

# How to Change Spark Plugs: 2010-2013 Subaru Outback and Legacy



**Photo Credit: (U.S. National Highway Traffic Safety Administration)**

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## Table of Contents

Table of Contents .....	iii
Introduction .....	v
Deciding to Perform Your Own Vehicle Maintenance .....	v
Performing Your Own Maintenance For the First Time .....	v
Some Notes on This Guide .....	vi
Chapter 1: Before You Start .....	3
Open the Hood .....	3
Familiarize Yourself With the Engine Bay .....	4
Identify Your Engine .....	6
Assemble Your Tools and Materials .....	7
Chapter 2: Changing Your Spark Plugs .....	11
Familiarize Yourself With the Air Box .....	11
Remove the Air Box .....	12
Familiarize Yourself With Spark Plugs #1 and #2 .....	16
Familiarize Yourself With Spark Plugs #3 and #4 .....	17
Replace Your Spark Plugs .....	18
Reinstall The Air Box .....	23
Test Run Your Vehicle .....	26
Basic Troubleshooting .....	26
Index .....	27
References .....	28



## Introduction

Subaru recommends that you change the spark plugs in the 2010-2013 Outback/Legacy every 60,000 miles (Spitz, 2011). Most Subaru dealerships charge hundreds of dollars to change spark plugs. However, it is a surprisingly simple job, and it requires no formal training or experience, and the parts cost around \$25.00. You can even buy the required tools for less than dealerships charge to change the spark plugs, and you can use them on future maintenance jobs.

These instructions apply only to the 2010-2013 Subaru Outback and Subaru Legacy equipped with the 2.5-liter 4-cylinder engine. If you do not know which engine your Outback or Legacy is equipped with, see the beginning of Chapter 1. Additionally, the instructions in this guide apply to vehicles with both manual and automatic transmissions.

## Deciding to Perform Your Own Vehicle Maintenance

You first need to decide if performing your own maintenance is the right choice for you. Performing your own maintenance and paying to have it done both have their own benefits.

By performing your own maintenance, you can:

- Save money
- Save time by not having to drive to, and leave your vehicle at a dealership
- Learn more about your vehicle

However, performing your own maintenance also has drawbacks. When you work on your own vehicle, you always take a risk. If a dealership performs a maintenance item incorrectly, they normally provide a warranty. If you make a mistake that you cannot fix, you will probably have to tow your vehicle to a dealership for them to correct it.

While the work outlined in this guide is accessible to the average car owner, there is always the chance that something will go wrong. I have included some basic troubleshooting steps at the end of the manual for common spark plug changing mistakes, but by following this guide, you do assume some risk for mechanical damage.

## Performing Your Own Maintenance For the First Time

It can be intimidating to work on your vehicle for the first time. Follow these tips to make it as stress-free as possible:

- Read the entire set of instructions before you begin.
- Take your time—trying to save time by cutting corners can end up costing you time, money, and stress.
- Check your work before you move to the next step.

- Keep detailed records of the maintenance you perform. Record the your vehicle's mileage and keep the receipts for the parts you buy.
- If you begin feeling angry or frustrated, take a break. We often make mistakes during these moments.

### Some Notes on This Guide

- When I refer to the left or right side of the engine, it is as seen when you are standing in front of it.
- I will not provide specific information on how to use tools. Please consult your tool manuals or your local hardware store for instructions on how to use your tools.
- Numbers included in photos correspond to items on the previous numbered list.







## Chapter 1: Before You Start

This section will guide you through opening your hood for the first time, learning the basic components in the engine bay, and making sure you have the correct engine for this guide.

### Open the Hood

First, open your vehicle's hood. To open the hood:

- Engage the parking brake.
- Pull out on the hood release, which is located near the brake pedal and circled in Figure 1.
- Stand in front of the hood of the vehicle. The front of the hood will be opened slightly. Press the hood latch, which is located in the center of the hood opening and circled in Figure 2.



**Figure 1: Hood Release**



**Figure 2: Hood Latch**

## Familiarize Yourself With the Engine Bay

Now that you have the hood open, you need to familiarize yourself with the engine bay. The engine bay is the compartment under the hood, where the engine sits.

