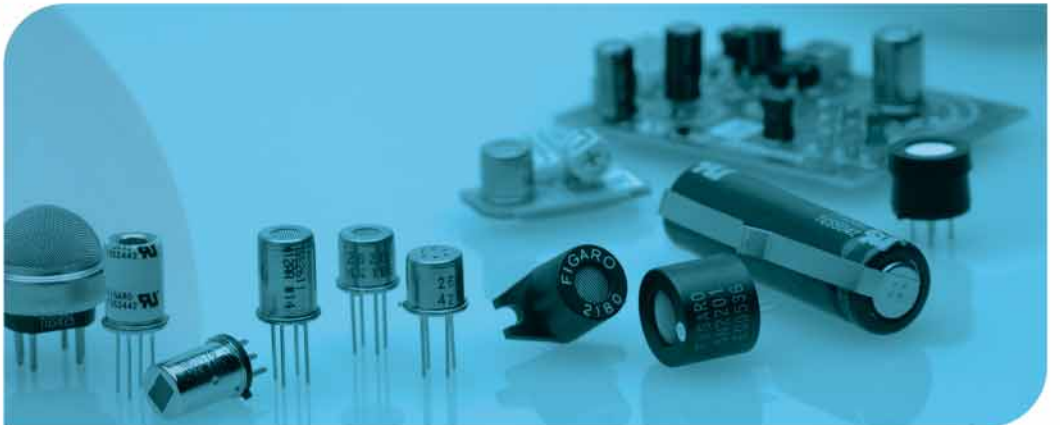




# Gas Sensors



World leader in gas sensing innovation

# FIGARO

ISO9001 & 14001 Company

# The World Leader in Gas Sensing Innovation

The World Leader in Gas Sensing Innovation, Figaro has more than 35 years of experience in supplying cost-effective gas sensing solutions in the fields of safety, air quality control, HVAC, home appliance, and the automotive industry.

## Our Company

Figaro is a global provider of solutions for sensing requirements in the fields of safety, comfort & health, and controls & measurements. Founded by Naoyoshi Taguchi, who pioneered application of metal oxide semiconductors (MOS) to gas sensing, Figaro was the first company to successfully commercialize MOS gas sensors. To date, more than 200 million Figaro sensors have been supplied to the gas sensing market. Its technical expertise has been recognized and awarded over the years by various industry and professional organizations, and it is acknowledged as the world leader in the development and high-volume production of semiconductor gas sensors. Expanding its reach into the gas sensing field, Figaro has added new technologies to its product lines. Worldwide, industries for gas detection, safety, air quality control, HVAC, appliances, and automotive applications have all relied on Figaro for cost-effective solutions to their gas sensing needs for more than 35 years.

As a full service company in the gas sensing industry, Figaro understands customer needs from development to production to on-time delivery. Figaro products are manufactured to the highest quality standards in our state-of-the-art facilities. Our flexible production system and ample capacity ensure just-in-time supply for any high-volume requirements.

In Rossini's opera, "The Barber of Seville", the main character is Figaro, a unique individual with boundless enthusiasm, curiosity, creativity, and the drive to tackle any problem, no matter how difficult. These are the qualities upon which Figaro was founded, so it was natural that the company assumed this name. Figaro strives to meet each challenge with the same vitality and spirit as its namesake.

## World Class Product Support

Together with our products comes access to Figaro's unparalleled product support services. Starting at initial design and continuing through successful launch of customer production and beyond, Figaro provides in-depth technical support to its customers with a worldwide reach. With support staff located in both our head office in Japan and in North America, and with a comprehensive network of distributors worldwide, technical assistance is readily available, and our engineers are prepared to respond to your needs verbally, in writing, as well as with timely in-person visits. Figaro's ability to support your efforts worldwide is unmatched among gas sensor suppliers in today's marketplace.

Visit [www.figaro.co.jp](http://www.figaro.co.jp) for more information, including data sheets.

## Quality Our No. 1 Priority

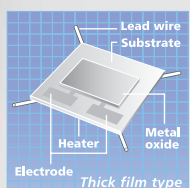
Figaro is widely recognized throughout the global gas sensing industry for its goal of producing the highest quality gas sensors. Figaro's commitment to excellence is reflected in the fact that it was one of the first gas sensor manufacturers to obtain **ISO9001** certification and has obtained UL component recognition for many of its products. Providing reliable products is paramount in the gas sensing industry where protection of lives and property is the main focus.



