HYBRID EV CHARGERS

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ABSTRACT

The transition to electric mobility is a promising global strategy for decarbonizing the transport sector. India is among a handful of countries that support the global EV30@30 campaign, which targets to have at least 30% new vehicle sales be electric by 2030. An accessible and robust network of electric vehicle (EV) charging infrastructure is an essential pre-requisite to achieving this ambitious transition. The Government of India has instituted various enabling policies to promote the development of the charging infrastructure network. However, given the novel characteristics of this new infrastructure type, there is a need to customize it to the unique Indian transport ecosystem and build capacity among stakeholders to support its on-ground expansion. A contextual approach is needed to ensure the efficient and timely implementation of EV charging infrastructure, such that it meets local requirements and is optimally integrated within the electricity supply and transportation networks.

OBJECTIVES

- An accessible, robust and eco-friendly network of electric vehicle charging infrastructure
- Accelerate electric vehicle adoption by offering the best charging experience to its customer.

METHODOLOGY

We have designed a Grid-Based EV charger, which takes input as 230V AC from the grid which is provides the output as 109 V DC using the components named Bridge Wave rectifier, DC LINK, electrolytic capacitor, Snubber,IGBT, choke transformer and a shunt with a PFC card.

On the other hand, we have also designed a Solar PV charger which takes input from the solar panels installed and provides us a DC output. We have used the components which include a Snubber, IGBT and an electrolytic capacitor, with a PFC card and shunt.

But the problem arises that both need to be dependent on each other to provide us with uninterrupted power supply to charge vehicles.

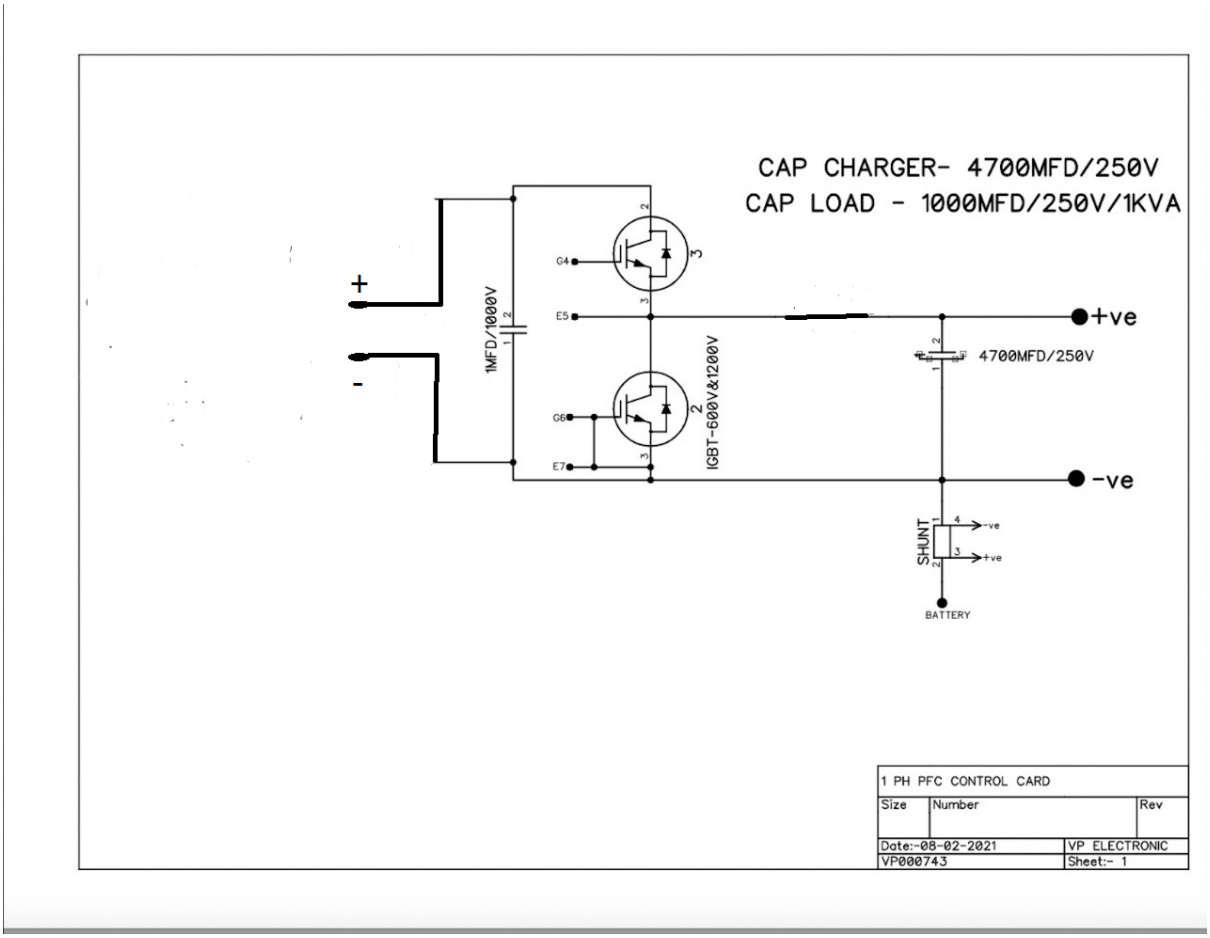
We have connected both the above chargers with their (output) positives and negatives connected to each other. This was done to achieve power-sharing. Power-sharing implies that both systems work simultaneously according to the needs. If solar is giving 100% production, the grid charger works 0% and vice-versa. Also if there is 50% contribution by the solar charger, the grid charger contributes 50%.

