

WE INCLUDE PROGRESS



» MELTING TECHNOLOGY

» CHANNEL FURNACE PLANTS

» CRUCIBLE FURNACE PLANTS

» COMPACT FURNACE PLANTS

» INDUCTORS

» IGBT CONVERTERS

» MARX COIL INSULATION

» MODERNISATION & CONVERSION

» SERVICE & MAINTENANCE

PERSUASIVE TECHNOLOGY

MELTING TECHNOLOGY



Channel furnace plants



The channel furnace technology developed by MARX over the last 50 years aims to make the very most of the advantages offered by state-of-the-art channel furnace plants, their particular **energy efficiency** and their varied application and usage possibilities.

The flow-oriented MARX channel inductors have been specially developed to meet the high requirements in terms of energy savings, maximum **melting performances** and service lives.

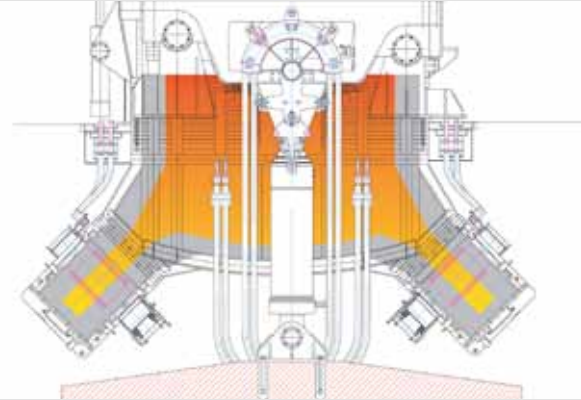
This type of technology makes it possible to significantly increase **service lives** while simultaneously reducing energy consumption.

For example, channel inductors with a power of 2,400kW were developed and trialled for copper and copper alloys, and with a power of 1,500kW for aluminium.

The power can be supplied either by conventional means or **IGBT converter** technology.



Channel furnace plants



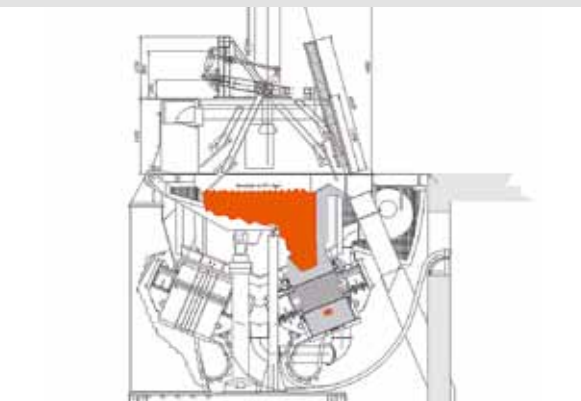
70t channel induction furnace for aluminium

| | |
|---------------------|--|
| Capacity: | 70t (Al) |
| Effective load: | 52t (Al) |
| Rated power: | total 6,000kW |
| Cooling type: | water cooled (WF) |
| Melt rate: | 11.7t/h |
| Al-temperature: | up to 780°C, Realisation with 4 channel-inductors in V-circuit |
| Power per inductor: | 1,500kW |



Channel inductors for aluminium and zinc

| | |
|--|---------------|
| Inductor power: | 60 to 1,500kW |
| » Melting furnaces | |
| » Holding/Storage furnaces | |
| » Casting furnaces | |
| » Piece-galvanising furnaces | |
| » Strip-galvanising furnaces | |
| » Furnaces for alloying and homogenising | |
| » Zinc-cathode melting furnaces | |



32t Channel melting furnace unit for brass

| | |
|---|------------------------|
| Capacity: | 32t (Ms) |
| Type: | MNFR-25.000-Ms-4,800kW |
| Rated power: | 4,800kW |
| Melt rate: | approx. 20t/h |
| Channel furnace with 2x2,400kW power for melting brass equipped with slag-skimming and ramming device | |



