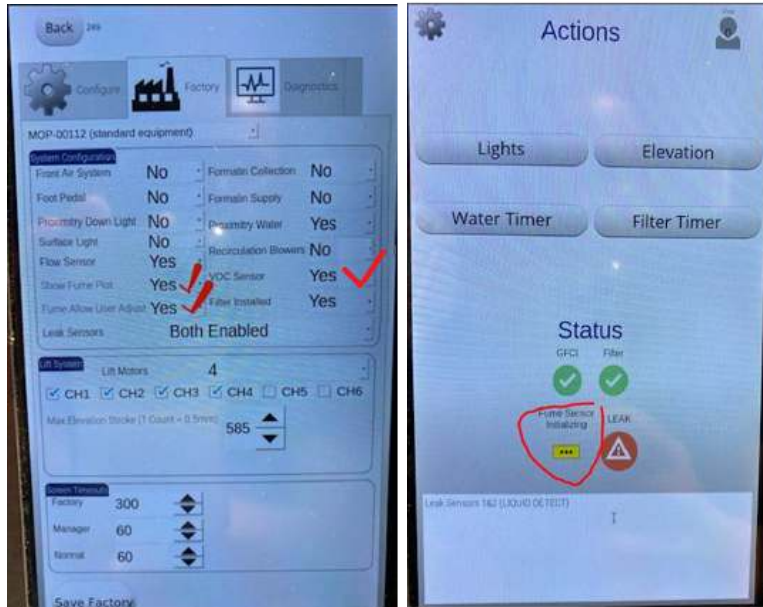
NEW UNIT SETUP

Use this section for setting up Fume Detection VOC sensor on an existing unit (This will already be configured on factory-built units).

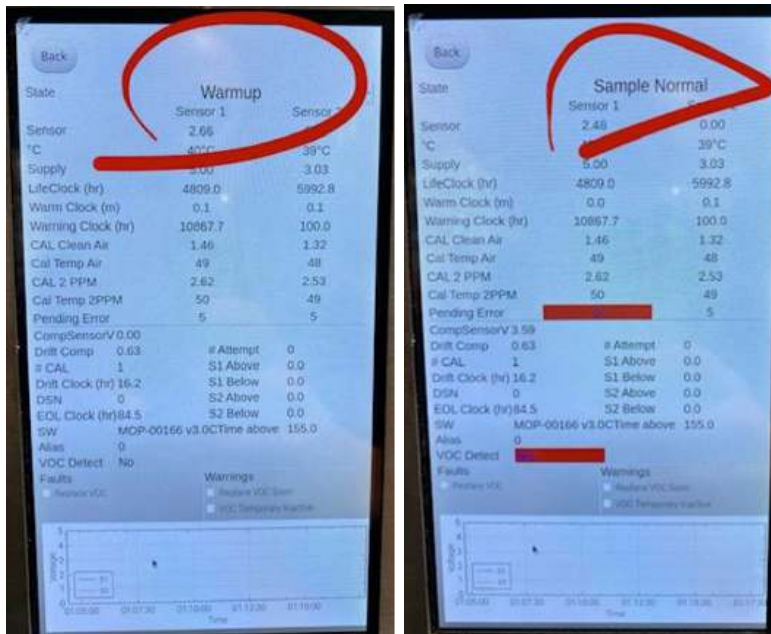
1. Turn on the unit. When the touch screen boots up click on the Settings button in the upper left corner of the screen
2. Type in the factory access code “4 3 2 1 “



3. Verify fume detection options are turned ON under the factory tab:



4. On initial start-up you should see the yellow icon displayed below that says “fume sensor initializing”:
5. Under the diagnostics tab it will look like this when initializing/starting up.
 - a. **NOTE: start-up could take up to 25 minutes.**
6. After the start-up process is complete, the screen will look like this: Notice it now says “Sample Normal” vs “Warmup” as previously shown during start-up. The sensor is now functioning.



QUICK START GUIDE

CALIBRATION POINT

1. The sensor will be calibrated with an atmosphere of 2 PPM formaldehyde.
2. **Notes:** This will assure if the reading is below 2 PPM that the formaldehyde is below the OSHA limit.

