

FIS GAS SENSOR SB-30

for ALCOHOL DETECTION

The SB-30 is a tin dioxide semiconductor gas sensor which has a high sensitivity to alcohol with quick response speed. This model is suitable for alcohol detection such as portable breath alcohol checker or ignition locking system in automobiles.

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 (Fig 1).

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.

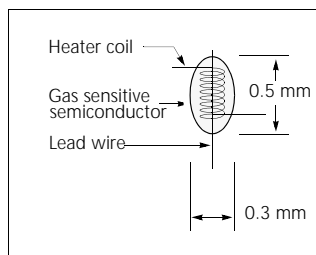


Fig 1a. Sensing element

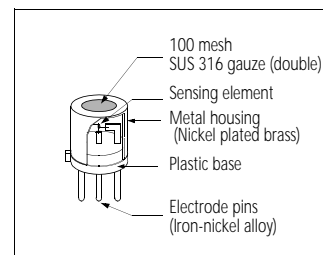


Fig 1b. Configuration

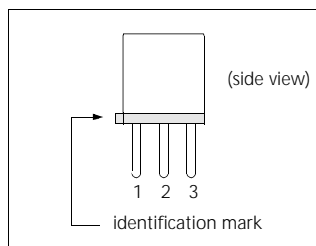


Fig 1c. Pin Layout

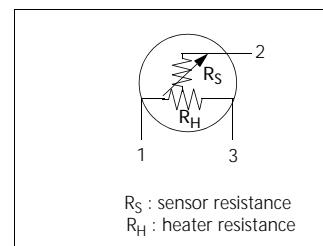


Fig 1d. Equivalent circuit

Sensitivity characteristics

Fig 3 shows the sensitivity characteristics curves of the SB-30 (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-30 is specified by the following parameters.

- Sensor resistance level: at ethanol 300 ppm
- Sensor resistance change ratio: between ethanol 50 ppm and 300 ppm

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

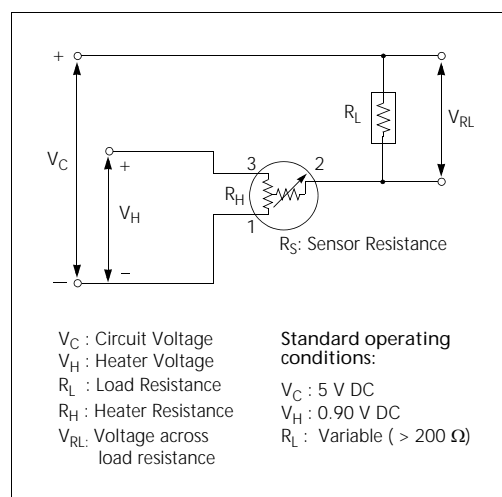


Fig 2. Standard circuit

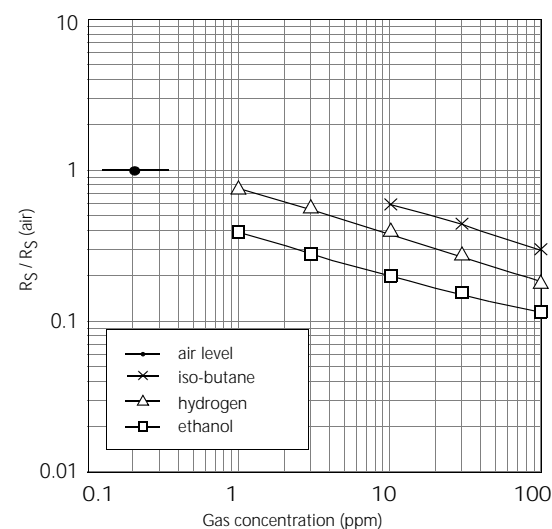


Fig 3. Sensitivity characteristics

SPECIFICATIONS

SB-30

Specifications

A. Standard Operating conditions

| Symbol | Parameter | Specification | Conditions etc. |
|--------|--------------------------------------|----------------------------------|--------------------------------------|
| V_H | Heater voltage | $0.9\text{ V} \pm 0.05\text{ V}$ | AC, DC or pulse |
| V_C | Circuit voltage | Less than 5 V | DC: Pin 2 (+) - Pin 1 (-) |
| R_L | Load resistance | Variable ($> 200\ \Omega$) | $P_S < 10\text{ mW}$ |
| R_H | Heater resistance | $2.8\ \Omega \pm 0.2\ \Omega$ | at room temperature |
| I_H | Heater current | 130 mA | $I_H = V_H / R_H$ (typical value) |
| P_H | Heater power consumption | 120 mW | $P_H = V_H^2 / R_H$ (typical value) |
| P_S | Power dissipation of sensing element | Less than 10 mW | $P_S = \frac{(V_C - V_{RL})^2}{R_S}$ |

