



Spectrum Timing Belt

The popularity of overhead cam engines has made timing belt replacement a pretty common maintenance procedure. Each of us has probably replaced more timing belts than we care to remember. And most of your customers have probably had at least one car with an overhead cam engine, so it shouldn't take too much explaining on your part when it's time to recommend a timing belt replacement. But how do you explain that the engine has to be removed before the timing belt can be replaced?

"Well, Mr. Jones, we can get you a good deal on the parts, but the labor is going to cost you about a week's pay and we'll need the car overnight."

Just such an explanation might be necessary if the customer owns a 1985-89 Chevy Spectrum or Isuzu I-Mark. It seems that when the engineers designed these Japanese twins, they forgot to leave enough room next to the engine to remove the crankshaft pulley bolt. The right front frame rail and inner fender hug the side of the engine, preventing wrench access to remove the bolt.

If the idea of spending several hours removing an engine to get to one bolt doesn't appeal to you, you're probably a couple steps ahead by now. Visions of cutting torches, air chisels, and hole saws might even be dancing through your head.

Opening a hole through the frame rail and inner fender to reach the crankshaft bolt may be a quick way to get the job done, but it isn't the right way. Nine out of ten juries will probably agree. You're liable for any effect that the access hole might have if the car is involved in an accident. Even if there's no accident, the hole just might give rust the foothold it needs to attack the inner fender.

There is another way. The crankshaft pulley bolt can be removed and the timing belt can be replaced with the engine in the car, without drilling an access hole. After removing the right side motor mount and rear torque rod, the engine can be raised and tilted far enough to allow crank pulley bolt access. And the whole job can be completed quickly enough to return Mr. Jones' car before supper time.

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Isuzu and Chevrolet listened to their technicians and revised their service manual recommendations. Raising the engine is now the accepted procedure for crank pulley bolt removal and timing belt replacement. The same method can be used on all Spectrums and I-Marks.

The Spectrum/I-Mark engine will bend its valves in two notes if the timing belt breaks or loses a few teeth. Be sure to mention this fact if the customer is reluctant to replace the timing belt at the recommended 60,000 mile interval. A sludge filled crankcase caused by neglected oil changes will also put an extra strain on the timing belt and could lead to an early belt failure.

Twins

We did a little comparison shopping before we bought our timing belt. Except for the badges and

trim, Chevy Spectrums and Isuzu I-Marks are identical under the skin. Both have 1.5 liter engines, and a turbocharger was an option on both cars. So we were reasonably sure that a timing belt for an I-Mark would fit a Spectrum, and vice versa.

Our target vehicle was a 1987 Chevy Spectrum, so we called our local Chevy dealer first for a price quote. A follow up call to the Isuzu dealership revealed that the Chevy part was about \$5.00 more expensive than the identical Isuzu part.

Our informal survey could hardly be called comprehensive. The price advantage might have gone to the Chevy dealer if we had been shopping for a different part. But it does prove the value of shopping around when you're working on a Spectrum/I-Mark or any other joint venture vehicle. If you can't find what you're looking for through one source, it may be waiting on the shelf at the other.

—By Karl Seyfert



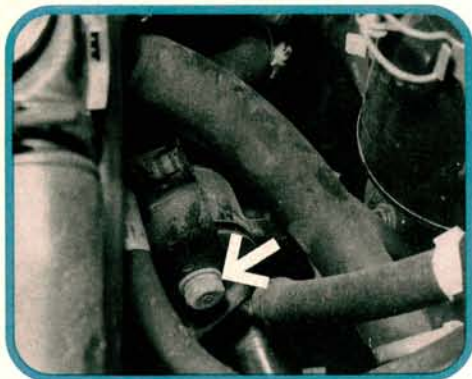
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The one piece timing cover extends all the way down to this aluminum casting at the front of the engine (arrow). The casting wraps around the bottom of the crankshaft timing sprocket to keep dirt and moisture out. The timing belt can't be replaced without removing the crankshaft pulley first.