## Features

- Reliable
- Long life
- Competitive cost
- Easy to use
- Compact size
- Environmentally friendly
- UL component recognition
- Meets and exceeds requirements of performance standards
- ISO9001** and **ISO14001** company
- More than 35 years of experience in the marketplace
- Global engineering support for both applications and implementation
- Continuous product support after point-of-sale
- Innovative

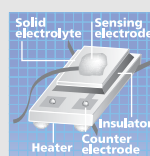
## Advanced Sensor Technologies



### Metal Oxide Semiconductor

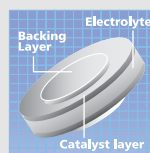
Figaro's signature technology is the metal oxide semiconductor type gas sensor. This type of Taguchi Gas Sensor (TGS) uses doped metal oxides with noble metal which, when heated to a certain temperature, react to the presence of deoxidizing gases with a large drop in resistance. Since the sensing material is not consumed in this process, the sensor possesses a long life, as much as 10 years in some cases. A simple circuit can monitor this reaction, making TGS sensors easy and inexpensive to use. This patented innovation has enabled mass production of gas sensors which provide safety from toxic, explosive, and combustible gases at a reasonable price. More than 200 million TGS sensors have been supplied to the marketplace since the product's inception. While TGS sensors are often the target of imitators, Figaro's 35+ years of experience in tailoring products to its customers' needs separates TGS sensors from the rest of the field, making them unrivaled among semiconductor gas sensor suppliers. Since the original generation of **bulk type sensors** were released, Figaro has enhanced its semiconductor product line with new technologies that have expanded the field of applications for its sensors. Figaro has developed **thick film type sensors** which use a screen printing technique, offering the advantage of narrow variation from sensor to sensor within production lots. Using micro-fabrication technology, Figaro also produces **micro bead type sensors** with a minute heater wire coil that can be operated at lower power and lower voltages.

### Electrochemical



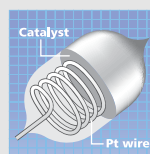
#### Solid state electrolyte type

Figaro was the first company to successfully commercialize solid state electrolyte CO<sub>2</sub> sensors by using a Figaro patented technology. This CO<sub>2</sub> sensor has compact size, low power consumption, and has lower cost and longer life than conventional Infra-red sensor technology.



#### Liquid electrolyte type

This type of sensor shows good accuracy, linear response, and exhibit excellent selectivity to its target gas. Since liquid electrolyte sensors can be operated without heat, they can be used in the development of battery operated sensing devices. Unlike traditional electrochemical sensors, Figaro's sensors are designed for environmental safety, using weak alkaline electrolyte.



#### Catalytic

The catalytic type gas sensor is a long established technology. The principle is based on combustion of the target gas on a heated catalyst, producing heat which is measured in order to determine the presence of gas. Figaro's 35+ years of experience in catalyst material technology and its advanced micro fabrication technology enable production of the most advanced compact pellistor sensors whose durability, stability, quick response, and linear output make them ideal for detecting many combustible gases.

## A World of Sensing Solutions



### Safety

- Toxic and explosive gas leak detectors for residential, RV, marine, and industrial applications
- Portable gas leak detectors and alarms
- Industrial gas monitors
- Fuel cell leakage detection
- Gas boiler leak detectors
- Refrigerant leak detectors
- Ignition interlock devices



### Comfort & Health

- Personal air quality monitors
- Odor detection
- Air purifiers for residential and automotive usage
- Individual room CO<sub>2</sub> monitors
- VOC monitors for the workplace



### Controls & Measurements

- Residential air cleaners and air conditioner control
- Building and room ventilation control
- Automobile damper control
- Parking garage ventilation control
- Automated cooking control in microwave ovens
- Breath alcohol detectors
- Oxygen monitors for medical usage
- Incubator air quality monitors