Channel inductors for copper and copper alloys

| | |
|---|---------------|
| Inductor power: | 50 to 2,500kW |
| » Melting furnaces | |
| » Melting furnaces for brass turnings | |
| » Holding furnaces | |
| » Combined melting and casting furnaces | |
| » Forehearth casting furnaces for vertical continuous casting | |
| » Holding furnaces for horizontal continuous casting | |
| » Dosing furnaces for sand moulding lines with stopper rod device | |

Channel furnace plants



40t Channel furnace unit for iron and ferrous-alloys

Upgrade of 40t channel furnace unit for grey iron

Capacity: 40t (GG)
Type: MNFR-GG-40,000/500
Rated power: 500kW



Channel inductors for iron and iron alloys

Inductor power: 125 to 2,000kW
» Holding furnaces
» Dosing furnaces with forehearth and stopper rod device



Movable 1t melting and casting furnace for copper-alloys

Capacity: 1t (Cu)
Type: MNFR-Cu-1,000/340
Rated power: 250kW / 340kW
» for copper and copper-alloys complete with electrical power-supply, control cabinet, cooling system and hydraulic unit
» conventional power supply or converter-technology



Automatic controlled 1.6t casting unit, pressureless for copper-alloys

Capacity: 1.6t (Cu)
Type: MNFG-Cu-1,600/240
Rated power: 240kW
» Pressurised protective gas possible

Spare parts for channel furnace plants



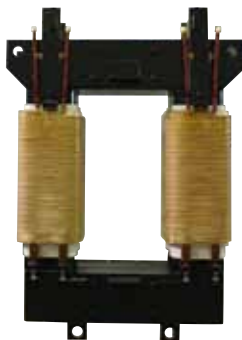
Spare coils for channel inductors, chokes and transformers from all manufacturers

- » in the water-cooled system (WF)
- » in the air-cooled system (AF)
- » Thermal insulation class H (to withstand +180°C continuously)



Cooling cylinders for channel inductors from all manufacturers

- » Made of copper for water-cooled system (WF)
- » Made of stainless steel for air-cooled system (AF)
- » Made of stainless steel for water-cooled system (WF)



Cores for channel inductors from all manufacturers

- » Made of high-quality grain-orientated transformer laminations
- » Insulated and bolted together with solid clamping plates
- » Provided with a yoke that can be removed at one end
- » Design: 2, 3 or 4 legs



Spare parts

- » Capacitors
- » High-current cables (water-cooled)
- » Individual components
- » Balancing chokes
- » Main contactors
- » Capacitor contactors
- » Channel formers



Crucible furnace plants

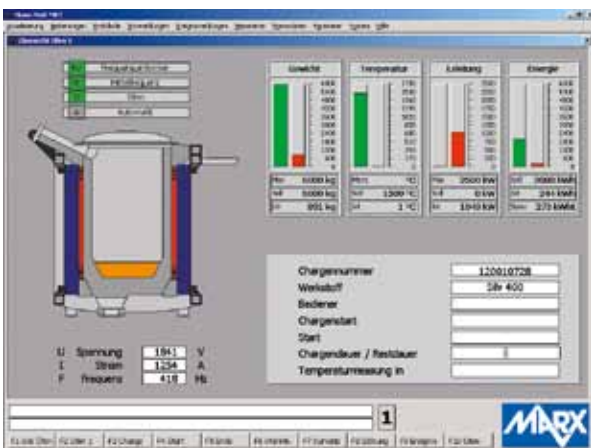
Our crucible furnaces are designed, constructed and installed in close collaboration with customers to develop optimum solutions for their applications.

The use of the very latest **IGBT converter technology** ensures practically **maintenance-free operation** of the power unit.

Power is regulated continually and adjusted to the melting process. Depending on their intended purpose, the IGBT converters are designed for mains and medium frequency applications as well as the low frequency range (<50Hz).

Supplying power in the low frequency range offers particular advantages when melting swarf. The chips are immediately stirred into the melt by intensive agitation of the bath, thus significantly reducing melting time, energy consumption and losses due to burn-off.

