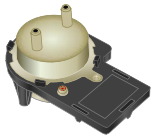
Pyrolysis-Particle Detection Method
Sensor: SS

Stationary sensor
Example: SS-1923



1. Brief description

This gas sensor heats the detectable gas to produce an oxide and measures particles of the oxide using a particle sensor. Maintaining stability over the long term, it exhibits an excellent interference resistance and responsiveness. The particle sensor is based on the same principles as for ionization-based smoke sensors that use radiation.

Category	Detectable gas
Other methods	Toxic

2. Structure and principles

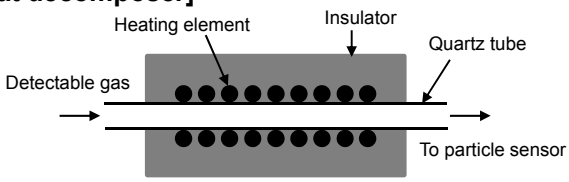
[Structure]

This sensor is typically a combination of a heat decomposer and particle sensor. In the center of the heat decomposer is a quartz tube wrapped with a heating element.
The particle sensor is an integration of a measurement chamber, which continuously generates ion currents using α rays, and a compensation chamber. Detectable gas enters only the measurement chamber, with the compensation chamber open to the atmosphere.

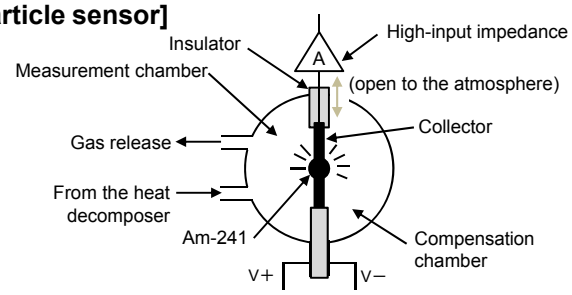
[Principles]

Many of organic metal gases such as TEOS, when heated, produce a particulate oxide. Detectable gas passes through the heat decomposer to become oxidized and enters the particle sensor.
In the measurement chamber of the particle sensor, an alpha-ray source (Americium-241 (Am-241)) is used to ionize air, causing a current to flow. Particles enter the measurement chamber and absorb ions; this decreases the ion current, resulting in reduced sensor output. Based on the reduction in output, the sensor determines the gas concentration. The compensation chamber compensates fluctuations in sensor output caused by temperature, humidity, and/or pressure.

[Heat decomposer]



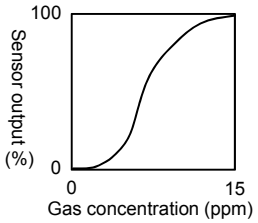
[Particle sensor]



3. Features (of the SSU-1925 (TEOS sensor) based on PLU + GD-70D as an example)

○ Output characteristics

The sensor output depends on the concentration of the particles produced through heat decomposition. The sensor uses a calibration curve so that the gas concentration will be linear with respect to the reading.

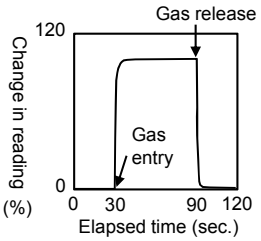


○ Aging characteristics

As the radiation source, the sensor uses Am-241, which has a very long half-life, approximately 400 years, and the sensor consequently hardly deteriorates in performance over time.

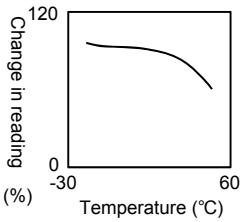
○ Responsiveness

Since the gas that enters the detection section is immediately oxidized in the heat decomposer, the sensor exhibits high response speed and excellent reproducibility.



○ Temperature characteristics

The sensor uses the compensation chamber to compensate temperature and thus exhibits excellent temperature characteristics.



4. Detectable gas, molecular formula, model, and detection range (examples)

Detectable gas	Molecular formula	Model #	Detection range
Tetraethoxysilane (TEOS)	$C_8H_{20}O_4Si$	SS-1923	0-15 ppm
		SSU-1925	

5. Products of this type (examples)

○Stationary products

... GD-70D + PLU-70

GD-70D + PLU-70