# IGN-1A Coil Adapter Harness Install
# Mazda RX-7 (FD3S) - PnP Version

## What's in the Box?

- IGN-1A coil adapter harness (FD)
- Sumitomo female terminal and wire seal (for Direct-Fire Setups)
- Instruction manual
- Harness and coil labeling stickers

## Required Tools

- ✔ 10mm and 12mm sockets
- ✔ Blue 18ga automotive electrical wire, and terminal crimper (for direct fire setups only)
- ✔ Allen Key Set

**Note:**
**Please read complete manual before beginning install process.**

**Install at your own risk. We take no responsibility for injury or damages incurred as a result of installing this product. Professional installation recommended.**

# Install Procedure:

## Step 1 - Remove factory igniter

To install the coil adapter harness you must first remove the factory igniter; located next to the brake booster and below the cruise control module on LHD cars (see image 1 for reference).

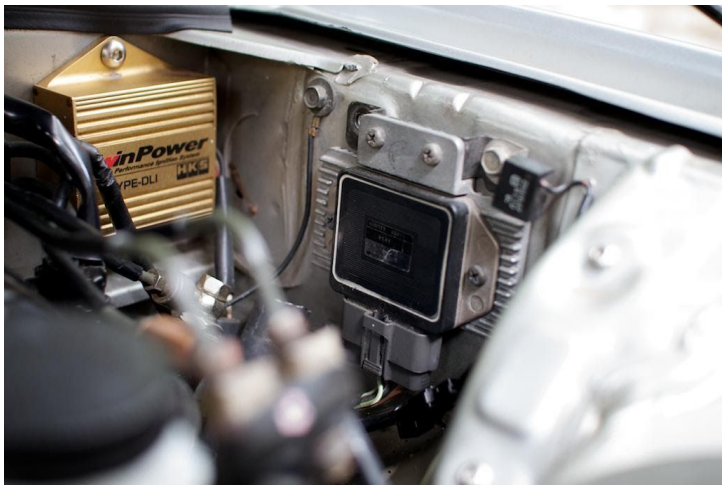



Image 1

**Note:**
**Ignition amplifiers (such as an HKS TwinPower) should be removed at this step as well. The IGN-1A Coil & Harness Upgrade from SakeBomb Garage replaces the need for any ignition amplifiers. Thus, any ignition amplifier you currently have will not need to be re-installed.**

## Step 2 - Label and Verify Coils and Harness Connections

In OEM configuration, the RX-7 FD3S uses a single coil with 2 outputs for the Leading spark signal. This is referred to as “waste spark”. OEM ECU applications, Power FC, and Haltech/Adaptronic ECU’s set up in waste spark will require no modifications. For advanced ECU’s with Direct Fire setup, please complete the labeling process below and skip to the advanced install section.

Using the included label stickers, apply the small L1/T1/L2/T2 stickers to the top of each coil. Next, reference the below chart for the IGN-1A Main Harness, and wrap the harness label around each coil connector wire to indicate which connector represents each coil signal. Pull back the wire cover to

reveal the color for the wire going to pin A on the connector and apply the label accordingly (Green = L1, Blue = L2, Pink = T1, Yellow = T2).

| Signal Carried: | OEM Sumitomo: | IGN-1A Harness: |
|---|---|---|
| Leading 1 (L1) | Light Green* | Green |
| Leading 2 (L2) | Light Green* | Blue |
| Trailing 1 (T1) | Brown | Pink |
| Trailing 2 (T2) | Brown/Black | Yellow |
| Relay Power | Black/White | Red |

For waste spark applications, you can now plug in the SBG igniter sub-harness adapter into the OEM 8 position igniter connector, and connect This sub-harness adapts the SBG IGN-1A main harness to the OEM ignition wiring, to pull signals for ignition on, and each coil signal (3 signal wires in waste spark configuration) directly from the ECU.

