

CO Sensor () - for the detection of CO gas

CO 가 , , 가 , 가 가

, ' , 가

가 가 가 ,

NDIR type 가 가

가 가 CO가



<GSET11>



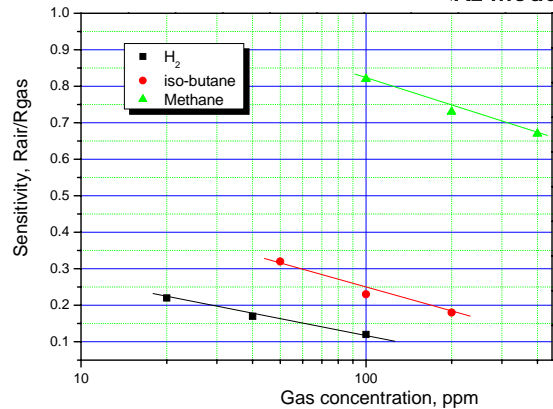
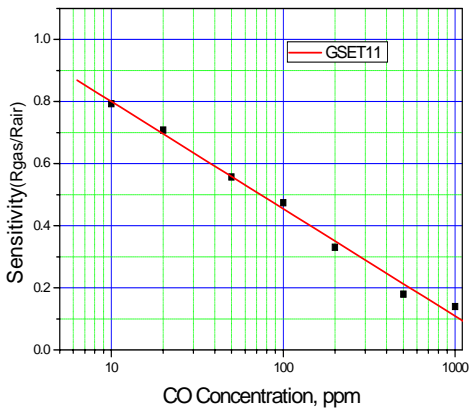
<OP Module>



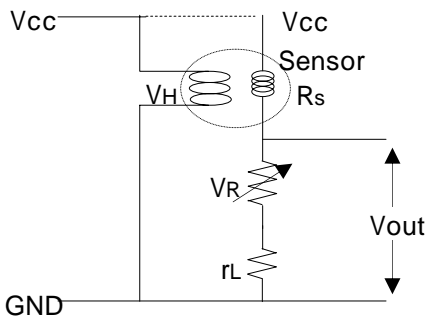
<RL Module>

Application * Air Purifier * Damper

1. Sensitivity characteristic slope

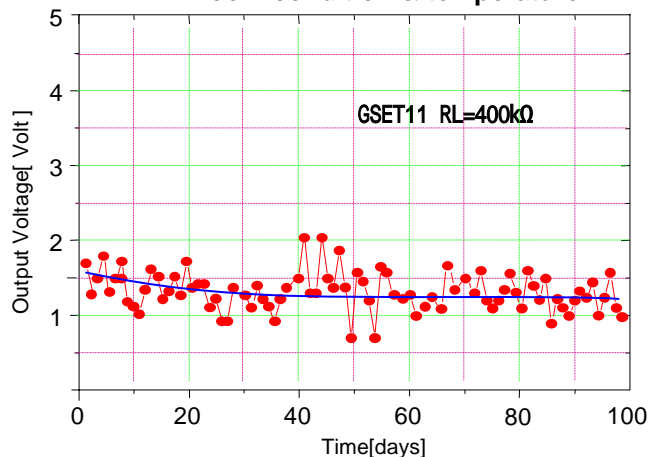


2. Basic Measuring Circuit & Stability



Vcc : Circuit Voltage(5V) VH : Heater Voltage(5V)
 RL : Load Resistance Rs : Sensor Resistance
 (RL=VR+rL)