This section lists the parts you will need to identify either to complete this project or for safety. In the following list, each part has a number that corresponds with Figure 3 on the following page. The items that say, "Approximate location," cannot be seen in this photo and are listed here to show you their general area. Those parts will be shown in detailed photos in the following sections.

1. Air box
2. Mass air flow sensor
3. Air box hose
4. Approximate location of spark plug #1 and #2 (Directly underneath black plastic shroud)
5. Approximate location of spark plug #3 and #4 (Directly underneath black plastic shroud and hoses)
6. Approximate location of engine identification mark (Between the two black plastic pieces. Look directly down at this point.)
7. Battery terminals
8. Alternator
9. Drive belt

Safety Note: Alternator and Battery  
Do not touch the alternator or battery terminals with metal tools. Doing so could shock you.

Safety Note: Drive Belt

- Do not leave items near the drive belt. It spins high speed while the engine is running.
- Do not put your hands anywhere near the drive belt while the engine is running.



## Identify Your Engine

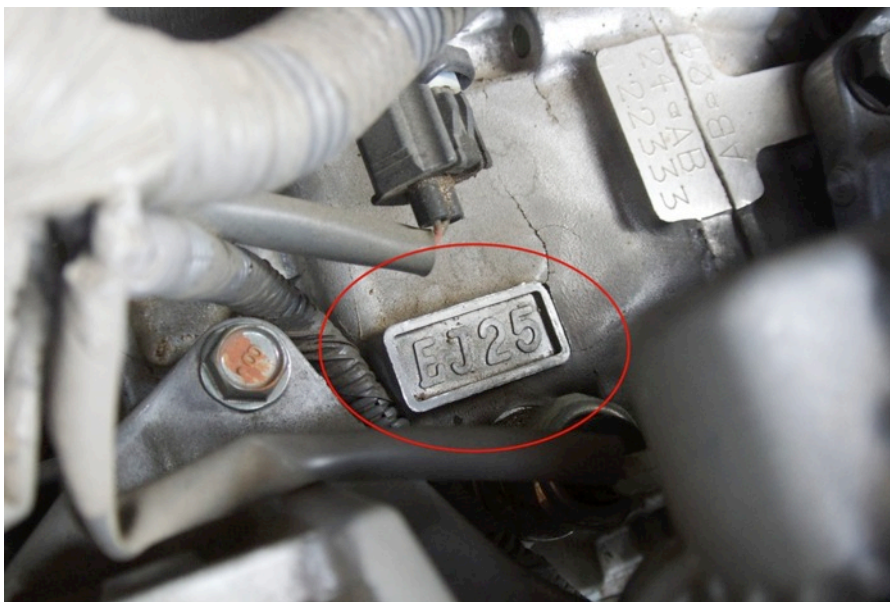
First, make sure that your car has the correct engine for this guide. To check your engine model:

1. Look down at the top of the engine, as shown in the circled area in Figure 4. The engine identification mark is between the two plastic shrouds.



**Figure 4: Engine Identification Mark Location**

2. Look for a mark that says “EJ25,” which is circled in Figure 5.



**Figure 5: EJ25 Engine Identification Mark**

3. If your engine has the EJ25 mark, then you have the correct engine for this guide. Proceed to the next section.

### Assemble Your Tools and Materials

The first step to any mechanical job is assembling your tools and other needed items. These are all common items, and should be available at your local hardware store.

You will need the following tools and materials:

1. 4 NGK Laser Iridium Spark Plugs
2. Flat head screwdriver
3. 10mm box end wrench
4. 5/8" spark plug socket
5. 3/8" drive ratchet
6. 3/8" drive extension totaling over 6"
7. Torque wrench (not pictured)

You will also need a small cup to help prevent losing bolts (not pictured), and clean rags or paper towels.

#### Note: Extensions

Extension come in many different lengths. Lengths can be combined for this project, or you can use one long extension.

Figure 4 shows two short extensions that equal 6". You can also use one 6" extension.

