Abstract

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Reduced voltage combined AC motor and drive system for safe electric vehicle

This paper presents the design, analysis and implementation of a proposed combined three phase induction motor and its drive system to meet the demand of low-voltage electrical system for hybrid and electric cars, avoiding the high voltage human risks, expensive and complex requirements of the higher voltage insulation and power electronic devices. The development of electric vehicle technologies has been reviewed. A conventional 220V 3-ph induction motor has been rewound in order to get the required 48V 3-ph motor. A comparison between the old motor and the rewound motor has been theoretically and practically carried out including different characteristics. Design and simulation analysis of different control cards have been carried out using PSpice software while the overall drive system performance has been simulated using Simulink under Matlab package. The proposed setup has been practically implemented using commercial available components. Different practical wave forms have been obtained for different operation modes, showing the effectiveness of the proposed setup as a reduced voltage speed control drive system suitable for safe electric vehicle applications.