RFGs Sensor – for the detection of Refrigerants

Target Gases : R404A / Composition		분자식	함량 (%)	분자량	밀도 (g/cc)
R125	pentafluoroethane	CHF2CF3	44%	120.030	1.530
R134A	1,1,1,2-Tetrafluoroethane	CH2FCF3	4%	102.030	1.207
R143A	1,1,1-Trifluoroethane	CH3CF3	52%	84.000	0.455
평균				100.574	0.958
액체 1g당 기화 부피(liq.15℃) = 0.225(liter) 액체 1cc당 기화 부피(liq. 15℃) = 0.216(liter)					

< Sensor (GSRS61 >

< Module(GSRS61-P110) >

1. Sensitivity characteristic slope

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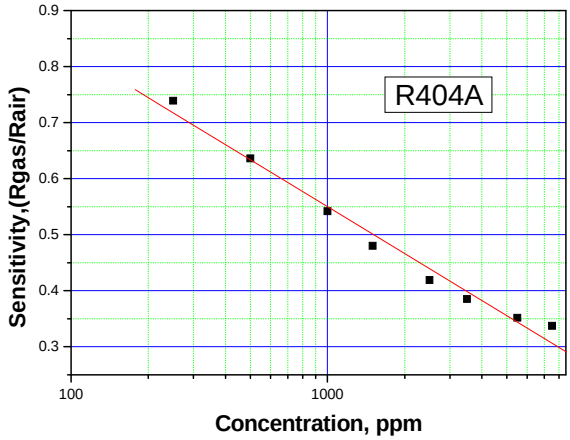
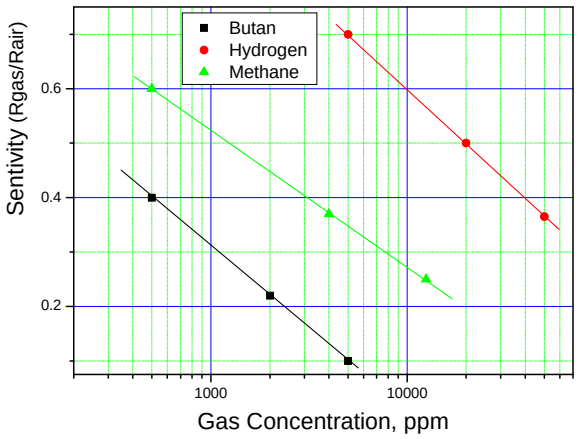
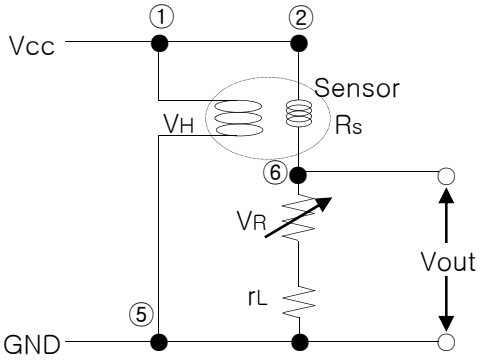


농도 (ppm)	감도	농도 (ppm)	감도	농도 (ppm)	감도	농도 (ppm)	감도
0	1.000	2,400	0.455	4,800	0.360	7,200	0.31
200	0.745	2,600	0.444	5,000	0.356	7,400	0.31
400	0.661	2,800	0.435	5,200	0.351	7,600	0.30
600	0.612	3,000	0.426	5,400	0.346	7,800	0.30
800	0.577	3,200	0.417	5,600	0.342	8,000	0.30
1,000	0.550	3,400	0.410	5,800	0.338	8,200	0.30
1,200	0.528	3,600	0.402	6,000	0.334	8,400	0.29
1,400	0.509	3,800	0.395	6,200	0.330	8,600	0.29
1,600	0.493	4,000	0.389	6,400	0.326	8,800	0.29
1,800	0.479	4,200	0.383	6,600	0.322	9,000	0.28
2,000	0.466	4,400	0.377	6,800	0.318	9,200	0.28
2,200	0.455	4,600	0.371	7,000	0.315	9,400	0.28



