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Fundamentals of DC Operation and Repair Tips

This book is not meant to replace the many good texts that cover the theory and design of DC machines, but to supplement them. Its purpose is twofold: to help the technician understand DC machine theory without complex formulae; and in a larger sense, to record in one place the repair procedures and tips usually learned the hard way during a long career of DC machine repair. It may take a decade or longer for a technician to become proficient and knowledgeable. We hope this book will cut many years from that timeline.

The text begins with DC theory (no math, we promise!), and then follows the logical progression of a DC machine through the service center. Disassembly, inspection and testing are covered in the initial chapters.

Subsequent chapters are organized around the main parts of a DC machine. The final chapters cover assembly, final testing and application issues. Sections focusing on components explain how those parts work, how they are made and how they can best be repaired.

Repair tips gleaned from EASA members' decades of experience are liberally sprinkled throughout the book. While many texts about DC machines explain how they

should work, this is the first (to our knowledge) to discuss all the exceptions that a repairer is liable to run across during a lifetime of working with DC machines. These might otherwise be labeled "lessons learned the hard way," except that the reader can benefit from having all these special cases collected in one source. When possible, it is better to learn by reading than by trial and error; otherwise, the first encounter with a unique design can result in a painful "learning experience."

A DC machine can be used interchangeably as a motor or generator, simply by changing the connection. Any DC motor can be driven and used to produce power, and any DC generator can be motorized to provide mechanical power. Although this text predominately refers to "motor," the material applies to both motors and generators.

As with the other EASA publications—Principles of Large AC Motors, Mechanical Repair Fundamentals of Electric Motors, and Root Cause Failure Analysis—each section is designed to stand alone. The small amount of duplication is intentional, to save the reader from flipping back and forth between sections.

Electrical Apparatus Service Association, Inc.
1331 Baur Boulevard • St. Louis, Missouri 63132 • USA
314-993-2220 • Engineering Fax 314-993-2998 • www.easa.com

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