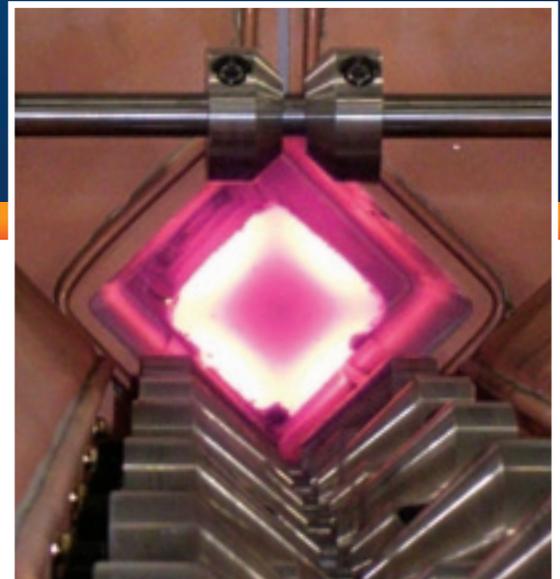
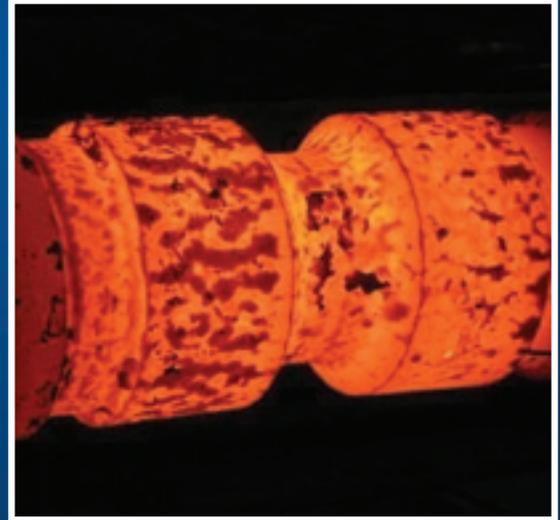
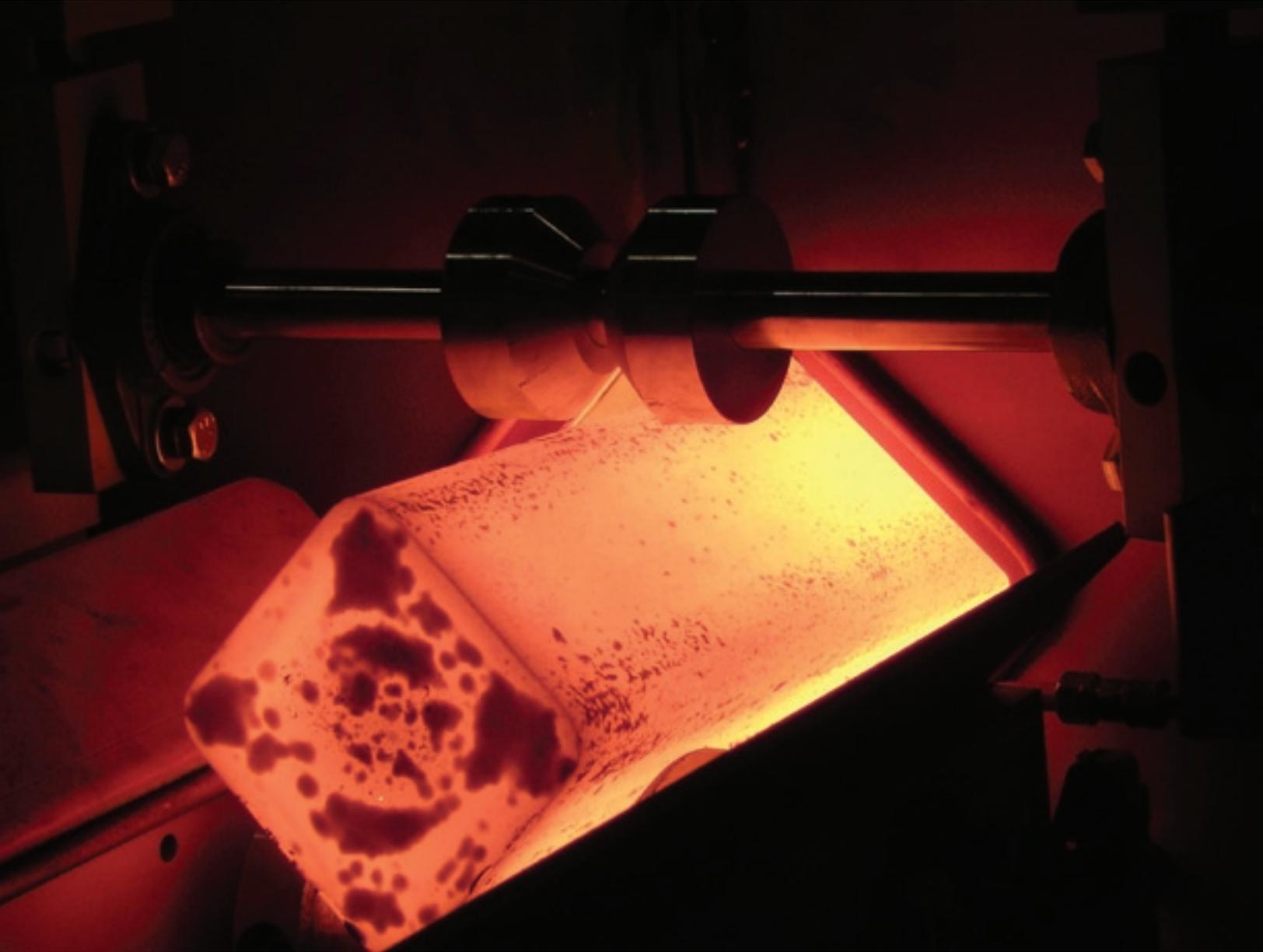


