

# SB-42A-00

## FIS GAS SENSOR SB-42A-00

for REFRIGERANT DETECTION(R134a,R410a,R407c)

The SB-42A-00 is a tin dioxide semiconductor gas sensor which has a high sensitivity to HFCs (e.g. Freon: R134a) with improved cross sensitivity to other gases. This model is suitable for R134a, R410a, R407c and other new Freon family which contains R134a. A significant feature of low power consumption design 120 mW) is advantageous for portable devices.

**Structure**

Gas sensitive semiconductor material is a mini bead type and a heater coil and electrode wire are embedded in the element. The sensing element is installed in the metal housing which uses double stainless steel mesh (100 mesh) in the path of gas flow. The mesh is an anti-explosion feature (Fig1b).

**Operating conditions**

Fig 2 shows the standard operating circuit for this model. The change of the sensor resistance ( $R_S$ ) is obtained as the change of the output voltage across the fixed or variable resistor ( $R_L$ ). In order to obtain the best performance and specified characteristics, the values of the heater voltage ( $V_H$ ) circuit voltage ( $V_C$ ) and load resistance ( $R_L$ ) must be within the range of values given in the standard operating conditions shown in the Specification table on the next page.

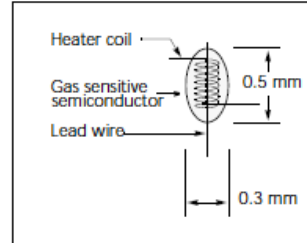


Fig 1a. Sensing element

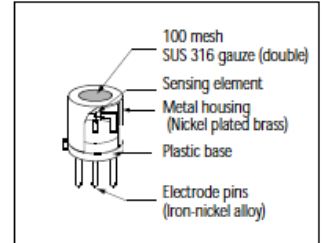


Fig 1b. Configuration

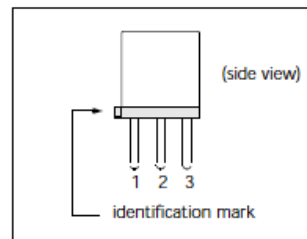


Fig 1c. Pin Layout

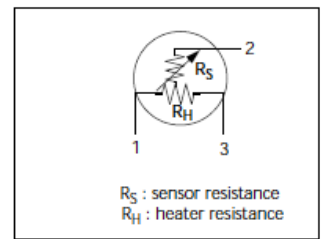


Fig 1d. Equivalent circuit

**Sensitivity characteristics**

Fig 3 shows the sensitivity characteristics curves of the SB-42A-00 (typical data). Sensitivity characteristics of our gas sensors are expressed by the relationship between the sensor resistance and gas concentration. The sensor resistance decreases with an increase of gas concentration based on a logarithmic function.

The sensitivity characteristics of the SB-42A-00 is specified by the following parameters.

- Sensor resistance level: at 1000 ppm of R134a
- Sensor resistance change ratio: between R134a 100ppm and 300 ppm

See the specification table on the next page for further details.

