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Convincingly Efficient: EIRICH Intensive Mixers with Torque Motors from OSWALD



An interview with Johannes Oswald, Managing Director of OSWALD Elektromotoren GmbH, and Wolfgang Wörner, Product Manager of Maschinenfabrik Gustav EIRICH GmbH & Co. KG

Thinking outside the box is worthwhile. EIRICH mixers are increasingly being fitted with torque motors for good reasons: They consume significantly less energy than conventional asynchronous motors. Torque motors also cause lower operating costs and run at significantly lower noise levels. Does an EIRICH mixer with torque drive also pay off for customers in the foundry industry? Johannes Oswald and Wolfgang Wörner have not the slightest doubt.

When and why did the development of torque motors gather momentum?

J. Oswald: In principle, synchronous motors, also known as torque motors or high-torque motors, are similar in design to conventional asynchronous motors. The main difference is the rotor. It is equipped with permanent magnets. Since the turn of the millennium, the necessary neodymium-iron-boron magnets have been available required corrosion-resistant quality. In addition, the right technology of frequency inverters was developed. As a result, we now have motors that are considerably more dynamic than asynchronous motors and offer significantly more torque at the same volume. In addition, torque motors have a very high efficiency even in partial load ranges.

At OSWALD, we have been among the front runners in developing torque motors from the very beginning. It was the right decision. Since then, our company has seen significant growth. At present, we build approximately 3,000 electric motors per year. Meanwhile, around 80 percent of these are torque motors.

Since when have you been supplying torque motors to EIRICH?

J. Oswald: Since 2006 – EIRICH was not among our first, but among our early customers to buy torque motors. And that is no coincidence. Just like us, EIRICH strives to offer benefit to their customers with all their innovations. EIRICH quickly recognized the potential of torque motors. The years have shown that we can work together smoothly and effectively; that is how I feel about it. One reason is the geographical proximity, as we are both based in the Odenwald region, and another reason is that we are both innovative, medium-sized family businesses.

W. Wörner: I can only agree. Torque motors are really perfectly suited as direct drives for our mixing tools because of their high torque. They optimally transmit the force to the tool. Regardless whether it is a conventional EIRICH intensive mixer or an EVACTHERM® mixer.

So it is the high torque that recommends the torque motors for the EIRICH mixers?

J. Oswald: The torque motor functions as a direct drive and is operated via inverter. Due to its high torque, it can replace the asynchronous machine including the transmission unit (belt or gearbox). The result is an even and powerful torque. It offers maximum efficiency in all operating phases - no matter whether I load it to 10 or 100 percent, it maintains its rotational speed. At higher torques, it is quite possible that the belt of an asynchronous motor slips. As a result, this naturally means downtimes and repairs.

How many of these motors has EIRICH installed in their mixers by now?

W. Wörner: More than 170. In some industries, the EIRICH mixer with torque motor is already widely used, for instance in the production of lead acid pastes, the preparation of ores and sinter mixes, and the preparation of anodes. In the foundry industry, however, it is only now that an intensive mixer with torque motor is being commissioned.

Which advantages and benefits win customers over to the torque motor?

J. Oswald: They benefit from less need for maintenance, reduced noise, reduced vibrations and substantially lower consumption of energy. Depending on the application, this can save up to 50 percent on energy.

How much energy saving is realistic in the foundry industry, from EIRICH's point of view?

W. Wörner: We took a very close look at this - not in a foundry, but as part of a bachelor thesis under comparable conditions. One of our customers has two identical mixers installed side by side - same task, same process, same machine filling, one with a torque motor, the other with a normal asynchronous motor. We have been comparing the power consumption over an extended period of time. For the torque motor, we arrived at a value that was 25 percent lower. And that is not a measurement at a single point in time.

An energy saving potential of 25 percent is a powerful argument. On the other hand, torque motors are considered expensive to purchase. How long does it take for the investment to pay off?

J. Oswald: In order to compare the costs, you need to look at the overall system. The direct drive does not replace the asynchronous motor alone, but the asynchronous motor with transmission elements. In the foundry industry, this is usually a V-belt drive. With the torque motor, you need an additional inverter; with the asynchronous motor, you often need a larger power supply because higher currents are required when starting up. You see, the comparison is not a trivial issue.

... and turns out in whose favor in terms of overall economic efficiency?

W. Wörner: Definitely in favor of the torque motor. You also have to take into account the shorter assembly time. Also, there is no need to adjust the V-belt pulleys. Our fitters say, "I just bolt it on, done - it fits." Today we say that the torque motor pays off within two to three years. And this with an average service life of 25 years for an EIRICH mixer.

Can an EIRICH mixer with a conventional asynchronous motor be retrofitted with a torque drive?

W. Wörner: Yes, in fact it is quite easy. At the beginning, we attached the mixing tools - one or more that are arranged eccentrically - directly to the motors. The motor served also as the bearing for the tool. Meanwhile, we have reconsidered and now use a bearing just like with a conventional motor. In the case of an asynchronous motor, the bearing carries the V-belt pulley. For the conversion, I simply take it off and replace it with a coupling, a shaft-to-shaft connection, so that the power can be transferred from the motor to this bearing. Then I add a torque bracket – that is all.

How long does the conversion to a torque motor take?

W. Wörner: The retrofitting work, including the installation of the inverter components - which can be prepared in advance - may take a weekend. The result is a practically maintenance-free motor. If anything can break one day, it is the bearings.

J. Oswald: I like to compare the service life of the bearings with that of a car. When a car has traveled 300,000 km, it has run between 5,000 and 6,000 hours and is often scrapped. The bearings of a torque motor are normally replaced after 30,000 or 40,000 hours. Mainly due to the low speeds and because there is no belt load, the bearings have a particularly long service life.

That almost sounds too good to be true. Has the torque motor no disadvantages?

J. Oswald: Some may see it as a disadvantage that a torque motor is always custom-made. The 160 kW asynchronous motors that are widely used in foundry mixers can be purchased off-the-shelf. In the event of a motor failure, which is extremely rare in torque motors, it is easier to obtain a spare. However, since we cooperate with EIRICH on a regular basis, we are able to react quickly in the event of an emergency and deliver a new motor at short notice.

Has this ever happened before?

W. Wörner: Well, what can I say? Actually, it did happen once. But that was when we dropped the motor. That does not really count. If anything, it is usually not the whole motor that breaks, but rather a bearing. We have an agreement with OSWALD that such spare parts are always available at short notice. Together, we are therefore able to ensure that the mixer will be operational again within one to two days.

Will GIFA visitors be able to get an impression of the torque motor on site?

W. Wörner: Yes, our exhibits will include at least one R28 Mixer with torque motors. We are really looking forward to convincing interested visitors from the foundry industry of the advantages of this direct drive. If it were up to us, we would not install any other motors anymore. For years, we have been making the experience that customers who know the torque drive are no longer interested in any other option. Our message on the GIFA is this: See for yourself and let us convince you.

Company Info



Eirich (Maschinenfabrik Gustav Eirich GmbH & Co.KG)

Walldürner Str. 50

74736 Hardheim

Phone: +496283510

Fax: +49 6283 51 325

E-Mail: eirich@eirich.de

Web: www.eirich.de