Induction Heating
Energy Efficiency
for Sustainable Results

eldec

Induction Heating & Hardening Solutions

Contents

From the Black Forest to the whole world

eldec - founded in 1982 in the Black Forest and has been working non-stop in the field of high-quality industrial induction heating ever since. We see ourselves as a constructive partner for our customers, as a technology leader, as obsessed with quality and as a professional home for our employees.

A medium-sized, owner-managed „hidden champion“, large enough to operate internationally, small enough to react flexibly and quickly to market and customer requirements, and with an unusually high level of vertical integration.

Our team is known as a constant driver of innovation with a high level of expertise: multi-frequency generators (SDF® and DFG), multi-process hardening machines, EEI² (eldec easy Intuitive Interface – smartphone-oriented HMI), FEM-supported process simulation, 3D-SLM printed inductors, eQC (eldec Quality Control – basis for I4.0 solutions) and HPTS (High Precision Tool System) are just a few examples of where eldec has set and continues to set the pace.

eldec (Suzhou) Induction Co.,Ltd. / China

LINK Induction LLC in Bloomfield Hills / USA

Generators

PICO

small, red, strong, low-cost - PICO by eldec

PICO-SC

mobile, compact and complete

SYSTEM-LINE

for integration into machines and fully automated systems

CUSTOM-LINE

A perfect fit for your application

The basis for reliable induction heating

Sophisticated rectifiers, robust IGBT inverter modules, highly efficient resonant circuit components combined with the microprocessor-based highspeed eldec control architecture provide a product that is unrivalled on the market in terms of matching range, efficiency, energy metering as well as reliability. Built many thousands of times. Continuously developed.

The PICO, ECO-LINE EEI², SYSTEM-LINE, RACK-LINE and CUSTOM-LINE product lines include medium-frequency and high-frequency generators from 1.5 to 1,500 kW as well as DF and SDF® generators from 50 to 3,000 kW.

ECO-LINE EEI²

maximum connectivity and intuitive touch display

RACK modules / RACK-LINE

Multi-power due to plug-in technology

PICO

Standard generators with one output and simple handling.
Available in numerous power classes. Just Heat!

PICO generators are low-priced generators in uncompromising eldec quality due to high standardisation of the components. They are extremely compact: e.g. the PICO-S generator (desktop housing size) is available with 30 KW MF - the best volume-to-power ratio on the market.

Thanks to the intuitive operator guidance, plug & play is truly reality.

Continuous, jog or timer operation, regulation according to output, current, temperature and recipe memory management are standard features.

PICO generators are offered as medium-frequency and high-frequency generators from 5 to 30 kW for inductive heating of a wide variety of workpieces and materials.

Available frequency ranges:
MF: 8 - 20 kHz / 16 - 40 kHz   HF: 70 - 175 kHz / 140 - 350 kHz

Technical Data PICO-S

Type Rated Capacity	Mains Connection +/-10 % 50/60 Hz		Required cooling water without inductor	Dimensions W x H x D	Weight
PICO-S 5 MF	3 x 400 V	10 A	6 l/m	450 x 280 x 510 mm	50 kg
PICO-S 10 MF	3 x 400 V	20 A	10 l/m	450 x 280 x 510 mm	50 kg
PICO-S 15 MF	3 x 400 V	32 A	12 l/m	450 x 280 x 510 mm	50 kg
PICO-S 20 MF	3 x 400 V	35 A	13 l/m	450 x 280 x 510 mm	50 kg
PICO-S 30 MF	3 x 400 V	63 A	14 l/m	450 x 280 x 510 mm	50 kg
PICO-S 5 HF	3 x 400 V	10 A	6 l/m	450 x 280 x 510 mm	42 kg
PICO-S 10 HF	3 x 400 V	20 A	10 l/m	450 x 280 x 510 mm	42 kg
PICO-S 15 HF	3 x 400 V	32 A	12 l/m	450 x 280 x 510 mm	42 kg

eldec

PICO – Specifications

Intuitive handling through sealed keypad and display

8 different timers with setpoint ramps

Control modes: power, temperature (PID)

Operation modes: Continuous, Tap, Timer

Sensor signals for temperature detection 0-5 V, 0-10 V, 0-20 mA and 4-20 mA

Highspeed eldec regulation and control technology (response time < 10 µs)

Available memory management for up to 50 recipes

Short-circuit and open-circuit proven IGBT transistor technology

Automatic adaptation to resonance frequency

Housing with IP40 protection

External control via hardware contacts

Energy transmission via flexible hose package 5 m (MF) and 3 m (HF)

Circuit topology with electrical isolation

Temperature and volume flow monitored fluid circuits with alarm function

Precise energy output due to power setting in 1% steps and 10 ms timer steps

Inverter efficiencies > 95% (depending on operating condition)

Automatic adaptation and power regulation through pulse width modulation (MF) and pulse packet control (HF), even when exceeding the Curie temperature

Interfaces & connections: Pyrometer, foot switch, foot pedal, emergency stop 1-channel, re-cooling system, 24V, signal lamp 4 coloured.

Power limitation possible (adjustable in 1 % steps)

Control possible via foot pedal and external interface

PICO – Options

Mains voltage 480 V optional

eldec Heat Controller can be used (with reduced range of functions)

Measurement of the energy consumption of the entire system (external device)

PICO-SC

PICO-SC is a compact „plug & play“ device for inductive heating of a wide variety of workpieces and materials. The integration of active cooler and generator in one housing simplifies stationary and mobile inductive brazing, annealing, cut edge hardening and many other applications in a practical way.

Technical Data PICO-SC High Frequency

	Power Output (100% duty cycle)	Mains Connection at 400V, 50HZ	Mains Connection at 480V, 60HZ	Tank Capacity	Capacity of Active Cooler	Weight (empty tank)
PICO-SC 5 HF	5 kW	25 A	20 A	65 l	7 kW	220 kg
PICO-SC 10 HF	10 kW	35 A	35 A	65 l	7 kW	225 kg
PICO-SC 15 HF	15 kW	50 A	35 A	65 l	7 kW	230 kg

Technical Data PICO-SC Middle Frequency

	Power Output (100% duty cycle)	Mains Connection at 400V, 50HZ	Mains Connection at 480V, 60HZ	Tank Capacity	Capacity of Active Cooler	Weight (empty tank)
PICO-SC 5 MF	5 kW	25 A	20 A	65 l	7 kW	225 kg
PICO-SC 10 MF	10 kW	35 A	35 A	65 l	7 kW	225 kg
PICO-SC 15 MF	15 kW	50 A	35 A	65 l	7 kW	230 kg
PICO-SC 20 MF	20 kW	63 A	50 A	90 l	10 kW	270 kg
PICO-SC 30 MF	30 kW	100 A	63 A	65 l	15 kW	280 kg

MF frequency range 8-20 kHz or 16-40 kHz HF frequency range 70-175 kHz or 140-350 kHz
Dimensions PICO-SC (H x W x D) 1,347 x 850 x 957 mm. Maximum ambient temperature: 35 °C

PICO-SC Specifications

Intuitive handling through sealed keypad and display

8 different timers with setpoint ramps

Control modes: power, temperature (PID)

Operation modes: Continuous, Tap, Timer

Sensor signals for temperature detection 0-5 V, 0-10 V, 0-20 mA and 4-20 mA

Highspeed eldec regulation and control technology (response time < 10 µs)

Available memory management for up to 50 recipes

Short-circuit and open-circuit proven IGBT transistor technology

Automatic adaptation to resonance frequency

Housing with IP40 (generator) & IP20 (active cooler)

External control via hardware contacts

Energy transmission via flexible hose package 5 m (MF) and 3 m (HF)

Circuit topology with electrical isolation

Temperature and volume flow monitored fluid circuits with alarm function

Precise energy output due to power setting in 1% steps and 10 ms timer steps

Inverter efficiencies > 95% (depending on operating condition)

Automatic adaptation and power regulation through pulse width modulation (MF) and pulse packet control (HF), even when exceeding the Curie temperature

Interfaces & connections:
Pyrometer, foot switch, foot pedal, emergency stop 1-channel, re-cooling system, 24V, signal lamp 4 coloured.

Power limitation possible (adjustable in 1 % steps)

Active cooler available in 3 power classes: 7 kW, 10 kW or 15 kW cooling capacity

PICO-SC Options

Mains voltage 480 V / 60 Hz

eldec Heat Controller

Hose assembly holder

Foot pedal and/or foot switch

Pyrometer

Energy transmission via flexible hose package up to 15 m (MF) and 5 m (HF)

weight-relieved holding of inductor / Heat Controller with cantilever with balancer

ECO-LINE EEI^2

Standardised energy sources with full range of functions and extensive I4.0 connectivity thanks to SIEMENS PLC. As easy to operate as a smartphone with EEI^2 interface.

ECO-LINE EEI^2 XS 15 MF

ECO-LINE EEI^2 75 MF

ECO-LINE EEI^2 L 75 MF 2A

The basic physical principle of induction heating enables maximum energy efficiency and, in conjunction with a high-quality and therefore durable product, the greatest possible sustainability.

Heating takes place exactly where it is technically necessary, without heating the surroundings or heating workpiece areas that can remain cold.

An induction heating process is powered by electricity and is therefore CO2-free if powered by renewable energy. Without gas or flame, precise and exactly reproducible.

State-of-the-art power electronics and control technology, Industry 4.0 connectivity, eQC modules for quality assurance and the stringent testing of all components make these generators top-class induction energy sources with maximum availability. With the eldec easy intuitive interface - EEI^2 for short - they are as easy to operate as a smartphone. They have a continuous output of 5 to 150 kW (MF) or 5 to 75 kW (HF), optionally time- and frequency-dependent power increase up to 50% (MF). ECO-LINE EEI^2 energy sources are available in a frequency range from 8 kHz to 400 kHz.

ECO-LINE EEI^2 generators are available with single or multiple outputs. Multiple outputs can be supplied as „2A" (two outputs, heating sequentially), as „x 2" (two outputs, heating simultaneously, independently of each other) or as „: 2" (two outputs, heating simultaneously, symmetrically).

