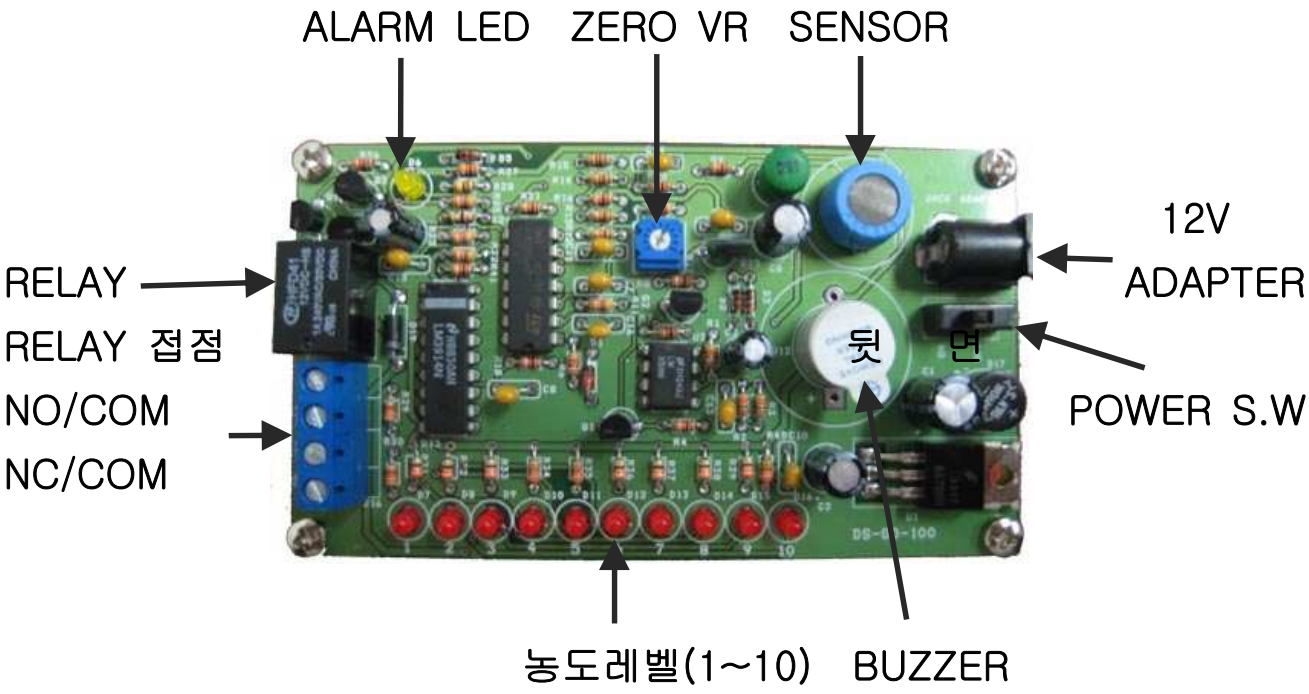
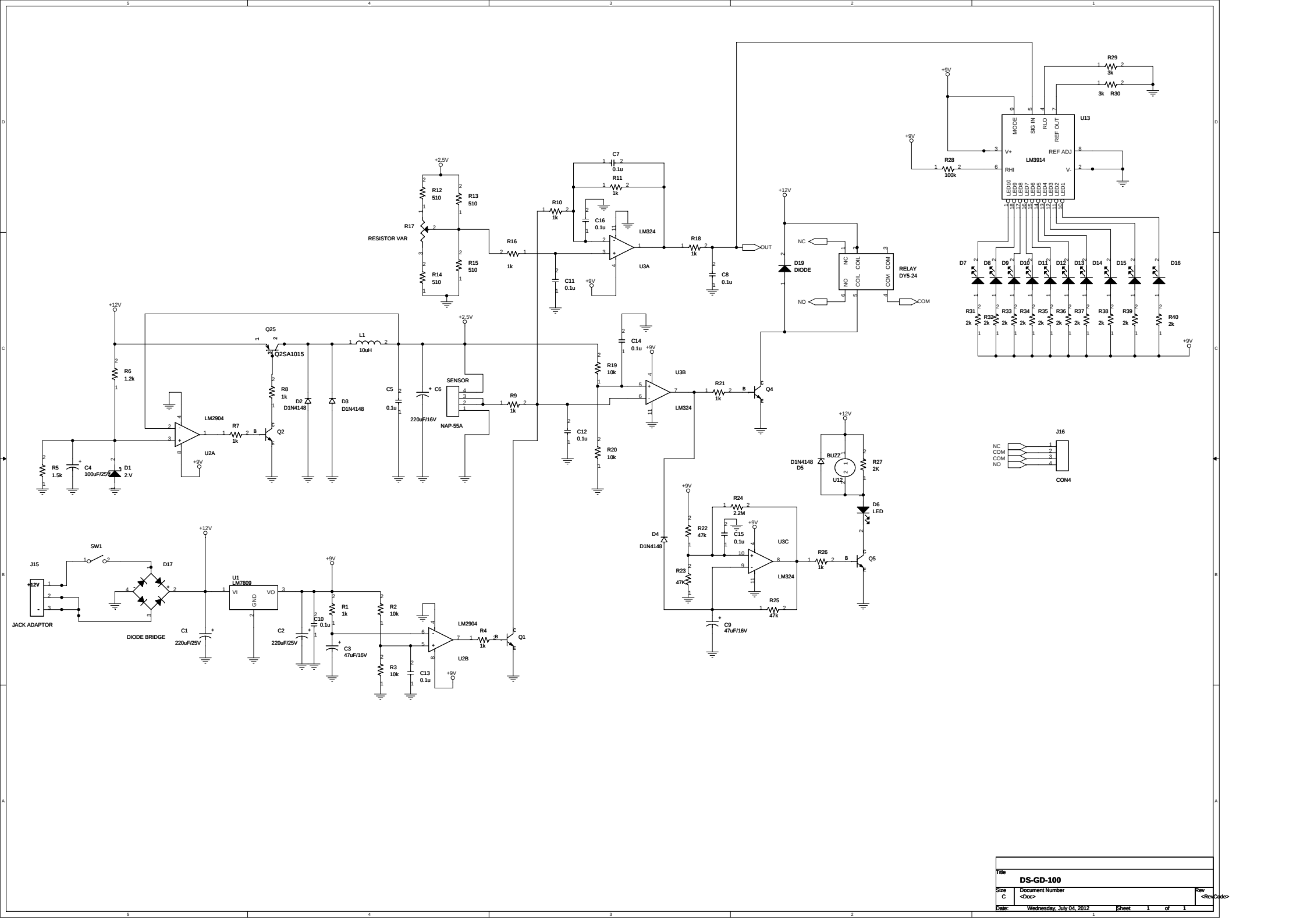
<제품 사양 및 구조설명>