B. Environmental conditions

| Symbol | Parameter | Specification | Conditions etc. |
|-------------------|-----------------------|--|--|
| Tao | Operating temperature | -10 °C to 60 °C | Recommended range |
| Tas | Storage temp | -20 °C to 70 °C | |
| 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

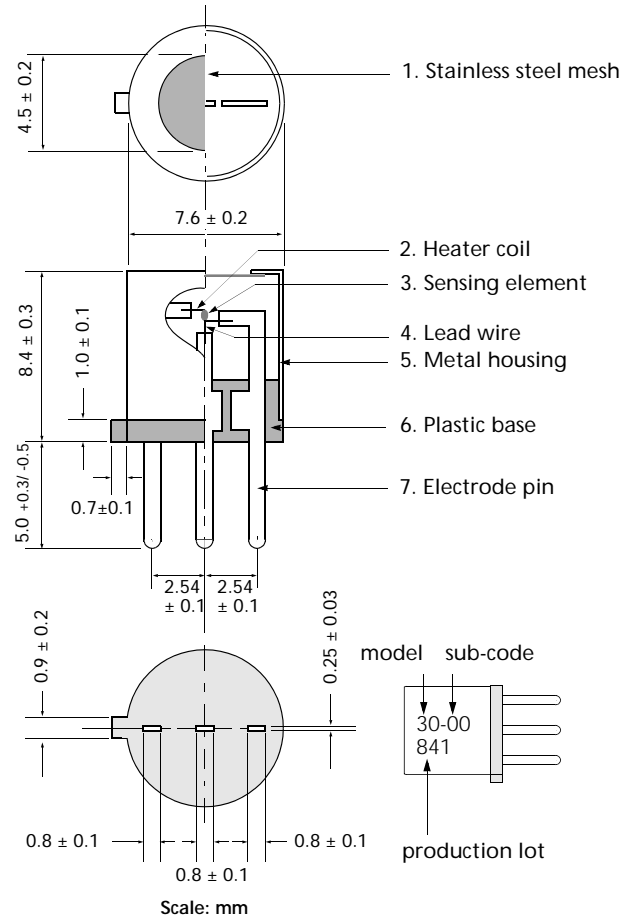
| Model | SB-30-00 | | |
|---------------------------|-------------------|--|---|
| Symbol | Parameter | Specification | Conditions etc. |
| R_S | Sensor resistance | $0.3\text{ k}\Omega$ to $5.0\text{ k}\Omega$ | at ethanol 300 ppm |
| β | Sensitivity | 0.35 to 0.65 | $\frac{R_S \text{ (at ethanol 300 ppm)}}{R_S \text{ (at ethanol 50 ppm)}}$ |
| Standard Test Conditions: | | Temp: $20\text{ }^\circ\text{C} \pm 2\text{ }^\circ\text{C}$ Humidity: $65\% \pm 5\%$ (in clean air) Pre-heating time: more than 48 hours | V_C : $5.0\text{ V} \pm 1\%$ V_H : $0.9\text{ V} \pm 1\%$ R_L : $750\ \Omega \pm 5\%$ |

D. Mechanical characteristics

| Items | Conditions | Specifications |
|-----------|---------------------|----------------|
| Vibration | Frequency: | 100 cpm |
| | Vertical amplitude: | 4 mm |
| | Duration: | 1 hour |
| Shock | Acceleration: | 100 G |
| | Number of impacts: | 5 times |

Should satisfy the specifications shown in the sensitivity characteristics after test.

Dimensions



Weight : 0.6g

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 (SnO_2) |
| 4 | Lead wire | Platinum |
| 5 | Metal housing | Nickel plated brass |
| 6 | Plastic base | PBT (Poly butylene terephthalate) |
| 7 | Electrode pins | Iron-nickel alloy |

Please contact

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