Installation Instructions for the 12V Electronic Ignition Distributor for the Datsun 240Z

CONTENTS

A. Introduction

If you choose to not follow these detailed instructions, at a minimum, don't overlook the following items:

1. Set the timing to the new spec, which may be different from the original spec. (new spec is 18 degrees BTDC at 650 rpm)
2. Install a 12 volt electronic ignition coil
3. Change the spark plug gap to the new spec (0.039" – 0.043").
4. Bypass or remove the ballast resistor from the ignition circuit.

The nomenclature used in this manual is consistent with Nissan's. There is a diagram with part descriptions at the end of this document that you may need to refer to, in order to understand part descriptions.

With this upgrade, there will never be a need to adjust or replace points again. High engine rpm performance will improve because points bounce will be non-existent. After setting the timing, it remains unchanged. It's a completely self-contained distributor with a simple 2 wire hook-up to the coil.

This distributor is built to produce 17° of centrifugal advance at the crankshaft. Compared to the distributors for emissions equipped 240Z's, the non-smog advance allows the 240Z engine to run much better and helps prevent ignition-related overheating problems. Also included at the end is a troubleshooting section for the electrical components of the EI distributor.

For best performance and to get the full benefit of the electronic distributor, a 12-volt coil must be installed and the ballast resistor should be permanently bypassed. With the ballast resistor removed from the circuit, a 12-volt signal is sent to the primary windings of the coil. The original 6-volt coil will burn out if subjected to a 12-volt signal. The 12-volt Nissan coil from cars with this distributor is proven and recommended. The Nissan part # is 22433-H7500 and its list price is $40 to $50.

B. Tools Required

1. Timing Light (not absolutely required)
2. 8 mm wrench
3. 10 mm wrench

C. How the EI Distributor Works

With the original 240Z distributor, the ignition timing is supplied by the breaker points as the contacts open and close. With the EI distributor, it is instead, provided by the reluctor (on the rotor shaft) and the pick-up coil. As the reluctor rotates, the amount of magnetic flux passing through the pick-up coil changes. The changing magnetic flux generates an electrical signal in the pick-up coil. This electrical signal is conducted into the IC ignition module (mounted on the side of the distributor), which triggers the primary current running through the ignition coil. This generates high voltage in the secondary winding of the coil, which is conducted to the spark plugs.

D. Removal of Your Original Distributor

1. Remove the distributor cap and make a note of which spark plug terminal on the cap that the rotor points toward.
2. Disconnect the harness wire on the side of the distributor housing (this is the wire from the points to the (-) terminal of the coil).
3. Disconnect the vacuum line to the distributor.
4. Remove the screw in the distributor fixing plate that's normally loosened to adjust the ignition timing. Remove the distributor. Remove the distributor pedestal by removing the 2 bolts securing it to the timing cover. This piece can be stored away with your original distributor. Remove the old gasket from the top of the timing cover and clean the gasket surface.