#### Note: Torque Wrench

A torque wrench is a ratchet-like tool that adjusts the tightness of a bolt. You will need a torque wrench that is capable of 32.5 lb-ft of torque.

Due to the wide variety of torque wrenches available, I have excluded it from photos to prevent confusion.

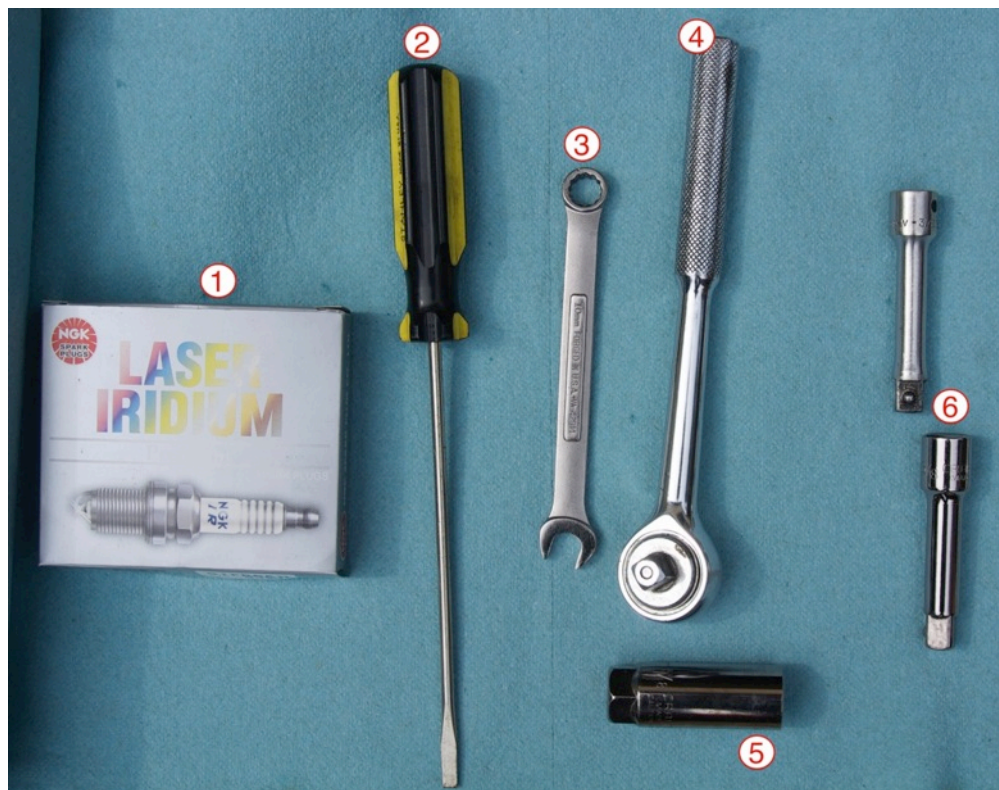


Figure 6: Tools and Materials









## Chapter 2: Changing Your Spark Plugs

### Familiarize Yourself With the Air Box

The air box is the plastic box that houses the air filter, and is shown in Figure 7. To access the left two spark plugs, you will need to remove the air box.

First, familiarize yourself with the basic parts of the air box.

1. Air box front half
2. Air box back half
3. Air box latches
4. Power steering hose
5. Power steering hose bracket on air box
6. Air box hose
7. Air box hose clamp
8. Mass air flow sensor wire
9. Mass air flow sensor wire bracket
10. Mass air flow sensor
11. Mass air flow sensor connector

