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Power up



Bächli's head of R&D Frank Hanisch reveals how the Smart-E-Power range is helping reduce electrical losses and save costs

Swiss-based company Bächli specializes in the development of energy-efficient electrotechnical components for the rail sector, including highly specialized transformers, chokes, filters and windings. Frank Hanisch Leiter, head of R&D at Bächli reveals more about the Smart-E-Power range and how it can provide an energy efficient alternative to standard electrotechnical products on the market.

What is Smart-E-Power?

At Bächli products that are extremely energy efficient are grouped under the Smart-E-Power brand name. These solutions use a highly efficient iron core and special sheet metal technology, which help to reduce power dissipation and save electricity. Furthermore, these products are suitable for noise-sensitive environments as they are quiet and they use sustainable materials.

Although these Smart-E-Power products are initially more expensive than standard solutions, the return on investment is achieved much quicker due to large savings in electricity costs and reduced maintenance requirements. For example, based on the Swiss energy price of CHF 0.12 (Euro 0.11) per kWh, the energy loss of the Smart-E-Power product costs CHF 836 (Euro 770) per year. If this is calculated on the basis of an average service life of a transformer of 30 years, the cost saving is more than 30% when choosing a Smart-E-Power product. Normally, several of these products are installed in one train, so the savings accumulate very quickly.

ABOVE: The Smart-E-Power design from Bächli

BELOW: Smart-E-Power series. Comparison of a Smart-E-Power compact 70kVA auxiliary converter transformer with a standard unit

	Smart-E-Power	Standard
Efficiency	98.48 %	97.76 %
Energy loss in 1 year (18h/day, operating hours)	6,964 kWh	10,295 kWh
Energy costs in 1 year (CHF 0.12/kWh)	CHF 836 (US\$907)	CHF 1,235 (US\$1,340)
CO ₂ generated per year	4,109 kg	6,074 kg

Is Smart-E-Power used on all Bächli products?

No, we are able to manufacture our products in four different designs, depending on the customer's needs. First is the Smart-E-Power and then we have the sustainable series, which is suitable for a short-term harmonic tendency and is characterized by a high efficiency. Then we also have compact products, which are lightweight, and finally we offer the standard design.

Tell us about a recent Bächli project.

Over the past year we have been working with a big train manufacturer to develop a compact and energy efficient line choke. We began serial production of this choke a few weeks ago. This is the largest line choke that Bächli has ever built, but it is still lightweight and efficient. We have managed to reduce the weight of the existing line choke by 50% meaning the new one weighs 2,000 kg. Due to its lighter weight, less energy is used for movement. At the same time, care was taken in the engineering process to use high-quality materials in order to reduce energy losses. This efficiency gain allowed the customer to switch to a smaller fan, which brings additional cost savings.

What key challenge is Bächli currently facing?

The biggest challenge we are trying to address is manufacturing durable products that are as maintenance-free as possible. We have achieved this with our Smart-E-Power transformers, which do not require forced ventilation and are therefore maintenance-free. This massively reduces the overall servicing costs.

Due to the use of enclosures and energy efficient materials, the purchase price for these Smart-E-Power transformers is higher. However, since the maintenance costs, the cooling circuit, the weight, etc., are eliminated, one very quickly arrives at a positive cost balance. The key is to look at the entire lifecycle costs. It is important that the train manufacturer passes this information on to the end customer, since they incur the maintenance costs. ■