

Import Distributor Service



It's been at least ten years since most auto makers stopped using breaker points in their ignition systems. Before long you'll be lucky to find a new lawn mower that still has points. Because it usually works so well, electronic ignition gets taken for granted. You're probably not beating yourself over the head day after day trying to solve weird ignition problems.

As trouble-free as it might seem, electronic ignition can still throw you a few curves. Each manufacturer seems to have his own ideas on how to build a system. Several use more than one system, even for the same car. You can't tell the players without a scorecard sometimes. We couldn't hope to cover the diagnosis and repair of every major import ignition system in

use today in one article.

Instead, we've gathered some of the more interesting and unusual problems and procedures that you're likely to encounter on a variety of imports. Look for additional coverage in this area soon. If we've left out one of your favorites, let us know.

'I Just Had It Tuned Up'

Electronic ignition has lead to some new definitions of what the words "tune up" mean. Just about any self-respecting DIYer can screw in a new set of spark plugs and tell his friends he's just done a tune up. Things aren't much better at the professional level in some shops. The distributor gets ignored until it stops working. Some guys don't even bother to check timing anymore. The owner of the car that came in on the hook this morning is convinced that all he needs is a tune up and his troubles will be over.

If you find yourself at the end of this particular game of pass the buck, get to the bottom of the problem. If someone before you has cranked the distributor all the way to the stop to set the timing, find out why. Don't put a band aid over the original problem unless you want to get better acquainted with the customer.

Increase your chances for diagnostic success by following recommended test procedures through to their conclusion. Electrical parts can be expensive and parts suppliers usually aren't too eager to take back unused parts after a fishing expedition. There's no room for guesswork.

Use an accurate volt-ohmmeter when taking circuit readings. The voltmeter article in this month's issue should demonstrate how important accurate meter readings are. Inaccurate readings can easily lead you off on a troubleshooting tangent.

Electronic ignition components can be easily

damaged if mishandled. Observe these simple cautions to avoid smoke testing that \$300 igniter:

- Turn the ignition off before making or breaking any electrical connections. Spike and transient voltages can damage or shorten the lifespan of delicate components.
- Take all volt-ohmmeter readings as close to room temperature as possible. This will help you avoid inaccurate test results due to ambient temperature variations.
- Never operate the engine with a spark plug wire disconnected. Some ignition coils may be damaged by this practice.
- Never hold an ignition wire in your hand while checking secondary ignition output. Being a path to ground for 40,000 volts was never my idea of a good time.
- Never ground the ignition coil terminals. Accidental grounding can damage the coil and igniter.
- Use the Toyota tachometer terminal when checking idle speed. Not all tachometers are compatible with this setup. Check your tach before you connect it to prevent damaging the ignition.
- Never leave the 1.5 volt battery connected to the igniter for more than five seconds when testing igniter operation on Toyota models. Diodes in the igniter will be damaged otherwise.
- Never ground the Toyota tachometer terminal.
- Back probe all connectors carefully during testing to avoid damaging them.
- Never pierce the insulation on any wiring, especially secondary ignition wires.
- Use a non-magnetic brass feeler gauge to measure distributor air gap.
- Never leave the ignition switched on with the engine not running for more than ten minutes. This may cause ignition component damage.

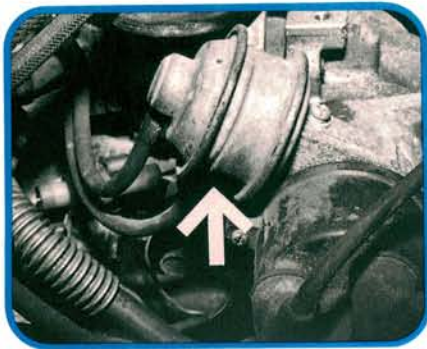
—By Karl Seyfert



The dual advance diaphragms used on 22R-E Toyota engines can cause problems. One diaphragm receives manifold vacuum while the other runs off ported vacuum. Test each with a vacuum pump before setting ignition timing. Leaking diaphragms will affect base and total advance settings.



Toyota had some problems with igniter (black arrow) failures on their Integrated Ignition Assembly (IIA). This unit can be found in 83-86 Tercels and Corollas. It's also found in early model Camrys and Vans. Use a compatible tachometer when using Toyota's test connector (white arrow).



