APPLICATION REPORT

ENERGY MANAGEMENT

Building Automation Semiconductor Industry

“Flexim’s FLUXUS® flowmeters provide reliable, indispensable measurement data for our energy management system and are optimally integrated into it via the Modbus interface.“

Michael Willenberg, Engineering, Facility Management, Elmos

Measuring Task

Non-intrusive flow and heat flow measurements as part of energy management at the Elmos SE headquarters in Dortmund

Sustainability is an essential part of Elmos’ corporate strategy and environmental protection is part of corporate thinking. Therefore, the production site in Dortmund is certified according to the demanding environmental management standard DIN EN ISO 14001 as well as the energy management standard DIN EN ISO 50001. These certifications are checked annually or confirmed in repeat audits.

Effective resource management is important both ecologically and economically. Irrespective of the certificates, Elmos collects a large number of consumption values among other things for operational evaluations as a basis for measures to optimize consumption in the company and as a basis for ESG activities and objectives. These include, for example, emissions, energy and water consumption and waste generation. Elmos analyzes the internal processes in order to generate further increases in efficiency and to achieve advantages for the environment as well as for the company’s economic basis.

If you want to manage resources effectively, you need to be able to precisely track and allocate consumption. Effective resource management requires data. Energy management is essentially about showing energy procurement, energy conversion and energy use and determining key figures – such as energy requirements per semiconductor circuit produced. The most complete tracking of the respective consumption creates transparency and shows potential for efficiency. Energy and, more generally, resource management is therefore based on measurements.

Solution

In the energy management of Elmos, the non-intrusive ultrasonic measurement technology from Flexim has proven to be the ideal solution. When the combined heat and power plant was put into operation at the site in 2012 and the energy management was certified according to DIN EN ISO 50001, the engineers responsible were specifically looking for a measurement technology that would affect the availability of the highly profitable systems as little as possible. Since 2004, Elmos' facility management has had a portable FLUXUS® ADM 6725 flowmeter from Flexim. Based on the positive experience with the non-intrusive clamp-on ultrasonic technology, the decision was made to equip the combined heat and power plant with stationary ultrasonic measuring systems from Flexim. Since then, the network of measuring points in Elmos energy management has been increasingly consolidated with flowmeters from Flexim. Dual channel versions of the measuring transducers are mainly used, with which measurements can be taken at two measuring points simultaneously. The FLUXUS® clamp-on ultrasonic systems are used to measure the flow of water - drinking water, deionised soft water, ultrapure water, heating water and water-glycol mixture for cooling - as well as gases such as compressed air and nitrogen and for non-intrusive heat flow measurement.

Non-intrusive heat flow measurement

Determining liquid-based thermal energy flows is a particularly practical application of Flexim's non-intrusive measurement technology. To do this, it is only necessary to record the temperature simultaneously with the flow measurement in the flow and return of a thermal consumer. This is also usually done non-invasively using clamp-on technology. In the FLUXUS® TE version, the measuring system combines all the functions of a heat meter: flow transducer, pair of temperature sensors and calculator, which calculates the current thermal output or, through integration, the transported energy from the recorded measured values and taking into account data specific to the heat transfer medium (enthalpy, heat coefficient). According to DIN EN 1434-1 paired and traceably calibrated temperature sensors as well as paired and traceably calibrated ultrasonic transducers ensure the very high measuring accuracy of the heat flow measurement. A major advantage of acoustic flow measurement

The headquarters in Dortmund is Elmos' only production site.
© Elmos Semiconductor SE

Certificate

Standard ISO 50001:2018
Certificate Registr. No. 01 407 120406

Certificate Holder: Elmos Semiconductor SE
Heinrich-Hertz-Str. 1
44227 Dortmund
Germany
including the locations according to annex

Scope: Development, procurement, production, storage and distribution of semiconductor devices

Proof has been furnished by means of an audit that the requirements of ISO 50001:2018 are met.

Validity: The certificate is valid from 2022-06-18 until 2025-06-17.
First certification 2012

2022-05-11

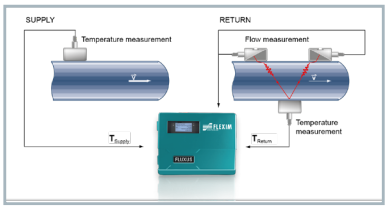
TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

www.tuv.com

TÜVRheinland®
Precisely Right.

