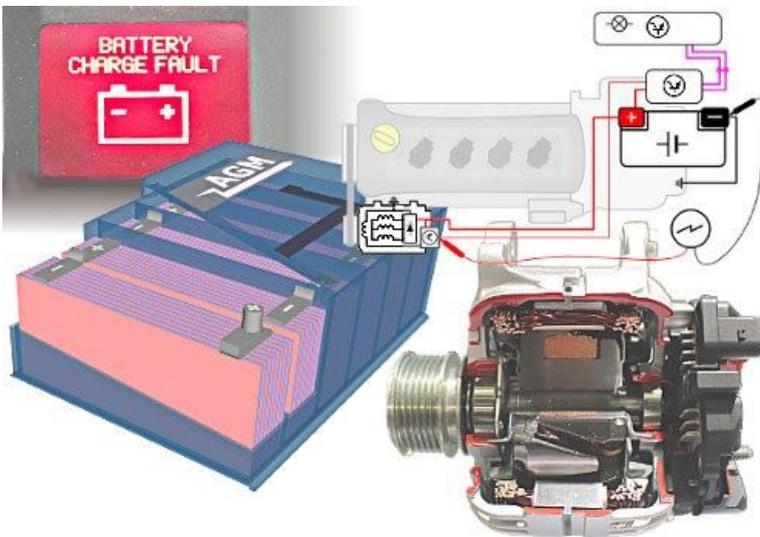




Charging System and Starter Batteries

The vehicle's electrical systems are all interconnected via electric power management, i.e. through the battery and charging system. Checking the battery and the charging system's condition is always the starting point for all troubleshooting in other electrical systems.



- Inspection of the charging system.
- Examples of measurement results and analysis.
- Alternator structure and operation.
- Alternator control circuits and operation types.
- Checking the starter battery using various methods.
- Structure and operation of starter batteries.
- Battery chargers.
- Highlight of battery replacement.

Language: English

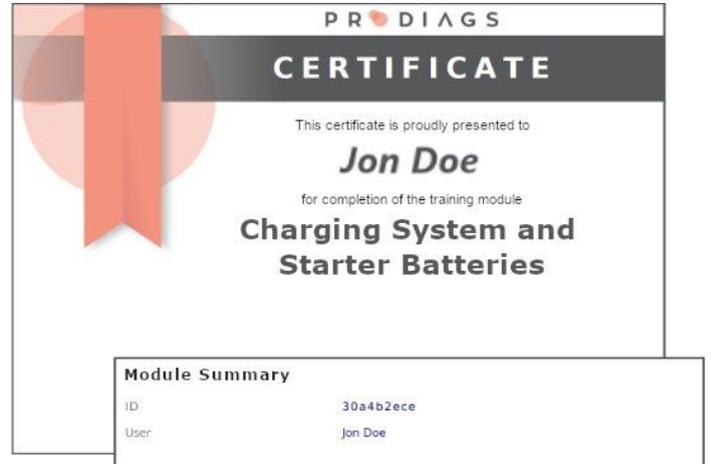
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LEARNING OUTCOMES

As your expertise improves, so too does your skills and abilities in performing work on charging systems and starter batteries. You will also be able to apply your skills in fault finding situations and execute better quality maintenance work.

Certificate

After completing your module of study and approved completion of the exercises, you will be allowed to take the final exam. After completing the final exam, you can print a Prodiags certificate from your attainments register as proof of your expertise.



INTRODUCTION

Why this module?

Understanding and checking the operation of the vehicle charging system is part of the basic skills of all mechanics. System checks must always be made before replacing the starter battery. For automotive technicians the inspection of the charging system and starter battery is the first practical situation to apply electrical and measurement technology skills.

What will you learn?

At the beginning of the study, you can immediately get acquainted with the operation of the charging system. You can challenge your expertise in electrical and measuring technology. In troubleshooting, you may find that the charging control circuit is not working properly. In this case, knowing and perceiving the control circuit and its operating conditions is a valuable skill. Studying will present you the main types of these control structures and will give you the basics for continuing the inspection.

The voltage regulation and voltage rectifier diodes check is performed on the battery terminals.

Charging voltage can be inspected by a multimeter or oscilloscope.

The inspection exploits the vehicle's electrical equipment (heaters, lights and heating equipment) to create maximum electric load.

Inspection stages:

1. At idle and maximum electrical load.
2. With more than 2500 rpm engine speed and minimum electrical load.

Throughout the different stages inspection the charging volt remain between 12.8 and 14.1V.

- Too low voltage will not sufficient battery charge.
- Too high voltage is a damage to the entire electrical system.
- In case of error, check the generator and alternator control.

The charging voltage rectification is checked with an oscilloscope in the so-called AC measurement. Instead of the voltage level, the measurement centralise at a very fast voltage variation, utilising AC voltage measurement. In the picture below you will find an example of a measurement device which also includes a display for the charge voltage and the charge current.

14.1V 24.1A

13.7V 22.3A

The rectifier diode fault, which appears as a clear change in AC measurement.

- The generator must be refurbished or replaced.

