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# GRIDSCAN 6000

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

## Catalogue

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## INTRODUCTION

H2scan's GRIDSCAN 6000 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 6000 provides accurate measurements of **hydrogen (H<sub>2</sub>)**, **moisture**, **pressure**, and **temperature of the insulating oil**, ensuring **early detection of dielectric failures** 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 DIFFERENTIATORS

**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<sub>2</sub>
- **Low cross-interference:** less than 2% sensitivity to CO, CO<sub>2</sub> and hydrocarbons
- **Patented solid-state technology:** no consumables or recalibration required

**2. Continuous Humidity Monitoring**

- **Measurement range:** 0 to 95% relative humidity
- **Precision:**
  - ±2% SR in a range of less than 20%
  - ±8% RS between 20-50%
- **Repeatability:** ±2% RS

**3. Pressure Measurement with High Reliability**

- **Measuring range:** 0 to 205 kPa (0 to 30 psia) absolute
- **Accuracy:** ± 2% FS
- **Repeatability:** ± 0.6 kPa (± 1 PSI)
- **Ability to detect pressure variations associated with leaks and mechanical impacts**

**4. Temperature Sensor for Critical Conditions**

- **Measuring range:** -40°C to 125°C
- **Accuracy:** ± 0.1°C
- **Repeatability:** < 2°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

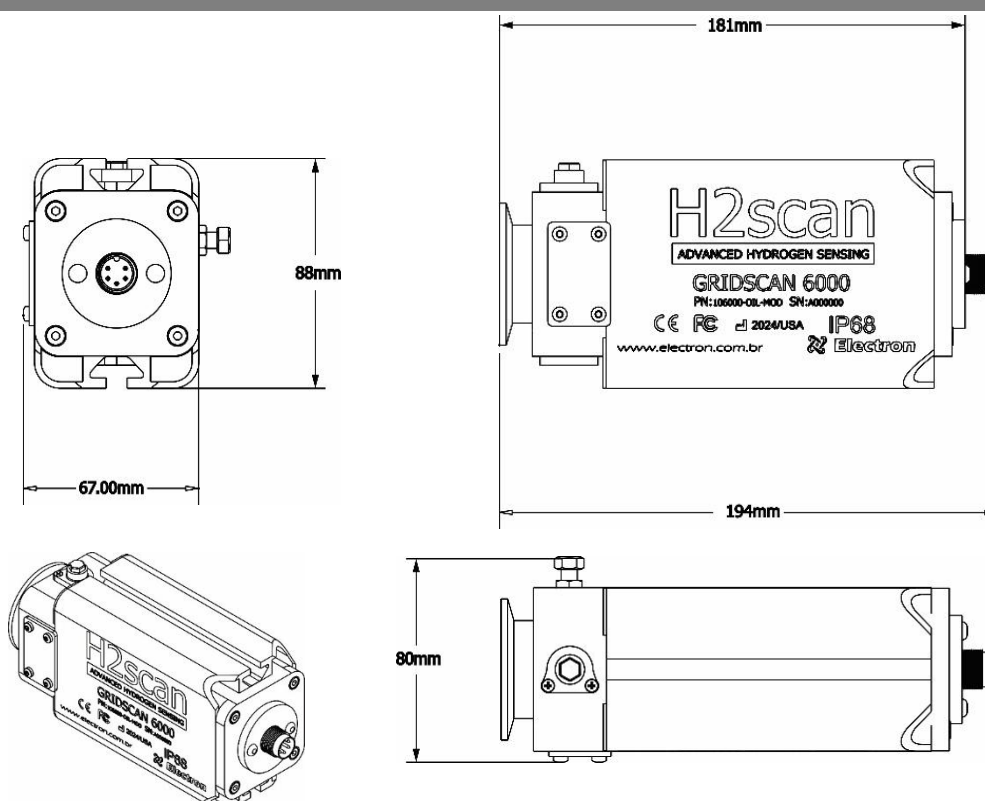
## COMMUNICATION AND INTEGRATION

- **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

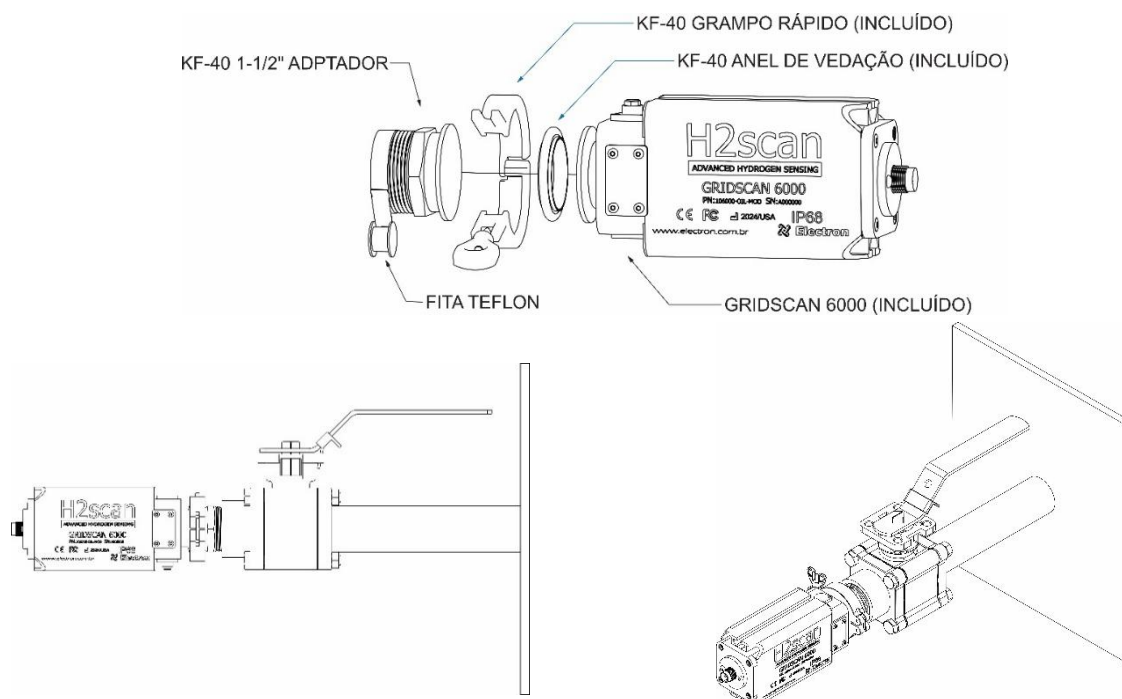
- **Dimensions:** 19.4 x 8.8 x 6.7 cm (7.63 x 3.47 x 2.65 in)
- **Peso:** 1.82 kg (4.01 lb)
- **Supply voltage:** 12 to 30 VDC
- **Maximum consumption:** 12W

