



Trouble-free grid operation at the Ercros chemical plant in Sabiñánigo, Spain

**POWER QUALITY ANALYTICS**

# Monitoring power quality at chemical plants

Expert service for Ercros since 2020

**SIEMENS**

## AT A GLANCE

# Service for Ercros

## High power quality for chemical processes

In Sabiñánigo, the Spanish chemical company Ercros manufactures basic chemicals such as hydrogen peroxide, ammonia, and caustic soda. These are continuous chemical splitting processes that must not be interrupted. But electrical equipment can fail due to harmonics, voltage fluctuations or dips, or transients. That can put the entire process at risk. A swift response is crucial, ideally long before a fault actually occurs. Ercros aims to remedy the situation by continuously measuring power quality. That's why, in early 2020, the company engaged the network planning experts from Siemens to monitor power quality at its plant in Sabiñánigo.

## Continuous monitoring and analysis using AI

Siemens Power Technologies International (Siemens PTI) rapidly put in place not only a monitoring system for voltage measurements at a measuring point on-site, but also a professional, predictive analysis of the measurement results. Using a remote connection via VPN tunnel, data is read out cyclically and transmitted very securely to Siemens' in-house AI analysis system. The Power Quality Analytics (PQA) system uses the measured data from multiple customers worldwide and, based on a complex comparison against historical data in self-learning neural networks, immediately detects impending changes in power quality. Plant-specific measurements, analysis results and visualizations can be directly inspected by Ercros using a mobile app.

"Thanks to this warning, we could see that we had a problem with a capacitor battery and a 5<sup>th</sup> harmonic filter. This warning was very important for us."

Roberto Díaz Juan, August 2020  
Head of Engineering and Maintenance at  
Ercros in Sabiñánigo

## Rapid response instead of process failure

It happened eight months after Siemens began monitoring power quality: The smart PQA system issued an alarm. It identified what's known as Total Harmonic Distortion (THD). The analysis showed that a switching process on a compensation unit had triggered an undesired trip function. Ercros was alerted to the imminent fault, it responded, and was able to prevent any further disruptions or potentially an entire process failure. Afterwards, the Siemens PTI network planning team offers their support to the client to develop an improved protection plan and a switching strategy that would eliminate this source of error, thus preventing further disturbances from the outset. Both the customer and Siemens have built on this success. Ercros also decided to have its chemical plant in Vila-seca monitored by the network experts and put four further measurement points into operation there.

## THE SOLUTION IN DETAIL

# Smart detection of network anomalies

In the past, more in-depth analyses were often performed only once a fault had occurred. But in many cases, it isn't possible to identify the causes of a fault after the event. Faults are normally brief events, occurring in fractions of a second. To instantly track such faults, Siemens PTI monitors the quality of the 11-kV power system at the Ercros plant in Sabiñánigo.

## Measurement point and VPN tunnel via LTE router



Since Sabiñánigo is a chemical plant with high reactive power consumption, it was decided to install capacitors and filters to improve the power quality. Considering the systems and nature of the power network, experts from Siemens worked closely with Ercros to determine the necessary number of recorders and the ideal locations for

the measuring points in the network. They decided to install and set up a SICAM Q200 power quality recorder and connect it remotely to a dedicated Siemens server. This was done using a router, which created a secure VPN tunnel using the LTE mobile wireless standard. Remote access is provided by the Siemens VPN solution SINEMA RC in combination with the SCALANCE M876 router. Measurement files on the recorders are read out cyclically and fully automatically and are stored locally on Siemens' servers.

## Expert know-how and AI analysis hand-in-hand

The AI-based PQA system accesses this data. Its logic contains the know-how and experience accumulated during more than 60 years of network analysis. And thanks to neural networks, it keeps on learning, using machine learning and deep learning loops. Unusual system states can thus be reliably detected on the basis of an expert system and a pattern recognition, pre-classified for the Siemens PTI PQ experts, and visually presented on a dashboard. Before the analysis or an alert is sent to the customer, an expert checks the classification determined by the system as well as its proposed diagnosis.

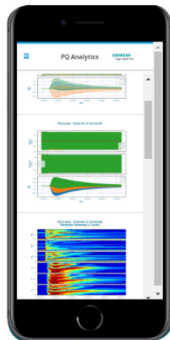


### Ercros Chemical Company

Ercros, an industrial group with a hundred-year tradition, has three business divisions: Chlorine Derivatives, Intermediate Chemicals, and Pharmaceuticals. As leader in its main markets, the company generates nearly half of its revenue from exports to more than 103 countries, primarily in the EU.

