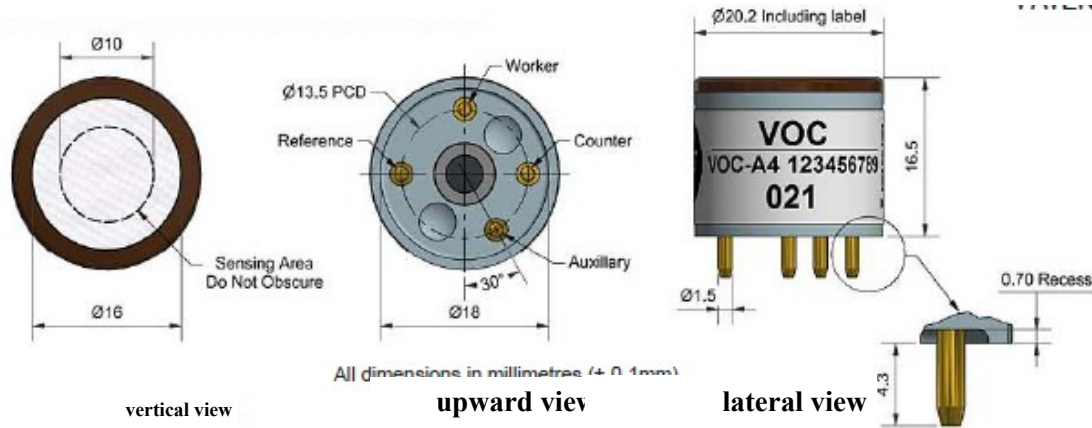


## VOC-A4 4 Electrode Volatile Organic Compounds VOC Sensor

Figure 1 Schematic Diagram of VOC-A4



function	sensitivity	<b>Sensitivity in 2ppmCO (nA/ppm)</b>	230~410
	response time	<b>Time from zero to 2ppmCO (s)</b>	<30
	zero current	<b>Output at 20°Cm in zero grade air (nA)</b>	±200
	noise *	Standard deviation ± 2 (equivalent ppb)	20
	range	Measuring limits (ppm) that guarantee product performance	190
	Linearly	The ppm value of the full scale error is linear at 0-10 ppm and represents the maximum ppm value for gas pulse stabilized reaction	±1.5
	overload		1000
life span	<b>zero drift</b>	Equivalent ppb values that change in the laboratory air from year to year	±500
	<b>sensitivity drift</b>	Percentage change in laboratory air over the year, measured monthly	< 15
	<b>working life</b>	Number of months to which the output is reduced to 50% of the original signal (24 months guaranteed)	> 36
environment	<b>-20°C sensitivity</b>	<b>2ppmCO at (-20°C output/20°C output)%</b>	50~80
	<b>Sensitivity at 50°C</b>	<b>2ppmCO at (50°C output/20°C output)%</b>	100~120
	-20°C when zero point	<b>Change in nA with 20°C as the base</b>	±20
	50°C at zero point	<b>Change in nA with 20°C as the base</b>	±100
cross sensitivity	C <sub>2</sub> H <sub>6</sub> O	Gas sensitivity percentage measured at <1ppmC <sub>2</sub> H <sub>6</sub> O	<125
	H <sub>2</sub> S	Gas sensitivity percentage measured at 5ppmH <sub>2</sub> S	< 400
	NO <sub>2</sub>	Sensitivity percentage of gas measured at 5ppmNO <sub>2</sub>	<-90
	Cl <sub>2</sub>	Gas sensitivity percentage measured at 5ppmCl <sub>2</sub>	< -45
	NO	Gas sensitivity percentage measured at 5ppmNO	< 35
	SO <sub>2</sub>	<b>Gas sensitivity percentage at 5ppmSO<sub>2</sub></b>	< 110
	H <sub>2</sub>	Gas sensitivity percentage measured at 100ppmH <sub>2</sub> (20°C)	< 50
	C <sub>2</sub> H <sub>4</sub>	Gas sensitivity percentage measured at 40ppmC <sub>2</sub> H <sub>4</sub>	< 115
	NH <sub>3</sub>	<b>Percentage sensitivity of gas at 20ppmNH<sub>3</sub></b>	< -0.1
CO <sub>2</sub>	Sensitivity percentage of gas measured at 5%Vol CO <sub>2</sub>	< 0.1	
key parameter	temperature range	°C	-30~50
	pressure limit	kPa	80~120
	Humidity range	Percentage of continuous relative humidity	15~90
	Storage period	Number of months for preservation from 3 to 20°C (to be kept in a sealed tank)	6
	load resistance	Ω (Recommended use of AFE circuit board)	33~100
	weight	g	< 13

