Effective network management minimizes production downtime and slashes energy costs

In present-day factories and other installations, electronically controlled drives with motion controllers are being used more and more for energy-efficient production. However, their frequency converters have the disadvantage of inducing supply-side perturbations with severe harmonics, which can lead to plant upsets and even total stoppages.

Successful manufacturing operations today therefore adopt a twofold approach to their electricity needs: optimizing power quality and using energy efficiently. To give equal importance to both aspects it is necessary to use intelligent network management, with power factor correction, energy data acquisition and power quality monitoring. This reduces the electricity bill, identifies potential energy-saving options and yields consistently high power quality.

FRAKO has the longest record of accomplishment in this field and offers power network management in the form of comprehensive customized solutions.

Background

The Rothaus Baden State Brewery is one of the most up-to-date breweries in Germany. Its energy-efficient and highly flexible production facilities mean that it consumes significantly less electrical power compared to other breweries. Years ago, Rothaus began to measure its consumption of electrical energy per hectolitre of beer produced, later also analysing

expenditure on other utilities such as water, gas and compressed air. The objectives were to identify potential energy savings and to optimize the production process. Highly complex manufacturing methods, constantly changing load conditions due to fluctuating demand from the market and an ever-increasing degree of automation made it ever more important to have continuous monitoring of power supply quality.

FRAKO power quality specialists carried out appropriate measurements and analyses, first installing detuned power factor correction systems, followed later by components for energy data acquisition and network analysis instrumentation for power quality monitoring. The ongoing modernization of manufacturing processes and the continual improvement in power quality that accompanies it now ensure efficient and uninterrupted production at Rothaus.

Optimally dimensioned power factor correction avoids reactive power charges

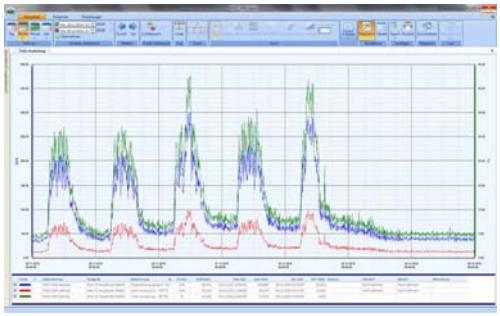
The costs for electrical energy are based not only on the actual consumption of active power, but also on reactive power. Electricity suppliers allow a certain level of reactive power, but once this is exceeded, the energy prices rise dramatically. Accurate monitoring and optimization of electricity consumption is therefore particularly important for the cost-effectiveness of manufacturing operations like Rothaus that have their own transformers. In Germany, electricity suppliers provide a company with reactive energy free of charge at levels up to 50% of the active energy demand. Any reactive energy over this amount must be paid for separately.

Installing a correctly dimensioned, detuned power factor correction system from FRAKO is therefore the first step in cutting electricity costs significantly.

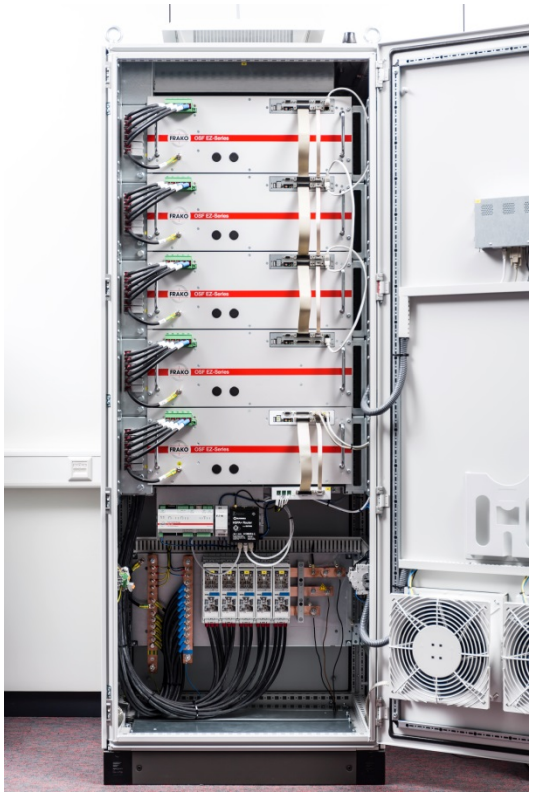
Energy data acquisition itemized down to individual consumers creates transparency

Manufacturing companies often consume very large amounts of electrical power and other forms of energy, with a corresponding impact on total production costs. Energy-saving measures and manufacturing processes that economize on resource consumption can therefore boost competitiveness. Companies introducing an ISO 50001 energy management system must comply with certain requirements for energy data acquisition. This applies especially to those particularly energy-intensive industries in Germany that are exempt from the surcharge on power costs levied under that country's Renewable Energy Sources Act to subsidize electricity generation from sustainable resources, and also to businesses in the manufacturing sector eligible for relief from electricity and energy taxes. This concession will only be given to companies that can demonstrate the purposes for which the power is needed, i.e. by documenting their energy flows. At Rothaus, the energy measuring instruments are networked with a central unit for collecting and managing their data. The brewery management can thus obtain an accurate overview of the energy flows, from the central incoming feeder right through to the individual departments, such as brewhouse, filling lines, labelling system, wastewater treatment, restaurant, laboratory, etc., without leaving the office.

FRAKO energy data acquisition provides transparency on utility consumption right down to sections of unit operations and individual consumers distinguishes between production processes for various products and identifies options for potential improvement.



Monitoring ensures consistently high network power quality

Highly automated, energy-efficient production facilities usually have variable-speed drives with motion controllers installed. These give rise to supply-side perturbations with severe harmonics, which can lead to unsatisfactory operating performance and even major upsets in a company's installations or equipment. FRAKO active filters solve this problem by significantly reducing the perturbations and thus increasing the operational reliability of the systems, ensuring uninterrupted production. In addition, the transformers and the most important distribution boards at Rothaus Brewery are monitored by Ethernet-capable network analysis instruments. These are connected via TCP/IP protocol with the energy management system for evaluation of the data in a PC.

FRAKO supplies customized power quality management systems that are fine-tuned to meet individual requirements.