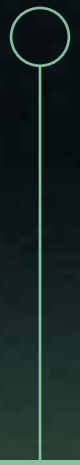
ENRX

HardLine® M

MODULAR VERTICAL HARDENING MACHINE



Maximum flexibility

The modular HardLine M is a new generation of vertical hardening machines, ideal for a variety of hardening and tempering applications.

Flexible

ENX is a global leader supplying advanced induction heating systems to many industries worldwide. With more than 75 years of experience in designing and manufacturing induction heating solutions, ENRX draws on its extensive expertise with the innovative HardLine M machine series.

The HardLine M is the latest member in the ENRX HardLine product family. Machines in the M-series can be used for a wide range of different workpieces in terms of weight, length and diameter.

The HardLine M is using modules with proven high-quality components – providing maximum flexibility at low cost.

Reliable

The HardLine M series' robust construction is designed for long-term operation. A highlight is the machine control which is based on advanced PLC technology. With clearly arranged functions and detailed monitoring, the operator can always keep an eye on the status of the machine.

Experienced experts from our worldwide service team offer remote analyses of efficiency, productivity and feasibility, as well as computer simulations so that you will always get the best results from your HardLine M machine.

Swift support with remote diagnosis and intervention in the machine and converter controls minimizes downtime in the event of faults.

Cost effective

Lower capital investment has been a key issue in the design of the new HardLine M series. Fast scanning speeds, low tolerance positioning, and digital converter technology ensure short cycle times, and energy efficiency, with low unit costs.

Easy to maintain

The HardLine M boasts ergonomic design, a well laid out work area, and good accessibility to sensors and actuators such as spindles and NC-motors. There is also easy access to cooling water components such as flow meters, temperature sensors and hoses.

The variety of spare part types required has been significantly reduced, and ENRX also ensures less downtime due to good availability of such spare parts.

Extension modules for your HardLine M

Extension modules enable complete digitization of the system with seamless integration into a server-supported machine and data management.

- Standby monitoring converter STMC
- Saving process data
- Database for process data
- Inductor lifetime monitoring
- Manual power correction
- Electronic key system
- Energy management
- Energy consumption monitoring
- Retrofitting checklist
- Machine data analysis
- Total preventive maintenance
- Automation interface

Designed for the future

The HardLine M modular hardening machine is equipped with all the functions that are required for smart manufacturing in the age of Industry 4.0.

Prepared for the future

The future is interconnected, bringing with it possibilities of access to real-time data, remote service and new ways to perform diagnostics and troubleshooting.

With easy updates to new features, your equipment is ready for the future.

- Latest generation of TIA-Portal-Programming
- Subsequent upgrades of the control unit
- Subsequent installation of additional functions

Interconnectivity

The extension of connectivity into industrial equipment allows devices to communicate over the Internet and be remotely monitored and checked.

Automation and real-time data

In a world where the industry pace is increasing, you may need to access information quickly. Data automation and the ability to collect data in real-time can be critical to the success of your project. Now, EFD Induction service engineers can exploit real-time visualization of your data to optimize processes and find out how your equipment actually performs in situ.

Remote service and augmented reality

The need for costly and time-consuming visits to your site will be reduced as experts have remote access to your equipment. Using augmented reality, they are able to blend interactive digital elements into your real-world environment, enhancing computer-generated information.

A Sinac for your HardLine M

Wide converter spectrum

All HardLine M vertical hardening systems are powered by ENRX Sinac generators, which are available in various powers and frequencies, both with parallel and serial oscillating circuit technology.