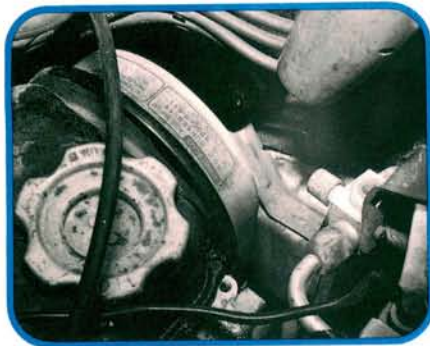
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Overadvancing the timing to compensate for a bad vacuum diaphragm or advance mechanism on 1984 and later Honda models with dual diaphragm distributors (arrow) can cause detonation induced piston damage. Use the following procedure to check all distributor parts before setting the timing.



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Warm the engine, then connect a timing light. Remove both vacuum hoses from the advance diaphragms and check for vacuum at idle. The inside hose (closest to the distributor) should have vacuum, the outside hose should not. Trace vacuum hoses and correct any problems, then plug the hose ends.



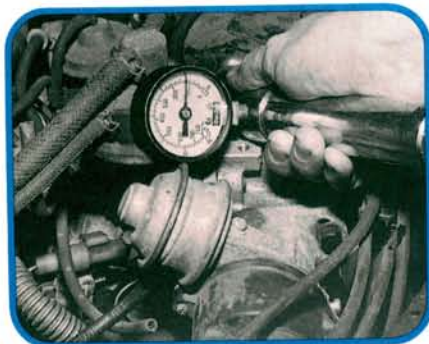
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Check the timing, but don't adjust it. It should be 3-4 degrees before TDC. If it's not, check the distributor for a sticking advance mechanism or a faulty advance diaphragm. If either one has been broken for awhile, someone may have already misadjusted the timing to compensate.



6

Reconnect the vacuum hose to the inside diaphragm. Timing should advance to the red timing mark. If not, check the inside advance diaphragm. Apply vacuum with a vacuum pump to the outside diaphragm. The timing should advance an additional 4-6 degrees. If not, check the outside diaphragm.



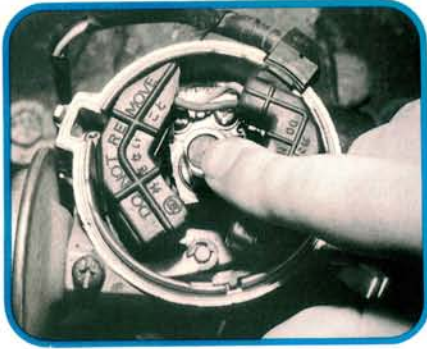
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We tested both vacuum diaphragms with a vacuum pump. The outer diaphragm held vacuum but the inner one leaked down. Inner diaphragms fail more often because they are constantly supplied with vacuum. A leaking diaphragm can prevent full advance. Replace it and retest the system.



8

Reinstall the outside vacuum hose. If these tests turned up a problem, resist the urge to elongate the slot in the distributor baseplate to set timing. The customer doesn't need any extra holes in his pistons. If everything is working properly, set timing to the specifications for your model.



9

Air gap is adjustable on this 1983 Subaru ND distributor. The specification is 0.2-0.4 mm. If it needs adjustment, check the distributor bushings first. The bushings on this distributor were so sloppy, we could touch the reluctor to the pickup coil. The pickup coil and igniter are an assembly.



10

The distributor gear pin must be drilled out to remove the distributor shaft. The advance plate can be removed without removing the distributor shaft. Metal from the bushings was hanging up the advance plate operation. Align the advance plate clips (arrow) with the distributor housing slots.



11

Nissan LED distributors seldom cause problems. The problem is usually in another part of the system. If you've got no spark, check for battery voltage to the power transistor connector. Consult a wiring diagram for the proper terminal. Check the E.C.C.S. relay if there's no voltage at the power transistor.



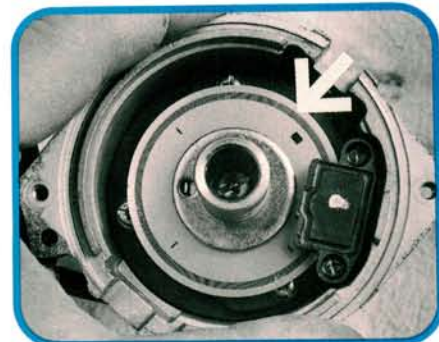
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Use the same connector to monitor the digital signal from the ECU to the power transistor with a logic probe. Connect the probe as shown, then crank the engine. If both battery voltage and an ECU signal are present, check the power transistor operation. Also inspect the ignition coil for cracks.



