

# ELECTRICAL AUTOMATION SYSTEMS TOWARDS INTELLIGENT AND ENERGY EFFICIENCY APPLICATIONS

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Musse Mohamud Ahmed



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**ELECTRICAL AUTOMATION SYSTEMS  
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INTELLIGENT AND ENERGY EFFICIENCY  
APPLICATIONS**

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## CONTENTS OF THE BOOK

<u>Chapter</u>	<u>Title &amp; Author</u>	<u>Page No</u>
<b>PART I: ELECTRICAL DISTRIBUTION AUTOMATION SYSTEMS</b>		
CHAPTER 1:	ELECTRICAL DISTRIBUTION SYSTEM ..... Musse Mohamud Ahmed and Soo Wai Lian	2
CHAPTER 2:	ELECTRIC DISTRIBUTION EQUIPMENT FAULTS..... Musse Mohamud Ahmed and Soo Wai Lian	6
CHAPTER 3:	FAULTS FROM TRADITIONAL TO AUTOMATION TECHNIQUES..... Musse Mohamud Ahmed and Soo Wai Lian	15
CHAPTER 4:	SCADA SYSTEM FOR ELECTRICAL DISTRIBUTION SYSTEM..... Musse Mohamud Ahmed and Soo Wai Lian	22
CHAPTER 5:	SCADA SOFTWARE DEVELOPMENT–INDUSOFT CASE STUDY ..... Musse Mohamud Ahmed and Soo Wai Lian	25
CHAPTER 6:	PROTECTION SYSTEM FOR ELECTRICAL DISTRIBUTION..... Musse Mohamud Ahmed and Soo Wai Lian	37
CHAPTER 7:	RELAYS..... Musse Mohamud Ahmed and Soo Wai Lian	43
CHAPTER 8:	REMOTE TERMINAL UNIT (RTU)..... Musse Mohamud Ahmed and Soo Wai Lian	49
CHAPTER 9:	INTELLIGENT AUTOMATION SYSTEM: AUTOMATION HARDWARE DEVELOPMENT Musse Mohamud Ahmed and Soo Wai Lian	60
CHAPTER 10:	SCHEMATIC DIAGRAMS OF AUTOMATED SUBSTATION PANELS..... Musse Mohamud Ahmed and Soo Wai Lian	69
CHAPTER 11:	SOFTWARE AUTOMATION DEVELOPMENT ..... Musse Mohamud Ahmed and Soo Wai Lian	78
CHAPTER 12:	DEVELOPMENT OF MODBUS TCP/IP SETTING..... Musse Mohamud Ahmed and Soo Wai Lian	87
CHAPTER 13:	POWER LINE CARRIER COMMUNICATION SYSTEM..... Musse Mohamud Ahmed and Soo Wai Lian	96
CHAPTER 14:	WIRELESS COMMUNICATIONS FOR ELECTRIC SYSTEM AUTOMATION..... Othman O. Khalifa and Musse Mohamud Ahmed	103
CHAPTER 15:	DEVELOPMENT OF AUTOMATION SYSTEM FOR SMALL/MEDIUM	

SCALE BIOMASS BASED RENEWABLE POWER PLANTS .....	108
Musse Mohamud Ahmed and Sheroz Khan	

<u>Chapter</u>	<u>Title &amp; Author</u>	<u>Page No</u>
<b>PART II: INTELLIGENT SYSTEMS USING COMMUNICATION AND ELECTRONICS SYSTEMS</b>		

CHAPTER 16:	MODELING OF LOW VOLTAGE POWER LINE FOR DATA COMMUNICATION: SIMULATION RESULTS .....	118
	Amar Hazwani Binti Radzi, Wisatawati Darwis Harahap, Sheroz Khan, Musse Mohamud Ahmed and Khaizuran Abdullah	
CHAPTER 17:	LOW VOLTAGE POWERLINE ANALYSIS AND SIMULATION RESULTS.....	125
	Amar Hazwani Binti Radzi, Wisawati Darwis Harahap, Sheroz Khan, Musse Mohamud Ahmed and Khaizuran Abdullah.	
CHAPTER 18:	ZIGBEE APPLICATIONS TO WIRELESS COMMUNICATION SYSTEMS .....	133
	Hikma Shabani, Musse Mohamud Ahmed, Sheroz Khan and Rashid A. Saeed	
CHAPTER 19:	MODELING OF AN ENVIRONMENT FRIENDLY HYBRID ELECTRIC VEHICLE (HEV).....	138
	Musse Mohamud Ahmed, M. Habib Ullah, Teddy S. Gunawan, M. Raihan Sharif and Riza Muhida	
CHAPTER 20:	PIC 16F877A FOR HYBRID VEHICLE CONTROLLER .....	144
	Musse Mohamud Ahmed, M. Habib Ullah, Teddy S. Gunawan, M. Raihan Sharif, and Riza Muhida	
CHAPTER 21:	FPGA-BASED HARDWARE MODELING OF LIGHT RAIL TRANSIT FARE CARD CONTROLLER .....	155
	Musse Mohamud Ahmed, M. Raihan Sharif and M. Habib Ullah	
CHAPTER 22:	DEVELOPMENT OF A METHOD TO MAINTAIN TEMPERATURE AND HUMIDITY IN AN OPEN COMPOUND RESTAURANT .....	166
	M. Raihan Sharif and M. Habib Ullah, Musse Mohamud Ahmed	

