

Seminar 16 Monday June 18, 2001

A COMPREHENSIVE REVIEW OF THE BASIC DESIGN ELEMENTS OF THE BRUSHLESS PM MOTOR AND DRIVE AND ITS USE IN WORLD MARKETS

9:00am - 6:00pm

Instructor: Dan Jones, Inremotion Associates, USA

ABOUT THE INSTRUCTOR

Dan Jones received his BSEE degree from Hofstra University in 1965 and MS Mathematics at Adelphi in 1969. He has over 35 years experience in the design of precision servo and step motors and has held engineering design and management and marketing management positions at a number of companies. He is recognized as an international authority on electric motors and motion control. He has written over 150 technical articles and papers and held seminars in 10 countries. He is the Past President of AIME and is a member of the Board of Directors of SMMA.

ABSTRACT

This seminar brings together the technical attributes and design tradeoffs of the 9 specific types of brushless PM motors and their associated drives along with its market successes and failures. The brushless PM motor and drive history is chronicled from the 1950's to today. Today's application success stories are discussed along with projections on future brushless PM applications.

CONTENTS

- 1. History of the Brushless PM Motor and Drive**
- 2. The 1980's Brushless PM Motor and Drive Developments**
- 3. Basic Design Choices for the Brushless PM Motors**

- The permanent magnet – "Performance Engine"
- Inner versus outer rotor design
- Surface magnet brushless PM motors
- Buried magnet brushless PM motors
- Axial versus Radial Motor Types
- The Slotless or Ironless Brushless PM Motor
- New Design Configurations

- 4. Motor Design Issues**

- Permanent Magnet and Pole Combinations
- Air Gap Length Selection
- Segmented and Bridged Stator Configurations
- Winding Patterns: Basic and Special
- Soft Iron and Steels' Selection Process
- Minimizing Electrical Losses
- Minimizing Mechanical Losses
- Thermal Characteristics of the Brushless PM Motor

- 5. Basics of Drive Electronics**

- Basic Block Diagrams
- Trapezoidal versus Sinusoidal Drive Topologies
- Power Circuit Topologies
- Commutation Strategies
- Optimizing Control Strategies
- Integrating Electronics and Mechanics

- 6. Applications – Present and Future**

- Transportation / Appliance / Factory Floor / Medical Instruments / Office Automation
- Telecommunications / Entertainment / Others

WHO SHOULD ATTEND

Both technical and marketing managers and executives with responsibility for planning their company's future motion control products. Design engineers involved in design of other motor types who want both design and application information or who wish to update their knowledge.

SEMINAR