

### TGS 5042 - for the detection of Carbon Monoxide

#### Features:

- \* Battery operable
- \* High repeatability/selectivity to CO
- \* Linear relationship between CO gas concentration and sensor output
- \* Simple calibration
- \* Long life
- \* UL recognized component
- \* Meets UL2034, EN50291, and RoHS requirements

#### Applications:

- \* Residential and commercial CO detectors
- \* CO monitors for industrial applications
- \* Ventilation control for indoor parking garages
- \* Recreational vehicle CO detectors
- \* Marine CO detectors
- \* Fire detection

Figaro's **TGS5042** is a battery operable electrochemical sensor which offer several advantages over traditional electrochemical sensors. Its electrolyte is environmentally friendly, it poses no risk of electrolyte leakage, can detect concentrations as high as 1% CO, operates in a range from -40° and +70°C, and it has lower sensitivity to interferant gases. With a long life, good long term stability, and high accuracy, this sensor is the ideal choice for CO detectors with digital display. OEM customers will find individual sensors data printed on each sensor in bar code form, enabling users to skip the costly gas calibration process and allowing for individual sensor tracking. TGS5042 utilizes a standard AA battery-sized package.



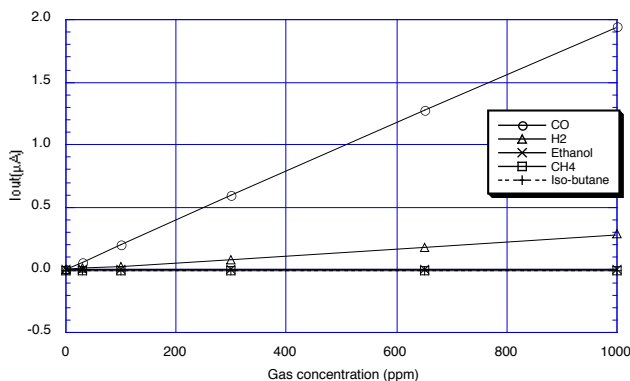
The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis shows the output current of the sensor ( $I_{out}/\mu A$ ) in each gas. Output current is linear to CO concentration, with a deviation of less than  $\pm 5\%$  in the range of 0~500ppm.

The figure below represents typical temperature dependency characteristics. The Y-axis shows the sensor output ratio ( $I/I_0$ ) as defined below. The linear relationship between  $I/I_0$  and CO concentration is constant regardless of the CO concentration range.

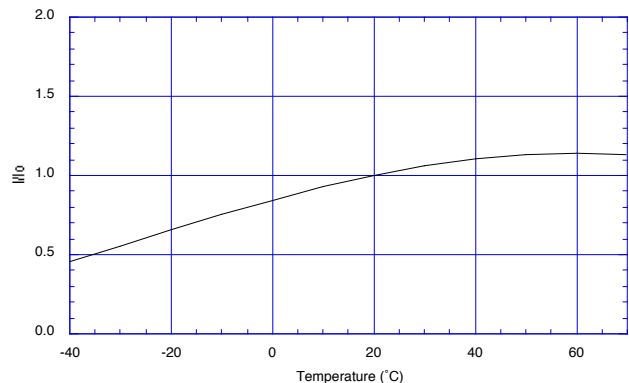
$I$  = Sensor output current in 400ppm of CO at various temperatures

$I_0$  = Sensor output current in 400ppm at 20°C/50%RH

#### Sensitivity Characteristics:



#### Temperature 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.

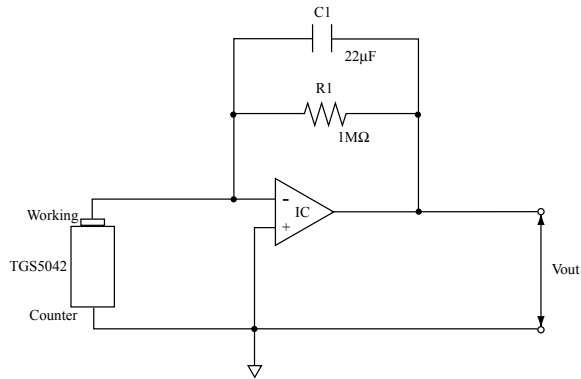
### Basic Measuring Circuit:

The diagram at the right shows the basic measuring circuit of TGS5042. The sensor generates a minute electric current which is converted into sensor output voltage (Vout) by an op-amp/resistor (R1) combination.