# Forging



# Pillar is your partner for induction heating 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. And do it all while keeping your line up, running and profitable. 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. When the right technology for forging is induction heating, the right partner is Pillar.

## A Heritage of Excellence

Pillar Induction is a leading supplier of induction heating and melting equipment. Reflecting the proud heritage of our group companies, Pillar, Westinghouse and Cycle-Dyne, 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 — all resulting in stable, long-term solutions that can last for decades.

## Continuous Innovation

Not only are we one of the largest induction suppliers, we are one of the most progressive, not to mention a market leader in developing customer-valued new technology. 3D CAD simulations, state-of-the-art manufacturing capabilities, application laboratories, and on-staff metallurgists guarantee that our customers always stay ahead of the industry.

## Your Process Partner

Through close collaboration and personal attention, Pillar is dedicated to sharing our customers' passion and focus on their business goals. Pillar 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.

## Customer Service and Support

Before the contract is signed and for years beyond start-up, customers can count on Pillar. 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. All day. Every day.

## Pillar Support Network

Along with personalized service, Pillar customers can benefit from the resources of a global corporation. We provide global assistance through our network of regional service engineers in China, England, Germany, Japan, Korea, Mexico and Thailand. Wherever you are, we can help.

## Solutions Designed for You

When you have unique requirements, Pillar can tailor a solution based on our extensive application experience. Through a combination of standard products and innovative engineering, Pillar can 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.



