1. General

1-1. Application : It is applied detection of reducing gases(carbon monoxide) for Air Cleaner and Ventilation with installing Electric · Electron Machine.

1-2. Operation Range

-Working Temperature : -10℃ ~ 60℃

-Working Humidity : below saturation point

-Storage Temperature : -20℃ ~ 80℃

2. Definition

2-1. Sensitivity : the value of gas sensor resistance divided by the value of special air resistance

2-2. Output Voltage($V_{out,air}$, $V_{out,gas}$)

-$V_{out,air}$: the value of gas sensor output voltage in special air or clean air

-$V_{out,gas}$: the value of gas sensor output voltage after injecting a fixed gas in special air

2-3. Output Voltage($R_{s,air}$, $R_{s,gas}$)

-$R_{s,air}$: the value of sensor output resistance in special air or clean air

-$R_{s,gas}$: the value of sensor output resistance in gas

2-4. Electric Current Time

-Needed time for normal working or stability of sensor with the object of inspection or use

3. Appearance, Structure & Dimensions

3-1. Appearance : Each parts protected and non-technical crack, non-defect

3-2. Structure, Dimension : Depended on individual products

3-3. Main Parts Package

PART	M A T E R I A L	SPEC.
Sensing Element	Sensing Element : oxide semiconductor Thick film	
Lead Wire	Platinum Wire	
Hermetic Terminal	Stem ; SPCC Pin: KOVAR Glass: Hard grass	
Cap	SPCC	

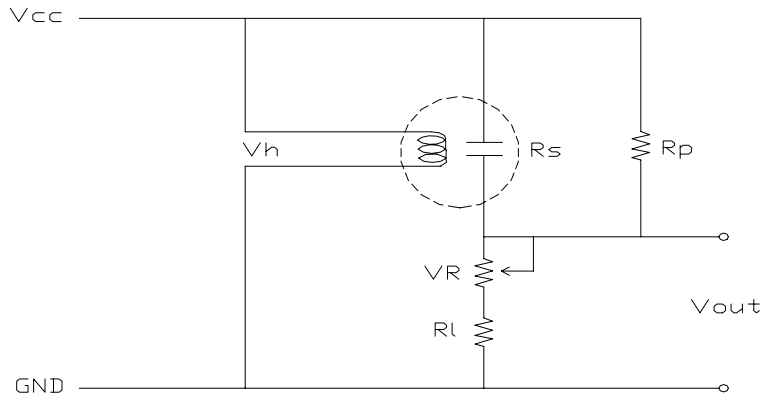
4. Standard test conditions

4-1. Basic measuring circuit

-Power(Vcc) : 5.0 V ± 5 %

-Sensor Resistance

$$Rs = \frac{(VR_{2-3t} + Rl)(Vcc - Vout)Rp}{Vout \cdot Rp - (VR_{2-3t} + Rl)(Vcc - Vout)}$$



Vcc : Circuit Voltage(5V) Vh : Heater Voltage(5V)

R_L : Load Resistance VR : Semi-Fixed Volume

Rs : Sensor Resistance Rp : Resistance ※ V_{out} : Balanced 1V

4-2. Test Conditions

INDEX	CONDITIONS	SPEC.
Test Temp. & Humidity Range	20±5℃ RH 65±10 %	
Test Gas (Standard Gas)	CO 10ppm	Liquid
Electric Time before Test	Over 1hr	Clean Air or Special Air
Volume	1ℓ / EA	300ℓ Closed Chamber

5. Specification

5-1. General test

INDEX		CONDITION & SPEC.		TEST PERIOD
		Power	Power consumption	
Rating	Package (sensing element)	Heater Voltage : 5V ± 5% (DC/AC) Circuit Voltage : ≤ 12V(DC)	below 450mW (20℃, 60%RH)	Regular Test
	Module	Circuit Voltage 5V± 5%(DC)	below 460㎽ (20℃, 60%RH)	
Gas Property	Package (sensing element)	① Rs,air = ~ kΩ (20℃, 65%RH)		Each Lot
		② Sensitivity($\beta=R_{s,gas}/R_{s,air}$)		
		Ethyl alcohol vapor(50ppm)	$\beta \leq 0.3$	Regular
		CO (10ppm)	**$0.5 \leq \beta \leq 0.7$**	Test
		Smoke (2,000ppm-ESSE, KOREA)	$\beta \leq 0.6$	Each Lot
		(Samples is gathered by using injector(10㎖) with 10mm/sec speed)		Each Lot
	Module	① Wire Connection Vcc : 1(or Red), GND : 3(or Black), Data : 2(or White) ② Output Power : $1_{Min.}$ ~ $5_{Max.}$ Output(Vout,ref) -> 1.0±0.2V ($V_{out,air}$) Sensitivity($\Delta V=V_{out,air}-V_{out,gas}$) -> 2.0v ~ 2.7V (CO, 200ppm)		Each Lot
Stability Time		・$V_{out,air}$: after switch on, reach 90% of the stable level within 3min ・$V_{out,gas}$: after injecting gas, reach 90% of the stable level within 1min		Regular Test
Appearance		・Non-deformation of Housing, Frame Arrester ・Non-short & no-Soldering Defect ・Structure & Dimensions are depended on individual products		Each Lot