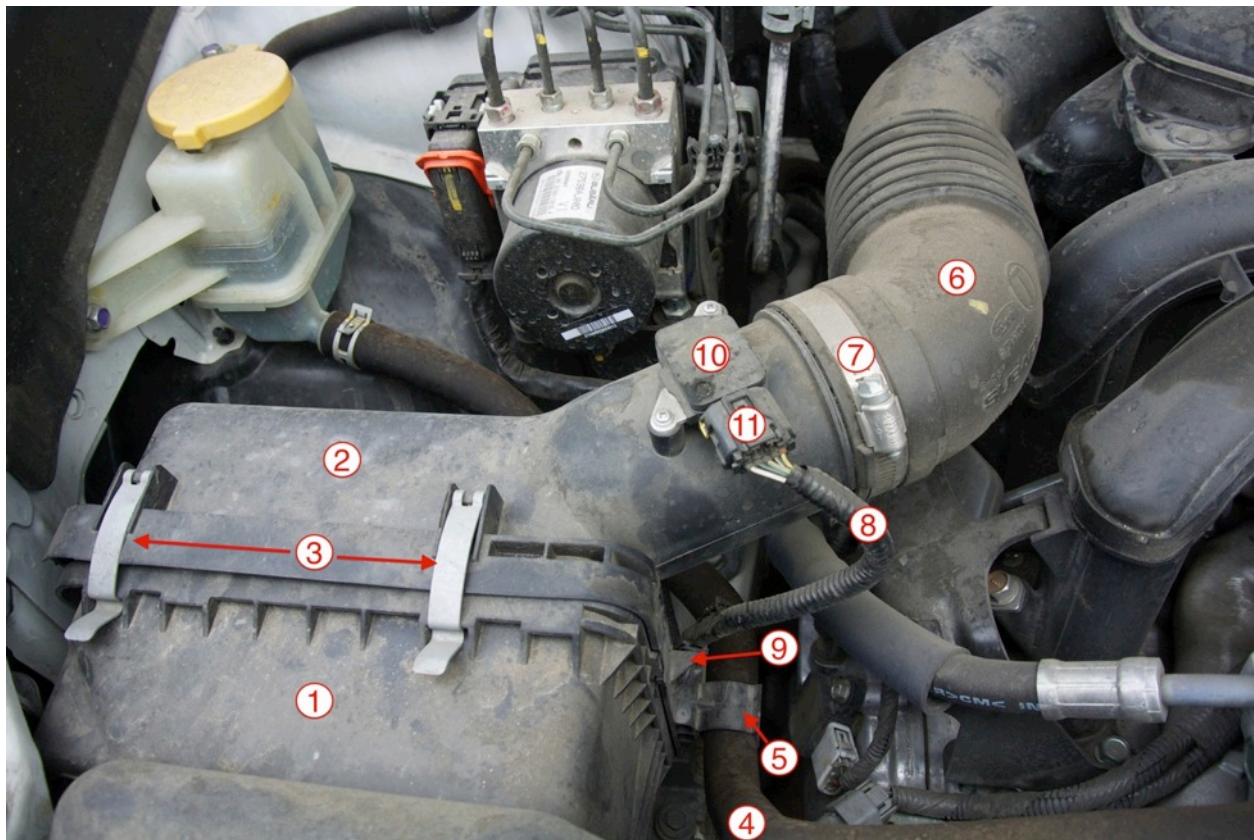


Figure 7: Parts of the Air Box

## Remove the Air Box

Now that you know the different parts of the air box, you can begin to remove it.

1. Disconnect the two latches on top of the air box.



**Figure 8: Disconnected Air Box Latches**

2. Loosen the hose clamp where the air box hose mates with the air box back half.



**Figure 9: Loosen the Air Box Hose Clamp**

3. Pull the air box hose off of the air box back half.



**Figure 8: Remove Air Box Hose**

4. Disconnect the mass air flow sensor wire from the mass air flow sensor. The wire's connector has a release button. Gently press down on the connector release button and pull the wire off of the mass air flow sensor.



**Figure 11: Disconnect Mass Air Flow Wire**

5. Pull the mass air flow sensor wire out of its bracket on the side of the air box, directly above the power steering hose bracket.



**Figure 12: Remove Mass Air Flow Sensor Wire Out Of Bracket**

6. Remove the air box front half from the engine bay and set it aside.



**Figure 13: Remove Air Box Front Half From Engine Bay**

7. (Optional) Plug the air box hose with a paper towel or clean rag. This is to prevent debris from entering the hose, which would eventually be sucked into the engine.



**Note: Plugging the Air Box Hose**

This step is optional because of the risk of leaving the plug in the air box hose.

