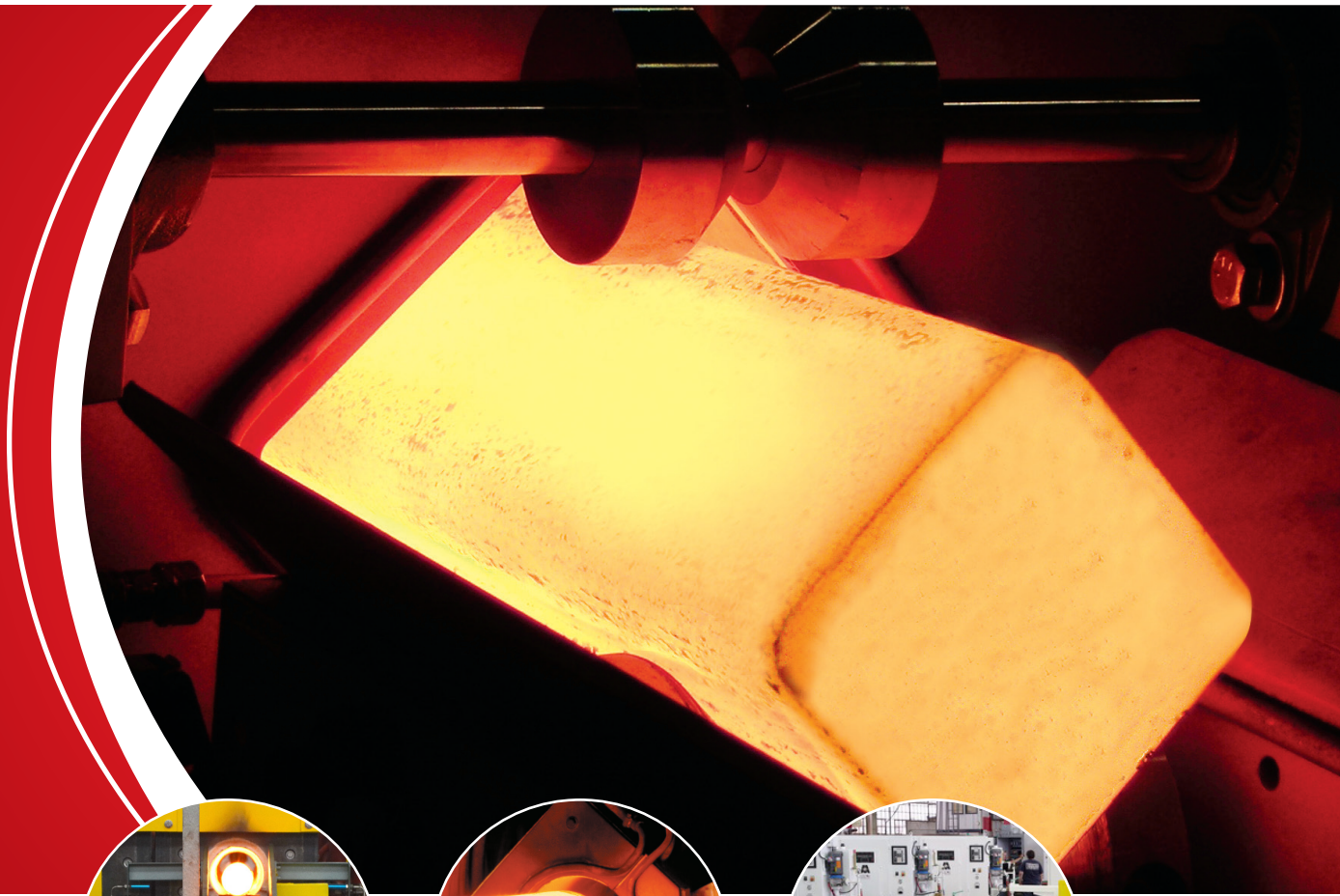


Forging

with Induction Heating Equipment



Induction Original
Equipment Manufacturer



Forging with Induction

Ajax TOCCO is your partner for Induction Forging Solutions

“DO MORE WITH LESS” — this is the challenge you face every day. Make the most of your existing resources. Maximize your return on new technology. Achieving this balance is difficult. When rising to the challenge, it helps to have a partner — both a technology provider and an expert on how to implement it — that partner is Ajax TOCCO.



Solutions Designed for You

When you have unique requirements, Ajax TOCCO will tailor a solution based on our extensive application experience. Through a combination of standard products and innovative engineering, Ajax TOCCO will meet your most demanding production and quality needs. With a wide range of field-proven solutions, our engineering team can provide the experience and expertise to optimize your process.



