

Abstract

The aim of the project is to design and develop a circuit of battery charger for AC Locomotives with higher efficiency. In AC locomotives battery charger is used for charging the battery and to supply the power also to load (like fans, lights). Three-stage conversion is implied for charging up the battery. In AC locomotives where temperature is vital factor and increase in temperature can invite malfunctioning of system. Above all in this project size of the charger is key factor it should not be more than 520mm x 170mm. Temperature factor and the rigidity of the module are of at most important since the charger will be mounted in the railway, mechanical design will have important part to play in the design phase. So considering all the aspect involved this battery charger is itself an aboriginal product.

A 2.2kW battery charger for AC locomotives provide 110 V /20A DC at O/P. Efficiency is between 87-93% and switching frequency of 40 KHz.

There are many constraints in the design of a battery charger out of which cost and space are very vital. The space available for mounting the charger is 520mm x 170mm only. Also temperature factor and the rigidity of the module are of at most importance since the charger will be mounted in the railways, mechanical design will have important part to play in the design phase. So considering all the aspect involved this battery charger is itself is an aboriginal product.

These kinds of modules are going to mount in the single cubical electrical cabinet in AC locos. After successfully testing, 40 units are going to produce annually by SIEMENS LTD, Nashik works. So this is tremendous cost saving project.

After successful field test further revised charger for different application in railways are going to be developed. In this project FETs are used but FET are more vulnerable during short circuit so battery charger based on IGBT is planned for better reliability and less failure rates.