## Induction OEM for



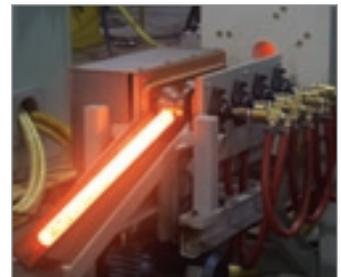
# Forging Applications

**Induction heating is the most energy-efficient and controllable method** for applying heat during the heat treating process. Its non-contact nature enables high production rates that meet the most demanding metallurgical requirements. The localized heating and direct coupling into the part minimizes the heat in the local environment, enhancing operator safety and comfort. As a leading supplier and innovator of induction heating solutions, Pillar Induction has the experience and product necessary to meet your critical production needs:

## Billet Heating

Mass heating by induction is the most reliable and efficient method for forging and forming processes. Pillar systems are used in a wide variety of applications and have produced controlled and repeatable results for through-heating of both ferrous and non-ferrous materials.

Pillar heating systems are designed for the applications and engineered for productivity.





## Bar End Heating

Pillar supplies optimum solutions for induction bar end heaters for a wide variety of production rates, sizes, shapes, metallurgical make-up and heated lengths. Our engineering experience includes many applications, satisfying both customer production requirements and the need to increase manufacturing efficiencies.

The handling of bars varies in complexity from manual systems to fully integrated cells.

### Oval Coil Design

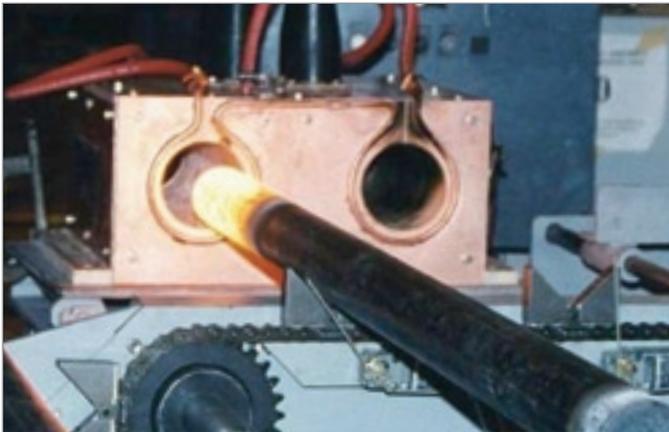
Multiple bar ends can be heated in an oval style, multi-turn coil either manually fed or with automation.

### Solenoid Coil Design

Single bars are fed either manually or with automation into a solenoid style coil.

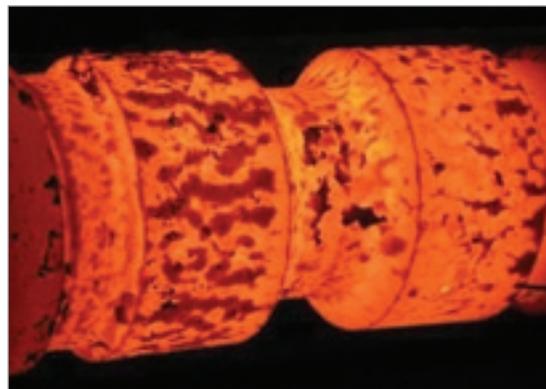
### Channel Coil Design

Bars are continuously fed on a conveyor with the end of the bar to be heated passing through channel coil.



## Special Heating

Pillar supplies both centrally controlled automated and manual systems for a variety of applications including large diameter crankshaft forging and bar heating.



# Power Supplies

## Power Supplies

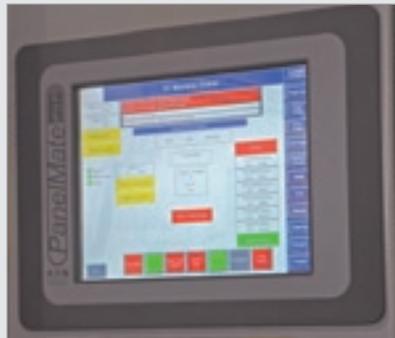
As the originator of the solid state power supply, Pillar Induction provides solid reliability, quality and efficiency in our market-leading product line. Pillar offers a wide range of IGBT and SCR power supplies with output frequencies of 120 Hz through 450 kHz, and power output up to 10 megawatts.