**Wiring Verification: As a final check, ensure that each of the wires in the sub harness, match the appropriate colored wires in the chassis harness.**

**-Light Green on the OEM harness (no stripe) matches the Green L1 wire on the SBG Sub-Harness.**

**-Brown on the OEM harness matches the Pink T1 wire on the SBG Sub-Harness.**

**-Brown w/ Black stripe on the OEM harness matches the Yellow T2 SBG Sub-Harness.**

**-Black w/ white stripe matches the SBG Sub harness Red relay signal power wire on the SBG Sub-Harness.**

*OEM configuration shares the spark signal between L1 & L2 from a single Light Green wire. If you would like to set up “Direct Fire” please see Step 3.

** For high boost / high performance applications, please see the Advanced Install section for directions on how to properly ground your harness to a Sensor Ground/Reference Ground. For most other applications, it’s fine to use the attached ring terminal to connect to a clean chassis ground.

## *Step 3 - Advanced Install (optional) - Direct Fire Setup

In the OEM configuration, the FD RX7 uses a single coil with 2 spark plug output wires for the Leading spark signal. This is referred to as “waste spark”. This fires both leading coils at the same time (in one rotor the spark does not combust fuel mixture and is therefore “wasted”). The SakeBomb Garage IGN-1A Coil Kit uses 4 independent IGN-1A coils, with a purple jumper connecting the two leading coil

signals together, mimicking the OEM waste spark configuration but with two independent coils. This is required if the system is being installed on a vehicle using the OEM ECU, PowerFC ECU, or another ECU which does not support “direct fire”. If you are using the OEM ECU, PowerFC, or other ECU that does not support “direct fire” then please move to Step 4.

For ECUs that do support “direct fire” we have built 2 features into the IGN-1A Harness which allow the 4-coil system to be set-up for “direct fire”.

1. On the SBG igniter adapter harness you will find a purple loop of wire. In default configuration, this purple wire jumpers the signal from the OEM waste spark wire to both L1 and L2 IGN-1A coils. For “direct fire” this purple loop of wire needs to be cut, so that independent signals can be fed to each L1 and L2 IGN-1A coil. To convert to direct fire, first cut this purple jumper wire and cover the exposed ends in heat shrink or electrical tape.