The advantages of these powerful and robust energy sources are found in many details - from the high level of device protection through electrical isolation, and short-circuit-proof transistor technology to the precise energy metering and high efficiency.

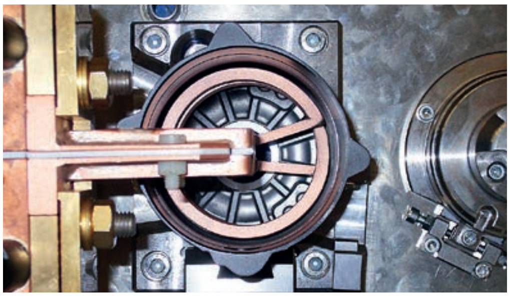
Technical Data ECO-LINE EEI^2 High Frequency

	Output power (100%ED)	Mains connection at 400V, 50Hz	Cooling water consumption without inductor	Dimensions H x W x D	Weight
ECO-LINE EEI^2 XS HF 5	5 kW (HF)	10 A	6 l/min	340 x 560 x 800 mm	50 kg
ECO-LINE EEI^2 XS HF 10	5 kW (HF)	20 A	10 l/min	340 x 560 x 800 mm	50 kg
ECO-LINE EEI^2 XS HF 15	5 kW (HF)	32 A	12 l/min	340 x 560 x 800 mm	50 kg
ECO-LINE EEI^2 S HF 5	5 kW (HF)	10 A	6 l/min	590 x 560 x 800 mm	80 kg
ECO-LINE EEI^2 S HF 10	10 kW (HF)	20 A	10 l/min	590 x 560 x 800 mm	80 kg
ECO-LINE EEI^2 S HF 15	15 kW (HF)	32 A	12 l/min	590 x 560 x 800 mm	80 kg
ECO-LINE EEI^2 S HF 20	20kW (HF)	50 A	13 l/min	590 x 560 x 800 mm	80 kg
ECO-LINE EEI^2 S HF 30	30 kW (HF)	63 A	14 l/min	590 x 560 x 800 mm	80 kg
ECO-LINE EEI^2 XL HF 50	50 kW (HF)	125 A	21 l/min	1170 x 560 x 800 mm	120 kg
ECO-LINE EEI^2 XL HF 70	75 kW (HF)	160 A	29 l/min	1170 x 560 x 800 mm	120 kg
ECO-LINE EEI^2 XL HF 90	90 kW (HF)	200 A	34 l/min	1170 x 560 x 800 mm	120 kg
„-2A" – two outputs, heating one after the other					
ECO-LINE EEI^2 S HF 5 -2A	5 kW (HF)	10 A	6 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S HF 10 -2A	10 kW (HF)	20 A	10 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S HF 15 -2A	15 kW (HF)	32 A	12 l/min	590 x 560 x 800 mm	60 kg
„x2" – two outputs, heating simultaneously and independently of each other					
ECO-LINE EEI^2 M HF 1,5 x2	2 x 1,5 kW (HF)	10 A	6 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M HF 5 x2	2 x 5 kW (HF)	20 A	12 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M HF 10 x2	2 x 10 kW (HF)	50 A	20 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M HF 15 x2	2 x 15 kW (HF)	63 A	24 l/min	770 x 560 x 800 mm	130 kg
„:2"– two outputs, simultaneous symmetrical heating					
ECO-LINE EEI^2 S HF 5 :2	5 kW HF (2,5 kW per coaxial transformer)	10 A	10 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S HF 10 :2	10 kW HF (5 kW per coaxial transformer)	20 A	15 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S HF 15 :2	15 kW HF (7,5 kW per coaxial transformer)	32 A	18 l/min	590 x 560 x 800 mm	60 kg

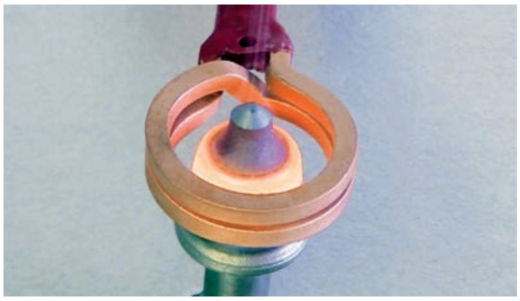
Technical Data ECO-LINE EEI^2 Middle Frequency

	Output power (100%ED)	Mains connection at 400V, 50Hz	Cooling water consumption without inductor	Dimensions H x W x D	Weight
ECO-LINE EEI^2 XS MF 5	5 kW (MF)	10 A	6 l/min	340 x 560 x 800 mm	42 kg
ECO-LINE EEI^2 XS MF 10	10 kW (MF)	20 A	10 l/min	340 x 560 x 800 mm	42 kg
ECO-LINE EEI^2 XS MF 15	15 kW (MF)	32 A	12 l/min	340 x 560 x 800 mm	42 kg
ECO-LINE EEI^2 XS MF 20	20 kW (MF)	40 A	13 l/min	340 x 560 x 800 mm	42 kg
ECO-LINE EEI^2 XS MF 20(30)	30 kW (MF)	40/63 A	14 l/min	340 x 560 x 800 mm	42 kg
ECO-LINE EEI^2 XS MF 30	30 kW (MF)	63 A	14 l/min	340 x 560 x 800 mm	42 kg
ECO-LINE EEI^2 S MF 5	5 kW (MF)	10 A	6 l/min	590 x 560 x 800 mm	50 kg
ECO-LINE EEI^2 S MF 10	10 kW (MF)	20 A	10 l/min	590 x 560 x 800 mm	50 kg
ECO-LINE EEI^2 S MF 15	15 kW (MF)	32 A	12 l/min	590 x 560 x 800 mm	50 kg
ECO-LINE EEI^2 S MF 20	20 kW (MF)	40 A	13 l/min	590 x 560 x 800 mm	50 kg
ECO-LINE EEI^2 S MF 20(30)	30 kW (MF)	40/63 A	14 l/min	590 x 560 x 800 mm	50 kg
ECO-LINE EEI^2 S MF 30	30 kW (MF)	63 A	14 l/min	590 x 560 x 800 mm	50 kg
ECO-LINE EEI^2 M MF 40	40 kW (MF)	80 A	18 l/min	770 x 560 x 800 mm	120 kg
ECO-LINE EEI^2 M MF 50	50 kW (MF)	100 A	21 l/min	770 x 560 x 800 mm	120 kg
ECO-LINE EEI^2 M MF 50(80)	80 kW (MF)	100/160 A	30 l/min	770 x 560 x 800 mm	120 kg
ECO-LINE EEI^2 M MF 75	75 kW (MF)	160 A	29 l/min	770 x 560 x 800 mm	120 kg
ECO-LINE EEI^2 XL MF 100	100 kW (MF)	200 A	37 l/min	1170 x 560 x 800 mm	200 kg
ECO-LINE EEI^2 XL MF 150	150 kW (MF)	300 A	49 l/min	1170 x 560 x 800 mm	200 kg
„-2A“ – two outputs, heating one after the other					
ECO-LINE EEI^2 S MF 5 -2A	5 kW (MF)	10 A	10 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S MF 10 -2A	10 kW (MF)	20 A	15 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S MF 15 -2A	15 kW (MF)	32 A	18 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S MF 20 -2A	20 kW (MF)	40 A	20 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S MF 20(30) -2A	30 kW (MF)	40/63 A	22 l/min	590 x 560 x 800 mm	100 kg
ECO-LINE EEI^2 S MF 30 -2A	30 kW (MF)	63 A	22 l/min	590 x 560 x 800 mm	100 kg
ECO-LINE EEI^2 M MF 40 -2A	40 kW (MF)	80 A	27 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 50 -2A	50 kW (MF)	100 A	30 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 50(80) -2A	80 kW (MF)	100/160 A	40 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 75 -2A	75 kW (MF)	160 A	39 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 XL MF 100 -2A	100 kW (MF)	200 A	56 l/min	1170 x 560 x 800 mm	200 kg
ECO-LINE EEI^2 XL MF 150 -2A	150 kW (MF)	300 A	76 l/min	1170 x 560 x 800 mm	200 kg

	Output power (100%ED)	Mains connection at 400V, 50Hz	Cooling water consumption without inductor	Dimensions H x W x D	Weight
„x2" – two outputs, heating simultaneously and independently of each other					
ECO-LINE EEI^2 M MF 5 x2	2 x 5 kW (MF)	20 A	12 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 10 x2	2 x 10 kW (MF)	40 A	20 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 15 x2	2 x 15 kW (MF)	63 A	24 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 20 x2	2 x 20 kW (MF)	80 A	26 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 20(30) x2	2 x 30kW (MF)	80/125 A	28 l/min	770 x 560 x 800 mm	150 kg
ECO-LINE EEI^2 M MF 30 x2	2 x 30 kW (MF)	125 A	28 l/min	770 x 560 x 800 mm	150 kg
ECO-LINE EEI^2 XL MF 40 x2	2 x 40 kW (MF)	160 A	36 l/min	1170 x 560 x 800 mm	150 kg
ECO-LINE EEI^2 XL MF 50 x2	2 x 50 kW (MF)	200 A	42 l/min	1170 x 560 x 800 mm	150 kg
ECO-LINE EEI^2 XL MF 50(80) x2	2 x 50(80) kW (MF)	200/355 A	60 l/min	1170 x 560 x 800 mm	250 kg
ECO-LINE EEI^2 XL MF 75 x2	2 x 75 kW (MF)	300 A	58 l/min	1170 x 560 x 800 mm	250 kg
„:2"– two outputs, simultaneous symmetrical heating					
ECO-LINE EEI^2 S MF 5 :2	5 kW MF (2,5 kW per coaxial transformer)	10 A	10 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S MF 10 :2	10 kW MF (5 kW per coaxial transformer)	20 A	15 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S MF 15 :2	15 kW MF (7,5 kW per coaxial transformer)	32 A	18 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S MF 20 :2	20 kW MF (10 kW per coaxial transformer)	35 A	20 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S MF 20(30) :2	30 kW MF (15 kW per coaxial transformer)	40/63 A	22 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 S MF 30 :2	30 kW MF (15 kW per coaxial transformer)	63 A	22 l/min	590 x 560 x 800 mm	60 kg
ECO-LINE EEI^2 M MF 40 :2	40 kW MF (20 kWper coaxial transformer)	80 A	27 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 50 :2	50 kW MF (25 kW per coaxial transformer)	100 A	30 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 50(80) :2	80 kW MF (40 kW per coaxial transformer)	100/160 A	40 l/min	770 x 560 x 800 mm	130 kg
ECO-LINE EEI^2 M MF 75 :2	75 kW MF (37,5 kW per coaxial transformer)	160A	40 l/min	770 x 560 x 800 mm	130 kg







