



EH600: ECAM

Built with R2's new SFOCOM

Overview

Within any plant monitoring, information, and safety system it is imperative that critical data be transmitted reliably and in a manner which preserves data integrity. In the case of electrochemical production, not only retrieving but also communicating reliable voltage data constitutes unique challenges due to the inherent hostile environment. Knowing that electrical data conveys important information regarding the safe operation of the process, it is necessary that any system preserve the highest quality electrical measurements possible and provide reliable communication for emergency shutdown (ESD) functions.

R2 has developed a proprietary system specifically designed to address the complex issues associated with the electrolytic cell room environment. **EMOS**[®] (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 and provide reliable ESD functions that are independent of the plant network.

An integral component of **EMOS**[®] is the ECAM (Electrolyser Communication & Alarm Module). Following many years of development based on the experience gained from installations the world over, R2 is presently offering its latest generation of communication management hardware unit for **EMOS**[®]; the ECAM (P/N EH600) which contains R2's latest design of communication card, the SFOCOM, which has been designed according to IEC 61508 standards for SiL2.

ECAM

Typically located in the cell room, the ECAM is a hardware module that acts as the interface between the EMOS software installed on the EMOS Server and EMOS acquisition hardware (MODA) physically mounted on the electrolyser frame. Specifically, the ECAM communication card, the SFOCOM, manages outgoing data requests by the software and incoming data signals from the MODA hardware. EMOS utilizes standard Ethernet as the communication protocol between the ECAM module and the EMOS Server and each ECAM has its own IP address. .

The ECAM unit also provides a 4-20 mA input to read the electrolyser current (electrolyser current is essential for normalisation voltage) to ensure precise voltage-current synchronization within the EMOS database.

Another important function of the ECAM unit is to trip the Rectifier in case of a high voltage alarm. The SFOCOM provides dry contacts (usually open) to shutdown the electrolyser directly in case of a high voltage alarm. Trip and alarm threshold limits can be set and triggered in multiple ways; (1) Hardware Trip: HIGH-HIGH voltage threshold value stored within EMOS hardware to automatically shutdown electrolyser(s) independent of R2 network when the limit is breached; (2) Software Trip: Options for various voltage alarm thresholds that can prompt EMOS to notify operators from within the R2 network when a particular limit is breached.

In all cases the contact shall be closed in case of voltage of one or several elements of the electrolyser breaching the adjustable threshold limit(s), and all threshold parameters are accessible through an administrative access level in the EMOS Server.

EMOS[®] monitoring equipment does not require an individual power supply; instead **EMOS**[®] 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**[®] hardware.

Due to the patented design of the **EMOS**[®] 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[®]

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**[®] hardware, such as the ECAM and SFOCOM, 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**[®] 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

Wire and Fibre Specifications

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, 100 mA maximum.
Analog Input: One 4-20mA channel for current shunt measurement.
Converter: 12-bit SAR yields 20A resolution for 20mA = 20kA.
Precision: TBD.
Accuracy: TBD.
Digital Input: One 24VDC Input
Digital Outputs: One HI Alarm output and one HI-HI Trip output
One optical fiber port to communicate with the MODA
One RS485 port to communicate with the EFOCOM

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.

Approval Objectives

TÜV and CE.

Need more Information?

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

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TECHNICAL SPECIFICATIONS

