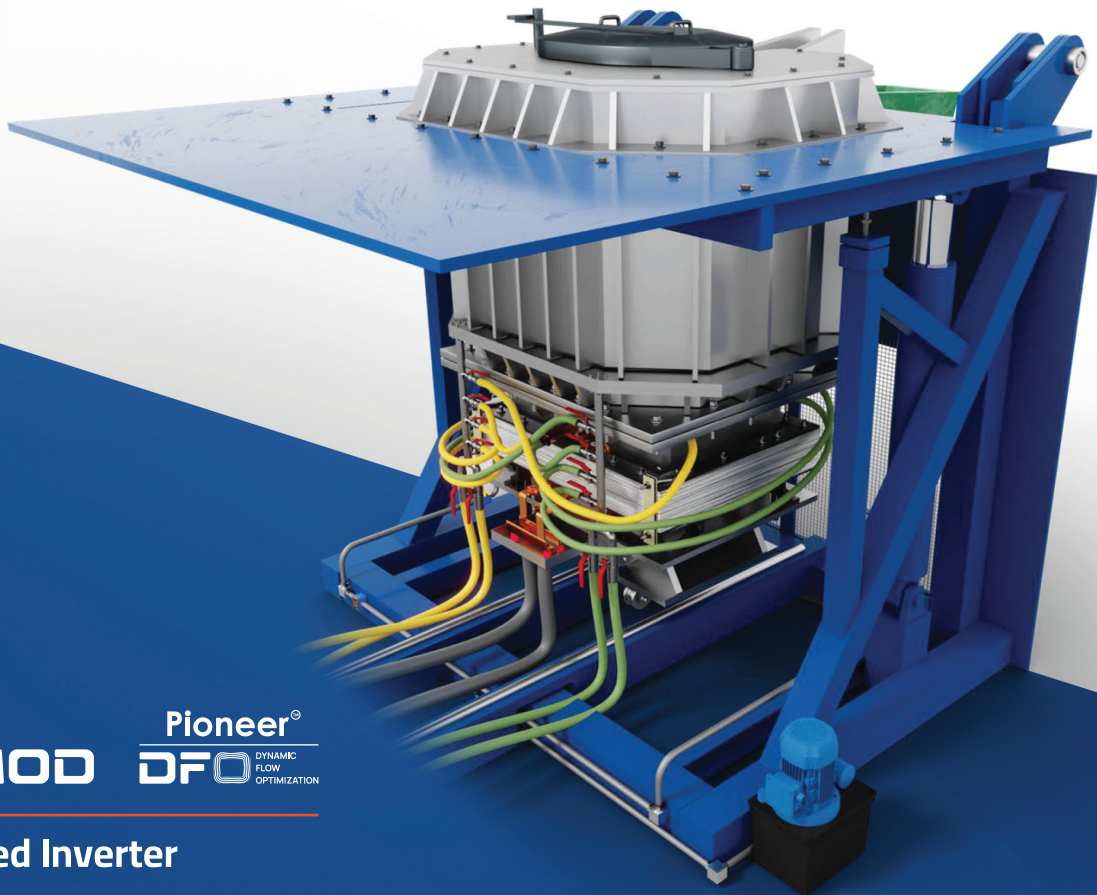


50+
Years of Legacy

INDUCTION MELTING CHANNEL FURNACE

For Non-ferrous Metals



DirectMOD **Pioneer[®]**
DFO DYNAMIC FLOW OPTIMIZATION

IGBT Based Inverter








Pioneer Furnaces is a trusted name in the field of induction melting and heating technology, designing and manufacturing advanced induction furnaces for the non-ferrous metal melting, heating, heat-treatment, and coating industries since 1972. With an engineering legacy spanning over five decades, Pioneer is recognized for delivering robust, energy-efficient and highly reliable furnace systems backed by prompt and committed service support. The company is ISO 9001:2015 certified, reflecting its strong process discipline, quality orientation and customer-centric approach.

