

General Precautions on the Usage of Figaro Semiconductor Gas Sensors

Applicable to TGS8xx, TGS2xxx, and TGS38xx series

Situations which must be avoided

1) Exposure to silicone vapors

If silicone vapors adsorb onto the sensor's surface, the sensing material will be coated, irreversibly inhibiting sensitivity. Avoid exposure where silicone adhesives, hair grooming materials, or silicone rubber/putty may be present.

2) Highly corrosive environment

High density exposure to corrosive materials such as H₂S, SO_x, Cl₂, HCl, etc. for extended periods may cause corrosion or breakage of the lead wires or heater material.

3) Contamination by alkaline metals

Sensor drift may occur when the sensor is contaminated by alkaline metals, especially salt water spray.

4) Contact with water

Sensor drift may occur due to soaking or splashing the sensor with water.

5) Freezing

If water freezes on the sensing surface, the sensing material would crack, altering characteristics.

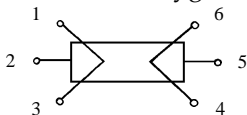
6) Application of excessive voltage

If higher than specified voltage is applied to the sensor or the heater, lead wires and/or the heater may be damaged or sensor characteristics may drift, even if no physical damage or breakage occurs.

7) Application of voltage on lead wires (8-series only)

On six-pin type sensors, if a voltage is applied on the lead wires between pins 1 and 3 and/or pins 4 and 6, this would cause breakage of the lead wires.

8) Operation in zero/low oxygen environment



TGS sensors require the presence of around 21% (ambient) oxygen in their operating environment in order to function properly and to exhibit characteristics described in Figaro's product literature. TGS sensors cannot properly operate in a zero or low oxygen content atmosphere.

Situations to be avoided whenever possible

1) Water condensation

Light condensation under conditions of indoor usage should not pose a problem for sensor performance. However, if water condenses on the sensor's surface and remains for an extended period, sensor characteristics may drift.

2) Usage in high density of gas

Sensor performance may be affected if exposed to a high density of gas for a long period of time, regardless of the powering condition.

3) Storage for extended periods

When stored without powering for a long period, the sensor may show a reversible drift in resistance according to the environment in which it was stored. The sensor should be stored in a sealed bag containing clean air; do not use silica gel. *Note that as unpowered storage becomes longer, a longer preheating period is required to stabilize the sensor before usage.*

4) Long term exposure in adverse environment

Regardless of powering condition, if the sensor is exposed in extreme conditions such as very high humidity, extreme temperatures, or high contamination levels for a long period of time, sensor performance will be adversely affected.

5) Vibration

Excessive vibration may cause the sensor or lead wires to resonate and break. Usage of compressed air drivers/ultrasonic welders on assembly lines may generate such vibration, so please check this matter.

6) Shock

Breakage of lead wires may occur if the sensor is subjected to a strong shock.

7) Soldering

Ideally, sensors should be soldered manually. However, wave soldering can be done under the following conditions:

a) *Suggested flux: rosin flux with minimal chlorine*

b) *Speed: 1-2 meters/min.*

c) *Preheating temperature: 100±20°C*

d) Solder temperature: 250±10°C

e) Up to two passes through wave soldering machine allowed

Results of wave soldering cannot be guaranteed if conducted outside the above guidelines since some flux vapors may cause drift in sensor performance similar to the effects of silicone vapors. Regarding soldering conditions for 8-type gas sensors, please refer to the document *Technical Advisory for Soldering of 8-type Gas Sensors*.

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