ALARM POINT AND TIME CONSIDERATION

1. The software will set the 2 PPM level as the initial alarm point. The alarm indication will be turned on if the VOC sensor voltage is at or above the 2 PPM level for a given time period, which will be user (lab manager) adjustable. The software will initially set this time limit at 15 minutes.
2. During the 15-minute period, if the sensor voltage drops below the 2 PPM equivalent level for more than 30 seconds the 15-minute timer will be restarted at 0 minutes if and when the voltage climbs above the 2 PPM equivalent level again.
3. If the sensor voltage drops below the 2 PPM equivalent for 30 seconds or less and then climbs above the 2 PPM equivalent level the 15-minute timer will continue counting up without a reset.

USER ADJUSTMENT OF ALARM POINT AND TIME ABOVE ALARM LIMIT

The user (Lab Manager) may adjust the alarm point parameters to accommodate lab specific preferences. It is anticipated that this adjustment would only be in an increased alarm value to offset normally present VOC fumes.

1. The user offsets allowed shall be:

Alarm Point

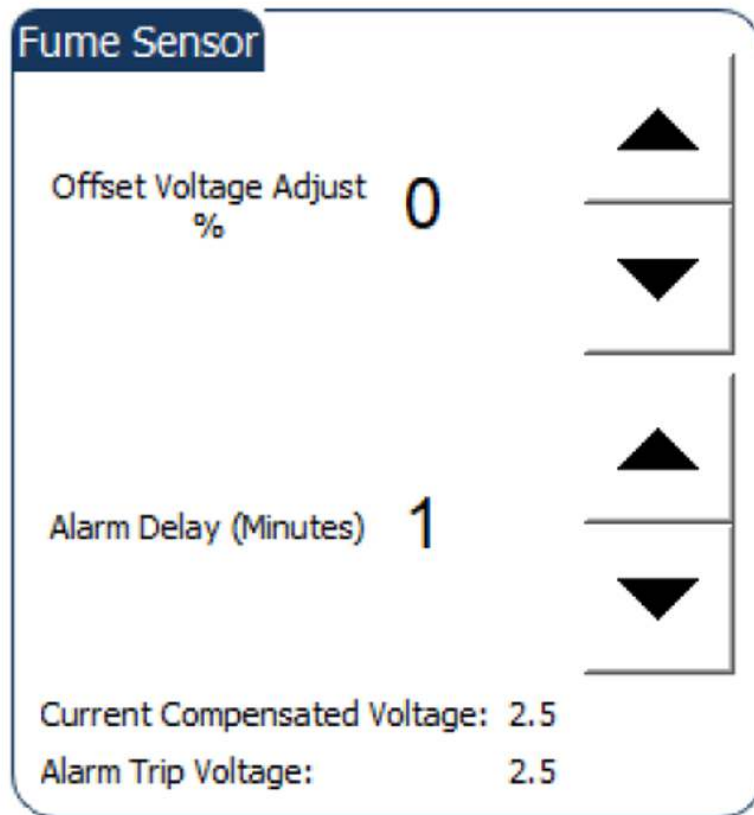
Initial Value: 2 PPM
Minimum Allowed: 0%
Maximum Allowed: +40%

Alarm Time

Initial Value: 15 Minutes
Minimum Allowed: 1 Minute
Maximum Allowed: 60 Minutes

2. The adjustment for alarm point and time shall be accessible by the lab manager as shown below.

3. Set-up Screen (Lab Manager)



4. The increase in the alarm point and time will be applied until the lab manager re-adjust the limits.
5. The alarm points and time considerations will be applied to the new offset values just as they were previously applied to the 2 PPM equivalent value.

