Sensor (Carbon dioxide)–for the detection of CO_2

Features

High selectivity to CO_2
Long-term stability
Low dependency on humidity & temperature

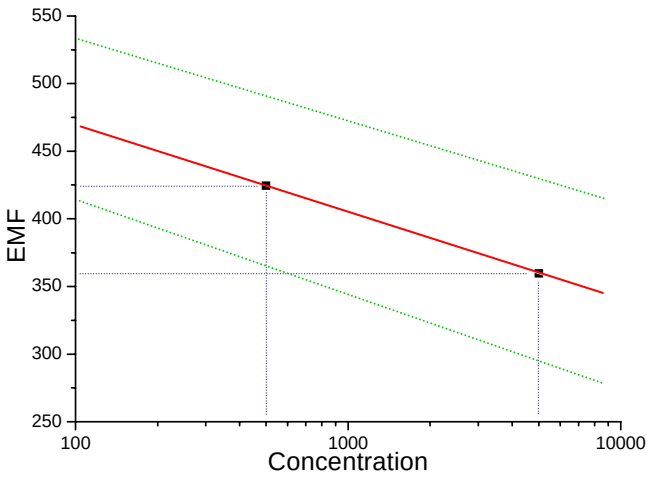
Applications

Air quality control
Agriculture & fermentation process control Ventilator

MS4100

MS4100-OEM
(Standard)