The Global Force in Induction Technology

A Heritage of Excellence

Ajax TOCCO Magnethermic is a leading supplier of induction heating and forging equipment. Reflecting the proud heritage of 100 years of induction heating experience with our group of companies, our personnel and innovative traditions remain central to our strategy and future. Our high-quality standards match our reputation, as does our expertise in process engineering and modernization resulting in stable, long-term solutions that last for decades.

Continuous Innovation

Not only are we one of the world's largest induction suppliers, we are one of the most progressive market leaders in developing customer-valued new technology. Finite element analysis, process heating simulations, state-of-the-art manufacturing capabilities, application laboratories, and on-staff metallurgists guarantee that our customers always stay ahead of the industry. Our PowerForge Induction Heater features Ajax TOCCO's reliable, energy efficient IGBT PowerBlock Technology or our optional SCR Technology. In addition, our PowerZone induction heating systems utilize the IGBT PowerBlock Technology with our advanced zone heating technology.

Your Process Partner

Through close collaboration and personal attention, Ajax TOCCO is dedicated to sharing our customers' passion and focus on their business goals. Ajax TOCCO doesn't just sell equipment, we provide the right solution. We optimize your floor plan. We streamline your energy consumption. By applying our years of experience and knowledge of best practices, our customers are empowered to compete more effectively.

Product Solutions

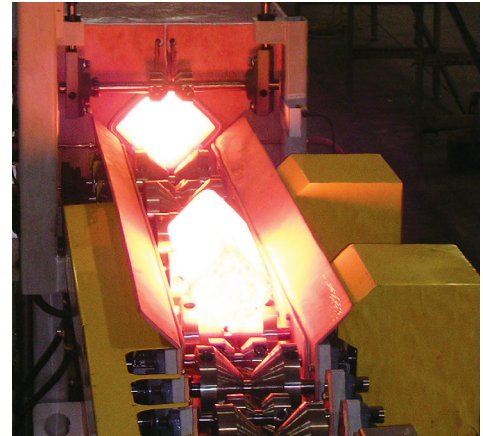
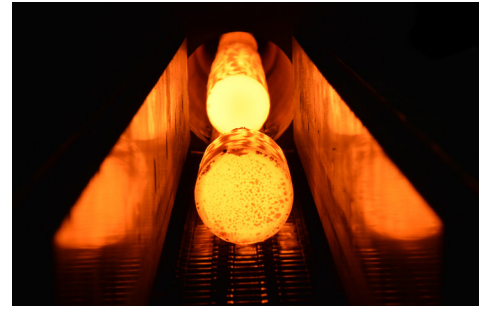
Our systems capabilities include application review, development, induction heating equipment, process tooling, material handling with installation and commissioning services available to complete a 'full turnkey' manufacturing solution.

Customer Service and Support

Before the contract is signed and for years beyond start-up, customers can count on Ajax TOCCO. Whether creating a turnkey solution from scratch, retrofitting and updating your existing lines, or evaluating future possibilities, the level of service is the same. Our maintenance specialists are available 24/7 and customers can enroll in preventive maintenance contracts to keep their lines up and running.

Ajax TOCCO Support Network

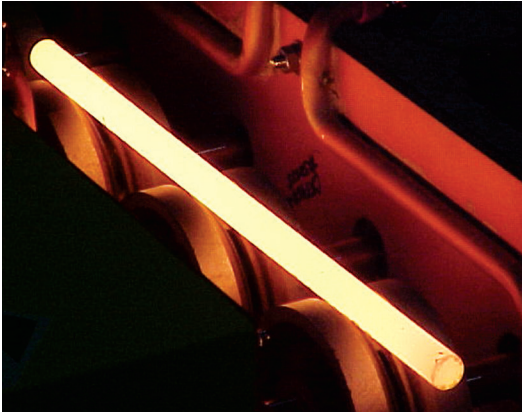
Along with providing each customer personal service, a proven process, and reliable equipment, Ajax TOCCO customers can benefit from the resources of a global corporation. We provide worldwide assistance through our network of regional sales and service engineers. Wherever you are, we can help.