ECO-LINE EEI^2 Specifications

Intuitive handling with EEI^2 touch-screen

Power, frequency, current and voltage display

Control modes: power, temperature (PID)

Operation modes: Continuous, Tap, Timer

SIEMENS PLC

8 different timers, each min. 0.1 sec. to max. 999 sec. running time

Recipe management memory: up to 500 recipes

Housing in protection class IP20

Sensor signals for temperature detection 4-20 mA

External control and data exchange via Profinet interface

Flow and temperature monitoring of various water circuits

Short-circuit and open-circuit proof IGBT transistor technology

Automatic adaptation to resonance frequency

Circuit topology with electrical isolation

Precise energy output due to power setting in 1% steps

Energy transmission via flexible hose package 5 m (MF) and 3 m (HF)

Temperature and volume flow monitored fluid circuits with alarm function

Automatic adaptation and power regulation by pulse width modulation (MF) and pulse packet control (HF), even when exceeding the Curie temperature

Interfaces & connections: Pyrometer, foot switch, foot pedal, re-cooling system, 24V, signal lamp 4 coloured.

Inverter efficiencies > 95% (depending on operating condition)

Cable box with glow cable
for heat shrink applications

Heat Controller can be used

ECO-LINE EEI^2 Options

Control type: Current

Heat controller usable

Special coating possible

Foot pedal and/or foot switch

Pyrometer (single and multiple)

Mains voltage 200 V, 480 V. Others on request

Annealing cable (connection via cable box or directly)

Energy transmission via flexible hose package up to 15 m (MF) and 5 m (HF)

Adjustment range extension through serial / parallel switching (manual or automatic)

Profibus, EtherCat, other fieldbuses on request

Emergency stop 2-channel to external

Quick-change device coax / cable box

Adjustment range extension through switchable second frequency band

UL standard optionally available

eQC Moduls: eSM earth fault, ePM flux, ePM energy & eSM RFID

Remote maintenance

Temperature curves (100 pcs.)

Separate inductor cooling water supply

Quick coupling for cooling water connections

Housing in protection class IP54

graphical display of temperature curves, storage of up to 100 units

Protection option for your generator: the Heavy Duty Field Case (HDFC):

SYSTEM-LINE

Standardised energy sources for integration into complete systems based on our proven ECO-LINE series, with extensive I4.0 connectivity thanks to SIEMENS PLC.

The basic physical principle of induction heating enables maximum energy efficiency and, in conjunction with a high-quality and therefore durable product, the greatest possible sustainability.

Heating takes place exactly where it is technically necessary, without heating the surroundings or heating workpiece areas that can remain cold.

An induction heating process is powered by electricity and is therefore CO2-free if powered by renewable energy. Without gas or flame, precise and exactly reproducible.

SYSTEM-LINE generators are designed without a display; operation and visualisation (HMI) take place on the higher-level system. Data exchange is via Profinet.

State-of-the-art power electronics and control technology, Industry 4.0 connectivity, eQC modules for quality assurance and the stringent testing of all components make these generators top-class induction power sources with maximum availability. They have a continuous output of 5 to 150 kW (MF) or 5 to 75 kW (HF), with optional time- and frequency-dependent power boosts of up to 50% (MF). SYSTEM-LINE energy sources are available in a frequency range from 8 kHz to 400 kHz.

SYSTEM-LINE energy sources are available with single or multiple outputs. Multiple outputs can be supplied as „-2A“ (two outputs, heating one after the other), as „x2“ (two outputs, heating simultaneously, independently of each other) or as „:2“ (two outputs, heating simultaneously, symmetrically).

The advantages of these powerful and robust energy sources are found in many details - from the high level of device protection through electrical isolation and short-circuit-proof transistor technology to the precise energy metering and high efficiency.

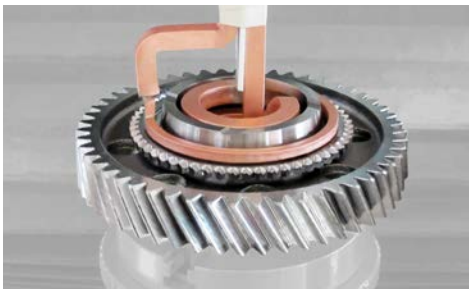
Technical Data SYSTEM-LINE High Frequency

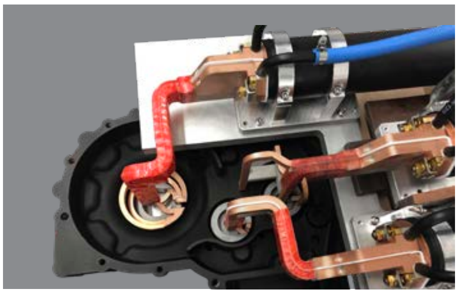
	Output power (100%ED)	Mains connection at 400V, 50Hz	Cooling water consumption without inductor	Dimensions H x W x D	Weight
SYSTEM-LINE XS HF 5	5 kW (HF)	10 A	6 l/min	340 x 560 x 800 mm	50 kg
SYSTEM-LINE XS HF 10	5 kW (HF)	20 A	10 l/min	340 x 560 x 800 mm	50 kg
SYSTEM-LINE XS HF 15	5 kW (HF)	32 A	12 l/min	340 x 560 x 800 mm	50 kg
SYSTEM-LINE S HF 5	5 kW (HF)	10 A	6 l/min	590 x 560 x 800 mm	80 kg
SYSTEM-LINE S HF 10	10 kW (HF)	20 A	10 l/min	590 x 560 x 800 mm	80 kg
SYSTEM-LINE S HF 15	15 kW (HF)	32 A	12 l/min	590 x 560 x 800 mm	80 kg
SYSTEM-LINE S HF 20	20kW (HF)	50 A	13 l/min	590 x 560 x 800 mm	80 kg
SYSTEM-LINE S HF 30	30 kW (HF)	63 A	14 l/min	590 x 560 x 800 mm	80 kg
SYSTEM-LINE XL HF 50	50 kW (HF)	125 A	21 l/min	1170 x 560 x 800 mm	120 kg
SYSTEM-LINE XL HF 70	75 kW (HF)	160 A	29 l/min	1170 x 560 x 800 mm	120 kg
SYSTEM-LINE XL HF 90	90 kW (HF)	200 A	34 l/min	1170 x 560 x 800 mm	120 kg
„-2A" – two outputs, heating one after the other					
SYSTEM-LINE S HF 5 -2A	5 kW (HF)	10 A	6 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S HF 10 -2A	10 kW (HF)	20 A	10 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S HF 15 -2A	15 kW (HF)	32 A	12 l/min	590 x 560 x 800 mm	60 kg
„x2" – two outputs, heating simultaneously and independently of each other					
SYSTEM-LINE M HF 1,5 x2	2 x 1,5 kW (HF)	10 A	6 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M HF 5 x2	2 x 5 kW (HF)	20 A	12 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M HF 10 x2	2 x 10 kW (HF)	50 A	20 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M HF 15 x2	2 x 15 kW (HF)	63 A	24 l/min	770 x 560 x 800 mm	130 kg
„:2"– two outputs, simultaneous symmetrical heating					
SYSTEM-LINE S HF 5 :2	5 kW HF (2,5 kW per coaxial transformer)	10 A	10 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S HF 10 :2	10 kW HF (5 kW per coaxial transformer)	20 A	15 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S HF 15 :2	15 kW HF (7,5 kW per coaxial transformer)	32 A	18 l/min	590 x 560 x 800 mm	60 kg

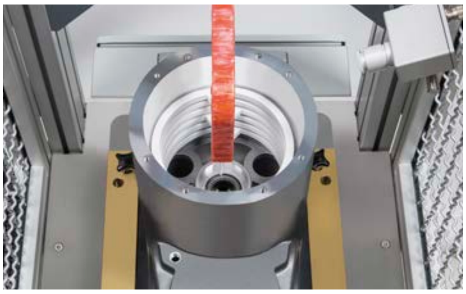
Technical Data SYSTEM-LINE Middle Frequency

