VOC Verification Kit

Installation and Operation Instructions

Product Identification

The VOC verification kit allows a known VOC sample to be generated and applied to a BAPI room or Duct VOC sensor. The sample tests the dynamic range of the sensor to see if the sensor element is working correctly.

The kit consists of a plastic bottle and a 60mL syringe. The customer has to supply 70% minimum Isopropyl Alcohol. A local drugstore will have it.

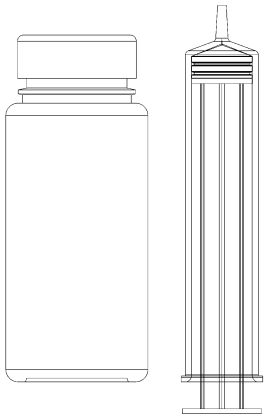

Figure 1: Verification Kit

Sensor Start-up

At each power up, the VOC sensor enters the start-up period for 15 minutes. The main display will show the current temperature and the minor display will show 123 for the first 15 seconds. The VOC output and display will follow the timing shown in figure 12.

During the start-up period an optional verification/commissioning test, described below, may be performed. This test is not mandatory, it is necessary only for building commissioning or if verification of VOC output is required.

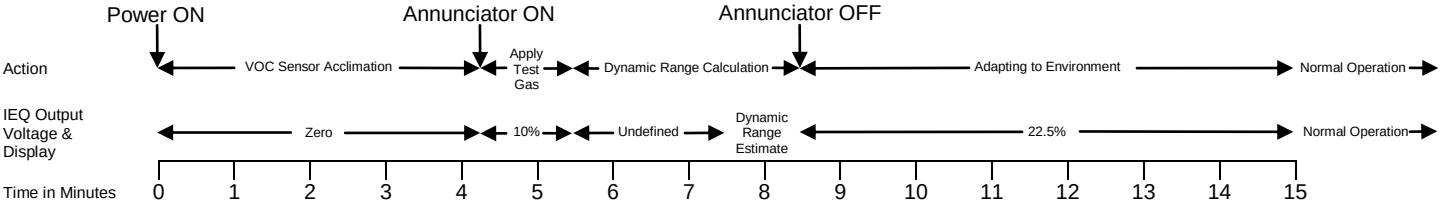

Figure 2: Sensor Start-up Timeline

Optional Sensor Performance Verification and Commissioning

The Volatile Organic Compound (VOC) transmitter contains an adaptive, self adjusting, Volatile Organic Compound (VOC) sensor element that provides a CO_2 equivalent control signal output. When incorporated into a control strategy based on ASHRAE's Demand Control Ventilation algorithm, the VOC sensor can provide improved indoor environment quality.

The fundamental performance criterion of the VOC sensor is its dynamic sensing range. The VOC sensor requires a minimum dynamic range of 30% for proper operation. During BAPI's verification/commissioning test, the dynamic range is tested and displayed.

BAPI recommends installing the sensor and powering it for at least 48 hours before the first verification test is performed. BAPI further recommends ventilating the space such that the sensor reads 37.5% contaminant or less (750 ppm CO_2 equivalent) before any verification test is performed. Wait at least one hour before repeating the test.

1. Start Automatic Verification/Commissioning Test

A. Remove sensor power for at least one minute and reapply. The VOC sensor will set the VOC output to zero volts and display units will show zero ppm contaminants.

B. Wait four minutes fifteen seconds.

C. The VOC sensor will illuminate an **annunciator** (**ON** icon for display units and a red LED for duct mounted units) as well as set the VOC output voltage to 10% of full scale (0.5 VDC for 0 to 5 VDC, 1.0 VDC for 0 to 10 VDC or 2.8 VDC for 2 to 10 VDC outputs).

D. The visual indication and the 10% output voltage confirms that the VOC sensor is in its verification/commissioning test. (Apply Test Gas period in figure 12)

2. Apply Verification Stimulus

A. Apply the stimulus gas during the first minute after the sensor illuminates the annunciator (*See Stimulus Preparation and Application)*.

B. Read and record the VOC output voltage or LCD display approximately 2 to 4 minutes following the stimulus gas application to determine the dynamic range measurement. (Dynamic Range Estimate period in figure 2)

C. When the dynamic range estimate period is complete the annunciator illuminated in step 1C will be extinguished.

3. Termination of Verification Mode

A. For the last 7 minutes of the start-up period the sensor adapts to its ambient environment, the VOC sensor will maintain its output at 22.5% (450 ppm CO_2 equivalent).

B. At 15 minutes the VOC sensor will terminate the start-up period and begin normal operation.

C. The VOC output will now report the VOCs present as CO_2 equivalents.

4. Result Analysis and Recommendations

A. The interpretation of the output in step 2B is a linear representation of the actual measured dynamic range of the sensor. An output value of 30% full scale represents 30% dynamic range. An output of 70%, 80%, or 90% full scale equates to a sensor dynamic range of equivalent values.

B. The VOC algorithm requires a dynamic range of greater than 30% for proper operation. Sensors reporting a dynamic range of 30% or less should be considered for replacement. (see Figure 3)

Stimulus Preparation and Application

Customer supplied – 70% minimum Isopropyl Alcohol.

Fill the plastic bottle approximately ¼ full. Place the cap on the bottle and allow to reach room temperature (65° to 80°F, 18° to 27°C), a minimum of 15 minutes.

1. Using a medical grade syringe, remove the cap from the alcohol bottle, place the tip of the syringe at least half-way into the bottle and withdraw a 60 ml sample of the alcohol vapor. (no liquid)
2. Replace the cap on the alcohol bottle.
3. Place the end of the syringe -
   A. Over, or into the top ventilation slot of the VOC transmitter's housing for room versions.
   B. Into a knockout opening or directly into the aspiration probe's top hole for duct mount versions.
4. Empty the syringe into the sensor using one continuous motion.

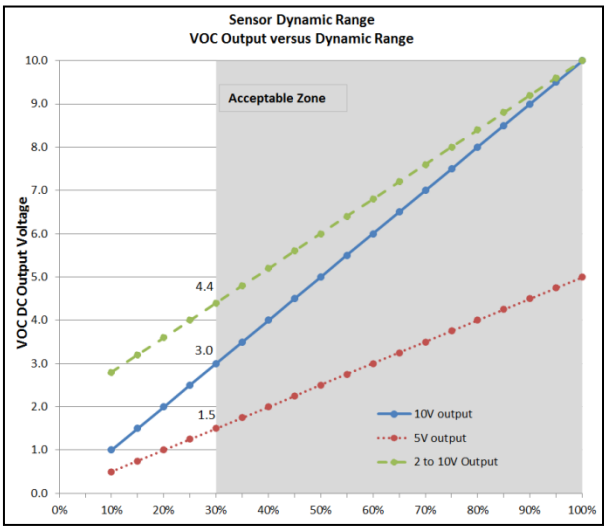

Figure 3: Acceptable Dynamic Range Output

Specifications subject to change without notice.