

HY-VAULT™

UNDERGROUND TRANSFORMER MONITORING



Enhance Underground Transformer Safety, Reduce Risks and Optimize Maintenance with HY-VAULT

H2scan's HY-VAULT™ is a next-generation transformer monitoring solution that enhances the safety, reliability, and efficiency of underground network transformers. By combining H2scan's proven GRIDSCAN® 5000 series of hydrogen sensors with the AVO-1, HY-VAULT delivers real-time insight across underground transformer fleets. This empowers power utilities to make smarter, data-driven maintenance decisions and improve overall safety.

H2scan's unique HY-VAULT solution allows power utilities to:

- Improve personnel & public safety
- Optimize human & OPEX resources
- Minimize unplanned outages that impact large city blocks
- Enhance grid resilience
- Create a safer working environment for maintenance group

Ensure the safety, reliability, and continuity of your underground transformer fleet with HY-VAULT. H2scan's HY-VAULT solution measures hydrogen generation, a leading indicator of an impending failure in network transformers. That knowledge allows grid operators to reduce unplanned outages, protect personnel and formulate maintenance plans that keep power flowing to businesses, homes, and critical infrastructure.

A Viable Underground Transformer Monitoring Solution For Urban Environments

Rapid Deployment:

Quick installation and commissioning (hours, not weeks)

Long Life Hydrogen Sensor:

Standard 3-year warranty on the product and 10-year warranty on the hydrogen sensing element

Patented Self-Calibration:

Eliminates drift and need for periodic calibration thus maximizing uptime

High-Temperature Resilience:

Engineered for continuous operation at 125°C (257°F) supporting deployment in network protector cabinets

Rugged and Reliable: IP68-rated with marine-grade corrosion resistance for harsh environmental conditions

Broad Connectivity: IoT/SCADA ready with Modbus or DNP3. Also, supports analog (0.5 to 5 VDC)



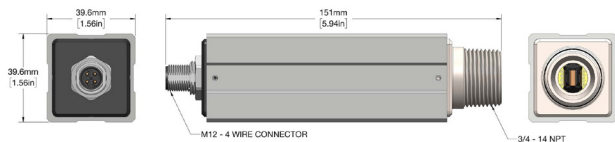
AVO-1 Specifications

Technical Specifications	
Voltage Input	120-125 VAC
Operating Temperature	-40°C to 125°C (-40°F to 257°F)
Storage Temperature	-40°C to 125°C (-40°F to 257°F)
Analog Output	0.5 to 5 VDC
Voltage Output (For Sensor)	24 VDC

GRIDSCAN® 5000 Series Specifications

Hydrogen Sensor Specifications		Physical Specifications	
Response Time	< 60 minutes	Wetted Materials and Internal Sealing	316SS, 40% mineral filled nylon, polyimide, viton (fluoropolymer elastomer), hermetic glass-to-metal feed-through
Storage Temperature	-40°C to 85°C (-40°F to 185°F)	External Housing and Sealing	Hard anodized 6061 aluminum, 40% mineral filled nylon, viton (fluoropolymer elastomer), nickel-plated zinc (4-wire connector)
Data Log Storage	1 year	Humidity and Corrosion Resistance	Class C5M marine equivalent; salt-water condensing (IEC60068-2-11 & DIN EN ISO 12944)
Cross-sensitivity to H ₂ O, CO ₂ , C ₂ H ₂ , C ₂ H ₄ , CO, etc.	<2%	Ingress Protection	IP68; 7.62 m [25 ft.] water for 14 days (IEC 60529)
Serial Communications	2-Wire RS485, Modbus, DNP3	Certifications	FM Approved - FM 6520:2022 (In Liquid Phase) ⁴ , CE Mark, ROHS 2011/65/EU compliant, EMC/RFI Electrical Certification, IEC 55022 IFCC Part 15, IEC 55011, IEC 61000-4-2 through 61000-4-4, 61000-4-6, and 61000-4-8, IEC 61010-1, IEC 61326, IEC 60068-2-30
Power Supply	12-48 VDC, 10 W	Vibration	3-axis Sinusoidal, Wide-band and Random [Simulated Long-Life] (IEC 60068-2-6 table C.2, IEC 60068-2-64 paragraph A.2, category no. 2)
Environment	IP68 (7.62 m [25 ft.] water for 14 days) – Marine rated assembly (C5M equivalent)	Shock	30 g, shock duration 18 ms (IEC 60068-2-27)
Insulating Liquid Supported	Mineral oil, silicone, natural ester, synthetic ester		

GRIDSCAN Series Dimensions



Model	H ₂ Measurement Range	Accuracy	Repeatability	Operating Temperature (Ambient)	Sensor Temperature Range
5000, 5010	Oil Phase: 25 - 5,000 ppm Gas Phase: 25 - 5,000 ppm in-oil equivalent	20%	10%	-40°C to 70°C (-40°F to 158°F)	Oil Phase: -40°C to 105°C (-40°F to 221°F) Gas Phase: -40°C to 80°C (-40°F to 176°F)
5000 HP	Oil Phase: 25 - 5,000 ppm Gas Phase: 25 - 5,000 ppm in-oil equivalent	10%	10%	-40°C to 70°C (-40°F to 158°F)	Oil Phase: -40°C to 105°C (-40°F to 221°F)
5015	250 - 50,000 ppm ¹	20% ²	10% ³	-20°C to 70°C (-4°F to 158°F)	Gas Phase: -40°C to 80°C (-40°F to 176°F)

1. Accuracy and Repeatability specs do not apply above 50,000 ppm
2. True accuracy of the sensor when in service
3. For consecutive measurements to an identical hydrogen concentration
4. Does not apply to GRIDSCAN 5010 and 5015