FIGARO

PRODUCT INFORMATION

TGS 816 - for the detection of Combustible Gases

Features:

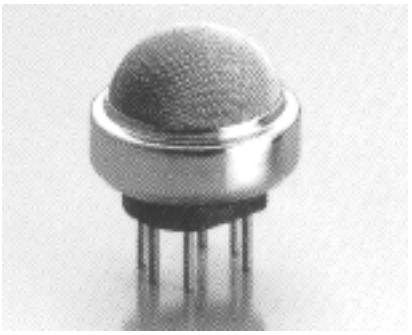
* General purpose sensor with sensitivity to a wide range of combustible gases
* High sensitivity to methane, propane, and butane
* Long life and low cost
* Ceramic base resistant to severe environment

Applications:

* Domestic gas leak detectors and alarms
* Portable gas detectors

The sensing element of Figaro gas sensors is a tin dioxide (SnO_2) semiconductor which has low conductivity in clean air. In the presence of a detectable gas, the sensor's conductivity increases depending on the gas concentration in the air. A simple electrical circuit can convert the change in conductivity to an output signal which corresponds to the gas concentration.

The **TGS 816** is not only sensitive to a wide range of gases, it also has a ceramic base which can withstand severe environments up to 200°C. It has high sensitivity to methane, propane, and butane, making it ideal for natural gas and LPG monitoring. The sensor can detect a wide range of gases, making it an excellent, low cost sensor for a variety of applications.



The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis is indicated as sensor resistance ratio (Rs/Ro) which is defined as follows:

Rs = Sensor resistance of displayed gases at various concentrations

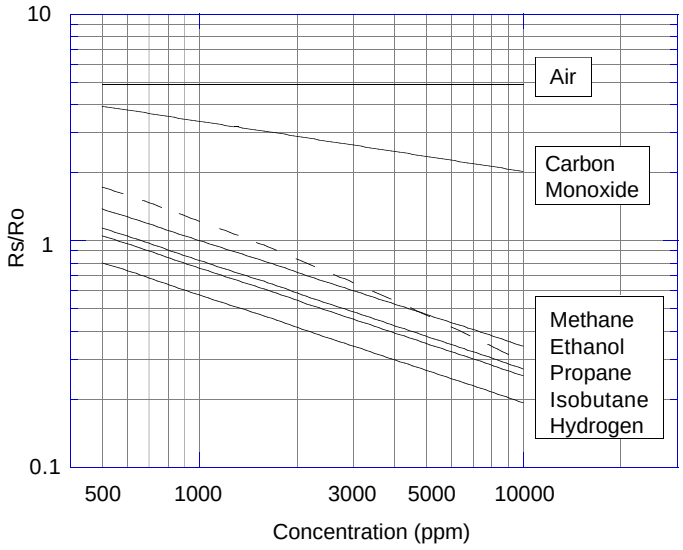
Ro = Sensor resistance in 1000ppm methane

The figure below represents typical temperature and humidity dependency characteristics. Again, the Y-axis is indicated as sensor resistance ratio, defined as follows:

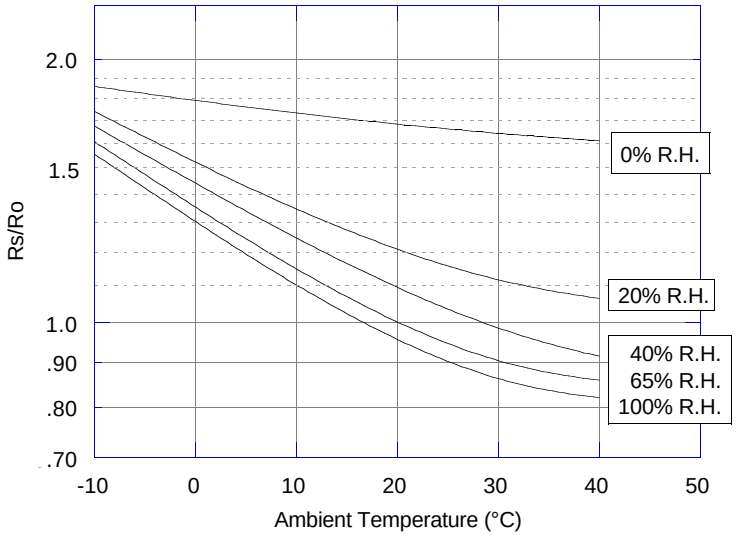
Rs = Sensor resistance at 1000ppm of methane at various temperatures/humidities

Ro = Sensor resistance at 1000ppm of methane at 20°C and 65% R.H.