Figaro recommends the following electrical parts:

- R1 : 1M $\Omega$
- C1 : 22 $\mu$ F
- IC : AD708

**NOTE:** When voltage is applied to the sensor output terminal, the sensor may be damaged. Voltage applied to the sensor should be strictly limited to less than  $\pm 10$ mV. An additional resistor or FET is required to prevent polarization of the sensor when Vc is off.



**Basic measuring circuit of TGS5042**

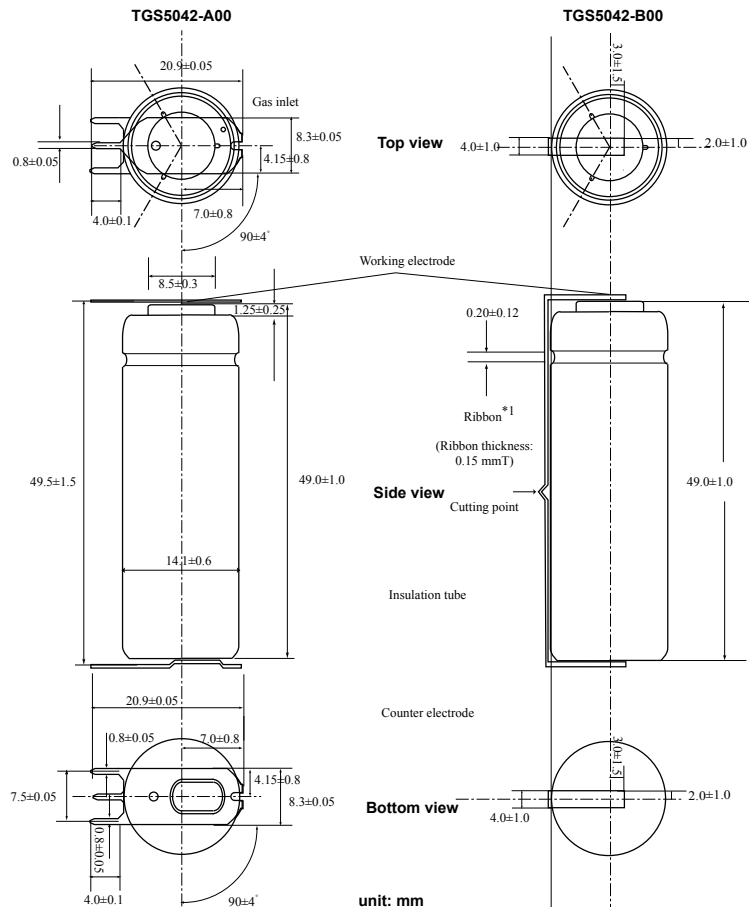
### Specifications:

| Item                     | Specification  |
|--------------------------|--|
| Model number             | TGS 5042-A00 (pin version)<br>TGS5042-B00 (ribbon version) |
| Target gases             | Carbon monoxide  |
| Typical detection range  | 0 ~ 10,000 ppm   |
| Output current in CO     | 1.2~2.4nA/ppm  |
| Baseline offset (*)      | $\leq \pm 10$ ppm equivalent                               |
| Operating temperature    | -10°C ~ +60°C (continuous)<br>-40°C ~ +70°C (intermittent) |
| Operating humidity       | 5 ~ 99%RH (no condensation)                                |
| Response time (T90)      | within 60 seconds  |
| Storage conditions       | -10°C ~ +60°C (continuous)<br>-40°C ~ +70°C (intermittent) |
| Weight                   | approx. 12g  |
| Standard test conditions | 20 $\pm$ 2°C, 40 $\pm$ 10%RH                               |

(\*) represents sensor output in air under operating conditions

**NOTE:** When ordering, please be sure to specify the full model number, including the suffix.

### Structure and Dimensions:



**NOTE 1:** When the sensor is shipped, the working electrode and counter electrode are connected (i.e. short circuited) by a spring (-A00) or a metal ribbon (-B00) in order to avoid polarization of the electrodes. To measure the sensor output, the spring should be removed (-A00) or the ribbon should be cut (-B00) and the sensor connected to a measuring circuit (see example above). The cutting point as indicated can be used to cut the ribbon easily.

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