2. Basic Measuring Circuit



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

Best solution of Measuring & Control system
Long term stability & High reliability
in sensing worldwide

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3. Specifications

3.1 Package (GSRS61 sensor)

a. 정격

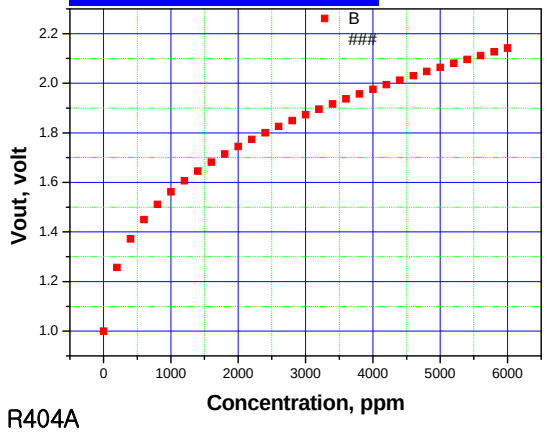
- Heater input voltage : 5volt±1%
- Power consumption : 680㎽ 이하
- Resistance : 16.0Ω±0.2Ω
- Sensor input Voltage : 1 ~ 12Volt

b. 전압 출력 별 가스 농도

- 기준 → RL : 100㏀, Sensor resistance : 400㏀, Vout,air : 1.0volt (센서 인가전압 5volt)
- 오차 : ±7% (온도, 습도 보상 전)

유효구간 -> R404A : 1,000ppm~6,000ppm
R22 : 100ppm~2,000ppm)

R404A/R22

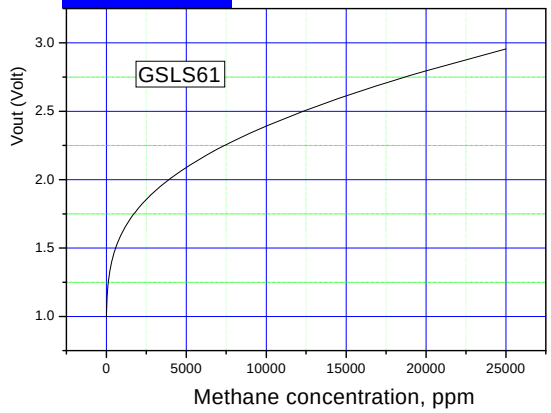


R404A

$$(ppm) = 10^{(1.2228+(3.0240E-4)(volt)-(2.636E-8)(volt)^2)}$$

R404A 농도 (ppm)	R404A 출력 (Volt)	R404A 농도 (ppm)	R404A 출력 (Volt)	R22 농도 (ppm)	R22 출력 (Volt)	R22 농도 (ppm)	R22 출력 (Volt)
0	1.000	3,000	1.873				
200	1.324	3,200	1.895				
400	1.484	3,400	1.917				
600	1.592	3,600	1.937				
800	1.677	3,800	1.957				
1,000	1.747	4,000	1.976				
1,200	1.808	4,200	1.995				
1,400	1.863	4,400	2.013				
1,600	1.912	4,600	2.030				
1,800	1.958	4,800	2.048				
2,000	2.000	5,000	2.064				
2,200	2.040	5,200	2.081				
2,400	2.077	5,400	2.096				
2,600	2.112	5,600	2.112				
2,800	2.145	5,800	2.127				

Methane



농도 (ppm)	출력 (Volt)	농도 (ppm)	출력 (Volt)	농도 (ppm)	출력 (Volt)	농도 (ppm)	출력 (Volt)
0	1.00	700	1.54	1,900	1.78	10,000	2.39
50	1.14	800	1.57	2,000	1.79	11,000	2.44
100	1.22	900	1.59	2,500	1.86	12,000	2.49
150	1.28	1,000	1.62	3,000	1.91	13,000	2.53
200	1.32	1,100	1.64	3,500	1.96	14,000	2.57
300	1.38	1,300	1.68	4,500	2.05	16,000	2.65
400	1.43	1,500	1.71	6,000	2.16	18,000	2.73
500	1.47	1,700	1.75	8,000	2.29	20,000	2.80
600	1.51	1,800	1.76	9,000	2.34	25,000	2.96