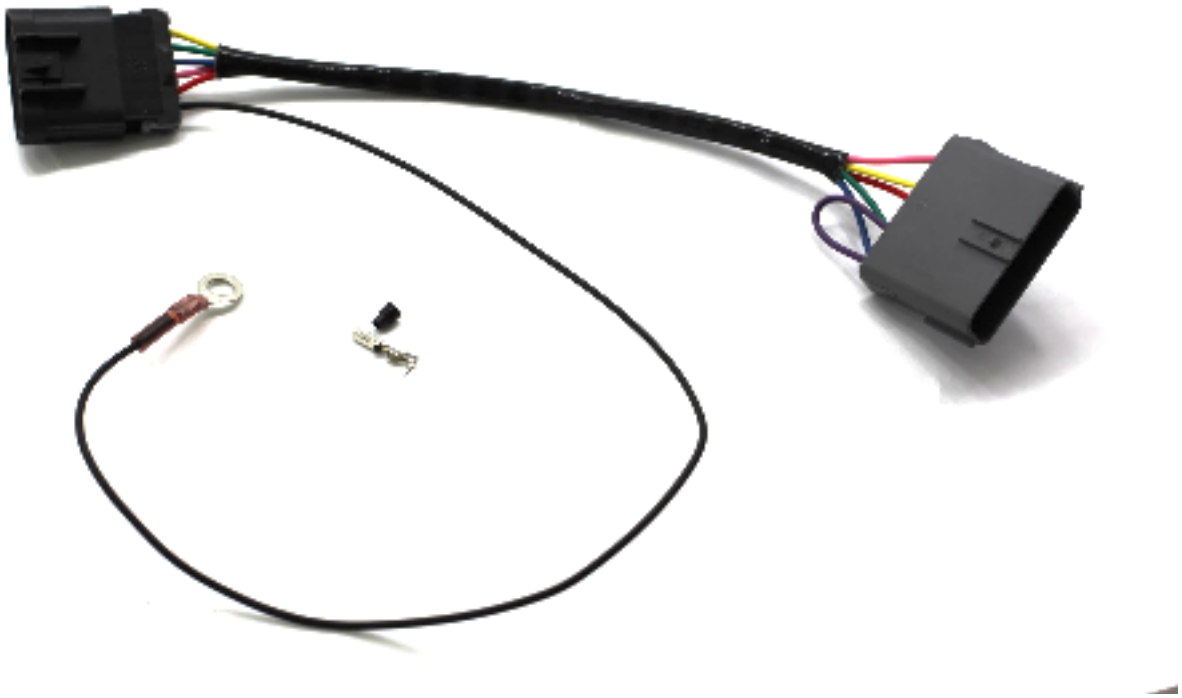
2. Next you will use the included female terminal and seal to crimp on the included female Sumitomo terminal to a (customer provided) 18ga BLUE signal wire (we recommend a blue 18ga automotive grade wire with an external sheath to protect it). This wire needs to be cut to length to extend back to the ECU or L2 Signal connection point. Different ECU’s have different options to send this 4th independent coil signal wire (L2) - Adaptronic for instance having an option to send this signal into the diagnostics box or directly back to the ECU. Please refer to your individual ECU requirements to set up the L2 Signal wire. Crimp on the female terminal and seal, and insert into the 8 position OEM igniter connector to connect to the corresponding BLUE wire on the SBG Igniter Adapter Sub-Harness (you will need to pull out the circular wire seal that is in the OEM connector before clicking in the new pin/wire.

After cutting the purple loop, the Light Green wire from the OEM harness that was used for waste spark is now used exclusively as the signal wire for the L1 IGN-1A Coil. The Blue L2 Signal wire now exclusively represents the L2 IGN-1A Coil.

OEM Sumitomo Igniter Connector

L2 Adapter Terminal

Crimp included terminal / seal to extended blue wire, and insert into OEM Sumitomo igniter connector



SBG igniter adapter sub-harness - cut purple jumper for direct fire applications

## **Step 4 – Advanced Install (optional) - Sensor Ground Setup

The ring terminal connected to the black wire on the igniter sub-harness connects to pin B on each coil connector. The coil uses this signal to reference ground. In unstable applications where battery voltage fluctuates or in high performance applications where consistent coil output is essential, it is advantageous to use the ECU-generated sensor ground signal to stabilize coil output. Utilizing the ECU generated sensor ground/reference ground will prevent under or overcharging the coil. The sensor ground/reference ground fluctuates in tandem with battery voltage to ensure a consistent differential between battery positive and “ground.”

For applications where coils are not tuned to close to the limits of the coil, these slight fluctuations in coil output based on changing battery voltage are acceptable. This includes most street applications where conservative dwell time settings are used (such as our dwell time curve listed in this manual for the Power FC).

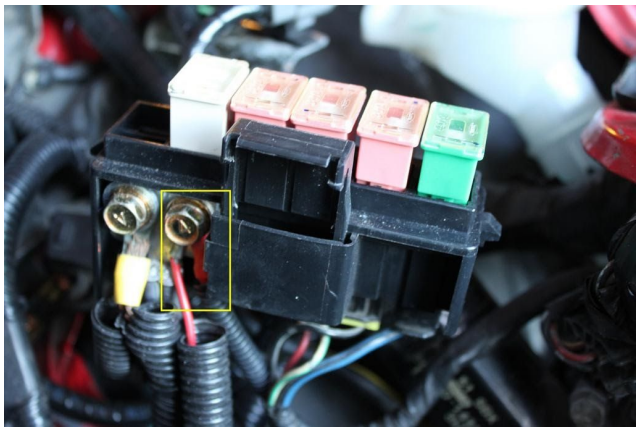
For performance applications where consistent coil output is of utmost importance, or where dwell time is close to the recommended limits of the coil, overcharging or undercharging the coils can become an issue and we recommend referencing sensor ground to counteract any voltage fluctuations in the cars electrical system.

