New Ceramic Catalytic Method Sensor: NC

Stationary sensor
Example: NCF-6319

Stationary sensor
Example: NC-6239

Portable sensor
Example: NCR-6309

1. Brief description

This sensor uses a ultra-atomized oxidant catalyst (a new ceramic) to detect gas in a wide range of concentrations from a low level (ppm) to the lower-explosion-limit (LEL). It is an epoch-making sensor independently developed by us as a sensor designed specifically for combustible gas.

Category	Detectable gas
Solid	Combustible

2. Structure and principles

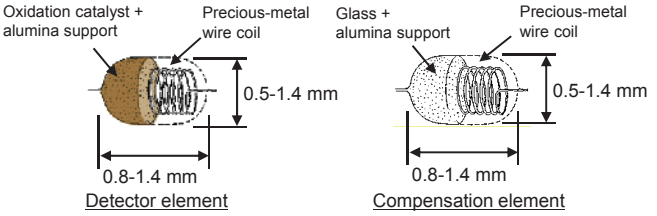
[Structure]

A new ceramic-based sensor consists of a detector element and a compensation element (some models include no compensation element). The detector element consists of a coil of a precious-metal wire and a ultra-atomized oxidant catalyst (a new ceramic)—a catalyst active against combustible gas—sintered on the coil along with an alumina support. The element burns in reaction to any detectable gas. The compensation element consists of a coil of a precious-metal wire and glass—a substance inactive against combustible gas—sintered on the coil along with an alumina support. This element corrects the effect of the atmosphere.

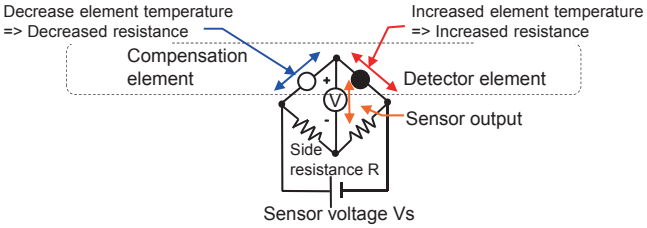
[Principles]

The precious-metal wire coil heats the detector element to 300℃ to 450℃. Then, a combustible gas burns on the surface of the detector element, increasing the temperature of the element. With changes in temperature, the precious-metal wire coil, a component of the element, changes in resistance. The resistance changes almost in proportion to the concentration of the gas. The bridge circuit allows the sensor to recognize the change in resistance as the voltage to determine the concentration of the gas.

[Conceptual rendering of the sensor elements]



[Bridge circuit]



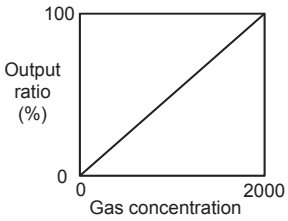
3. Features(of the sensor NC-6239 as an example)

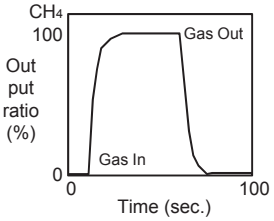
○ Output characteristics

The catalyst used in the detector element provides improved combustion reactivity. This efficiently produces combustion heat, allowing the sensor to detect lower concentrations (ppm) of gases undetectable by catalytic combustion-based sensors.

○ Responsiveness

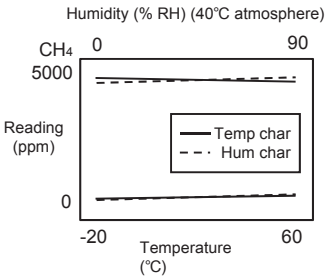
The combustion heat produced on the surface of the detector element transfers to the precious-metal wire coil, changes the resistance of the bridge circuit, and then transforms into signals. With a high reaction rate, this sensor excels in responsiveness, accuracy, and reproducibility.





○Temperature and humidity characteristics

The materials used in the elements have high electrical resistances and less likely to be affected by the temperature and humidity in the use environment, allowing the reading to stay almost constant.



○ Detectable concentrations

The sensor detects a wide range of concentrations from low levels (ppm) to high levels (% LEL).

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

Detectable gas	Molecular formula	Model #	Detection range
Combustible gases in general	-	NCR-6309	0-100%LEL
Combustible gases in general	-	NCF-6319	0-100%LEL
Methane	CH_4	NCF-6318	0-100%LEL
Combustible gases in general	-	NC-6211	ppm level to 100% LEL
Methane	CH_4	NC-6239	
Vinyl chloride	C_2H_3Cl	NC-6214	

5. Products of this type (examples)

○Stationary products

... SD-3NC, SD-3DNC,
GD-A80, GD-A80D, SD-1 (TYPE NC),
SD-D58･DC (TYPE NC)

○Portable products

... GX-3R, GX-3R Pro, GP-03,
GX-2012, GX-8000

GX-3R Pro