Electron

GRIDSCAN 5000

High-Precision Monitoring for Transformers with Continuous Measurement of Hydrogen and Temperature

Catalogue

INDEX

INTRODUCTION

H2scan's **GRIDSCAN 5000** is a state-of-the-art monitor that **integrates multiple sensors** into a single device, enabling **advanced predictive diagnostics** and **continuous monitoring** of electrical transformers.

With its patented solid-state technology, the GRIDSCAN 5000 provides accurate **hydrogen (H_2) and temperature measurements**, for **early detection of dielectric faults** and **prevention of catastrophic events**.

The solution allows a **significant reduction in operating costs (OPEX),** eliminating the need for periodic calibration and minimizing maintenance interventions.

KEY TECHNICAL DIFFERENTIALS

1. High Precision Hydrogen Sensor

- Measurement range: **25 to 5000 ppm**
- **Accuracy:** ± 20% of reading or ± 25 ppm, whichever is greater
- **Repeatability:** ± 10% of reading or ± 25 ppm
- **Response Time:** < 60 minutes after contacting H_2
- **Low cross-interference**: less than 2% sensitivity to CO, CO_2 and hydrocarbons
- **Patented solid-state technology**: no consumables or recalibration required
- **PT100 Sensor**: RTD Type -40 TO 105ºC = <1°C

ROBUSTNESS AND OPERATION IN EXTREME ENVIRONMENTS

- **Operating temperature:** -40°C to 70°C
- **Submersion resistance: IP68** (immersion in water up to **7.6 meters for 14 days**)
- **Compatible with insulating oils:** mineral, silicone, natural ester and synthetic
- **Marine resistance: IEC 60068-2-11** compliant (salt spray)
- **Operating pressure at sensor:** 0.1 to 2 bar absolute (1.45 to 30 psi)
- **Operating altitude:** up to 3000 meters above sea level

COMMUNICATION AND INTEGRATION

- **Output Protocol:** RS-485, Modbus RTU
- **EHMI and SCADA compatible**
- **Dynamic data storage**
- **Flexible connectivity:** choice of wired or wireless communication

MECHANICAL AND ELECTRICAL SPECIFICATIONS

- **Dimensions:** 15.1 x 3.9.8 x 3.9 cm (5.94 x 1.56 x 1.56 in)
- **Weight:** 0.387 kg (0.85 lb)
- **Supply voltage:** 12 to 48 VDC
- **Maximum consumption:** 10W

TECHNICAL DATA OPERATING CONDITIONS

Parameter	Value			Units
	Minimum	Nominal	Maximum	
Environment – Insulating Liquid				
Multinational	-40		105	°C
Survival	-40		135	°C
Rate of change			24	°C / hour
Pressure	0.1 (10000)		10 (1000000)	Bar (Pa)
Environment – Environment				
Operating Temperature	-40	25	70	°C
Storage Temperature	-40		85	°C
Ingress Protection	IP68; 25 feet of water for 14 days (IEC 60529)			
Humidity	0 to 100% relative humidity, condensation			
Corrosion resistance	C5M Marine Class Classification; salt water condensation (IEC 60068-2-11 and DIN EN ISO 12944)			
Mechanic				
Vibration	3-axis sine, wideband and random (IEC 60068-2-6 table C.2, IEC 60068-2-64 paragraph A.2, category No. 2, IEC 61373:2010			
Shock	30g, 18ms shock duration (IEC 60068-2-27)			
Weight	0.85 pounds (387 grams) (387 grams)			
Electric				
Voltage input	12	24	52.8	VDC
Power Consumption			10	W

Table 1 – Operating Conditions

TECHNICAL DATA HYDROGEN MEASUREMENT

PARAMETER	VALUE
Oil Range	25–5000 ppm
Gas Range	25–5000 ppm
***Response Time, T90**	<60 minutes
Accuracy	±20% of reading or ±25 ppm, whichever is greater
Repeatability	±10% of reading or ±15 ppm, whichever is greater
Cross-sensitivity	Less than 2% cross-sensitivity to other gases (CO, CO2, hydrocarbons)
Calibration Range	No periodic calibration is required

Note: Once hydrogen reaches the sensor, the sensor will respond in 60 minutes or less.

