Automotive Hydrogen Leak Detector

Catalytic-combustion H_2 sensor for fuel-cell vehicles

A compact hydrogen detector for leak monitoring on fuel-cell vehicles. The granular electroplated sensing element gives a fast response, high resistance to poisoning and a long service life; the PWM output drops straight into the vehicle ECU without a separate conditioning module.



FH2-HY04-GS2 · 4-pin connector

Key features

- Start-up time under 1 second
- T80 response under 2 seconds
- High resistance to HMDSO / D5 poisoning
- Service life over 20,000 operating hours
- Built-in temperature compensation
- PWM output at 250 Hz, direct to the ECU
- Compact and light for on-board fitting
- Catalytic combustion — no electrolyte

How the measurement is made

Sensing element

A granular electroplated Pt/Pd element burns any hydrogen that reaches it. The heat of combustion changes its resistance.

Reference element

A matched Pt/SiO_2 element sees the same ambient air but no hydrogen, so temperature and humidity drift cancel out.

PWM output

The bridge signal becomes a 250 Hz duty. H_2 (ppm) = 500 × (Duty % − 10), so 10 % duty is hydrogen-free air and 90 % is 40,000 ppm.

Installation & handling

- Mount with the sensor opening facing down — calibration is done in this attitude.
- Do not block or cover the membrane opening.
- Do not mount on a curved surface.
- Do not connect the reserved pin to GND; it causes a calibration error.
- Avoid mechanical shock, dropping, or piercing the PTFE membrane.
- Never apply high-pressure air or liquid directly to the membrane.
- Keep clear of continuous temperatures above 120 °C — the housing deforms.

Electrical interface

4-pin automotive connector — Sumitomo Wiring Systems 6189-1231

1 PWM output signal	2 Reserved (calibration / test)	3 Power input (+)	4 GND (power & signal)

Technical data

Quoted at 12 V supply and 25 °C unless stated otherwise. The 0–40,000 ppm range is 0–4.0 vol% H_2 in air.

Core performance parameters

Item	Specification
Detection gas	Hydrogen (H_2)
Detection range	0 – 40,000 ppm (0 – 4.0 vol% in air)
Initial accuracy	± 10 % over 10,000 – 40,000 ppm
Power supply	DC 9 – 16 V (nominal 12 V)
Power consumption	1 W
Output signal	PWM, 250 Hz — H_2 (ppm) = 500 × (Duty % − 10)
Housing material	PBT + PC-(GF + GS) 40 — marking FH2-HY04-GS2

Operating & environmental ratings

Item	Rating
Operating temperature	−35 °C to +85 °C, < 95 %RH non-condensing
Storage temperature	−40 °C to +105 °C, < 95 %RH non-condensing
Physical dimension	62.2 (W) × 49.0 (D) × 22.5 (H) mm
Weight	58 ± 2 g
Cross-sensitivity	No interference from 5,000 ppm HC, CO, dimethyl ether or alcohol

Structure & materials

Item	Material
Housing	PBT + PC-(GF + GS) 40
Detection sensor	Pt wire 30 μm + Pd — granular electroplating element
Reference sensor	Pt wire 30 μm + SiO_2
Membrane	PTFE — water-resistant, must not be punctured
Terminals	C2600W-3/4H, Sn 0.8 / 1.5 μm, 2 pcs

Reliability summary

Item	Result
Sensitivity drift	< ± 20 % after long-term exposure to HMDSO / D5 contaminant
Long-term stability	Verified powered and un-powered over 19,000+ h continuous operation
Target application	On-board leak detection for fuel-cell vehicles

Note
For application reference only. Specifications are subject to change without prior notice; confirm the harness and mounting attitude against the vehicle drawing at order.