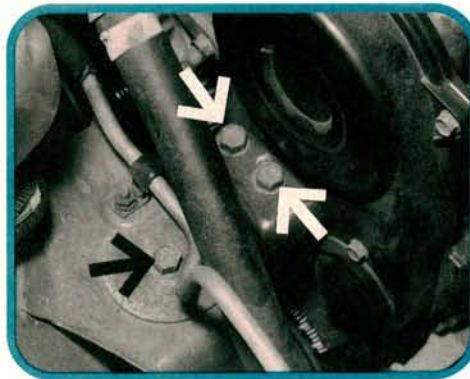
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Remove the accessory drive belts. With the splash panel out of the way, it's a clear shot to the lower pivot bolts for the A/C compressor and alternator. The belts came off easily after loosening the upper adjustment bolts. Our Spectrum didn't have power steering to contend with.



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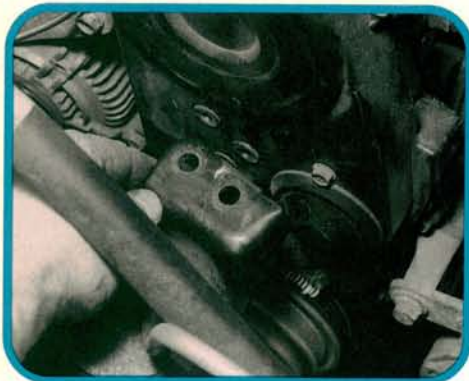
Remove the torque rod located at the rear of the engine, below the air filter snout (arrow). Removing the torque rod lets us raise and tilt the engine without binding the other engine mounts. Both torque rod mounting bolts have captive nuts, so there's no need for a backup wrench.



4

Support the engine under the oil pan with a floor jack and a block of wood. The two piece right side motor mount bolts through the belt cover and must be completely removed. Remove the three upper mount bolts (arrows). Now reach under the mount to remove the three bolts that pass through the belt cover.

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After all six mount bolts are removed, there's just enough room to remove the engine half of the mount. Slowly raise the engine until the other half of the mount can be removed from the body. Take the mount to the bench, remove the rubber end caps, and check the mount for signs of wear.



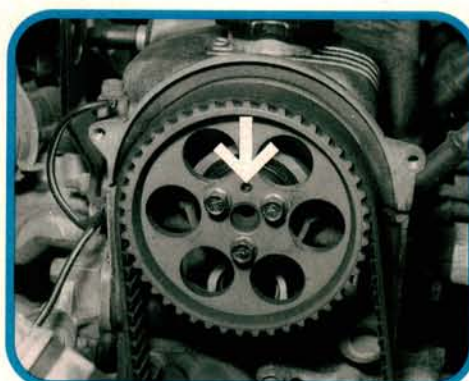
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The timing belt cover can be removed either before or after the crankshaft pulley is removed. If you want a quick look at the timing belt or if you're only replacing the water pump, remove the cover now. The bottom of the one piece cover will just clear the crank pulley after the cover bolts are removed.



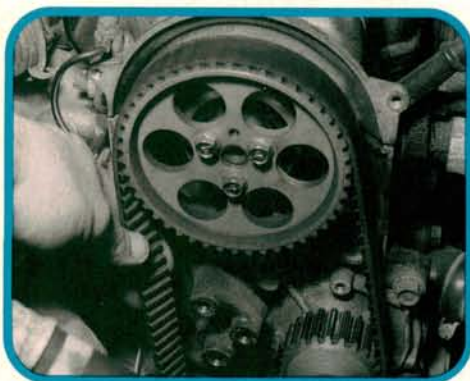
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Keep raising the engine until a box wrench or socket will fit over the crankshaft pulley bolt. Dealer service departments have a special tool to lock the flywheel or flexplate. We put the transmission in gear, locked the brakes, loosened the pulley bolt, then removed the crankshaft pulley.