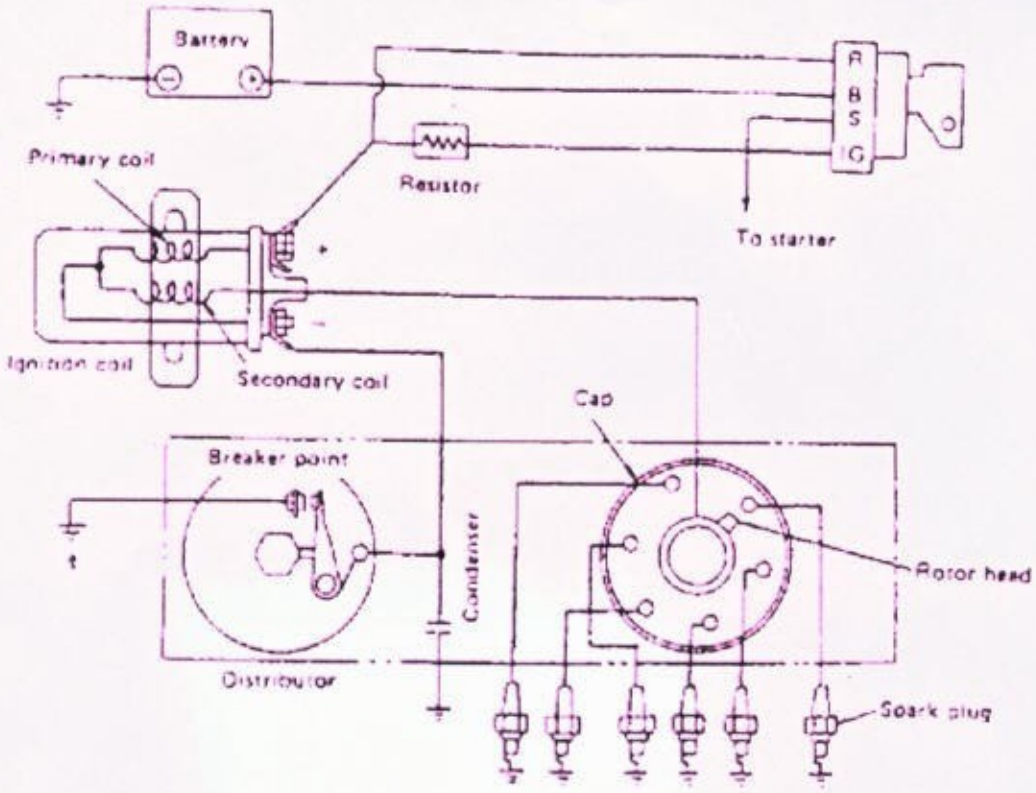
E. Installation of EI Distributor

1. Install the pedestal piece, with the new gasket, that comes with the EI distributor, with the long ear facing up and toward the front of the car. Secure it to the timing cover with the 2 bolts.
2. Put the O-ring in the groove of the pedestal.
3. Using an 8mm wrench, loosen the bolt that holds the fixing plate to the distributor housing. Loosen it just enough to allow the plate to rotate on the housing.
4. Rotate the EI distributor's shaft so that its offset slot is oriented the same as the offset tang on the shaft inside the engine. The offset slot is seen inside the plastic coupling on the lower shaft. The rotor should point in the same direction that the rotor on the original distributor was pointing before you removed it.
5. Lower the distributor shaft into the pedestal and engage it. You may need to rotate the rotor shaft a few degrees either direction for the shaft slot to engage with the shaft tang in the engine. After the distributor is seated completely on the pedestal, rotate the distributor so that the pointer on the fixing plate is centered at the center mark on the fixing plate.
6. Tighten the screw on the fixing plate to the pedestal.
7. The ignition timing can be set before starting the engine if a timing light is not available. Roll the engine crank manually so that the timing mark on the crank pulley is set at 18° BTDC. It's usually easier to roll the crank by removing the spark plugs first. Don't lose track of which spark plug cables go to which cylinder. The rotor should be pointing toward the #1 spark plug terminal on the cap to verify that the crank is positioned between the compression and power strokes (versus between exhaust and intake strokes, which is 180 degrees different for the distributor, 360 degrees different for the crank). Rotate the distributor housing so that the tips on the reluctor line up with the tips on the stator.
8. After the ignition timing is set, tighten the 8 mm hex head screw under the fixing plate. Any further adjustment can be made with the screw on top of the fixing plate.

