

*TODAY'S TECHNICIAN™*

# AUTOMOTIVE ELECTRICITY & ELECTRONICS

5TH EDITION

CLASSROOM MANUAL



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**BARRY HOLLEMBEAK**

***TODAY'S TECHNICIAN™***

**CLASSROOM MATERIAL**  
**AUTOMOTIVE ELECTRICITY  
AND ELECTRONICS**

**FIFTH EDITION**

**BARRY HOLLEMBEAK**

**Today's Technician™: Automotive Electricity  
and Electronics, 5th Edition**  
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**Professional Group Cengage Learning**

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Library of Congress Control Number

ISBN-13: 978-1-4354-7008-8

ISBN-10: 1-4354-7008-7

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5 Maxwell Drive

Clifton Park, NY 12065-2919

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## PREFACE

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Thanks to the support the *Today's Technician™* series has provided in the automotive technology, Delmar Cengage Learning, the series is able to live up to its promise to provide new editions of the series. We listened and responded to our critics and our fans and produced this fifth edition. By revising this series on a regular basis, we ensure that the series reflects the changes in the automotive industry, changes in technology, changes in the certification requirements, and the needs of those who teach automotive technology.

We also listened to instructors when they said something was missing in the last edition. We responded to those and the results are in this edition.

The *Today's Technician™* series, by Delmar Cengage, features comprehensive coverage of mechanical and electrical systems of automobiles and light trucks. The titles correspond to the certification areas for 2009 areas of certification (ASE Automotive Service Excellence) certification.

Additional titles include remedial skills and theories common to all technicians and advanced or specific subject areas that reflect the latest technology.

This new edition, like the last, was designed to give students the same skills and gain the same knowledge that today's successful technicians have. It reflects the changes in the guidelines established by the National Education Foundation (NATEF) in 2008.

The purpose of NATEF is to evaluate technician training programs and recommend qualifying programs by ASE. Programs can earn ASE certification upon the recognition that the national standards reflect the skills that students must master. The evaluation ensures that certified training programs meet or exceed the uniform standards of excellence.

The technician of today and for the future must know the theory and practice of the systems and be able to service and maintain those systems.





## PREFACE

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Chapter 1 introduces the student to the automotive electrical system and provides a general overview. This chapter emphasizes the interconnections of the system and describes the purpose and location of the subsystems and components of the system and subsystems. The goal of this chapter is to provide a foundation for students to base their learning on. All systems and subsystems discussed in the text are introduced and their primary purpose described. Chapter 2 covers the underlying basic theories of electricity and now includes a section on safety, which is valuable to the student and the instructor because it covers information that is often assumed the reader knows. All related basic electrical theories are covered.

Chapter 3 applies those theories to the operation of electrical systems, and Chapter 4 covers wiring and the proper use of wiring diagrams to determine how the system works and how to troubleshoot it.

The chapters that follow cover the major components of automotive electrical systems, such as batteries, starting systems and motor drives, lighting systems. This is followed by chapters that detail the operation of input components, and vehicle communication networks. The final chapter covers specific systems that utilize computer functions.

Current electrical and electronic systems are used as examples throughout the text. These systems are discussed in detail. This includes computerized engine management, lighting, night vision, adaptive lights, instrumentation, and more. Coverage includes intelligent wiper, immobilizer, and adaptive cruise control, among a few. Chapter 15 details the passive restraint systems currently in use.

## HIGHLIGHTS OF THIS EDITION—SHOP MANUAL

Like the Classroom Manual, the Shop Manual has a new layout and illustrations. The Shop Manual includes photographs and illustrations of the components and systems discussed in the text.

## PREFACE

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work order and ASE certification. Another section was added to cover proper diagnostic procedures.

Chapter 3 leads the student through basic troubleshooting of various test equipment to locate circuit defects and how to replace components. Chapter 4 provides experience with wiring repairs and exercises on using the wiring diagrams.

The remainder of the chapters has been thoroughly updated. The Classroom Manual and the Shop Manual has been reduced in size. Again is if it is necessary to explain the diagnostic results or procedures. The Shop Manual is cross-referenced to the Classroom Manual. This provides the benefit to the student of being able to quickly find a component or system that they are now working with.

Currently accepted service procedures are used as examples. The procedures also served as the basis for new job sheets that are in the chapters.

