

**DESIGN AND ANALYSIS OF SOFT START OF A
THREE PHASE INDUCTION MOTOR**

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**AHMAD FAIZ BIN AHMAD
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM,
SELANGOR, MALAYSIA**

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ABSTRACT

Nowadays industries are using machinery which has large capacity power rating. The three phase induction motor is commonly used in industries. Large capacity induction motors take very high inrush currents during starting direct from a three phase supply. To avoid this problem, soft start technique during starting is used to get the smooth starting of large capacity induction motors. AC voltage controller topology is used as a means of the soft start technique. By using this starting technique, harmonics rich current will exist particularly during operating at large firing angles. Connecting the active power filter (APF) in parallel with the system will reduce the total harmonics distortion (THD) of the system. This study uses MATLAB/Simulink software to design the circuit. The simulation is using the equivalent circuit of the motor. The parameters of the equivalent circuit referred to the 15 kW (20hp) asynchronous motor types as used in the Simulink library with and without soft start arrangement.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

The three phase induction motor is commonly used in industries nowadays. The induction motor was named as such because voltage is induced in the rotor (thus no need for brushes), but for this to happen, the rotor must rotate at a lower speed than the rotating stator magnetic field to allow for the existence of an induced voltage. Therefore a new term is needed to describe the induction motor, the slip. Most application used the three phase induction motor in many field such commercial, general industrial and heavy industrial. The examples of the machinery that use the three phase induction motor are the HVAC fans, pumps, conveyor, material handling and mining. Theoretically, the three phase induction motor is self-starting. Its stator consists of three phase windings, which produce the rotating magnetic field when connected to the three phase source. The rotation of the rotor is produced from the magnetic field created by the rotor and the stator. Both magnetic fields will interact each other and produce a rotation. There is a number of starting technique of the three phase induction motor. For examples, the common techniques are direct on line starter, star-delta starter, autotransformer starter, rotor impedance starter and power electronics starter [1]. Large capacity induction motors take very high inrush currents during starting direct from a three phase supply. To avoid this problem, soft start technique during starting is used to get the smooth starting of large capacity induction motors.