# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"Jnana Sangama" Belagavi – 590 010

## PROJECT REPORT ON

# "AUTOMATIC POWER FACTOR CORRECTION"

Submitted in partial fulfillment of the requirements for the award of degree

**BACHELOR OF ENGINEERING**
**IN**
**ELECTRONICS & COMMUNICATION ENGINEERING**

**Submitted By**


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**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**
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**2017-2018**

# ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

**MOODBIDRI – 574 225**

(Affiliated to VTU, **BELAGAVI**)

**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

# CERTIFICATE

Certified that the project work entitled "**AUTOMATIC POWER FACTOR CORRECTION**" is a bona fide work carried out by

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in partial fulfillment for the award of BACHELOR of ENGINEERING in **ELECTRONICS & COMMUNICATION ENGINEERING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2017–2018. It is certified that all corrections/suggestions indicated for internal assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the Bachelor of Engineering degree.

25/5/18 D.V. 25/05/18

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# ABSTRACT

Power factor correction using capacitor banks reduces reactive power consumption which will lead to minimization of losses and at the same time increases the electrical system's efficiency. Power saving issues and reactive power management has brought to the creation of single phase capacitor banks for domestic applications. The development of this project is to enhance and upgrade the operation of single phase capacitor banks by developing a micro-processor based control system. The control unit will be able to control capacitor bank operating steps based on the varying load current. Current transformer is used to measure the load current for sampling purposes.

The project work applies the Peripheral Interface Controller (PIC) microcontroller to produce switching commands in order to control the capacitor bank steps. Intelligent control using this micro-processor control unit ensures even utilization of capacitor steps, minimizes number of switching operations and optimizes power factor correction. Fluorescent lamp will be used as loads in this single phase capacitor bank developments. That fluorescent lamp shall be divided into different load value to enable capacitor bank model is controlled systematically. This project aims to present an indigenous technique and method which could be used for static power factor correction. It is demonstrated in this work that phase difference between voltage and current can be determined using zero crossing detectors. Voltage and current transformers have been used for transforming load voltage and current respectively to bring them in desired working range of microcontroller. The Power Factor of varying load can be measured and compensated using static methods. After measurements, the reactive power is compensated by switching capacitors using solid state relays by taking advantage of its long life and fully static Power Factor correction. Based on this calculation, capacitors are automatically brought online or offline by switching solid state relay to achieve unity power factor after displaying the essential data on Liquid Crystal Display (LCD).This project provided one of the techniques used to overcome power losses due to low power factor associated with common household and small industrial units. In this project work AC load voltage and current was measured by sampling rectified sine wave. All information (i.e. RMS voltage and & current, active power, reactive power, apparent power, power factor, capacitance) works using different formulas. Moreover, based on this analysis, a corrective algorithm is to achieve power factor close to unity.