Kitashiba induction furnace systems reducing environmental load and cost

KITASHIBA INDUCTION FURNACE SYSTEM

General brochure of electrothermal products

KITASHIBA ELECTRIC CO., LTD.
www.kitashiba.co.jp
In 1930, Toshiba’s first induction furnace was born in Japan. Inheriting this DNA, Kitashiba Electric continues to evolve its original technologies in induction heating and melting and electric power control.

The 21st century is being called the century of the environment. Kitashiba Electric uncompromisingly pursues environment-friendly performance to provide induction melting system solutions that achieve the highest levels of efficiency and contribute to conserving the earth’s environment.

**Optimal control of electrical power to reduce power consumption**
- Full use of electrical power within power contract. It is always controlled optimally by attempting peak-cutting and leveling.
- The electricity consumption is constantly monitored to automatically ensure that power consumption is within the electricity contract.
- Adaptable for any furnace and facilities

**Supporting thorough visualization and optimization of overall energy consumption at cast foundry**
- Achieving approx. 2% energy saving by “visualizing” the operation of ancillary facilities through the use of EMS technology
- Reducing power consumption by automatic cooling water control and optimal inverter pump operation
- Announcing the “start” and “stop” of cold charging by automatically monitoring the progress of the melting process in order to optimize it

*This Product is sold only in Japan.*

**At Kitashiba Electric Co., Ltd., we create a valuable future for mankind and the earth by offering next-generation induction heating technology.**

**Offering the industry leading, optimized melting systems**
- Achieving energy-saving as high as approx. 9%, and improving electrical power consumption rate by adopting the new, high-efficiency induction furnace facilities known as the “Elesave Furnace” series
- Certified by Toshiba Group as “Excellent ECP” products
Kitashiba Electric provides a comprehensive plant energy-saving solution that responds to all of our customers’ requirements such as streamlining production, saving energy, and implementing safety measures at casting plants—for all equipment, from induction furnaces to ancillary facilities.

### Energy-Saving System Solutions for Casting Plants

**Customer**
- Technical planning and support from the conceptual stage
  - Planning of system structure and disposition
  - Preparation of system specifications
  - Solving of technical issues (systematic and structural analysis, etc.)
  - Detailed design work

**Planning, design and consulting**
- Procurement with the best mix of efficiency, quality, and price
- Undertaking on-site construction and testing in a planned manner
- Quality after-sales services
  - Periodic inspections
  - FOMS

**Construction**
- Installation
- Site management
- Commissioning testing and quality assurance

**Operation**
- Free layout of equipments
- Production on customer’s specifications
- Free choice of furnace power, frequency, melting volume, and number of furnace
- Can be used as an automatic molten metal charger

**Total customer support**

### Foundry Operation and Energy Management System

Realizing “visualization” of electrical power at casting plants

Kitashiba Electric’s FOMS (Foundry Operation and Energy Management System) is an energy-saving operation management system that is specially designed for the processes from metal melting to casting. With the system, you always know the usage of electric power, gas, and heavy oil by the plant’s facilities, including induction furnace facilities. It even monitors the condition of the cooling water.

### The “ELESAVE FURNACE” series

High-frequency induction furnaces

Using our high-current electromagnetic field analysis technology for large capacity hot-rolling heating devices, we have optimized the entire system, taking into account every coil—right from the design phase. Characterized by its low environmental load, our brand new “Elesave Furnace” series can reduce your power consumption.

**Increase production by 6–8%**

Our brand new “Elesave Furnace” series is characterized by low environmental load, and is able to reduce power consumption.

#### Standard Type

**High-Frequency Furnace**

1. Free layout of equipments.
2. Production on customer’s specifications.
3. Can be used as an automatic molten metal charger.

The “Elesave Furnace” series are certified by Toshiba Group as “Excellent ECP” products. (as of November 2013)

Toshiba Group is making efforts to develop a product with the best environmental performance by thoroughly and constantly improving environmental performance. In this way, we certify those with the best environmental performance as “Excellent ECP” products when they are launched on the market (or officially unveiled). The “Elesave Furnace” series are certified by Toshiba Group as “Excellent ECP” products.

#### High-efficiency equipment

- Improve 6-8% of melting basic unit (compared with our furnace)

#### Safety equipment (Option)

- Prevent falling into the pit during furnace tilting.
The “ELESAVE FURNACE” series
High-frequency induction furnaces

Coil protection technology

1) Detection sensor of molten metal leak
Normally, detection sensor is attached the inside of coil cement. Our detection sensor is between the coil cement and the chamber. Can be molten metal is sensed before leak the coil cement, detection sensitivity is high.

2) Castable lining layer (Coil cement)
The minute construction with castable cement provides high strength with minimal cracking, and is tolerant of corrosive gas. It also has high heat conductivity to reduce the temperature at the back of the layer, which contributes to safety and longevity.

3) Coil insulation
Providing superior heat-resistance and fireproofing characteristics, the materials used in the product also provide sufficient resistance against moisture absorption and mine dust.

4) Core insulating plate

Brazing is the most important technique for the manufacture of melting furnaces. Highly reliably brazing is essential for melting furnaces to withstand electric vibrations and thermal fatigue. Above all, the brazing of inductive coils requires sophisticated skills, taking the shape of copper pipes, temperature, temperature rise time and metal characteristics into consideration. At Kitashiba Electric, a strict qualification test is carried out for the certification of brazing technicians. Kitashiba has won one of the top prizes at the Toshiba Group Skills Competition and continually endeavors to maintain and further improve its skills.