1. 제품명 : 가스센서 모듈(GAS DETECTOR MODULE)
2. 모델명 : DS-GD-100
3. 대상가스 : LPG,LNG,메탄,프로판,H2(가연성)
4. 센서사양 : 접촉연소식(일본 네모토사) NAP-55A
   * 정격전압 : 2.5V(120mA)
5. 회로전압 : DC9V~12V
6. 소비전력 : 100~150mA
7. 출 력 : DC 0~5V
8. 크 기 : 110mm*60mm
9. 구조설명





Title	DS-GD-100	
Size C	Document Number <Doc>	Rev <RevCode>
Date: Wednesday, July 04, 2012	Sheet 1 of 1	

(Revised November 20, 1995)

USER'S MANUAL
HOT-WIRE TYPE GAS SENSOR NAP-55A & 50A
(For All Combustible Gases, Low Power Consumption)

CONTENTS

1. General

Nemoto's NAP-55A & 50A are miniature-sized hot-wire type gas sensors for every combustible gases. These new sensors are smaller than our NAP-2A sensor and consume much less power. (Approx. half a wattage of NAP-2A). These sensors respond 30% quicker than NAP-2A.

NAP-55A is sensitive to all combustible gases, while NAP-50A has lower sensitivity only to alcohol. NAP-55A would be suitable for general applications, and NAP-50A would be the best for residential gas detectors which should not be affected by noise gases other than fuel gases.

1) Features

* Excellent stability.
* Remarkable reproducibility and accuracy.
* Linear output signal for natural (city) gas concentration.
* Superior response characteristics.
* Miniature size for flexibility in the design of detectors.

2) Applications

* Gas densitometers
* City gas leakage detectors

2. Specifications

1) Voltage supplied to sensor bridge ; D.C. ; 2.50 +/- 0.25 V
A.C. ; 2.50 +/- 0.25 V
(r.m.s. 50 - 60 Hz)

2) Current (when 2.50 V is supplied) ; D.C. ; 160 to 180 mA
A.C. ; 160 to 180 mA
(r.m.s. 50 - 60 Hz)

3) Ambient temperature &
humidity during operation ; Temperature ; -10^{o}C to +50^{o}C
Humidity ; Less than 95% RH

4) Ambient temperature &
humidity during storage ; Temperature ; -20^{o}C to +60oC
Humidity ; Less than 95% RH