In order to convert your harness to use this sensor ground signal, you will need to cut off the ring terminal on the sub-harness. We recommend tapping into the MAP sensor reference-ground wire, which is the middle wire, colored black with a green stripe (see right). This can be done using a “vampire tap” or for a more secure connection, solder with heat-shrink tube.

## Step 5 - Install main IGN-1A adapter harness

Once the sub-harness is connected to the factory wiring it's time to connect the adapter harness. Mount the relay and connect the power/ground wires. We recommend mounting the relay to the chassis slightly in front of the brake booster (see Image 2 for reference), but it can be mounted elsewhere if desired.

- The Batt + wire needs to be connected to the positive terminal on the battery (we recommend connecting to the main fuse box attached to the positive battery cable) or a constant power source.



    - If your battery positive wire is not within reach of the harness, you may also use the factory connection on the large gauge starter wire, or other clean direct battery connections.

- The Batt – wire (longer of the two ground wires on the main harness) needs to be connected to the negative terminal on the battery. If unavailable you may use a clean chassis ground.

- **Attach the engine ground wire to the rotor housing or any clean ground location on your engine/chassis**
  **(We recommend using the factory harness grounding location located beneath the throttle body)**

- The black ground wire on the short sub-harness may be connected to any clean chassis ground, but for high performance applications please see Step 2: Advanced Install for further directions.

- The OEM harness ground is accessible by removing the factory coils (Which are no longer used) See Image 3. We recommend removing the factory coils to aid in cooling under the upper intake manifold.

See photos on next page

Image 2

Image 3: Recommended engine grounding location

## Step 6 - Install coils and bracket

After you have the adapter harness routed you may now install the coils. If you have chosen our bolt on coil mount please continue reading, otherwise disregard this step, as your mounting solution will vary.

- If equipped, remove the cruise control module.
- Detach windshield nozzle elbow from the firewall (Image 4) which is accessible by moving the cover at the base of the windshield (see image 5).
- Detach map sensor harness from firewall.
- Remove plastic firewall clip from map sensor harness by unwrapping the electrical tape holding it on.
- Tuck the harness behind brake booster and under the brake lines to provide additional clearance for the IGN-1A coils.
- Assemble the coils onto the coil bracket. The coils must be assembled in the same orientation with the plug wire post facing the engine. Failing to do this will cause fitment issues. Use Image 6 for reference.
- With the coils assembled onto the mount, plug the adapter harness connectors to the bottom of each coil in the following order (starting at the front of the car): Leading 1, Trailing 1, Leading 2, and Trailing 2. If not already done, adhere the included marking tags to the top of the coils.
- Verify coil tags and harness tags match, as well a spark plug wire locations! Double check your work referencing the color guide in the wire and coil labeling section above! Mis-wiring the ignition system can lead to engine failure. It is critical to ensure the correct signal wires are connected to the correct coils, and plug wires.
- Plug the corresponding coil connectors into the corresponding coils, and attach corresponding spark plug wires.
- Lower the coil mount into position, and bolt the mount and black condenser to the frame rail using the supplied M6 hardware. See Image 7 for reference (Condenser is circled in red).