Long Term Stability - Room condition & temperature



3. Specifications

3.1 Package (GSET11), MOQ :



a. Characteristics

Index		Spec. & Test condition
Circuit Voltage	Vc	Sensor input Voltage : 1~12Volt, Sensor Resistance : refer to Rank table
	VH	Heater input voltage : 5volt±1%, Heater Resistance : 29.0 ±2.0
	PH	Power consumption : 380mW , Inrush current : 200mA
Characteristics of sensitivity () (Rs,gas / Rs,air)		- CO(10PPM) 0.75 0.85, CO(100PPM) 0.30 0.60 - Tobacco(2,000ppm-ESSE, KOREA) 0.6 - Ethyl alcohol vapor (50ppm) 0.50 (Sample is gathered by using injector(10Mℓ) 10mm/sec speed)
Guarantee		- 3years, - Calibration interval 1years recommended
Operating environment		- Temp. : -10 ~ 50 , Humidity : 5 ~ 90%RH, Non-condensing - Storage → Temp. : -10 ~70 , Humidity : 0 ~90%RH
Reaction time(T90)		- Reaction Time(T90) : Less then 10sec - Recovering Time(T90) : Less then 30sec

b. 가 : : ±15% (,)

→ Vout,air : 1.0volt (가 5volt) 130124

(ppm)	(Volt)	(ppm)	(Volt)	(ppm)	(Volt)	(ppm)	(Volt)
0	1.00	110	1.84	230	2.19	550	2.84
5	1.10	120	1.88	240	2.22	600	2.92
10	1.21	130	1.91	250	2.24	650	3.01
20	1.34	140	1.94	260	2.27	700	3.09
30	1.43	150	1.97	270	2.29	750	3.17
40	1.51	160	2.00	280	2.31	800	3.25
50	1.57	170	2.03	290	2.33	850	3.33
60	1.62	180	2.06	300	2.36	900	3.40
70	1.67	190	2.09	350	2.46	950	3.48
80	1.72	200	2.12	400	2.56	1,000	3.55
90	1.76	210	2.14	450	2.66		
100	1.80	220	2.17	500	2.75		

$$Con.(ppm) = 113.26043 - 271.01187 \times (Vout) + 148.17739(Vout)^2$$

(ppm)	Smoke (HC)	Alcohol(C2H5OH)	Hydrogen(H2)	Butane(C4H10)
Concentration	2,000ppm	50ppm	200ppm	500ppm
Sensitivity	0.6	0.3	0.5	0.4

* Sensitivity() = Rgas/Rair

* Rgas : 가 , Rair :

c. Sensor connection

Sensor (Rs) RL ('3.1-b') Basic measuring circuit('2 ')
 .(: ,)

- Heater(DC 5volt \pm 3%) \rightarrow : Vcc : GND,
- Sensor(DC/AC 0 ~ 12volt) \rightarrow : Vcc : GND,

d.

GSET11-E

E : rank ex) E11 -> Sensor (Rs,air) : 14.5 ~ 19.3k Ω

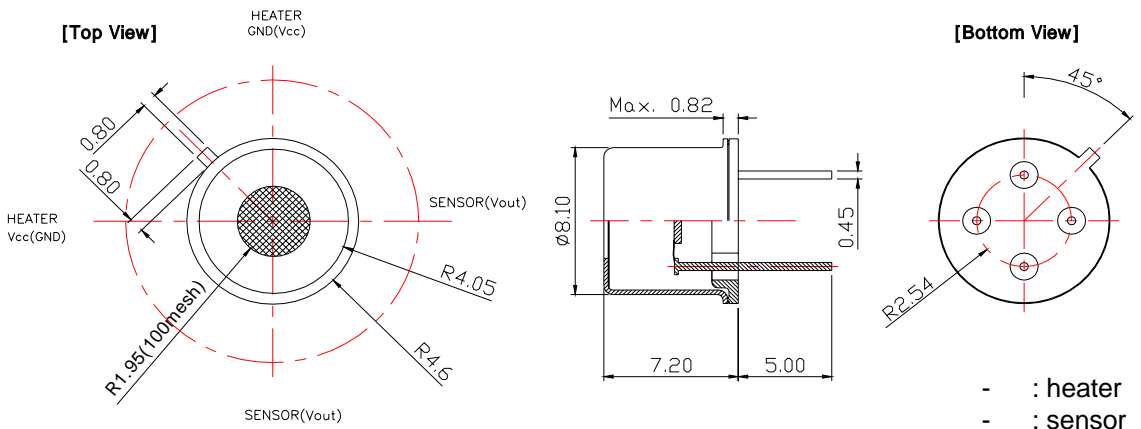
- Sensor Resistance Table(Only package)