## DIMENSIONS



1 – Dimensions

## INSTALLATION AND ASSEMBLY



1 – Installation and Assembly

## 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**

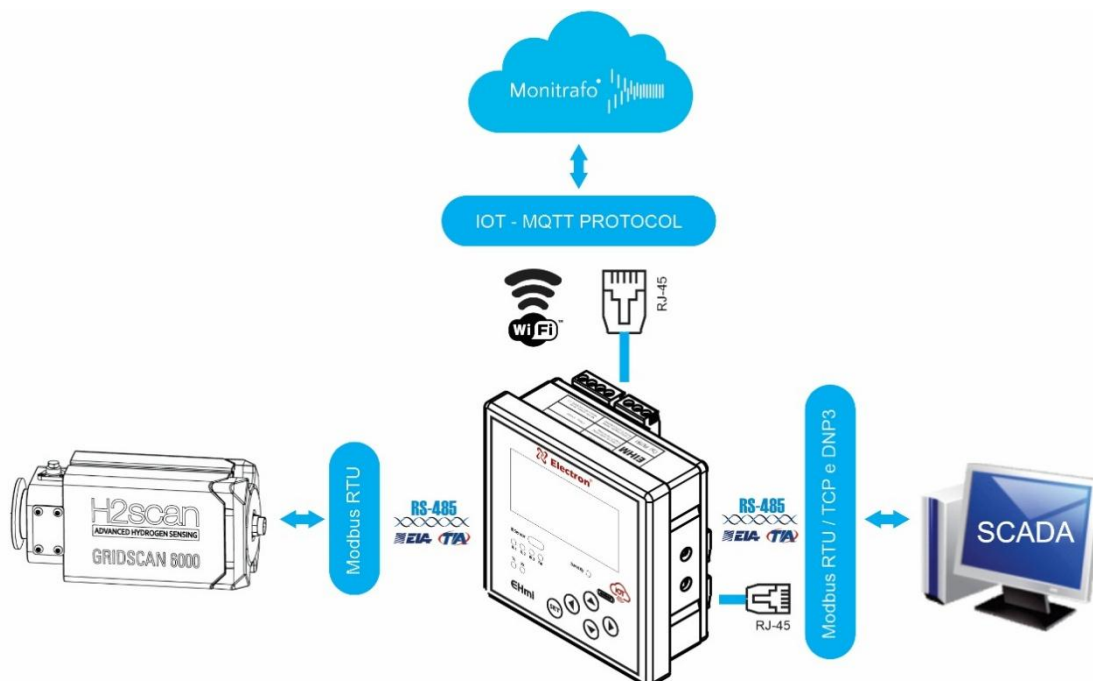
**3. Dielectric and Operational Fault Detection**

- **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



3 – Application Example

## BENEFITS OF INTEGRATING WITH EHMI AND MONITRAFO

The **GRIDSCAN 6000**, 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 6000** 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<sub>2</sub>):** 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.

## CERTIFICATIONS AND COMPLIANCE

The **GRIDSCAN 6000** meets stringent international standards for electrical safety and electromagnetic compatibility:

- ✓ IEC 60068-2, IEC 60529 (degree of protection and environmental testing)
- ✓ EN 55011, EN 61000-4, EN 61326-1 (electromagnetic compatibility)
- ✓ FCC Part 15, IEC 61010 (electrical safety)

## SPECIFICATION FOR ORDER

**Código:** CJ-0085

**Name:** GRIDSCAN 6000 MONITORING KIT

**Even Non-Kit Items:**

- 1 GRIDSCAN 6000 Sensor (Hydrogen, Temperature, Humidity & Pressure)
- 1 KF40 Adapter (clamp + threaded connection + O' ring)
- 10 meters of RS485 4-wire connection cable with circular connector (external use).

**Optional:**

**Code:** PA-1161

**Name:** EHMI – HUMAN-MACHINE INTERFACE with IoT and Gateway for Protocol Conversion

## WARRANTY TERM

The **GDSCAN 6000** Electron has a warranty period of two years from the date of sale stated 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.