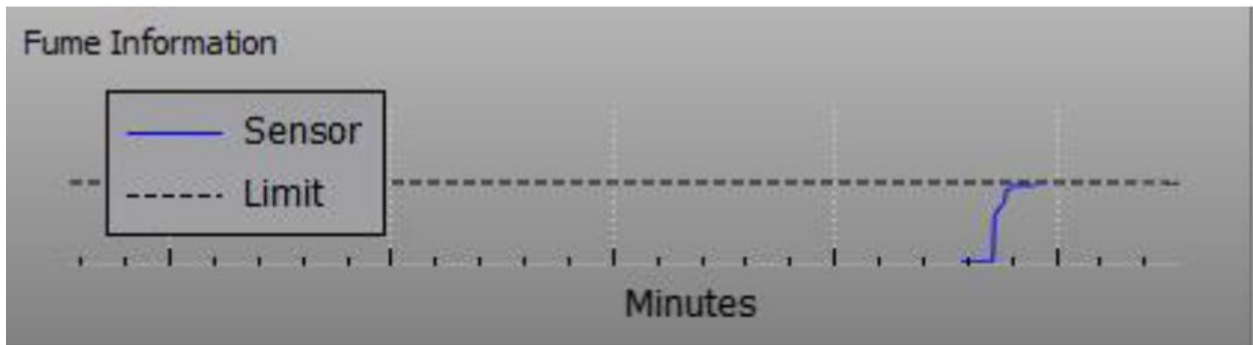
TIME ADJUSTMENT BASED ON SLOPE OF SENSOR OUTPUT

1. None

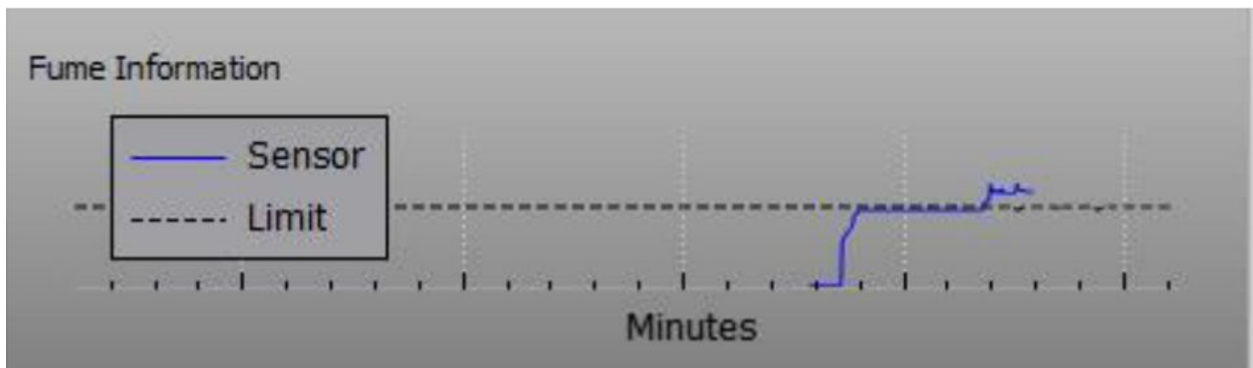
DISPLAY OF VOC SENSOR OUTPUTS, LIMITS, AND ALARMS

1. The display of the VOC will not change from the current implementation. It will show the alarm limit as a horizontal dashed line at 2 PPM and a moving line to indicate current VOC levels. This will allow the user to see if values are increasing or decreasing over time.

MAIN UI SCREEN



Simulated sensor voltage just under alarm point
Alarm adjust set to 0%



Simulated sensor voltage just under alarm point
Alarm adjust set to 20%

SETUP SCREEN (LAB MANAGER)

Fume Sensor

Offset Voltage Adjust % **0**

Alarm Delay (Minutes) **1**

Current Compensated Voltage: 2.5

Alarm Trip Voltage: 2.5

FACTORY CONFIGURE SCREEN

System Configuration

Front Air System	No	Formalin Collection	No
Foot Pedal	No	Formalin Supply	No
Proximity Down Light	No	Proximity Water	No
Surface Light	No	Recirculation Blowers	No
Flow Sensor	Yes	VOC Sensor	Yes
Show Fume Plot	Yes	Filter Installed	No
Fume Allow User Adjust	Yes		
Leak Sensors	Both Disabled		