Forging with Induction

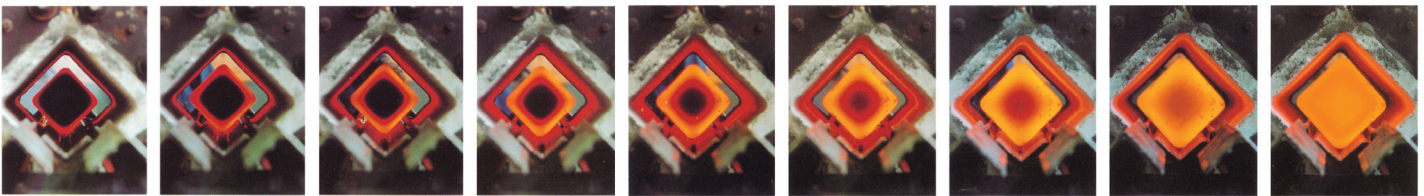
Induction Forging Technology & Equipment

Induction heating is efficient, easily controlled, uses no energy when not heating, and puts the heat where you want it, when you want it. No idle time, no massive refractories to heat, and close coupling enables you to **use energy in the best possible way**.

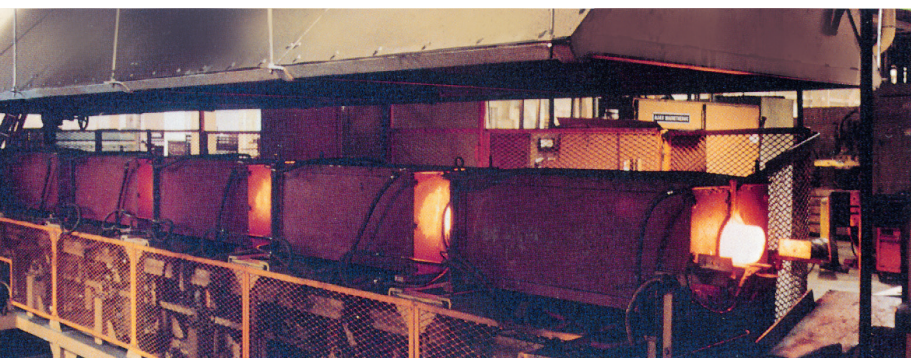


Equally important is the manufacturers experience and know-how in providing the right equipment to match your overall objectives. Ajax TOCCO Magnethermic® (ATM) has experience that spans over 90 years and covers heating all metals in all shapes and sizes utilizing a wide range of advanced solid state power supplies ranging from 50 and 60 Hz, to 450,000 Hz.

The photo sequence below shows the heating process. However, there are other determining factors which set induction heating apart from other heating methods. Factors such as energy efficiency, labor costs, quality, automation, maintenance, scale losses, cleaning, and scrap losses are some of the advantages of induction heating.

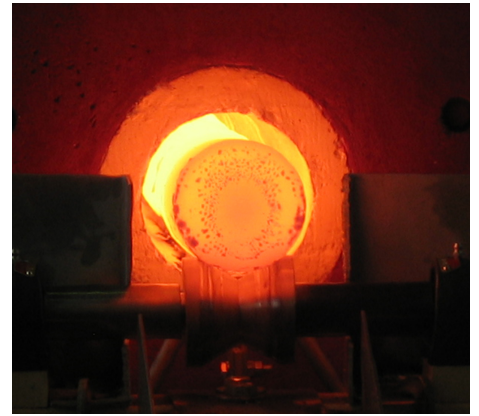
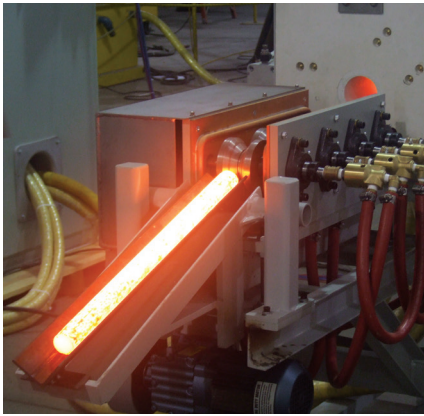


This induction heater and forge press work in perfect harmony at this automotive forge shop. Powered by a 250 kW, 10 kHz Ajax TOCCO Pacer®, bars are heated in a channel coil and automatically fed to the press operator. Typical forging installations provide maximum efficiency – requiring minimal floor space, labor and material handling.



No wasted energy, no wasted billets with Walking Beam induction heaters. Heavy duty single action lifts, advances and returns in one smooth, continuous action.

Ajax TOCCO Induction Heating Systems



Advanced Technology

Ajax TOCCO continues to refine induction technology offering the most efficient and flexible heating systems to the forging market. Utilizing **cast brick** or **open coil** inductor technology, we supply heating systems designed to meet customer's thermal requirements and increase process efficiencies required to meet the challenging demands of the global economy.

For typical forging heating applications, we provide increased operating efficiencies, reduction in installation cost, and a minimized footprint by offering PowerForge and PowerZone heating systems.

For larger applications we market our standard heating concepts, which are easily modularized to meet our customer's specific process applications.