The MK-Series power supply provides the consistent and reliable heating which is necessary for critical applications in tube and pipe production. In conjunction with real time process feedback including temperature monitoring the MK-Series power supply offers simple operation and maintenance.

With thousands of MK-Series power supplies utilized around the world, Pillar offers a proven solution for the most demanding production needs.

## Data Acquisition & Process Control

- Data output board to acquire critical power supply operating information.
- Remote I/O can be added to the power supply
- Chart recorder to monitor critical functions
- Energy monitoring



Heat Station



MK8

## MK8 – SCR Power Supply

**Power Range:** 50kW – 750kW

**Frequency:** 200Hz – 3000Hz

The MK8 is a voltage source inverter with a parallel tuned circuit. This range of power supply is designed as an economic and reliable solution for applications up to 750kW. The parallel tuned circuit keeps the high currents away from the inverter thyristors (SCR). The lower currents flowing into the SCR's results in low power loss and high efficiency.

Control is by a combination of rectifier voltage control at lower power levels and inverter swept frequency control at higher power levels. This provides very controllable starting and excellent fault protection, along with constant output power over the entire heating cycle. Accurate and reliable control is achieved in extreme ambient conditions without the need for additional cooling.



MK11

## MK11 – IGBT Power Supply

**Power Range:** 100kW – 600kW

**Frequency:** 1kHz – 50kHz

The MK11 is an energy efficient, voltage source inverter with a parallel-tuned technology. This IGBT power supply offers a wide tuning range and is available in both local and remote heat station configurations which simplifies integration into new installations or retrofitting existing systems with energy-efficient.

Selectable output regulation modes are voltage, kW, or current, at any rated output.

## MK15 – IGBT Power Supply

**Power Range:** 600kW – 2000kW

**Frequency:** 200Hz – 10000Hz

The MK15 is a voltage source inverter with a series tuned circuit. This IGBT power supply offers low loss, transistorized devices, with an embedded microprocessor control and fiber optic control firing.



MK15



MK17

## MK17 – SCR Power Supply

**Power Range:** 750kW – 6000kW

**Frequency:** 200Hz – 3000Hz

The MK17 is a current source, parallel tuned circuit which allows for relatively low currents through the SCR's without the need for series reactors.

The SCR current is accurately controlled under both normal and fault conditions by using high speed electronic controls together with a large choke. This level of control is essential in the larger power levels to ensure equipment reliability.

The combination of current control, voltage control and electronic sophistication allows the power supply to be turned on and off at any selected power level.

# Coil Technology

## New & Retrofit

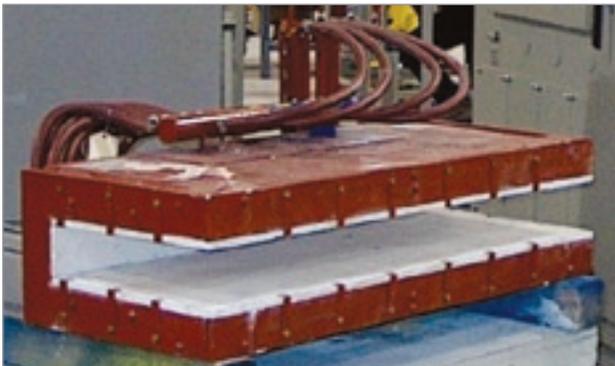
Pillar Induction utilizes many innovative coil designs and manufacturing techniques to achieve proper heating of your product. Trust your application to our experts who will provide the most efficient and productive solutions. Coils are designed by our team of engineers and are manufactured in-house, to provide high-quality products at a competitive price.

Recent demands for high productivity, high quality and close tolerance have placed new demands on the design of induction equipment and tooling. Induction coil and tooling innovations have been developed to help address many of these areas. Induction systems have become very complex in design; yet, it is the coil (inductor) and tooling that very often dictates the success or failure of the entire system.

