



On wings of green!

Synchronous motor with novel stator design boasts efficiency over 90%

38 billion – that is the number of kilowatt hours Germany could save per annum with highly efficient drives: using drives such as >Rosync<. Based on an optimised rotor and special, plastic-bonded neodymium magnets, this permanent magnet synchronous motor achieves efficiencies in excess of 90 percent. And with its >GreenDrive Technology< it is clearly physically smaller than conventional motors of the same output.

► **ACCORDING TO INTER-TRADE ORGANISATION ZVEI**, motor-driven machines in commerce, industry and public utilities consumed about 200 billion kWh in Germany in 2010.

► THE SUPPLIER

Rotek offers its customers a flexible modular system with more than **60 000 product types**. All Rosync motors have the same external design as the conventional synchronous Rotek motors, meaning that virtually all the components in a range can be used. A comprehensive **range of gears** complements the motor programme. The motors are offered for voltages ranging from 1-24 to 1-230 V and 3-230 V for converter operation and 3-400 V, as well as special customised designs. A large stock of magnets stabilises prices and also absorbs supply fluctuations.

This constitutes 40 percent of Germany's total electrical power consumption. 38 billion kWh could be saved per annum if the around 35 million electric motors were to be replaced by energy saving motors or energy saving components such as speed-controlled drives. This comes down to approx. 23 million tons of carbon dioxide. Projected for all of Europe, the savings potential is 135 billion kWh. This explains the increasing political pressure for energy conservation and the efforts of the EU commission to legislate for energy efficiency figures for drive components to be expanded to include entire systems.

Innovative motor concepts clearly save electricity, thereby making significantly better use of existing resources. Permanent magnet synchronous motors can be optimised through innovative design and using new, stronger magnetic materials. With its >Rosync< range of synchronous

motors, the Bremerhaven manufacturer Rotek has developed just such a product. The novelty here is in the stator design and an optimised rotor with improved magnetic material made of plastic-bonded neodymium magnets. It was possible to increase the efficiency to more than 70 percent for the single-phase synchronous motor (capacitor motor) version. By way of comparison: The widely available asynchronous motors with the same output are around 50 percent efficient, whilst low priced shaded pole motors reach only 20 percent.

In continuous operation, the single-phase Rosync motors deliver 20 to 36 W, depending on windings, and may deliver up to 50 W short-time. As a three-phase motor (AC motor) it achieves 50 to 85 W in continuous operation, at more than 90 percent efficiency. Windings for short-time operation do not realistically make sense here.

Further advantages are constant speed (independent of load and voltage), short starting and stopping times and running with low vibrations. Furthermore, the motors are maintenance-free and have a long service life. The compact design is an advantage when space is at a premium.

Planned legislation and increasing energy prices will force consumers to give even more consideration in future to the overall energy balance before making an investment. Life cycle cost analyses should be the basis of all planning for machines and plant. Companies with foresight do this voluntarily already today, since it makes sense also from the operations point of view.

Motor renders conveyor belt compact and resistant to wear

The Fimatech Industrietechnik Vertriebs-GmbH company in Rehling (www.fimatech.de) is a good example of savings achieved by replacing a conventional motor with a Rosync motor. The company produces modular design link belt conveyor systems. Whilst basic asynchronous motors were used in the past, the Swabian conveyor specialists now deploy AC synchronous motors of the Rosync range. Fimatech accommodates the drive in the body of the modular conveyor. This enables a very compact design. Transmission of power to the belt is via one or more tightly meshed gear wheels. This means that the system's linked belt requires no tensioning and very little force, running virtually without wear.

To Fimatech, the most important factors favouring the energy saving motor were the low temperature rise and the robust planetary gears of the drive unit. The Fimatech conveyors, after all, are often used by companies manufacturing plastic in-



Comparison of the size of a Rosync energy saving motor (left) and a conventional asynchronous motor with the same output

jection moulded parts for the medical and pharmaceutical sectors. And low temperature rise is decisive in the manufacture of thin-walled caps or lids. In the meantime, Fimatech has also registered significant energy saving through deployment of the new motor.

Motor provider Rotek has calculated the following: Depending on the cost of electricity, energy costs may be reduced by approx. 6 000 Euros per annum simply by replacing just 100 of the small motors with Rosync series motors. Rosync motors proved their mettle especially in applications with longer running periods such as the above conveyors, with pellet heater screw conveyors or as drives in rotary heat exchangers. Due to their consistent material efficiency focussed design, the procurement costs are said to be in line with conventional costs of quality motors in the European market.

Assuming a 12-year service life, however, the lifecycle cost would be at least one-third less than that of an asynchronous motor with the same rating.

But Rotek can be even more concrete. Assuming you would use a Rosync and a

conventional asynchronous motor, each rated 50 W, to drive a transport conveyor for 8 000 hours p.a., then the consumption of the former would be 55 W and of the latter 90 W (efficiencies reversed). This equates to an annual energy consumption of 440 kWh as opposed to 720 kWh, implying energy costs of EUR 101 as opposed to EUR 165, assuming an electricity tariff of 23 cents.

The manufacturer of the North highlights another positive feature of the energy saving motor: carbon dioxide reduction. By deploying a single 50 W AC motor, a max. of 150 kg less CO₂ is produced p.a. than with the conventional motor of the same rating. This equates to 200 times its own weight – an important argument when taking the holistic view of plant and the >carbon footprint< of a company, as emphasised by Rotek at Bremerhaven. ■



Using the energy saving motor to drive a link belt conveyor, as shown here, renders conveyor design extremely compact

INFO

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Available: at the manufacturer directly

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