	Output power (100%ED)	Mains connection at 400V, 50Hz	Cooling water consumption without inductor	Dimensions H x W x D	Weight
SYSTEM-LINE XS MF 5	5 kW (MF)	10 A	6 l/min	340 x 560 x 800 mm	42 kg
SYSTEM-LINE XS MF 10	10 kW (MF)	20 A	10 l/min	340 x 560 x 800 mm	42 kg
SYSTEM-LINE XS MF 15	15 kW (MF)	32 A	12 l/min	340 x 560 x 800 mm	42 kg
SYSTEM-LINE XS MF 20	20 kW (MF)	40 A	13 l/min	340 x 560 x 800 mm	42 kg
SYSTEM-LINE XS MF 20(30)	30 kW (MF)	40/63 A	14 l/min	340 x 560 x 800 mm	42 kg
SYSTEM-LINE XS MF 30	30 kW (MF)	63 A	14 l/min	340 x 560 x 800 mm	42 kg
SYSTEM-LINE S MF 5	5 kW (MF)	10 A	6 l/min	590 x 560 x 800 mm	50 kg
SYSTEM-LINE S MF 10	10 kW (MF)	20 A	10 l/min	590 x 560 x 800 mm	50 kg
SYSTEM-LINE S MF 15	15 kW (MF)	32 A	12 l/min	590 x 560 x 800 mm	50 kg
SYSTEM-LINE S MF 20	20 kW (MF)	40 A	13 l/min	590 x 560 x 800 mm	50 kg
SYSTEM-LINE S MF 20(30)	30 kW (MF)	40/63 A	14 l/min	590 x 560 x 800 mm	50 kg
SYSTEM-LINE S MF 30	30 kW (MF)	63 A	14 l/min	590 x 560 x 800 mm	50 kg
SYSTEM-LINE M MF 40	40 kW (MF)	80 A	18 l/min	770 x 560 x 800 mm	120 kg
SYSTEM-LINE M MF 50	50 kW (MF)	100 A	21 l/min	770 x 560 x 800 mm	120 kg
SYSTEM-LINE M MF 50(80)	80 kW (MF)	100/160 A	30 l/min	770 x 560 x 800 mm	120 kg
SYSTEM-LINE M MF 75	75 kW (MF)	160 A	29 l/min	770 x 560 x 800 mm	120 kg
SYSTEM-LINE XL MF 100	100 kW (MF)	200 A	37 l/min	1170 x 560 x 800 mm	200 kg
SYSTEM-LINE XL MF 150	150 kW (MF)	300 A	49 l/min	1170 x 560 x 800 mm	200 kg
„-2A“ – two outputs, heating one after the other					
SYSTEM-LINE S MF 5 -2A	5 kW (MF)	10 A	10 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S MF 10 -2A	10 kW (MF)	20 A	15 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S MF 15 -2A	15 kW (MF)	32 A	18 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S MF 20 -2A	20 kW (MF)	40 A	20 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S MF 20(30) -2A	30 kW (MF)	40/63 A	22 l/min	590 x 560 x 800 mm	100 kg
SYSTEM-LINE S MF 30 -2A	30 kW (MF)	63 A	22 l/min	590 x 560 x 800 mm	100 kg
SYSTEM-LINE M MF 40 -2A	40 kW (MF)	80 A	27 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 50 -2A	50 kW (MF)	100 A	30 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 50(80) -2A	80 kW (MF)	100/160 A	40 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 75 -2A	75 kW (MF)	160 A	39 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE XL MF 100 -2A	100 kW (MF)	200 A	56 l/min	1170 x 560 x 800 mm	200 kg
SYSTEM-LINE XL MF 150 -2A	150 kW (MF)	300 A	76 l/min	1170 x 560 x 800 mm	200 kg

	Output power (100%ED)	Mains connection at 400V, 50Hz	Cooling water consumption without inductor	Dimensions H x W x D	Weight
„x2" – two outputs, heating simultaneously and independently of each other					
SYSTEM-LINE M MF 5 x2	2 x 5 kW (MF)	20 A	12 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 10 x2	2 x 10 kW (MF)	40 A	20 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 15 x2	2 x 15 kW (MF)	63 A	24 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 20 x2	2 x 20 kW (MF)	80 A	26 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 20(30) x2	2 x 30kW (MF)	80/125 A	28 l/min	770 x 560 x 800 mm	150 kg
SYSTEM-LINE M MF 30 x2	2 x 30 kW (MF)	125 A	28 l/min	770 x 560 x 800 mm	150 kg
SYSTEM-LINE XL MF 40 x2	2 x 40 kW (MF)	160 A	36 l/min	1170 x 560 x 800 mm	150 kg
SYSTEM-LINE XL MF 50 x2	2 x 50 kW (MF)	200 A	42 l/min	1170 x 560 x 800 mm	150 kg
SYSTEM-LINE XL MF 50(80) x2	2 x 50(80) kW (MF)	200/355 A	60 l/min	1170 x 560 x 800 mm	250 kg
SYSTEM-LINE XL MF 75 x2	2 x 75 kW (MF)	300 A	58 l/min	1170 x 560 x 800 mm	250 kg
„:2"– two outputs, simultaneous symmetrical heating					
SYSTEM-LINE S MF 5 :2	5 kW MF (2,5 kW per coaxial transformer)	10 A	10 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S MF 10 :2	10 kW MF (5 kW per coaxial transformer)	20 A	15 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S MF 15 :2	15 kW MF (7,5 kW per coaxial transformer)	32 A	18 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S MF 20 :2	20 kW MF (10 kW per coaxial transformer)	35 A	20 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S MF 20(30) :2	30 kW MF (15 kW per coaxial transformer)	40/63 A	22 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE S MF 30 :2	30 kW MF (15 kW per coaxial transformer)	63 A	22 l/min	590 x 560 x 800 mm	60 kg
SYSTEM-LINE M MF 40 :2	40 kW MF (20 kWper coaxial transformer)	80 A	27 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 50 :2	50 kW MF (25 kW per coaxial transformer)	100 A	30 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 50(80) :2	80 kW MF (40 kW per coaxial transformer)	100/160 A	40 l/min	770 x 560 x 800 mm	130 kg
SYSTEM-LINE M MF 75 :2	75 kW MF (37,5 kW per coaxial transformer)	160A	40 l/min	770 x 560 x 800 mm	130 kg







SYSTEM-LINE Specifications:

Inverter efficiencies > 95% (depending on operating condition)

Power, frequency, current and voltage display

Control modes: power, temperature (PID)

Operation modes: Continuous, Tap, Timer

SIEMENS PLC

Automatic adaptation and power regulation by pulse width modulation (MF) and pulse packet control (HF), even when exceeding the Curie temperature

Interfaces & connections: Pyrometer, emergency stop 2-channel, re-cooling system, 24V, signal lamp 4 coloured.

Housing in protection class IP20

Sensor signals for temperature detection 4-20 mA

External control and data exchange via Profinet interface

Temperature and volume flow monitored fluid circuits with alarm function

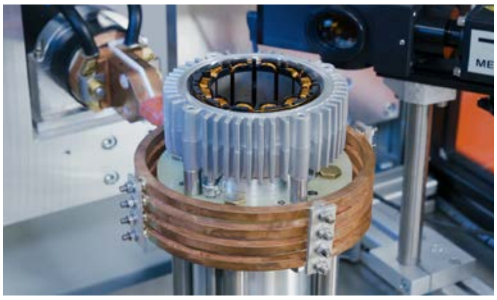
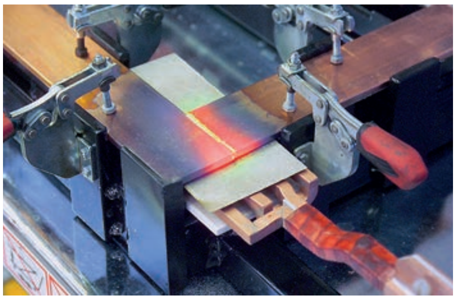
Short-circuit and open-circuit proof IGBT transistor technology

Automatic adaptation to resonance frequency

Circuit topology with electrical isolation

Precise energy output due to power setting in 1% steps

Energy transmission via flexible hose package 5 m (MF) and 3 m (HF)


SYSTEM-LINE Options:

Control type: Current

Sensor signals for Temperature-detection 0-5V, 0-10V and 4-20mA

Special paint finish possible

Quick coupling for cooling water connections

Pyrometer (single and multiple)

Mains voltage 200 V, 480 V. Others on request

Performance specification <1%-increments on request

Energy transmission via flexible hose package up to 15 m (MF) and 5 m (HF)

Extension of the adjustment range through serial / parallel switching (manual or automatic)

Profibus, EtherCat, other fieldbuses on request

Separate inductor cooling water supply

Coolant systems active/passive

Extension of the adjustment range through switchable second frequency band

UL standard optionally available

eQC Moduls: eSM earth fault, ePM flux, ePM energy

Remote maintenance

CUSTOM-LINE

Cabinet-based generators with up to 8 outputs, extensive I4.0 connectivity and EEI² light user interface, in the frequency ranges LF, MF, HF, DF and SDF®

Cabinet-based generators with continuous power from 5 to 2000 kW and up to 8 outputs in the frequency ranges LF, MF, HF, DF and SDF®. Equipped with extensive I4.0 connectivity and intuitive EEI² light user interface as well as eQC modules for quality assurance. CUSTOM-LINE generators can be used as a stand-alone solution or for integration into overall systems.

Multiple outputs can heat consecutively („nA"), heat simultaneously-independently of each other („xn") or heat simultaneously-symmetrically („:n").

LF (low frequency) 2-6 kHz: for large components and very large penetration depths.

MF (medium frequency) 8-40 kHz: for medium and large penetration depths.

HF (high frequency) 50-400 kHz: for small components and shallow penetration depths.

DF (Dual Frequency, MF and HF sequential): Two frequency ranges switchable (MF with HF) in one generator sequentially available on one inductor.

SDF® (Simultaneous Dual Frequency, MF and HF parallel, patented): Two frequency ranges (MF with HF) in one generator simultaneously on one inductor. The main application is the hardening of gear tooth components: While medium frequencies penetrate deeper into the gear and heat the tooth root, high frequencies ensure the heating of the tooth tip. The simultaneous superimposition of MF and HF results in true-contour gear tooth profile hardening

CUSTOM-LINE Specifications

Intuitive handling with EEI²-Light-Touch-screen (Siemens)

Power, frequency, current and voltage display in %

Control modes: power

Operation modes: Continuous, Tap, Timer

SIEMENS PLC

8 different timers, each min. 0.1 sec. to max. 999 sec. running time

Recipe management memory: up to 500 recipes

Housing in protection class IP54

Sensor signals for temperature detection 4-20 mA

Inverter efficiencies > 95% (depending on operating condition)

Mains voltage 400V / 50Hz

Short-circuit and open-circuit proof IGBT transistor technology

Automatic adaptation to resonance frequency

Circuit topology with electrical isolation

Precise energy output due to power setting in 1% steps

Energy transmission via flexible hose package 5 m (MF) and 3 m (HF)

Volume flow monitored fluid circuits with alarm function

Automatic adaptation and power regulation by pulse width modulation (MF) and pulse packet control (HF), even when exceeding the Curie temperature

Interfaces & connections: emergency stop 2-channel, re-cooling system, 24V.