Power Systems

Our power supplies are the proven choice. Operating in a 3 to 1 conductance range, our patented designs minimizes the number of inductors required, thus reducing capital expense, ensuring process integrity and reducing changeover time while increasing productivity and profits. Control and monitoring of our systems is provided through our **ForgeView** control packages, which monitor and control the power supply, billet feeding system, and temperature of the billets.

Standard controls are PLC based, offering basic power and system monitoring. When process requirements dictate more precise control and monitoring, PC based controls can be supplied with capability to monitor and/or upgrade operating parameters via the internet, utilizing our ForgeView and ForgeView Plus technology, allowing the user to change production requirements as needed to meet their customer's needs.

Fixturing

We offer billet feeding solutions via pinch wheel, pusher, and caterpillar type drive units. For special applications, a walking beam fixture may be considered.

Technical Support and Service

With our ability to integrate billet handling systems plus offering "turnkey" installation, Ajax TOCCO has the engineering, technical, service and spare parts network in position to meet the needs of the forging industry as we meet the challenges of an ever changing global market.

Authorized Original Equipment Manufacturer for American Induction Heating,
Industrial Electric Heating, Ajax Magnethermic® and TOCCO®



Forging with Induction

Ajax TOCCO Induction Heating Systems

FEATURES & BENEFITS:

- IGBT PowerBlock technology
- Minimal floor space required
- Turn-key operation
- Built-in heat station
- Built-in power supply
- Built-in pinch roll drive
- Built-in exit conveyor
- Quick change coil(s)

OPTIONS:

- ForgeView or ForgeView Plus technology
- SCR power supply
- Coil shuttle
- Cooling water recirculating systems
- Loaders & feeders
- Coil cassettes
- Replacement liners
- Wear rails



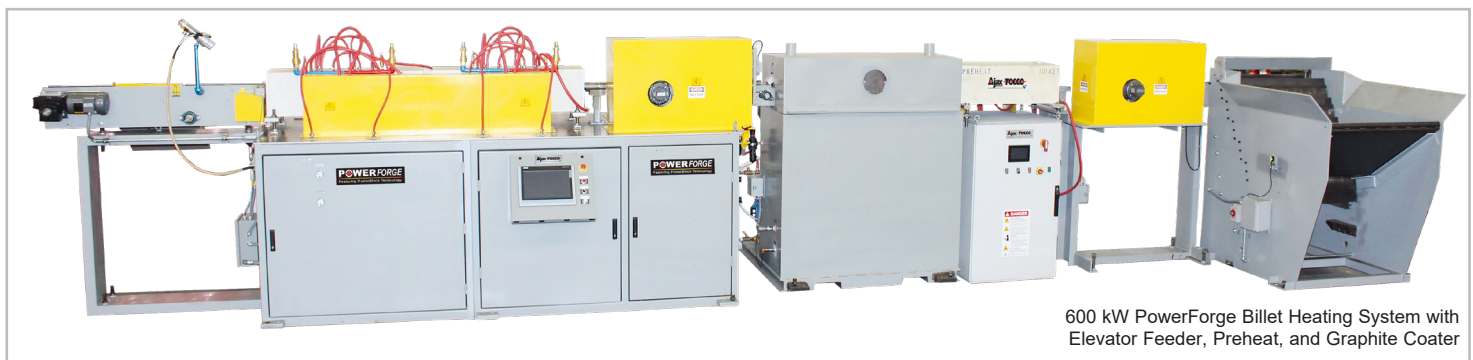
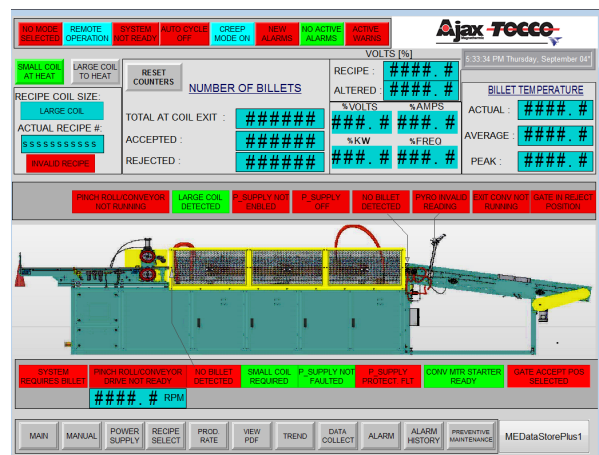
PowerForge Specifications:

Power Range: 300 kW – 2,400 kW
Frequency Range: 500 Hz – 30 kHz
Input Line Voltage:
3 phase, 380 – 575 Vac

