Melting furnace with transistor converter

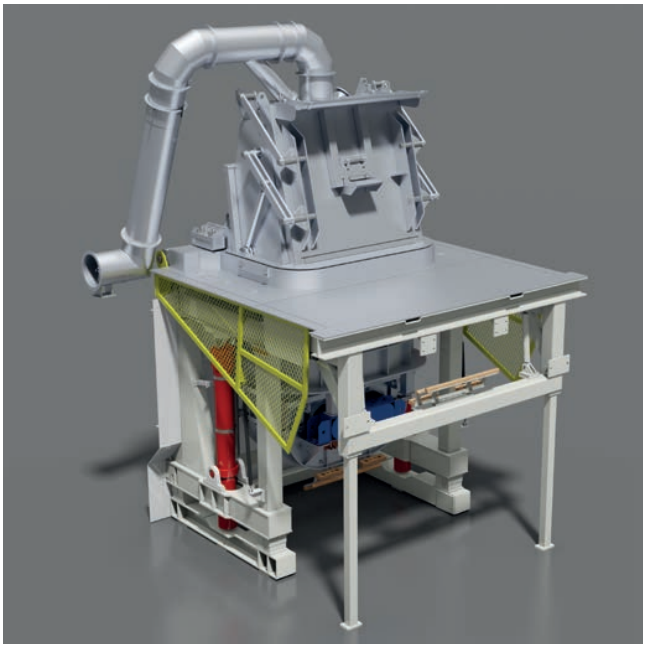
The combination of computerised process control and new transistor converter technology brings many advantages to the operation of channel-type induction furnaces.

Transistor converter

The use of proven transistor converter technology does not cause any current surges in the site grid. The power factor in the site grid is always > 0.95 in all performance ranges and during changes of alloy, while the output is infinitely adjustable from 0 to 100%. The transistor converter requires little or no maintenance. There are also no wear parts. The transistor converter output is protected against short-circuits. The power limiter in the unit prevents the pinch effect in the channel. A special system (in the converter) monitors the insulation between the molten metal and the safety cylinder, and allows early detection of infiltration of molten metal into this area.

Process

The melting process and its required sub-processes are shown in different colours on a display screen. Just a few key strokes are needed to obtain an overview of all electrical, thermal and mechanical process data from the furnace. This allows continuous monitoring of the melting process



and its subsidiary and support processes such as sintering, heat retention and analysis correction.

Because it is not possible to measure the temperature of the charge for different materials continuously, the melt processor calculates a theoretical operating temperature using a mathematical model in parallel with the process. This depends on the power output, the size of the charge and other influencing factors. Temperature measurements are made with a probe to correct this model.

As soon as the target temperature is reached, a visual signal is sent to the operator and the furnace is switched to holding mode. This makes the melting process more reliable and saves energy at the same time.

In the heat-holding mode and depending on the alloy, charge level and channel condition, the furnace is automatically supplied with enough power to keep the temperature stable.

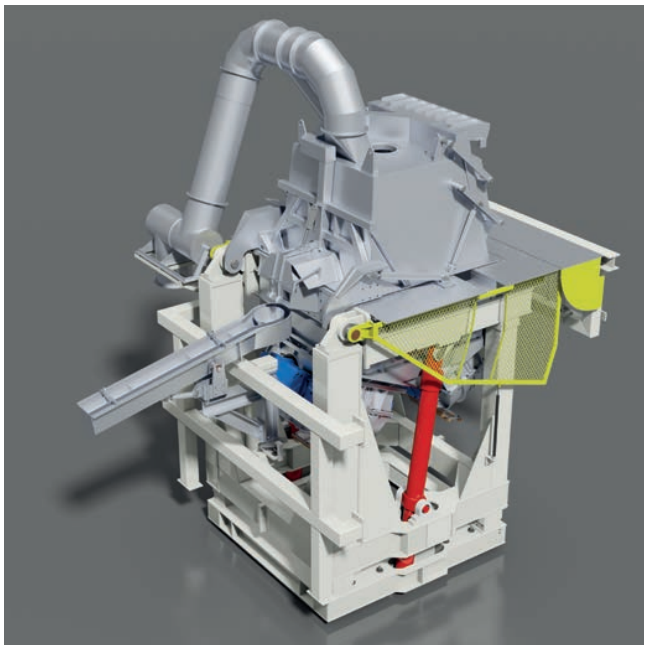
The melt processor compiles all relevant production data incl. analysis data for archiving. These reports are also kept for extended periods and can therefore be used for statistical analyses.

These logs provide an overview of all furnace parameters and the attached power supply, and current heat data such as cooling water temperatures. These settings are monitored regardless of the process step being carried out in the process. The data is displayed continuously and is used for trend analysis and for maintenance purposes of the channel inductor.

This also allows a fast identification of any process deviations.

If desired, the software can be modified to suit the requirements of the operator.

MACHINE CHARACTERISTICS	
Charge	Cu-alloys
Tapping weight	approx. 3,000 - 8,000 kg (Cu)
Total furnace capacity	approx. 5,000 - 14,000 kg (Cu)
Inductor power	500 - 1,400 kW (Cu)
Melting power	1,800 - 5,000 kg/h (Cu)
Energy consumption	approx. 260 kWh/t (Cu/1,250°C)
Number of inductors	1-2
Compensation factor	> 0,95
Cooling water requirement	6,0-17,0 m³/h



www.thoeni.com