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## REDUCTION OF CLOCK FREQUENCY TO INCREASE THE SERVICE LIFE OF THE POWER MODULE

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## REDUCTION OF CLOCK FREQUENCY TO INCREASE THE SERVICE LIFE OF THE POWER MODULE

### **Technical task:**

When operating an electric or hybrid vehicle, the AC current in the inverter is generated from DC current via the power module at battery voltage (DC voltage).

When the power semiconductors are switched, thermomechanical voltages are generated by losses, which over time lead to the end of the service life of the components.

### **Initial situation:**

The service life of the power semiconductors may not meet the requirements under certain applications. For this reason, the component may fail earlier than required.

### **Solution:**

The clock frequency, which is switched via the power semiconductors, is reduced.

The motor current consists of the fundamental oscillation, which generates the actual rotating field, as well as higher frequency components, which are generated by the clock frequency and the switched voltage pulses. Lowering the clock frequency, for example from 3KHz to 1KHz, reduces the number of semiconductor circuits, which leads to less frequent switching losses. In this example an improvement of the lifetime consumption by approx. factor 1.5 - 2 is possible.

### **Advantages:**

Current investigations show that by lowering the clock frequency, the lifetime consumption of the power semiconductors can be reduced.