Rank Table No.:G

Rank No.	RL \pm 0.16v		
D13	8.45	30.3	38.5
D14	10.7	38.5	48.7
D15	13.7	48.7	62.4
D16	17.4	62.4	79.3
D17	22.1	79.3	101
D18	28.0	101	128
D19	35.7	128	163
D20	45.3	163	206
D21	57.6	206	262
D22	73.2	262	333

Rank No.	RL \pm 0.16v		
D23	93.1	333	424
D24	118	424	538
D25	150	538	683
D26	191	683	870
D27	243	870	1,107

e. Structure and Dimensions



3.2 OP Module (GSET11-P1xx), MOQ :

a. Characteristics



Index		Spec. & Test condition
Circuit Voltage	Vc	Module input Voltage : 5±0.1Volt
	PH	Power consumption : 460mW , Inrush current : Less than 140mA
Guarantee		- 3years over - Calibration interval 1years recommended
Worm up Time (T90)		- Less then 300sec
Reaction time(T90)		- Reaction Time(T90) : Less then 5sec - Recovering Time(T90) : Less then 30sec

b. 가 data sheet

- Output data : 0.5 ~ 5Volt - : ±7% (,)
- Relay Output : 4.0Volt

- Max. Range : 200ppm
(GSET11-P11X)

(ppm)	(Volt)	(ppm)	(Volt)
0	0.72	130	3.40
10	1.23	140	3.51
20	1.63	150	3.61
30	1.91	160	3.71
40	2.14	170	3.81
50	2.33	180	3.90
60	2.50	190	3.99
70	2.66	200	4.08
80	2.80	210	4.17
90	2.93	220	4.25
100	3.06	230	4.34
110	3.18	240	4.42
120	3.29	250	4.50

$$(ppm) = 7.448 - 19.757 * (Vout) + 16.388 * (Vout)^2$$

- Max. Range : 500ppm
(GSET11-P12X)

(ppm)	(Volt)	(ppm)	(Volt)
0	0.63	260	3.52
20	1.40	280	3.62
40	1.78	300	3.73
60	2.05	320	3.83
80	2.27	340	3.92
100	2.46	360	4.02
120	2.63	380	4.11
140	2.78	400	4.20
160	2.92	420	4.29
180	3.05	440	4.37
200	3.18	460	4.46
220	3.30	480	4.54
240	3.41	500	4.63

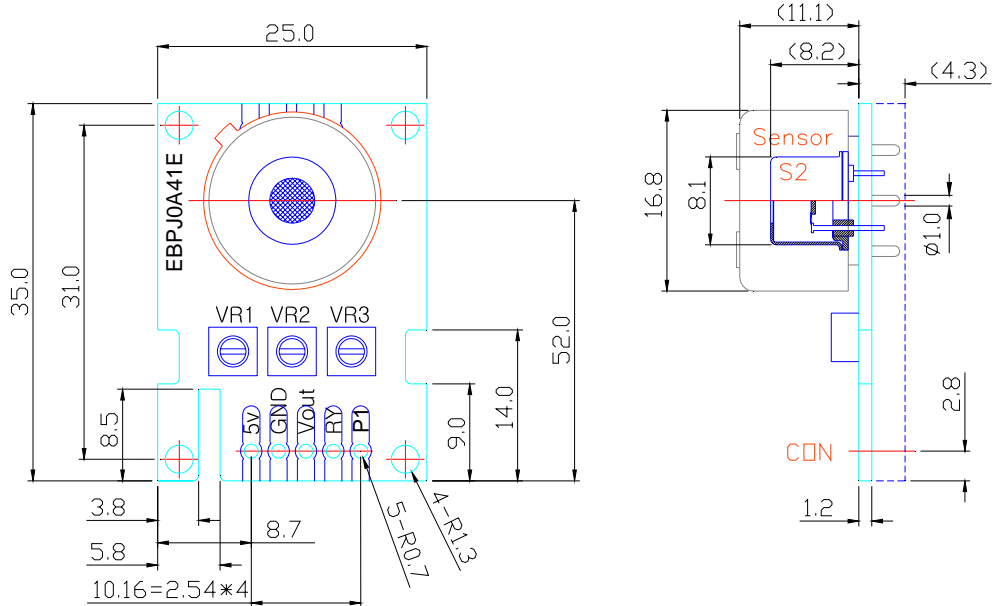
$$(ppm) = 16.806 - 45.739 * (Vout) + 32.581 * (Vout)^2$$

