



High current sources  
for industrial  
heating applications

EXPERT transformatorbau gmbh

high current technique  
heating current sources  
resistance welding



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**EXPERT transformatorbau gmbh, based in the southern Hessian city of Lorsch, boasts more than 40 years of tradition and experience in the development and construction of liquid-cooled high current transformers and rectifiers.**

The extraordinary quality and reliability of our products is based on the technical and technological know-how which we have acquired over many years combined with the creativity and expertise of our employees.

Highly efficient liquid cooling enables the production of extremely light and compact inductive components.

Furthermore, our process transformers and chokes are completely resin moulded and, as such, can be used in tough industrial conditions with high ambient temperatures in the direct vicinity of the process.

The transformers are used directly or in conjunction with rectifier units, for example for annealing, smelting and heating in the glass, ceramic and semiconductor industries.

In addition to standard assemblies, our solutions are frequently designed and adapted to meet customer requirements.



Electrically heated furnaces

Reference: FCT Anlagenbau GmbH Sonneberg



## Transformers and rectifiers for the electrical heating of furnaces, melting tanks and jets in the glass and ceramic industries

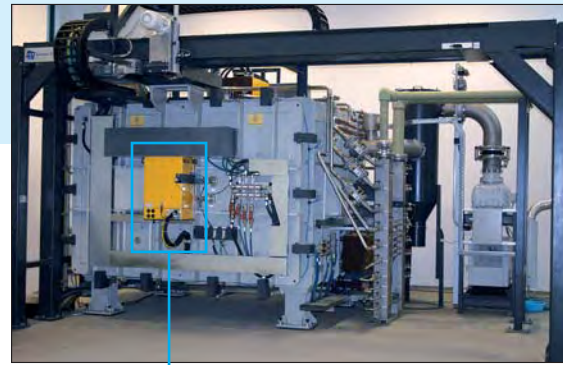
The power is matched via compact water-cooled transformers that are designed for use in the direct vicinity of the process and which can withstand high ambient temperatures.

The location of the transformer close to the process enables short low-impedance cables to be used on the high current side of the transformer.

The transfer losses, which can be extremely high, can thus be dramatically reduced.

With a concept of this nature using decentralised process transformers, the energy balance of the overall system can often be significantly improved compared to a central heating current supply.

- **Example: transformer 82 kVA, 42V, 1,950A**



Maximum temperature furnace (2400°C)  
for the production of aerospace components  
measuring up to 2m in length  
Reference: FCT Systeme GmbH Rauenstein





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## Current supplies for melting facilities for the semiconductor industry

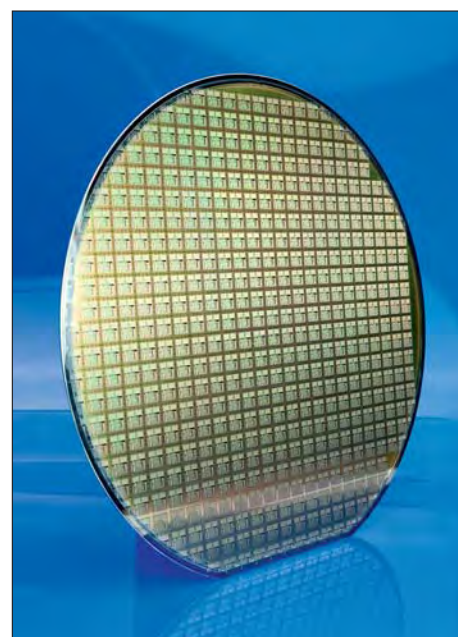
The compact design of our process transformers and rectifiers also enables innovative concepts to be realised for highly efficient energy transmission and power matching in high energy processes up to the megawatt level in this technology segment.

These products are used, for example, for the manufacture and conversion of silicon materials for solar modules and semiconductor wafers.

- **Example:**  
**High current transformer 500 kVA, 10 V,**  
**secondary current 50,000 A**



Pilot plant in semiconductor industry  
Reference: FCT Systeme GmbH Rauenstein



Silicon wafer for microchip manufacturing







## Current sources for manufacturing high-performance materials

Use in facilities for the manufacture of

- carbon materials,
- special alloys,
- carbide metals,
- sintered materials.

The desired type of energy feed-in can vary depending on the manufacturing process.

Our solutions take account of the various demands and requirements.

In addition to continuous current sources for the manufacture of special materials, for example, pulse systems are becoming increasingly popular.

Devices of this type are able to produce extremely short high current pulses at kA level.

- **Example: transformer 200 kVA, 72 V, 2,780 A**



Vacuum pressure sintering furnace

Reference: PVA TePla AG



Gas pressure sintering furnace 2.200°C, 100 bar

Reference: FCT Systeme GmbH Rauenstein



## Conductive heating of components

**As an alternative to inductive processes, conductive materials can also be heated up using current heat (Joule effect). The heat builds up directly in the component and thus guarantees optimal energy input.**

Although the physical nature of inductive processes means that they only have a limited penetration depth and can thus only heat up the surface, with current heat even larger components can be evenly heated up over their entire cross-section.

Together with modern frequency converters, highly effective current sources can be achieved that can be optimally matched to the processes.

- The power range extends from approx. 10 kW to around 500 kW.

This process is successfully used to heat up forging and to anneal components.

It is also used, for example, for directly heating up tube systems for the transport of liquids and pasty masses in the chemical industry.

