



# H2SENS

Hydrogen sensors for transformer dissolved gas monitoring using our proven DGA platform

Advance hydrogen sensing technology using palladium-nickel alloys with proprietary materials coating to protect the sensor, enabling it to measure hydrogen in oil or gas phase of power transformers and ancillary equipment.

This solid-state sensing element is hydrogen specific, inert to other transformer gases and can be immersed directly in the transformer oil during normal operation to measure hydrogen levels continuously. H2SENS platform has no consumable components or any degradation of the sensor, does not require carrier or calibration gases to maintain accuracy and has a theoretically unlimited useful life.



## TECHNICAL SPECIFICATIONS

Parameter	Oil Phase	Gas Phase
Measurement Accuracy Range	25 - 5,000 ppm	500 - 100,000 ppm
Accuracy <sup>1</sup>	20% of reading or 25 ppm <sup>†</sup>	20% of reading or 500 ppm
Repeatability <sup>2</sup>	10% of reading or 15 ppm <sup>†</sup>	10% of reading or 300 ppm
Response Time	< 60 minutes	< 60 minutes
Operating Temperature (Ambient)	40°C to +70°C	-40°C to +70°C
Storage Temperature	-40°C to +85°C	40°C to +85°C
Oil Temperature Range <sup>3</sup>	-40°C to +105°C	n/a
Data Log Storage	1 Year	1 Year
Cross-sensitivity to H <sub>2</sub> O, CO <sub>2</sub> , C <sub>2</sub> H <sub>2</sub> , C <sub>2</sub> H <sub>4</sub> , CO, etc.	<1%	<1%
Serial Communications	RS485, MODBUS RTU	RS485, MODBUS RTU
Power Supply	9-48 VDC, 10 Watt	9-48 VDC, 10 Watt

<sup>†</sup> whichever is greater

## PHYSICAL SPECIFICATIONS

### Wetted Materials

316SS, 40% mineral filled Nylon, polyimide, glass

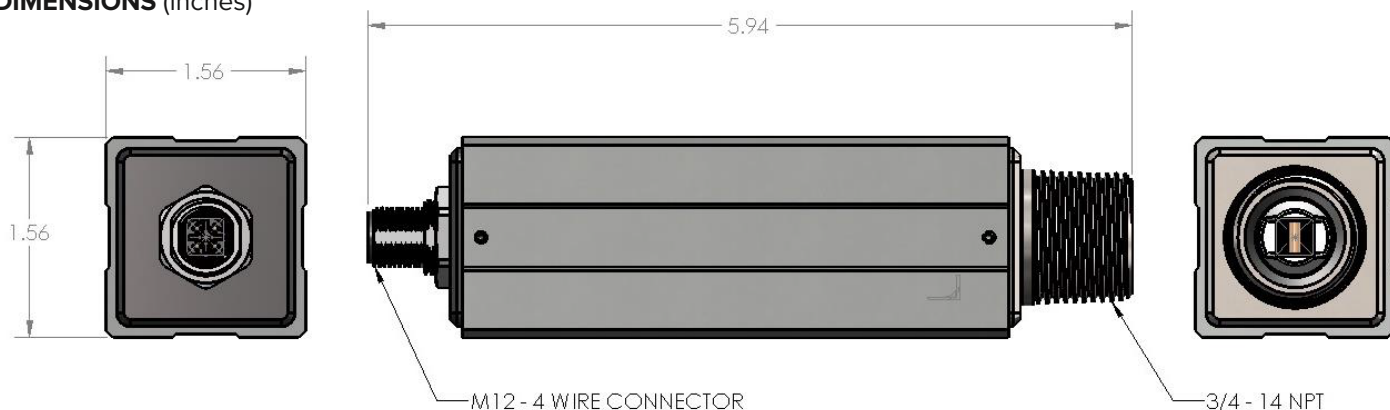
### Sealing

Hermetic glass-to-metal feedthrough, Buna-N gaskets

### Housing

Hard Anodized 6061 Aluminum

### DIMENSIONS (inches)



### Ratings

CE Mark (IEC 61000)  
ROHS 2011/65/EU compliant  
EMC/RFI and Other Electrical Certification

