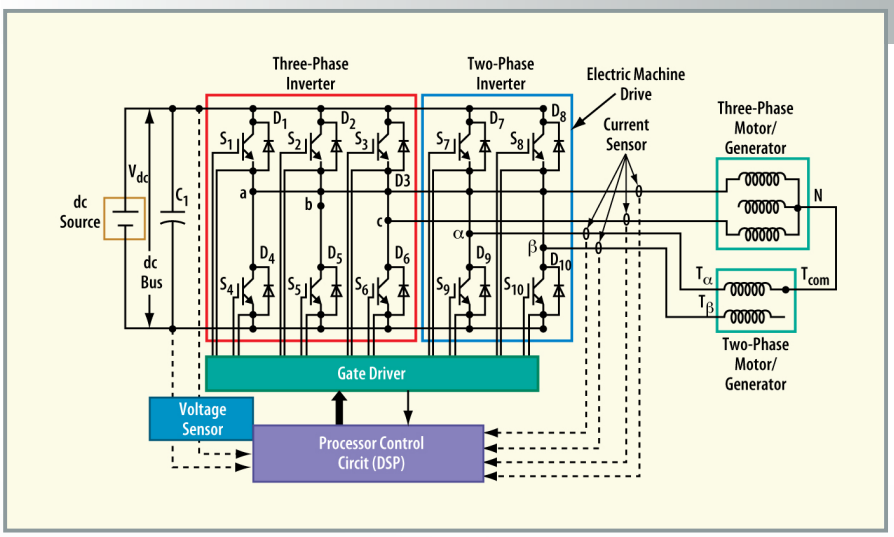
Integrated Inverter Control for Multiple Electric Machines

UT-B ID 200301316



Technology Summary

Conventional electric or hybrid electric vehicles have a main motor and one or more accessory motors or generators, plus an inverter for each. A consequence of this design is that each vehicle requires a number of inverters and inverter controllers, plus the engine volume to house them all.

To improve options for motor design, ORNL researchers invented an integrated inverter control for directing multiple inverters with a single processer. This invention reduces the number of components required in an electric engine, lowering the total component cost. It also supports the design of smaller engines.

The integrated inverter control permits each inverter to share one or more of the following: a common DC bus, a DC bus filtering capacitor, a gate drive circuit, a process control circuit, voltage sensors, current sensors, speed sensors, or position sensors. With a proper control algorithm, the motors/generators can be run in either a motoring mode, providing power to the motor shaft, or in a generating mode, in which power is transferred from the motor shaft to the inverter direct current source. The invention can be used in synchronous machines, induction machines, or permanent magnet machines.

Advantages

- Lower cost due to fewer components
- Smaller engines

Potential Applications

- Electric vehicles and hybrid electric vehicles
- Other applications that require multiple electric engines

Patent

Gui-Jia Su and John S. Hsu, *Integrated Inverter for Driving Multiple Electric Machines,* U.S. Patent 7,023,171, issued April 4, 2006.

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