With proper engineering the induction heating process can be improved to reduce downtime, improve quality, increase throughput and reduce energy costs. On older equipment an investment in updated tooling will provide pay back in a very short period of time.

## Applications include:

- Billet heating
- Bar heating
- Bar end heating



OEM for Westinghouse and Cycle-Dyne induction equipment.

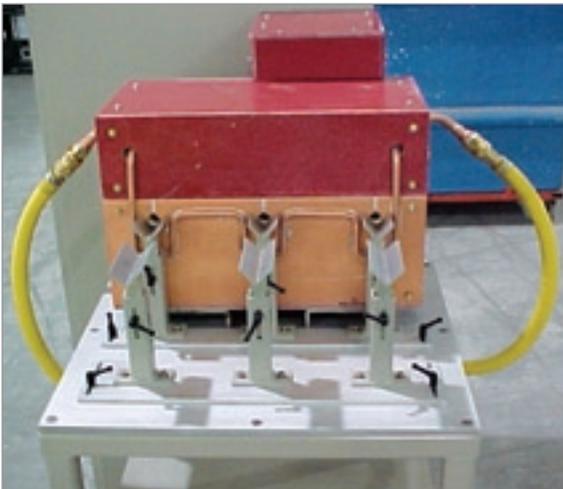
## Repair & Rebuild

- Pillar has the expertise to rebuild or repair all OEM types of coil designs, including:
  - Cast block refractory
  - Replaceable cast liners
  - 60Hz Tie-Rod (Westinghouse) type coils
  - Open style coils
  - Box style coils
  - Channel coils
- Ceramic coated water cooled skid rails
- Hot rails (non-water cooled)
- Composite coil liners
- Atmosphere purging mechanisms
- Insulated coil hoods
- Composite or cast support boards
- Quick change mechanisms
- Simulation of heating process profile

Before



After



# Automation & Components

## Components

Complete system designs can dramatically increase the efficiency of your forging and forming process. Whether the goal is to lower utility costs, increase production or build a more reliable system, ABP has your solution.

### Loaders

- Vibratory bowl / bin tippers
- Magazine loaders
- Incline feeders

### Drives

- Walking beam
- Tractor drive
- Pinch wheel
- Pusher

### Extractions

- Single reject diverter
- Multiple over / under temperature diverters
- Fast extraction devices