Table 2 – Hydrogen measurement specification

GETTING TO KNOW GDSCAN 5000

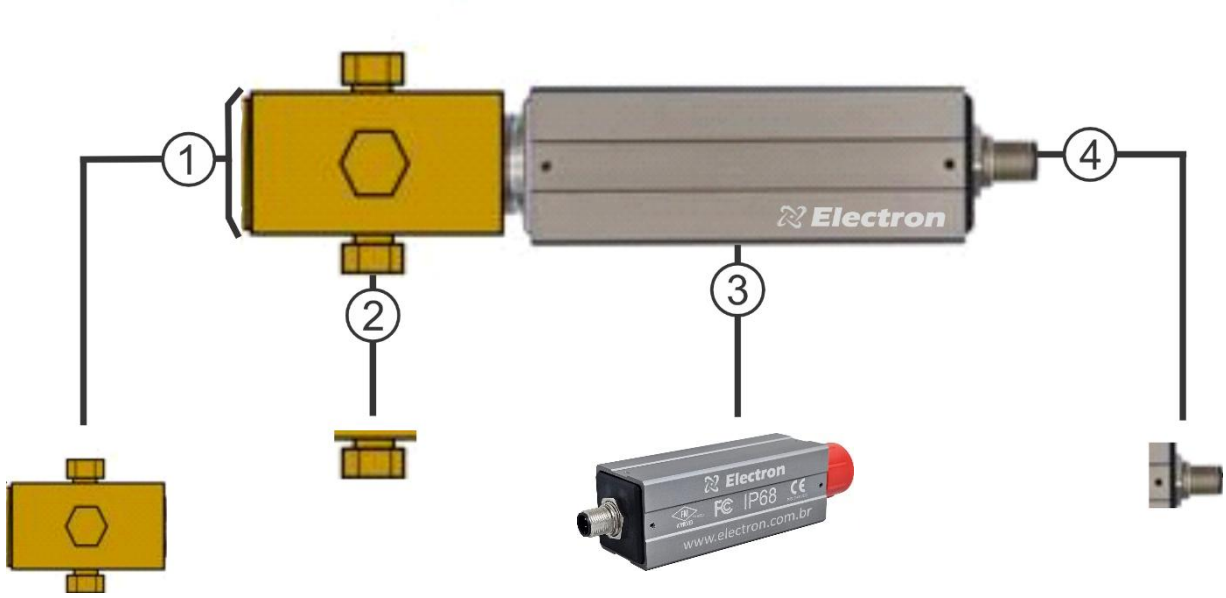
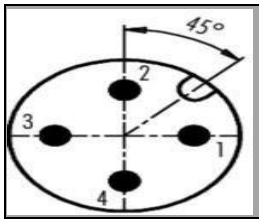


Fig 1 – Getting to know the GDSCAN 5000

1. 3/4" Female to 1" NPT Adapter
2. Bleed Valve
3. H2SCAN 5000
4. Electrical Connections

CONNECTION DIAGRAM

All electrical connections of the GRIDSCAN® 5000 are supplied via a single four(4) pin M12 connector. The key location (notch) and pin numbers are shown in the table below:



ENTRY	SIGNAL NAME	YARN COLOR
1	DC Power 12-48 Vdc	**Brown**
2	Grounding DC 12-48 Vdc	**White**
3	RS-485+	**Blue**
4	RS-485 Data -	**Black**