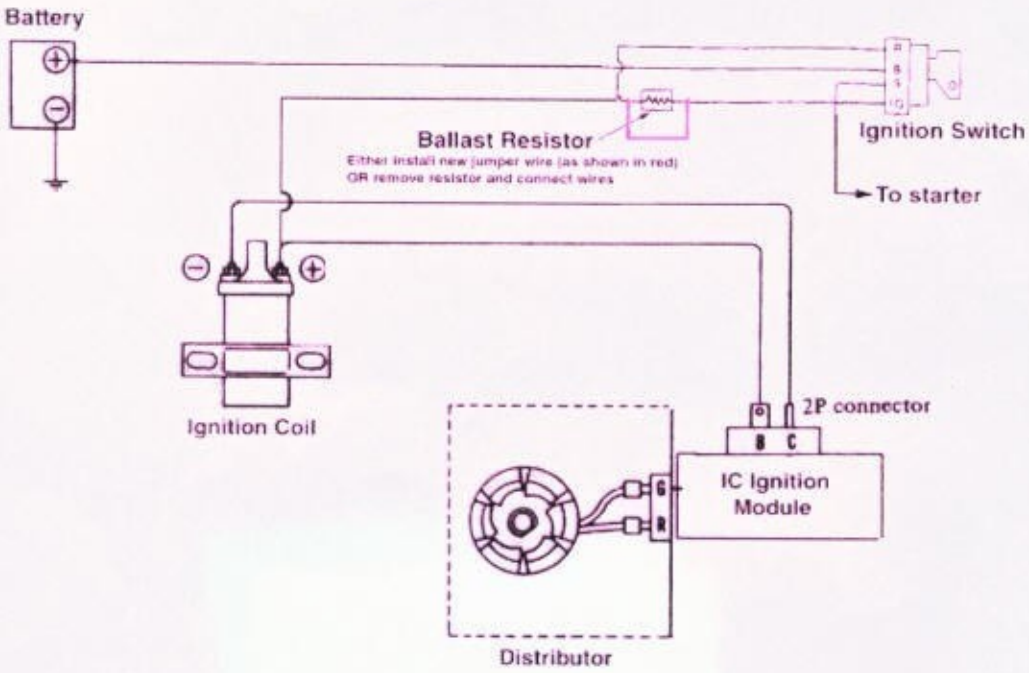
F. Wiring Connections

1. Refer to the wiring schematics at the end of this section, if necessary.
2. Connect the new wiring harness plug to the ignition module on the side of the distributor.
3. With the wires left connected, remove the old coil and it's mounting bracket from the inner fender. If there is a condenser and wire to the coil, remove it also.

4. Install the 12 volt coil. If there was a condenser mounted on the original coil bracket, mount it under one of the 12 volt coil bracket screws.
5. Connect the wires of the new harness from the ignition module to the 12-volt ignition coil according the tags on the wires. The heavier gauge wire connects to the (+) terminal of the coil along with the wire from the ignition switch. (from step 6 above). The smaller gauge wire connects to the negative (-) terminal of the coil.
6. There may be a double spade clip on the (−) terminal of the original coil. Transfer this double clip to the (+) terminal of the 12 volt coil.
7. Connect the wire originally connected to the (+) terminal of the coil to the (+) terminal of the 12 volt coil that you have installed.
8. The wire connected to the (-) terminal of the coil should be disconnected. This wire came from the original points and will not be used with the EI system.
9. Transfer any other wires from original coil to the respective terminal on the 12 volt coil.
10. Secure the new harness to the existing wires stretching from the front of the engine to the left inner fender, using zip-ties. Ensure that the wires will not get hit by the fan.
11. Now that there are no points to protect and the EI distributor is designed to operate on 12 volts, the ballast resistor can be taken out of the circuit. Install the jumper wire provided to bypass the ballast resistor to get 12 volts to the coil full time. Or remove the ballast resistor and connect the two wires from each end of the resistor together (secure and insulate them so they don't touch any grounded surface).
12. Transfer the spark plug cables to the EI distributor cap. Note how the cap has an opening in one side for the cap holder, which determines the orientation of the cap. Based on what spark plug # the rotor was pointing toward on the old cap, transfer that spark plug cable to the spark plug terminal on the new cap terminal. Attach the remainder of the spark plug cables according to how they are attached to the original cap. If the arrangement is uncertain, you can determine the proper arrangement by the firing order. If you are certain that the #1 cable is in its correct terminal on the cap, attach the other cables in the firing order of 1-5-3-6-2-4 in a counter-clockwise rotation, since the distributor rotates counter-clockwise.



