Products for Induction Heating
Your part – our task

As a globally active company we develop, produce and distribute inductive heating technologies. We offer varied solutions that are highly efficient and based on a simple, tried and tested principle: electrically conductive bodies generate eddy current losses when an alternating magnetic field is passed through them. They are self-heating due to the alternating magnetic field. A high level of heat, which is easy to control, is created immediately upon induction from the workpiece itself, and can be used for hardening, tempering and brazing, for annealing and shrink-joining, for coating and stripping.

eLdec products are solutions. Innovative solutions for the special tasks which you request from us. Because every workpiece is different, every customer order involves a special feature that leads us to new solutions. This is why everything revolves around definition of your job. We work closely with you to develop the right solution for your needs. This cooperation starts with a comprehensive consultancy review session during which we first create a precise “picture” of the situation: of your workpiece, the special requirements and the associated technological process.

You will profit, like many other renowned companies worldwide, from our long years of experience in the most varied applications of inductive heating. Your success is our goal.
Our solutions are in use in the most varied of sectors, because inductive heating of electrically conductive materials is becoming more and more popular across the board.
eldec solutions are effective, efficient and economical too, particularly in terms of energy consumption. Our solutions also contribute to our green dot for energy efficiency. As a result, there are few value added chains that can do without these technologies. Every day new application areas are opened up using eldec technologies. Worldwide. When can we help you to optimize your manufacturing process?

The most notable eldec users of induction heating technology:

- Electrical machine construction
- Automotive
- Mechanical and systems engineering
- Tool and die construction
- Aerospace engineering
- Other special applications
eldec Generators: powerful, precise, energy-efficient

There can be no induction without an energy source. eldec generators create the basis for efficient and reliable induction heating systems, with the necessary plant-engineering environment if required. The optimally tiered range of eldec generators comprises medium-frequency and high-frequency generators from 1.5 to 1,500 kW and SDF® generators from 50 to 3,000 kW.

Our generators are easy to use and can be optimally integrated, if required, into the most varied of manufacturing systems. They are small in size, light in weight and big on performance. With eldec generators, the electronic power control in combination with automatic adaptation ensures optimal utilization of the available generator power.

Optimum efficiency and short, accurate heat input: for you this means short process times and high process capability as well as low energy consumption and low maintenance costs.

The generators are also short-circuit and open-circuit proof. Inadvertent work-piece contact thus has no effect. With us, safety, efficiency and precision come together: as glowing innovations.
MF (medium-frequency) and HF (high-frequency) generators

- Robust IGBT transistor technology => short-circuit and open-circuit proof
- Efficiency > 90%
- Pulse width modulation and pulse package control for automatic power regulation (including for the transition at \( T_{Curie} \))
- Automatic adjustment to resonance frequency and thus inductor impedance
- Switch topology with output matching transformer: optimal user protection
- High speed PLC with eldec control
  - print: short clock frequencies for the quickest control

- Precise energy dosing => high process capability (reproducibility)
- Modular alternating current converter
- Compact eldec transformers and throttles => best power density
- Coaxial cables up to 15 m in length (at MF)
- Largest frequency and power range and largest adjustment range on the market
- Virtually maintenance-free

SDF\textsuperscript® generators (Simultaneous Dual Frequency): Energy sources with maximum power density in simultaneous dual frequency technology for inductive hardening.

- Simultaneous heating with medium and high frequencies
- True-contour edge-zone hardening of complex surface geometries
- Flexible use also as a purely MF or HF generator
- Combination of pulse width modulation and pulse package control
- High speed PLC with eldec control
  - print: short clock frequencies for the quickest control
- Highest power density => short process times

- Short process times => in-line integration possible
  => low energy consumption/workpiece
  => no or hardly any scaling
  => minimized component bracings

SDF\textsuperscript® (Simultaneous Dual Frequency):
- Typical effective hardening depths (true-contour):
  - MF: 8 kHz – 40 kHz
  - HF: 80 kHz – 450 kHz
  - Power: 50 kW – 3,000 kW

eldec generators are available with various outputs: double, threefold, fourfold, up to eightfold. Twin and symmetrical solutions are also available.

Customized cooling systems: Bespoke and therefore always precisely dimensioned.

Depending on the system design, eldec generators can be built with or without cooling systems. Everything is adjusted to suit the overall plant dimensions and the conditions on site, individually and to your wishes.

The generator, inductor and, if required, the quenching medium can be passively or actively cooled in this process.
eldec MICO: energy source and cooling system integrated in one

Small and compact, stationary or mobile. Inductive heating – re-thought and re-done. The integration of frequency converters and a cooling system in a single housing creates multiple application possibilities. This means maximum flexibility for your heating task, making processes like inductive brazing, annealing and cutting-edge hardening as well as coating and stripping both practical and uncomplicated.

