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Approach to Connecting Vehicles with Reconstructed Onboard with Electric Propulsion Converter

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Abstract— *An onboard converter that uses the present hardware of electric cars is proposed. It does not require any additional equipment, and it can be made use of of in any vehicle. The device can be connected to the strength grid through a home or workplace strength outlet. There is no need for any extra equipment on AC side of the device.*

Key Words: Switching network, EDROC

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I. Introduction

To maintain the cleanliness and environmental protection, electric powered automobile earnings may be predicted to increase in the future. The electric pressure tool and charging tool in plug in vehicles will update the traditional pressure gadget of the inner combustion engine due to the fact the electrical powered strain can reap 0 emissions. The electricity gadget consists of motor and motive force circuit. The gadget has large measurement and immoderate price. Boom the electricity density through integrating the pressure gadget and charging gadget in plug in vehicles. Due to a more efficient motor is needed, The motor with units of 3-section windings is used in running mode, the motor is painted as a 3-section motor; In load mode, the motor is painted as a transformer. The different EDROCs with specifically designed cars are linked AC supply to the impartial factor of the motor in. However, the specifically designed cars are extra complex than traditional traction cars, and further terminals want insulation protection. Considering the traditional EPI electric motor, the EDROC with additional AC device is proposed and studied. The extra device may be onboard without particularly insulation protection. However, the gadget provides an out of control rectifier unit or relay, the extra device takes more space.

II. Problem Statement

A simple electric powered-pressure onboard converter is proposed. This converter makes use of the traditional motor of connecting vehicles and is again constructed through a switching community. This converter can immediately make use of the so electricity outlet at the workplace or home. This gadget can make use of the present pressure gadget with out specifically and it has the benefits of easy shape and occasional price.

III. Solution Methodology

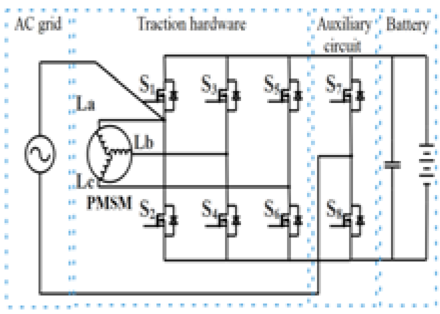

Figure 1.Topology of electric-drive-reconstructed onboard converter

The proposed electric powered-pressure-reconstructed onboard converter in PEV is found out through connecting an auxiliary circuit among battery and traction hardware, as proven in FIGURE 1. The auxiliary circuit and the inverter of traction hardware shape a switching community to reconstruct converter. And the proposed manipulation technique is relevant for any 3-section inverter drive hardware, and you do not need a specially designed motor. The converter most effective makes use of a singlephase electricity deliver with out extra device together with inductance or relay on the AC side. The gadget has operating modes, which can be charging mode and motive force mode.

IV. Working Methodology

The auxiliary circuit and the traction equipment inverter form a switching network to rebuild the converter. And this control method is applicable to any three-phase inverter traction equipment, and a specially designed motor is not required The wiring diagram for a 3 section inverter is shown below.

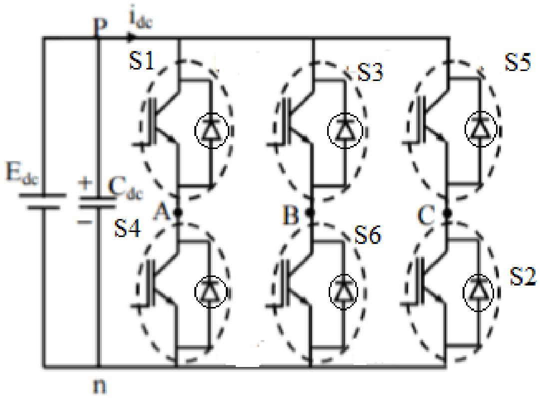

Figure 2. Three Phase Inverter Circuit

Basically, the 3 hands of an inverter may not be on time with a hundred and twenty stages perspective to generate a three section AC deliver. The switches S1, S2, S3, S4, S5, and S6 supplements every different. In 3 inverters with unmarried-section are positioned throughout a comparable DC supply. The line voltage in the 3-section inverter is equal to the line voltages in the mid-bridge inverter with a unmarried section.

