

## SMART BIDIRECTIONAL ENERGY METER FOR A GRID-INTERFACED ELECTRIC VEHICLE CHARGER

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### ABSTRACT

Electric Vehicle (EV) has been given considerable attention due to their attractive properties of reducing the fuel consumption and the gas emission. The energy during EV batteries charging and discharging can be calculated via smart meter, bidirectional communication and remote control can be achieved between EV and the grid. In this paper, a smart energy meter for EV is presented where the EV acts as a smart grid application. When the EV is connected to the grid, the meter measures and displays the battery voltage, current and the power. Additionally it displays the direction of the battery current whether it is in charging or discharging mode and the power flows from grid to vehicle (G2V) or from vehicle to grid (V2G). The data is displayed on LCD shield in addition to a remote computer via a ZigBee wireless connection. A practical prototype using an Arduino and ZigBee wireless communication is implemented to verify the proposed system performance.

**Keywords:** Smart energy meter, distributed generation, electric vehicle, energy efficiency.