- Max. Range : 1,000ppm
(GSET11-P13X)

(ppm)	(Volt)	(ppm)	(Volt)
0	0.59	650	3.74
50	1.55	700	3.86
100	1.93	750	3.97
150	2.19	800	4.08
200	2.42	850	4.19
250	2.61	900	4.30
300	2.78	950	4.40
350	2.94	1000	4.51
400	3.09		
450	3.23		
500	3.37		
550	3.50		
600	3.62		

$$(ppm) = -12.256 - 30.431 * (Vout) + 46.539 * (Vout)^2$$

c. Structure and Dimensions



- VR1 : reference
- VR2 : Gain ()
- VR3 : Offset (Level shift)

d. Data output

- Vcc : 5.0volt
- GND
- Data(Vout, analogue signal)
- Relay

e. Relay Output

- Max. output range H2 340ppm : Hi(4.0~4.1volt) output at 70ppm(H2)
- : Hi(4.0~4.1volt) output at 480ppm(Smoke)



3.3 RL Module(GSET11-P3xx), MOQ :1,000pcs

a. Characteristics

Index		Spec. & Test condition
Circuit Voltage	Vc	Module input Voltage : 5 ± 0.1 Volt
	PH	Power consumption : 450mW , Inrush current : Less than 140mA
Characteristics of Output data		Data
Guarantee		- 2years over - Calibration interval 1years recommended
Operating environment		- Temp. : -10 ~ 50 , Humidity : 5 ~ 90%RH, Non-condensing - Storage → Temp. : -20 ~ 70 , Humidity : 0 ~ 90%RH
Reaction time(T90)		- Reaction Time(T90) : Less then 10sec - Recovering Time(T90) : Less then 180sec

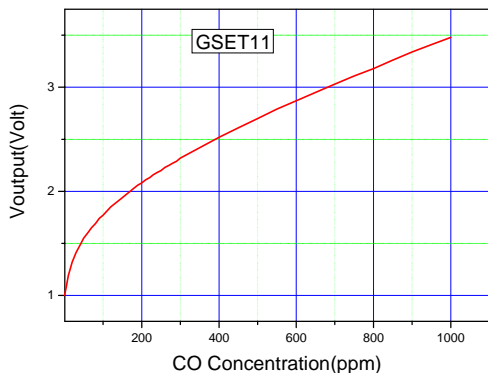
b.

가

→ RL : 100kΩ, Sensor resistance : 400kΩ
Vout,air : 1.0volt (가 5volt)

- : $\pm 15\%$ (,)