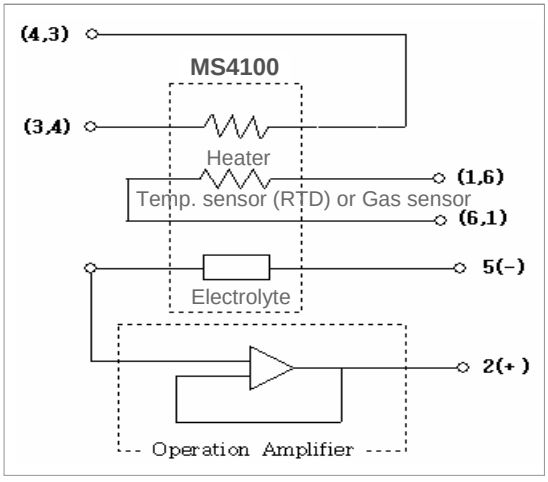
1. Sensitivity characteristic slope



$$EMF = (EMF0) - \beta \cdot Log(Concentration)$$

β : Slop, EMFo : Electromotive force

2. Basic Measuring Circuit



Input impedance < 100GΩ
Bias current < 1pA

RTD : 85 ~ 120Ω
Heater : 14.0±0.2Ω

3. Packages

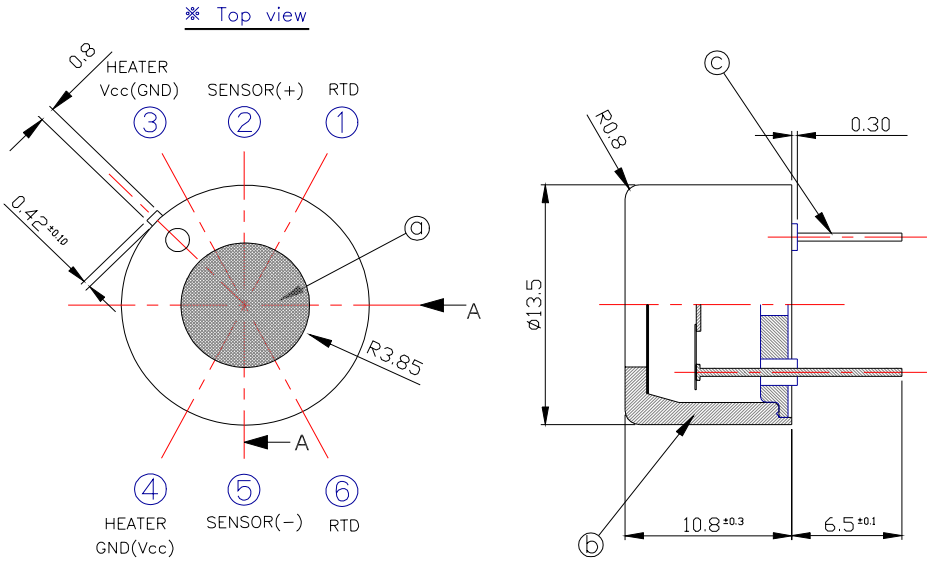
3.1 Characteristics

Model number			MS4100(Package)
Sensing element type			Solid electrolyte
Target gas Measuring range			CO_2(Carbon dioxide) (0~30,000PPM)
Power			DC 5volt ± 0.5%
Electrical characteristics under standard test conditions	R_H	Heater resistance	14.0Ω±0.2Ω
	V_H	Heater Voltage	5.0V±2%
	P_H	Power consumption	Less than 800㎽
	SP	Electromotive force	430~540㎷(0ppm CO_2)
	Ic	Sensitivity slope	60.0 ~72.0
			———
Sensor characteristics	Response time(T_{90})		Reaction :less than 5sec Recovery:less than 10sec
	Beginning stability time(T_{90})		Less then 60minute
	Reliability		±5% at the concentration
	Resolution		Less than 0.02%
	Temp. sensor (Platinum RTD)	Resistance	85~120Ω
		TCR	Less then 3700ppm/·k
		Measuring Circuit	Less than 0.2㎃ Constant current
	Gas sensor (Smoke) β = R_{gas}/R_{air}	Resistance	—
		Target gas	—
		Sensitivity	—
Operation conditions			-10 ~ 50℃, 5 ~ 95%RH
Storage conditions			-20 ~ 80℃, 0 ~ 95%RH
Environmental condition	* Standard test condition (balance gas : clean air, or special gas) ・Temp. : 20℃±2℃, ・ Humidity : RH65%±5%, ・ Pressure : 1atm ・Test chamber : more than 1ℓ/EA, ・ Pre-heating time : more than 24hr * Storage temp. & Relative humidity : -20℃ to 80℃, less then dew point * Oxygen concentration : 21% ± 10%(The sensitivity characteristics are independent by variation in oxygen concentration		

Attached data

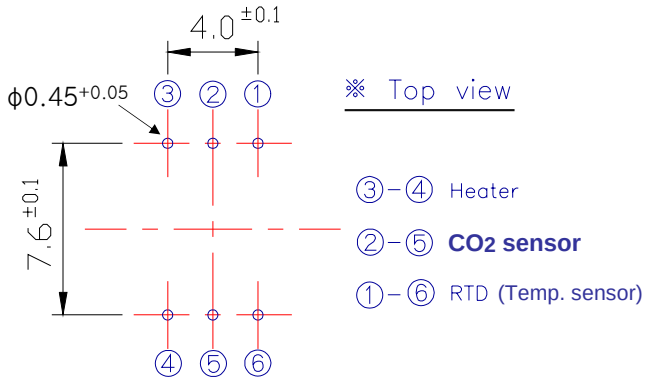
* Measuring S/W, * Temperature sensor data (Rrtd, TCR)
* Sensor characteristics (Slope, EMF0,)

Dimensions

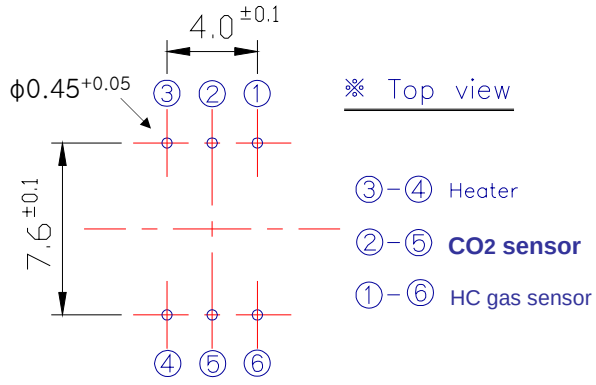


Application circuit

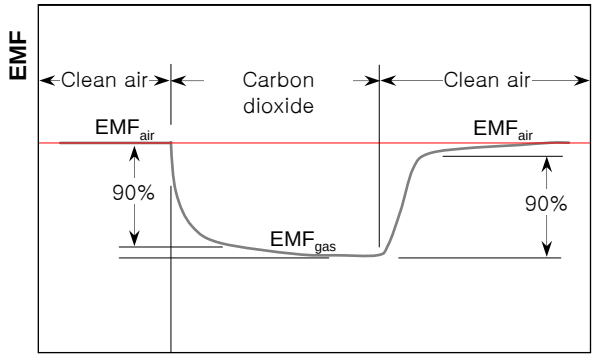
MS4100



MS4200



3.2 Reaction time(T90)



EMF_{air} : Sensor EMF without gases
EMF_{gas}: Sensor EMF after blowing gases

* Reaction Time(T90) : Less then 5sec
  [Between EMF_{air} & EMF_{gas}]
* Recovering Time(T90) : Less then 10sec
  [Between EMF_{gas} & EMF_{air}]
* Beginning stability time(T95) : Less then 60 min.
* Standard test conditions
  Test gas condition : CO_2 in air
  at 20±2℃, 65±5%RH
  Circuit condition : V_H = 5.0±0.05V DC
  Conditioning period before test : 2 days