The company has committed to ensuring the safety of its facilities and protecting human health, respect for the environment, product quality, and dialog and transparency in its dealings with society. At Sabiñánigo, Ercros produces hydrogen peroxides, ammonia, caustic soda, caustic potash, chlorine, chloroisocyanurates, hydrochloric acid, sodium chlorate, and sodium. At its plants in Vila-seca, the company produces chlorine, caustic soda and inorganic derivatives, and PVC.

## Mobile app for a rapid overview



An overview of the measurements and analyses in the form of diagrams, curves, or heat maps is available to Ercros via a mobile app at any time. The system makes the data and graphics available via a browser. Via the app, Ercros immediately receives warnings of critical events. At the same time, the PQA system automatically distributes an alert to the person in charge at the customer's end and at Siemens.

An integrated contact function also makes it easy for the customer and Siemens to share information.

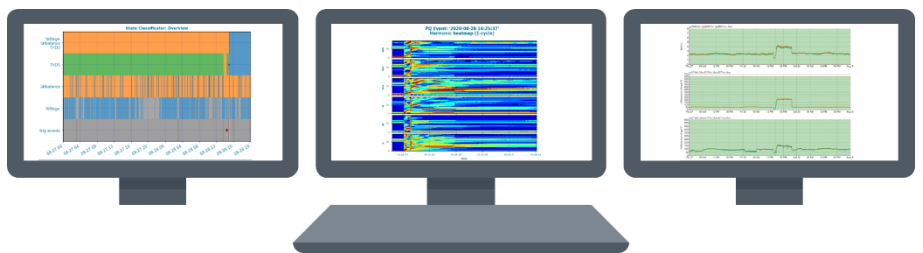
## PQA IN USE

# Warning prevents faults

The system was set up in early 2020. It automatically calls up the measured data. Anomaly recognition sensitivity adapted to suit the local situation. A trigger setting was adjusted manually after a few weeks to ensure that the measuring system maintained an ideal balance between sensitivity and sturdiness. The customer receives a summary analysis report every month. Ercros can see the current values and changes in measurements via an app. Then, after eight months, an alarm was received.

## Harmonic distortion creates a scare

Although no limit violations were observed, the system identified a significant status change in power quality on August 28. It detected an anomaly at the THD and triggered an alarm. The anomaly was linked to a switching event without any correlation to an operational load change. The Siemens PTI experts evaluated the event as a probable critical situation with serious consequences over the longer term and informed the client immediately.



## The cause: a fault in a compensation unit

Following a check of available data and system analyses, workflows, and correlations, everything pointed to the undesired triggering of a trip function in the reactive power compensation unit. Thanks to the alarm, Ercros could immediately see what needed to be done. The reactive power compensation unit was quickly restored to normal operation. The critical change in voltage was corrected. The AI-based PQA system worked hand-in-hand with the fine analysis by the Siemens PTI experts to prevent extensive damage and avoid a costly outage.

### The PQA service solution for Ercros includes:

- Determining the ideal position for a total of five SICAM Q100 and Q200 recorders in two locations
- Data transfer to Siemens server via SCALANCE LTE router
- Continuous monitoring and analysis of power quality for two years
- Monthly reporting and recommendations for appropriate actions to reduce risk
- Additional network consulting services by request

## Added value for Ercros

- Preventing production outages through early and reliable recognition of abnormal system changes
- Fault identification and evaluation
- Identification of appropriate optimization measures
- Problem-free expansion of services to include additional chemical plants at other locations

# About us

## **Siemens PTI: Consulting and planning for power supply networks**

From strategic advisory service and technical consultancy to state-of-the-art planning and analysis software: Siemens Power Technologies International (PTI) provides an end-to-end portfolio to master the challenges facing current and future energy systems. Our strategic consultants help optimize value by providing guidance in the fields of business transformation, infrastructure development, as well as market and transaction advisory service. Drawing on more than 60 years of international experience and continuous innovations in power system planning, our experts address the full scope of analysis, design, and optimization studies for international utility companies. The latest user requirements and our project experience continuously shape the design of the Siemens PSS® software portfolio for power system planning, simulation, and model management.

Is there anything else you'd like to know, or would you be interested in a personalized offer? Get in touch using our [contact form](#). Our power quality experts will be in touch promptly.

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