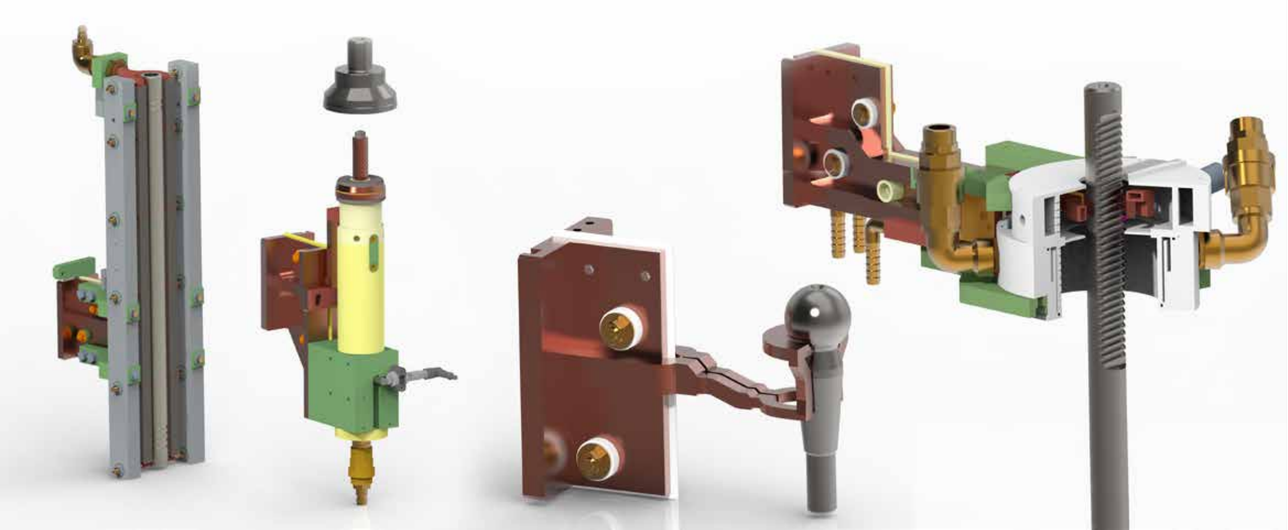
The HardLine M can be delivered with a wide range of Sinac converters for precise adaptation to your special requirements. The Sinac's output power and frequencies range from 10 kW to 320 kW and from 4 kHz to 400 kHz. The Sinac can have series and parallel circuit design with one or more power outputs.

The Sinac SM/SH range features a control system that is digital to the core, which ensures that your equipment will have extended life through advanced machine audits. Better use of your machine data will increase your productivity, and you will have unmatched control and efficiency, reduced maintenance requirements and shorter service response time.

THE SINAC UNIVERSAL INDUCTION HEATING GENERATORS ARE THE MOST ADVANCED AND RELIABLE SYSTEMS ON THE MARKET.

Tools for your HardLine M

With decades of experience, ENRX has the industry's best know-how in tool design and manufacturing. That means you will get optimal results from your machine.



Modular recooling systems

Your HardLine M building blocks

Even the cooling systems of the HardLine M are modular. You can choose two different cooling systems to integrate with your machine.

M-RC: recooling system for cooling water

Recooling system for supplying the electrical components such as converters, matching transformers, connecting brackets and inductors. For cooling the powered electronics of the converters, inductors and power cables.

- Units in 3 standard power range of 30 to 130 kW
- Pump output of 100 to 300 l/min
- Very good adjustment of the cooling capacity and the delivery rate

Advantages

- Optimal use of the available production area by installation on a separate base frame with compact dimensions.
- Simple and clear arrangement of the components for service and repair work.

M-RQ: recooling system for quenchant

Recooling system for processing the quenching medium and supplying the showers. For supplying the process or protection shower and for post-cooling.

- Units in 6 standard ranges of 30 to 160 kW
- Pump output 100 to 600 l/min
- Very good adjustment of the cooling capacity and the flow rate

Advantages

- Easy to expand so that several supply pumps (e.g. with several heating stations) can be used.
- Filtering of the quenching medium before it enters the main tank using a single, double or belt filter in the return line.
- Thorough mixing, ventilation and constant temperature thanks to a separate circulation pump.
- Simple and clear arrangement of the components for service and repair work.

Decisive advantages

- Built-in control system for self-sufficient operation, quick commissioning and easy installation.
- Large tank size for degassing the recirculated quenchant.
- Welded stainless steel pipes, built-in parts can be easily exchanged using a flange.
- Very good access to all components for maintenance, cleaning and replacement.