3. Gas sensitivity

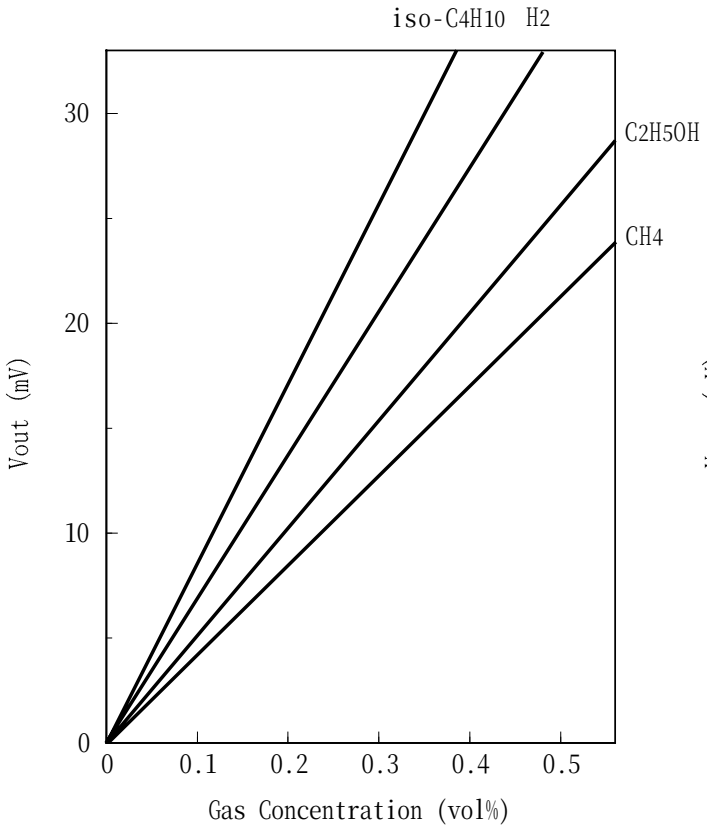


Fig. 1 Gas sensitivity of NAP-55A

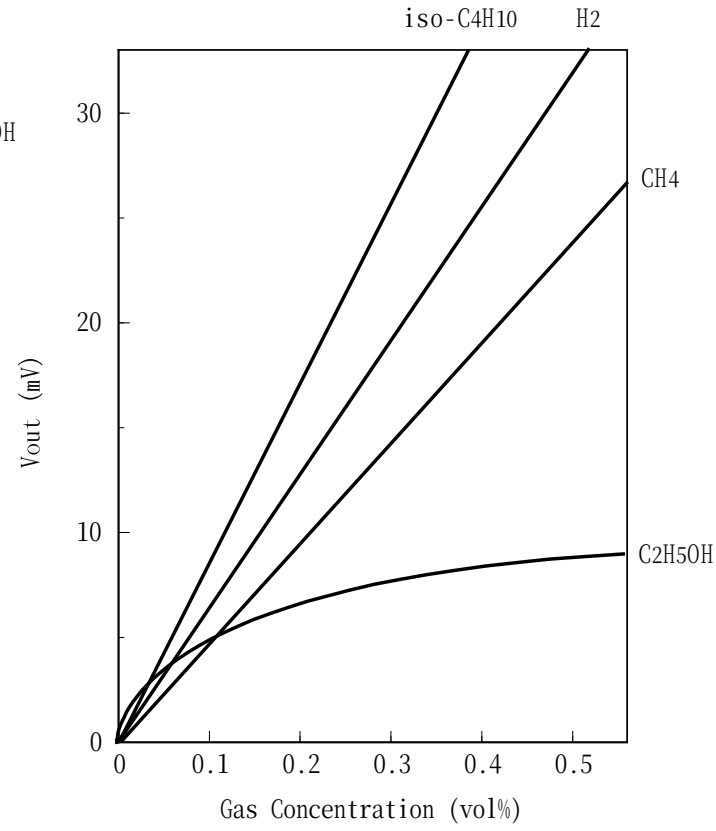


Fig. 2 Gas sensitivity of NAP-50A

4. Response characteristics

(Measurement example ; Comparison to NAP-2A)

