



Here's an interesting little game of three on one. Toyota, Nissan, and Mazda have all made names for themselves (and a lot of money) by selling a large fleet of small trucks. But one Japanese manufacturer, Isuzu, has been trying to play ball with the big guys when it comes to small trucks and light utility vehicles. In fact, Isuzu recently announced that it would leave our small car market altogether, to concentrate on utility vehicles.

This month, we find ourselves under the hood of a 1988 Isuzu four wheel drive pick up. The truck is equipped with a very large 2.6 liter four cylinder engine. This engine is also used in some Trooper, Rodeo, and Amigo models. The truck has 59,000 miles on it. It runs well, but we've been warned that periodic valve adjustments and a timing belt replacement at 60,000 miles are very important. This engine will bend valves if the belt breaks.

If you're familiar with the Mitsubishi 2.6 liter four banger, you may expect to see balance shafts in the

Isuzu engine. Many large four cylinder engines use balance shafts to reduce vibration. But the Isuzu is an exception to the rule. The absence of balance shafts makes timing belt replacement a lot simpler than you might think.

(By the way, even though the 2.3 liter Isuzu engine uses different parts, the configuration and procedures for timing belt replacement are the same.)

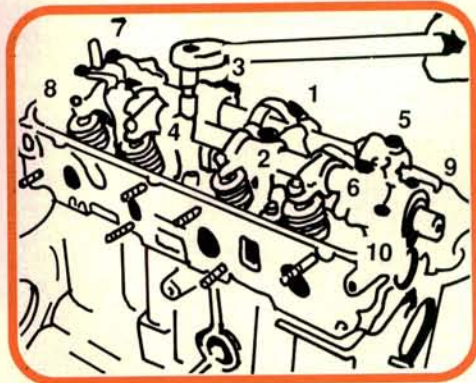
We'll also throw in some information which goes along with this month's Driveability Clinic coverage of No-Spark problems. The power transistors on these engines can fail. But the power transistor (we'll call it the igniter here) is located on the underside of the intake manifold near the number three intake runner.

There are two tests you can run on this secondary circuit. We'll show you how to test upstream at the Intermediate Connector under the hood. Then we'll show a direct test of the igniter itself.



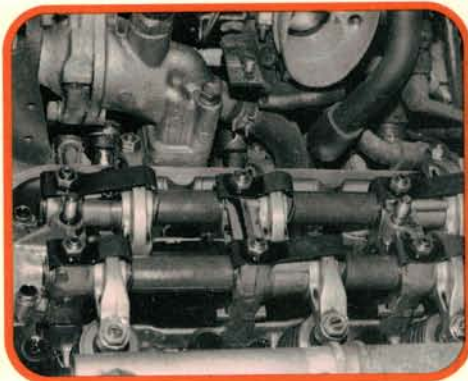
1

The air intake duct straddles the valve cover, so you'll need to remove it. You'll also need to remove the coil and spark plug wires, throttle cable, the two breather hoses connected to the duct, the condenser wire, and a ground at the back of the valve cover. Then remove the valve cover.



2

The rocker shaft setup on the 2.6 is your familiar SOHC design with twin rocker shafts. Isuzu suggests that you check the torque on the rocker shafts during a maintenance. Tighten bolts 1 through 8 to 22 Nm (16 ft-lb). The short bolts in the front camshaft seal cap should then be tightened to 8 Nm (6 ft-lb).



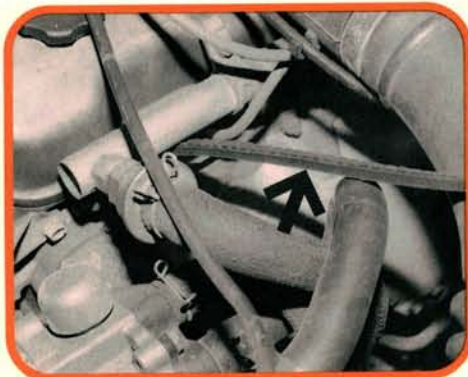
3

Valve lash specs are the same for both intakes and exhausts, 0.20 mm (0.08 in). Adjust the valves at the valve end of the rocker arm with the engine COLD. Isuzu is serious about the word COLD, recommending that an engine be allowed to sit for at least 2-3 hours with the hood up before a valve adjustment.