While there is a step later in the guide that instructs you to remove the plug, you should skip this step if you think you may forget. Leaving the plug in the hose could lead to serious engine damage.

**Figure 9: (Optional) Plug the Air Box Hose**

8. Now that the back half of the air box is off, the air filter is exposed. Remove the air filter and set it aside.



**Figure 10: Remove the Air Filter**

### Familiarize Yourself With Spark Plugs #1 and #2

Now you have access to all of your vehicle's spark plugs. I will refer to the first two as spark plug #1 and spark plug #2. They are located directly to the right of the air box back half that you just removed.

First, familiarize yourself with the locations of the first two spark plugs, which are shown in Figure 16:

1. Spark plug #1 coil
2. Spark plug #2 coil
3. Power steering hose
4. Air box front half

#### Note: Spark Plug Coils

Each spark plug is covered by an ignition coil, which I will refer to as the "coil."

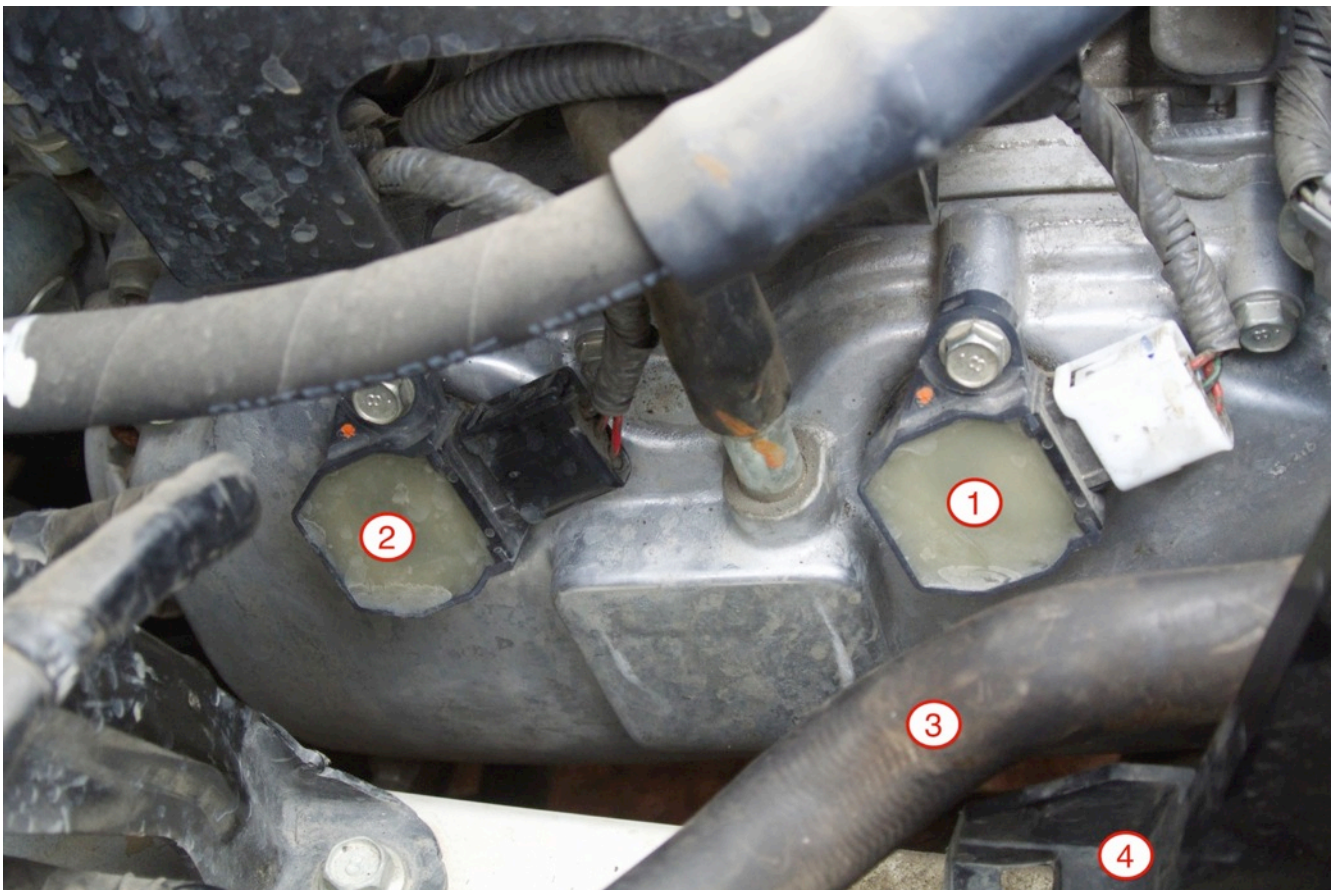


Figure 11: Spark Plugs #1 and #2

### Familiarize Yourself With Spark Plugs #3 and #4

Now you should familiarize yourself with spark plugs #3 and #4, which are located on the opposite side of the engine. Figures 17 and 18 show spark plugs #3 and #4.

1. Spark plug #3 coil
2. Spark plug #4 coil
3. Battery



Figure 12: Spark Plugs #3 and #4 Overview

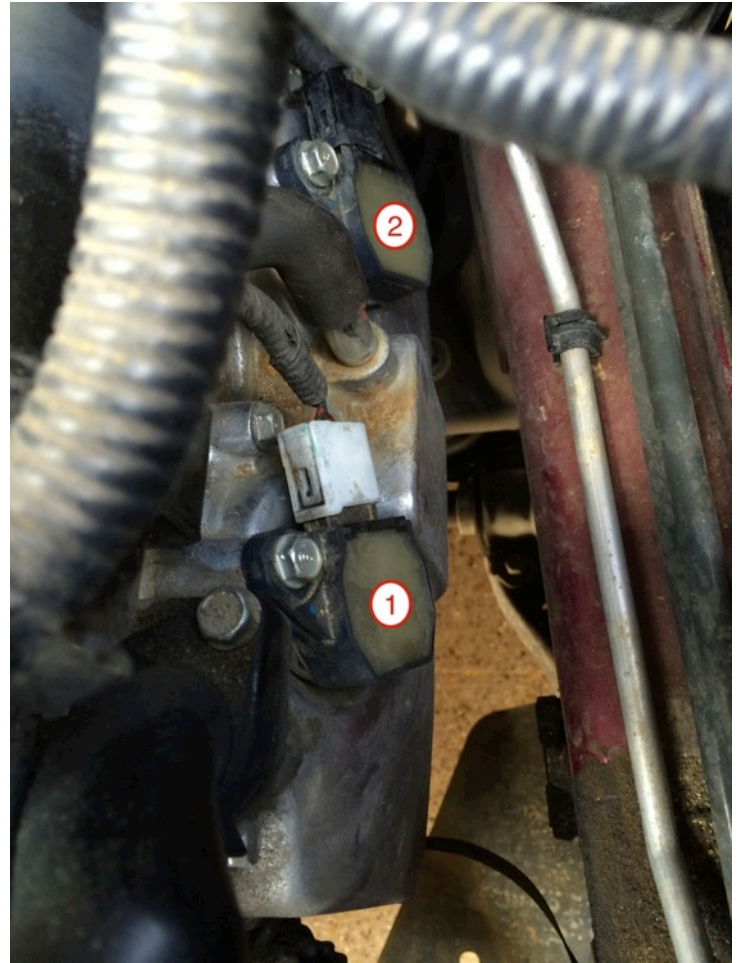


Figure 13: Spark Plugs #3 and #4 Closeup

## Replace Your Spark Plugs

Now you can begin replacing the spark plugs. It is easiest to change them in numerical order, beginning with spark plug #1, and finishing with spark plug #4. Completely install each spark plug before moving on to the next.

### Note: Spark Plug Instructions

Although the photos show spark plug #1 being replaced, the procedure for replacing the spark plugs is the same on all four.

