



## Starting and Start-Stop System

Understanding the Starter System's function and control circuit is essential for a mechanic when troubleshooting a vehicle that won't start. Newer vehicles also has a Start-Stop function, which reduces emissions and noise.



- Check the starter circuit in a correct way
- Inspection measurements example with images
- Measurement analysis and condition assessment
- Typical starter motors, parts and function
- Control circuits and operation
- Start-Stop system, operation and use.

Language: English

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# LEARNING OUTCOMES

After the studies and applied practical tasks, you will have the skills to perform repair and troubleshooting work on the starter system. You will also be able to apply your skills to vehicles equipped with a Start-Stop system.

## 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 the operation of the starter system, and in particular its inspection is a prerequisite for troubleshooting a vehicle that won't start. Learning how to troubleshoot the starter system is a great opportunity for the mechanic to apply and practice the basic skills of electrical engineering and measurement technology.

## What will you learn?

At the beginning of the study, you will be familiarised with the operation of the starter system. You get to practice your expertise in electrical and measuring technology. The function check is divided into two typical fault descriptions, the starter motor rotates and does not rotate. The symptom has an impact on the order of performing the checks, and the conclusions.

**Starting current**  
Locate the positive supply cable between the battery and motor. Connect a current clamp to the oscilloscope around positive supply cable. Remember to zero the clamp before the measurement.  
Leave the battery voltage drop measurement in the other oscilloscope channel to support the evaluation of the current test.

**Based on the test result, the current draw of the starter motor is evaluated.**

When the starter motor is initially engaged, the current draw will increase sharply, but when the starter is rotating, current will reduce rapidly within approximately 0.1 seconds. When the starter motor and engine rotates, the starting current is:

- Petrol engine: decreasing 250A ... 100 Amps
- Diesel engine: decreasing 350A ... 100 Amps until the engine starts.

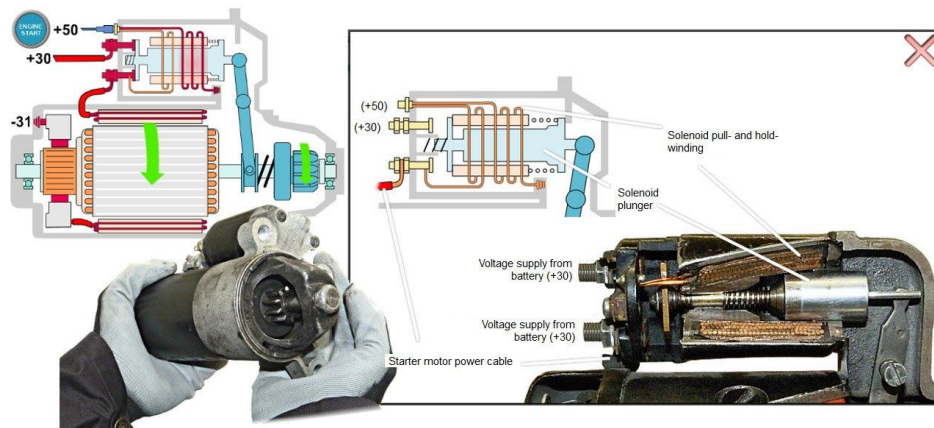
**Conclusions:**

- Excessively high starter current draw combined with excessive starting voltage drop indicates either a mechanical failure or a short circuit within the starter motor.
- Insufficient starter current draw combined with excessive starting voltage drop indicates either a low battery state of charge or low battery state of health.

Insufficient starter current draw combined with insufficient starting voltage drop requires further test measurements to be carried out.

In troubleshooting, you may find that the starter control circuit is not working properly. In this case, knowing and understanding the operating circuitry and operating conditions of the control circuit is a valuable skill. This study will show you the main types of these control structures and give you the basics for continuing the inspection.

As the troubleshooting progresses and when the fault is discovered, it becomes natural to understand which basic components the starter requires to operate. From the structure and activity part of the study, you will find illustrative content to answer your questions.



When working on the latest technology you will become familiar with Start-Stop vehicles. This environment- and consumption-saving system is becoming more common, it's functioning and its impact on the starting system must be known and taken into account in troubleshooting. In the Start-Stop system you will be introduced to the system basics, driving, components, and data used for the data network.

## PREREQUISITES

To get the best learning outcomes you need to have basic knowledge of electrical and measurement technology. Learning outcomes will improve if you have an oscilloscope. For studying these subjects, we recommend the module: 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 module's 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.