Ogam Technology

PRODUCT INFORMATION
GHFS4x-Pxxx

CDO 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

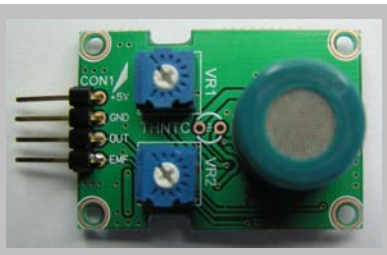
- General -

* Application : It is applied detection of carbon dioxide(CO2) gases for Air Conditioner and Ventilation with installing Electric · Electron Machine

* Operation Range

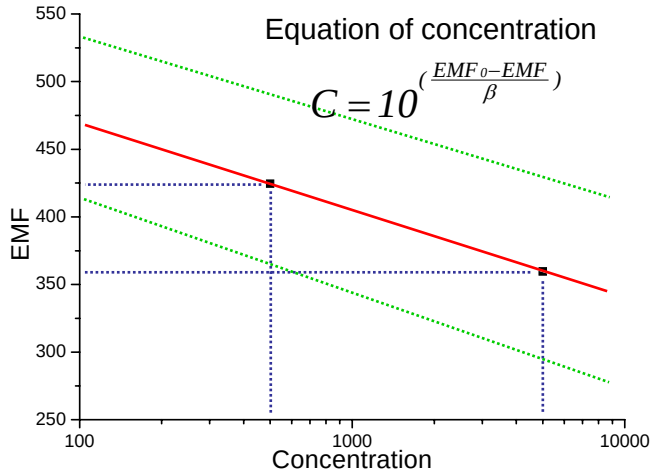
- Working Temperature : -10℃ ~ 60℃
- Working Humidity : below saturation point
- Storage Temperature : -20℃ ~ 70℃

Sensor (GHF4x)



Pack Module (GHFS4x-Pxxx)

1. Sensitivity characteristic slope for Sensor

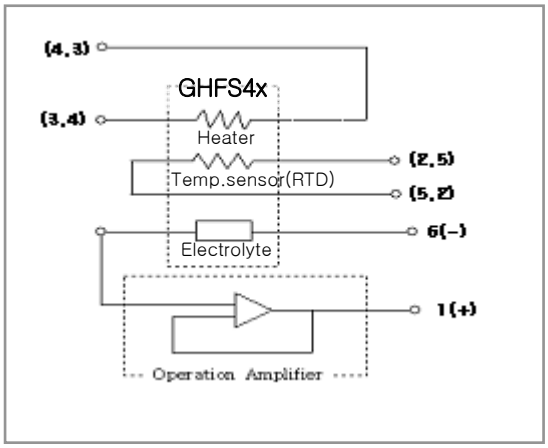


$$EMF = (EMF0) - \beta \cdot Log(Concentration)$$

β : slpoe (55~75), EMF_0 : 기전력(550 ~ 650mV)

EMF : electromotive force

2. Basic Measuring Circuit



Input impedance < 10GΩ
Bias current < 1pA
Heater : 15.5±0.3Ω

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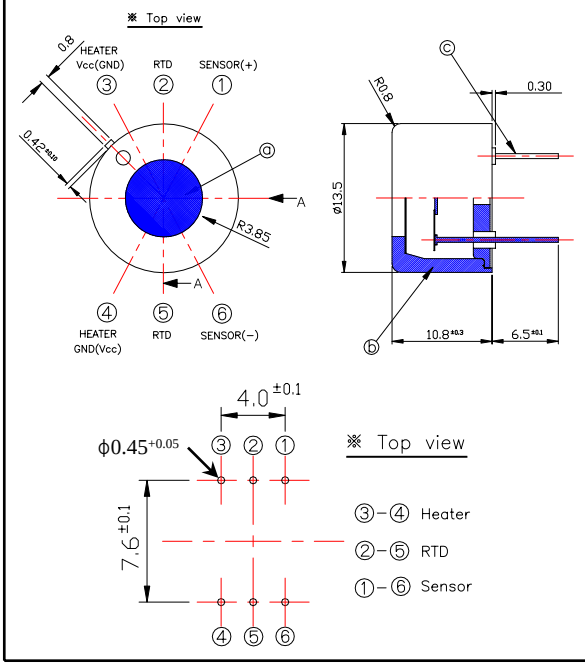
3. Sensor Characteristics