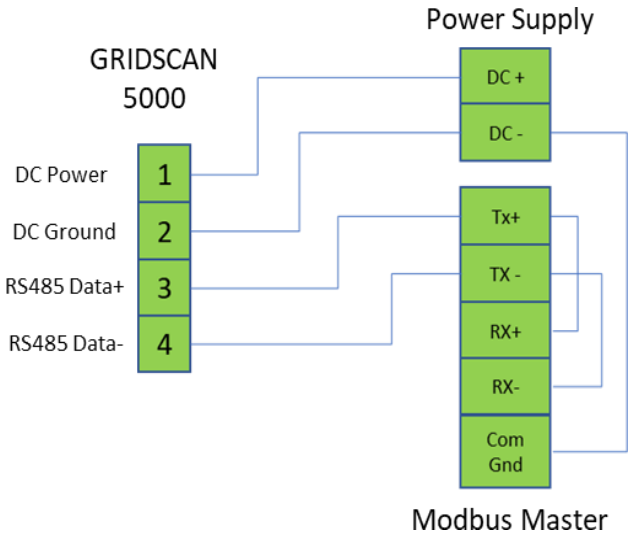


Fig 2 – Connection diagram

DIMENSIONS

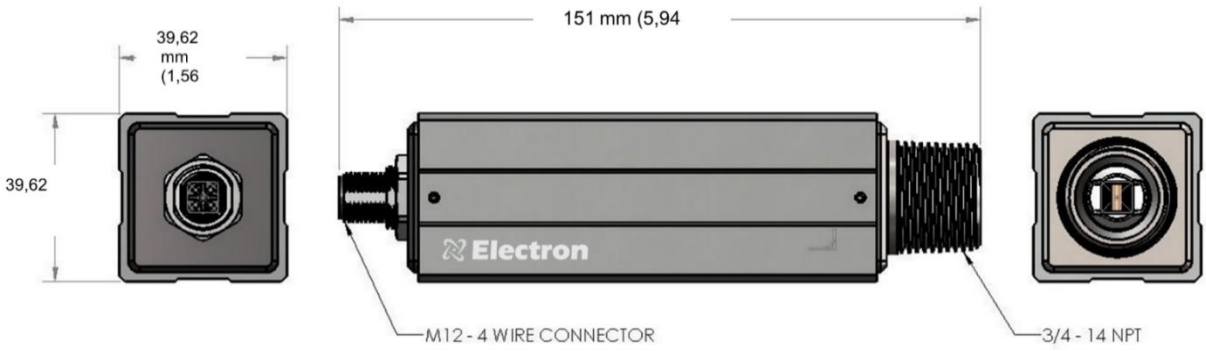


Fig 3 – Dimensions

BENEFITS FOR ENGINEERING AND MAINTENANCE

1. Real-Time Monitoring

- Provides **continuous data** on key transformer operating parameters
- **Predictive analytics** enable failure anticipation and strategic maintenance planning

2. Maintenance-free technology

- **Hydrogen sensor with 10-year warranty** – free of consumables and calibration
- **Rapid deployment and simplified integration**

3. Dielectric and Operational Fault Detection

- **Early indication of** failures associated with leaks, overheating and dielectric degradation
- **Reduced OPEX** with optimized maintenance

4. Advanced Connectivity

- **EHMI and SCADA compatible** for remote management
- **Robust industrial protocols** ensure reliable integration

EXAMPLE APPLICATION WITH EHMI

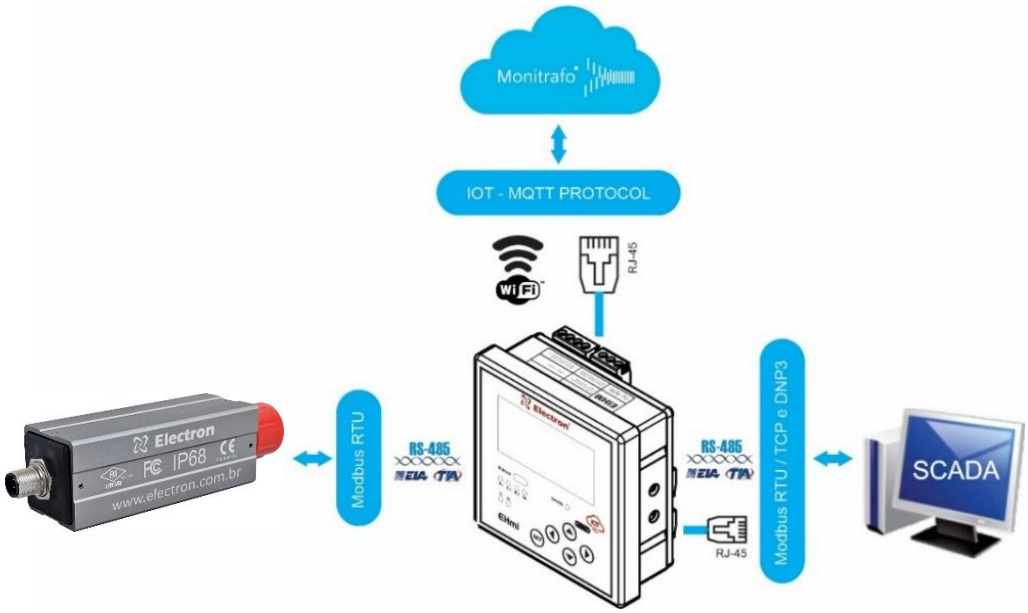


Fig 4 – Application Example

BENEFITS OF INTEGRATING WITH EHMI AND MONITRAFO

The **GRIDSCAN 5000**, combined with **EHMI - IoT** and the **MONITRAFO platform**, offers the most complete solution for **monitoring transformers and critical assets**. The integration of the systems allows **for greater predictability, operational efficiency, and cost reduction**, ensuring safety and performance in real time.

