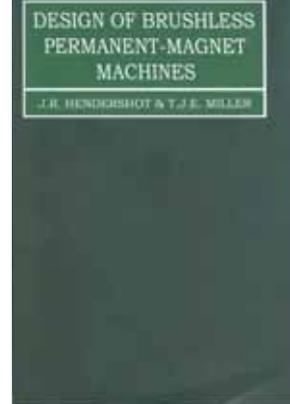


New Book Updates a 1994 Classic on Brushless Permanent Magnet Motors

DESIGN OF BRUSHLESS PERMANENT-MAGNET MACHINES

By Jack McGuinn, Senior Editor



By J.R. Hendershot
and T.J.E. Miller
822 pages, published in USA
by Motor Design Books LLC

The latest offering by machine design experts J.R. Hendershot and T.J.E. Miller is an 822-page brushless permanent-magnet (PM) machine design book that serves as a worthy follow-up to their 1994 work (*Design of Brushless Permanent-Magnet Motors*). The new entry—*Design of Brushless Permanent-Magnet Machines*—is rich in color illustration and is the direct result of extensive consulting by the authors in collaboration with a number of the preeminent producers of brushless permanent-magnet machine products. Much of the theoretical material derives from Miller's SPEED Laboratory at the University of Glasgow, acknowledged as a leading supplier of design software for electric machines—specifically, the theory text that accompanies the SPEED PC-BDC software developed by Miller. The book was written with a focus on real-life engineering practice and addresses the questions that typically arise on a daily basis in PM brushless machine design. As such, working engineers have used the 1994 book as a reliable go-to resource. In the update, there are many more examples than the 1994 book. The expertise on display in this volume is the result of the authors' long-standing partnership and combination of theoretical, practical and consulting experience. In addition, the book and its illustrations of industrial products are striking testimony to the incredible engineering accomplishments of design engineers around the world.

Following are brief notations for each chapter, all of which are indicative

of the depth of interest and knowledge to be found in this comprehensive study:

General Introduction; Machine Types and Applications; Basic Design Choices; FLUX, EMF and Torque; Inductance; Squarewave Drive; Sinewave Drive; kT and kE, and Figures-Of-Merit; Generating; Multiple-Phase Machines; Line-Start Motors; Losses and Cooling; and Testing, followed by a very detailed Appendix.

A sampling of accompanying sub-chapters includes: (1) Definitions and types of brushless motors; (2) Machine configuration; (3) Sizing—the ABC of electric machine design; (4) Permanent magnets and magnetic circuits; (5) Important practical effects of inductance; (6) Three-phase bi-polar drives; (7) Electronic control; (8) kT and kE of squarewave and sinewave motor/drives; (9) Configurations and loads; (10) Finite element analysis; (11) Analysis of polyphase and single-phase line-start motors; (12) Joule losses in stator conductors; and (13) Objectives of testing.

Add to this a very extensive collection of symbols, abbreviations and explanatory notes—and bibliography—and the result is perhaps a new gold standard for the study, understanding and implementation of brushless PM machine science

T.J.E. Miller, Ph. D., is founder and director of the Scottish Power Electronics and Electric Drives Consortium (SPEED). Members include over 100 industrial companies around the world. Miller led the development of theoretical methods,

design techniques and software used in the manufacture of electric motors and generators used in appliances, power tools, vehicle traction drives, aerospace and a wide variety of industrial products. An IEEE Fellow and Tesla Award recipient, Miller is the author of over 200 publications on motors, drives, power systems and power electronics, including nine books.

James R. Hendershot has over 40 years' experience in the practical design, development and manufacture of PM and switched reluctance brushless machines, as well as AC induction machines for inverter control. Mr. Hendershot has designed hundreds of machines for computer disc drives, machine tool spindles, traction motors, PM generators for micro-turbines and many other applications. His past employment includes Lear Siegler, Clifton Precision, General Motors, United Technologies and Pacific Scientific. He has written (or co-authored) numerous technical papers, publications and three books, plus 13 patents. An IEEE Fellow, Hendershot holds a bachelor's degree in physics from Baldwin Wallace College in Berea, Ohio. 