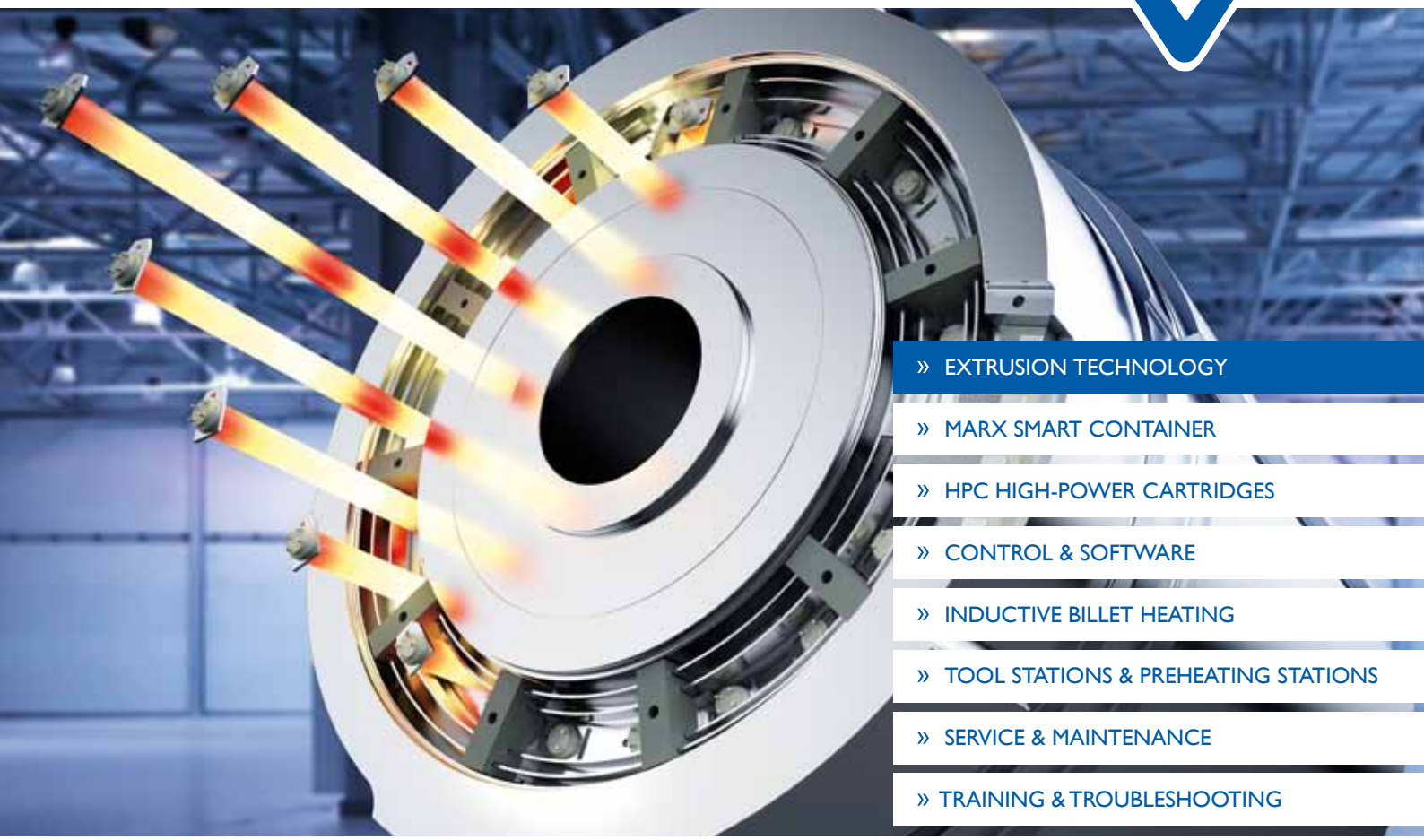
WE INCLUDE PROGRESS





PERSUASIVE TECHNOLOGY

# EXTRUSION TECHNOLOGY

## Process controlled containers

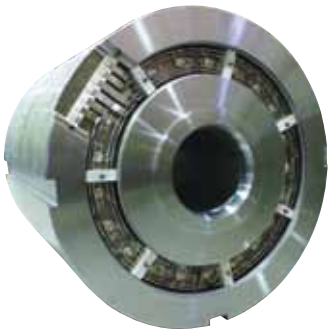
SMART CONTAINER®
BY MARX TECHNOLOGIES

The current state of development of the process-controlled **"Smart Containers"** means that they can be heated up and regulated at weights of between 500kg and over 100 tons in segmented heating zones.

The **high-power heating cartridges** can be produced with up to three heating zones and achieve a proven service life of up to 5 years and above depending on their intended purpose.

The zone arrangement is designed individually depending on the particular application, which include special solutions such as containers with oval inner liner, large external diameters or long containers.
The process is controlled based on the specific requirements, and is supported by segmented cooling zones as required.

