

PEM-Scoot: Control and operation analysis

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The principle of supply and demand suggests that as fossil fuel supplies diminish, prices will rise. Higher prices will lead to increased alternative, renewable energy supplies such as hydrogen. The PEM-Scoot is a Scooter with electric motor. Powered by a fuel cell using hydrogen as fuel and pure oxygen as oxidizing agent the Scooters exhaust is pure water. This diploma project involves software for the control unit and drive tests.



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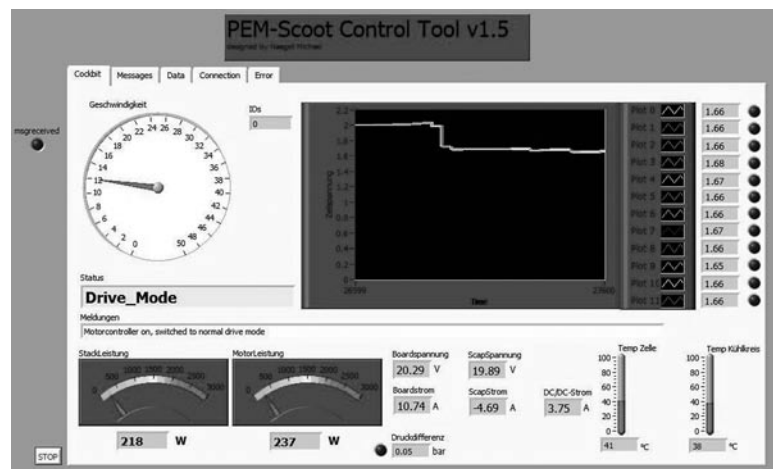
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System overview

The PEM-Scoot is an electrical Scooter produced by Peugeot. In a former project its batteries had been replaced by fuel cells. The hydrogen fuel and the oxygen are stored in two pressure cylinders. In the fuel cell hydrogen and oxygen are directly converted to electricity and heat with water as exhaust product. Super capacitors buffer the fuel cell so that acceleration power demand can be reached.



Labview analyser



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Control and analysis

A microcontroller is implemented to ensure safe and comfortable driving. The unit controls peripheral parts such as gas valves, water pumps and power relays. In addition,

cell voltages, stack current, and temperature are measured and controlled to enable stable operation. Furthermore, security procedures are implemented to keep the system safe in case of a system failure or malfunction. Over a CAN-interface typically used in vehicle applications this data is sent to a Bluetooth-Transmitter. The Bluetooth device permits a wireless connection to a notebook in a surrounding area of up to 100 meters. This allows the PEM-Scoot data to be viewed and analysed on the notebook. For this purpose, a LabView program was designed.

Driving tests

By means of real live drive tests specific data was gathered and analysed. With this information critical parameters could be adjusted, enabling maximum fuel exploitation and enhancing stability.

Conclusion

The PEM-Scoot is a prototype and shows solid options for replacing fossil fuel powered vehicles in traffic.



PEM-Scoot