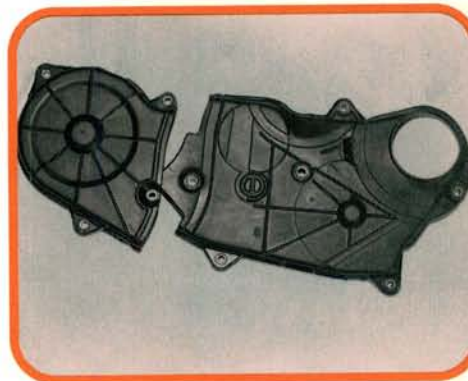
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Next, the timing belt. This is an easy belt to replace. Remove the accessory belts. Unbolt the cooling fan and lay it down in the shroud while you complete the timing belt replacement. The water pump pulley is sandwiched between the pump flange and fan, and will slide off the pump with the fan removed.



5

Dealer techs have special tools to hold the crankshaft while they loosen the crank bolt. We don't. Instead, we slide a length of fan belt into number one plug hole just before TDC on number one. (Any cylinder will work as long as you catch the piston coming up to TDC with both valves CLOSED.)



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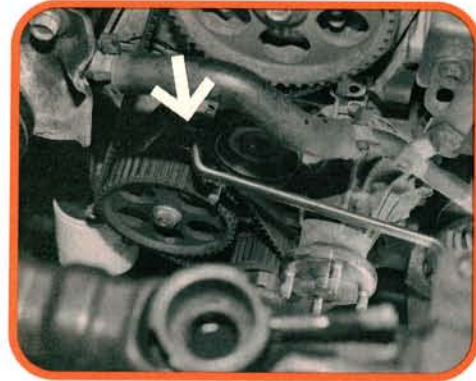
The rubber belt stops the piston before TDC so we can loosen the bolt. With the crank pulley removed, we can remove the lower timing cover. This photo will help you get your bearings and locate all the timing cover fasteners if this is your first try at one of these. (You can remove the belt from the plug hole now.)

Pick Up Game



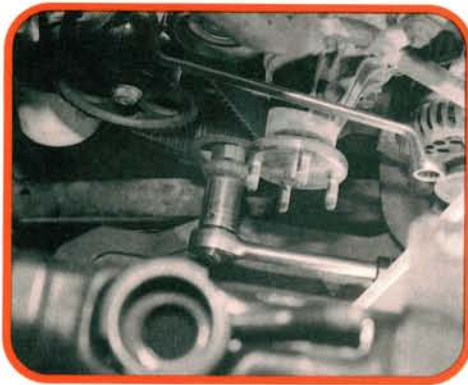
7

We temporarily reinstall the crank bolt, and use it to turn the engine over until the crankshaft and camshaft timing marks are properly positioned. The inset illustration shows the crank marks. The punch mark in the cam gear is small, so look sharp. Align it with the arrow in the casting (arrows).



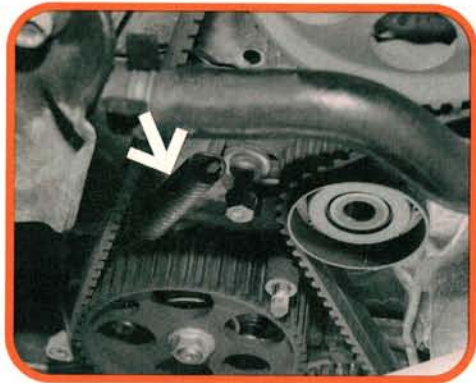
8

From here on, proceed as you would with any other timing belt replacement on a similar engine. Loosen the pinch bolt on the spring loaded tensioner and push it away from the belt to remove belt tension. Then retighten the bolt to hold the tensioner off to the side as you install the new belt.



