FIS
A Nissha Company

FIS GAS SENSOR SB-AQ1-06

for AIR QUALITY CONTROLS (VOCs)

The SB-AQ1-06 is a tin dioxide semiconductor gas sensor which has a very high sensitivity to VOCs, solvents and many other gases. This model is suitable for air quality monitoring for general applications.

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).
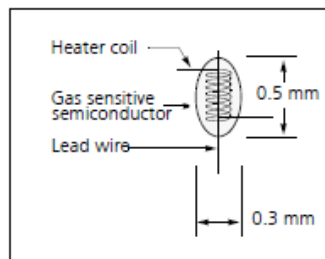
Operating conditions
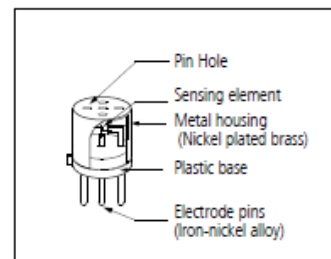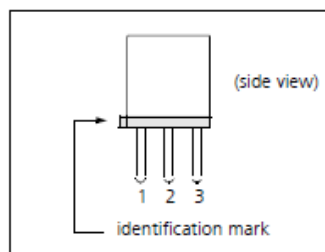Fig 2 shows the standard operating circuit for this model. The change of the sensor resistance (R_S) is obtained as the change of the output voltage across the fixed or variable resistor (R_L). In order to obtain the best performance and specified characteristics, the values of the heater voltage (V_H) 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.

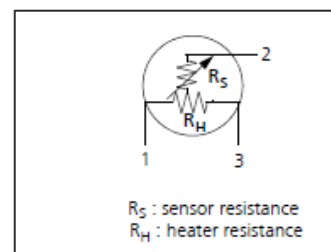Fig 1a. Sensing element

Fig 1b. Configuration

Fig 1c. Pin Layout

R_S : sensor resistance
R_H : heater resistance

Fig 1d. Equivalent circuit

Sensitivity characteristics
Fig 3 shows the sensitivity characteristics curves of the SB-AQ1-06 (typical data). Sensitivity characteristics of the FIS 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-AQ1-06 is specified by the following parameters.
- Sensor resistance level: in clean air
- Sensor resistance change ratio: between hydrogen 10ppm and in air

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

V_C : Circuit Voltage
V_H : Heater Voltage
R_L : Load Resistance
R_H : Heater Resistance
VS : Voltage of Sensor Signal

Standard operating conditions:
V_C : 5 V DC
V_H : 0.90 V DC
R_L : Variable (> 200 Ω)
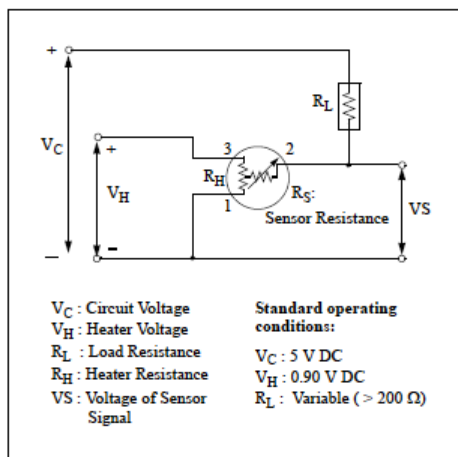
Fig 2. Standard circuit