CUSTOM-LINE Options

Control type: current, temperature

Remote maintenance

Special paint finish possible

Connections & interfaces for: Pyrometer and signal lamp 4 coloured.

„Heat & Repeat“ function

Mains voltage 200 V, 480 V. Others on request

Glow cable (connection via cable box or directly)

Energy transmission via flexible hose package up to 15 m (MF) and 5 m (HF)

Adjustment range extension through serial / parallel switching (manual or automatic)

Profinet, Profibus, EtherCat, Ethernet IP, other fieldbuses on request

Display of power and current as absolute values

Quick-change device coax / cable box

Adjustment range extension through switchable second frequency band

UL standard optionally available

eQC Moduls: eSM earth fault, ePM flux, ePM energy & eSM RFID

Quick coupling for cooling water connections

Storage of temperature curves

Separate inductor cooling water supply

Operating mode: Timer+temperatur

CUSTOM-LINE offers a wide variety of technical configurations, so please refer to the overview table of possible sizes and technical values on our website.

RACK modules and RACK-LINE

Multi-power due to rack plug-in technology

RACK modules & RACK LINES are not off-the-shelf solutions.

RACK modules and RACK-LINE generators are individual solutions and are developed in close coordination according to customer requirements. As a result, an almost unlimited number of parallel induction heating operations are possible, which are integrated into customer machines, matched to their control concept.

The basis are RACK modules, compact plug-in units for induction heating. The inverter and the complete oscillating circuit are located on a base plate. The inductor is connected either directly to the module or via a hose package with coaxial transformer. Additional components for protecting and connecting the modules to the power supply can either be part of the RACK module or placed separately and higher-level.

The RACK modules communicate with a higher-level controller via Profinet, receive heating parameters, START and STOP commands from it and communicate their status. This control handles the evaluation and monitoring of the flow meters placed on the RACK module and is normally part of the customer's machine. But other constellations can also be mapped.

We also offer complete systems in which these modules are integrated in control cabinets: our RACK-LINE generators.
The higher-level control system can be included in the scope of delivery. If required, such solutions can also be designed with empty modules for later expansion. The sensible use of these modules begins with more than two heating operations to be operated in parallel and a high integration requirement in a series machine

RACK-LINE Specifications

Siemens control

Efficiency > 90 %

Maintenance free

Modular inverter

Largest frequency and power range as well as largest adaptation range on the market

Automatic adaptation to resonance frequency and thus to the inductor dimension

Circuit topology with output transformer: best operator protection

High speed PLC with eldec control board: short cycle frequencies for fastest control

precise energy dosing (+/- 2 %) => high process capability (reproducibility)

robust IGBT transistor technology => short-circuit and open-circuit proof

compact eldec transformers and chokes => best power density

Hose packages up to 15 m length

Profinet, Profibus, other fieldbuses possible

selected eQC modules for process monitoring

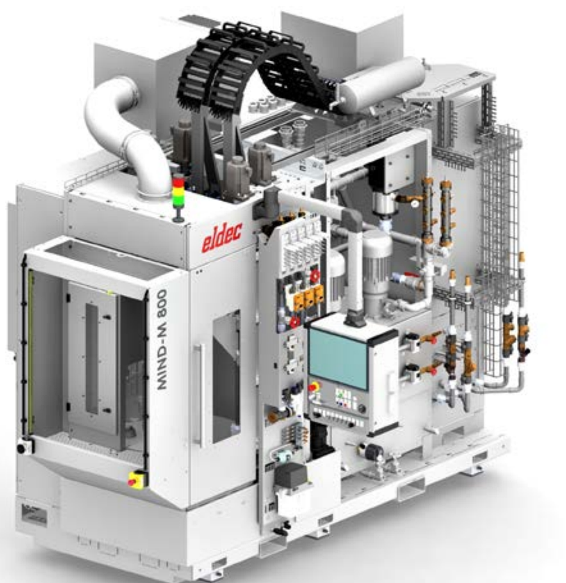
Hardening Machines

MIND-S 250

All in One: compact complete hardening machine for chuck parts in medium batch quantities

MIND-S 1000

All in One: compact complete hardening machine for shaft parts in medium batch quantities



MIND-M 800

Our new, low-priced induction hardening machine for medium to large batch quantities in the typical eldec quality

The industry reference in induction hardening

MIND stands for Modular Induction. The modular principle makes it possible to configure an eldec MIND system from the main components of the basic machine, energy source, automation components, cooling system, clamping device and tool, depending on the workpiece dimensions, hardeness profile and requirements for flexibility and batch size. The hardening machines are classified from S to XL according to the workpiece and machine size. The hardening machines are designated according to the workpiece and machine size from S to XL.

MIND-L 1000

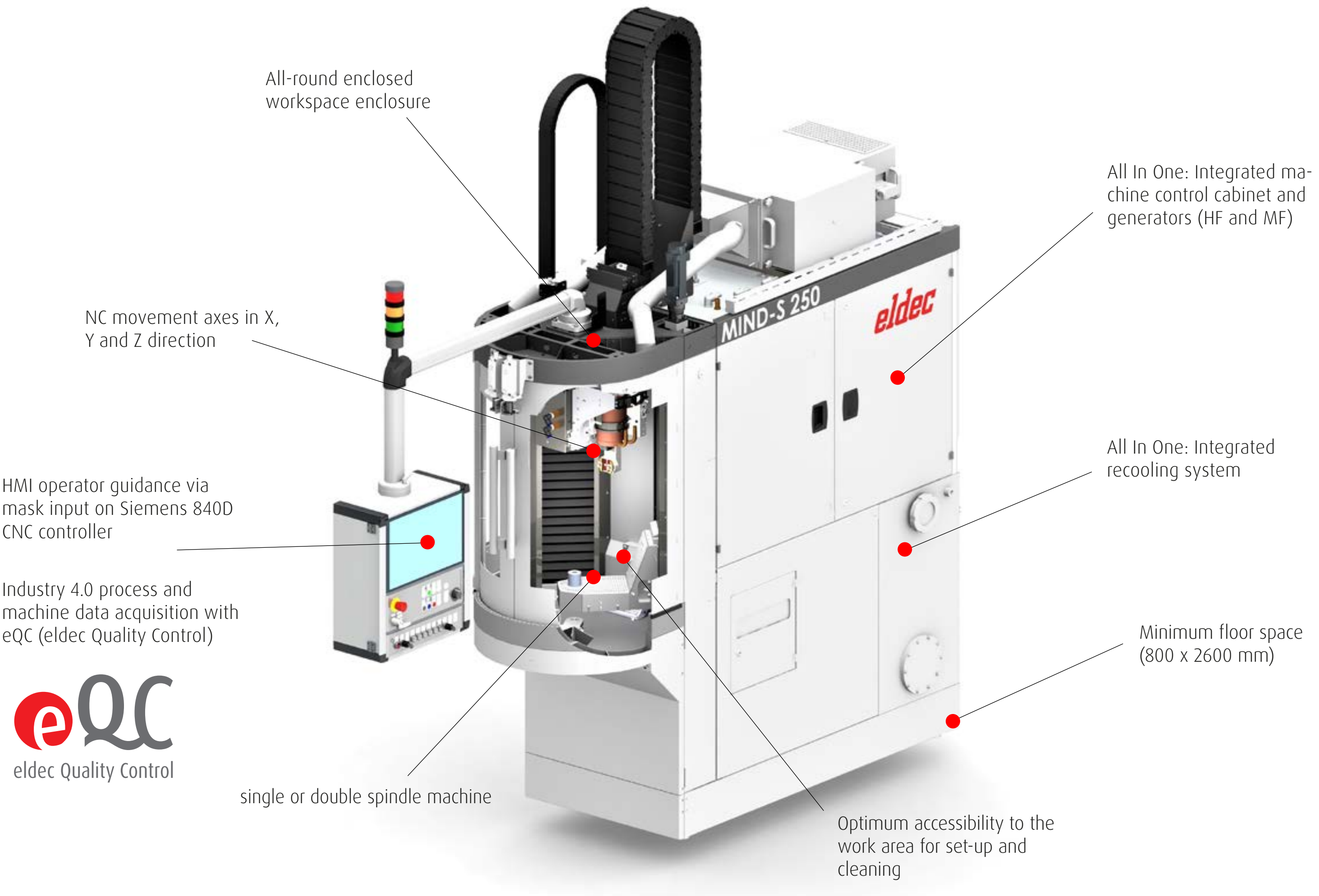
Induction hardening machine for large batch quantities with maximum and consistent precision

MIND-XL 750 / 1500

Induction hardening machine for very large and heavy components in small to medium batch quantities

MIND-S 250

All in One: compact complete hardening machine for chuck parts in medium batch quantities



The MIND-S 250 is a compact complete hardening machine for induction hardening of chuck parts up to 250 mm in length. Cooling system, energy source, machine control cabinet and process cell are integrated in a space-saving manner on a common machine stand, thus ensuring maximum productivity in the smallest possible space and at comparably low investment costs.

Induction hardening tasks, including serial induction tempering if required, with a maximum power requirement of 50 kW HF or 100 kW MF, can be solved with the MIND-S 250.

The MIND-S 250 is equipped with Y- and Z-NC axes for positioning the inductor to the workpiece, a main spindle drive for workpiece rotation, a temperature- and flow-monitored shower for the quenching medium and a full Siemens 840D CNC control.