Figure 2. Linearity of the Sensor to 0-10ppm CO

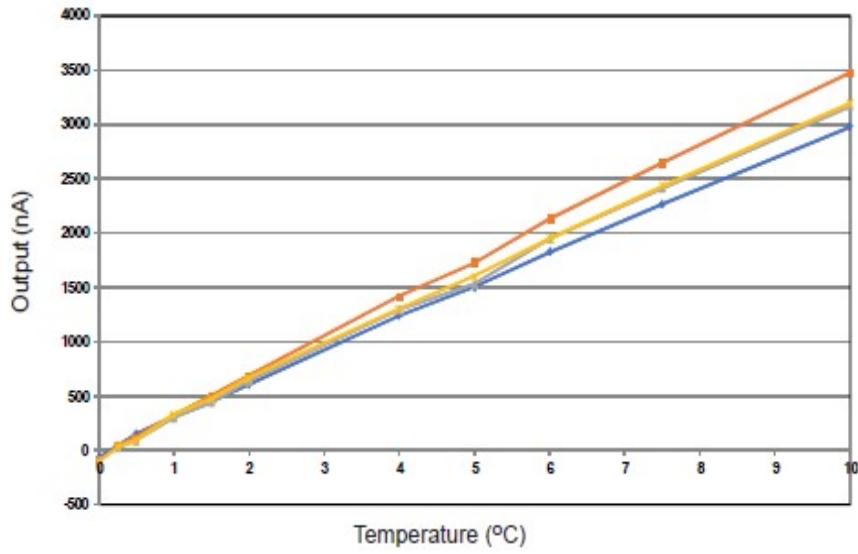


Figure 2 shows an example of the sensor's response at CO concentrations of 0 ~ 10ppm.

Figure 3 Zero Temperature Characteristics

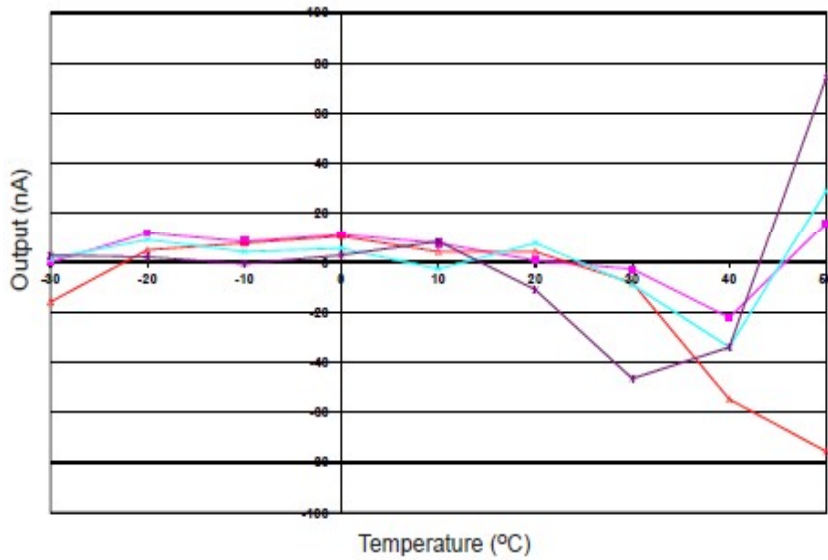


Figure 3 shows an example of the zero point output variation of the working electrode caused by temperature changes, in units of nA.

VOC - A4 can detect both VOC gas and CO gas. The simultaneous use of VOC - A4 and CO - A4 sensors can estimate the VOC concentration without bias.