Customized to your needs

The HardLine M is a versatile all-rounder designed for diverse hardening and tempering applications.

Its modular DNA allows for a tailor-made configuration that scales with your business.

Scalable automation
Start with manual loading and automate later as production volumes grow.

Custom tooling
Flexible integration of inductors, showers, and specialized process functions.

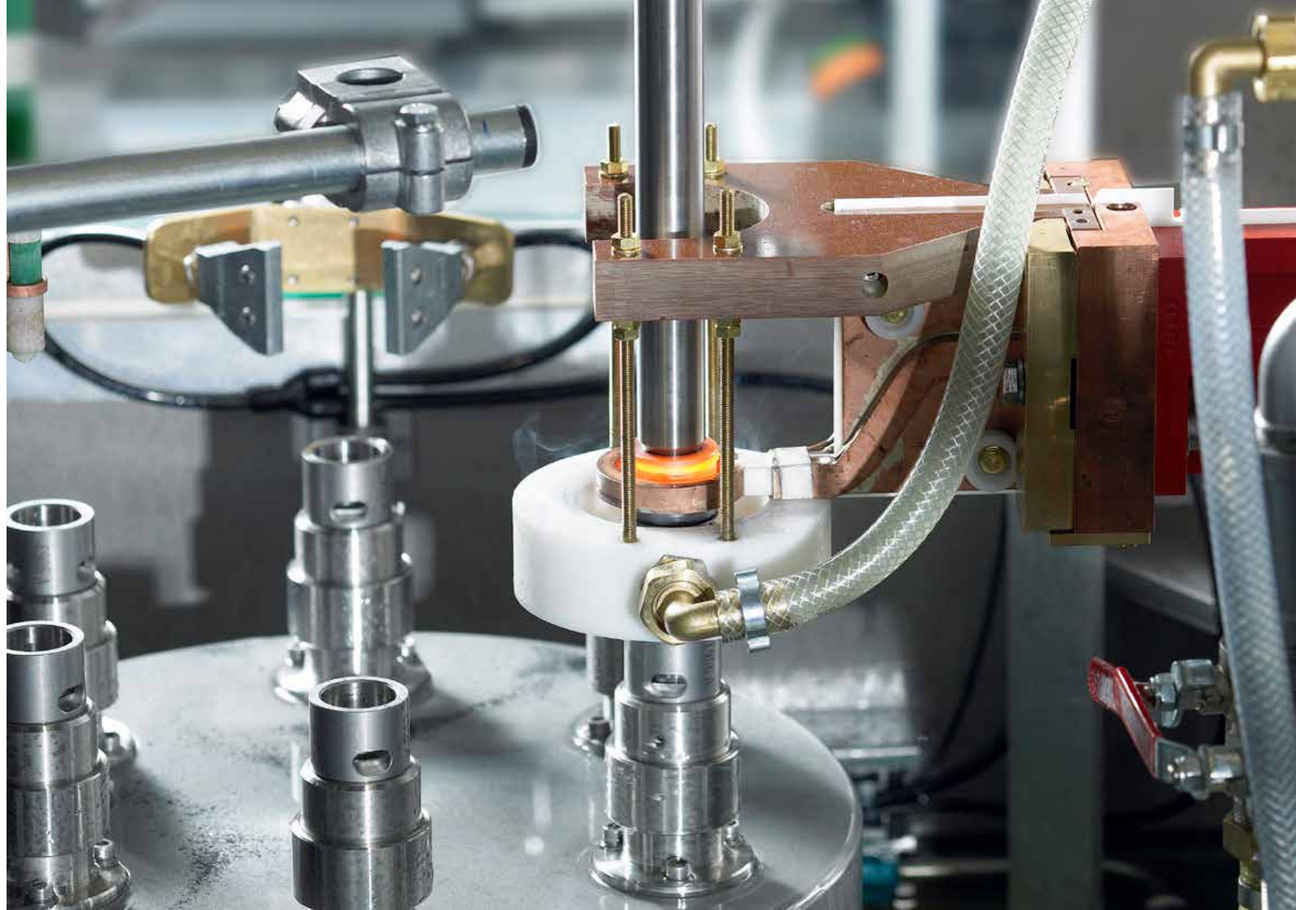
Universal compatibility
Optimized for a wide range of workpiece weights, lengths, and diameters.