240Z Original Ignition Wiring Schematic



Datsun 240Z Modified Ignition Schematic for 12V EI Distributor

G. Engine Startup and Timing Adjustment

1. Prior to starting the engine the spark plug gaps should be widened to 0.039" to 0.043". This is your new spark plug gap specification for this EI system.
2. This EI distributor has less mechanical advance than most original 240Z distributors. This will allow the timing at idle to be advanced more than the factory spec for the original 240Z distributor. This should be checked with the vacuum hose disconnected from the vacuum controller on the distributor. After full engine warm-up, check for desired idle timing of 18 degrees BTDC at 650 rpm. If the engine speed is higher than 650 rpm while setting the idle timing, the distributor's advance will not reach the desired full advance of 35 degrees BTDC, because the distributor has already started to advance above 650 rpm.
3. If using vacuum advance, re-connect the vacuum hose from the carburetor to the vacuum controller on the distributor. The engine's vacuum source to the distributor should be from the vacuum fitting(s) on the carburetor(s), NOT from a fitting on the intake manifold.
4. You can experiment with advancing or retarding the timing to get the optimum power and driveability. If you experience any knocking (pinging) while driving, the timing should be retarded enough to eliminate any knocking. Extended driving with engine knock will cause major engine damage.

H. Other Ignition System Components

You must use a 12-volt ignition coil that was designed for EI. It will produce a stronger spark than the 240Z's original 6 volt coil. The original coil is designed to work with a ballast resistor. Use of the 12V EI distributor and without the ballast resistor will overheat and/or burn out the original 240Z coil. The Nissan coil for the 12V EI is part # 22433-H7500. If you choose to get a coil from a salvage yard, get it along with the bracket, from a 1979-82 Datsun 210, 310, 510, 810, 280ZX,or pickup truck. You

should verify the coil is good by checking the resistance across the windings of the disconnected coil. The primary winding resistance should be 0.84 to 1.02 ohms. This is measured between the two small terminals on the coil. The secondary winding should be 8.2 to 12.4 kilo-ohms. This is measured between the contact where the big coil wire plugs into the coil and either of the two small terminals. You should open up your spark plug gap too since you will now have a stronger spark. The amount you increase your spark plug gap depends on the rest of your ignition system. If the converted distributor and the 12-volt coil (with ballast resistor bypassed or removed) are the only ignition system modifications, your new specification for the spark plug gap is 0.039" to 0.043". If you have an MSD or other capacitive discharge high-energy system, 0.045" to 0.050" seems to work well. To get the full potential of your converted distributor, make sure you have good quality spark plug cables and the right spark plugs.