The **visualisation** on the MARX plants provides the operator with a clear picture of the current plant parameters.



Crucible furnace plants



Crucible furnace plants

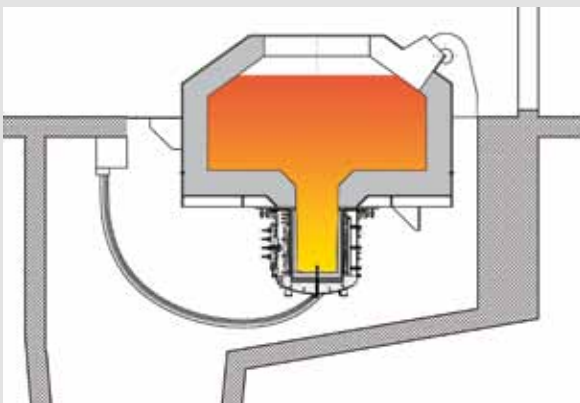
Capacity: up to 30t
Alloy: Iron and non-ferrous metals
Power unit: NF /MF (transistor technology)

Power input can be distributed to one or more furnaces.



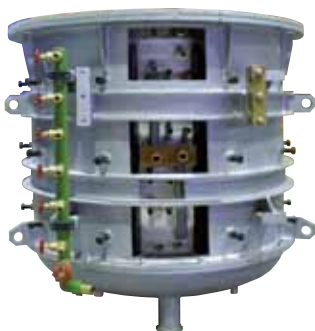
4.5t Vacuum melting furnace for ferrous-alloys

Capacity: 4.5t (Fe)
Type: MMFT-Fe-4,500/1,650
Rated power: 1,650kW
Frequency: 300Hz



30t Holding and casting furnace for aluminium

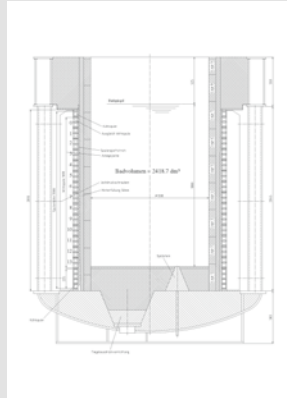
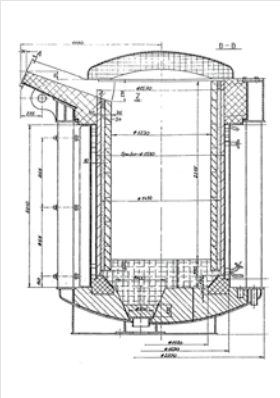
Capacity: 30t (Al)
Type: MNT-Al-30,000/350
Rated power: 350kW



Crucible inductors for applications at continuous casting, mould casting and low pressure casting

Power: 100 to 1,000kW
Alloy: Non-ferrous metals (Al / Cu)
Power unit: NF / MF (transistor technology, IGBT-Converter)

Crucible furnace plants



Modification

Old melting plants have great potential for performance improvements. A wide range of reusable plant parts and technologies can easily be utilised in order to exploit this potential. Performance improvements can be achieved for a large number of old plants by measures such as the following:

- » State-of-the-art coil design technologies
- » Effective insulation technologies
- » Redesign of furnace vessels
- » Remodelling of the ceramic furnace parts
- » Ramming the inner crucibles
- » Use of IGBT converters
- » Replacement of furnace controls

It is also usually possible to increase the capacity.

Coil production and repair

- » Manufacturing of new coils
- » Coil repair for all brands
- » Restoral of nominal diameter
- » Volume increase
- » Power increase
- » Coil optimisation
- » TIG welding method



MARX full-insulation technology

- » Crucible furnace coil treated with special sandblasting process, pure metal.
- » Gotekplast insulation (grey-green-grey)
- » Intermediate insulation of Cogemikanit or GHG
- » Intermediate insulation technologies are doubly applied, overlapping, and consolidated with saturation
- » Outer layer coated with Isoplan or silicate felt fabric

Crucible furnace coils, can be impregnated both in the open dipping process, as well as under vacuum conditions.