2,000 kW PowerForge Induction System

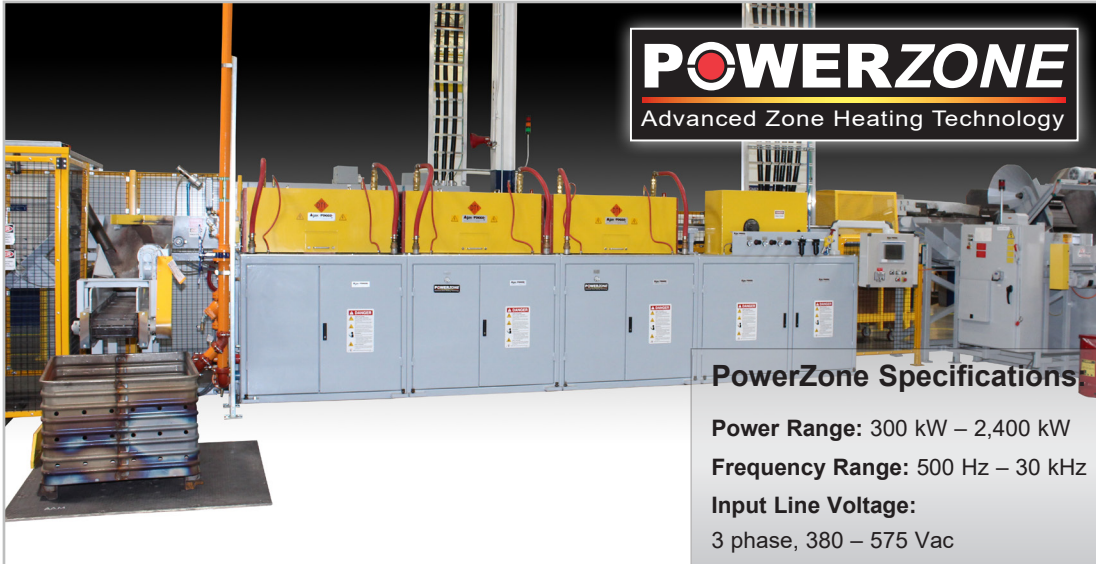
PowerForge Induction Heater

The Ajax TOCCO PowerForge design integrates the entire induction system, including the water cooling system, onto a common base for a quick, efficient installation that conserves floor space. Whether you need 500 lbs per hour or 12,000 lbs per hour, heating billets or bar ends, Ajax TOCCO has over 150 years of combined experience to provide systems which meet your requirements for maximum efficiency.



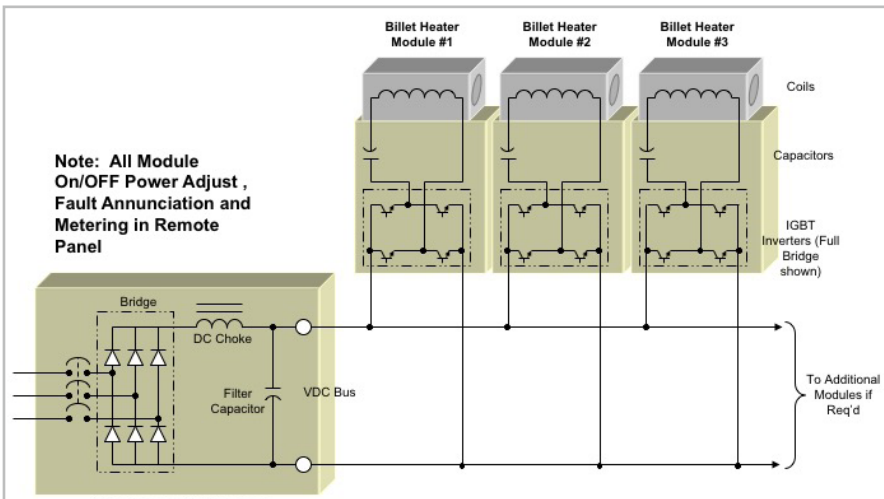
600 kW PowerForge Billet Heating System with Elevator Feeder, Preheat, and Graphite Coater

Ajax TOCCO Induction Heating Systems



1,050 kW PowerZone Induction System

PowerZone Advanced Zone Heating Technology



FEATURES & BENEFITS:

- Easily expandable
- IGBT PowerBlock Technology
- Minimal floor space required
- Turn-key operation
- Built-in heat station
- Built-in power supply
- Built-in pinch roll drive
- Built-in exit conveyor
- Quick change coil(s)

OPTIONS:

- ForgeView or ForgeView Plus technology
- Coil shuttle
- Cooling water recirculating systems
- Loaders & feeders
- Coil cassettes
- Replacement liners
- Wear rails

The PowerZone modular design integrates the entire induction system, including the water cooling system, onto a common base for seamless installation. This system can be easily expanded via **PowerBlock** modules. Whether you need 500 or 25,000 lbs per hour, heating billets or bar ends, Ajax TOCCO has over 150 years of combined experience to provide systems that meet your requirements for maximum efficiency.