## GAS SENSORS

| Target gas                | Range                                      | Model No. | Type | Typical application   |
|---------------------------|--|-----------|------|---|
| Alcohol                   | 0 - 1,000ppm                               | TGS 3820* | S    | Personal alcohol checkers   |
| Alcohol & solvent vapors  | 0 - 5,000ppm                               | TGS 2620  | S    | Alcohol & solvent vapor detectors   |
| Ammonia                   | 0 - 300ppm                                 | TGS 826   | S    | Refrigerant leak detectors  |
|                           | 0 - 100ppm                                 | TGS 2444* | S    | Refrigerant leak detectors, ventilation control for agricultural & poultry industries |
| Carbon dioxide            | 0 - 50,000ppm                              | TGS 4160  | E(S) | Air quality control in buildings, homes & the agricultural industry                   |
|                           | 0 - 10,000ppm                              | TGS 4161  | E(S) | Air quality control in buildings, homes & the agricultural industry                   |
| Carbon monoxide           | 0 - 1,000ppm                               | TGS 2442  | S    | Gas alarms for homes  |
|                           | 0 - 1,000ppm                               | TGS 5042  | E(L) | Gas alarms for homes, recreational vehicles, boats, gas boilers, parking garages      |
| Dissolved oxygen          | 0 - 80ppm                                  | KDS-25B   | E(L) | Dissolved oxygen monitors   |
| Gasoline & diesel exhaust | 0 - 1,000ppm CO + 0-10ppm NO <sub>2</sub>  | TGS 2201  | S    | Automobile ventilation control  |
| General air contaminants  | 0 - 30ppm                                  | TGS 2600  | S    | Indoor air quality control  |
|                           | 0 - 30ppm                                  | TGS 2602  | S    | Indoor air quality control  |
| Halocarbon gas            | 0 - 3,000ppm                               | TGS 832   | S    | Refrigerant leak detectors  |
|                           | 0 - 3,000ppm                               | TGS 2630* | S    | Refrigerant leak detectors  |
| Hydrogen                  | 0 - 1,000ppm                               | TGS 821   | S    | Hydrogen leak detectors   |
| Hydrogen, Methane & LP    | 0 - 100%LEL                                | TGS 6812  | C    | Hydrogen & combustible gas leak detectors for fuel cells                              |
| Hydrogen sulfide          | 0 - 100ppm                                 | TGS 825   | S    | Industrial gas detectors  |
| LP gas                    | 0 - 20%LEL                                 | TGS 2610  | S    | Gas alarms for homes, recreational vehicles, boats, gas boilers                       |
| Methane                   | 0 - 20%LEL                                 | TGS 2611  | S    | Gas alarms for homes, recreational vehicles, boats, gas boilers                       |
| Methane & CO              | 0 - 25%LEL CH <sub>4</sub> + 0-1,000ppm CO | TGS 3870  | S    | Gas alarms for homes, gas boilers   |
| Methane & LP              | 0 - 20%LEL                                 | TGS 2612  | S    | Gas alarms for homes, recreational vehicles, boats, gas boilers                       |
|                           | 0 - 100%LEL                                | TGS 6810  | C    | Gas alarms for homes, recreational vehicles, boats, gas boilers                       |
|                           | 0 - 100%LEL                                | TGS 6811* | C    | Industrial gas detectors  |
| Oxygen                    | 0 - 30%                                    | SK-25     | E(L) | Oxygen monitors   |
|                           | 0 - 100%                                   | KE-25     | E(L) | Oxygen monitors   |
|                           | 0 - 100%                                   | KE-50     | E(L) | Oxygen monitors   |
| Water vapor               | 0 - 150g/m <sup>3</sup>                    | TGS 2180  | S    | Microwave oven  |

## PRE-CALIBRATED SENSOR MODULES

| Target gas               | Range         | Model No. | Type | Typical application   |
|--------------------------|---------------|-----------|------|---|
| Carbon dioxide           | 0 - 40,000ppm | CDM 4160  | E(S) | Air quality control in buildings, homes & the agricultural industry |
|                          | 0 - 8,000ppm  | CDM 4161  | E(S) | Air quality control in buildings & homes                            |
| General air contaminants | 0 - 30ppm     | AMS 2600  | S    | Indoor air quality control  |
| Hydrogen                 | 0 - 100%LEL   | FCV 6813* | C    | Hydrogen leak detectors for fuel cell vehicles                      |
| Hydrogen, Methane & LP   | 0 - 100%LEL   | FCM 6812  | C    | Hydrogen & combustible gas leak detectors for fuel cells            |
| LP gas                   | 0 - 20%LEL    | LPM 2610  | S    | Gas alarms for homes  |
| Methane                  | 0 - 20%LEL    | NGM 2611  | S    | Gas alarms for homes  |

Types : S ; Semiconductor type  
 E(L); Liquid electrochemical type  
 E(S); Solid electrochemical type  
 C ; Catalytic type

\* : Under development

For sensor needs which are not shown above, please contact Figaro at the locations shown below.

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