SB-96-00

FIS GAS SENSOR SB-96-00

for CARBON MONOXIDE AND LP DETECTION

General
The SB-96 is a tin dioxide semiconductor gas sensor which has an excellent performance in detecting both CO and iso-butane/propane selectively with single sensor element. This unique feature was realized by using a mini-bead type sensing element with a periodic temperature changing operation method.

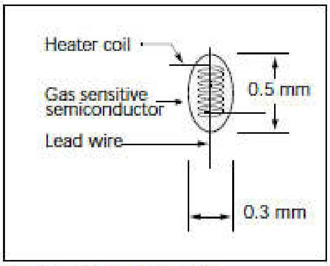


Fig 1a. Sensing element

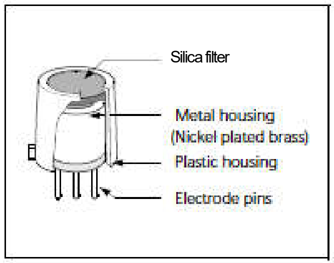


Fig 1b. Configuration

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. This sensor unit is placed in an external housing which contains nonwoven filter (Fig 1b).

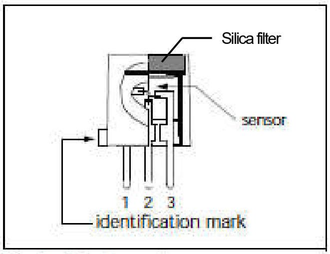


Fig 1c. Pin Layout

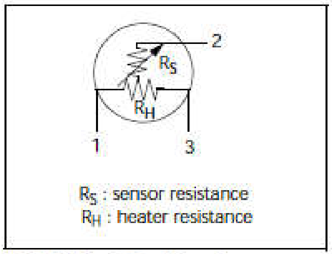


Fig 1d. Equivalent circuit

Operating conditions
When the sensor is operated with high/low periodic operation (Fig 2), sensor signal changes according to the temperature dependency characteristics. By detecting the sensor signal at sufficient timings (at a high temperature for iso-butane and at a low temperature for CO), selective detection of both isobutene and CO has been achieved. Figs 3a and 3b show the sensitivity characteristics of the SB-96, at high temperature and at low temperature signals respectively.