Forging with Induction

ForgeView Software

ForgeView and ForgeView Plus

The ForgeView Plus System is an intelligent HMI terminal that provides the operator direct access to the induction heater's controls. With a few key strokes, the unit automatically sets up all the operating parameters for a given part.

OPERATOR CONTROLS

The operator can control all functions of the induction heating system from the ForgeView Plus terminal including all material handling.

PROCESS MONITOR

A graphic pictorial screen representing the complete induction system simulates the flow of billets through the induction heater along with a display of pertinent data of the process.

PART SELECTION

ForgeView Plus provides precise and rapid setup for various production operations. Once a proper operating condition has been established for a specific part, it can be saved for later recall.

INCREMENTAL TEMPERATURE CONTROL

The ForgeView Plus System incorporates Incremental Temperature Control (ITC). Final billet temperature is continually monitored and this information is used to reset the power supply output before the final billet temperature reaches either the over or under limit.

PRODUCTION SUMMARY

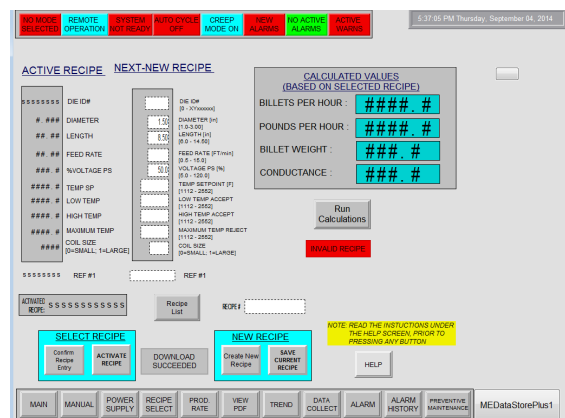
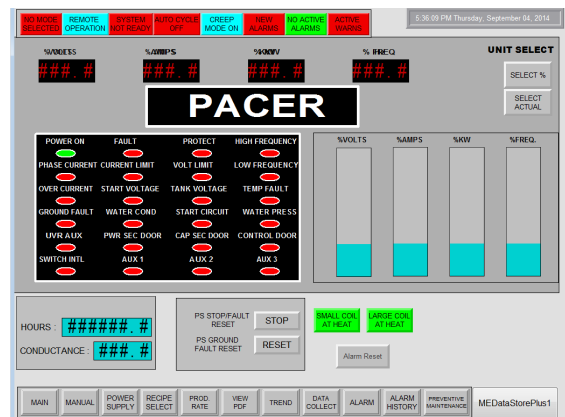
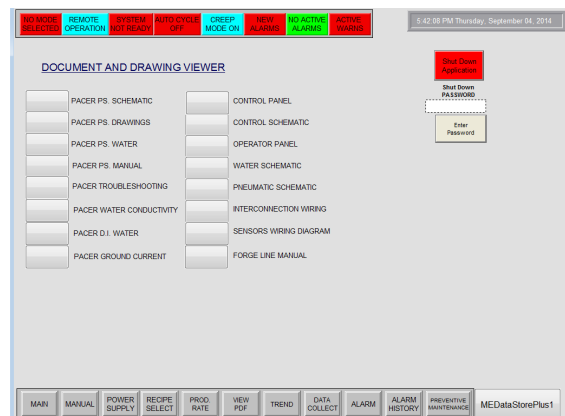
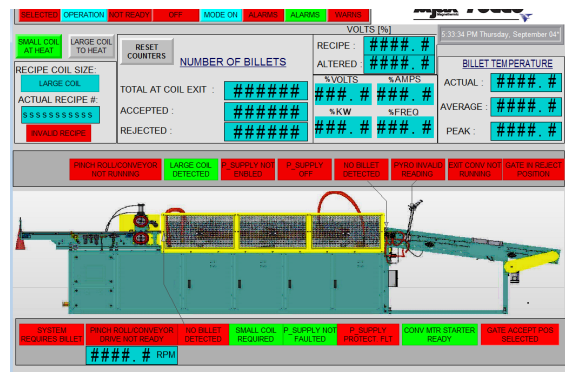
The production summary screens provides a current and accumulated status for the number of billets which have been processed through the heater which includes number of rejects for under temperature conditions or the number of rejects for over temperature conditions which are not reusable and should be accounted for under a quality control program.