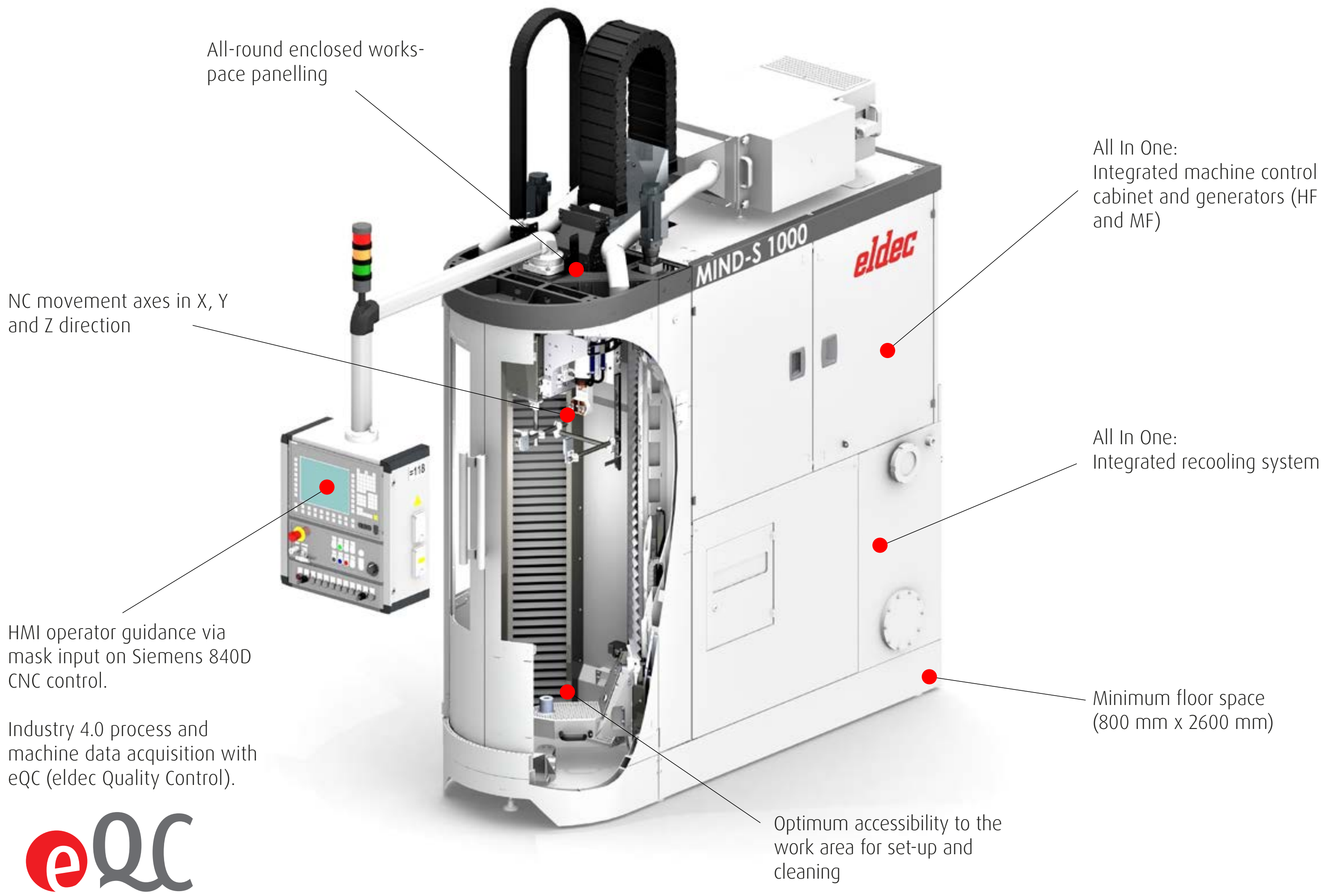
The MIND-S 250 is available as a single or double spindle machine. The loading module allows the system to be loaded either manually or automatically.

Technical Data

Workpiece length, max.	200 mm	Generators	up to 100 kW (MF)
Workpiece dia., max.	300 mm		up to 50 kW (HF)
Workpiece weight, max.	10 kg		
X-axis travel	10 mm	Minimum floor space	800 x 2600 mm
Y-axis travel	40 mm		
Z-axis travel	250 mm		

MIND-S 1000

All in One: compact complete hardening machine for shaft parts in medium quantities



eldec Quality Control

eldec

The MIND-S 1000 is a compact complete hardening machine as a single-spindle, double-spindle or indexing table version for the induction hardening of shaft-shaped workpieces up to 900 mm in length. All components are integrated on a machine stand to save space: Cooling system, energy source, machine control cabinet and process cell. The result is cost-effective and maximum productivity in the smallest possible space.

With a maximum power requirement of 50 kW HF or 100 kW MF, workpieces can be hardened and optionally induction tempered.

The main equipment of the MIND-S 1000 includes Y- and Z-NC axes for positioning the inductor to the workpiece, a main spindle drive for workpiece rotation, a Siemens 840D CNC control and a temperature- and flow-monitored shower for the quenching medium.

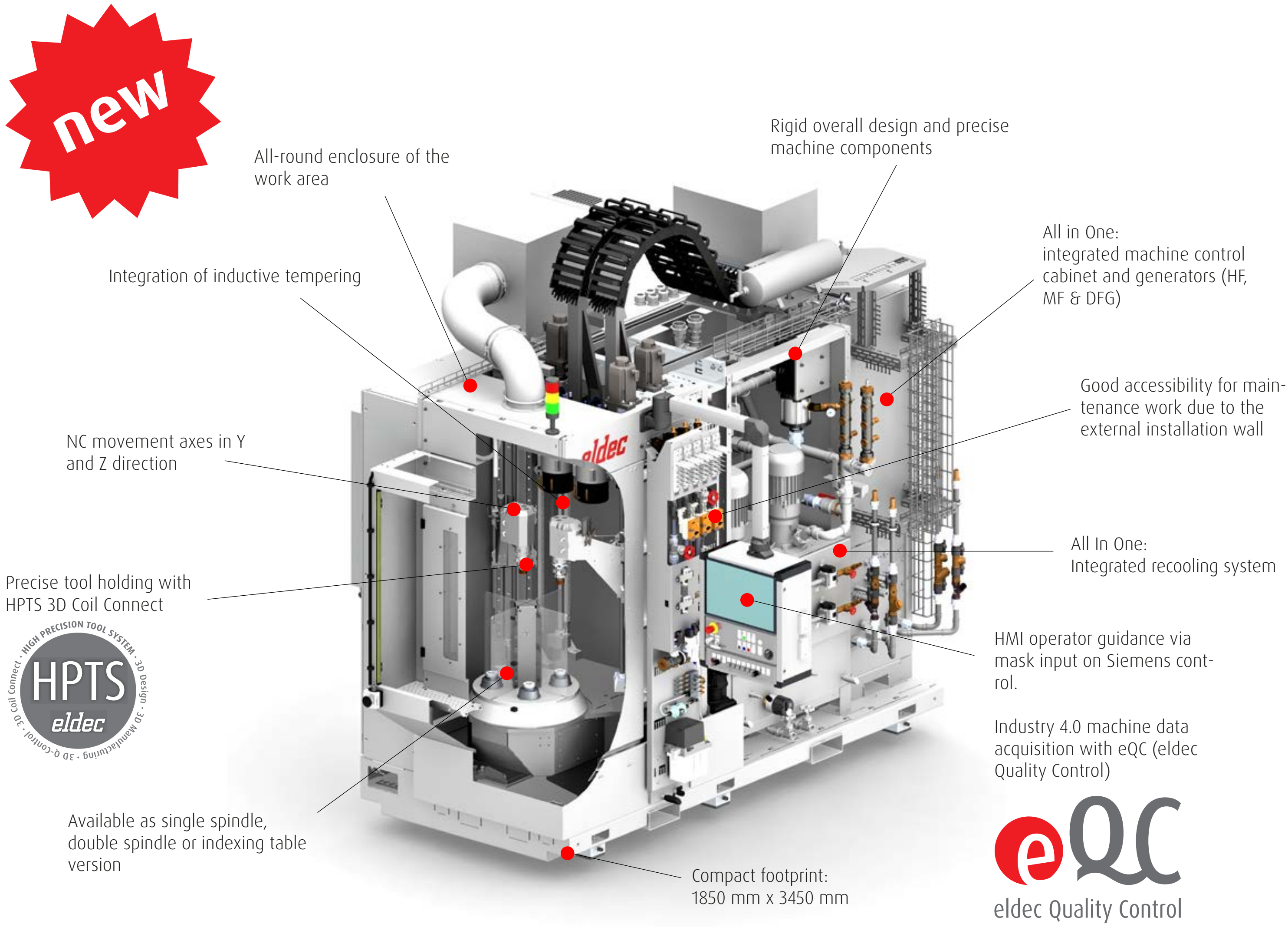
Clamping between centres is possible with the tailstock module and centring mandrel. The loading module allows the system to be loaded either manually or automatically.

Technical Data

Workpiece length, max.	900 mm	Generators	up to 100 kW (MF)
Workpiece dia., max.	300 mm		up to 50 kW (HF)
Workpiece weight, max.	10 kg		
X-axis travel	10 mm	minimum floor space	800 x 2600 mm
Y-axis travel	40 mm		
Z-axis travel	1000 mm		

MIND-M 800

Our new, low-priced induction hardening machine for medium to large quantities in the typical eldec quality.



The new all-rounder: The new MIND-M 800 combines the small space requirement of the MIND-S series with the functional diversity of the MIND-L series. A compact complete hardening machine for induction hardening of chuck and shaft parts up to 600 mm in length. The cooling system, energy sources (high-frequency generators up to 150 kW HF or medium-frequency generators up to 250 kW MF as well as dual-frequency generators up to 125/75 or 75/100 kW (MF/HF)), machine control cabinet and process cell are also integrated in a space-saving manner on a common machine stand in the MIND-M 800. Together, they ensure maximum productivity at comparably low investment costs.

Modular design with maximum availability thanks to function optimisation in every detail. Rigid overall design, precise positioning and exact generator control ensure reproducible and permanently consistent hardening results. Industry 4.0 process and machine data acquisition is based on eQC (eldec quality control). With our High Precision Tool System - HPTS for short - set-up times are significantly reduced.