Elmos energy management has been certified according to DIN EN ISO 50001 since 2021.
© Elmos Semiconductor SE

Right from the start, i.e. since 2012, the Elmos combined heat and power plant has relied on non-intrusiveflow and heat flow measurement with FLUXUS®.



The FLUXUS® TE ultrasonic systems measure the energy drawn from the consumer by determining the amount of heat flowing into and out of the system (differential method).

technology when recording thermal consumption lies in its extraordinary dynamics and in particular in its high sensitivity to even the smallest flows. As a result, all consumption is precisely recorded, in the low-load range as well as in peak-load situations.

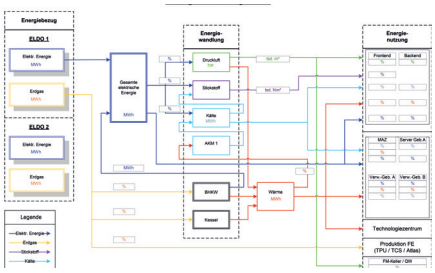
Integration into the building control and energy management system via Modbus/TCP

Of course, the mere collection of measurement data is not decisive for the effectiveness of an energy management system, but rather their meaningful linking and evaluation.
Reasonable use of measurement data in the context of an energy management system is based on data communication, processing, graphic representation and interpretation. The visualisation makes it clear what is actually happening, thereby showing ways to improve efficiency.

The FLUXUS® transmitters have interfaces for bidirectional digital communication, including Modbus/TCP. This means that the flow and energy measurements can be easily integrated into the energy management or process control system. The operating personnel can control the respective measuring systems via their IP address on the computer, and they can display and evaluate measuring and diagnostic data. In the Elmos energy management system, all relevant data is automatically transferred and calculated into key figures.

With a densely instrumented energy management system like that of Elmos with around 200 energy meters, almost a quarter of which are flow measurements from Flexim, there is also a certain challenge in instrument management. The FluxDiag software from Flexim offers practical help. With FluxDiag, for example, the measuring systems can be conveniently parameterized from the PC in the office using remote access via Modbus/TCP and their parameterization settings can be conveniently managed.

Measuring point for thermal energy on a cooling line. The ultrasonic and Pt100 temperature sensors are fully integrated into the insulation.



In the Elmos energy management system, all relevant data is automatically transferred and calculated into key figures.

Energy measurement systems of the type FLUXUS® F721 TE in dual channel designare mainly used.

Measuring Points and Instrumentation

Pipelines	1¼“ to 8”, steel, stainless steel, copper, plastic
Media	Drinking water, deionised soft water, ultrapure water, cold water (water-glycol mixture), heating water, compressed air, nitrogen
	19 stationary clamp-on ultrasonic systems mainly of the FLUX-US® F721 TE type for non-intrusive heat flow measurement and FLUXUS® G721 CA for non-intrusive flow measurement of compressed air predominantly in a dual channel version for simultaneous measurement at two measuring points

Advantages

- Reliable and accurate measurement of flow and thermal power
- Reliable acquisition of measurement data and determination of parameters for the energy management system according to DIN EN ISO 50001
- Non-intrusive measurement technology guarantees unrestricted system availability
- Easy retrofitting without interfering with the existing piping system with minimal installation work and without the costs for additional fittings and piping work
- No risk of introducing impurities when measuring the flow of ultrapure water
- Economical solution through the use of two-channel devices
- Process integration via Modbus/TCP
- Convenient meter management with FluxDiag
- Decades of convincing experience with Flexim‘s clamp-on ultrasonic measurement technology

Customer

Elmos Semiconductor SE, Dortmund, Germany

Elmos develops, produces and sells semiconductors primarily for use in cars. For almost 40 years, semiconductor solutions from Elmos have been enabling new functions and making mobility around the world safer, more comfortable and more energy-efficient. As one of the world‘s most experienced companies for mixed-signal semiconductors, Elmos has developed a leading role in various application fields in the automotive industry. Elmos components communicate, measure, regulate and control safety, comfort, drive and network functions. On average, seven Elmos integrated circuits (ICs) are installed in every newly delivered automobile.

1,200 employees, including more than 350 product developers and engineers, generated sales of EUR 447 million in the 2022 financial year.

For more information, visit
Emerson.com/Flexim

AR-202311-Elmos-US

FLEXIM

EMERSON