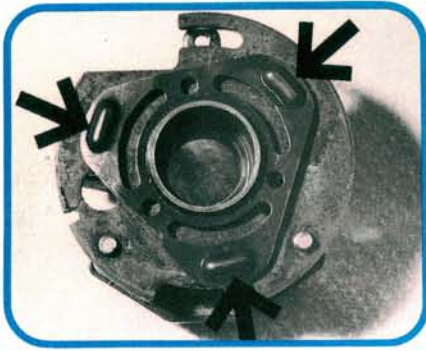
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Later production Nissan Sentra distributor caps include a matched rotor and cover plate with the distributor. The cover plate (arrow) serves two purposes. It keeps moisture out and also shields the sensors in the pickup assembly from stray flashes in the cap which could confuse the sensors.



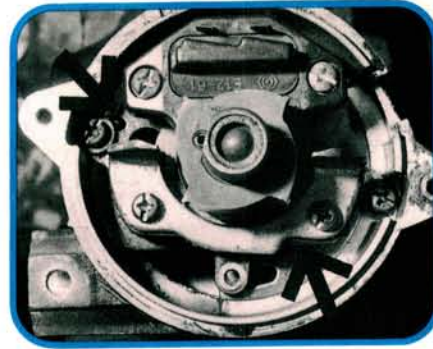
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You can see how tiny the one degree signal slits (arrow) are. Oil leakage on horizontal mount distributors can cause some interesting driveability problems. The inside of the distributor must be kept clean and dry. The LED pickups on this style distributor rarely die of natural causes.



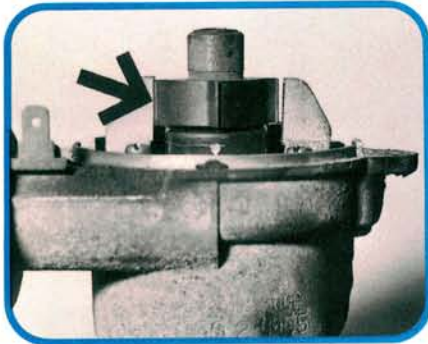
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This Hitachi advance plate is from a 1982 Nissan Sentra, but you'll find them in some early '80s Hondas and Subarus too. Some internal parts will interchange. The advance plate pivots on ball bearings under three dimples (arrows). The bearings can fall out and affect distributor operation.



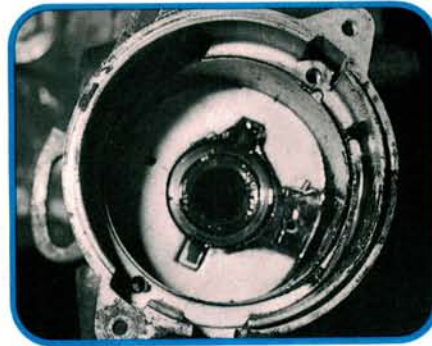
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Check inside the distributor if you suspect problems. Loose bearings will often cling to the stator magnet (right arrow). Wiggle the stator plate to check for looseness. Index the notch in the advance plate (left arrow) with its mate in the distributor housing when replacing the plate.



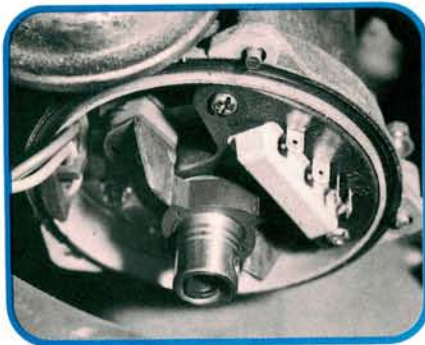
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A loose advance plate forces the stator against the reluctor (arrow), causing an intermittent miss. Pry off the reluctor, then replace the damaged advance plate. Adjust the air gap to 0.3-0.5 mm on both sides of the stator. Reinstall the reluctor with the letter facing up.



