

# SiCDual Family

## Silicon Carbide Dual-Frequency Hardening Generator



# The SiCDual Family

The **SiCDual** family of induction hardening generators corresponds to a range of generators for hardening non-regular surfaces covering power levels up 800 kW (400 kW MF + 400 kW HF) and frequencies up to 25 kHz for the MF output and 400 kHz for the HF output.

**SiCDual** generators are based on the ultimate power electronics technologies as Silicon Carbide (SiC) MOS Transistors, advanced DC link using antiferroelectric capacitors, ultrafast high isolation circuitry and advanced transistor driving circuits and fully digital controller all integrated in a PCB, allowing inverter efficiencies up to 99% @ 400 kHz and consequently very small and compact chillers.



**SiCDual** generators are specifically designed for the hardening of non-regular surfaces, as gears and pinions, and can be used in spin as well as in tooth-by-tooth hardening applications, depending on the module and size of the workpiece.

**SiCDual** generators allows Sequential Dual hardening processes with one or two heating inductors as well as Simultaneous Dual Frequency Hardening processes.



In combination with **SiCDual** generators, SiCtech offers standard as well as custom design heating stations for single, sequential dual or simultaneous Dual frequency processes, integrating in a, up to 10 m., separate cabinet high efficient output transformer, resonant capacitors and if needed a matching transformer, that could be placed near the heating workpiece.

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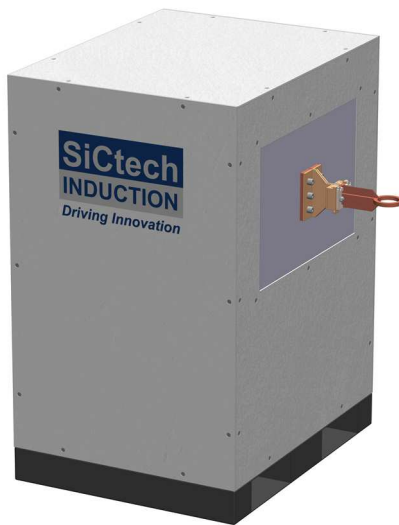
## THE MAIN ADVANTAGES OF SiCtech TECHNOLOGY

- ⇒ Total power up to 800 kW
- ⇒ Maximum MF Power: 400 kW
- ⇒ Maximum HF Power: 400 kW
- ⇒ MF frequency range: 8 - 25 kHz
- ⇒ HF frequency range: 100 - 400 kHz
- ⇒ Extremely high efficiency inclusive at frequencies as high as 400 kHz.
- ⇒ Customised output power combinations according the application
- ⇒ Very small size and weight.
- ⇒ Very high robustness due to the use of SiC MOS Transistors.
- ⇒ Very easy use of the generator due to the use of advanced algorithms that auto-adjust the generator depending on the required heating process
- ⇒ **Applications:**
  - Sequential Dual frequency Hardening processes with one heating inductor
  - Sequential Dual frequency Hardening processes with two heating inductors
  - Simultaneous Dual Frequency gear hardening processes

# The SiCDual Family Features & Subsystems

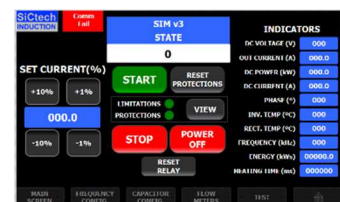
**SiCDual** generators can handle sequential and simultaneous hardening processes with frequencies in the MF range between 8 - 25 kHz and in the HF range between 100 - 400 kHz. The supply voltage is  $400 V_{AC} \pm 10\%$  and the system is water-cooled. **SiCDual** generators include a Siemens PLC with communication via industrial busses like Profinet, Modbus, Ethernet etc.

The **SiCDual** generators are based in the 100 & 200 kW MF and in the 100 kW HF SiCtech power modules. These modules integrate, in both cases, the same core controller that includes all the features needed in an induction heating application.



In combination with **SiCDual** power supply unit, SiCtech offers custom design of dual frequency heating stations integrating in a, up to 10 m., separate cabinet highly efficient output transformer, resonant capacitors. Dual frequency heating stations for sequential dual frequency or simultaneous dual frequency applications cover a range of frequencies between 8 and 25 kHz and 100 to 400 kHz for heating for hardening in sequential dual or simultaneous dual frequency hardening processes.

A highly interactive and comprehensible HMI based on Siemens PLC 1200, guides the user in any interaction with the generator as the starting up, the resonant frequency selection by autotuning, the matching of the load etc. and provides information on the status and working conditions of the generator at any time.



## KEY FIGURES

- ⇒ Up to 800 kW.
- ⇒ 8-25 kHz in the MF power output
- ⇒ 100-400 kHz in the HF power output
- ⇒ Outputs:
  - **Sequential Dual** Hardening processes: 8-25 kHz/100-400 kHz (sequential)
  - **Simultaneous Dual** Hardening processes: 8-25 kHz/100-400 kHz (simultaneous)
- ⇒ Different power combinations for the HF and MF outputs
- ⇒ Energy monitoring.
- ⇒ Extremely compact and efficient.

# The SiCDual Portfolio & Technical Specs

SiCDual Family	100/100	200/100	200/200	300/100	300/200	300/300	400/200	400/300	400/400
<b>Total Output Power</b>	<b>200 kW</b>	<b>300 kW</b>	<b>400 kW</b>	<b>400 kW</b>	<b>500 kW</b>	<b>600 kW</b>	<b>600 kW</b>	<b>700 kW</b>	<b>800 kW</b>
MF Output power	100 kW	200 kW	200 kW	300 kW	300 kW	300 kW	400 kW	400 kW	400 kW
HF Output Power	100 kW	100 kW	200 kW	100 kW	200 kW	300 kW	200 kW	300 kW	400 kW
MF Output Frequency Range	8-25 kHz								
HF Output Frequency Range	100-400 kHz								
Efficiency	98,9 % @ 10 kHz 98,4% @ 400 kHz								
Mains Voltage <sup>(3)</sup>	400 V <sub>AC</sub> ± 10 % (Three-Phase)								
Normal Oper. Freq. Range	50 & 60 Hz								
Cos (φ)	> 0,99								
Output Circuits	Series LC								
Inductor Short Circuit Protec.	Yes								
Controller	Fully Digital Controller								
Power Regulation Range <sup>(1)</sup>	2... 100 %								
Power Setting Time <sup>(2)</sup>	1 ms								
SiCDual Cabinet Size (WxDxH)-cm	120x60x160				240x60x160				
SiCDual Cabinet Weight	330 kg	350 kg	335 kg	355 kg	(4)	(4)	(4)	(4)	(4)
Water Max. Temperature	+40 °C								
Minimum Water (litre/min)	10 l/min	10 l/min	15 l/min	15 l/min	20 l/min	25 l/min	30 l/min	35 l/min	40 l/min
Environmental Temperature	+5 °C to +50 °C								
Maximum Humidity	90 %								
User Interface	Siemens HMI KTP700 / KTP900								
Standard Fieldbus	ModBus TCP/IP								
Optional Fieldbuses	Profinet, DeviceNet,								
Optional External Control Unit	The Unit comprises: External Star/stop, External power control, External Emergency Stop								
Optional Temperature Control	Low Temperature Pyrometer (150-400 °C); High temperature Pyrometer (500-1000 °C)								
Optional Cable Length	10 m								

**NOTE:** <sup>(1)</sup> At Nominal Load  
<sup>(2)</sup> At Adaptive Mode  
<sup>(3)</sup> For 480 VAC contact with SiCtech  
<sup>(4)</sup> Contact with SiCtech

Subject to changes