The MICO product line is offered in a wide range of power ratings (from 15 kW to 70 kW) and can be both stationary or mobile. MICO can be configured with rollers, crane hooks or forklift openings as well as various work surfaces and can be equipped with a variety of tools: inductors, brazing guns or heating cables. The choice is yours. The modular design is evident even in the superstructures:

- from folding cantilever arms with parallelogram kinematics, through short or long cantilever arms with special balancers, up to the connection of heating cables in a practical cable box.
- A small but highly effective device with enormous flexibility.

HF power: 15 kW
MF power: 18 kW - 30 kW
Tube package length: up to 15 m
Multiple outputs on request: Dual output or twin

HF power: 15 kW - 35 kW
MF power: 18 kW - 70 kW
Tube package length: up to 15 m
Touch screen operation
Multiple outputs on request: Dual output or twin
eldec Heating Systems: complete solutions for brazing, heating and joining

eldec generators are the basis for reliable induction heating. Numerous applications require further components and devices in addition to the energy source, resulting in complete and partially automated systems.

In the course of its history, eldec has built many of these complete heating systems for a number of tasks. Either eldec alone, or together with renown partners.

Heating system for joining stators in synchro motors

Heating system for housings of electric motors

Heating system for cutting, forming and brazing of pole coils
eldec MIND: modular systems for hardening chucked parts and shafts up to Ø 1,200 mm

The MIND series is the result of many years of experience, which we have gained as a supplier of inductive energy sources and complete special hardening machines. This accumulated know-how has now crystallized in a new generation of modular, inductive hardening systems. MIND stands for modular induction. Full modularity for optimal solutions. Efficient hardness solutions in a modular design. Depending on the workpiece dimensions, desired hardness profile and requirements in terms of flexibility and lot size, an eldec MIND system is configured from the main components of base machine, energy source, automation components, cooling system, workholding and tooling. A well thought-out modular system which can handle your very particular task quickly and cost-effectively.

eldec MIND hardening machines can be supplied as a manually operated stand-alone solution, as heat treatment systems with a customized level of automation or also as in-line hardening cells, completely integrated in the process chain of soft and hard machining.

eldec MIND is suitable for the following workpieces:
- Workpiece geometry: chucked parts and shafts
- Workpiece diameter: up to 1,200 mm
- Workpiece length: up to 1,500 mm
eldec MIND modular system:
a selection of modules and options

1. Work area for camshafts
2. Work area for drive shafts
3. Work area for sprockets made of powder metal

- Larger work table Ø 1,200 mm
- Manual load station
- PLC-control
- CNC-control
- Actuator for NC-controlled rotary table
- C-axis NC-control
- Electromechanical rotary table drive
- Y-axis servo drive
- X-axis servo drive
- Laser sensing inductor position
- Laser sensing
- Workpiece detection
- Main spindle drive
- 4-position rotary index table
- 8-position rotary index table
- Twin station 4-position rotary index table
- Tailstock column for rotary index table
- Tempering station Z
- Z slide with 2 coax
- 2 x Z slides with 4 coax
- NC-controlled tailstock
- Laser sensing inductor position
- NC-controlled tailstock
- 2 x Z slides with 4 coax
- 8-position rotary index table
- 4-position rotary index table
- Tailstock
- Laser sensing
eldec MIND-M: compact hardening systems

The MIND-M offers a high degree of precision and reliability at comparably low investment costs. Simple heat treatment tasks with a maximum power requirement of 30 kW at high frequency (HF) or 100 kW at medium frequency (MF) applications can be processed with the MIND-M.

Energy source, cooling system and process cell are combined on a single machine base to save space. The MIND-M is fitted with an X, Y and Z axis for positioning the inductor in relation to the workpiece, a main spindle drive for workpiece rotation, as well as a temperature and flow controlled spray for the quenching medium.

A tailstock module with centering pin enables secure clamping of workpieces between the centering points. Loading of the unit can be performed either manually or automatically within the process chain with the aid of a loading module. In combination with a 180° adapter plate this can also be carried out in parallel with heat treatment.

MIND-M 250 is suitable for chucked parts up to a diameter of 350 mm as well as shafts with a maximum workpiece length of 250 mm.

MIND-M 1000 is suitable for shaft shaped components with a length of up to 1,000 mm.
eldec MIND-S: minimal floor space induction heating and hardening systems

The eldec MIND-S is the compact, "smaller sibling" of our full featured MIND hardening machine series. A complete, integrated system for your induction hardening application or any other induction heat treating of small parts. The energy source with active coolant and quench system (if required) is integrated into the machine base.

The spacious working area allows for different modules and work holding devices to be freely positioned. This creates flexibility for various parts and applications. Effective for low, medium and high volume production for hardening, tempering, brazing, fitting or melting in the smallest possible space.

The MIND-S can be transported "as is", featuring the smallest footprint of any complete system. This makes MIND-S a complete space saving and crane ready system with a maximum power requirement of 15 kW for high frequency (HF) or 30 kW for medium frequency (MF) applications.

eldec MIND-S is suitable for various workpieces and heating tasks. All in one and easily accessible: energy source, coolant system, quench system and electrical controls.