기타 가스

β = Rs,gas / Rs,air

종 류	Sensitivity, β (1,000ppm)	특 성
Smoke	Less than 0.9	디스, Korea
Alcohol	Less than 0.8	Cooking gas
Butyl Acid	Less than 0.8	부페취, 발/땀냄새

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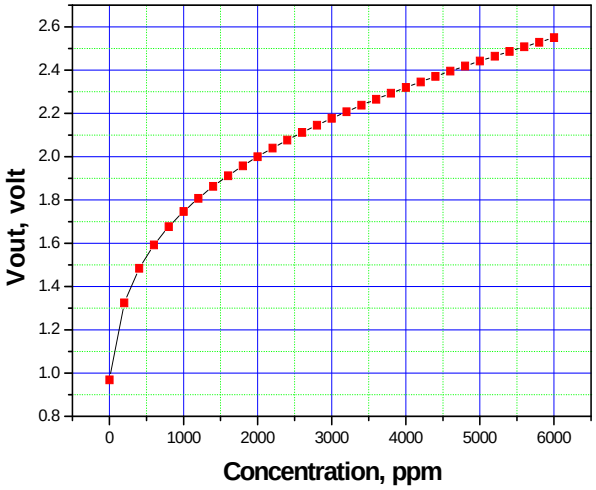
3.2 Module (냉매, Refrigerants)

a. 정격

- Input voltage : 5Volt±1%
- Power consumption : 710㎽ 이하
- Output data : 0.5 ~ 5Volt
- Relay Output : 4.0Volt 이상

b. 가스 농도 별 data sheet오차 : ±5% (온도 보상, 습도 보상)

R404A GSRS61-P110

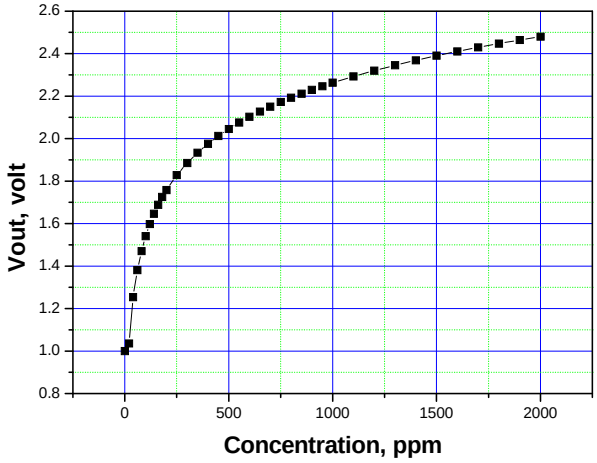


$(Vout) =$

$(ppm) =$

농도 (ppm)	출력 (Volt)	농도 (ppm)	출력 (Volt)	농도 (ppm)	출력 (Volt)	농도 (ppm)	출력 (Volt)
0	0.969	3,000	2.177	6,000	2.550	9,000	2.82
200	1.324	3,200	2.208	6,200	2.570	9,200	2.84
400	1.484	3,400	2.238	6,400	2.590	9,400	2.85
600	1.592	3,600	2.266	6,600	2.609	9,600	2.87
800	1.677	3,800	2.293	6,800	2.629	9,800	2.89
1,000	1.747	4,000	2.320	7,000	2.648	10,000	2.90
1,200	1.808	4,200	2.346	7,200	2.666	10,200	2.92
1,400	1.863	4,400	2.371	7,400	2.684	10,400	2.93
1,600	1.912	4,600	2.395	7,600	2.702	10,600	2.95
1,800	1.958	4,800	2.419	7,800	2.720	10,800	2.96
2,000	**2.000**	5,000	2.442	8,000	2.738	11,000	2.98
2,200	2.040	5,200	2.464	8,200	2.755	11,200	2.99
2,400	2.077	5,400	2.486	8,400	2.772	11,400	3.00
2,600	2.112	5,600	2.508	8,600	2.789	11,600	3.02
2,800	2.145	5,800	2.529	8,800	2.805	11,800	3.03