FAULT ALARMS

Multiple screens are provided for interrogating any fault conditions along with suggested corrections by the operator or maintenance personnel. One viewing the screens will see an active fault "blinking" with a highlighted color condition.

MAINTENANCE SCHEDULE

Periodic maintenance schedules are established within the induction heater control system and alerts the maintenance personnel when miscellaneous actions are required based on production time or other criteria.



Induction Power Supplies for Forging

Power to Spare

Ajax TOCCO has lead the way in developing and improving induction power supplies. Our frequency line ranges from 50 Hz to 450,000 Hz to cover your frequency needs. With Pacer's flexibility, you can heat a wide range of work pieces at the highest efficiency. In fact, Pacer® is the only solid state induction power supply with a 3 to1 conductance range to allow custom adjusting of frequency for each billet size with only a capacitor change. This feature allows the equipment to run a broad range of diameters in a single given coil size delivering full power over the range of sizes.

THE PACER POWER SUPPLIES HAVE THE FOLLOWING FEATURES:

Cabinet isolation of the control section from the power section for safety.

- Infinite power control from 10% to 110%
- Main disconnect with under voltage trip
- Digital metering of output kW, volts, amps and frequency
- Complete short circuit protection
- Nonferrous internal water piping
- Fan cooled gate driver
- Single board logic control system located in a separate fully enclosed climate cooled compartment
- Self diagnostics of the logic control and pulse amplifier boards with front annunciation panel aids in trouble shooting. Optional water path temperature monitoring is available.

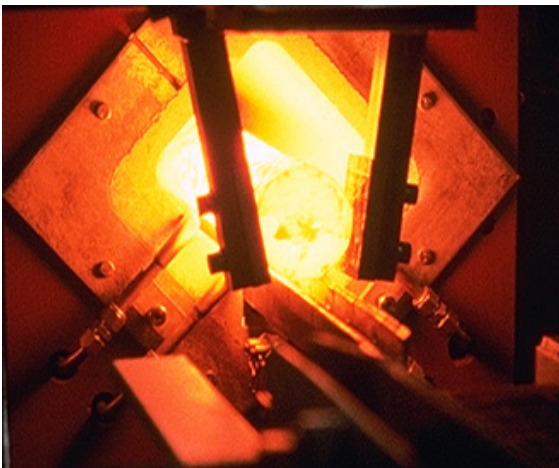


Forging with Induction

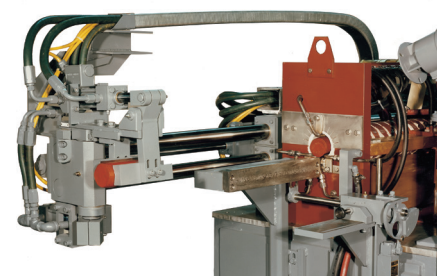
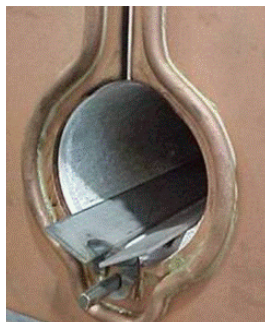
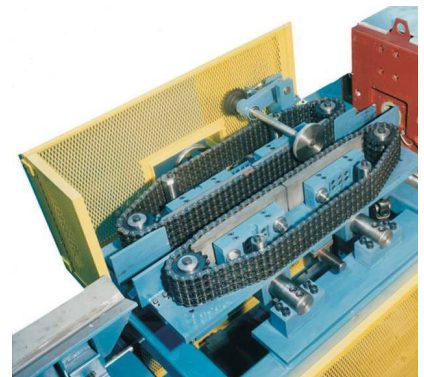
Components & Fixturing

Experience and know-how play an important role in recommending the right equipment to handle your heating requirements dependably and economically. Properly designed induction heating equipment offers many advantages. The difference in equipment is in its reliability and the way it's applied to solve a heating problem. Each component has a function to perform. The components selected are developed by Ajax TOCCO specifically for induction heating applications. As a result, we offer a full range of frequencies, power sources, and inductor designs to insure that each installation is designed for your specific application.

Whether your forging system demands an incremental feed, a continuous feed, or a propulsion system that keep billets separated, Ajax TOCCO has modern, proven units in the field plus the technology to select and furnish the best equipment for the forger's needs.



Fast Extractor



Technical Service & Support

Ajax TOCCO **commissioning and service engineers** are involved with many of our customer's main equipment contracts, from commencement of manufacturing through to final on-site commissioning. Technical assistance from numerous engineers is available to solve the most complex of problems and to offer suggestions for performance improvements and reliability.