Spacious working area.
Process development
Innovative products require innovative processes. We are here to advise you on this. Our broad technical and application know-how, our deep understanding of complete manufacturing process chains and our well established knowledge of metallurgy, together with comprehensive test and analytical capacities, form the foundations of our solutions oriented work.

Technological consultancy
We seek out the right solution for your tasks. To do this we provide support from the very start with sound technological consultancy. Our employees pride themselves on their networked thinking, they are always in demand as speakers at technology conferences and specialist forums and are constantly exchanging ideas and information with their colleagues in the sciences.

Commissioning / acceptance
System solutions (with specification sheet and process technology) will be set up at one of the eldec locations, Dornstetten (D) or Auburn Hills (USA), for preacceptance, if required.

After-sales service
From the eldec locations or in conjunction with our global sales and service partners, we ensure that everything runs smoothly for you and that the complete scope of services of your system is always available to you, now and for many years to come. Full spare part availability and a competent service team ensure a reliable service and a swift response.

Equipment rental service
You have just received a large order and you have to start production quickly? Your system is malfunctioning or you need a test device immediately? We would be delighted to help by providing a plant hire service.
eldec Services: all-round service

A product is only as good as the service that follows it. That’s why with us a perfect solution comes hand in hand with an excellent all-round service that we can offer worldwide thanks to our service network.

User training
Our sophisticated training concept gives you the opportunity to have your eldec system operators comprehensively trained. Individually or in small groups, the participants learn how to get the best productivity levels from your system.

Technological and metallurgical training
Our engineers will provide you with the knowledge you need to competently make any decisions that arise. In our metallurgy training courses, we teach both the basics and also more detailed topics for specialists. Because regardless of whether hardening or brazing – the material to be heated determines the process.

Maintenance training
The service life of every machine is increased significantly through maintenance and care. To maintain your production levels, we offer maintenance training courses, during which your maintenance operatives will learn about all the opportunities for preventive maintenance. Ensuring that your manufacturing system always runs smoothly.

Basic training in induction technology
This training will teach you everything you need to know about induction heating. We will provide brief, concise and memorable answers to your questions about induction.

Inductor design and inductor manufacturing training
The inductor forms the core of every eldec system. We therefore also dedicate special training to inductor manufacturing, which is subdivided into theoretical and practical parts. Here, the participants are first taught the theoretical principles before the practical exercises, where they learn how to build a suitable coil based on frequency, material and power density.
eldec was founded in 1982 as Schwenk Induktorgbau GmbH. To this day, inductor design and manufacture continues to be one of our core competences. It forms the basis for all our solutions. 

Werkzeug jeder The tool for every inductive heating system is the inductor, which specifically encompasses precisely the workpiece area to be heated depending on the frequency, material and power density. It is precise in both target and duration. Therefore, the inductor’s shape and its construction style are determined principally by the geometry of the workpiece section to be heated.

eldec inductors are designed using state-of-the-art 3D CAD software, manufactured on CNC tool machines and built by the best qualified specialists in Germany and the USA.

The result is that thousands of inductors fulfill their intended purpose precisely and reliably for our customers.
Innovative specialists for your heating task

Our customers drive us onward. Progress defines us. Solutions move us. That is eldec. As a globally active company we develop, produce and distribute technologies for inductive heating. For curing and tempering, brazing, annealing and shrink-joining, for coating and stripping. Innovative solutions with a multitude of applications – few value added processes can do without eldec. Every workpiece is different – and thus every customer order involves a special feature that leads us to new solutions. That is why we owe a debt of gratitude to our customers and partners; for their long years of confidence in us and the exciting tasks they set us.

They spur us on every day to new heights.

Leading companies rely on innovative eldec solutions:

Company history
1993 The product range continues to expand: eldec develops and supplies the first HF and MF generators with IGBT semiconductor transistors.
1998 Founding of eldec Induction USA. This facility markets all eldec products, assemblies generators and offers all services for the American markets.
2000 Supply of the first SDF® generators. A patented technology which is mainly used for true-contour inductive surface hardening of gear wheels.
2004 € 11 million turnover with the two facilities.
2006 Completion of a worldwide unique pilot hardening system with a 3000 kW SDF® generator.
2007 eldec reaches turnover of approx. € 12 million with 90 employees.
2008 Introduction: MIND hardening machine range.
2010 Introduction of MIND-S product line.
2011 Introduction of MIND-M product line. Additional floor space for production and assembly in USA. New production and assembly facility with additional 2000 m² in Dornstetten, Germany. Worldwide turnover approx. € 19 million with 135 employees.
2012 Introduction of MICO-S. The MICO product line is complete. eldec reaches turnover of approx. € 21 million worldwide.
2013 eldec becomes a member of the EMAG Group.