- The power electronics assembly is the core of a charging station. It supplies the power to the EV's onboard battery charger.

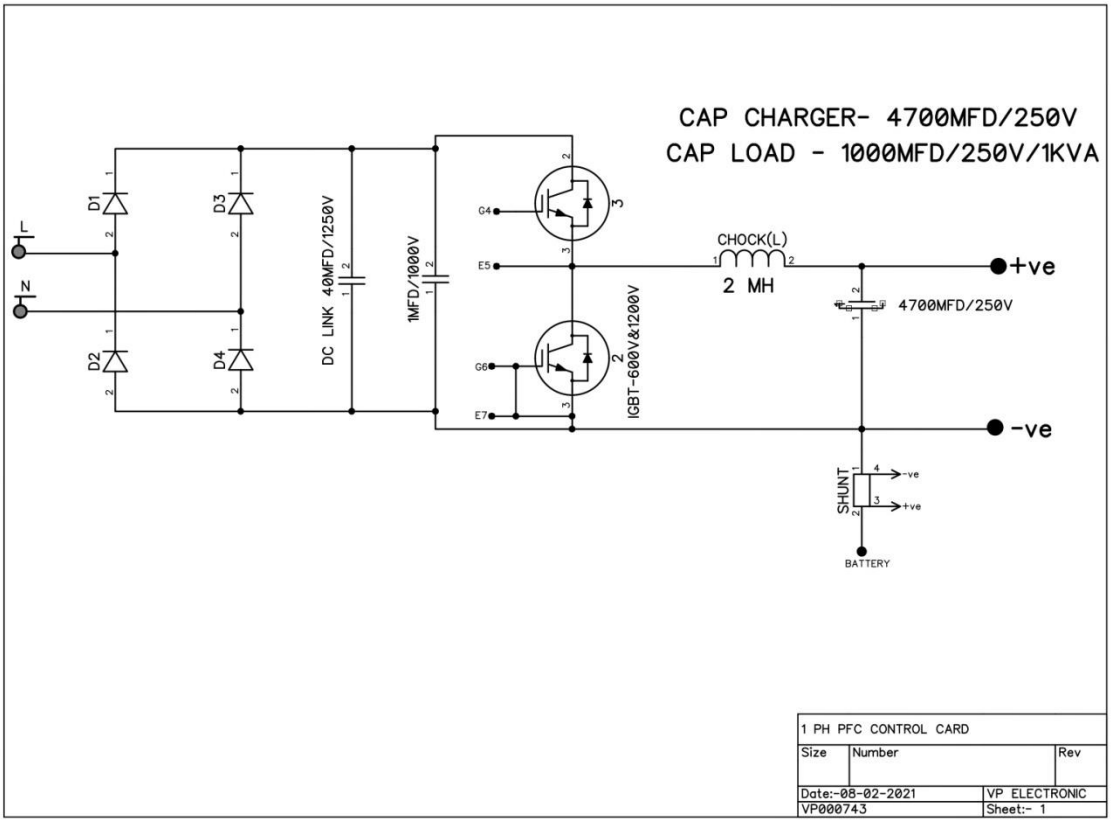
- The charge controller is the intelligence of the charging station and manages basic charging functions, like turning a charger on and off, metering of power usage, and storing key bits of realtime and event data.
- The network controller provides the interconnection of the charging station to the broader network. It allows the station to communicate with its network using an on-board telecommunications device so that system managers can monitor, review, and control the device usage. It also manages user access to charging stations.
- The cable and connector are sometimes referred to as a charging gun. It plugs into the vehicle making a safe physical connection between the charger and vehicle. Charging guns or connectors often conform to a standard form factor specific to the vehicle OEM (e.g., CCS, CHAdeMO, SAE J1772, IEC 60309).