# MARX Smart Container



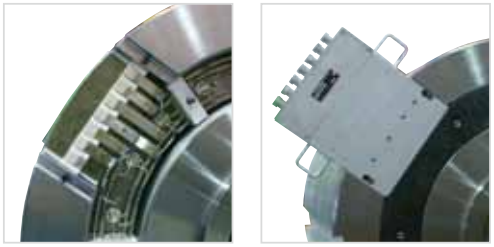
### Container heating system for Aluminium 25MN

| | |
|---|---|
| Press: | 25MN |
| Length: | 47" (1,200mm), Ø 39" (1,000mm) |
| Weight: | 7t |
| Heating zones: | 2 |

### Welded connections for the Marx HPC-Heating cartridges

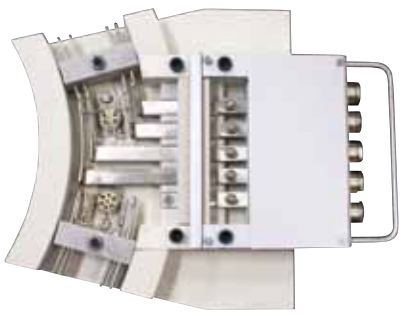
Advantages:

» Lower costs through reduced effort during assembly
» Stable structure of the complete heating system
» Permanent contact security for the cartridge connections
» Safe operation due to bigger distances between the live-parts
» Easy repair due to a clear and simple structure



### MARX Quick-Connector

» Rapid disconnection and reconnection of the power circuits with pressure contacts used for frequent change of format and container



### MARX Compact-Connector

» For containers which are placed inside the press for a longer period it is recommended to use the Compact-Connector with threaded power contacts

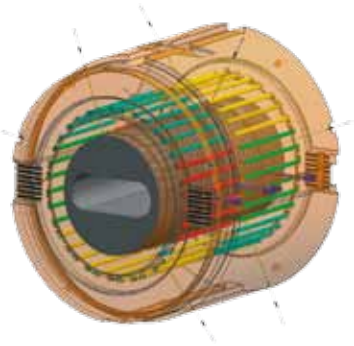
# MARX Smart Container

### Container heating system for Aluminium 160MN

| | |
|---|---|
| Press: | 160MN |
| Length: | 109" (2,770mm), Ø 93" (2,350mm) |
| Heating zones: | 4 |
| Billet: | Ø 24" (615mm), 29" (735mm) |

### Container heating system for Aluminium 80MN

| | |
|---|---|
| Press: | 80MN |
| Container: | Length: 61" (1,550mm), Ø 63" (1,590mm) |
| Weight: | 22t |
| Billet: | Length: 43" (1,100mm);<br>Ø: 11"x24" (270x600mm) |
| Heating zones: | 8 |



Control System for 80MN press for different containers (rectangular and round inner liners)

| | |
|---|---|
| Control system: | Switchable between 4, 6 or<br>8 heating zones<br>up to 18 temperature measuring points |

### Container heating system for Aluminium 200MN

| | |
|---|---|
| Press: | 200MN |
| Container: | Length: 83" (2,100mm), Ø 120" (3,050mm) |
| Weight: | 100t |
| Heating zones: | 4 |
| Billet: | 79" (2,000mm), Ø 26" (650mm),<br>31" (800mm), 35" (900mm), 43" (1,100mm) |

# MARX Smart Container

### Container heating system for Brass 130MN

| | |
|---|---|
| Press: | 130MN |
| Container: | Length: 126" (3,200mm), Ø 88" (2,240mm) |
| Weight: | 100t |
| Heating zones: | 4 |
| Cooling zones: | 10 |
| Billet: | length: 118" (3,000mm); Ø 18" (450mm) |

# Special applications

### Bolster-heating

| | |
|---|---|
| Dimensions of the Bolster: | Length: 8" (200 mm), Ø 15" (380mm) |
| Rated power: | 6kW |
| Main voltage: | 230V |
| Heating zones: | 2 (top/bottom) |

### Horse-Shoe (Die-slide) – heating

| | |
|---|---|
| Dimensions of horse shoe: | 11.4"x19.7"x19.9" (290x500x505mm) (WxDxH) |
| Bore-diameter heaters: | 1" (26mm) |
| Rated power: | 6kW |
| Main voltage: | 400V |
| Heating zones: | 1 |

### Container heating system for forging press tools

| | |
|---|---|
| Dimension: | 8" (200mm), Ø 24" (600mm) |
| Weight: | 410kg |
| Power: | 10,5kW |
| Input voltage: | 400V |
| Heating zones: | 1 |

# HPC and Smart Container equipment

### HPC High-Power Cartridges

» up to 3 heating zones in one cartridge
» Lifetime: up to 5 years and above


### Software modul – Compatible with Siemens and Allen Bradley

» Visualized process control for Smart Container
» Upgrade for existing heating systems

### Special-Components for connection, insulation and temperature-recording

» Multiple Thermocouples with up to 3 measuring points for simultaneous recording of several temperatures in extrusion containers
» Customized insulation components

### Special thermocouples to remain in the containers

Ideal, if the temperature detection of positions is required which are not reachable from the outside or were the container housing cannot be machined with drillings.