Ajax TOCCO has heavily-invested facilities dedicated for the sole purpose of repairing and reconditioning electronic control boards and components. Using exclusive electronic simulators that duplicate actual operating conditions we are able to pinpoint problems quickly and to speed repairs.

Well equipped workshop facilities provide skilled services for the repair, refurbishment, and upgrade of most types of heating and melting equipment.



Complete & Comprehensive Support

Spare Parts

Ajax TOCCO offers an extensive computerized inventory of factory certified replacement parts for our induction heating and melting equipment to assure quick turn around. We also offer replacement parts for all other makes of induction equipment. Our commitment to customer support means Ajax TOCCO is available to handle emergencies any time of the day and any day of the week.

Repair Centers

Strategically located facilities are geared to meet the repair requirements of all induction users. Our skilled workforce assures the customer's peace of mind in knowing that their job will benefit from the latest technological advances in state-of-the-art materials, components, and craftsmanship.

Customer Support

- Replacement power units designed to replace all makes and models.
- Solid State contactors designed to replace the electro-mechanical devices.
- Infrared imaging for locating extraordinary sources of heat in induction equipment.
- Pre-packaged set of tools for equipment maintenance.
- MAGNE-CLEAN water system flushing service.
- MAGNE-FIELD electromagnetic field mapping of induction equipment.

Service

Technical assistance is available any time of the day or night using our 24 hour hot line. Our experienced service team is strategically located to provide quick response to our customers wherever they are located.

Installation

Installation of induction equipment performed timely and accurately is critical to the financial success of a project. Ajax TOCCO offers complete turn-key installation service on all equipment.

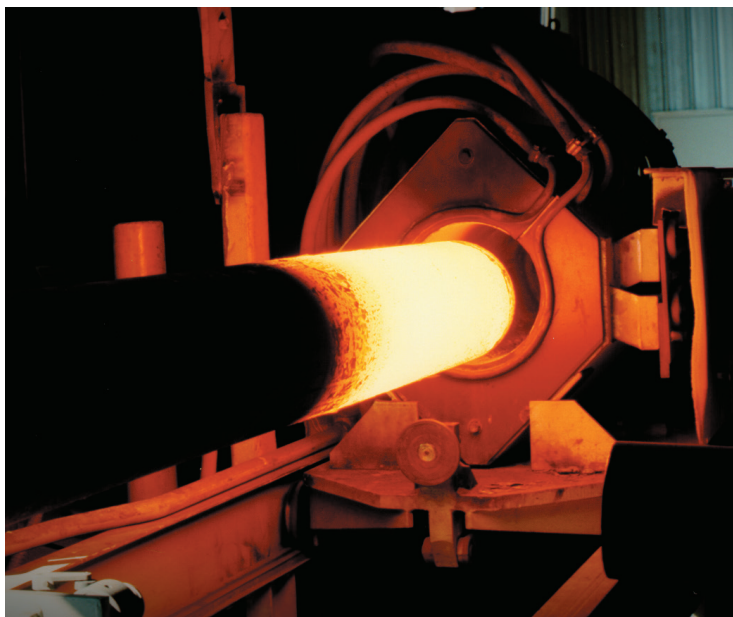
Training

Ajax TOCCO offers professional training by certified, experienced instructors. Regularly scheduled schools combine classroom and hands-on training on power supply troubleshooting techniques and maintenance, safety procedures, testing, reading schematics, applications and the basics of induction.

The schools can be taught at our training facility or on-site, customer locations. Class curriculums are customized to the customers needs. Classes are held in a computer friendly training center designed specifically for this purpose.

Authorized OEM for AIH, IEH, Ajax Magnethermic®, and TOCCO®

Ajax TOCCO Forging Solutions



Ajax TOCCO has earned an outstanding reputation within the forging industry for reliability through superior technology and quality of design. Our reputation carries on after the sale with outstanding service and support from dozens of trained dedicated field service engineers located strategically across North America and around the world. Ajax TOCCO is dedicated to maximizing the profitability of our customer partners. We are leading the way with new advanced process controls, data trending and new induction power source designs that minimize energy consumption and maximize process adaptability.

Ajax TOCCO Magnethermic® Companies Group designs and manufactures world-class induction heating and melting equipment for various industries and applications throughout the world. In addition, we provide a wide range of services including laboratory process development, preventive maintenance, equipment repair, and parts, coil repair facilities and installation services with locations in North America, South America, Europe and Asia. www.AjaxTocco.com



GLOBAL SALES, SERVICE & SUPPORT

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