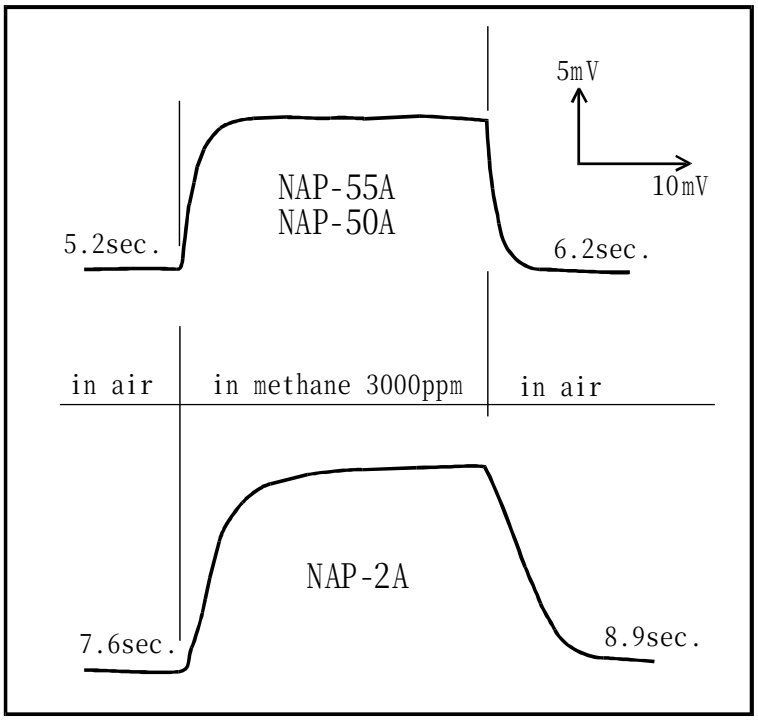


Fig. 3

The times are ones to be required for 90% response

5. Voltage dependency characteristics

Voltage dependency on NAP-55A & 50A gas sensitivity

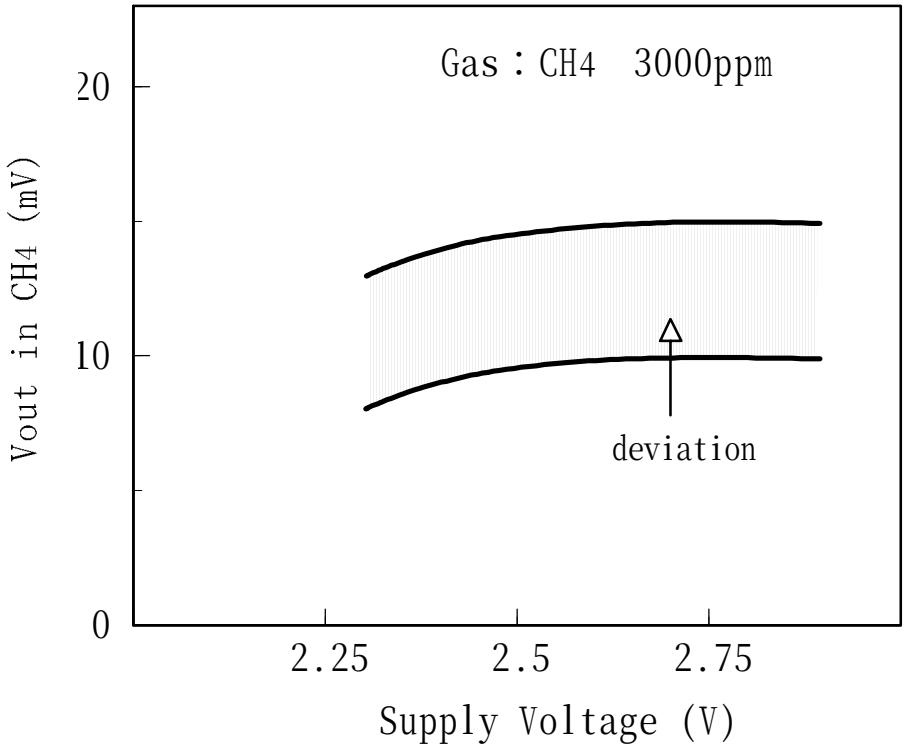