18

This is a horizontally mounted distributor on Hondas and Nissans. Look for telltale signs of oil near the breather holes or on the outside of the distributor that would indicate a shaft seal leak. Leaks this bad usually indicate problems with the distributor shaft bushings.



19

The dual plug ignition found on 1982-86 Nissan Stanzas is similar in operation to the single plug Hitachi unit above. The module is the weakest link in the system. Half of the module can fail and the engine may still run. Operating symptoms will vary depending on which side of the module is blown.



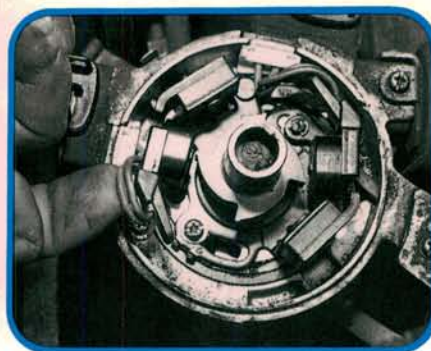
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If the dash tachometer doesn't work, check the intake side of the system for spark. The module automatically cuts operation of the intake ignition coil at higher RPMs. If the exhaust side of the module is blown, the engine will shut off each time it's accelerated hard.



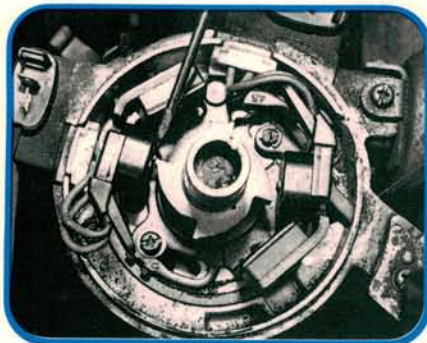
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Mazda's RX-7 uses a leading and trailing ignition system for complete rotary engine combustion. Both ignition coils are recessed in the left inner fender. The coil on the right fires the leading plugs several degrees before the coil on the left fires the trailing plugs.



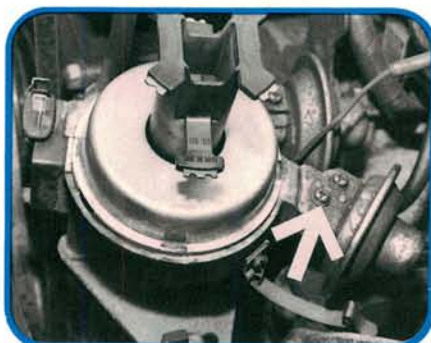
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Check the pickup coil leads for fraying. Standard pickup coil resistance is 650 ± 50 ohms at 68 degrees. Attach a milliammeter to the pickup coil leads. Touch a screwdriver to the magnetic core of the pickup coil. The meter reading should change when the screwdriver is pulled away quickly.



23

Line up the reluctor opposite each pickup coil and measure the air gap with a non-magnetic feeler gauge. Proper air gap is 0.5-0.9 mm (0.020-0.035 in). No adjustment is possible. If it's out of specification, look for a worn advance bearing assembly or worn distributor shaft bushings.



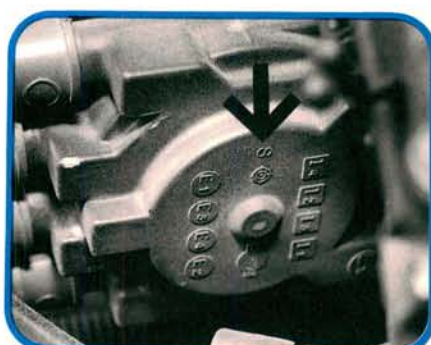
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Lead ignition timing is adjusted by rotating the distributor housing. Set the lead timing, then loosen the screws (arrow) to set trailing ignition timing. Slide the trailing diaphragm in or out to make the adjustment. No-starts may be caused by a shorted radio condenser.



25

Trust me, there's a distributor under there (arrow). Nissan moved the distributor to the left end of the camshaft on 1987 and later Stanzas. Problems with early Mitsubishi distributors caused the engine to cut out intermittently at about 2500 RPM. The only fix is to replace the distributor.



26

The trademark on the O.E.M. cap indicates whether it's a Hitachi or Mitsubishi distributor. The caps don't interchange. Letter "S" caps are a vented, moisture resistant design. Oil leakage in late model horizontal Stanza distributors can clog the shutter wheel and cause driveability problems.