

TGS 5042 - for the detection of Carbon Monoxide

Features:

- * Battery operable
- * High repeatability/selectivity to carbon monoxide (CO)
- * Linear relationship between CO gas concentration and sensor output
- * Low sensitivity to ethanol
- * Reduced influence by various interference gases
- * Long life

Applications:

- * Residential and commercial CO detectors
- * CO monitors for industrial applications
- * Ventilation control for indoor parking garages

Figaro's **TGS5042** is a new electrochemical CO sensor possessing improved characteristics. By using very low concentration alkaline electrolyte, integration of an extremely small amount of noble metal catalyst into the catalyst layer, and application of a separator, TGS5042 has the advantage of being more environmentally friendly than traditional electrochemical sensors. Using a dry battery structure, TGS5042 poses no risk of electrolyte leakage and offers characteristics superior to those of traditional electrochemical CO sensors.



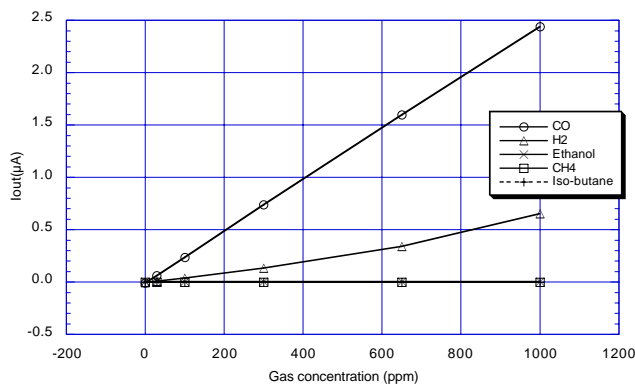
The figure below represents typical sensitivity characteristics, all data having been gathered at standard test conditions (see reverse side of this sheet). The Y-axis shows the output current of the sensor ($I_{out}/\mu A$) in each gas. Output current is linear to CO concentration, with a deviation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

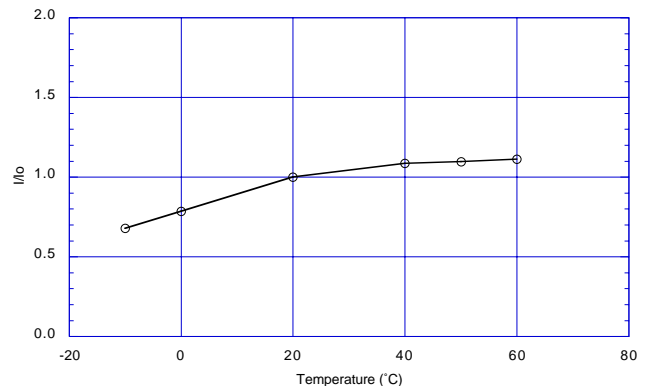
I = Sensor output current in 400ppm of CO at various temperatures

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

Sensitivity Characteristics:



Temperature Dependency:



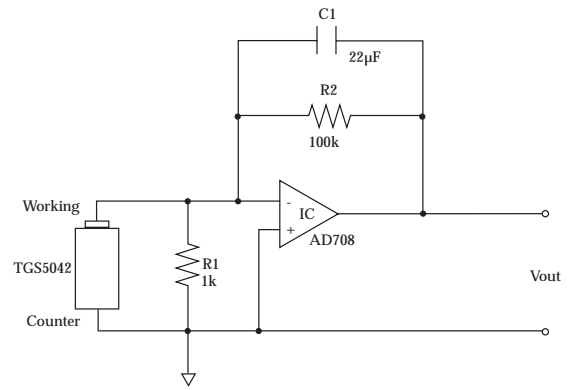
Basic Measuring Circuit:

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 (V_{out}) by an op-amp/resistor (R_2) combination. An additional resistor (R_1) is required to prevent polarization of the sensor when circuit voltage is off.

Figaro recommends the following electrical parts:

- R1 : 1k Ω
- R2 : 100k Ω
- C1 : 22 μ 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 ± 10 mV.



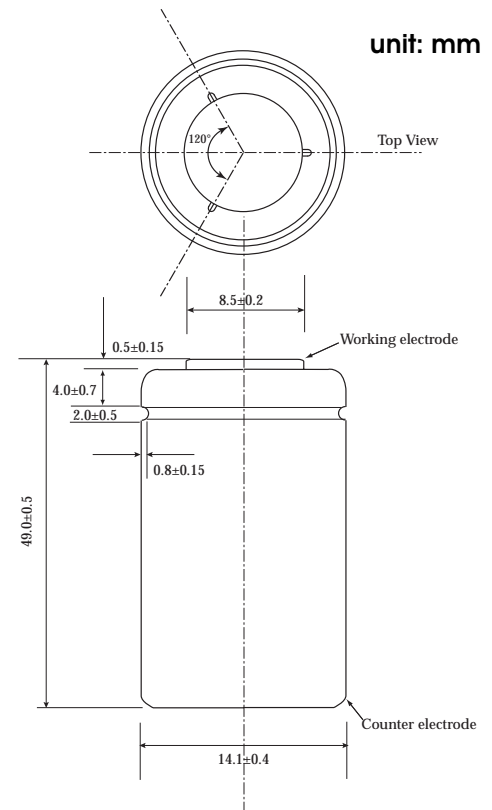
Basic measuring circuit of TGS5042

Specifications:

| Item | Tentative Specification |
|--------------------------|--|
| Model number | TGS 5042 |
| Target gases | Carbon monoxide |
| Typical detection range | 0 ~ 1000 ppm |
| Output current in CO | 1.00~3.75nA/ppm |
| Baseline offset | < ± 15 ppm equivalent |
| Operating temperature | -10 ~ +60 $^{\circ}$ C |
| Operating humidity | 5 ~ 99%RH (no condensation) |
| Response time (T90) | within 60 seconds |
| Expected accuracy (*) | $\pm 20\%$ at 0-100ppm of CO $\pm 15\%$ at 100-500ppm of CO (at 20 $\pm 5^{\circ}$ C/50 $\pm 20\%$ RH) |
| Storage conditions | -40 ~ +70 $^{\circ}$ C |
| Weight | approx. 12g |
| Standard test conditions | 20 $\pm 2^{\circ}$ C, 40 $\pm 10\%$ RH |

(*) assumes calibration points of 0 and 500ppm of CO, exposure time of 4 minutes, one day of aging in detector.

Structure and Dimensions:



FIGARO ENGINEERING INC.

1-5-11 Senba-nishi
Mino, Osaka 562-8505 JAPAN
Phone: (81)-72-728-2561
Fax: (81)-72-728-0467
email: figaro@figaro.co.jp