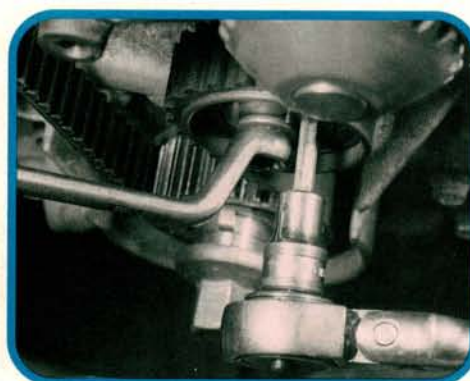
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Temporarily reinstall the crankshaft pulley bolt. Turn the crankshaft clockwise until the camshaft sprocket's dowel pin (arrow) is at 12 o'clock. The crankshaft sprocket's keyway should also be pointing straight up. Now we're ready to remove the old belt.



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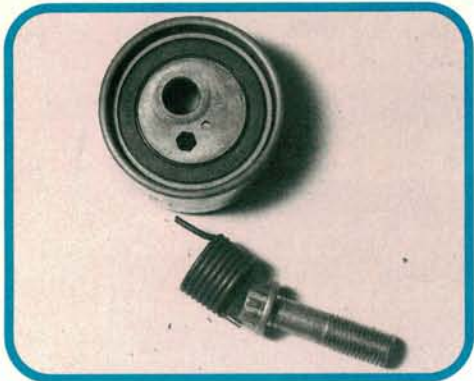
While the old belt didn't look badly frayed after more than 60,000 miles, it had stretched quite a bit. We could twist the belt better than a quarter turn by grabbing the long side of the belt between the crank and cam sprockets. The belt tensioner doesn't adjust belt tension as the belt wears.



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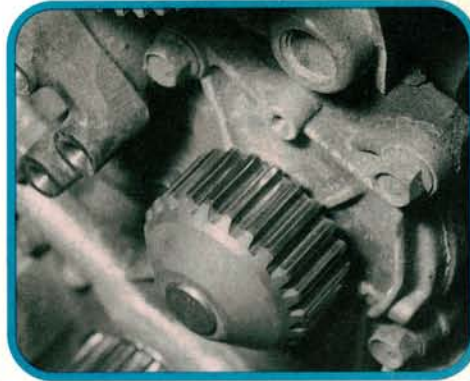
Loosen the twelve point belt tensioner bolt. Relieve the timing belt tension either by pushing on the long side of the belt, or by rotating the spring loaded tensioner clockwise using an Allen® socket. Tighten the tensioner bolt, then remove the old timing belt.

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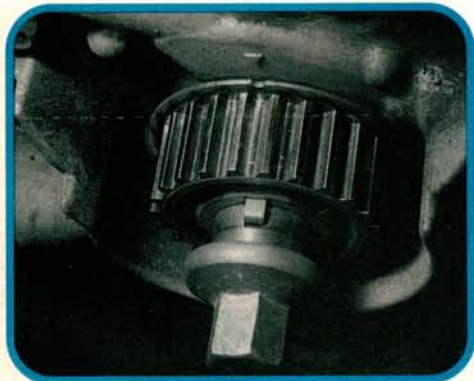
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We cleaned the tensioner and checked its condition. We also cleaned the tensioner mounting surface on the block to assure free tensioner movement. The tensioner spring's longer tab fits into the block. The spring moves the tensioner, but final belt tension is adjusted by turning the tensioner hex.



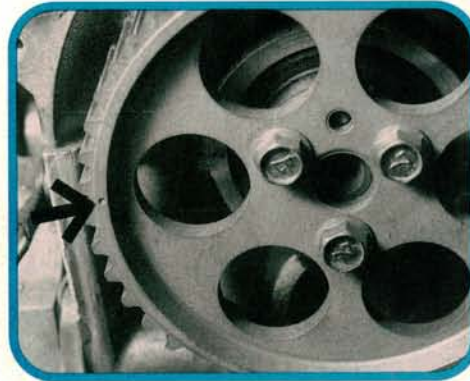
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Depending on the vehicle mileage, the water pump may fall into the "while you're at it" category. The pump is driven by the timing belt and would sure mess up the new belt if the pump decided to leak a short time later. A seized pump could also cause internal engine damage. It's your decision.



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More preventive maintenance. Check the condition of the front crank seal and replace it if necessary. Make sure that any debris from the old belt is cleaned out of the crank sprocket teeth. Line up the crankshaft sprocket notch with the triangle pointer that's cast into the front cover.



