

A Major-Project report on

# **"High Reactive Power Compensation Accuracy for cascaded H-Bridge Inverter Based Decoupling"**

Submitted to

**Jawaharlal Nehru Technological University, Hyderabad**

In partial fulfillment of the academic requirements for

the award of Degree of

**BACHELOR OF TECHNOLOGY**

In

**ELECTRICAL & ELECTRONICS ENGINEERING**

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**2022-23**

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### CERTIFICATE

This is to certify that the major project entitled **"High Reactive Power Compensation Accuracy For Cascaded H-Bridge Inverter Based Decoupling"** submitted to JNTUH carried out by the following students of IV-B.Tech in the partial fulfillment for the award of the B.Tech Degree in **Electrical&Electronics Engineering** during the academic year 2022-23.

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## ABSTRACT

The Static Synchronous Compensator (STATCOM) has gained popularity among many utilities for solving power quality problems in distribution substations. There are many types of topologies for STATCOM found in the literature, of which the Multilevel Cascaded H-bridge Inverter (MCHI) is the most adaptable and energy efficient power inverter topology. The aim of this paper is to define a control scheme and its transfer function in order to achieve low switching frequency and high-bandwidth power control of MCHI. The controller of the proposed STATCOM system is implemented to provide vector control for reactive power or Voltage-Ampere Reactive (VAR) compensation at the Point of Common Coupling (PCC) under balanced loading conditions. To accomplish this, mathematical equations for a STATCOM system is derived in dq-coordinates based on Park's transformation. Then, the designed equations are used to calculate appropriate values of the controller's gain parameters for realizing the cascade Pulse Width Modulation (PWM) STATCOM with various voltage and current ratings. Lastly, the performance of the proposed control scheme is verified through simulation and numerical analysis using MATLAB-Simulation link.



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