FIS

SB-95-12

FIS GAS SENSOR SB-95-12

for CARBON MONOXIDE and METHANE

The SB-95-12 is a tin dioxide semiconductor gas sensor which has an excellent performance in detecting both CO and methane selectively with single sensor element. This unique feature was realized by using a mini-bead type sensing element with a periodic temperature change operation method.

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 active charcoal filter (Fig 1).

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 methane and at a low temperature for CO, selective detection of both methane and CO has been achieved. Fig 3a and 3b show the sensitivity characteristics of the SB-95-12, at high and low temperature signals respectively.

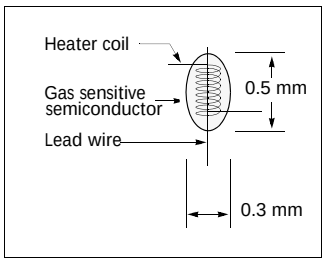


Fig 1a. Sensing element

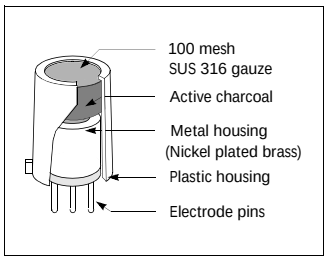


Fig 1b. Configuration

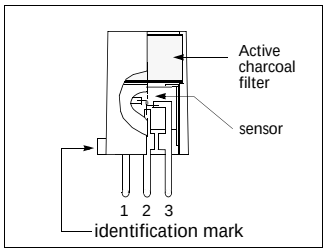


Fig 1c. Pin Layout

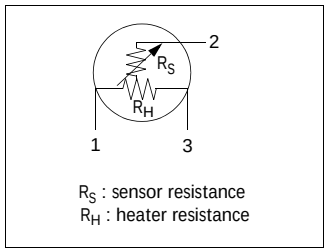


Fig 1d. Equivalent circuit

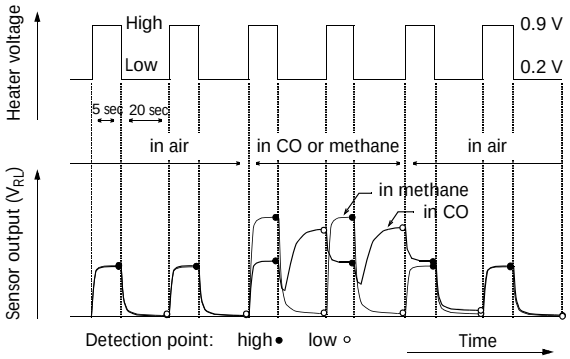


Fig 2 SB-95-12: Operating conditions and output signal

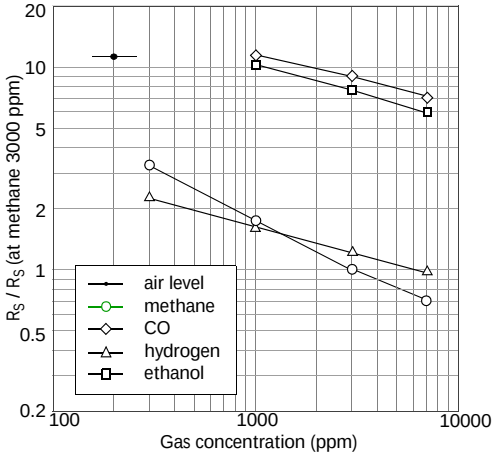


Fig 3a. SB-95-12: Sensitivity at HIGH signal for methane

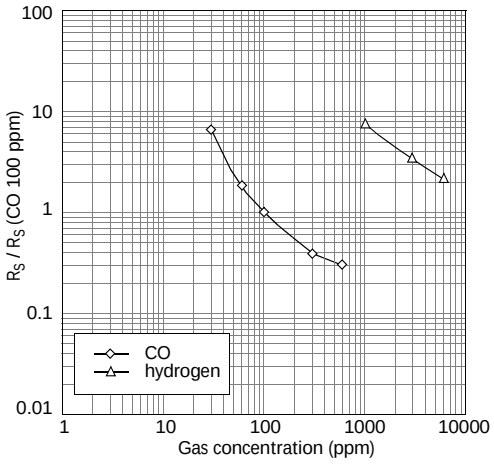


Fig 3b. SB-95-12: Sensitivity at LOW signal for CO

SPECIFICATIONS

Specifications

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
V_C	Circuit voltage	Less than 5 V	DC: Pin2 (+) - Pin 1 (-)
R_L	Load resistance	Variable (> 200 Ω)	P_S < 10 mW
R_H	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	
I_S (H)	Current consumption (high)	132mA ± 15mA	VH=0.9V
I_S (L)	Current consumption (low)	59mA ± 10mA	VH=0.2V
Ps	Power dissipation	Less than 10 mW	

B. Environmental conditions

Symbol	Parameter	Specification	Conditions etc.
Tao	Operating temperature	-10 °C to 60 °C	Recommended range
Tas	Storage temp.	-30 °C to 100 °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.	