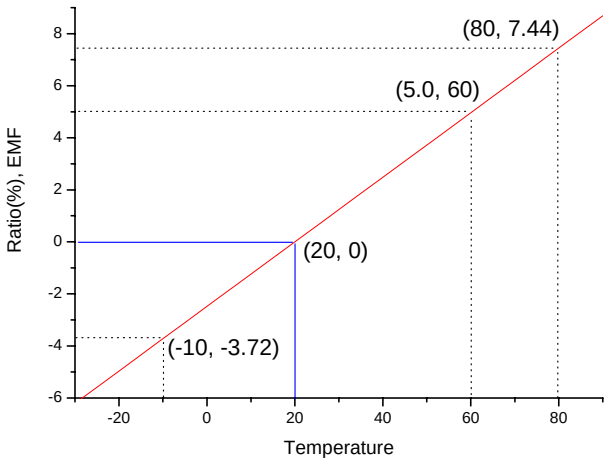
Model number			GHFS41	GHFS42	Remark
Sensing element type			Solid electrolyte		
Target gas			CO_2(Carbon dioxide)		
Measuring range			(200 ~ 30,000ppm)		
Electrical characteristics under standard test Conditions	RH	Heater resistance	15.5Ω±0.3Ω		
	VH	Heater Voltage	5.0V±0.05V		
	PH	Power consumption	Less than 680㎽		
	EMF	Electromotive force	300~350㎷ in 400ppm CO_2		Rank
	Amp	Amplifying	Upper 100GΩ		
Sensor characteristics (After gas saturation)	Response time(T_{90})		Reaction : less than 5sec Recovery : less than 10sec		
	Beginning stability time(T_{95})		Less then 60minute		
	Sensitivity slope (β)		55 ~65		Rank
	Accuracy		±10% at the concentration		
	Resolution		1%		
Temp. sensor (Platinum RTD)	Sensor resistance		35~45Ω (at 25℃)	None	
	Measuring current		Less than 1㎃		
	TCR (Resistance slope)		3840ppm/·k		
Environmental Condition	* Standard test condition (balance gas : clean air, or special gas) ・Temp. : 20℃±2℃, ・ Humidity : RH65%±5%, ・ Pressure : 1atm ・Test chamber : more than 50ℓ, ・ Pre-heating time : more than 24hr				
	* Storage temp. & Relative humidity : -20℃ to 70℃, less then dew point * Oxygen concentration : 21% ± 10%(The sensitivity characteristics are independent by variation in oxygen concentration				



* Dependency of Temperature (Outside temp.)

Ratio (%) = -2.481+ 0.124×(t), t=Temp.

Real EMF = (Out EMF) × {1- (Ratio/100)}



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4. Specifications

4.1 Characteristics

Model number		GHFS41-Pxxx	GHFS42-Pxxx
Sensing Method		Solid electrolyte	←
Target gas		CO_2(Carbon dioxide)	←
Measuring range		(200 ~ 30,000ppm)	←
Resolution, Accuracy		Less then ±1.0%, ±10%	←
Dimensions		25W X 35H	←
Warm up time		Beginning stability time : 60min (95%)	←
Response time		< 10sec to 95% of step change	←
Temp. compensation		Built-in platinum RTD(35 ~45Ω, at 20℃)	None
Circuit Voltage	VC	5.0V ± 0.05V	←
Power consumption	PH	Less than 700mW	←
Output options	Concentration output	Analogue signal(0 ~ 4V)	←
	EMF output	Analogue signal(300 ~ 650㎷)	←
	PCB Connection	Term.(4-connection), 2.54 pitch(◇0.5X0.5)	←
Accuracy		±7% at the concentration (20℃)	
Resolution		1%	
Calibration interval		2 years recommended, No calibration on installation	
Operating range		Temp.:-10 ~ 60℃, Humidity:5 ~ 95%RH, Non-condensing	
Storage		Temp. : -20 ~70℃, Humidity : below saturation point	

Range of Gas Concentration

Using Concentration	Factory Cal. range
200 ~ 2,000	100 ~ 3,000
200 ~ 4,000	100 ~ 6,000
200 ~ 8,000	100 ~ 12,000
200 ~ 16,000	100 ~ 24,000
200 ~ 30,000	100 ~ 48,000

(ppm)

Environmental test condition

* Standard test condition (balance gas : clean air)
  - Temp. : 20℃±5℃, · Humidity : RH65%±10%,
  - Pressure : 1atm · Test chamber : more than 50ℓ
  - Pre-heating time : more than 24hr
* Operation temp. & Relative humidity
  -10℃ to 60℃, less then dew point
* storage temp. : -20℃ to 80℃
* Oxygen concentration : 21% ± 5%
  The sensitivity characteristics are influenced by variation in oxygen concentration

4.2 Sensor Installation (refer to specification)

This will show you how to perform steps for installation

- Select a mounting location with clean air environment, when you test.
- Keep away from ventilation inlets, doors and windows.
- When you connect power, the out signal is displayed high concentration and then that is gradually getting stabilized within about 60minutes.

