

Aníbal de Almeida · Paolo Bertoldi
Werner Leonhard (Eds.)

Energy Efficiency Improvements in Electric Motors and Drives

With 224 Figures
and 101 Tables



Springer

Contents

Preface	V
Part I - Introduction	
Energy-Efficient Motor Technologies..... <i>Aníbal T. de Almeida, Paula Fonseca</i>	1
Part II - The Relevance of Motors and Drives	
Characterisation of the Electricity Use in European Union and the Savings Potential in 2010..... <i>Aníbal T. de Almeida, Paula Fonseca</i>	19
The United States Motor Systems Baseline: Inventory and Trends..... <i>Mitchell Rosenberg</i>	37
Motors and Drives :The Challenges to a Global Company..... <i>Paul Buysse</i>	61
Efficient Use of Electricity in Motors and Drives: The Utilities´ Perspective..... <i>Domenico Carra, Gianpietro Pacati</i>	70
Part III - Energy-Efficient Motors	
The Whole Life Efficiency of Electric Motors - UK Developments..... <i>D. G. Walters</i>	81
Energy Efficient Motors..... <i>Joseph A. Kline</i>	95
Motor Developments and Energy Efficiency..... <i>Sven Sjöberg</i>	102

Efficiency Improvements in Induction Motors.....	113
<i>Takaharu Watanabe</i>	
Induction Motor Technology: Experience in Design Optimization of High Efficiency Induction Motors.....	116
<i>Enzo Chiricozzi, Francesco Parasiliti, Marco Villani</i>	
Electric Motor and Belt Retrofits: Measured Savings and Lessons Learned..	138
<i>Steve Greenberg</i>	
Part IV - Energy Savings with Electric Drives	
Efficiency Gains in Electrical Drive Systems.....	149
<i>Jouko Karvinen, Mauri Peltola</i>	
Electronic Drive Systems: A Major Source of Energy Savings.....	159
<i>François Peltier</i>	
Electric Variable Speed Drives: Development (1-300 KW) and Some Impacts on Energy Savings.....	166
<i>Paul Thøgersen, Kenneth Skaug Rasmussen</i>	
Part V - Advanced Motor and Drive Technologies	
Power Electronics and Electrical Drives, a Key to Flexible and Efficient Electromechanical Energy Conversion.....	175
<i>Werner Leonhard</i>	
Advanced Motor Technologies: Reluctance Motors.....	188
<i>H. R. Bolton</i>	
Advanced Motor Technologies: Converter Fed Machines (CFMs).....	205
<i>T. A. Lipo</i>	
Advanced Motor Technologies: Synchronous Motors and Drives.....	223
<i>A. Vagati</i>	
Part VI - Efficiency Testing Standards	
Efficiency Measurement Testing Standards Stray Loss, the Key to Efficiency Determination.....	249
<i>C. N. Glew</i>	

Comparative Efficiency Measurements IEC 34-2 vs IEEE 112.....	266
<i>R. G. Bartheld, J. A. Kline</i>	
Efficiency Measurement Testing and Labeling.....	274
<i>Paul G. Cummings</i>	
Considerations about the Determination and Designation of the Efficiency of Electric Machines.....	284
<i>H. Auinger</i>	
Part VII - Policies	
Strategies to Promote Energy-Efficient Motor Systems.....	305
<i>E. Jochem, M. Landwehr</i>	
Barriers Towards Successful Technology Transfer and Commercialization of Energy Efficient Advanced Motors and Drives.....	321
<i>Ben Benerjee, Patrick J. McCleer</i>	
Electric Motor Energy Efficiency Regulations: The Canadian Experience...	337
<i>Valerie Whelan</i>	
United States Department of Energy: National Energy Efficiency Program for Consumer Products and Commercial Equipment.....	346
<i>Anthony Balducci</i>	
Industrial Motor Standards in Latin America.....	351
<i>Stephen Hall</i>	
Part VIII - Programmes I (America and Far East)	
Overview of Programmes to Promote Energy Efficient Motor Systems in the United States.....	365
<i>Steven Nadel, Neal Elliott</i>	
A National Strategy for Energy Efficient Industrial Motor-Driven Systems..	377
<i>Paul E. Scheihing</i>	
High Efficient Motors in Brazil: a Perspective.....	390
<i>Adilson de Oliveira, Edmar de Almeida, George Soares</i>	
Energy Efficiency of Electric Motors and Drives: Australian and New Zealand Programmes.....	408
<i>David Cogan</i>	

Part IX - Programmes II (Europe)

Calculation of Energy Savings from Drives: The French Demand Side Management Approach.....	419
<i>Alain David, Mario Panasco, Bruno Chretien</i>	
Italian Programmes.....	432
<i>Salvatore Russo</i>	
RAVEL - The Swiss Energy Programme: Information and Training in Efficient Drives and Energy Saving.....	439
<i>Raimund E. Neubauer, Konrad Reichert, Jürg Nipkow</i>	
Energy Efficiency Improvements in Motors and Drives: United Kingdom Programmes.....	448
<i>Hugh Falkner</i>	
The Danish High Efficiency Motor Campaign 1996-1998.....	452
<i>Søren Rise</i>	
The Dutch Programme on Efficient Motors and Drives.....	464
<i>Dick Both</i>	

Part X - Motor Databases

MotorMaster+: The Evolution of a Motor Energy Management Tool.....	475
<i>Craig Wohlgemuth, Gilbert McCoy, Chris Cockrill</i>	
Data Integrity and the Canadian High-Efficiency Motors Database.....	497
<i>Jacques Ethier</i>	
The Selection of Energy-Efficient Motors from Catalogues.....	503
<i>Ronald Tanner</i>	