Fig. 4

Voltage dependency on output in air

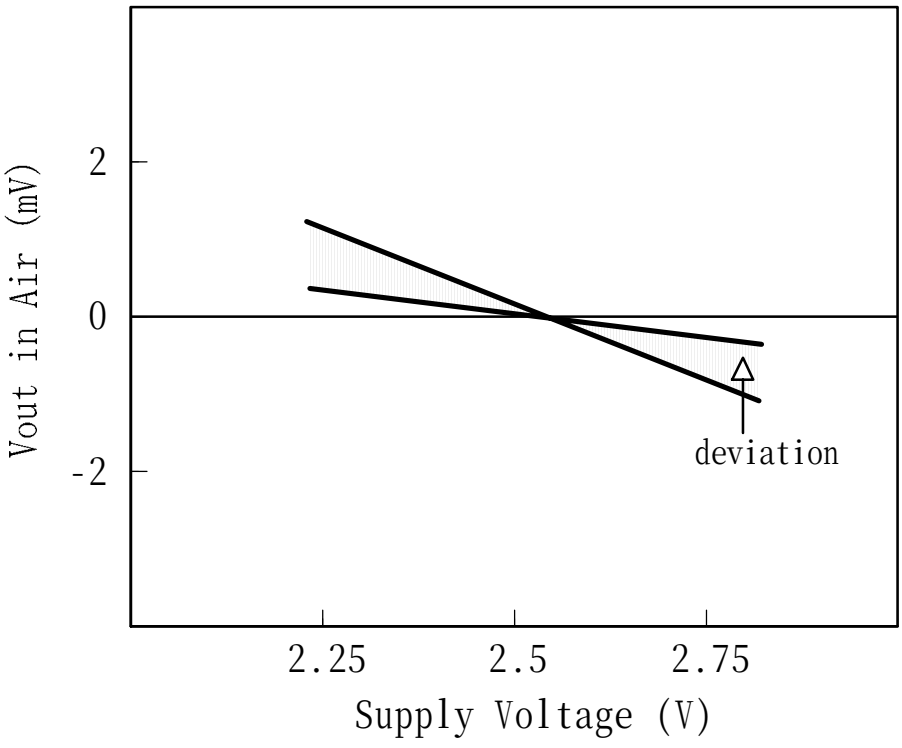


Fig. 5

Voltage dependency on theoretical alarm concentration

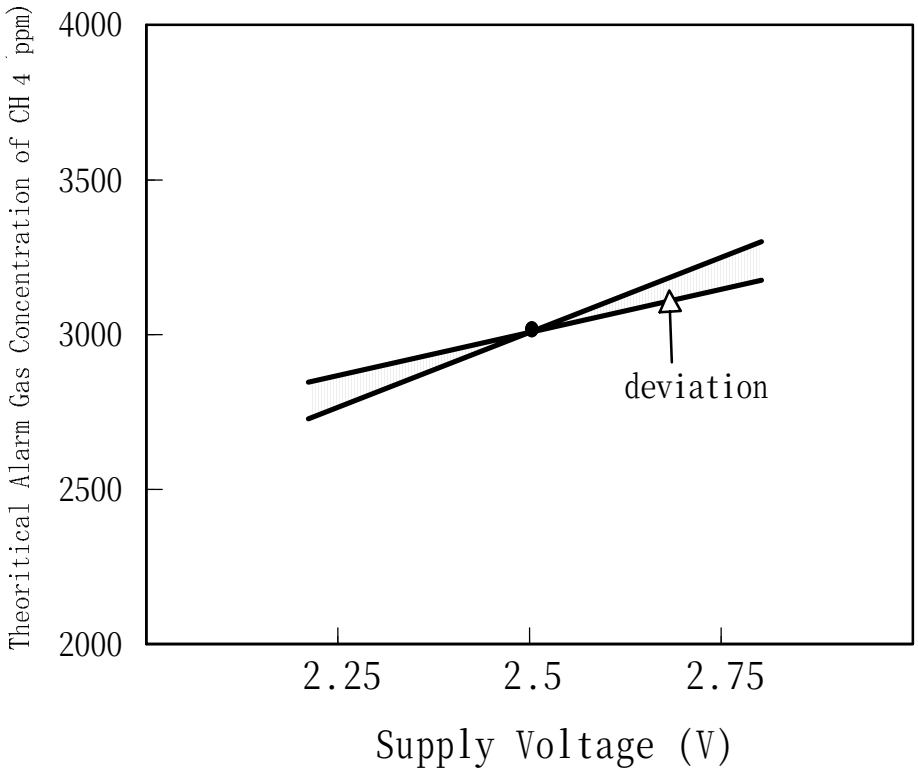


Fig. 6

6. Temperature characteristics

