



WE MAGNETISE THE WORLD



Do You Use Inductive Heating?

Technology Brief



INDUSTRIAL CONTROL SYSTEMS





Packaging machine with inductive heating

Think outside the box!

Targeted heat through eddy currents

The induction heater is considered the very latest kitchen innovation. Kendrion Kuhnke has the know-how to implement the very same inductive heating technology to a wide range of industrial processes.

Technology

Many industrial processes require the generation of heat. In many cases, this heat needs to be available immediately and it must be possible to quickly switch it off. It needs to be distributed evenly and controlled dynamically. Plus the energy consumption should be as low as possible.

When it comes to heating flat or round-shaped tools – or many metal parts with a special geometry – a heating system based on the eddy current principle is the ideal solution. It uses high frequency alternating current to generate an alternating magnetic field that can be transferred into the metal in a well-defined way. The resulting eddy current losses will lead to a thermal energy that can be controlled precisely by simply changing the flow of current.

Typical applications

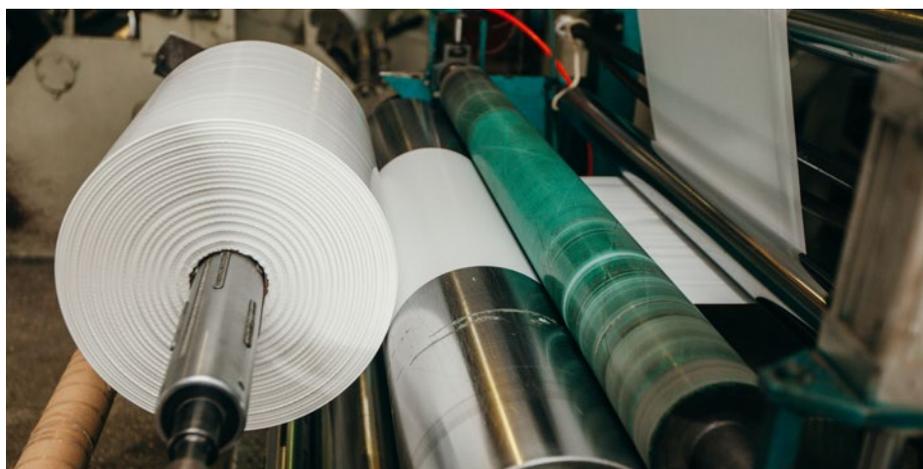
A typical application for eddy current heating systems is the production of synthetic fibers. Here, it is important to heat the plastic to a uniform and precisely defined temperature at a narrowly defined point in the production process. Completely different requirements need to be met when it comes to thermal welding or shaping of plastic foils in the packaging industry. The challenge here is not only to heat a relatively large surface as uniformly as possible. The required

temperature must also be available as quickly as possible in order to rapidly dissipate after the welding process.

Application-specific inductors

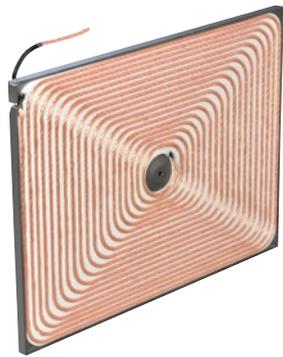
With such applications, the inductor has a very important task. It is responsible for generating the specific temperature required for the particular application. Since it must be precisely matched to the geometry of the metal it is always the result of an application-specific design. Kendrion Kuhnke uses a specially developed procedure to determine an optimal inductor design that ensures uniform heating of the metal at the required temperature. It is possible to achieve continuous temperatures of up to 250 °C. The inductors are thermally stable and do not require any additional cooling measures, such as a water cooling.

With all applications, a distinction is made between roller and surface inductors. Roller inductors are used, for example, in the production of synthetic fibers or in embossing processes in the graphic arts industry. They can be produced with different roller



Inductive heating using a roll inductor

diameters and can be equipped with one or more heating zones depending on the application. A very decisive advantage here is that the alternating current for producing the magnetic field can be transmitted to the rotating roller in a contact-free manner without any mechanical wear.



Flat surface inductor

Surface inductors are used, for example, for heating foodstuffs, for welding foils or for graphic embossing processes. Here, the induction heating allows a uniform energy input over the entire surface. This not only results in fast heating and cooling, but also allows the use of less massive heating surfaces, which in turn makes the machine lighter, more dynamic and more efficient.

Innovative generators

Kendrion Kuhnke has developed innovative generators based on state-of-the-art semiconductor technology for its inductive heating systems. Depending on the application, they operate with frequencies up to 50 kHz and are characterized by their high efficiency. Depending on the generator design, up to 8 independent inductors can be connected. The generators are short-circuit-proof and can deliver an output of up to 10 kW per inductor.

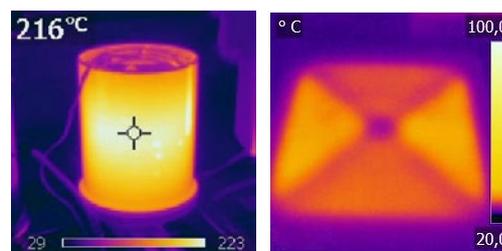
In the field of control electronics, Kendrion Kuhnke is focusing on an innovative solution based on micro controllers. Temperature control, system monitoring and the adaptation of the inductors to the output stages are combined into one compact unit. For temperature monitoring designs for all prevalent sensor types, such as thermocouple or PT 1000 are available. Via a field bus, such as EtherCAT®, the control unit can also be networked with a higher-level process control system.



Generator



Inductive heating in synthetic fiber production (picture: © Oerlikon Neumag)



Thermographic recording of roll and flat surface inductor

Kendrion Kuhnke believes that an efficient and energy-optimized induction heating system can only be achieved if all components are precisely matched. This is why the company clearly focuses on customer-specific solutions. The company sees itself as a system partner of its customers and is willing to introduce its expertise into any development project.



WE MAGNETISE THE WORLD

Kendrion Kuhnke Automation GmbH
Lütjenburger Strasse 101
23714 Malente
Germany
Phone: +49 4523 402-0
Fax: +49 4523 402-201
sales-ics@kendrion.com
www.kuhnke.kendrion.com



All changes, modifications and errors with reference to the products are reserved.
Illustrations are exemplary. The rights of all companies and company names
as well as products and product names are with the respective companies.