Mazda RX-8 Spark Plug and Spark Plug Wire Install Guide

How-To Guide on replacing your spark plugs and spark plug wires on Mazda RX-8 vehicles

Thank you for downloading our How-To guide on installing spark plugs and spark plug wires on your 2004+ rotary powered Mazda RX-8. While changing spark plugs on most vehicles is an easy task for some, there are some vehicles that are just a little different and make you go: umm…. Well, the RX-8 is definitely one of those vehicles! The RX-8 is an amazing car; it has stellar handling, a lightweight chassis, good looks, four doors, and last but not least a Mazda exclusive rotary engine. While there are a few different vehicle layouts, such as: Front wheel drive, rear wheel drive, all wheel drive, front engine, mid engine, rear engine, they all typically utilize a piston driven internal combustion engine. That is where the RX-8 differs. Like its RX-7 predecessors, the Mazda RX-8 employs a unique style of engine called a Rotary, invented by German engineer Felix Wankel in the 1950's. Without going into too much detail (the Wikipedia article on "Wankel Rotary Engine" is recommended), the rotary engine in your RX-8 is basically an internal combustion engine which uses oblong shaped triangles instead of a conventional piston to convert the combustion process into spinning motion. Basically your motor has two of these triangles within two different chambers (similar to a cylinder in a piston engine) that: intake, compresses, fires, and exhausts the air/fuel mixture that is fed into it to create the spinning motion needed to provide thrust. Yeah, that Wikipedia article is looking really good now isn't it? So, knowing that what does that have to do with the spark plugs?

Introduction/facts/information

Spark Plug Facts and Information

The spark plugs in your RX-8 are for one, special spark plugs designed specifically for the RX-8. Secondly, there are 4 spark plugs of two different types on an RX-8 engine. There are two "leading" and two "trailing" spark plugs, one on top of the other situated in a square pattern when looking at them from the side. They fire in sequence, leading and then trailing. And lastly they are located within your engine in a strange spot, much unlike the 4, 6, or 8 cylinder engines you might be used to. If they weren't, you might not even be looking at this guide! The spark plugs are of the Iridium type, which means the tip of the electrode is iridium plated. The reason for an iridium tip is to provide a super hard surface which reduces the erosion from the constant sparking and high heat created in a rotary engine. Unfortunately since these spark plugs are special, they are expensive too. Depending on what type you get, they usually start around $17 per plug and up. We recommend the NGK brand Laser Iridium plugs. 5X Racing carries these plugs and if you email us and mention that you read this guide we will give you a discount for shopping with us!

Spark Plug Wires

While changing your spark plugs for the first time, or during one of your regular tune ups, we recommend replacing your spark plug wires with a higher performance, thicker core racing style wire. The benefits of spark plug wires might not kick you in the seat of the pants like an intake, exhaust, or turbocharger, but they will work behind the scenes to ensure that you are getting the most out of your ignition system, which is an important part of making horsepower. While spark plug wires will not necessarily "make" power (don't always believe what you read), they will allow the unrestricted full amount of spark to be delivered to the plugs from the coils (think about water going through a pipe, a bigger size pipe allows more pressure to be used) and a good set will block any electromagnetic interference from outside sources such as other close by spark plug wires. With the full amount of spark being delivered, you can expect better efficiency out of your ignition system. Efficiency means better fuel economy too, as you are igniting the air/fuel mixture in your engine with a stronger, more consistent spark. On top of that, they are also made from a better material than your factory wires, they will withstand heat better (important for the hot running rotary), and will add a performance look to your engine bay. We always use and recommend Magnecor brand spark plug wires for our racecars and our street cars here at 5X Racing. We recommend fitting the biggest plug wire you can on your engine, if you have a race car you can bypass the factory wire looms and fasten as needed, because form follows function in a race car. If you have a high performance street car and want to keep the factory fit and finish using the wire looms, we recommend the Magnecor KV-85 series of spark plug wires. The KV-85's will squeeze into the factory wire looms on your RX-8 and allow the use of the factory plastic standoff rings on the two wires for the back rotor. So, now that you know about spark plugs and spark plug wires, we will provide you with our recommended list of parts for your next tune up on your RX-8. 5X Racing carries all of the parts necessary, once again contact us and tell us you read our guide for a discount.