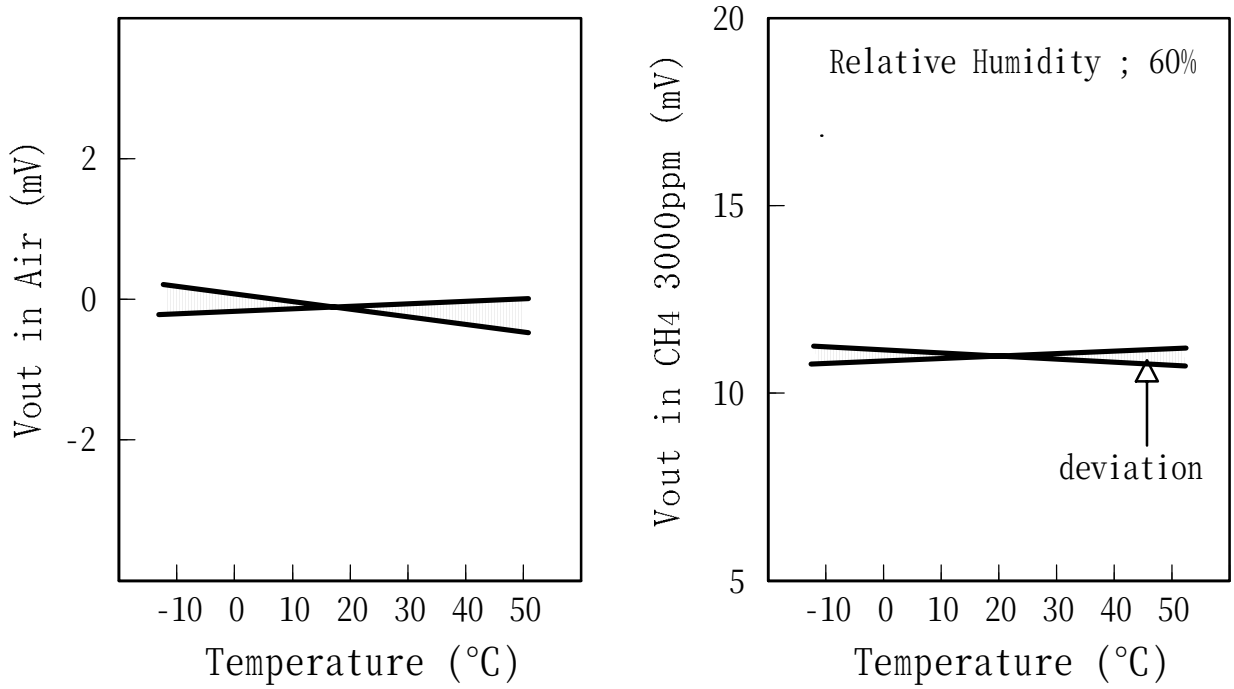


Fig. 7

7. Humidity characteristics

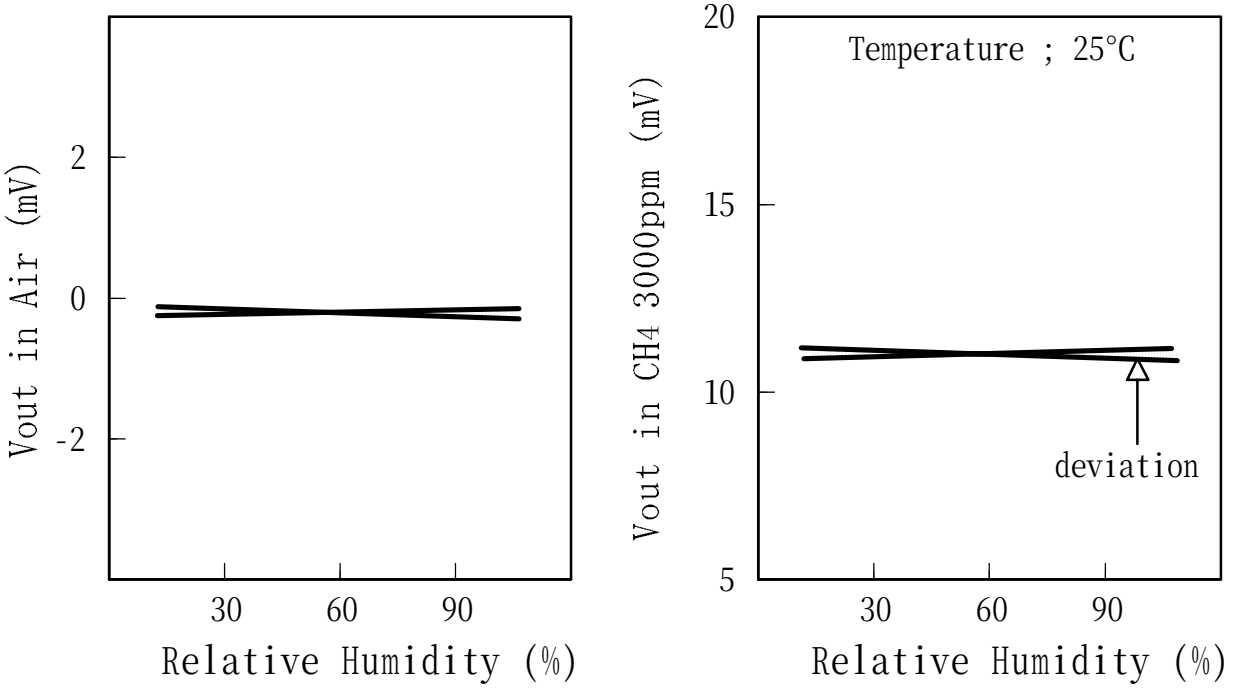


Fig. 8

8. Evaluation of sensors

(1) Testing equipment

The following is and outline of a test system.