- **Example: transformer rectifier unit 39 kVA, frequency converter 10 kHz, output 7 VDC, 3,000 A**



High current transformer,  
secondary connection







## Liquid-cooled chokes for high current applications

These are used, among other things, as

- power chokes in frequency converters for supplying facilities for regenerative energy production (wind farms, solar technology)

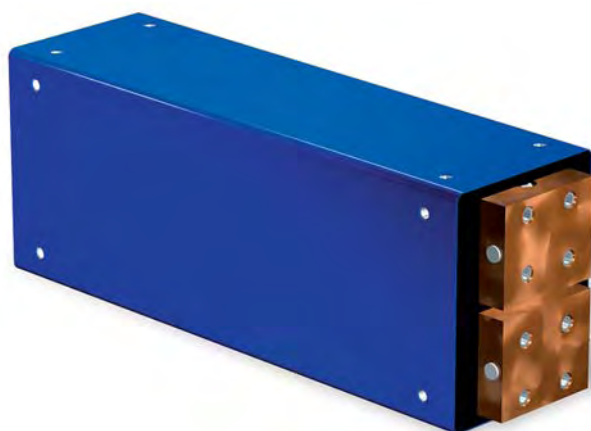
and as

- DC chokes, e.g., in galvanic equipment.

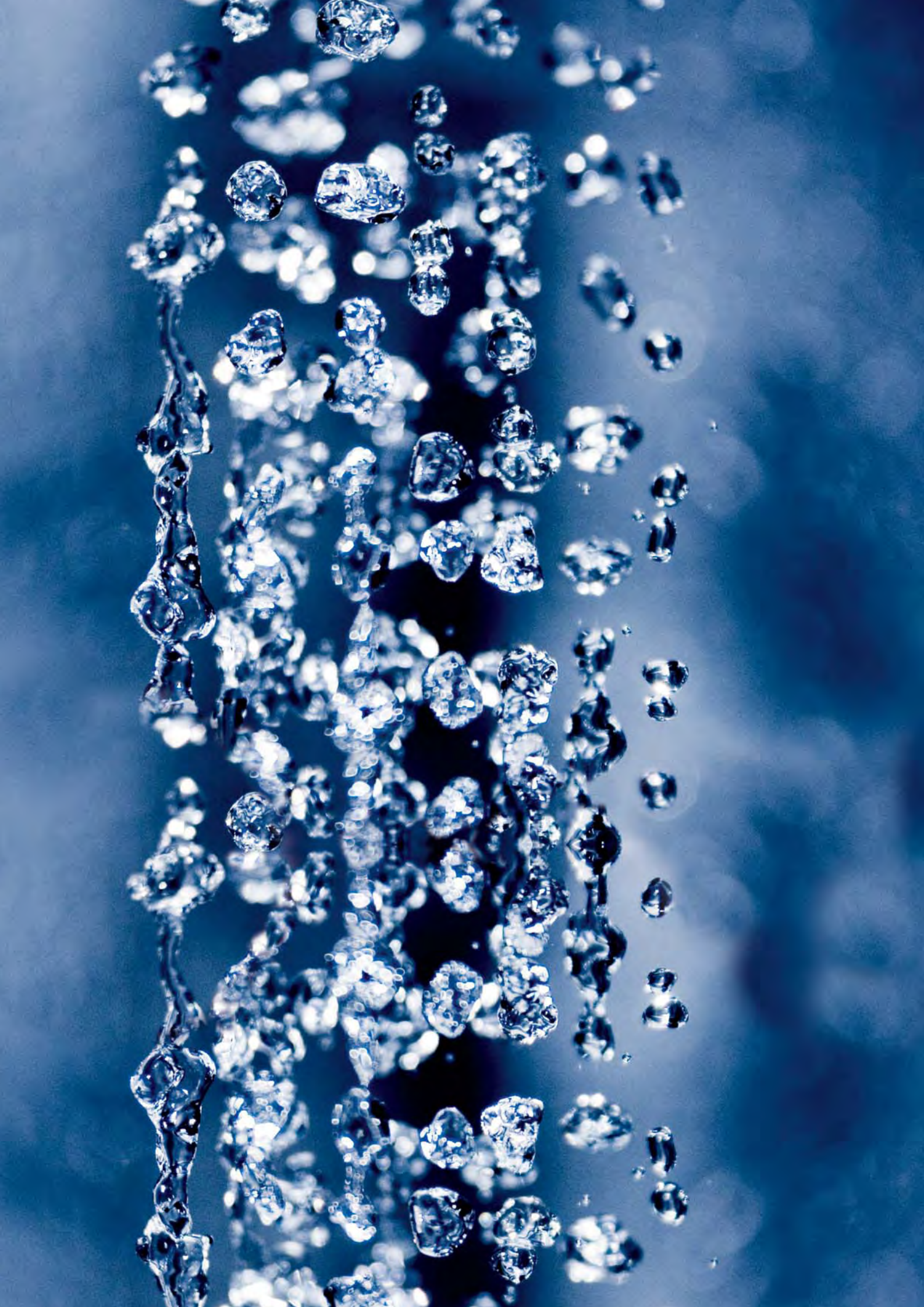
Thanks to the efficiency of liquid cooling, extremely small and compact inductive components can be realised here.

Enclosed in robust housing and potted in resin, these can be used in tough industrial conditions even with high ambient temperatures.

- **Example: DC choke 0,1mH, 5,000 A**







Character attribute of EXPERT Transformers  
is the water cooling style

## The advantages of water cooling

- The outstanding efficiency of water cooling is due to the physical properties of water.
- The heat absorption capacity of water is four times greater than that of air.
- Furthermore, the heat transfer from metal parts to water is approx. 1000 times greater compared to air.
- It is these properties that make water cooling so effective and also enable a greater power density and, in turn, considerably more compact and lighter chokes and transformers.
- The cooling system can function directly or indirectly, i.e. electrically separated.
- The guidelines in accordance with ISO 5826 provide the foundation for the design and development of such components.

Please contact us for further information.

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