- IEC 55022 IFCC Part 15
- IEC 55024
- IEC 55011
- IEC 61000-4-2 through 61000-4-6, and 61000-4-8
- IEC 61010-1
- IEC 60255-5
- IEC 61326

### Humidity and Corrosion Resistance

Class C5M Marine rated; salt-water condensing  
(IEC 60068-2-11 & DIN EN ISO 12944)

### Ingress Protection

IP68; 25 feet water for 14 days  
(IEC 60529)

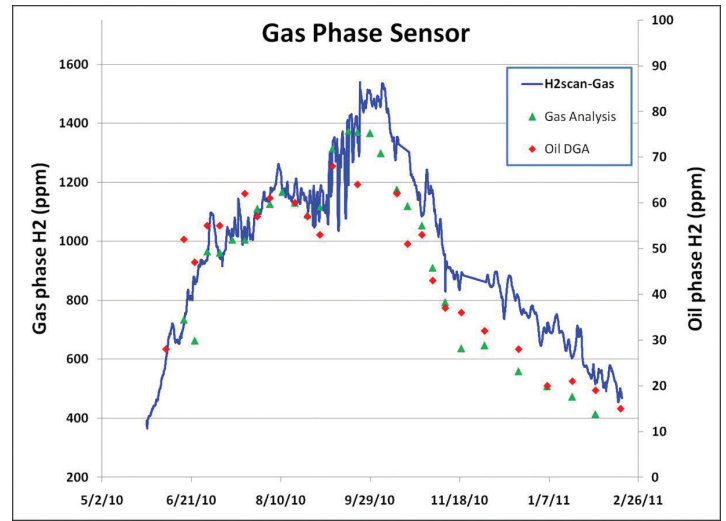
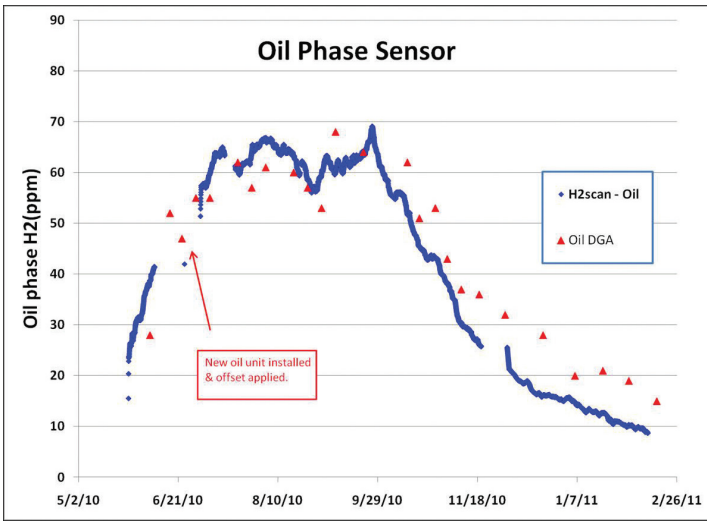
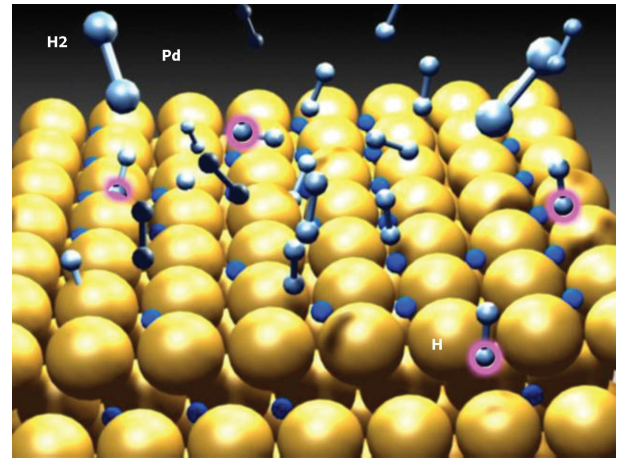
### Vibration