Drying furnace for drying coils and crucible furnace inserts

- » Drying and hardening the impregnation varnishes to solidify the entire coil unit
- » Removal of residual moisture in permanent concrete and coil grout
- » Pre-drying of magnet yokes for treating with 2-component resin





Compact furnace plant

Alloy: Iron and non-ferrous metals
Power unit: MF (transistor technology)
Capacity: up to 3t

Our compact furnaces and small crucible furnace systems stand out for their **compact design** with a capacity of up to 3 tons. They are designed for iron, steel or copper and their alloys. The smallest crucible furnace built by MARX to date has a capacity of 6kg of aluminium.

Their advantage lies in their compact design (minimal installation space). All induction furnace system components are to be found either on (IGBT converters, control panel) or under (capacitors, impedance matching transformers, power cables, hydraulics etc.) the furnace platform. This ensures **quick assembly** of the new plant and the greatest operational safety possible by way of fully enclosed electrics.

Smaller crucible furnace systems can be produced as individual components as an alternative to compact systems. This allows bespoke installation adjusted to the space available at your foundry.





Power supply

» IGBT converters

The use of the very latest IGBT converter technology ensures practically maintenance-free operation of the power unit.

» Conventional

Conventional power supplies can be manufactured, repaired or modified.

Service and maintenance

Customer service is of top priority for us. In the casting sector in particular, fast response times and flexibility are of crucial importance. That's why we make it possible for you to contact us at any time on our **24h emergency number**.

With a total of **three production and service sites** in Germany, we are able to reach and support our customers all over Europe as quickly as possible.

Our assembly personnel also have **years of experience**, enabling them to provide solutions competently, reliably and quickly.

IGBT converter



IGBT converter technology

- » Balanced load on the mains power supply
- » Infinitely variable power feed
- » Power factor (cos phi) always close to 1
- » Facility for controlling power to an externally-set level
- » No mechanical wearing parts
- » Simple installation and handling
- » Low maintenance costs

Service, maintenance and training



Service

- » Furnace inspection and maintenance
- » Spare parts service
- » Coil repairs for all brands
- » NDT testing for welded seams
- » Coil storage
- » On-site coil change for all brands
- » Maintenance workshops for furnace plants
- » Safety seminars for induction furnaces



Quality assurance and testing methods

- » Helium leakage rate check
- » Water-flow check
- » Water-pressure check
- » Endoscopy examination
- » Insulation measurement
- » Electrical tests as per VDE



Special-design steel constructions

- » Furnace platforms
- » Inductor housings
- » Tilting frames
- » Crucible furnace frames
- » Capacitor racks
- » Welded constructions based on customer requirements
- » Crucible-push-out stations



Donauwörth / Germany



Hennigsdorf / Germany



Youngstown / Ohio / USA



Iserlohn / Germany

MARX GMBH & CO. KG

Lilienthalstraße 6-13
58638 Iserlohn
Postfach 2022
58590 Iserlohn

Phone + 49 2371 2105-0
Telefax + 49 2371 2105-11
E-Mail info@marx-gmbh.de
Web www.marx-gmbh.de

24h emergency call
+ 49 172 279 95 64

MARX ELEKTROWÄRME GMBH

Philipp-Pforr-Straße 6
16761 Hennigsdorf

Phone + 49 3302 200930
Telefax + 49 3302 200938
E-Mail ew@marx-gmbh.de

MARX OFENBAU GMBH

Joseph-Gänsler-Straße 12
86609 Donauwörth

Phone + 49 906 3090
Telefax + 49 906 22576
Cell + 49 171 235 66 91
E-Mail ofenbau@marx-gmbh.de

MARX LLC, USA

1221 Velma Court
Youngstown, OH 44512

Phone + 1 330 788 0864
Telefax + 1 330 788 4946
E-Mail sales@marx-us.com
Web www.marx-us.com