

Application Note

Power Consumption Improvement in EV Development

In EV development, it is crucial to simultaneously grasp the levels of high voltage and large current at the battery terminal, as well as the power consumption and standby power of each electrical component such as the ECU. Comprehensive power management can aid in the developer's a reduction in the overall power consumption of the vehicle.



Issues

A significant challenge in extending the range of EVs is how to reduce the energy consumption of the main motor that drives the vehicle. In addition to this, it is necessary to manage the energy levels of components that are next in-line in terms of the energy they consume, such as air conditioning and ECUs. Therefore, it is important to perform power management and measure the electric consumption of the power source (i.e., the battery) and connected devices.

Solution

In order to perform overall power management and discover areas that power consumption can be reduced, developers measure various measurements. To perform overall power management and discover areas that power consumption can be reduced, developers measure current, power, and leakage current of various devices (such as ECUs) in the completed EV's main drive system. Developers can measure the dynamic power during driving at the battery output and each component of the battery. Hioki provides market-leading measurement with its Power Analyzer PW8001 combined with a large line-up of current probes for various current-value and probe-size needs as shown below.

- Small high-precision DC current probes CT6830 (2 A), CT6831 (20 A)
- High-current, high-precision DC current probes CT6841A (20 A), CT6843A (200 A), CT6844A (500 A), CT6845A (500 A), CT6846A (1000 A)



AC/DC Current Probe CT6830, CT6831



Power Analyzer PW8001

Application Note

Features of AC/DC Current Probes CT6830 (2 A), CT6831 (20 A)

- Flux gate technology reduces the effects of temperature and enables high-precision current measurement for extended periods of time.
- They're approximately the size of an index finger, making it easy to access even wires in complicated vehicle wiring. This makes them suited for measuring consumption current at multiple points.

AC/DC Current Probe CT6830: for devices with a load current of 2 A or less

Examples: ECU, wiper, power window, window heater, headlamp, etc.

AC/DC Current Probe CT6831: for devices with a load current exceeding 2 A (up to 20 A)

Examples: power steering, air conditioning compressor, water pump, etc.



Large Current Probe Series

- AC/DC Current Probe CT6841A (AC/DC 20 A)
- AC/DC Current Probe CT6843A (AC/DC 200 A)
- AC/DC Current Probe CT6844A (AC/DC 500 A)
- AC/DC Current Probe CT6845A (AC/DC 500 A)
- AC/DC Current Probe CT6846A (AC/DC 1000 A)



Summary

By combining the Hioki Power Analyzer PW8001 and current probe of desired current-level or clamp size, you can simultaneously measure the electric characteristics of the EV, from the battery power source to the finer components. This measurement of power consumption and standby power enables the developer to perform overall power management of the vehicle.

This solution can be used not only for EV development but also for various E-mobility development such as electric motorcycles, electric construction machinery, and electric agricultural machinery.

For more information about the products, please visit the corresponding product page on the Hioki website.

For information on combinations of various sensors and current units, demonstration unit requests, and consultations about applications, please contact your nearest Hioki sales representative through our contact page.