

INTRODUCTION TO ELECTRIC MOTORS

Electric motors provide the driving power for a large and still increasing part of our modern industrial economy. The range of sizes and types of motors is large and the number and diversity of applications continues to expand. The computer on which this book is typed, for example, has several electric motors inside, in the cooling fan and in the disk drives. There is even a little motor that is used to eject the removable disk from its drive.

All around us there are electrical devices that move things around.

Just about everything in one's life that whine, whirrs or clicks does so because an electric motor caused the motion.

At the small end of the power scale are motors that drive the hands in wristwatches, a job that was formerly done by a mechanical spring mechanism. At the large end of the power scale are motors, rated in the hundreds of megawatts (MW), that pump water uphill for energy storage.

Somewhat smaller motors, rated in the range of 12 to 15 MW, have taken over the job of propulsion for cruise ships—a job formerly done by steam engines or very large, low speed diesel engines.

The flexibility of electric motors and generators and the possibility of

transmitting electric power from place to place makes the use of electric motors in many drive mechanisms attractive. Even in situations in which the prime mover is aboard a vehicle, as in diesel-electric locomotives or passenger ships, electric transmission has displaced most mechanical or hydraulic transmission. As well, because electric power can be delivered over sliding contacts, stationary power plants can provide motive power for rail vehicles. The final drive is, of course, an electric motor.

The expansion of the use of electric motors' industrial, commercial and consumer applications is not at an end. New forms of energy storage systems, hybrid electric passenger vehicles, and other applications not yet envisioned will require electric motors, in some cases motors that have not yet been invented.

This book provides a basic and in-depth explanation for the operation of several different classes of electric motor. It also contains information about motor standards and application. The book is mostly concerned with application of motors, rather than on design or production. It takes, however, the point of view that good application of a motor must rely on understanding of its operation.

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