High throughput
Utilize a rotary table to process up to four workpieces simultaneously.

Various machine types

From single and twin main spindles to dual with rotary table.

	ONE		ONE UNIVERSAL		ROTARY TABLE		DUAL	
	SINGLE	TWIN	SINGLE	ROTARY TABLE	4x1 / 4x2 4x3 / 4x4	6x1 6x2	SINGLE	TWIN
HARDENING STATION [qty]	1	2 parallel	1	1-2	1-2	1-2	2x1	2x2
WORKPIECE LENGTH [mm]	500 1000 1500 2000	2x 500 2x 1000 2x 1500	500 1000 1500 2000	500	500		2x 500 2x 1000 2x 1500 2x 2000	4x 500 4x 1000 4x 1500
WORKPIECE DIAMETER [mm]	400	2x 150	400	RT550 4x1/4x2/6x1/6x2 100 RT550 4X3 55	RT550 4x1/4x2/6x1/6x2 100 RT550 4x3 55 RT710 4x1/4x2/5x1/6x1/6x2 100 RT710 4x3/4x4 50		2x 400	4x 150
WORKPIECE WEIGHT [kg]	500	2x 250	500	RT550 4x1/4x2/6x1/6x2 15 RT550 4x3 15	RT550 4x1/4x2/6x1/6x2 15 RT550 4x3 15 RT710 4x1/4x2/5x1/6x1/6x2 15		2x 500	4x 250
CONVERTER POWER [kW]	6 - 200 Continuous output power [320 Peak output power]							
CONVERTER FREQUENCY [kHZ]	Medium and High Frequency [range 4 - 400]							



An eco-friendly technology

Induction heating is an inherently clean process. It is far more energy-efficient than other heating alternatives. It does not emit carbon dioxide. It eliminates open flames, reduces the need for fuel and transport, and promotes safer, healthier workplaces.

What is induction heating?

Induction heating is the process of heating electrically conductive materials, such as metals, by letting an alternating current create a magnetic field around a coil. When you place an object inside the coil, the object is immediately heated. The heat is generated into the object itself instead of by an external heat source via heat conduction.

Fast

The produced heat in induction heating is instant. It takes less than one second to achieve a uniform surface temperature of 1,000°C on small metal components.

Accurate

The right temperature is delivered precisely where it is needed. Customised coils ensure optimal heat patterns with minimal energy consumption.

Controllable

Transistorised induction heating systems and process control software deliver complete control over the entire heating process.

Repeatable

Induction heating can accurately repeat the desired heating cycle, including key parameters such as temperature, penetration depth and heat pattern.

Clean, safe and compact

No gas, no open flames, no noticeable increase in ambient temperature and no excessive floor space occupied by furnaces.

A family for every need

HardLine is one of six product families within ENRX induction heating solutions. Together, these product families let you perform virtually any industrial heating task. In the unlikely event they don't meet your specific needs, we can sit down with you and devise your own customised induction heating solution.

ENRX also develops, commercialises and supplies mechanical handling equipment, coils and software control systems. We also offer a worldwide service program. To learn more about ENRX – and how we can help your business – please contact your nearest ENRX office.

Sinac®	Universal heat generators
Weldac®	High-output solid-state welders
Minac®	Mobile heat generators
Ventac®	Portable air-cooled induction heating system
HeatLine®	Industrial heat processing systems
HardLine®	Industrial heat treatment systems

Get in touch

More about our products, applications and the industries we serve.

About ENRX

ENRX is a global green tech company driven by induction. We offer induction heating, wireless inductive charging and contactless power supply with low or no carbon footprint for virtually any application within mobility and manufacturing.

THE RIGHT ENERGY CAN TAKE YOU ANYWHERE • ENRX.COM

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