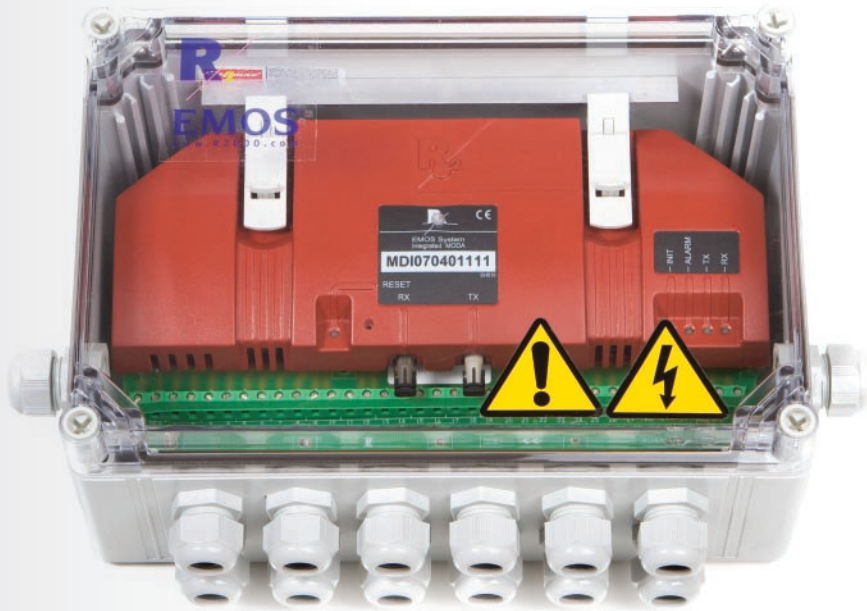


# EH500: Integrated MODA

Engineered for the electrochemical environment

## Overview

Data acquisition is the cornerstone of any plant information, monitoring, and optimization system. In the case of electrochemical production, retrieving reliable voltage data constitutes unique challenges due to the inherent hostile environment. Since electrical data conveys important information pertaining to the manufacturing process, it is imperative to obtain and preserve the highest quality electrical measurements possible.



R2 has developed a patented data acquisition system to address the complex issues associated with the electrolytic cell room environment. **EMOS**<sup>®</sup> (Electrolyser Management & Optimization System) hardware has been designed incorporating the concept of converting an analog to a digital signal as close to the acquisition source as possible, and then filtering out any noise unrelated to normal process operations (i.e. rectifier noise) before transmitting digital signals through a fiber optic network, to preserve signal integrity. At the heart of the **EMOS**<sup>®</sup> acquisition hardware is the MODA (data acquisition module). Following many years of development based on the experience gained from installations the world over, R2 is presently offering its latest generation of MODA hardware unit for **EMOS**<sup>®</sup>; the Integrated MODA (P/N EH500) which has been designed according to IEC 61508 standards for SiL2.

## Integrated MODA

Integrated MODA units are electronic assemblies that are physically mounted on the electrolyser frame. They contain the signal terminals (TFP) for connection of the individual voltage wires from electrodes and/or electrode arrays, and the MODA mother board. Each individual TFP terminal is surge-protected by micro-fuses (1.0 Amps). The function of the MODA mother board is to identify and filter incoming signals, convert analog to digital signals (A/D), and perform data transmission and communications management with the ECAM (Electrolyser Communication & Alarm Module). The MODA are connected through a fibre optic communications loop, with the ECAM serving as the beginning and end of the loop.

Through a patented design, MODA units filter and adapt each signal to the Rectifier's specific noise signature and frequency to ensure that the transmitted signals convey only those variations caused by the process. In essence, each MODA receives analog voltage signals from the individual elements of the electrolyser and generates filtered, digitally converted and electronically tagged optical signals. All incoming signals are insulated through an isolated amplifier (2500 volts to the ground) and are electrically isolated from each other at 400 volts. Each MODA unit has a capability of 32 readings.

Each MODA is also constantly validating incoming signals. Four A/D conversion systems are included in each data MODA. Each reads eight individual voltage signals as well as an additional signal representing the total “gap” of the eight cells. The embedded firmware constantly compares the total “gap” readings to those obtained individually in order to detect any problems with the A/D conversion unit, or with a faulty wire or connection.

**EMOS**<sup>®</sup> monitoring equipment does not require an individual power supply; instead **EMOS**<sup>®</sup> is powered directly off cell voltage and are configured to come online at minimum polarization current. This approach results in lower installation costs and an increase in safety since no external wires need to be connected to the **EMOS**<sup>®</sup> hardware. Due to the patented design of the **EMOS**<sup>®</sup> hardware, it is able to deliver a true value voltage measurement precision of +/- 1.5mV, the highest true value voltage measurement accuracy in the World. Without this level of reliability and accuracy, no quantifiable benefits can be derived from further analyses.

## About R2 & EMOS<sup>®</sup>

**R2** has a proven track record of valuable contributions towards operational efficiency and cost savings for leaders in the chemicals industry. The specialized design of **EMOS**<sup>®</sup> hardware, such as the Integrated MODA, provide for the early detection of critical electrolyser process faults and individual critical component failures. Through an unparalleled monitoring accuracy and advanced analysis software suite of tools, **R2** and **EMOS**<sup>®</sup> have aided producers in reducing operating costs, and increasing plant safety and efficiency.

### Measurement Category

CAT III Measurement equipment

### Environmental Specifications

Ambient Operating Temperature: -20 to 60 °C  
Humidity: 5 to 95% non-condensing  
Altitude: 2000 m maximum

### Mechanical Specifications

Assembly Weight: 2 Kg without MODA, 3 Kg with MODA installed.  
Assembly Dimension: 30 cm width, 20 cm height, 13 cm depth.

### Wire and Fibre Specifications

Voltage Wire: 1.5 mm<sup>2</sup> NSGAFOU (recommended)  
Optical Fibre: Multimode, 62.5 / 125 Core / Cladding diameter, 900µm diameter tight buffer with ST connectors.  
Optical Fibre Tolerance: 5 dBm maximum loss.

### Electrical Specifications

Supply Input Range: 22 to 70 VDC, 300 mA maximum.  
Analog Inputs: 32 channels with ±5VDC input range.  
Isolation: 2000V between power supply and measurement channels.  
Converter: 16-bit Sigma-Delta.  
Precision: <1 mV.  
Accuracy: ±2mV to 60°C ambient. ±1mV to 60°C optionally available.

### Enclosure Specifications

Type 4, 4X, 12, 13  
IP66, 67

### Standards/Specifications

IEC 61508 Safety Integrity Level. Designed to SIL level 2 requirements.  
IEC 61010 Safety requirements for electrical equipment for measurement, control, and laboratory use.  
IEC 61000-6-2, EMC Interference Immunity for industrial environments.  
IEC 61000-6-4, Emission standard for industrial environments.

### Approvals

TÜV (Pending, planned Q2 2008) and CE.

## Need more Information?

If you have any questions, or would like further information on **R2's Integrated MODA**, please do not hesitate to contact us:

**Telephone: +1.514.987.1303    Email: info@r2000.com**

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