1. Use your 10mm box end wrench to remove the bolt on top of the spark plug coil.



**Figure 14: Remove Bolt on Spark Plug Coil**



2. Gently twist the coil approximately 15 degrees to the left and right to loosen it.



**Figure 20: Gently Twist the Coil**

3. Pull the coil directly out of the engine.



**Figure 21: Pull The Coil From the Engine**

4. Tuck the coil in a position that keeps it out of the way. Wrap a paper towel or clean rag around the end of the coil to keep it clean.



**Figure 22: Tuck the Coil**

5. Attach at least a 6" extension and your 5/8" spark plug socket to your 3/8" ratchet. Insert the spark plug socket into the spark plug coil's opening until it meets resistance.



**Figure 23: Insert the Spark Plug Socket into Opening**

6. Set your ratchet to its loosen bolt setting, and turn it counterclockwise.
7. When you stop feeling resistance as you turn the ratchet, pull your ratchet assembly out of the engine. The spark plug socket should have the old spark plug on the end, as shown in Figure 23. If does not, repeat steps 5, 6, and 7 until the spark plug comes out.



Figure 24: Old Spark Plug

8. Pull the old spark plug from the end of your spark plug socket and replace it with a new spark plug.



Figure 25: New Spark Plug

9. Insert new spark plug into the same hole from which you extracted the old one.
10. Set your ratchet to its tighten setting. Turn it clockwise until you feel more resistance than you can push with one finger on the ratchet.
11. With your extension and spark plug socket still in the engine, disconnect your ratchet from the extension.



**Figure 26: Insert the New Spark Plug**

12. Attach your torque wrench to the extension. Follow the instructions included with the torque wrench and torque the spark plug to 32.5 lb-ft.
13. Pull your torque wrench, extension, and spark plug socket out of the engine.
14. Remove the clean rag or paper towel from the spark plug coil, and insert it back into its original place.



**Figure 27: Insert the Spark Plug Coil**

15. Replace the bolt you previously removed from the spark plug coil. Tighten the bolt with you 10mm box end wrench.



**Figure 28: Replace Bolt on Spark Plug Coil**

Repeat steps 1-15 on the other three spark plugs.

### Reinstall The Air Box

Now that the spark plugs have all been replaced, you need to reinstall the airbox.

1. Insert the air filter back to its original position in the air box front half.



**Figure 29: Insert Air Filter**

2. Remove your clean rag or paper towels from the air box hose (if you followed optional step 7 on page 15).
3. Reattach the mass air flow sensor wire to the mass air flow sensor. It should click into place.



**Figure 30: Reattach Mass Air Flow Sensor Wire**

4. Reattach the air box back half to the air box hose.



**Figure 31: Reattach Air Box to Hose**

5. Close the two air box latches. They snap into place.



**Figure 32: Closed Air Box Latches**

6. Use your screwdriver to tighten the air box hose clamp.



**Figure 33: Tighten Air Box Hose Clamp**

### Test Run Your Vehicle

The last step is to test run your vehicle. First, clear all tools and materials from the engine bay. Then, start your vehicle.

When you test run your vehicle:

- Make sure your vehicle starts and runs smoothly.
- Listen for unusual noises, such as loud metallic knocks, that were not there before.

If your engine runs less smoothly than before, or makes any loud metallic noises, continue to the following section.

### Basic Troubleshooting

If you encounter any problems during your test run, turn the engine off. Repeat each step in the guide and pay attention to any steps you may have skipped.

Pay particular attention to:

- Any loose or missing bolts
- Loose spark plug coils
- Missing air box components

If you cannot determine your vehicle's problem, you may have to transport it to a dealership or independent service shop for professional diagnostics.



## Index

air box, 11, 12, 13, 14, 15, 16, 24, 25, 26, 27

air filter, 11, 15, 24

coil, 16, 17, 18, 19, 20, 23

engine identification mark, 4, 6

hood, 3, 4

hose, 4, 11, 12, 13, 14, 15, 16, 24, 25, 26

sensor, 4, 11, 13, 14, 25

spark plug, v, 4, 7, 16, 18, 20, 21, 22, 23, 27

tools, v, vi, 7, 27

wrench, 7, 18, 23

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