I. Electrical Troubleshooting

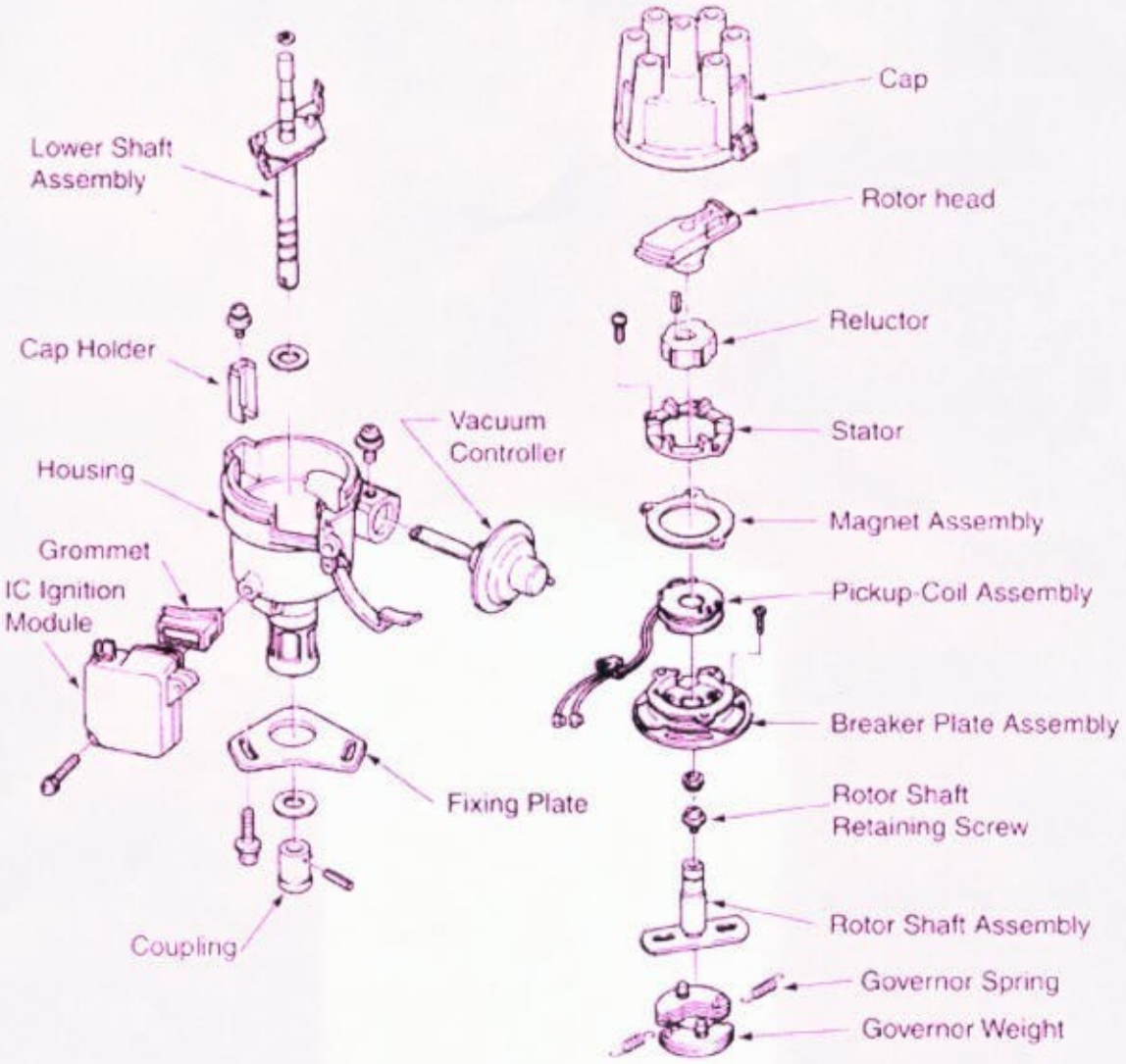
Troubleshooting the entire ignition system is beyond the scope of these installation instructions. However, if your distributor is not producing current to the coil, this is a guide for checking the electrical components of the EI distributor. Of course, before troubleshooting the distributor, you should verify that the distributor is receiving power from the ignition switch.

1. Turn the ignition switch to the "OFF" position.
2. Remove the distributor cap and rotor head.
3. With a circuit tester, measure the resistance between the 2 terminals of the pick-up coil as a distributor assembly. The 2 terminals are found in the rubber grommet on the top edge of the distributor housing adjacent to the IC ignition module. Measure the resistance by reversing polarity of the circuit tester probes.
4. If the resistance is approximately 400Ω, the pick-up coil is good and the IC ignition module is bad. Many auto parts stores can test the module. If the resistance is not approximately 400Ω, proceed to step 5.
5. Verify that the wiring harness is connected to the IC ignition module.
6. Turn the ignition switch to the "ON" position.
7. Measure the voltage at the ignition coil (-) terminal.
8. Turn the ignition key to the "OFF" position.
9. If voltage measured in step 7 is 0, the IC ignition module is bad. If voltage is approximately 12V, proceed to step 10.
10. Unplug the red and green wires from the IC ignition module. Measure the resistance between the 2 terminals of the pick-up coil (red and green wires).
11. If the resistance is approximately 400Ω, the pick-up coil is good and the IC ignition module is bad. If the resistance is not approximately 400Ω, the pick-up coil is bad.
12. If no spark occurs after replacing the pick-up coil and checking all other components of the ignition system, replace the IC ignition module.