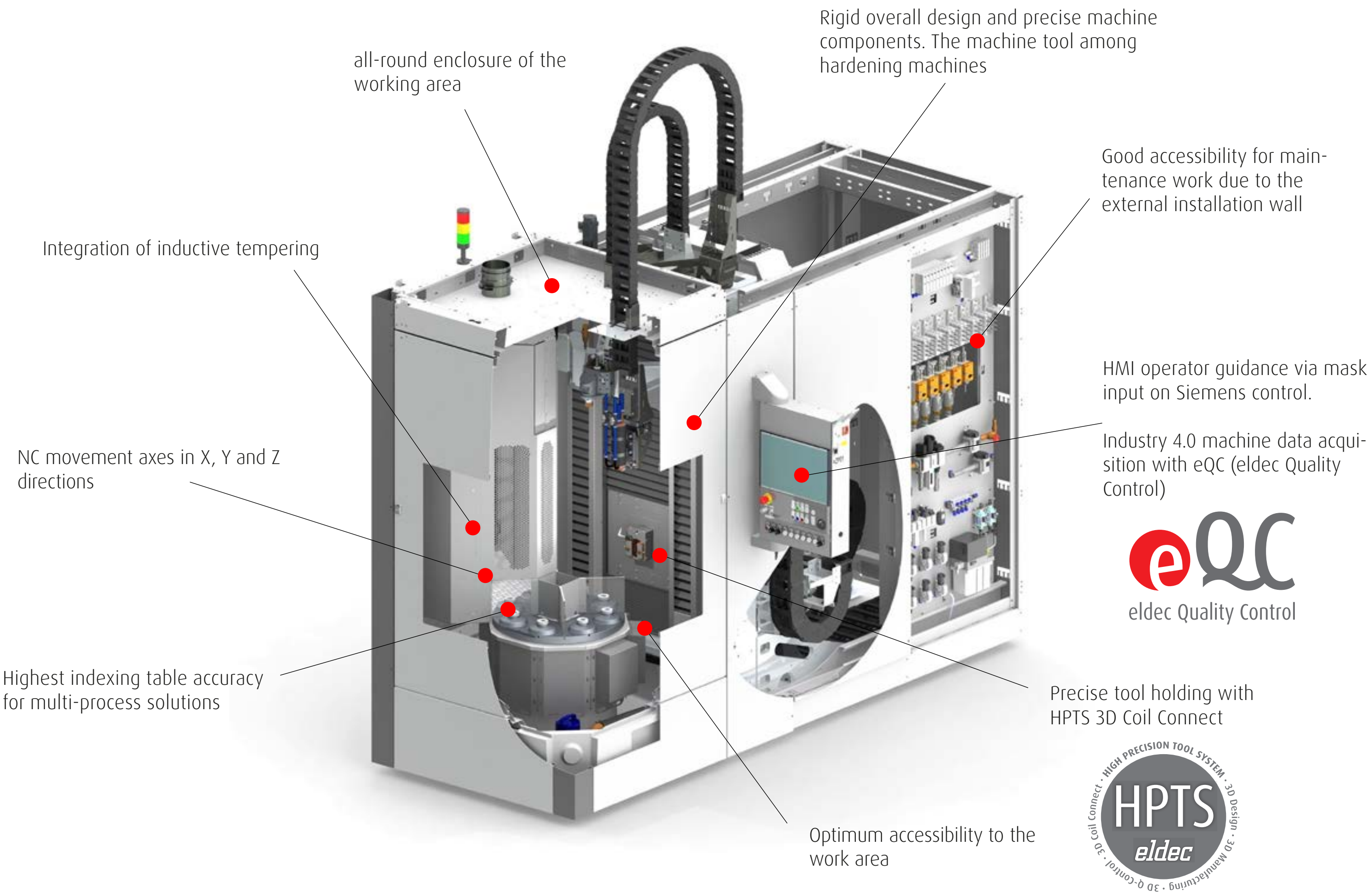
The MIND-M 800 is available as a single-spindle machine, double-spindle machine or with indexing table for loading and unloading during machining. The system can be loaded either manually or automatically by the loading module.

Technical Data

Workpiece length, max.	600 mm	Generatores	up to 250 kW (MF)
Workpiece dia., max.	300 mm		up to 150 kW (HF)
Workpiece weight, max.	35 kg		up to 125/75 or 75/100 kW (DFG)
Y-axis travel	60 mm		
Z-axis travel	800 mm	Minimal footprint	1850 x 3450 mm

MIND-L 1000

Induction hardening machine for large quantities with maximum and consistent precision



The machine tool among hardening machines. Modular design with maximum availability due to optimised functions in every detail. Rigid overall design, precise positioning and exact generator control ensure reproducible and permanently stable hardening results. Comprehensive Industry 4.0 process and machine data acquisition with eQC (eldec Quality Control). Set-up times are significantly reduced with HPTS (High Precision Tool System). Maximum accessibility for set-up operation and maintenance work.

Multi-process indexing table concept: Full process integration in one machine, such as simultaneous induction hardening, tempering, cooling, blowing-off, measuring, image acquisition, etc. for workpieces up to 200 mm diameter and 800 mm length. Available with energy sources from 10 - 1000 KW in the frequency ranges LFG, MFG, HFG, DFG (Dual Frequency, MF/HF) and SDF® (Simultaneous Dual Frequency).

Workpiece length, max.	800 mm	Generators	up to 500 kW (MF)
Workpiece dia., max.	160 / 200 mm		up to 500 kW (HF)
Workpiece weight, max.	10 kg per spindle		up to 200 kW (LF)
X-axis travel	20 mm		up to 1000 kW (SDF®)
Y-axis travel	250 mm		up to 500/500 kW (DFG)
Z-axis travel	1000 mm		

The MIND-L 1000 series is based on a modular construction kit, which makes the construction forms S, L, T and I possible and therefore the adaptation to a wide range of tasks.

MIND-L 1000 S:
Induction hardening machine for large quantities with maximum and consistent precision

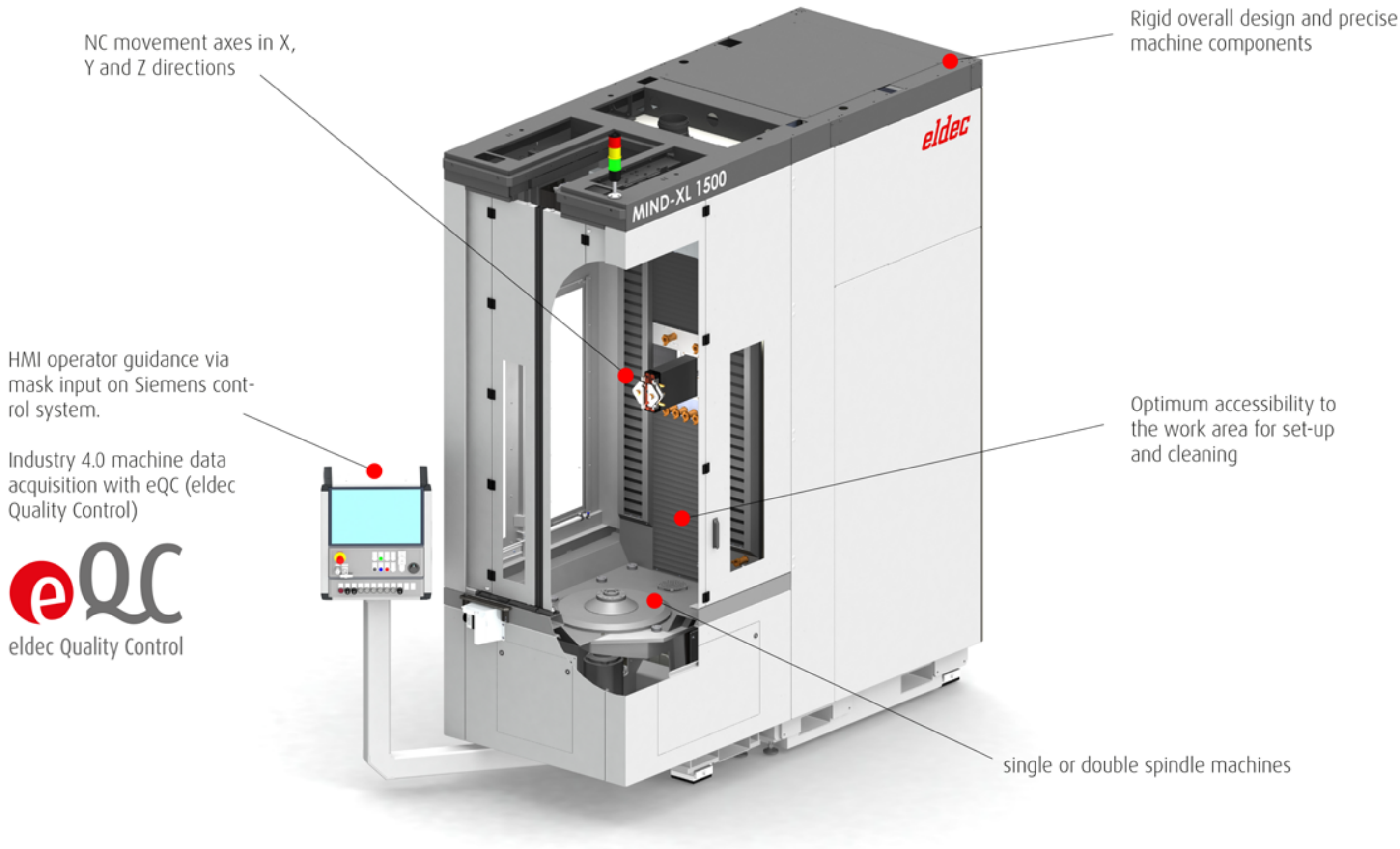
MIND-L 1000 L:
Induction hardening machine for large quantities and numerous multi-processes, with maximum and constant precision

MIND-L 1000 T:
Induction hardening machine for large quantities and multiple processes, with maximum and consistent precision

MIND-L 1000 I:
Induction hardening machine for high volumes and process parallelisation, with maximum and consistent precision

MIND-XL 750 / 1500

Induction hardening machine for very large and heavy components in small to medium quantities



Induction hardening machines for huge tasks: The right choice for manufacturers of agricultural technology, construction machinery, power plant components, printing machines, truck components, shipbuilding components, wind turbines, roller bearings - in short: induction hardening machines for big tasks.