V. Results of Three Phase Inverter Circuit Using SIMULINK

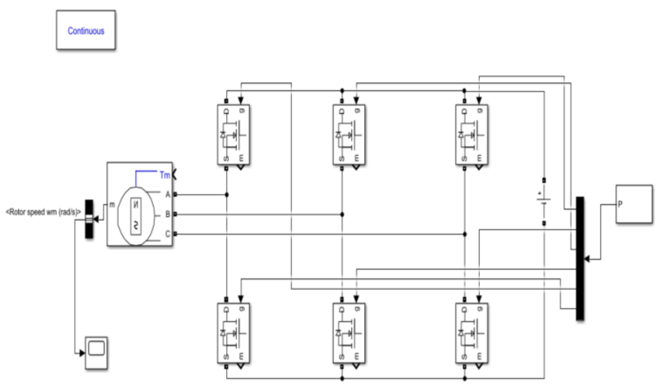

Figure 3. Simulink Model

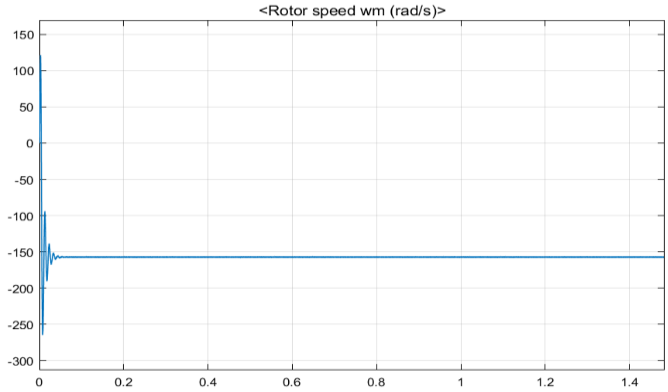

Figure 4. Graph of speed vs time

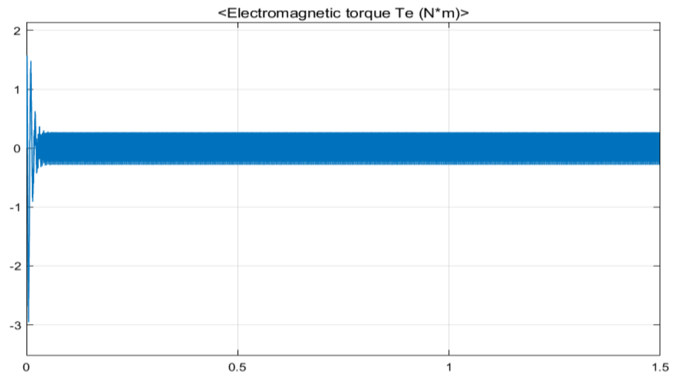

Figure 5. Graph of torque vs time

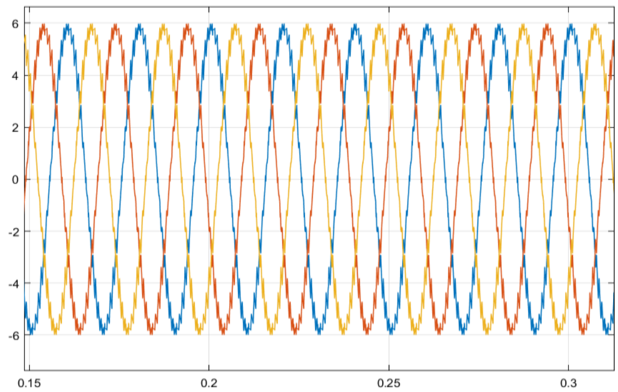

Fig.5. Graph of current vs time

VI. RESULTS AND DISCUSSION

The PMSM is connected to the proposed onboard charger the battery is connected to the circuit. There are two operation modes ,