3.3 Rank Table

Rank No. : **EMF0**

Rank	EMF0(SP)	Rank	EMF0(SP)	Rank	EMF0(SP)
10	430 ~ 460	13	480 ~ 490	16	510 ~ 520
11	460 ~ 470	14	490 ~ 500	17	520 ~ 530
12	470 ~ 480	15	500 ~ 510	18	530 ~ 540

Rank No. : **Slope**

Rank	Slope	Rank	Slope	Rank	Slope
10	58.5 ~ 60.0	13	63.0 ~ 64.5	16	67.5 ~ 69.0
11	60.0 ~ 61.5	14	64.5 ~ 66.0	17	69.0 ~ 70.5
12	61.5 ~ 63.0	15	66.0 ~ 67.5	18	70.5 ~ 72.0

3.4 Product code

MS4100- 10 10

Slope Rank No.

EMF0 Rank No.

	Method for compensation temp. or interference gases	Target gas in air	Power	Remark
MS4100	Temperature sensor (RTD)	CO2	Max. 800㎽	
MS4200	HC Gas sensor (Semi-conductor type)	CO2, HC	Max. 800㎽	

4. Module

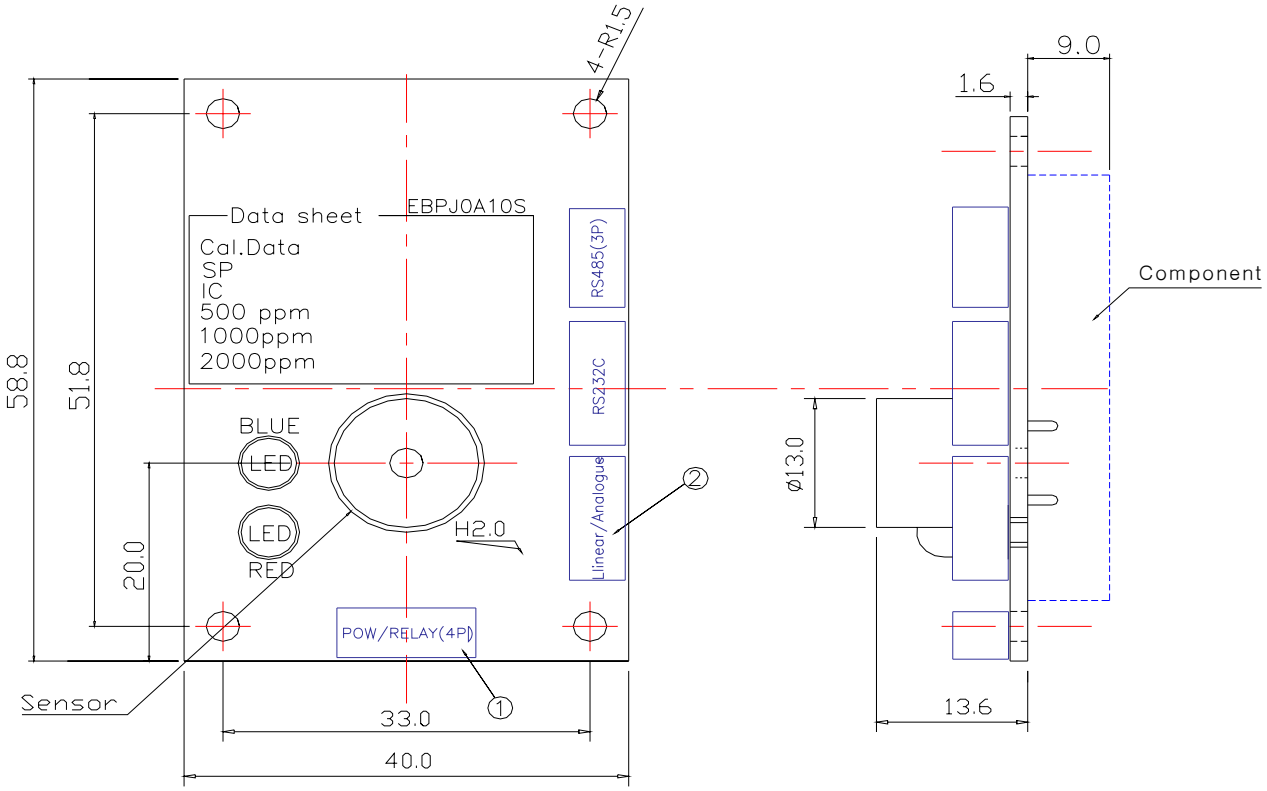
4.1 Characteristics

Model number		MS4100-XXXX (Module)	MS4200-XXXX(Module)
Sensing Method		CO_2 :Solid electrolyte Temp. : Platinum RTD	CO_2 :Solid electrolyte VOCs : Semiconductor
Target gas		CO_2(Carbon dioxide)	CO_2(Carbon dioxide) Smoke (HC), VOCs
Measuring range		(100 ~ 10,000ppm)	CO_2 : 100 ~ 2,000ppm VOCs : 10 ~ 500ppm
Resolution, Accuracy		Less then ±0.02%, ±7%	Less then ±0.02%, ±15%
Dimensions		40^W X 58.8^H	40^W X 58.8^H
Warm up time		Beginning stability time : 60 min LED display : minus count	Beginning stability time : 60min LED blinking
Circuit Voltage	V_C	12.0V ~13.0V	12.0V±0.1V
Power consumption	P_H	Less than 1.6w	Less than 1.5W
Response time		< 5sec to 100% of step change	←
Output options	Relay output	DC 12V, Hi(12V) / Low(0V) User defined upper/lower ppm setting for software (factory set at upper-1,000ppm, lower-700ppm)	←
	Interface	RS485 or RS232 serial port (select)	←
	Output data	Analogue signal (Refer to 4.2)	←
Calibration interval		2 years recommended	
Operating range		Temp. : -10 ~ 50℃, Humidity : 5 ~ 95%RH, Non-condensing	
storage		Temp. : -20 ~80℃, Humidity : 0 ~ 95%RH	

Environmental test condition

* Standard test condition (balance gas : clean air, or special gas)