J. Replacement Parts

Nissan Parts

Governor weights - Nissan Part # 22109-A5500, Quantity 2 required
Governor spring Set - Nissan Part # 22110-P7100
Shaft coupling, Nissan Part # 22119-73400
Reluctor, Nissan Part # 22115-Q1700
Stator, Nissan Part # 22163-Q1700
Magnet Assembly, Nissan Part # 22158-S6700
Pickup coil, Nissan Part #22229-Q1700
Breaker plate assembly, Nissan Part # 22136-H9501
Vacuum controller, Nissan part # 22301-N4700
Cap & Rotor, from any auto parts store, for a 1979 Nissan 280ZX



Some good info on coils for the EI upgrade:
COIL

The Nissan 12 volt EI coil that was used with these EI distributors has the following specs:
Primary resistance 0.84 – 1.02 ohms (as measured between the 2 small terminals, with no wiring attached)
Secondary resistance 8.2 – 12.4 kilo-ohms (as measured between the center terminal and either of the 2 small terminals)

* The opposite of a toy-train transformer, a coil converts 12-14 volts to a several thousand inside the coil. A pulse from the negative wire sends this hot spark down the coil wire to the distributor – this is the common setup on just about every car over the last 100 years. But when using a capacitive discharge ignition like the Crane or MSD, 450 volts is supplied to the coil (instead of 12-14). This is why a better ignition produces such a mammoth spark out of the coil. Also, an electronic ignition can supply a high-current spark out past redline, which points ignitions have trouble doing.

* When buying a quality performance coil for an electronic ignition, look at it's specs. The "primary

resistance" should be lower than about one ohm, but higher than about .40 or so. The lower the primary resistance, the more voltage it can convert. Companies don't usually print these specs, I would go to their web sites. Most racing coils have very low "primaries" which require you use a racing ignition to supply the large amount of current they draw. So be careful adding a coil with low primary resistance to a 280Z or ZX. The brain supplies the 12V to the coil on these cars and can damage it. A solution is to run a dedicated, separate 12V line to the coil + terminal.

* A couple of high output coils to consider are the MSD Blaster-2 coil, which has a primary resistance of 0.7 ohms. Another is the Crane PS60, which has a primary resistance of 0.4 ohms and is designed to work well with electronic ignitions.

- The big yellow Accel Super Coils were designed in the 1970s for muscle cars with points and high resistance ignitions. They have a high primary resistance, so avoid them because they are not compatible with the ignition module and will also reduce the performance of your EI system.

The following information is provided in the event you have problems with your tachometer not working after installation of the EI distributor and coil. I have not needed to use this info because I had no tach problem after my installation. This is not my information but may be valuable to you. There are 2 sections, from 2 different sources. The 2nd source states that the 240Z tach will not work with this EI conversion. This is not necessarily true. It depends on the tach and its associated wiring that your 240Z has.

I found out that there are at least two types of tachs for the 240Z and 260Z. One type is a four wire positive trigger tach and another is a three wire negative trip tach.

The 4 wire type has one wire that sends positive voltage to the tach, one wire is for ground and the other two leads are the trigger loop, one coming and the other going. I can't say off hand exactly where these two feed to/from but they are shown in both my 72 and 73 factory manual wiring diagrams. They are also poorly pictured in these manuals. From past experience I have found that this type of tachometer is very unreliable. I have found this true in Mazdas and Datsuns.

I have found the 3 wire type of tachometer to be much more reliable and more adaptive to aftermarket modifications to the ignition system. The 3 wire type has a positive lead, a ground and a negative trip lead that runs directly from the negative terminal on the coil. Strangely, however, I have not found a Datsun wiring diagram or picture depicting this three wire tach.