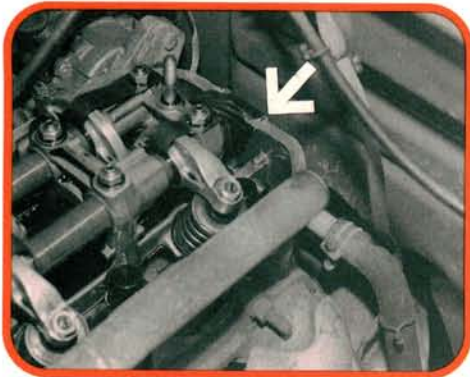
9

Pull the new timing belt tight on the "drive" side of the cam and crank sprockets. Loosen the pinch bolt on the tensioner, allowing the tensioner spring to remove the slack. Retighten the pinch bolt. Then turn the engine counterclockwise, two full rotations. Loosen and retighten the pinch bolt one last time.



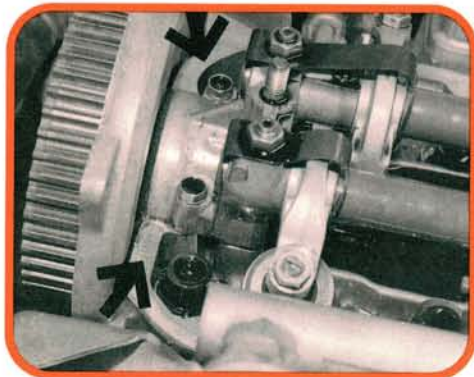
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Double check your timing marks. Please resist the temptation to overtighten the timing belt. The tensioner spring (arrow) should properly tighten the belt. We experimented a bit, and added a slight amount of tension above and beyond what the tensioner spring offers. The result was a noisy belt.



11

Before you reinstall the valve cover, replace the rubber half moon at the rear of the head. Apply a thin bead of sealer to bridge the seams between the seal and the valve cover sealing surface. We also discovered (the hard way) that the head casting has a very sharp edge right near the half moon seal.



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At the front of the head, apply a small amount of sealer in the area bracketed by our arrows. Reinstall the cover. Easy big fella, the valve cover nuts tighten to only 7 ft-lb. A new gasket, prudent use of sealer as mentioned, and even tightening are more important to a good seal than overtightened fasteners.

Pick Up Game



13

Now you can button things up. Replace the front cover and install the crank pulley. Torque the crankshaft bolt to 128 Nm (87 ft-lb). Reinstall the water pump pulley, fan, and accessory belts. Deflection across the longest length of all accessory belts is 10 mm with a force of 22 pounds applied.



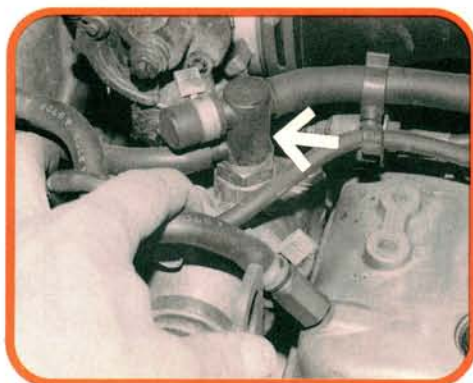
14

Check the throat of the throttle body for any carbon deposits, and clean them away before reinstalling the intake ducting. When you reinstall the throttle cable, make sure it's adjusted so the cable doesn't keep the throttle open at idle, and that you have WOT with the pedal mashed to the floor.