  • Temp. : 20℃±5℃, • Humidity : RH65%±10%, • Pressure : 1atm
  • Test chamber : more than 1ℓ/EA, • Pre-heating time : more than 6hr
* Operation temp. & Relative humidity : -10℃ to 60℃, less then dew point
* storage temp. : -20℃ to 80℃
* Oxygen concentration : 21% ± 2%(The sensitivity characteristics are influenced by variation in oxygen concentration

4.2 Dimension & External output



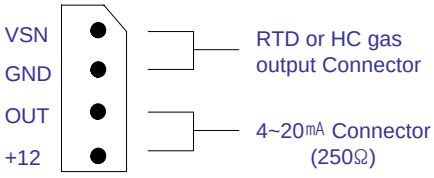
① Power / Relay Output

Molex Connector
5267-04-AX

- Power : 12i → 12V(+)
  G → ground
- Relay : 12V(+)
  RY : Relay out
  Hi : 12V Low : 0V

	0ppm	700ppm (default)	1,000ppm (default)
RED LED	Off →	Off →	On→
	←Off	←Off	←On
Relay	Low →	Low →	Hi →
	← Low	← Low	← Hi

② Data Output



Molex Connector
5267-04-AX

③ RS232C : factory using S/W control

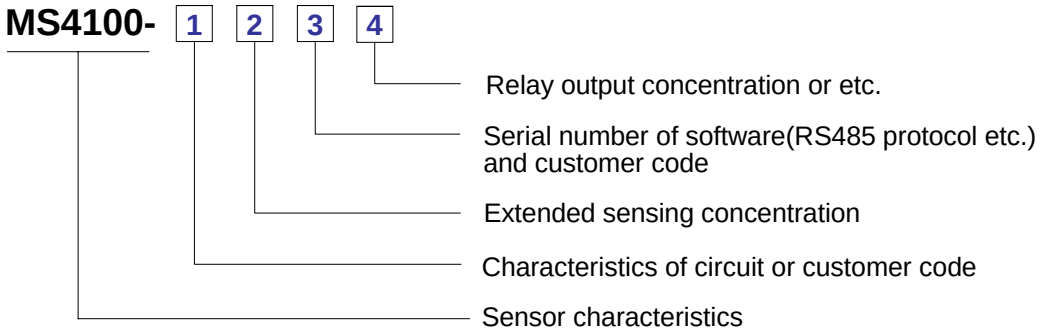
④ RS485 port : Attached data (Molex Connector : 5267-03-AX)

4.3 Sensor Installation (refer to specification)

This will show you how to perform steps for installation

- Select a mounting location with good air circulation within the area to be monitored.
- Select a mounting location that is not near ventilation inlets, doors, windows, or other fresh air entry points.
- For a while installation, At first, it is low concentration display, after a few minutes, display of concentration is appeared high and then after 60minutes sensor will be stabilized.

4.4 Product Code



1 Characteristics of circuit

Code	S	Others
Circuit	Standard	

2 Sensing concentration

Code	1	2	3	4	5	Others
Concentration (ppm)	Standard 0 ~ 2,000	0 ~ 4,000	0 ~ 8,000	0 ~ 10,000	0 ~ 20,000	

3 Serial number of software or RS485 protocol

Code	1	2	3	Others
Release	Standard	RS232	RS485	

4 Relay output

Code	1	Others
Concentration (ppm)	Standard Hi:1,000 Low:700	

5. Others

In case of requirement for detail data, we will provide “specification”