OK, here is what I have done with my 72 240Z. I removed my old 4 wire tach and replaced it with the three wire. I ran all new wires to the tach to assure proper circuitry. One wire from a trustworthy + supply, another to a nice ground, and the third directly to the negative lead on the coil. Here is where a problem crops up. Remember those two wires, on the 4 wire tach, that formed the positive trip circuitry? Well that loop is needed to keep your car running. Apparently the primary ignition circuitry runs through this loop (weird). I had to just complete this loop and the car started right up.

Here's another info source for tachometer issues associated with the EI upgrade:

Some 240Z tachometers may not work with this setup. Replace it with a 75-78 280Z tach and connect it's sensor lug to the negative (-) terminal on the coil. If the tach jumps around, solder a 7500-10,000 ohm resistor inline with the sensor wire to reduce the signal voltage.

280Z TACH INTO A 240Z

I would recommend getting rid of your old 240Z tach. Vintage, but not designed well, they're inaccurate and start jumping around as they age: Replace it with a 1975-78 280Z tach. Put the new tach in the 240 metal housing, and swap the faceplates to keep the redline accurate. The needle pops off, don't damage it. A drop of rubber cement might be needed to put it back on. Don't use superglue or you'll never get it off again. Connect the tach's sensor lug to the negative terminal on the coil.
NOTE: Make sure you reverse the power leads on the back of the tach, compare them before you swap for a reference. The little "loop plug" from the 240 tach should be plugged back into the wiring harness in the dash, otherwise the car won't start.

The following information is provided in the event you have problems with your tachometer not working after installation of the EI distributor and coil. I have not needed to use this info because I had no tach problem after my installation. This is not my information but may be valuable to you. There are 2 sections, from 2 different sources. The 2nd source states that the 240Z tach will not work with this EI conversion. This is not necessarily true. It depends on the tach and its associated wiring that your 240Z has.

I found out that there are at least two types of tachs for the 240Z and 260Z. One type is a four wire positive trigger tach and another is a three wire negative trip tach.

The 4 wire type has one wire that sends positive voltage to the tach, one wire is for ground and the other two leads are the trigger loop, one coming and the other going. I can't say off hand exactly where these two feed to/from but they are shown in both my 72 and 73 factory manual wiring diagrams. They are also poorly pictured in these manuals. From past experience I have found that this type of tachometer is very unreliable. I have found this true in Mazdas and Datsuns.

I have found the 3 wire type of tachometer to be much more reliable and more adaptive to aftermarket modifications to the ignition system. The 3 wire type has a positive lead, a ground and a negative trip lead that runs directly from the negative terminal on the coil. Strangely, however, I have not found a Datsun wiring diagram or picture depicting this three wire tach.

OK, here is what I have done with my 72 240Z. I removed my old 4 wire tach and replaced it with the three wire. I ran all new wires to the tach to assure proper circuitry. One wire from a trustworthy + supply, another to a nice ground, and the third directly to the negative lead on the coil. Here is where a problem crops up. Remember those two wires, on the 4 wire tach, that formed the positive trip circuitry? Well that loop is needed to keep your car running. Apparently the primary ignition circuitry runs through this loop (weird). I had to just complete this loop and the car started right up.

Here's another info source for tachometer issues associated with the EI upgrade:

Some 240Z tachometers may not work with this setup. Replace it with a 75-78 280Z tach and connect it's sensor lug to the negative (-) terminal on the coil. If the tach jumps around, solder a 7500-10,000 ohm resistor inline with the sensor wire to reduce the signal voltage.

280Z TACH INTO A 240Z

I would recommend getting rid of your old 240Z tach. Vintage, but not designed well, they're inaccurate and start jumping around as they age: Replace it with a 1975-78 280Z tach. Put the new tach in the 240 metal housing, and swap the faceplates to keep the redline accurate. The needle pops off, don't damage it. A drop of rubber cement might be needed to put it back on. Don't use superglue or you'll never get it off again. Connect the tach's sensor lug to the negative terminal on the coil.
NOTE: Make sure you reverse the power leads on the back of the tach, compare them before you swap for a reference. The little "loop plug" from the 240 tach should be plugged back into the wiring harness in the dash, otherwise the car won't start.