ABSTRACT

In recent days the gold price is on a big hike which has lead to increase in recycling process. The melting is the first stage of recycling. Thus a requirement is generated for development of optimized Embedded controller for Induction Melting machine.

Electromagnetic induction refers to the phenomenon by which electric current is generated in a closed circuit by the fluctuation of current in another circuit placed next to it. In the melting applications, induction heating has made it easier to set the heating parameters without the need of an additional external power source. This substantially reduces heat loss while maintaining a more convenient working environment. Absence of any physical contact to heating devices precludes unpleasant electrical accidents. High energy density is achieved by generating sufficient heat energy within a relatively short period of time.

The demand for better quality, safe and less energy consuming products is rising. Such systems are described in the literature but no commercial design is available. Theoretical aspects are well understood but the practical utility and cost analysis are to be investigated.

As a resonant converter provides most of the energy conversion efficiency in a power system by minimizing switching loss it is widely used in a variety of industries. And this is also the reason why the converter is adopted in the Induction Melting Power System Topology, which is the major area of work for this thesis.

The main objective of the research work is to propose and implement the modified quasi-resonant converter. Project envisages the development of Embedded Controller to improve the performance of Induction Melter. Proposed strategies employing soft computing are simulated using development support tools such as: MATLAB/SIMULINK. Ideas of the practical application of such a Melter for Gold & other metals with all next generation facilities and cost benefit analysis are looked into detail. The project provides sufficient insight into these aspects. The technical report discusses technical and economical competitiveness of the prototype. Commercialization of the technology is positive.

A prototype model is developed to evaluate the scheme and to generate experimental results.