Recommended Parts List

Spark Plug Wires

Magnacor R-100 Spark Plug Wires (10mm thick) (racing recommended)
Part #: 49435
Magnacor KV-85 Spark Plug Wires (8.5mm thick) (street/race recommended)
Part #: 45435

Spark Plugs

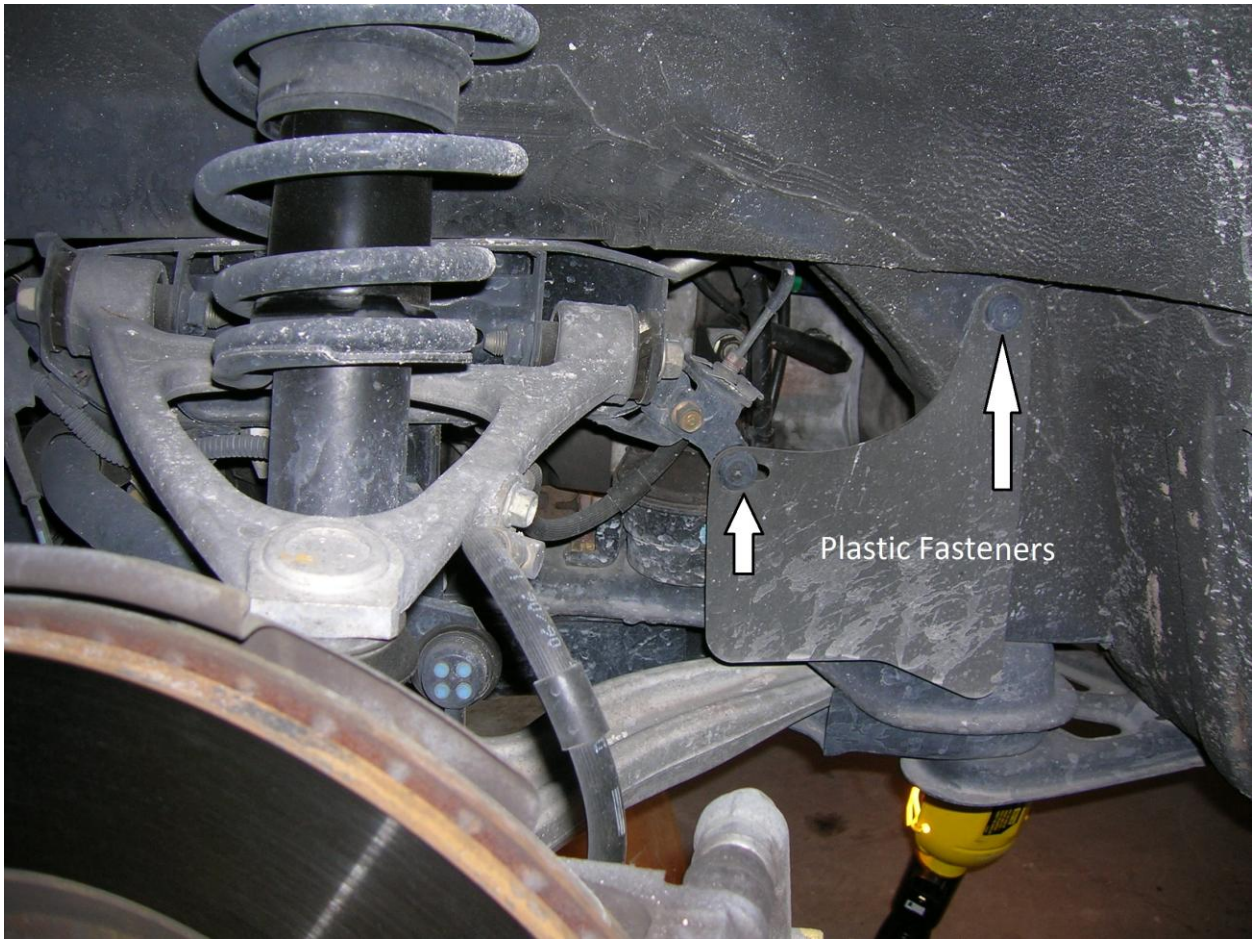
NGK Laser Iridium Spark Plug (leading) Part #: RE7C-L
NGK Laser Iridium Spark Plug (trailing) Part #: RE9B-T

Step 1

Remove the front left wheel.
The first step in the installation process is going to be to jack the front of the car off the ground and remove the front left wheel. It is only necessary to lift the car high enough to allow the wheel to be removed, be sure to use jack stands when working underneath any car. It might be possible to perform a spark plug change without removing the wheel, but for the sake of this install all instructions will be with the wheel removed.

