

# CALISTO™ H1

Hydrogen Sensor for Transformers

## COST-EFFECTIVE AND SAFE HYDROGEN MEASUREMENT

The Calisto™ H1 includes the industry's premier solid-state hydrogen sensor technology in a robust yet compact package. It continuously samples the oil in transformers to detect spikes in hydrogen levels that are often indicative of an electrical fault. The Calisto H1 is Doble's latest product from the Calisto Condition Monitoring Platform, which includes the Calisto T1, Calisto 2, Calisto 5 and Calisto 9 DGA monitors as well as the doblePRIME suite of products.

### APPLICATIONS

Rated for a wide temperature range and marine exposure, the Calisto H1 installs directly onto a transformer and can withstand the harshest applications including:

- Small distribution transformers
- Vault transformers
- Wind farm transformers
- Railroad/traction transformers
- Offshore platforms

### FEATURES

- Sensing device immersed directly in oil for real-time hydrogen measurement
- Functionality over a broad temperature range
- High EMI/RFI rating
- IP68 Ingress Protection

### BENEFITS

- Enable monitoring of more assets with this economical solution to provide a broader view of overall power system performance
- Reduce staff exposure to potential safety risk posed by on-site collection of an oil sample in a potentially volatile situation
- Manage communication via Modbus for data exchange with other applications
- Seamlessly integrate Calisto H1 test results, along with data from other products in Doble's Calisto Condition Monitoring platform into doblePRIME software for improved decision-making



## CALISTO H1 TECHNICAL SPECIFICATIONS

### PERFORMANCE SPECIFICATIONS

Measurement Range	25-5000 ppm
Accuracy	20% of reading or 25 ppm, whichever is greater
Repeatability	10% of reading or 15 ppm, whichever is greater
Response Time	< 60 min (90% of step change)
Cross Sensitivity	Less than 2% cross-sensitivity to other gases (CO, CO <sub>2</sub> , Hydrocarbons)
Calibration	No periodic calibration is required.

### FUNCTIONAL SPECIFICATIONS

Temperature of Insulating Liquid: Operation	-40°C to 105°C
Temperature of Insulating Liquid: Survival	-40°C to 135°C
Pressure of Insulating Liquid	Maximum 3 bar; minimum 0.1 mbar
Maximum Rate in Changing Temperature	Fast increase in temperature (24°C/hour), e.g. during transformer start-up

### ENVIRONMENTAL SPECIFICATIONS

Ambient Temperature	-40°C to +70°C (IEC 60068-2-2 & EN 50155 Section 13.4.4)
Humidity and Corrosive 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)

### PHYSICAL SPECIFICATIONS

Wetted Materials	316SS, 40% mineral filled Nylon, polyimide, glass
Sealing	Hermetic glass-to-metal feedthrough, Buna-N gaskets
Adapters	Includes standard 3/4"-14 NPT fitting with options for other adapters.
Housing	Hard Anodized 6061 Aluminum
Dimensions	5.94 x 1.56 in 15.08 x 3.96 cm

### ELECTRICAL SPECIFICATIONS

Communication Port	Isolated RS485 Serial Port: 2 Wire, Modbus User-selectable Device ID
Internal Data Storage	Data capacity is more than one (1) year of sensor data recorded every hour. Data includes hydrogen concentration, rate of change per day, rate of change per week and events.
Power Supply	9 to 48 VDC, 10 Watt
Ratings	CE Mark (IEC 6100) 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



#### Doble Engineering Company

Worldwide Headquarters  
123 Felton Street, Marlborough, MA 01752 USA  
tel +1 617 926 4900 | fax +1 617 926 0528  
[www.doble.com](http://www.doble.com)

Specifications are subject to change without notice.  
Doble is an ISO 9001 & ISO/IEC 17025 & 17034 Certified Company.  
Doble is an ESCO Technologies Company.  
PUBLISHED: APRIL 2021