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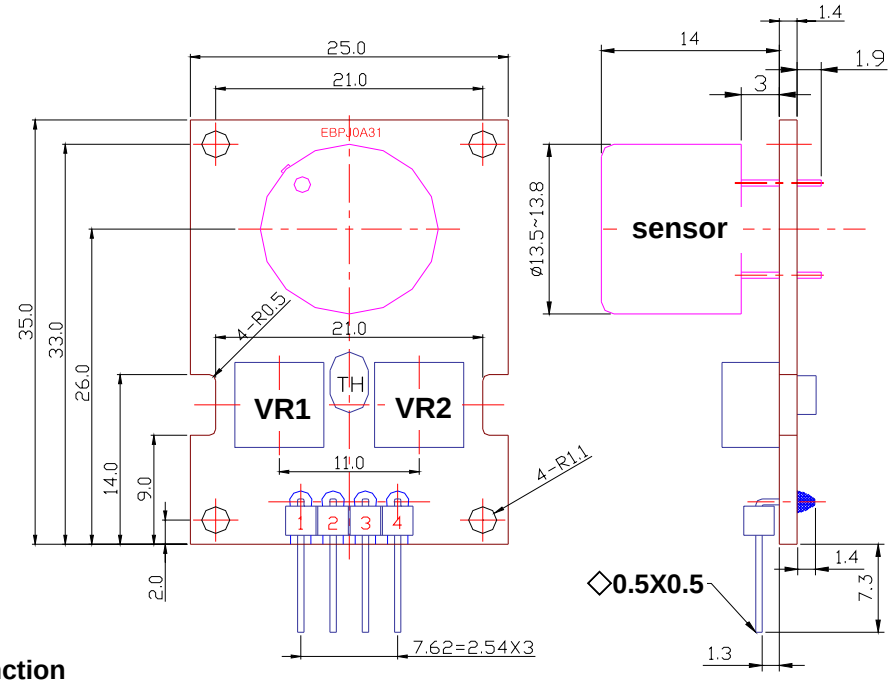
5. External output

5.1 Dimensions (straight)



5.2 Function

① Output Terminal

1	2	3	4
■	■	■	■
+5V	G	Out	EMF

② Calibration (refer to specification)

[Front Side]

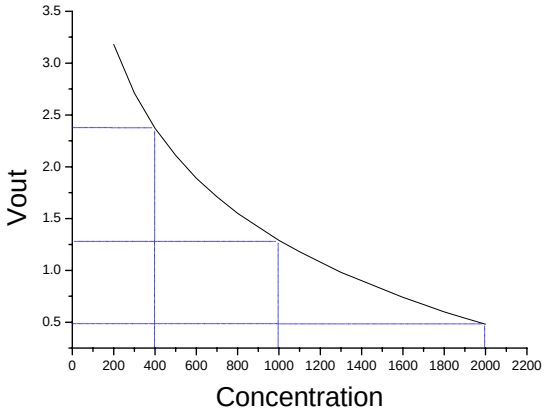
VR1 : Offset Calibration

VR2 : Gain Calibration

[Rear Side]

R5 : Temp. compensation cal.
(Only GHFS41)

5.3 Standard Slope



5.4 Output Data (standard data at 20℃)

① We will support datasheet according to customers.

② The table is part of datasheet in case of 2,000ppm.

Con. (ppm)	Vout (V)	EMF (mV)	Con. (ppm)	Vout (V)	EMF (mV)
100	4.00	(405.0)	1,100	1.18	(337.3)
200	3.18	(385.4)	1,200	1.08	(334.9)
300	2.71	(374.0)	1,300	0.98	(332.6)
400	2.37	(365.9)	1,400	0.90	(330.5)
500	2.11	(359.6)	1,500	0.82	(328.6)
600	1.89	(354.4)	1,600	0.74	(326.7)
700	1.71	(350.1)	1,700	0.67	(325.0)
800	1.55	(346.3)	1,800	0.60	(323.4)
900	1.42	(343.0)	1,900	0.54	(321.9)
1,000	1.29	(340.0)	2,000	0.48	(320.4)

5.5 Specification of customer

① Using concentration Range

② Amplifying Rate

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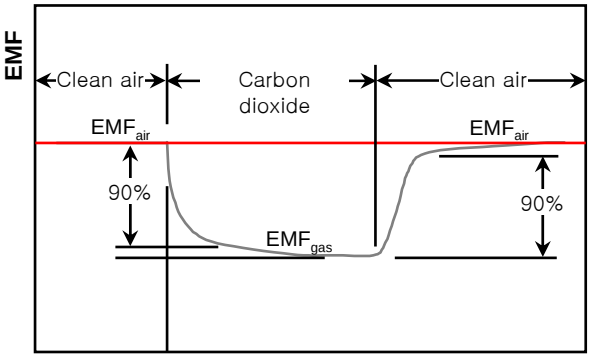
5.6 Reaction time(T90)



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

6. Product Code

GHFS4x - P [1] [2] [3]

- [3] Shape of terminal
- [2] Concentration range
- [1] Characteristics of circuit or customer code
- GHFS4x Sensor characteristics

[1] Characteristics of circuit

Code	1	2	Others
Temp. Compensation	Built-in RTD	None of RTD (Instead of Thermistor)	

[2] Sensing concentration

Code	1	2	3	4	5	Others
Concentration (ppm)	Standard 200~2,000	200~4,000	200~8,000	200~16,000	200~30,000	

[3] Shape of terminal

Code	1	2	Others
Connection	Straight	Angle	

7. Others

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

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