

Intelligent Fuel Cell and Battery Hybrid System for Portable Power Application

Technology Overview

Hydrogen fuel cells and batteries such as lead-acid and lithium-ion are key energy sources today, each with unique strengths. Hydrogen fuel cells have much higher energy densities (450-500 Wh/kg) compared to lithium batteries (200-260 Wh/kg). Batteries, however, provide superior high dynamic performance, delivering surge power effectively. This project aims to combine these strengths by exploring how a PEM fuel cell stack can charge batteries, creating a portable hybrid system suitable for outdoor use.

Features & Specifications

The intelligent fuel cell and battery hybrid technology is developed to coordinate and optimise power delivery from both the fuel cell stack and the battery.

Key features include:

- Extended system running time: 3+ times energy capacity as pure lithium battery pack with the same weight.
- More stable system output profile: Low ripple and noise, down to 100 mVp-p, suitable for critical applications requiring a stringent output profile.
- Scalable power extension: Modular design to the fuel cell power unit.
- Maintenance-free battery management: Built-in fully automatic battery self-maintenance feature for the users.
- Remote monitoring and control: Enhance user management experience through IoT technology.

Key specifications include:

System Power Rating:	Up to 1,000W
DC Output:	24VDC, USB-C, USB-A x 2
AC Output:	220VAC x 1
Running Endurance:	>6 hrs with 12L of Hydrogen
Dimension:	30 x 14 x 32 cm
Weight:	6kg



Customer Benefits

- Compact and light weight
- Scalable power for different application
- Long endurance
- Maintenance free
- Web monitoring
- Clean power

Potential Applications

This technology can be applied in:

- Portable tower light for construction
- Emergency backup power system
- Remote monitoring and surveillance system
- Military applications

