DESIGN OF POWER ELECTRONIC INVERTER FOR ACTIVE POWER REDISTRIBUTION IN AN UNBALANCED THREE PHASE SYSTEM

M. T.K.De Silva
(PG/EE/22/99)

thesis submitted to the Faculty of Engineering, University of Moratuwa
in partial fulfillment of the requirement for the degree of
Master of Engineering
In
Electrical Engineering

Under the supervision of
Dr. J.P.Karunadasa
Faculty of Engineering
University of Moratuwa

2004

Abstract

This project presents a scheme to balance the active power consumed by unbalanced loads in three-phase four wire system.

Power systems are generally unbalanced due to asymmetry of the load applied and different time operations by consumers. Unbalanced operating conditions cause lot of problems to the power system.

There are schemes for power balancing in three phase three wire systems, but this project illustrates power balancing in three-phase four wire systems.

It can be shown that a power electronic converter based on the generalized instantaneous power theory, can redistribute active power among phases. The generalized instantaneous power theory can be used in both three-wire and four-wire three-phase systems.

Power electronic circuit takes power from the phase that delivers low power and feeds to the phase that delivers high power. Therefore load as viewed by the power source becomes balanced without negative and zero sequence components although unbalanced power is still supplied to the load.

The load current and the voltage are measured continuously and the instantaneous power is calculated. Reference current wave for the hysteresis current controller is calculated using the-control strategy. Power electronic inverter is controlled by hysteresis current controller and it redistributes the active power in the phases. There are no external power sources used and the inverter is driven by a capacitor. Therefore power source supplies balanced power to an unbalanced source.

The simulation studies of the project is done by MatLab software and results show that the source current becomes balanced after connecting to the power electronic

converter The rating of the power electronic converter is decided on the basis of the phase unbalance rather than the rated load power.

DECLARATION

I hereby declare that this submission is my own work and that, to the best of my knowledge and behalf, it contains no material previously published or written by another person nor material, which to substantial extent, has been accepted for the award of any other academic qualification of an university or institute of higher learning except where acknowledgement is made in the text.

M.T.K.De Silva
February 2004

Dr. J.P.Karunadasa
Project Supervisor
February 2004

Acknowledgements

First of all, thanks to Dr. J.P. Karunadasa for his guidance and advice throughout my research as the supervisor.

I am also grateful to all the staff led by Prof J.R. Lucas of the Department of Electrical Engineering, University of Moratuwa for their help with this research.

My special thanks also go to all the previous researchers who contributed to the development of knowledge in this area of concern which immensely help me throughout this research work..

Last, but by no means least, a special mention for my daughter, Nethmi and my husband Muditha who have provided the love and support required for such a work as this to be completed.

Thank you to everyone for all the help, support and encouragement.

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