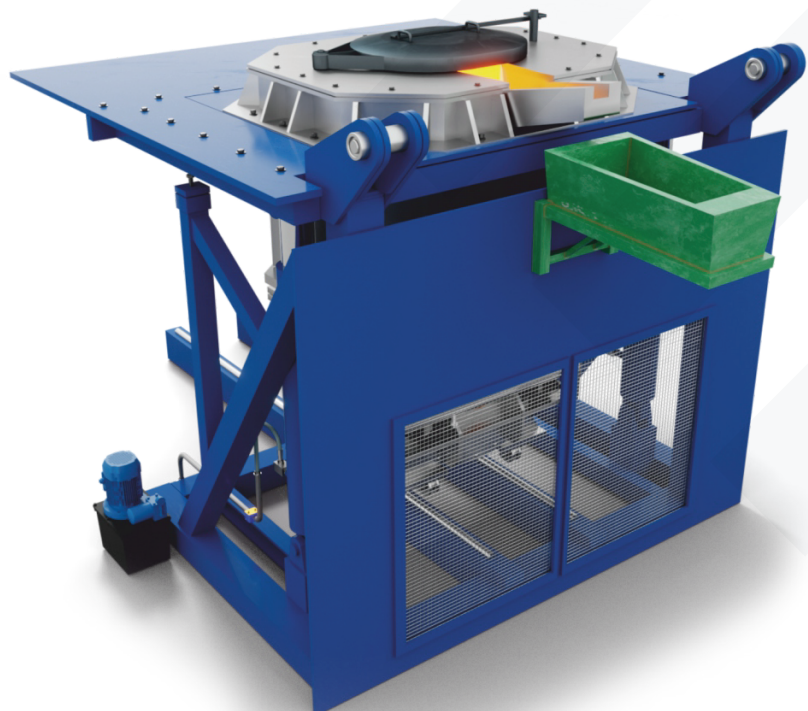
Reliability | Precision | Performance

The channel induction furnace operates on the transformer principle. The inductor coil, together with the laminated magnetic core, forms the primary winding of the transformer, while the loop-shaped molten metal in the channel acts as a single-turn, short-circuited secondary winding. When alternating current flows through the primary coil, it produces an alternating magnetic flux in the core, which links with the molten metal loop and induces a high circulating current in the channel. Due to the electrical resistance of the molten metal, this circulating current produces Joule (I^2R) heating, which heats the channel metal and transfers heat to the main bath, thereby melting and maintaining the metal at the desired temperature.

The interaction between the secondary circulating current and the magnetic field generates Lorentz forces, resulting in continuous electromagnetic stirring of the molten metal. In the narrow channel, these forces also produce a pronounced pinch effect, where the current-carrying molten metal experiences radial electromagnetic compression. This pinch pressure drives molten metal flow through the channel and into the main bath, ensuring strong circulation.

■ Advantages of Pioneer Channel Induction Furnace:

-  Highest Efficiency, as high as 85%
-  Lowest Energy Consumption
-  Most suitable for melting and holding non-ferrous metals and their alloys, viz. copper, aluminium, zinc
-  Lowest burning / oxidation loss
-  Highest refractory lining life
-  Sturdy equipment, built for continuous operations
-  Lowest operating cost



▪ Capacity Range:

Tilting furnace with open spout

Power Rating: **100 KW to 3000 KW** | Holding Capacity: **300 Kg to 50000 Kg**

Tilting furnace with closed tube spout

Power Rating: **350 KW to 3000 KW** | Holding Capacity: **2000 Kg to 25000 Kg**

Static furnace for cathode melting

Power: **150 KW to 5000 KW** | Holding Capacity: **10000 Kg to 150 metric ton**

▪ Salient Features:

- ▶ Best suited for applications like cathode melting, horizontal casting, vertical casting of rods and die-casting for entire range of non-ferrous metals and their alloys
- ▶ Flexible power density (KW to Kg ratio) depending on process requirements
- ▶ Option of twin-chamber construction for simultaneous and continuous melting, holding and casting applications
- ▶ Power Supply unit with IGBT based DirectMOD inverter technology eliminates the need of conventional LC resonant tank circuit, reducing system complexity and losses
- ▶ Highest electrical efficiency, lowest energy consumption, and highest power factor irrespective of load
- ▶ Minimal maintenance
- ▶ Option of high-level automation with PLC and SCADA for real-time data exchange, centralized supervision, and predictive maintenance through online analytics
- ▶ Furnaces are available in different shapes and configurations like vertical crucible, oval-shaped crucible with a single inductor, drum-shaped furnace with multiple inductors for copper cathode melting, elliptical furnace shell to melt a variety of bulk scrap with higher charge accommodating capacity, open or closed tube spout, etc.
- ▶ High flow U or W type inductor with water-cooled coil and cooling jacket
- ▶ Optimal stirring ensures homogenous temperature and composition of metal avoiding alloy segregation specially with leaded brass
- ▶ Flexibility top construction and sealing ensure melting in oxygen-free atmosphere



Product Portfolio

- ▶ **Coreless & Channel Type Induction Melting and Holding Furnaces**
for aluminium, copper, and copper alloys (like brass, bronze, etc.) and zinc & zinc alloys
- ▶ **Custom-designed Induction Heating Systems**
specially for non-ferrous extrusion applications
- ▶ **Heat-treatment Furnaces**
for a wide spectrum of metallurgical applications
- ▶ **Coating Solutions**
Pre-melt furnaces
Launders
Pots with inductors for GI | GL | GA | ZAM | Al-Si | Galfan

Our Key Clientele:



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