Sensitivity Characteristics:



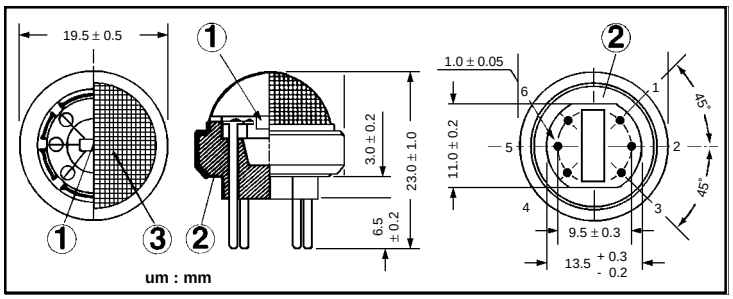
Temperature/Humidity Dependency:



IMPORTANT NOTE: **OPERATING CONDITIONS IN WHICH FIGARO SENSORS ARE USED WILL VARY WITH EACH CUSTOMER'S SPECIFIC APPLICATIONS. FIGARO STRONGLY RECOMMENDS CONSULTING OUR TECHNICAL STAFF BEFORE DEPLOYING FIGARO SENSORS IN YOUR APPLICATION AND, IN PARTICULAR, WHEN CUSTOMER'S TARGET GASES ARE NOT LISTED HEREIN. FIGARO CANNOT ASSUME ANY RESPONSIBILITY FOR ANY USE OF ITS SENSORS IN A PRODUCT OR APPLICATION FOR WHICH SENSOR HAS NOT BEEN SPECIFICALLY TESTED BY FIGARO.**

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Structure and Dimensions:



(1) Sensing Element:
SnO_2 is sintered to form a thick film on the surface of an alumina ceramic tube which contains an internal heater.

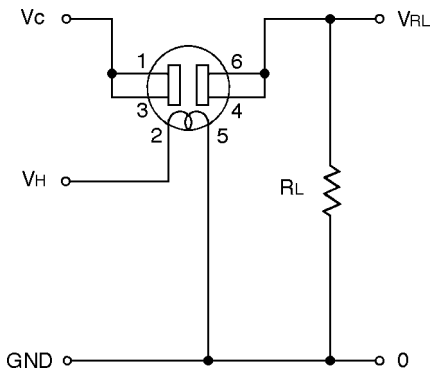
(2) Sensor Base:
Alumina ceramic

(3) Flame Arrestor:
100 mesh SUS 316 double gauze

Pin Connection and Basic Measuring Circuit:

The numbers shown around the sensor symbol in the circuit diagram at the right correspond with the pin numbers shown in the sensor's structure drawing (above). When the sensor is connected as shown in the basic circuit, output across the Load Resistor (V_{RL}) increases as the sensor's resistance (Rs) decreases, depending on gas concentration.

Basic Measuring Circuit:



Standard Circuit Conditions:

Item	Symbol	Rated Values	Remarks
Heater Voltage	V_H	5.0±0.2V	AC or DC
Circuit Voltage	V_C	Max. 24V	AC or DC *PS 15mW
Load Resistance	R_L	Variable	*PS 15mW

Electrical Characteristics:

Item	Symbol	Condition	Specification
Sensor Resistance	Rs	Methane at 1000ppm/Air	5k ~ 15k
Change Ratio of Sensor Resistance	Rs/Ro	$\frac{Rs\ (Methane\ at\ 3000ppm/Air)}{Rs\ (Methane\ at\ 1000ppm/Air)}$	0.60 ± 0.05
Heater Resistance	R_H	Room temperature	30.0 ± 3.0
Heater Power Consumption	P_H	VH=5.0V	835 ± 90mW

Standard Test Conditions:

TGS 816 complies with the above electrical characteristics when the sensor is tested in standard conditions as specified below:

Test Gas Conditions: 20°±2°C, 65±5%R.H.
Circuit Conditions: V_C = 10.0±0.1V (AC or DC),
V_H = 5.0±0.05V (AC or DC),
R_L = 4.0kΩ±1%
Preheating period before testing: More than 7 days

Sensor Resistance (Rs) is calculated by the following formula:

$$Rs = \left(\frac{V_C}{V_{RL}} - 1\right) \times R_L$$

Power dissipation across sensor electrodes (Ps) is calculated by the following formula:

$$Ps = \frac{V_C^2 \times Rs}{(Rs + R_L)^2}$$

FIGARO USA, INC.
3703 West Lake Ave. Suite 203
Glenview, Illinois 60025
Phone: (847)-832-1701
Fax: (847)-832-1705
email: figarousa@figarosensor.com

For information on warranty, please refer to Standard Terms and Conditions of Sale of Figaro USA Inc.

REV: 9/99

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