Step 2

Locate and remove rubber splash guard.
There is a small rubber splash guard located within the wheel well, after it is removed you can clearly see the spark plugs. The rubber piece is fastened with strange screw like plugs, loosen the “screws” within the plug and pry them out gently to remove the piece.



Step 3

Remove spark plugs and install new plugs.
After removing the splash guard you can clearly see the spark plugs located on the side of the engine. The blue and green stripes on the top plug wires indicate the trailing plugs, which are on the top. It is very important that the correct plugs get installed in the correct locations.
The spark plugs will be marked with either a “T” or “L” in the part number on the plug; also there are “T” and “L” markings on the side of the engine case next to the spark plug locations (marked in picture).

We used a 1/2” ratchet with a special spark plug socket to remove our plugs. We also employed the use of a couple of extensions and a universal or “swivel” at the end which allows you to work at angles with your ratchet. You can use whatever extension you would like, as long as it is a comfortable distance for you to remove the plugs.

We recommend replacing the plugs one for one, as in remove one plug then install the new plug. We do not recommend removing all of the plugs at once, it can be very easy to lose track of where your spark plug wires go if they are all removed at the same time. When you get the old plug out, look at the number on the side, match the number with the number on the new plug, take the new plug and apply a small amount of some type of anti-seize compound to the threads (we recommend a high-temp copper based anti-seize), and install the new plug finger tight. DO NOT tighten the plug with the 1/2" ratchet! The plugs should be tightened to the torque spec of around 12-15 ft/lbs, and be sure to feel the crush washer on the plugs give way before reaching your final torque. There should be a light, constant resistance while tightening until a solid tightness is felt, this is when you should reach your torque spec. Replace the remaining plugs the same way.

Once all of the spark plugs have been replaced you are ready to install the new spark plug wires. If you are not replacing the spark plug wires then reinstall the rubber splash guard, reinstall your wheel, lower the car, and start the car to ensure proper operation. If you are replacing your spark plug wires, then please continue.

Installing spark plug wires

Step 4

Remove plastic part attached to the intake tube above ignition coil.

Not really sure what this part is, but it is in the way. It is very easy to remove and will make the job so much easier. It is fastened on by a worm gear band clamp and has a tube routed on the back that must be freed to remove it completely. You can see the ignition coil beneath it, which is what we must access.

In Picture: Plastic part removed and out of the way.

Step 5

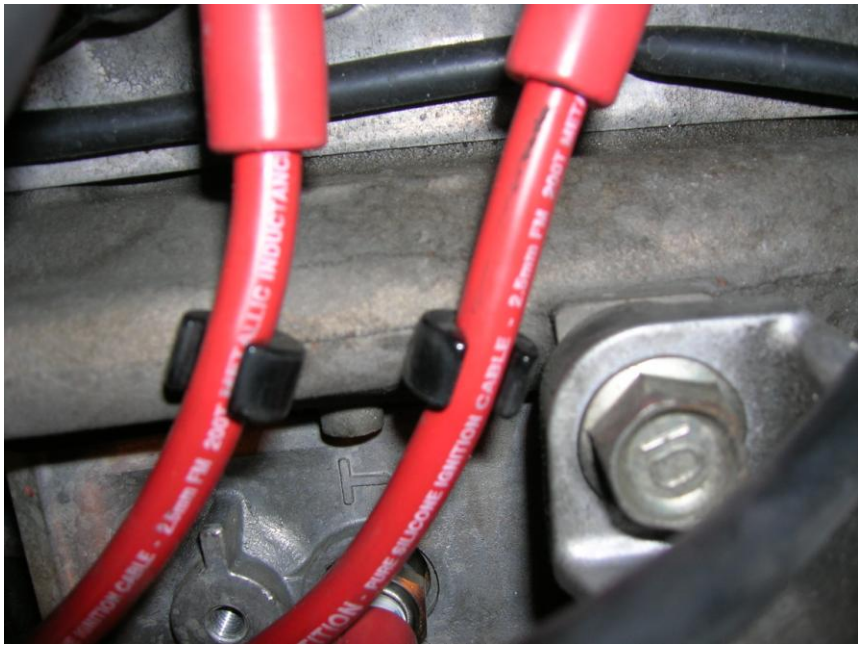
Replace spark plug wires one by one.