Carbon Monoxide



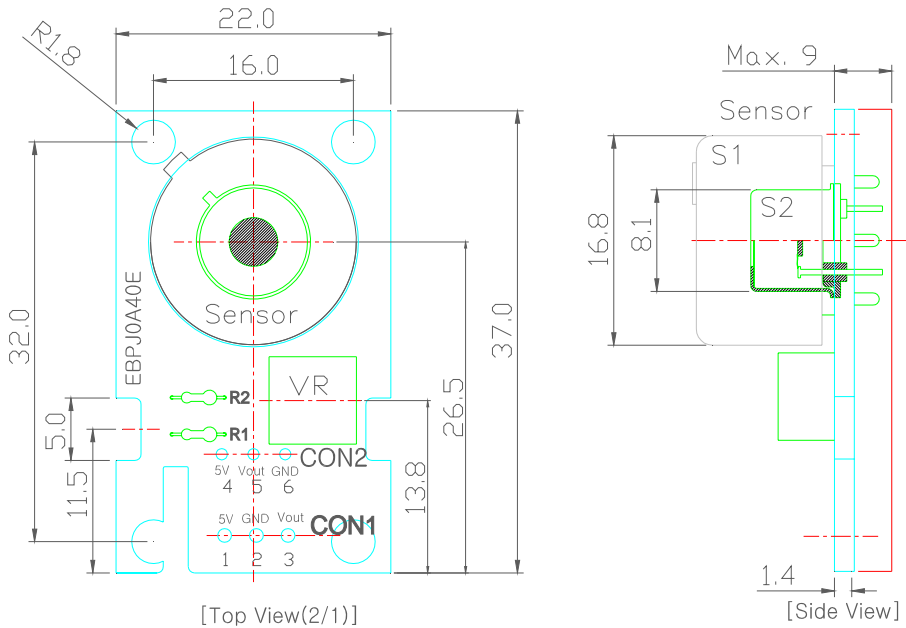
(ppm)	(Volt)	(ppm)	(Volt)	(ppm)	(Volt)	(ppm)	(Volt)
0	1.00	110	1.84	230	2.19	550	2.84
5	1.10	120	1.88	240	2.22	600	2.92
10	1.21	130	1.91	250	2.24	650	3.01
20	1.34	140	1.94	260	2.27	700	3.09
30	1.43	150	1.97	270	2.29	750	3.17
40	1.51	160	2.00	280	2.31	800	3.25
50	1.57	170	2.03	290	2.33	850	3.33
60	1.62	180	2.06	300	2.36	900	3.40
70	1.67	190	2.09	350	2.46	950	3.48
80	1.72	200	2.12	400	2.56	1000	3.55
90	1.76	210	2.14	450	2.66		
100	1.80	220	2.17	500	2.75		

$$(ppm) = 113.260 - 271.012 * (Vout) + 148.177 * (Vout)^2$$

c. Sensor connection

- CON1, CON

d. Structure and Dimensions



e. Data output (CON1, CON2)

CON1

CON2

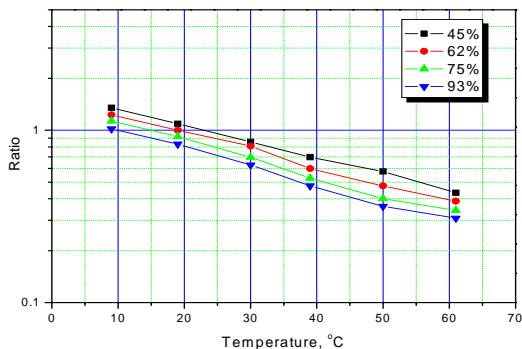
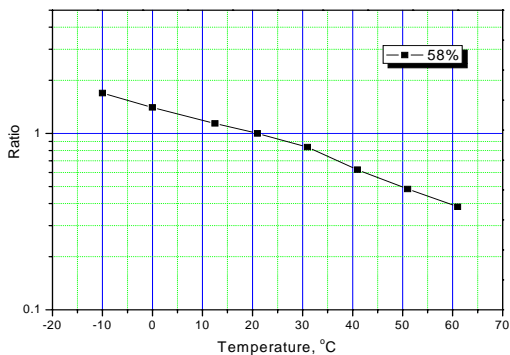
- , → Vcc : 5.0volt
- , → GND
- , → Data(Vout, analogue signal)

