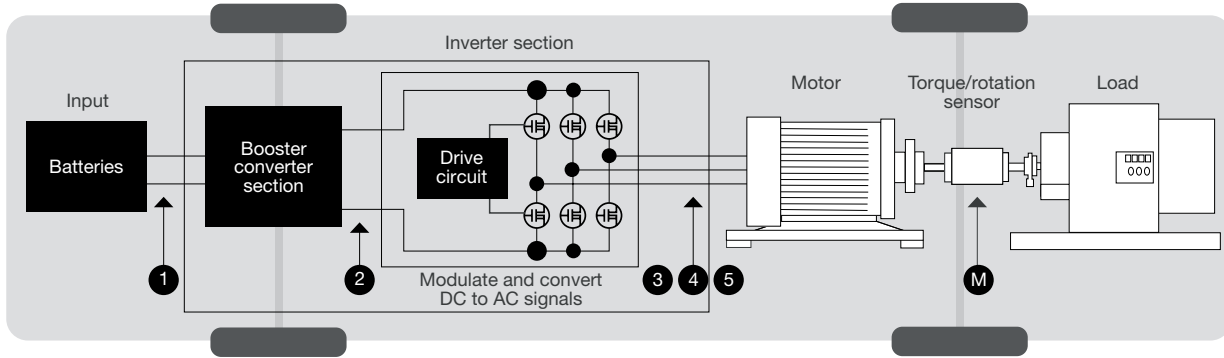


Application note

# Electric Vehicle – Power train efficiency



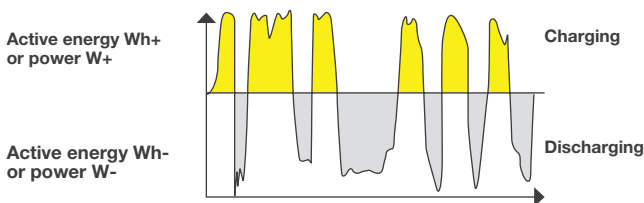
Precision power analysers such as the WT5000, WT3000E and WT1800E feature motor evaluation capabilities

## Overview

Between 16 to 18% of the total charge of an electric car is consumed as electric drive system losses. Electric and hybrid car manufacturers therefore need to accurately evaluate motor and inverter control in order to achieve higher precision and greater efficiency. Additionally, the accurate analysis of inverter waveforms without interference from switching noise is a key part of evaluating the motor drive circuit.

## Key requirements

- Battery charging/discharging characteristics
- Measure positive and negative cycles of power
- Holistic view of charging and consumption efficiency
- Harmonic analysis at various rotation speed



Battery charging and discharging characteristics

## The WT5000 advantage

[WT5000](#) helps automotive engineers improve conversion efficiency, shorten charging times and improve driving range by offering highly accurate analysis of charging discharging and overall electromechanical efficiency.

### Powertrain efficiency

With power measurements on up to 7 input channels and a dual motor evaluation function the WT5000 is ideal for evaluating how the charging system, drive train and motors power the electric vehicle. It enables simultaneous measurements of voltage, current, power, torque, rotation speed, electrical angle and mechanical power.

### Battery charging & discharging characteristics

In integrated measurement, the battery charge and discharge can be evaluated. Instantaneous positive and negative values captured at 2MS/s high-speed sampling rate are integrated.

### Harmonics analysis & comparisons

Motor testing is performed at various rotation speeds. The WT5000 supports the lower limit frequency of 0.5Hz to make it possible to measure harmonics at a very low motor rotation speed without using an external sampling clock.