The circuit diagrams are attached below:

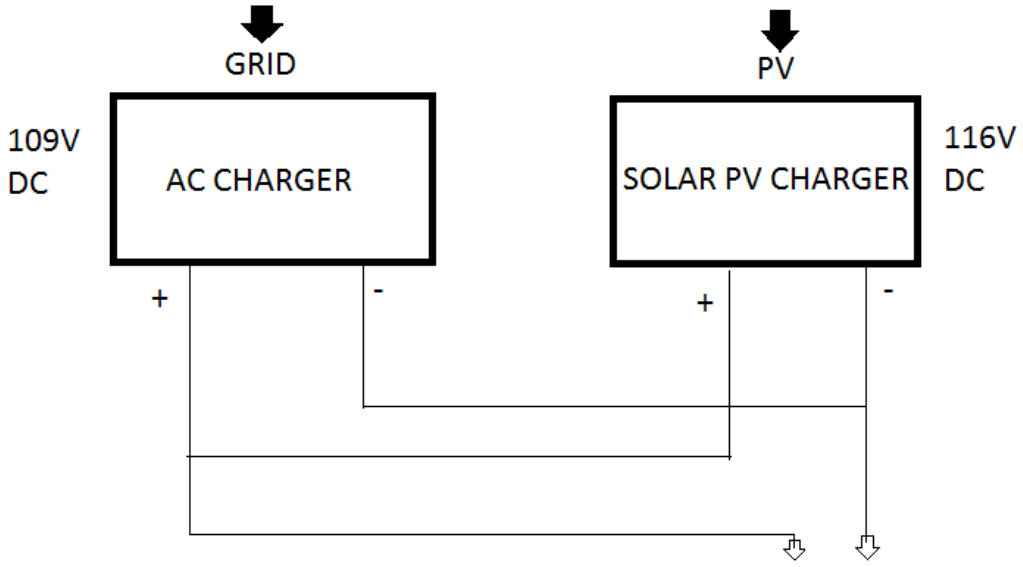
SOLAR BASED EV CHARGERS



GRID-BASED EV CHARGERS



HYBRID EV CHARGER-



RESULTS AND DISCUSSIONS

We have made a hybrid EV charger which is Eco-friendly and economical and is useful for small business start-up also using the solar energy we have reduced the price of charging and the current monopoly of the market . so we are providing this as a real solution in the market for a good cause