1. Driving mode
2. Charging mode

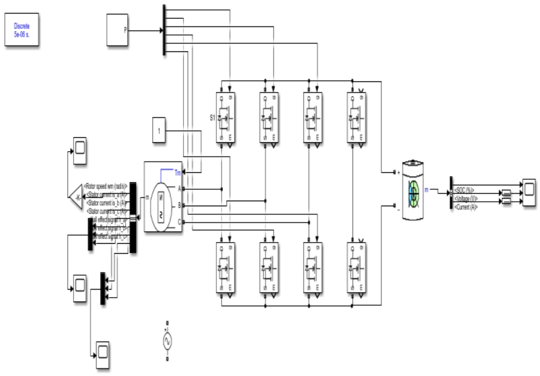

Figure 6. charging mode simulation

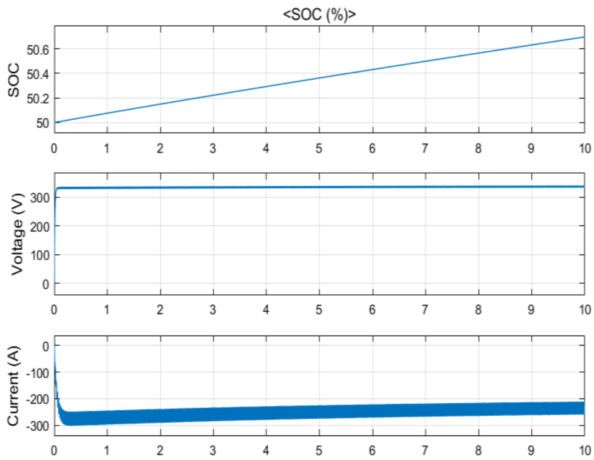

Figure 7. Charging voltage, current and SOC

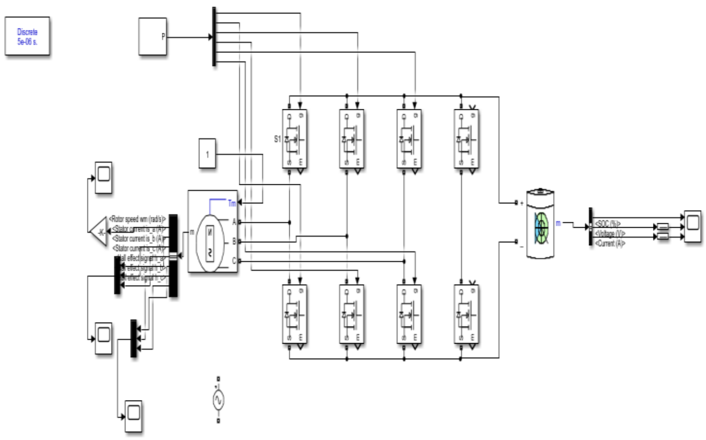

Figure 8. Driving Mode circuit

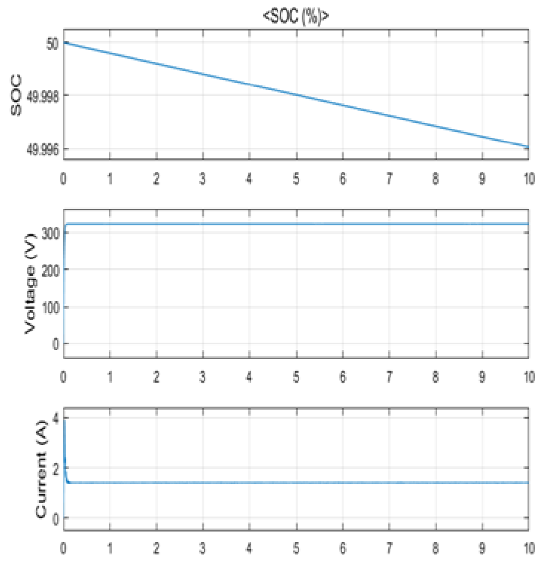

Figure 9, battery discharging, current, voltage and SOC

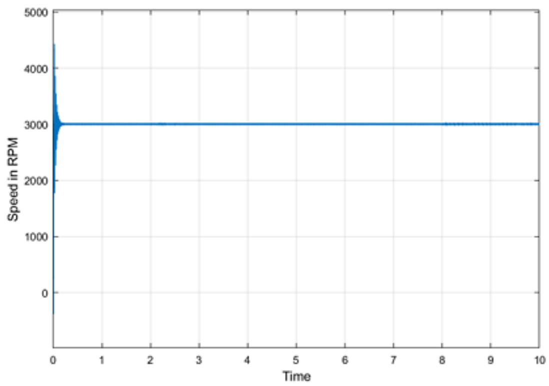

Figure 10, PMSM motor speed

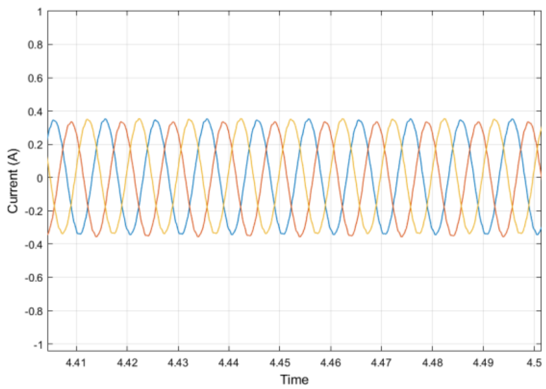

Figure 7:. PMSM motor current

The Figure 1 shows the charging mode simulation. It shows that the S1 and S2 are not working. Other switches help to charge the battery. The Figure 2 shows the charging voltage, current and SOC. The Figure 4. Shows the Driving Mode circuit. It shows that the S7 and S8 are not used. The Figure 5 shows the Battery discharging current, voltage and SOC. Then the Figure 6 shows the PMSM motor speed. It shows the motor runs in maximum speed. The Figure 7 shows the PMSM motor current. It is sinusoidal.

VI. Conclusion

A 3-section inverter operating precept is, it consists of 3 inverter switches with unmarried-section wherein every transfer may be linked to load terminal. The PMSM is used here as motor and the battery bank can be charged and discharged using the same circuit. For charging S1 and S2 are not operated rest of the switches works. For driving mode the S7 and S8 are not used. Remaining switches are used for driving. Both the modes works in the same circuit.

1. The simulation of PMSM circuit and inverter
2. Operate the simulation in both the ways (charging and discharging mode)
3. Verify the results with the simulation

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