VOC Air Monitor with SD-card

The VOC Air Monitor is developed by One Cue Systems for long term use in indoor environment. The monitor is designed to support a Volatile Organic Compound (VOC) sensor in order to determine the pollution by volatile organic compounds in schools, offices and other premises. The Monitor has a built-in clock that continues to run when the power is turned off. Every chosen number of minutes, the time and measurements are stored on an SD card, which can be read out at any time.

Operation

The Air Monitor is controlled by a micro-controller. Normally, the display will show the VOC value and the time and a graph that shows the average value of the measurements the moment the data is stored on the SD card.
Above the preset alarm value the display will show in flashing red "Ventilation on".

First time startup

- Place the Air Monitor in a place where unauthorized persons can not easily reach.
- If necessary insert an SD card (the Monitor works also without).
- Activate the Monitor by connecting to a 9 V DC power unit.
- Next, the Monitor starts up with the settings that are stored in the internal memory (Eeprom).
- If necessary, press the right button to activate the menu and set the time and/or perform a new zero calibration (in clean air!!).
- **The sensors need 5 days to stabilize!** Changing the sensitivity within 5 days will lead to erroneous readings.

Menu

Is activated when the right push button is pressed. At first the version of the installed firmware is shown, then a number of settings follows (random values):

- **VOC1 Null = 227 .**
  The start up value of canairy sensor 1 for the micro-controller after zero calibration.
  Max VOC = 18 ppm. The highest measured VOC level of the sensor. Is reset after zero calibration.
  F1 = 30 . The factor by which the deviation from VOC Null is multiplied (derived from the calibration with 100 ppm calibration gas).
  Reading = 255 = 1246 mV. The actual value of VOC sensor for the micro-controller (maximum 1023) and the sensor output in mV.

Subsequently, a number of possibilities are offered to set up the monitor.

- **Set time?**
  After confirming "dy/mo/yr hr:min" and then "00/--/-- --:--" is displayed. The time can be set using the both buttons. The initial value of 00 runs in steps of 1 when the right button is pressed. Use the left button to decrease the value. If nothing

happens in three seconds, the next value can be set.
Finally the day of the week can be set.

- **New zero calibration?**
  After confirming the calibration takes place. The display says: "Wait a moment.."
  Once a constant value is measured for the VOC sensor the Monitor reports that the calibration is OK. For VOC 0 ppm is set as a benchmark.

- **Sensitivity set up?**
  This can only be performed by authorized personnel by placing the sensors in a cabinet or room where the air is 'polluted' with 100 ppm of test gas. Now you are asked to enter a code (=17). Then press the right button to increase (left button to decrease) F1 and the corresponding VOC value. Release the button as soon as the VOC value reads 100 ppm.
  The calibration will only be correct when the monitor was zero calibrated earlier in clean air!

- **Alarm value = 50 set up?**
  This is the VOC value above which the display shows "Ventilation on" whereby the relay switches to the 'on' state.

- **Interval data> SD set up?**
  This is the time in minutes between the storage of two subsequent data. The average value of the measurements is stored. Can be set from 1 to 60 minutes. The interval is also used to update the graph in the display. The graph will only show the last 160 measurements.

Data storage

The VOC Air Monitor is provided with an opening through which an SD card can be inserted into the device with the contact strips towards the front. The controller works with or without an SD card. If it is removed, then the device says: No SD card! Once a card is inserted saving of the measurements is started or continued. When the time is set correctly the measurements can be stored for months (until the card is full) and be displayed correctly using the supplied software.

Each specified time interval date, time, and VOC are stored in the DATA.TXT file (N.B. in uppercase!).

With the supplied software on the SD card a graph of the data can be made. To do so, insert the SD card into a Windows computer and double-click DataPlotter.exe.
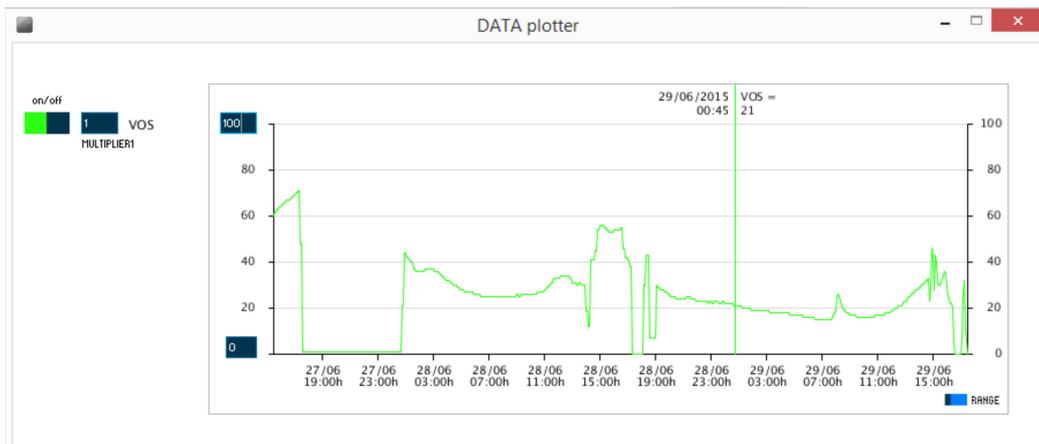
With the colored boxes on the left to display the different variables can be turned on or off. In the boxes next to them a factor can be entered by which the variables are

multiplied. When a value of 0.1 is introduced next to VOC the line for VOC is lowered 10x. When only one variable is made visible, a vertical line with exact data will follow the mouse pointer.

You can scroll through the graph with the cursor keys or by moving the blue slider in the RANGE box.

(This program only works if JAVA version 7 or higher installed.)

Specifications

VOC-sensor:	Metal oxide semiconductor (MOS) sensor.
Range:	0 – 250 ppm
Resolution:	1 ppm
Temperature range:	0–35°C
Lifetime sensor:	Minimum 3 years.
Response time (21°C):	From 0 to 10 ppm: max.20 seconds.
Power supply:	7–9 Volt.
Power consumption:	ca. 90 mA.
Temperature:	5–35°C.
Dimensions:	85mm × 85mm × 25mm
Weight:	ca. 100 g.
Reset:	Reset of the monitor takes place at power connection.
Eeprom:	Saves:

- Alarm value for VOC.
- Fresh air start value VOC Null.
- Sensitivity factor F1.
- Interval between storing data / graph update.

SD card	SDHC Class 4–10

Terminals

DC power socket	Connection for the power supply. The voltage is minimum 7 and maximum 9 volt. Note proper connection! The monitor is **not** protected against wrong connection!
Internal terminal block:	
0V and OUT	Sensor output. 0 ppm corresponds to 0V, 250 ppm or higher corresponds to 5V.
Relay	OFF when VOC is lower than the alarm value. ON when VOC is higher than the alarm value. The relay will stay ON until VOC has dropped to less than half the alarm value.