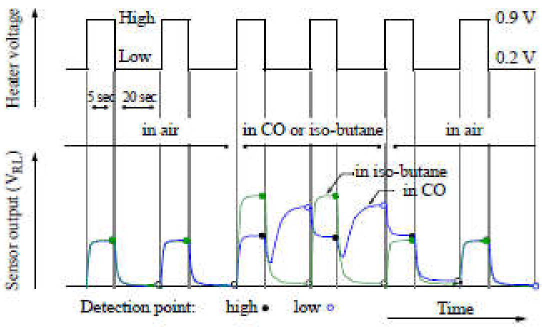


Fig2. SB-96-00: operating conditions and output signal

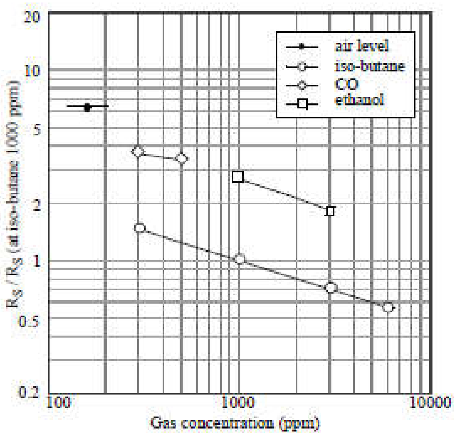


Fig3a. SB-96-00: Sensitivity at HIGH signal

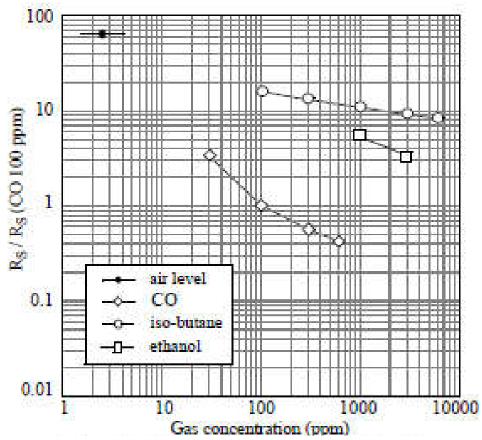


Fig3b. SB-96-00: Sensitivity at LOW signal

SPECIFICATIONS

Specifications: SB-96-00

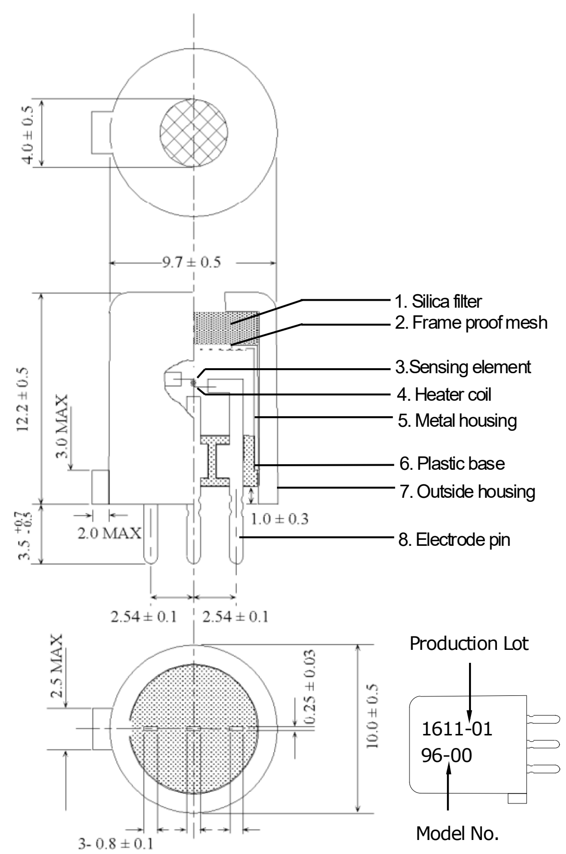
A. Standard Operating conditions

Symbol	Parameter	Specification	Conditions etc.
VH(H)	Heater voltage (high)	0.9 V ± 5%	AC, DC or pulse
VH(L)	Heater voltage (low)	0.2 V ± 5%	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
TH(H)	Heating time (high)	5 sec ± 0.1 sec	
TH(L)	Heating time (low)	20 sec ± 0.1 sec	
DT (L)	Detection timing (low)	< 0.1sec	before switching to HIGH
IS(H)	Current consumption(high)	132 mA ± 15 mA	VH=0.9V
IS(L)	Current consumption(low)	59 mA ± 10 mA	VH=0.2V
PS	Power dissipation of sensing element	Less than 10 mW	$P_S = \frac{(V_C - V_{RL})^2}{R}$

B. Environmental conditions

Symbol	Parameter	Specification	Conditions etc.
Tao	Operating temperature	-10 ℃ to 50 ℃	
Tas	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 us for details.	

Dimensions



Weight : 1.1g

Scale : mm

C. Sensitivity characteristics

Model	SB-96-00		
Symbol	**Parameter**	**Specification**	**Conditions etc.**
Rs (L)	Sensor resistance at LOW period	4.5 k - 45 kΩ	at 100ppm of CO
α (L) (30-100)	Sensitivity slope (30 - 100 ppm)	0.70 to 2.5	$\frac{\log(Rs(30\ ppm)/Rs(100ppm))}{\log(30/100)}$
α (L) (100-300)	Sensitivity slope (100 - 300 ppm)	0.4 to 1.2	$\frac{\log(Rs(300\ ppm)/Rs(100ppm))}{\log(300/100)}$
RS (H)	Sensor resistance at HIGH period	0.35 k - 3.5 kΩ	at 3000 ppm of iso-butane
β (H)	Sensitivity slope at HIGH period	0.40 to 0.70	$\frac{Rs\ (at\ 3000\ ppm\ of\ iso\text{-}butane)}{Rs\ (at\ 500\ ppm\ of\ iso\text{-}butane)}$
Standard Test Conditions: (in clean air)	Temp: 20 ℃ ± 2 ℃ VC : 5.0 V ±5% Humidity:65% ± 5% VH (high) : 0.9 V ± 5% VH (low) : 0.2 V ± 5% RL (high) : 750Ω ± 1% (Low) : 10 kΩ ± 1% Pre-heating time: more than 4 days		

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	

E. Parts and Materials

No.	Parts	Materials
1	Silica filter	Silica
2	Frame proof mesh	SUS 316 (100 mesh,double)
3	Sensing element	Tin dioxide
4	Heater coil	Platinum
5	Metal housing	Nickel plated brass
6	Plastic base	PBT (GF30%)
7	Outside housing	Nylon 6 (UL94 V-0)
8	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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