This is very easy, but care must be taken to install the correct wires in the correct places. We recommend replacing only one wire at a time to avoid mixing up the wire locations. With the plastic piece out of the way you can clearly see the ignition coil and spark plug wires.

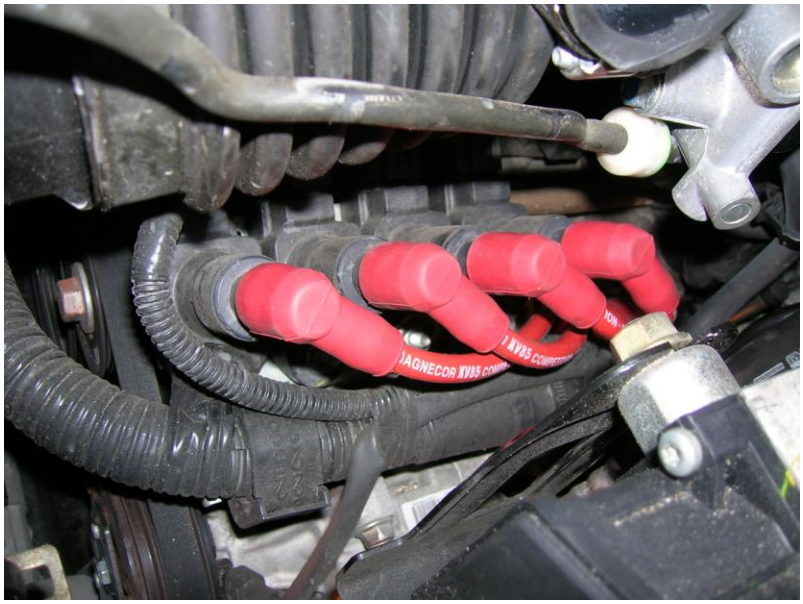
The wires are in a tight spot and are a bit of a pain to route as you change them. There is a wire loom about half way down the wires that holds all four leads, the rightmost two wires go to the rear rotor spark plugs and the leftmost two wires go to the front rotor spark plugs (looking at the engine from the drivers side). We freed all wires from the loom and removed the rightmost wire first.
We had already opened our box of Magnecor wires and laid out the contents in order of longest to shortest so it was easier to match up our removed wires.

Once you remove the original wires, match it up to the appropriate Magnecor wire. When you remove the two wires that go to the rear rotor you will notice they have a small black donut shaped plastic ring near the end of the wire. This is to protect the wires from abrasion against the engine block on their way to the spark plug. These rings should be transferred over to the new wires. The rings are a tight fit on our KV-85 Magnecor wires, but they squeeze on there. They might not fit the R-100 racing wires, some sort of method should be used to prevent abrasion if the thicker R-100 wires are used.

You can see the rings installed on the wires in the picture. We installed them after the wires were installed on the coil and plugs.



Go ahead and install all of the remaining wires, position them in the same manner of the original wires. Be sure all of the caps for the plugs and coil tops are pushed all the way down, everything should be good to go!
Here are some finished shots of the wires installed; this will conclude the installation of the spark plug wires.



Step 6

Reinstall the wheel and lower the vehicle.

This completes the install guide! Enjoy the benefits of your new spark plugs and spark plug wires. You should notice a sharper throttle response, smoother idle and acceleration, and better fuel economy in most cases.

If you have any questions of you would like to order the parts we used in this guide please visit www.5xracing.com or contact sales@5xracing.com