The data given in this TDS refers to the application of the VOC - A4 sensor without bias. However, the sensor can be used under a bias of 0 ~ 0.3V (see application note AAN - 805)

To calculate the concentration of VOC, ensure that the electronic zero point offset, sensor zero point offset, temperature characteristics, sensitivity (nA / ppm) calibration and sensitivity temperature characteristics of both sensor signals have been corrected.

C <sub>2</sub> H <sub>6</sub> O detection parameters		
Performance sensitivity	<b>Sensitivity in C<sub>2</sub>H<sub>6</sub>O (nA / ppm)</b>	200~400
response time	<b>Time to t90 from zero to C<sub>2</sub>H<sub>6</sub>O 11111 &lt;sp_1</b>	< 30
zero current	<b>Output at 20°C in zero-level air (nA)</b>	±200
noise	Standard deviation ± 2 (equivalent ppb)	20
range	Measuring limits (ppm) that guarantee product performance	2
degree of linearity	<b>The ppm value of the full scale error is linear at 0~2612 H<sub>2</sub>O</b>	< 0.13
overload	<b>Maximum ppm value of gas pulse stabilized reaction</b>	5
<b>Lifetime zero drift</b>	Equivalent ppb values that change in the laboratory air from year to year	±500
sensitivity drift	Percentage change in laboratory air over the year, measured monthly	< 15
working life	Number of months to which the output is reduced to 50% of the original signal (24 months guaranteed)	> 36
<b>Sensitivity at -20°C</b>	<b>2ppmCO at (-20°C output/20°C output)%</b>	ND
Sensitivity at 50°C	<b>2ppmCO when, (50°C output/20°C output)%</b>	ND
-20°C when zero point	<b>Change in nA with 20°C as the base</b>	±20
50°C at zero point	<b>Change in nA with 20°C as the base</b>	±100
cross connection CO	Gas sensitivity percentage measured at 2ppmCO	< 110
<b>Sensitivity H<sub>2</sub>S</b>	Gas sensitivity percentage measured at 5ppmH <sub>2</sub> S	<400
NO <sub>2</sub>	Sensitivity percentage of gas measured at 5ppmNO <sub>2</sub>	< -80
Cl <sub>2</sub>	Gas sensitivity percentage <sub>2</sub> measured at 5ppmCl	< -40
NO	Gas sensitivity percentage measured at 5ppmNO	< 40
SO <sub>2</sub>	<b>Gas sensitivity percentage<sub>2</sub> at 5ppmSO</b>	< 100
H <sub>2</sub>	Gas sensitivity percentage measured at 100ppmH <sub>2</sub> (20°C)	< 50
C <sub>2</sub> H <sub>4</sub>	Gas sensitivity percentage measured at 40ppmC <sub>2</sub> H <sub>4</sub>	< 110
NH <sub>3</sub>	<b>Percentage sensitivity of gas<sub>3</sub> at 20ppmNH</b>	< -0.1
CO <sub>2</sub>	<b>5%Vol CO<sub>2</sub> when measured percentage sensitivity of gas</b>	< 0.1
<b>Key temperature ranges</b>	°C	-30~50
<b>Pressure range of parameters</b>	kPa	80~120
Humidity range	Percentage of continuous relative humidity	15~90
Storage period	Number of months for preservation from 3 to 20°C (to be kept in a sealed tank)	6
load resistance	Ω (ISB circuit board is recommended)	33~100
weight	g	< 6

Figure 4. Linearity of the Sensor to Ethanol from 0 to 860ppb (approximation)

