113. HIGH EFFICIENT INDUCTION HEATING USING RESONANT CONVERTER UNDER DUAL MODE

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Induction heating (IH) technology is nowadays widely present in domestic appliances because of its cleanness, high efficiency, and faster heating process. All of these advantages are due to its heating process, where the pot is directly heated by the induced currents generated with a varying magnetic field. As a result, the glass where the pot is supported is not directly heated and, consequently, efficiency and heating times are improved. IH systems are based on dc-link inverters to generate the required alternating current to feed the inductor. Usually, resonantconverters are used to achieve higher efficiencies and power densities. In such systems, the maximum output power and efficiency are achieved at the resonant frequency, and the switching frequency is increased to reduce the output power. As a consequence, in these converters, the efficiency is also reduced in the low-medium output power range. This paper proposes the use of the half-bridge inverter in two operating modes to achieve higher efficiency in a wide output power range. The power converter topology can be reconfigured by changing the resonant capacitors through electromechanical relays. As a consequence, the entire efficiency of the cooking process is improved with a cost-effective procedure. In addition to this in the rectifier unit instead of using bridge rectifier, Vienna rectifier which is known as power factor correction rectifier is used which improves the power factor near to unity and thus improves the efficiency of the system. The simulation result is verified using MATLAB/SIMULINK.

Index Terms—Induction heating (IH), inverter, resonant power conversion, power factor correction.

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