The **GRIDSCAN 5000** and **EHMI - IoT** form a robust and efficient ecosystem for **monitoring transformers and electrical assets**. With the integration of the **MONITRAFO** platform, users have access to a complete solution for **acquisition, processing, and analysis of operational data**, ensuring greater reliability and efficiency in asset management.

Monitored Parameters:

- **Hydrogen (H_2):** First dielectric fault gas, essential for internal overheat monitoring.
- **Humidity**: Critical monitoring of insulating oil degradation and prevention of internal shorts.
- **Pressure**: Indicates operational variations and can detect structural leaks.
- **Temperature**: Allows you to predict thermal failures and overloads.

EHMI uses **MQTT protocol** and integrates advanced tools such as **Artificial Intelligence, Machine Learning, Database, Programmable Functions, Automatic Calculations and Notifications**. In the event of a loss of connection, the data is stored locally and later sent to the server.

With the MONITRAFO platform, users can set up custom designs, track measurements in real-time, and access detailed reports of monitored quantities, triggers, alarms, and predictive maintenance. Monitoring can be done via **internet browser or MONITRAFO app**, available for Android and iOS.

When integrated with the **MONITRAFO** platform, EHMI - IOT offers a complete ecosystem for monitoring and managing electrical assets, significantly expanding its functionalities:

- **Efficient Monitoring:** Access to advanced monitoring, diagnosis, and fault prevention tools directly from the cloud, allowing flexibility and operation from anywhere with internet access.
- **Real-Time Alerts:** Immediate notifications of faults and alarms via SMS, WhatsApp, and email, ensuring quick responses to critical events.
- **Reports with Artificial Intelligence:** Generation of detailed reports with accurate diagnoses, assisting in preventive maintenance and identifying potential problems before they become critical.
- **Interactive Dashboards:** Personalized visualization of projects through modes such as Dashboard, Overview and Map, facilitating the identification of active events and the efficient management of monitored assets.
- **Event Announcer:** Real-time notification to the entire team of substation incidents, promoting effective collaboration and ongoing equipment maintenance.
- **Maintenance Schedule:** Periodic maintenance recommendations generated by IEDs and artificial intelligence, ensuring the best performance and extending the useful life of sensors and electrical assets.
- **Team Communication:** Integration and facilitated communication between team members through notifications and chat on the platform, optimizing maintenance management and maintaining a history of actions.
- **API and Integrations:** Support for various programming languages and integration with ERP systems and IoT platforms, such as SAP, Oracle, Totvs, AWS, Google Cloud, Azure and IBM Watson, providing flexibility and versatility in meeting the specific needs of users.

WARRANTY TERM

The **GDSCAN 5000** Electron has a warranty period of two years from the date of sale recorded on the invoice, with coverage for any manufacturing defects that make it unsuitable or unsuitable for the applications it is intended for.

Disclaimer of Warranty

The warranty does not cover transportation expenses for technical assistance, freight and insurance for shipment of a product with evidence of defect or malfunction. The following events are also not covered: Natural wear and tear of parts due to continuous and frequent use, damage to the outside caused by falls or improper packaging; attempt to repair/break a seal with damage caused by persons not authorized by Electron and in disagreement with the instructions that are part of the technical description.

Loss of Warranty

The product will automatically lose its warranty when:

• The instructions for use and assembly contained in this manual and the installation procedures contained in the NBR 5410 Standard are not observed;

• Subjected to conditions outside the limits specified in the respective technical descriptions;

• Violated or repaired by a person other than Electron's technical team;

• The damage is caused by a fall or impact;

• Infiltration of water or any other liquid occurs;

• Overload occurs that causes degradation of the components and parts of the product.

Use of the warranty

To enjoy this warranty, the customer must send the product to Electron along with a copy of the purchase invoice properly packaged so that there is no damage in transport. For an emergency service, it is recommended to send as much information as possible, regarding the defect detected. This will be analyzed and subjected to full functional tests.

The analysis of the product and its eventual maintenance will only be carried out by the technical team at the headquarters of Electron do Brasil.