Fig3. Sensitivity characteristics

- air level
- methane
- iso-butane
- hydrogen
- ethanol
- CO

SPECIFICATIONS

SBAQ106E_170308V1
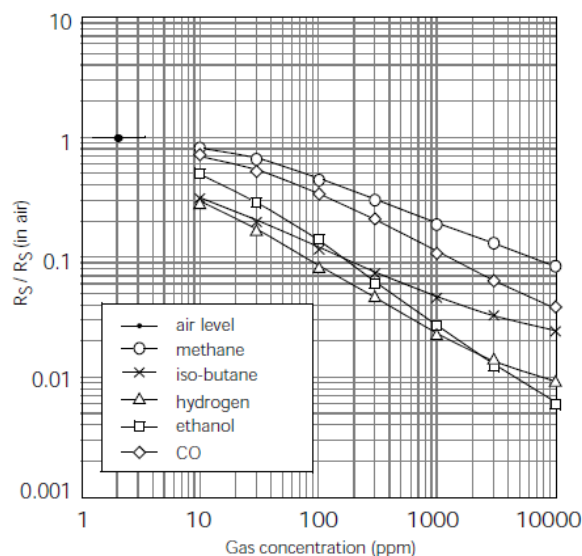
Specifications

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)	P_S < 10 mW
RH	Heater resistance	2.8 Ω ± 0.2 Ω	at room temperature
IH	Heater current	130mA (Typical value)	IH = VH / RH
PH	Heater power consumption	120 mW (Typical value)	$PH = VH^2 / RH$
PS	Power dissipation of sensing element	Less than 10mW	$P_S = \dfrac{(V_C - V_{RL})^2}{R}$

B. Environmental conditions

Symbol	Parameter	Specification	Conditions etc.
T_{ao}	Operating temperature	-10 ℃ to 50 ℃	
T_{as}	Storage temp	-20 ℃ to 60 ℃	
RH	Relative humidity	Less than 95%RH	
(O_2)	Oxygen concentration	21% ± 1% (Standard condition)	Absolute minimum level : more than 18%.
		The sensitivity characteristics are influenced by the variation in oxygen concentration. Please consult FIS for details.	

C. Sensitivity characteristics
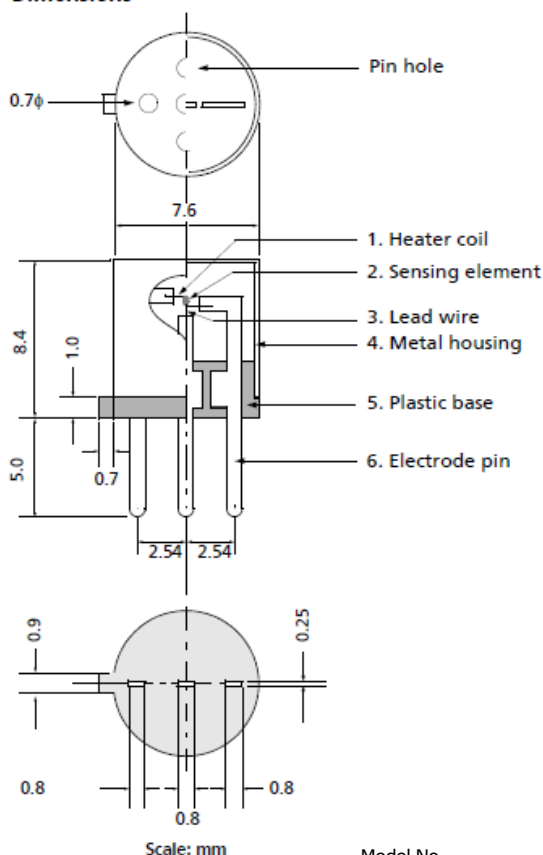
Model	SB-AQ1-06		
Symbol	Parameter	Specification	Conditions etc.
R_S	Sensor resistance	1kΩ to 20 kΩ	at clean air
	Acetone selectivity	0.15 to 0.45	$\dfrac{\text{Rs at Hydrogen 10ppm}}{\text{Rs in air}}$
Standard Test Conditions:	Temp : 20℃±2℃ Humidity : 65%±5% (in clean air) Pre-heating time: more than 48 hours	VC : 5.0 V ± 1 % VC : 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	Height : 60 cm Number of impacts : 3 times	

Dimensions

Pin hole
0.7φ
7.6
8.4
1.0
5.0
0.7
2.54 2.54
0.9
0.25
0.8 0.8
0.8
Scale: mm
Weight : 0.6g

1. Heater coil
2. Sensing element
3. Lead wire
4. Metal housing
5. Plastic base
6. Electrode pin
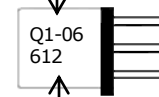
Model No.
Q1-06
612
Production lot

E. Parts and Materials

No.	Parts	Materials
1	Heater coil	Platinum
2	Sensing element	Tungsten oxide
3	Lead wire	Platinum
4	Metal housing	Nickel plated brass
5	Plastic base	PBT (GF30%)
6	Electrode pin	Iron-nickel alloy

Please contact

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