



# Crankshaft hardening

A guide to the benefits of induction heating



# How to solve the cost versus quality dilemma

**EFD Induction crankshaft hardening systems are a proven way to meet stringent specifications, while at the same time minimizing costs. Available in four machine types, these systems offer compelling technical and commercial benefits.**

## **Fillet hardening capability**

Active power variation dynamically adjusts the power in accordance with the crankshaft's angle of rotation during heating. The result is minimized distortion, as active power adjustment limits heat seepage. The feature also enables inductive fillet hardening—a process that contributes to making smaller, lighter, more fuel-efficient engines.

## **Fast integrated tempering**

The integrated tempering options in our systems are much faster than furnace tempering. The real-time monitoring software that enables integrated tempering also provides key quality data on each hardened crankshaft.

## **Long coil lifetimes**

EFD Induction coil assemblies feature optimized parts and water circuits. These components, together with the assemblies' low-weight, mean the coils deliver exceptional working lifetimes. The results are higher productivity, with minimized downtime due to unscheduled coil changes.

## **Minimized distortion**

Our inductors minimize distortion by ensuring optimal contact pressure of the coil guides on the crank—not enough to cause significant marring or distortion, but sufficient to achieve accurate coupling between the bearing and the inductor assembly.

## **Reliable power supply**

The power supplies used in EFD Induction systems feature rugged IGBT transistors, and deliver a power efficiency of more than 92%. Operational flexibility is assured by a broad frequency range of 0.5 – 200kHz, and PLC and CNC-based remote control capabilities.



*An EFD Induction robot-type crankshaft hardening system in action. All our systems feature mechanical and control innovations that minimize Total Indicated Run-out.*

# The EFD Induction range of crankshaft hardening systems

Our crankshaft hardening systems are divided into four types: drum, robot, heavy and conveyor. Each type is modular, making it easy to adapt to changing requirements. Automatic cycles, CNC or PLC controls and real-time process monitoring are standard for each type—as are innovations that minimize Total Indicated Run-out.



## **Drum type**

This system is designed for truck and off-highway crankshafts up to a maximum length of 1,5m. Single- and double-head, and single- and twin-tank versions are available.



## **Heavy type**

The heavy type is for crankshafts up to 10m long, and maximizes throughput by the use of semi-automatic loading and coil changeovers. The system features automatic laser-guided coil re-positioning.



## **Robot type**

This type features robotized automatic loading/unloading. The number of stations and coils is determined by the production rate. The system handles crankshafts up to 1,2m long.



## **Conveyor type**

This system, which handles parts up to 1,4m long, is designed for in-line integration. The system features multiple stations and coils, the number of which depends on throughput. An automatic loading/unloading version is available.

# Get more from your equipment

When you choose a solution from EFD Induction you choose security and peace-of-mind. As one of the world's largest induction heating companies we offer a full range of maintenance, logistics, training and spares services. Make the most of your heating system—with a little help from the people who built it.



*A robot type crankshaft hardening system. Like all EFD Induction crankshaft systems, the robot type is modular. Such modular layouts are not only proven solutions, they also mean short delivery and commissioning leadtimes.*

EFD Induction has to date installed thousands of heating solutions for a vast range of industrial applications—bringing the benefits of induction technology to many of the world's leading manufacturing and service companies. EFD Induction has manufacturing plants, workshops and service centers in the Americas, Europe and Asia.

**Learn more about the EFD Induction solutions that are boosting productivity for companies around the world. Visit: [www.efd-induction.com](http://www.efd-induction.com)**