### **PART III: ENERGY EFFICIENCY APPLICATIONS TO ELECTRIC MOTORS AND FAN MOTORS**

CHAPTER 23:	ELECTRIC MOTOR .....	176
	Musse Mohamud Ahmed, Noor Zatil Amali Bt Muhammad Hanapi and Che Fazilah Bt Fathil	
CHAPTER 24:	LOSSES OF ELECTRIC MOTORS .....	180
	Musse Mohamud Ahmed, Noor Zatil Amali Bt Muhammad Hanapi and Che Fazilah Bt Fathil	
CHAPTER 25:	ELECTRIC MOTOR EFFICIENCY .....	185
	Musse Mohamud Ahmed, Noor Zatil Amali Bt Muhammad Hanapi	

and Che Fazilah Bt Fathil

CHAPTER 26:	ENERGY EFFICIENCY IMPLEMENTATION OF PERMANENT MAGNET SYNCHRONOUS MOTOR.....	191
	Musse Mohamud Ahmed, Noor Zatil Amali Bt Muhammad Hanapi and Che Fazilah Bt Fathil	

<u>Chapter</u>	<u>Title &amp; Author</u>	<u>Page No</u>
CHAPTER 27:	ENERGY CALCULATIONS.....	195
	Musse Mohamud Ahmed, Noor Zatil Amali Bt Muhammad Hanapi and Che Fazilah Bt Fathil	
CHAPTER 28:	MODELING, RESULT AND ANALYSIS .....	203
	Musse Mohamud Ahmed, Noor Zatil Amali Bt Muhammad Hanapi and Che Fazilah Bt Fathil	
CHAPTER 29:	AIR BLOWING EQUIPMENT .....	210
	Musse Mohamud Ahmed, Rafizah Rahmatullah and Syarifah Nur Zati Abdul Rashid	
CHAPTER 30:	ENERGY USAGE IN MALAYSIA.....	214
	Musse Mohamud Ahmed, Rafizah Rahmatullah and Syarifah Nur Zati Abdul Rashid	
CHAPTER 31:	FAN MOTOR EFFICIENCY REQUIREMENT.....	217
	Musse Mohamud Ahmed, Rafizah Rahmatullah and Syarifah Nur Zati Abdul Rashid	
CHAPTER 32:	APPLICATION OF FAN MOTOR ENEGY EFFICIENCY.....	220
	Musse Mohamud Ahmed, Rafizah Rahmatullah and Syarifah Nur Zati Abdul Rashid	
CHAPTER 33:	FAN EFFICIENCY GRADE (FEG) DEVELOPMENT STAGES.....	223
	Musse Mohamud Ahmed, Rafizah Rahmatullah and Syarifah Nur Zati Abdul Rashid	
CHAPTER 34:	FEG AND FMEG PRACTICAL CONSIDERATIONS – FAN SELECTIONS GUIDE .....	227
	Musse Mohamud Ahmed, Rafizah Rahmatullah and Syarifah Nur Zati Abdul Rashid	
CHAPTER 35:	RESULTS AND DISCUSSIONS.....	232
	Musse Mohamud Ahmed, Rafizah Rahmatullah and Syarifah Nur Zati Abdul Rashid	

## CHAPTER 23

### ELECTRIC MOTOR

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#### 23.1 Introduction

The main goal of this part is focused on high efficiency electrical machine optimization performances. Results of the motor efficiency are compared among the motors, which are Hanning, Ashley Power, VEM, Siemens and ITT motors. The permanent magnet synchronous motor (PMSM) is implemented by selecting the most efficiency motor, which is determined by the calculation assessments. This explains the theoretical basis of the permanent magnet synchronous motors. The Matlab simulink model was developed to examine the performance of permanent magnet synchronous motor. The results indicated that permanent magnet synchronous motor could be a practical solution for the new efficiency standard and with further optimization of parameters, the performance could be even more competitive and the cost might be reduced as well.

#### 23.2 Electric Motors Problems

Industry/organizations should come up with performance studies on the equipment used in their facilities such as electrical motors to save energy and as well develop energy efficiency performance analysis for operating the electrical motors. There is no such this system in Malaysia. Electrical motors are widely used in every sector of the industry. They are the backbones of all types of industries including universities laboratories. This book focuses on developing new operating performances for electrical motors suitable to particular environmental conditions. The main goal is to study the ways and means to develop the standard parameters of new electrical motors and come up with operating performance criteria for the new electrical motors. As we know that the real data is not commonly available in the facilities because the data is confidential to the manufacturing companies and cannot be public domain. The data used in part has been collected from different industrial manufacturers to study and do analysis. Matlab software was used to come up with simulink of an energy saving reduction techniques for energy efficiency purposes. Data comparisons were done to verify the integrity of the used data. For the Matlab simulink of energy saving reduction techniques for energy efficiency purpose we implement the data of induction motor we get from the manufacturers to permanent magnet motors.

Small and large appliances have a motor, a heating element, or both. Motors are important components to hundreds of devices we use in daily life. Electrical motors are widely used in every sector of the industry. They are the back bone of all types of industries