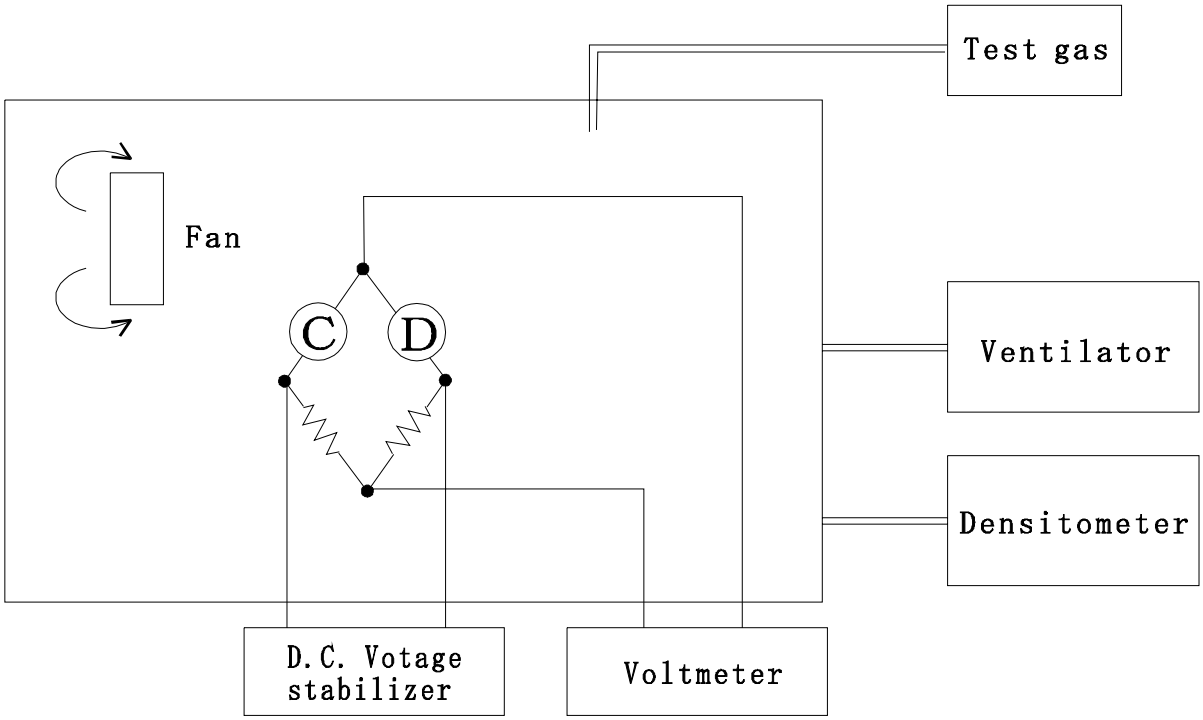


Fig. 9

Remarks:

1) Test chamber ;

* Metal or glass which does not generate or absorb gases is desirable as test chamber material.

* The volume of the chamber should be larger than 1 liter / sensor.

2) Gas densitometer ;

* An infrared gas densitometer is recommended for measuring gas concentration.

3) Air agitation ;

* The air inside the chamber should be agitated, but not so as to directly blow on the sensor. Air flow should be less than 0.5m/sec.

4) Power supply ;

* Sensors can be operated using either D.C. or A.C., but for optimal measurement accuracy, use of a D.C. voltage stabilizer is recommended.

5) Voltmeter ;

* A voltmeter with greater than 100K ohm impedance is sufficient for measuring sensor bridge out put voltage.

6) Ventilation ;

* Before proceeding with a subsequent test, the air inside the test chamber should be ventilated using a ventilator which has a capacity of more than 10 times the volume of the chamber per minute.

7) Placement of sensors in a test chamber ;

* Sensors should be placed in a chamber in a same attitude. (Normally horizontal).
Changing the attitude creates different thermal convection, and may cause inaccurate measurement results.

(2) Adjustment of gas concentration

Gas concentration in a test chamber is usually adjusted by a volumetric method injecting iso-butane gas using a syringe, or by monitoring with an infrared gas densitometer.