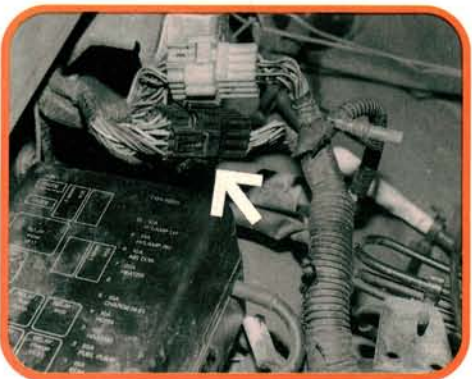
15

Start and fully warm the engine. Use the air bypass screw in the throttle body to set the curb idle to 900 RPM. Set ignition timing to 12 degrees BTDC at 900 RPM (wheels straight ahead with P/S, vacuum hoses at the EGR and canister purge plugged, A/C off, transmission in neutral or park).



16

If a coolant drain or flush was a part of your repair or maintenance, proper bleeding of the cooling system is a must. Trapped air in the thermostat housing can cause the engine idle to hunt up and down. Temporarily remove the vacuum valve to bleed off the air. Later engines have a bleed screw.



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In keeping with this month's No-Spark article, let's look at diagnostic tests for this Isuzu. If you have a no-spark, use the test procedures on the last page of this article. The first test is made at the Intermediate Connector. It's a 16 pin black connector located near the fuse box.



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The other key component is the power transistor. This little critter is so cleverly hidden on the underside of the intake manifold that some have denied its existence. Here we've removed the right front wheel and inner splash shield to show you its whereabouts. It's easier to reach than to photograph!

Testing for No-Spark



The ignition system used in the 2.6 Isuzu is similar to others you may have seen. The distributor contains a shutter wheel, LED, and photoelectric cell. The distributor keeps track of both engine speed and crank angle. (If you know the setup used by Nissan in some of their cars, you get the idea.) The Isuzu distributors have a reputation for dependability. In fact, we were informed that most distributors returned under warranty have tested okay.

A much more likely cause of a no-spark condition is the power transistor (igniter) and its related circuit. The igniter acts like an old set of ignition points. A signal from the ECU causes the transistor in the igniter to switch the negative side of the coil to ground.

You can test the coil and igniter as follows:

- Disconnect the coil wire and attach a spark tester between the coil wire and ground.
- Turn on the ignition (engine off).
- A factory bulletin recommends that you then ground the negative side of a 1.5 volt D-cell battery and touch the positive end of the battery to the Intermediate Connector terminals shown in our accompanying diagram. On our pickup it's terminal 4. On Trooper models it's terminal 72.

The first time we tried this, we thought something was wrong with the test. We were using a homemade spark tester, but the test didn't produce a spark, even though the truck had a known good igniter. We later discovered that a 3 volt signal from two D-cell batteries works a lot better. The volt and a half will trigger the igniter, but the spark you get is so weak, you may not even see it.

Testing for a Bad Igniter

Still don't have spark? The igniter is a likely suspect, but getting at it for a direct test is the hard part. It's hiding up under the intake manifold.

Try this. Remove the right front wheel and the inner fender splash protector. Reach up under the intake manifold and remove the igniter. Be very careful when you disconnect the snap connector at the igniter harness. The igniter wiring is thin, and very easily damaged.

With the igniter removed from the vehicle, use the following test procedure. You won't find it in any shop manual, but it works.

- Use two regular old fashioned test lights. Connect both lights to the positive terminal of the battery. Attach a ground wire between the frame of the igniter and the battery negative post.
- Connect the tip of Light One to the blue wire terminal of the igniter.
- Briefly touch the tip of Light Two to the green wire terminal.
- Each time you touch Light Two to the green wire terminal, Light One should flash as the igniter switches ON, completing the circuit to ground.

- No light? No good.
- When you reinstall the igniter on the engine, make sure it's bolted up tight. An intermittent miss or stalling can result if the igniter doesn't have a good ground. A poor igniter ground can also store a code 54 in the computer.

While you're on that side of the engine, check the engine ground cable at the intake manifold. We're told that a loose ground connection here can also cause the engine to stall or miss.

Intermediate Connector (Black)



for Pick Up (TF)



for Trooper (KT)

Positive Battery Terminal