R22 GSRS61-P110



$$(Vout) = 0.09696 + 0.72197\,Log(ppm,10)$$

$$(ppm) = 10^{(Vout - 0.09696)/0.72197}$$

농도 (ppm)	출력 (Volt)	농도 (ppm)	출력 (Volt)	농도 (ppm)	출력 (Volt)	농도 (ppm)	출력 (Volt)
0	1.00	450	2.01	1400	2.37		
20	1.04	500	2.05	1500	2.39		
40	1.25	550	2.08	1600	2.41		
60	1.38	600	2.10	1700	2.43		
80	1.47	650	2.13	1800	2.45		
100	1.54	700	2.15	1900	2.46		
120	1.60	750	2.17	2000	2.48		
140	1.65	800	2.19				
160	1.69	850	2.21				
180	1.73	900	2.23				
200	1.76	950	2.25				
250	1.83	1000	2.26				
300	1.89	1100	2.29				
350	1.93	1200	2.32				
400	1.98	1300	2.35				

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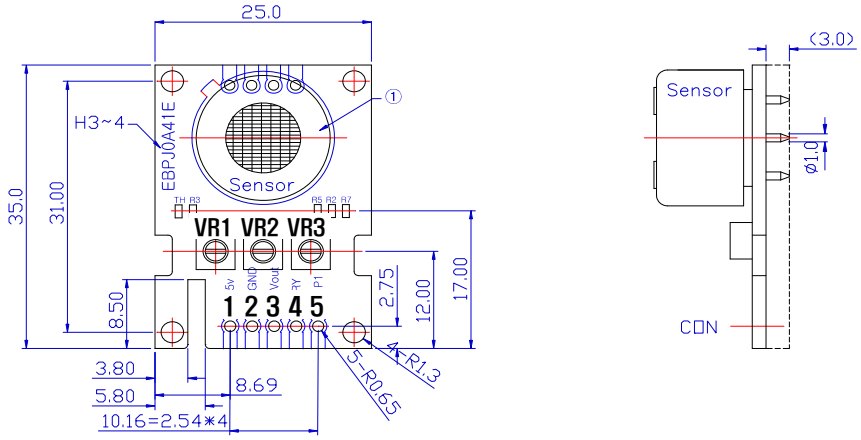
4. Characteristics and Dimensions



a. Output Data

1 ■	2 ■	3 ■	4 ■
+5V	GND	Vout	Relay

- Calibration (refer to specification)

[Front View]

VR1 : RL Set VR2 : Gain Calibration VR3 : Offset Calibration

b. Product code

GSRS61-P■ ■ ■ (1) Division Circuit → 1:standard circuit
1 2 3 2:Precision grade
3:Micro-processor

(2) Sensing range → **1 : 3,000ppm**

(3) Connector → Customer

c. Relay Output

Vout이 3volt(2,000ppm) 출력 시 Hi(4volt) 출력

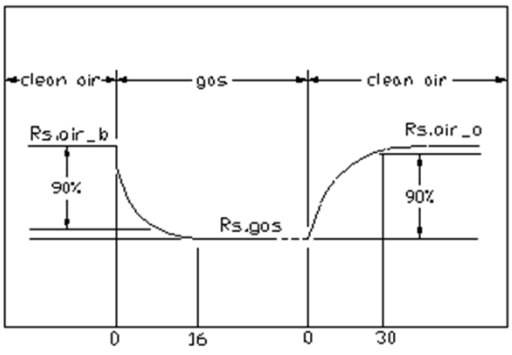
5. Reaction time(T90)

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)

* 본 규격서는 summary 규격서로 제품 향상을 위하여 공지 없이 변경될 수 있음을 알려드립니다.

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