Cast iron and steel melting

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Note: Values marked with an asterisk (* ) refer to approximate melting values obtained when melting of cold charge of the second cycle after which furnace is warmed, and operations including material input, retention, slag removal and molten metal output are not included.

Note: Products having characteristics other than those indicated above may also be manufactured. Contact Kitashiba Electric.

Copper alloy melting and Holding furnaces (Brass and bronze)

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Melting furnaces for aluminum and special metals can also be manufactured. We will manufacture optimal melting furnaces according to your specific requirements. Contact Kitashiba Electric.
“ELESAVE FURNACE” series module type
High-frequency induction furnace

KITASHIBA’s unique design.
Installation takes only about a third of the time of the free layout design.
1. The furnace modules are constructed with built-in power receiving unit, power supply unit and furnace unit. Wiring and piping inside each module is already complete.
2. Easy foundation work and minimum installation period, taking just six days before molten metal discharge.
3. The upper part of the facility is constructed from checkered steel plate, negating the need to install a platform. We can also lay the railing for the feeding cart.
4. Required space for installation is about 70% of the standard design furnace.

Dimensions of super unit furnaces

<table>
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<tr>
<th>Power supply range</th>
<th>300 to 750 kg</th>
<th>750 to 2,000 kg</th>
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<td>1,400 to 2,400 kW</td>
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Configuration of super unit furnaces

■ Use low-voltage power supply
  No need for a massive power project

■ The power supply and the furnace casing are installed in one base.

■ Abundant options matched to research content

■ The small size machine, it is highly effective.

Facility Outline

- Power supply capacity: 30 to 100 kW
- Power supply frequency: 1,000 to 3,000 Hz (100 kW is 1,000 Hz)
- Input voltage: AC 220V - 60Hz - 3-phase
- Melting volume: 5 to 100 kg (for cast iron)
- Melting materials: cast iron, cast steel, copper alloy, etc.
- External dimensions: Width 2,000 mm, Depth 2,400 mm, Height 2,600 mm (with filter), Furnace height 1,000 mm
The power receiving control, and power receiving and transforming equipment we developed by applying our wide experience and achievements, are widely adopted by a number of domestic and overseas clients. By allowing full use of electrical power within the electricity supply scheme, peak-cut and leveling of power consumption can be achieved. We are able to flexibly adapt to induction furnaces and load systems developed by our competitors.

Unexpected problems in your melting facilities lead to huge production losses due to recovery work and expenses. To ensure the reliability of your Kitashiba furnace system, we cooperate with a service partner in North America.

We provide speedy response to trouble, inspections, and repairs, thanks to Ajax TOCCO’s service group and its globally operating service centers, as well as our company’s other affiliate service partners. Fully equipped staff will visit you to handle all of your needs, from preventive maintenance inspections to urgent on-site repairs.

- **Field troubleshooting and repairs**
- **Preventative maintenance**
- **Coil/inductor change out**
- **Power supply tune up and meter calibration**
- **Implement engineered system updates, upgrades, and improvements**
- **Energy audits**
- **Safety and technical training schools on-site**

**Comprehensive on-site diagnostics, troubleshooting and repairs of your induction furnace system**

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**Increase your uptime with reliability services provided by KITASHIBA’s service partners, including:**

1. Field troubleshooting and repairs
2. Preventative maintenance
3. Coil/inductor change out
4. Power supply tune up and meter calibration
5. Implement engineered system updates, upgrades, and improvements
6. Energy audits
7. Safety and technical training schools on-site

**Aftermarket Support Partner**

**Service Partners Strategically Located in North America**

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Safety precautions

- In this facility, high temperature metals, high voltage current, water, oil, etc., are used. Please use this facility correctly, otherwise it may cause serious physical injury or death.
- To operate the product correctly, please read the “Operation Manual” carefully before using it.
- Please note that some electrical devices must be maintained and inspected only by qualified persons.
- To operate this product properly, electrical work by experts is required.
- Please contact us if you plan to transfer the facility to a region where different power supply frequencies are applied.
  - If you use the facility in a different operating environment, it may cause smoke or fire.
- The information contained herein is as of January 1, 2014.
- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by KITASHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of KITASHIBA or others.
- KITASHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law.
- KITASHIBA does not take any responsibility for incidental damage (including loss of business profit, business interruption, loss of business information, and other pecuniary damage) arising out of the use or disability to use KITASHIBA products.
- The products described in this document may include products subject to the foreign exchange and foreign trade laws.
- The products described in this document may contain components made in the United States and subject to export control of the U.S. authorities. Diversion contrary to the U.S. law is prohibited.

Order instructions

Please inform us of the following information when ordering the High Frequency Induction Furnace Facility.

1. Purpose of installation and use of the melting furnace facility.
2. Types and shapes of materials to be melted
3. Production volume (tons per hour, tons per day or tons per month)
4. Melting temperature (°C)
5. Quantity of molten metal output at a time (tons)
6. Molten metal output cycle period (minute)
7. Power supply voltage and frequency (V, Hz)
8. Brief description of the installation space
9. Desired delivery time
10. Other

The information contained herein is as of May 1, 2015.