3-axis Sinusoidal, Wideband and Random  
[Simulated Long-Life] (IEC 60068-2-6 table C.2, IEC 60068-2-64 paragraph A.2, category no. 2, IEC 61373: 2010 Cat 1B section 9)  
Shock: 30g, shock duration 18ms (IEC 60068-2-27)

# H2 SENSOR KEY FEATURES AND BENEFIT

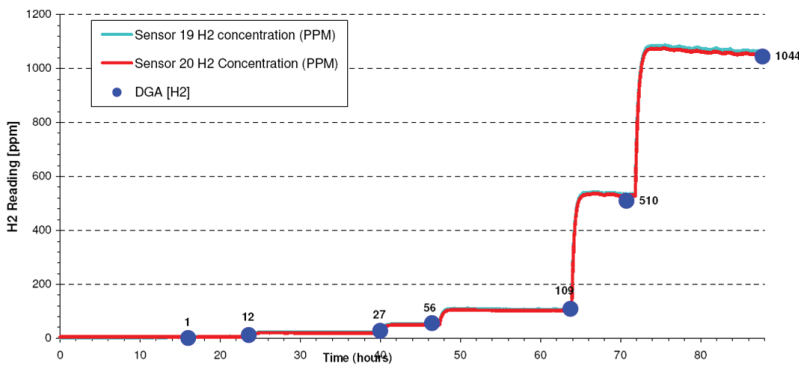
H2SENS sensor is based on many years of research, experience and commercial success in various industries, including petroleum refineries, chemical production, nuclear power plants and fuel cells. H2SENS sensor is developed specifically for monitoring hydrogen in electric power transformers and other oil filled apparatus.

H2SENS sensors can be retrofitted onto active transformers without having to de-energize them. Unlike other technologies, H2SENS sensor technology does not suffer from signal saturation at high hydrogen concentrations. The sensor continuously measures oil temperature and provides an oil-temperature corrected hydrogen signal that can be used to activate relays and provide early warnings of a transformer failure.

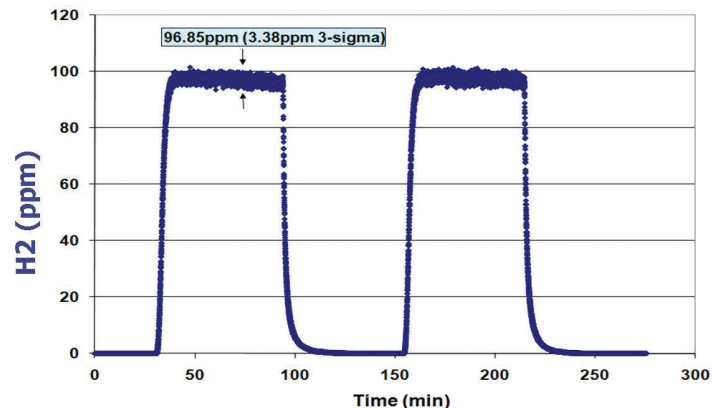


- Low cost solution for key incipient fault marker that is easy to install and maintain
- Operates immersed directly in transformer oil or headspace
- Continuous hydrogen monitoring reveals potential faults to ensure timely action and avoid downtime
- Reduced dependence on costly oil sample based DGA diagnostics
- No membrane, consumables, moving parts or reference gas

# H2 SENSOR PERFORMANCE



Sensor matches DGA readings in Oil Phase



Sensor performance in Gas Phase

## H<sub>2</sub> SENSOR FOR TRANSFORMERS AND OTHER OIL FILLED ASSETS

May be installed on New and Retrofit Applications

- Any class of oil filled transformer (Transmission /Distribution /Commercial /Industrial)
- Instrument Transformers
- Load Tap Changers and other oil-filled assets



Transformer Installation



### Rugged Monitoring Services

Rugged Monitoring provides customization of sensors, monitors & software. In addition we offer on-site commissioning services, maintenance contracts and technical support to all customers worldwide.



### About Rugged Monitoring

Industry leading team of fiber optic experts with 100+ years of combined experience committed to delivering customizable solutions for challenging applications. We offer a range of reliable, high performance, customizable sensors and monitoring solutions that are immune to external influence.

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