Gas concentration adjustment by a volume method can be calculated according to the following formula.

$$V(\mathbf{0}) = Vi \times C \times 10^{-6} \frac{273 + Tr}{273 + Tc}$$

V ; Volume of gas to be injected
Vi ; Inside volume of a chamber (ml)
C ; Gas concentration to be adjusted
Tr ; Room temperature (^{o}C)
Tc ; Temperature inside a chamber (^{o}C)

(3) Measurement

1) Preparatory aging;

* Before measurement, sensors should be supplied with the specified voltage at least for more than 1 hour.

2) Measurement;

* After confirming that the output voltage level has stabilized, the output value in air (Va) is measured.

* A test gas is injected into the test chamber and wait for an even dispersion of the gas inside the chamber. (Usually 1 min. or more)

* Output voltage in gas (Vg) is measured.

* Thoroughly ventilate the test chamber with a fresh air from outside.

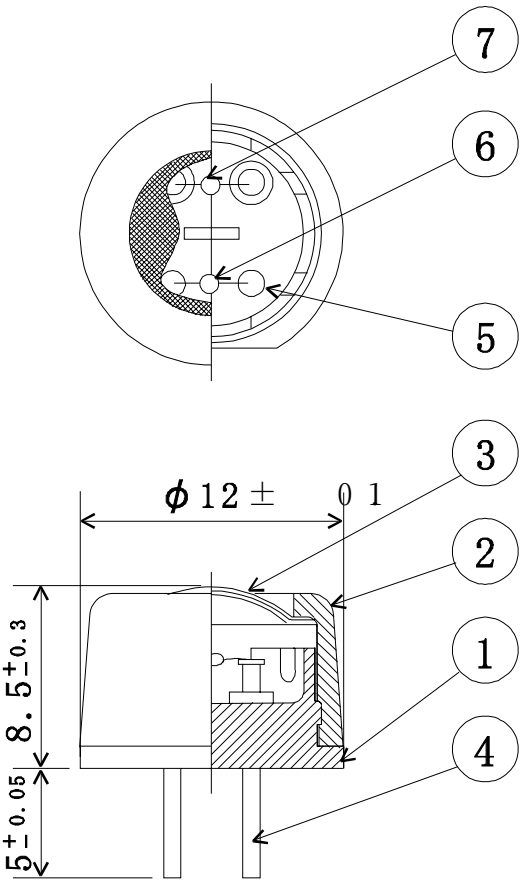
(4) Other remarks

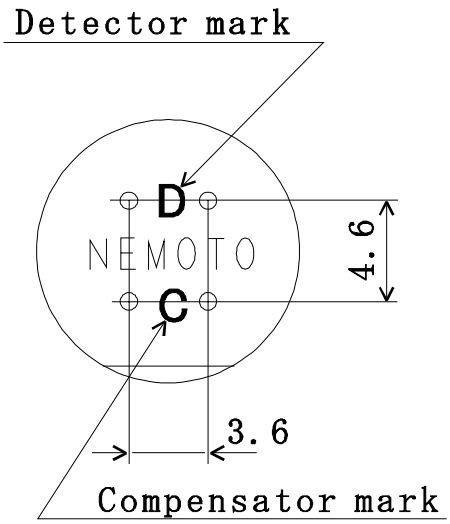
* Sensors should not be dropped or subjected to strong shocks.

* Refrain from use in an atmosphere that may contain poisonous or corrosive gases.

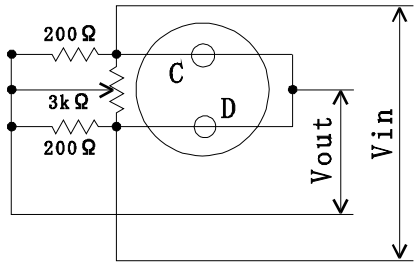
* Do not soak sensors in water.

9. Drawings





Bottom view



Measuring circuit

No.	PARTS	MATERIALS	REMARKS
7	Detector	———	NEMOTO & CO.,LTD.
6	Compensator	———	NEMOTO & CO.,LTD.
5	Coil	Pt	φ30μm
4	Pin	Pure Ni	φ0.8
3	Strainer	SUS316#100mesh	Double layered
2	Cap	66Nylon	20% Glass
1	Base mount	66Nylon	20% Glass

	APPROVED	CHECKED	DESIGNED	DRAWN	MATERIAL	Q.TY	SCALE
THIRD ANGLE PROJECTION	TITLE: NAP-55A & 50A				DATE: DEC, 25, 1993	DRG.NO.: G-01-04-143	
					NEOTO & CO.,LTD		

Fig. 10