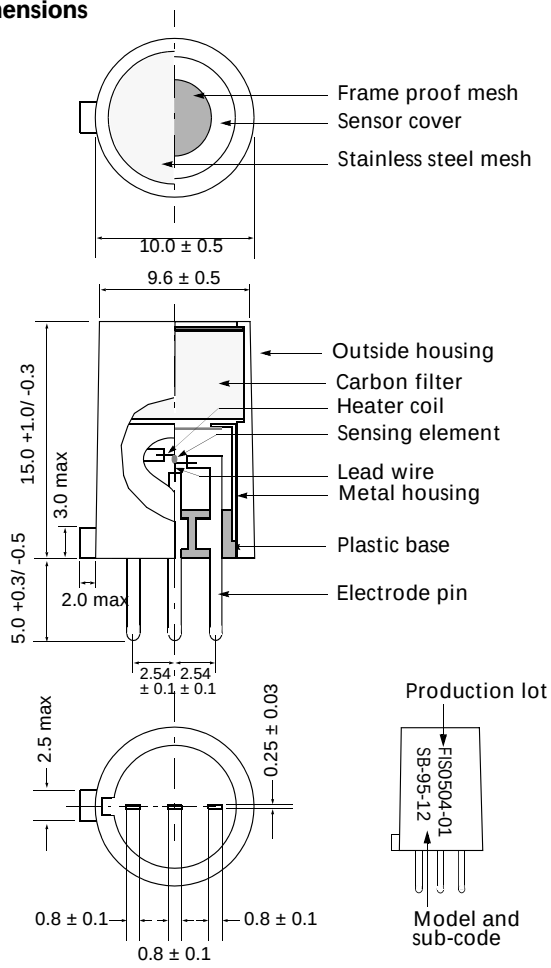
C. Sensitivity characteristics

Model	SB-95-12		
Symbol	**Parameter**	**Specification**	**Conditions etc.**
R_S(L)	Sensor resistance at LOW period	4.5 kΩ - 40 kΩ	at 100ppm of CO
$\alpha_{(L)\ (30\text{-}100)}$	Sensitivity slope (30 - 100 ppm)	1.05 to 2.1	$\frac{\log(Rs(30\ ppm)\ /Rs(100ppm))}{\log(30/100)}$
$\alpha_{(L)(100\text{-}300)}$	Sensitivity slope at LOW period	0.5 to 1.0	$\frac{\log(Rs(300\ ppm)\ /Rs(100ppm))}{\log(300/100)}$
R_S(H)	Sensor resistance at HIGH period	0.2 kΩ - 2.3 kΩ	at 3000 ppm of methane
$\beta_{(H)}$	Sensitivity slope at HIGH period	0.45 to 0.65	Rs (3000 ppm) /Rs (1000ppm)
Standard Test Conditions:		Temp: 20 °C ± 2 °C Humidity:65% ± 5% (in clean air)	V_C : 5.0 V ± 5% V_H (high) : 0.9 V ± 5% V_H (low) : 0.2 V ± 5% R_L (high) : 750Ω ± 1% R_L (low) : 10 kΩ ± 1%
		Pre-heating time: more than 4 days	

D. Mechanical characteristics

Items	Conditions		Specifications
Vibration	Frequency: Acceleration: Sweep Time:	5 - 500 Hz 1.3 G 40 min.	Should satisfy the specifications shown in the sensitivity characteristics after test.
Drop	Height: Number of impacts:	60 cm 3 times	

Dimensions



Scale: mm

Weight : 1.2g

E. Parts and Materials

No.	Parts	Materials
1.	Sensing element	Tin dioxide
2.	Heater coil / Lead wire	Platinum
3.	Stainless steel mesh	SUS 316 (100 mesh, single)
4.	Carbon filter	Activated carbon
5.	Outside housing	Nylon 6 (UL94 V-0)
6.	Flameproof mesh	SUS 316 (100 mesh, double)
7.	Metal cover	Nickel plated brass
8.	Plastic base	PBT (poly butylen telephtalate)
9	Electrode pins	Iron-nickel alloy

Please contact

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FIS Inc.
3-36-3, Kitazono
Itami, Hyogo
664-0891 Japan

Tel: +81-72-780-1800
Fax: +81-72-785-0073
http://www.fisinc.co.jp