### Specialty Items

- Coil Emptying Chain
- Multiple Coil Shuttle



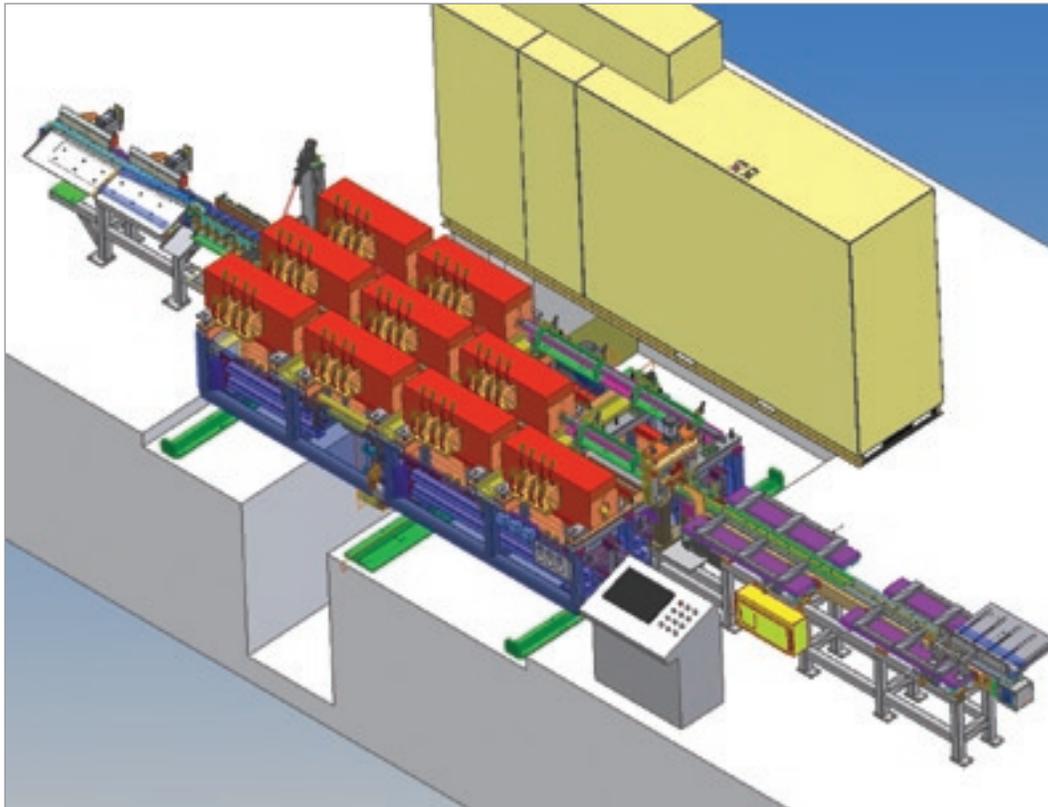
Magazine Loader



Pneumatic Pusher System



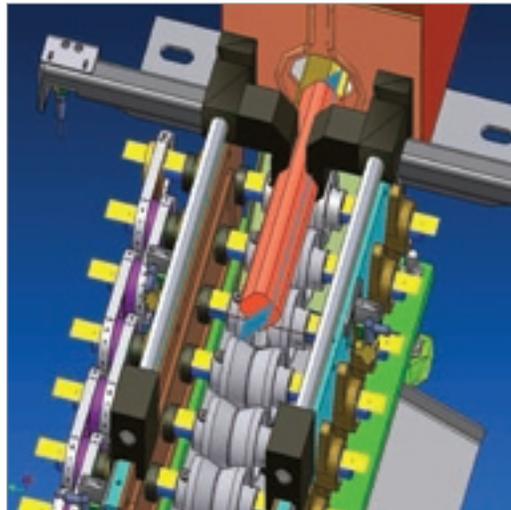
Fast Extract Gripper System



Multiple Coil Shuttle



Fast Extract Roller



Fast Extract Roller

# Support



## Melting

### Materials

- Ferrous
- Non-Ferrous
- Precious Metal Melting

### Furnace Styles

- Coreless
- Steel Shell
- Steel Frame
- Box, Lift / Swing
- Lift Coil and Hand Furnaces

### Custom Applications

- Vacuum Melting
- Crucible Melters
- Graphite Susceptor Melting

## Heating

### Tube & Pipe

- Heat Quench & Temper
- Upsetting
- Seam Annealing
- Normalizing
- Coating & Galvanizing
- Stress Relieving

### Forging & Forming

- Billet Heating
- Bar End Heating

### Heat Treatment

- Horizontal & Vertical Scanners
- Single Shot
- Lift & Rotate
- Automated Pick & Place
- Tooth-by-Tooth Gear Hardening

### Specialty Heating

- Wire Heating
- Brazing & Soldering
- Shrink-Fitting
- Crystal Growing

## After-Market

### Induction Coils

- Repairs
- Rebuilds
- New & Retrofit

### Spare & Replacement Parts

- SCR's Diodes, and IGBT's
- Capacitors
- Water Cooled Power Leads
- Bus Bars
- Control Boards

### Retrofit & Refurbishments

- Controls Upgrades
- Heat Station Rebuilds
- Equipment Upgrades
- Water System Replacements

### Repair Services

- Control Boards
- Water Cooled Power Leads

### Field Service

- Preventative Maintenance
- Training
- Documentation
- Thermal Imaging Analysis
- 24-Hour Service Hotline

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OEM for Westinghouse and Cycle-Dyne induction equipment.

[www.pillar.com](http://www.pillar.com)