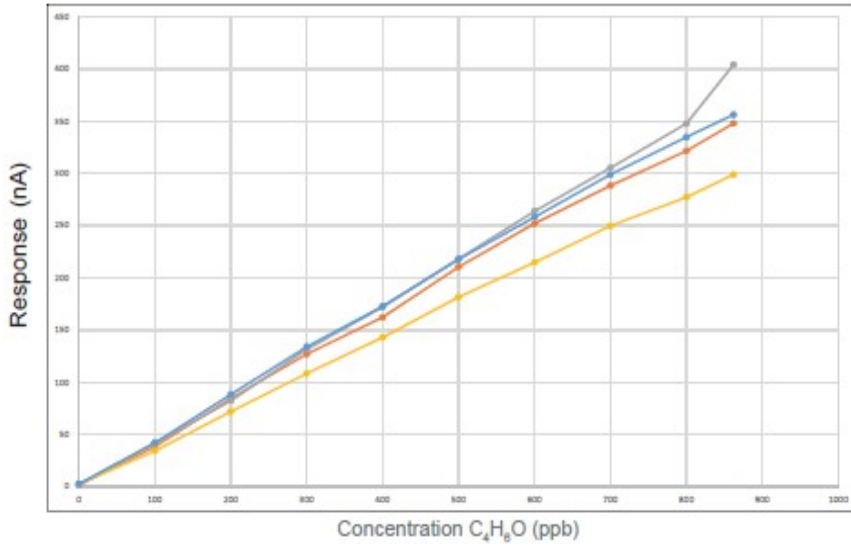


Figure 4 shows an example of the sensor output at ethanol concentrations of 0 ~ 860ppb (approximate).

Figure 5 Reaction of 860ppb (approximation) Ethanol

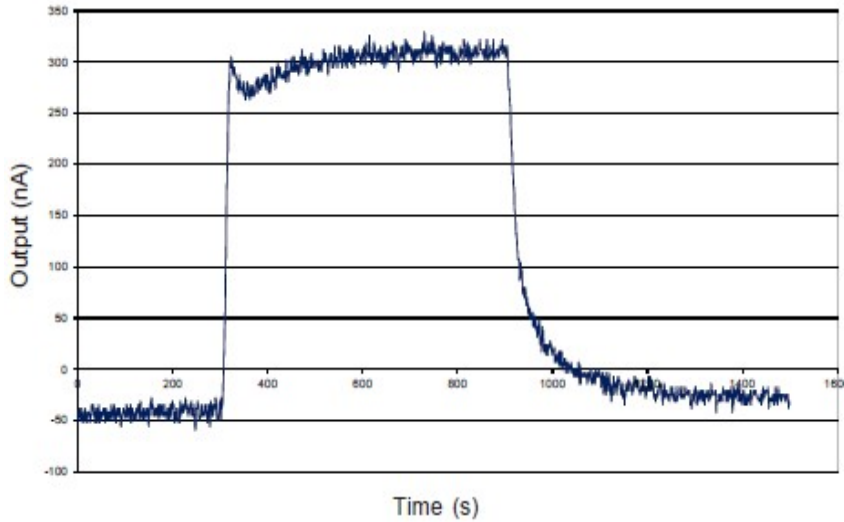


Figure 5 shows an example of the sensor output at ethanol concentration 860ppb.

Figure 6 Reaction of 2ppm C<sub>4</sub>H<sub>8</sub>

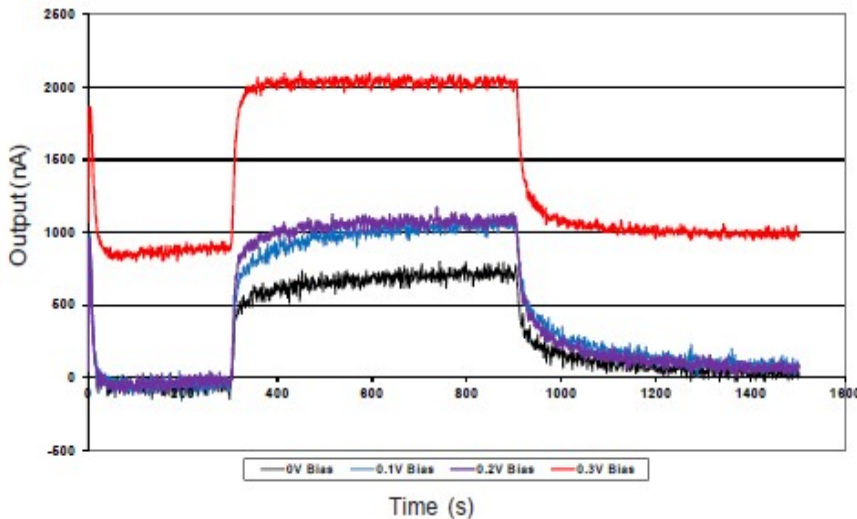


Figure 6 shows examples of the transducer output for 2ppm C<sub>4</sub>H<sub>8</sub> at different biases.