3.4 Product code & characteristics

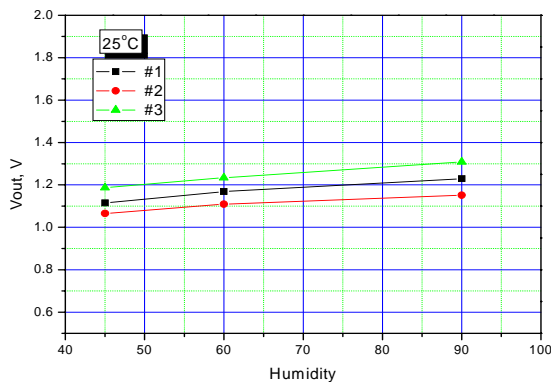
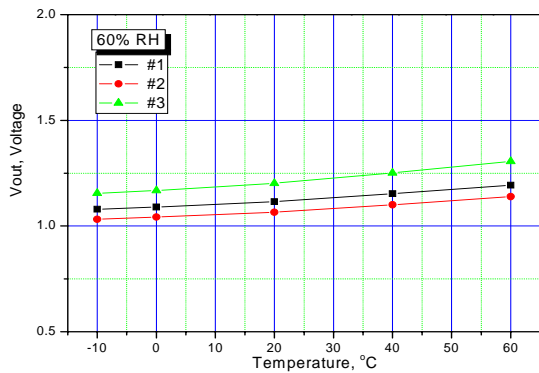
Product code	Consumption	Circuit	Output	Worm-up time
GSET11 – P1XX	390mW	OP-Amplifying	Data : Analogue Relay : Hi(4V), Low(0V)	Long
Study - P2XX		μ-processor	Data : Digital Open collect	short
GSET11 - P3XX		Basic Circuit	Data : Analogue	Long

3.5 Dependency of temperature & humidity

- Sensor



- Module(.)



4.

Index	GSET11	GSET11-P11X	GSET11-P21X ^{study}	GSET11-P3XX
Circuit	Package	OP - Module	MP - Module	RL - Module
Target Gas	CO Gas			
Accuracy	± 15%	± 7%	± 7%	± 10%
Measuring Circuit	Basic Circuit	Op - Amp	Micro Processor	Basic Circuit
Input Voltage	5Volt±3%	←	←	←
Output	0 ~ 4volt	0 ~ 4volt	Open collect	0 ~ 4volt
MOQ	None	None	None	More than 3,000ea

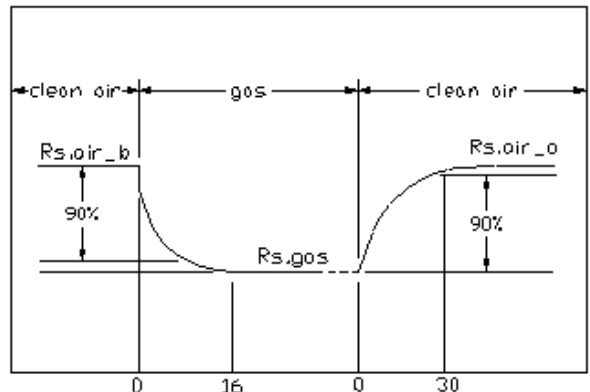
5. Reaction time(T90)

Reaction Time(T90) : Less then 10sec
[Between Rs,air_b & Rs,gas]

Recovering Time(T90) : Less then 30sec
[between Rs,gas & Rs,air_a]

Beginning stability time(T90) : Less then 10 min

Rs,air_b : Sensor Resistance without gases
Rs,gas : Sensor Resistance after blowing gases
Rs,air_a : Sensor Resistance removing gases



6. Application

- * Hood, Ventilator
- * Damper
- * Gas Leak Alarm (Explosive gases)

7. Product code

GSET11-P

1 2 3

- (1) Division Circuit → 1 : Op-amp circuit 2 : Micro processor Circuit 3:Micro-processor
 (2) Gas sensing range → **1: Standard**
 (3) Connector → 0:None

* **summary**