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Panasonic Develops an Ultrasonic Gas Flow and Concentration sensor for Hydrogen

This represents the industry's first sensor¹ enabling real-time simultaneous measurement of the flow rate and concentration of hydrogen under a highly humid environment



Osaka, Japan – Panasonic Corporation has developed an ultrasonic gas flow and concentration sensor for hydrogen that enables the real-time simultaneous measurement of the flow rate and concentration of hydrogen under a highly humid environment for the first time in the industry¹.

In recent years, with growing interest in hydrogen as the next generation energy, actions aimed at utilizing hydrogen energy are actively being promoted around the world. With the aim of further spreading and expanding fuel cells that generate electricity through the chemical reaction of hydrogen, the research and evaluation of stack units used as key components are becoming increasingly important.

However, it is difficult for fuel cells to cause a full reaction of all of supplied hydrogen, and the unreacted hydrogen is exposed to high temperature and very humid conditions due to heat and water produced through the chemical reaction. In order to increase the efficiency of stack unit evaluation and the utilization ratio of hydrogen, it is effective to collect and recycle unreacted hydrogen. However, there is a problem whereby it is difficult for the conventional thermal flow rate sensor and concentration sensor to accurately measure the unreacted hydrogen because the sensor has poor performance under humid conditions.

This time, Panasonic has developed a technology that enables the simultaneous measurement of the flow rate and concentration of hydrogen under a highly humid environment by making use of its ultrasonic gas measurement technology through the development of gas meter devices, and the knowledge as a leader in household fuel cells. This technology is incorporated into the ultrasonic gas sensor for measuring the flow rate and concentration of hydrogen under a highly humid

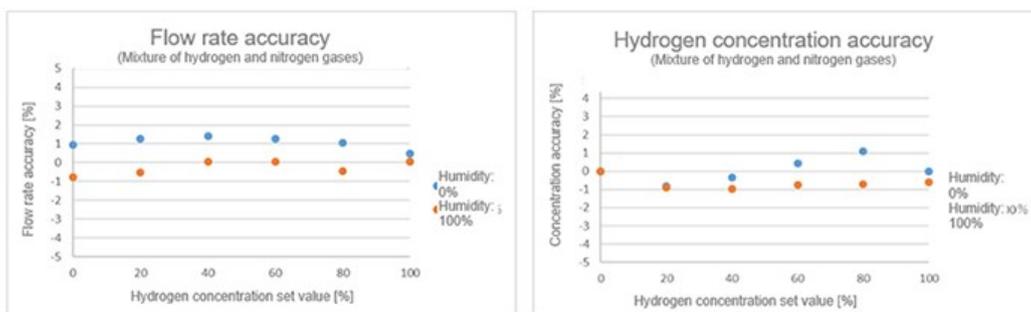
environment. The use of this sensor for both research and evaluation purposes is expected to accelerate the development of hydrogen energy-related technologies.

Panasonic will contribute to the realization of a carbon-free society through the development of hydrogen energy-related technologies.

Main features of the developed product

1. Enabling the simultaneous measurement of the flow rate and concentration of hydrogen under a highly humid environment

The product achieves the simultaneous measurement of the flow rate and concentration of hydrogen under a highly humid environment through the use of Panasonic's ultrasonic measurement technology and fluid control technology through the development of gas meter devices. The use of the sensor simplifies system configurations for evaluating pure hydrogen fuel cells and fuel cell stack units.



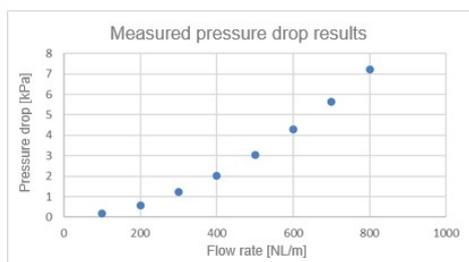
Measurement results of the flow rate and concentration of hydrogen under a highly humid environment (Flow rate: 25 NL/m at 35°C under ambient pressure)

2. Enabling the measurement of a wide range of hydrogen flow rate and concentration

With regard to hydrogen energy-related technologies including for pure hydrogen fuel cells, the flow rate of supplied hydrogen varies significantly depending on the application. The developed product adopts Panasonic's signal processing technology developed in-house, thereby allowing the measurement of hydrogen flow rates ranging from 0 to 700 NL/min. This achieves a more efficient evaluation of hydrogen without the need for using different measuring instruments depending on the use conditions.

3. Achieving low pressure-drop performance even when measuring high-flow gases

The adoption of the ultrasonic method for gas measurements achieves a low pressure-drop performance. This allows the measurement of the flow rate and concentration of gases without causing a negative impact such as a reduction in flow.



Main specifications of the developed product

Item	Specifications
Target gas	H ₂ , N ₂ , O ₂ , Air
Flow rate range	0 to 700 NL/min (H ₂ : 100%)
Flow rate accuracy ²	±3.0% RD (H ₂ : 100%, Flow rate: 100 to 700 NL/min) ±3 L (H ₂ : 100%, Flow rate: < 100 NL/min)
Concentration accuracy ²	±2.0% (H ₂ : 100%)
Operating humidity range	0 to 100% RH
Water resistance ²	Measurable even when droplets flow in
Operating temperature range	0 to 70°C
Size	300 x 177 x 96 mm

*1 Panasonic data as of August 18, 2020

*2 These specifications may vary depending on measurement and sensor installation conditions.

The product announced in this release is under development and its specifications may be subject to change without prior notice.

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About Panasonic

Panasonic Corporation is a worldwide leader in the development of diverse electronics technologies and solutions for customers in the consumer electronics, housing, automotive, and B2B businesses. The company, which celebrated its 100th anniversary in 2018, has expanded globally and now operates 528 subsidiaries and 72 associated companies worldwide, recording consolidated net sales of 7.49 trillion yen for the year ended March 31, 2020. Committed to pursuing new value through innovation across divisional lines, the company uses its technologies to create a better life and a better world for its customers. To learn more about Panasonic:

<https://www.panasonic.com/global>.

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