Image 4

Image 5

See photos on next page

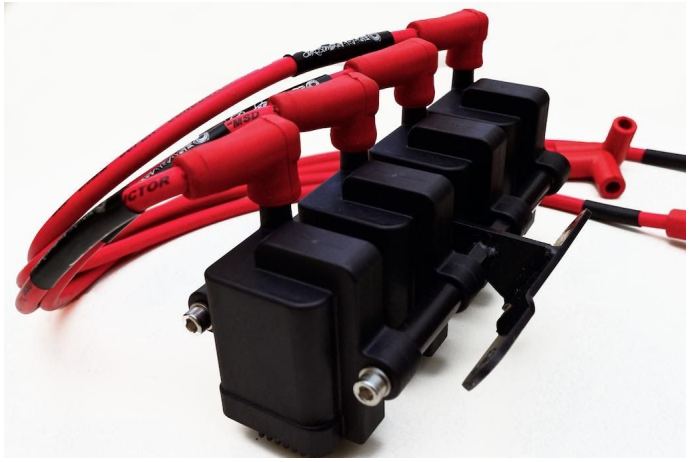


Image 6 Note coil post orientation.

Image 7: Condenser circled in red

## Step 7 - Spark plug wire install

Your coils should be connected in the following order (starting at the front of the car): Leading 1, Trailing 1, Leading 2, and Trailing 2. Connect each spark plug wire to the correct spark plug on the motor. The plug wires need to be connected to the engine in the order pictured (Image 8). NOTE: Mis-wiring the ignition system on a rotary can lead to a blown motor, double and triple check your work!

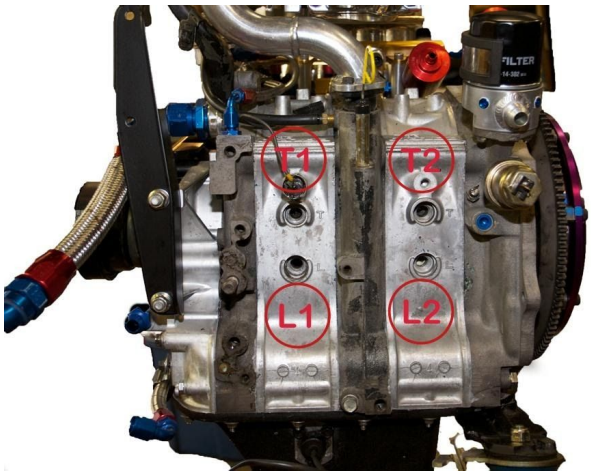


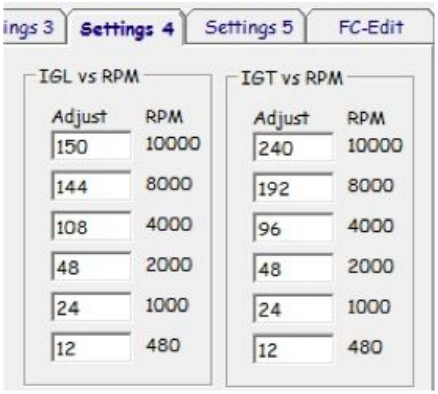

Image 8

## Recommended Dwell Settings

The dwell settings in the ECU will need to be modified if you want to get the most out of your new coil package. If you have a stock ECU no modifications are possible or needed.

The Apexi Power FC is one of the most commonly used aftermarket ECU for the RX-7. A FC-datalogit is required to make the appropriate changes to the ECU. Below is a screen shot with the settings we recommend to start with. Based on your boost level and fuel, your tuner may decide to modify these settings as needed during a dyno session. The following chart is a good starting point however.

Other ECU's such as Haltech, Adaptronic, etc. will require your tuner to create a base dwell setting table for startup depending on a number of factors including waste-spark or direct-fire setup. Please refer to your tuner for the appropriate base map, and dyno tuning to build an appropriate dwell map for your setup. As over-dwelling the coils through software is possible, we do not have a warranty on the coils themselves.




Apexi Power FC Recommended Base Settings

Your install is now complete! Thank you for choosing SBG, and for your continued support. We realize you have multiple options when shopping for parts, which is why we strive to produce new and innovative products for all of the chassis we support. If you have any questions please feel free to contact us!

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