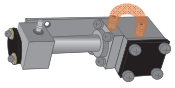
Non-Dispersive Infrared Method Sensor: DE

Stationary sensor
Example: IRF-1301

Stationary sensor
Example: DE-3315-1



Portable sensor
Example: DE-3123-1

1. Brief description

Based on the fact that many gases absorb infrared rays, this sensor applies infrared light to the measurement cell to detect changes in infrared light caused by the absorption of a detectable gas. It seamlessly detects all infrared light in a particular wavelength range without separating (dispersing) infrared light on a wavelength basis.

Category	Detectable gas
Optical	Combustible / Toxic

2. Structure and principles

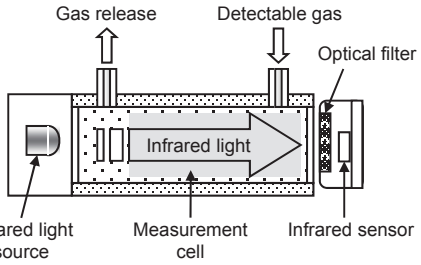
[Structure]

This sensor is structured with an infrared light source and an infrared sensor, between which a measurement cell and an optical filter are placed. The infrared light source emits infrared light, which passes through the measurement cell and optical filter to be detected by the infrared sensor. The optical filter selectively allows the infrared wavelengths that the appropriate detectable gas absorbs to pass through it.

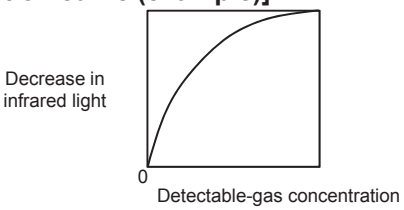
[Principles]

A detectable gas enters the measurement cell and absorbs infrared light. This reduces the amount of infrared light detected by the infrared sensor. Some detectable gases where the concentrations are known are entered to determine the relationship (calibration curve) between the decrease in infrared light amount and the concentration of each detectable gas. When a detectable gas where the concentration is unknown is entered, the sensor uses the calibration curve based on the measured decrease in infrared light amount to determine the gas concentration.

[Structure]



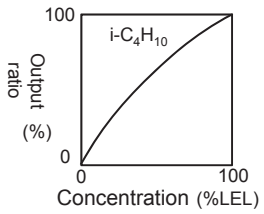
[Calibration curve (example)]



3. Features (of the sensor DE-3313-5 as an example)

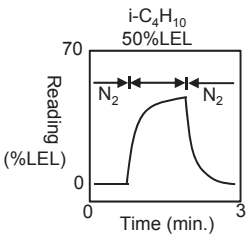
○ Output characteristics

The gas concentration and sensor output are not in proportional to each other but in a relationship as shown by the curve in the right figure. ($i\text{-}C_4H_{10}$: isobutane)



○ Responsiveness

When gas is supplied to the gas sensor at a constant flow rate, the sensor excellently reproduces responses.

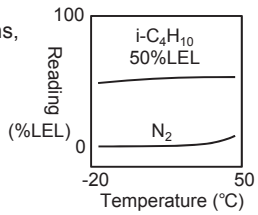


○ Aging characteristics

In an environment with small variations in temperature, the sensor remains stable without showing large deterioration in reading accuracy over time. Depending on the environment, the sensor may significantly deteriorate over time. If this is the case, you can minimize the deterioration by performing gas calibration every six months or so.

○ Temperature and humidity characteristics

By performing temperature corrections, you can minimize the dependency of readings on temperature within the specified temperature range.
When no condensation has formed inside the gas cell, the sensor is almost not affected by humidity.



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

Detectable gas	Molecular formula	Model #	Detection range
Carbon dioxide	CO_2	IRR-0409	0-5vol%
Carbon dioxide	CO_2	IRR-0433	0-10000ppm
Methane	CH_4	IRF-1301	0-100%LEL
HFC-134a	$C_2H_2F_4$	DE-2113-35	0-5000 ppm
Methane tetrafluoride	CF_4	DE-2113-42	0-500 ppm
Sulfur hexafluoride	SF_6	DE-2113-43	

5. Products of this type (examples)

○Stationary products

... SD-3RI, SD-3DRI, SD-1RI, SDWL-1RI, RI-600, GD-70D, RI-257

○Portable products

... GX-3R Pro, RX-8000, RX-8500, RX-8700, RI-557

SD-3RI