## Billet heating equipment

» Billet heating equipment in compact design for laboratory purposes, universities and operators of small presses; Stand-alone system, energy-efficient, optional with protective gas connection to the surface protection.

» The converter, induction coil, power unit, recooling system, control and operator cabinet with operator panel are combined within a frame to form a single unit

» Compact dimensions, for example:
- approx. 35"x28"x83" (900x700x2,100mm) (WxDxH)
- With billet data: Length 8" (200mm), Ø up to 2.4" (60mm)
- Temperatures up to 560°C

» Building, repair and modernization of coils for billet heaters

» Spare parts and accessories for billet heating plants

## Tool stations and Preheating stations

In order to meet today's modern demands, **special tool stations** have been developed at MARX, to heat up the extrusion press tools to an **optimal process temperature**.

The **container preheating stations** are either fitted with independent heating systems, or can be operated via the resistance heating system integrated in the container. In this case, power is supplied automatically via a pneumatic contact unit. The heating process is precisely controlled via integrated controllers.

# Tool stations and Preheating stations

### Container preheating station

to preheat containers outside of the press. The cover is moved by manual operation. Station with pneumatic operated power supply unit for the container own heating.

| | |
|---|---|
| Dimensions: | |
| Container: | Length: 47" (1,200mm), Outer Ø 53" (1,345mm) |
| Station: | 91"x106"x98" (2,300x2,700x2,500mm) (WxDxH) |
| Nominal temperature: | 400°C |

### Die heating oven for single dies

with resistance heating system, air circulation and motor operated cover

| | |
|---|---|
| Usable dimensions: | 39"x39"x39" (1,000x1,000x1,000mm) (WxDxH) |
| Rated power: | 64kW |
| Main voltage: | 400V / 50Hz |
| Working temperature: | 400°C ± 5 % |
| Max. temperature: | 500°C ± 5 % |
| Ventilator power: | 2m³/sec. |

### Die heating oven for several dies

| | |
|---|---|
| Usable dimensions: | 79"x51"x28" (2,000x1,300x700mm) (WxDxH) |
| Rated power: | 2x25kW |
| Input voltage: | 400V, 50Hz |
| Nominal temperature: | 400°C |
| Ventilator power: | 2m³/sec. |

### Heating oven with drawers for 7 press stems

| | |
|---|---|
| Usable dimensions: | 63"x134"x20" (1,600x3,400x500mm) (WxDxH) |
| Rated power: | 2x25kW |
| Input voltage: | 400V, 50Hz |
| Nominal temperature: | 400°C |
| Ventilator power: | 2m³/sec. |

## Service and maintenance

Modernisation of heating systems
» Conversions from induction heating to resistance heating
» Conversions from external heating (holder) to internal resistance heating
» Conversions to „SMART CONTAINER SYSTEM“

Repair service
» Container heating systems (resistance heating, induction heating)
» Billet heating systems
» Tool stations and preheating stations

Spare parts service
» High-Power Cartridges (HPC)
» Customized insulation components
» Multiple Thermocouples
» Quick-Connectors

## Training sessions

» Change of heating cartridges
» Heating assembly
» Trouble shooting
» On site support

# Service and maintenance

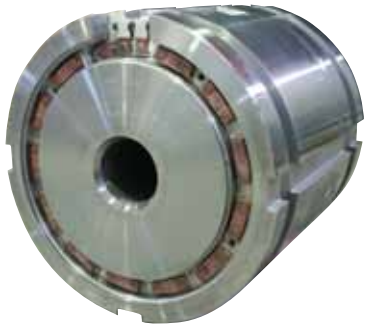
### Welded connections for the Marx HPC-Heating cartridges

The welded design of the heating cartridge connections provides all the advantages of a modern heating system for containers.

The reduced need for individual components results particularly in properties that meet the requirements for ever increasing availability, heating durability and ease of maintenance.

### Copper welding of an induction heating

All connections are made in a special protective gas welding process. The combination of heating construction in conjunction with modern insulation materials guarantee a long service life of the heating systems.



### Container with induction heating system

New manufacturing and repair of induction heating as a substitute in extrusion containers of all worldwide existing presses sizes.
Internal heating connections in welded and soldered version, soldered version also with nickel plated heater rods and interconnection bars. Power-contacts with silver-plates.

### Assembled ready to install

Advantages:
» Accurately fitting, quick and simple self-assembly of the resistance heating system


Donauwörth / Germany


Hennigsdorf / Germany


Youngstown / Ohio / USA


Iserlohn / Germany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