5-2. Sensor Resistance/ Output Voltage

INDEX	SPEC.	CONDITIONS
PACKAGE	1.7kΩ ~ 7.1kΩ	・Atmospheric Pressure, Clean Air 20℃, 65% RH

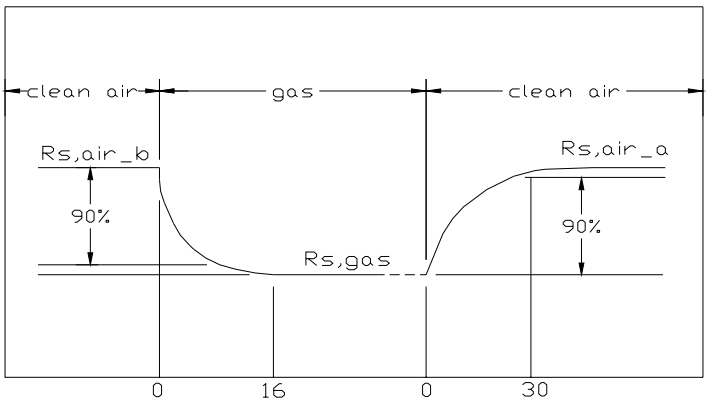
5-3. Response Property

-After injecting or eliminating CO 10ppm to the Chamber, reach Time to 90% of the stable level

5-3-1. Response Time

-Reaction Time : within 10 sec. [Between Rs,air_b & Rs,gas]

-Recovery Time : within 20sec. [Between Rs,gas & Rs,air_a]



Rs,air_b : before injecting gas, resistance in Clean Air Condition

Rs,gas : after injecting, resistance in the Stability Condition

Rs,air_a : after eliminating gas, resistance in Clean Air Condition

5-3-2. Test Conditions

① PRE-HEATING

-Test after impressing Standard Voltage for over 10min in Clean Air

② Concentration control of CO gas

6. Endurance Test

INDEX	TEST METHOD & SPEC.	TEST PERIOD
Interior Voltage	After impressing 100V between Accumulator & different polarity or non-accumulator for 1min, should be non-breakdown and non-short circuit	Regular Test
Insulating Resistance	After testing between Electric current and Non-electric current by insulating ohmmeter(DC 500V), should be over 100	〃
Dampproof	① After aging at RH 95±5%, 20±5℃for 24hr, should be non-rust & non- twist on the Cover &Frame ② Ratio of Vout,air Voltage of after aging for 24hr at RH 30±5% & V'out,air Voltage of after aging for 24hr at RH 95±5% in Special Air at 20±5℃& 5V impressed, should be within 60% $\frac{\lvert V'' out,air - V' out,air \rvert}{V' out,air} \times 100$	〃
Heat-Resistant	① After aging at RH 60±5%, 90±5℃for 24hr, should be non-rust &non-twist on the Cover & Frame ② Ratio of Vout,air Voltage of after aging for 24hr at RH 60±5% & V'out,air Voltage of after aging for 24hr at RH95.5% in Special Air at 20±5℃&5V impressed, should be within 80% $\frac{\lvert V'' out,air - V' out,air \rvert}{V' out,air} \times 100$	〃
Corrosion Resistance	After aging 168hr at 70±5℃, RH 90 ~ 95%, shouldn't be generated rust on NET, PIN	〃
Mechanical Property — Vibration Resistance	Frequency : 10 ~ 50Hz (10Hz gap) Acceleration : 1G Time : in the direction of X, Y & Z, for 2hr	Should be satisfied with SPEC. as the value of $V_{out,air}$ and Output Property without non-transformation of appearance Structure	〃
Mechanical Property — Impact Test	At height of 1m from the wood pad(3㎝		

7. Caution

7-1. No-injection with High Concentration Gas

① Shouldn't spray High Concentration Gas(60%) on the Element Surface for over 2 sce directly as general test

② Shouldn't be injected Gas on the Sensing Surface by Diffusion at over 10㎝ height with spraying at the side way as continuous test

③ Shouldn't check if Base Resistance is decreased by generating a blazing fire of Catalyst with furious combustion reaction on the Sensing surface

7-2. No-impressed Voltage over using Voltage

- Shouldn't impress over 5.5V on the Heater Voltage

-Generated a blazing fire of Catalyst by increasing Temperature of Sensing Surface

8. Shipment Sign

8-1. Label Sign

CUSTOMER		
PRODUCT		
DESCRIPTION		Inspector
Lot NO.		
Quality PCS	Rank: Rs :	Date
Ogam Technology Co., Ltd.		

※Rank : Sensor Resistance in Clean Air or A Fixed Condition

Figure. 7 Label

8-2. Rank Table

Rank No : 40