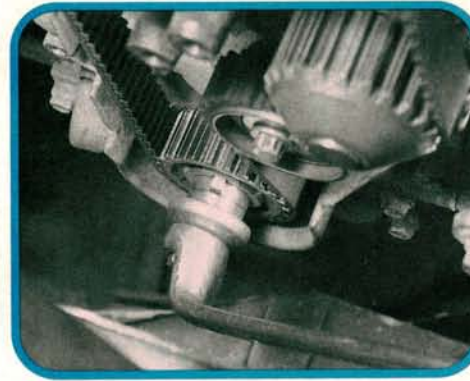
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The same goes for the camshaft seal. You won't get an easier chance to replace it. Torque the cam sprocket bolts to 10 Nm (86 in-lb), then line up the small dot on the camshaft sprocket with the top surface of the cylinder head (arrow). The cam sprocket dowel pin should still be at 12 o'clock.



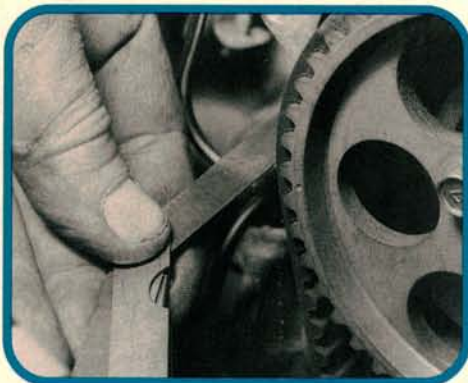
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Turn the tensioner clockwise, then tighten the lock bolt. Install the new belt with the manufacturer's name facing you. Keep the slack on the tensioner side of the belt and don't move the camshaft or crankshaft sprocket. Loosen the tensioner bolt to remove the belt slack, then retighten the bolt.



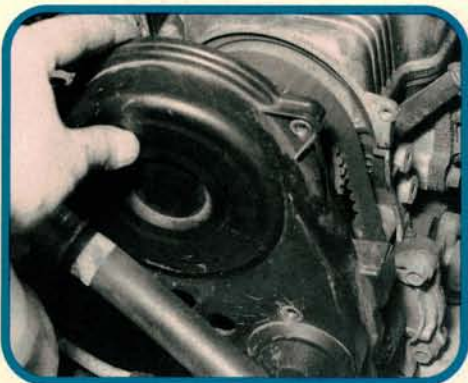
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Use the crank pulley bolt to rotate the crankshaft counterclockwise through two complete crankshaft revolutions. This equalizes the belt tension all the way around the belt. It's also a good way to make sure no internal engine parts are going bump in the dark before we crank the starter.



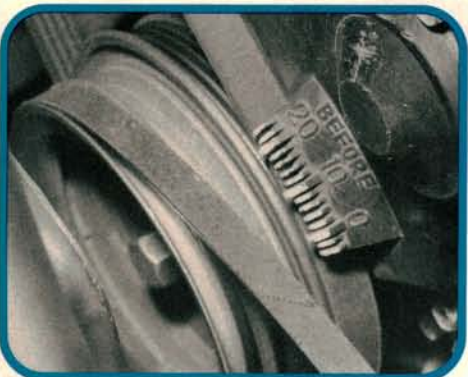
17

Line up the cam and crank sprocket timing marks. We used a feeler gauge blade edge to recheck the cam sprocket timing mark. Belt tension must be adjusted by feel because there is no room for a belt tension gauge. Tension is properly adjusted when the long side of the belt can be twisted a quarter turn.



18

Torque the tensioner bolt to 50 Nm (37 ft-lb), then reinstall the timing belt cover and crankshaft pulley. Lock the crankshaft, then torque the crankshaft pulley bolt to 147 Nm (108 ft-lb). Lower the engine, then reinstall the motor mount bolts, rear torque rod, and drive belts.



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Don't forget to check the timing. If the timing was adjusted before the old stretched timing belt was replaced, you'll probably need to readjust it now. Check the engine compartment for any hoses or harness connectors that may have been disconnected while the engine was jacked out of its normal position.