Rigid overall design, precise positioning and exact generator control ensure reproducible and permanently stable hardening results. Extensive I 4.0 process and machine data acquisition with eQC (eldec quality control).

Maximum accessibility for set-up operation and maintenance work.

Available with power sources from 10 - 2000 KW in the frequency ranges LFG, MFG, HFG, DFG (Dual Frequency) and an SDF® (Simultaneous Dual Frequency) for workpieces up to 1300 mm in length, 600 mm in diameter and 200 kg in weight. MIND-XL 750 and 1500 are available as single spindle and double spindle machines, optionally as toploader version for crane loading from above.

Technical Data

Workpiece length, max.	1300 mm
Workpiece dia., max.	600 mm
Workpiece weight, max.	200 kg
X-axis travel	100 mm
Y-axis travel	300 mm
Z-axis travel	750 / 1500 mm

Generators	up to 500 kW (MF)
	up to 225kW (HF)
	up to 2000 kW (SDF®)
	up to 200 / 100 kW (DFG)

Induction Heating Systems

Complete solutions for induction heating

Brazing and shrink-fitting with manual or semi-automated systems

UNI HEATs and HEAT STATIONS are complete heating systems that are configured into individualised solutions based on standardised assemblies and components. The application focus of these products is on shrink-fitting electric motor components, and soldering a wide variety of components. The degree of automation depends on the customer's requirements: From manually loaded fixtures for small batches to partially or fully automated systems for large batch quantities. Various process monitoring options - from temperature control to eQC modules for I4.0 connection (eldec Quality Control) - ensure full reproducibility of the heating process

HEAT STATION:

Heating system with generator on an aluminum profile frame

- Base frame with adjustable machine feet
- The active cooler stands separately

Standard equipment variants available:
- External button/foot pedal
- Signal light
- pyrometer
- Active cooler KLH Omega 6.3 kW to 67.9 kW

Generator:
- ECO-LINE
- SYSTEM-LINE
- PICO

eldec

UNI HEAT:
Heating two rotor shafts

Tempering station for parallel heating of two rotor shafts after forming. Reduction of the risk of cracking. Loading and unloading can be done manually or automatically.

Generator: SYSTEM-LINE M: 30 kW x2

UNI HEAT:
Heating and shrink-fitting of gears on motor shafts

The helical spur gear and the electric motor are loaded and unloaded manually. Temperature monitoring via pyrometer. Automatic joining feed and cooling to target temperature. Operation via handheld display with touch screen.

Generator: SYSTEM-LINE M 30

Tools

Inductors conventional or 3D-printed, quenchant showers and protective gas chambers

With the help of state-of-the-art CAD, CAM and FEM simulation software, inductors and quenchant shower heads are designed at eldec. The inductors are manufactured by means of a manual manufacturing process, or 3D-printed in-house using a SLM process. We are a pioneer and technology leader in the additive manufacturing of these copper components. Our quenchant showers and protective gas chambers are meanwhile almost exclusively manufactured using a plastic 3D printing proces.

Conventional Inductors

A conventionally manufactured inductor is a masterpiece of craftsmanship. Tailor-made inductors have been produced at eldec since 1982 from precise components assembled by experienced specialists. These components are manufactured in the tool production shop at eldec using the most modern CNC turning and milling centres and, if necessary, supplemented with wire-eroded and water-jet-cut components.

3D-printed inductors

eldec has been working intensively with the SLM process (Selective Laser Melting) since 2010. In cooperation with RWTH Aachen University, the process for copper materials was industrialised. As a technology leader, eldec has raised the production of inductors to a new level of quality with this development and now has two systems in Dornstetten for round-the-clock printing. Electrically and fluidically optimised and, if necessary, filigree inductor geometries can be produced, which are at the same time enormously rigid and reproducibly precise.

Quenchant showers

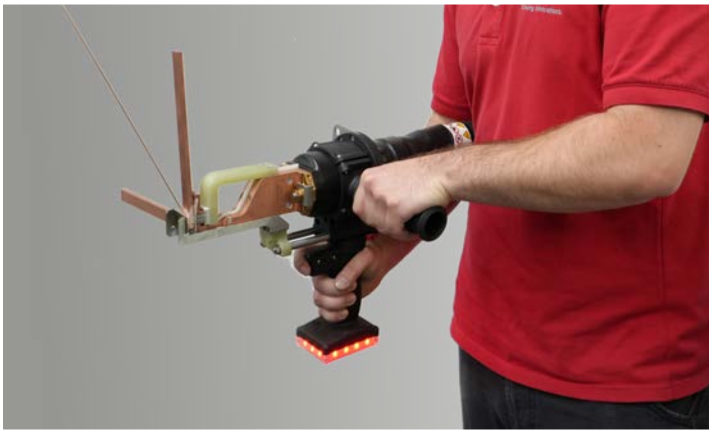
Induction hardening brings the components to above transformation temperature. However, the actual structural transformation in the outer layer of the component takes place with the help of the quenchant shower. They are therefore a central element in creating wear protection. In the meantime, almost all eldec quenchant shower units are 3D-printed, for which we use different plastics. This manufacturing process enables flow-optimised quenching

Protective gas chambers

In some cases, protective gas chambers are used to avoid or reduce oxide layers on the component surface. When designing these chambers, the challenge lies in the conflicting demands of short cycle times and purging that is as complete as possible. These components are now also almost all 3D-printed in plastic, which makes it possible to achieve a flow-optimised design.

Heat Controller

Hand-held induction heating processes are still difficult to reproduce today. With the new heat controller from eldec, this problem is reduced through sensory process control.

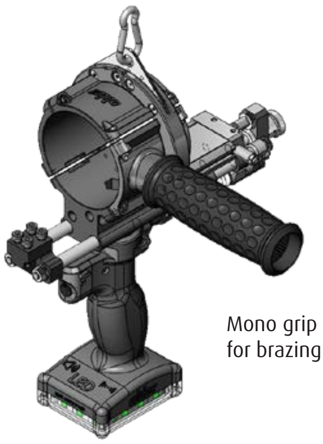


Active feedback enables the reproducibility of the hand-held induction heating processes for the first time.

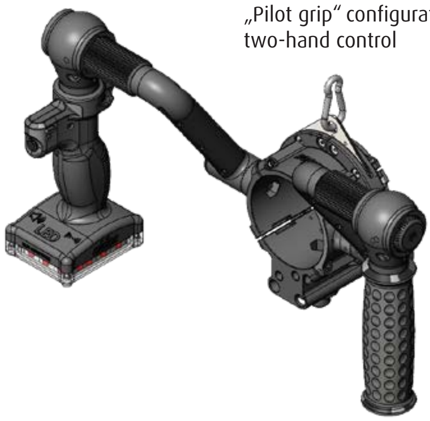
When the preset heating time or temperature (only in combination with a pyrometer) is reached with the Heat Controller, a multi-coloured LED light signal, a vibration signal or an acoustic signal is optionally activated – this can also be combined.

Variants

The Heat Controller is designed as a modular system - a wide range of variants are possible. Here are two examples:



Mono grip configuration with preparation for brazing



„Pilot grip" configuration for stable two-hand control

Specification Heat Controller

Active process response with LED band, vibration or acoustic signal

Process-integrated time or temperature control

Weight relief through steplessly rotation suspension (boom necessary)

Ergonomic handling

Various grip configurations available

Pneumatic workpiece clamping can be integrated (soldering gun)

Available for eldec coaxial transformers, diameter = 80 mm

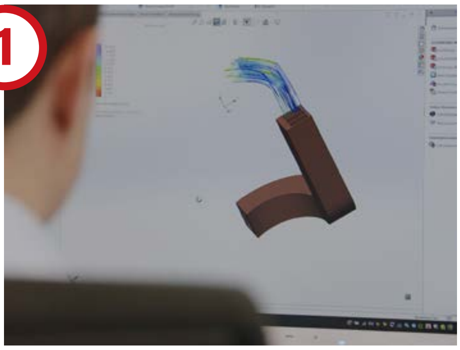
Full range of functions with eldec ECO-Line EEi² generators (reduced range of functions with units of the PICO generators)

HPTS – High Precision Tool System

Less downtime, more output

With HPTS, set-up times are reduced by up to 90%.
This result is achieved through a comprehensive 4-step solution:

1



In the **first step**, the basis is created: With the help of 3D CAD and FEM, task-specific inductors are designed with high precision that are also highly energy-efficient.

2

In the **second step**, the coil is manufactured in-house at eldec using the 3D SLM process: the basis for repeatable and extremely rigid inductors that achieve exceptionally long service lives.

3

After soldering the 3D-SLM printed coil onto the inductor base, in the **third step** the entire inductor is 3-D measured, and inspection report created.

4

Step four ensures that the inductor is installed in the hardening machine with exact repeatability thanks to “3D-Coil Connect” - an inductor base developed by eldec.

As a result, depending on the QA strategy, production can already be continued during the test in the laboratory or the component test in the laboratory can be completely dispensed with.

Glow Cables

Induction heating for large surfaces and diameters

Glow cables are used for pre- and post-heating of large diameters or surfaces, e.g. around welding processes. The connection is made using the cable box to which up to 8 cables can be connected. This box is connected to the actual generator. Depending on the application, air-cooled cables with a length of up to 30 m can be used. They can be used for stationary or mobile applications at process temperatures up to 500 °C.

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AR-based Service

With our AR glasses, you are directly in contact with our service specialists at the machine. Quick fault diagnosis and repair saves time, costs, and gets your machine up and running again as quickly as possible.

For more information, please contact our service colleagues in Dornstetten, see contacts above.