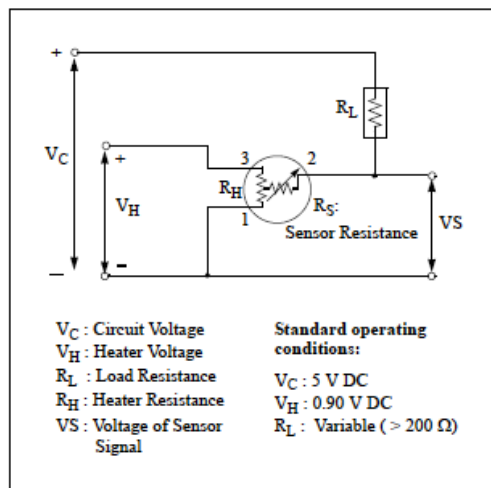


Fig 2. Standard circuit

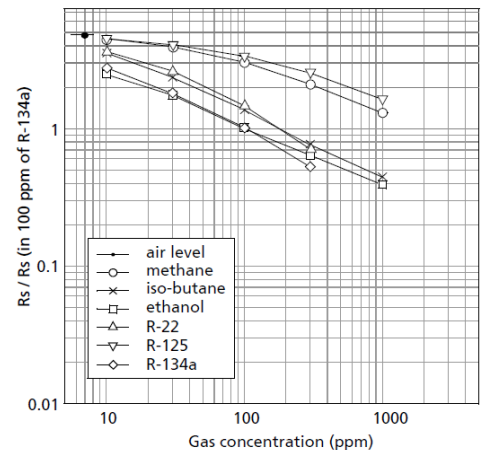


Fig3. Sensitivity characteristics

**SPECIFICATIONS**

# Specifications: SB-42A-00

## A. Standard Operating conditions

Symbol	Parameter	Specification	Conditions etc.
VH	Heater voltage	0.9 V ± 0.05 V	AC, DC or pulse
VC	Circuit voltage	Less than 5 V	DC: Pin2 (+) - Pin 1 (-)
RL	Load resistance	Variable (> 200 Ω)	Ps < 10 mW
RH	Heater resistance	2.8 Ω ± 0.2 Ω	at room temperature
IH	Heater current	130 mA (Typical value)	IH = VH / RH
PH	Heater power consumption	120 mW (Typical value)	PH = VH <sup>2</sup> / RH
PS	Power dissipation of sensing element	Less than 10mW	$P_s = \frac{(V_C - V_{RL})^2}{R}$

## B. Environmental conditions

Symbol	Parameter	Specification	Conditions etc.
T <sub>ao</sub>	Operating temperature	-10 °C to 50 °C	
T <sub>as</sub>	Storage temp	-20 °C to 60 °C	
RH	Relative humidity	Less than 95%RH	
(O <sub>2</sub> )	Oxygen concentration	21% ± 1% (Standard condition) The sensitivity characteristics are influenced by the variation in oxygen concentration. Please consult us for details.	Absolute minimum level : more than 18%.

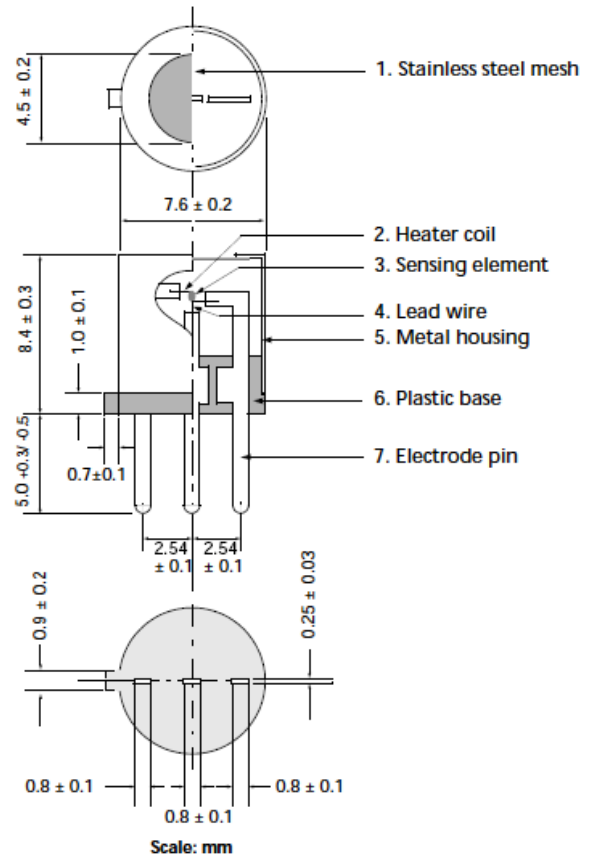
## C. Sensitivity characteristics

Model	SB-42A-00		
Symbol	Parameter	Specification	Conditions etc.
Rs	Sensor resistance	2 k to 20kΩ	at 1000 ppm of R134a
β	Resistance change	0.55 to 0.65	<u>Rs at 300ppm of R134a</u> <u>Rs at 100ppm of R134a</u>
Δ	Sensitivity	Lower than 0.40	<u>Rs at 100ppm of R134a</u> <u>Rs in air</u>
Standard Test Conditions:		Temp : 20°C±2°C Humidity : 65%±5% (in clean air) Pre-heating time: more than 48 hours	VC : 5.0 V ± 1 % VH : 0.9 V ± 1 % RL : 10 kΩ ± 5%

## D. Mechanical characteristics

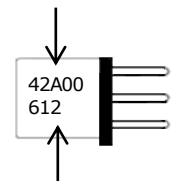
Items	Conditions	Specifications
Vibration	Frequency : 5 - 500 Hz Acceleration : 1.3 G Sweep Time : 40 min.	Should satisfy the specifications shown in the sensitivity characteristics after test.
	Drop	

## Dimensions



Weight : 0.6g

Model No.



Production lot

## E. Parts and Materials

No.	Parts	Materials
1	Stainless steel mesh	SUS 316 (100 mesh, double)
2	Heater coil	Platinum
3	Sensing element	Tin dioxide
4	Lead wire	Platinum
5	Metal housing	Nickel plated brass
6	Plastic base	PBT (GF30%)
7	Electrode pin	Iron-nickel alloy

Please contact

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In the interest of continued product improvement, we reserve the right to change design features without prior notice.

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