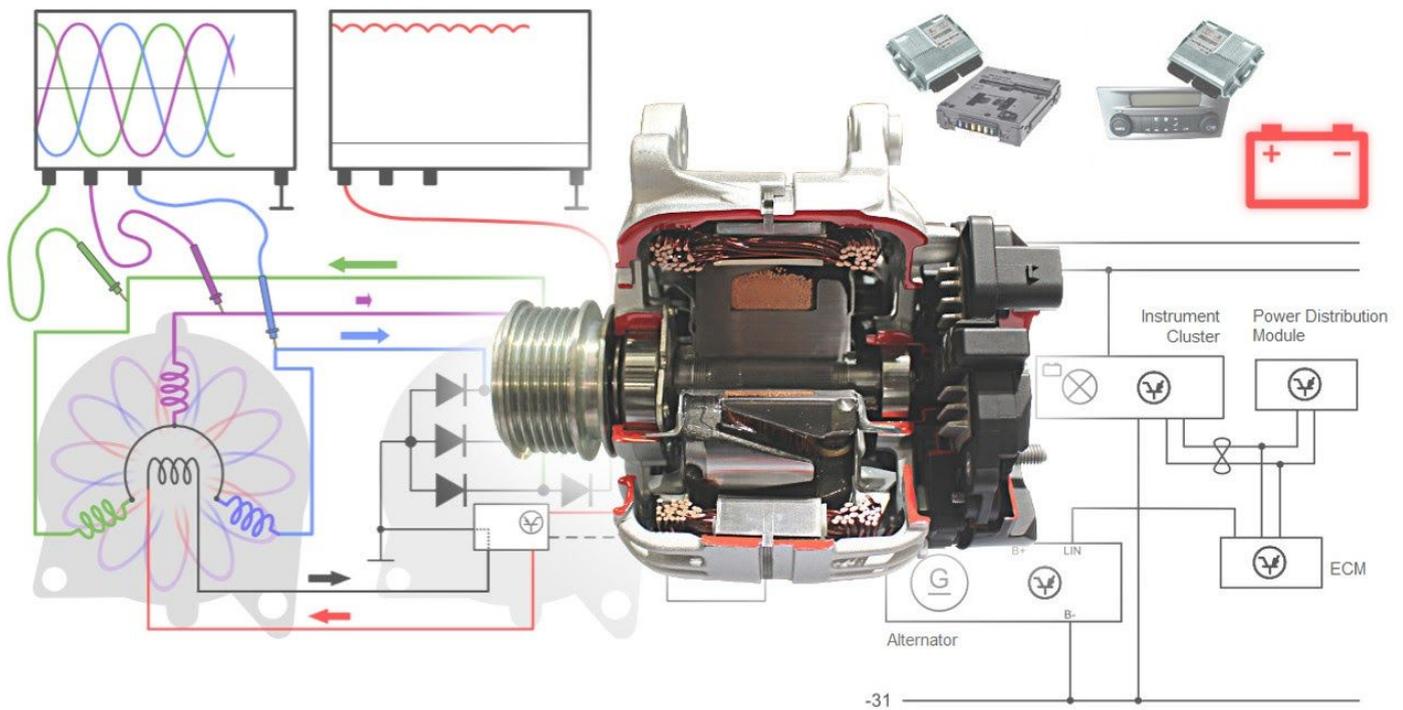
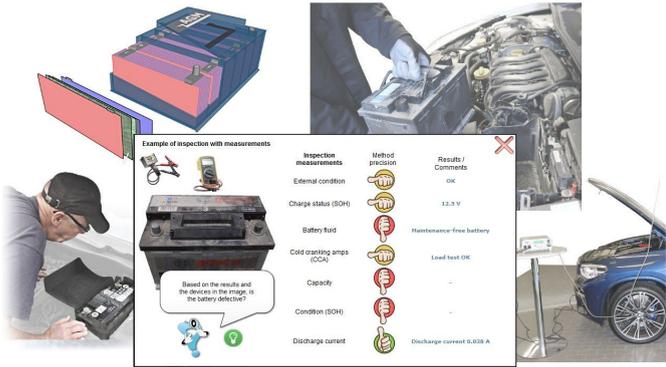
The rectification is fine when the voltage variation is low and steady.

Battery charging fault

PROSCOPE 2

As the troubleshooting progresses and when the fault is discovered, it becomes normal to have the need for more understanding of the basic components of the alternator construction and how it operates. The next study part covers more detailed information of structures and operation. You can explore more information via many illustrative images and animations.

Charging system operation involves a starter battery. Even if a malfunction and customer complains indicates a battery failure, you need always confirm the alternator operation and vehicle sleep mode discharge current before replacing the battery. How to check battery condition, there are several methods for that. Study of battery inspection will present you the most typical methods both without a battery tester with a tester. This will also help you learn the correct steps of the work procedure. You will also learn differences between various battery testing devices, feature and results. You quickly notice that checking the battery and the vehicle's basic electrical system correctly is a truly professional job.



Learn more about battery design and differences. Get information on different types of battery chargers and for what purpose they are developed. Finally, you will learn about the battery replacement steps. By studying more, you can learn more about battery structures and differences.

You will find information on various battery chargers and for what purpose they have been developed. Finally, you learn the most general steps for battery replacement.

PREREQUISITES

To get the best possible learning outcome, we hope that you have a basic knowledge in electricity and measurement techniques. For studying these subjects, we recommend the modules: Electricity.

System Requirements

Internet connection and PC or laptop with browser.
Recommended screen resolution 1024 x 768 or higher.

Updates

We want to make sure that you always have the latest version of our product. Prodiags reserves the right to make real time updates and changes. This way you'll always have the best version, without extra fees.

Content Equivalence

This modules topics and objectives correspond in scope to a conventional 2 day training event.

Once you have made your payment, you get immediate access to the content. You'll save time and money by not needing to travel.

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